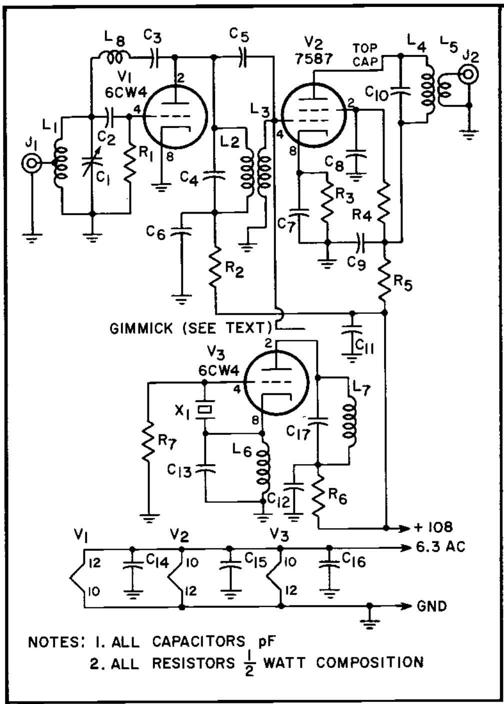


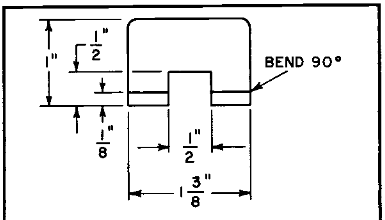
C_1—0.5 to 5 pf tubular trimmer (Erie type 532A or equiv.)
C_2, C_3, C_{11}, C_{12}, C_{14}, C_{15}, C_{16}—500 pf ceramic disc (Centralab type DD501 or equiv.)
C_4, C_{17}—3.3 pf ceramic tubular (Centralab type TCZ 3R3 or equiv.)
C_5—2.2 pf ceramic tubular (Centralab type TCZ 2R2 or equiv.)
C_6, C_7, C_8, C_9—500 pf silver button (Erie type 370 CB-501K or equiv.)
C_{10}, C_{13}—30 pf ceramic (Centralab type DD 300 or equiv.)
J_1, J_2—Coax jack type BNC
L_1—5 turns No. 16 bare wire, ¼-inch diameter, spaced wire diameter, tap 2 turns up or best noise figure
L_2—4 turns No. 26 enamelled wire, ¼-inch diameter, close wound on slug-tuned form (CTC-PLST or equiv.)
L_3—4 turns No. 26 enamelled wire, ¼-inch diameter, close wound on slug-tuned form (CTC-PLST or equiv.)
L_4—11 turns No. 26 enamelled wire, ⅜-inch diameter, close wound on slug-tuned form (CTC-LS3 or equiv.)
L_5—3 turns insulated wire, close wound link
L_6—5 turns No. 26 enamelled wire, ⅜-inch diameter, close wound on slug-tuned form (CTC-LS3 or equiv.)
L_7—7 turns No. 26 enamelled wire, ¼-inch diameter, close wound on slug-tuned form (CTC-PLST or equiv.)
L_8—25 turns No. 30 enamelled wire, wound on 1-megohm ½-watt resistor, approximately 5/16-inch long; adjust for neutralization (see text)
R_1—47,000 ohm, ½ watt
R_2—6800 ohm, ½ watt
R_3—68 ohm, ½ watt
R_4—18,000 ohm, ½ watt
R_5—470 ohm, ½ watt
R_6—27,000 ohm, ½ watt
R_7—100,000 ohm, ½ watt
Miscellaneous—1 standoff insulator; 1 socket (Jones type P304AB or equiv.); 1 crystal 39.33 megacycle overtone (International Crystal Co. type FA5 or equiv.) for output 26-30 Mc; 3 nuvistor sockets (Cinch No. 133 65 10 0.011)

Figure 1: Schematic diagram and parts list.

used for layout, the coils can be mounted in the same position as on the original model, and unwanted feedbacks and intercouplings will be eliminated. The oscillator coil is coupled to the mixer input by a lead wire from the grid end of the mixer coil to an unused lug on the plate end of the oscillator coil. No further coupling is needed.

Because of their small size, nuvistor sockets are clamped (rather than bolted) to the chassis by bending two lugs on the socket. After the chassis hole is drilled, two notches are hand-filed (see Figure 4) to insure a tight fit of the socket to the chassis. For grounding, both socket lugs are soldered to the chassis, which should be a copper or brass plate. All ground connections for each socket should be made to the socket lugs, except in the case of the rf-amplifier, which uses the rf shield as the ground return. This rf shield for the amplifier tube (shown in Figure 2) is a thin piece of brass or copper soldered to pins 8 and 10 of the socket and to the chassis. As in all VHF construction, good grounds are essential. Connection to the top cap (of the tetrode) is best made with a piece of piano wire looped into a tight-fitting one-turn coil.

Figure 2: Base shield.



The converter described in this article was built for use at an if output frequency of 26 to 30 megacycles. For lower if outputs, only the crystal and the if output coil frequencies need be changed. If operation at 14 to 18 megacycles is desired, a crystal frequency of 43.3 megacycles should be used. No changes are necessary in the oscillator coil. The output coil requires approximately 22 turns to tune to 14 megacycles.

Alignment

Alignment of this two-meter converter is simple. You need only a grid-dip meter and a receiver having an S meter. If available, sweep generators and noise sources can be used for greater accuracy in alignment.

First, use the grid-dip meter to set all coils to the correct frequencies: L_1, L_2, and L_3 to 146 megacycles, L_4 to 28 megacycles, L_6 to 40 megacycles, and L_7 to 118 megacycles.

Next, connect the antenna and receiver to the converter and apply power. The high-voltage input should not exceed 125 volts, the plate-voltage maximum rating for the 6CW4 and the 7587.

Check that the wiring is correct by comparing the voltages with those in the following table. All voltages are with respect to ground and may vary by 20%.

	Tube Type			
Voltage	V_1 *6CW4*	V_2 *7587*	V_3 *6CW4*	
Plate to ground	65	103	50	volts
Screen grid to ground	—	50	—	volts
Control grid to ground	0	0	0	volts
Cathode to ground	0	–0.7	0	volts

If the grid-dip meter adjustments are made correctly, signals can be heard on the two-meter band. If no signals are heard, the oscillator should be checked by removing the crystal from the socket. With the crystal removed, the background noise from the receiver should fall off. A slight readjustment of L_6 may be necessary to start up the oscillation. L_7 should be peaked for maximum oscillator output.

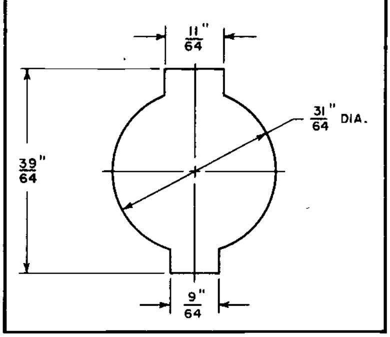


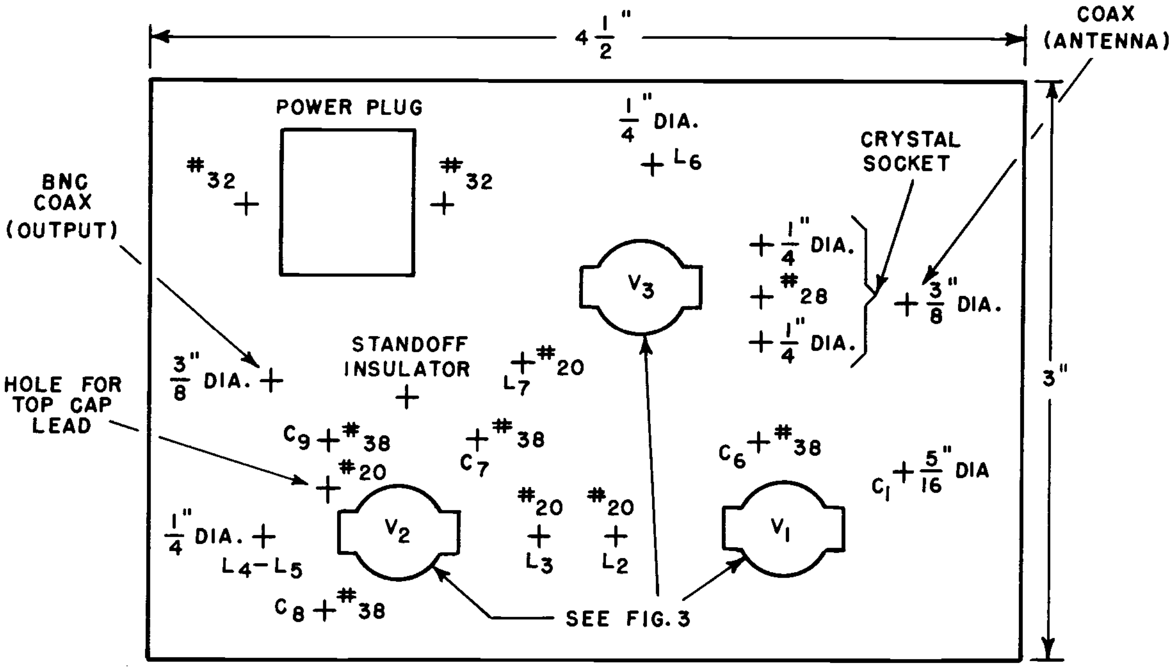
Figure 3: Nuvistor socket hole.

Tune in a signal at about 145 megacycles and tune L_2 for maximum S-meter reading. Repeat at 147 megacycles and tune L_3. Find a signal near the middle of the band and tune $L_1 - C_1$. This tuning is very broad.

The rf amplifier is most easily neutralized by first opening its heater lead. Adjust L_8 by starting with a few extra turns and removing one turn at a time to find the point of minimum feed-through of a strong signal when the other tubes are operating. This adjustment is not very critical.

Conclusion—The fine performance of this easily constructed nuvistor converter will surprise any ham who thought that a good converter was hard to build or required elaborate alignment equipment.

Figure 4: Top view of chassis plate (actual size). Note that #20, #32, and #38 are drill sizes.



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Harvey Slovik, Editor

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