DSPIRA Horn Assembly

Overview of Telescope Design

- The Horn is designed as an 'optimal' horn, constructed from 1 gallon square paint thinner can and aluminized insulation board.

- The cradle provides a frame for the horn to be easily connected to any support stand of your choice. The cradle design presented here provides an ability for the horn to be rotated on an axis to set any elevation desired.

- The cradle can be connected to any base desired. The wooden support stand presented here provides sturdy support for the horn. It is a simple design that is affordable and easy to construct. Its largest dimension is 75 cm so that it just fits through a standard doorway.

1. Horn-Can Assembly

MATERIALS NEEDED:

4' × 8' sheet of aluminized home insulation board – one sheet can make one horn; two sheets can make 3 horns

1 gallon square paint thinner can (F syle metal gallon container)

Copper wire for probe (gauge 4 or 6) – the probe is 5.25 cm long

Panel mount 4 hole male bulkhead SMA connector for the feedthrough

Aluminum flashing – for providing support between the horn and the can

Foil tape – e.g. 3M HVAC tape or Metal Repair tape – for taping the horn interior

Duct tape – because you can't do a building project without it.

ASSEMBLING THE HORN:

1. Cut the horn sides out of the 4' × 8' sheet of aluminized home insulation board, as illustrated below:
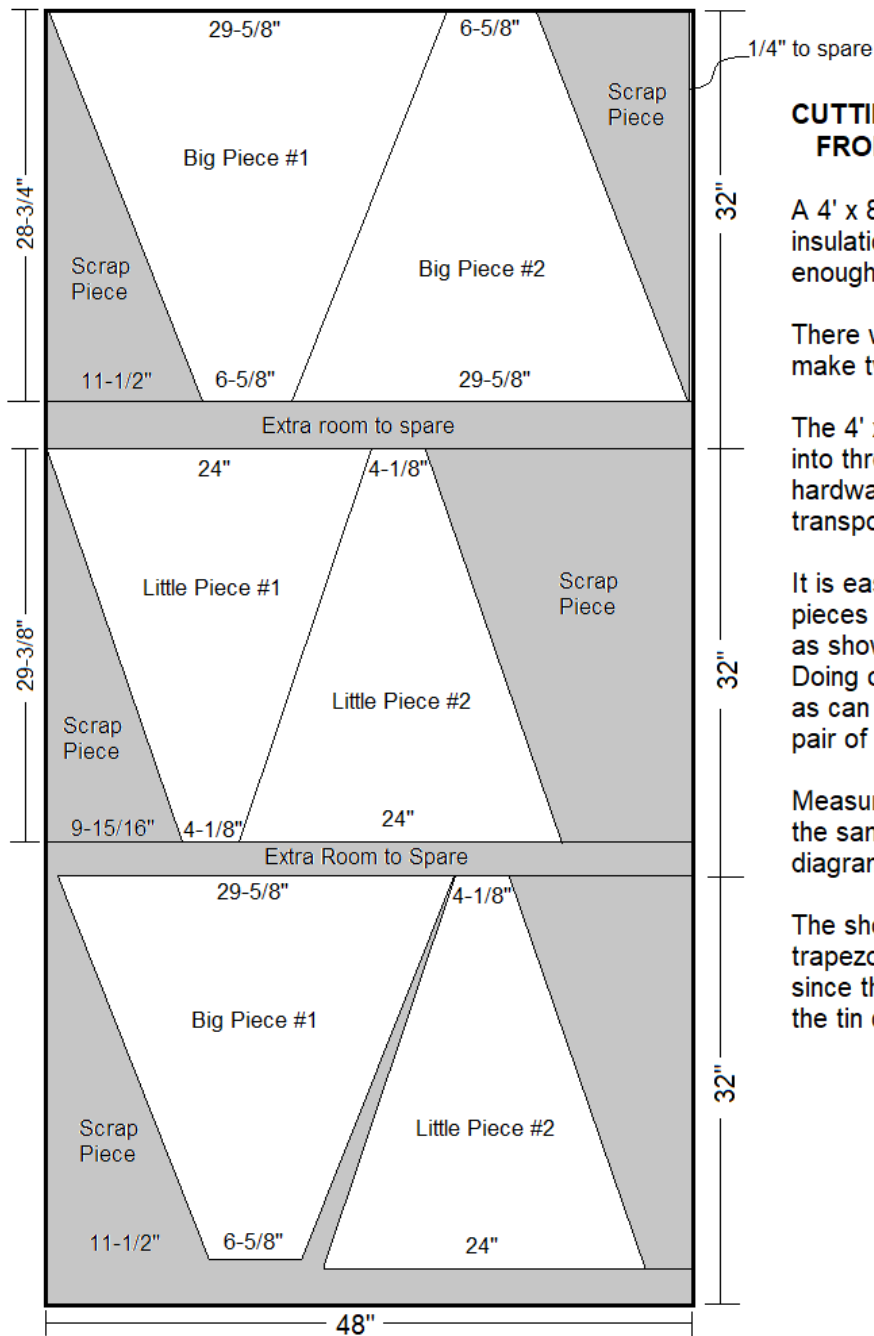
CUTTING HORN PIECES FROM 4' x 8' SHEET

A 4' x 8' sheet of folied insulation foam board will be enough to make one horn.

There will be enough extra to make two spare pieces.

The 4' x 8' sheet could be cut into three 32" strips at the hardware store for easier transport.

It is easiest to cut the 2 big pieces or the two little pieces as shown in the diagram. Doing one of each is awkward, as can be seen in the bottom pair of the diagram.

Measure all dimensions from the same side (left side in diagram)

The shorter ends of the trapezoids are most important since they need to line up with the tin can dimensions.

2. With the silver side of the panels facing upward, align the panels side by side and use the foil tape to tape the panels together, as shown below:
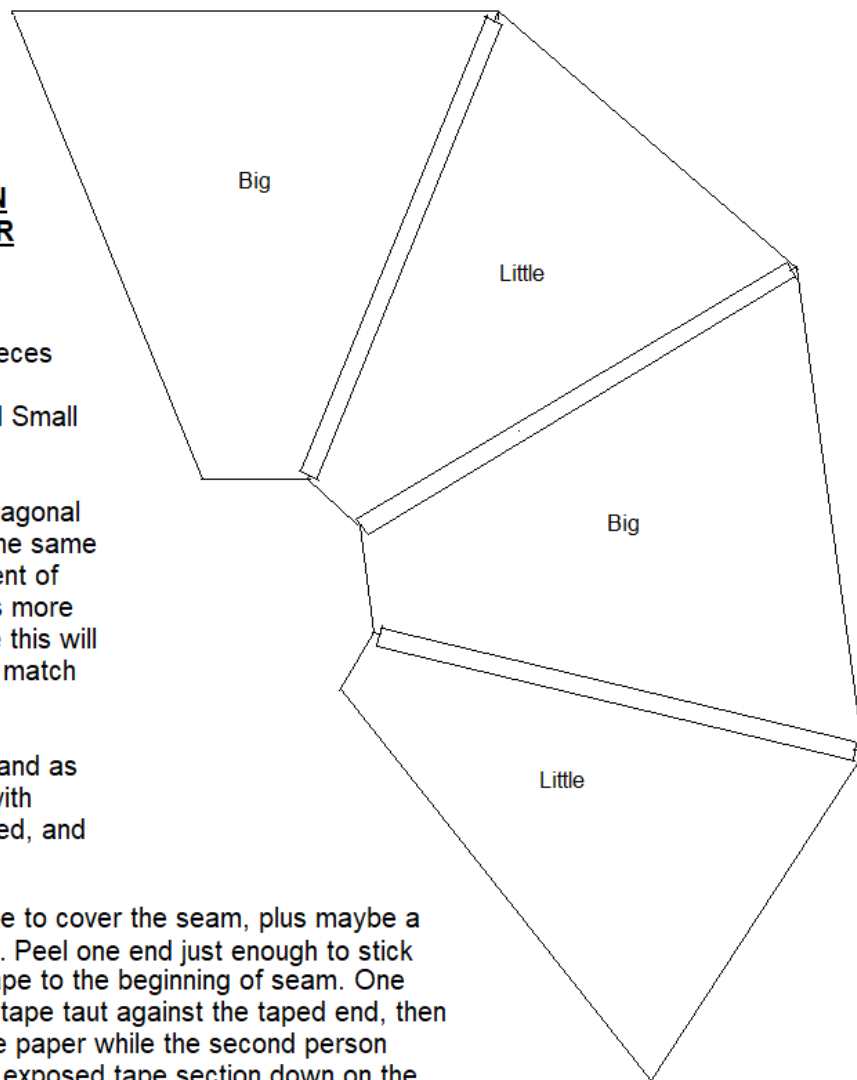
TAPING THE HORN PIECES TOGETHER

Big

Little

Line up the four pieces on a flat surface alternating Big and Small pieces.

Big

Even though the diagonal edges should be the same length, the alignment of the shorter ends is more important because this will be put together to match up with the can.

So, line up edges and as best as possible with smaller ends aligned, and get ready to tape.

Little

Roll out the foil tape to cover the seam, plus maybe a 1/2 inch extra. Cut. Peel one end just enough to stick down the end of tape to the beginning of seam. One person should pull tape taut against the taped end, then start to peel off the paper while the second person presses the newly exposed tape section down on the seam.

3. Complete the horn assembly by taping the remaining edges together to form a square pyramid horn.

   NOTE: The silvered faces of the panels are the inside surface of the horn.

4. Tape over the top and bottom edges of the horn using the foil tape so that the edges are sealed. This provides protection to the horn edges from damage. (It also looks nice.)

ASSEMBLING THE CAN:

1. Cut off the bottom of the can using a smooth edge can opener (e.g. an Oxo Smooth-edge can opener).

2. Solder the 5.25 cm long copper probe to the pin of the SMA feedthrough. See below.

3. Drill a ¼ " hole through the side of the can along the midpoint at a distance of 5.25 cm from the capped end of the can, as illustrated below.

   Suggestion: Place a block of wood on the inside of the can as you drill. This helps prevent the can from collapsing during drilling.

4. Solder the SMA feedthrough to the can with the copper probe extending into the can.
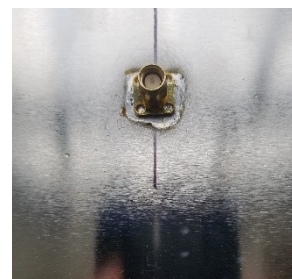
ATTACHING THE HORN TO THE CAN:

1. Cut two 2" × 6" pieces of the aluminum flashing. Mold the flashing into a square "S" shape. These will fit along the contour of the can-horn connection to provide structural support.

2. Place the horn upside down on the floor. Tape the flashing to the horn as illustrated in the photo below.

3. Place the open end of the can on top of the horn, and align the openings with the flashing pieces on the outside of the can, is illustrated in the photo.

4. Fit each flashing piece into the contour of the junction between the horn and the can on the outside, and tape the flashing pieces to the can., with either duct tape or foil tape.

5. Use the foil tape to tape the horn and can pieces together on the inside. Be sure to completely cover the adjoining seams so that there are no openings or gaps.

Looking down into the can from the mouth of the horn. Notice the taping along the corner edges and at the can/horn seams.