

Casting Replacement Parts

A DIY approach may be the only solution when you cannot locate the right parts.

An issue with restoration of vintage electronic equipment is replacement availability of missing or damaged cabinet or cosmetic parts. Some restorers demand that everything look just as it did when the unit left the factory. Many popular common parts such as decals and knobs are commercially reproduced (Antique Electronic Supply, www.tubesandmore.com, in Tempe, Ariz. offers a wide range of reproduction parts), but what if you can't find reproduction parts for your particular restoration?

The Heathkit W-7s rebuilt in my previous article ("Heathkit W-7M Rebuild," May '07, p. 28) were a perfect example of this dilemma. One of the amps was missing the plastic Heathkit logo on the front panel and had several broken feet. The feet, which were used on a number of 1950-60s Heath vintage amps, preamps, and tuners, had a unique slanted shape, and I could not locate replacements (or anything cosmetically close). The feet were attached to the bottom of the chassis by two screws, one that went into the body from the back side of the bottom plate, and the other

through the extension from the bottom side (Photo 1).

The chassis logo shown was used on many Heathkits, both audio and radio. It was also on a number of amplifier cages, with a contrasting metal plate beneath it. This part originally had two locating pins on the backside. If you have one with broken pins, you can usually glue it in place, but if the logo is missing, it is rarely obtainable. Fortunately, I had an example of the logo from another unit.

I used the following techniques to reproduce both of these parts, in small numbers. The examples of these three parts cover a fairly wide range of possibilities.

For your own production, you can purchase the necessary materials for manufacture of plastic or even metal casting from most well-stocked hobby stores or from specialty catalogs. One of my personal favorite catalog sources is MICROMARK™ (www.micromark.com), offering thousands of unique tools and supplies for many hobbies (be prepared to spend some time browsing). They also offer a wide range of books containing detailed instructions and helpful hints.

MOLD TECHNIQUES

The first step you will take to reproduce a part is to make a mold of the object you intend to. Micromark offers a great book, *How to Cast Small Metal and Rubber Parts*, by William A. Cannon. Many of the same techniques described also apply to plastic molding. For plastic casting, molds are made of a latex type material, which comes in a liquid form. Some mold materials require mixing and some are ready to use. With enough work and careful planning, most objects can be duplicated.

If the object is light enough (for example, the Heathkit logo) you can carefully drop it onto the surface of a batch of latex in a small container. If the object is complex and heavy enough that it will not readily float, you need to build a vessel large enough to submerge the object almost completely. In the cases of the feet and TransOceanic buttons, I used two different techniques for these and will explain both.

As mentioned, the Heathkit logo was quite light. I made a simple shallow container of cardboard, mixed the latex compound, poured the compound into

PHOTO 1:
Feet attached
to plywood.



PHOTO 2:
Receptacle
for mold.



the container, and carefully placed the logo lightly into the latex, face down. When the latex was set, I easily pulled the original logo from it, or you could use a dental pick to help pry out more stubborn originals.

I had three intact original cabinet feet, too heavy for the floating technique, and used a small dab of hot melt glue to attach them to a piece of 1/4" plywood (Photo 1). Attach a cardboard strip around this piece of wood to produce a vessel (I used duct tape to secure it). Mix enough latex to completely cover your objects, and after a thorough mixing, pour the latex into your container (Photo 2).

Once the latex material has set up (3-6 hours), you can remove the "positives" from the mold. In my case it meant carefully cutting away the wood block to which I had attached the feet and twisting the mold to release the intact feet. This mold was so close to the original that even the screw hole on the exten-

sion was fully formed. Some instructions for the use of latex compounds recommend that you first coat your objects with "release agent," although I have not found this to be necessary for this step (Photo 3).

DENTAL APPOINTMENT

The third option for making a mold, if you have a limited number or size of objects and do not wish to invest in your own supplies, requires the help of a "co-operative" dentist. Many dentists make molds of teeth for orthodontics, caps, and crowns. During a routine visit to my dentist, I asked him to help me make a mold, in this case, of TransOceanic knobs.

Because TransOceanic used six band buttons, and I had a number of originals available, I decided to make a mold for all six at one time, and had already made up a cardboard container of the correct size. The dentist kindly assisted in the project. Dental casting latex sets up very

quickly (in 1-2 minutes). You must be ready to push your objects into the latex and hold them in place until the latex sets up (Photo 4).

At this point the molds are made and you are ready to proceed to the repro-

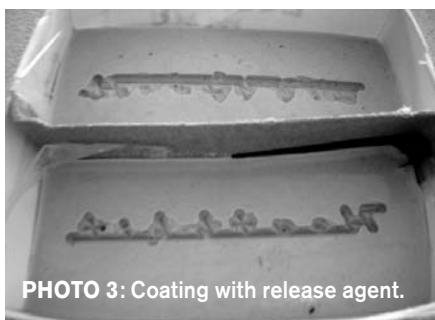


PHOTO 3: Coating with release agent.

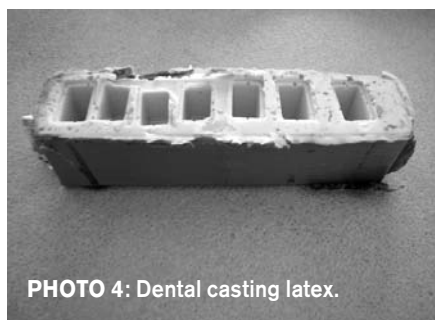


PHOTO 4: Dental casting latex.

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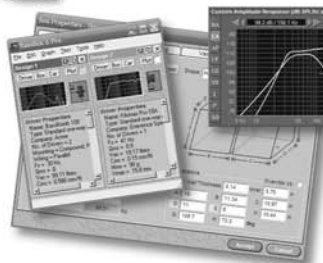


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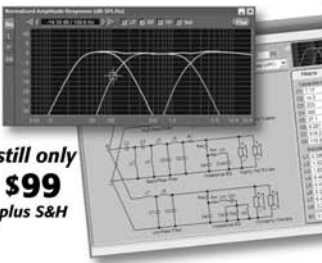
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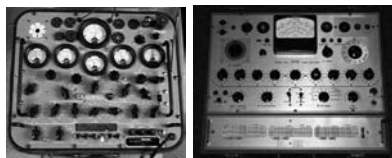
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duction parts casting. Some resin materials require that their mold be coated with a release agent prior to pouring the resin. This is pretty important if you intend to reuse the mold. Follow your manufacturer's directions!

MIX IT UP

Casting resins come in a variety of hardness and strengths. Materials are provided in two containers, one of

which contains the resin, and the second a hardener or activator. You can usually purchase them in sizes ranging from pints all the way up to several gallon containers. There is a wide variety of resins, from a stiff, rather brittle solid, to a rubbery texture. The unaltered color of the final part will be translucent yellow or amber, but you can add a coloring pigment to the resin before mixing. Micromark sells a variety

of color pigments for use with resins, and with careful blending you can match many shades.

I used black pigment on all these parts. It is important to mix the pigment with the resin *before* you add the hardener, because working time once the two parts are mixed is very short (2-3 minutes). You can extend your working time with

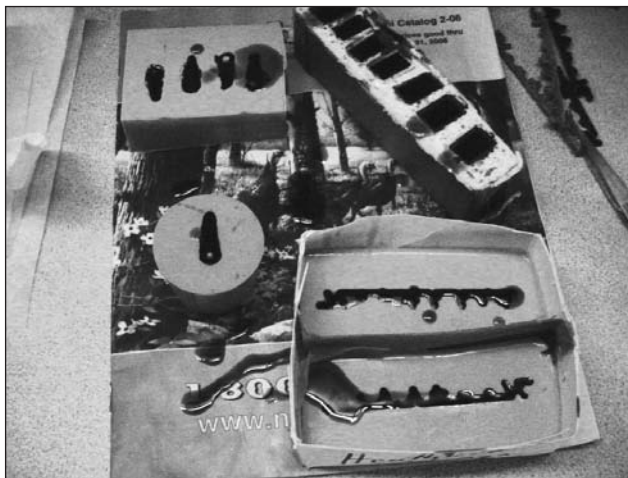


PHOTO 5: Molds for various parts.

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the resin by keeping both bottles in the refrigerator between uses and mixing while still cold.

Follow the manufacturer's recommendations with these resins. It is important to carefully measure the amount of resin and hardener. A very small extra amount of resin and the object may take days or longer to set up; a little too much hardener and it will start to set before you can pour it into the mold. I used small disposable plastic drinking cups to measure and mix my resin. To estimate the amount of liquid needed to make a part, fill its mold with water, and then pour the water into one of these cups to determine the amount of resin and hardener to prepare.

When the casting resin has solidly set, manipulate the mold by gentle twisting, or use the dental pick to remove the new casting. I slightly over-filled my molds and trimmed the final product clean with a utility knife, then worked the part on a piece of sandpaper to flatten the back (**Photo 5**).

Here is the test: which of the pictured objects are the originals and which are the castings? It is hard to tell, sometimes even with careful examination (**Photo 6**). The feet, for example, even have the original casting line from Heath's supplier's mold.

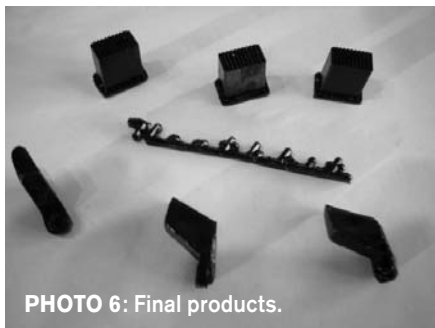


PHOTO 6: Final products.

I hope you find these techniques interesting and useful. Cannon's book also covers metal casting, everything from low temperature alloys to bronze, brass, and steel. It also covers permanent and intricate molds. I have not tried any of the metal casting techniques yet, but plan to cast a McIntosh MACKIT amplifier logo.

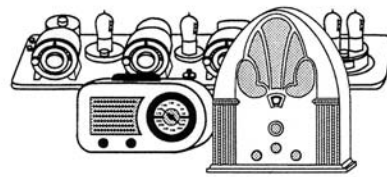
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