RADIOTRONICS

AMALGAMATED WIRELESS VALVE CO. PTY. LTD.

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HUM NEUTRALISATION

Although the most satisfactory way of avoiding hum is to use sufficient filtering, there are occasions when any increase in filtering is impracticable, and neutralisation may be adopted to reduce the annoyance. Unfortunately neutralisation does not usually result in complete elimination of the hum due to phase difference and harmonics, and even if initial optimum neutralisation is obtained it may fail to maintain correct balance due to variations in components or valves. While therefore not recommended as good practice it may yet be extremely convenient.

One very simple way in which neutralisation may be obtained is shown in Fig. 1 which represents a resistance coupled pentode A.F. amplifier. With C_1 omitted and $C_2 = 0.5\mu$F. the circuit is quite standard. Any hum in the plate supply voltage will result in a somewhat reduced hum voltage being passed on to the following stage. Tests showed that with 10 volts hum in the supply voltage, 5.6 volts appeared in the output of the 6J7G. By adding a suitable value of C_1 this could be neutralised, and it was found that by using 0.05 μF. the hum in the output was reduced to an *average* of 1.4 volts, this average taking account of valve and condenser variations.

In a standard 6J7G-6F6G receiver audio amplifier with feedback, the improvement obtainable with hum measured at the 6F6G output is not so noticeable due to the variety of causes. The addition of condenser C_1 reduces the hum output from 0.72 volt to 0.33 volt without feedback and 0.55 to 0.22 volt with negative feedback.

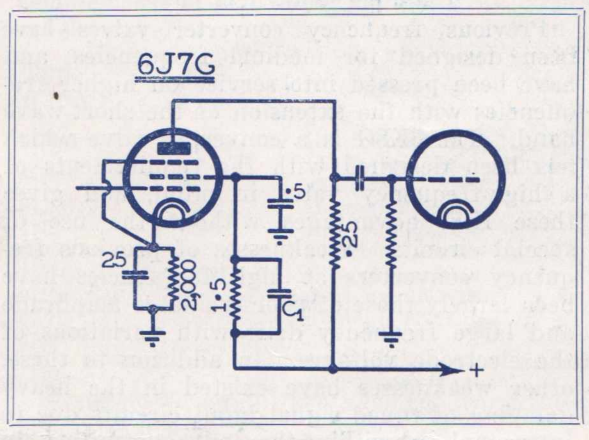


Fig. 1. *A simple method for neutralising hum in the plate supply voltage of a resistance coupled pentode A.F. Amplifier.*

RADIOTRON 6K8G
TRIODE-HEXODE FREQUENCY CONVERTER

The release of the Australian-made 6K8G is announced, and tentative characteristics, together with brief notes on its operation, are given below. The extremely fine shortwave performance of this type make it of special interest at the present time, and the freedom from "fluttering" is a valuable characteristic. Additional information on the practical application of this type is expected to be included in the next issue of Radiotronics.

TENTATIVE DATA ON AUSTRALIAN-MADE TRIODE-HEXODE FREQUENCY CONVERTER, 6K8G.

Heater Voltage ..	6.3 Volts
Heater Current ..	0.3 ampere
Overall Length ..	$4\frac{7}{32}''$ to $4\frac{15}{32}''$
Maximum Diameter	$1\frac{9}{16}''$
Bulb	ST12
Cap	Skirted Miniature
Base	Small Shell Octal 8-Pin.

ELECTRICAL CHARACTERISTICS

Direct Interelectrode Capacitances

Hexode Grid No. 3 to Hexode Plate	0.04 μμF
Hexode Grid No. 3 to Triode Grid and Hexode Grid No. 1 ..	0.1 μμF
Triode Grid and Hexode Grid No. 1 to Triode Plate ..	2.0 μμF
R.F. Input (Hexode Grid No. 3 to all other electrodes) ..	5.5 μμF
Osc. Output (Triode Plate to all other electrodes except Osc. Grid)	4.0 μμF
Osc. Input (Triode Grid to all other electrodes except Triode Plate)	7.0 μμF
Mixer Output (Hexode Plate to all other electrodes) ..	5.5 μμF

Maximum Ratings

Hexode Plate Voltage	250 max. V.
Hexode Screen (Grids 2 and 4) Voltage	100 max. V.
Hexode Control Grid (Grid No. 3) Voltage	−3 min. V.
Triode Plate Voltage	200 max. V.
Total Cathode Current	16 max. mA.

Typical Operation

Heater Voltage ..	6.3	6.3	Volts
Heater Current ..	0.3	0.3	Ampere
Hexode Plate Voltage .	100	250	Volts
Hexode Screen Voltage	100	100	Volts
Hexode Control-Grid Voltage	−3	−3	Volts
Triode Plate Voltage	100	100	Volts
Triode Grid Resistor .	50000	50000	Ohms
Hexode Plate Resistance	0.4	0.6 min.	Megohm
Conversion Transconductance	325	350	μmhos
Hexode Control Grid Voltage for Conversion Transconductance = 2 micromhos	−30	−30	Volts
Hexode Plate Current	2.3	2.5	mA.
Hexode Screen Current	6.2	6.0	mA.
Triode Plate Current .	3.8	3.8	mA.
Triode Grid & Hexode Grid No. 1 Current .	0.15	0.15	mA.
Oscillator Transconductance for Triode Plate = 100 Volts, Triode Grid = Zero Volts		3000	μmhos

Application Features of the 6K8G on Short-Waves

Previous frequency converter valves have been designed for medium frequencies, and have been pressed into service on higher frequencies with the extension of the short-wave band. The 6K8G is a converter valve which has been designed with the requirements of a high-frequency valve in mind, and gives these H.F. advantages without the use of special circuits. Weaknesses of previous frequency converters at high frequencies have been largely those of poor oscillator amplitude and large frequency drift with variations of the electrode voltages. In addition to these, other weaknesses have existed in the heavy damping of tuned signal input circuits due to intercoupling within the valve, resulting in poor image and noise ratios, and reduced overall sensitivity.

The high oscillator transconductance (3000) of the 6K8G enables oscillation easily to be maintained over the short-wave band thereby simplifying the problem of band coverage.

The separation of the oscillator triode from the hexode or mixing section of the valve materially assists in the improvement of a large number of features including the following:— (1) High frequency conversion gain is maintained at a value commensurate with that indicated by the valve characteristics, and equal to that at broadcast frequencies; (2) The valve has a negative input conductance, raising the "Q" of the signal input circuit, thereby improving the image and noise ratios; (3) The frequency drift with signal grid bias is reduced from 1 kilocycle per volt with the 6A8G to 100 cycles per volt max., enabling AVC to be applied without bad effects on tuning and signal distortion.

Variations in screen voltage compensate for variations in oscillator plate voltage in their effect on oscillator frequency, so that by supplying these two electrodes from the same voltage source, this cause of instability is eliminated and the tendency to "frequency flutter" is materially reduced.

Operating Points.

The 6K8G may in general be substituted directly for the 6A8G (6A7) with the following changes:— (1) Under Standard voltage conditions the screen grid and oscillator anode should be supplied through a common 15,000 ohms dropping resistor from 250 volts. The screen grid current changes only by approximately 5% with the full range of signal-grid bias, permitting good regulation with a dropping resistor; (2) The oscillator feedback coil may have its turns or coupling ratio reduced considerably to obtain the optimum grid current values. The grid current should be maintained between approximately 100 and 200 microamperes over the short-wave band.

No additional filtering at audio frequencies is required in the oscillator supply circuit, to prevent frequency "flutter" in the receiver, as is the case with converters having poorer frequency characteristics. No additional circuit modifications are recommended, and with the standard type of grid tuned oscillator circuit, the oscillator frequency should be higher than the signal frequency.

Neutralisation (which has been supplied between the signal and oscillator circuits of other converters), is not necessary, and in some cases may mar the frequency stability of the valve.

6K8G or 6A8G

While the 6K8G offers improved performance from every aspect of short-wave operation, it has slightly lower sensitivity than the 6A8G on broadcast frequencies. With the valve combinations used for dual wave receivers to-day, it is usually considered that the broadcast sensitivity is more than ample. The use of the 6K8G with enormous improvements on short-waves and with a very minor sacrifice of broadcast sensitivity, seems to offer the correct balance of qualities for this class of receiver.

RADIOTRON 6.3 VOLT 0.15 AMPERE SERIES

A complete series of 6.3V. 0.15A heater valves is now available in the Radiotron range. These are particularly intended for use in receivers operating from a 6 volt D.C. supply where a reasonably heavy current is practicable but where economy is desired over the heavier-drain types commonly used in A.C. receivers. It is now possible to construct a 5-valve receiver using indirectly heated valves and drawing only 0.75 ampere at 6.3 volts, which would be suitable in locations where charging facilities are available. It is not expected that these valves will be very widely used where it is necessary to transport the accumulators for recharging, since the 2 volt battery series provides equivalent performance for less than one-third of the A Battery power.

The range comprises the following Radiotron types:—

- 6D8G Converter: Heater 6.3V. 0.15A.
- 6G6G Power Pentode: Heater 6.3V. 0.15A.
- 6L5G General Purpose Triode: Heater 6.3V. 0.15A.
- 6N5 Magic Eye Tuning Indicator: Heater 6.3V. 0.15A.
- 6S7G Super Control R.F. Pentode: Heater 6.3V. 0.15A.
- 6T7G Duo-Diode High-Mu Triode: Heater 6.3V. 0.15A.

In addition to these types there are also two twin triodes and a full wave rectifier, each fitted with two units having similar heaters, but the total current is twice as great since the two are connected in parallel.

- 6C8G Twin Triode Amplifier: Heater 6.3V. 0.3A.
- 6Z7G Twin Class B Amplifier: Heater 6.3V. 0.3A.
- 6ZY5G Full Wave High Vacuum Rectifier: Heater 6.3V. 0.3A.

Small quantities of all these types are held in stock.

Application

These types are not recommended for use in A.C. powered circuits unless the use of the standard A.C. series is impracticable. Present indications are that the 0.3A types are more robust and have a longer service life as well as being more likely to give satisfactory service under arduous conditions. The 0.15A. types should not be used with series heater connections owing to unavoidable variations in heater current from valve to valve.

The characteristics of the 0.15A. series resemble those of equivalent standard A.C. types as shown:—

Type 0.15A	0.3A Type	Comments.
6D8G	6A8G	Interchangeable
6G6G	38	Different bias voltages; Different bases
6L5G	6C5G	Interchangeable
6N5	6G5	Interchangeable
6S7G	6U7G	Interchangeable
6T7G	6Q7G	Interchangeable
6C8G	nearest equivalent 6N7G*	
6Z7G	nearest equivalent 6N7G	
6ZY5G	no equivalent.	

* 6N7G has different base connections and both cathodes are connected internally.

A suggested circuit arrangement using these types is

R.F. Amplifier	6S7G
Converter	6D8G
I.F. Amplifier	6S7G
Second Detector, etc.	6T7G
Power Pentode	6G6G
or alternatively	
Audio Driver	6L5G
Class B. Output	6Z7G
Rectifier (with vibrator)	6ZY5G

RADIOTRON 6AF6G

Twin Indicator Magic Eye

In addition to the well-known Radiotron Magic Eye Tuning Indicator types 6E5, 6G5, 6N5 and 6U5, there has recently been announced type 6AF6G, incorporating two separate ray control electrodes and a fluorescent target, but not including any amplifying units. In this new type it is possible to connect together both ray control electrodes so as to give twin shadows but alternatively they may be connected separately so as to give different indications, such as for example one operating on strong signals and one on weak signals. The latter arrangement is not normally required under Australian conditions since the sensitivity of most receivers is so high that satisfactory operation is obtained from types 6G5, 6N5 or 6U5 and it is not expected that the new type will be adopted for general use in receivers. It is, however, possible that it will find some special applications where its particular advantages and flexibility provide new features.

Since the 6AF6G does not include any amplifying units, it is necessary to apply to the ray control electrode a voltage of from 60 to 81 volts under normal operating conditions for a complete closure of the shadow angle. In order to obtain such a high voltage it is necessary to make use of a separate valve forming a D.C. amplifier. If a super-control characteristic is required any super-control R.F. pentode may be used as an amplifier with the plate, suppressor and screen grid tied together to form a triode. If each ray control electrode is required to be operated separately, it will be necessary to use two separate amplifiers, one to each electrode.

Alternatively, it is possible to insert a resistor in the plate circuit of the I.F. amplifier valve and to utilise the voltage drop in this resistor for the necessary deflection voltage, but this arrangement is necessarily a compromise and does not appear to offer any advantage over the usual arrangement with Radiotron 6U5 or similar types.

Stocks of Radiotron 6AF6G are now available, but only in limited quantities since it is not expected to be used except in special applications. The ratings and characteristics are given below:—

Tentative Characteristics and Ratings

HEATER VOLTAGE (A.C. or D.C.)	6.3 Volts
HEATER CURRENT	0.15 Ampere
OVERALL LENGTH	2″ to 2$\frac{5}{16}$″
MAXIMUM DIAMETER	1$\frac{3}{16}$″
BULB	T-9
BASE	Small Shell Octal 7-Pin

Maximum Ratings and Typical Operating Conditions

TARGET VOLTAGE		135 *max.* Volts 90 *min.* Volts	
RAY-CONTROL-ELECTRODE SUPPLY VOLTAGE		135 *max.* Volts	
TYPICAL OPERATION:			
Heater Voltage ..	6.3	6.3	Volts
Target Voltage ..	100	135	Volts
Target Current* ..	0.9	1.5	Milliamperes
Ray-Control Electrode Voltage (Approx.)† ..	60	81	Volts
Ray-Control Electrode Voltage (Approx.)‡ ..	0	0	Volts

For the control valve a typical value of series-load resistor is 0.5 megohm, when the ray-control electrodes of the 6AF6G are connected in parallel.

* With 0 volts on ray-control electrodes. Subject to wide variation.

† For shadow angle of 0° produced by either ray-control electrode.

‡ For shadow angle of 100° produced by either ray-control electrode.

SWITCHING-OFF FEEDBACK

Although negative feedback is very desirable for local station fidelity reception with pentode or beam tetrode power valves, it necessarily reduces the overall gain of the receiver. In certain circumstances it may be advantageous to arrange a switch so as to cut out the feedback for shortwave or distant reception, and a suitable arrangement by which this may be done is shown in the diagram (Fig. 2). It will be seen that the switch short-circuits the lower section of the voltage divider across the load, and under no circumstances will the plate circuit of the preceding valve become open circuited.

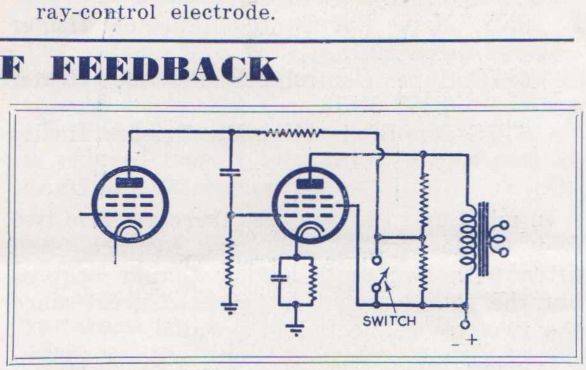


Fig. 2. *A suitable arrangement for switching-off negative feedback to increase overall receiver gain, for short wave or distant reception.*

INPUT CAPACITANCE OF PENTODE WITH NEGATIVE FEEDBACK APPLIED TO SCREEN GRID

The method of applying a negative feedback voltage to the screen grid of a resistance coupled pentode valve, as described in Radiotronics 89, causes a change in the effective input capacitance. This result is somewhat similar to the "Miller Effect", and since the voltage which is fed back to the screen is out of phase with the signal voltage on the control grid, the alteration of capacitance is in a positive direction, that is to say, that the input capacitance is increased by the application of feedback.

The amount by which the input capacitance is increased is

$$\mu' C_{g1g2} \left(\frac{\beta M}{1 + \beta M} \right)$$

where C_{g1g2} is the capacitance from control grid to screen,
μ' is the "triode amplification factor" of the valve (20 for the 6J7G),
and $(1 + \beta M)$ is the gain reduction factor.

In the case of the Radiotron 8.5 Watt Amplifier A140, the *increase* in input capacitance due to feedback is approximately $33\mu\mu$F., which is less than half that which would occur with a type 75 valve without feedback.

INPUT RESISTANCE OF PHASE SPLITTER

Due to the degeneration which occurs with a Phase Splitter having equal plate and cathode loads, the input resistance of such a stage is approximately 10 times the resistance of the grid resistor. The reason for this effect is that the effective voltage across the grid resistor is the *difference* between the grid and cathode voltages. Since the A.F. voltage at the cathode is approximately 0.9 of the grid voltage, the voltage across the grid resistor is the difference between 1.0 and 0.9, that is, 0.1 of the input voltage. The damping is therefore equivalent to that which would occur with a grid resistor having 10 times the actual resistance.

As a result of this phenomenon the capacitance of the grid coupling condenser to this stage could, if desired, be decreased to one-tenth of its normal value, but there is normally no object in so doing. In a feedback amplifier it is desirable to avoid any phase rotation at low frequencies in this stage, and the effect is therefore advantageous in such a case.

RADIOTRON 6L6G

Equal Plate and Screen Operation

Radiotron 6L6G, particularly when used in conjunction with negative feedback, is probably the most generally satisfactory and efficient valve type for use with a power output above 5 watts for a single valve or 10 watts for a push pull stage. One of the disadvantages connected with the use of the 6L6G is that under many conditions of operation the screen voltage is less than that of the plate, and as a consequence a heavy-current voltage divider is required. It is perfectly satisfactory, for limited power output, to operate the plate and screen at the same voltage and thereby reduce the cost of the amplifier and power pack. The operating conditions are as follow:—

Single Valve Class A_1 Operation

Plate and Screen Voltage	100	150	200	250	275 (max.)
Zero Signal Plate Current (mA)	18.5	33.5	51.5	72	82.5
Max. Signal Plate Current (mA)	20	37.5	57	79	90.5
Zero Signal Screen Current (mA)	1.2	2.3	3.6	5	5.8
Max. Signal Screen Current (mA)	2.0	3.4	5.2	7.3	8.4
Control Grid Bias (volts)*	–5.5	–8.4	–11.2	–14.0	–15.4
Mutual Conductance (μmhos)	3770	4620	5370	6000	6300
Load Resistance (ohms)	4000	3280	2800	2500	2400
Power Output (watts)	0.7	1.8	3.8	6.5	8.4

Push-Pull Class A_1 Operation

(Plate and Screen Currents shown are for two valves)

Plate and Screen Voltage	100	150	200	250	290 (max.)
Zero Signal Plate Current (mA)	32.5	55	85	120	150
Max. Signal Plate Current (mA)	37.5	65	100	140	175
Zero Signal Screen Current (mA)	2.5	4.5	7.0	10	12.5
Max. Signal Screen Current (mA)	4.2	7.4	11.4	16	20
Control Grid Bias (volts)*	–6.25	–9.5	–12.75	–16	–18.5
Load Resistance plate to plate (ohms)	8000	6500	5600	5000	4600
Power Output (watts)	1.6	4.2	8.4	14.5	21.2

* Peak grid voltage at grid current point.

N.B. These tables have been extracted from the curves on one of the Radiotron loose-leaf Data Sheets on type 6L6G, to which reference should be made for intermediate points.

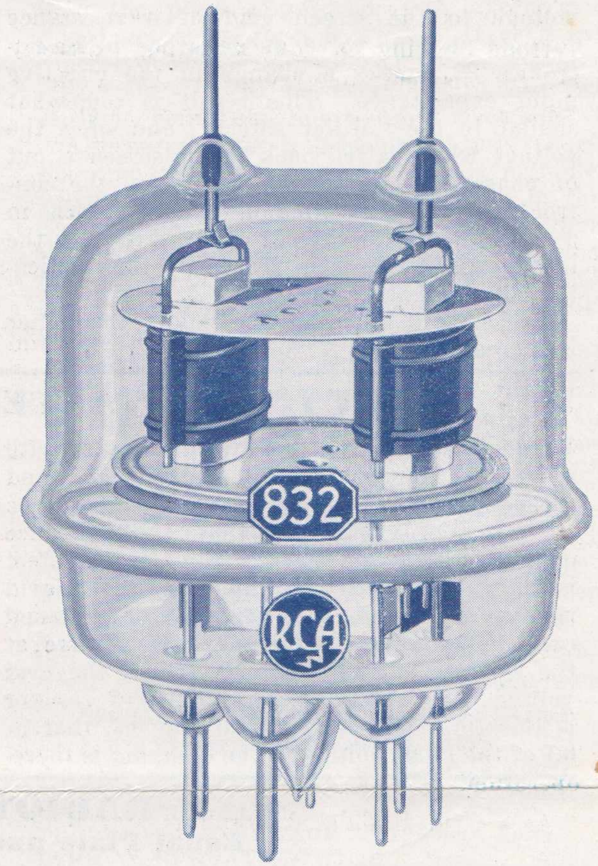
RADIOTRON 832
Push-Pull R.F. Beam Power Amplifier

Radiotron 832 is an indirectly-heated cathode type of transmitting valve, containing in one envelope two beam power tetrode units. This valve is designed primarily for use as a push-pull R.F. power amplifier for ultra-high frequencies, and operates with maximum ratings to 2 metres and with reduced ratings to 1 metre. The total plate dissipation (both plates) is 15 watts for Class C telegraph service. Neutralisation of the 832 is unnecessary in adequately shielded circuits.

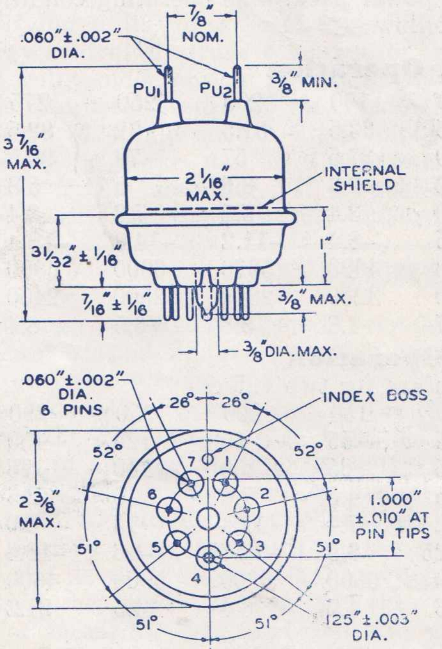
The exceptional efficiency of the 832 at the ultra-high frequencies is made possible by the balanced and compact structure of the beam power units, excellent internal shielding, close electrode spacing, and internal screen-to-cathode bypass condenser (65 $\mu\mu$F). The internal leads are short in order to minimise internal lead inductance. The terminal arrangement provides excellent insulation and is designed to facilitate symmetry of circuit layout.

The heaters are arranged to allow operation from either a 12.6 or 6.3 volt supply, the heater current being 0.4 or 0.8 A. respectively. The transconductance for a plate current of 30 mA. is approximately 3000 μmhos, and the "triode" (grid to screen) amplification factor is 7. The input and output capacitances of each unit are 7.5 and 3.8 $\mu\mu$F. respectively while the grid-plate capacitance with external shielding is 0.05 max. $\mu\mu$F.

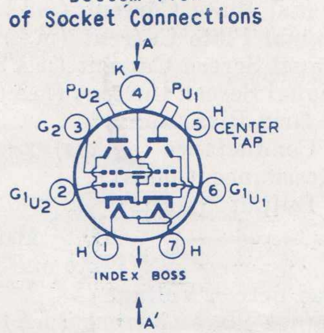
The maximum plate and screen voltages are 400 and 250 except for Plate Modulated conditions when they are 325 and 250 volts maximum.



The power output under typical operation as a Grid Modulated Amplifier is 7.6 Watts, as a Plate Modulated Amplifier 12 Watts and as a Class C Telegraphy Amplifier 22 Watts, these values applying to the total output as a Push-Pull Amplifier. The Driving Power in these cases is 0.1, 0.06 and 0.18 Watt respectively.



Bottom View of Socket Connections



AA' = PLANE PARALLEL TO PLANE OF ELECTRODES OF EACH UNIT

PIN 1 - HEATER
PIN 2 - GRID NO.1 OF UNIT NO.2
PIN 3 - SCREEN
PIN 4 - CATHODE
PIN 5 - HEATER CENTER TAP
PIN 6 - GRID NO.1 OF UNIT NO.1
PIN 7 - HEATER
P_{U1} & P_{U2} - PLATE TERMINALS OF UNITS NO.1 AND NO.2, RESPECTIVELY

RADIOTRON 1619

Quick-heating Transmitting Valve

Beam Power Tetrode

Radiotron 1619 is a metal Beam Power Tetrode having a quick-heating, directly heated filament operating at 2.5 Volts 2 Amperes. It is suited for operation as an A.F. or R.F. amplifier, modulator, frequency multiplier or oscillator in equipment where quick off-on operation is essential. The 1619 may be operated at maximum ratings up to 45 Mc. Neutralisation of this type is generally unnecessary in adequately shielded circuits. The input and output capacitances are 10.5 and 12.5 $\mu\mu$F. respectively, and the grid-plate capacitance 0.35 $\mu\mu$F. The base is a small wafer Octal 7 pin.

As a single valve Class A_1 Amplifier the 1619 will give an output of 3 Watts into a load of 8800 ohms with 300 Volts on the plate and 250 on the screen. As a push-pull Class AB_1 Amplifier, two such valves will give an output of 17.5 Watts with plate and screen voltages of 400 and 300 respectively, while under similar voltage conditions they will give an output of 36 Watts with Class AB_2 operation.

As a Grid Modulated Amplifier, one Radiotron 1619 will give an output of 3.8 Watts, as a Plate Modulated Amplifier 13.0 Watts, and as a Class C Telegraphy Amplifier 19.5 Watts.

The overall dimensions, outline and socket connections of type 1619 are the same as those of type 6L6 except that in the 1619 the filament takes the place of the heater, and the beam-forming plates (which should be connected to the mid-point of an A.C. filament circuit) are brought out to the "cathode" pin.

INCREASED RATINGS FOR RADIOTRON 1G5G

750 Milliwatts at 135 Volts

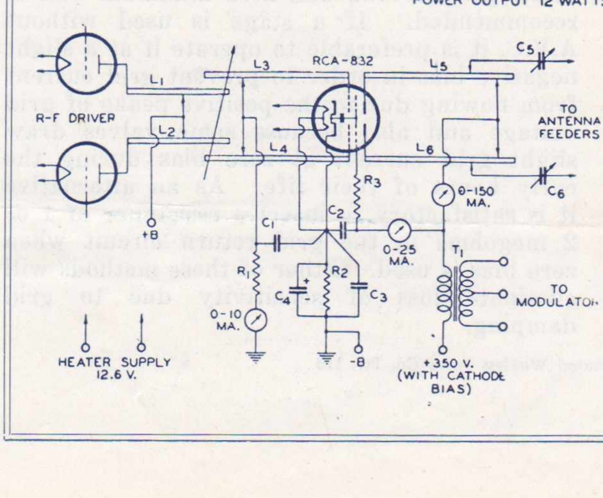
Increased ratings have been announced for Radiotron 1G5G Power Pentode with 2 volt 0.12 amp. filament. Previously the maximum voltage was limited to 90 volts under which conditions the power output was 250 milliwatts. Under the new conditions the maximum supply voltage is 135 volts and the maximum power output 750 milliwatts. It is sometimes convenient to use such a valve with back bias and 135 volt supply and the effective plate voltage will then be 124 volts, being the difference between 135 and 11 volts for bias. Data for 90, 124 and 135 volt operation are given for ready reference.

Radiotron 1G5G

Plate and screen ..	90	124		135	max.	volts
Grid	−6	−11		−13.5		volts
Peak A.F. grid voltage ..	6	9.9	11.0	9.2	13.5	volts
Zero signal plate current ..	8.5	10.0	10.0	8.7	8.7	mA.
Max. signal plate current	8.7	10.7	—	9.7	—	mA.
Zero signal screen current	2.5	3.0	3.0	2.5	3.0	mA.
Max. signal screen current	3.0	4.3	—	3.6	—	mA.
Load resistance ..	8500	8000	8000	9000	9000	ohms
Harmonic distortion:						
Total ..	6	10.5	13	11	18	%
Second	3	7	6	8	9	%
Third	5	7.5	11	7	15	%
Power Output ..	250	600	650	550	750	mW.

Radiotron 1G5G is available in small quantities from stock.

ULTRA-HIGH-FREQUENCY PLATE-MODULATED PUSH-PULL R-F POWER AMPLIFIER
POWER OUTPUT 12 WATTS (APPROX.) AT 2 METERS



C_1, C_2, C_3 = 500 $\mu\mu f$
C_4 = 25 μf, 200 VOLTS
C_5, C_6 = 3 TO 35 $\mu\mu f$
R_1 = 10000 TO 20000 OHMS, 1 WATT
R_2 = 300 OHMS, 5 WATTS
R_3 = 7500 OHMS, 5 WATTS
L_1, L_2 = DIMENSIONS DEPENDENT ON TYPE OF DRIVER APPROX. SAME AS L_5 L_6
L_3, L_4 = ¼" DIA. COPPER TUBING, APPROX. 10" LONG AND SPACED 1" BETWEEN CENTERS.
L_5, L_6 = ¼" DIA. COPPER TUBING, APPROX. 12" LONG AND SPACED 1" BETWEEN CENTERS.
T_1 = MODULATION TRANSFORMER

NOTE: ADJUST COUPLING OF L_1 L_2 AND L_3 L_4 FOR OPTIMUM GRID EXCITATION.

RCA APPLICATION NOTE ON RECEIVER DESIGN

Hum Modulation in A-C/D-C Sets

When abnormally high hum modulation is present in A.C./D.C. receivers, it is suggested that the heater of the pentagrid converter be located as near chassis potential as possible. In several cases where this condition was investigated, hum modulation was reduced considerably by rearranging heater connections in such a manner that the heater of the pentagrid converter was second from the chassis. The heater of the first A.F. valve was located at chassis potential in order to reduce hum introduced in the grid circuit of this valve.

Grounding No. 1 Pin of Octal-Base Sockets

Receivers designed for octal-base glass valves often use the blank No. 1 lug on a socket as a terminal post for B+ or other high-potential leads. When a metal equivalent of a glass valve is inserted in such a socket it is possible to receive a shock, violate fire underwriters' regulations, and impair receiver performance because the shell of the metal valve is not at ground potential. It is suggested that the No. 1 pin of octal-base sockets be grounded in order to avoid these difficulties.

RADIOTRONS 1852, 1853

Television Amplifier Pentodes

RADIOTRON 1852 has an electrode assembly identical to that of type 1851 (described in Radiotronics 86) having a mutual conductance of 9000 μmhos. The 1852, however, has the control grid lead brought out to a base pin, a special screening arrangement providing an even lower grid-plate capacitance (0.015 max. $\mu\mu$f).

RADIOTRON 1853 is identical in external dimensions and grid-plate capacitance to the 1852, but has a mutual conductance of 5000 μmhos with –3 volts bias, and 50 μmhos with –15 volts bias, the grid characteristic being of the super-control variety.

The socket connections of both types are as follow:—

Pin No. 1—Shell
Pin No. 2—Heater
Pin No. 3—Suppressor
Pin No. 4—Control Grid
Pin No. 5—Cathode
Pin No. 6—Screen
Pin No. 7—Heater
Pin No. 8—Plate

The maximum overall dimensions are $2\frac{5}{8}$in. by $1\frac{5}{16}$in. diameter, both types being of metal envelope construction.

RADIOTRON NEWS

RADIOTRON 6K8G, Triode-Hexode Frequency Converter, described elsewhere in this issue, is now available from stock. This type is of Australian manufacture.

RADIOTRON 832, Push Pull Beam Tetrode Transmitting Valve, which is described elsewhere in this issue, is expected to be available early in October.

RADIOTRONS 1852 and 1853, Television Amplifier Pentodes are expected to be available early in October.

RADIOTRON 6AF6G, Twin Indicator Magic Eye without any amplifying units, is now available from stock.

RADIOTRON 1619 Quick-heating Beam Power Tetrode described in this issue, is expected to be available early in October.

DROPPING RESISTORS FOR AIR-CELLS

In Radiotronics 82 (December, 1937) there was given a table of recommended values of Resistors for connecting in series with Air Cells. In view of the importance of the correct design of these resistors, and in view of the fact that lower resistance values have been published (from an American source) which will not give satisfactory performance, this table is repeated.

Nominal Drain	Series Resistor including lead resistance
600 mA	.595 ohms
540 „	.685 „
480 „	.81 „
420 „	.96 „
360 „	1.10 „

PRECAUTIONS WITH FIXED ZERO BIAS OPERATION

Radiotron types 1C4 and 1M5G are intended for use as R.F. or I.F. amplifiers in receivers fitted with A.V.C., and zero minimum bias is recommended. If a stage is used without A.V.C. it is preferable to operate it at a slight negative bias in order to prevent grid current from flowing due to the positive peaks of grid voltage and also because some valves draw slight grid current at zero bias during the early hours of their life. As an alternative it is satisfactory to insert a resistance of 1 or 2 megohms in the grid return circuit when zero bias is used. Either of these methods will eliminate loss of sensitivity due to grid damping.

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