

A New Group of Receiving Tubes

Pertinent Dope on the 56, 57 and 58

THREE new types of receiving tubes that promise to be of especial interest to amateurs will make their appearance in the near future, the type numbers being 56, 57 and 58. All three have indirectly heated cathodes, with heaters designed to operate at 2.5 volts and one ampere, a.c. or d.c. Included in the group are a general purpose triode, a triple-grid tube with sharp plate current cut-off, suitable for use as detector or amplifier, and a triple-grid tube of the variable-mu type.

THE TYPE 56

The 56 is the general purpose triode. It is intended to be used as a detector, as an a.f. amplifier with either transformer or resistance coupling, and as an oscillator. It has a small bulb — the same size as that used on the Type '37. Its plate impedance is about the same as that of the '27, but the amplification factor and mutual conductance are about 50% higher.

Following are the tentative ratings and characteristics of the 56 as a Class A amplifier:

Plate voltage, 250 volts max.
Grid voltage, —13.5 volts.
Amplification factor, 13.8
Plate resistance, 9500 ohms
Mutual conductance, 1450 micromhos
Plate current, 5 ma.

As a bias detector with 250 volts on the plate, the bias will be approximately —20 volts. The bias should be adjusted to make the plate current 0.2 ma. with no signal, requiring a cathode resistor of approximately 100,000 ohms for automatic bias. When the tube is used as an oscillator the maximum recommended plate voltage is 90 volts.

The tube has the small-size 5-pin base.

THE 57 AND 58

In many ways the design of the 57 and 58 represents a distinct departure from custom. Both tubes are screen-grid r.f. amplifiers which may or may not be pentodes — a rather queer sounding statement, but literally true. The tubes

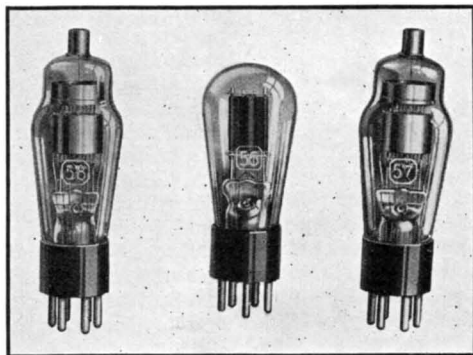
contain the usual control and screen grids, and have in addition a third grid adjacent to the plate which is connected to a separate pin on the tube base. If the tube is to be used as a pentode, this grid is connected direct to the cathode. It may be used for other purposes, however, if the set-builder wishes.

Bringing out separate connections from all these grids completely overloaded the old 5-prong base, so a new 6-prong base replaces it. Then too, these tubes are equipped with a brand-new type of bulb — a pear-shaped affair like that used on the Type '37 with the addition of a dome on top. This odd-looking construction has been adopted to reduce the output capacitance — and since the tubes are said to function well as r.f. amplifiers at frequencies as high as 60 megacycles, it is evident that some improvement has been effected over the older type of construction. Briefly, the outer screen which covers the plate in tubes of the '24 type has been replaced by an electrostatic shield in the dome of the bulb. The shield is connected to the cathode inside the tube.

The 57 and 58 are alike in appearance, and the following ratings are the same on both tubes:

Heater voltage, 2.5 volts
Heater current, 1.0 amp.
Plate voltage, 250 volts max

Screen voltage, 100 volts max.
Direct Interelectrode Capacitances:
Effective grid-plate, 0.010 max. μ fd. (with shield can)
Input, 5.2 μ fd.
Output, 6.8 μ fd.
The operating conditions for the 57 as a Class A amplifier are as follows:
Plate voltage, 250 volts max.
Screen voltage, 100 volts max.
Grid voltage —3 volts
Amplification factor, Greater than 1500
Plate resistance, Greater than 1.5 megohms
Mutual conductance, 1225 micromhos
Grid voltage for cathode current cut-off, —7 volts approx.



THE NEW RECEIVING TUBES

The 56 is in the center, flanked by the 57 and 58. Note the unusual bulb shape on the latter two and the shield in the dome top. These two tubes also have six-pin bases.

Plate current, 2.0 ma.
Screen current, 1.0 ma. max.

As a bias detector the tube should be operated with a plate voltage of 250 and screen voltage of 100. The grid voltage should be approximately —6 volts. Plate current should be adjusted to 0.1 ma. with no signal. The plate load should consist

of a 250,000-ohm resistor or a 500-henry choke shunted by a 250,000-ohm resistor.

The tube is also well adapted for use as an automatic volume-control rectifier.

The 58 is intended for r.f. amplifier circuits where comparatively large signals are to be handled and where the volume control operates on the grid bias of the tube. Its operating conditions and characteristics are as follows:

Plate voltage, 250 volts max.
Screen voltage, 100 volts max.
Grid voltage, -3 volts min.
Amplification factor, 1280
Plate resistance, 800,000 ohms
Mutual conductance, 1600 micromhos
Mutual conductance at -40 volts bias, 10 micromhos
Mutual conductance at -50 volts bias, 2 micromhos
Plate current, 8.2 ma.
Screen current, 3.0 ma. max.

The 58 may also be used as a first detector in superheterodynes, in which case the grid voltage should be -10 with the plate and screen voltages listed above.

With both the 57 and 58 the screen voltage may be obtained through a series resistor from the plate supply if the suppressor grid is connected to the cathode.

Neither tube is suited to use as a dynatron oscillator.

No definite information has been received about the date on which these tubes will be available. However, it looks as though they should be better suited to short-wave receivers than the present types, and we hope that actual tests will show them to be superior.

— G. G.

The New Class B Tube

THE story on the type '46 tube, started on page 14 of our last issue, was incomplete. The missing portion of the tale follows:

The plate curves for Class A operation are shown in Fig. 1. The usual load lines can be drawn in for various operating points, using the familiar method applying to other tubes used as class A amplifiers.² The 46 will deliver 1.25 watts with a 33-volt grid swing as against 1.6 watts with a 50-volt grid swing from the Type '45, a comparison which gives a fair indication of the relative merits of the two tubes as Class A amplifiers.

As a Class B amplifier, with the two grids of each tube connected together, the operating conditions and characteristics are as follows:

Plate voltage.....	300	400 volts max.
Grid voltage.....	0	0 volts
Plate current (no signal).....	4	6 ma.
Peak plate current.....	150	200 ma.
Load resistance per tube.....	1300	1450 ohms

² See chapter on Radiotelephony in *The Radio Amateur's Handbook*.

Max. signal voltage.....	40	41 volts r.m.s.
Max. continuous power output (2 tubes).....	16	20 watts
Max. plate dissipation (average per tube).....	10	10 watts

Fig. 2 shows the dynamic characteristic of two 46's in push-pull as Class B amplifiers for four different load resistances, the plate voltage being 400. The optimum load is that of curve B. A typical circuit using the tubes is shown in Fig. 3.

The following table shows some Class B combinations using a pair of 46's in the output stage, this information being taken from a preliminary technical bulletin on the tubes prepared by RCA Radiotron Co. One interesting point is that a pair of Type '27's in push-pull is adequate to excite the Class B stage to full output — quite a reduction in driving power from a pair of '45's exciting a pair of '10's. The voltage ratios of the input transformers also are given, as well as the peak power efficiency required of the transformer. The efficiencies are measured at 60 cycles.

Central Division Convention

June 25th and 26th, East St. Louis, Ill.

THE Knights of Columbus Club at 15th and State Streets, East St. Louis, Ill., is the place towards which the radio amateurs within a radius of three hundred miles should turn their eyes, prepare the old 'bus, save a few pennies from now on till convention time and register bright and early Saturday morning, June 25th, for two days of entertainment, talks, trips, etc. There will be prizes for attendance, smallest portable receiver and transmitter, the neatest low-power transmitter, the best station photo and several other things. The Egyptian Radio Club is sponsoring the convention and while it has had some good "Hamfests" in the past this is the first convention undertaken.

A cordial invitation is extended to everyone and a royal welcome awaits those who come. The price is \$2.50 if you register in advance or \$3.00 at the door. Your inquiries should be mailed to Earl Linder, W9DZG, 713 St. Louis Ave., East St. Louis, Ill., or to Harold Jansen, W9DJG, Box 751, Nameoki, Ill.



A radiogram from VK3LP nominates H. A. Marshall, VK2HM, to membership in the H.A.M. Club. This list still grows!

And again: A radiogram from ZL via ZL4AB and signed NZART says that insufficient postage is being used on correspondence with distressing results. Five cents in stamps is the required amount.