

Philips New Battery Valves

Philips announce the introduction of a comprehensive range of 2-volt valves for use in battery receivers.

The valves released so far consist of the following types:—

- B217 General Purpose Triode.
- B240 Double Triode (Class "B").
- B255 Super Control Screen Grid R.F. Amplifier.
- B262 Screen Grid R.F. Amplifier.

Additional types will be produced shortly including a double-diode-triode for battery receivers. The new series of valves combine the dependability and robustness of the existing 4 and 6 volt range with new standards of efficiency.

Data and characteristics of the new types are furnished hereunder:—

B217 Triode General Purpose Detector, Amplifier, Driver, Oscillator.

Characteristics.

- Filament voltage—2 V.
- Filament current—1 A.
- Plate voltage—120-150 V.
- Normal plate current—4 mA.
- Negative grid bias—4 V.
- Voltage amplification factor—17.
- Mutual conductance (normal)—1.3 mA/V.
- A.C. plate resistance—13000 ohms.
- Base—4 pin.

Application

Detector With Transformer Coupling

As a grid leak detector in battery operated receivers the B217 will be found to

be sensitive and non-microphonic. The value of the grid condenser may be between .0001 and .0003 mfd. and the grid leak from 1 to 3 megohms.

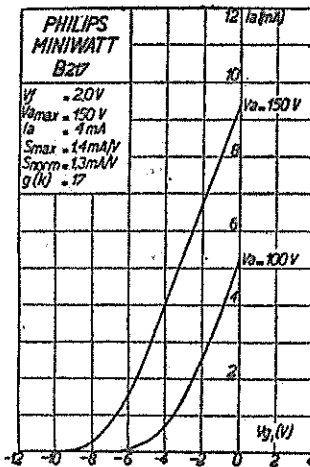
The B217 is also particularly suited for use as a short wave detector with reaction and in this respect is comparable with the A415.

Audio Amplifier

The minimum negative bias voltages for this purpose are as follows:—

Plate voltage	Bias
150	3
100	1.5

The Philips new Audio Transformer Type 4003N is recommended for all straight audio circuits.



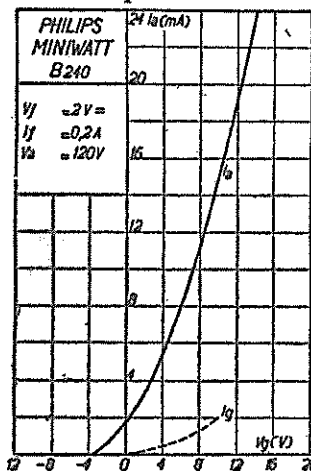
Driver

The B217 is specified as a driver for the B240, the Philips 2-volt Class "B" output valve. For further information on Class "B" see data for B240.

Oscillator

The B217 being a ready oscillator operates satisfactorily as a separate oscillator for all wave super-heterodynes.

B240 Double Triode Class "B" Output Valve



June 29th, 1934.

The B240 combines two high mu triodes in the one envelope and is designed for class "B" operation in the output socket of battery receivers.

Characteristics.

- Filament voltage—2 V.
- Filament current—0.2 A.
- Plate voltage—120 V.—150 V. (max.)
- Static plate current (2 plates)—2.5 mA.—3 mA.
- Plate current max (total)—15 mA.—21 mA.
- Grid bias—0 V.—0 V.
- Maximum signal input voltage per triode—14 V.—14 V.
- Maximum input impedance (valve)—3000-5000 ohms.
- Optimum load (plate to plate)—14000 ohms—14000 ohms.
- Mutual conductance (grid voltage plus 5)—2.2 mA/V.
- Output watts (2 triodes)—1.25 W.—1.9 W.
- Base—medium—6 pin.

Application

Under correct operating conditions it is possible to obtain from the B240 volume and quality comparable with All Electric Receivers, at a current demand well within the capabilities of "B" Batteries.

For Class "B" the triodes are operated in push-pull. The characteristics of the triodes are such that with no negative bias applied and the tubes in a static condition, only a small plate current will flow (2.5 to 3 mA.). The grid return of both triodes should be connected to negative filament.

When a signal voltage is applied to the grids of the B240 in this circuit arrangement, the grids will alternatively become positive and grid current will flow. It is the function of the preceding valve together with the coupling transformer to supply this grid current. For this reason it is not practicable to feed the output valve directly from the detector.

Driver Stage

In common with other Class "B" valves the B240 should be preceded by a driver stage, the specified valve for the purpose being the B217.

The recommended negative bias for the B217 in this application is 4.5 V. at 150 V. plate potential and 3.0 V. with 120 V. on the plate.

To obtain the greatest output with a minimum of distortion it is necessary that a fairly high signal input be applied to the driver valve. To fully load the B240 the signal voltage applied to the grid of the B217 should approximate 3 volts (R.M.S.). The detector must be able to supply this voltage.

June 29th, 1934.

Audio Transformers for Class "B" are necessarily of special design and the following specifications are applicable to the abovementioned valve types.

Input Transformer following B217 as driver

Ratio 3: 1 to each half of the secondary winding. The total transformer ratio will be 1.5: 1 overall. To avoid grid damping the total resistance of the secondary winding should not exceed 400 ohms.

Output Transformer

The most favourable plate to plate load for the B240 is 14,000 ohms and the output transformer feeding the speaker is designed accordingly. The D.C. resistance of the primary winding should not exceed 1000 ohms.

To limit high frequency response a limiting circuit consisting of a condenser of .005 mf. in series with a 10,000 ohm resistor is generally connected across the primary of the output transformer. (See Fig. 1).

As a precaution against undesirable high frequency oscillation resistances of 10,000 ohms may be shunted across each half secondary winding of the input transformer. The presence of oscillation is indicated by an abnormally high static plate current.

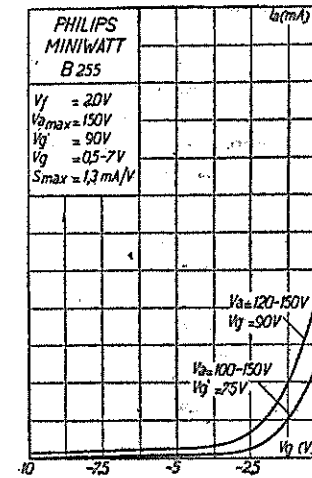
Battery Consumption

On an average the plate current of the B240 will have a value of from 6 to 8 mA. at a plate voltage of 150 and 4 to 5 mA. at 120 V.

The driver stage usually accounts for from 2.5 to 3 mA. so that the plate consumption for the B240 plus the B217 will approximate as follows:—
 Plate voltage—120 V.—150 V.
 No signal—4.5 mA.—6 mA.
 Max. Signal—18.5 mA.—24 mA.
 Average—6.5 to 7.5 mA.—9 to 11 mA.

B255 Super Control Screen Grid R.F. Amplifier Characteristics

- Filament voltage—2.0 V.
- Filament current—.18 A.
- Plate voltage—120-150 V.
- Screen voltage—90 V.
- Plate current—1.8 mA. (max.)
- Negative grid bias—0.
- Voltage amplification factor—400.
- Mutual conductance—
 (neg. grid bias=0.5)—1.2 mA/V.
 (neg. grid bias=7.0)—.014 mA/V.
- A.C. Plate resistance—330,000 ohms.
- Base—4 pin.



Application

Variable Mu H.F. or I.F. Amplifier for battery receivers.

A feature of the B255 is the fact that whilst the working value of mutual conductance varies smoothly with the negative bias applied to the grid, a bias of 9 volts is sufficient to cut off the plate current. Consequently the previous disadvantage of the necessity for a high "C" battery with variable mu valves is obviated by the use of the B255.

The grid bias for volume control purposes should be obtained from a potentiometer of 10,000 to 20,000 ohms connected across a 9 volt grid bias battery, which, incidentally, may also be used to supply bias to other valves in the receiver.

The positive return from the "C" battery will normally be connected to negative filament.

B262 Screen Grid R.F. Amplifier Detector Characteristics

- Filament voltage—2.0 V.
- Filament current—0.18 A.
- Plate voltage—120-150 V.
- Screen voltage—90 V.
- Plate current—2 mA. max.
- Negative grid bias—0 V.
- Voltage amplification factor—500.
- Mutual conductance (normal) — 1.3 mA/V.
- A.C. plate resistance—400,000 ohms.
- Base—4 pin.

Application R.F. Amplifier

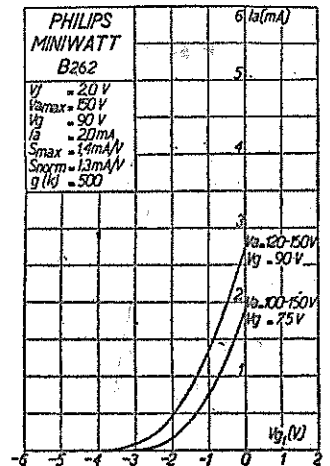
The B262 has been developed to give exceptional efficiency and the maximum stage gain when operated as an R.F. amplifier with well designed coils.

Due to the special construction of this valve satisfactory operation is possible even with 100 volts applied to the plate.

However, for maximum results higher plate ratings are recommended. No negative bias should be applied to the B262 for this application. Normally, the grid return will be taken to filament negative.

Detection

The B262 is recommended for use as an "autodyne" first detector in super-heterodynes. A suggested circuit is shown



in Fig. 2 which gives satisfactory results. It will be observed that two similar reaction coils are wound in phase and coupled to the tuned oscillator circuit. Approximately 3 turns are required for each winding so that the voltage drop in the filament circuit is negligible.

ELECTRIC REFRIGERATORS AT £25

It is reported that McWhirters Pty. Ltd., Brunswick and Wickham Sts., Valley, Brisbane, Q., have been enquiring on the American market for inexpensive equipment for the manufacture of a low price electric refrigerator.

It is understood that this Company contemplates the manufacture of an electric refrigerator to sell for £25 in Australia.

