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QST Issue: Apr 1977
Title: Solid-State BC-221 Frequency Meter

Click Here to Report a Problem with this File described in Fig. 1. The bandwidth measurements are given in Fig. 2.

As can be seen from the curves in Fig. 1, a gain of 4 dBd, and a 15-dB FBR can be secured quite easily with a physically short Yagi. As with other Yagis, the gain is relatively constant over a wide frequency range. However, the FBR drops quite fast especially when trying to use the antenna below its design frequency. From curves given in Fig. 2, the bandwidth between the 2:1 VSWR points is shown to be about 3.7 percent. Translated to 20 meters this bandwidth would be 500 kHz, equal to or greater than the average 3-band trap Yagi. If indeed the design were scaled to 14 MHz, the antenna would have element lengths of slightly over 12 feet and a boom length of 10 feet, 6 inches.

Adapting Design to Ham Bands

Since it has been shown that a physically short Yagi can provide significant gain and FBR, a few design pointers are in order. First, make the element length no shorter than physically necessary for your particular situation. Bandwidth and efficiency will improve with greater lengths. Second, the use of large capacitance hats is recommended, as this reduces the helical conductor length and thus R_{loss}. Third, use large forms of good dielectric quality (fiberglass). The larger the form diameter, the greater the length reduction for a given number of turns. Also, with large diameter forms (1.5 inch), the width of the conductor can be increased, thus reducing R_{loss}. Fourth, regardless of the matching network used, construction of capacitance hats, etc., *solder all* joints and *seal* with silicone rubber. *Do not rely on pressure joints.* Fifth, to secure a reasonable FBR with any Yagi using a split driven element and fed with coaxial cable, some form of balun transformer is required to keep currents from flowing on the outside of the coax braid. Sixth, the use of a grid-dip meter is the only practical method to secure resonance with a fixed physical length. Construction will require some cut and try. Proximity to surrounding objects will effect resonance, and should be avoided when tuning the array.

No doubt I have left out items which may prove to be a problem for the reader. This article was intended to be more thought provoking than constructional although there should be enough information here to build your own antenna with a reasonable amount of experimental effort. My current plans call for construction of a 2-element 10-meter Yagi (for reception of OSCAR signals) with 6-foot elements and a 5-foot boom. I wish to thank Mike Povlich, WB9HGS and Russ Mills for their assistance with measurements.

QST

Footnotes

[1] Kuecken, *Antennas and Transmission Lines,* Howard W. Sams and Company, Indianapolis, IN, 1st Edition (1969), p. 274.

[2] Copper tape available from Minnesota Mining and Mfg. Check Yellow Pages for the address of a local distributor.

[3] Orr, *Beam Antenna Handbook,* Radio Publications Inc., Wilton, CT, Third Edition, p. 63.

Feedback

□ In "Solid-State BC-221 Frequency Meter" (*QST,* February, 1977), page 36, first column, the value of 4.7 ohms is incorrect. It should be 4700 ohms. We are also advised that if there is difficulty in getting the crystal oscillator to oscillate, try a 3- to 10-pF capacitor between the gate and drain of Q3 (pins 5 and 6, Fig. 2).

□ With reference to the "Hints and Kinks" item concerning an antenna adapter for the Wilson T-1402 Handie-Talkie (*QST,* November, 1976), AVA Electronics & Machine Corp., of Lansdowne, PA, advises that they no longer manufacture the model 1013-24 adapter. Thanks to VE2JN for the notice.

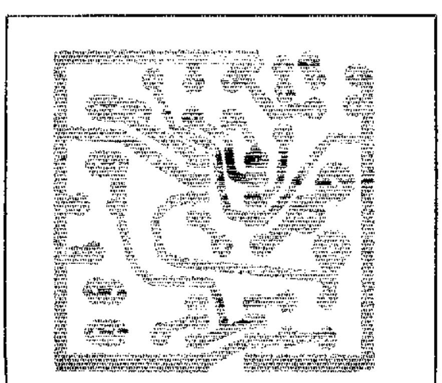
□ Technical Correspondence contributor (*QST,* February, 1977) John Robotham's full call is VE4XI, not VE4X.

□ Jury Belevich, UA1IG, advises that in his article, "On Signal Strength Evaluation" (*QST,* October, 1976), the standard for R. L. Drake Co. given under point 3, page 50 is "50 μV through a 5-dB pad for S9."

□ The exhibit photograph from the Big Rapids Area (MI) Amateur Radio Club (*QST,* February, 1977, page 17) should be credited to W8OWN instead of WB8TVD.

□ WAØUZO reports a feedback for "Understanding Linear ICs, Part 2" (*QST,* February, 1977). A typographical error specifies no. 38 enamel wire. It should be no. 28 wire.

□ If you tried to associate the pc-board pattern in March 1977 *QST* "Feedback" with the blurb above it, they actually refer to two separate articles. The pattern belongs to "A Time-Delayed Tone Encoder" (*QST,* February, 1977). Diodes CR1 and CR2 are reversed from the way they should be installed in Fig. 1. Also, there is an error in the pc-board layout as it appears in Fig. 2. Here is a corrected layout of the board, full-scale pattern, viewed from the foil side.



Strays

□ Fred B. Cassens (left), presently residing in Phoenix, AZ, has been an avid *QST* reader since 1920, when this picture was taken. He has collected most issues and is the proud owner of ARRL's 1928 *Radio Amateur Handbook,* 3rd edition.

During his early years, Fred operated 9DB out of Lane Technical High School and 9ZN out of the Edgewater Beach Hotel in Chicago, which was the old Karl Hassel and R. C. Mathews station. Also, he was one of five employees for Chicago Radio Lab, later Zenith Radio Corp., to help build and wire the Zenith transmitter and radio receiver that went with Don Mix on the *Bowdoin* in 1923 to the Arctic. At 73, Fred hopes a few of his old ham friends are still on the air.