DALI

OBERON C and SOUND HUB COMPACT

WHITE PAPER

DALI

IN ADMIRATION OF MUSIC

1. OBERON C and SOUND HUB COMPACT - The Active Choice

Our world is increasingly one in which wireless technology is the norm. We're familiar with the idea and appreciate the convenience of consumer electronic hardware that no longer requires a physical connection; printers, headphones, desktop speakers, telephones, and even room thermostats for example. Hi-Fi speakers are similarly undergoing a wireless revolution and DALI has played a pioneering role with the RUBICON C and CALLISTO C series. And now, with the new OBERON C series and SOUND HUB COMPACT wireless audio preamplifier, DALI has brought wireless active Hi-Fi, that comfortably outperforms equivalent passive systems, within the reach of many more music lovers and audiophiles.

At the same time as providing a more cost-effective and seamlessly integrated wireless Hi-Fi option, the OBERON C series and SOUND HUB COMPACT are perfectly configured for contemporary home media installations where Bluetooth devices and smart TVs are the primary audio sources.

The OBERON C and SOUND HUB COMPACT major simultaneously on simplicity in installation and operation, and genuine audiophile sound quality in use. Music lovers and audiophiles no longer have to choose between incredible sound quality and convenient integration with their contemporary Bluetooth and smart TV centred lifestyles. The OBERON C series and SOUND HUB COMPACT deliver both.

1.1 INTRODUCING THE OBERON C SERIES

The OBERON C series comprises the three, two-way, wireless active speakers derived from the renowned OBERON passive series and utilising the wireless technology developed for CALLISTO C series. The compact, stand or shelf-mount OBERON 1 C, the floor standing OBERON 7 C, and the compact, low profile wall-mount OBERON ON-WALL C: the OBERON C series is ideally suited for use with the new SOUND HUB COMPACT wireless audio preamplifier however, it is also compatible with the existing SOUND HUB.

OBERON 1 C

The OBERON 1 C is the compact speaker of the series. Sporting a 29mm ultra-lightweight soft dome tweeter and a 5.25" wood fibre cone SMC bass/midrange driver, its rear reflex loaded cabinet offers an optimal balance between internal volume for bass performance and compact dimensions for small rooms. The OBERON 1 C can be used with the DALI CONNECT Stand E-600, installed within furniture units or on shelves, or wall mounted directly via rear panel keyhole slots.

OBERON 7 C

The slender proportioned, floor-standing and rear reflex loaded OBERON 7 C sports twin, 7" DALI wood fibre cone SMC bass/mid drivers, and the same DALI ultra-lightweight 29mm soft dome tweeter as the OBERON 1 C. Despite its size, the OBERON 7 C is a subtle performer and impresses with its ability to render any style of music naturally and lifelike, even at low volume levels. The OBERON 7 C incorporates an integral die-cast plinth fitted with attachment points for floor-spikes or compliant feet.

OBERON ON-WALL C

The slim and discreet OBERON ON-WALL C comprises a compact, low profile, rear reflex loaded cabinet fitted with a 5.25" DALI wood fibre cone SMC bass/mid driver, and a DALI ultra lightweight 29mm soft dome tweeter. The OBERON ON-WALL C was designed with TV audio very much in mind and despite its compact dimensions, the combination of DALI technologies employed endow it with performance comparable to significantly larger speakers. The OBERON ON-WALL C is designed specifically for direct wall mounting via rear panel keyhole slots. Portrait and landscape orientations are both accommodated.

All three OBERON C speakers incorporate wireless interface, digital signal processing (DSP) and Class D power amplification electronics in a module located on their rear panels. The two-channel amplification in each OBERON model provides 50 Watts each for the bass/mid and high frequency drivers. Crossover functions within the OBERON C electronics are implemented through DSP running at 24 bit/96 kHz resolution.

NOTE

OBERON C series speakers are additionally compatible with the DALI SOUND HUB wireless audio preamplifier originally introduced with CALLISTO C series. In addition to providing Bluetooth and a variety of wired audio inputs, the SOUND HUB is equipped with facilities for future expansion and upgrade. For example, with its optional NPM-1 BluOS module installed, the SOUND HUB can provide MQA certified high resolution music streaming and multiroom functionality, as well as supporting Spotify Connect.

1.2 INTRODUCING THE SOUND HUB COMPACT

Designed specifically with seamless TV integration and Bluetooth audio in mind, the SOUND HUB COMPACT wireless audio preamplifier combines all the functions and interface facilities needed to play the central role in a complete wireless active Hi-Fi system. It can handle a variety of wired digital and analogue sources, including HDMI ARC, and also pair with Bluetooth audio devices such as smartphones, tablets, laptop and desktop computers to enable entirely wireless audio playback. The SOUND HUB COMPACT can be installed on a table, shelf or furniture unit or be direct wall-mounted using its keyhole slot features.

The SOUND HUB COMPACT is controlled via its supplied infrared remote control in combination with its top panel input selection and volume indicators. In use, the SOUND HUB COMPACT is intuitive and immediate. Its user interface is designed to place as few operational hurdles as possible between the user and their favourite audio source. For example, when connected to a TV via HDMI the TV remote control is all that's needed for volume and standby control, and with Bluetooth audio, the source playback app effectively takes control – including volume synchronisation. The system will even automatically switch on when a previously paired Bluetooth device is connected and playback initiated. There's no complex control app to learn, just automatic input switching and intuitive source based volume control.

The SOUND HUB COMPACT transmits to OBERON C speakers using a proprietary 30 bit wireless protocol derived from the acclaimed DALI SOUND HUB. Audio transmission latency from input to speaker is typically less than 15mS, and inter-speaker timing is accurate to the single sample period of the broadcast audio data.

NOTE

The SOUND HUB COMPACT is additionally compatible with the RUBICON C and CALLISTO C series of active wireless speakers.

2. Choosing and Using OBERON C

The three OBERON C wireless active speaker models are each designed to suit and appeal to different applications and users.

OBERON 1 C

The OBERON 1 C is intended for smaller rooms where space is a precious commodity and volume levels are relatively modest. Music lovers and audiophiles who prefer the style and sound of stand-mounted speakers will be drawn towards the OBERON 1 C. Listening to music, perhaps from CD, internet radio, or a turntable and precious record collection, is likely to be their priority over TV audio – although if the OBERON 1 C speakers are located appropriately, one on either side of the screen, TV audio may become increasingly of interest.

OBERON 7 C

The OBERON 7 C is intended for more expansive homes where music has space to breathe and can be played at higher volume levels. It will suit more ambitious music lovers and audiophiles, keen to make a grander statement with their audio system. With more space and speaker positioning options available in larger rooms, it is perhaps more likely that OBERON 7 C speakers will be located on either side of a screen and used for TV audio, but still, music playback from CD or streaming services will probably be their primary role.

OBERON ON-WALL C

The OBERON ON-WALL C is intended to find a role in any room, large or small, that includes a wall mounted TV with space for a speaker on either side. In contrast to the OBERON 1 C and OBERON 7 C, the OBERON ON-WALL C is designed specifically to suit wall-mounted TV audio applications, where it will almost certainly produce more satisfying results than a TV soundbar. Having said that however, the OBERON ON-WALL C is equally adept at reproducing all audio formats, and while it is most likely to suit those for whom TV audio is a priority, its inherent DALI quality will perhaps increasingly entice simple music reproduction.

OBERON C FINISHES

OBERON C speakers are available in four high quality laminate cabinet finishes and are supplied with a contrasting grey fabric grille attached with conventional grille pegs. The use of grilles is entirely optional.

The four OBERON C laminate finishes: matt white, light oak, dark walnut and black ash, were chosen specifically to provide options that cover the full range of colour tones and themes found most commonly in homes throughout the world. At the same time, the laminate tones work with the grille fabric and aesthetic detail of the speakers to reinforce the traditional DALI values of sensitive and stylish Danish design.


White


Light oak


Dark walnut


Black ash

3. Technology In The Service of Music

DALI is driven by the philosophy that better music in the home is a force for good, and the technologies that enable the OBERON C series and SOUND HUB COMPACT to perform to such an exceptional level are really no more than means to that end.

3.1 OBERON C

The temptation for many Hi-Fi manufacturers when developing active speakers is to believe that active amplification and digital signal processing can compensate for the use of less technologically sophisticated, and perhaps less expensive, drivers and electro-acoustic engineering. At DALI we know that this simply isn't true, and in fact, in some technical respects such as the distortion effects that can arise from the driver magnet and voice-coil system, active amplification makes greater demands on performance than passive amplification. Furthermore, with the drivers effectively connected directly, while there is minimal loss from passive crossover components, the amplifiers are required to drive more dynamic loads, so care has to be taken to ensure the amplifiers and drivers are matched appropriately.

So, with the OBERON C series, rather than seeing active amplification and DSP 'horsepower' as an opportunity to simplify or down-spec the drivers, we committed early in the development process to use the same technologically advanced units that perform so spectacularly in the passive OBERON series. Matching these exceptional drivers with active amplification and DSP filter technology made it possible to create in the OBERON C speakers a level of performance significantly higher than their passive speaker counterparts.

NOTE

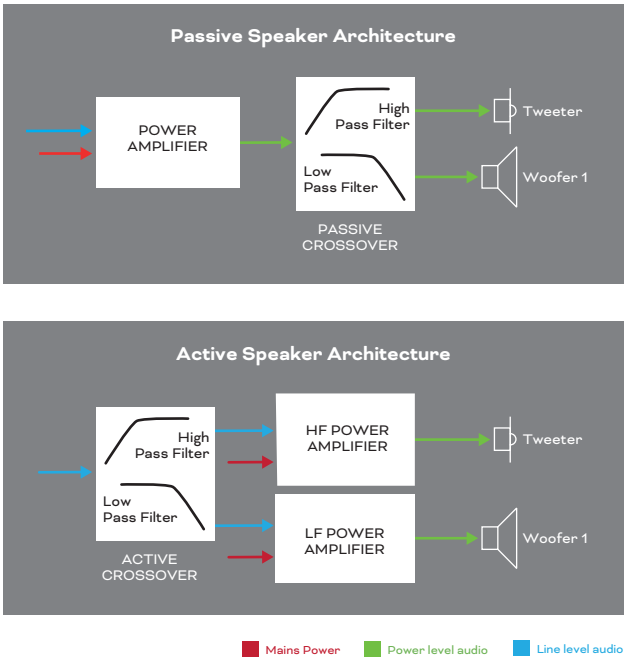
THE ACTIVE DIFFERENCE

The difference between active and passive speakers is not simply that active speakers require a mains power supply. There is a fundamental advance in the 'architecture' of an active speaker that should, in theory, result in significant performance advantages over a similar passive design. In a passive speaker, a single power amplifier output channel is connected to a passive crossover network that divides the signal between the two (or sometimes more) drivers. Because the crossover network is positioned downstream of the power amplifier, the inductive and capacitive components that create its filters need to be of high values and power ratings, and that means they tend to be both relatively "lossy" and to have their own sonic signature. Passive crossover networks are also affected by the impedance of the downstream drivers, and if that changes, as voice-coil temperature rises for example, the frequency response of the crossover filters will also change.

In an active speaker, each driver is connected directly to its own dedicated power amplifier, with the crossover dividing the signal located before the power amplifier inputs. This immediately means that, firstly, the amplifiers have much improved control over the drivers, and secondly that driver impedance changes don't affect frequency response. A further advantage is that if one amplifier reaches its power limits and clips the signal, the other amplifier (or amplifiers) will not be affected. With the crossover network now working on a line-level, rather than a power-level, signal, its filters can be generated through the use of low value and very low loss capacitors combined with high precision transistors. But active crossovers don't only achieve a level of precision and consistency that passive crossovers can't ever hope to match, they can also be designed to have much steeper filter slopes. For example, a steep, fourth order filter with 24dB/octave slopes is problematical in a passive crossover – the likely component losses and sensitivity to downstream driver impedance are just about at the limit of feasibility. A fourth order active filter however is in principle no less feasible to implement than a first order one. Even eighth order (48dB/octave) filter slopes are not unknown in active speakers. Such a steep slope would be all but impossible to implement in a passive filter.

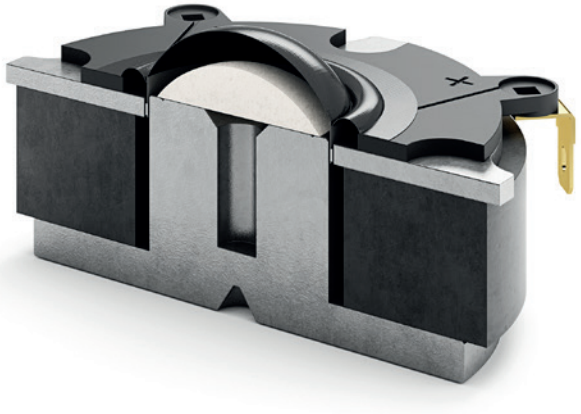
In the paragraph above we've described active crossovers in the analogue domain but in the OBERON C series the concept of an active crossover has been taken one step further by positioning it even before the digital to analogue conversion stage. The crossover is implemented entirely within the digital signal processing DSP, so now there's not even any capacitors or transistors involved in creating the filter slopes. Everything is done in the digital domain through immensely fast binary processing.

PASSIVE AND ACTIVE SPEAKER ARCHITECTURE



BASS/MID DRIVER

OBERON C bass/mid drivers feature our proprietary paper pulp and wood fibre composite diaphragm materials, advanced copper-coated aluminium voice-coil wire and, in particular, our unique SMC (Soft Magnet Compound) magnet technology. By introducing electrically non-conductive elements to the magnet structure, SMC significantly reduces the effect of a variety of distortion-producing mechanisms inherent to moving-coil driver architecture. For example, SMC minimises eddy current effects, increases flux linearity, reduces magnetic hysteresis and minimises the variation of voice-coil inductance with position. Taken together, these benefits make SMC equipped drivers particularly suited to active amplification.



The OBERON C high frequency driver is a damped textile dome tweeter featuring an unusually light diaphragm and a larger than typical, 29mm diaphragm and voice-coil. The light diaphragm means that the upper frequency response of the driver is unusually extended before its mass limited roll-off, while the large diameter diaphragm and voice-coil increases sensitivity and power handling, reduces distortion, and enables the driver to operate to lower frequencies than is the case with smaller tweeters, which helps provide more latitude in crossover design. Further increasing power handling, and significantly reducing signal compression as the voice-coil temperature rises with increased volume, the driver is equipped with ferro-fluid in its voice-coil gap.

CABINET CONSTRUCTION

OBERON C cabinets are constructed from CNC-machined high strength MDF panels and finished with a variety of wood-effect or matt white laminates. The cabinets are engineered for optimum rigidity to minimise panel resonance, with corner fillets and, in the case of the larger OBERON 7 C, strategic internal cross-bracing. Corner fillets have become increasingly unusual in contemporary speaker cabinet construction but at DALI we believe they play an important role in ensuring rigidity. OBERON C internal cabinet damping materials are selected and positioned strategically in order to maximise midrange energy attenuation without degrading bass transient response and bandwidth, as so often the case with reflex loaded speakers.

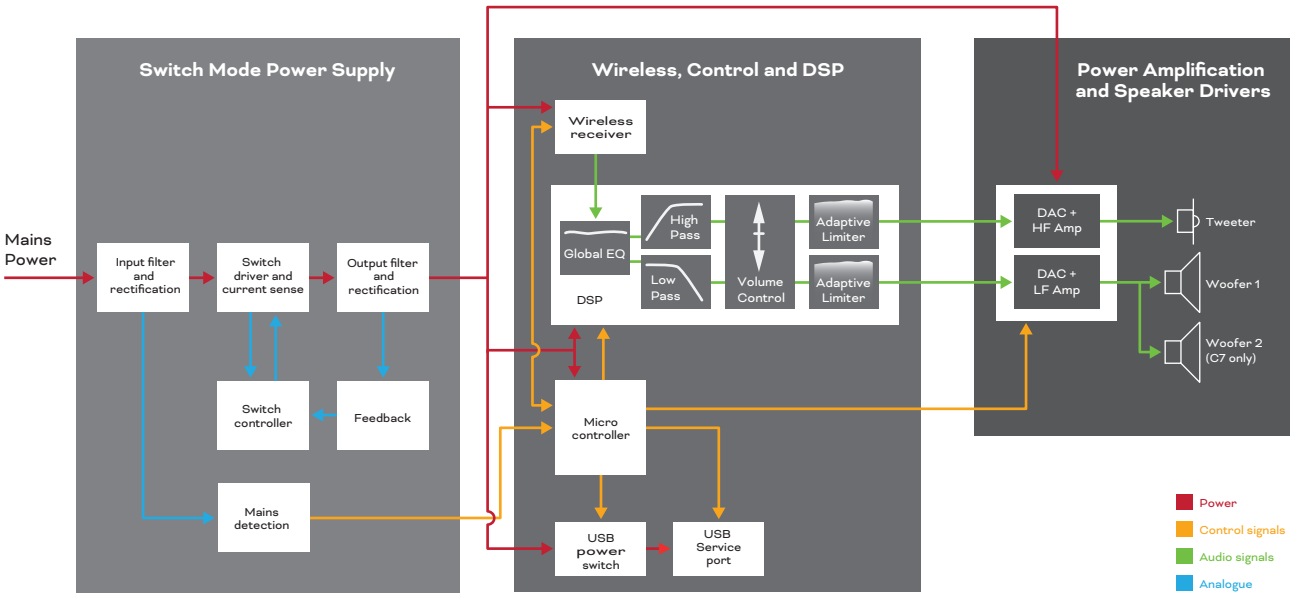
The OBERON 1 C and OBERON 7 C are fitted with unusually large diameter rear panel dual-flare reflex ports that are engineered to minimise port turbulence, distortion and compression, while also factoring-in the potential proximity of the rear wall. Flaring on the port entrance, as well as on the exit, delays the onset of airflow turbulence as volume level rises, and helps ensure that bass performance remains consistent at all volume levels. Rear-mounting the reflex ports has the great advantage of directing any midrange energy emitted from inside the cabinet away from the listening position.

The OBERON ON-WALL C also incorporates dual, rear panel reflex ports but they are configured to exit in parallel alignment with the rear wall and to incorporate the wall and the rear panel of the speaker in their operation. The ON-WALL C reflex port is a uniquely innovative solution that plays a significant role in enabling the speaker's unusually shallow depth dimension.

ELECTRONICS AND AMPLIFICATION

The rear panel mounted OBERON C electronic module incorporates a wireless receiver element and user setup interface, a DSP equalisation and crossover filter element, and a high efficiency two channel power amplifier with a closely integrated power supply.

OBERON C SYSTEM SCHEMATIC



WIRELESS FUNCTIONS

The OBERON C wireless receiver module acquires the digital wireless stream transmitted from the SOUND HUB COMPACT or SOUND HUB and, depending on the channel role assigned to the speaker when it is set up, either the left or right channel data is discarded. The remaining channel data is then passed in unchanged at 24 bit/96 kHz resolution to the DSP based equalisation and crossover filter electronics.

EQUALISATION AND CROSSOVER FILTER FUNCTIONS

The OBERON C equalisation and crossover filter elements play two roles. Firstly, through gentle modification of frequency response, equalisation helps ensure that the speaker produces the appropriate, neutrally balanced overall response in the listening room. Not too bright or too bass heavy, and with the perfect midrange level. A specific custom DSP equalisation profile was developed for each OBERON C model in order to create a tonal balance that suits its cabinet size and likely installation environment. Only active DSP technology can enable the degrees of freedom that makes such equalisation feasible. For example, the boundary effect on the frequency response of a wall mounted speaker such as the OBERON ON-WALL C is all but impossible to correct with passive equalisation, but such correction is easily within the scope of active equalisation. As a result of active boundary correction, the OBERON ON-WALL C displays none of the subjective tonality often associated with on-wall locations. It has more of the open, unconstrained character of a free-standing speaker.

Secondly, the OBERON C equalisation stage analyses the incoming signal and, depending on its low frequency content and the speaker volume level, applies subtle dynamic profiling to ensure that the speaker's bass/mid drivers are not required to work outside their comfortable, low distortion limits. It's partly thanks to dynamic profiling that OBERON C speakers remain subjectively so consistent at all volume levels.

Following equalisation, the crossover filter module divides the signal appropriately for the bass/mid and high frequency drivers through a pair of digital filters: a low-pass filter feeding the bass/mid driver and a high-pass filter feeding the high frequency driver. The filter slopes have a profile that combines a relatively slow roll-off with benign phase change through their pass-band regions.

The opportunity to apply both equalisation and crossover filtering entirely in the digital domain is one of the enormous advantages that digital active speakers have over their traditional analogue passive cousins. As we described earlier however, such theoretical advantages can only result in improved subjecting performance if, as is undoubtedly the case with OBERON C, the fundamental speaker electro-acoustics are up to the task.

POWER AMPLIFICATION

The OBERON C power amplification comprises two 50 Watt peak, closed loop Class-D power amplifiers chosen specifically for their sound quality and dynamic ability. One amplifier powers the high frequency driver, one powers the bass/mid driver (or twin drivers in the case of the OBERON 7 C). The 100dB signal-to-noise ratio of the power amplifiers ensures that even the smallest detail in a quiet musical passage is reproduced with clarity and accuracy. Powering the amplifier is a custom designed, 65W(rms), very low noise switched mode supply that is able dynamically to share resources between the two amplifier channels in response to demand. The OBERON C is, as a result, unusually frugal in terms of power consumption, yet gives nothing away in terms of dynamic punch when the music demands it.

3.2 SOUND HUB COMPACT

As its name suggests, the SOUND HUB COMPACT plays the central role in an active wireless Hi-Fi system comprising a stereo pair of OBERON C speakers. Designed primarily with Bluetooth audio and HDMI connections in mind, The SOUND HUB COMPACT receives wired or Bluetooth audio sources and transmits them wirelessly to the speakers. The SOUND HUB COMPACT was designed specifically to achieve compact dimensions and is slim enough that it can even be located out-of-sight behind a wall-mounted TV.

NOTE

The SOUND HUB COMPACT is additionally compatible with the RUBICON C and CALLISTO C series of active wireless speakers.

WIRELESS TECHNOLOGY

The SOUND HUB COMPACT wireless connection protocol is a proprietary 30 bit digital stream broadcast over the 5.2 GHz or the 5.8 GHz band. The optimal band option is selected automatically depending on the local radio signal environment. The 30 bit protocol transmits uncompressed I2S audio at 24 bit/96 kHz resolution and utilises the remaining six bits for feed-forward error correction, volume control, speaker identification and for other miscellaneous functional requirements.

ZERO LOSS

The need for volume control data to be transmitted to the speakers results from the implementation in the SOUND HUB COMPACT and OBERON C of DALI Zero Loss volume control technology. Zero Loss ensures that volume adjustment does not result in data loss through truncation of the digital word length. By placing speaker volume control at the end of the digital signal chain, directly before the digital to analogue conversion stage, full 24 bit digital resolution is retained at all volume levels.

RELIABLE WIRELESS

Thanks partly to utilising a relatively un-congested radio band, and partly to the use of a protocol specifically designed for audio data, the SOUND HUB COMPACT and OBERON C wireless connection is highly stable and introduces next to no packet loss. Feed-forward error correction is employed however to eliminate the results of packet loss should it occur. The sub 15mS input to speaker latency of the system means also that the SOUND HUB COMPACT and OBERON C system can be used in audio-visual systems with no resulting loss of lip-sync.

The robust nature of the SOUND HUB COMPACT and OBERON C wireless connection means they can be located as much as 10m apart without risk of connection failure or temporary signal interruptions.

ANALOGUE LEGACY

The SOUND HUB COMPACT is almost entirely digital in its internal signal path and processing, however it incorporates a high quality analogue input designed for legacy audiophile sources such as CD players, preamplifiers and turntables. The analogue to digital conversion stage following the input generates a high resolution, better than CD, 24 bit/ 96kHz data stream.

INPUTS AND CONNECTIONS

With five discrete audio inputs available, the SOUND HUB COMPACT can connect to almost any audio device. For example, there are no less than four ways to connect a TV and transmit its audio to OBERON C speakers, but there are also ample possibilities to connect music streaming or conventional audio devices.

BLUETOOTH

The SOUND HUB COMPACT Bluetooth input features AAC and aptX HD high performance codecs and enables smartphones, tablets, laptop or desktop computers, or any other Bluetooth audio source easily and quickly to play either locally stored or streamed music. Even Bluetooth equipped TVs can be connected to create a completely wireless TV audio solution.

HDMI ARC

The SOUND HUB COMPACT HDMI ARC is designed to play TV audio. It additionally supports CEC to enable the use of the TV remote control to adjust volume and mute functions, as well as to switch the SOUND HUB COMPACT on and off in sync with the TV.

NOTE

TV manufacturers use a variety of different terms for CEC:

Samsung:	Anynet+
LG:	SimpLink
Sony:	Bravia Link
Phillips:	EasyLink
Panasonic:	VieraLink
Hitachi:	HDMI-CEC

AUTO-SWITCHING

The SOUND HUB COMPACT has optional auto signal detect on all inputs. With auto signal detect switched on, instigating playback on the source will trigger the SOUND HUB COMPACT automatically to switch on and select the appropriate input. If there is no audio for 20 minutes, the SOUND HUB COMPACT (and OBERON C speakers) will automatically switch to standby mode and save energy.

OPTICAL IN 1

The SOUND HUB COMPACT Optical S/PDIF Input 1 is intended for the connection of CD players or other conventional digital audio sources fitted with a digital optical output.

OPTICAL IN 2 (TV)

The SOUND HUB COMPACT Optical S/PDIF Input 2 is intended for the connection of TVs fitted with a digital optical output. The auto switch on function of Optical Input 2 is activated by the carrier light in the optical connection, rather than the audio signal, which ensures that the SOUND HUB COMPACT is ready to play TV audio as soon as the TV is switched on.

ANALOGUE

The SOUND HUB COMPACT analogue line input is intended for the connection of conventional audio sources such as CD players or preamplifiers. Turntables can be connected directly if fitted with a line output, or alternatively, connected via an RIAA phono preamplifier. The analogue input is where audiophile tradition meets the future of wireless active Hi-Fi.

FURTHER CONNECTIONS

The SOUND HUB COMPACT provides a volume controlled, line-level analogue subwoofer output that switches on automatically when a subwoofer connection is detected. The subwoofer output is low-pass filtered at 100Hz to match the frequency characteristics of the main speakers. When a subwoofer is in use, the audio transmitted to the main speakers is high-pass filtered to reduce its energy content below 80Hz and preserve power handling in the main speaker frequency band.

The SOUND HUB COMPACT incorporates a USB-A socket that's primarily intended for service and diagnostic use. The USB socket can however also be used to charge a mobile device or to power a media streaming device such as an Amazon Echo or Google ChromeCast Audio, the output from which can then be routed to a SOUND HUB COMPACT input and potentially introduce a voice control element to the system.

The SOUND HUB COMPACT includes a wired IR Signal Receiver accessory that enables it to be located out of line-of-sight of its remote control handset. The IR Signal Receiver is optionally connected to a SOUND HUB COMPACT rear panel socket. Connecting the IR Signal Receiver disables the SOUND HUB COMPACT integrated IR receiver.

4. OBERON C and SOUND HUB COMPACT - The Active Choice

The OBERON C series demonstrates that the theoretical advantages of active speakers can be truly realised, and plainly heard, and proves that genuine Hi-Fi speakers can be easily integrated in contemporary lifestyles needs and media systems. And the SOUND HUB COMPACT demonstrates that versatility of use in the modern world of both streamed and conventional audio need not mean any compromise of functionality or sound quality.

The OBERON C and SOUND HUB COMPACT represents a new era of revolution in the DALI story. The traditional DALI values of easy accessibility, simple operation and class-beating sound quality have found their way into a genuinely high-performance digital, active wireless Hi-Fi system.

Technical specifications

	OBERON 1 C	OBERON 7 C	OBERON ON-WALL C
Frequency range (±3 dB) (Hz)	39 – 26,000	31 – 26,000	51 – 26,000
Maximum SPL (dB)	106	108	107
Crossover frequency (Hz)	2350	2450	2700
Crossover principle	Full active 24 Bit DSP	Full active 24 Bit DSP	Full active 24 Bit DSP
High Frequency driver	1 × 29 mm soft dome tweeter	1 × 29 mm soft dome tweeter	1 × 29 mm soft dome tweeter
Low frequency driver	1 × 5.25"	2 × 7"	1 × 5.25"
Enclosure type	Bass reflex (Rear ported)	Bass reflex (Rear ported)	Bass reflex (Rear ported)
Reflex tuning frequency (Hz)	52	40	52
Amplifier output power (W)	2 × 50 W	2 × 50 W	2 × 50 W
Amplifier type	Class-D	Class-D	Class-D
Wireless input	Full 24 Bit / 96 kHz (not compressed)	Full 24 Bit / 96 kHz (not compressed)	Full 24 Bit / 96 kHz (not compressed)
Wireless Audio RF Band (MHz)	5150-5250 MHz and 5725-5875 MHz*	5150-5250 MHz and 5725-5875 MHz*	5150-5250 MHz and 5725-5875 MHz*
Input Mains	Universal mains 100-240 VAC	Universal mains 100-240 VAC	Universal mains 100-240 VAC
Maximum power consumption (W)	62	62	62
Standby power consumption (W)	1	1	1
Networked standby power consumption (W) **	1.25	1.25	1.25
Time to enter networked standby	< 20 minutes	< 20 minutes	< 20 minutes
Recommended placement	Stand/ Shelf	Floor	Wall
Recommended distance to walls (cm)	1 – 50	15 – 100	On-wall
Dimensions (H × W × D) mm	274 × 162 × 234	1015 × 200 × 340	385 × 245 × 120
Weight (kg/lb)	4.2 kg / 9 lb	14.8 kg / 32 lb	4.9 kg / 10 lb
Included accessories	Quick start guide, mains cable, front grille, rubber feet, silicone bumpers	Quick start guide, mains cable, front grille, rubber feet, spikes	Quick start guide, mains cable, front grille, rubber feet, silicone bumpers, cable clips

* Excluding Japan
** Please note that the speaker will remain in networked standby if the SOUND HUB / SOUND HUB COMPACT is powered off.

	SOUND HUB COMPACT
Wired inputs	2 × Optical (TOSLINK™) 1 × Analogue Stereo (RCA) 1 × HDMI (ARC)
Input impedance RCA (Ohm)	7.2 k
Max input (RCA)	3.0 Vp
Maximum Optical Digital Input Resolution (Bits/kHz)	24 / 192
Wired outputs	1 × SUB OUT (RCA with detection)
SUB output max voltage (V)	1.7 V RMS
Wireless inputs	BT 5.0, AAC, aptX, aptX HD
Wireless output	Full 24 Bit / 96 kHz (Not compressed)
Wireless Audio RF Band (MHz)	5150-5250 MHz and 5725-5875 MHz*
Other connections	1 × IR Sensor input / 1 × USB-A power output (5 V/1.5 A) / Service
Power input	9V DC
Maximum power consumption (W)	2.8 W
Standby power consumption (W)	1.7 W
Networked standby power consumption (W)	1.7 W
Time to enter networked standby	< 20 minutes
Dimensions (H × W × D) mm	30 × 212 × 132 mm (1.2 × 8.4 × 5.2 in)
Included accessories	Quick start guide, IR remote control, 9V DC power supply (universal 100-240 VAC), IR sensor
Weight (kg/lb)	0.5 kg
Accessories	Rubber feet, manual, power supply unit, remote control, IR receiver

* Excluding Japan