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**QST Issue:** Jun 1981
**Title:** Maritime Antenna For 2 Meters
**Author:** Andy Griffith, W4ULD

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Radio Shack (no. 276-1740). Also Radio Shack's pc board potentiometer no. 271-333 is satisfactory for R1. Their no. 276-1363 heat sink will meet the needs of Q1. A nice, but optional, item is the LED indicator, DS1.

For the meter, choose one that has a 100-mA, full-scale movement and make a shunt of Nichrome wire or low-value resistors in parallel to give a switchable 1-ampere range. For best regulation, the unshunted internal resistance of the meter should be less than 2 ohms.

The diode in the S-1, which protects the pack from the momentary short when the charger is plugged in, has a voltage drop of 0.71 V at 25 mA. Therefore, R1 should be adjusted to set the unloaded output of the regulator (measured at the collector of Q1) at 1.43 V × 8 + 0.71 V, which equals 12.15 V. If you don't have a digital voltmeter, you can set R1 in the following manner: (1) Charge the pack with the trickle charger for 14 hours, then unplug it; (2) set the regulator output for 10 V, then connect it to the S-1 in the taper charge mode and slowly adjust R1 upward until the current meter indicates 15 mA.

To check the current limit, connect a 10-watt (or larger) 10-ohm power resistor to the regulator output. The current meter should indicate between 650 and 850 mA. If the indicated current is not within this range, change the value of R2. The value of R2 is not critical.

Depending on how you package the unit, rf can affect the regulator. If rf does affect the operation, install a 0.01-μF bypass capacitor at the input, another at the output and one directly across the 723 regulator supply pins 12 and 7. One of these is included in the diagram.

When using this charger/regulator circuit with other than Tempo hand-held sets, be sure there is a diode between the regulator and the battery pack to prevent damage to the regulator when the input voltage is off. Choose a diode with at least a 1-ampere rating, such as the 1N4001. With the added diode, the charger should work with the Kenwood TR-2400. Be sure, however, you are aware that the battery plug on this radio is "backwards," with the center pin grounded. ICOM has two NiCad packs for the IC-2: The standard one has seven cells and the higher power pack has nine cells. The seven-cell pack requires a lower regulator voltage setting. To accommodate the nine-cell pack, change R1 to a 2-kΩ potentiometer. The input voltage should be at least 13.7 V. Also, note that the two screws on the bottom of an IC-2 battery pack are connected directly to the + and − battery terminals. For this reason a charger stand is practical.

As a final word of caution, do not overcharge NiCads, even with a trickle charger. Unless the radio is in actual use, do not leave it connected to the charger for long periods after charging is completed. — *Joe Moell, K0OV/WA6JFP, Fullerton, California*

## CENTURY 21 DRESS-UP

☐ The analog dial and meter faces of the Ten-Tec Century 21 may be made more eye-catching by attaching pieces of colored plastic in front of the cutouts on the subpanel. I used some red plastic (from a discarded box) that I cut to the proper sizes. Quick-drying epoxy, spotted around the perimeter of the plastic, is sufficient to hold it in place. The resultant coloring is quite appealing, especially in low ambient light areas.

Some '21 owners may have found as I did that the ZERO-BEAT and SET DRIVE push buttons stick or become intermittent after a period of use. Replacement of the switches is the route to follow. Substitutions for the original switches may be found at the local Radio Shack store. Two types of switches are available — momentary contact types (275-618) like the originals or push-on/push-off (275-617). The type to use is a matter of personal preference. Some might prefer to use the push-on/push-off switch for the SET DRIVE control; it will maintain a key-down situation without the need for the operator to keep the button depressed during drive or antenna matching network adjustment. Aesthetically, the switches offer a contrasting red/black styling, which adds some pizzazz to the rather conservative gray/black front panel of the transceiver.

The knobs, control nuts and front panel must be removed to gain access to the switch mounting clips. Since these clips are difficult to loosen, it is easier to cut them off with a pair of diagonal cutters. The removal and replacement process should take less than a half hour. — *Paul K. Pagel, N1FB, ARRL Hq.*

## REDUCING HW-101 SIDETONE VOLUME

☐ If the cw sidetone volume of your HW-101 is too loud, add this simple and inexpensive modification that was dropped by Heath when the product line was switched from the SB-101 to the HW-101. The circuit boards in the HW-101 still have the holes for the additional components to be added. No retuning is necessary. (See Fig. 6.)

Begin by locating the audio circuit board. Then remove and discard R326 (1 MΩ). Refer to your manual. Temporarily remove R336 (330 kΩ); it will be replaced later. Add C319 (0.005 μF/disc) as shown — this is Heath part no. 21-27 or Radio Shack no. 272-130.

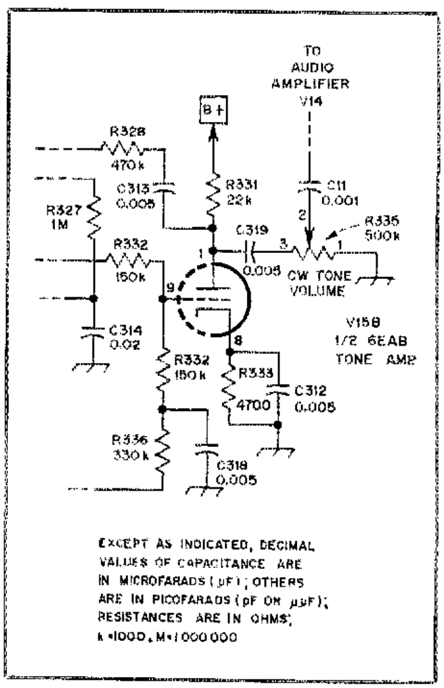


Fig. 6 — Control of the sidetone volume of the HW-101 is accomplished with the addition of a potentiometer, as indicated in the diagram. Stan Smith, VE3IOI, provides the details in the text.

Next, add the volume control, R335 (500 kΩ), which can be Heath no. 10-149, Radio Shack no. 271-1723 or the equivalent. Mount the control from the foil side of the circuit board; space is available adjacent to R336. Be sure to solder the rear of the control cover to the foil. Have the shaft project up through the board. Replace R336 (330 kΩ) as shown. Then pack up, fire up and enjoy! — *Stan Smith, VE3IOI, New Market, Ontario*

## ANOTHER APPROACH TO GETTING ON 10 METERS WITH A CB YAGI

☐ Several people advised me at the time I got my ticket in April 1979, to modify an 11-meter CB antenna for use on the 10-meter amateur band. Because I had not seen the WB3GCN antenna modification in March 1979 *QST*, I set about the task in a slightly different way than outlined by Mr. Inverso, but with equally satisfactory results. Luck assisted me in obtaining a very nice 11-meter, three-element aluminum Yagi from a dealer's dusty shelf for $30, and the project was launched.

The elements were shortened according to formulas in *The ARRL Antenna Book*. These state that the driven-element length in feet equals $475/f_{MHz}$, the director length in feet equals $455/f_{MHz}$ and the reflector length in feet equals $500/f_{MHz}$. Since the elements are composed of telescoping sections, the outer section was simply slipped inward slightly and firmly clamped by stainless steel, gas line clamps obtained at an auto parts store. These clamps also permit easy tuning of the elements as needed by loosening the clamps and altering element lengths.

Turning to the *Antenna Book* table entitled "Optimum Element Spacings for Multielement Yagi-Arrays," I found that the element spacing had to *increase* over the spacing distance the CB designer posted. Guided by the graph for spacing from the director to the fed element, I chose a spacing of 0.177 wavelength. This meant the element spacing had to be "blown open" about 5 feet (1.5 meters) over the CB design. An appropriate length of aluminum tubing, therefore, was bolted to the boom to lengthen it.

Information in the back of the *Antenna Book* indicated that the gamma match had to be moved out from 3-3/4 inches (95 mm) to 4 inches (102 mm), accomplished with the cutting of a couple of new straps.

With just simple tools the work can be done in an hour. Time for mounting is additional. The method of mounting is left to the builder.

Although placed deep among 100-foot (30-m) oaks and pines, the antenna really sparkles. On the first try the SWR ranged from 1.0 to 1.3, so it was left alone. West Coast reports jumped to consistent S-9s from previous S-6.

Amateur Radio has its foundation well set on experimentation and ingenuity. My hope is that this simple experiment will be of value to you, increasing your enjoyment of 10-meter operation. — *Dr. F. W. Shield, KA4HIP, Hampton, Virginia*

## MARITIME ANTENNA FOR 2 METERS

☐ For some time I searched for a good 2-meter antenna for my boat. Requirements were simplicity, low SWR, insensitivity to location, a single mast without radials and resistance to corrosion. Simple coaxial antennas, as you

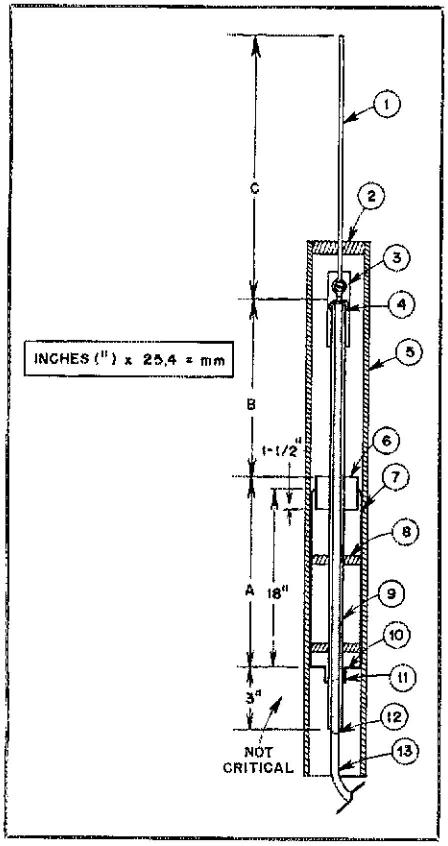


Fig. 7 — When Andy Griffith, W4ULD, operates maritime mobile from his boat, he maintains 2-meter communication with the help of an antenna made in the manner of the drawing. No special tools or materials are required to make this antenna. Identification information related to the encircled numbers of the drawing is as follows: (1) 3/32-in. (2.38-mm) stainless steel welding rod; (2) phenolic or Lucite disc waterproofed with windshield sealer; (3) phenolic or Lucite block; (4) coaxial cable shield soldered to copper tubing with center conductor soldered to lug attached to welding rod; (5) 3/4-in. (19-mm)[1] CPVC pipe, the length determined by the mounting system at the bottom and desired antenna height; (6) tuning sleeve made of brass shim stock soldered in place after adjustment; (7) 3/4-in. OD copper pipe or tubing wrapped with a small amount of tape at the top and bottom to fit snugly; (8) Lucite or phenolic spacing discs (four required) equally spaced; (9) 1/4-in. (6-mm) OD copper tubing; (10) copper disc soldered in place; (11) brass sleeve, 1/4-in. ID hobby tubing or made from shim stock with sleeve soldered in place after adjustment; (12) seal with windshield sealer and tape and (13) RG-58/U coaxial cable with the outer covering removed from the section inside the copper tubing (overall length is not critical).

know, have feed line and location problems. I knew from tearing apart a broken commercial vhf marine antenna that isolation of the feed line was accomplished by a 1/4-wavelength stub at the bottom. I tried this approach, but scaling the commercial antenna dimensions to 2 meters just wouldn't work with readily available materials. Neither did the use of conventional stub and antenna formulas help me to zero in on the three critical dimensions of A, B and C of the accompanying sketch. (See Fig. 7.)

Starting from scratch, I wound up with the 100% adjustable antenna shown in the drawing. The only difference between the prototype and the final antenna is the top half of the original version, which was made from aluminum ground wire with an adjustable sleeve over the top end. Also the experimental model was not enclosed in plastic pipe.

As you can see, the 1/4-wavelength stub at the bottom is adjustable with a sleeve in the top end. The length B is adjustable by sliding the 1/4-inch (6-mm) copper tubing through the sleeve at the bottom of the stub. The top half is adjustable as mentioned above. With all of these adjustments and an SWR meter, it took only 10 or 15 minutes to zero in on the proper lengths. During the tests, the antenna was mounted in a vise placed on a picnic table. The vise gripped the bottom inch of the stub. The minimum SWR at resonance (146.16 MHz) was 1.2:1. Bandwidth for a 2:1 maximum SWR appears to be ± 1 MHz.

With the antenna placed in the plastic pipe, the resonant frequency dropped slightly but came back to the desired frequency by nipping 1/8 inch (3 mm) from the top. The final dimensions for 146.16 MHz were:

A = 18-9/16 inches = 2713.1/f

B = 20-1/8 inches = 2941.5/f

C = 19-3/8 inches = 2831.9/f

where f = MHz, and millimeters = inches × 25.4.

The antenna works well on my boat. I have it mounted on an aluminum railing around the center console and held in place by two screw-type pipe clamps. By the way, no special tools are needed to make this antenna. The materials are common, everyday items available to almost anyone. I would add that an ordinary standard-size faucet washer can be substituted for the Lucite disc in the stub. — *Andy S. Griffith, W4ULD, Kinston, North Carolina*

[1]Plastic pipe sizes may vary from those on the labels. The 3/4-inch CPVC used for this antenna measured 7/8-inch OD (22 mm) and 21/32-inch (16.7-mm) ID, a good fit for the 5/8-inch OD stub.

## BATTERIES IN THE FREEZER?

☐ The Hints and Kinks item by Glenn Jacobs, WB7CMZ, in January 1981 *QST* under "Extending Battery Life" is the exact opposite of extending life. According to information from the Union Carbide Corporation, batteries do freeze and may become useless if frozen for a period of time. The recommended temperature for maximum storage life is 40°F (4° C). So if you wish to store batteries for a long time, do so in your *refrigerator* — not in the freezer. In addition, be sure to wrap the cells in a plastic bag to prevent moisture formation while in the cold. These batteries should be allowed to warm up in the bag before being used. — *Jordan Kaplan, W9QKE, Chicago, Illinois*

## EXTENDING THE HW-22A FREQUENCY COVERAGE

☐ Unfortunately the HW-22A does not cover all of the Advanced portion of the 40-meter band. A simple modification will allow coverage from 7125 to 7220 kHz. Lift the ground side of C205, which is across L6 (the VFO coil), and place an spst switch in series with it to ground. I mounted my switch immediately under the BIAS SET/OPERATE TUNE switch. A ground lug for this modification can be attached to one of the bolts holding the switch. With the switch open, the transceiver covers the frequencies mentioned above. With it closed, the HW-22A will cover the normal 7200 to 7300 kHz. This modification is based on the fact that the VFO operates on the high frequency side of the mixer. I replaced C205 with a silver mica capacitor of the same value as the original disc type (47 pF). — *Ev G. Taylor, W6DOR/W7BYF, Davis, California*

## CHARGING NICADS FROM ELECTRICAL SYSTEM IN A CAR

☐ Often when using a battery-powered portable transceiver such as my Kenwood TR-2200A in my car, I have felt the need to operate simultaneously from the electrical system in the car and safely charge the internal NiCad battery pack. The circuit shown in Fig. 8 permits operation from the power system in the automobile, while at the same time providing a tapering charge for a 12 V NiCad pack. The circuit includes reverse voltage protection, a hash filter for transceiver operation, and a voltage and current regulator for NiCad charging. The output color markings are for the TR-2200A accessory cable. — *Leo Finkelstein Jr., WA4AOL, East Greenbush, New York*

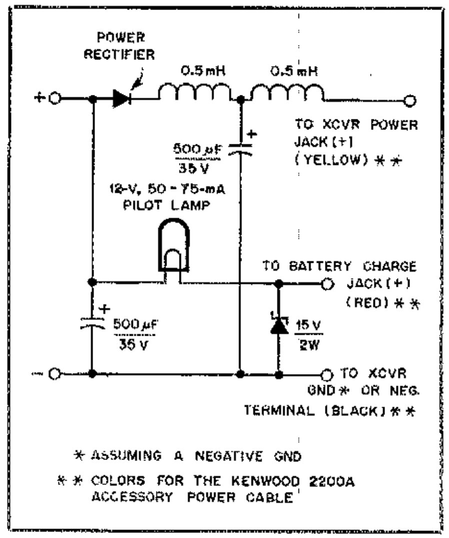


Fig. 8 — Leo Finkelstein Jr., WA4AOL, uses the electrical system of his car to charge his NiCad power pack with the help of this circuit. This arrangement is for use with a negative ground (*). The wiring colors at the right (**) are for the TR-2200A accessory power cable. The power rectifier should be rated at 50 V, 2 A.

## DRAKE TRANSMITTER MODIFICATION JUST FOR VOICE OPERATION

☐ The "Hints and Kinks" column for November 1977 contains a suggestion by WA2YPO for improving VOX operation of Drake transmitters by replacing the 6EV7 with a 6AQ8. I did this and it works fine — *on phone.* On cw, with the 6AQ8, the VOX locks up and won't let go, regardless of the control settings. Those who use Drake transmitters on cw should *not* change the VOX tubes. Those working only phone (and missing half the fun of ham radio!) can switch tubes and get improved performance — *but only* on phone! — *Roy Williams, W6VON, La Mesa, California*