

Tubes of the Month

The 77, 78, 75 and 53

WHEN the 57 and 58 were announced we rather suspected that it would be simply a matter of time before corresponding types would be made available in the 6.3-volt series. Now we have them in the 77 and 78 — r.f. pentodes with the suppressor grid brought out to a separate pin on the base. The electrical characteristics of both types are sufficiently close to those of the corresponding 2.5-volt types to make the new tubes interchangeable with the old, except for filament voltage, in ham receivers. There are a few physical differences, however. It will be remembered that in the 57 and 58 there is no screen around the outside of the plate, and that because of this a special type of tube shield became necessary. The idea behind this was to cut down the output capacitance of the tube to make it better at high frequencies. Apparently this feature has not proved sufficiently valuable to be retained in the 77 and 78, because both these types have shields outside the plate in the familiar style of the 24 and 35.

THE 77

The 77 is a sharp cut-off tube suitable for use as an r.f. amplifier, detector and oscillator, and may be used with either a.c. or d.c. heater supply. It resembles the 57 in external appearance, having the same size and shape of bulb, a small 6-prong base and a grid cap on top. The pin connections are the same as those of the 57 (see March *QST*, page 30). The characteristics follow:

Heater voltage	6.3 volts
Heater current	0.3 amp.
Plate voltage	250 volts
Screen voltage	100 volts
Grid voltage	— 3 volts
Plate current	2.25 ma.
Screen current	1 ma. max.
Amplification factor	1500
Plate resistance	1.5 megohms
Mutual conductance	1250 micromhos

In the 77 the shield outside the plate is connected to the screen grid — a desirable feature when the tube is used as an electron-coupled oscillator. For such use the suppressor grid should be connected to the screen grid.

THE 78

The 78 is a variable-mu tube and as such is especially valuable as an r.f. amplifier. In this tube the shield outside the plate is connected to the cathode — note the difference between the 78 and the 77 in this respect — and therefore is not as desirable as the 77 as an electron-coupled oscillator because the effect of the shielding is partially destroyed when the cathode is "above

ground." The characteristics of the 78 are as follows:

Heater voltage			6.3 volts
Heater current			0.3 amp.
Plate voltage	250	250	180 volts
Screen voltage	125	100	75 volts
Grid voltage	— 3	— 3	— 3 volts
Plate current	10	7	4 ma.
Plate resistance	.65	.8	1.2 megohms
Mutual conductance	1650	1450	1050 micromhos
Grid voltage for plate current cut-off	— 50	— 42.5	— 35 volts

The 78 has the same bulb and base as the 58. Pin connections also are the same.

THE 75

The 75 is a high-mu variety of the 85. It is a duplex-diode triode belonging to the 6.3-volt family and may be operated on either a.c. or d.c. heater supply. Physical appearance and pin connections are the same as the 85. The characteristics of the triode portion as a Class A amplifier are:

Heater voltage	6.3 volts
Heater current	0.3 amp.
Plate voltage	250 volts
Grid voltage	— 2 volts
Plate current	1.2 ma.
Amplification factor	100
Plate resistance	90,000 ohms
Mutual conductance	1100 micromhos

The 75 may be used for any of the applications to which the 55 and 85 are adapted. The triode portion is designed primarily for resistance-coupled amplification. When used for this purpose the coupling resistor may be of any value up to 500,000 ohms.

THE 53

The 53 is a twin Class B tube of the 2.5-volt series, having an indirectly heated cathode. It has a medium dome-top bulb and a medium 7-pin base. Using the notation given in March *QST*, the pin connections are as follows: No. 1, grid No. 1; No. 2, plate No. 1; Nos. 3 and 4, heater; No. 5, plate No. 2; No. 6, grid No. 2; No. 7, cathode.

The characteristics of the 53 are as follows:

Heater voltage	2.5 volts
Heater current	2.0 amp.
Plate voltage	300 volts
Grid voltage	0 volts
Plate current, zero signal	12 ma.
Plate current, full signal	70 ma.
Optimum load resistance	10,000 ohms
Power output	10 watts

No information is available as to the driving power required.

We are indebted to Everready-Raytheon for the information on the four types described above.

— G. G.