

JL AUDIO®

Ahead of the Curve™

Foam Party

2003 MERA Training

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Training Mission

This training is designed to explain various design, construction and finishing techniques used by the Research and Development Department at JL Audio to create sturdy, custom panels in a short amount of time. The discussion will cover the following techniques:

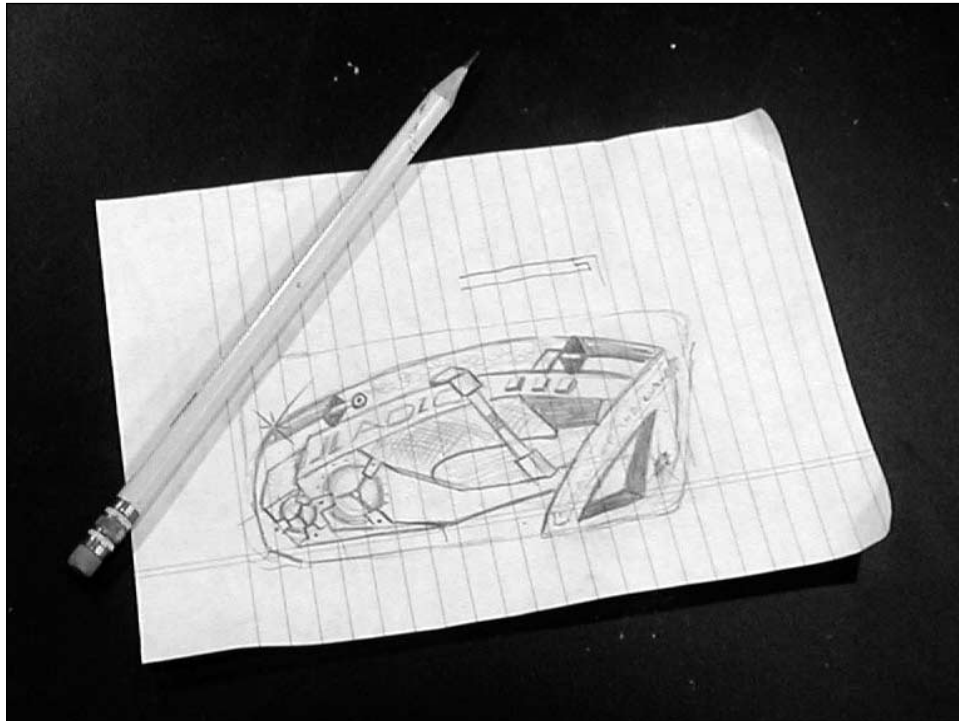
- Router Techniques
- Part Shaping Using Two-Part Expanding Foam
- Fiberglassing for Strength and Shape
- Vinyl Finishing
- Accents (Metal & MDF)

The door panel shown above will be used to illustrate these techniques. Every step of the creation process of this panel is illustrated in this document.

Further questions can be directed to Hector Yanez and Bill Hamze of JL Audio (954-443-1100).

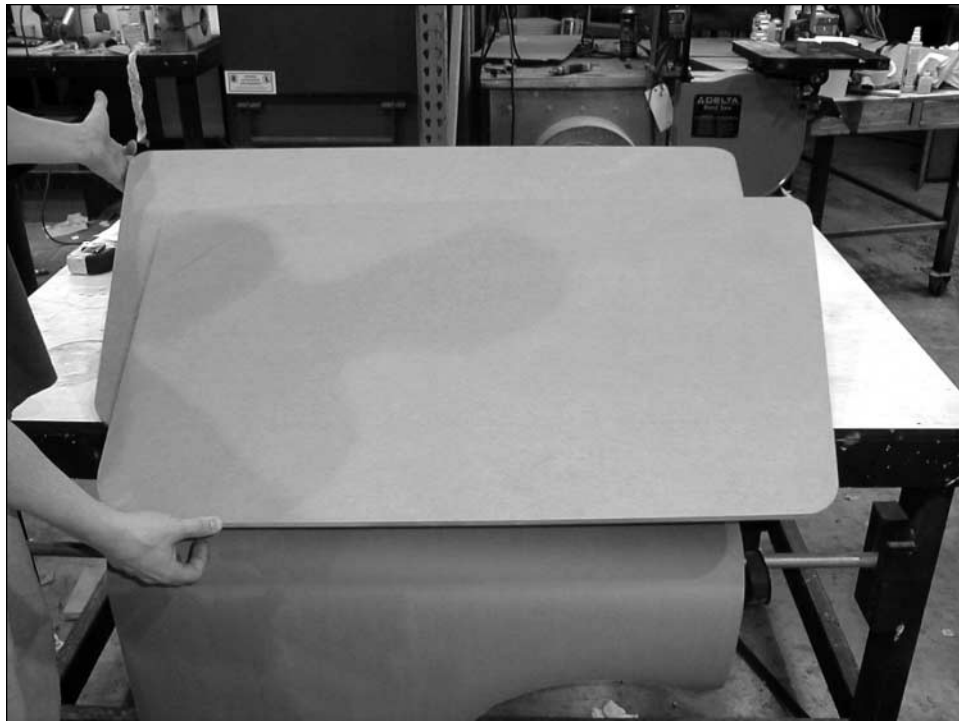
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1



The project begins with a sketch of the concept for the door panel.

2



An MDF panel is cut to serve as the base of the door panel. The shape of the panel will be taken from the shape of this base.

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3



The sketch from Step 1 is applied to the door base with chalk.

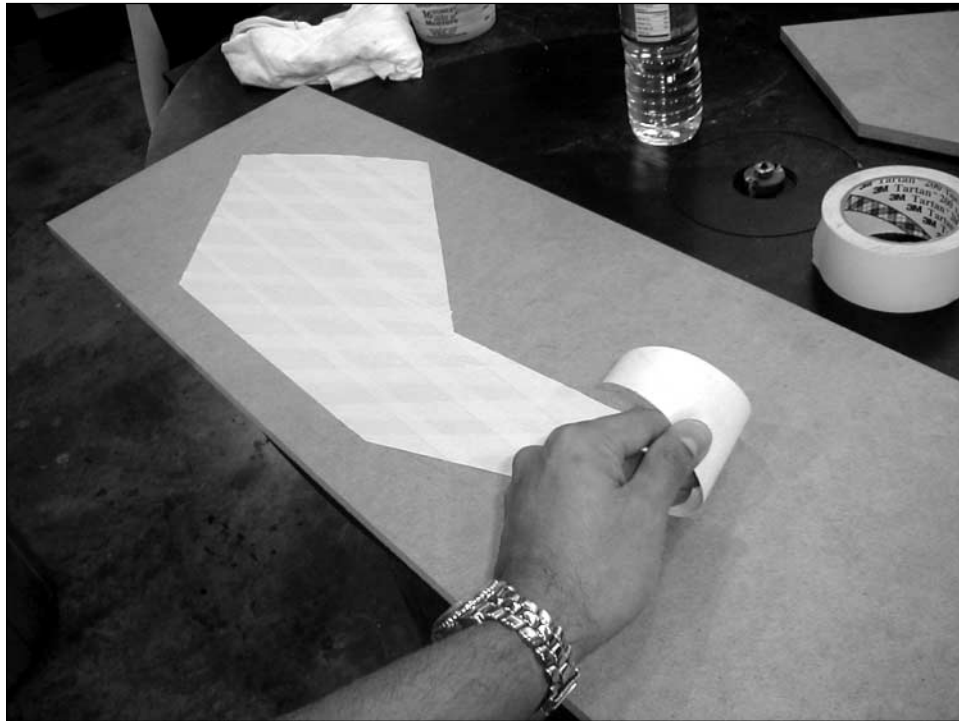
4



The chalk lines drawn in Step 3 are replaced with pencil lines. Masking tape is placed on the inside of each line of a given section to create a template. A tape-template is made for each section of the door panel.

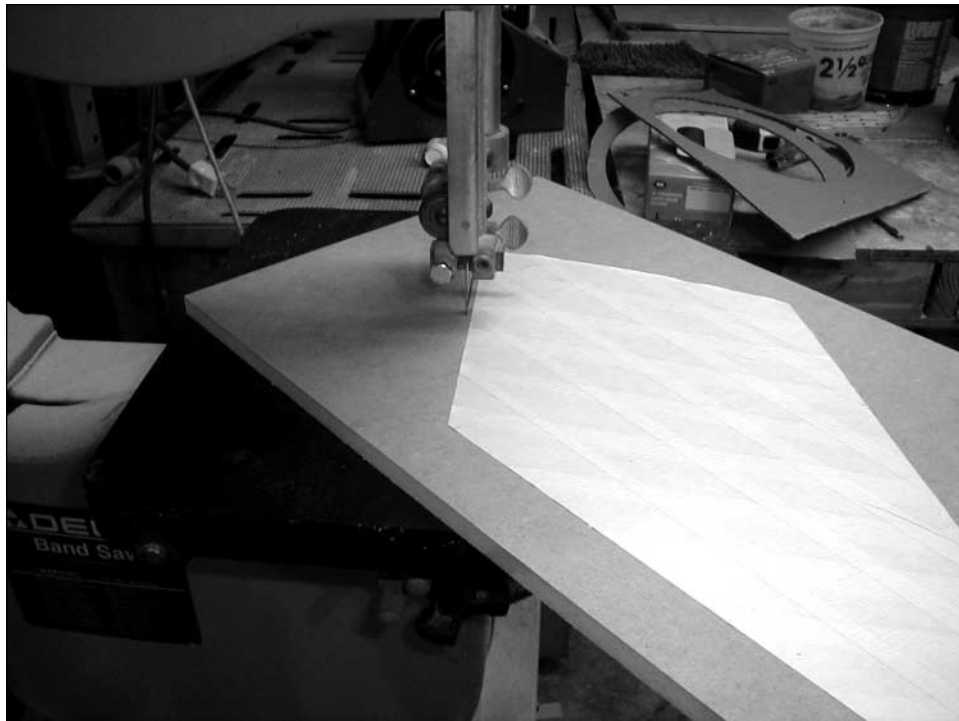
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5



A tape-template is shown here being placed on a piece of MDF. This piece will be cut into the shape of the template.

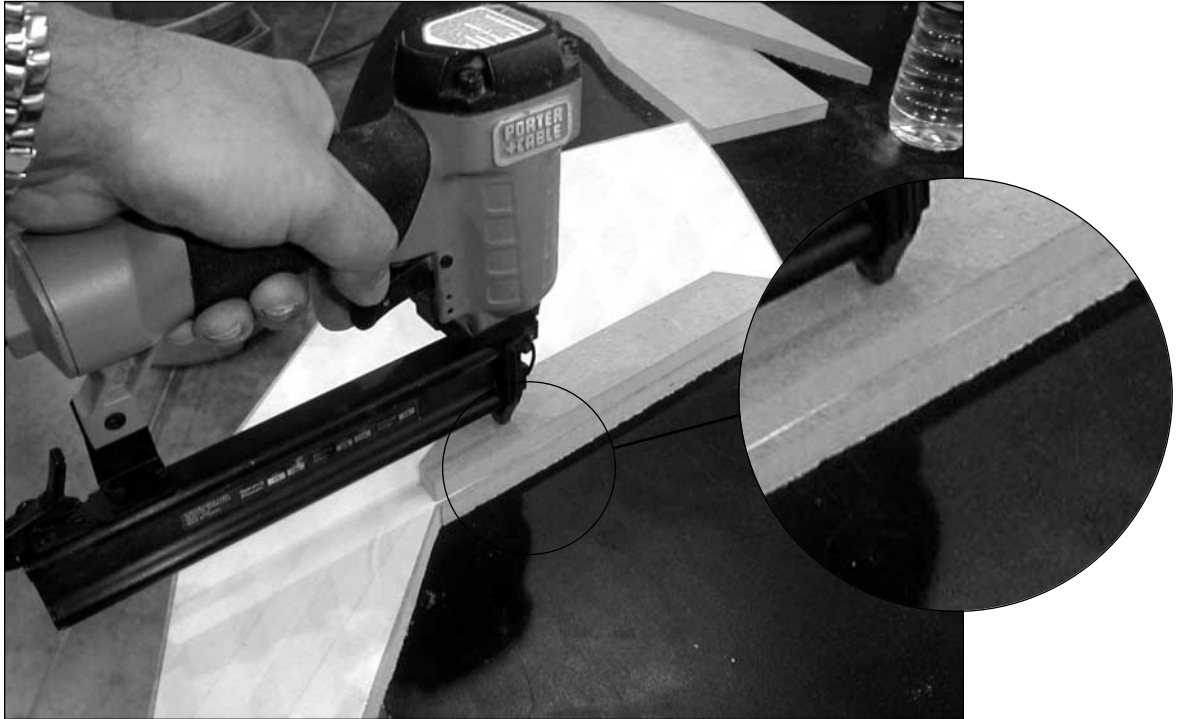
6



The part is cut with a band saw leaving a 1/8" border around the perimeter. This border will be flush-trimmed to the exact size of the part later in the process.

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7



Straight edges are created with strips of MDF along the perimeter of the tape template. These strips are temporarily stapled in place.

8



A router is used to flush trim the part. The strips attached in Step 7 are used as guides for the router bit's bearing to ride along.

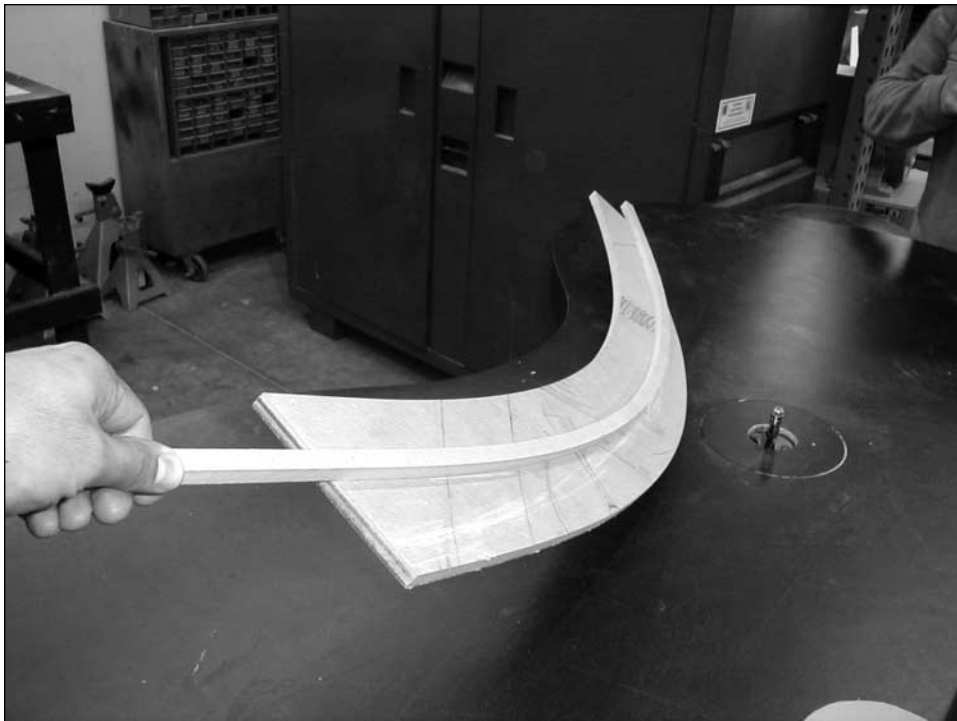
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9



1/2" x 1/2" MDF strips are bent and secured to a separate piece of MDF. These bent strips create "arc" shapes to be used as inserts in the door panel.

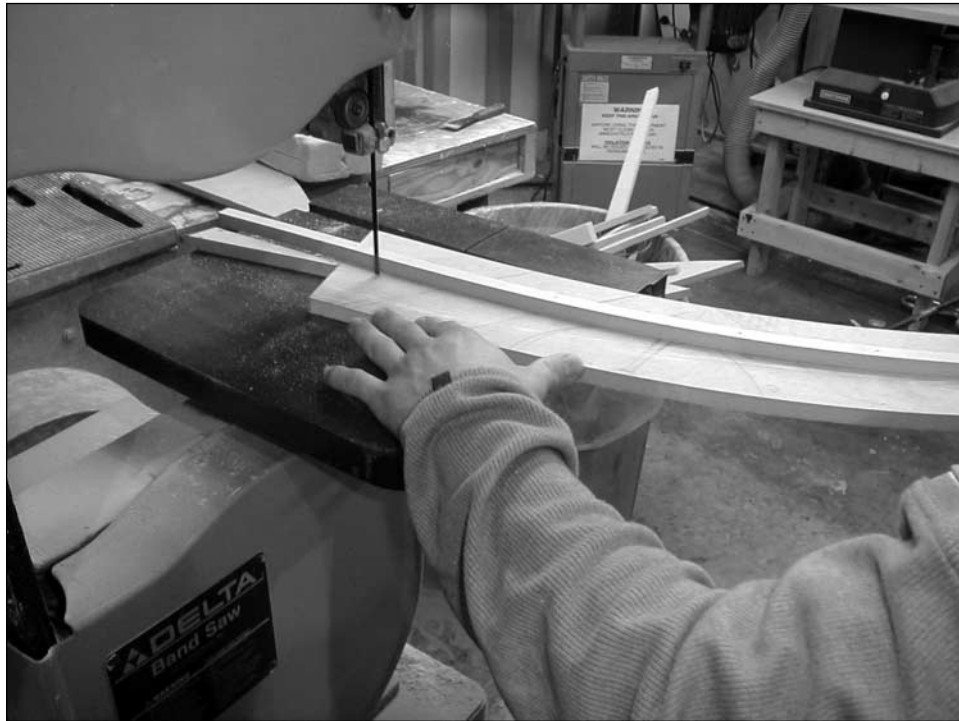
10



An arc attached to the potential insert is shown here.

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11



A rough cut is made to cut out the basic shape of the arc(s). A 1/8" border is left to allow for a smooth, clean cut to be made with the router.

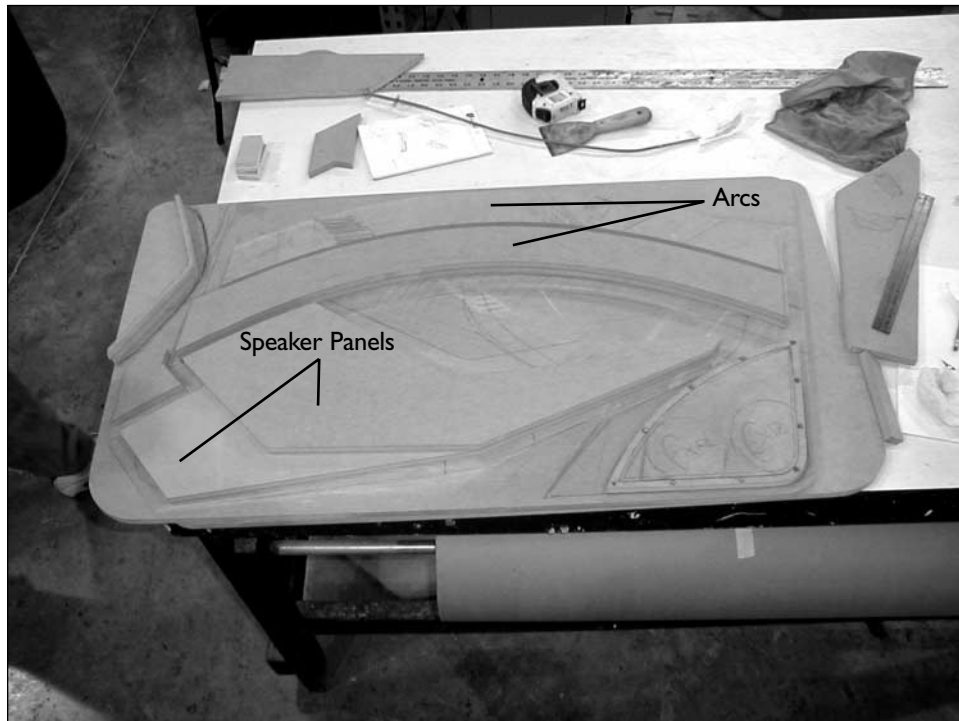
12



Both arcs are flush trimmed with a router. A duplicate of each arc is then made to be used in future steps.

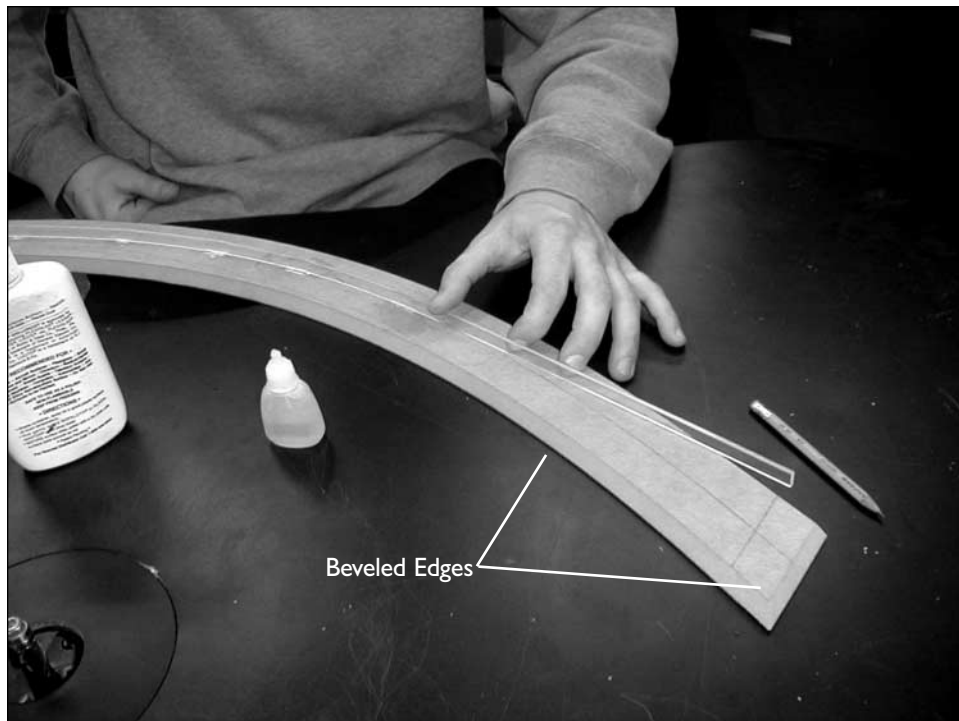
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13



All of the templates for the various sections of the door panel are shown as they will appear on the finished door panel.

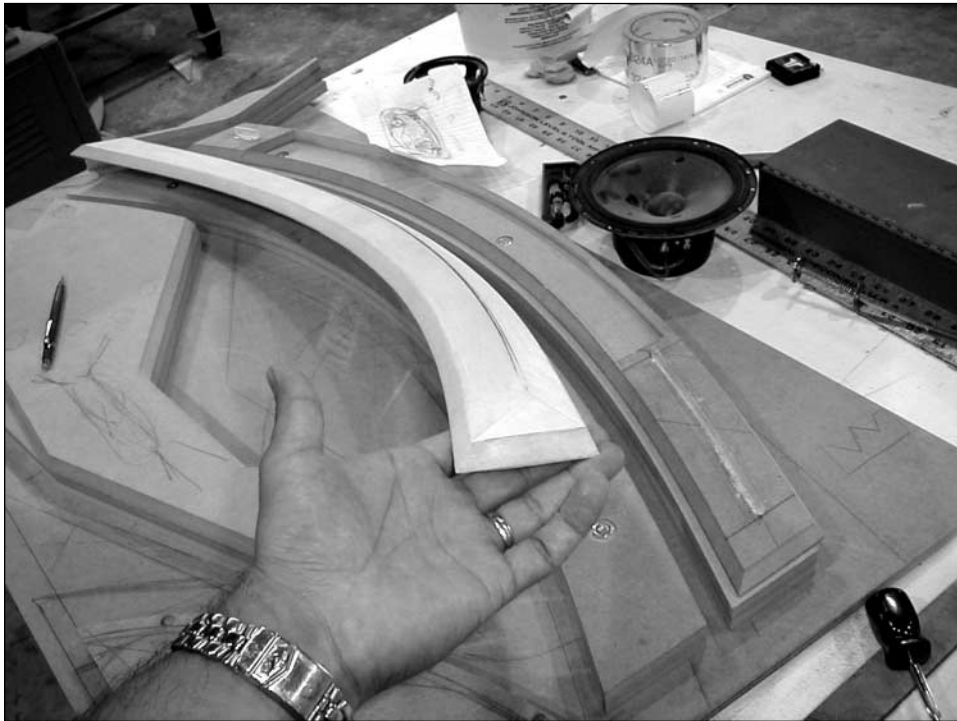
14



Let's go back to the arcs. Both arcs are given beveled edges using a router. The entire center of one arc, and parts of the center of the second arc, are raised. This is accomplished using a 1/2" strip of 1/8" plexi glass which is glued to the center of the arc.

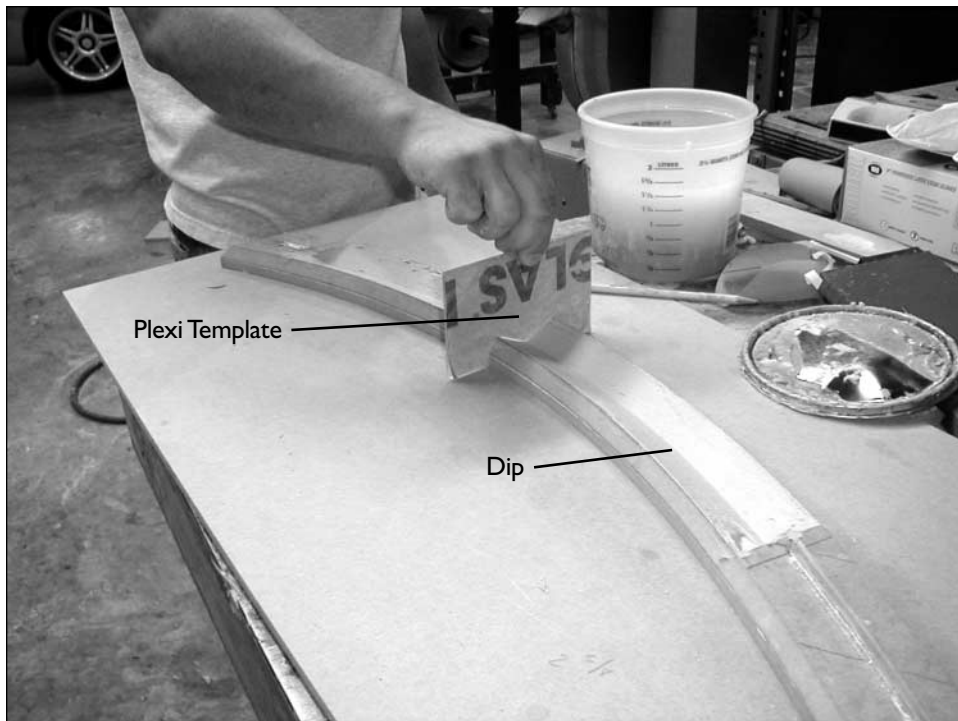
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15



The final shape is formed with bondo using the plexi center and the edge of the arc as guides.

16



The center of the second arc is debossed. This is accomplished by cutting out the center of the arc leaving a 1/4" border. Bondo is then used to fill the center of the arc. The deboss, or "dip", into the arc is formed using a plexi glass template with the desired shape.

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17



Here we see the completed arcs and the desired speaker locations.

18



At this point, the templates are used to create the final parts to be permanent sections of the door panel. Each section will consist of two MDF parts. We will refer to them as Part 1 and Part 2. To begin making Part 1 the edges of each template are wrapped in vinyl to account for vinyl thickness. The template is then outlined by MDF strips to be used as guides in later steps.

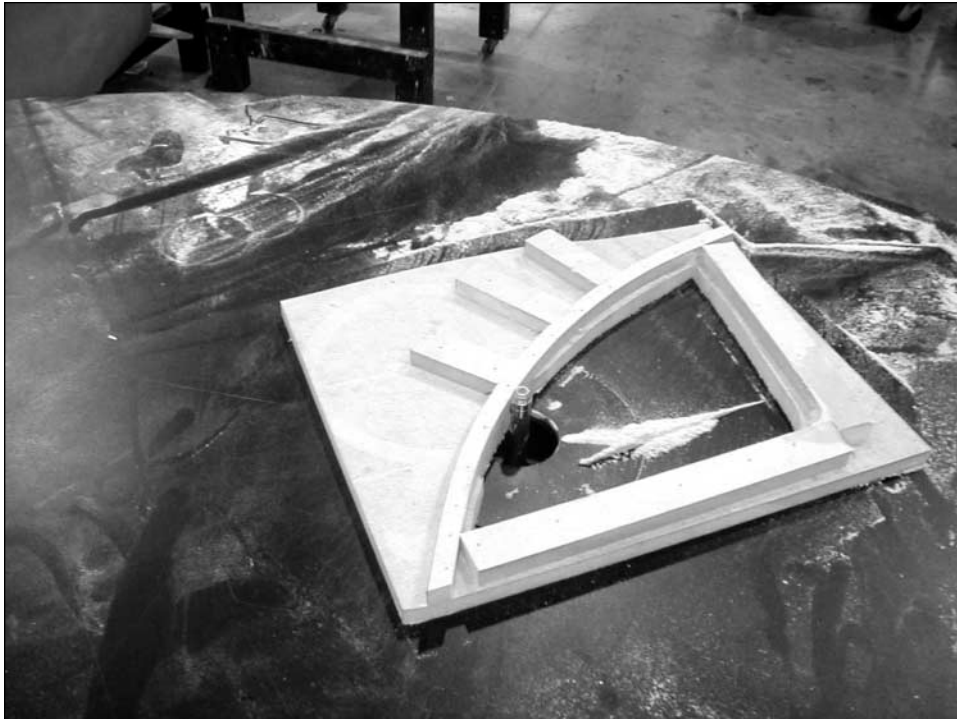
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19



The center of Part I is cut out leaving a 1/8" inch edge inside of the wood strip barrier.

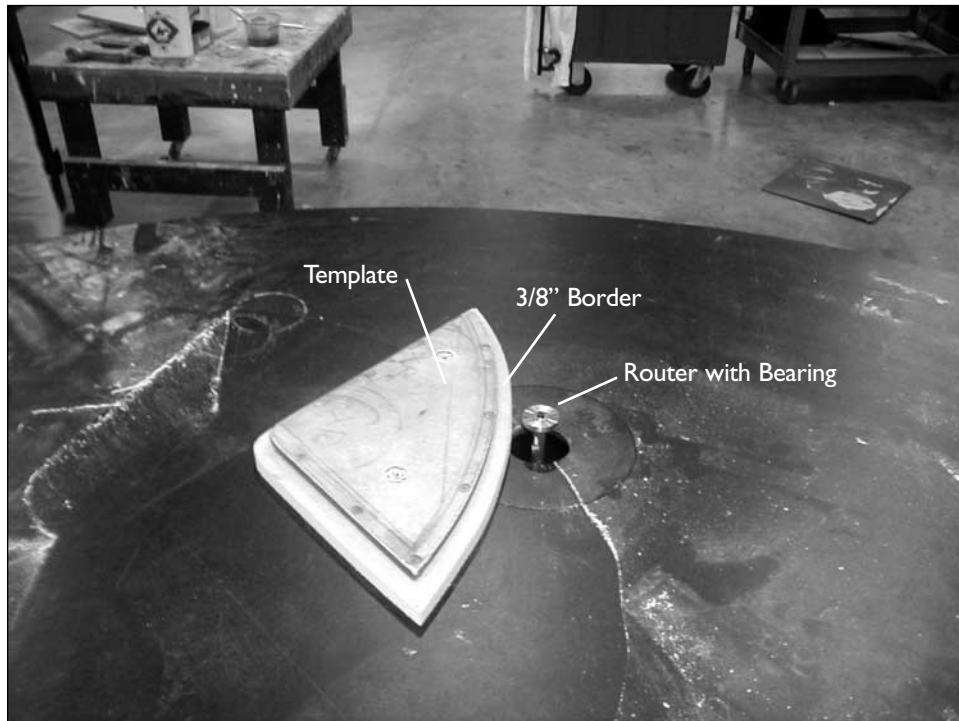
20



Using a flush trim bit, the excess 1/8" of material is removed leaving a perfect negative of the template (including vinyl thickness). Part I is set aside to be used later.

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21



The original template is attached to another piece of MDF that is to be made into Part 2. This part is roughly cut so that its perimeter is 1/2" larger than that of the template. The final trim is made by a router with a trim bit and bearing. The bearing is sized so as to leave a border around Part 2 measuring 3/8" outside the edge of the template.

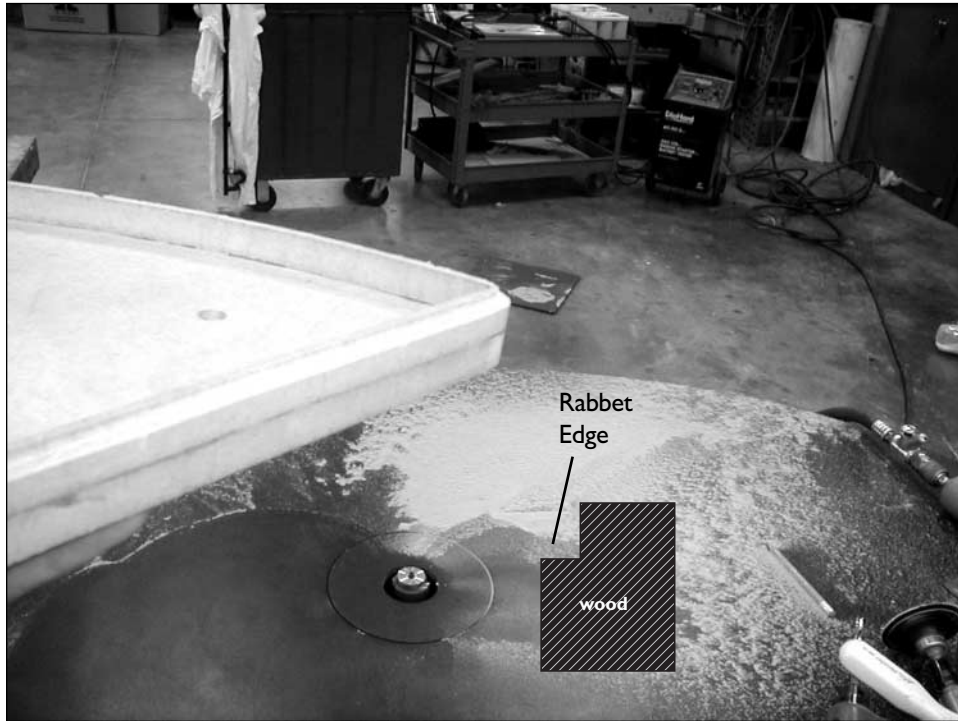
22



Part 2 (with the template attached) was glued to Part 1. The template remained attached to Part 2 and acted as a guide to align the two parts (the template fit inside the cut out in Part 1 as shown in the picture).

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23



Using the edge of Part 2 as a guide, Part 1 is flush trimmed with a router. A $3/16'' \times 3/16''$ rabbet is cut into the top edge of Part 1. This edge will be used later.

24



The process described in Steps 18 through 23 is used on all sections of the door panel. All sections are then permanently secured to the base of the door.

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25



An ABS Plastic frame is stapled to the perimeter of the door base to create a barrier.

26



Two-part expanding foam is poured onto the panel.

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27



The foam conforms to the boundaries of the ABS Plastic and around the individual sections of the door panel.

28



The foam cures and is ready to be sculpted.

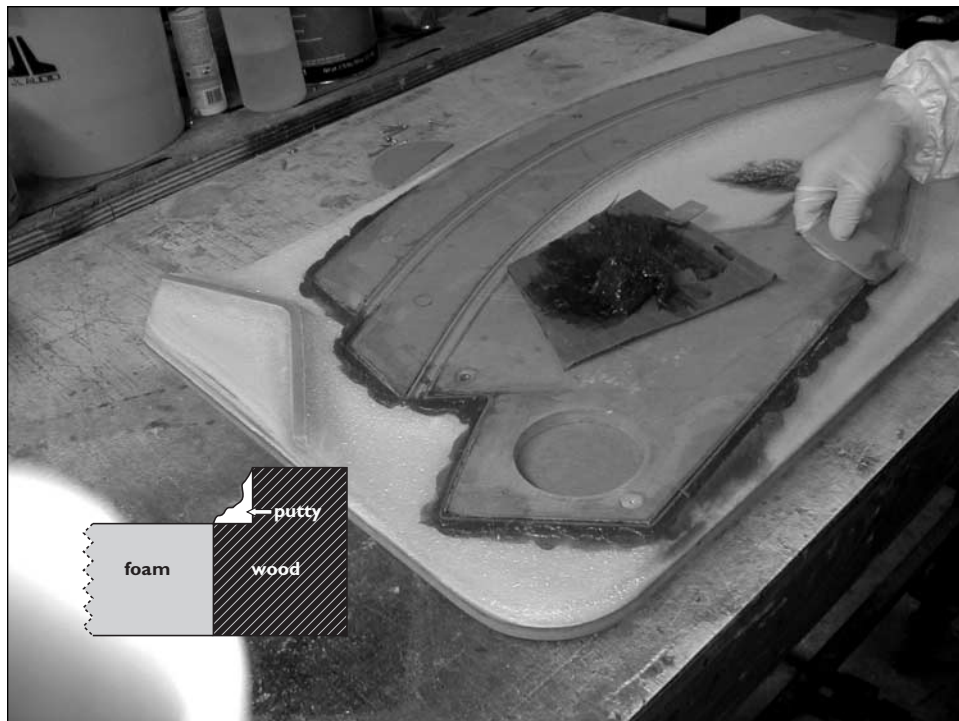
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29



The foam is sculpted into the desired door panel shape. The foam stops at the bottom of the rabbit edge on all sections of the door panel.

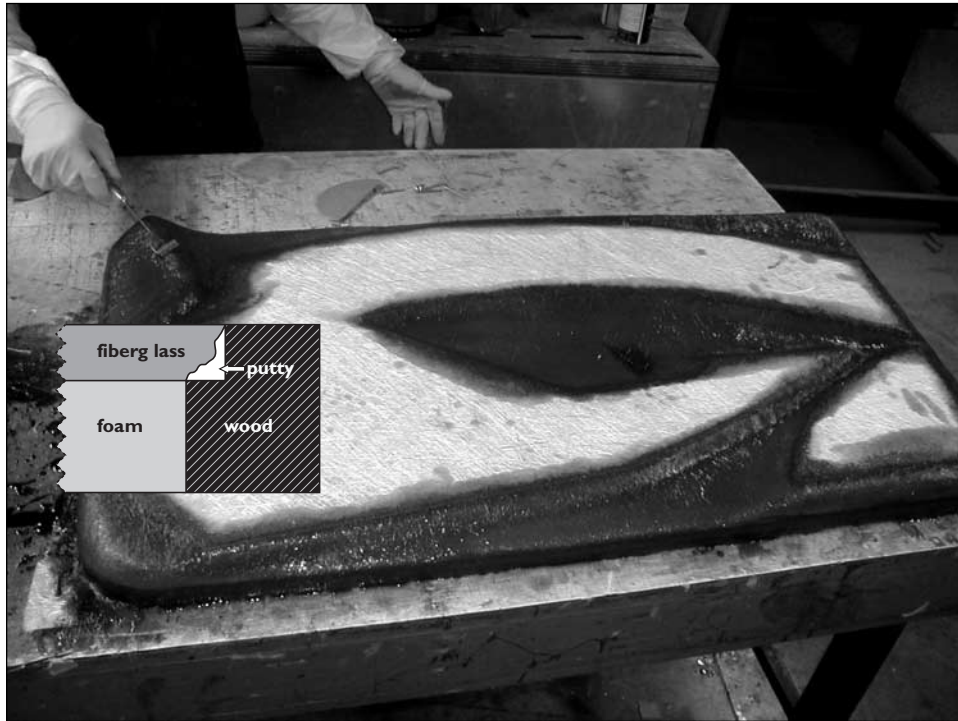
30



Fiberglass putty is added to the corner of the rabbit to prevent air bubbles from forming in that area when the entire surface of the door panel is covered in fiberglass.

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31



Three layers of 1 1/2 oz. fiberglass mat are laid on the door panel and all of the air bubbles are removed with a roller.

32



The fiberglass mat that covered the features (sections) of the door panel is removed with a razor knife.

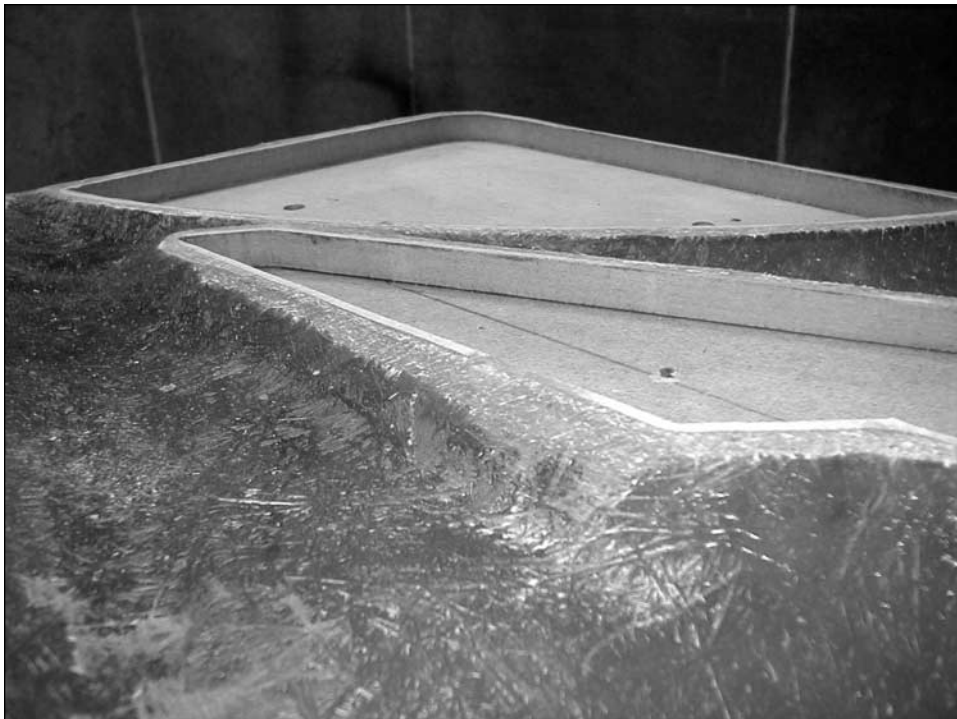
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33



The edges of the fiberglass panel are disc-sanded and block-sanded so that they terminate flush with the top of the rabbet edge of the MDF sections.

34



This picture shows the flush transition from the fiberglass to the MDF sections.

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35



Bondo is used to smooth the surface of the fiberglass panel. Detail work is completed on the various sections of the door panel and it is ready to be covered in vinyl.

36



All of the inserts are removed. Contact cement is sprayed on the door panel and vinyl.

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37



Extra glue is applied to the inner edges of each section to ensure a strong bond between the vinyl and the MDF.

38



The vinyl is heated and trimmed to perfectly cover the door panel.

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39



The door panel is shown here with its vinyl work completed. It is ready to accept the finished inserts.

40



The finished door panel is shown here with inserts, speakers and a grille in place.

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