Bench Power Supply

A Versatile Instrument for Temporary Set-ups

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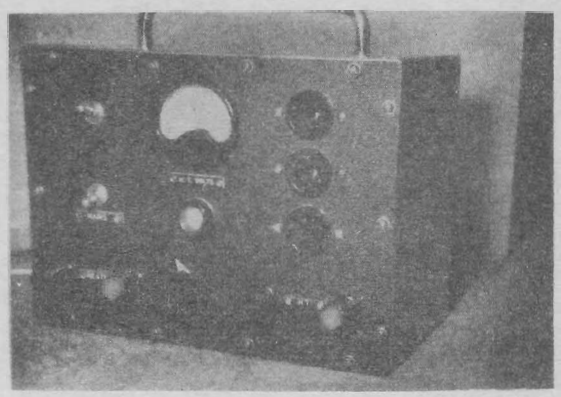


External appearance of the power supply unit. The variable control is positioned below the pilot lamp with the insulated terminals on either side

IT IS OFTEN NECESSARY TO OBTAIN a specific h.t. voltage when either testing a piece of equipment under construction or while using apparatus without its own power supply. One method of obtaining the required voltage is to take it from a piece of existing equipment by soldering wires directly to the appropriate points. Alternatively, each piece of equipment with its own power supply could be fitted with an octal socket so that ancilliary equipment can be run from it.

A disadvantage with such a procedure, however, is that the supplies might occasionally be grossly overrun, and damage to the transformer and rectifier may occur. Also, of course, it may not always be possible to obtain exactly the correct voltage required. The writers have, therefore, designed a power supply unit specifically for the applications outlined above.

Specification

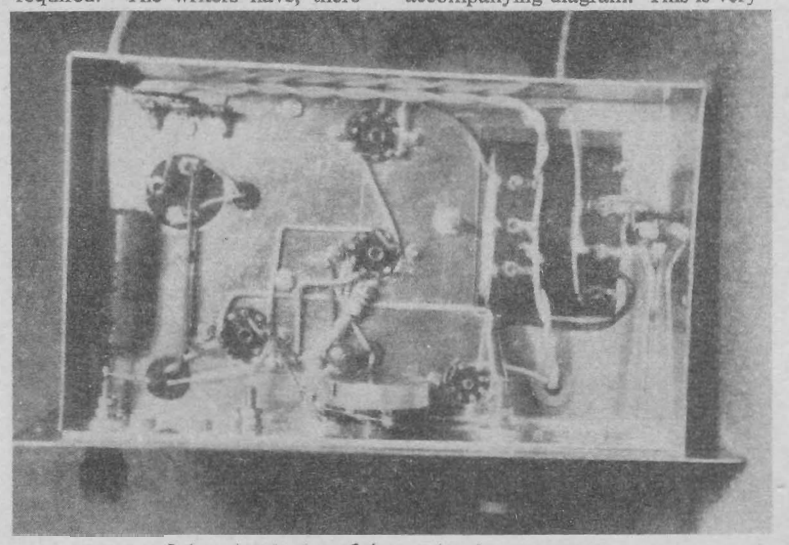
One requirement of the unit was that a variable supply should be available from 0 to 300 volts at up to 80mA. Secondly, an optional 150 volt stabilised supply was desirable and, if needed, should be available at the same time as a higher voltage unstabilised output. These requirements were met by the unit, which also provides a 6.3 volt output for heaters at a current depending upon the capabilities of the mains transformer used.

Circuit

The circuit is shown in the accompanying diagram. This is very simple and needs little explanation. The choice of regulator valves is not critical provided they will pass the full rated value of h.t. current.

The output voltage is adjusted by the potentiometer VR_1. This varies the control grid voltage on V_2 and V_3, and the voltage appearing at the cathodes attains a value related to this in accordance with the current passed. The use of valves in the regulation circuit obviates the use of a potentiometer with a very high wattage rating. The potentiometer used in the circuit given here dissipates less than half a watt.

Parasitic stopper resistors, R_1 and R_2, are provided to prevent the regulator valves from acting as a push-pull oscillator at v.h.f. frequencies.*



Below-chassis view of the regulated power supply

Construction

The unit was built on a chassis 4½ x 8 x 2in, with a front panel measuring 9 x 7in, in a cabinet of corresponding dimensions.

Mounted on the front panel are three international octal valveholders and four insulated terminals for the output connections. The pin connections for the octal sockets are given on the circuit diagram, and these correspond to a standard adopted by many constructors.

The panel also carries a meter which indicates the output voltage appearing across the terminals. Almost any low current moving-coil meter may be employed, with the correct value of series resistor, to

* The mains transformer shown in the circuit diagram has three 6.3 volt heater windings. If difficulty is experienced in obtaining a transformer with three heater secondaries, it would be possible to employ an auxiliary heater transformer to provide one of the three 6.3 volt supplies.

Components List

Resistors

R_1	100Ω ½ watt
R_2	100Ω ½ watt
R_3	5kΩ 5 watts wirewound
R_4	1.2mΩ ½ watt (for 500μA meter—see text)
VR_1	500kΩ potentiometer linear track

Capacitors

C_1, C_2	16+32μF, 500V wkg., electrolytic
C_3	16μF, 500V wkg., electrolytic

Valves

V_1	EZ80
V_2	EL84
V_3	EL84
V_4	150C2

Inductors

L_1	Smoothing choke, 10H, 80mA
T_1	Mains transformer. Secondaries: 300–0–300V at 80mA, 6.3V at 1A, 6.3V at 4A, 6.3V at 2A. (See text)

Switches

S_1	s.p.s.t. toggle switch (mains on-off)
S_2	d.p.d.t. toggle switch (stabiliser switch)

Meter

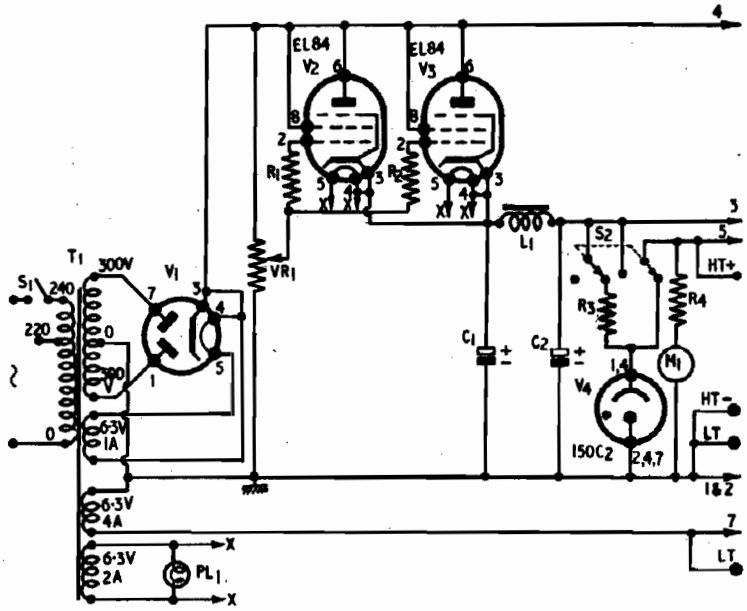
M_1	500μA meter (see text)

Pilot Lamp

PL_1	6.5V, 0.3A pilot lamp

Sockets

3 B9A valveholders
1 B7G valveholder
3 International octal valveholders
1 Pilot lamp holder



Circuit diagram of the regulated power supply

enable voltages up to 600 volts to be measured. The meter employed in the prototype is as used in the well known 19 Set, and is already calibrated 0–600 volts. This particular meter should be used with a 1.2MΩ resistor in series.

Outputs

Output is provided for 6.3 volts and three h.t. voltages on the octal sockets. For "lash-ups" and test purposes, 6.3 volts and the h.t. voltage connected to pin 5 of the octal sockets are available from the terminals.

Pin 5 is the usual connection when using the unit. It provides either a smoothed regulated supply, or a stabilised voltage of 150 volts selected by switch S_2. When using the stabilised supply, the potentiometer, VR_1, should be increased until the meter gives a slight downward kick thus indicating that the stabiliser valve has struck.

Pin 3 of the octal socket will provide a higher voltage simultaneously with a stabilised voltage from pin 5, while at pin 4 there appears the full unsmoothed h.t. output direct from the rectifier cathode.

This power supply has many times over saved the time spent in its construction, and can be considered an addition to the constructor's den which is well worthwhile.

ELECTRICAL ENGINEERS EXHIBITION
18th — 25th March 1964

The organisers of the Electrical Engineers Exhibition are faced with a problem.

It is that having taken and allocated all available floor space at Earls Court to exhibitors, the demand is such that the layout had to be partially replanned to accommodate more stands than was originally envisaged.

In 1964 it will be the world's only exhibition of its kind, but the admission of overseas exhibitors now promises a high standard of representation of the world's electrical industry which will, for the first time, be gathered under one roof.

More British exhibitors will be there than ever before, but in addition many European and other overseas countries are represented, including 12 from Germany.

All overseas exhibits will be on the first floor, some of them on the largest sites available.