Hints & Kinks

Edited by ***Bob Schetgen, KU7G*** *• Senior Assistant Technical Editor*

This hint is a gem from the mines of South Africa! It tells how to resurrect old Yaesu FT-101s with 6146 finals. Thanks to *Radio ZS*[1] and the South African Radio League for letting us reprint it here.—*Ed.*

A NEW LIFE FOR YOUR FT-101

◊ Many amateurs who were active in the 1970s were proud owners of Yaesu's FT-101, a set that gave Yaesu a good name in the amateur fraternity and is still in use by many amateurs around the world.

If we look at the design of the early FT-101s, one of its drawbacks is the choice of low-cost TV "sweep" tubes in the output stage. Namely, a pair of 6JS6As and later, 6JS6Cs. These tubes were designed as high-power amplifiers at 20 kHz, for use in TV horizontal sweep circuits. Yaesu used them in FT-101s purely for their availability and low cost, whilst their opposition, Trio/Kenwood, opted for the superior 6146B tubes (S2001), which were specifically designed for RF application, in their TS-510, TS-515 and the TS-520. (Yaesu used 6146s the FT-101ZDs, which were more like baby FT-901s than FT-101s.—*Ed.*)

Today, however, the cost of 6JS6Cs is prohibitive, if you can find them, and many FT101s have been retired due to the high replacement cost of these tubes. Far-superior 6l46B tubes are available at a moderate cost, if not in most junk boxes.

In the October 1996 Issue of *Radio ZS*, my article on the modification of the FT-200 to take 6146s was published. In it, I mentioned that it should also be possible to modify the FT101 to take the same tubes, but I did anticipate a slight drop off in output power due to the lower plate voltage in the FT101, which is around 650 V.

Recently, I was given a Yaesu FT-101B for repair. After sorting out the many problems, mostly inflicted by amateurs who should not be allowed to take off the covers of amateur equipment, I found that the transmitter output was down to a couple of watts. I therefore decided that the set was a prime candidate for the modification. Before tackling this task, I fitted a 0.01-µF capacitor in series with C13 as a precaution. This 80-pF capacitor often becomes leaky, destroying the final tubes. A brand new set of 6JS6s was installed temporarily, just to check that the alignment was correct and the output power was 100 W.

Getting Down To It

Disconnect the power lead from the mains supply and remove the final tubes. Remove the bottom cover and screening plate over the PA and driver section. Locate the two 12-pin sockets and unsolder R14 (100 Ω), L4, C16, R12 and the black coaxial cable inner wire from the tube sockets. Unsolder all the ground connections, decoupling capacitors and the blue heater wires. Unscrew the four Phillips screws and remove the tube sockets. Fit two octal sockets with the keyway facing to the chassis center and wire the sockets as shown in Figure 1A.

Use the decoupling capacitors from the old sockets, between where indicated with an asterisk and the closest ground point. These capacitors have been left off the pictorial for clarity, but are shown in the schematic diagram, Figure 1B. As the 6146Bs require a greater screen-grid voltage than the original tubes, one must trace the orange wire from R14 (100 Ω) to the feedthrough capacitor (C35) and disconnect it from this point. Then connect it to a different feed-through capacitor, C30, which is the 300 V line for the 12BY7A driver tube.

Due to the lesser interelectrode capacitance of the 6146B tubes, two circuit modifications are necessary. In the original

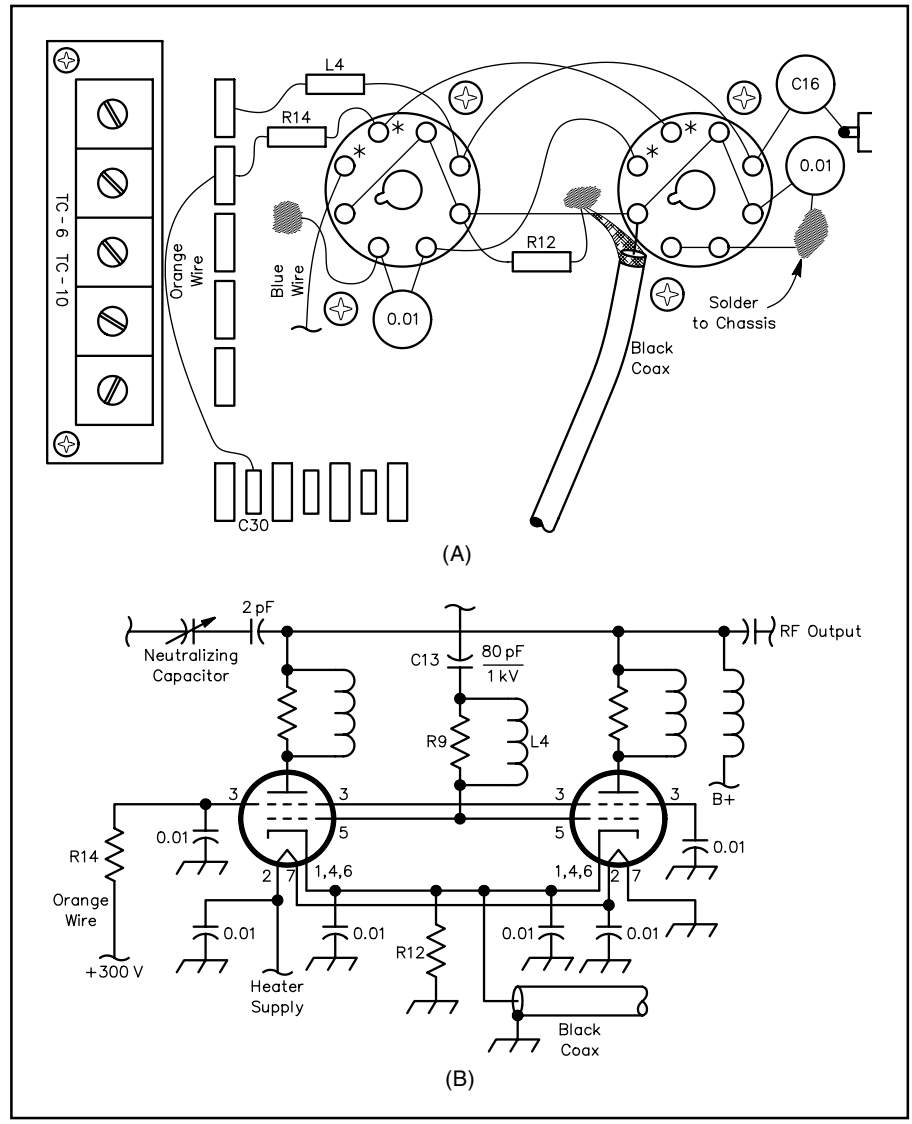

Figure 1—(A) a pictorial of the FT-101 PA compartment. (B) a schematic of the FT-101 PA circuit.

[1]R. Davis, ZS1J, "A New Life for Your FT-101," *Radio ZS,* August 1998, pp 12-13.

design, the permeability-tuned coil in the plate circuit of the 12BY7A, T103, is resonated on 10 meters using the input capacitance of the final tubes. Because this capacitance has now been reduced by almost 25 pF, we must compensate for the lost capacitance by introducing a small variable capacitance across T103.

Remove the two screws securing the circuit board with the trimmer capacitors, TC6 to TC10, to expose the terminals of coil T103. Solder a 20-pF trimmer capacitor across the two terminals and replace the trimmer board, but leave the screws loose.

Neutralizing Capacitance

The last modification is to reduce the neutralizing capacitance. Remove the 100-pF capacitor, C125, which is in the PA compartment and is connected between the top of the plate choke and the variable neutralizing capacitor. Replace this capacitor with a 2-pF capacitor and adjust the neutralizing capacitor to minimum capacitance from below the chassis.

The set is now ready for testing, switching and final alignment. Before switching it on, adjust the bias control fully counterclockwise. This control can be found on board PB-1314 (Regulation and Calibration Unit).

With the 6146Bs installed in their sockets, the plate connectors attached and the top screen fitted, power up the set and adjust the bias control for 60 mA in the SSB mode, but with no transmit audio. Switch the set off, turn it upside down and remove the two screws securing the trimmer board. Being careful not to short the board to the chassis, switch the power on and tune the set on 28.000 MHz with the preselector control at the beginning edge of the 10-meter mark. With an insulated alignment tool, adjust the installed trimmer across T103 for maximum drive, being very careful not to touch the loose trimmer board because there is high voltage on these components. This adjustment must be combined with the alignment instructions on page 25, section (3) paragraph two in the original instruction manual. Although no further alignment should be necessary on the other bands, the set should be checked for power output on all bands. Check and if necessary, adjust the neutralization as on page 24 of the manual.

If all modifications have been done correctly, you should have in excess of 100 W output on all bands.—*Roger Davis, ZS1J, PO Box 1099, Plettenberg Bay, 6600, Republic of South Africa*

CRAMPED QUARTERS OVERCOME WITH BAMBOO SKEWER AND STICKY COAXIAL WATERPROOFING GOOP!

◊ Have you ever been faced with the need to get some small part—a screw, a nut or a washer—into or out of an inaccessible spot? Well, your troubles are over!

One of the many items in my workshop is a bundle of bamboo skewers that are meant for cooking kabobs on the grill. These skewers are about $^1/_{16}$-inch in diameter and eight inches long with a point on one end. I use them for everything from cleaning melted solder out of a hole (for resoldering) to miniature dowels. Now I have found a further use for them!

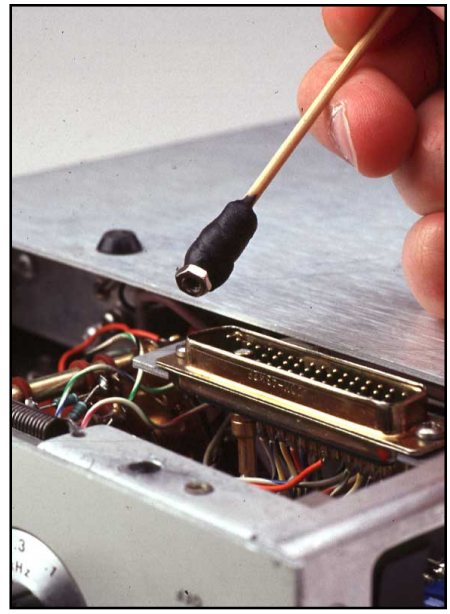

Figure 2—A small stick with connector sealant can pick up or hold a multitude of objects. It's a big help when starting threads.

One day I was trying to put a small "star" lock washer onto a bolt located far down inside my power supply. I tried long-nose pliers but to no avail. Because the pliers handles interfered with everything, I was continually dropping the washer into the "works."

I know that a magnetic wand sometimes works well, but it also requires that the object you are seeking is ferrous. (Besides, I don't have such a device.)

So on that lucky day I was casting my eyes around the shop for some other means (easy and simple), when I spied my roll of sealing tape (RadioShack #278-1645) designed to seal coaxial connectors. Remembering how sticky that stuff is, I put a small glob of it on the flat end of a skewer and my problems were over. I just picked up the star washer with the glob and placed it down into the close confines of my power supply (See Figure 2). I later found that you can pick up good-sized screws and nuts—even up to $^1/_2$-inch items—with the same procedures and you can start the threads by turning the skewer. This works on screws with either Phillips or slotted heads. It also works on wood, plastic, mica, glass, aluminum, etc. Boy is that stuff sticky!

Because space is at a premium in my shop and because storage and retrieval is becoming more difficult, I just throw away the skewer tool when I am finished. It is so cheap that I can make myself a new one when the next occasion arises.—*Glenn E. Yingling, W2UW, PO Box 62, Newark Valley, NY 13811-0062*

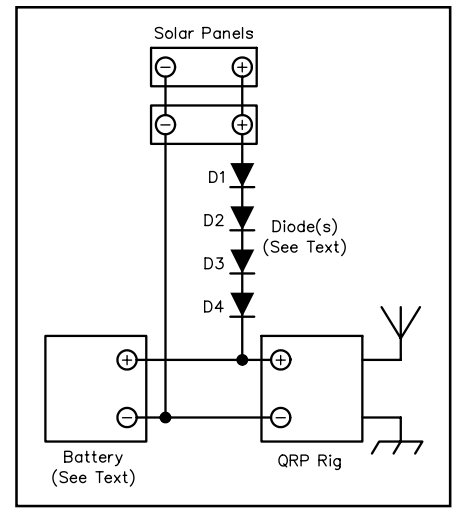

Figure 3—A diode string lowers 16 V solar-array voltage for use by radio and batteries.

A BACKPACKING SOLAR SUPPLY

◊ For backpacking, I use two small solar panels with 16 V, 0.290 A output. Paralleled, they easily produce over 0.5 A. (See Figure 3.) Isolation diode D1, plus dropping diodes D2, D3 (and as many as required) may be most any diode with a rating of 1 A at 50 PIV or more. RadioShack #276-1143 (3 A, 200 PIV) will put the charging in a good range for most batteries. To determine how many diodes to use, you should check the charge available *in full sunlight*. When you obtain a suitable charge rate with the QRP rig connected, the voltage is correct.

I built the prototype for friend WA5TYJ, who reports that it performs nicely. By using the battery for energy storage, ample power is available to operate his QRP rig. The solar panels can charge the battery and power the rig simultaneously when the sun is out. The battery takes over whenever there is insufficient sunlight.—*A. W. (Bill) Edwards, K5CN, 456 Glenmore St, Corpus Christi, TX 78412-2827*

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