

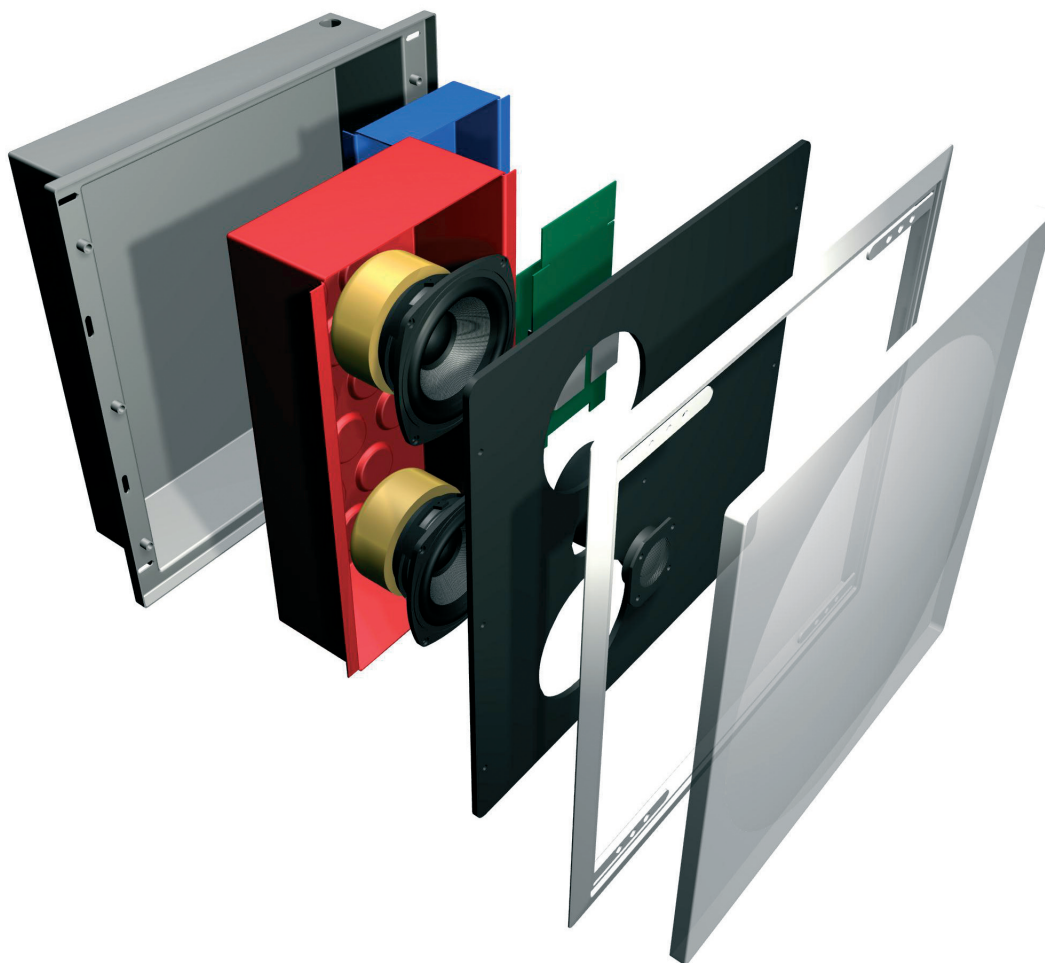
DSP420

Digital Signal Processing
In-Wall Loudspeaker System

M420

Analogue Active In-Wall
Loudspeaker System

INSTALLATION & OPERATION



The world's first DSP In-wall based on technology used in Meridian's famous DSP speakers

New analogue active version also available

Easy-install sealed pre-construction enclosure with redesigned, simplified back-box

Double sealed and damped acoustic enclosure

Separate, on-board, 85W bass and 65W treble power amplifiers

2 way active speaker with DSP (DSP420) or analogue line-level (M420) crossover

Custom paintable grille/frame

The DSP420 accepts up to 96kHz/24-bit inputs including Meridian MHR Smart Link. The M420 accepts line-level balanced analogue inputs. Unit is designed to comply fully with international building regulations

Background

In-wall loudspeakers are not a new invention. Indeed they have been employed for many years by installers who wish to provide an unobtrusive audio solution to customers who have been unwilling or unable to install conventional free-standing loudspeakers.

However, the design restraints generally imposed on an in-wall design – limited space and thus limited enclosure volume, physical limitations on materials and other restrictions – have meant that in-walls have traditionally offered a level of quality and performance that has lagged some distance behind their free-standing counterparts.

Meridian's DSP420 breaks that mould with an in-wall loudspeaker that is a cut above the rest. Inside each unit, Meridian's unique high technology digital signal processing is used to free the sound from the walls: the result is clear and open with a wide response, very much in line with the performance of Meridian's smaller free-standing DSP-based loudspeaker models,

and with a similar character, enabling in-wall and free-standing speakers to be combined in a single system as required.

As a result, the DSP420 has become one of Meridian's most popular loudspeakers. Following its success, and in response to customer demand, an active analogue variant, the M420, is now available, with the same bass drivers and power amplifiers as the DSP version. In addition, the back-box available for both units has been redesigned to permit easier and quicker installation, including BNC connectors on the digital version and XLRs on the analogue.

Truly Active In-Walls

The DSP420 and M420 are truly active in-wall speakers with separate internal amplification for high and low frequency bands. Rated at 65 and 85 Watts respectively and using carefully selected bipolar output devices, the idealised low feedback designs are based on those used in other Meridian loudspeakers to deliver exceptionally fast bass response and

high resolution. These amplifiers are coupled directly to the drive units for the most efficient delivery of power and the best possible control over driver excursion. Both analogue and digital variants exhibit extremely low levels of noise and distortion, aided by careful star earthing, while the power supply includes a substantial toroidal transformer and audiophile-grade capacitors.

Meridian DSP

The DSP420 accepts digital input signals up to 96kHz/24bit, including Meridian High Resolution (MHR) streams from Meridian Surround Controllers, Processors and DVD Players. Enclosed in a fully shielded housing, Meridian's unique DSP processing is performed on a specially-designed six-layer PCB using a powerful 100 MIPS Motorola DSP engine. Thanks to this sophisticated audio computer, the DSP420 embodies identical high-technology features to those found throughout the Meridian DSP Loudspeaker family. These include:

- Position control to compensate for speaker location
- FIFO memory buffer at the input for the lowest possible jitter
- Linear-phase crossover for precision drive unit integration
- Tweeter delay for perfect driver alignment
- 48-bit resolution volume control
- Minimal frequency equalisation, delivering a frequency response free from drive unit or electronic colouration
- Transparent tone controls
- Absolute phase control
- Phase-corrected balance control

Active Bass Extension

A further DSP-enabled enhancement to the audio performance of the DSP420 is Meridian's active bass extension. This deepens the response of the system without excessive woofer excursion and in turn produces a convincingly 'big box' sound from an in-wall unit. At moderate volumes, a psychoacoustically-correct filter significantly extends the bass response, while at high volumes dynamic DSP bass protection is used to prevent the woofers from bottoming.

Analogue or Digital – Your Choice

Following the success of the original DSP420, the loudspeaker is now also available in an analogue active version, the M420. The M420 features a balanced line-level audio input (which may be unbalanced), with an XLR link from back-box to speaker unit (the digital unit is connected to the back-box via a 15-pin DSUB cable) and analogue crossover. The amplifiers, bass drivers and enclosure are identical in both variants. In addition, a redesigned back-box is available, common to both units, that features several design improvements based on installer feedback from the original design. Audio and power interfacing are built into fire-retardant boxes.

The available redesigned back-box kit includes both analogue and digital input boards, allowing the correct board to be installed as appropriate. While the original screw terminals are retained, digital audio and Meridian Comms connections also employ BNC connectors, while analogue audio is on XLR. Power is hard-wired into the back-box and supplied to the speaker assembly via an IEC connector, thus helping to maximise the speed and efficiency of installation.

Acoustics

The DSP420/M420 front baffle and acoustic back box are made from aluminium. This offers very low resonance at low frequencies and is further damped by the incorporation of stiffening into the back-box. Additional high frequency damping means that the whole system suffers exceptionally low cabinet colouration and delivers excellent mid-range transparency. All damping materials have been fully tested and in all cases comfortably meet or exceed building regulations for in-wall design.

The bass drive units are two parallel 5in woofers with cast alloy chassis, carbon fibre cones and very large shielded magnets that provide excellent drive and control.

The tweeter (aluminium-domed in the DSP420, silk-domed in the M420) has a Neodymium magnet and a protective grille, while an acoustically transparent grille protects the front baffle and drive units from harm when installed. Its powder finish means the grille can be easily painted, helping the unit to blend in with its surroundings.

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Introduction

The DSP420 Digital In-Wall Loudspeaker System uses high technology digital signal processing to remove the compromises previously associated with in-wall speakers, allowing them to achieve the same clear open sound and wide frequency response as traditional free-standing speakers. The M420 Analogue In-Wall Loudspeaker System employs a similar design to the DSP model, but instead of digital inputs provides a line level analogue audio input.

DSP420 or M420 loudspeakers are ideal as part of a home theatre system, or as the basis for a compact stereo system where the loudspeakers need to be hidden or unobtrusive.

Available accessories

The DSP420 is shipped ready to be used as a speaker in a small Meridian Digital Theatre with a Meridian optical disc player such as the 800 or G98, or a Meridian Digital Surround Controller such as the 861 or G68. The M420 may be attached to a controller or preamplifier with analogue outputs at line level.

Other applications, and some advanced features, may require one or more of the following accessories, which can be purchased from your Meridian dealer:

- Meridian System Remote Plus.
- G12 Remote Eye for infrared remote control reception.

Indicator lights: (*DSP420 only)

The following table explains the function of the indicator lights on the front panel:

Light	State	What it means
Red	On	Power supplied to speaker.
	Flashing	Speaker is being reset, or speaker has overheated and has shut down.
*Green	On	Speaker is locked to a digital input.
	Off	Speaker is in standby.

Note: The indicator lights are blanked if the Meridian system displays have been blanked.

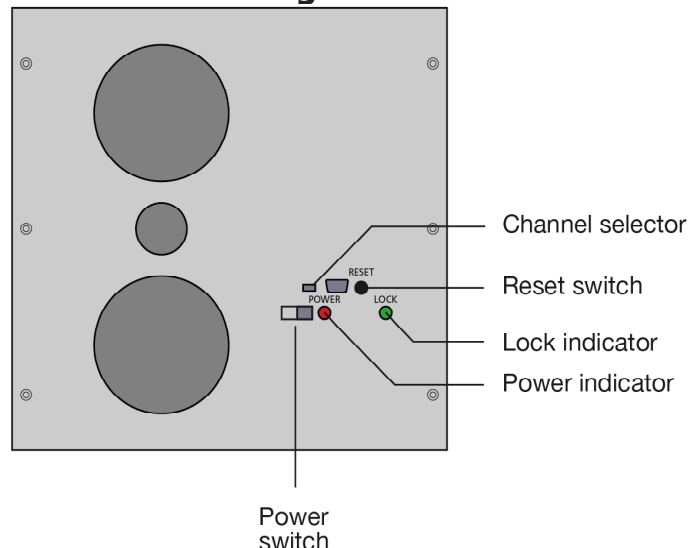
Configuration: DSP420

The DSP420 can be configured either with a PC, using the Meridian graphic configuration program or via RS232 commands. The use of the configuration application is described in its manual, which can be downloaded, along with the latest version of the program, from the Meridian web site, www.meridian-audio.com.

RS232 control: DSP420

The primary RS232 command to which the DSP420 responds is the Position command, which adjusts the loudspeaker parameters according to its position in the room. Send the command PO followed by 0 (default), 1 or 2. 0 sets the loudspeaker for the tweeter at ear level. Use 1 if the speaker is near the ceiling and 2 if it is in a corner. The complete list of RS232 commands is available from the Meridian web site.

To reset the configuration of the DSP420



The following procedure can be used to reset the configuration of the DSP420 loudspeaker to the default settings, without needing a computer, using the reset switch accessible below the front panel.

- Turn off the power at the front panel.
- Press and hold in the reset switch, using a suitable object such as a bent paperclip or the grille removal tool.
- Turn on the power. The red power indicator on the front panel will flash. When the indicator stops flashing:
- Release the reset switch.

Troubleshooting

This section provides suggested solutions to typical problems that may occur when setting up the M420 and DSP420 loudspeaker(s). If you are still not able to resolve a difficulty with the

help of this section, please contact your Meridian dealer or Meridian Audio Ltd.

Red power indicator on front panel not lit

Check the following:

- The power switch on the front panel of the unit is turned on.

If the power indicator will still not illuminate, check any fuses in your power supply and the fuse on the front panel of the loudspeaker. If these are all intact, contact your dealer.

Red power indicator on front panel is flashing

This normally indicates that the unit has overheated, and that it has shut down to cool down. If the unit is cold, it may indicate a fault.

- Allow the unit to cool down. It should then operate normally.

Green lock indicator will not light (DSP420 only)

The green indicator lights when the product is out of standby and is locked to a digital source.

- Check that the digital audio input is wired correctly and that it is connected to an active S/PDIF source.
- Check that the COMMS is wired correctly and that the Meridian system is out of standby.

Note: The DSP420 boots to an *out-of-standby* state, unlike other Meridian DSP speakers, so repowering the unit will ensure that it is out of standby.

Drive units move when the speaker is switched on or off

This is normal as the speaker active electronics settle.

Sound is odd or mono (DSP420)

- Check the channel selector switches on both loudspeakers are correctly set.

Only the master loudspeaker plays (DSP420)

- Check the S5 cables are connected correctly.

Centre not working (DSP420)

- Check that the channel switch is set to LEFT/ CENTRE.

Configuring the DSP420 does not have any effect

- Make sure that you are configuring the DSP420 used as the master digital loudspeaker in the system. This determines the configuration of all digital loudspeakers in the system.

Service

Meridian components are carefully designed to give years of untroubled service. There are no user-serviceable parts inside the case, nor do the units require any form of maintenance.

In the unlikely event that your unit fails to function correctly, it should be returned, in its original packaging, to your Meridian dealer.

In case of difficulty within the UK or USA please contact the appropriate sales and service address, printed elsewhere on this sheet. In case of difficulty outside the UK or USA, contact the importing agent for the territory. A list of Meridian agents abroad is available from Meridian Audio or from the web site.

No responsibility can be accepted for the unit whilst in transit to the factory or an agent, and customers are therefore advised to insure the unit. When seeking service under guarantee, proof of the date of purchase will be required.

Guarantee

The DSP420 DSP In-Wall Loudspeaker System is guaranteed against defects in material and workmanship for two years from the date of purchase. The guarantee is void if the In-Wall Loudspeaker System has been subject to misuse, accident, or negligence, or has been tampered with or modified in any way without the written authorisation of Meridian Audio Limited.

Note: Connecting anything other than the correct network lead to the COMMS sockets may cause damage to the DSP420 DSP In-Wall Loudspeaker System which will not be covered by this guarantee. Attempted servicing by unauthorised people may also invalidate this guarantee. Labour and carriage charges are not covered unless by local agreement.

Outside the UK, local warranty liability is restricted to equipment purchased within the territory. Our agents abroad are only under contractual obligation to service under guarantee equipment sold through them. They are entitled to make a non-refundable charge for any service carried out on other equipment.

This guarantee does not limit your statutory rights within the United Kingdom.

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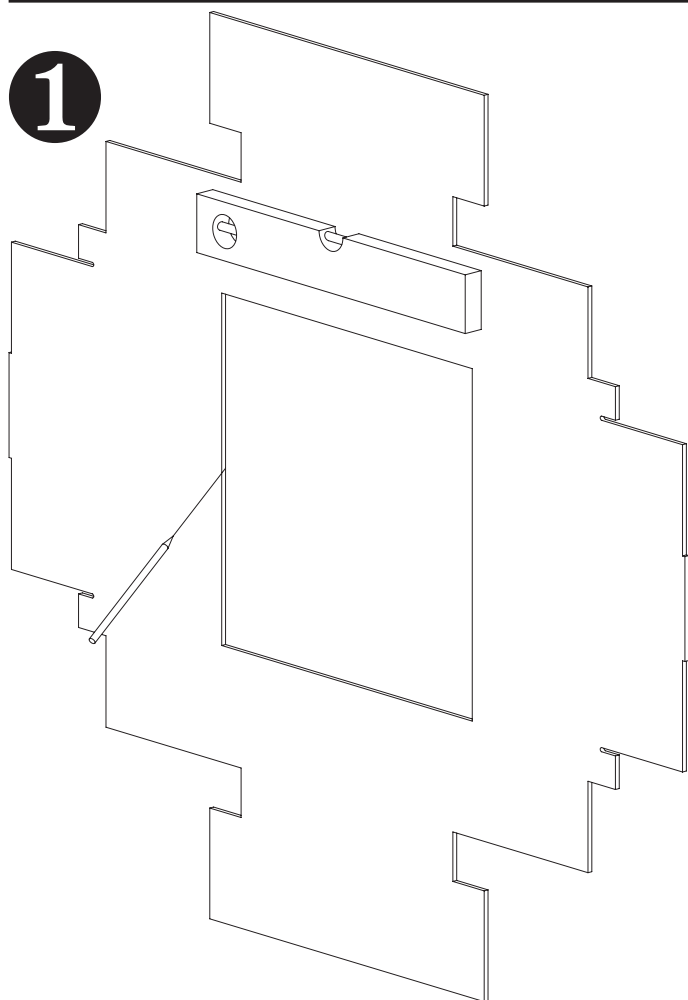
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Fitting Instructions

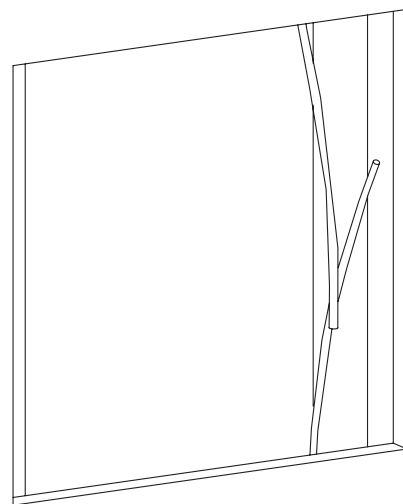
See separate sheet for important safety instructions! Illustrations are not all to the same scale.



Step 1: Use the template (provided as part of the packaging) to mark wall for cut-out (*far left*). Position equally between battens. Use this alternative method (*left*) to mark battens prior to wall covering.

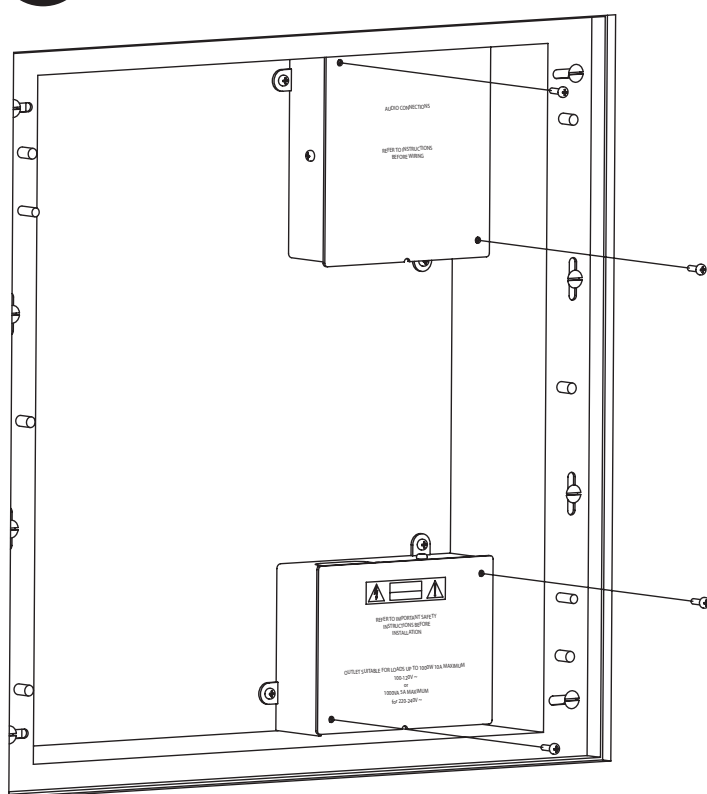
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Step 2: Ensure that 12in (300mm) of each cable is present in the wall cut-out.



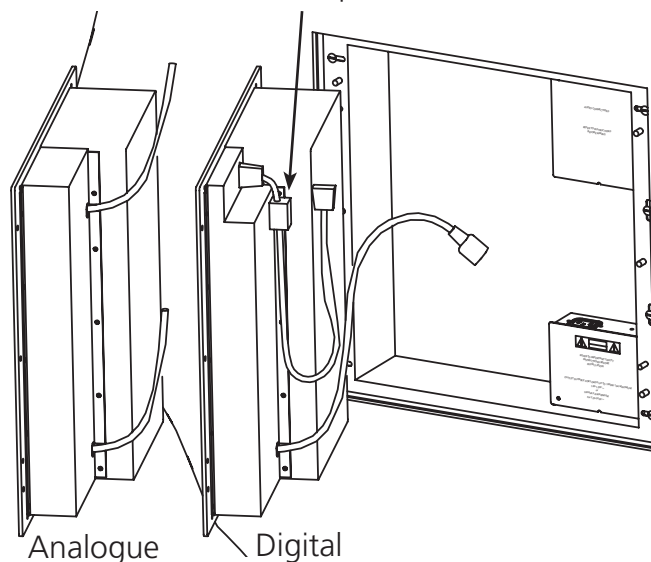
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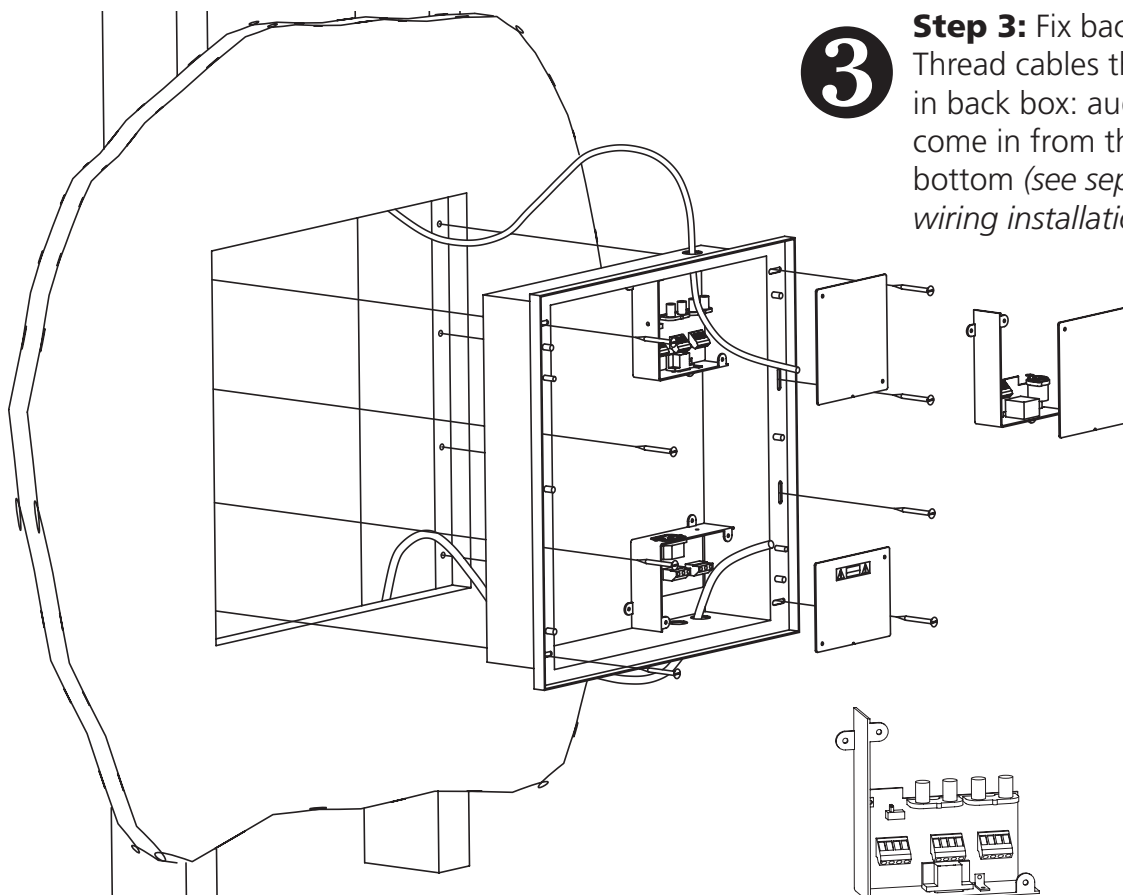
Step 5: Tidy and clamp all cables. Fit covers to power and audio boxes.



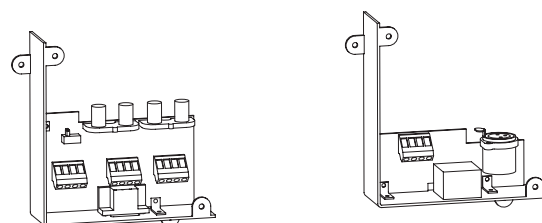
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Step 6: Carefully connect power and audio between loudspeaker unit and back box. An IEC connector is used for power; XLR for analogue; DSUB for digital audio. Be sure to install the digital cable with the choke on the end next to the speaker.

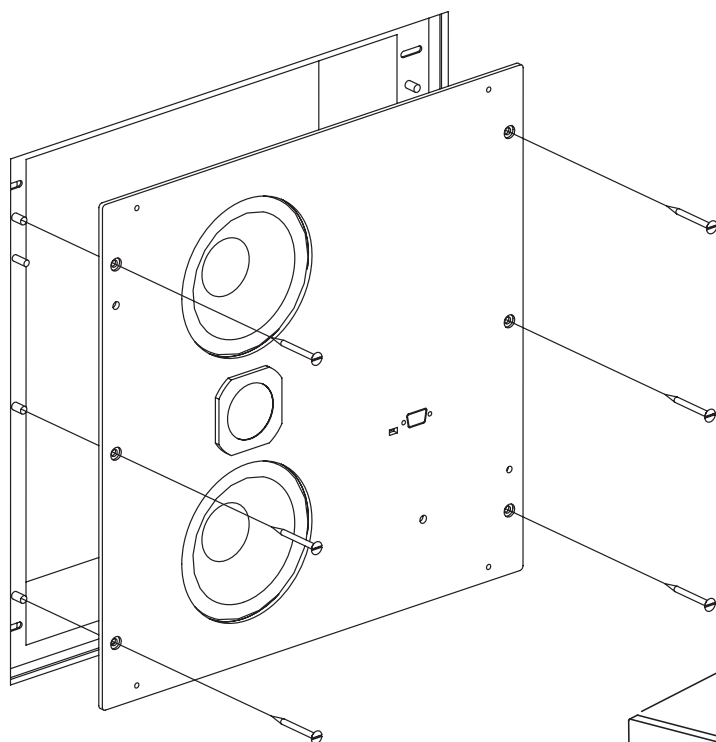




- 3** **Step 3:** Fix back-box into cut-out. Thread cables through correct holes in back box: audio/comms cables come in from the top; power from the bottom (*see separate sheet for power wiring installation instructions*).

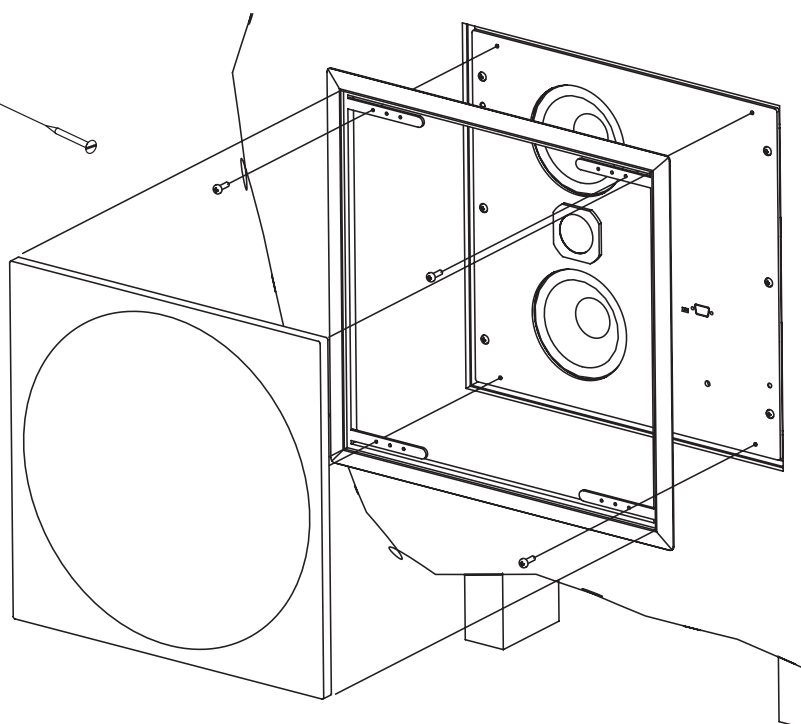


- 4** **Step 4:** Fix the required audio junction box in top right position. The digital board (*left*) is already installed; the analogue board (*right*) is supplied loose. You can use either the connectors or the terminal blocks provided.



- 7** **Step 7:** Neatly position power and comm cables and push the loudspeaker unit all the way in so that it locates on the pegs in the back-box. Secure using the six M5 x 12 button-head socket screws supplied, Meridian part number H61513. These should be inserted carefully using the 3mm Allen key provided, Meridian part number G34775, to avoid damage.

- 8** **Step 8:** Secure frame and fit grille. Grille can be *carefully* removed using the extraction tools supplied.



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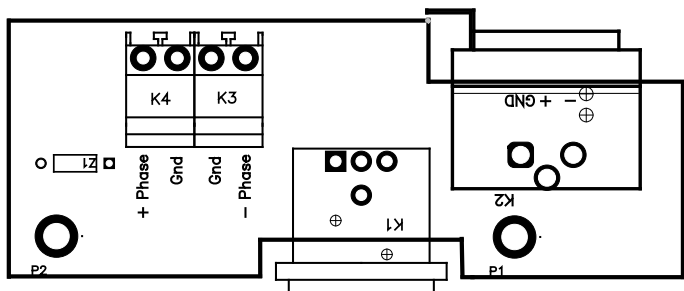
INSTALLATION & OPERATION

Audio wiring instructions

First remove the cover labelled *audio connections*.

M420

If it is intended to use the wall box with a M420 loudspeaker, then select the analogue input card.

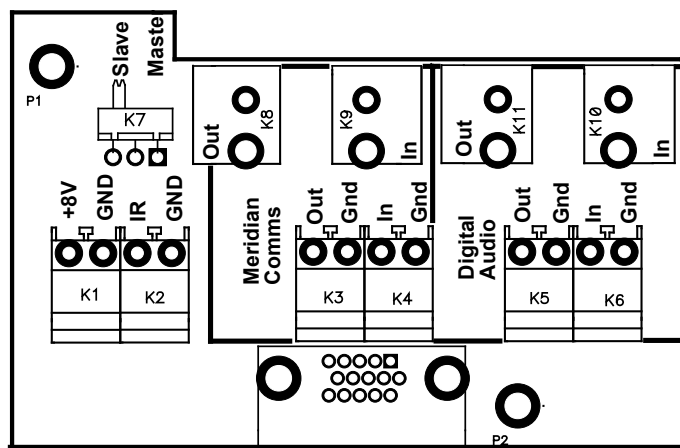


Audio connections are made in one of two ways:

- XLR connection using a male XLR plug connected to K2. The XLR wiring is conventional “pin 2 hot”, ie:
Pin 1 ground / shield; Pin 2 ‘+ phase’ / hot;
Pin 3 ‘– phase’ / cold
- Hard wired to the terminal block, connected as marked. It is recommended balanced wiring is installed, if however single-ended wiring has been fitted then wire the signal to ‘+ phase’ and the outer / shield to the gnd terminals, ‘– phase’ should be left unconnected.

DSP420

If it is intended to use the wall box with a DSP420 then use the digital input card.



In order to function correctly, the DSP420 requires connections to be made to both Meridian Comms and digital audio.

Connections to both the Comms and digital audio can be made using either BNC connections or can be hard-wired to the terminals as marked.

A remote IR connection can be optionally accommodated from a remote sensor such as a Meridian G12 or 512, which can be wired to a master speaker as follows: Red to +8V, blue to IR and screen GND.

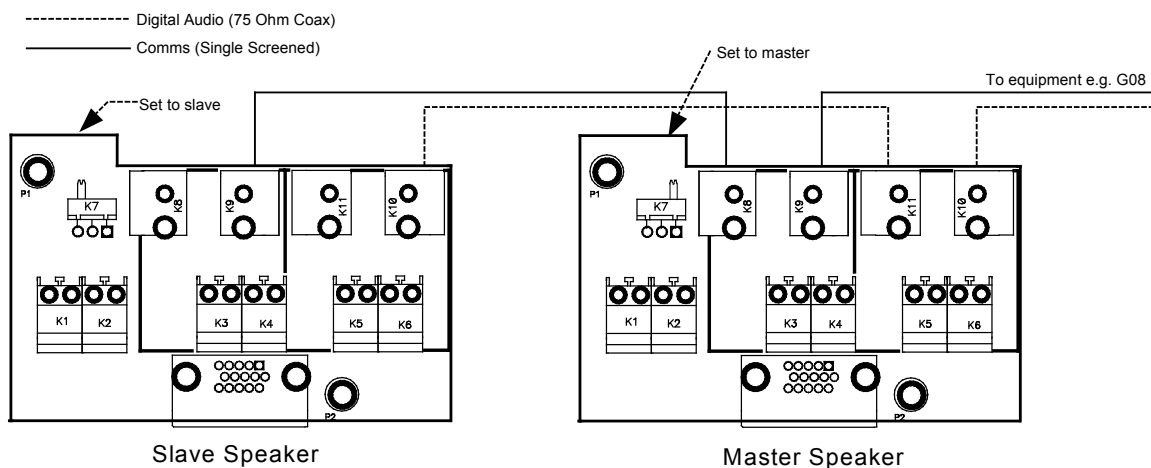
Meridian Digital link cable is suitable for the Comms and audio but it does not have approvals such as UL. If alternative cable is required, then the following specifications should be adhered to:
Comms: Single screened cable, 100pF/m or less
Digital Audio: 75Ω coaxial cable, shielded with braid and foil

Outline Specifications

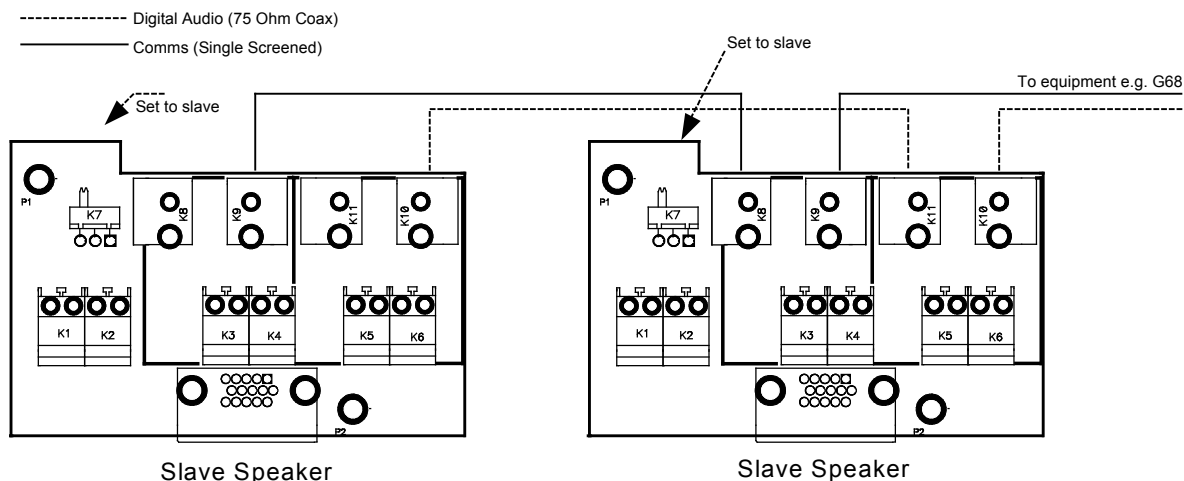
Inputs:	DSP420—1 x 75Ω coaxial digital input, IEC958 (S/PDIF), 44.1kHz – 96kHz. FIFO locks at 44.1, 48, 88.2, & 96kHz ±150 PPM, PCM & MHR. M420—1 x 300Ω balanced line-level input on XLR connector
Enclosure:	Aluminium front baffle with sealed, mechanically damped and insulated acoustic enclosure. Baffle finished in textured black enamel. Grille finished in easy-to-paint white powder coat, backed by acoustically-transparent scrim. White moulded custom paintable frame.
Acoustics:	2-way Infinite Baffle enclosure. 2 x 127mm high-efficiency long-throw custom bass drivers, 1 x Meridian 25mm tweeter with aluminium (DSP420) or silk (M420) dome.
Response:	55Hz – 20kHz ±3dB.

Amplification:	Internal 85W woofer, 65W tweeter. 6VA (quiescent) – 200VA (full output).
DSP (DSP420):	100MHz Motorola 56364, Linear Phase Crossover, 96kHz, 24-bit DAC.
Controls & Indicators:	Front baffle controls for power and channel selection. LED indicators for power, lock (DSP version) and thermal warning.
Approx. Dimensions:	Frame 450mm (17.72in) square, depth 102mm (4.02in) Hole cutout 357 x 388mm (14.10 x 15.28in) Note: dimensions are approximate. See installation drawings for detailed information. The DSP420 and M420 are designed to fit standard 16in stud centres.
Approx. Weight:	8.5 kg (18.7 lb) main unit without frame, grille or connection boxes.
Mounting:	Easy-install frame with fire-retardant power and audio connection boxes. Templates provided for both new construction and installation into existing walls.

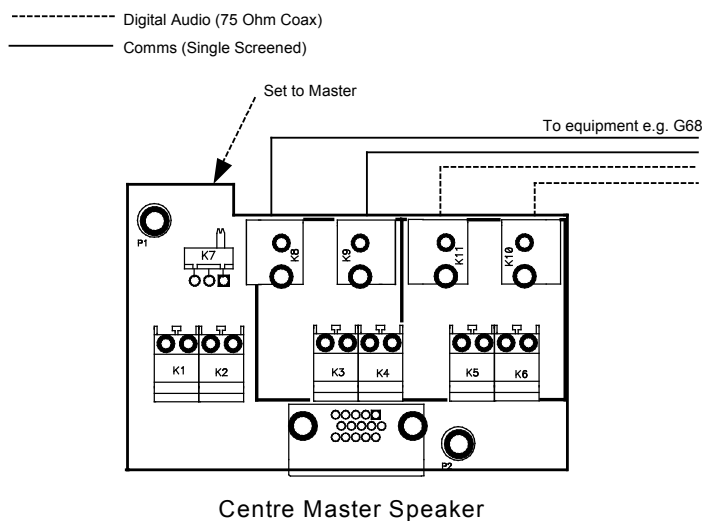
Connecting a pair of DSP420s as a stereo system



Connecting a pair of DSP420s as slaves in a theatre system



Connecting a DSP420 as a centre master in a theatre system



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