DSP420
In-Wall Loudspeaker System
User Guide

Important safety instructions

- Read the instructions.
- Keep these instructions.
- Follow all instructions.
- Do not use this apparatus near water.
- Clean only with a dry cloth.
- Install only in accordance with the manufacturer's instructions.
- Only use with a Meridian Audio RF420 rough-in box.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Refer all servicing to approved service personnel.
- Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Do not disassemble – no user-servicable parts inside.
- Unplug the apparatus during lightning storms or when unused for long periods of time.

This apparatus has been designed with Class 1 construction and must be connected to a mains socket outlet with a protective earthing connection (the third grounding pin).

The apparatus may be isolated from mains power by unplugging the connector at the opposing end of the power cord or cable from its supply outlet. As a result, this connector should remain accessible.

Do not defeat the safety purpose of the polarized or grounding plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade, or the third prong are provided for your safety. If the provided plug does not fit your outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and at the point they exit the apparatus.

Safety warnings
WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

- Do not expose the unit to dripping or splashing.
- Do not place any object filled with liquid, such as a vase, on the unit.
- Do not place naked flame sources, such as lighted candles, on the unit.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

To avoid overheating
- Leave at least 10cm around the equipment to ensure sufficient ventilation.

Do not position the unit:

- In direct sunlight.
- Near heat sources, such as a radiator.
- Directly on top of heat producing equipment.

The DSP420 front plate acts as a heatsink and requires adequate ventilation. Ensure that air can flow around it. Do not block any ventilation openings.

To avoid interference
Do not position the unit:

- Near strong electrical or magnetic radiation, such as near a power amplifier.

Radio interference
FCC Warning: This equipment generates and can radiate radio frequency energy and if not installed and used correctly in accordance with our instructions may cause interference to radio communications or radio and television reception. It has been type-tested and complies with the limits set out in Subpart J, Part 15 of FCC rules for a Class B computing device. These limits are intended to provide reasonable protection against such interference in home installations.

EEC: This product has been designed and type-tested to comply with the limits set out in EN55013 and EN55020.

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Copyright and acknowledgements

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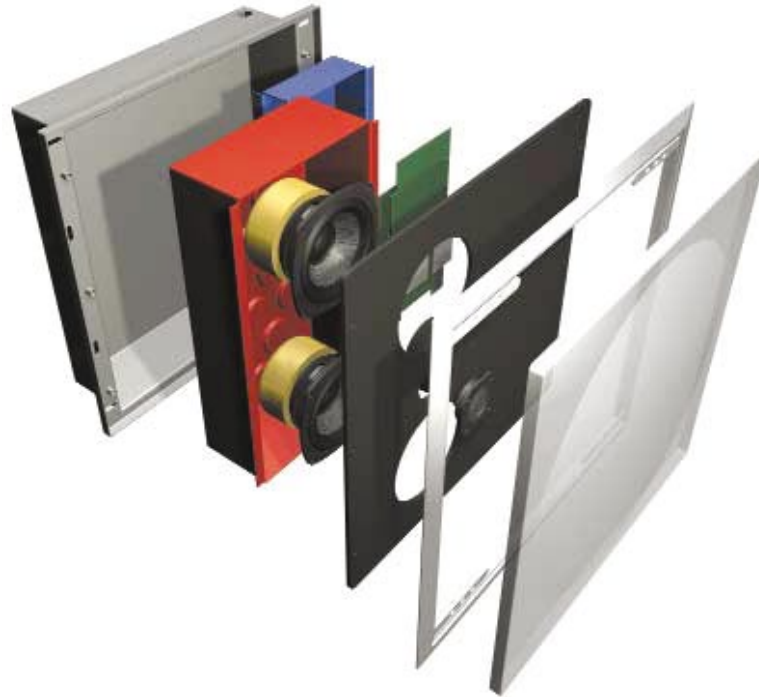http://www.interface.co.uk

Introduction

The DSP420 In-Wall Loudspeaker System uses high technology digital signal processing to remove the compromises previously associated with in-wall loudspeakers, allowing them to achieve the same clear open sound and wide frequency response as traditional free-standing loudspeakers. DSP420 loudspeakers are ideal as part of a home theatre system, or as the basis for a compact stereo system.

For instructions on installing and connecting the loudspeakers please refer to the separate sheet *DSP420 Installation Instructions*.

For instructions on setting up the loudspeakers turn to the next chapter, *Unpacking the DSP420 loudspeakers*, page 7. Once they have been set up refer to *Using the DSP420 loudspeakers*, page 11, for information about getting the best results from all your music and video recordings.

The DSP420 In-Wall Loudspeaker System

The DSP420 In-Wall Loudspeaker System incorporates the result of several years of research and development into innovative technologies.

Meridian DSP

The DSP420 accepts digital input signals up to 96kHz/24-bit, 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 specifically designed six-layer PCB using a powerful 100 MIPS Motorola DSP engine. Through this sophisticated audio computer the DSP420 receives all of the same high technology features that can be found throughout the Meridian DSP loudspeaker family.

These include:

• FIFO memory buffer 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 to give a frequency response free from drive unit or electronic coloration.
• Transparent tone controls.
• Absolute phase control and phase-corrected balance control.

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 extends the bass response much further than can be achieved with an analogue loudspeaker of equal size while at high volumes dynamic DSP bass protection is used to prevent the woofers from bottoming. As a result only the very lowest frequencies are reduced.

Power amplifiers

The loudspeakers are driven by two high-power, low-feedback power amplifiers using carefully selected bipolar output devices. The amplifiers are direct coupled to the drive units for the most efficient delivery of power and the best possible control over driver excursion.

The power supply includes a substantial toroidal transformer and audiophile-grade capacitors, and the system uses careful star earthing, resulting in extremely low levels of noise and distortion.

DSP420 drivers

Each DSP420 loudspeaker uses two parallel 127mm (5") bass drive units which incorporate a cast alloy chassis and carbon fibre cone. They have a very large magnet which provides excellent drive and control. Combined with Meridian's active bass extension technology, they provide surprisingly rich, deep bass, quite unprecedented for this size of cabinet.

The treble unit is a very high quality 25mm (1") aluminium dome with a neodymium magnet and a protective grille. It is extremely well matched to the woofer, and also tonally very compatible with the other loudspeakers in the Meridian range.

The DSP420 is enclosed in an acoustic back box and front baffle constructed from aluminium, which has low resonance at low frequencies and has been further dampened by incorporating stiffening into the back box. Additional high-frequency damping ensures

that the whole system suffers exceptionally little cabinet coloration and delivers excellent mid-range transparency. All damping materials have been fully tested to ensure they comply with building regulations for in-wall designs.

Meridian High Resolution (MHR)

The DSP420 In-Wall Loudspeaker System supports Meridian High Resolution (MHR) to allow you to connect to other MHR-compliant Meridian products to take advantage of high-rate audio sources and provide the additional benefits of lower jitter and improved sound quality on all sources.

MHR is a proprietary secure encoding format that uses encryption and anti-copy methods to provide a secure copyright protection environment, and allow the secure transfer of audio streams within a Meridian-only system for playback only.
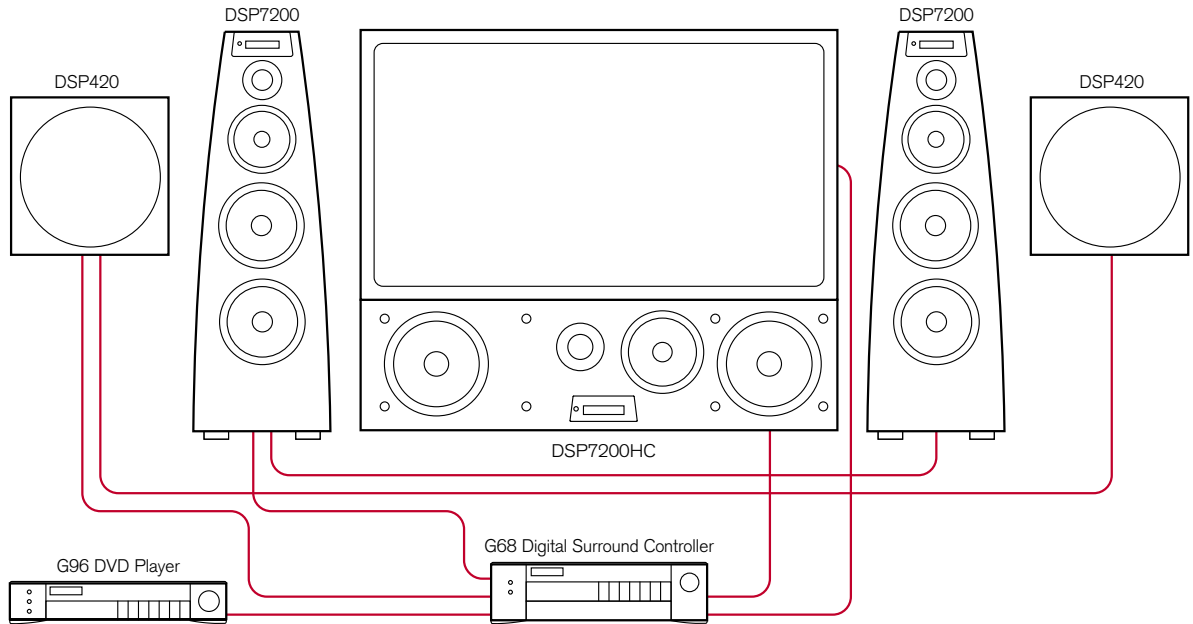
Meridian Comms

The DSP420 In-Wall Loudspeaker System is part of the Meridian family of advanced digital, analogue, and video components. These incorporate a sophisticated communications link to allow you to control any combination of units using a single remote and ensure that they will work together as a fully integrated system.

The communications system also allows you to extend your hi-fi system into two or three rooms with the ability to control the sources in one room from the controller in another room.

The following pages show two recommended configurations based on the DSP420 In-Wall Loudspeaker System to illustrate the flexibility of Meridian components.
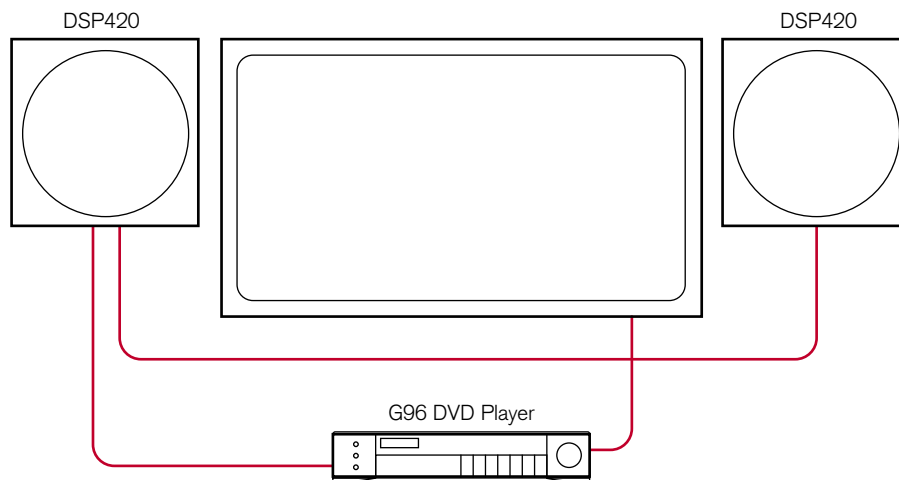
Sample configurations

Meridian Digital Theatre™

DSP420 loudspeakers can be used in conjunction with a Meridian Surround Processor to provide the two rear channels, and optionally two additional side channels, to create an unobtrusive surround system with superb music and cinema sound.

A pair of DSP7200 loudspeakers, in conjunction with a DSP7200HC centre loudspeaker, would provide excellent choices for the front channels, giving a complete system without compromise.

DSP420 Digital Stereo System

DSP420   DSP420

G96 DVD Player

The DSP420 can be connected directly to almost any source that provides a PCM SPDIF output, including CD or DVD players, some PC soundcards, and digital satellite decoders.

The DSP420 includes a DSP volume control. With Meridian sources this operates seamlessly via the Meridian Comms system.

Alternatively, the volume can be controlled with the Meridian System Remote using the optional G12 Remote Eye.

Other applications

Other applications include:

- Main loudspeaker in a Digital Music System with a Meridian CD Player (G12 required).
- Main loudspeakers with another source of digital audio; eg satellite (G12 and MSR+ required).
- Second zone loudspeaker in a Meridian two-room plus system (long M5 lead, G12, and MSR+ required).

These applications may require additional accessories; for more information see *Available accessories*, page 6.

Specifications

Connections

- Digital input: 1 x balanced digital (AES/EBU) input on RJ45. 32kHz – 96kHz sampling rates.
- Digital output: 1 x RJ45 with balanced digital audio and control for a second loudspeaker.
- 9-pin D connector for RS232 PC setup and control, null modem, 9600 baud, 2N1, no handshake.

Digital formats

- 44.1–96kHz. FIFO locks at 44.1, 48, 88.2, or 96kHz ±150ppm.
- PCM using SPDIF/IEC60958, or MHR connection support with auto-detection.

Signal processing

- 1 x Motorola 56364 running at 100MHz.
- 1 x 24-bit Multi-bit delta-sigma DAC with 128x oversampling.
- Crossover linear-phase ±30° at 2.3kHz.

Output stages

- Power amplifiers: Low feedback complementary bipolar design, with output-stage error correction and twin loop design.
- Bass: 85W RMS.
- Treble: 65W RMS.

Acoustic

- Bass drive units: 2 x 127mm (5") carbon fibre custom drivers, cast alloy chassis.
- Treble drive unit: 1 x 25mm (1") aluminium dome neodymium magnet, with protective grille.

Characteristics

- Distortion: Typically <0.01%, or <0.05% up to full power at all frequencies.
- Noise and hum: <-95dBr at all volume settings.
- Acoustic output: Typically >104dB spl @ 1m.
- Acoustic noise: <15dB spl @ 1m.
- Frequency response: 55Hz-20kHz ± 3dB

Cabinet

- Aluminium front baffle with sealed, mechanically dampened and insulated acoustic enclosure.
- Dimensions: Frame 457mm (18") square x 89mm (3.5").
- Hole cutout 420mm (16.54") square.

Power

- Power: 100-125; 200-250V AC 50-60Hz.
- 6VA idle; 200VA max.

Meridian Audio reserves the right to amend product specifications at any time.

Available accessories

The DSP420 is shipped ready to be used as a loudspeaker in a small Meridian Digital Theatre with a Meridian DVD Player (such as the 800 or G96) or a Meridian Digital Surround Controller (such as the 861, G68, or G61R).

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

- Meridian System Remote Plus (MSR+).
- G12 Remote Eye for remote control reception.
- Meridian SpeakerLink cables (available in various lengths).

Unpacking the DSP420 loudspeakers

This chapter explains what you should find when you unpack the loudspeakers, prior to installing them. It also explains how to reset the configuration from the front panel.

For information about installing and connecting up loudspeakers please refer to the *DSP420 Installation Instructions* leaflet, supplied separately.

For information about configuring the loudspeakers, using the Meridian Configuration Program, please refer to the *Meridian Configuration Program Guide*.

Unpacking

The digital loudspeaker system is supplied in a box
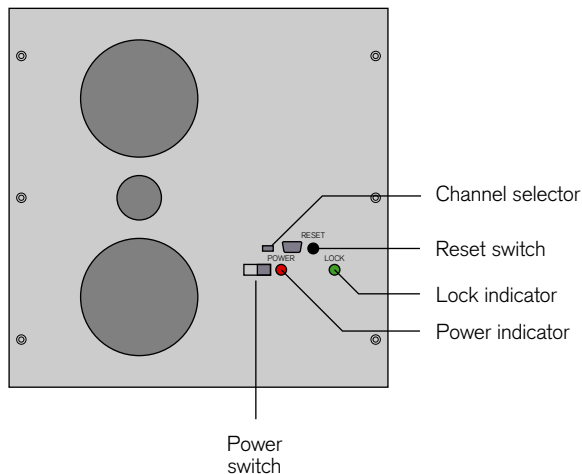containing the following components:

- DSP420 loudspeaker module.
- Grille assembly.
- Spare grille scrim.
- This user guide.
- *DSP420 Installation Instructions* leaflet.
- Screw pack (containing six screws) for loudspeaker
  module.
- Meridian Comms interconnect lead.
- Configuration Program CD.
- Grille removal tool.

If any of these items is missing, please contact your
retailer. We suggest that you retain the packaging
carefully, as it provides maximum protection in transit.

Resetting the loudspeakers

To reset the configuration of the digital loudspeaker

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:

Channel selector

Reset switch

Lock indicator

Power indicator

Power switch

• 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 swith.

Indicator lights

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

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

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

Using the DSP420 loudspeakers

In systems with a Meridian preamplifier or control unit all of the functions
of the DSP420, including volume, tilt, and bass, are operated via
the controller. For more information refer to the user guide for the
preamplifier or control unit, and you can ignore this chapter.

However, the DSP420 In-Wall Loudspeaker System can also be
connected directly to a digital source to create a complete, minimum
system. This chapter provides step-by-step instructions for operating the
digital loudspeakers in a system with no Meridian preamplifier or control
unit.

Selecting a source

When not playing, the digital loudspeakers should be left in the standby state. This ensures that the components of the loudspeakers operate at maximum efficiency from the moment you start.

To select a source

• Press the appropriate source key on the remote; eg **DVD**.

This will bring the digital loudspeakers out of standby. If there is a signal to the loudspeakers the green indicator on each loudspeaker will be illuminated.

To switch to standby

• Press **Off** on the remote.

The loudspeakers will switch to standby and the green indicator on each loudspeaker will go off.

Adjusting the volume

The digital loudspeakers adjust the volume in precise steps of 1dB, where 9dB is equivalent to doubling the loudness, and can be varied in the range 1 to 99dB.

When you first connect power to the digital loudspeakers the volume is set to 65, which is similar to the midway position of the rotary volume control on a conventional preamplifier.

To change the volume

• Press the red ▲ or ▼ keys on the remote.

To mute the sound

• Press **Mute** on the remote.

To restore the sound

• Press **Mute** again on the remote.

Alternatively, the sound will be restored if you adjust the volume.

Adjusting the balance or phase

The balance control of the DSP420 In-Wall
Loudspeaker System uses digital signal processing
to compensate for an off-centre listening position by
delaying and diminishing the sound in one loudspeaker,
thus effectively shifting the loudspeaker's image back.

To change the balance

• Press ◀ or ▶ on the remote.

• There are 20 settings in each direction.

To reset the balance to the centre

• Press ▼ on the remote.

Note: Because the use of the balance control
processes the digital signal, you may hear a slight
clicking as the balance is adjusted.

To change the phase

• Press ▲ on the remote.

The phase function controls the absolute phase of
the digital conversion. It can be used to compensate
for signals that are out of phase, giving an unnatural-
sounding bass.

Troubleshooting

This chapter provides suggested solutions to typical problems that may occur when setting up the digital loudspeaker(s).

If you are still not able to resolve a difficulty with the help of this guide and the suggestions in the following pages, please contact your Meridian retailer or Meridian Audio Ltd.

Troubleshooting

Red power indicator on front panel not lit

Check the following:

• The power switch on the front panel of the DSP420 is turned on.

If the DSP420 will still not illuminate, check any fuses in your power supply and the fuse on the front panel of the DSP420. If these are all intact, contact your retailer.

Red power indicator on front panel is flashing

This normally indicates that the DSP420 has overheated and that it has shut down to cool down. If the DSP420 is cold, it may indicate a fault.

• Allow the DSP420 to cool down. It should then operate normally.

Green lock indicator will not light

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 source of SPDIF.
• 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 loudspeakers, so repowering the unit will ensure that it is out of standby.

Drive units move when the loudspeaker is switched on or off

This is normal as the loudspeaker's active electronics settle.

Sound is odd or mono

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

Only the master loudspeaker plays

• Check the RJ45 cable is connected correctly.

Centre not working

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

There is radio interference

The DSP420 is a digital audio and computing device which has been designed to very high standards of electromagnetic compatibility.

If this equipment does cause or suffer from interference to/from radio or television reception then the following measures should be tried:

• Reorient the receiving aerial (or antenna) or route the antenna cable of the receiver as far as possible from the DSP420 and its cabling.
• Ensure that the receiver uses well-screened antenna cable.
• Relocate the receiver with respect to the DSP420.
• Connect the receiver and this product to different AC outlets.
• If the problem persists contact your retailer.

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.

Meridian Configuration program repeatedly fails to talk to the loudspeaker

- Check that you have selected the correct COMMS port on your PC.
- Check that no other program currently running is using the COMMS port.
- Check that it is connected correctly.
- Turn off the DSP420 for a few seconds and turn back on, then retry.
- Quit from all other programs and retry.
- Reboot the computer and retry.
- Ensure you are using the serial lead supplied with the product, or a null modem cable.
- If you are using a notebook computer, ensure that it is connected to its power supply and not powered from battery.
- If you are using a notebook computer try turning off the screensaver or power management software.

Service and guarantee

Service

The Meridian components have been 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 DSP420 fails to function correctly, it should be returned, in its original packaging, to your Meridian retailer.

In case of difficulty within the UK or USA please contact the appropriate sales and service address shown on page iv.

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.

No responsibility can be accepted for the DSP420 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 DSP420 DSP 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 that onnecting anything other than the correct network lead to the COMMS or SpeakerLink 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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