

Wood & Laminates



Application Note

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Introduction

The Amina Mobius range of invisible loudspeakers can be installed into wooden panelling, millwork and furniture using a 2-part epoxy adhesive.* This guide details the steps that should be taken to achieve an acoustically high-performing installation into timber, MDF and wood veneer as well as other sheet materials like leather, concrete, slate, marble, melamine and more.



By adhering the soundboard of Amina's Mobius speakers to the rear side of sheet material, the material becomes part of the vibrating mass of the speakers soundboard, allowing full-range sound to be transmitted into the room while completely concealing the speaker from view. For the soundboard to have the correct mass for proper sound reproduction throughout the frequency spectrum, the material that covers the speaker face should have a maximum thickness of 3mm - ideally around 2mm. Veneers thinner than 2mm will tend to result in a bright sound that can be compensated for by using equalisation. Alternatively, the veneer can be carefully built up to the correct thickness.

There are two main tried and tested installation methods for achieving flawless results for different types of wood and laminates, outlined on the next pages.

Epoxy Recommendation



When selecting a 2-part epoxy adhesive it is important to choose a type that allows manipulation on contact, but that fully cures within 24 hours*. Great success has been achieved with Araldite Rapid 2-part epoxy adhesive, which is readily available across the world.

* If adhering a speaker to routed / milled MDF, it is highly recommended to treat the surface with thin layers of fast drying varnish coat before applying adhesive to avoid swelling.

For both of the methods in this guide, the speaker aperture / pocket should be made with specific dimensions. These dimensions are defined in the table across:

| Speaker model | Height | Width |
|---------------|--------|-------|
| Mobius5i, 7i | 456mm | 351mm |
| Mobius3 | 406mm | 306mm |
| Mobius5i/S200 | 456mm | 206mm |

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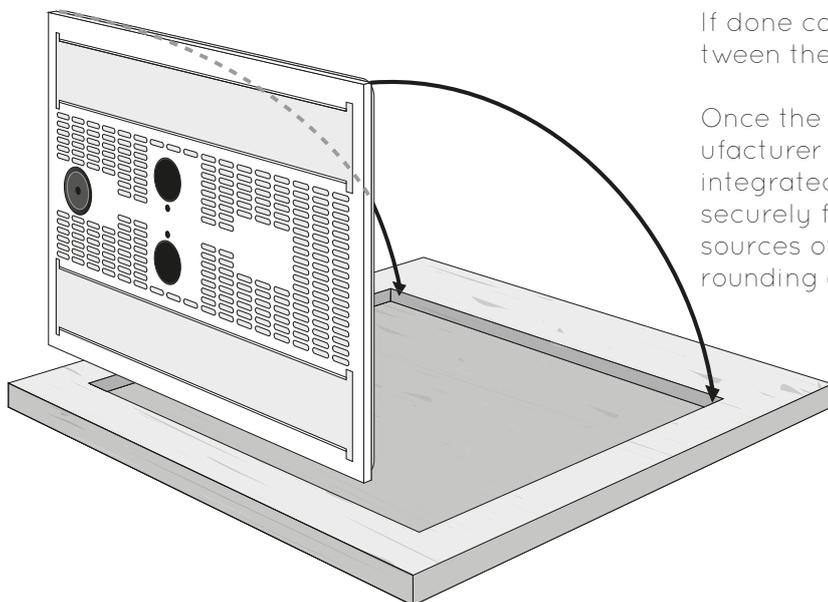
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Method 1: Routed Pocket

For solid or pre-laminated stock, it is possible to use a router table or CNC to mill down the back surface of the wooden panel to leave the face of the material intact with an even, smooth gluing surface for the soundboard to adhere to.

A hand router can be used to achieve similar results, although we would suggest lightly sanding any resulting ridges to ensure a smooth surface, and using a little extra adhesive on the routed area to fill any inconsistencies.

Important: When fibrous stock such as MDF is routed down, the remaining surface will be “fluffy”. First sand and vacuum the area to give the best possible adhesion to the surface, then it is necessary to varnish the routed pocket with several very light layers prior to the application of adhesive to seal the porous material and eliminate the possibility of the material swelling.



Once the pocket is fully prepared the speaker can be adhered in place using a locally-sourced 2-part epoxy, such as Araldite.

Note: Atmospheric conditions and different ratios of the epoxy/hardener mix can cause the epoxy to harden at different rates, so pay attention to the set times and mixing instructions of the epoxy. Usually epoxy hardens within around 5 minutes, so it is recommended to only mix enough for one speaker at a time and to work quite quickly to ensure proper adhesion and manoeuvrability. 50ml of epoxy mix is usually enough for one speaker.

Evenly spread the epoxy mix throughout the routed pocket, as well as a thin layer covering the soundboard of the speaker itself. Position the loudspeaker at a slight angle into the routed area, and lower into the pocket (as shown below left) making certain no air pockets are formed, and that the glue is evenly distributed across the entire surface using a back and forth motion to press the speaker into place. Excess glue will work its way up the sides of the panel frame.

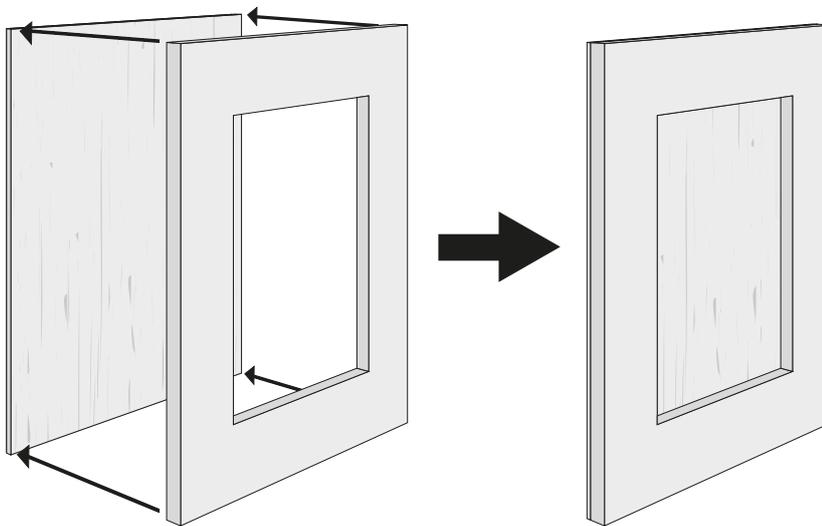
Light pressure is applied to the accessible areas of the soundboard until the epoxy has hardened, forcing more epoxy in to any remaining gap between the panel frame and the side of the wood. This ensures full lateral strength.

If done correctly, this will make a strong bond between the speaker and the routed area of the board.

Once the epoxy has fully cured according to manufacturer guidelines, the wood panel can then be integrated into the larger structure, taking care to securely fix in place and eliminate any potential sources of unwanted noise such as a rattle from surrounding areas by being fully secured.

Method 2: The Sandwich Method (for veneers)

Depending on the installation, it may be possible to avoid routing altogether and instead build the “routed” area. This can be achieved by sandwiching two materials together - one with a maximum 3mm thickness to another which has had an aperture cut through it to accommodate the speaker as shown in the diagram below. The two surfaces can be bonded together with epoxy, contact adhesive or PVA based wood glue, but the speaker must not be attached until fully dried. For drying times please refer to manufacturers instructions.



Construction by this method will allow the epoxy to bond to the un-routed, smooth, sealed surface of MDF or high pressure laminate. The 3mm MDF requires no other preparation. Other materials that you might consider for use as a front panel range from Melamine (clean areas) to slate, concrete and marble. The ideal depth of the covering material, which can vary between 1-3mm, depends on the characteristics of the selected product. In general, heavier materials will require less covering thickness; please contact technical support for further advice in this regard. Thinner coverings will create a louder, brighter sound, which can be easily compensated for by using equalisation. Thicker coverings will result in a loss of efficiency particularly in the the mid and high frequencies & should be avoided.

As with method one, evenly spread the epoxy mix throughout the aperture created, as well as a thin layer covering the soundboard of the speaker itself. Position the loudspeaker at a slight angle into the aperture, and lower into the pocket making certain no air pockets are formed, and that the glue is evenly distributed across the entire surface. Using a back and forth motion to press the speaker into place. Light pressure is applied to the accessible areas of the soundboard until the epoxy has hardened, forcing more epoxy in to any remaining gap between the panel frame and the side of the wood.

Once the epoxy has fully cured according to guidelines, the covered wood panel can then be integrated into the larger structure, taking care to securely fix in place and eliminate any potential sources of unwanted noise.

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