

Design suggestions for the CIA 4.5 inch Neo BMR

Both the rubber surround and fabric surround CIA 4.5 inch Neo BMR drivers are very versatile full range drivers which can be used in a wide range of applications and cabinet designs. From desk top or small surround speakers to full range ultra-high performance line arrays and mastering grade studio monitors.

Our drivers are also a perfect for home cinema systems using the latest Dolby Atmos panning and mixing software as they have the most accurate time domain performance of any full range driver.

The drivers perform best in sealed box applications and are optimised for sealed air volumes between 3 litres to 12 litres depending on model, required frequency range, Q and crossover.

The rubber surround driver sings beautifully in a box volume (V_b) of 5 litres with a Q of approx. 0.79. You gain a bit more efficiency and bass extension when increased to 10 or 12 litres, Q approx. 0.72.

The rubber surround drivers “perfect” Q of 0.707 is reached in approx. 14 litres. They can be run full range in any sealed design from singles to massive panel designs, or used with subwoofers / bass drivers as required.

The double roll silk surround version is a more specialised driver, optimised for use with a bass driver(s) or subwoofers. Ideal crossover is around 150Hz to 250Hz depending on required SPL's and crossover slopes. A sealed volume of 2.4 litres results in the “perfect” Q of 0.707, but the driver can be used in tiny enclosures all the way down to 1 litre which gives a Q of approx. 0.9.

For the valve and vinyl audio purist, the drivers can be combined in line arrays to create very sensitive (94dB to 102dB / 1 watt @ 1 meter) high impedance (8 Ohm to 12 Ohm) designs which can be run full range with no crossover and no Eq at all.

For ultra-high performance studio monitors, critical listening and dedicated home cinema installations the drivers can be Eq'd to allow for speaker location i.e. in wall / on wall soffit mounting, near field monitors or floor standing monitors.

We do not recommend open baffle applications. The drivers need the loading of a sealed box to control low frequency cone motion. There is a high risk of damaging the driver when used in open baffle and over driving is not covered by our warranty!

When using computer based sources, fine tuning of the sound is easily achieved with modern Eq. The best value in modern DSP is the Yamaha YPAO system which comes fully installed and automated in their excellent range of AV receivers and processors. There is excellent manual control as well as superbly accurate automated “set and forget” options which use studio grade algorithms developed by Yamaha's professional studio engineers over many years.

If you are running a DAW (Digital Audio Workstation) or dedicated media PC we recommend both Blue Cat Audio www.bluecataudio.com and Fab Filter www.fabfilter.com as studio grade solutions, for home use we recommend you use the built in Eq that comes with all good media hosts such as iTunes and JRiver.

For low to medium SPL applications such as casual listening, PC speakers, home cinema surround sound etc. the drivers can be run full range with no Eq. As most AV receivers and media hosts (JRiver, iTunes etc.) have Eq built in you can use this to boost the low end and / or compensate for speaker location i.e. on wall, in corners, desk top etc.

As SPL and dynamic range requirements increase the drivers can be combined in groups and line arrays to create true full range, zero crossover loudspeaker systems to meet the most demanding requirements. We have had astonishing results with both two channel and multi-channel systems using 18 to 56 drivers per cabinet.

In September 2015 the www.custominstallaudio.com site will be ready for UK launch with comprehensive information on a wide range of products and solutions, from professional monitors, high end music and cinema solutions and mainstream AV products.

Design & construction suggestions for DIY builds

(1) Internal cabinet wall damping material is vital, a good 2mm or 3mm of bitumen type material should cover 100% of the internal cabinet walls. In addition we recommend Twaron or "Angel Hair" internal damping material, approx. 10 g per driver. This is well worth the extra cost compared to fibre glass! Please note all the Twaron must be sealed in a thin cotton or silk bag to avoid the tiny fibres getting into the voice coil of the driver.

(2) Please note the quoted sealed air volumes above are **after** the allowance for cabinet damping and the air volume the driver itself takes up, for example a silk surround driver with a Q of 0.707 one needs to start with a box volume (V_b) of approx. 3.2 litres and then allow approx. 0.8 litres of air being taken up by damping materials and the driver chassis.

(3) The drivers do need about 50 hours running in....Some Maxwell from his "Embrya" album at good volume does the trick...Enough to get about plus / minus 1mm to 2mm cone movement.

(4) Use Sorbothane gaskets behind the drivers and pre drill pilot holes to accept "Turbo" wood screws or use "T" nuts and bolts. Hand tighten (no power tools or torque wrench) and ensure even tightening until all 4 fixings are hand tight. The polymer chassis is made from a special non-resonant material and only requires moderate pressure...Do not over tighten the screws!

(5) We recommend crimping all joints (not solder) and use 0.6mm solid core silver cable to wire the speakers. Multi stranded copper cable and solder are bad news for

signal quality, especially in Line Arrays where you have 8, 16, 32 or even 56 drivers per cabinet.

RRP for single roll rubber surround 4.5 inch Neo BMR drivers

1 to 9 drivers £75.00

10 to 19 drivers £65.00

20 to 49 drivers £55.00

RRP for double roll silk surround 4.5 inch Neo BMR drivers**

1 to 9 drivers £155.00

10 to 19 drivers £145.00

20 to 49 drivers £135.00

Prices do not include insured delivery with tracking service.

**** Please note the double roll silk surround drivers are only available with certain high end kits, which will include the following:**

- (1) Flat packed or assembled stranded bamboo cabinets which only require a light coating of oil (easily done by hand) to provide a stunning natural finish. The stranded bamboo also has the best acoustic properties of any natural wood or grass, Bamboo is a grass not a wood & is very environmentally friendly.
- (2) All the correct damping materials with the correct size and thickness of cotton bags with draw strings to hold and position the damping materials.
- (3) Correct gauge and lengths of high purity silver plated solid core wire to build the wiring loom and the loudspeaker cables. Stranded and / or copper cables are not recommended with the BMR's.
- (4) The correct gauge and grade of heat shrinkable Teflon tubing to insulate the cables.
- (5) Self-adhesive black baffle felt to eliminate baffle reflections and provide a stunning professional finish.
- (6) Driver gasket material and templates to ensure correct fitting and maximum isolation from vibrations.
- (6) Solder free connectors / crimp sleeves. This is very important as solder is a toxic mix of low conductivity materials....Try using lengths of solder as loudspeaker cables....!
- (7) The correct crimping tools, the best cable / connection cleaner, and a pair of white cotton gloves to handle the polished cabinets.
- (8) Dedicated DSP electronic crossover / Eq.
- (9) Subwoofers with inbuilt power amplifiers.

April 215. Prices and spec may vary without notice. For more information visit

www.custominstallaudio.com