

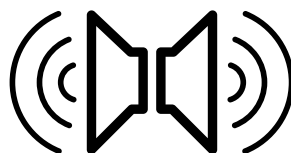
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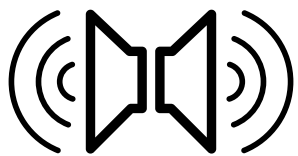
USER GUIDE

Cuboid

Loudspeakers



Loudspeakers



Loudspeakers

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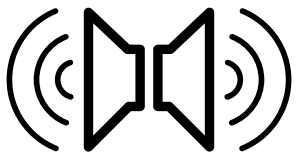
Congratulations on your choice of Optimal Audio for your latest sound system installation.

The Optimal Audio range of compatible audio zoners, amplifiers and loudspeakers are designed to work together simply and effectively. Our quick start guides will take you through the simple connection and set up procedure.

Cuboid consists of a series of full-range, high-powered loudspeakers designed to deliver great sound at an affordable price. When used in conjunction with the rest of the Optimal Audio eco-system Cuboid will surprise you with its performance, even coverage and professional aesthetic.

This Quick Start Guide will help you get your loudspeakers rigged, positioned and connected correctly.

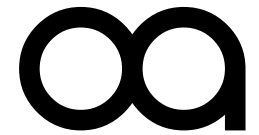
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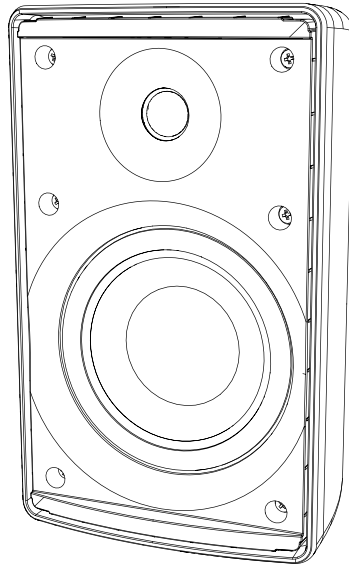
Cuboid loudspeakers

All the speakers in the Cuboid range are full-range, 2-way loudspeakers. This means that they have a high frequency tweeter loaded onto a waveguide, giving increased efficiency and directivity, and a low-frequency cone driver.

The loudspeaker is fed with a full-range output from an amplifier and an internal electronic cross-over network divides the signal between the high and low frequency drivers.

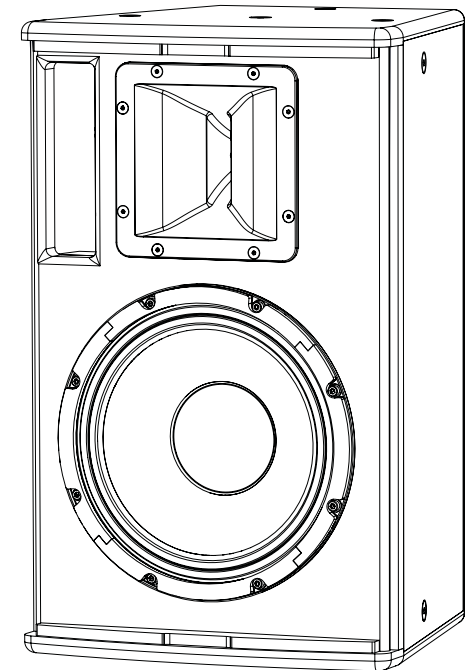
Cuboid 3, 3TX, 5, 5TX, 6 and 6TX

- Fixed high frequency waveguide
- Low frequency driver
- Moulded ABS cabinet

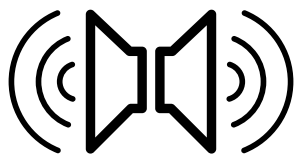


Cuboid 8, 10, 12 and 15

- Rotatable high frequency horn
- Low frequency driver
- Bass reflex port
- M8 fixings
- Wooden cabinet



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Cuboid model	Wall bracket	Combined weight	U bracket	Combined weight	Eyebolt fitting
Cuboid 3	included	1.39kg (3.06lbs)	N/A	N/A	M5 x 1
Cuboid 3TX	included	1.77kg (3.9lbs)	N/A	N/A	M5 x 1
Cuboid 5	included	2.28kg (5.02lbs)	N/A	N/A	M5 x 1
Cuboid 5TX	included	2.66kg (4.98lbs)	N/A	N/A	M5 x 1
Cuboid 6	included	2.99 (6.59lbs)	N/A	N/A	M5 x 1
Cuboid 6TX	included	3.94 (8.68lbs)	N/A	N/A	M5 x 1
Cuboid 8	A	10.64kg (23.45lbs)	A	13.0kg (28.66lbs)	M8 x 16
Cuboid 10	B	17.26kg (38.05lbs)	B	20.0kg (44.09lbs)	M8 x 21
Cuboid 12	B	21.26kg (46.87lbs)	C	25.5kg (56.21lbs)	M8 x 21
Cuboid 15	C	31.35kg (69.11lbs)	D	35.0kg (77.16lbs)	M8 x 19

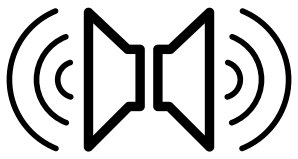
Cuboid can be mounted on a wall in either portrait or landscape mode using the appropriate wall bracket or suspended from a ceiling with the appropriate U bracket.

The above table lists the correct wall bracket for each Cuboid model, along with the combined weight of the loudspeaker and bracket.

It is critical that the structure to which Cuboid is to be mounted is suitable for taking the weight of the loudspeaker/bracket assembly.

It is highly recommended that a secondary safety fixing be fitted. This can be achieved using a suitable rated M8 eyebolt and rated safety chain or steel wire rope (not supplied) in the case of the Cuboid 8 and above, or with the supplied M5 bolt and steel wire rope in the case of the Cuboid 3, 3TX, 5, 5TX, 6 and 6TX.

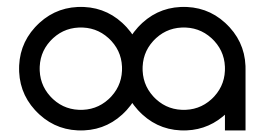
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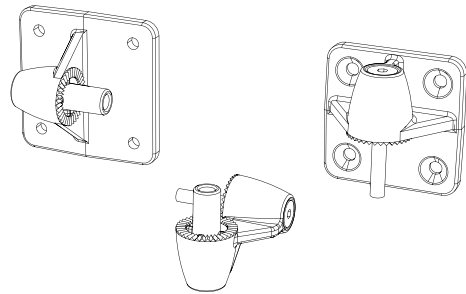
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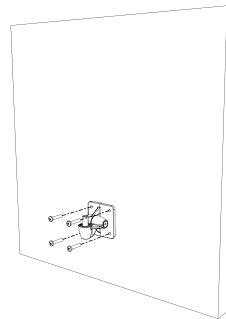
Wall mounting Cuboid 3, 3TX, 5, 5TX, 6 and 6TX – Portrait or landscape

Mounting Cuboid 3, 3TX, 5, 5TX, 6 and 6TX in any orientation is easy thanks to the universal bracket that is supplied with the loudspeaker.

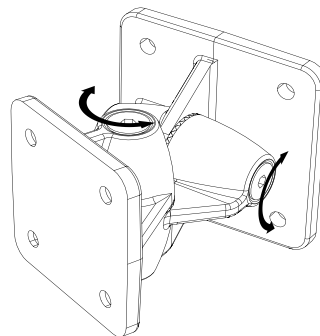


It is critical that the structure to which Cuboid is to be mounted is suitable for taking the weight of the loudspeaker/bracket assembly. It is highly recommended that a secondary safety fixing be fitted.

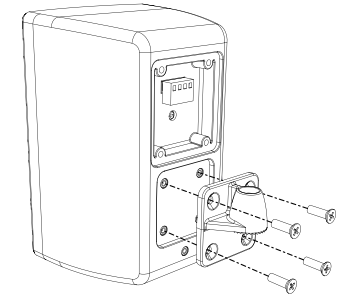
The wall bracket is fixed to the mounting position by 4 screws as shown.



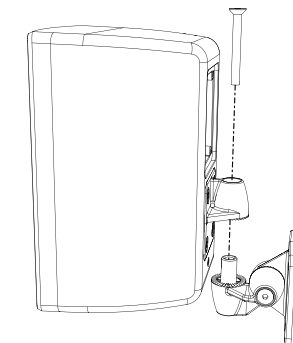
The orientation of the loudspeaker fixing plate can be pre-set and tightened using the supplied 4mm hex wrench. Use the supplied 3mm hex wrench to fix the loudspeaker to the bracket.



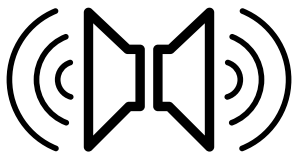
Once the wall mounting part is fixed, attach the loudspeaker part of the bracket to the mounting points on the back of Cuboid 3, 3TX, 5, 5TX, 6 and 6TX.



Attach the loudspeaker and bracket assembly to the wall mount and tighten in the desired orientation.



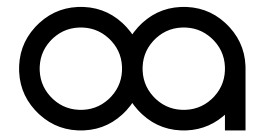
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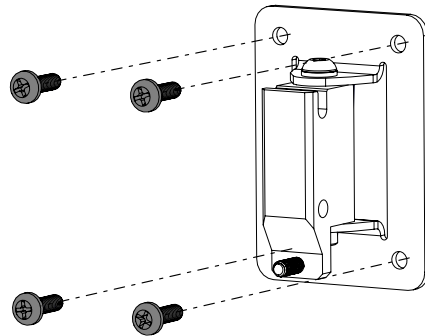
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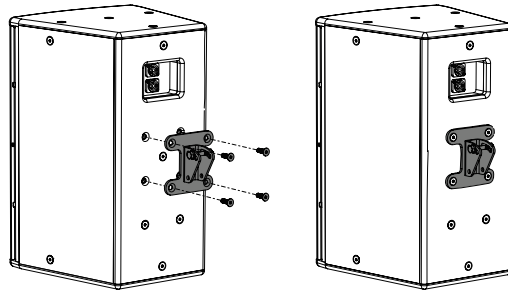
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Wall mounting Cuboid 8, 10, 12 and 15 – Portrait or landscape

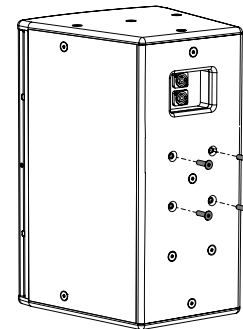
Once loudspeaker position has been decided, affix wall section of wall bracket (A, B or C depending on Cuboid model) securely to a suitable wall mounting point.



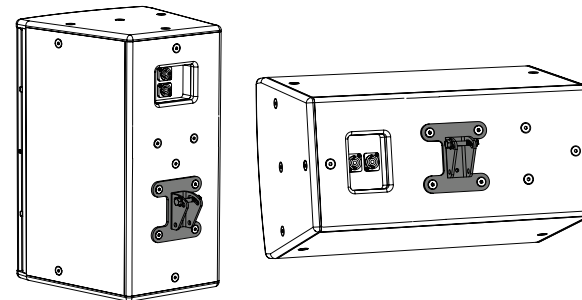
Position loudspeaker cabinet section of wall bracket over the four M8 mounting points and secure with the four bolts from the back of the cabinet.



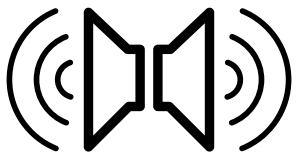
Remove M8 fixing bolts from the rear of the loudspeaker cabinet.



Optional wall bracket mounting positions enable greater down-tilt, using the lower four M8 bolt position, or the loudspeaker can be mounted in landscape mode by rotating the bracket as shown: the loudspeaker to the bracket.



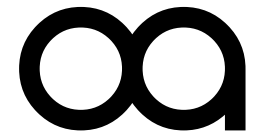
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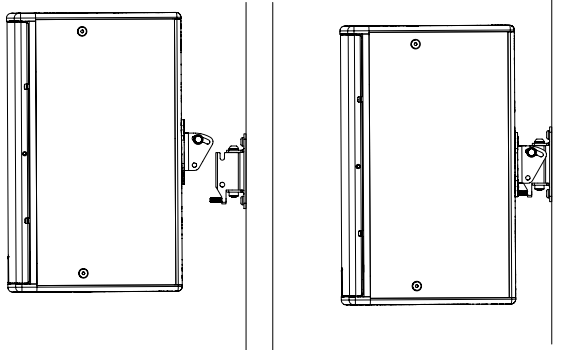
Loudspeakers



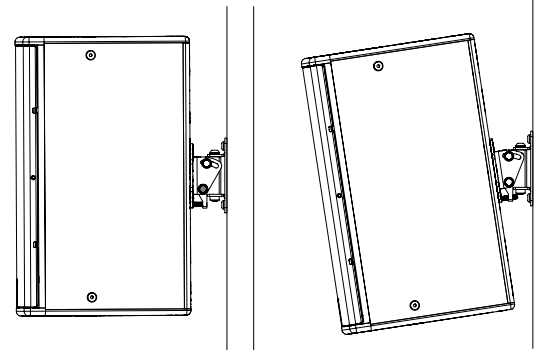
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Wall mounting Cuboid 8, 10, 12 and 15 – Portrait or landscape

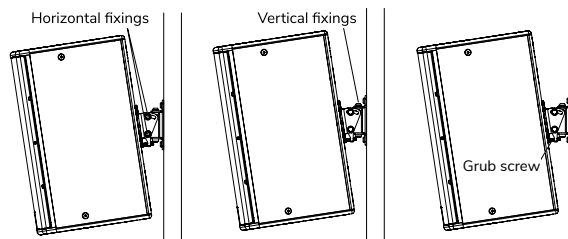
Lift loudspeaker into position making sure that the two halves of wall bracket line up – the adjustable bolt sits into the two 'U shaped' cups in the wall section of the bracket.



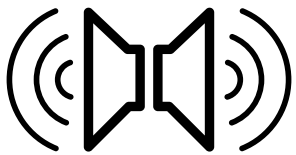
Secure the assembly with the fixed bolt in the lower hole in the bracket – this provides the pivot for angling the loudspeaker. Adjust the grub screw to fix the down-tilt angle.



Once the loudspeaker is in position and you are happy with the angle adjustments, tighten all fixings as shown to lock the cabinet in place.



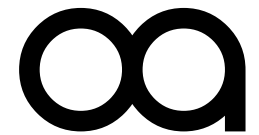
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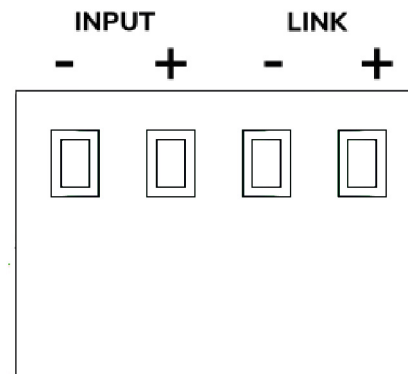
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Connecting Cuboid 3, 3TX, 5, 5TX, 6 and 6TX



Cuboid 3, 3TX, 5, 5TX, 6 and 6TX loudspeakers are fitted with four pin push-in euroblock connectors.

You can connect a cable from the SmartAmp or Zone speaker outputs to either of the +ve (positive) and -ve (negative) pins, and use the other pair to link on to the next loudspeaker. Note that when using these loudspeakers in low impedance (not 100 or 70 volt line) **you can only connect two loudspeakers per amplifier channel**, as the impedance is reduced to 4 Ohms.

When multiple Cuboid 3TX, 5TX and 6TX are in use, we recommend using 70 volt taps when using bridged speaker outputs on a Zone, and 70 or 100 Volt as required with SmartAmp. You can add as many speakers as the total load on the amplifier allows. For example, with the Cuboid 5TX on a 7.5W tap, you can use up to 33 of them from a single SmartAmp 10. SmartAmp 10 has a maximum output of 250W when all available power is directed to one channel (no power will be available on the other channel) - $7.5W \times 33 = 247.5W$ required.

It is perfectly possible to have different loudspeaker on different power tap settings, to balance volume levels around a room – make sure that the total

power of the circuit does not exceed the capability of the amplifier channel driving that circuit.

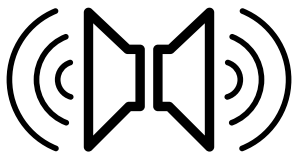
For outdoor use, a weatherproof connector cover with cable glands can be purchased as an accessory to ensure no water ingress to the loudspeaker terminals.

Be sure to select a gauge of cable with a maximum outside diameter of 6.8mm to ensure it fits inside the gland, and a minimum OD of 4 mm to ensure a good seal.

Insert the cables to be connected through the gland, then strip to a suitable length, terminate and tighten the glands, ensuring they clamp onto the outer insulation of the cable.

Then insert the four screws through the corners of the plate and into the loudspeaker.

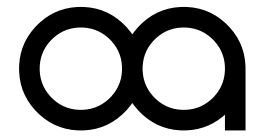
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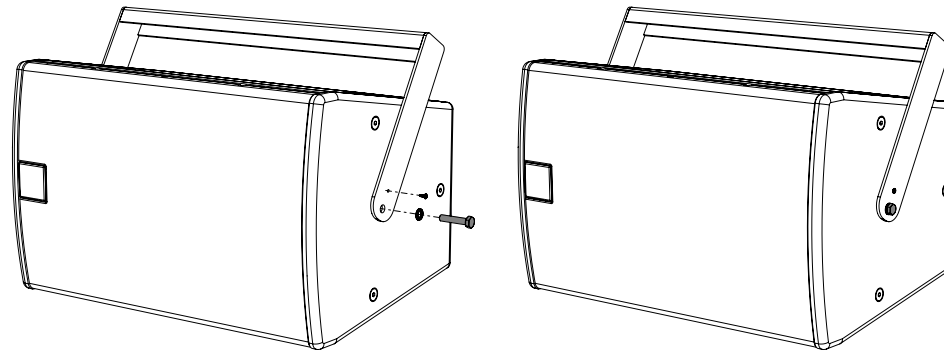
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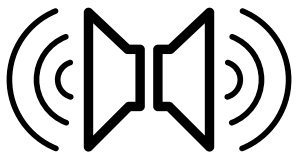
Ceiling mounting Cuboid 8, 10, 12 and 15 using U bracket



The U brackets A, B, C and D are specifically designed for hanging Cuboid from a ceiling in landscape mode. Fixing the U bracket is a simple process:

- Remove the centre M8 bolt from the top and bottom of Cuboid
- Place the U bracket over the loudspeaker and line up the holes with the centre M8 bolt hole
- Use the supplied bolts to fix the bracket to the loudspeaker
- When the angle is set, fix with the supplied locking screw

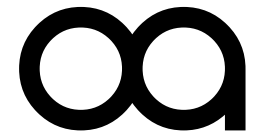
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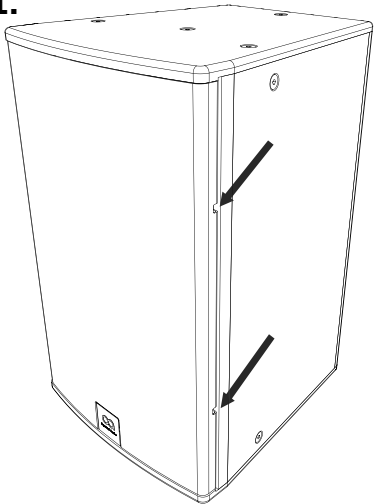


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Grille removal

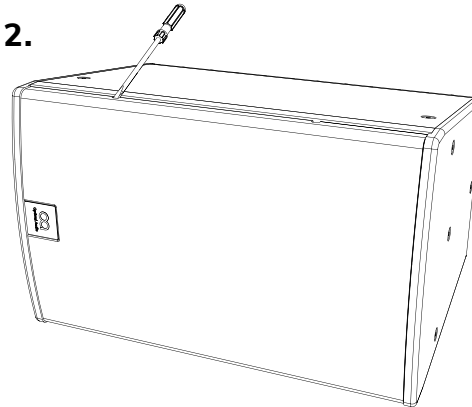
Grilles on Cuboid 8, 10, 12 and 15 loudspeakers are designed to be easy to remove to facilitate driver rotation. No screws are used to hold them in place; they are manufactured with a natural spring which holds them in place in slots in each side of the cabinets. The grilles have two or three gaps in the sides into which an appropriately sized flat-bladed screwdriver can be inserted to assist in removal.

1.



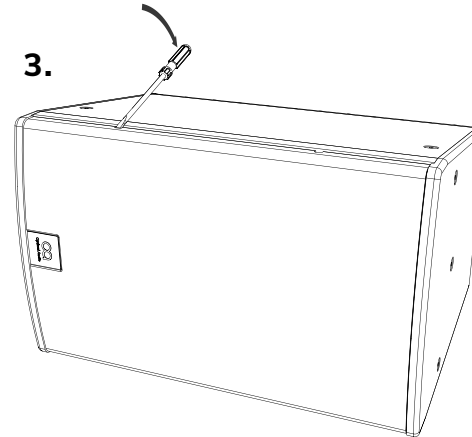
Insert the screwdriver blade into one of the gaps - either at the top or bottom of the cabinet.

2.



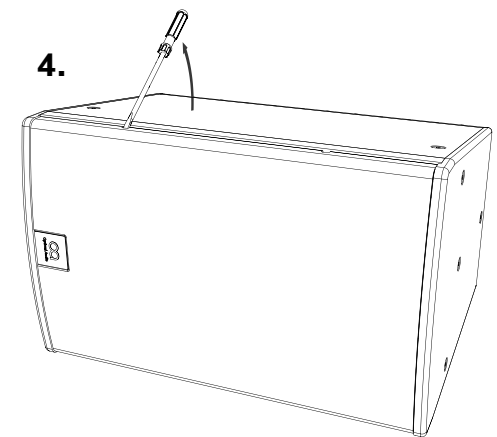
Gently push the handle down. This will ease the grille out of the slot, it may have bitten into the paint surface, so you just need to make sure it is free to be lifted clear.

3.



Now lift the handle up; this will ease the grille forward slightly to prevent the return on the grille dropping straight back into the slot:

4.

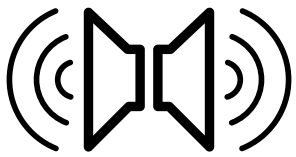


Repeat this process for the remaining gaps in the grille to ease it out of the slot all the way up one side of the cabinet; when you get to the final gap the grille should pop out and away from the front of the cabinet.

To replace the grille, first insert one side into the slot on one side of the cabinet. Make sure the return on the grille

is completely engaged in the slot. Push on the front of the grille with the flat of your hand, which will encourage the other edge of the grille to locate on the side of the cabinet close to the slot. Now push the edge of the grille back starting at the top or the bottom to engage the return in the slot; you may need to do this a little at a time, working down the length of the grille until it pops into place.

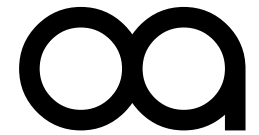
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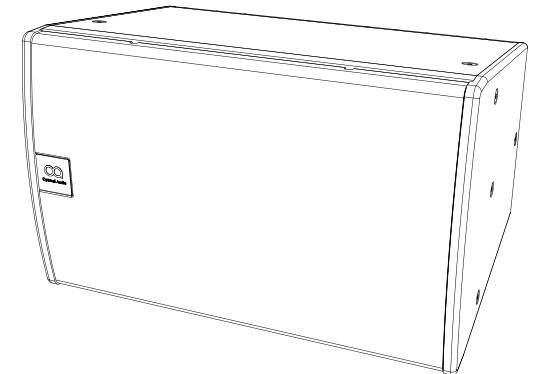
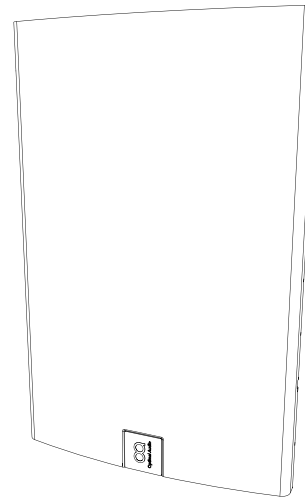
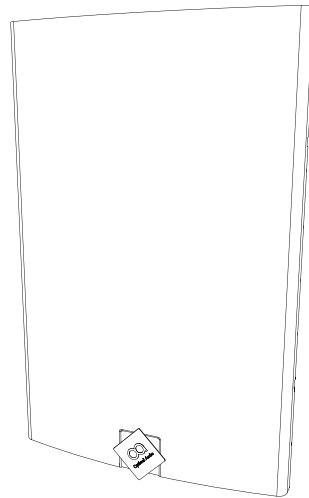
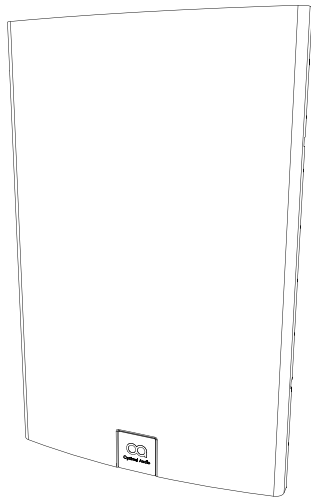
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Badge rotation

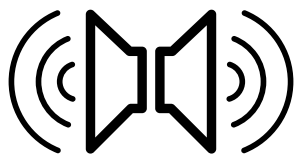
When used in landscape rotate the Optimal Audio badge on the grille so that it matches the orientation of the speaker. The badge is spring loaded and very easy to rotate and can only be turned in fixed 90° increments so you will have no problem making sure that it is straight.

The badge is easier to rotate if the grille is first removed (except Cuboid 3, 3TX, 5, 5TX, 6 and 6TX – grille is not removable). With the grille removed push the spigot holding the badge in place so the badge is protruding forward from the grille and is proud of the recess in which it sits. Rotate the badge as required and release the spigot on the rear so it settles back into the recess in the grille.

To adjust the badge on Cuboid 3, 3TX, 5, 5TX, 6 and 6TX simply rotate as required.



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Cuboid coverage specifications

Cuboid model	Horizontal coverage	Vertical coverage
Cuboid 3 and 3TX	150°	100°
Cuboid 5 and 5TX	130°	120°
Cuboid 6 and 6TX	130°	120°
Cuboid 8	90°	50°
Cuboid 10	90°	50°
Cuboid 12	80°	50°
Cuboid 15	80°	50°

When installing loudspeakers, it's worth taking a moment to understand how the loudspeaker projects sound and how to get the best coverage in your venue by careful aiming.

The coverage specs are useful for informing this important decision.

In any loudspeaker, the optimum output can be considered as the centre axis of the high frequency driver - maximum SPL (Sound Pressure Level). The extremity of the coverage is defined as the angle from the centre axis where the SPL drops by 6dB to each side of the centre axis:

- 45° horizontally either side of centre for Cuboid 8, 10, 12 and 15
- 75° horizontally either side of centre for Cuboid 3 and 3TX
- 65° horizontally either side of centre for Cuboid 5, 5TX, 6 and 6TX

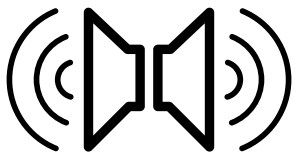
It therefore follows that the axis should be aimed at the furthest point of the desired coverage area. This is also useful for controlling the amount of energy hitting unwanted areas, such as a ceiling or wall, or ensuring SPL is not too high for a listener near the loudspeaker (see page 14 on aiming and room coverage).

These specifications refer to the loudspeaker ex-factory - with the loudspeaker in portrait, the horn is fitted to deliver coverage as shown in the table above.

If you intend to mount your Cuboid 8, 10, 12 or 15 in landscape mode (when suspending horizontally from ceiling for instance), consider rotating the horn as shown on the following page.

For Cuboid 3, 3TX, 5, 5TX, 6 and 6TX models the horn is not rotatable. The loudspeakers can easily be mounted in either portrait or landscape as desired.

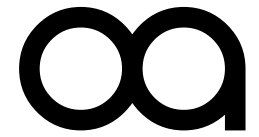
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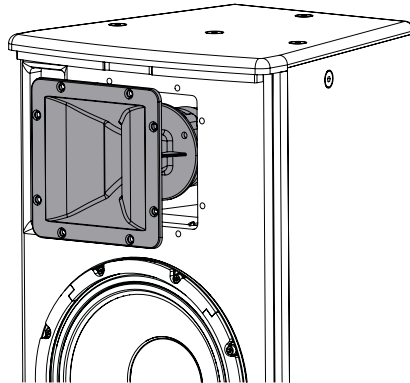
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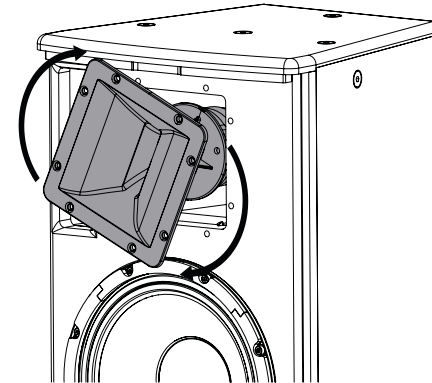
Rotating the horn (Cuboid 8 ,10 ,12 and 15)

1.



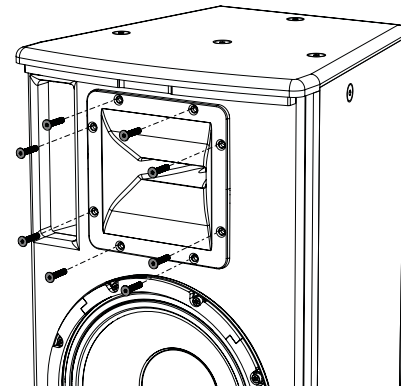
Remove horn

2.



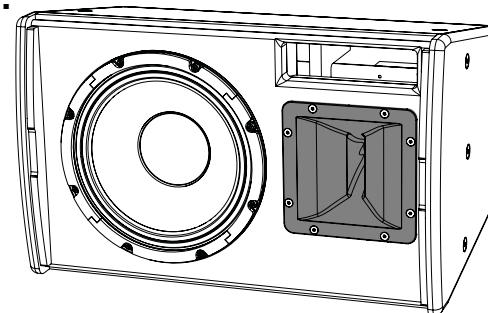
Rotate horn

3.



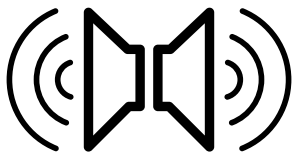
Replace fixings

4.



Rotate cabinet

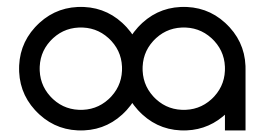
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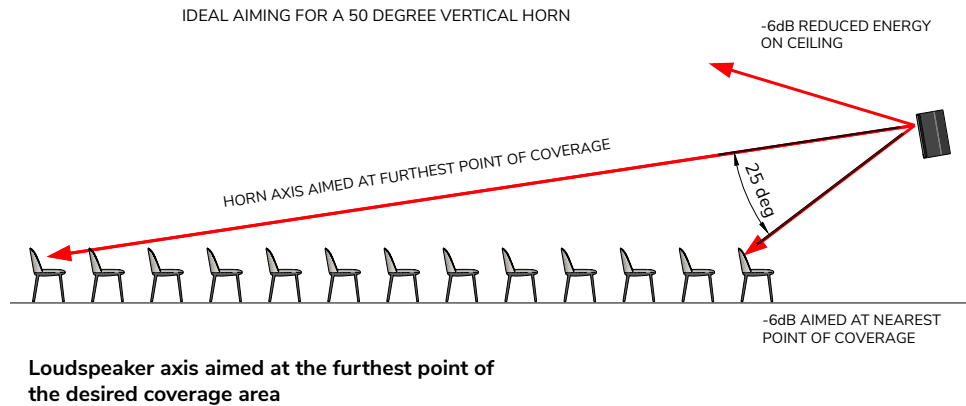


Optimal Audio

Loudspeaker aiming and room coverage

Sound Pressure Level decreases by 6dB for every doubling of distance from the source loudspeaker. This means that 96dB at 5m from a loudspeaker will reduce to 90dB at 10m – a significant drop in energy.

Because of this level drop over distance, in larger rooms it's worth considering additional loudspeakers to counter this effect, maintaining volume and intelligibility. In this case, it is important that the second row of loudspeakers down the room are delayed to match the arrival of the sound from the first pair of speakers, as shown below.

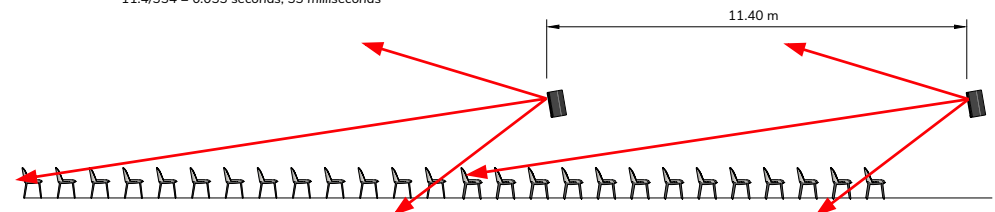


IN THIS EXAMPLE THE ROOM IS TOO BIG FOR ONE SPEAKER TO BE ABLE TO COVER RIGHT TO THE BACK. A SECOND SPEAKER IS ADDED AT THE POINT WHERE THE FIRST AND SECOND CROSS OVER. THE SECOND IS DELAYED BACK TO THE FIRST USING THE FORMULA:

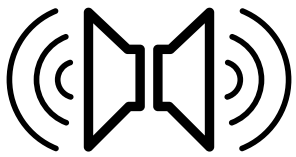
$\text{distance/speed of sound (334m/s @ 20 degrees C)}$

IN THIS CASE:

$11.4/334 = 0.033 \text{ seconds, } 33 \text{ milliseconds}$



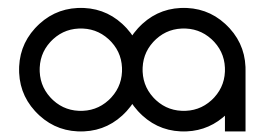
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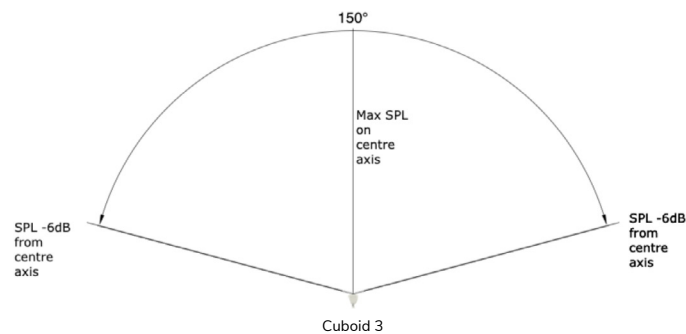


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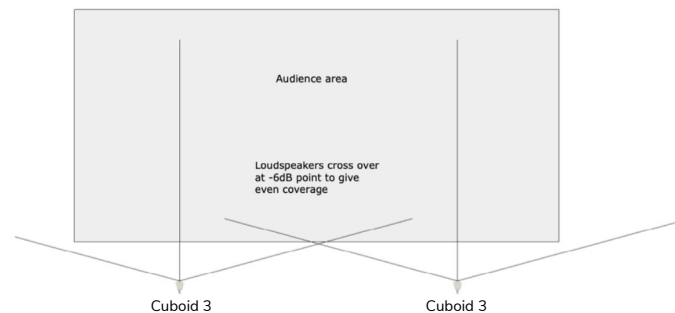
Horizontal coverage

It is important to consider the dispersion angles, or coverage, of each loudspeaker, and ensure that at the point at which you are at the extreme of the loudspeaker's horizontal coverage angle, you are overlapping with that from another loudspeaker, to prevent "dead spots", areas where the high frequency

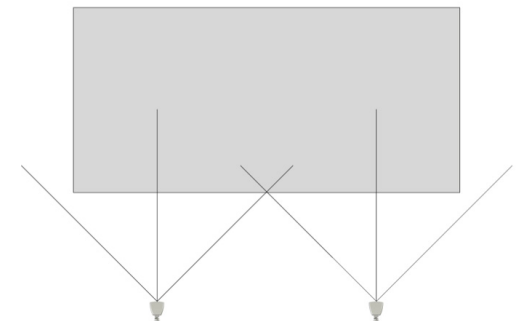
sounds from the loudspeaker drop more than 3dB below those on axis of the loudspeaker. This would reduce the speech intelligibility and the clarity of music reproduction.



Cuboid 3 horizontal coverage

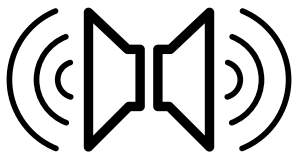


2 x Cuboid 3 positioned to overlap horizontal coverage



For Cuboid 8 and upwards, the horizontal dispersion is narrower, and the loudspeakers will necessarily be placed closer together, or further away from the listeners for seamless horizontal coverage.

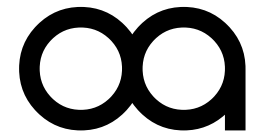
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Connecting Cuboid 8, 10, 12 and 15



- NL4 connector uses 1+/1- for input.
- When wiring loudspeaker cables be careful to observe the correct polarity of the cable and connector at both ends.

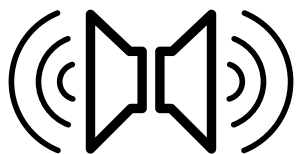
Cuboid 8, 10, 12 and 15 are fitted with two connector types for a wider range of installation types.

A single NL4 type connector that utilises only the 1+ and 1- for input signals.

A 4-pin Euroblock type connector. These have two pairs of terminals. The first pair marked INPUT+/-, and a second pair marked LINK +/-.

The LINK terminals provide an easy way of connecting a further loudspeaker of the same type. No more than two loudspeakers should be connected to a single amplifier channel.

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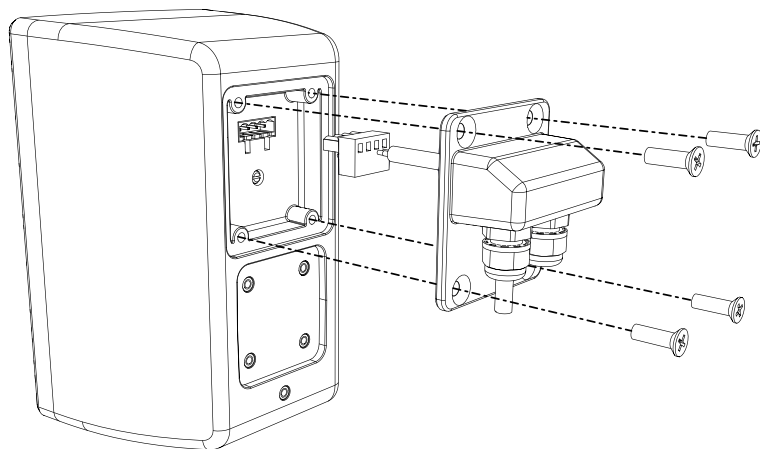
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Fitting weatherproof connector – Cuboid 3, 3TX, 5, 5TX, 6 and 6TX

To use the weatherproof connection cover, firstly run the input and link output (where used) cables through the glands.

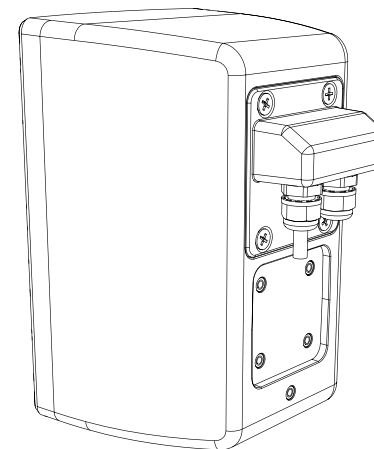
Trim the cable ends to fit into the loudspeaker's euroblock connector, without leaving excessive exposed conductor, as this can easily short the two cores together. Doing so will cause your amplifier to protect itself, and no sound will come from the loudspeaker.

Be sure to observe correct loudspeaker polarity.



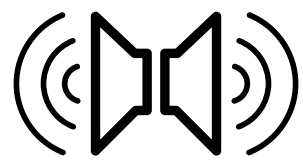
Where present, make sure you have the correct tapping selected from the rotary control beneath the input connector. Then push the cable mounted connector into the speaker, and slide the cover over the cable until it fits against the recess in the back of the speaker.

Insert the four screws to secure in place, tight enough to seal against the cabinet but not over tight.



Finally, tighten the cable gland onto the cable(s) to provide a good seal. If only one gland is used, tighten the second as far as you can.

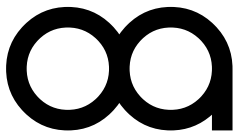
USER GUIDE



Loudspeakers

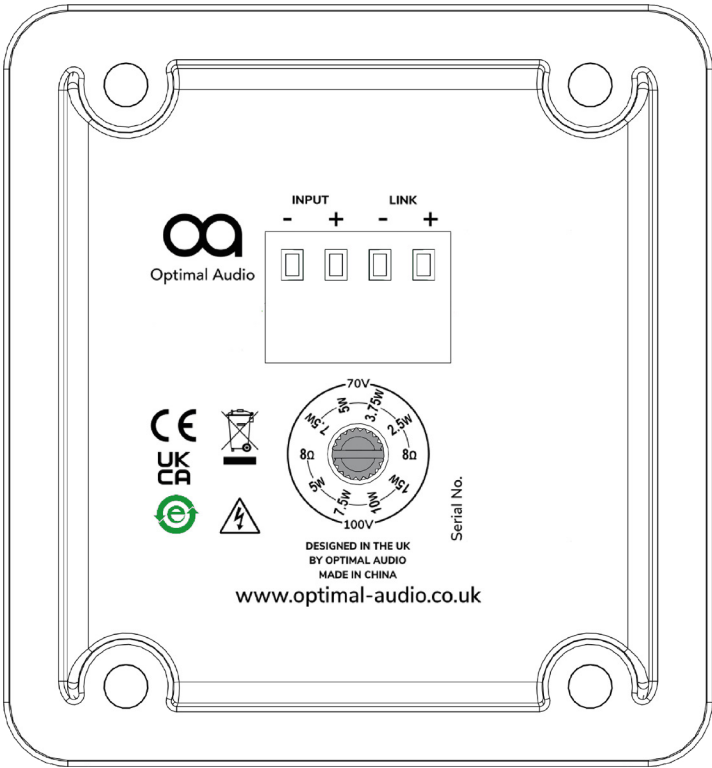
Cuboid

Loudspeakers



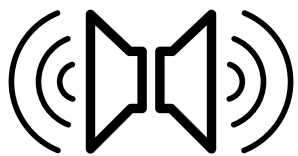
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Transformer taps – Cuboid 3TX and 5TX



Cuboid model	70V taps				100V taps			
Cuboid 3TX	2.5	3.75	5	7.5	5	7.5	10	15
Cuboid 5TX	2.5	3.75	5	7.5	5	7.5	10	15

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Loudspeakers

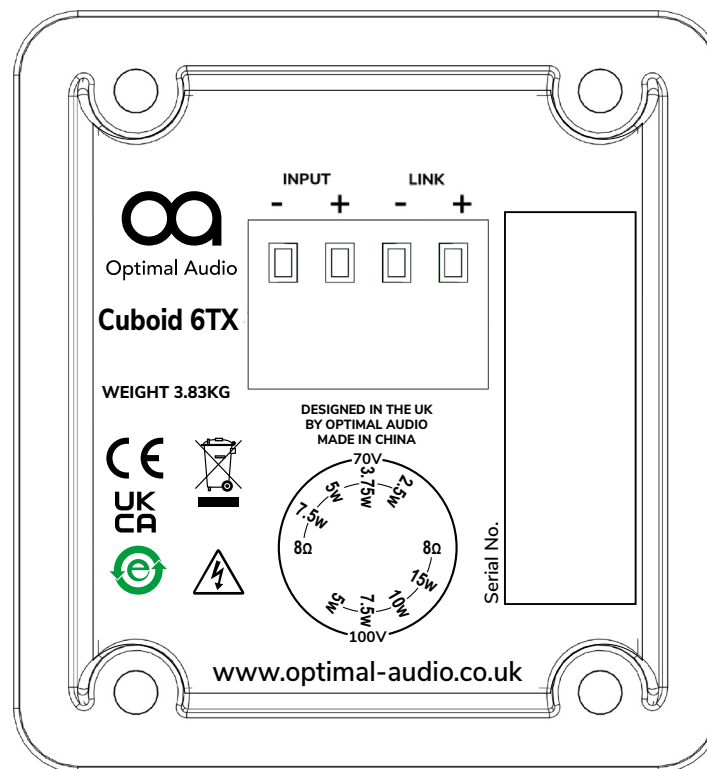
Cuboid

Loudspeakers



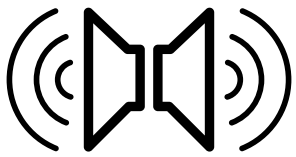
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Transformer taps – Cuboid 6TX



Cuboid model	70V taps				100V taps			
Cuboid 6TX	3.75	7.5	15	30	7.5	15	30	60

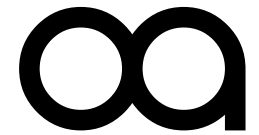
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Matching speakers and amplifiers

To get the best from your loudspeakers, it's important to make sure the amplifier you are using is up to the job. Several factors have to be considered, and it's worth clarifying what they mean and how they affect the performance of a loudspeaker.

Loudspeakers tend to be quantified using Watts, but this is purely a measure of the amount of power a loudspeaker can take at its input over time, and not necessarily a measurement of how loud it might go.

Optimal Audio loudspeaker power handling is therefore quoted as Watts (AES) and Watts (Peak), Peak delivering 6dB(SPL) acoustic output higher than AES (AES2-2012 standard) and referring to the loudest transients a loudspeaker can handle without distortion.

In Watts, this means that the peak power handling of a Cuboid 3 for example is 120W, four times its continuous power handling of 30W. The peak power handling for a Cuboid 8 is 800W, four times its 200W continuous power handling capability.

So, give a Cuboid 3 30W of continuous power and you will get 98dB(SPL) out of it if you are standing 1m away from it. It will however be able to deliver transient peaks in the audio signal at 114dB(SPL(@1m)) when connected to an amplifier capable of delivering the full 120W of its peak power handling.

Deliver 200W of continuous power to Cuboid 8 and you will get 115dB(SPL) out of it if you are standing 1m away from it. It will however be able to deliver transient peaks in the audio signal at 121dB(SPL(@1m)) when connected to an amplifier capable of delivering the full 800W of its peak power handling.

In the case of Cuboid 3TX, 5TX and 6TX, the inclusion of a 70V/100V transformer determines the amount of power being delivered to the loudspeaker – see previous page. The amplifier 'sees' the transformer and not the actual loudspeaker, enabling many loudspeakers to be connected together up to a value that does not exceed the amplifier's power output capability in Watts.

What this all means is that for the best performance from your loudspeaker, make sure you have an amplifier that is capable of delivering more than a loudspeaker's rated AES power handling ability at the nominal impedance of the loudspeaker – 8 Ohms in the case of all low impedance Cuboid speakers. A 200W amplifier will deliver 115dB(SPL) from a Cuboid 8 and nothing more, but a more powerful amplifier will have the headroom to deliver short musical transients at higher levels, thereby ensuring that faithful reproduction of the program material is maintained.

Product specifications for each model are on page 21 of this guide.

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Accessories

Weatherproof Cover (black)	CIPKIT-B	Weatherproof cover for Cuboid 3, 3TX, 5, 5TX, 6 and 6TX (black)
Weatherproof Cover (white)	CIPKIT-W	Weatherproof cover for Cuboid 3, 3TX, 5, 5TX, 6 and 6TX (white)
Wall Bracket A (black)	WB1-B	Wall bracket for Cuboid 8 (black)
Wall Bracket B (black)	WB2-B	Wall bracket for Cuboid 10 & 12 (black)
Wall Bracket C (black)	WB3-B	Wall bracket for Cuboid 15 (black)
U Bracket A (black)	UB1-B	U bracket for Cuboid 8 (black)
U Bracket B (black)	UB2-B	U bracket for Cuboid 10 (black)
U Bracket C (black)	UB3-B	U bracket for Cuboid 12 (black)
U Bracket D (black)	UB4-B	U bracket for Cuboid 15 (black)

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Specifications



	Cuboid 3	Cuboid 3TX	Cuboid 5	Cuboid 5TX	Cuboid 6	Cuboid 6TX
TYPE	Two-way, full range, passive 3" loudspeaker	Two-way, full range, passive 3" loudspeaker with transformer	Two-way, full range, passive, 5" loudspeaker	Two-way, full range, passive, 5" loudspeaker with transformer	Two-way, full range, passive 6.5" loudspeaker	Two-way, full range, passive 6.5" loudspeaker with transformer
FREQUENCY RESPONSE (with preset)	125Hz - 20kHz +/-3dB -10dB @ 80Hz	125Hz - 20kHz +/-3dB -10dB @ 80Hz	97Hz - 20kHz +/-3dB -10dB @ 80Hz	97Hz - 20kHz +/-3dB -10dB @ 80Hz	90Hz - 20kHz +/-3dB, -10dB @ 70Hz	90Hz - 20kHz +/-3dB, -10dB @ 70Hz
DRIVERS	LF: 3.5"(90mm) coated paper, ferrite motor system. HF: 0.5" (12.5mm) PEI Diaphragm neodymium motor system	LF: 3.5"(90mm) coated paper, ferrite motor system. HF: 0.5" (12.5mm) PEI Diaphragm neodymium motor system	LF: 5.25"(133mm) coated paper, ferrite motor system. HF: 0.75" (19mm) Silk Dome neodymium motor system	LF: 5.25"(133mm) coated paper, ferrite motor system. HF: 0.75" (19mm) Silk Dome neodymium motor system	LF: 6.5"(165mm) coated paper, ferrite motor system. HF: 1" (25.4mm) Silk Dome, neodymium motor system	LF: 6.5"(165mm) coated paper, ferrite motor system. HF: 1" (25.4mm) Silk Dome, neodymium motor system
IP RATING	IP 54, when used with accessory terminal cover	IP 54, when used with accessory terminal cover	IP 54, when used with accessory terminal cover	IP 54, when used with accessory terminal cover	IP54 when used with accessory terminal cover	IP54 when used with accessory terminal cover
RATED POWER	30 W (AES) 120W (peak)	30 W (AES) 120W (peak)	50 W (AES) 200W (peak)	50 W (AES) 200W (peak)	60 W (AES) 240W (peak)	60 W (AES) 240W (peak)
NOMINAL IMPEDANCE	8Ω	8Ω	8Ω	8Ω	8Ω	8Ω
SENSITIVITY (1W/1m)	84dB	84dB	88dB	88dB	89dB	89dB
MAXIMUM SPL	98dB (cont) 114dB (peak)	98dB (cont) 114dB (peak) @ 8Ω	105dB (cont) 111dB (peak)	105dB (cont) 111dB (peak) @ 8Ω	107dB (cont) 113dB (peak) @ 8Ω	107dB (cont) 113dB (peak) @ 8Ω
CROSSOVER	3kHz	3kHz	2.5kHz	2.5kHz	3.4kHz	3.4kHz
REC. HIGH PASS FILTER	—	24dB Per Octave @ 80Hz	24dB Per Octave @ 60Hz	24dB Per Octave @ 60Hz	24dB Per Octave @ 50 Hz	24dB Per Octave @ 50 Hz
TRANSFORMER TAPS @ 70V	—	2.5, 3.75, 5, 7.5W	—	2.5, 3.75, 5, 7.5W	—	3.75, 7.5, 15, 30W
TRANSFORMER TAPS @ 100V	—	5, 7.5, 10, 15W	—	5, 7.5, 10, 15W	—	7.5, 15, 30, 60W
DISPERSION (-6dB)	130°H x 120°V	130°H x 120°V	150°H x 100°V	150°H x 100°V	130°H x 120°V	130°H x 120°V
ENCLOSURE	ABS	ABS	ABS	ABS	ABS	ABS
FINISH	Black and White finish	Black and White finish	Black and White finish	Black and White finish	Black and White finish	Black and White finish
PROTECTIVE GRILLE	Painted Aluminium	Painted Aluminium	Painted Aluminium	Painted Aluminium	Painted Aluminium	Painted Aluminium
CONNECTORS	4 pin Euroblock	4 pin Euroblock	4 pin Euroblock	4 pin Euroblock	4 pin Euroblock	4 pin Euroblock
PIN CONNECTIONS (INPUT)	Positive and negative in with link out terminals	Positive and negative in with link out terminals	Positive and negative in with link out terminals	Positive and negative in with link out terminals	Positive and negative in with link out terminals	Positive and negative in with link out terminals
FITTINGS	M4 mounting points for wall bracket	M4 mounting points for wall bracket	M4 mounting points for wall bracket	M4 mounting points for wall bracket	M4 mounting points for wall bracket	M4 mounting points for wall bracket
DIMENSIONS	(W)120mm x (H)190mm x (D)118mm (W)4.7" x (H)7.5" x (D)4.7"	(W)120mm x (H)190mm x (D)118mm (W)4.7" x (H)7.5" x (D)4.7"	(W)155mm x (H)255mm x (D)150mm (W)6.1" x (H)10" x (D)5.9"	(W)155mm x (H)255mm x (D)150mm (W)6.1" x (H)10" x (D)5.9"	(W)200 x (H)320 x (D)190mm (W)7.9" x (H)12.6" x (D)7.5"	(W)200 x (H)320 x (D)190mm (W)7.9" x (H)12.6" x (D)7.5"
WEIGHT	1.26kg (2.8lb)	1.26kg (2.8lb)	2.15kg (4.7lb)	2.15kg (4.7lb)	3.82kg (8.4lb)	3.82kg (8.4lb)
ACCESSORIES (available separately)	Weatherproof terminal cover	Weatherproof terminal cover	Weatherproof terminal cover	Weatherproof terminal cover	Weatherproof terminal cover	Weatherproof terminal cover

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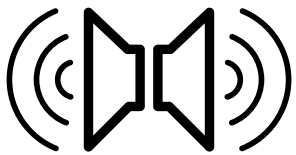
Loudspeakers

Specifications



	Cuboid 8	Cuboid 10	Cuboid 12	Cuboid 15
TYPE	Two-way, full range, passive loudspeaker	Two-way, full range, passive loudspeaker	Two-way, full range, passive loudspeaker	Two-way, full range, passive loudspeaker
FREQUENCY RESPONSE (with preset)	90Hz - 18kHz $\pm$ 3dB -10dB @62Hz	65Hz - 20kHz $\pm$ 3dB -10dB @49Hz	62Hz - 20kHz $\pm$ 3dB -10dB @47Hz	58Hz - 18kHz $\pm$ 3dB -10dB @40Hz
DRIVERS	LF: 8" (200mm), ferrite motor system. HF: 1" (25mm) exit/1" (25mm) voice coil, HT polymer dome compression driver	LF: 10" (254mm), ferrite motor system. HF: 1" (25mm) exit/1.4" (36mm) voice coil, polyimide dome compression driver	LF: 12" (300mm), ferrite motor system. HF: 1" (25mm) exit/1.4" (36mm) voice coil, polyimide dome compression driver	LF: 15" (380mm), ferrite motor system. HF: 1" (25mm) exit/1.7" (44mm) voice coil, polyimide dome compression driver
IP RATING	—	—	—	—
RATED POWER	200W (AES) 800W (peak)	250W (AES) 1000W (peak)	300W (AES) 1200W (peak)	500W (AES) 2000W (peak)
NOMINAL IMPEDANCE	8 Ω	8 Ω	8 Ω	8 Ω
SENSITIVITY (1W/1m)	92dB	96dB	98dB	99dB
MAXIMUM SPL	115dB (cont), 121dB (peak)	120dB (cont), 126dB (peak)	123dB (cont), 129dB (peak)	126dB (cont), 132dB (peak)
CROSSOVER	2.9kHz passive	2.8kHz passive	2.5kHz passive	2.3kHz passive
REC. HIGH PASS FILTER	—	—	—	—
TRANSFORMER TAPS @ 70V	—	—	—	—
TRANSFORMER TAPS @ 100V	—	—	—	—
DISPERSION (-6dB)	90° H x 50° V (user-rotatable)	90° H x 50° V (user-rotatable)	80° H x 50° V (user-rotatable)	80° H x 50° V (user-rotatable)
ENCLOSURE	Trapezoid wooden cabinet	Trapezoid wooden cabinet	Trapezoid wooden cabinet	Trapezoid wooden cabinet
FINISH	Black textured paint	Black textured paint	Black textured paint	Black textured paint
PROTECTIVE GRILLE	Black perforated steel with scrim cloth backing	Black perforated steel with scrim cloth backing	Black perforated steel with scrim cloth backing	Black perforated steel with scrim cloth backing
CONNECTORS	1x NL4, 1x 4 pin Euroblock	1x NL4, 1x 4 pin Euroblock	1x NL4, 1x 4 pin Euroblock	1x NL4, 1x 4 pin Euroblock
PIN CONNECTIONS (INPUT)	NL4 Input only 1+/1-, 4-pin Euroblock with +/- for input and +/- for link connections	NL4 Input only 1+/1-, 4-pin Euroblock with +/- for input and +/- for link connections	NL4 Input only 1+/1-, 4-pin Euroblock with +/- for input and +/- for link connections	NL4 Input only 1+/1-, 4-pin Euroblock with +/- for input and +/- for link connections
FITTINGS	16 x M8, inset bolts	21 x M8, inset bolts	21 x M8, inset bolts	19 x M8, inset bolts
DIMENSIONS	(W) 256mm x (H) 422.5mm x (D) 261mm (W) 10.08" x (H) 16.63" x (D) 10.28"	(W) 322mm x (H) 524mm x (D) 326mm (W) 12.68" x (H) 20.63" x (D) 12.83"	(W) 360mm x (H) 575mm x (D) 392mm (W) 14.17" x (H) 22.64" x (D) 15.43"	(W) 426.5mm x (H) 691.5mm x (D) 416mm (W) 16.79" x (H) 27.22" x (D) 16.38"
WEIGHT	10kg (22.05lb)	16kg (35.27lb)	20kg (44.09lb)	28kg (61.73lb)
ACCESSORIES (available separately)	Wall bracket A, U bracket A, M8 eye bolt	Wall bracket B, U bracket B, M8 eye bolt	Wall bracket B, U bracket C, M8 eye bolt	Wall bracket C, U bracket D, M8 eye bolt

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WARNING!

**DO NOT EXPOSE THIS EQUIPMENT
TO RAIN OR MOISTURE**

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



CAUTION

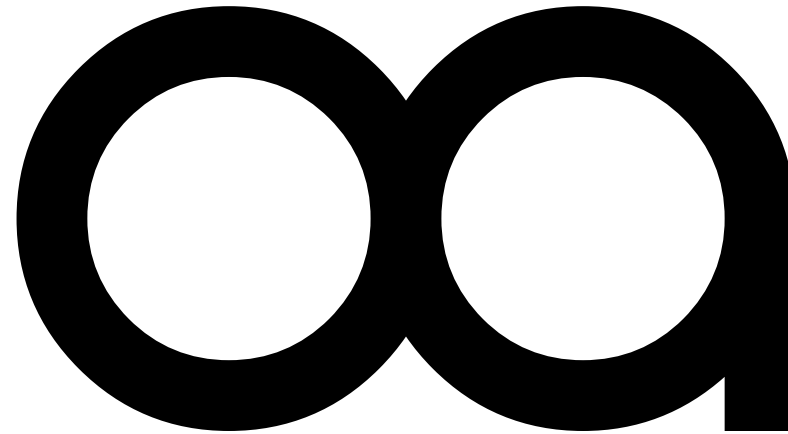
**RISK OF ELECTRIC SHOCK
DO NOT OPEN**

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of **sufficient magnitude to constitute a risk** of electric shock to persons.

Important safety instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Protect the loudspeaker cable from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10. Do not unplug the unit by pulling on the loudspeaker cable, use the plug.
11. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as 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.
12. The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
13. Do not remove any covers, loosen any fixings or allow items to enter any aperture.
14. Ensure the loudspeaker is mounted with appropriately sized fixings of suitable load bearing capacity
15. Always ensure a secondary safety fixing is used where loudspeakers are mounted overhead.

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optimal-audio.co.uk

Optimal Audio Group Ltd.
Century Point, Halifax Road,
Cressex Business Park,
High Wycombe,
Buckinghamshire,
HP12 3SL