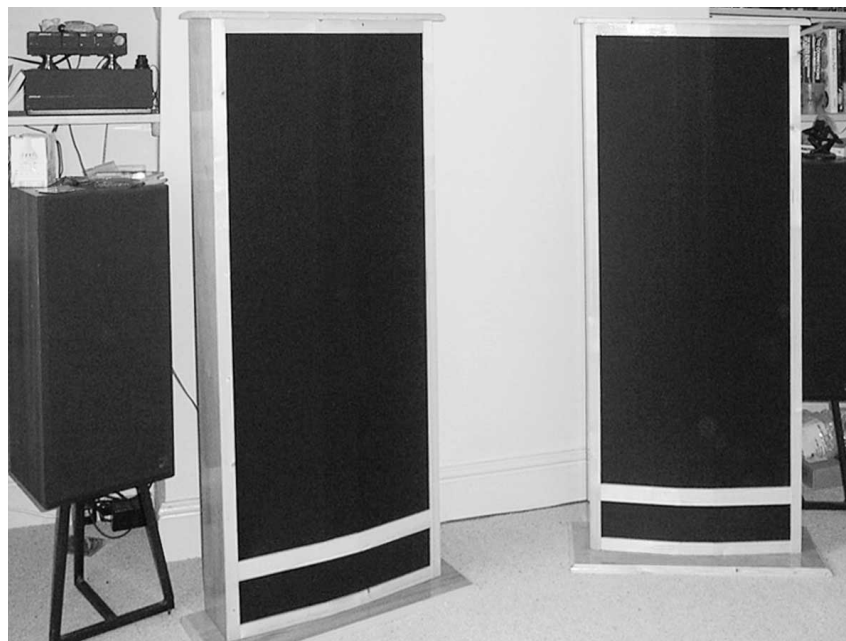


Panel Power



Ed Swift catches unwraps an Electrostatic speaker kit from Australia

This foray into the dark art of DIY electrostatics came after the disappointment of chasing 2 pairs of QUAD 63s on Ebay, only to find they had faults when I arrived to pick them up. This was to be the realisation of a long held dream for me so failure was very frustrating. Having read Roger Sanders superb book on the subject I was convinced that building was a possibility and immediately started searching for materials. However, the cost and specific nature of the parts looked like a risk area, so when I discovered the kit from ER Audio in Australia, the answer seemed at hand. We are now venturing into the little charted waters of specialist DIY so I may already have chased away half the audience. DIY will always be a bit scary, especially if you don't have a local friend who has trodden this path before. "But", I hear you cry, "DIY hifi will usually produce products of inconsistent specification and quality and suffer from limited and subjective reviewing. Anyway, who would want to publish such rarefied stuff?, it's not like it's in demand."

So, I'm going to try to convince you that it's a fairly straightforward job, and with a bit of effort and attention to detail, a high specification product can be produced. I am

hoping here to address the areas of inconsistent spec and quality which is, after all, what a good kit should try to overcome. My credentials for this task are strictly amateur, having been an avid hifi fan for 30 years and dabbled in cabinet construction as a hobby during most of this time, I'm sure I can pass on some encouragement to many would-be constructors.

WHAT YOU GET FOR YOUR MONEY

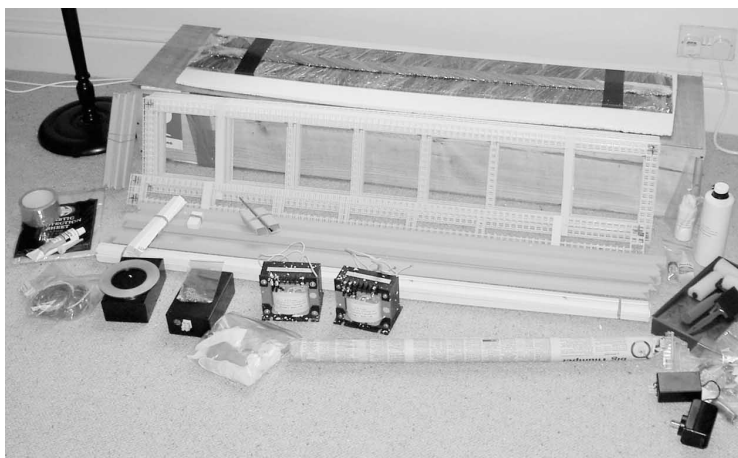
The kit itself is very comprehensive, containing all the electronics and all the necessary parts for constructing the electrostatic panels. Comprehensive means all the minor things like glue, gloves, wires and clips. These are things that some kit producers seem to think people keep in their cupboards. However, the kit does not include any materials for the cabinets, although plans are included for two suggested cabinet frames. The instruction manual is equally comprehensive and runs to 50 pages including numerous, very helpful photographs and diagrams.

CONSTRUCTION

The speakers themselves are intended to be arranged as vertical 4 feet panels, two 8 inch bass panels

positioned either side of a 3 inch high frequency panel.

Following the instructions gives a low-pain route to the finished product but, I emphasise this is not a doddle, and care and attention, together with a degree of precision are required. Preparation is crucial here and space and patience are primary requirements. It is necessary to have a solid work surface at least 5 feet by 2 feet 6 inches with access all around. In addition it is necessary to cut some MDF panels to use as pressure pads for the weights while gluing. I used car batteries (9 of them!) as weights, but anything heavy will suffice. All panels are produced in 2 halves with the all-important diaphragm being attached to only one half and then being sandwiched between the pair. Producing the panel halves is a matter of gluing thin plastic spacers around the edge of a half inch thick plastic mesh frame (The mesh frame is identical to the light diffusers which can be seen underneath fluorescent light fittings). Plastic coated metal grids (stator panels) are then glued to the mesh frame, within the border made by the spacers. This procedure is not technical but is very time-consuming. Each gluing operation takes 24 hours to cure, and if producing 1 panel half at each session means 8 days to glue



Contents of the kit.

the panel spacers and grids, 4 days for the spacers and 4 days for the grids.

Once the metal stators are glued in place, the diaphragm is fitted to one half of each pair of panels. This panel half is the one that faces the front of the finished speakers. To the other half of the panel pair, a strip of copper conductive tape is fitted around the plastic spacer. This tape carries the charge to the diaphragm and is in contact with it when the two panel halves are brought together. Fitting the diaphragm was found to be the most exacting task of the whole assembly, and involved laying the polyester film (diaphragm material) onto the construction table and then tensioning and taping all around the perimeter of the film. Once tensioned the panel half is glued (super glue) and laid on top of the film. This process is exact as the panel must be laid precisely onto the film so that the glue corresponds to a track of primer which has been applied previously. Once attached to the panel, blobs of silicone bath sealer have to be applied to the diaphragm at strategic points so that it is attached to the stator grids. The designer states that this gives a D'Appolito array effect.

Before assembling the panel halves, the diaphragm has to be coated with a conductive paint which allows the bias charge to be held by the diaphragm. Again attention to detail here because the 'paint' must

be applied in a temperature above 20 degrees in order to cure correctly. Assembly is simply a matter of joining the panel halves with plastic channel clips. Very simple and very effective and it does mean that



Cab Glue: Cabinet all glue together.

panels can be easily dismantled if errors are detected.

Wiring is straightforward. After soldering terminals to the supplied wire they are attached to the grids with small brass nuts.

The cabinet shown in the photograph is based on the suggested plan in the instruction manual, however I have reduced the height to satisfy what the designer calls "WAF" (Wife Acceptance Factor). Height is important with electrostats and I was aware that reducing the height might have

needed compensation by introducing a slight upward tilt. I have used 1 sheet of good quality 18mm ply and cut down some pine into strips 6mm thick for the front edges. The edges are necessary to hold the panels inside the cabinets. The only other additional item is 3 meters of medium duty speaker cloth, Maplins or similar will suffice. Cloth is needed front and back to prevent dust from entering. The cabinet can be constructed with minimum wood working skills but abilities with table saw and router are necessary. The whole cabinet is constructed as box sides with internal shelves, and jointing is all by routed grooves. The quality of finish will obviously be based on proficiency here. I am fortunate to have a friend in the motor trade who kindly finished my cabinets in car lacquer. Any more detail here, I feel, would belong in a

woodworking magazine.

Wiring the panels into the cabinet is, again, straightforward and all connections are achieved using standard connector blocks. The wiring diagram is foolproof and I experienced no problems following it. There is no mention of quality where the audio signal wire is concerned but I elected to join the gold plated banana terminals to the step-up transformer with 1mm solid mains wire.

The only other modification that was found necessary was to replace the 9v power supply for the diaphragm bias power. This came as an integral unit with an Australian plug which was connected to the voltage adjuster circuit. I elected to dismantle the power supply and re-house it in a new box together with the voltage adjuster. This looks more elegant and is perfectly functional.

THE SOUND.

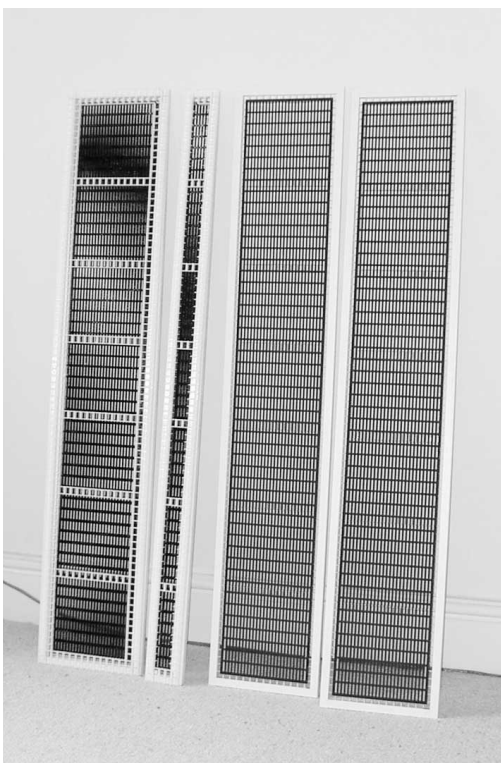
Switch on was a nail-biting moment.



Cloth being attached to the frame.

The manual gives comprehensive advice for a number of possible problem areas and I was beginning to think 'what if this' and 'what if that'. I had been building for 3 weeks, surely during this time I must have made some mistake. So, after waiting the prescribed hour for the diaphragms to charge up, and adjusting the bias voltage for optimum level (all fully detailed in the instructions), I connected to the amp, my trusted Meridian modular pre/power which has been with me for 20 years.

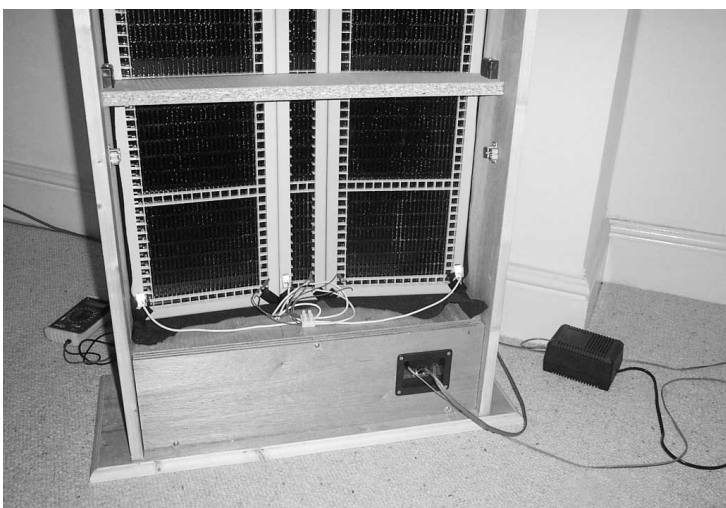
Without being too melodramatic, I was totally unprepared for the experience. This was a greater leap for my hifi than the introduction of my Linn Sondek/Ittok in 1985. Christening



Panels made up.

was achieved with Vaughn Williams Fantasia and Lark Ascending. Things will never be the same again!. All the clichés apply here, clarity, space, precision and presence. To be able to locate all the instruments in space was breathtaking. The system has always produced a reasonable stage, but distinctions between instruments in roughly the same location has always eluded it, until now.

Next up was Van Morrison's Astral Weeks which I have always considered a bit of a reference recording. Cyprus Avenue and Madame George. The dings are dingier, the thuds are thuddier and the whole thing appears to be happening inside the head. The introduction of vocals, bringing invisible people into the middle of



Internal view of the speaker.

the room is still a bit disquieting. There is no doubt whatsoever that the system is singing as I am now discovering rhythms that I hadn't even noticed before, presumably as previously unheard instruments become visible. Every subsequent disc produced the same result and my whole record collection now contains new experiences.

During the first hour of playing, the volume increased noticeably, and I had to back the volume down from 11 o'clock to 9 o'clock. This is the same listening level that the previous speakers had (KEF Carlton III), so I am assuming they may have similar efficiencies. This is presumably the diaphragms bedding in.

One idiosyncrasy that I had read about being present in most electrostats was the beaming phenomena. When moving from the favoured location the sound appears to leave ones head and just be present in the room. At the same time the volume appears to diminish. The down side here is that inviting friends round to listen may result in rough stuff as everybody fights for the sweet spot. There is bass, contrary to some articles I have read about electrostats in general. I cannot detect any deficiency and my own recordings produced in my home studio produce the same bass as was present on the studio monitors (Tannoy Reveals).

CONCLUSION

I am in no doubt that this is a high end product although I am

in no position to compare it with exotics like Apogees etc. The kit is priced at AUD 1700 which converts to approximately £650. In addition there is £160 for shipping and £160 for import duty to be considered. In total, the finished speakers cost just over £1000. A bargain? I think so. The backup and advice from Rob Mackinlay at ER Audio has been faultless and I can thoroughly recommend the kit. I am now glad I didn't find that immaculate pair of Quad 63s, the disappointment was well worthwhile.

**THE ELECTROSTATIC LOUDSPEAKER COOKBOOK
ROGER R. SANDERS
- ISBN 1-882580-00-1**



internal view of speaker (No.2)

Rob Mackinlay
ER Audio
www.eraudio.com.au