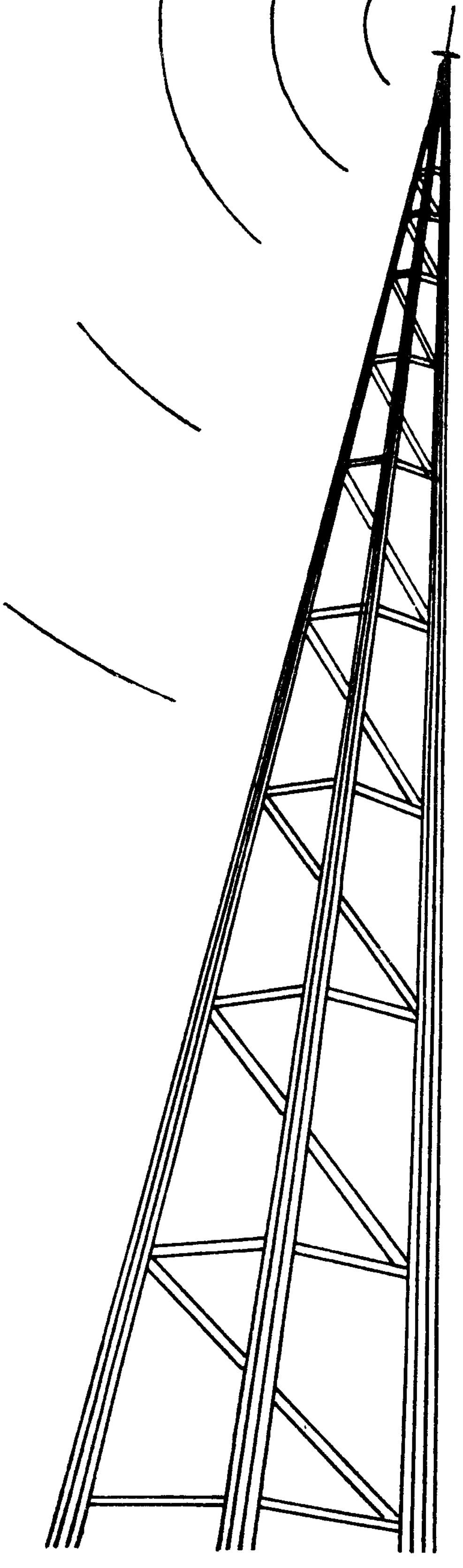
FREE
COUPON INSIDE

QSX PE



ZS2PE

FREQUENCIES:

Bulletin	3640 Khz
	7107 Khz
National Call	145,5 Mhz
P.E. Repeater	145,05/65
Grahamstown	145,20/80
Lady's Slipper	145,10/70

Port Elizabeth Branch of the South African Radio League

P.O.Box 462, Port Elizabeth. 6000.

MINUTES OF THE MONTHLY MEETING OF THE PORT ELIZABETH BRANCH OF THE S.A.R.L. HELD ON 16th June 1978.

PRESENT: A total of 20 members and visitors. The Chairman welcomed Johann Coetsee, ZS2HI, ZS2KX, ZS2LO, ZS2PR.

APOLOGIES: ZS2JP, ZS2EA, ZS2TY, ZS2KT.

MINUTES: These had been published in QSX. ZS2BS proposed and ZS2BE seconded adoption.

ARISING: Nil.

FINANCE: No report due to the Treasurers absence. The Secretary will handle all money matters until Franks recovery.

CORRESP: Nil.

GENERAL:

(1) The Chairman expressed condolences to Van ZS2Y and his XYL, whose Mother passed away recently.

(2) Frank ZS2CY was passing through a somewhat unstable phase at present but improving. The Chairman appealed to members to make an effort to visit him.

(3) A DF hunt will be held this Sunday. ZS2BK will be the fox.

(4) Notes will be published in QSX regarding the change of bulletin frequency and forthcoming technical classes.

(5) Chairman thanked Alan ZS1AC and Van ZS2Y for their contributions to QSX.

(6) Lionel ZS2DD had found a VFH trophy cup amongst the late ZS2CB's possessions. This was last awarded in 1953 to Les ZS2KF for 6 metre DX work. More details will have to be researched in this connection.

(7) The hoped-for guest speaker for the meeting was not able to attend, as he had to make certain arrangements prior to addressing our meeting. It is hoped that he will be available next month.

(8) The new crystal for the Lady's Slipper repeater should arrive during the next week, and the modifications will be made as soon as it arrives.

(9) Basil ex ZS2ML now holds the call ZS6NA.

There being no further business the meeting closed at 20h33.

s gd.
R.W.Schonborn ZS2RS
CHAIRMAN.

sgd.
B.A.Weller ZS2AB.
SECRETARY.

D. F. HUNT

The next D.F.Hunt will be held on Sunday, 23rd July, 1978.

START: Corner of Moffat Freeway and Bayley Street, Charlo.

Time: 2.30pm.

The fox will transmit for a generous minute, every five minutes, at full power until and including 3.10pm. Then at low power at 3.15, and at 3.20. Continuous low power from 3.25 to 3.30.

Relax for tea and chin-wag at the Graydawn Bird Park Tea-Room after the hunt.

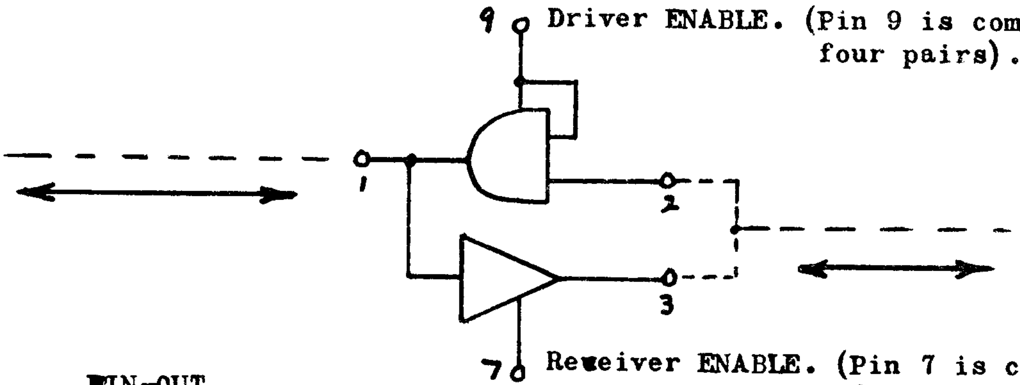
cu.

THE DS8833 BI-DIRECTIONAL BUFFER (TRI-STATE)

Although this is not one of the 7400 series, it is nevertheless fully TTL compatible.

The DS8833 is a Quad device, i.e. the Driver/Receiver-pair as shown below is repeated four times in a 16 pin package.

A single line, as shown, can be used for both send and receive - so the device is also referred to as a Transceiver.



PIN-OUT

1	2	3	4	QUAD. No.
2	5	11	14	Driver In.
3	6	10	13	Receiver Out.
1	4	12	15	Driver Out/Receiver In.

16 Vcc

8 Gnd.

9 Common Driver Enable.

7 " Receiver "

The Receiver and Driver outputs are Tri-state. In both cases, a low-level (logic 0)-input enables, while a high-level puts the output into a Hi-Z state. PIN 7 or PIN 9

The Driver can sink in excess of 30mA (50mA @ 0.5V) and is capable of driving 100 ohm dc terminated lines.

The Receiver can sink 16 mA.

Gud DX on ur TTL TX/RX !

73, Bert, ZS2EA.

IMPORTANT!

NBNBNBNBNBNBNBNBNBNBNBNB

WILL ALL MEMBERS PLEASE NOTE THAT THE NEXT GENERAL MEETING OF THE P.E. BRANCH SHALL BE HELD ON FRIDAY 21 JULY AT 8PM AT ST. JOHNS PRIMARY HALL, HAVELOCK ST. AND NOT AT THE YMCA AS USUAL.
The YMCA venue is booked for another function and they have kindly arranged for us to use the St. Johns primary hall. This hall is situated next to St. Johns church which is in the same street as the YMCA. Someone will be on duty at the "Y" to redirect the lost souls.

Frank ZS2CY is still in the white house and can be heard daily on the local repeater. At present he is doing battle with rather a bad cold. Hope you feel better soon.

Several out of town stations have been heard during the past week. They include Peter ZS1U MM, Horace ZS5C, Percy ZS6BGJ and James ZS3JG.

Lil (better known as Snoopy) the XYL of Brian ZS2GF left last week for Johannesburg where she will spend some time with her daughter and son in law.

Barry ZS2BS is making good progress with his antenna instalation and at the time of writing is ready tieerect the HF beam. The overall construction should be some 65 ft high.

A new receiver was fitted to the Ladies Slipper repeater last week. The new set did not like the old "tail" circuit and as a result Brian ZS2AB designed and built a solid state timer which gives a seven second tail. Users are invited to comment at the meeting.

The results of the last PMG examination are at last seeping in and by the time the monthly meeting takes place we may know them all.
REMEMBER THE CLASSES WHICH WILL BE RUN BY ALBERT ZS2U. THIS WILL BE FOR THOSE WISHING TO WRITE AGAIN IN NOVEMBER. HE HAS ROOM FOR ONLY TEN PUPILS, SO ITS FIRST COME FIRST SERVED. A FEE OF R10 WILL BE LEVIED FOR THE COURSE.

Alan ZS1AV and XYL Naydene have just returned from a week in division 3. He reports low activity on "2" and the odd fact that 145.150 is used as a simplex chatting frequency. No wonder he couldnt find anyone to talk to.

Antenna Gain Facts

-- don't be misled

Ken Schnell W5OBR
2607 Easy St.
Pasadena TX 77502

This will be a short article to discuss the gain of antennas. I always get confused when someone quotes me a gain of a particular antenna. The confusion arises because I don't know what baseline or reference point he is using. Normally, in measuring HF antenna gain, the figures are referenced to those obtained by using a horizontal dipole (halfwave). In the FM communications field, the reference for gain is still a halfwave dipole, but mounted in the vertical plane. As far as the FCC rules are concerned, antenna gain is based on a halfwave dipole as a reference. This can be important because many antenna manufacturers use an isotropic source as a reference for listing the gain of their antennas. A common antenna (and the simplest) is the 1/4 wavelength whip perpendicular to ground plane. By comparison to an isotropic source, this antenna shows a gain of .3 dB. Additionally, the 1/2 wavelength antenna shows a gain of 2.1 dB over isotropic or 1.8 dB gain over a 1/4 wavelength antenna. The common 5/8 wavelength antenna, that we see so often on the mobiles, has a gain of 1.2 dB over the 1/2 wavelength or 3.3 dB over isotropic. Higher omnidirectional gain is usually accomplished by using stacked halfwave dipoles. As an example, four stacked halfwave dipoles on 146 MHz can provide approximately 6 dB gain. Usually the maximum number of halfwave elements stacked vertically will be eight (8), which should provide an omnidirectional gain of about 9 dB. ■

Antenna Type	Gain
Isotropic	.0
1/4 wave	.3
1/2 wave	2.1
5/8 wave	3.3
Collinear	6.0

Harry L. Fish K4IFH
PO Box 1587
Avon Park FL 33825

Try A Trapped Dipole

-- save copper and coax!

Often the need arises for a permanent low cost antenna. A dipole or inverted vee is a good choice. They are easy to install and cheap to build. One of the disadvantages of such antennas is that they are only usable on a single band, unless they are fed with an open feedline and an antenna tuner.

Most traps used in amateur radio multiband antennas are made of a lumped inductance and capacitance in parallel. I tried to overcome this.

By placing a trap 32 feet 6 inches from the feedpoint, a current maximum will occur at 7200 kHz. With the correct wire length on the outside end of the trap, the antenna can also show current maximum at the feedpoint for 3900 kHz. In both cases, the dipole functions as a half-wave dipole.

Why not add another antenna under the existing 80 and 40 meter wire, fed at the same feedpoint, with another trap tuned for 21300 kHz? An outside wire of the correct length will give current maximum on 80, 40, 20 and 15 meters, all functioning as a halfwave dipole.

With the help of my XYL, I came up with this antenna. The information for construction follows. I hope it will do as well for you as mine does for me!

The dimensions given here are resonant at 3.9 MHz, 7.2 MHz, 14.3 MHz and 21.3 MHz. For 40 meters it's 160 turns, for 15 meters, 55 turns. Number 12 magnet wire is wound on a 1/2 inch rod, close wound. The coil is removed from the 1/2 inch rod and placed inside the 1/2 inch PVC pipe.

The PVC pipe is cut to 18 inches for 40 meters, 10 inches for 15 meters. The PVC is then placed inside the 7/8 inch ID, 1 inch OD aluminum tube. The aluminum is cut to 16-1/2 inches for 40 meters, 8-1/2 inches for 15 meters.

Drill a hole in the center (ends) of eight 1/2 inch PVC caps, and mount stainless steel eye bolts on them. (Cut off the eye bolts as short as possible, so they will not go into the PVC tube.) Now drill a hole to fit the #12 magnet wire below the eye bolt in each end cap. See Fig. 4.

Cement one end cap onto the PVC tube after bringing the end of the coil wire through the small hole. Secure a tin solder lug on one end of the aluminum tube, as shown in Fig. 3, with a pop rivet or small screw. Do not use aluminum or copper for the solder lug. Slide the aluminum tube over the PVC with the solder lug end first, and solder a jumper from the lug to the coil wire as close to the PVC cap as possible.

You are now ready to tune the traps. The traps were adjusted to frequency through the use of a grid-dip meter (checking on a receiver for accuracy). The coil can be changed quite easily if an extra turn or two is put on for adjusting purposes. The coil can also be wound with spacing and compressed or extended to get the traps exactly on frequency. Tune to 7.2 on 40 meters. Tune to 21.3 on 15 meters.

After the tuning is completed, the end cap can be cemented on. The two wires sticking out of the end caps are to be soldered to the antenna wires.

My antenna is supported in the center about 32 feet high and 10 feet at the ends. I show an swr of 1.2 to 1 on 3.9, 1.3 to 1 on 7.2, 1.3 to 1 on 14.3 and 1.2 to 1 on 21.3. The CW bands can be worked with the swr less than 2 to 1 on all CW bands.

The overall length is 106 feet, and it can be installed as an inverted vee in a lot less than 90 feet. ■

Parts List

PVC cement
8 1/2" PVC caps
56" of 1/2" PVC pipe
1 balun, 1:1
4 ceramic insulators
135' of antenna wire
50" of 1" aluminum tubing (a discarded lawn chair will do)
80' of #12 magnet wire

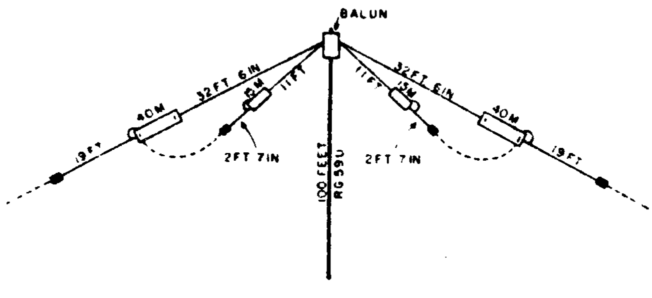


Fig. 1.

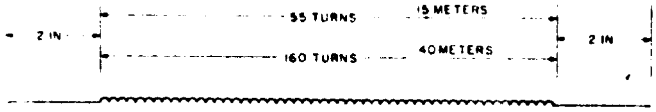


Fig. 2. Don't forget to leave 2" on each end of each coil.

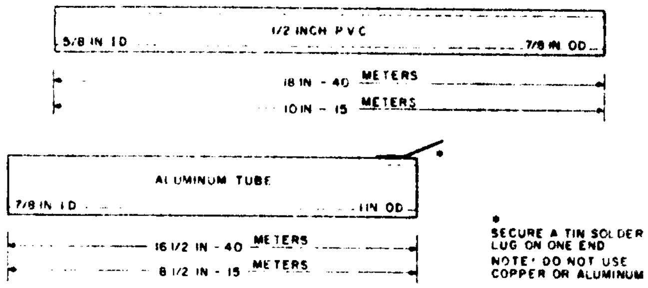


Fig. 3.

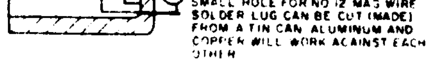
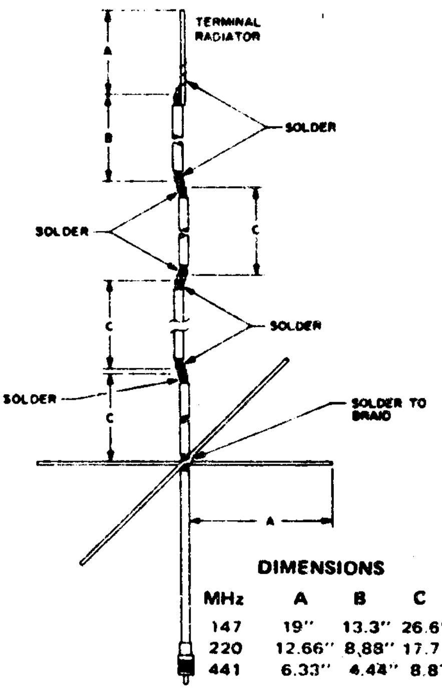


Fig. 4. The coil will expand to make a nice fit inside the PVC tube. The aluminum fits snugly over the PVC, and the cap rims help hold the aluminum tube in place. It all makes a very nice looking assembly.

PART I



DIMENSIONS

MHz	A	B	C
147	19"	13.3"	26.6"
220	12.66"	8.88"	17.75"
441	6.33"	4.44"	8.875"

Fig. 1. The collinear gain antenna is made up of coaxial sections connected in a phase-reversal configuration. The bottom section (from the radials to the first joint) and the upper section (which joins the antenna to the shorted radiator) are half the size of all other sections.

Project: GAIN ANTENNA FOR VHF/UHF REPEATER

An omnidirectional collinear coaxial stack – that's our short, pet name for this outstanding antenna. This one will quadruple your repeater output power and bring in those marginal mobiles in the fringe areas. By none other than K6MVH.

Probably the most popular antenna in the amateur repeater world is the omnidirectional collinear coaxial stack, although it is seldom called by that name. Versions of this antenna are manufactured by such companies as Prodelin, Phelps Dodge (Communications Products), and several other firms that build antennas specifically for the commercial bands.

Two of the reasons the collinear antenna is so popular are that it can be made to exhibit a great deal of omnidirectional gain at a very low angle of radiation and it takes up very little space. In its manufactured form, it resembles a long fishing pole with a pair of crossed fins at the base.

In spite of the fact that a great deal of painstaking effort is required to make the antenna and get it just right, the operation is surprisingly simple. And what makes it even more attractive to the amateur, it is remarkably inexpensive. About all you need is a good-sized hunk of 50Ω foam-dielectric coaxial cable and some polyvinyl-chloride (PVC) pipe. For 2 meters, the pipe should be between 20 and 21 ft in length; for 450 MHz, an 8 ft length will do fine. The total omnidirectional gain (as compared with a reference dipole) will be 6 dB (actually 5.8 dB, but who's counting?).

Building the Antenna

Ignoring the structural aspects, the antenna itself is nothing more than a series of precise lengths of coaxial cable soldered in an alternate phase-reversal configuration as shown in Fig. 1. A quarter-wave whip at the antenna's tip shorts the inner and outer conductors of the coax and becomes the terminal radiating element. At the lower end of the antenna, the last coax section actually becomes the feedline itself, whose length, incidentally, is not critical as long as the dimensions are followed with religious fanaticism.

A number of amateurs have managed to build antennas of this type, and diagrams have never been scarce. But few have handled the project successfully. Getting the antenna together is no big deal. The problems start to happen when it's time to turn the soldered-together pieces of coax into a structurally sound antenna. Applying wet epoxy, as in a fiber-glassing scheme, doesn't work out. I have yet to determine whether the problems are attributable to some chemical interaction between the wet epoxy and the coax dielectric (changing the dielectric constant of the line) or because the hardened epoxy doesn't allow any flexing of the coax braid. In any event, sealing the antenna with epoxy is ultrabad news. When the antenna is rigid and looks great, you'll measure a very disappointingly high standing wave ratio and you'll discover with much lament that your old groundplane worked better.

The commercial antenna people use fiber glass, but they do not use it to seal the antenna. Instead, they use an inert and flexible sealer, then encase the whole business within a preformed fiber-glass tubular envelope. At least one of the commercial suppliers uses beeswax as the inert sealer. Actually, there is no real need to immobilize the antenna once it has been placed inside the PVC pipe. The most important point in the construction process is to make the thing water-tight. Water drops inside a hunk of coax do bad things to antennas and feedlines; and once the water gets inside, you're better off changing antennas than trying to ignore the problems.

The dimensional details of the antenna are shown in Fig. 2. Lengths have been calculated in the decimal system to the nearest hundredth of an inch. Of course, you'll not be able to maintain this accuracy, but the system did simplify the computations. The 2 meter figures are based on an operating frequency of 147 MHz. The antenna is broadbanded enough to give an swr of close to unity regardless of the FM channel of operation. The 450 MHz frequency of operation is 441 MHz, exactly three times the frequency of the 2 meter version. You'll note that the 450 dimensions are just one-third those shown for the 2 meter version. If you build both antennas, don't select those two exact frequencies for repeater channels or you'll likely end up with your 2 meter system

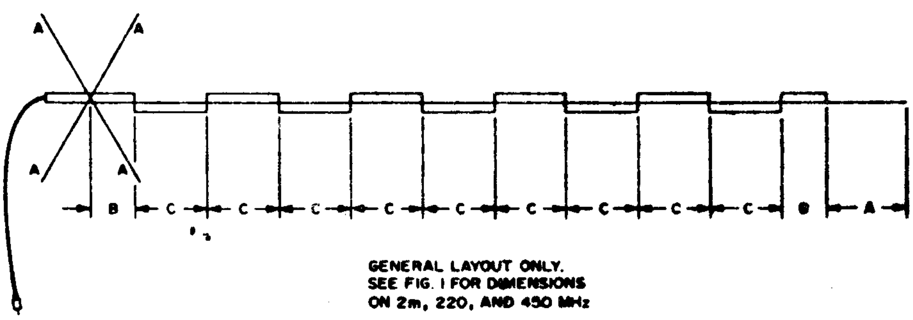


Fig. 2. Layout and dimensions of collinear gain antenna. The 2 meter dimensions are for a frequency of 147 MHz; the 450 MHz dimensions are for 442 MHz exactly. The 220 dimensions are for 220.5, just half the 450 frequency. The antenna is broadbanded enough to yield a low vswr on any frequency within a megahertz of that shown.

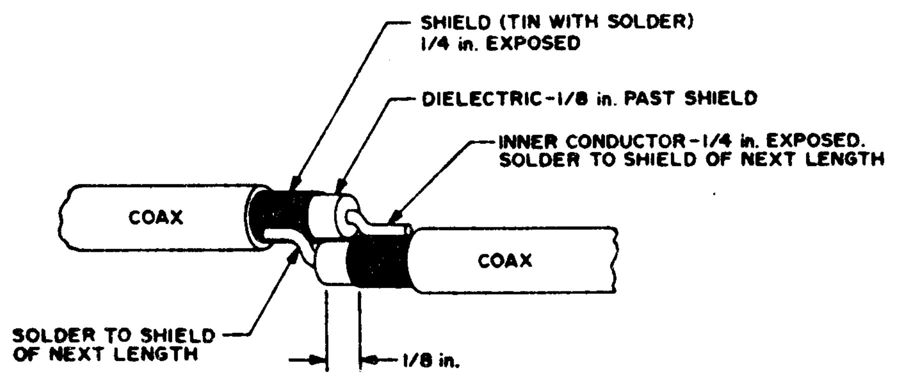


Fig. 3. The coaxial lengths should be soldered as shown. Keep the braid trimmed evenly all the way around and make sure the braid from one section doesn't make contact with the braid of the next section. If conductors are well tinned, problems will be minimized. Coax lengths are measured individually from braid end to braid end.

triggering your 450 receiver -- it *has* happened. The 220 dimensions are calculated for 220.5 MHz (half the 450 frequency). I haven't built the antenna for 220 because I've never had the occasion to use that band except when getting into W6ZJU's private repeater. But if 450 continues its trend of increasing population, there should be a general turning to 220 MHz for repeater control in the not-too-distant offing.

To begin construction, cut eight lengths of coax from the reel. Each piece should be cut about an inch oversize, then trimmed down later so that all pieces are of exactly the same length. The dimensions given are end-of-braid to end-of-braid for any given length. (See closeup detail in Fig. 3.) The braid-to-braid distance should be approximately the same as the distance between the inner and the outer conductor of the coax you're using, or approximately 1/8 in. This dimension is the only one that does not change with operating frequency or band.

When all the lengths have been cut and trimmed to the precise lengths, and you are sure they will fit together as shown, study Fig. 3 carefully, then tin all exposed braid and conductors. This tinning process is an important step and should be done as completely as you can manage it.

As you solder the lengths together, use care to avoid handling the soldered pieces any more than is absolutely necessary. The braid can pull loose without much encouragement and when that happens your only recourse is to replace the section with the loose braid. Winding each joint with electrical tape has always worked out well for me, but I always wonder if everything is okay under that tape. Once the tape is applied, you'll just have to guess about the condition of the hidden joint. The best approach would probably be to make all joints first, then inspect the whole antenna. If everything looks shipshape, then go ahead and wrap the joints with tape. Just be very careful in the handling until the antenna is safely stuffed into its plastic pipe.

The quarter-wave radiator that goes at the top can be any good conductor, but copper is best. And the easiest way to get a good, stiff copper conductor is to buy some narrow-diameter (1/8 in. is ideal) copper tubing. The same material can be used for the radials at the base of the antenna. I *have* used type TW soft-drawn copper wire (10-gage), but it has proved too flexible for applications involving remote mounting such as at distant repeater sites. The tubing offers a great deal better stability. If you have a heavy-wattage soldering iron or gun, you'll have excellent results soldering the tubing, too - even though you'll probably have to file or scrape the parts where solder is to be applied.

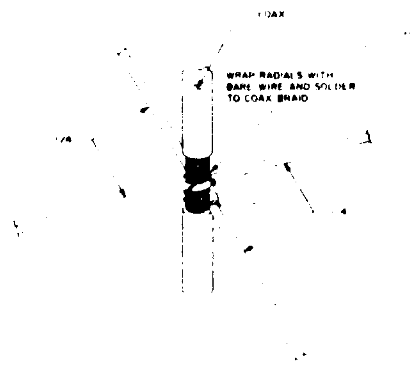


Fig. 4. Radials, of narrow-diameter copper tubing, should be cut to slightly longer than a half wavelength. The center should be bent to conform to the rounded shape of the coax braid so that on each radial a quarter-wave length extends outward from the coaxial braid. Tin the braid first. After wire-wrapping and soldering, wrap the joint well with electrical tape.

Ground Radials

There is nothing sacred about the manner in which the radials are attached to the antenna. Figure 4 shows the system I used, which worked but had a rather ugh look about it. K6VBT built one and used an arrangement of his own that looked much more professional - but his required a lot more work and some rather precision drill work in the PVC pipe. The idea is to get four 19 in. radials extending equilaterally away from the antenna while maintaining some structural integrity. If the concept of Fig. 4 is adopted, the slot arrangement of Fig. 5 will hold things together satisfactorily.

The slots (Fig. 5) are cut lengthwise into the bottom of the PVC pipe so that the radials can be held in place when the PVC is inserted into the mounting pipe (made of heavy metal). The metal pipe is notched gently to seat the radials. Before inserting the PVC into the larger pipe, the slots on the PVC should be taped up (after the antenna is installed in the PVC sheath, of course).

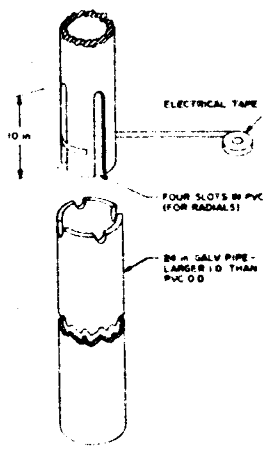


Fig. 5. Long slots in the PVC pipe will hold the radials in place with the antenna inserted. Wrap the bottom well with electrical tape after the antenna is installed in the fiber tube. Notch four matching places on a 2 ft length of galvanized pipe to seat, and try for a snug fit.

Building your own gain antenna *is* a lot of trouble, as you can readily see. But it looks pretty attractive when you start pricing the commercial equivalents. And there is an almost indescribable satisfaction that comes with putting out a good "commercial quality" signal from a homebrew antenna.

CONCLUSION NEXT ISSUE.