

SOLID-STATE TUBE SUBSTITUTES

In my job I service U.S. Army electronic equipment that uses vacuum tubes. I've heard that there are solid-state replacements for vacuum tubes such as the 12AT7, 12AU7, 6AL5, 6AK5 and 6SN7. Is that true? If so, where can I find them?--R. L., Anaheim, CA

Back in the mid-1960's, several manufacturers attempted to de-

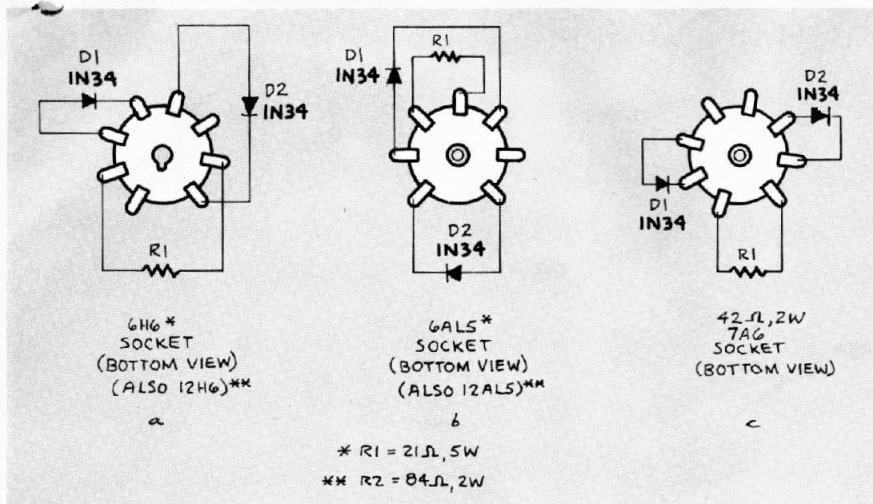


FIG. 2

velop lines of universal semiconductor replacements for vacuum-tube diodes and triodes. Their efforts were short-lived because substituting a semiconductor device for a tube usually meant that the adjacent circuitry had to be extensively modified.

One approach was using two transistors connected in a cascode arrangement as a plug-in replace-

ment for a triode voltage-amplifier tube. Similarly, semiconductor diodes were offered replacements for vacuum-tube diodes. To my knowledge, none of the solid-state replacements for tubes included a resistor as the equivalent of the tube's heater. A resistor would have to be hard-wired into the circuit to take the place of the heater in series heater-string sets.

Of all the plug-in solid-state replacements tried, the most practical and successful were those for power rectifiers. For a short period in the 1960's, five IN-type silicon rectifier assemblies were offered as replacements for some popular vacuum-tube rectifiers. Those were the IN1237 for the 0Z4, the IN1238 for the 5U4-GB, the IN1239 for the 5R4, the IN1262 for the 6AU4-GTA, and the IN2637 for the 866-A.

If you are permitted to make permanent modifications in the equipment you are servicing, then you might consider hard-wiring 1N34 semiconductor diodes as replacements for small-signal detector tubes.

Figure 2 shows how to do that for 5 popular tubes. The scheme for replacing a 6H6 or 12H6 is shown in Fig. 2-a, the scheme for replacing a 6AL5 or 12AL5 is shown in Fig. 2-b, and the scheme for replacing a 7A6 is shown in Fig. 2-c. The resistors shown need only be installed in circuits where the tube heaters are wired in series. **R-E**