Swans Speakers DIY Kits

Everything You Need Is Inside the Box

Photo 1: All the parts needed for equipping two speakers are shown. Note the labeled packaging on the hardware items.

With the renewed interest in two-channel stereo comes a resurgence of DIY speaker systems. In this article, Ken Bird details his experience in building a set of speakers from the new Swans Speakers Kits catalog.

By
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(United States)

Speaker kits have been around since the dawn of the hi-fi craze in the early 1950s. During that period, the major driver manufacturers (e.g., Electro Voice, University, Sherwood, Argos, and Utah) offered kits to the DIY market. Major distributors also entered the market with Allied, Lafayette, McGee Radio. One of the most popular suppliers, Heathkit, sold thousands of speaker kits along with its line of other electronic kits. The off-the-shelf speaker market offered by RadioShack, Best Buy, and retailers reduced the number of speaker kit suppliers in the last third of the century, forcing the DIY audio hobbyist who wanted a better-quality speaker to purchase wood, drivers, and other supplies to build their own. The advent of multiple-channel surround sound systems and portable music devices further reduced the interest in DIY speaker building. The average non-technical audio enthusiast was left with whatever the consumer market offered in off-the-shelf speakers.

Photo 2: The materials for constructing the two speakers are contained in one well packed box weighing about 70 lbs. The components are individually packaged and well labeled for identification.

The renewed interest in vinyl by baby boomers and millennials alike has once again spawned an interest in two-channel stereo, opening a mass market for DIY speaker systems sold through online suppliers. One company, Swans, a long-time supplier of high-quality high-end speakers and well known by audio enthusiasts, is now offering DIY speaker kits through Amazon under the Swans Speaker Kits name (www.swanskits.com).

Swans is a now a division of HiVi Research, a manufacturer of fine quality drivers. They produce more than 3 million drivers annually for use in the OEM market. Swans Speakers currently has two kits

available. One is a two-way bookshelf design, the DIY 2.2A and the slightly larger three-way design, the DIY 3.1A. Both models incorporate HiVi drivers.

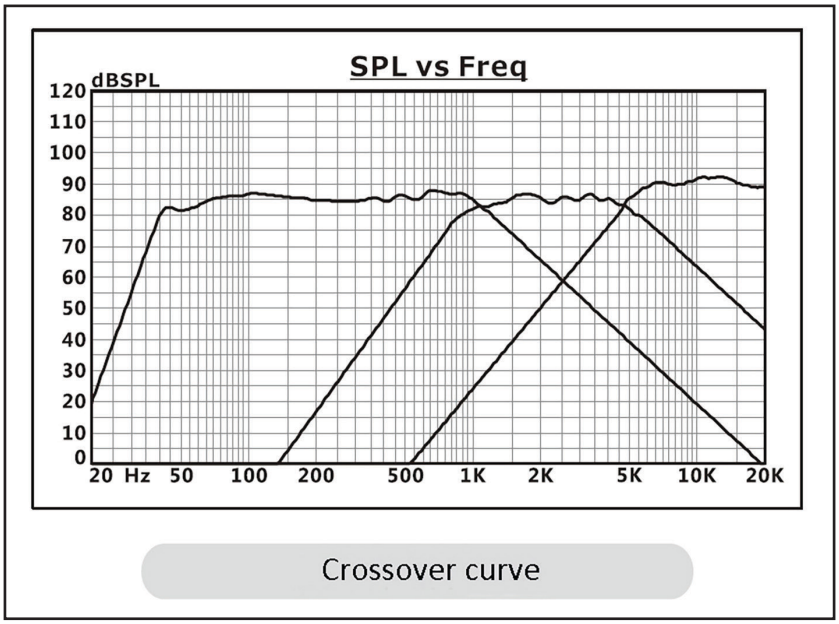

Figure 1: Crossover chart of the 3.1 system. (Image courtesy of Swans Speakers Kits)

The Speakers

The speakers were shipped via the US Postal Service, and being on a rural route, the 70 lbs. box was too large for home delivery, requiring a trip to the post office. Once I got the packages home and in the shop, the un-boxing commenced. The packaging was most impressive with liberal use of protective foam. Each of the drivers was separately boxed and the pre-cut MDF cabinet parts were also boxed separately and wrapped in protective plastic separated by foam sheets. The driver hardware and other parts were equally well packaged (see **Photo 1** and **Photo 2**).

The assembly instructions were sketchy, being written in "Chinese English," but photos in the manual made identification of the parts easy. All of the small hardware parts were bagged and marked with an identification letter. Like any project of this type, following the directions, with exceptions noted later in the article, is the best way to proceed. Use the manual as a guide and conduct an inventory for each part before assembly.

The Drivers

The drivers supplied with the kit are fine quality Hi-Vi models. The woofer is the L6-4R 6" with a woven Kevlar cone and phase plug. It is rated at 4 Ω, with an

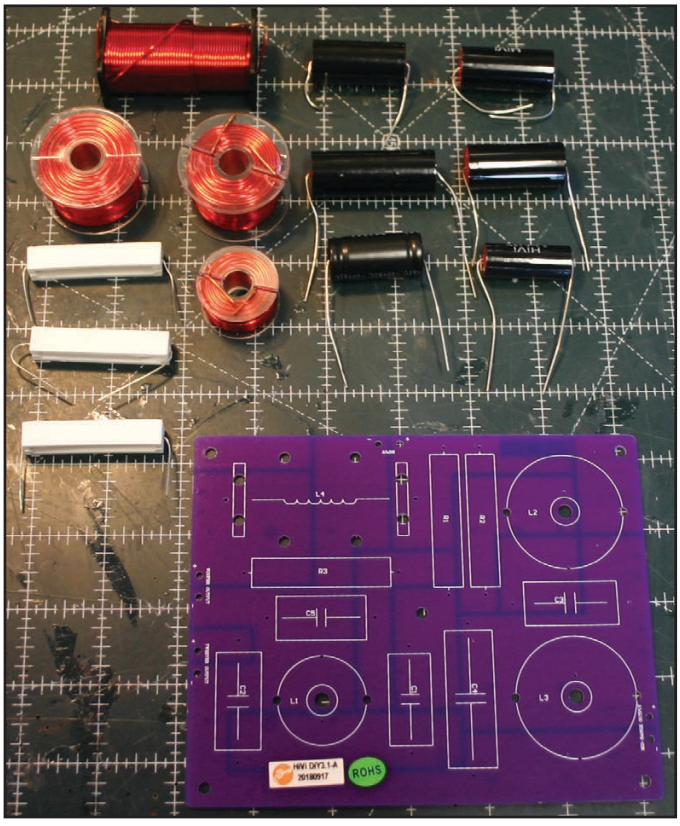

Photo 3: The second-order crossover uses quality components that are easy to assemble on the well marked circuit board.

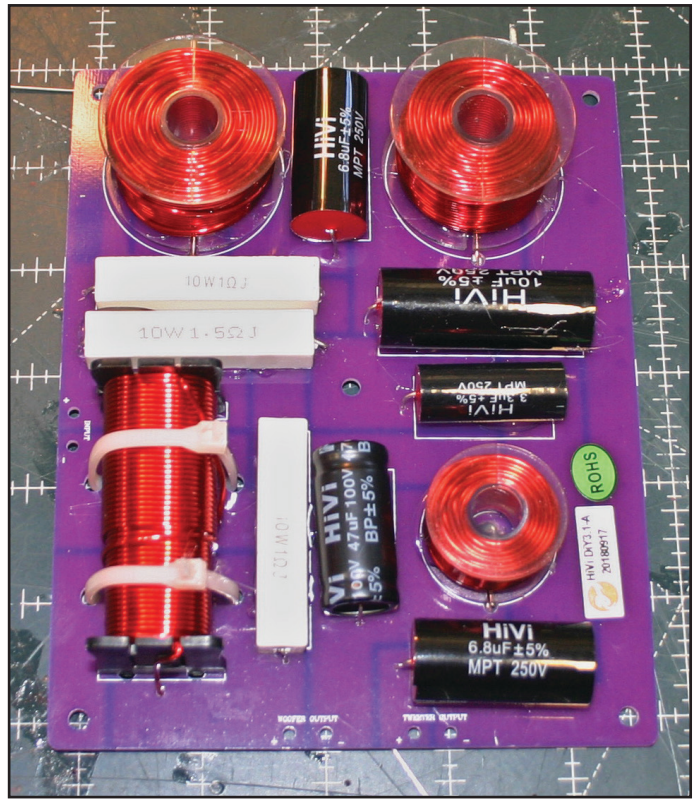

Photo 4: The assembled circuit is ready for wire connections.

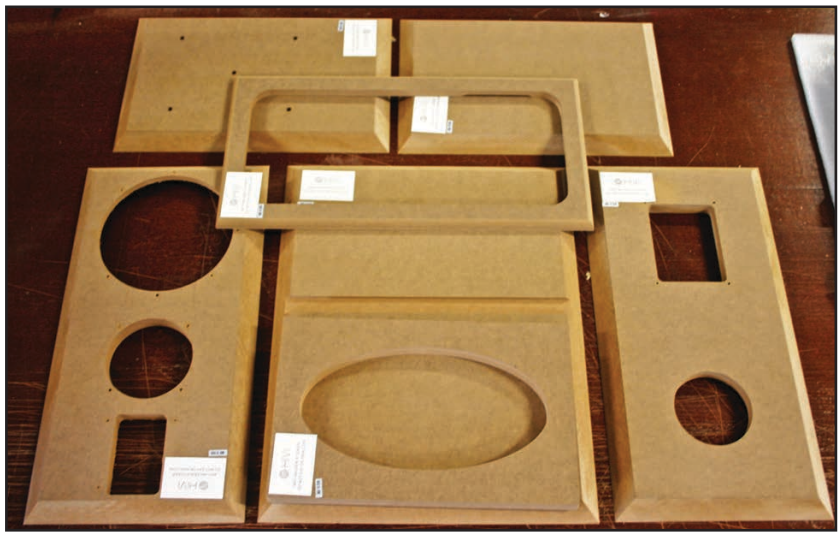

Photo 5: The precut MDF panels are laid out for assembly.

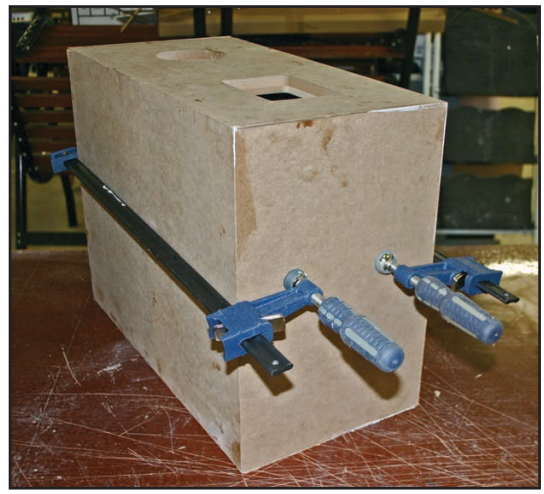

Photo 6: Clamps are used to hold the panels as the glue dries. An optional step is to use a nail gun to hold the panels, which reduces the need for multiple clamps.

F_S of 50 Hz and a nominal 30 W of power handling. The midrange is the HiVi DMN-A, a chambered 50 mm soft dome driver with a neodymium magnet and a range of 800 to 9 kHz.

The tweeter is the HiVi RT1, from the isodynamic series of drivers using a membrane-style cone and neodymium magnets. It has a range of 2.5 kHz to 40 kHz. The speakers are crossed over at 1.1 kHz and 4.8 kHz (see **Figure 1**).

Crossover Assembly

Assembly starts with the crossover networks. All the parts are contained in clearly marked plastic bags and can be easily identified by using the photos and the list

Photo 7: I applied the grill cloth into the pre-milled grills using a thin putty knife to stuff the cloth into the glue-filled grooves.

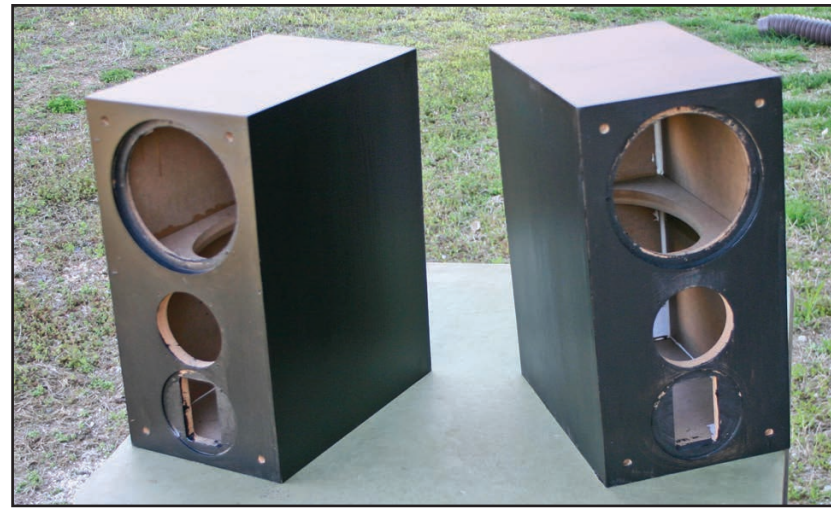

Photo 8: I painted the assembled enclosures a satin black. Note the predrilled holes for the rubber grille holders.

shown in the manual (see **Photo 3**). The crossover board is well marked for the parts location and only requires insertion of the parts and a solder connection on the bottom of the board (see **Photo 4**). While assembling the parts, I used a glue gun to hold the capacitors, the resistors, and two of the small coils in place prior to soldering. I anchored the larger coil to the board with cable ties. Once I installed the components, I installed the included pre-cut speaker wires and soldered them to the board.

Cabinet Assembly

The cabinets are composed of pre-cut and drilled MDF, which accounts for the hefty weight of the enclosures. All the pieces were smooth and cut to very accurate dimensions and all the mounting holes for the speakers, the crossover, and the speaker terminal were pre-cut and drilled (see **Photo 5**). Screws and nails are not used in the assembly of the enclosure, and in my opinion, that could be problematic. Relying on just clamped wood glue joints may threaten the structural integrity and does not guarantee a good air seal that can affect woofer performance. The manual says to "add some acoustic stuffing into the enclosure and press it hard against the side panels."

This is a bit vague but it is an important step in the construction. Without some damping material, the lower midrange could be made muddy by woofer reflections in the cabinet. A better solution was to line the side panels, top, bottom, and rear panels with 1" polyester batting before assembly. I cut the material to fit and stapled it in place allowing 0.5" clearance on the internal cabinet edges.

As recommended, I used cabinet clamps during the assembly to hold the pieces (see **Photo 6**). If the builder has an extra pair of hands, it would make assembly easier. Start by gluing in the centerboard and then the opposite side using clamps to hold the sides together. An optional step would be to use a nail gun with 2" staples to secure the center board and each subsequent joint. Another optional step would be to add a bead of window caulking on the inside joints as the enclosure is being pieced to assure a good air seal. Once assembled, check for any glue seepage and allow the cabinets to dry overnight before finishing.

The grilles provided were pre-grooved for inserting the supplied black grille cloth. I painted each grille black and inserted the cloth into the pre-glued slot with a putty knife (see **Photo 7**). I then applied the

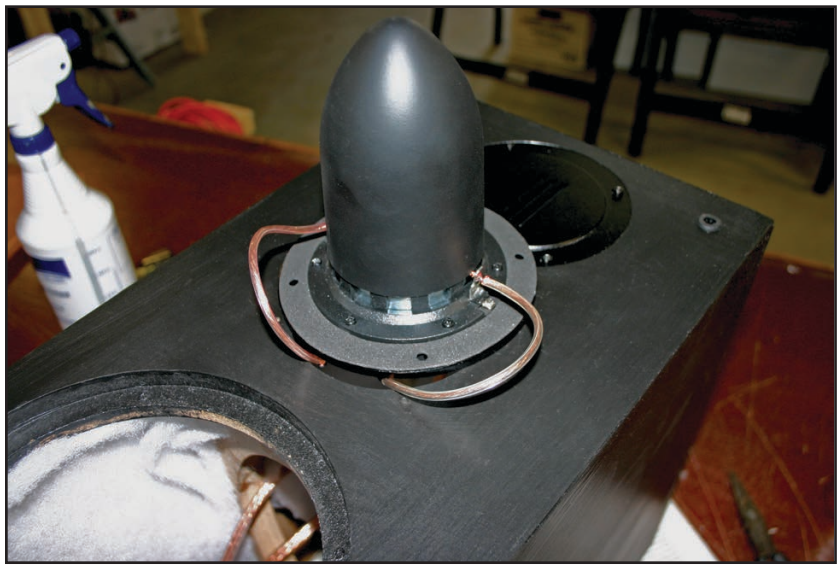

Photo 9: I wired the speakers using the supplied cable. The polyester battens lining the insides can be seen.

optional supplied SWAN logo to the lower right of the grilles.

Cabinet Finishing

I sanded the enclosures to remove any surface imperfections or glue seepage. The user can elect to cover the cabinet with the supplied black vinyl material, or the enclosures can be painted or have a wood veneer applied. The instructions for applying the vinyl "veneer" is to apply the glue (not supplied in the kit) to the back of the vinyl and "paste" it to the cabinet. The instructions further recommended that a hot cloth be used to make the vinyl softer when applying. No glue type is specified in the manual. I decided not to apply the vinyl and instead I painted them with satin black enamel (see **Photo 8**). After painting the enclosures, I installed the port tube using a bead of window caulk around the rim and attached the supplied rubber feet.

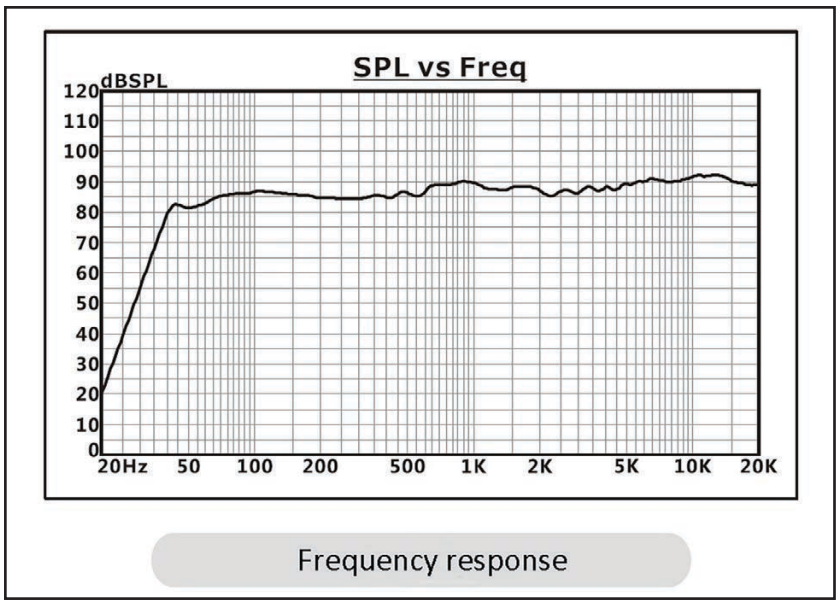

Figure 2: Over all response of the system (Image courtesy of Swans Speakers Kits)

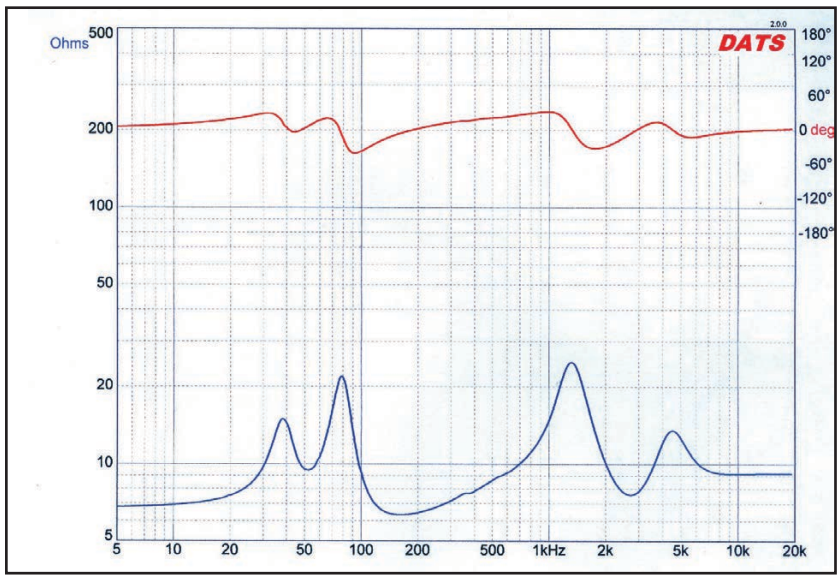

Figure 3: Impedance chart, obtained with the Dayton DATS system, shows the box is tuned to 50 Hz.

About the Author

Ken Bird has had a 40-year engineering and product management career focusing on consumer, industrial, and telecommunications electronics. Ken retired to his native Missouri and now pursues his interest in building speakers and tube amplifiers, along with model railroading, amateur radio (WOKLB), and digital photography.

Installing the Drivers

Before installing the drivers, the previously wired crossover network must be installed in the bottom of the cabinet using the supplied screw retainers. I hammered them into pre-drilled holes in the bottom. Then, I soldered the input wire to the speaker terminal board and mounted it in the rear of the cabinet. I made sure the red wire was soldered to the + terminal.

Installation of the drivers was not difficult as all the hardware was provided. The screws use "Star" type heads rather the common Phillips type, but bits for them are available at any hardware or home store. Gaskets are provided with each driver for forming a good air seal. I soldered each driver to the previously installed wire on the crossover network (see **Photo 9**). Careful note of the polarity requires the red lead to be on the red terminal on each speaker. An optional metal trim ring was supplied for the woofer.

Testing

The speakers measured about 6.54 Ω impedance and the enclosure resonance was seen at 50 Hz, or about the resonance of the raw driver. The speakers are advertised at a 45 kHz to 20 kHz response and the response graph, supplied by Swans, showed they should have no problem meeting those specifications (see **Figure 2**). The impedance graph that I measured shows the system was tuned to 50 Hz (see **Figure 3**).

The speakers will need to be used with stands to be properly positioned for listening. Those shown in **Photo 10** were improvised using discarded copper wire spools. I began testing by attaching the speakers to a receiver and slowly bringing up the volume, listening for any rattles or distortion that may indicate a poor connection or defective speaker. No problems were evident and the listening test continued with a variety of classical, rock, country, and vocal music.

The speakers performed exceptionally well. The bass was surprisingly tight and deep, without boom, even on some very low organ pieces. The midrange was crisp, bright, and had a forward sound that some audio enthusiasts might find annoying, but turning

the treble down from the flat position will modify the midrange to the satisfaction of most listeners. Advanced speaker builders could tinker with the resistors on the crossover board to change the crossover energy to the midrange and the tweeter. The following web location has some suggestions: https://diy.midwestaudio.club/discussion/550/hivi-diy-3-1-revisited.

Vocalists stood out very well on the speakers and the lack of any discernible distortion even at higher that moderate listen levels were evident. Swans engineering, using the HiVi drivers, has produced a speaker that performs at the level appreciated by an experienced audiophile, at a price the average listener can afford. They also could find good use in the professional audio field as studio monitors or would make great surround sound speakers.

Photo 10: I used the completed speakers in a 2.1 audio system.

Summation

These kits are not the assemble-on-the-kitchen-table type as they do require an individual to have some tool handling knowledge, especially soldering, plus some additional tools the average household might not have (e.g., multiple cabinet clamps and "star bits"). However, anyone who has assembled an IKEA product or other built-it-yourself-type project should have little difficulty in assembling these speakers. Once completed, the owner will have a high-quality audio product that should give years of listening pleasure.

A pre-assembled pair of speakers of this quality would sell for $1,000 or more, and purchasing just the raw drivers would set you back $263, making the $289.99 price for the entire kit on Amazon a real bargain.