

**P1200A Mainframe
C- and E-Series Systems,
MAX/MAX12
User Manual**

References in the manual

WARNING!

This refers to a potentially dangerous situation which may lead to personal injury.

CAUTION!

This refers to a potentially dangerous situation which may lead to damage to the equipment.

IMPORTANT!

This refers to a situation which may cause the equipment to malfunction.

Symbols on the equipment



Please refer to the information in the operating manual.



WARNING! Dangerous voltage!

General Information

P1200A, C-Series & E-Series Systems, MAX/MAX12 User Manual
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The information presented in this document is, to the best of our knowledge, correct. We will however not be held responsible for the consequences of any errors or omissions.

Technical specifications, weights and dimensions should always be confirmed with d&b audiotechnik AG prior to inclusion in any additional documentation.

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Safety precautions

Before you use our products, read the manual carefully and observe all the safety precautions. They will protect you and help to avoid equipment failures. Keep this manual in a safe place so that it is available for future reference.

If you supply d&b products, please draw the attention of your customers to these safety guidelines. Enclose the relevant manuals with the systems. If you require additional manuals for this purpose, you can order them from d&b .

Information regarding use of the P1200A mainframe

The mainframe complies with the electromagnetic compatibility requirements of EN 50082-1 - residential, business and commercial areas.

CAUTION!

Acoustic interference and malfunctions may occur if the unit is operated in the immediate vicinity of high-frequency transmitters (e.g. wireless microphones, mobile phones, etc.). Damage to the mainframe is unlikely, but cannot be excluded.

To meet the EMC requirements, use only shielded cables with properly connected plugs for all signal terminals (INPUT, INPUT LINK, MONO OUT).

The following information is intended to prevent fires and possible electric shocks:

WARNING!

The mainframe is a protective class 1 unit. Make sure that the earth (ground) contact is attached when the unit is in operation. A missing earth (ground) contact may lead to dangerous voltages in the housing and controls.

To reduce the possibility of audible hum the mainframe signal ground (XLR pin 1) to earth (ground) connection has a high impedance. It will prevent the unit from static charge but any voltage applied to signal ground will pass through all connectors. To prevent electric shock, make sure that all devices in the signal path are grounded properly.

Never connect an amplifier output pin to any other in- or output connector pin or earth (ground). This might damage the mainframe or lead to electric shock.

Lay all cables to and from the unit so that they cannot be crushed by vehicles or other equipment and that no-one can step on them.

Keep dust, moisture, water or other liquids well away from the unit.

Never operate the unit when it is open.

Always disconnect the mains power supply when replacing a defective fuse. Only use the type of fuse listed in the specifications.

Only carry out work specified in this manual and always disconnect the mains power supply.

All other work should be performed by trained service staff, especially in the following cases:

- Mains power cable or plug has been damaged
- Objects or liquids have entered the unit
- The unit is not operating normally
- The unit was dropped or the housing is damaged

Information regarding use of loudspeakers

Never stand in the immediate vicinity of loudspeakers driven at a high level. Professional loudspeaker systems are capable of causing a sound pressure level detrimental to human health. Seemingly non-critical sound levels (from approx. 95 dB SPL) can cause hearing damage if people are exposed to it over a long 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 d&b for assembly and mobile deployment. Pay attention to the correct application and maximum loading capacity of the accessories as specified in our Rigging Accessories Manual.

Ensure that all additional hardware, fixings and fasteners used for installation or mobile deployment 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.

WARNING!

WARNING!

CAUTION!

Only use loudspeakers in the C and E-Series with the P1200A mainframe fitted with the correct controller modules or with a correctly configured E-PAC. The controller monitors cone excursion and voice coil temperature of the drivers. When loudspeakers are operated without the correct controller, in addition to losses in tone, there is a risk of damage to the components. Any defects arising from operation other than those specified in this manual will be excluded from any warranty claims.

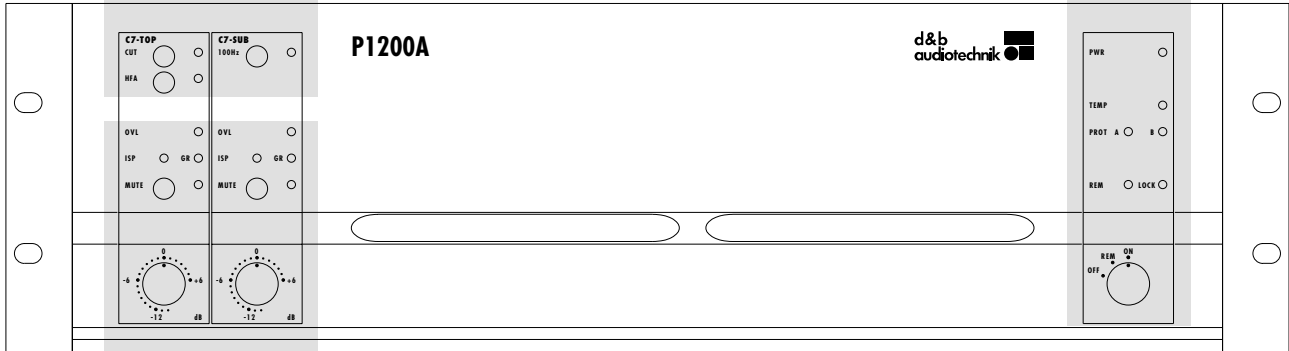
Loudspeakers produce a static magnetic field even if they are not connected or are not in use. Therefore make sure when erecting and transporting loudspeakers that they are nowhere near equipment and objects which may be impaired or damaged by an external magnetic field. Generally speaking, a distance of 0.5 m (1.5 ft) from magnetic data carriers (floppy disks, audio and video tapes, bank cards, etc.) is sufficient; a distance of more than 1 m (3 ft) may be necessary with computer and video monitors.

Configuration switches

These switches depend on the type of loudspeaker. They are described individually for each system in section 4.

Displays and controls of mainframe

These elements are described in section 2.7



Displays and controls of controller modules

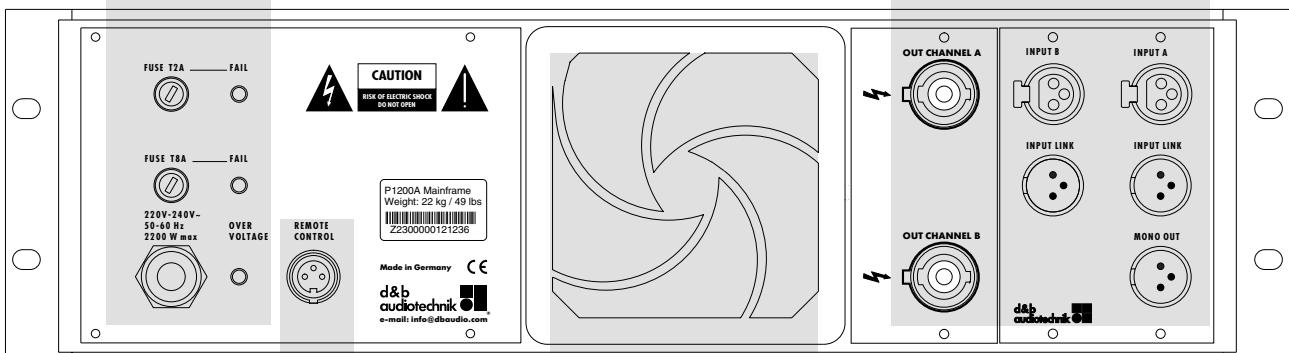
These elements are common to all controllers and are described in section 3.2

Mains input and protection circuits

These are described in sections 2.3 to 2.7

Input and output connectors of mainframe

These elements are described in section 2.8



Connector for remote control

The features of d&b remote control operation are described in section 2.6

Controlled fan

Its function is described in section 2.2.

Contents

Safety precautions

1. Introduction	1-1
1.1. System concept.....	1-1
1.2. C-Series and E-Series system design.....	1-2
1.3. MAX loudspeaker and AMP modules	1-3
2. P1200A mainframe.....	2-1
2.1. P1200A power amplifiers	2-1
2.2. Fan	2-1
2.3. Mains power input and overvoltage protection.....	2-2
2.4. Mains power inrush current limiter.....	2-3
2.5. Fuses	2-3
2.6. Remote control and monitoring	2-3
2.7. Controls and indicators.....	2-5
2.8. Connections	2-6
2.9. Mainframe configurations	2-7
2.10. Controller module exchange.....	2-9
2.11. Mainframe installation	2-11
2.12. Power consumption and power loss.....	2-12
2.13. REMOTE addressing.....	2-13
2.14. Dimensions	2-13
2.15. Technical specifications	2-14
3. Controller modules	3-1
3.1. Features.....	3-1
3.2. Controls and indicators.....	3-2
4. Loudspeaker systems.....	4-1
E3	
E9	
E15-BX	
E18-SUB	
C6/C690	
C6-MON	
C4-TOP	
C4-SUB	
C3	
C7-TOP	
C7-SUB	
MAX	
MAX12	
5. System operation.....	5-1
5.1. Setting up/stacking the loudspeakers	5-1
5.2. Wiring	5-2
5.3. Using the P1200A MONO OUT.....	5-5
5.4. Level setting of mid/high and SUB systems	5-6
6. Troubleshooting	6-1
7. EU declaration of conformity (CE symbol).....	7-1

1. Introduction

This user manual describes the facilities and functions of d&b Systems which are operated with the P1200A mainframe. It covers the operation of the mainframe, the controller modules and the loudspeakers used in these systems.

d&b publishes additional application and technical information notes (TI). Examples for different applications and combinations of C-Series and E-Series systems are given in TI 326.

1.1. System concept

All d&b loudspeaker systems are designed to meet the following criteria :

- Consistent neutral sound over the full working dynamic range
- Ease of operation
- Simple set up and wiring
- Safe and reliable operation
- Compact design

In order to satisfy these demands d&b developed a complete system concept incorporating the loudspeaker, the loudspeaker specific control electronics (the controller) and the power amplifier.

Fundamental to the performance of the loudspeaker is the care taken in the development of individual components resulting in well controlled dispersion, high efficiency and excellent dynamic response.

The controller creates the optimum mix of output level capability, operating reliability and longevity, and pure sound quality. Protective circuits continuously model the loudspeaker load through simulation of cone displacement and voice coil temperature ensuring signal level is only reduced when necessary to prevent driver damage. No signal compression takes place within the systems normal operating range and there is no dynamic manipulation of system frequency response enabling most applications and acoustic environments to require no additional signal processing.

The power amplifier and control for each loudspeaker are housed within the A1 and P1200A mainframes or the E-PAC power amplifier controller. All systems are compatible, easily combined and complementary, and can be accessed using the d&b remote control system to allow overview and control over the most complex applications.

1.2. C-Series and E-Series system design

The C and E-Series feature a range of compact loudspeaker models which cover nearly every sound reinforcement application.

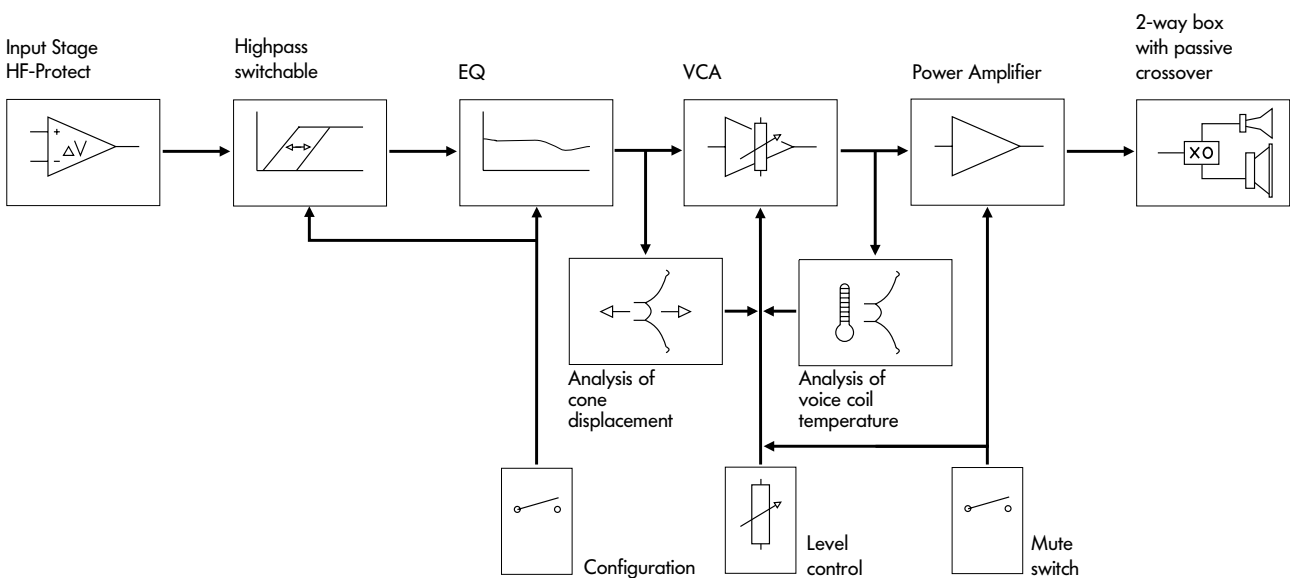
All these systems are operated with a related controller module fitted in a P1200A mainframe or with a suitably configured E-PAC. The loudspeakers are designed in such a way that they develop their maximum efficiency when operated with their respective controllers.

The two power amplifiers in the P1200A mainframe can each deliver 600 W into a 4 ohm load and each mainframe can house two controller modules - one per mainframe output. Each output will normally drive up to two cabinets. With E3 cabinets, up to four loudspeakers can be driven per channel.

Installing two identical modules in a single mainframe creates a stereo subwoofer or mid/high system depending on the modules used. Alternatively, single mainframes can be fitted with different modules to create a single channel TOP/SUB system. The modular nature of these mainframe systems allows later expansion and/or reconfiguration.

E3, E9, C6 and C7-TOP are full range speakers with two passively separated drivers. The product range is graded according to dispersion characteristics, maximum sound pressure and size.

In the high frequency range they all have CD dispersion characteristics. CD is the abbreviation for "Constant Directivity" and means that the dispersion angle of the systems does not vary with frequency. CD characteristic is a practical consideration for operating several loudspeakers in a cluster arrangement. To simplify arraying, C and E-Series cabinets have precisely angled rear side walls defined according to the cabinets' horizontal coverage.



Block diagram of a typical C or E-Series system

Depending on the level requirement, the full range systems can be supplemented by various active subwoofer systems. These systems are designated as -SUB. The active cross-over network is located in the related controller module.

The C4-TOP occupies a special position among the C and E-Series cabinets. It is generally operated with an additional subwoofer system.

All the loudspeakers in the C and E-Series feature cabinets made from marine plywood. They are coated with an impact resistant paint. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a acoustically transparent foam.

The cabinets can be deployed in a number of ways, via threaded inserts, stands and mountings for "flying" and the construction of clusters. A complete range of accessories is also available. We would like to refer in this respect to the d&b "Rigging accessories" manual which describes the different installation applications of the loudspeakers.

1.3. MAX loudspeakers and AMP modules

MAX is a versatile passive loudspeaker, basically designed for stage monitor use. MAX can be used with almost any high-quality power amplifier. When operated with a d&b P1200A fitted with an ampMAX controller module, MAX cabinets can be used in a range of additional applications such as two-way active monitor, front of house system or beneath a flown C4 system as downfills.

ampMAX is a two channel controller module and occupies both of the P1200A module slots. In its standard, passive configuration ampMAX provides two linear amplifier channels. ampMAX also incorporates additional switches to specifically configure a mainframe for use with MAX systems.

The AMP-L module occupies a single P1200A module slot and provides a single linear amplifier channel with a switchable highpass filter (CUT). This module is used to drive MAX cabinets or other passive loudspeakers while the second P1200A module slot is occupied by a d&b TOP or SUB controller module.

2. P1200A mainframe

The P1200A mainframe is housed in a 3 rack unit high, 353 mm (13.9") deep, 19" rack mount enclosure. Included in the mainframe are power supplies for the controller modules and mainframe electronics, two power amplifiers, monitoring and protection circuits and the associated display elements.

C-Series and E-Series loudspeaker specific controller modules may be installed in either of the two mainframe module slots. The P1200A mainframe can also be fitted with AMP-L or ampMAX input modules and configured as a conventional stereo amplifier.

All mainframe facilities and functions and those of the controller modules can be remotely interrogated and altered via the d&b Remote Interface Bridge (RIB).

2.1. P1200A power amplifiers

The two P1200A mainframe power amplifiers can each deliver 400 W continuous sine wave output power into an 8 ohm load. With a 4 ohms load, the output power increases to 600 W continuous sine wave. Both these output figures remain valid for at least 30 minutes of operation at ambient temperatures below 24°C (75° F).

A P1200A will normally be operated with speech or music programme, complex signals where the average power requirement is below peak power. The P1200A will continue to operate indefinitely even where the signal has a very low peak to RMS ratio (Crest factor, see section 2.12.), provided the device is installed to enable the heat generated to be adequately dissipated.

2.2. Fan

A fan draws in air through a filter behind the rear panel air intake. The fan speed is governed by the temperature of the output module heat sink and the momentary output level. This arrangement ensures a minimum of fan noise since the fan operates at minimum speed when power demand is low.

The level controlled fan allows greater cooling during louder passages, thereby allowing fan speed to be reduced still further during quiet passages preventing background noise interference.

We advise frequent cleaning of the fan filter to ensure good airflow through the unit. If the filter is visibly dirty, then it should be cleaned or replaced. Never operate the P1200A without a filter. Dust deposits, especially combined with damp conditions, could cause the mainframe to malfunction.

When setting up the mainframe, do not block or cover the rear panel air intake or the vents on the front panel of the mainframe. See also section 2.11. (Mainframe installation).

IMPORTANT!

2.3. Mains power input and overvoltage protection

To protect against mains power overvoltage damage the P1200A is fitted with an efficient, self-resetting overvoltage protection circuit.

The nominal mains power voltage for the standard version is 230 V (50 - 60 Hz). As soon as the mains supply voltage exceeds 265 V the overvoltage protection circuit responds and isolates the mainframe power supply from the mains power supply leaving only a supervisory circuit active to monitor the mains supply voltage. The green POWER LED on the mainframe front panel goes out and the overvoltage LED on the mainframe rear panel comes on.

Only if the mains voltage drops below 255 V is the mainframe automatically reconnected to the mains supply and normal operation resumed. This 10 V (approx. 4 %) difference in the protection circuit switching levels (switching hysteresis) prevents the mainframe from cycling on and off with a fluctuating mains power supply voltage.

The protection circuit will operate with any overvoltage up to 400 V; allowing the P1200A to survive connection across two phases of a three phase mains power supply.

Note that repeatedly and rapidly occurring on and off switching due to overvoltages may trigger the fuse of the mains inrush current limiter circuit.

Option 100 V mains voltage

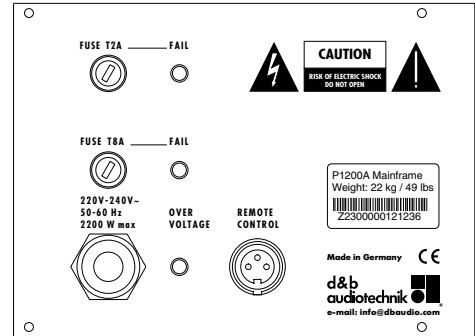
With the 100 V option the overvoltage threshold is at 115 V. When the voltage drops below 111 V the mainframe switches on again.

Option 115/230 V variable mains voltage

This version includes an automatic adaptation for the 115 V and the 230 V mains power voltage range (50 - 60 Hz each). The voltage supervisory circuit not only monitors overvoltage but also under voltage. In either case the mainframe power supply will be isolated from the mains power supply (the green POWER LED goes out) leaving only the supervisory circuit active. The different voltage ranges are listed in the table at the right.

The supervisory circuit is equipped with a time delay and a switching hysteresis (4 % difference between thresholds for switching on and off). This provides stable operation even with a fluctuating mains supply voltage.

The protection circuit will operate with any mains power overvoltage up to 400 V.



P1200A mains power input and fuses

Voltage	Status	OVER VOLTAGE LED
0 - 98 V	Undervoltage	off
98 - 132 V	115 V operation	off
132 - 195 V	Undervoltage	off
195 - 265 V	230 V operation	off
265 - 400 V	Overvoltage	on

Voltage ranges with 115/230 V option

Version	Fuse for inrush current limiter	Fuse for transformer
230 V	2 A Time Lag (T)	8 A Time Lag (T)
100 V	5 A Time Lag (T)	16 A Time Lag (T)
115/230 V	8 A Time Lag (T)	8 A Time Lag (T)

Mainframe fuses

CAUTION!

2.4. Mains power inrush current limiter

The mains inrush current limiter ensures a slow "start-up" for the mainframe and allows several mainframes connected to the same mains supply circuit to be switched on together without temporarily overloading the supply circuit. The inrush current at switch on is limited to 5 A (10 A at 115 V and 100 V version).

Note that repeatedly and rapidly switching a mainframe on and off will stress the inrush current limiter circuit - a rear panel fuse protects the circuit from damage.

2.5. Fuses

Two fuse carriers are fitted on the mainframe rear panel - the upper fuse protecting the mains power inrush current limiter and the lower fuse for the mainframe power supply. If either fuse should fail then the red LED (FAIL) indicator next to the respective fuseholder will light.

If one of the fuses has failed disconnect the P1200A from the mains supply before replacement. Only use a fuse of the correct type and nominal current value. Both are 20 mm fuses, the values are printed on the mainframe rear panel above the respective fuse carrier. Before restoring power to the mainframe all cabling should be checked for faults. If in any doubt disconnect all signal and loudspeaker connections.

2.6. Remote control & monitoring

The P1200A is fitted with a remote interface for various levels of remote control and system supervision of the mainframe and its controller modules. The remote interface connection is opto-coupled and floating.

Basic-Remote

The Basic Remote is the simplest way to implement a remote control system. A mainframe can be remotely powered on by simply applying an 18 - 28 VDC control voltage to the terminals of its remote interface connector. Connecting a simple detector circuit to the remote interface of a mainframe also allows remote warning of a mainframe fault.

Details of basic circuits for remote power control and fault display are published in d&b technical information bulletin TI 212, available on request.

Control by the d&b Remote Interface Bridge (RIB)

The d&b RIB is a 19" rack mount device, 1 rack unit high. Up to 12 mainframes (A1 or P1200A) or E-PACs at distances up to 500 m (1650 ft) can each be directly connected via a twin wire to a RIB I/O port. From the front panel of the RIB each device can then be remotely powered on and off and its power and error status monitored. A group of E-PACs or mainframes can be switched directly by the RIB front panel MASTER ON/OFF switch or remotely via a connection to an opto-coupled input port on the rear panel of the RIB. Remote indication of the error status of a mainframe group can also be relayed by the RIB.

Computer/MIDI control

Using a PC and the d&b ROPE control software or a MIDI control device, up to eight RIBs can be controlled via RS232, RS422 or MIDI interface. The following remote control and display options become available:

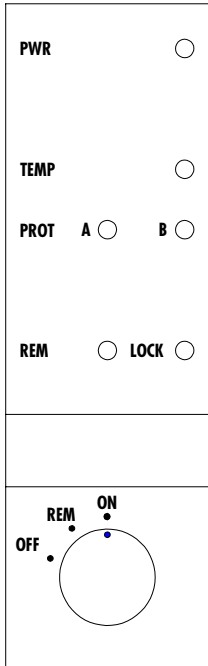
Remote control

- Power On/Off switching of mainframe
- Level control from +6 to -57.5 dB in 0.5 dB steps.
- MUTE switching
- Configuration switching e.g. CUT, MON, etc.

Remote status information

- Configuration switch status
- Mute switch status
- Level control setting
- Front panel indicator status (ISP, GR, OVL etc.)
- Protect status (internal protect, short circuit protect, thermal protect)
- Temperature status (ok/warning/off)
- Available headroom (pre-limiter)
- Gain reduction (due to limiter operation)

A detailed description of remote control with the d&b RIB is given in the RIB user manual (d&b code D2903.E). The P1200A object addresses for programming are to be found in section 2.13.



P1200A front panel

2.7. Controls & indicators

PWR - Power (green)

- **Lights continuously** when the mainframe is switched on and ready for use.
- **Off.** The mainframe is not powered from the mains supply, the mains overvoltage protection has triggered (see 2.3.) or the mainframe is not switched on.
- **Flashes** during the initial power-up cycle for about 2 seconds and also when the mains overvoltage protection circuit is triggered by an external fault (see also PROT below).

TEMP - Temperature (red)

- **Flashes.** The mainframe has switched off because the maximum permissible operating temperature of the power amplifier heatsink (83° C / 180° F) or the mains power transformer (120°C / 250° F) has been exceeded.

PROT - Protect (red)

As the two mainframe power amplifier channels operate independently there are two separate PROT indicators.

- **On and PWR LED is on.** An internal fault has been detected on the mainframe channel concerned (e.g. DC voltage fault in the output stage).
- **On and PWR LED flashes.** The respective power amplifier has switched off due to an external fault like a short circuited loudspeaker cable or too low a load impedance overloading its output. Once the cause of the fault has been identified and removed either muting and unmuting the controller module or powering the mainframe off and on again will reset the protection circuit.

REM - Remote (green)

- **On.** Communication to the RIB.

LOCK (yellow)

- **On.** The mainframe has been placed in a locked condition by the remote control system. This means that all the mainframe and controller module controls with the exception of the mains switch are inactive (locked out).
- **Off.** The P1200A mainframe is set to local operation, i.e. may be operated using the front panel controls.

OFF/REM/ON (mains power switch)

- **OFF.** With the exception of the mains overvoltage protection circuit, the mainframe is isolated from the mains supply.
- **REM.** The mainframe is set to remote operation. If no remote control system is connected this setting is equivalent to OFF.
- **ON.** The mainframe is switched on. In this switch position, the remote control system can monitor and display the operational status of the mainframe but cannot change any settings.

2.8. Connections

INPUTS A/B and INPUT LINK

Each of the two mainframe channels has its own 3 pin XLR female input connector. Below and wired in parallel with each input connector is a 3 pin male XLR input link connector used to feed the input signal on to the next device in the system signal chain.

INPUT A relates to the left hand controller module, INPUT B to the right hand module (front view).

MONO OUT

In a P1200A, the two input signals of INPUT A and INPUT B are combined, electronically balanced and buffered. This signal is then routed to the rear panel MONO OUT connector.

The signal level at the MONO OUT connector is -3 dB the sum of the mainframe controller module inputs. The 3 dB signal attenuation prevents feedback if the signal routing is incorrect (e.g. if the MONO OUT is routed to a module signal input in the same mainframe).

The MONO OUT signal pins (2 and 3) are disconnected by a relay when the mainframe is powered off. To prevent disruptive noises when switching on the mainframe they are connected after a short delay.

For further information see also section 5.3. (Using the P1200A MONO OUT).

Transformer balanced input (option)

To prevent system ground loops, the P1200A can be supplied with transformer balanced inputs. The transformers used are studio quality toroidal transformers able to handle signal levels up to +28 dBu without degrading the systems low frequency response.

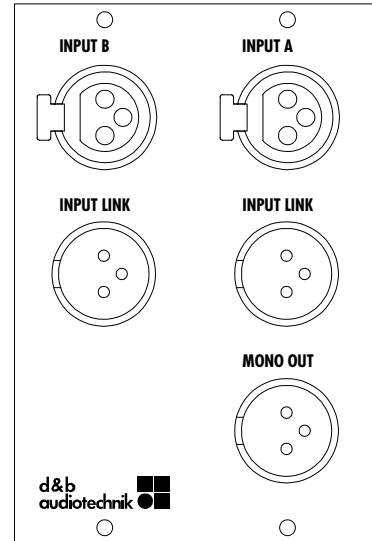
The input balancing transformer gives electrical isolation between the source output (e.g. mixing console) and controller inputs and therefore prevents ground loops. A 22 kohms coupling resistor prevents electrostatic loading of the mainframe.

The P1200A when fitted with input transformers loses the MONO OUT facility.

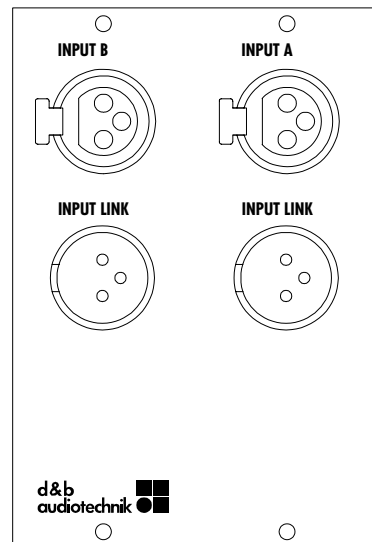
REMOTE CONTROL

The P1200A is fitted with a two-wire serial remote control interface. The 3 pin female DIN remote control connector is located on the left of the P1200A rear panel. The connector is opto-coupled.

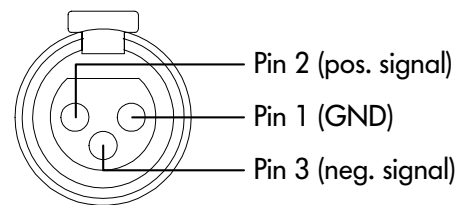
The remote functions are detailed in section 2.6. (Remote control & monitoring).



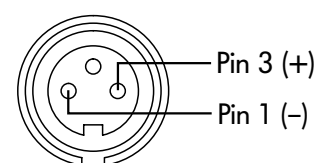
P1200A input signal connectors



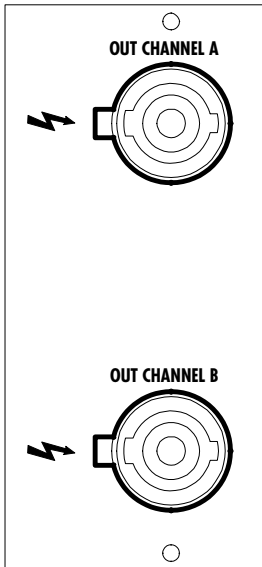
P1200A input signal connectors
-transformer balanced input
option fitted



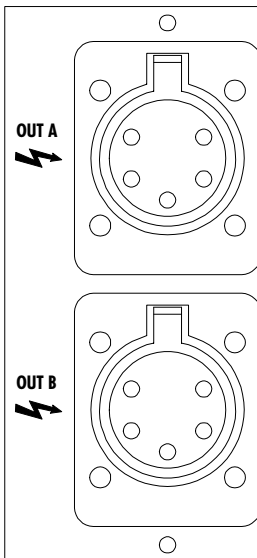
Pin assignments on P1200A signal inputs



Pin assignment for remote
control



Speakon-NL4 connector panel



EP-5 connector panel

	NL4	EP-5
TOP +	1+	1
TOP -	1-	2
SUB +	2+	3
SUB -	2-	4
n.c.		5

Speakon-NL4 and EP-5 pin assignments

OUT CHANNEL A/B (loudspeaker outputs)

The mainframe power amplifier outputs can also be found on the mainframe rear panel. The P1200A is fitted with 4 pin Speakons as standard, EP-5 output connectors are available as an option. All C-Series and E-Series loudspeakers use Speakon connectors as standard.

The Speakon connector pin assignments match the type of loudspeaker used and therefore depend on the controller module fitted to the mainframe (see section 2.9.).

The full range/TOP systems (E3, E9, C6, C7-TOP and C4-TOP) and passive subwoofers (E15-BX) use pins 1+ and 1- of the Speakon connector. Active subwoofers (C4-SUB, C7-SUB, E18-SUB) use pins 2+ and 2-.

Not only do these pin assignments protect full range loudspeakers from being damaged by accidental connection to a mainframe subwoofer output, they also allow full range cabinets and subwoofers to be linked together and connected to a mainframe with mixed controller modules using a single four-wire cable.

AMP-L modules feed pins 1+ and 1- of the speakon connector.

ampMAX modules feed all four pins of both output connectors. However, the type of signal at the different pins depends on the controller set up (active or passive mode; see section 4. MAX).

Pin equivalents for the optional EP-5 mainframe output connectors are listed in the table below.

Each P1200A mainframe output is rated to drive a load impedance of 4 ohms or greater. This means that each output will drive two 8 ohm loudspeakers connected in parallel or, in the case of E3 loudspeakers, rated at 16 ohms impedance, four connected in parallel.

Connecting and driving more loudspeakers will not damage the mainframe but will limit the quality and dynamic range of reproduced sound as the load dips below 4 ohms. Driving low impedance loads at high levels can also trigger the mainframe protection circuits for thermal or output current overload.

2.9. Mainframe configurations

Due to the different pin assignments of subwoofers (SUB) and full range or mid/high (TOP) systems different configurations of the two mainframe module slots are possible.

A given combination of controller modules requires certain slot positions and a corresponding output connector wiring.

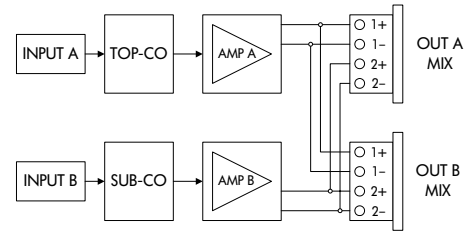
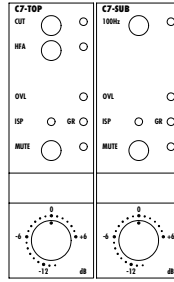
The following overview shows the possible module and output wiring configurations of the P1200A mainframe. AMP-L modules are to be handled like TOP modules.

MIX configuration

TOP-CO - left slot (INPUT A)

SUB-CO - right slot (INPUT B)

If the P1200A mainframe is fitted with mixed controller modules (a TOP module and a SUB module), then both mainframe power amplifier outputs share both Speakon output connectors - the TOP signal appears on 1+/1- and the SUB signal on 2+/2- of both the mainframe Speakon outputs.

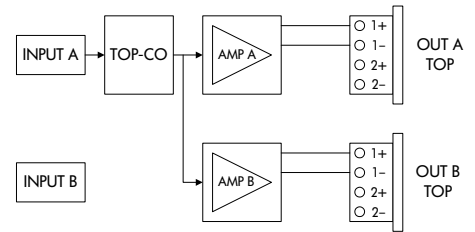
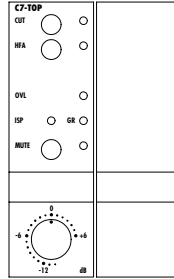


TOP-MONO configuration

TOP-CO - left slot (INPUT A)

MONO-adapter - right slot

One single TOP module is driving both power amplifiers - a special mono-adapter (Z2380) is fitted to the unused module slot and a blanking panel covers the mainframe front slot.

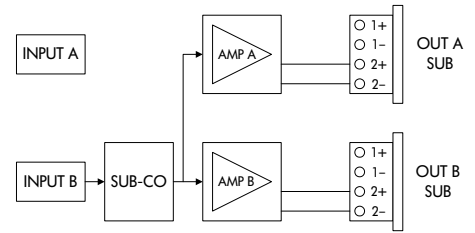
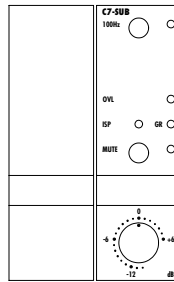


SUB-MONO configuration

MONO-adapter - left slot

SUB-CO - right slot (INPUT B)

Here a single SUB module is driving both power amplifiers - a special mono-adapter (Z2380) is fitted to the unused module slot and a blanking panel covers the mainframe front slot.

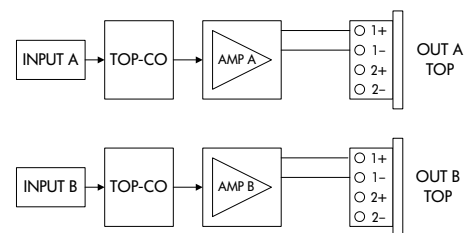
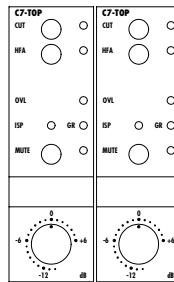


TOP-TOP configuration

left module (INPUT A) - OUT A

right module (INPUT B) - OUT B

If two TOP modules are fitted to a mainframe - each driving one power amplifier channel - then each mainframe power amplifier output is connected to pins 1+/1- of its own output connector.

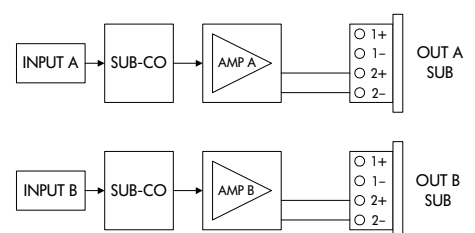
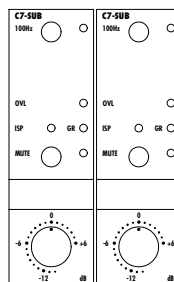


SUB-SUB configuration

left module (INPUT A) - OUT A

right module (INPUT B) - OUT B

If two SUB modules are fitted to a mainframe - each driving one power amplifier channel - then each mainframe power amplifier output is connected to pins 2+/2- of its own output connector.



2.10. Controller module exchange

The modular design of the P1200A allows modules to be easily replaced or exchanged without the need for special adjustment or alignment. However, the mainframe internal output connector wiring needs to be re-configured when swapping a TOP or AMP-L module for a subwoofer module - and vice versa.

The replacement of a controller module requires the exchange of the controller motherboard (board with a number of sub boards mounted at right angles) and the front panel with controls and indicators and - if necessary - the re-configuration of the loudspeaker connector board.

CAUTION!

Make sure the mainframe is configured correctly. If the module positions are swapped or the output wiring is wrong, TOP cabinets could be driven with SUB signal. This can damage the drivers.

The ampMAX module consists of a single, double width front panel and two identical controller cards which automatically configure themselves for Hi/Lo operation when the active mode is selected.

IMPORTANT!

ampMAX modules can only be used with P1200A mainframes from version 11 onwards (Z2300.000.11).

WARNING!

When carrying out the following procedure it is absolutely vital for your own personal safety that the unit is completely disconnected from the mains power supply.

Tools required

- Phillips #1 screwdriver
- 2.5 mm Allen (Hex) key
- screwlock compound (loctite) or lacquer

Controller module disassembly

1. Undo the 6 screws securing the top cover in place and disconnect the safety earth (ground) strap on the underside of the cover before removing it.
2. Remove the bottom cover in the same way.
3. Undo the 2 screws securing the module front panel, pull the front panel forward, unlock and unplug the ribbon cable to the controller module motherboard.
4. Undo the 4 screws securing the module motherboard and remove the modules towards the front of the mainframe. Board B (right hand slot) should always be removed first and replaced last. If board A (left hand slot) is being exchanged then board B needs to be removed first. If only board B is to be exchanged then board A can remain in place.

Controller module reassembly

1. Avoid damage by carefully refitting the controller motherboards - these fit snugly with very little play. On no account force them into place.
2. Secure the controller module motherboard(s) in place using 4 x M2.5x10 screws and apply screwlock compound or lacquer.
3. Re-plug the front module ribbon cable connector ensuring that the connector latches are locked.
4. Secure the front module with 2 x BS2.9x9.5 screws.

5. Check the loudspeaker output wiring (see below). If necessary change the output wiring to suit the new module configuration.
6. Reconnect the safety earth (ground) straps and refit the top and bottom covers (6 x M3 screws per panel).

Ensure that the safety earth (ground) straps to both covers are reconnected. With loose connectors not only is the mainframe housing incorrectly grounded, there is also a risk of a short circuit inside the device.

WARNING!

Loudspeaker output configuration

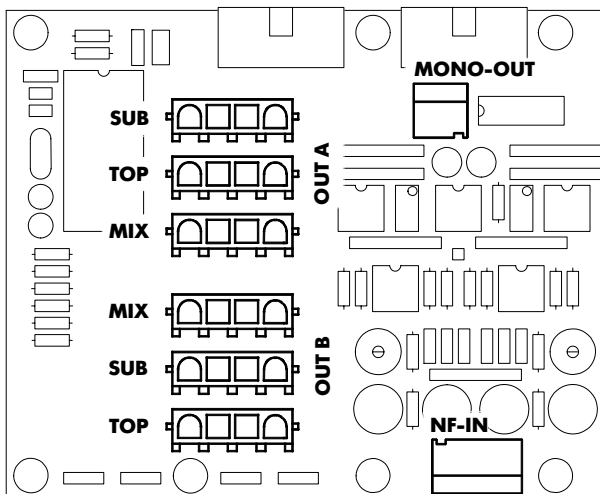
The loudspeaker output connectors are linked to the mainframe power amplifier outputs by 4 pin push on connectors located behind the mainframe loudspeaker connector panel. To reconfigure the speaker output wiring the speaker connector panel needs to be removed. To gain better access to the speaker output board the input signal connector panel can also be removed (6 x M3 screws in total).

Rear panels with speaker connectors using 4 pins (SPEAKON or EP-5) are terminated with two 4 pin push-on connectors. Pressing the sides of the push-on connectors unlatches and releases them from the speaker output board terminals. There are three terminals for each output connector (SUB/TOP/MIX - OUT A and MIX/SUB/TOP - OUT B).

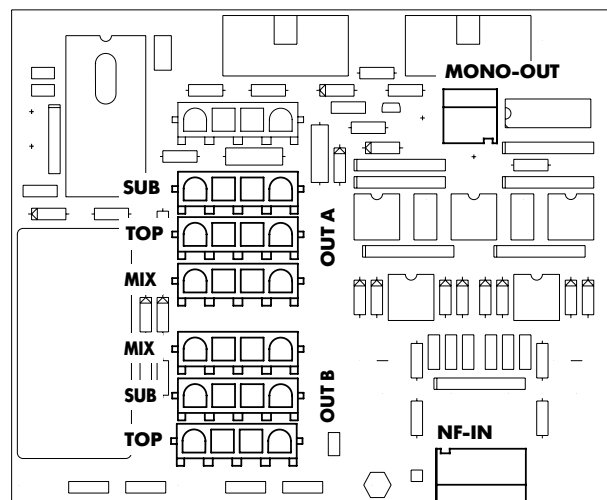
Depending on the choice of controller modules fitted to the mainframe the appropriate terminals are used for the A and B output connector wiring. In the block diagrams in section 2.9. the connector positions appear on the right hand side. Both connectors must go to a terminal of the same type (TOP-TOP, SUB-SUB or MIX-MIX). Note the different arrangement of the sockets for OUT A and OUT B on the connector board.

With ampMAX modules the outputs are connected to the MIX terminals.

XLR speaker output panels have only one 4-pin connector. It is wired to either of the MIX terminals - OUT A or B .



Input-/output-board of mainframe up to version 10



Input-/output-board of mainframe from version 11

2.11. Mainframe installation

P1200A mainframe enclosures are designed to fit a standard 19" equipment rack or cabinet.

The front panel vent slot serves as a useful handle for lifting and moving mainframes in and out of racks. The front panel switches are flush-fitted and the level control(s) and mainframe power switch are recessed to protect them from accidental damage and unintentional adjustment.

When specifying a rack, be sure to allow extra depth (10 cm is usually sufficient) to accommodate the cables and connectors at the rear of the mainframe(s).

When mounting mainframes into a 19" rack cabinet, provide additional support using shelves fixed to the inner sides of the cabinet or the mounting holes provided on the mainframe rear-mounted rack ears - do not just rely on fixing and supporting mainframes by their front panels. This advice is particularly important if mainframes are being racked-up for touring use.

IMPORTANT!

Since the P1200A power amplifiers can generate a lot of heat, please ensure, whatever the mounting or racking arrangement, that adequate cool airflow is provided to avoid a build-up of hot air inside the rack leading to overheating. The P1200A air intake is on the rear panel and the air outlets are set into the front panel.

To maintain good airflow through mainframes we recommend frequent cleaning of the fan filters. If mainframes are installed in cabinets so that direct access to the rear panel filters is not possible, we recommend using additional fan modules with front-mounted filters which can be easily replaced without opening the sealed cabinets. We will gladly advise on the choice of suitable fan modules.

2.12. Power consumption and power loss

The power required from the mains supply and the waste heat produced by the amplifiers power loss are variable figures depending on the load impedance and the signal levels and characteristics (e.g. speech, music).

In practice, the theoretical peak power consumption of a system will only be sustained for a short period of time. Basing mains current and air conditioning plant requirements on the peak power consumption of the sound system would result in a generously over-specified installation. The key factor in power consumption calculations is the crest factor of the music signal or speech signal - the ratio of peak to sustainable RMS voltage of the signal.

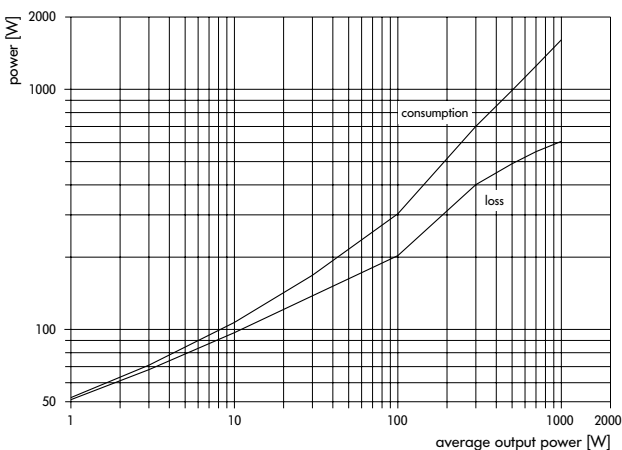
The above table gives power figures for various types of signal waveforms. The figures were measured on a P1200A driving 4 ohms loads (both channels) to the clipping point of both mainframe power amplifiers.

Power input and thermal power loss as a function of average output power for sine wave and pink noise signal waveforms can also be derived from the two graphs shown below (Note that pink noise signal reaches the clipping point of the amplifiers at approx. 200 W average output power).

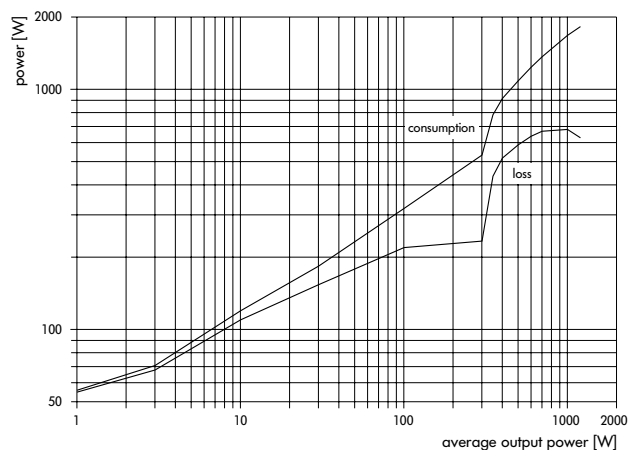
Signal waveform	CF	P _{out} [W]	P _{in} [W]	P _{loss} [W]
Square wave	1	1900	2600	700
Sine wave	1.4	1200	1830	630
Pink noise, compressed music	3.5	200	500	300
Music with medium dynamic range	5	100	300	200
Speech, music with wide dynamic range	8	40	200	160

- CF : Crest factor
P_{out} : Maximum average output power (sum of both channels)
P_{in} : P1200A power input
P_{loss} : P1200A power loss

P1200A Power balance



Average power consumption and loss of P1200A as a factor of output power with pink noise signal (load impedance 4 ohms, both channels driven, sum of output power of both channels)



Average power consumption and loss of P1200A as a factor of output power with sine wave signal (load impedance 4 ohms, both channels driven, sum of output power of both channels)

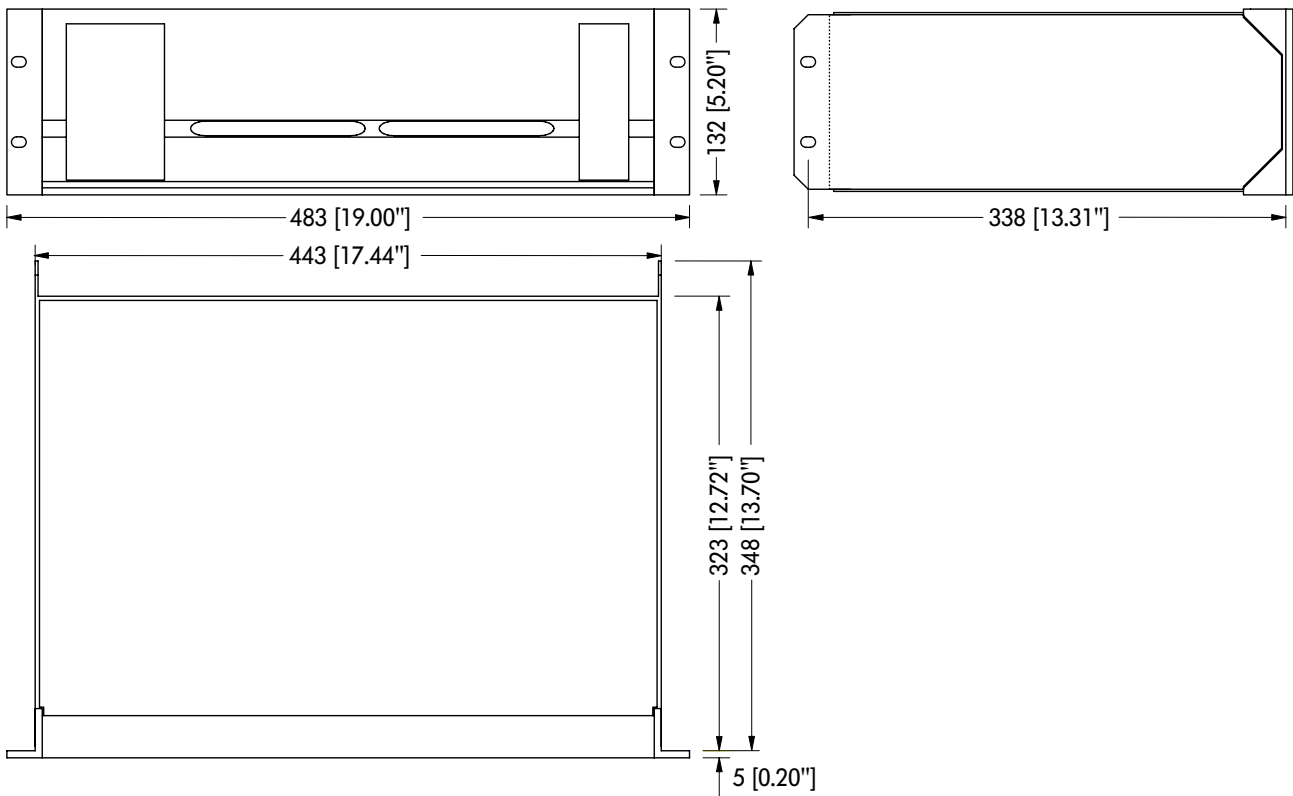
2.13. REMOTE addressing

The structure of the P1200A object addresses in the d&b RIB is identical to the A1 and E-PAC addresses.

Address	Read/Write	Object	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	RD	Status Base Device		Gnrl-Error	SW-Rem	LockCmd	LockMode	PWR Ok	PWR On
0	WR	Status Base Device				LockCmd			PWR On
2	RD/WR	Potentiometer A	Attenuation in steps of 0.5dB, 7-bit coded (0=+6dB, 127=-57.5dB)						
3	RD/WR	Switch Settings A	MUTE				Switch 3	Switch 2	Switch 1
4	RD/WR	Potentiometer B	Attenuation in steps of 0.5dB, 7-bit coded (0=+6dB, 127=-57.5dB)						
5	RD/WR	Switch Settings B	MUTE				Switch 3	Switch 2	Switch 1
8	RD	Errors Base Device		Tmp Error	Tmp Warn	AMP Prot. B	AMP Prot. A	AMP Error B	AMP Error A
10	RD	Output Signal						Present B	Present A
12	RD	LED's Controller A	ISP	GR	OVL				
13	RD	Headroom/GainRed A	0..63:Headroom, 64..127:GainRed, 7-bit coded (0=32dB Hdrm, 64=0dB, 127=31.5dB GR)						
14	RD	LED's Controller B	ISP	GR	OVL				
15	RD	Headroom/GainRed B	0..63:Headroom, 64..127:GainRed, 7-bit coded (0=32dB Hdrm, 64=0dB, 127=31.5dB GR)						

P1200A object addresses for remote operation with the d&b RIB

2.14. Dimensions



P1200A enclosure dimensions mm [inch]

2.15. Technical specifications

Nominal output power..... 2 x 400 watts - 8 ohms
 (THD+N < 0.1%, both channels driven)2 x 600 watts - 4 ohms
Frequency response (-1 dB)..... 10 Hz ... 40 kHz
 measured at rated output power, both channels driven
Distortion (THD+N)..... < 0.06 %
 from 0.1 W to rated output power, 20 Hz ... 20 kHz
Intermodulation distortion (SMPTE)..... < 0.03 %
 from 0.1 W to rated output power
Residual noise..... > 110 dB
 below rated output power, 22 Hz ... 22 kHz, unweighted, RMS
Damping factor at loudspeaker output..... > 50
 20 Hz - 20 kHz, 4 ohms load
Crosstalk< -55 dBr

Protection circuits

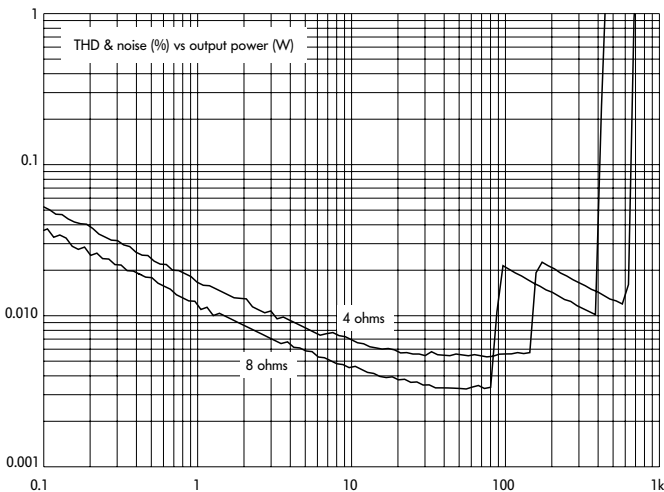
Mains inrush current limiter..... 5 A
 Switch-on delay..... < 2 s
 Overvoltage, DC output, overtemperature and short circuits

Connections

INPUT..... XLR 3-pin female
 Pin assignments..... 1 = GND, 2 = pos. signal input, 3 = neg. signal input
 Input impedance..... 44 kohms
 electronically balanced (transformer balanced optional)
INPUT LINK.....XLR 3-pin male
 parallel to input
MONO OUT.....XLR 3-inl. male
 balanced, minimum output load impedance600 ohms
OUT CHANNEL A/B.....Speakon-NL4 (EP-5 optional)
 Pin assignments for full range speakers and passive subs.....1+ / 1- (EP-5: 1/2)
 Pin assignments for active subwoofers.....2+ / 2- (EP-5: 3/4)
REMOTE CONTROLDIN 3-pin, 1 = - / 2 = n.c. / 3 = +

General

Height x width x depth..... 3 rack unit x 483 mm (19") x 353 mm (13.9")
 Weight with 2 modules fitted 22 kg (48.5 lbs)
 Mains voltage (min/nominal/max) 195 / 230 / 265 V / 50 - 60 Hz
(additionally with 115/230 V version: 98 / 115 / 132 V / 50 - 60 Hz)
(100 V version: 85 / 100 / 115 V / 50 - 60 Hz)
 Fuses..... 1 x 2 A Time Lag (T), 1 x 8 A Time Lag (T)
(115/230 V version: 2 x 8 A Time Lag (T))
 (100 V version: 1 x 5 A Time Lag (T), 1 x 16 A Time Lag (T))



3. Controller modules

The controller modules include all the signal processing electronics, front panel controls and indicators needed to control and operate a specific matching loudspeaker system.

The P1200A mainframe can be fitted with two controller modules with each module normally driving one of the two mainframe power amplifiers. The two mainframe power amplifiers can also be driven by a single controller module e.g. for a four cabinet mono subwoofer system. However a special mono module needs to be inserted in the unused controller module slot.

The controller module modifies the frequency response and the maximum output level of the mainframe to suit the characteristics of its matching loudspeaker. A loudspeaker driven with a non-matching controller module will produce a corrupted sound and there will be a risk of damage to the loudspeaker components.

3.1. Features

Input circuit

A balanced and band-limited input circuit protects the system against out-of-band signals and radio frequency interference.

Equalisation

Equalisers match the relative levels of the high and low drivers used in full range cabinets and ensure the linear frequency response of the loudspeaker system. Some controller modules are fitted with additional configuration switches to give the user a degree of control over the system frequency response.

Highpass filter

A highpass filter circuit fine tunes the bass-reflex loudspeaker enclosures used in these systems and also helps to maintain a linear low frequency response while protecting the loudspeakers from extreme sub bass signals.

Crossover filters

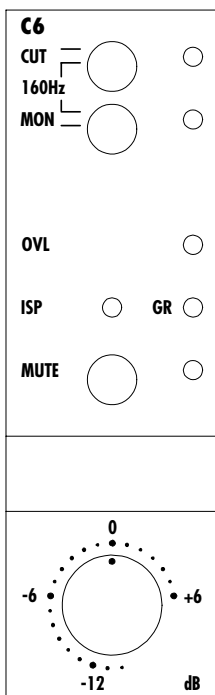
The controller modules for the subwoofer systems incorporate a lowpass filter as an active crossover to a full range/TOP system. Conversely, the full range systems have a switchable highpass filter for use with an additional subwoofer system.

Thermal limiter

An internal control circuit simulates the loudspeakers voice coil temperatures under the actual load conditions. The output of this circuit is used to protect drivers by reducing the signal level when critical temperature values are reached.

LF displacement limiter

A second internal control circuit simulates the mechanical displacement of the LF driver cone and reduces the signal level before over-exursion damage can occur.



C6 controller front view

Clipping limiter

To maintain sound quality output stage clipping is kept within reasonable bounds by a limiter circuit. The limiter threshold alters to take account of the supply voltage to the mainframe power amplifiers. So if the mains supply voltage or the connected load impedance alter, then the limiter automatically tracks these changes to maintain the system sound quality.

3.2. Controls and indicators

This section describes the controls & indicators common to all P1200A controller modules. Loudspeaker specific controls and indicators are explained in the sections dealing with the respective loudspeakers.

OVL - Overload (red)

- **Illuminates** when an overload occurs in the signal path (input signal too high)
- **Illuminates** when the amplifier gain is reduced because the output current is too high (e.g. due to a short circuit).

ISP - Input Signal Present (green)

- **Illuminates** when the controller input signal exceeds -36 dBu. The ISP circuit is unaffected by the setting of the controller mute switch and level control.

GR - Gain Reduction (yellow)

- **Illuminates** when the controller limiters reduces gain by more than 3 dB.

MUTE (red)

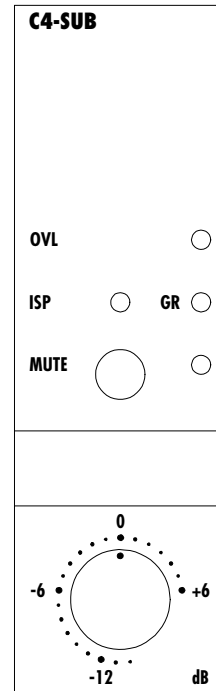
This switch mutes the system output without having to alter any of the system level settings. The mute circuit acts by electronically disconnecting the mainframe power amplifier output. The red LED next to the MUTE switch illuminates to verify that the switch has been selected.

If cabinets used in an array are muted, the movement of the loudspeaker cones in those cabinets is no longer damped by the influence of the mainframe power amplifier output. The removal of damping to some drivers in an array makes them susceptible to excitation by the other loudspeakers in the array. Audible resonances may occur, and even absorption of low frequency sound energy as the undamped loudspeakers act like a 'bass trap'. To permanently mute single cabinets of an array it is therefore preferable to turn down or disconnect the input signal of the corresponding controllers instead of using the MUTE switch.

When the mainframe is connected to the d&b remote control system (d&b RIB and PC) it is possible to use the minimum input gain setting (-57.5 dB) instead of the MUTE function.

Level control

The detented level control adjusts the controller input sensitivity and has a 20 dB range, -14 dB to +6 dB, calibrated in 1dB steps. The level control is normally set to 0 dB.



Standard controls on C4-SUB controller module

IMPORTANT!

4. Loudspeaker systems

On the following pages you will find data sheets for the d&b loudspeakers which can be operated with the P1200A. The data sheets contain information about the loudspeakers and operation with their respective P1200A and E-PAC controller settings.

4.1. Data sheets for the loudspeakers

The following data sheets are a compilation of the individual data sheets for the d&b loudspeakers. Please note that the version number for the individual data sheets, shown as a footnote on the respective pages, can differ from the version number of this manual.

E3

E9

E15-BX

E18-SUB

C6/C690

C6-MON

C4-TOP

C4-SUB

C3

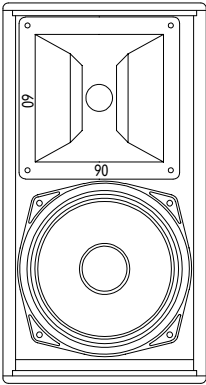
C7-TOP

C7-SUB

MAX

MAX12

E3



The E3 cabinet is a full range, two way bass-reflex enclosure. Fitted with a single 6.5" LF driver passively connected to a 1" HF compression driver coupled to a constant directivity horn with a 90° x 60° dispersion. Illustrated in the drawing on the left is an E3 with the standard 90° horizontal horn configuration. The horn can be rotated through 90° for a reversed 60° x 90° (h x v) dispersion.

The E3 cabinet is constructed from marine plywood with an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. A connector plate with two parallel wired Speakon connectors, which can be swapped between the rear and side of the cabinet, together with pairs of M8 threaded inserts for mounting brackets on each panel allow the E3 to be mounted in almost any position.

The outstanding feature of the E3 is its neutral sound balance coupled with an extraordinarily high output capability for a cabinet of such a size. The E3 frequency response covers a 80 Hz to 17 kHz band making it extremely versatile and ideal for use in near field, delay, effects, ultra compact monitor and miniature array systems. Used with an auxiliary subwoofer system, the E3 can also easily reproduce high level music programs. Suitable subwoofers are E12-SUB, E18-SUB or C7-SUB.

With an asymmetrical cabinet design and an extensive range of mounting and rigging accessories (please refer to the E-Series brochure) E3 cabinets can be mounted or flown almost anywhere and used in pairs to create 120° or 180° horizontal arrays.

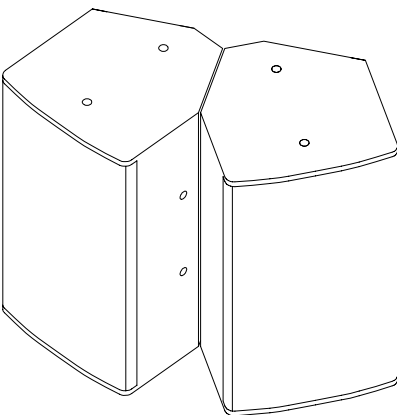
CAUTION!

Only operate E3 loudspeakers with a d&b P1200A mainframe fitted with E3 controller modules or a d&b E-PAC in E3 configuration, otherwise there is a risk of damaging the loudspeaker components.

Altering the HF horn dispersion

The E3 HF horn has a square flange allowing it to rotate through 90°. Two dispersion angles, 90° and 60°, are engraved on the flange, the value on the horizontal edge indicates the loudspeakers horizontal dispersion angle.

To change the horn dispersion, first remove the front grill by undoing the Allen screws (M4x25 mm) at the top and bottom of the grill using a 2.5 mm Allen key. Using a 3 mm Allen key, undo the 4 Allen screws (M4x25 mm) which hold the horn in place. The horn can then be rotated through 90°, refastened and the front grill replaced.



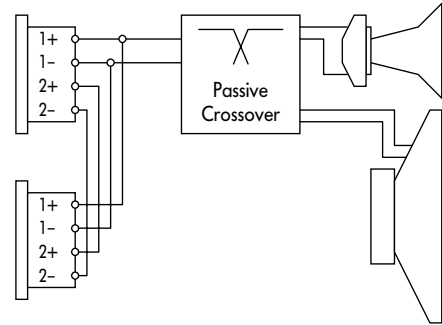
E3 array, 120° coverage

Connections

The E3 cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The E3 uses the pin assignments 1+/1-. Pins 2+/2- are designated to active d&b subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The connector plate is fitted to the E3 rear panel. Next to it, on the left hand side panel, is a metal blank plate with the cabinet details and serial number. The connector and blank plates can be swapped over to allow mounting brackets to be fitted to the back panel of the cabinet or to allow it to be placed on its back as a stage monitor.

The plates are removed by undoing the four 2.5 mm hex head screws securing each panel. The connector wiring is disconnected in order to swap the panels. Make sure when reconnecting the wiring that the red wire goes to pin 1+ and the black wire to pin 1- on the Speakon connector board.



Connector wiring

IMPORTANT!

Operation with P1200A

Up to four E3 loudspeakers can be driven by each P1200A power amplifier channel. Fitting one E3-CO and one subwoofer controller module allows a single mainframe to drive four E3 and two active subwoofer cabinets (E18-SUB or C7-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

E3 controller module switches

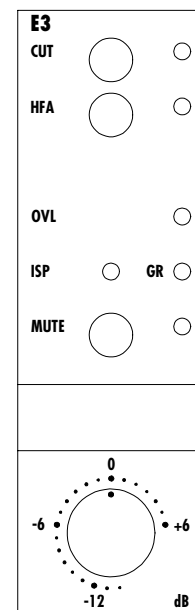
CUT switch and indicator

Set to CUT, a high pass filter with a 110 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. The E3 system is now configured for use with d&b C or E-Series active subwoofers.

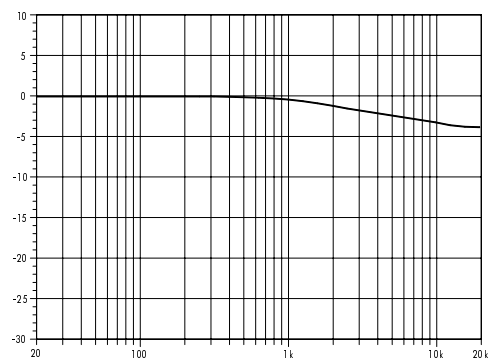
HFA switch and indicator

In HFA mode (High Frequency Attenuation), the HF response of the E3 system is rolled off. The yellow HFA LED illuminates. The HFA circuit configures the E3 loudspeakers to provide a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

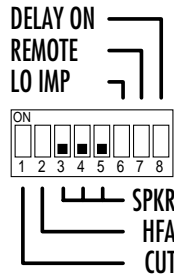
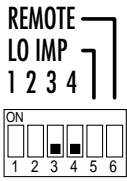
High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.



Controls on E3 controller module



Frequency response correction of HFA circuit



E-PAC version 1

E-PAC version 2

E-PAC Configuration for E3

Operation with E-PAC

To drive E3 cabinets the E-PAC has to be configured to E3 mode.

For an E-PAC version 1 and 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

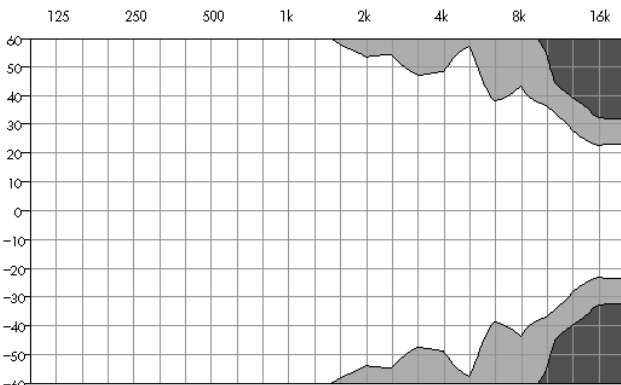
For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT and HFA settings are explained on the previous page under the section "E3 controller module switches".

The E-PAC can drive up to two E3 cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive four E3 cabinets with a 6 dB reduction of input level to the speakers.

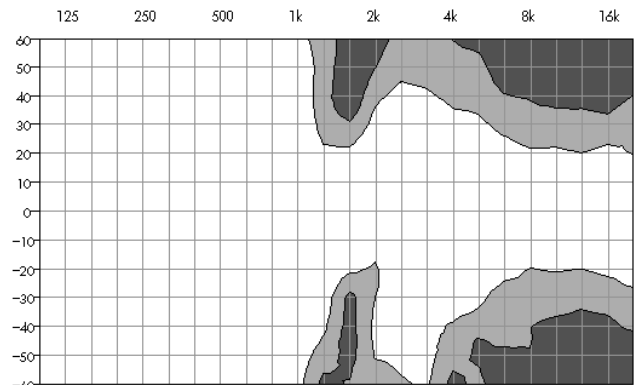
Dispersion characteristics

The diagrams below show dispersion angle vs frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB.

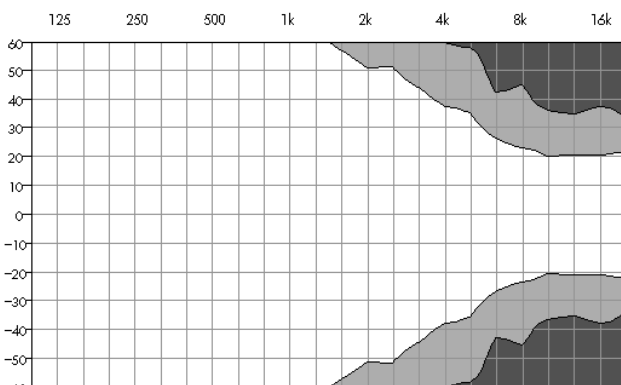


horizontal

E3 isobar diagram, configuration 90° horizontal (standard)

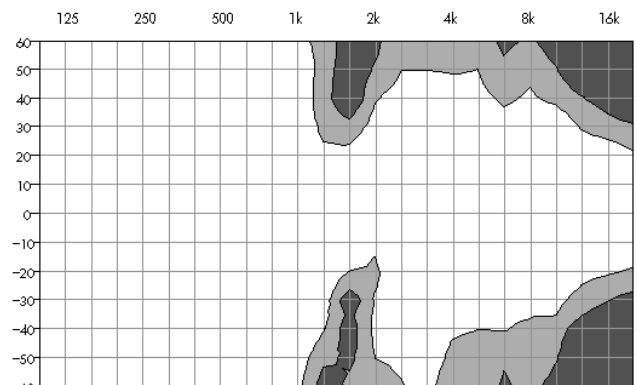


vertical



horizontal

E3 isobar diagram, configuration 90° vertical



vertical

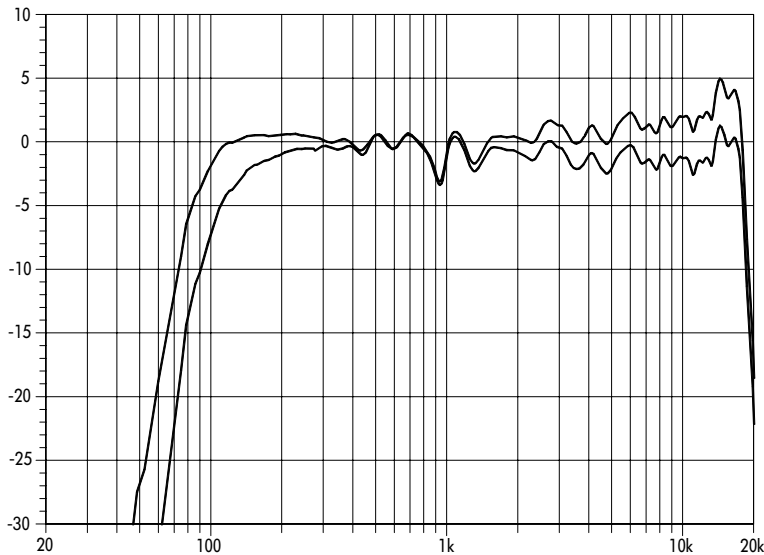
Technical specifications

E3 system data

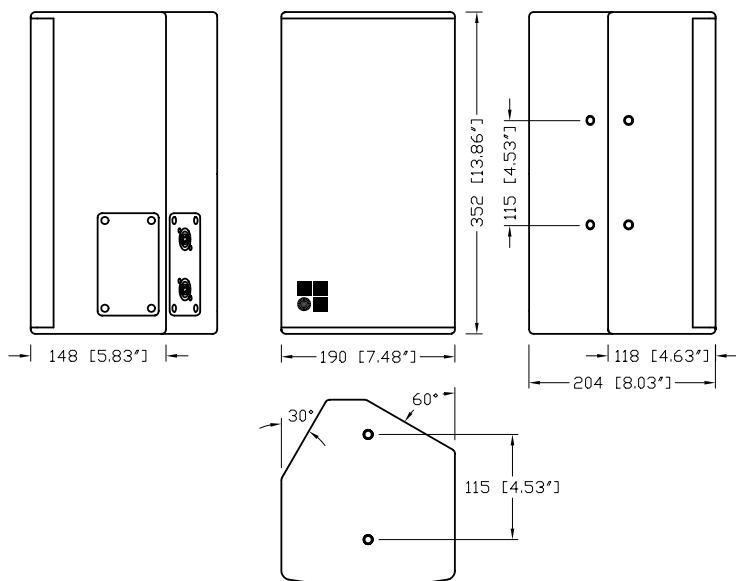
Frequency response (-5 dB)	80 Hz ... 18 kHz
Max. sound pressure (1 m, free field)	122 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax)	+9 dBu
Input level (100 dB-SPL / 1 m)	-10 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: -

E3 loudspeaker

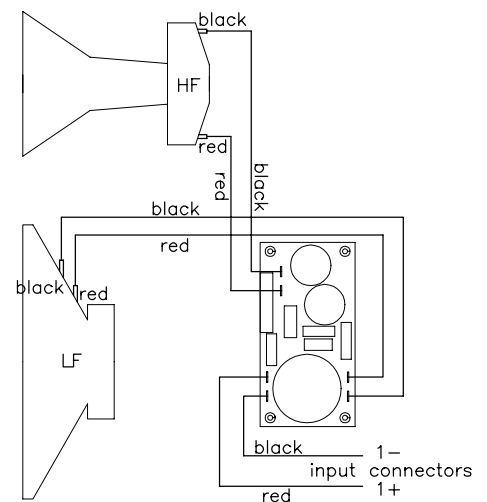
Nominal impedance	16 ohms
Power handling capacity (RMS / peak 10 ms)	120 / 480 W
Nominal dispersion angle (hor. x vert.)	90° x 60°
..... (rotatable through 60° x 90°)	
Connections	2 x Speakon-NL4
Pin assignments	1+ / 1-
Weight	7.2 kg (16 lb)



E3 frequency response, standard, CUT and HFA switch settings

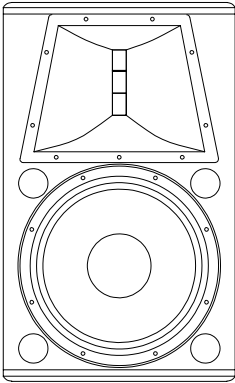


E3 cabinet dimensions in mm [inch]



E3 wiring diagram

E9



The E9 cabinet is a full range, two way bass-reflex enclosure fitted with a single 12" LF driver passively connected to a 2" HF compression driver coupled to a vertically asymmetrical 90° x 50° CD horn. The asymmetry of the HF horn means that the E9 has a vertical coverage pattern with a downward tilt. The actual vertical dispersion is 20° above and 30° below the cabinet axis.

The E9 cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. The cabinet top plate has an integral handle and four M10 threaded inserts for mounting brackets and rigging. The L shaped metal plate at the bottom of the cabinet also incorporates a handle, four M10 threaded inserts, a socket to accept a loudspeaker stand and, on the rear panel, two parallel wired Speakon-NL4 or EP-5 connectors.

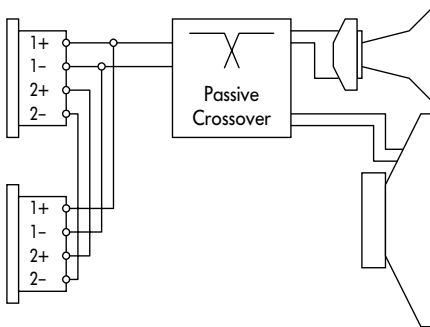
The E9 frequency response is truly full range covering a 50 Hz to 17 kHz band - even without an additional subwoofer, this is quite sufficient for many applications. The wide horizontal and asymmetric vertical dispersion makes the E9 especially suitable for close coverage applications up to 15 m (50 ft) where it can be deployed to best advantage mounted on a high stand.

The E9 can also be used as a stage monitor by simply placing the cabinet rear side down on stage (baffle angle 45°).

Within a larger system E9s are ideal as delays and for close, wide coverage work. The precisely angled rear side panels of the cabinet allow E9 cabinets to be simply placed side by side forming an array with accurate 90° horizontal coverage per loudspeaker. To simplify array construction an extensive range of mounting and rigging accessories are available - please refer to the E-Series brochure.

The E9 system can be used with the d&b active subwoofer systems E12-SUB, E18-SUB or C7-SUB. When operated with the P1200A mainframe the E9 may also be combined with the E15-BX passive bass extension.

Only operate E9 loudspeakers with a d&b P1200A mainframe fitted with E9 controller modules or a d&b E-PAC (version 2) in E9 configuration, otherwise there is a risk of damaging the loudspeaker components.



Connector wiring

CAUTION!

Connections

The E9 cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The E9 uses the pin assignments 1+/1-. Pins 2+/2- are designated to C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The E9 can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table on the left.

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Operation with P1200A

Up to two E9 loudspeakers can be driven by each P1200A power amplifier channel. Fitting one E9-CO and one subwoofer controller module allows a single mainframe to drive two E9 and two active subwoofer cabinets (E18-SUB or C7-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

The E9 can also be used with the E15-BX bass extension cabinet. The E15-BX cabinet is equipped with a passive crossover network and simply connects in parallel with the E9 cabinet without the need for any additional control electronics. One E9 and one E15-BX cabinet can be driven by each P1200A output channel.

E9 controller module switches

Standard setting

If the CUT switch and BX switch are not selected the module is configured for use with E9 loudspeakers when used as a stand alone system without subwoofers.

CUT switch and indicator

Set to CUT, a high pass filter with a 110 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. The E9 system is now configured for use with d&b C or E-Series active subwoofers.

BX switch and indicator

When the E9 is used with the passive E15-BX subwoofer, i.e. E9 and E15-BX are linked to the same amplifier output, the BX switch should be selected. The LF level - boosted by the bass extension cabinet - is then attenuated by 3 dB, thereby increasing headroom at bass frequencies.

When E9 loudspeakers are deployed as stage monitors selecting the BX switch reduces the low frequency energy gained from the coupling effect of floor placement.

SUB (CUT and BX both selected)

Selecting the CUT and BX switches activates a lowpass filter. The module now transmits frequencies from 50 to 110 Hz only, allowing the d&b E15-BX to be driven as an active subwoofer.

The E9-CO drives Speakon pins 1+/1- (EP-5: 1/2). Therefore the SUB setting is not suitable to drive d&b C/E-Series active subwoofer cabinets.

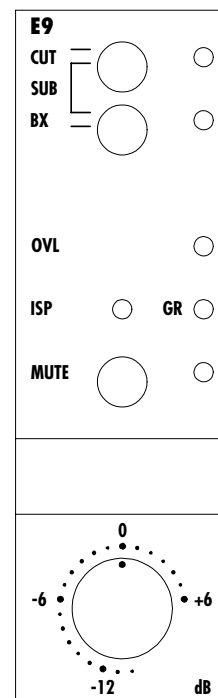
Operation with E-PAC

To drive E9 cabinets the E-PAC has to be configured to E9 mode.

For an E-PAC version 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

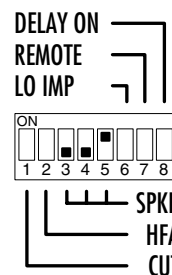
For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT setting are explained on the previous page under the section "E9 controller module switches". The functions BX and SUB are not available with the E-PAC controller.



Controls on E9 controller module

IMPORTANT!



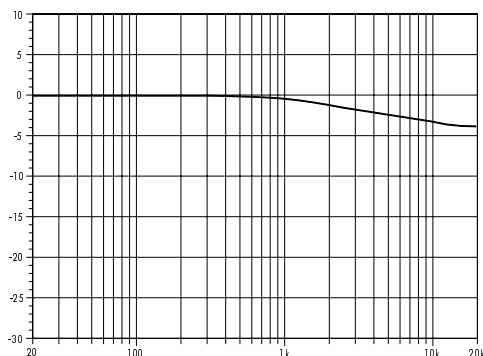
E-PAC Configuration for E9 (E-PAC version 2)

The E-PAC can drive a single E9 cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two E9 cabinets with a 6 dB reduction of input level to the speakers.

HFA setting

In HFA mode (High Frequency Attenuation), the HF response of the E9 system is rolled off. The HFA circuit configures the E9 loudspeakers to provide a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

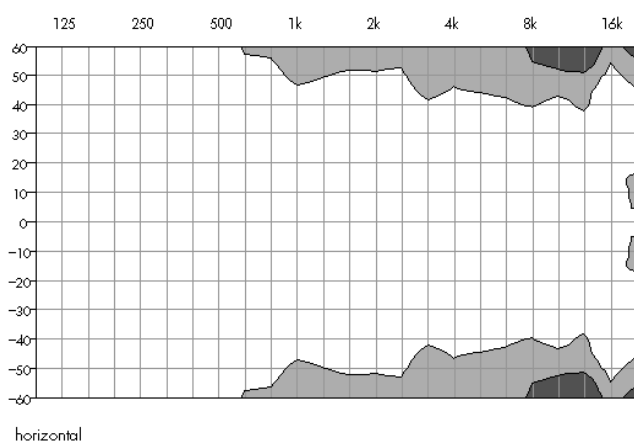
High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll-off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.



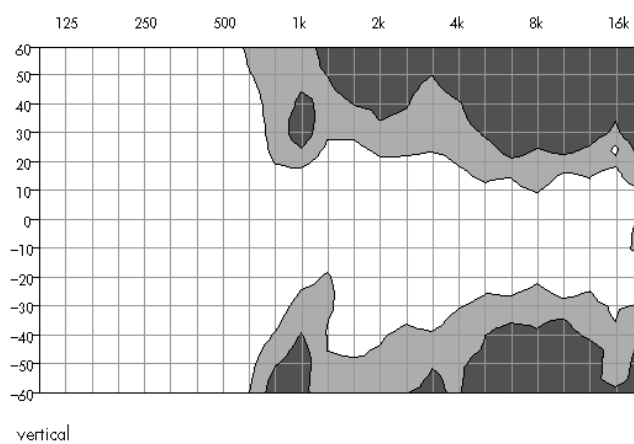
Frequency response correction of HFA circuit (only available with E-PAC)

Dispersion characteristics

The diagrams below show dispersion angle vs frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal 90° horizontal dispersion is maintained from 20 kHz down to 900 Hz.



E9 isobar diagram



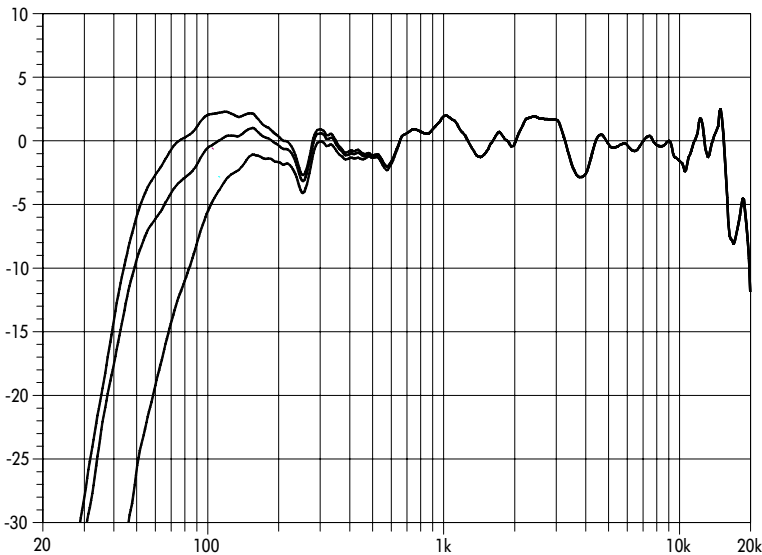
Technical specifications

E9 system data

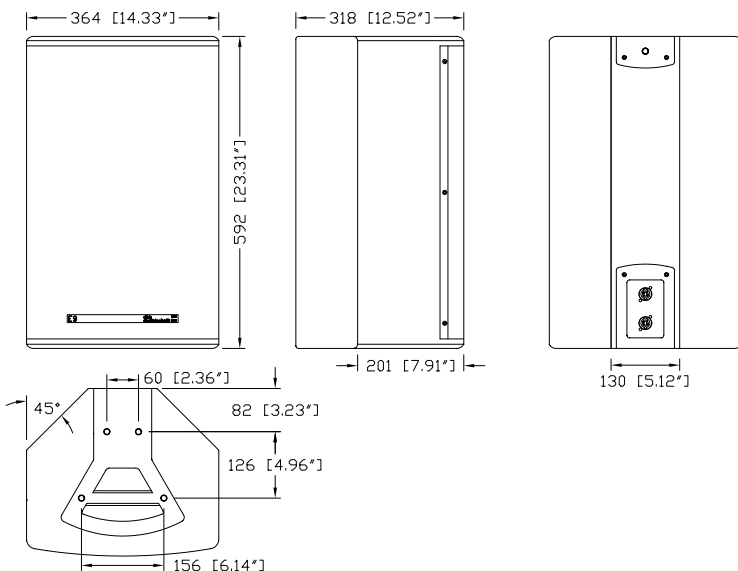
Frequency response (-5 dB)	50 Hz ... 17 kHz
Max. sound pressure (1 m, free field) with P1200A	128 dB
Max. sound pressure (1 m, free field) with E-PAC	126 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax)	+12 dBu
Input level (100 dB-SPL / 1 m)	-13 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: -

E9 loudspeaker

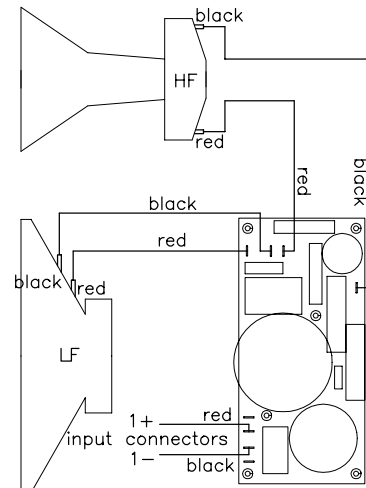
Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms)	200 / 800 W
Nominal dispersion angle	horizontal 90°, vertical +20° / -30°
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	1+ / 1-
.....	(EP-5: 1 / 2)
Weight	26 kg (57 lb)



E9 frequency response, standard, BX and CUT switch settings

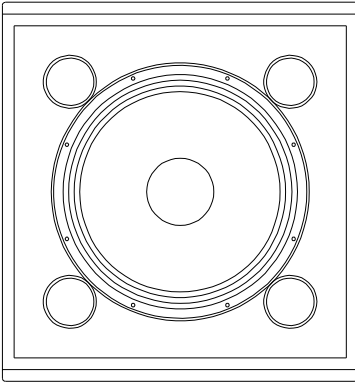


E9 cabinet dimensions in mm [inch]



E9 wiring diagram

E15-BX



The E15-BX passive subwoofer system is used to extend the low frequency range of the E9 loudspeaker. The E15-BX bass-reflex cabinet is fitted with a single 15" driver and an internal passive crossover.

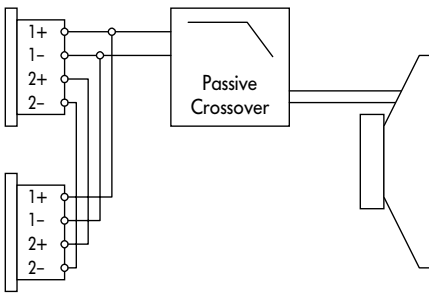
The E15-BX cabinet is constructed from marine plywood, fitted with steel handles and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill and covered with a replacable acoustically transparent foam. Mounted on the rear panel are two Speakon NL4 or EP-5 connectors wired in parallel and on the top panel an M20 threaded flange to accept the d&b Z5013 loudspeaker stand for the deployment of full range cabinets.

The passive crossover network has a cutoff frequency of 150 Hz. The E15-BX can be connected in parallel with an E9 or MAX cabinet without active filtering. No additional electronics are required.

Driving an E15-BX in parallel with other full range loudspeakers like E3, C6 or C7-TOP is not practicable, because their respective controllers only transmit the frequency range above 80 Hz (E3) or 70 Hz (C6, C7).

Only operate E15-BX loudspeakers with a d&b P1200A mainframe fitted with E9, ampMAX or AMP-L controller modules. As an alternative other high quality power amplifiers may be used, provided their output power does not exceed 500 watts into 8 ohms and an additional subsonic filter is used (25 Hz with 12 dB/octave minimum), otherwise there is a risk of damaging the loudspeaker components.

CAUTION!



Connector wiring

Connections

The E15-BX cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The E15-BX uses the pin assignments 1+/1-. Pins 2+/2- are designated to d&b C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The E15-BX can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table below.

IMPORTANT!

The E15-BX is operated in parallel to a full range loudspeaker or direct from the E9-CO and driven using pins 1+ and 1-, hence the difference in the pin assignment to d&b active subwoofers.

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

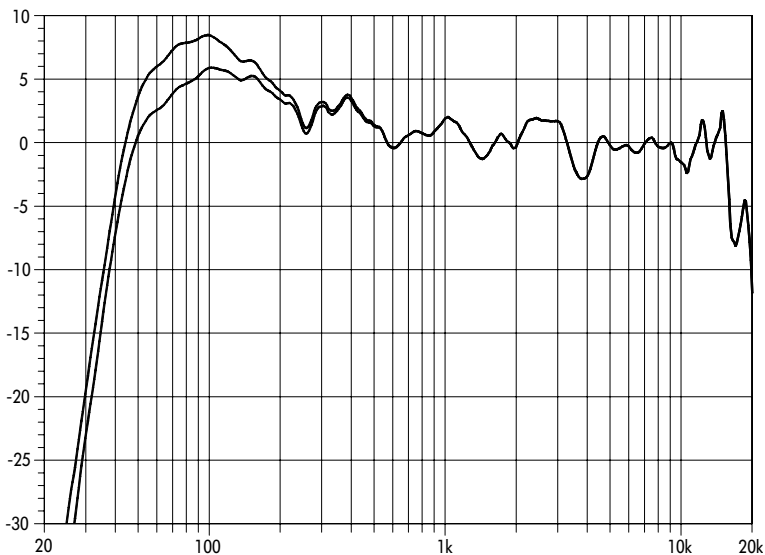
Speakon- NL4 and EP-5 pin assignments

Operation with d&b P1200A and E9 controller

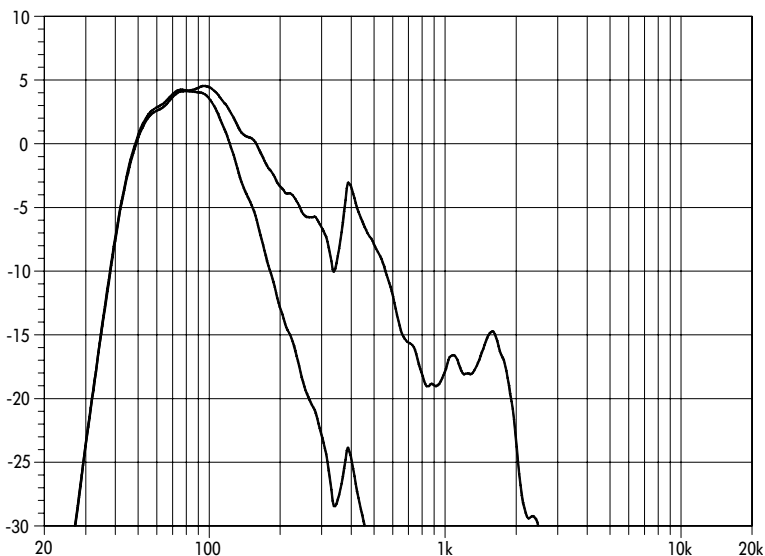
The characteristics of the configuration switches on the E9 controller are described previously in the E9 section of this manual.

The E9 loudspeaker has a frequency response covering the 50 Hz to 17 kHz band. When combined with an E15-BX the systems low frequency SPL increases by 6 dB. To compensate for this selecting the BX switch on the E9 controller attenuates the LF by 3 dB. One E9 and one E15-BX linked together locally can be driven by each output channel of a P1200A mainframe.

The E15-BX can also be used actively, driven from its own P1200A mainframe channel fitted with an E9 controller module. The active configuration (SUB setting selected on the E9-CO) allows up to two E15-BX cabinets to be driven from one mainframe output. If E9's are deployed as mid/high cabinets, they have to be driven by a separate mainframe channel fitted with an E9-CO and CUT (highpass) selected.



E9 with E15-BX, frequency response, standard and BX switch settings



E15-BX frequency response, active and passive setup with E9-CO

Technical specifications

E15-BX system data, passive setup with E9-CO

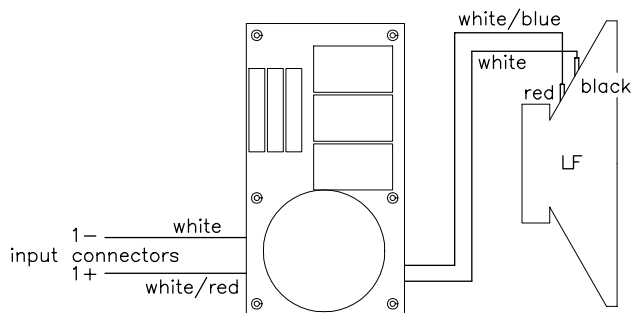
Frequency response (-5 dB).....	45 Hz ... 180 Hz
Max. sound pressure (1 m, free field).....	126 dB (SPLmax peak, pink noise test signal with crest factor of 4)
Input level (SPLmax).....	+12 dBu
Input level (100 dB-SPL / 1 m)	-10 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: +

E15-BX system data, active setup with E9-CO

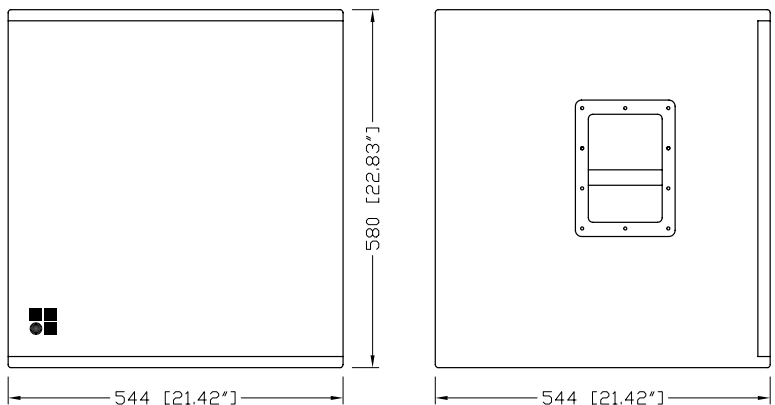
Frequency response (-5 dB).....	45 Hz ... 130 Hz
Max. sound pressure (1 m, free field).....	128 dB (SPLmax peak, pink noise test signal with crest factor of 4)
Input level (SPLmax).....	+14 dBu
Input level (100 dB-SPL / 1 m)	-11 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: +

E15-BX Subwoofer

Nominal impedance.....	8 ohms
Power handling capacity (RMS / peak 10 ms).....	300 / 1200 W
Connections	2 x Speakon-NL4 (optional 2 x EP-5)
Pin assignments	1+ / 1-(EP-5: 1 / 2)
Weight	38 kg (84 lb)

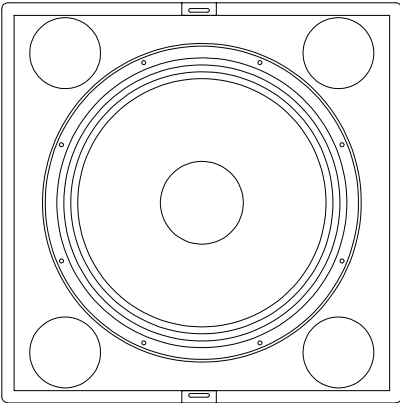


E15-BX wiring diagram



E15-BX cabinet dimensions in mm [inch]

E18-SUB



CAUTION!

The E18-SUB is a compact, very low tuned bass-reflex design employing a single 18" driver.

The E18-SUB loudspeaker cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. Also at the front, fittings at the top and bottom edges of the cabinet are used to secure an optional transport lid E7908. The cabinet incorporates a pair of steel handles and, on the rear panel, four heavy duty wheels and two parallel wired Speakon-NL4 or EP-5 connectors. Fitted to the top panel is an M20 threaded flange to accept the Z5013 Loudspeaker stand for the deployment of a full range cabinet.

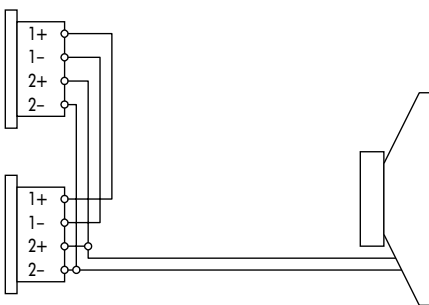
Designed to be actively driven using the d&b P1200A mainframe or the d&b E-PAC, the E18-SUB is normally used to support d&b full range cabinets such as the E9, C6 or E3 by covering the 38 Hz to 110 Hz frequency band.

Only operate E18-SUB loudspeakers with a d&b P1200A mainframe fitted with E18 controller modules or a d&b E-PAC (version 2) in E18-SUB configuration, otherwise there is a risk of damaging the loudspeaker components.

Connections

The E18-SUB cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The E18-SUB uses the pin assignments 2+/2-. Pins 1+/1- are designated to C and E-Series full range systems. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The E18-SUB can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table below.



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Operation with P1200A

Up to two E18-SUBs can be driven by each P1200A power amplifier channel. Fitting one E18-SUB-CO and one C or E-Series TOP controller module allows a single mainframe to drive two E18-SUB and two (E3: four) mid/high cabinets. All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

E18 Controller module switches

160Hz switch and indicator

If the 160Hz switch is selected (yellow 160Hz LED illuminated), the upper operating frequency of the system is raised from 110 Hz to 160 Hz. This setting can be used when E18-SUBs are used with the C6 system - the 160Hz setting on the C6-CO should also be selected to increase the C6 system's headroom (see C6 data sheet).

Operation with E-PAC

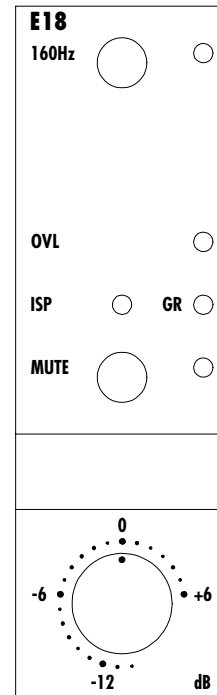
To drive E18-SUB cabinets the E-PAC has to be configured to E18-SUB mode.

For an E-PAC version 2, the configuration is selected by setting the appropriate DIP switches on the rear panel. DIP switches 1 and 2 (CUT and HFA) are not functional with the configuration E18-SUB.

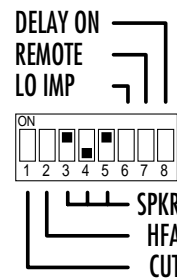
For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The 160Hz mode of the E18 controller module is not available on the E-PAC controller.

The E-PAC can drive a single E18-SUB cabinet at an output power of 300 watts. We do not recommend that two E18-SUB cabinets are driven in LO IMP mode as the 6 dB reduction in input level to the loudspeakers results in no gain in acoustical output.



Controls on E18 controller module



E-PAC Configuration for E18-SUB (E-PAC version 2)

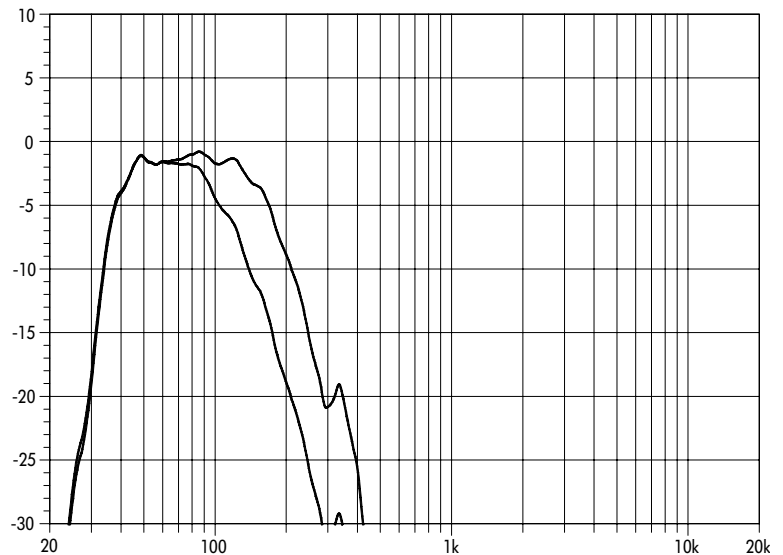
Technical specifications

E18 system data

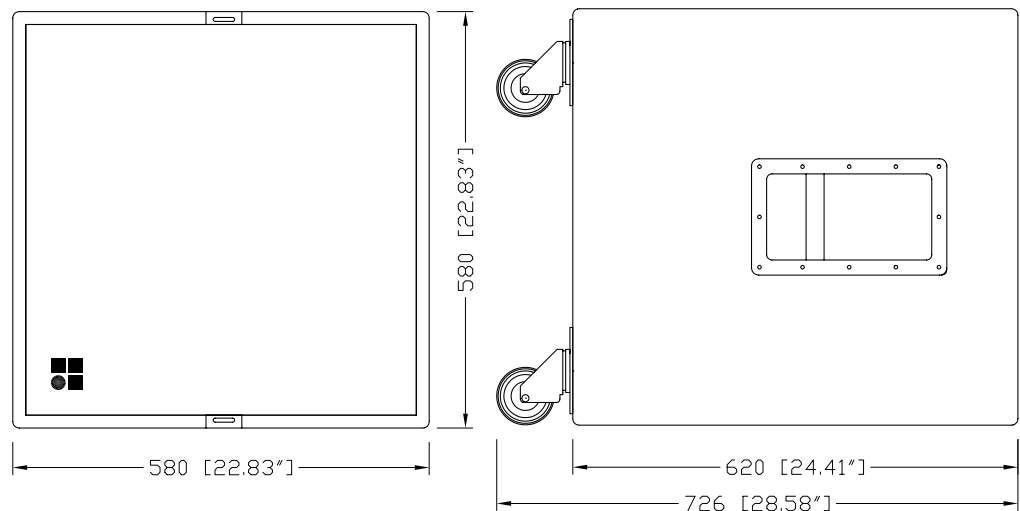
Frequency response (-5 dB).....	38 Hz ... 110 / 160 Hz
Max. sound pressure (1 m, free field) with P1200A.....	130 dB
Max. sound pressure (1 m, free field) with E-PAC	128 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+15 dBu
Input level (100 dB-SPL / 1m)	-11 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: +

E18-SUB loudspeaker

Nominal impedance.....	8 ohms
Power handling capacity (RMS / peak 10 ms).....	200 / 800 W
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	2+ / 2-
.....	(EP-5: 3 / 4)
Weight	42 kg (93 lb)

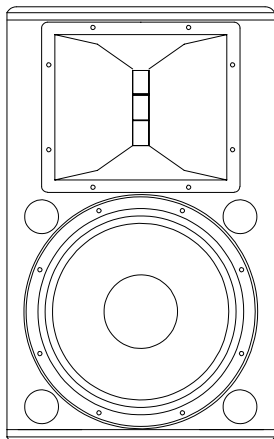


E18-SUB frequency response, standard and 160Hz switch settings



E18-SUB cabinet dimensions in mm [inch]

C6



The C6 cabinet is a full range, two way bass-reflex enclosure fitted with a 12" LF driver passively connected to a 2" HF compression driver which is coupled to a 60° x 40° CD horn.

The C6 cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. The cabinet top plate has an integral handle and four M10 threaded inserts for mounting brackets and rigging. The L shaped metal plate at the bottom of the cabinet also incorporates a handle, four M10 threaded inserts, a socket to accept a loudspeaker stand and, on the rear panel, two parallel wired Speakon-NL4 or EP-5 connectors.

The C6 frequency response covers a 70 Hz to 17 kHz band - quite sufficient for applications that don't require deep bass. However, for high level music reproduction, the C6 benefits from the bass extension and added power of active subwoofer systems E18-SUB, C4-SUB or C7-SUB.

The outstanding performance features of the C6 are its narrow dispersion angle and its very high output capability - these features are best used for audience coverage at distances to 20 m (65 ft) and beyond. Within a larger system C6 loudspeakers are ideal as high power delay systems and for high intelligibility speech reinforcement. The precisely angled rear side panels of the cabinet allow C6s to be simply placed side by side forming a powerful array with accurate 60° horizontal coverage per loudspeaker. To simplify array construction an extensive range of mounting and rigging accessories is available - please refer to the C6/C7 brochure.

CAUTION!

Only operate C6 loudspeakers with a d&b P1200A mainframe fitted with C6 controller modules or a d&b E-PAC (version 2) in C6 configuration, otherwise there is a risk of damaging the loudspeaker components.

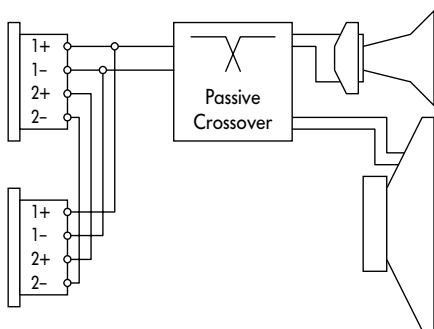
Version C690

The C690 has wider horizontal and vertical dispersion than the C6, the only difference being the 90° X 50° CD horn. C690 is driven by the same controller as the C6 and is suited to near field applications where wider coverage at high SPLs is required.

Connections

The C6 cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C6 uses the pin assignments 1+/1-. Pins 2+/2- are designated to C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C6 can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table on the left.



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Operation with P1200A

Up to two C6 loudspeakers can be driven by each P1200A power amplifier channel. Fitting one C6-CO and one subwoofer controller module allows a single mainframe to drive two C6 and two active subwoofer cabinets (E18-SUB, C4-SUB or C7-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

C6 controller module switches

Standard setting

If the CUT switch and MON switch are not selected the module is configured for use with C6 loudspeakers used as a stand alone system without subwoofers.

CUT switch and indicator

Set to CUT, a high pass filter with a 110 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. The C6 system is now configured for use with d&b C-Series active subwoofers.

MON switch and indicator

If the MON switch is selected the yellow MON LED illuminates and the low frequency level is reduced by 3 dB. This setting particularly applies to the C6-MON as this setting reduces the low frequency energy gained from the coupling effect of floor placement.

160Hz setting (CUT and MON switches both selected)

If the 160Hz mode is selected, a high pass filter is inserted in the controller signal path. The crossover frequency of 160 Hz is higher than in CUT mode and thus increases the available headroom in the C6 system. The 160Hz mode can be selected when the system is operated with d&b subwoofers C4-SUB, C7-SUB or E18-SUB (also in 160Hz mode, see manual section E18-SUB). This configuration is particularly useful when C6 loudspeakers are stacked directly on top of the subwoofer system.

Operation with E-PAC

To drive C6 cabinets the E-PAC has to be configured to C6 mode.

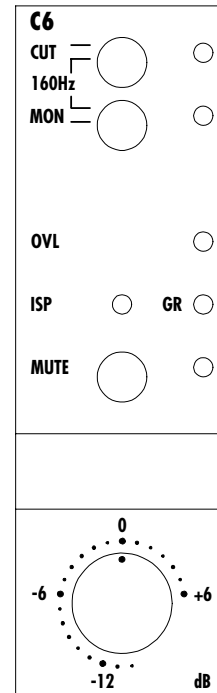
For an E-PAC version 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

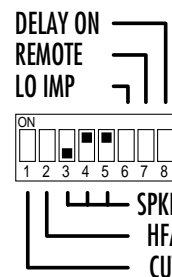
The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT setting are explained on the previous page under the section "C6 controller module switches".

The functions MON and 160 Hz are not available with the E-PAC controller.

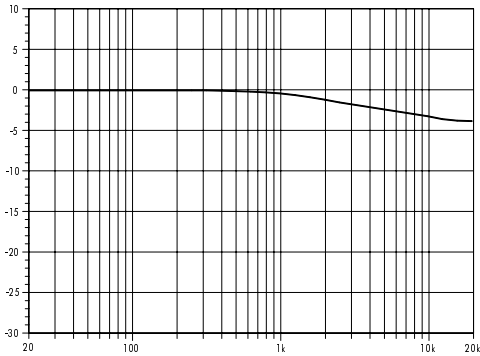
The E-PAC can drive a single C6 cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two C6 cabinets with a 6 dB reduction of input level to the speakers.



Controls on C6 controller module



E-PAC Configuration for C6 (E-PAC version 2)



Frequency response correction of HFA circuit (only available with E-PAC)

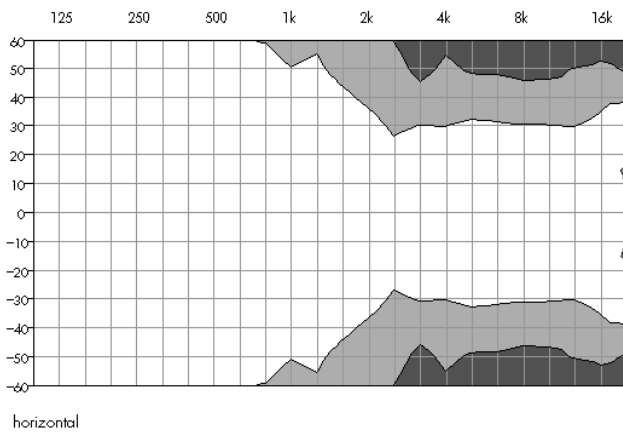
HFA setting

In HFA mode (High Frequency Attenuation), the HF response of the C6 system is rolled off. The HFA circuit configures the C6 loudspeakers to provide a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

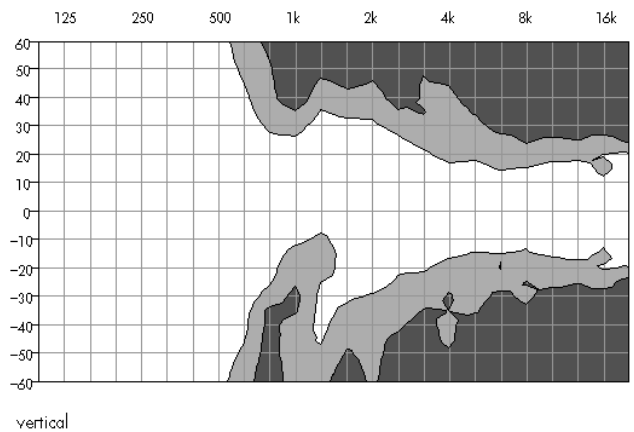
High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll-off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.

Dispersion characteristics

The diagrams below show dispersion angle vs frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal 60° horizontal dispersion is maintained from 20 kHz down to 2 kHz.



C6 Isobar diagram



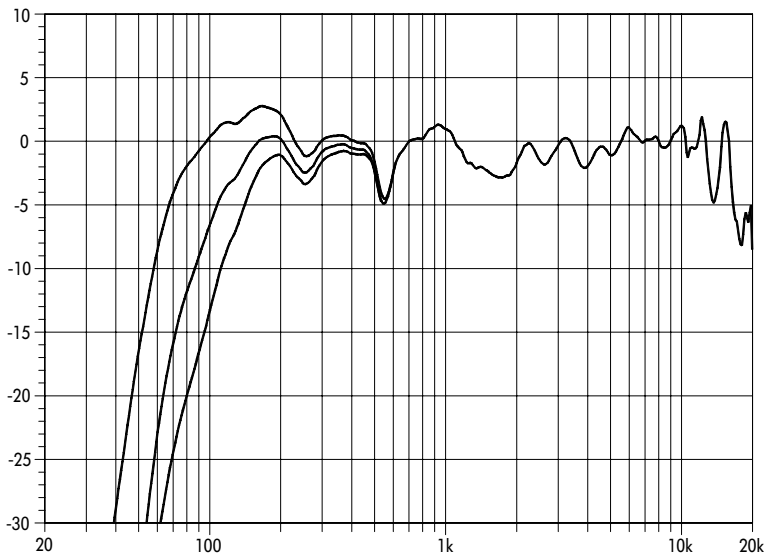
Technical specifications

C6 (C690) system data

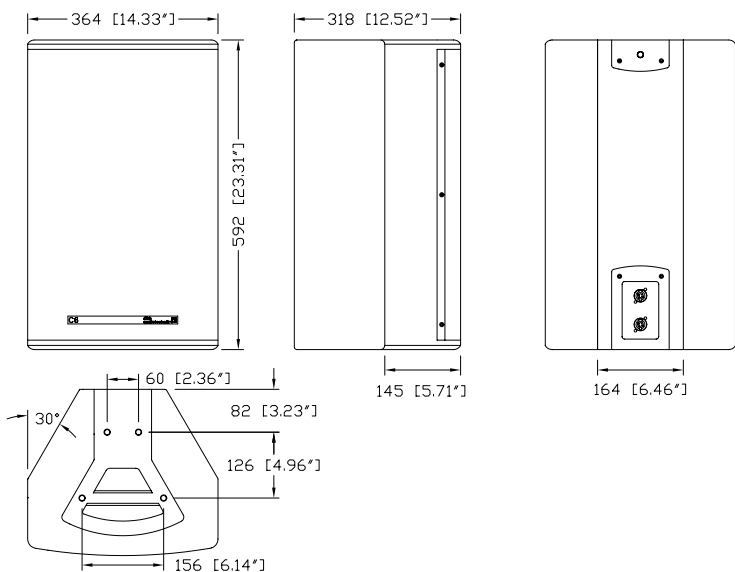
Frequency response (-5 dB)	70 Hz ... 17 kHz
Max. sound pressure (1 m, free field) with P1200A	133 (132) dB
Max. sound pressure (1 m, free field) with E-PAC	131 (130) dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax)	+16 dBu
Input level (100 dB-SPL / 1 m)	-14 (-13) dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: -

C6 (C690) loudspeaker

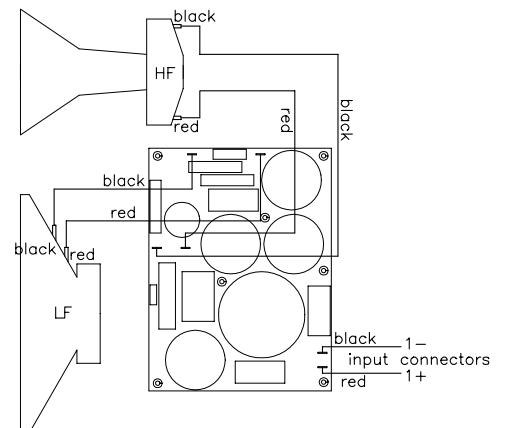
Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms)	200 / 800 W
Nominal dispersion angle (hor. x vert.)	60° x 40° (90° x 50°)
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	1+ / 1-
.....	(EP-5: 1 / 2)
Weight	28 kg (62 lb)



C6 frequency response, standard, CUT and 160Hz switch settings

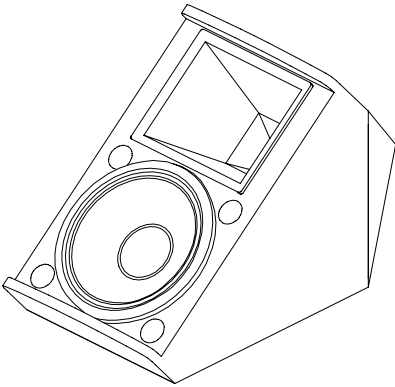


C6 cabinet dimensions mm [inch]



C6 wiring diagram

C6-MON



The C6-MON is a full range, two way bass-reflex enclosure fitted with a 12" LF driver passively connected to a 2" HF compression driver coupled to a 60° x 40° CD horn.

A wedge shaped stage monitor with a 40° angled speaker baffle, the C6-MON is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. Mounted on the rear panel are two Speakon NL4 or EP-5 connectors wired in parallel. The top plate has an integral handle and four M10 threaded inserts for attaching installation hardware.

With a frequency response extending from 65 Hz to 17 kHz, the C6-MON can generate a 133 dB peak sound pressure level at 1m. This high output capability coupled with a high gain before feedback ratio is a consequence of a linear frequency response and controlled dispersion. The result is in an extremely efficient stage monitor for vocal work. Faceted cabinet side panels simplify the assembly of a twin C6-MON array covering a 100° horizontal angle.

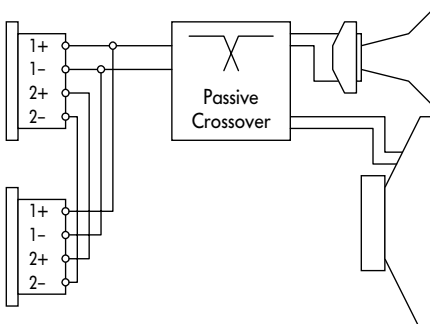
The top panel has a combined handle and mounting plate similar to that of the C6 allowing the use of the same rigging accessories. Using the Z5023 Flying bracket 02 and a high stand it is possible to use C6-MON in a front of house system.

The C6-MON has the same electroacoustic performance as the C6 and uses the same C6 controller module. Please note, that for front of house systems, C6-MON cabinets are not as straightforward to array as the C6 version of the cabinet.

C6-MON can also be supplemented with the d&b active subwoofer systems E18-SUB, C4-SUB or C7-SUB.

Only operate C6-MON loudspeakers with a d&b P1200A mainframe fitted with C6 controller modules, otherwise there is a risk of damaging the loudspeaker components.

CAUTION!



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Connections

The C6-MON cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C6-MON uses the pin assignments 1+/1-. Pins 2+/2- are designated to C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C6-MON can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table below.

Up to two C6-MON can be driven by each P1200A power amplifier channel. Fitting one C6-CO and one subwoofer controller module allows a single mainframe to drive two C6-MON and two active subwoofer cabinets (E18-SUB, C4-SUB or C7-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

C6 controller module switches

Standard setting

If the CUT switch and MON switch are not selected the module is configured for use with C6 loudspeakers used as a stand alone system without subwoofers.

CUT switch & indicator

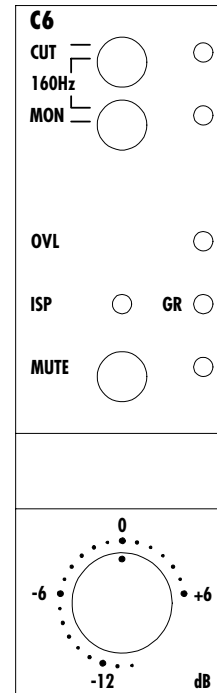
Set to CUT, a high pass filter with a 110 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. The C6 system is now configured for use with d&b C-Series active subwoofers.

MON switch & indicator

If the MON switch is selected the yellow MON LED illuminates and the low frequency level is reduced by 3 dB. This particularly applies to the C6-MON stage monitor, as this setting reduces the low frequency energy gained from the coupling effect of floor placement.

160 Hz setting (CUT & MON switches both selected)

If the 160 Hz mode is selected, a high pass filter is inserted in the controller signal path. The crossover frequency of 160 Hz is higher than in CUT mode and thus increases the available headroom in the C6 system. The 160 Hz mode can be selected when the system is operated with d&b active subwoofers C4-SUB, C7-SUB or E18-SUB (also in 160 Hz mode, see manual section E18-SUB). This configuration is particularly useful when C6 loudspeakers are stacked directly on top of the subwoofer system.



Controls on C6 controller module

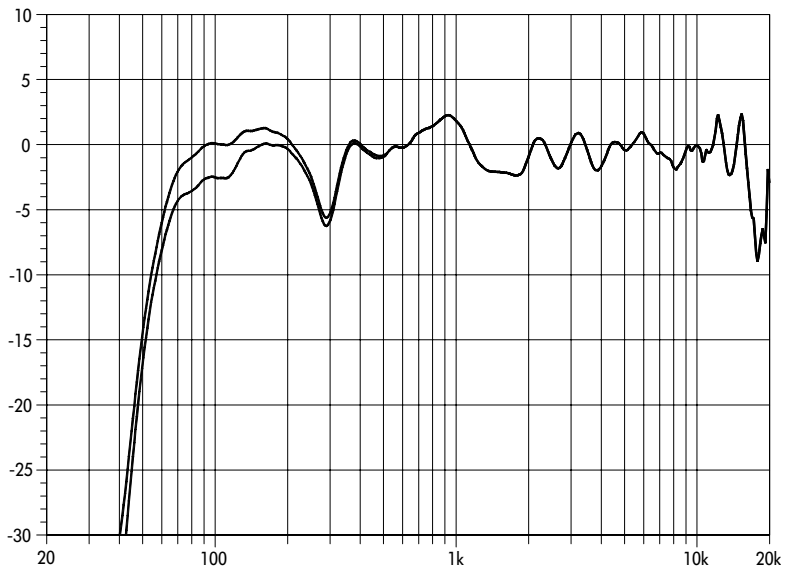
Technical specifications

C6-MON system data

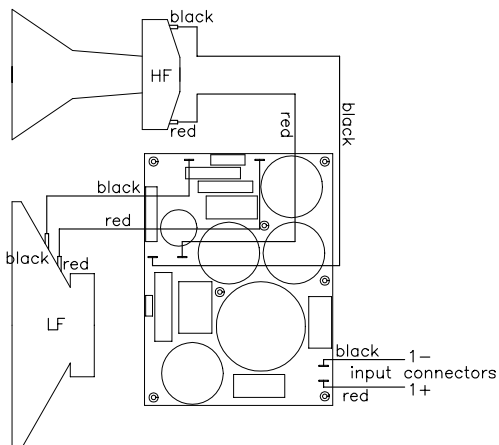
Frequency response (-5 dB).....	65 Hz ... 17 kHz
Max. sound pressure (1 m, free field).....	133 dB (SPLmax peak, pink noise test signal with crest factor of 4)
Input level (SPLmax).....	+16 dBu
Input level (100 dB-SPL / 1 m).....	-14 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -).....	LF: + / HF: -

C6-MON stage monitor

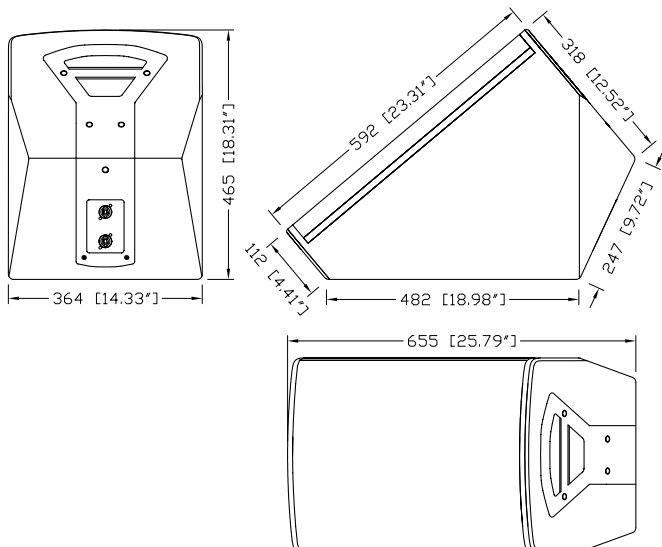
Nominal impedance.....	8 ohms
Power handling capacity (RMS / peak 10 ms).....	200 / 800 W
Nominal dispersion angle (hor. x vert.).....	60° x 40°
Connections.....	2 x Speakon-NL4 (optional 2 x EP-5)
Pin assignments.....	1+ / 1- (EP-5: 1 / 2)
Weight.....	30 kg (66 lb)



C6-MON frequency response, standard and MON switch settings

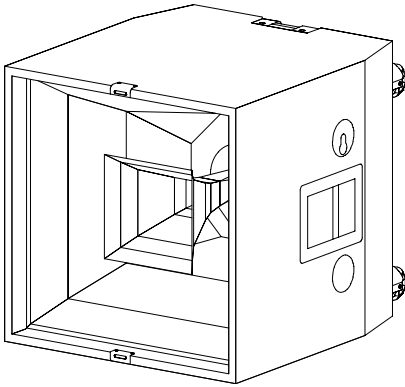


C6-MON wiring diagram



C6-MON cabinet dimensions in mm [inch]

C4-TOP



The C4-TOP is a two way horn loaded loudspeaker which provides high SPL coverage from mid to high frequencies. The constant directivity design of the C4-TOP's coaxial horns ensures that its 35° x 35° dispersion is maintained down to 800 Hz. The driver complement consists of two passively coupled devices - a 12" low/mid frequency driver and a 2" HF compression driver.

The C4-TOP cabinet is constructed from marine plywood, fitted with steel handles, MAN CF4 stud plate rigging points and has an impact resistant paint finish. The front of the loudspeaker cabinet is protected by a rigid metal grill, covered with a replaceable acoustically transparent foam and fitted with catches to the top and bottom for securing an optional transport lid E7908. Mounted on the rear panel are ratchet strap guide plates (kelping bars), four M10 threaded inserts for attaching installation hardware, two Speakon NL4 or EP-5 connectors wired in parallel and four heavy duty wheels.

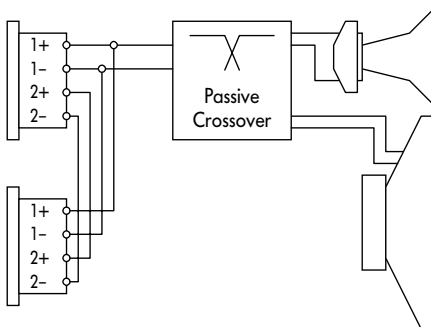
As the C4-TOP operates from 18 kHz down to 150 Hz, it requires low frequency support from a subwoofer system like the C4-SUB (50 Hz to 150 Hz).

C4 systems comprising TOP and SUB cabinets can be used ground-stacked or flown. The distinctive angled rear side panels of the C4 cabinet set a 30° horizontal angle between side by side array columns. The recommended two stack minimum C4 configuration - two TOP's and two SUB's per side - gives 70° of horizontal coverage.

The narrow dispersion angle and very high output capability of the C4 system make it suitable for audience coverage up to and beyond 50 m (165 ft) - ideal for large concert halls, arenas and open air festival sites.

Only operate C4-TOP loudspeakers with a d&b P1200A mainframe fitted with C4-TOP controller modules otherwise there is a risk of damaging the loudspeaker components.

CAUTION!



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Connections

The C4-TOP cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C4-TOP uses the pin assignments 1+/1-. Pins 2+/2- are designated to C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C4-TOP can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table on the left.

Up to two C4-TOP loudspeakers can be driven by each P1200A power amplifier channel. Fitting one C4-TOP-CO and one subwoofer controller module allows a single mainframe to drive two C4-TOP and two active subwoofer cabinets (C4-SUB or C7-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

C4-TOP controller module switches

HFC switch & indicator

In HFC mode (High Frequency Compensation, yellow HFC LED illuminated), the response of the system is tailored for remote listening positions. The characteristics of HFC mode are detailed in the graph below right.

Selecting the HFC switch compensates for loss of high frequency energy due to absorption in air when loudspeakers are used to cover far field listening positions. The HFC correction equates to the HF loss which occurs at a distance of 30 m (100 ft) at 20° C (68° F) in 70% relative humidity.

In applications which use vertically arrayed C4-TOP cabinets, ground stacked or flown, the HFC switch should be used selectively, only for those cabinets covering the far field. This guarantees the correct sound balance between close and remote audience areas, whilst all mainframes driving the array can be fed with the same signal.

Operation with E-PAC (only possible with E-PAC version 3 with display)

To drive C4-TOP cabinets the E-PAC has to be configured to C4-TOP mode.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The HFC setting is available. The characteristics of the HFC setting are explained on the previous page under the section "C4-TOP controller module switches".

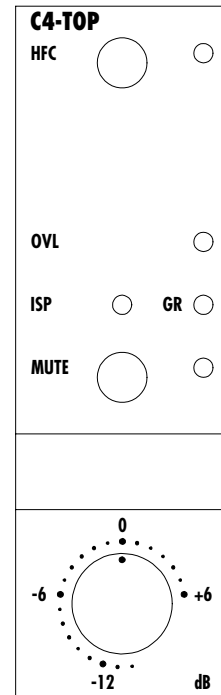
The E-PAC can drive a single C4-TOP cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two C4-TOP cabinets with a 6 dB reduction of input level to the speakers.

C4 arrays

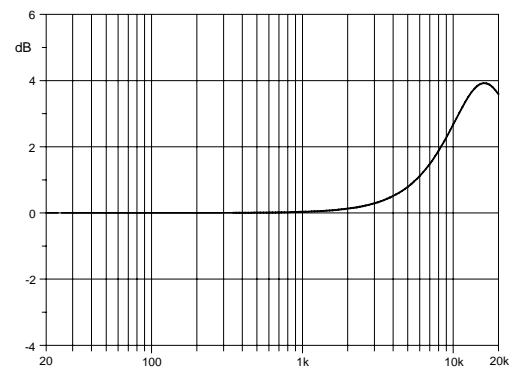
The horizontal angle between adjacent C4-TOP's in an array can be set to between 20° and 30°. Using the 30° maximum horizontal array angle produces arrays with $(n \times 30^\circ) + 10^\circ$ horizontal coverage - where n = the number of speaker columns in the array - in the case of a four column array this results in 130° of horizontal coverage. Smaller angles between the cabinets will give a smaller horizontal coverage area but will produce higher sound pressure on the array middle axis.

Especially in venues with difficult room acoustics the configuration of the array should be thoroughly adapted to the actual requirements. In order to keep diffuse sound low, the total coverage angle should only be as wide as necessary to cover the audience area.

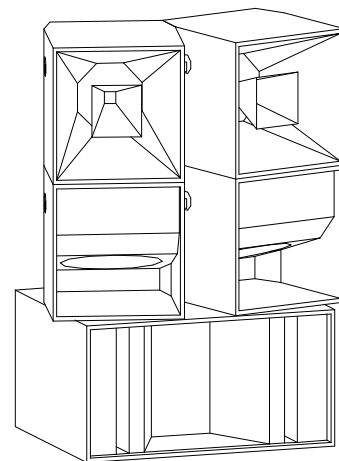
In a typical left-right set up it is sufficient if the coverage zones of the two PA wings or rigs overlap only in the middle of the room. Because of the differences in arrival time, large set ups allow stereo imaging only on the middle axis between both arrays.



Controls on C4-TOP controller module



Frequency response correction of HFC circuit



C4-TOP/SUB stacks with B2-SUB

Ground stacks are normally constructed by placing cabinets directly on top of each other. Having no vertical angle between TOP cabinets produces a strong coupling effect and increases vertical directivity which helps to provide coverage to the far field. However it is not recommended to stack TOP cabinets more than three high as this produces very different dispersion patterns in the mid and high frequency range.

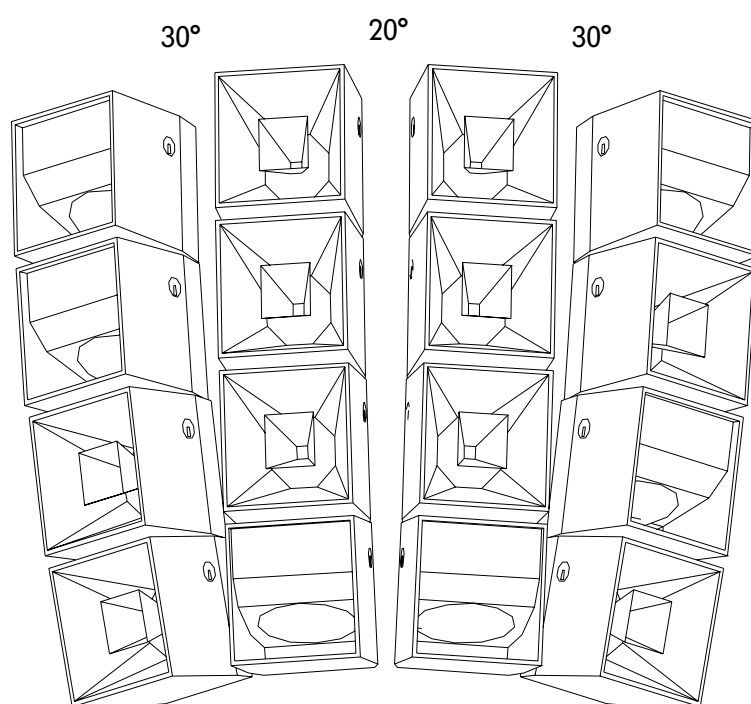
Flown systems

d&b offers a wide range of accessories for the assembly of flown C4 arrays (d&b Flying Bar, d&b Flying System). Detailed descriptions can be found in the manuals for Rigging Accessories and the Flying System.

Compared to a ground stacked system a flown array will normally give a smoother level distribution in the audience area and provide coverage over a longer range.

For the horizontal set up of the array generally the same rules apply as already described in the section C4 arrays. The vertical set up of TOP's and SUB's is determined by the required level and reach of the system. A standard 5° vertical angle is normally used between adjacent rows of C4 cabinets in an array.

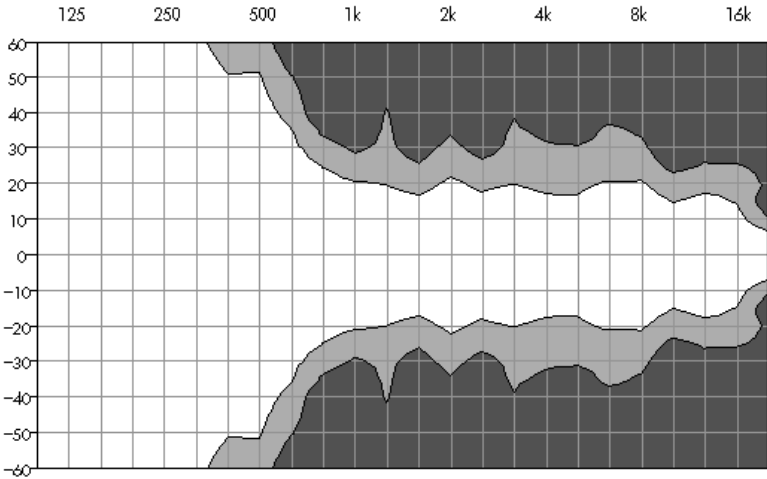
Placing all the C4-SUB's used on the ground in preference to flying them may give a higher sound pressure level but at the expense of an inferior sound balance from the whole system. So at least some of the SUB's should be integrated into the flown array. This can be achieved by placing them in the lower rows, where, due to the smaller distance to the audience less TOP's are needed or by inserting whole columns or rows of C4-SUB's. If a vertical column of SUB's is deployed ensure that the total horizontal angle between TOP cabinets in adjacent columns does not exceed 30°.



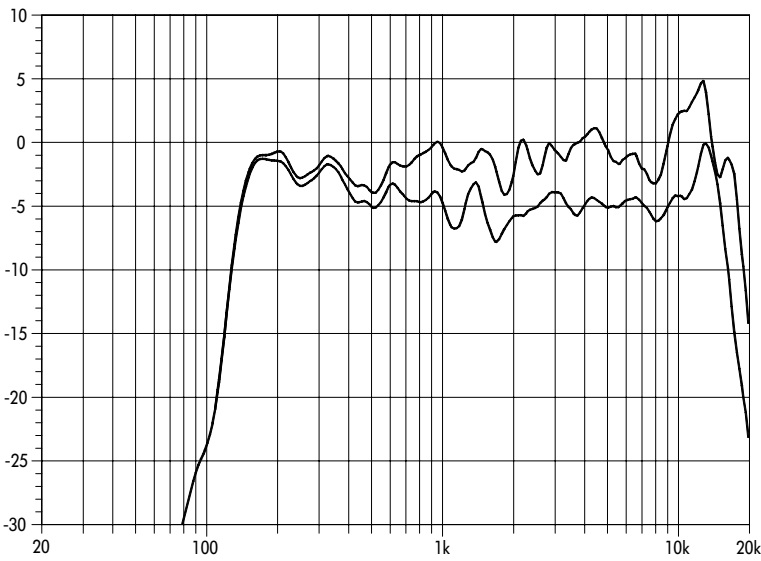
Example for a flown C4 array

Dispersion characteristics

The diagrams below show dispersion angle vs frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal 35° dispersion is maintained from 16 kHz down to 800 Hz. Horizontal and vertical characteristics are identical.



C4-TOP isobar diagram



C4-TOP frequency response on axis and 18° hor./vert. angles

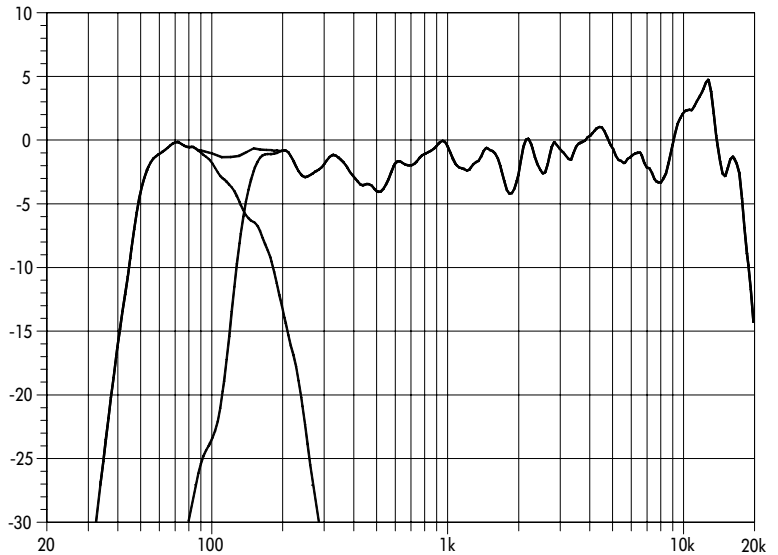
Technical specifications

C4-TOP system data

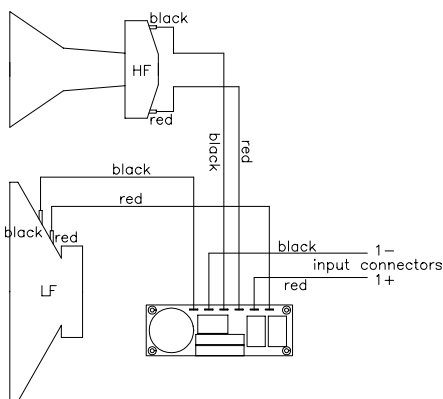
Frequency response (-5 dB).....	150 Hz ... 18 kHz
Max. sound pressure (1 m, free field) with P1200A	138 dB
Max. sound pressure (1 m, free field) with E-PAC	136 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+14 dBu
Input level (100 dB-SPL / 1 m).....	-21 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: +

C4-TOP loudspeaker

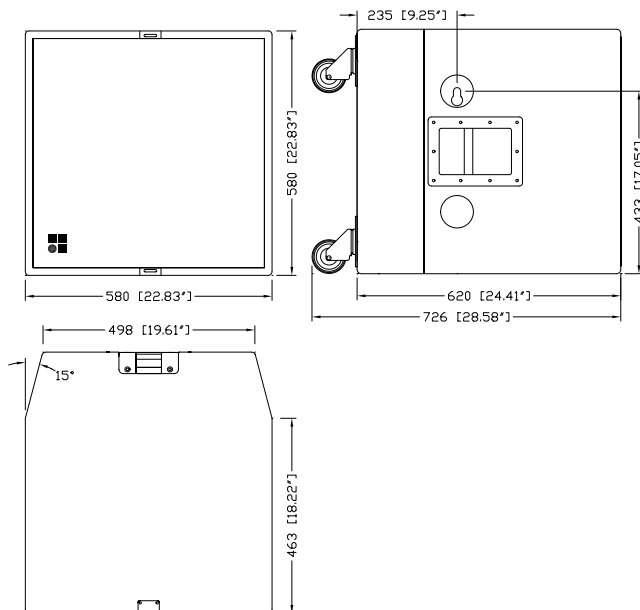
Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms).....	200 / 800 W
Nominal dispersion angle (hor. x vert.).....	35° x 35°
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	1+ / 1-
.....	(EP-5: 1 / 2)
Weight	58 kg (128 lb)



C4-TOP frequency response used with C4-SUB

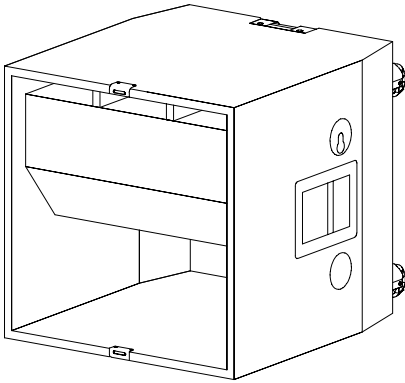


C4-TOP wiring diagram



C4-TOP cabinet dimensions in mm [inch]

C4-SUB



The C4-SUB is a compact, horn-loaded bandpass design employing a single 18" driver. It is designed for use with the C4-TOP cabinet as a part of the C4 System.

The C4-SUB cabinet is constructed from marine plywood, fitted with steel handles, MAN CF4 stud plate rigging points and has an impact resistant paint finish. The front of the loudspeaker cabinet is protected by a rigid metal grill, covered with a replaceable acoustically transparent foam and fitted with catches to the top and bottom for securing an optional transport lid E7908. Mounted on the rear panel are ratchet strap guide plates (kelping bars), four M10 threaded inserts for attaching installation hardware, two Speakon NL4 or EP-5 connectors wired in parallel and four heavy duty wheels.

Designed to be actively driven using the d&b P1200A mainframe, the C4-SUB is normally used to support the C4-TOP cabinet by covering the 50 Hz to 150 Hz frequency band.

The C4-SUB cabinet has the same dimensions and shape as the C4-TOP and is also fitted with the same hardware so that arrays, ground-stacked or flown, using different combinations of these cabinets can be speedily built and deployed.

However, the C4-SUB can also be used with other d&b C-Series and F-Series systems. This is particularly important when these systems require flown subwoofers.

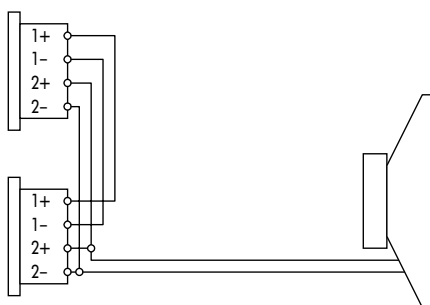
Only operate C4-SUB loudspeakers with a d&b P1200A mainframe fitted with C4-SUB controller modules otherwise there is a risk of damaging the loudspeaker components.

CAUTION!

Connections

The C4-SUB cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C4-SUB uses the pin assignments 2+/2-. Pins 1+/1- are designated to d&b C- and E-Series full range systems. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C4-SUB can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table below.



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

Operation with P1200A

Up to two C4-SUB's can be driven by each P1200A power amplifier channel. Fitting one C4-SUB-CO and one C-Series TOP controller module allows a single mainframe to drive two C4-SUB and two mid/high cabinets. All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.

Operation with E-PAC (only possible with E-PAC version 3 with display)

To drive C4-SUB cabinets the E-PAC has to be configured to C4-SUB mode.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The E-PAC can drive a single C4-SUB cabinet at an output power of 300 watts. We do not recommend that two C4-SUB cabinets are driven in LO IMP mode as the 6 dB reduction in input level to the loudspeakers results in no gain in acoustical output.

Stacking notes

The horn chamber, which transmits frequencies ranging from approx. 70 Hz to 180 Hz, is located in the bottom half of the cabinet. A reflex system which covers frequencies below this range (tuning frequency: 53 Hz) is located at the top of the front panel. The system has been tuned to ensure the correct operation of C4-SUB used on its own. When arraying C4-SUB's there is therefore no point in creating an enlarged horn opening by stacking the cabinets horn to horn.

If the C4-SUB system is placed directly on the floor, we advise turning the cabinet upside down so that floor coupling helps to increase the effective baffle area for the reflex port. If C4-SUB systems are stacked two high, the upper C4-SUB can be turned upside down so that both reflex ports lie directly on top of each other. If cabinets are stacked three or more high they can be used in their upright positions - with their reflex ports to the top.

Combination of C4-SUB and B2 systems

The C4-SUB operates down to 50 Hz (-5 dB). However, some applications require frequencies below this cutoff. Using the B2 subwoofer can not only give the required LF extension but also increase the low frequency headroom of the C4 system.

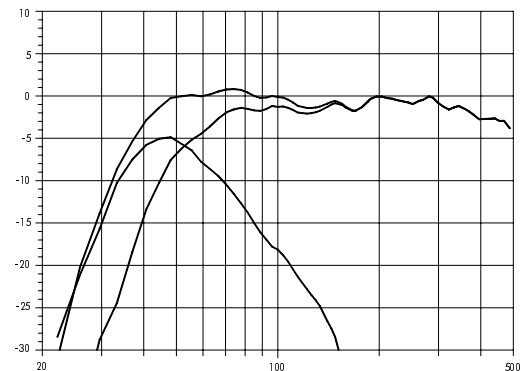
Setting the B2 controller module to INFRA by a front panel switch configures the B2 system to operate in the 50 Hz area covering a one octave band from 32 Hz to 68 Hz (-5 dB).

A single B2 system delivers enough low end bass to supplement the output of four C4-SUB cabinets. When C4-SUB and B2-SUB's are operated in an identical acoustic environment (e.g. in one cluster on the ground), with controllers set to the same level, the combined systems low frequency limit is 37 Hz (-5 dB).

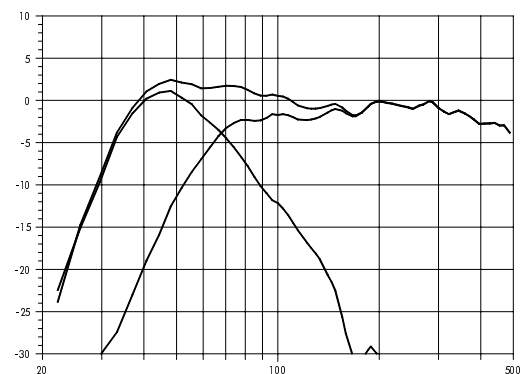
The system headroom can be increased in applications using less than four C4-SUB's to one B2 subwoofer by raising the lower cut off frequency of the C4-SUB's. A dedicated balanced output (C4-OUT) is provided on the rear panel of the B2 controller for driving the C4 system under these conditions.

The C4-OUT introduces a relatively narrow-band signal attenuation around 50 Hz, which raises the lower frequency limit of the C4-SUB's to around 60 Hz. This shift is not acoustically critical since the region affected is covered by the B2 system. The response of the TOP cabinets in the system will remain the same whether their controllers (C4-TOP-CO or C7-TOP-CO) are fed directly or by the C4-OUT signal.

In applications where most of the C4-SUB's are flown, they are deprived of the additional acoustic gain due to ground coupling. To maintain a tight bass sound the level of the ground stacked B2-SUB's should be turned down respectively. (approx. -6 dB). The increased system headroom derived from the use of the C4-OUT can be an advantage when used to drive the flown system.



C4 and B2-SUB systems, 4:1 ratio



C4 and B2-SUB systems driven from C4-OUT connection, 2:1 ratio

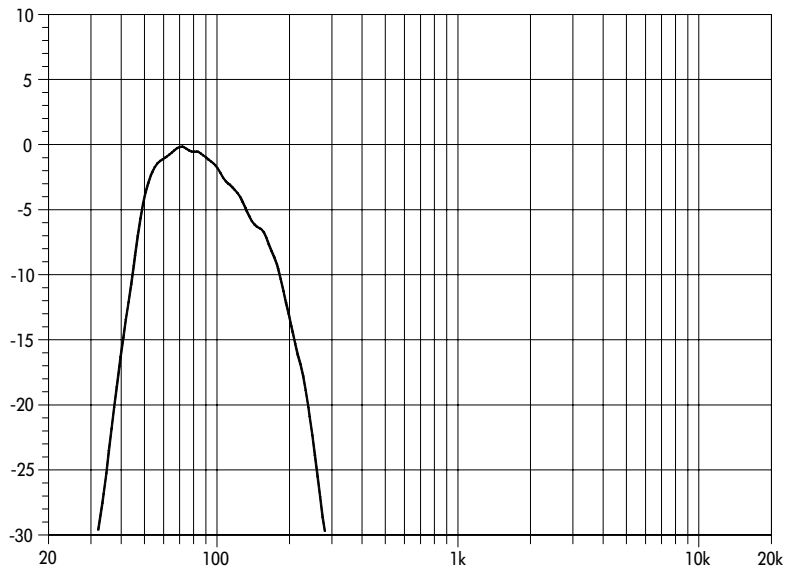
Technical specifications

C4-SUB system data

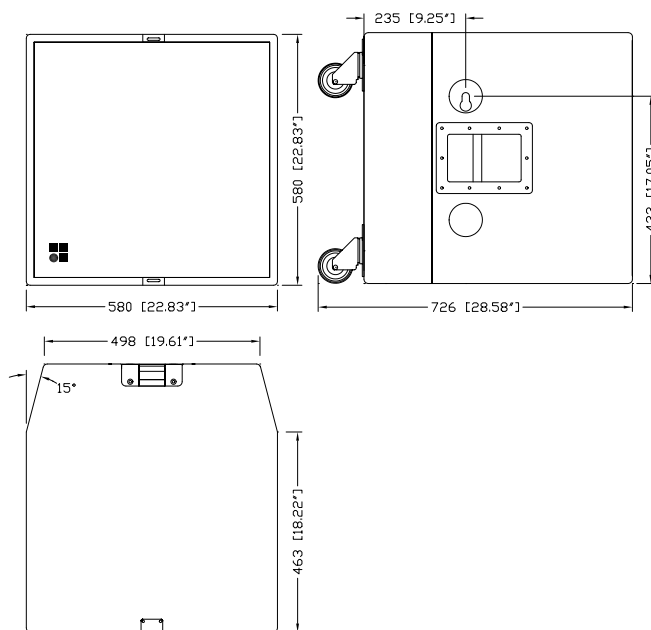
Frequency response (-5 dB).....	50 Hz ... 150 Hz
Max. sound pressure (1 m, free field) with P1200A	133 dB
Max. sound pressure (1 m, free field) with E-PAC	131 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+17 dBu
Input level (100 dB-SPL / 1 m).....	-13 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: +

C4-SUB loudspeaker

Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms).....	200 / 800 W
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	2+ / 2-
.....	(EP-5: 3 / 4)
Weight	48 kg (106 lb)

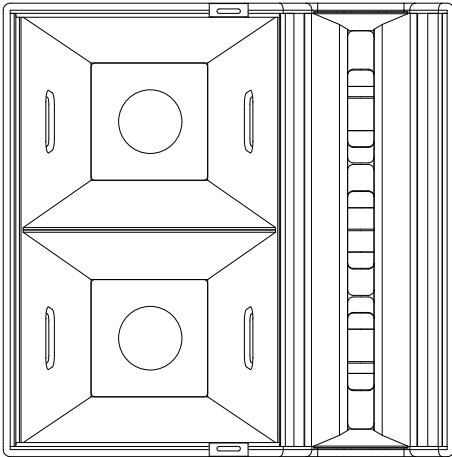


C4-SUB frequency response



C4-SUB cabinet dimensions in mm [inch]

C3



The C3 is the line array module for the d&b C4 system. The C3 cabinet houses 2 x 10" mid-range drivers and 3 x 1.3" HF compression drivers, producing a maximum sound pressure level greater than 143 dB SPL. The 2-way active C3 loudspeaker is an entirely hornloaded design which unlike other "line arrays" can be arrayed not only vertically but also horizontally, and by employing the distinctive 15° angled rear side panels and rigging accessories of the C4 cabinet it extends even further the scalability of the C4 system. Utilising an identical horizontal dispersion of 35° (above 900 Hz) and with a 5° vertical HF dispersion per cabinet, the C3 is used to build vertical columns producing a curved coherent wave front. This enables the C3 to address distances above 30 metres in different ways: starting as an extension module for a C4 array where additional mid and high range is required in the far field, up to a full line array approach using C4-TOP cabinets as near field supplements.

The C3 is designed for use with two or more cabinets in a vertical column and the use of single cabinets is therefore not recommended. The frequency response of two cabinets with a 5° vertical splay angle extends from 130 Hz to above 16 kHz in standard mode. With full range music program at high SPLs, additional subwoofers are required. The LFC mode extends the response for speech reproduction down to 80 Hz with reduced SPLmax. The C3 is designed to be flown in columns, which should be horizontally arrayed at 30° to each other. The vertical dispersion is designed for coupling angles of 1° to 5°, two C3s using the standard 23 link load chains (5° vertical splay) will give a vertical coverage of 10°. Utilizing an identical cabinet shape and rigging accessories as the C4, the C3 can be directly integrated into the C4 system.

The C3 cabinet is constructed from marine plywood, fitted with steel handles, MAN CF4 stud plate rigging points and has an impact resistant paint finish. The front of the mid-range section of the loudspeaker cabinet is protected by a rigid metal grill fitted with a replaceable acoustically transparent foam, and the HF section is fitted with a foam block in the horn throat. Catches are fitted to the top and bottom of the cabinet for securing an optional transport lid E7908. Mounted on the rear panel are ratchet strap guide plates (kelping bars), an EP5 or NL4 connector, two hinge plates, and four heavy duty wheels.

CAUTION!

Only operate C3 loudspeakers with a d&b P1200A mainframe fitted with a C3 controller module otherwise there is a risk of damaging the loudspeaker components.

Connections

The C3 cabinet can be fitted with either one EP5 male or one NL4 connector. Pin equivalents of EP5 and NL4 connectors are listed in the table on the left.

	MF+	MF-	HF+	HF-	n.c.
EP5	1	2	3	4	5
NL4	1+	1-	2+	2-	

EP5 and NL4 pin assignments

The C3 cabinet is a 2-way active design employing both channels of the P1200A power amplifier, fitted with the C3 controller module. Up to two C3 loudspeakers can be driven with one mainframe. To avoid HF loss with long cable runs each cabinet must be connected to one of the mainframe outputs using separate cables.

C3 controller module switches

HFC switch and indicator

Selecting the HFC mode (High Frequency Compensation, yellow HFC LED illuminated), compensates for loss of high frequency energy due to absorption in air. The HFC switch should be used exclusively for those cabinets covering the very far field. This guarantees the correct sound balance between close and remote audience areas, whilst the mainframes driving the array can be fed with the same signal.

LFC switch and indicator

In LFC mode (Low Frequency Compensation, yellow LFC LED illuminated), the low frequency response is extended down to 80 Hz for speech reinforcement without subwoofers.

Indicators

These indicators give a three stage indication of the C3 controller signal levels.

- **ISP** (**I**nput **S**ignal **P**resent, green) illuminates when the input signal of the controller input exceeds a -36 dBu threshold value. The ISP circuit is unaffected by the setting of the controller mute switch and level control.
- **GR** (**G**ain **R**eduction, yellow) illuminates when the controller limiter reduces gain by more than 3 dB.
- **OV** (**O**verload red) illuminates when the controller limiter reduces gain by more than 12 dB or overload occurs in the signal path (input signal too high) or when the amplifier gain is reduced because the output current is too high (e.g. due to a short circuit).

The limiter indicators show the condition of the HF and LF channels independently.

Level Control

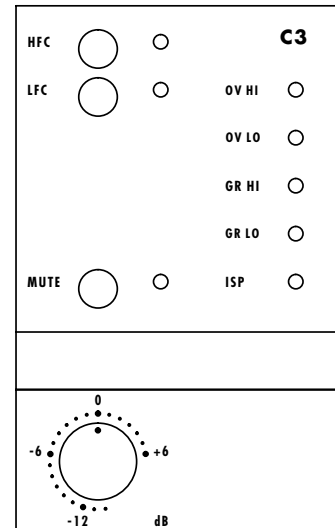
The detented level control adjusts the controller input sensitivity and has a 18 dB range (-12 dB ... $+6$ dB) calibrated in 1 dB steps. The controls are normally set to 0 dB.

Arraying C3 and C4 cabinets

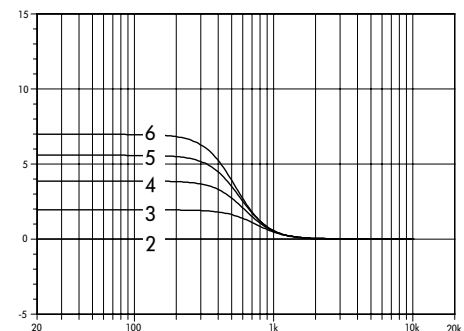
Vertical array of C3 cabinets

A vertical array of C3 cabinets produces a precisely shaped wavefront following the mechanical arrangement of the cabinets. The cut off at the upper and lower limits of the vertical dispersion of a C3 column is very sharp, and therefore precise aiming is absolutely essential to address the desired audience area.

The vertical coverage angle of a single cabinet is 5° and this defines the maximum splay angle between adjacent cabinets in a column. This dispersion angle is achieved above approximately 5 kHz, while lower frequencies will disperse into a wider area creating an overlap of the coverage patterns of the single cabinets. Therefore directivity and the level of lower frequencies increases with every cabinet added to the column. Two cabinets arrayed vertically with a 5° splay angle produce a flat frequency response. Longer columns will therefore boost low and low/mid frequencies according to the graph on the right.



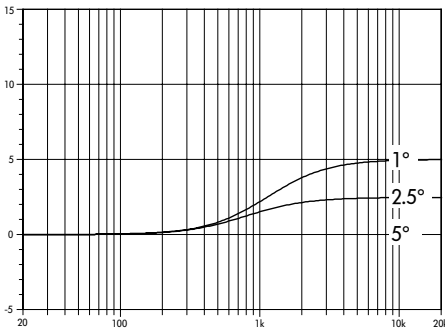
C3 controller module



Typical change in frequency response with increasing column length (2, 3, 4, 5 and 6 deep)

Longest C3 column in array	Low shelf f_c	Gain dB
3	800 Hz	-3
4	600 Hz	-4
5	450 Hz	-5
6	350 Hz	-6
7	250 Hz	-7
8	200 Hz	-8

Single column



Typical change in frequency response when decreasing the splay angle between two cabinets from 5° to 2.5° and 1°.

This typical behaviour can be compensated by using a standard 2nd order (12 dB) low shelf filter. The corner frequency and gain setting depend on the number of C3 cabinets in the longest column and on the overall array size. Typical corner frequencies are listed in the table on the left; the gain listed applies to a single column. This equalization has to be used for the C3s only. C4-TOP cabinets in the array should be driven from a separate signal.

Decreasing the splay angle to 2.5° or even 1° will also create an overlap of the coverage patterns above 5 kHz resulting in increased high frequency output to the main axis. This effect can be used to compensate for air absorption effects when covering remote audience areas. In opposite to the HFC circuit of the controller this "mechanical HFC" equalization does not affect the headroom of the system.

To achieve a smooth level distribution the vertical splay of a column is the first thing to consider when designing a set up for a specific venue. Usually the distances to the audience that an array has to cover increase from the bottom to the top of a column, consequently more power is required at the top. This can be achieved by using different vertical splay angles between cabinets in a column, with smaller angles achieving more power within a given vertical segment. For a smooth level distribution over distance it is desirable to gradually change the angle increments, e.g. 1°, 2.5°, 5° for a 4 deep column.

Vertical array of C3 and C4 cabinets

As their horizontal dispersion behaviour is identical, C4-TOP and C3 cabinets can be easily combined in one array. The larger vertical dispersion of a C4-TOP can be used efficiently to cover the near field in front of a C3 column. A vertical splay of 5° or 10° to the lowest C3 is useful, depending on the total height of the system.

Horizontal array of C3 and C4 cabinets

The horizontal angle between adjacent C3 and/or C4 cabinets in an array can be set to between 20° and 30°. The most even and widest energy distribution is achieved with 30°. Smaller angles between the cabinets will give a smaller horizontal coverage area but will produce higher sound pressure on the centre axis of the array.

The configuration of any array should be thoroughly adapted to the actual venue room acoustics and requirements. In order to keep diffuse sound low, the total coverage angle should only be as wide as necessary to cover the audience area.

Operation with C4-SUB and B2-SUB

To extend the C3 frequency response C4-SUBs should be used. Forming columns of SUB cabinets improves efficiency and vertical directivity at low frequencies.

For a balanced sound at high levels a ratio of at least one C4-SUB per C3 or C4-TOP cabinet is required.

For a further extension of bandwidth and headroom ground stacked B2 subwoofers are used (INFRA mode).

Time alignment and signal distribution

When combining C3s and C4-TOPs the correct time alignment of both systems is of great importance. To achieve this C3 and C4-TOPs have to be driven by separate input signals. With a delay of 0.3 ms in the C4 signal path both systems are perfectly coherent over the whole audio band, while the C3 signal path contains the vertical array equalization as described above. To avoid the influence of different latencies (inherent delays) of the signal chains, make sure that the C3s and C4s in one array are driven with the same signal processing devices using different outputs.

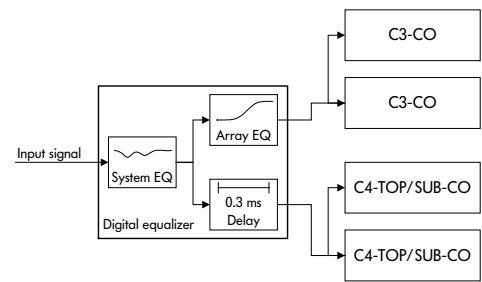
Normally C4-SUBs will be driven from the same signal processor output as the C4-TOPs, or if B2-SUBs are used, from the C4-OUT of the B2 controller. Should the B2-SUBs be driven separately (e.g. when driven from an auxiliary output of the console or for time alignment reasons), the low cut provided by the C4-OUT of the B2 controller can also be created for the C4 using a standard parametric bandpass filter in a signal processor. The parameters are $f = 44 \text{ Hz}$, $Q = 3$, $\text{Gain} = -6 \text{ dB}$.

Integration into the C4 flying system

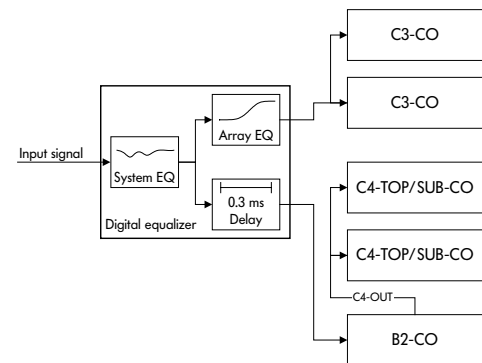
The vertical splays between the cabinets of a C3/C4 array are set by load chains of different lengths. d&b offer chains for 1° , 2.5° and 5° angles plus a shortening chain enabling greater variable angles. For a coherent coupling of adjacent cabinets the precise alignment of the rear panels of the cabinets is essential. Therefore it is necessary to use the d&b Z5110.100 Hinge between the cabinets throughout the whole column.

C3 arrays have a very high vertical directivity, therefore the use of a precise digital angle finder to verify the desired aiming is strongly recommended. Deviations of less than 1° can have an immense impact on the coverage in the far field. A laser distance finder is recommended to set the correct array height.

d&b **TransCalc V3** is a Microsoft Excel based calculation tool for planning the mechanical set up of the d&b Transformer flying system. It computes all settings for the flying system plus dimensions, weights, CAD export and a parts list for the whole rig. Version 3 now provides a graphic display for up to four listening planes in 2D projections showing the aiming points of all C3 and C4-TOP cabinets of the array. The above mentioned laser distance finder is a useful tool to assess the dimensions of the listening areas.



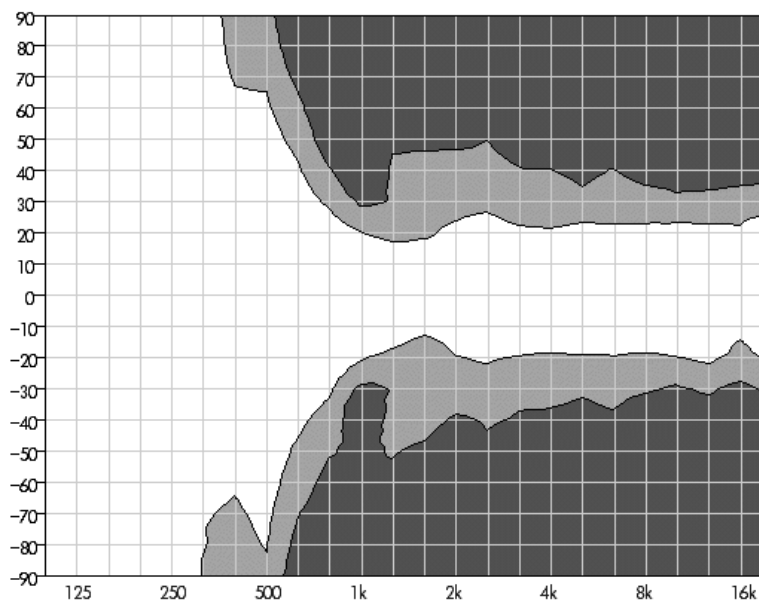
C3 wiring with C4-TOP and C4-SUB



C3 wiring with C4-TOP, C4-SUB and B2-SUB

Dispersion characteristics

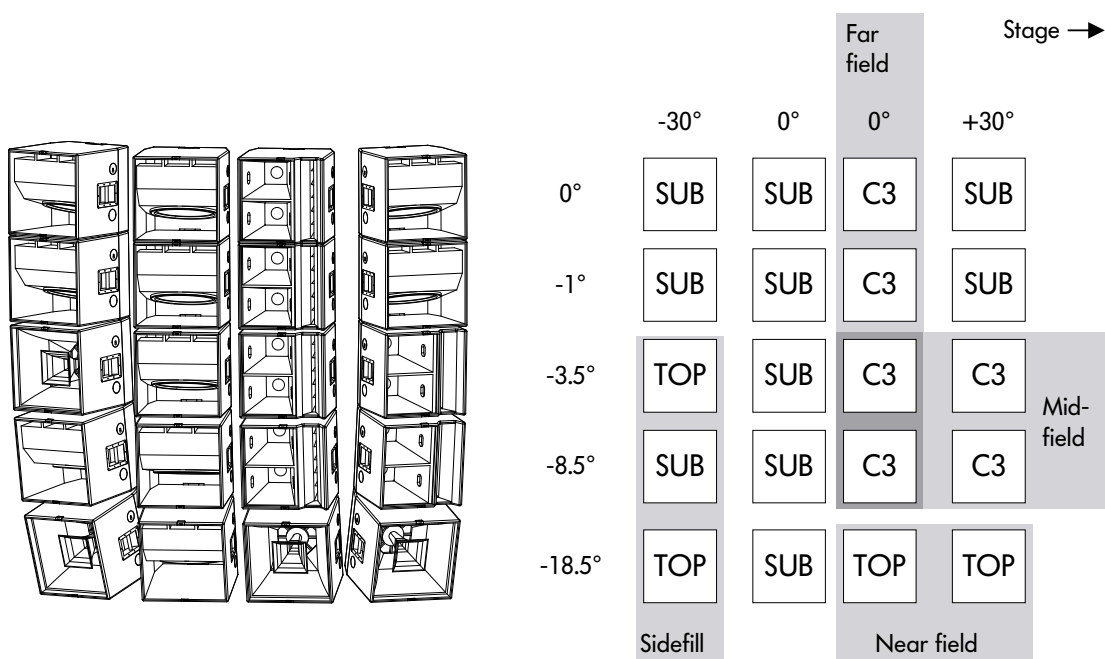
The diagram below shows dispersion angle vs frequency, plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal horizontal dispersion of 35° is maintained above 900 Hz.



C3 horizontal isobar diagram

Example set up

The example below shows a C3/C4 set up arranged to provide the coverage and level distribution for a simple rectangular audience area. The central C3 column projects energy to the far field with a 40° horizontal coverage angle, the C4-TOP cabinets lower down in the cluster provide the wider horizontal coverage angle required in the near field. The C3s in the inner column cover the mid-field and the mixing position, while the column of C4-SUBs maintains a consistent vertical directivity in the lower frequencies.



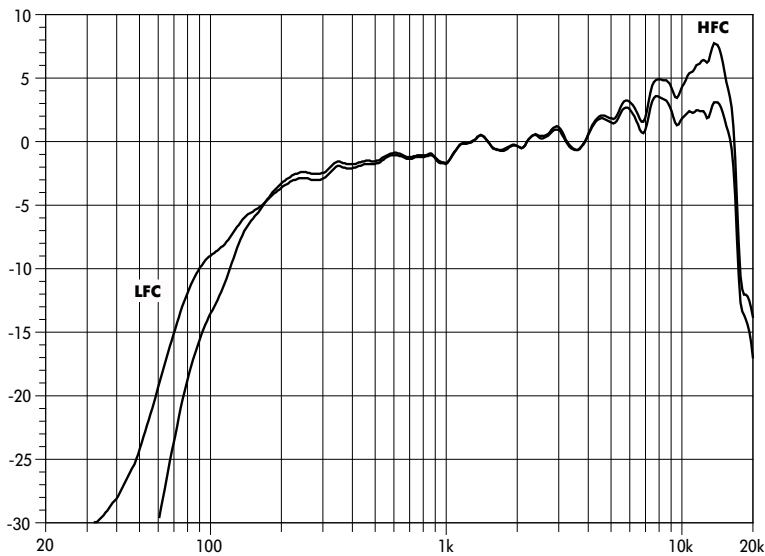
Technical specifications

C3 system data

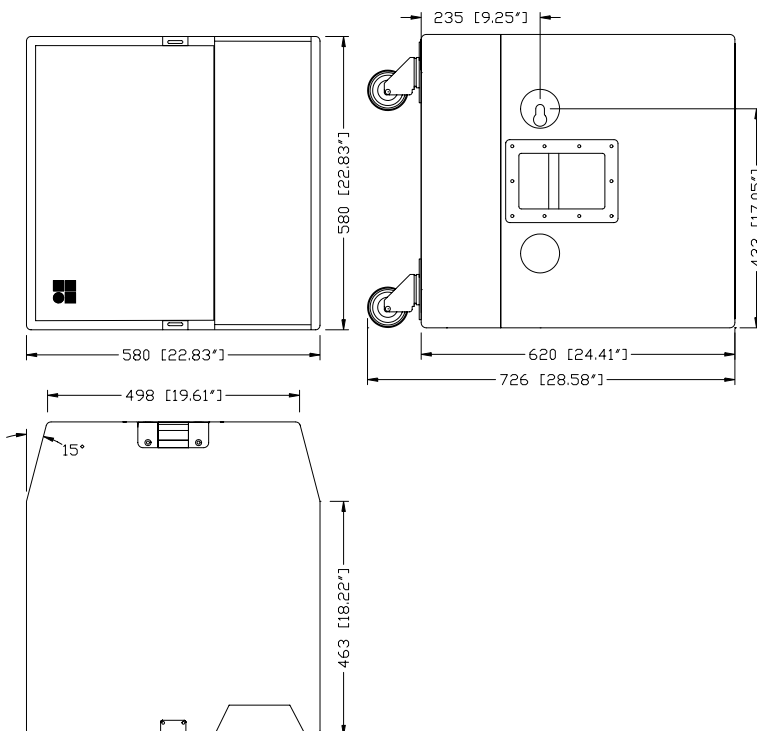
Frequency response (-5 dB standard, two cabinets) 130 Hz ... 16 kHz
 Frequency response (-5 dB LFC Mode, two cabinets) 80 Hz ... 16 kHz
 Max. sound pressure (1 m, free field) > 143 dB
 (SPLmax peak, pink noise test signal with crest factor of 4)
 Polarity to controller INPUT (XLR pin 2: +/3: -) LF: +/HF: +

C3 loudspeaker

Nominal impedance (LF/HF) 4 ohms/5.3 ohms
 Power handling capacity LF (RMS / peak 10 ms) 500/2000 W
 Power handling capacity HF (RMS / peak 10 ms) 150/600 W
 Nominal dispersion angle (hor. x vert.) 35° x 5°
 Connections 1 x EP5
 (optional 1 x NL4)
 Pin assignments EP5: 1/2 LF; 3/4 HF
 NL4: 1+/1- LF; 2+/2- HF
 Weight 71 kg (156 lb)



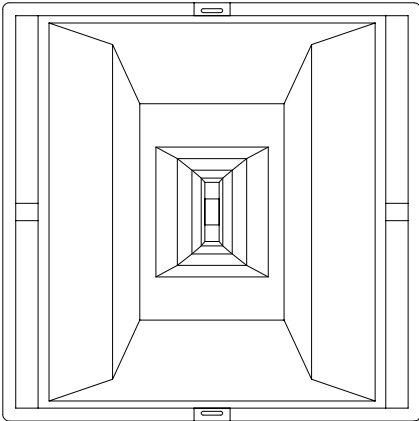
C3 frequency response, standard, LFC and HFC mode (single cabinet)



C3 cabinet dimensions in mm [inch]



C7-TOP



The C7-TOP is a two way horn loaded loudspeaker which provides full range coverage at very high SPLs. The constant directivity design of the coaxial horns used in the C7-TOP helps maintain the 75° x 40° dispersion down to 600Hz. Two passively coupled drivers are used - a 15" low/mid driver back loaded by a vented enclosure, and a 1.5" exit HF compression driver.

The C7-TOP cabinet is constructed from marine plywood, fitted with steel handles, MAN CF4 stud plate rigging points and has an impact resistant paint finish. The front of the loudspeaker cabinet is protected by a rigid metal grill, covered with a replaceable acoustically transparent foam and fitted with catches to the top and bottom for securing an optional transport lid E7908. Mounted on the rear panel are ratchet strap guide plates (kelping bars), four M10 threaded inserts for attaching installation hardware, two Speakon NL4 or EP-5 connectors wired in parallel and four heavy duty wheels.

As the C7-TOP maintains its high efficiency from 18 kHz down to 68 Hz, subwoofers are not needed for applications which do not require very low frequencies.

When high level bass reproduction is desired, then the C7-TOP can be supplemented with the C7-SUB or B2-SUB systems. In larger systems the C7-TOP can also be operated with the C4-SUB and B2 subwoofer combination.

High output, wide horizontal and narrow vertical dispersion down to the low/mid range means that a simple set up using a pair of C7-TOP cabinets, one per side, can deliver smooth wide area coverage across the near field to a distance of 30 m (100 ft). Within a larger set up C7-TOP cabinets are ideal as frontfill, nearfill or delay systems for C4 arrays.

The C7-TOP is compatible with the C4 System - both loudspeaker systems share similar phase responses and cabinet dimensions allowing the straightforward construction of stacked or flown mixed cabinet arrays.

Placing a pair of C7-TOP cabinets with their angled rear side panels together sets them 50° apart to give a combined horizontal coverage of 130°. Similarly a C7-TOP deployed with a C4-TOP sets the cabinets 40° apart to give a combined horizontal coverage of 100°.

CAUTION!

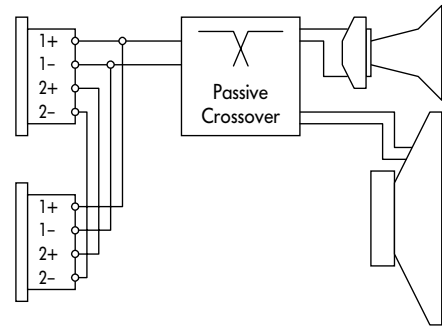
Only operate C7-TOP loudspeakers with a d&b P1200A mainframe fitted with C7-TOP controller modules, otherwise there is a risk of damaging the loudspeaker components.

Connections

The C7-TOP cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C7-TOP uses the pin assignments 1+/1-. Pins 2+/2- are designated to d&b C and E-Series active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C7-TOP can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table on the right.

Up to two C7-TOP loudspeakers can be driven by each P1200A power amplifier channel. Fitting one C7-TOP-CO and one subwoofer controller module allows a single mainframe to drive two C7-TOP's and two active subwoofer cabinets (C7-SUB or C4-SUB). All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.



connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

C7-TOP controller module switches

CUT switch & indicator

Set to CUT, a high pass filter with a 130 Hz cutoff frequency is inserted in the controller signal path. The yellow CUT LED illuminates. The C7 system is now configured for use either with d&b C-Series active subwoofers or the B2 subwoofer set to 'standard' mode.

For high level music applications with the C7-SUB or C4-SUB, we recommend a ratio of two subwoofers per C7-TOP cabinet.

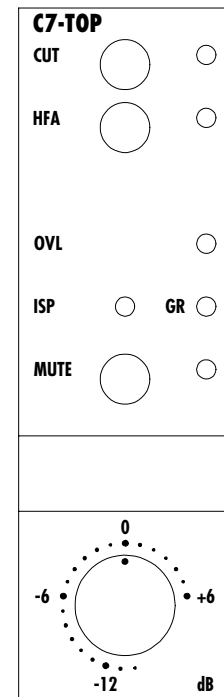
When C7-TOP's are flown without additional subwoofers the cabinets should be operated full range, i.e. CUT mode not selected on the controller module. Low end support can then be provided by C7-SUB systems in 100Hz mode or a B2 system in INFRA mode. A single B2-SUB is enough to support two C7-TOP cabinets. The low crossover frequency allows the subwoofers to be placed centrally and to be driven with a mono signal.

HFA switch & indicator

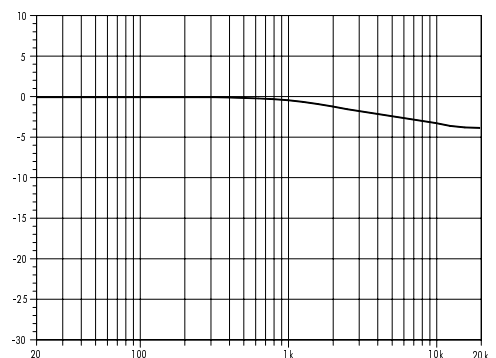
In HFA mode (High Frequency Attenuation), the HF response of the C7 system is rolled off. The yellow HFA LED illuminates. The HFA circuit configures the C7-TOP to provide a natural, balanced frequency response at close listening positions.

High Frequency Attenuation begins gradually at 1 kHz, dropping to approximately 3 dB down at 10 kHz. This roll off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.

The HFA facility thus provides an easy way to adapt C7-TOP loudspeakers for use close to an audience, for example as nearfills or delays.



Controls on C7-TOP controller module



Frequency response correction of HFA circuit

Operation with E-PAC (only possible with E-PAC version 3 with display)

To drive C7-TOP cabinets the E-PAC has to be configured to C7-TOP mode.

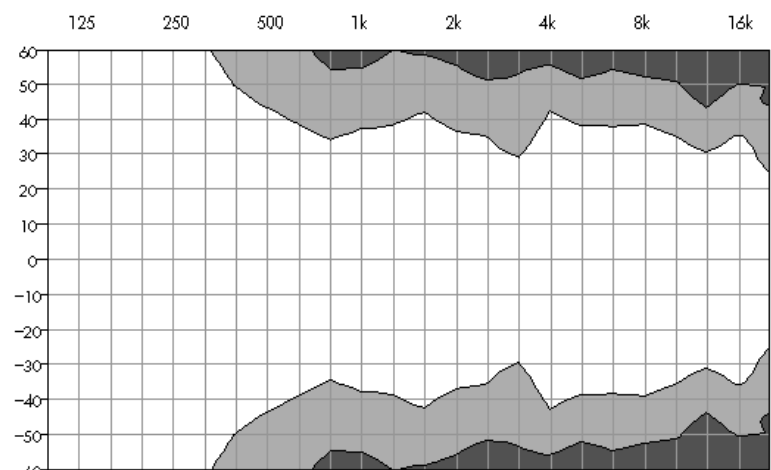
For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The CUT and HFA settings are available. The characteristics of the CUT and HFA settings are explained on the previous page under the section "C7-TOP controller module switches".

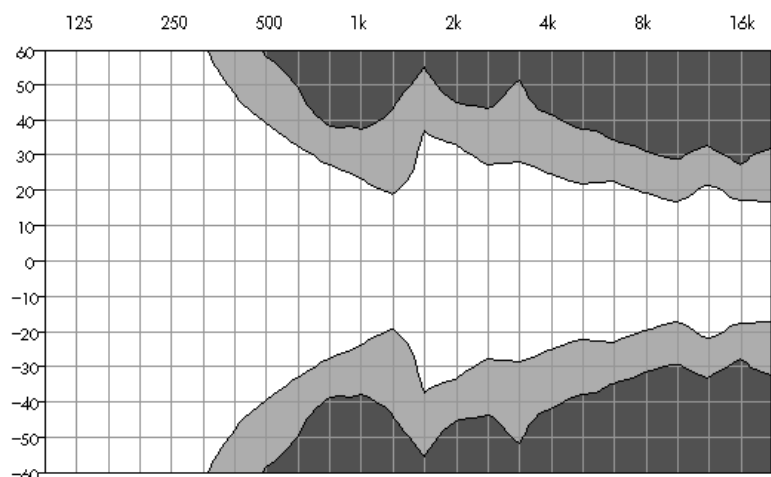
The E-PAC can drive a single C7-TOP cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two C7-TOP cabinets with a 6 dB reduction of input level to the speakers.

Dispersion characteristics

The diagrams below show dispersion angle vs frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal 75° horizontal dispersion is maintained from 17 kHz down to 600 Hz.



horizontal



vertical

C7-TOP isobar diagram

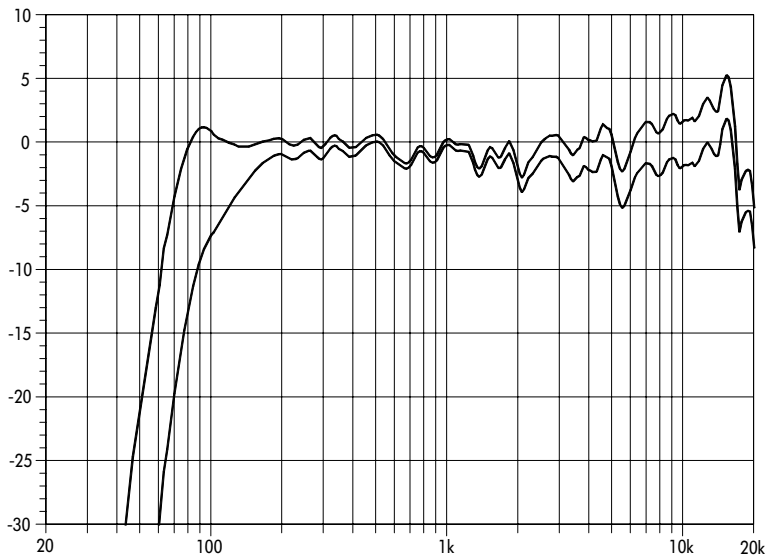
Technical specifications

C7 system data

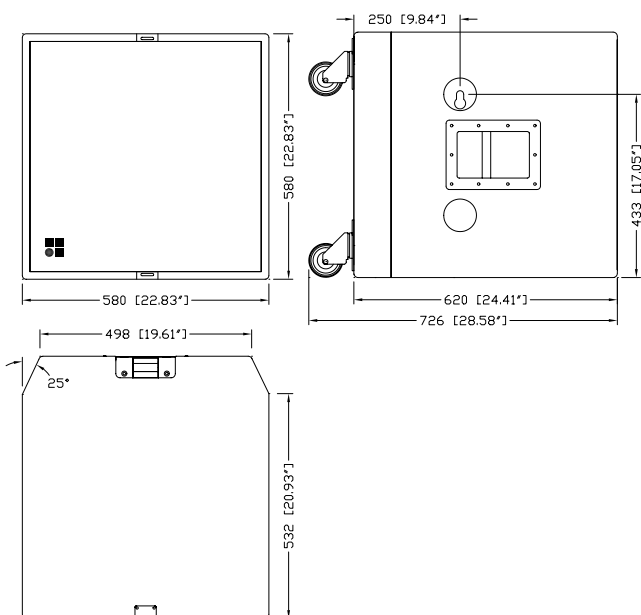
Frequency response (-5 dB)	68 Hz ... 18 kHz
Max. sound pressure (1 m, free field) with P1200A	136 dB
Max. sound pressure (1 m, free field) with E-PAC	134 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax)	+14 dBu
Input level (100 dB-SPL / 1 m)	-19 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: +

C7 loudspeaker

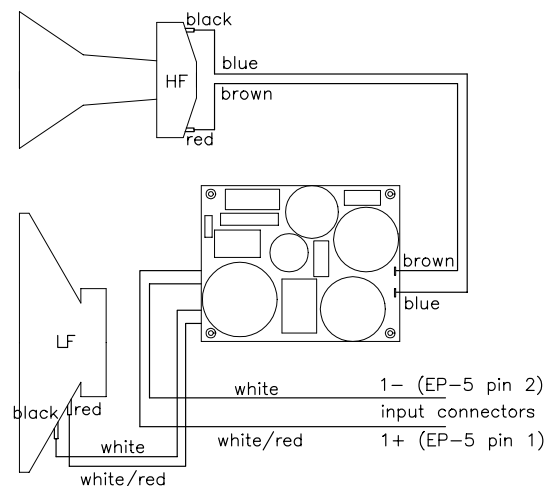
Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms)	200 / 800 W
Nominal dispersion angle (hor. x vert.)	75° x 40°
Connections	2 x Speakon-NL4
.....	(optional 2 x EP-5)
Pin assignments	1+ / 1-
.....	(EP-5: 1 / 2)
Weight	52 kg (115 lb)



C7-TOP frequency response, standard, CUT and HFA switch settings

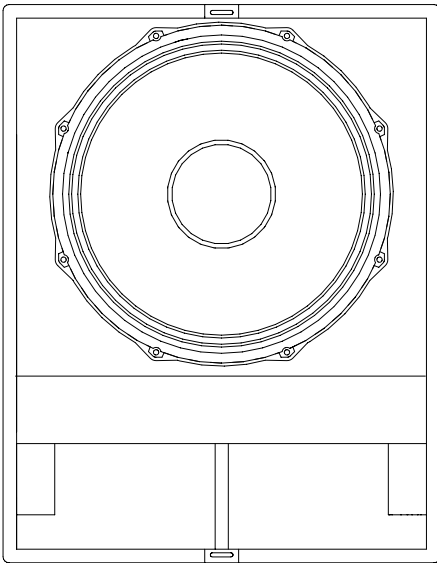


C7-TOP cabinet dimensions in mm [inch]



C7-TOP wiring diagram

C7-SUB



The C7-SUB is a bass-reflex design employing a long excursion 18" driver. The large, specially shaped reflex port enables the C7-SUB to achieve high sound pressure levels with minimal power compression and breathing effects.

The C7-SUB cabinet is constructed from marine plywood, fitted with two pairs of steel handles, and has an impact resistant paint finish. The front of the loudspeaker cabinet is protected by a rigid metal grill, covered with a replaceable acoustically transparent foam and fitted with catches to the top and bottom for securing an optional transport lid E7916. Mounted on the rear panel are two Speakon NL4 or EP-5 connectors wired in parallel and four heavy duty wheels. An M20 threaded flange in the top panel accepts the d&b Z5013 loudspeaker stand for the deployment of full range cabinets.

Designed to be actively driven using the P1200A mainframe, the C7-SUB covers the 44 Hz to 140 Hz or 44 Hz to 100 Hz frequency band, depending on the controller setting.

The C7-SUB is the largest and most powerful C-Series subwoofer principally designed to supplement the C7-TOP loudspeaker. The C7-SUB may however be used to provide bass support for other d&b systems like C6 or MAX (controller CUT setting selected in each case).

Only operate C7-SUB loudspeakers with a d&b P1200A mainframe fitted with C7-SUB controller modules otherwise there is a risk of damaging the loudspeaker components.

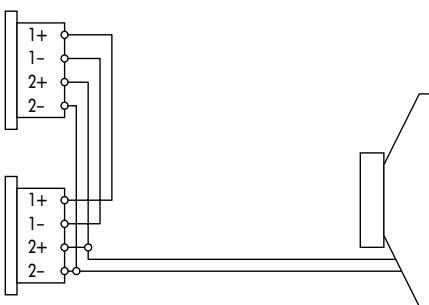
CAUTION!

Connections

The C7-SUB cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. The C7-SUB uses the pin assignments 2+/2-. Pins 1+/1- are designated to C and E-Series full range systems. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The C7-SUB can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table below left.

Up to two C7-SUB's can be driven by each P1200A power amplifier channel. Fitting one C7-SUB-CO and one C-Series TOP controller module allows a single mainframe to drive two C7-SUB and two mid/high cabinets. All cabinets can be linked together locally and fed by a single four-wire cable from either mainframe output connector.



Connector wiring

EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Speakon- NL4 and EP-5 pin assignments

C7-SUB controller module switches

100Hz switch & indicator

If the 100Hz switch is selected (yellow 100Hz LED illuminated), the upper operating frequency of the system is reduced from 140 Hz to 100 Hz. This switch setting allows the C7-SUB to supplement TOP cabinets in full range mode (i.e. CUT not selected).

The 100Hz mode may also be used with TOP cabinets in CUT mode to compensate for room resonances often found in the 125 Hz band.

Mainframe controller configuration

A P1200A mainframe in a mixed configuration, i.e. one TOP and one SUB controller module, can deliver a higher peak power at its SUB output than at either output in a SUB-SUB or Mono-SUB configuration where SUB's are driven on both channels. Hence two mixed configuration mainframes will achieve the maximum low frequency output for a system requiring the use of two TOP and two C7-SUB channels.

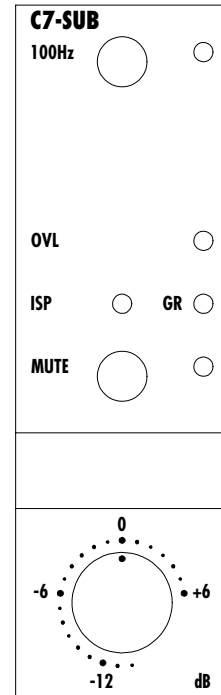
Operation with E-PAC (only possible with E-PAC version 3 with display)

To drive C7-SUB cabinets the E-PAC has to be configured to C7-SUB mode.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

The 100 Hz setting is available. The characteristics of the 100 Hz setting are explained on the previous page under the section "C7-SUB controller module switches".

The E-PAC can drive a single C7-SUB cabinet at an output power of 300 watts. We do not recommend that two C7-SUB cabinets are driven in LO IMP mode as the 6 dB reduction in input level to the loudspeakers results in no gain in acoustical output.



Controls on C7-SUB controller module

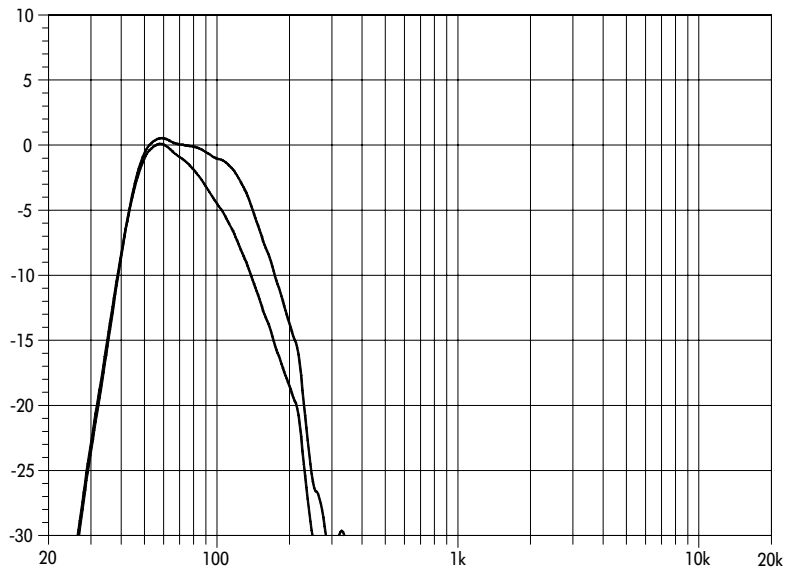
Technical specifications

C7-SUB system data

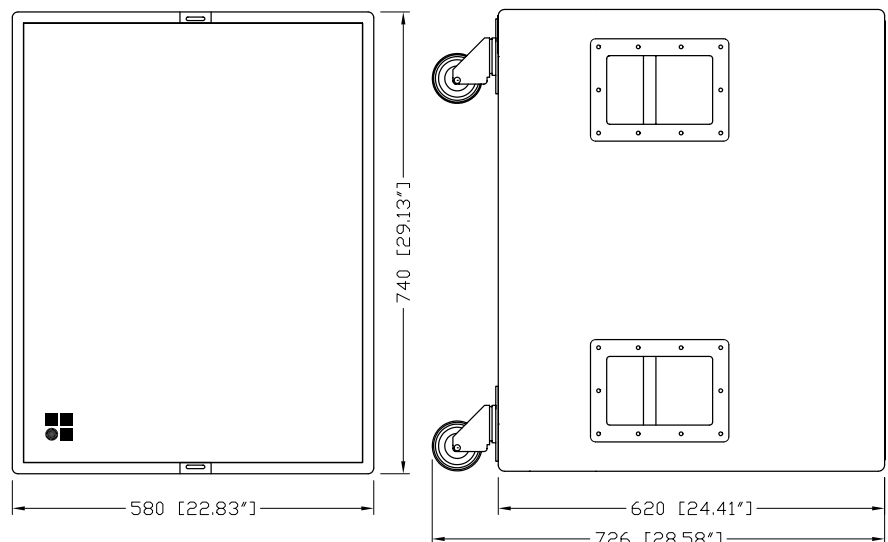
Frequency response (-5 dB).....	44 Hz ... 140 / 100 Hz
Max. sound pressure (1 m, free field) with P1200A.....	133 dB
Max. sound pressure (1 m, free field) with E-PAC	131 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+17 dBu
Input level (100 dB-SPL / 1m)	-13 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: +

C7-SUB loudspeaker

Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms).....	400 / 1200 W
Connections	2 x Speakon-NL4
..... (optional 2 x EP-5)	
Pin assignments	2+ / 2-
..... (EP-5: 3 / 4)	
Weight	49 kg (108 lb)

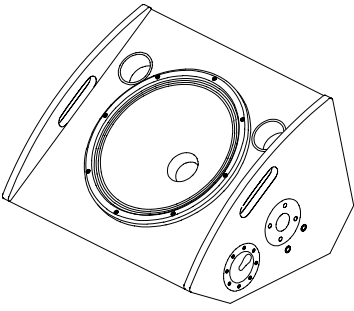


C7-SUB frequency response, standard and 100Hz switch settings



C7-SUB cabinet dimensions in mm [inch]

MAX



MAX is a 2-way floor monitor system and uses a 15"/2" coaxial driver combination with a passive crossover. The driver design allows the use of a compact, low height cabinet. MAX can be driven actively or passively.

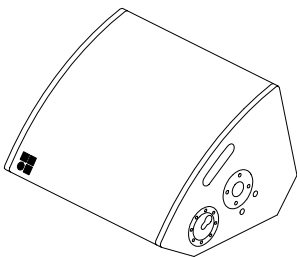
Coaxially mounting the 2" HF and 15" LF drivers creates a very compact single driver whilst retaining the benefits of separate magnetic assemblies. The drivers are positioned together to utilise the combined shape and geometry of the LF cone and HF horn to create a single waveguide with a controlled, symmetrical, 60° conical dispersion.

The MAX cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. A socket to accept a loudspeaker stand, a ratchet strap helping bar and optional MAN CF4 studplates for flying complete the possible rigging options for MAX. Fitted on the rear panel are two parallel wired Speakon-NL4 or EP-5 connectors.

The MAX cabinet does not require special controller electronics. As a stage monitor MAX is preferably operated with the P1200A mainframe equipped with the ampMAX module. The ampMAX module can be configured for passive or 2-way active operation.

The negligible signal delay with this type of construction closely approximates the ideal acoustic point source. The result is a loudspeaker with remarkable vocal presence and clarity, a neutral, balanced sound, high feedback stability and a high sound pressure level capability. The frequency response covers a 85 Hz to 18 kHz band - sufficient for speech reinforcement and stage monitor use.

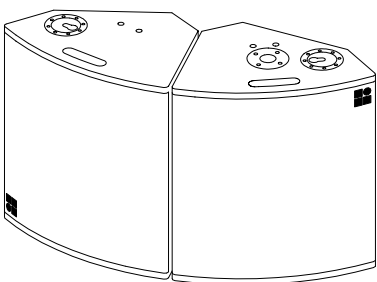
MAX's angled side panels allow a choice of two set up angles when placed on stage (35° or 67°). Together with a comprehensive range of rigging hardware, the MAX cabinet allows fast and easy deployment, either as stage monitors or front of house in a main PA system. Viewed from the top, the angle between the MAX side panels is 45°. MAX cabinets can be deployed side by side to create semi-circular arrays, two cabinets result in an horizontal dispersion of 100° and three cabinets 145°.



**MAX as a stage monitor
(baffle angle 35°)**

For applications which require deep bass, the LF response can be extended by using additional active subwoofer systems C7-SUB or C4-SUB. MAX can also be combined with the E15-BX passive bass extension speaker (not recommended when MAX is driven with an E-PAC).

MAX has been designed to match the dimensions of the C4 system cabinets. Fitted with optional MAN stud plates, MAX can be flown beneath a C4 system as downfills. To maintain the correct phase relationship MAX cabinets are used in passive mode when combined with C4 systems.



MAX as an array with 100° dispersion

Only operate MAX loudspeakers with a d&b P1200A mainframe fitted with ampMAX or AMP-L controller modules or with an d&b E-PAC in linear configuration. As an alternative other high quality power amplifiers may be used, provided their output power does not exceed 500 watts into 8 ohms and an additional subsonic filter is used (25 Hz with 12 dB/octave minimum), otherwise there is a risk of damaging the loudspeaker components.

Connections

The MAX cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

MAX can be supplied with EP-5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP-5 connectors are listed in the table on the right.

CAUTION!

	LF+	LF-	HF+	HF-	n.c.
EP-5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

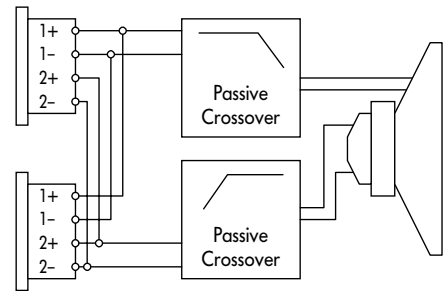
Four wire and two wire operation

To allow the choice of active or passive operation MAX cabinets are driven by a four core cable. The HF and LF drivers are each fed by their own pair of pins and separate passive crossovers. Pins assignments 1+/1- connect the LF driver, pins 2+/2- connect the HF driver, as illustrated on the right.

For applications requiring dedicated passive use, the MAX cabinets internal wiring can be configured for connection to pins 1+/1- allowing use of a two core cable.

The passive two wire configuration is also used when MAX cabinets are combined with C-Series active subwoofers. Driven by a P1200A mainframe fitted with one AMP-L and one C-Series SUB controller module the cabinets can be fed by a single four core cable and linked together locally.

IMPORTANT!

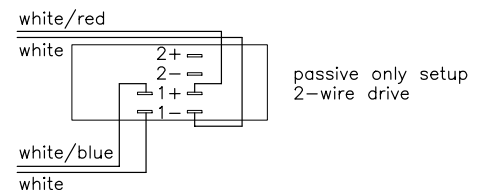
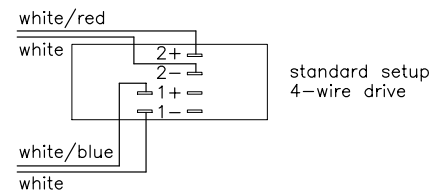


Connector wiring (four wire operation)

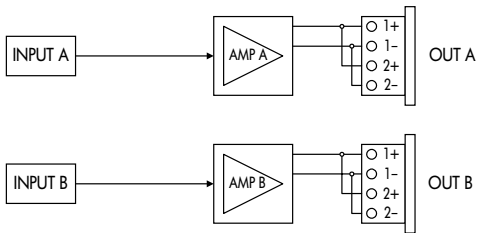
To configure the cabinet for twin wire use the connector panel has to be removed by undoing the four Allen screws with a 2.5 mm Allen key. The wiring on the back of the connector panel can be changed to that shown in the lower illustration on the right.

In the twin wire/passive configuration both the LF and HF drivers are connected to pins 1+/1-. Note that only the HF driver wiring (white and white/red) differs from that used in the four wire version.

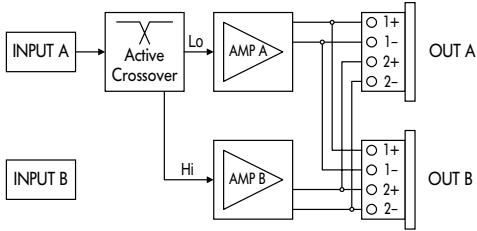
In the twin wire configuration MAX can also be used with amplifiers from other manufacturers. The amplifier or signal distribution box needs to have positive signal on pin 1+ and negative signal on pin 1- of it's speakon output connectors.



MAX internal wiring of the connector panel to the crossover board in four wire and two wire operation



P1200A with ampMAX, passive mode



P1200A with ampMAX, active mode

Operation with P1200A and ampMAX module

ampMAX is a two-channel controller module occupying both slots of a P1200A mainframe. The combination of P1200A and ampMAX allows MAX loudspeakers to be driven passively or in 2-way active mode.

Passive operation

In standard passive mode, ampMAX provides two linear amplifier channels, each amplifier driving all four pins on the channels Speakon output connector. Pins 1+ and 2+ carry positive and pins 1- and 2- carry the negative components of the signal. Two MAX cabinets can be driven by each P1200A amplifier channel.

MAX can also be used with the E15-BX bass extension cabinet. The E15-BX cabinet is equipped with a passive crossover network and simply connects in parallel with the MAX cabinet without the need for any additional control electronics. One MAX and up to two E15-BX cabinets can be driven by each P1200A output channel.

2-way active operation

The ampMAX module contains a switchable electronic crossover which routes separate LF and HF signals to the P1200A amplifier channels. Pins 1+/1- of both loudspeaker outputs carry the LF signal, 2+/2- carry HF signal. The output connector pin assignment is changed automatically when active operation is selected. The input signal is fed to INPUT A, INPUT B is not used.

A P1200A mainframe can drive two MAX loudspeakers in active mode, the extra headroom gained serves for the most demanding monitor applications.

When MAX systems are used as downfills or frontfills for C4 Systems passive operation is recommended. In active mode the phase response of MAX is not compatible with C4 systems.

ampMAX module switches

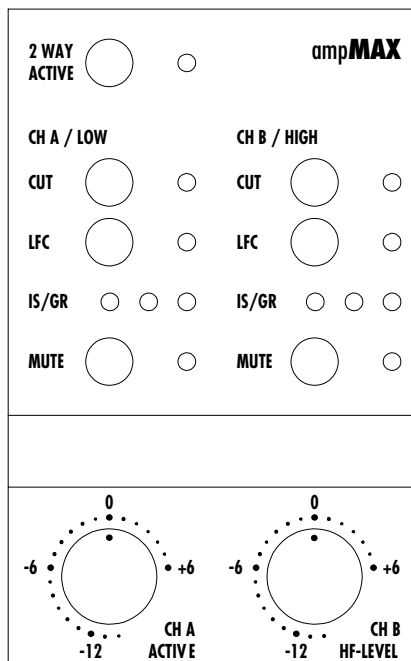
2-WAY ACTIVE switch and indicator

Selecting this switch configures the P1200A for active operation of MAX cabinets - channel A drives the 15" LF loudspeaker, whilst channel B drives the 2" HF driver. The yellow LED next to the switch illuminates to indicate active mode.

The left volume control (CH A / ACTIVE) now controls both channels and sets the overall level, the right volume control (CH B / HF-LEVEL) sets the **relative** HF level.

CUT switch and indicator

Set to CUT, a high pass filter with a 130 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. MAX is now configured for use with d&b C-Series active subwoofers. In active mode only the channel A CUT switch is functional.



Controls on ampMAX module

LFC switch and indicator

When MAX cabinets are used without an active subwoofer selecting LFC, Low Frequency Compensation, extends the low frequency response of MAX cabinets down to 65 Hz. The yellow LFC LED illuminates. In active mode only the channel A LFC switch is functional.

IS/GR indicators

These indicators give a three stage indication of ampMAX signal levels.

- **Input Signal Present** (green) illuminates when the signal presented to the controller input exceeds a -36 dBu threshold value. The ISP circuit is unaffected by the setting of the controller mute switch and level control.
- **Gain Reduction** (yellow) illuminates when the controller limiter reduces gain by more than 3 dB.
- **Overload** (red) illuminates when an overload occurs in the signal path (input signal too high) or when the amplifier gain is reduced because the output current is too high (e.g. due to a short circuit).

With active mode selected, the channel A indicators show the state of the LF channel and the channel B indicators show the state of the HF channel.

Level controls in passive mode

The CH A and CH B detented level controls adjust the controller input sensitivity and have a 20 dB range, -14 dB to +6 dB, calibrated in 1 dB steps. The level controls are normally set to 0 dB.

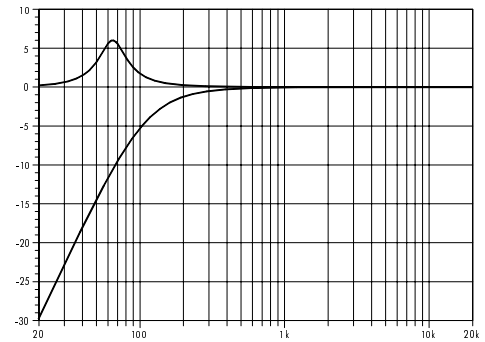
Level controls in 2-way active mode

In active mode the CH A / ACTIVE level control adjusts the controller input sensitivity and has a 20 dB range, -14 dB to +6 dB, calibrated in 1 dB steps. The CH B / HF-LEVEL control adjusts relative HF level in 0.5 dB steps. For a flat response, whatever the setting of the CH A / ACTIVE level control, the CH B / HF-LEVEL control should be set to 0 dB. The more precise 0.5 dB HF level detent settings invalidate the control scale markings. To account for the actual 10 dB range of HF level adjustment from -7 dB to +3 dB divide the control scale setting by two to arrive at the actual value for relative HF level.

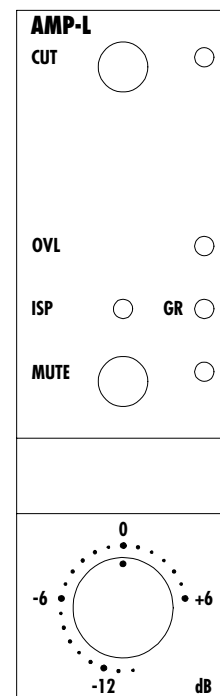
Operation with P1200A and AMP-L module

The AMP-L module occupies a single P1200A module slot and provides a single linear amplifier channel, which drives the pins 1+/1- of the respective output connector. For operation with the AMP-L module MAX cabinets have to be configured for two wire operation (see section "Four wire and two wire operation").

In passive mode up to two MAX loudspeakers can be driven by each P1200A power amplifier channel. Fitting one AMP-L and one subwoofer controller module allows a single mainframe to drive two MAX and two active subwoofer cabinets (C7-SUB or C4-SUB). All cabinets can be linked together locally and fed by a single four-core cable from either mainframe output connector.



Frequency response of CUT and LFC circuits



Controls on AMP-L module

AMP-L module switches

CUT switch and indicator

Set to CUT, a high pass filter with a 130 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. MAX is now configured for use with d&b C-Series active subwoofers.

Operation with E-PAC

To drive MAX cabinets the E-PAC has to be configured to LINEAR mode.

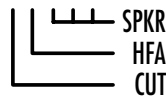
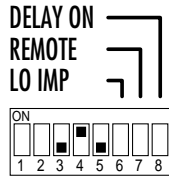
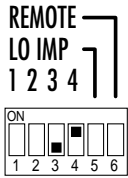
For an E-PAC version 1 and 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

In LINEAR mode all four pins on the Speakon connector are driven by the E-PAC power amplifier, pins 1+ and 2+ carry positive signal, 1- and 2- carry negative signal. MAX loudspeakers can be used in either four wire or two wire configuration.

The E-PAC can drive a single MAX cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two MAX cabinets with a 6 dB reduction of input level to the speakers.

The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT setting are explained above under "AMP-L module switches".



E-PAC version 1

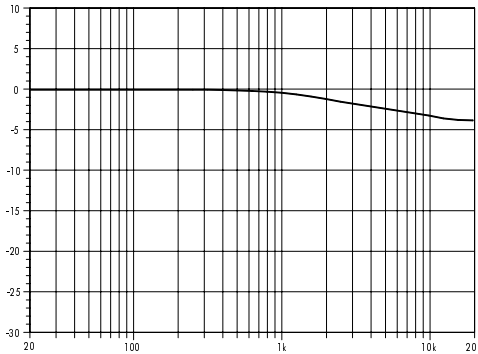
E-PAC version 2

E-PAC Configuration for LINEAR mode

HFA setting

In HFA mode (High Frequency Attenuation), the HF response of the MAX system is rolled off. The HFA circuit configures MAX to provide a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

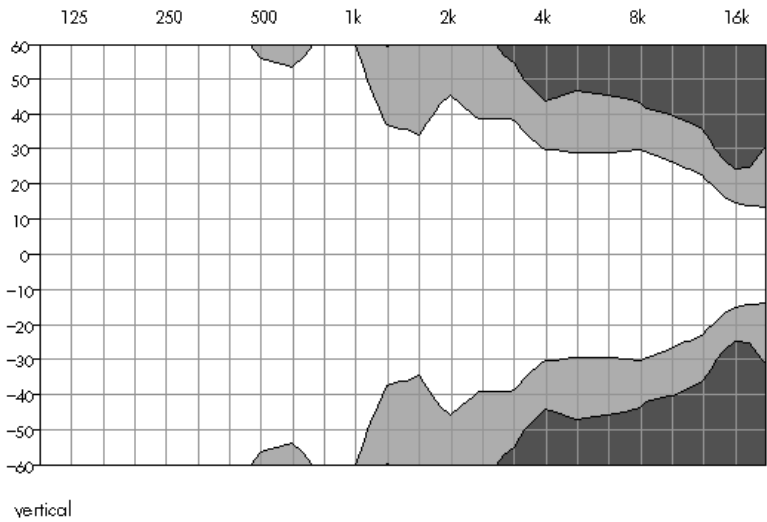
High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll-off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.



**Frequency response correction of HFA circuit
(only available with E-PAC version 2)**

Dispersion characteristics

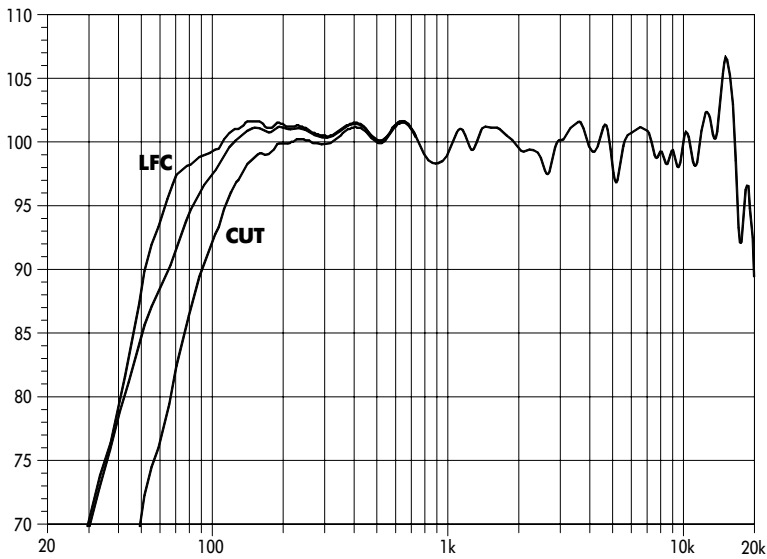
Due to the conical coverage pattern of the coaxial driver design, the horizontal and vertical dispersion characteristics of MAX are largely identical (slight differences which do occur are attributable to the asymmetric cabinet shape). The diagram below shows dispersion angle versus frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB. The nominal 60° dispersion angle is maintained from 4 to 10 kHz.



MAX isobar diagram

Frequency response

The graph below shows the different response curves for MAX driven with the P1200A mainframe with ampMAX. The response in standard mode is equivalent to the operation with a linear power amplifier (SPL at a distance of 1 m, output voltage 2.83 V).



MAX frequency response, standard (linear), LFC and CUT switch settings

Technical specifications

MAX system data, passive setup

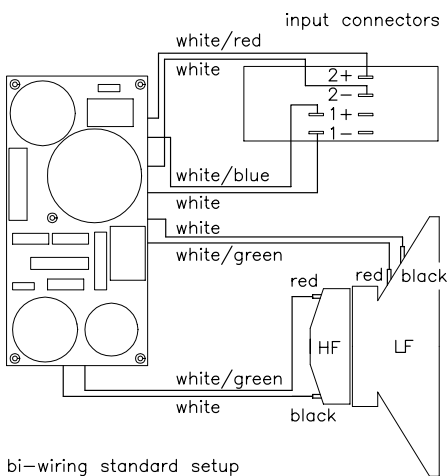
Max. sound pressure (1 m, free field) with P1200A.....	133 dB
Max. sound pressure (1 m, free field) with E-PAC	131 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+13 dBu
Input level (100 dB-SPL / 1 m).....	-17 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: -

MAX system data, active setup with ampMAX

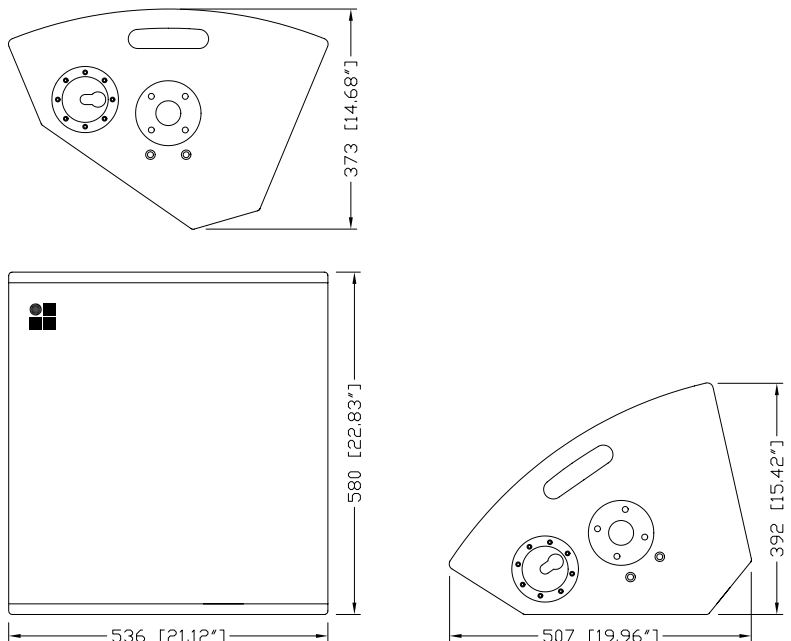
Max. sound pressure (1 m, free field).....	135 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+15 dBu
Input level (100 dB-SPL / 1 m).....	-17 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: +

MAX loudspeaker

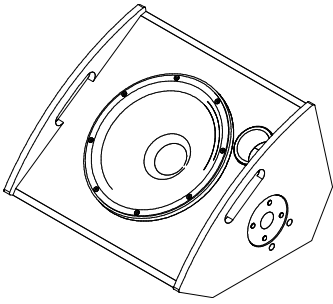
Frequency response (-5 dB, free field)	85 Hz ... 18 kHz
Frequency response (-5 dB, floor coupling).....	60 Hz ... 18 kHz
Sensitivity (2.83 V / 1 m).....	100 dB
Nominal impedance	8 ohms
Power handling capacity (RMS / peak 10 ms).....	250 / 1200 W
Nominal dispersion angle	60° conical
Connections	2 x Speakon-NL4
..... (optional 2 x EP-5)	
Pin assignments Speakon-NL4.....	HF 2+ / 2-
.....	LF 1+ / 1-
Pin assignments EP-5	HF 3 / 4
.....	LF 1 / 2
Weight	26 kg (57 lb)



MAX wiring diagram



MAX12



MAX12 is a 2-way floor monitor system and uses a 12"/2" coaxial driver combination with a passive crossover. The driver design allows the use of a compact, low height cabinet. MAX12 can be driven actively or passively.

Coaxially mounting the 2" HF and 12" LF drivers creates a very compact single driver whilst retaining the benefits of separate magnetic assemblies. The drivers are positioned together to utilise the combined shape and geometry of the LF cone and HF horn to create a single waveguide with a controlled, symmetrical, 80° conical dispersion.

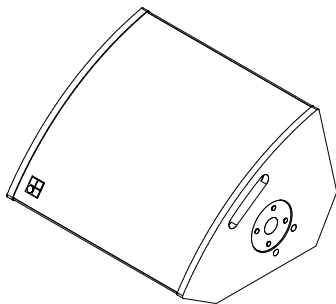
The MAX12 cabinet is constructed from marine plywood and has an impact resistant paint finish. The front of the loudspeaker cabinet is fitted with a rigid metal grill covered with a replaceable acoustically transparent foam. A socket to accept a loudspeaker stand and four M10 threaded inserts complete the possible rigging options for MAX12. Fitted on the rear panel are two parallel wired Speakon-NL4 or EP5 connectors.

The MAX12 cabinet does not require special controller electronics. As a stage monitor MAX12 is preferably operated with the P1200A mainframe equipped with the ampMAX module. The ampMAX module can be configured for passive and for 2-way active operation.

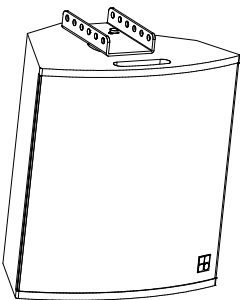
The negligible signal delay with this type of construction closely approximates the ideal acoustic point source. The result is a loudspeaker with remarkable vocal presence and clarity, a neutral, balanced sound, high feedback stability and a high sound pressure level capability. The free field frequency response covers a 100 Hz to 18 kHz band - sufficient for speech reinforcement. When used as a stage monitor the floor coupling extends the frequency response down to 80 Hz.

MAX12's angled side panels allow a choice of two set up angles when placed on stage (35° or 67°). Together with a comprehensive range of rigging hardware, the MAX12 cabinet allows fast and easy deployment of cabinets either as stage monitors or front-of-house in a main PA system. Viewed from the top, the angle between the MAX12 side panels is 45°. MAX12 cabinets can be deployed side by side to create semi-circular arrays, two cabinets result in an horizontal dispersion of 120° and three cabinets 170°.

For applications which require deep bass, the LF response can be extended by using additional active subwoofer systems C7-SUB or C4-SUB. MAX12 can also be combined with the E15-BX passive bass extension speaker (not recommended when MAX12 is driven with an E-PAC).



**MAX12 as a stage monitor
(baffle angle 35°)**



MAX12 with 03 Flying adapter

Only operate MAX12 loudspeakers with a d&b P1200A mainframe fitted with ampMAX or AMP-L controller modules or with an d&b E-PAC in linear configuration. As an alternative other high quality power amplifiers may be used, provided their output power does not exceed 500 watts into 8 ohms and an additional subsonic filter is used (25 Hz with 12 dB/octave minimum), otherwise there is a risk of damaging the loudspeaker components.

Connections

The MAX12 cabinet is fitted with a pair of Speakon-NL4 connectors. All four pins of both connectors are wired in parallel. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

MAX12 can be supplied with EP5 output connectors as an option. Pin equivalents of Speakon-NL4 and EP5 connectors are listed in the table on the right.

CAUTION!

	LF+	LF-	HF+	HF-	n.c.
EP5	1	2	3	4	5
NL4	1+	1-	2+	2-	n.c.

Four wire and two wire operation

To allow the choice of active or passive operation MAX12 cabinets are driven by a four core cable. The HF and LF drivers are each fed by their own pair of pins and separate passive crossovers. Pins assignments 1+/1- connect the LF driver, pins 2+/2- connect the HF driver, as illustrated on the right.

For applications requiring dedicated passive use, the MAX12 cabinets internal wiring can be configured for connection to pins 1+/1- allowing use of a two core cable.

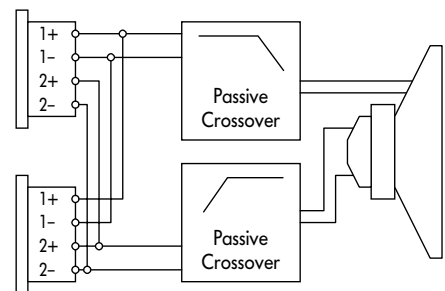
The passive two wire configuration is also used when MAX12 cabinets are combined with C-Series active subwoofers. Driven by a P1200A mainframe fitted with one AMP-L and one C-Series SUB controller module the cabinets can be fed by a single four core cable and linked together locally.

To configure the cabinet for twin wire use the connector panel has to be removed by undoing the four Allen screws with a 2.5 mm Allen key. The wiring on the back of the connector panel can be changed to that shown in the lower illustration on the right.

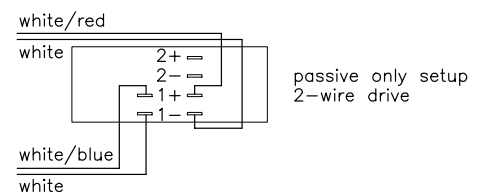
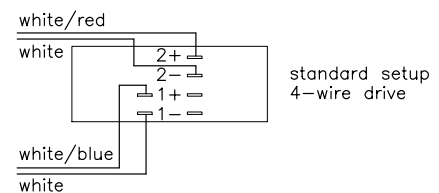
In the twin wire/passive configuration both the LF and HF drivers are connected to pins 1+/1-. Note that only the HF driver wiring (white and white/red) differs from that used in the four wire version.

In the twin wire configuration MAX12 can also be used with amplifiers from other manufacturers. The amplifier or signal distribution box needs to have positive signal on pin 1+ and negative signal on pin 1- of it's speakon output connectors.

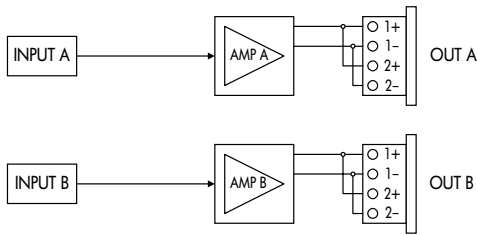
IMPORTANT!



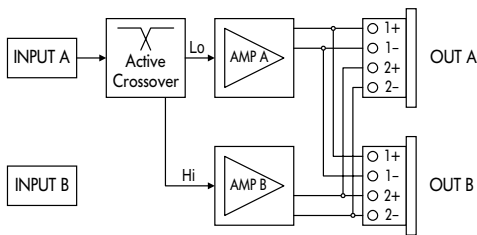
Connector wiring (four wire operation)



MAX12 internal wiring of the connector panel to the crossover board in four wire and two wire operation



P1200A with ampMAX, passive mode



P1200A with ampMAX, active mode

Operation with P1200A and ampMAX module

ampMAX is a two-channel controller module occupying both slots of a P1200A mainframe. The combination of P1200A and ampMAX allows MAX and MAX12 loudspeakers to be driven passively or in 2-way active mode.

Passive operation

In standard passive mode, ampMAX provides two linear amplifier channels, each amplifier driving all four pins on the channels Speakon output connector. Pins 1+ and 2+ carry positive and pins 1- and 2- carry the negative components of the signal. Two MAX12 cabinets can be driven by each P1200A amplifier channel.

MAX12 can also be used with the E15-BX bass extension cabinet. The E15-BX cabinet is equipped with a passive crossover network and simply connects in parallel with the MAX12 cabinet without the need for any additional control electronics. One MAX12 and up to two E15-BX cabinets can be driven by each P1200A output channel.

2-way active operation

The ampMAX module contains a switchable electronic crossover which routes separate LF and HF signals to the P1200A amplifier channels. Pins 1+/1- of both loudspeaker outputs carry the LF signal, 2+/2- carry HF signal. The output connector pin assignment is changed automatically when active operation is selected. The input signal is fed to INPUT A, INPUT B is not used.

A P1200A mainframe can drive two MAX or MAX12 loudspeakers in active mode, the extra headroom gained serves for the most demanding monitor applications.

ampMAX module switches

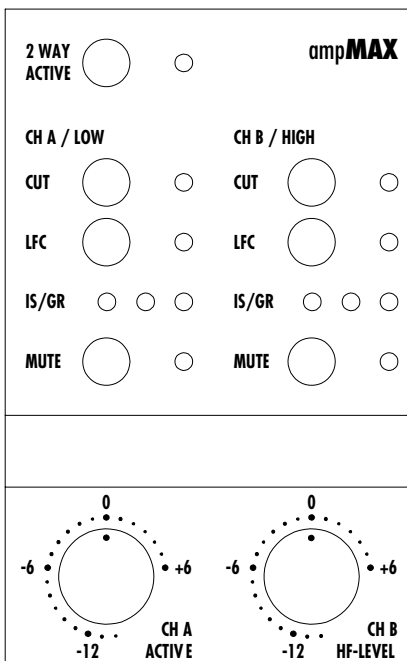
2 WAY ACTIVE switch and indicator

Selecting this switch configures the P1200A for active operation of MAX12 cabinets - channel A drives the 12" LF loudspeaker, whilst channel B drives the 2" HF driver. The yellow LED next to the switch illuminates to indicate active mode.

The left volume control (CH A / ACTIVE) now controls both channels and sets the overall level, the right volume control (CH B / HF-LEVEL) sets the **relative** HF level.

CUT switch and indicator

Set to CUT, a high pass filter with a 130 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. MAX12 is now configured for use with d&b C-Series active subwoofers. In active mode only the channel A CUT switch is functional.



Controls on ampMAX module

LFC switch and indicator

When MAX12 cabinets are used without an active subwoofer selecting LFC, Low Frequency Compensation, extends the low frequency response of MAX12 cabinets down to 75 Hz. The yellow LFC LED illuminates. In active mode only the channel A LFC switch is functional.

IS/GR indicators

These indicators give a three stage indication of ampMAX signal levels.

- **Input Signal Present** (green) illuminates when the signal presented to the controller input exceeds a -36 dBu threshold value. The ISP circuit is unaffected by the setting of the controller mute switch and level control.
- **Gain Reduction** (yellow) illuminates when the controller limiter reduces gain by more than 3 dB.
- **Overload** (red) illuminates when an overload occurs in the signal path (input signal too high) or when the amplifier gain is reduced because the output current is too high (e.g. due to a short circuit).

With active mode selected, the channel A indicators show the state of the LF channel and the channel B indicators show the state of the HF channel.

Level controls in passive mode

The CH A and CH B detented level controls adjust the controller input sensitivity and have a 20 dB range, -14 dB to +6 dB, calibrated in 1 dB steps. The level controls are normally set to 0 dB.

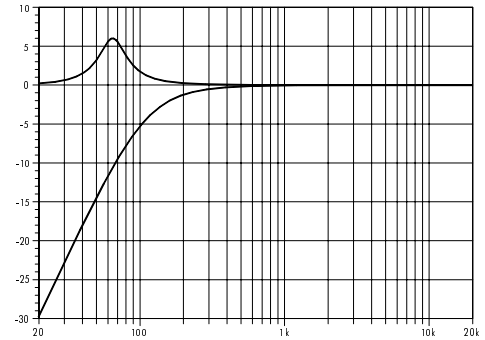
Level controls in 2-way active mode

In active mode the CH A / ACTIVE level control adjusts the controller input sensitivity and has a 20 dB range, -14 dB to +6 dB, calibrated in 1 dB steps. The CH B / HF-LEVEL control adjusts relative HF level in 0.5 dB steps. For a flat response, whatever the setting of the CH A / ACTIVE level control, the CH B / HF-LEVEL control should be set to 0 dB. The more precise 0.5 dB HF level detent settings invalidate the control scale markings. To account for the actual 10 dB range of HF level adjustment from -7 dB to +3 dB divide the control scale setting by two to arrive at the actual value for relative HF level.

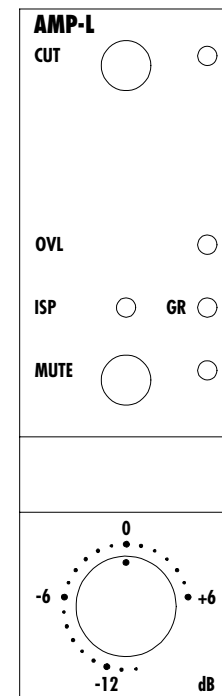
Operation with P1200A and AMP-L module

The AMP-L module occupies a single P1200A module slot and provides a single linear amplifier channel, which drives the pins 1+/1- of the respective output connector. For operation with the AMP-L module MAX12 cabinets have to be configured for two wire operation (see section "Four wire and two wire operation").

In passive mode up to two MAX12 loudspeakers can be driven by each P1200A power amplifier channel. Fitting one AMP-L and one subwoofer controller module allows a single mainframe to drive two MAX12 and two active subwoofer cabinets (C7-SUB or C4-SUB). All cabinets can be linked together locally and fed by a single four-core cable from either mainframe output connector.



Frequency response of CUT and LFC circuits



Controls on AMP-L module

AMP-L module switches

CUT switch and indicator

Set to CUT, a high pass filter with a 130 Hz cut-off frequency is inserted in the controller signal path. The yellow CUT LED illuminates. MAX12 is now configured for use with d&b C-Series active subwoofers.

Operation with E-PAC

To drive MAX12 cabinets the E-PAC has to be configured to LINEAR mode.

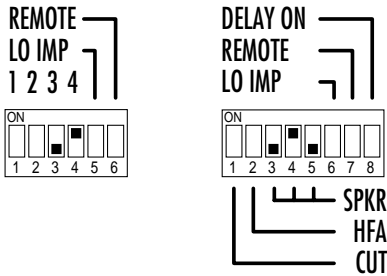
For an E-PAC version 1 and 2, the configuration is selected by setting the appropriate DIP switches on the rear panel.

For an E-PAC version 3, the configuration is set via a front panel digital rotary encoder in conjunction with an LCD.

In LINEAR mode all four pins on the Speakon connector are driven by the E-PAC power amplifier, pins 1+ and 2+ carry positive signal, 1- and 2- carry negative signal. MAX12 loudspeakers can be used in either four wire or two wire configuration.

The E-PAC can drive a single MAX12 cabinet at an output power of 300 watts. LO IMP mode allows the E-PAC to drive two MAX12 cabinets with a 6 dB reduction of input level to the speakers.

The CUT and HFA settings are available on versions 2 and 3. The characteristics of the CUT setting are explained above under "AMP-L module switches".



E-PAC version 1

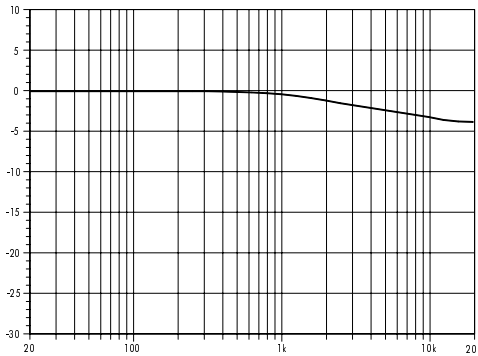
E-PAC version 2

E-PAC Configuration for LINEAR mode

HFA setting

In HFA mode (High Frequency Attenuation), the HF response of the MAX12 system is rolled off. The HFA circuit configures MAX12 to provide a natural, balanced frequency response when a unit is placed close to listeners in near field or delay use.

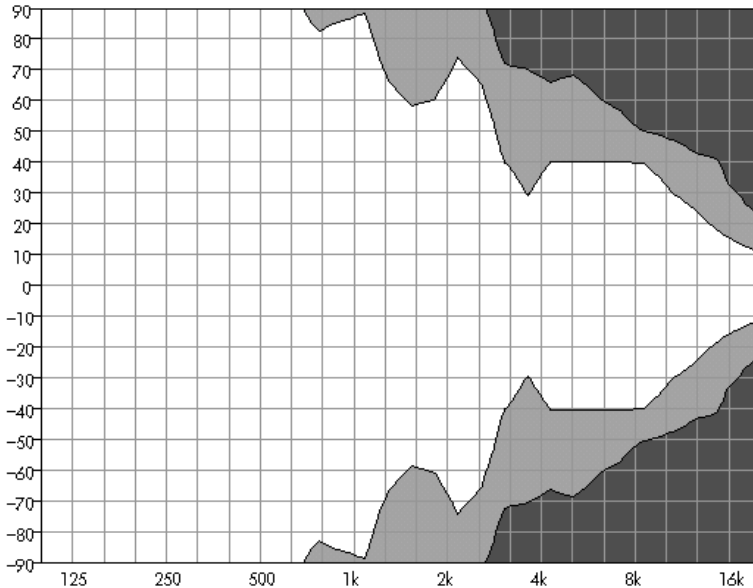
High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll-off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.



Frequency response correction of HFA circuit (only available with E-PAC version 2)

Dispersion characteristics

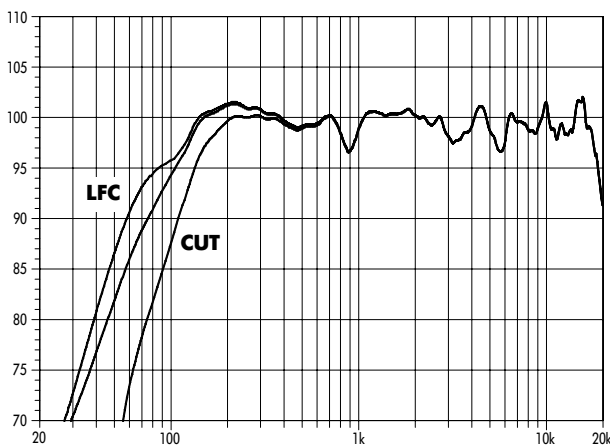
Due to the conical coverage pattern of the coaxial driver design, the horizontal and vertical dispersion characteristics of MAX12 are largely identical (slight differences which do occur are attributable to the asymmetric cabinet shape). The diagram below shows dispersion angle versus frequency plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB.



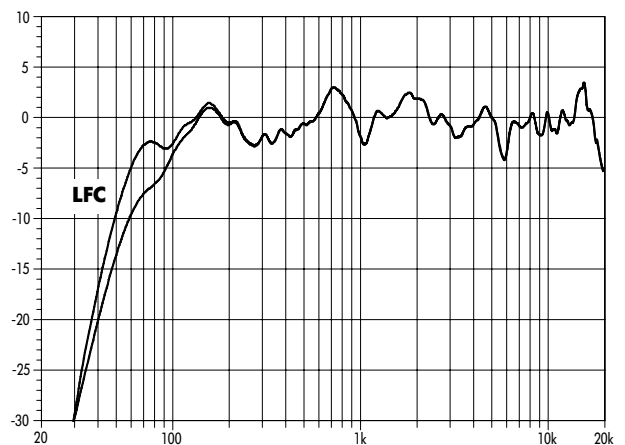
MAX12 isobar diagram

Frequency response

The graph below shows the different response curves for MAX12 in free field driven with the P1200A mainframe with ampMAX. The response in standard mode is equivalent to the operation with a linear power amplifier.



MAX12 frequency response, (1m, free field) standard (linear, 2,83 V), LFC and CUT switch settings



MAX12 frequency response, floor position, Microphone on axis, height 1.5 m, standard and LFC switch settings

Technical specifications

MAX12 system data, passive setup

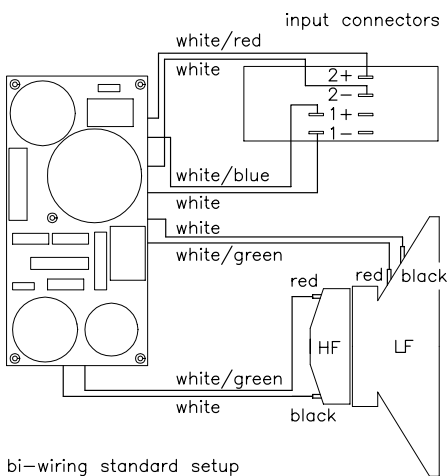
Max. sound pressure (1 m, free field) with P1200A.....	132 dB
Max. sound pressure (1 m, free field) with E-PAC	130 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+13 dBu
Input level (100 dB-SPL / 1 m).....	-16 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: -

MAX12 system data, active setup with ampMAX

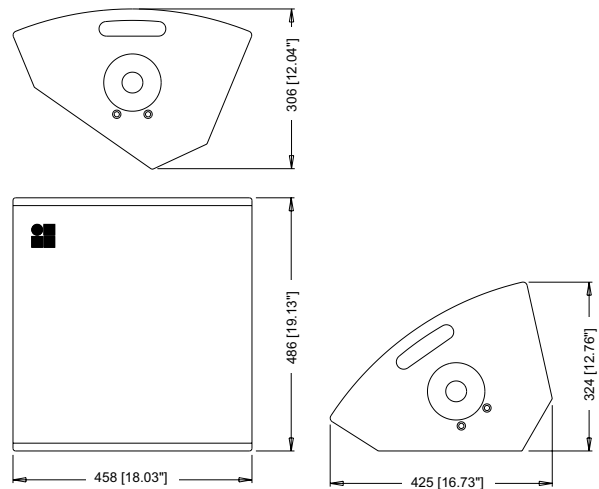
Max. sound pressure (1 m, free field).....	134 dB
(SPLmax peak, pink noise test signal with crest factor of 4)	
Input level (SPLmax).....	+15 dBu
Input level (100 dB-SPL / 1 m).....	-16 dBu
Polarity to controller INPUT (XLR pin 2: + / 3: -)	LF: + / HF: +

MAX12 loudspeaker

Frequency response (-5 dB, free field)	100 Hz – 18 kHz
Frequency response (-5 dB, floor coupling).....	80 Hz – 18 kHz
Sensitivity (2.83 V / 1 m).....	99 dB
Nominal impedance.....	8 ohms
Power handling capacity (RMS / peak 10 ms).....	250 / 1200 W
Nominal dispersion angle	80° conical
Connections	2 x Speakon-NL4
..... (optional 2 x EP-5)	
Pin assignments Speakon-NL4.....	HF 2+ / 2-
..... LF 1+ / 1-	
Pin assignments EP5.....	HF 3 / 4
..... LF 1 / 2	
Weight	22 kg (48 lb)



MAX12 wiring diagram



MAX12 cabinet dimensions in mm [inch]

5. System operation

5.1. Setting up/stacking the loudspeakers

To get the best out of any high quality loudspeaker system it must be properly set up. Care and attention needs to be paid to the position of loudspeaker cabinets relative to each other and also to how they are angled and aimed towards the audience.

Vertical aiming

The aiming of the loudspeaker in the vertical plane is responsible for the coverage all the way from the stage to the furthest listening point. Both the height and vertical angle of the loudspeakers need careful adjustment. The best way to set the height and angle of cabinets independently of each other is to use a loudspeaker stand with the cabinet fitted to a swivel bracket. The loudspeaker stand can be the usual free standing type or a simple column stand fitted to the top of a subwoofer cabinet - both types are illustrated in the d&b system brochures.

The lower the loudspeaker height, then the greater the sound level difference between the audience area at the front of the stage and the area at the extreme range of the loudspeaker coverage. To give a relatively even level distribution the loudspeakers need to be placed as high as practicable.

In relatively confined spaces there is a risk of aiming too much energy towards the rear wall and ceiling of a room, increasing the reverberant component in the room. In the worst case, bad speaker aiming can create an audible slap echo from the rear wall of the room - slightly tilting the loudspeaker cabinets down towards the audience can reduce this problem.

Because it's HF horn has a built-in 8° downward tilt, the E9 loudspeaker is ideally suited to this type of application. Usually there is no need to use a swivel bracket - the cabinet can be fixed straight on to a loudspeaker stand.

Horizontal aiming

The design of the d&b C- and E-Series cabinets simplifies horizontal aiming. The sloping rear side panels of the cabinets precisely define the edges of a cabinet's horizontal coverage. It's easy to gauge the extent of the horizontal coverage by sighting along a line from the surface of each rear side panel of the cabinet.

Arraying mid/high cabinets

With more than one loudspeaker source in a room, comb filter effects can create coverage problems. Comb filtering creates an uneven frequency response across an area which is reached by two or more sources at similar levels but at slightly different path lengths (interference between the signals).

Therefore arrays need to be constructed so that the coverage patterns of the individual loudspeakers combine with minimal overlap. Placing C-Series cabinets with their rear side panels butted together guarantees minimal dispersion pattern overlap and hence minimal interference.

Vertically stacking the cabinets, rather than horizontally arraying them is particularly useful in deep rooms where more than one cabinet has to be used because a single cabinet has insufficient throw for the level needed at the back of the room. This helps reduce interference in the horizontal plane and gives more vertical directivity.

Coupling subwoofers

Regardless of the type and operating principles of the subwoofer systems, the basic relationships of coverage and array directivity at bass frequencies apply.

- Vertical arrays of subwoofers carry bass further since they have higher vertical directivity, and hence dissipate less energy in the vertical direction.
- Horizontal arrays have greater horizontal directivity and can therefore be used more effectively to influence level distribution in the horizontal plane, e.g. between the middle and sides of the stage. The typical effect of bass over-accentuation on the central axis between the two front stacks can be reduced by rotating the two subwoofer arrays in an outward direction. The broader the SUB array, the greater the effect.

If a large number of systems are available, an L-shape configuration can combine the advantages of the two variants.

The arrangement of subwoofers in flown arrays (C4 system) is often determined by the position of the TOP cabinets, i.e. the coverage requirements of the array. However, it is important to ensure that the subwoofer systems are also arranged in groups (blocks, rows or columns) in order to benefit from the coupling effects described above.

5.2. Wiring

In order to keep losses in tone and power low the length of cable run between mainframe and loudspeaker should be kept as short as possible. A conductor size of 1.5 mm² (16 AWG) is necessary, 2.5 mm² (12 AWG) is preferable.

When full range loudspeakers and actively driven subwoofers are operated together, then - due to the different pin assignments of the systems - four-core cables have to be used.

We recommend the use of d&b MC4 cable (4 x 2.5 mm² / 4 conductor 12 AWG). MC4 cables retain their flexibility even at low temperatures and can be supplied in various lengths.

If very long cable runs are unavoidable in an installation, a conductor size greater than 2.5 mm² (12 AWG) may be needed to reduce power loss and to achieve an acceptable damping factor (relation of load impedance to cable impedance). If the individual conductor size in a cable is insufficient, then it's permissible to use two or more of the conductors.

The following 'rule of thumb' formula allows you to estimate the maximum cable length with an acceptable damping factor (>10):

$$\text{maximum (single) length of cable [m]} = 3 \times \text{load impedance [ohms]} \times \text{cross-section [mm}^2\text{]}$$

The parallel wired connectors fitted to all C-Series and E-Series loudspeakers allow the mainframe output signal to be looped from one cabinet to another dispensing with the need for signal distribution boxes.

P1200A stereo configuration

For stereo use the mainframe is fitted with two controller modules of the same type - either two modules for full range systems (E3, E9, C6, C7-TOP, C4-TOP) or two modules for active subwoofer systems (C4-SUB, C7-SUB, E18-SUB).

The left controller module (INPUT A) drives the upper mainframe output connector (OUT CHANNEL A), the right module drives the lower one (OUT CHANNEL B).

Up to two loudspeaker cabinets - four in the case of E3 loudspeakers - may be connected to each of the two P1200A mainframe output channels. A single speaker cable can be used between each mainframe output and the first cabinet on that output channel, with second and subsequent cabinets 'daisy-chained' using short link cables from cabinet to cabinet.

P1200A mixed configuration

If a mainframe is fitted with mixed modules, one TOP module and one SUB module, INPUT A relates to the TOP controller, INPUT B to the SUB controller.

Normally both will be operated with the same input signal, i.e. the signal is connected to INPUT A and then - using a short signal link cable - fed from the INPUT LINK connector of INPUT A to INPUT B.

The output signals for subwoofer and mid/high cabinets will appear on both output connectors. This means that it does not matter which mainframe output a subwoofer or full range cabinet is connected to, whether directly or via a link connection to another cabinet, each type of cabinet will pick off from the four core speaker cable the pair of conductors with the appropriate drive signal.

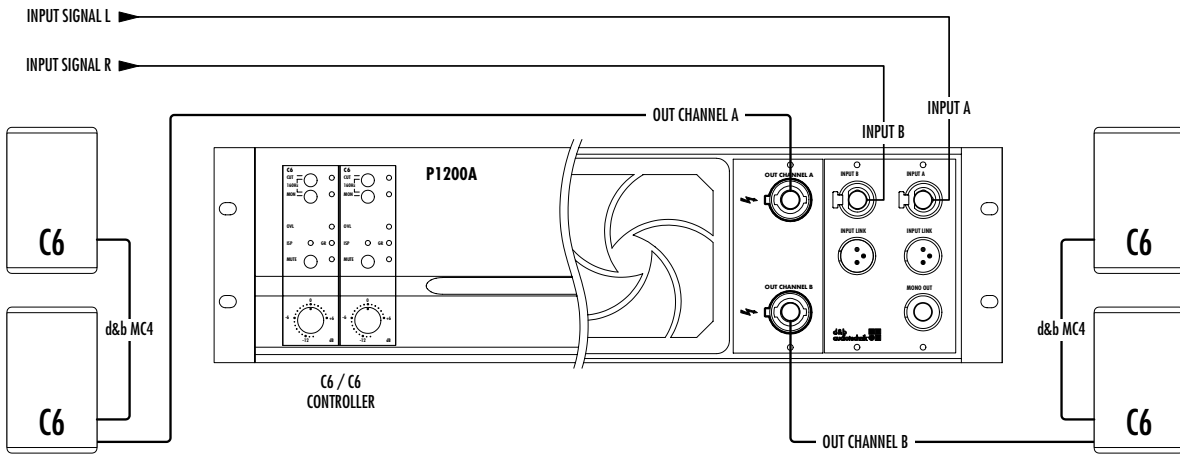
With mixed modules two full range cabinets (E3: four) plus two subwoofers can be driven using a single cable from either mainframe output with the first cabinet connected directly to the mainframe output channel and second and subsequent cabinets 'daisy-chained' using short link cables from cabinet to cabinet.

P1200A mono configuration

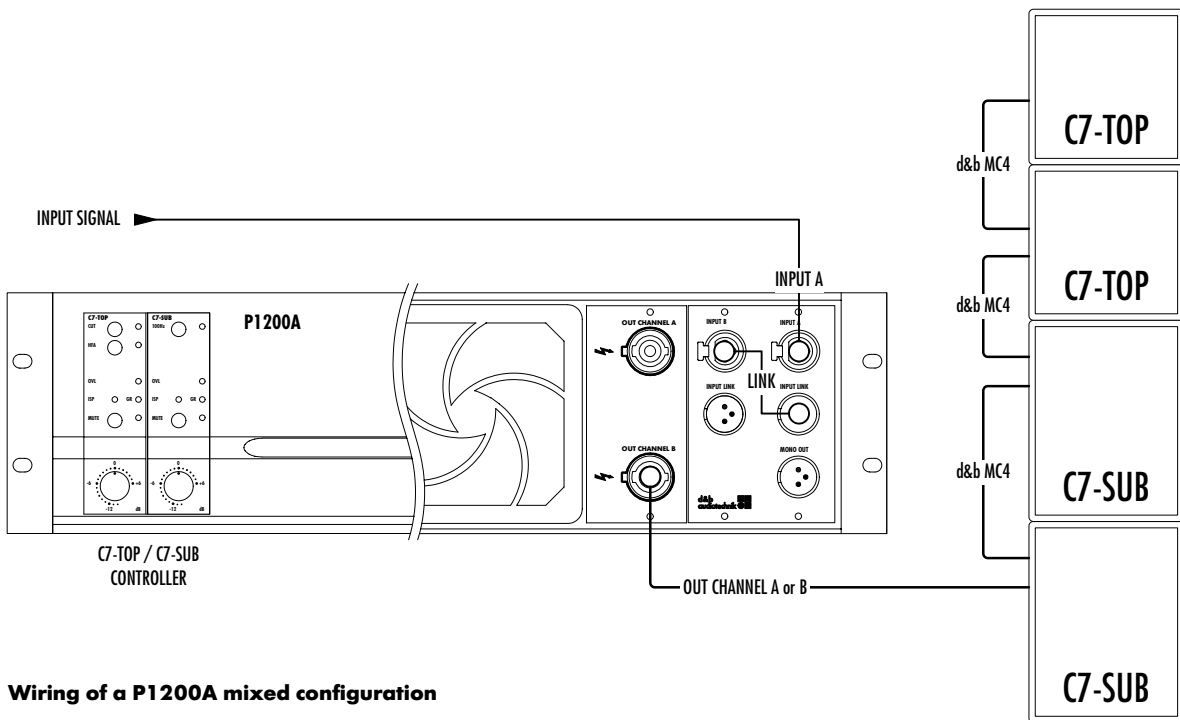
With mainframes fitted with a single controller module and a mono adapter, only one input connector is active. INPUT A in the case of a TOP mono configuration, INPUT B in the case of a SUB mono configuration.

The same mono signal will appear on both mainframe output connectors. Note however, that each connector is driven by a separate mainframe power amplifier channel. Up to two cabinets (E3: four) can be driven from each output connector.

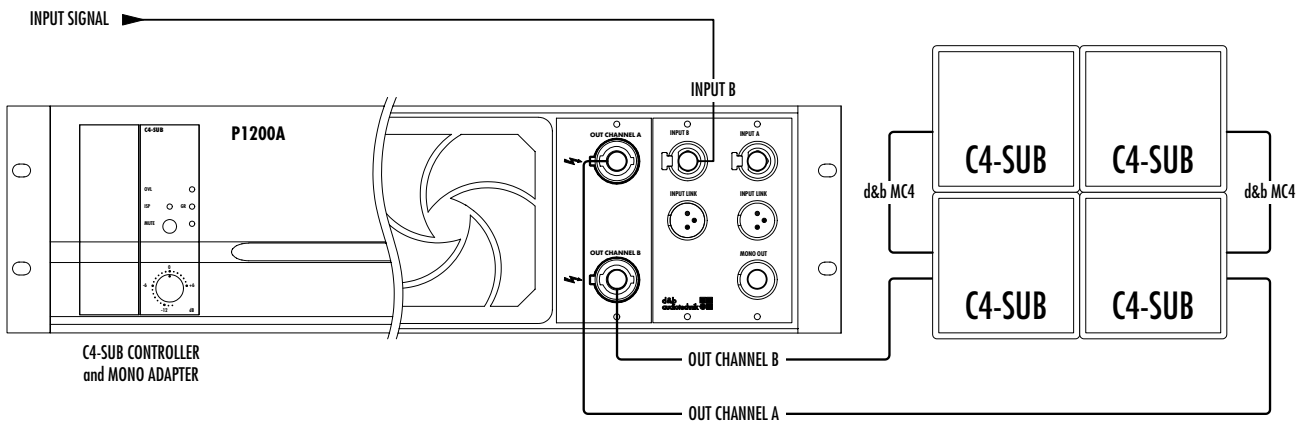
With the mono configuration it is not possible to drive all the cabinets using a single loudspeaker cable connected to just one of the mainframe outputs - this would connect all the loudspeakers to just one mainframe power amplifier channel.



Wiring of a P1200A stereo configuration



Wiring of a P1200A mixed configuration



Wiring of a P1200A mono configuration

5.3. Using the P1200A MONO OUT

In a P1200A, the two input signals of INPUT A and INPUT B are combined, electronically balanced and buffered. This signal is then routed to the rear panel MONO OUT connector.

The MONO OUT signal is generated on the mainframe input board. Therefore the signal is completely independent of the controller configuration of the mainframe (stereo, mono or mixed).

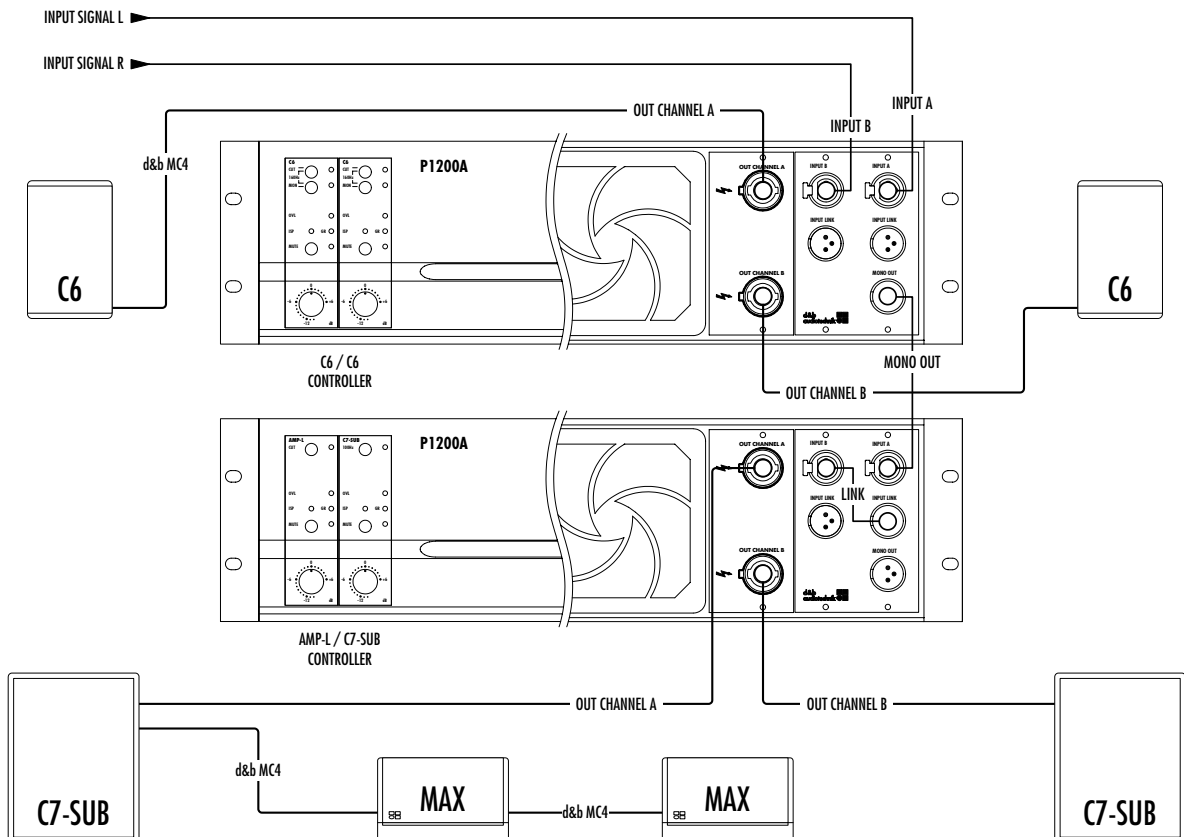
The MONO OUT is normally used to provide a mono signal for additional systems like subwoofers, near fills, delay speakers or monitors when the main system is driven with left and right signal. For these applications the main system must include at least one mainframe in stereo configuration to generate the mono signal.

The signal level at the MONO OUT connector is -3 dB the sum of the mainframe controller module inputs. The 3 dB signal attenuation prevents feedback if the signal routing is incorrect (e.g. if the MONO OUT is routed to a module signal input in the same mainframe).

IMPORTANT!

Note that because of its attenuation the MONO OUT should not be used as a signal buffer to feed subsequent mainframes (e.g. of the same PA channel). All devices connected after the MONO OUT will have 3 dB less input signal.

In the following configuration example two C6 cabinets are used as a front of house system. The MONO OUT signal from the C6 system mainframe is fed to both inputs of a second mainframe. This second mainframe is fitted with one C7-SUB controller and one AMP-L module. Connected to the outputs of the second mainframe are two C7 subwoofers and two MAX cabinets used as stage monitors.



5.4. Level setting of mid/high and SUB systems

With equal numbers of mid/high cabinets and corresponding active subwoofers the input gains of the TOP and SUB controllers will normally be set to the same level. This setting gives a correct sound balance and matches the characteristics of the active crossover filters in the controller modules.

Using different ratios of mid/high to subwoofer systems will affect the relative levels between the systems which will require correction using the controller module level controls.

The level gain when using multiple cabinets of the same type can be evaluated with the table below or with the formula:

$$\text{Level gain [dB]} = 10 \times \log (\text{number of systems})$$

Example: Using 10 subs together with 4 tops will give a level gain of 10 dB in the sub range and 6 dB in the top range. So the SUB controllers should be turned down about 4 dB.

Relative to these nominal settings the balance between mid/high and subwoofers should not be changed more than approx. 3 dB, otherwise the crossover frequency between the systems is changed and overall sound quality may be deteriorated.

With E3 systems the correct balance is obtained using a ratio of two speakers to every subwoofer.

If mono subwoofer systems are driven via the MONO OUT connection from another P1200A mainframe, the 3 dB attenuation must be taken into account.

If the acoustic environment or the program material used requires a severe correction in sound balance, it's much better to use an external equaliser in the signal path before both the full range and subwoofer systems so that the level correction is applied equally to both systems. This allows the frequency response of the whole system to be tuned without influencing the level, phase and frequency response of the full range and subwoofer systems relative to each other.

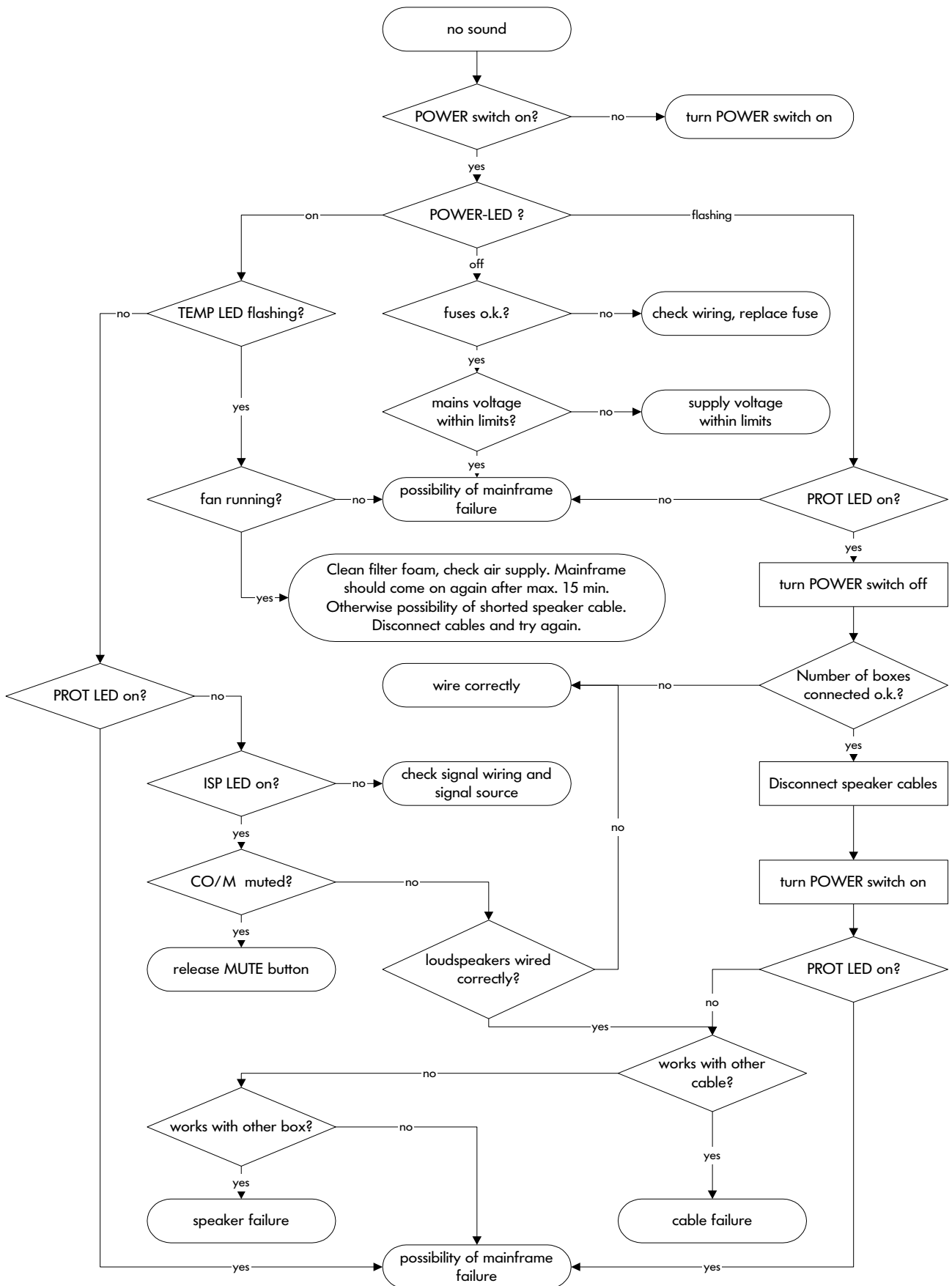
The sensitivity values quoted for the systems are also a useful additional aid to relative level setting. The values in the technical specification for each loudspeaker give the input signal level expressed as the dBu value needed to produce a 100 dB (SPL) sound pressure level measured at one metre.

Example: the E9 system input sensitivity for a 100 dB-SPL is -13 dBu, and that for the E3 system is -10 dBu. For equal sound level from E3 and E9 loudspeakers used together, the E3 controller level needs to be set 3 dB higher than that of the E9 controller.

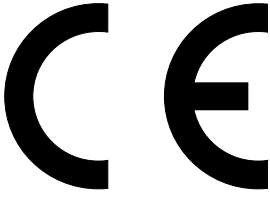
No. of systems	Level gain
1	0 dB
2	3 dB
3	5 dB
4	6 dB
6	8 dB
10	10 dB

Average level gain when using multiple loudspeaker cabinets of the same type.

6. Troubleshooting



7. EU declaration of conformity (CE symbol)



EU conformity of loudspeakers

This declaration applies to loudspeakers manufactured by d&b audiotechnik AG and includes the types listed in the table below:

– E1	Z0121
– E3	Z0300
– E9	Z2250/Z2260
– E12-SUB	Z0200
– E18-SUB	Z2253
– E15-BX	Z1200
– C6 / C690	Z2252/Z2262
– C6-MON	Z2256
– C7-TOP	Z2257/Z2263
– C4-TOP	Z2254
– C4-SUB	Z2255
– C3	Z2230
– C7-SUB	Z2259
– MAX	Z1100
– MAX12	Z1300

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 electromechanical modifications.

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

- 89/336 Electromagnetic Compatibility

The following standards have been applied:

- DIN EN 55013:08-1991
- DIN EN 55020:05-1995
- DIN EN 50082-1:03-1993

d&b audiotechnik AG of Backnang accepts responsibility for this declaration.

EU conformity of mainframes

This declaration applies to the P1200A mainframe manufactured by d&b audiotechnik AG consisting of the amplifier unit including the installed controller modules.

- **P1200A** **Z2300 from version 10**
- **Controller modules** **Z2301 - Z2313, all**

All production versions of type P1200A starting from version Z2300.000.10 are included, provided they correspond to the original technical version and have not been subject to any later design or electromechanical modifications.

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

- **73/23** **Low Voltage**
- **89/336** **Electromagnetic Compatibility**

The following standards have been applied:

- **DIN EN 60065:1993**
- **DIN EN 55022:1994**
- **DIN EN 60555-2:1987**
- **DIN EN 50082-1:1992**

d&b audiotechnik AG of Backnang accepts responsibility for this declaration.



