Here's an interesting item you can take with you on your next vacation or business trip.

A "Bedsheet" Beam For Two Meters

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How many times have you been on a trip and fired up your handi-talkie on a local repeater from a hotel room only to hear "Sorry, old man, but you are not quite strong enough to make this repeater. . . . 73s"

After traveling with a host of duckies, dipoles, coax dipoles, and J-poles, I finally decided to try something big—about 6 inches by 3 inches by 1 inch when packed for travel.

Step one is to take a piece of 4 mil thick plastic and cut it to about 70 inches long by 40 inches wide. You could also use an old plastic crib sheet as I did, and then truly claim to have made a bedsheet beam. Tape the sheet or plastic securely to the floor, and then use an indelible pen to mark out the element positions as shown in fig. 1. Be careful and accurate, but don't worry about an eighth of an inch. As you will see later, high accuracy is nice but not necessary.

The elements are made by using strips of window burglar-alarm foil, such as Radio Shack 49-502. Cut them to the sizes shown in the figure, and then fold then gently in half to find the center. Peel the paper backing from the metal foil and lay the strips in place with the center of the strip on the marked centerline of the beam. This might be a two-person job. After the beam is tested, you can cover the elements for protection with clear shipping tape such as Radio Shack 64-2339 or any standard stationary-store packaging tape.

The beam consists of three directors, a driven element, and a reflector. After cutting the driven element to size, cut it once more in half and position it on the bedsheet with about an eighth of an inch gap between the two halves.

You might like to design your own mounting arrangements. I chose to fasten some fishing split shot in the positions marked to hold the bottom of the beam vertically down, and taped the top of the bedsheet to a piece of ⅛ inch cord about 20 feet long. This mounting relieves any stresses from the plastic and assures vertical polarization.

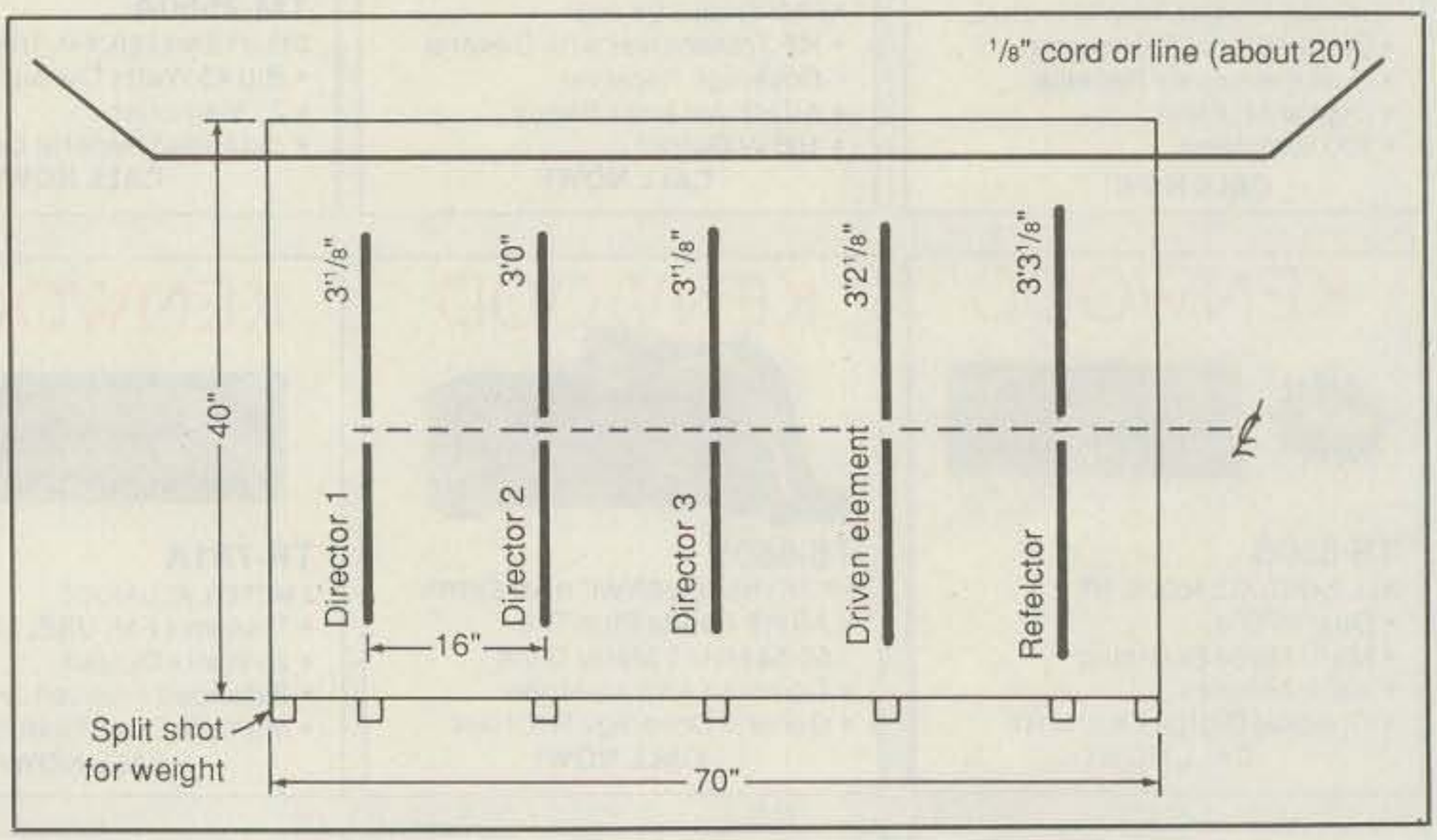

Fig. 1– Overall plan for the portable 5-element beam.

The other possible stress point is the mounting point of the feed line to the driven element. Fig. 2 is an expansion of the area around the center of the driven element. The dotted line is the edges of a 2

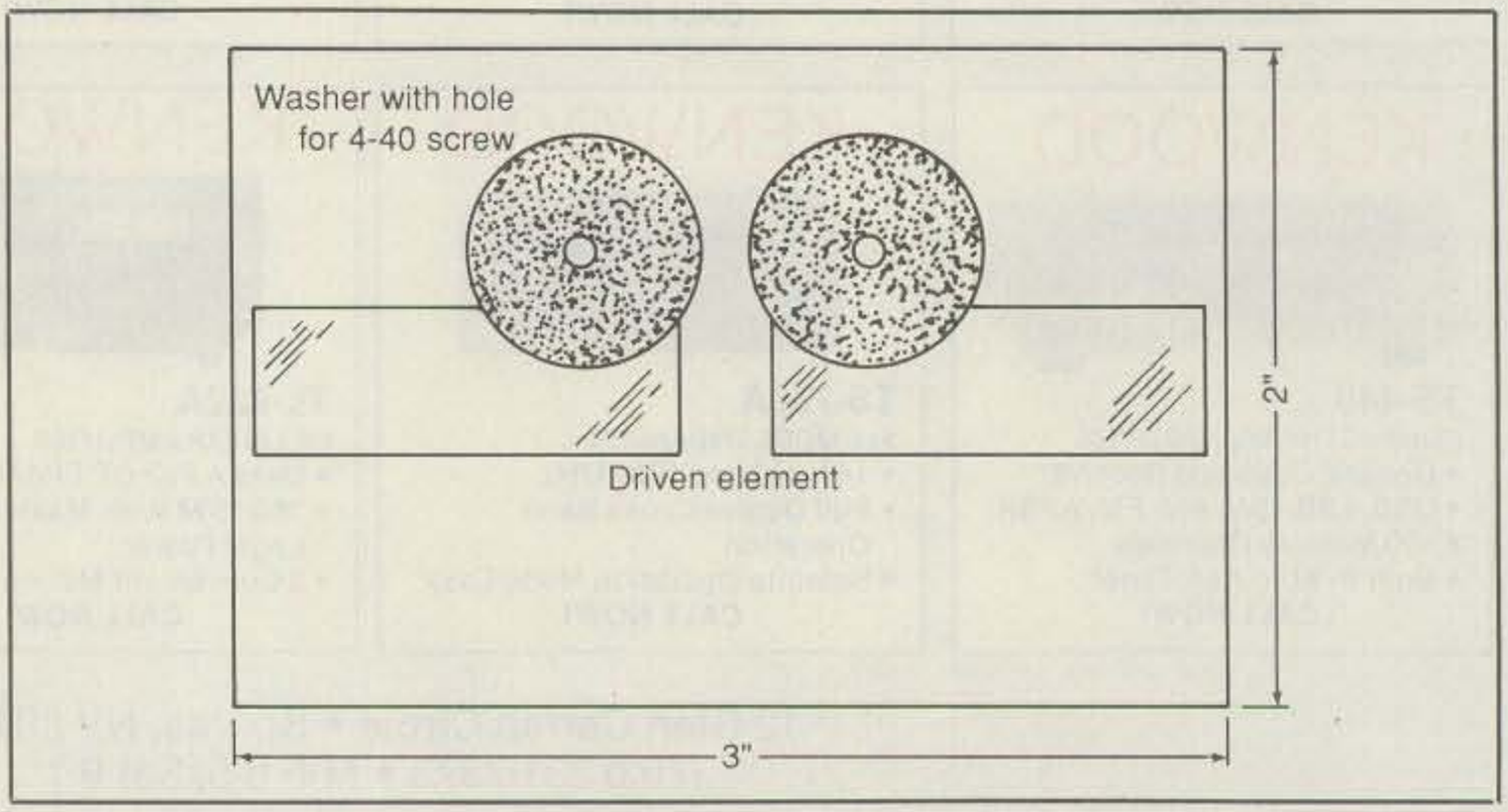

Fig. 2– Details for connecting to the driven element.

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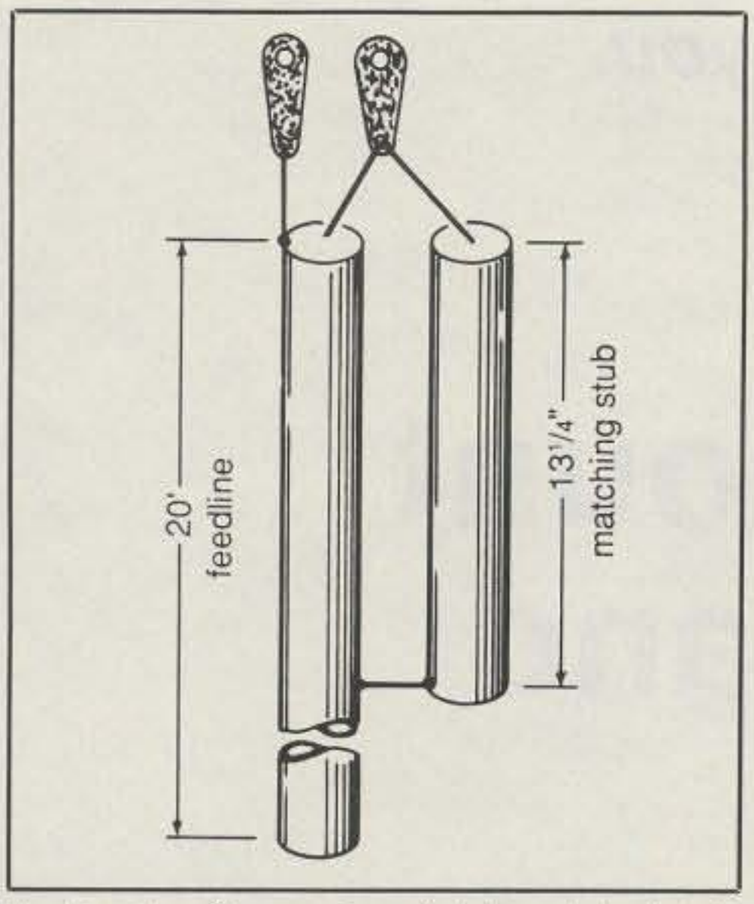

Fig. 3– Feedline and matching stub details.

inch by 3 inch piece of plastic cut from a plastic butter tub and taped to the back side of the beam. Two holes are drilled next to, **but not through**, the ends of the driven element sections. An assembly of a 4-40 screw, nut, and oversize washer is now tightened as shown, with the washer making contact to the metal of the driven element and the backing plastic relieving any strain from the bedsheet.

The feed line, as shown in fig. 3, terminates in two solder lugs which then are placed over the exposed screw bodies and fastened in place with finger-tightened nuts. I remove the feed line for traveling.

The feed line is a 20 foot section of RG-59. At one end is a connector which matches the connector on your rig. The other end is assembled as shown in fig. 3. This is a standard design for a matching stub, and for anyone who has not built it before, the drawing is not in error. The center conductor of the 13¼ inch stub is *not* connected.

With plastic tape, tape the stub to the feed line every 2 inches. I suggest covering as much of the exposed wire as possible at each end with a silastic, rubber, or hot glue for protection. The ends of the two solder lugs should be kept bare!

Directions for use are simple. Fasten one end of the cord to anything that is available (I carry a few thumb tacks) and rotate the other end of the cord for maximum signal strength.

If you can, try to dress the feed line so it comes out at right angles from the beam for 2 or 3 feet.

If this was a perfect world and we could design and build a perfect beam and mount it free and clear in the blue sky, we might get 9 or so dB gain from the beam. But this is not a perfect world, and hotel or motel rooms are full of wiring, steel reinforcing rod for the concrete, lamps, and other fixtures. For this reason the beam SWR will probably run at 2:1 or so in use, and attempts to reduce it are not worthwhile because the room will change its effect on the beam each time you swing its direction. Therefore, it probably does not pay to attempt to trim the beam to reduce the SWR and maximize the gain to the utmost.

A 3 dB gain doubles your effective power, and a 6 dB gain multiplies it by 4. Therefore, if the beam works moderately well, you can probably plan on some gain between these figures with a surprising increase in performance, since most quarter-wave whips on handie-talkies do not perform anywhere as well as a true dipole and all rubber duckies do even worse.

No claims are made for gain in this design. But since the investment is only a few dollars and less than an hour of work, you might be surprised at the results. Between trips you can unfold the beam and hang it on the wall as a decorative picture or painting.

I would like to thank Dr. Harold Shnitkin, whose prototype wideband TV Yagi, built on a large sheet of drawing paper, suggested this concept to me.

Materials

Plastic sheet, minimum 70 inches by 40 inches, 4 mil thickness or greater.

RG-59 coax, 20 feet or so.

Coax connector to match your rig antenna connector.

Self-adhesive foil for window burglar alarms, Radio Shack 49-502.

4-40 screw, nut, and oversize washer.

Twenty feet of cord or string.

Roll of clear shipping tape, Radio Shack 64-2339.

Two solder lugs.

Six to 12 medium split shot.

Silastic, liquid rubber, or hot melt glue.