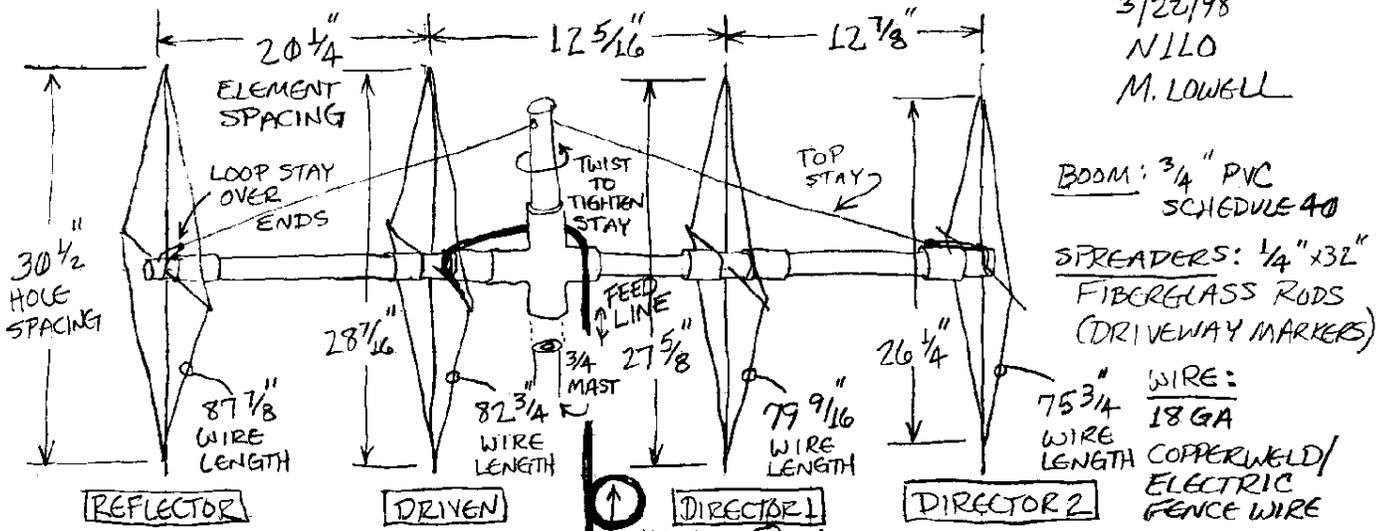
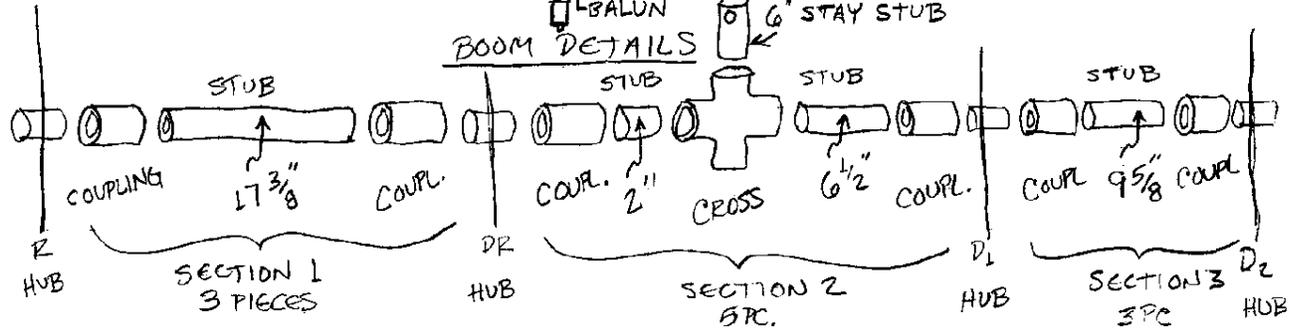


PORTABLE 4 ELEMENT 2M QUAD

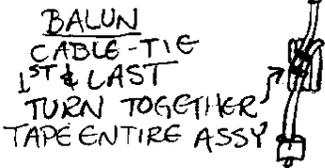
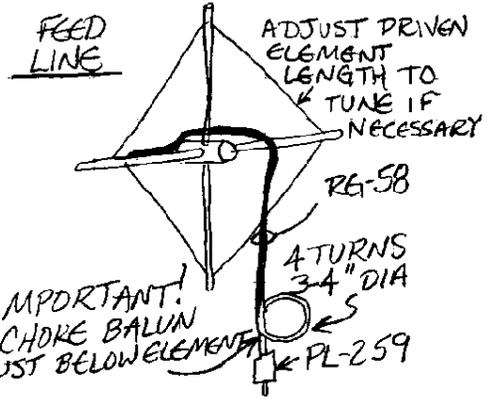
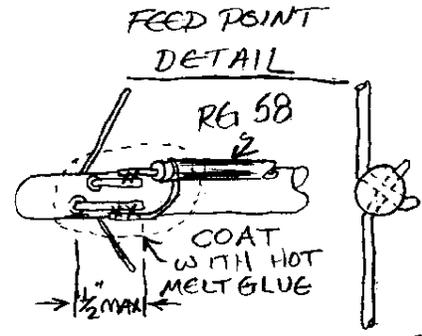
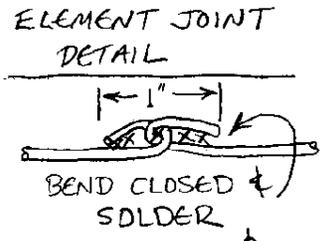
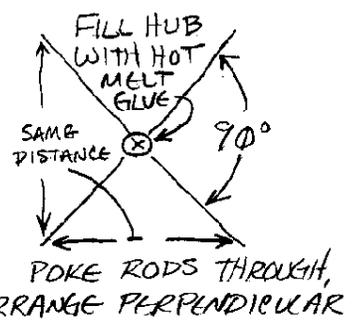
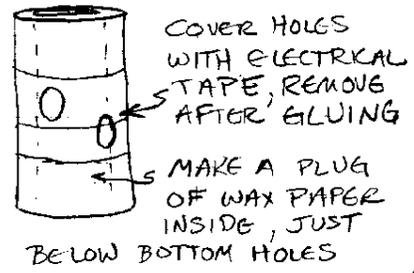
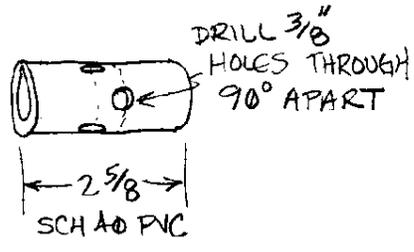
3/22/98
N1LO
M. LOWELL



- BOOM: $3/4$ " PVC SCHEDULE 40
- SPREADERS: $1/4$ " x $3/2$ " FIBERGLASS RODS (DRIVEWAY MARKERS)
- WIRE: 18 GA COPPERWELD/ELECTRIC FENCE WIRE



ELEMENT HUBS



4 Element, 2 Meter Quad Antenna Plan

M. Lowell, N1LO, 4/16/98

OK, this is the plan you have been waiting for! See the attached figure. Several of you have asked for a plan of the 4 element quad that several of us have built. This antenna is a proven performer! It features:

- 1) 9 to 10 DBd forward gain, 30 DB front-to-back ratio, and 33 DB front-to-side ratio.
- 2) Direct-connect feedpoint with no matching devices.
- 3) Compact and lightweight, less than 4 feet long.
- 4) Commonly available building materials.
- 5) Portable, break-down construction stores nearly flat.
- 6) Easily switched between vertical and horizontal polarization.
- 7) Covers the entire 2 meter band with low SWR (<1.4:1).

This beam makes an excellent base or portable antenna. Its directivity also makes it very well suited to transmitter hunting. They can also be stacked for more gain. The original electrical plan (element sizes and spacing) was published in the first September 1996 issue of Amateur Radio Trader, page 58, "Simpleton's Guide to QUAD Antennas". It featured a wooden construction, and was tuned for 147 MHZ. I re-tuned it for 146 MHZ and refined the mechanical design for durability and portability.

CONSTRUCTION NOTES

The illustration is rather busy, but should provide all the necessary information. Each element is built on a separate hub so the antenna can be taken apart. The boom is made from common schedule 40 PVC. The spreaders are available in home and garden centers as driveway markers with reflectors on them. Larger rods are available, but the smaller, 0.25" diameter rods are lighter and plenty strong. Dowels will work but will not stand up to much weather unless you boil them in paraffin. The elements can be strung from just about any type of solderable wire, but the electric fence wire is very thin, and has a steel core for strength. Good ol' Radio Shack #14 antenna wire works, too.

Note that you won't need a drill press to make the spreaders accurately. The 3/8" holes are oversized to allow for alignment. Take a few extra minutes to jig the spreaders square before you glue them. Prop the ends up with anything handy while the glue sets. High temperature, hot-melt glue works great. Don't forget the electrical tape around the hub; it keeps the glue from oozing out of the oversize holes. The wax paper plug keeps the glue from running out of the bottom. Form a small ball of wax paper, place it inside the hub, and tamp it flat over your bench top with the end of a dowel. Then push it up just below where the first spreader crosses. Mark the center of each spreader to make it easier to get them evenly placed.

Dry fit everything and adjust parts to yield the given element spacing. The coupling length will vary from brand-to-brand, affecting the spacing. For a take-down boom, go ahead and glue everything except the element hubs and the top stay support. This leaves you with just three pieces plus the elements. For a permanent assembly, glue all joints except the stay support. This support must remain free to wind up and tighten the stay, although it can be secured with a single stainless screw after tightening. The stay adds tremendous rigidity and should be made from sunlight resistant, non-conductive cord such as Dacron polyester. In the case of a permanent assembly, choose your polarization before gluing! Place the feed point on one side, as shown, for vertical polarization, and on either the top or the bottom for horizontal polarization. The elements get progressively larger from front to rear, so you can tell them apart, but a few identifying marks with a pen or soldering iron are helpful to speed assembly. You can substitute a tee for the cross and use 2 "U"-bolts to attach the boom to any suitable mast. I frequently use this antenna on a short PVC mast that has a 3/4" stub at the top for mounting.

The given spacing for the holes where the elements pass through the spreaders should be very close and is based on 3 prototypes.

Do NOT adjust the element length to suit your holes. Measure and cut the element raw wire lengths carefully, assemble them with 1" of overlap at each joint, and then adjust the spreader hole spacing to hold the elements taught. Don't worry if there's a little play in the wire; it won't matter. The balun is an integral part of the feed attachment. Wind it just below the driven element. Wind the turns like a spring, with no gaps, on the outside of a piece of 2" PVC pipe, and tape all the turns together. Use a couple of cable ties to secure the first turn to the last. A pl-259 and a barrel connector together make the antenna ready for your unbalanced coaxial feedline.

HAPPY BUILDING AND BEAMING! —...MARK, N1LO...—