

LOUDSPEAKER AND POWER SUPPLY UNIT PS1/15

Introduction

The PS1/15 is an 11-volt stabilised power supplier and loudspeaker unit designed for use with the UN1/584 and UN1/585 receiver units. It operates from mains power or from a 12-volt battery and is self protecting against overload. It includes an audio amplifier and monitoring loudspeaker and also provides a balanced sound output at standard level.

The unit is constructed on a CH1/12A chassis with index-peg positions 9 and 39.

General Specification

Mains input	240 V \pm 20 V, 50 Hz
Batter input	12 V +3 V -0 V
Output voltage	11 V
Output current (nominal)	250 mA
Overload cut-off current (nominal)	400 mA
Regulation 100 mA to 200 mA load	60 mV
Regulation \pm 20 V mains input	+50 mV
Audio output level to monitoring loudspeaker	1 watt
Audio output level balanced into 600 ohms	Adjustable to 1 mW
Audio input impedance	100 kilohms
Weight	2 lbs.

Circuit Description

The circuit diagram is given in Fig. 1.

Power Supplier

The regulator employs three transistors, TR5, TR6 and TR7. The emitter potential of TR7 is stabilised with respect to the negative line by the zener diode D5. Its base potential is controlled

by R22 in series with R21 across the regulated supply. TR7 operates as a common-base amplifier and any change of voltage on the regulated line appears amplified, but not reversed, at the collector. Thus if a reduction in the load current occurs, the output voltage tends to increase and the current through TR7 drops. This reduces the current drive into the base of TR6 and therefore also into the base of TR5, thus reducing the current available for the load and maintaining the correct output voltage across C9.

R20 acts as a starting resistance when the unit is first switched on, supplying sufficient for TR7 base. This allows TR6 to take current, switching on TR5; the output voltage then builds up, the zener current starts in D5 and full stabilisation is achieved.

Under overload conditions, if the output current tends to rise much above 400 mA, the large sustaining base current required by TR5 from TR6, causes the voltage across TR6 to collapse. TR6 then operates as a diode and cannot supply sufficient current to drive TR5. The output voltage drops and there is insufficient current to maintain the zener action in D5. TR7 now operates as a common emitter amplifier and, with falling base voltage, less current is available to drive TR6, thus a cumulative shut down occurs. The 2.2 ohm resistor in TR5 emitter circuit improves the overload protection by limiting the maximum current available.

The unit will not start up again while the short circuit, or near short circuit, conditions persist as there is no base bias available for TR7. Immediately normal load conditions are restored, the output voltage is restored as already described.

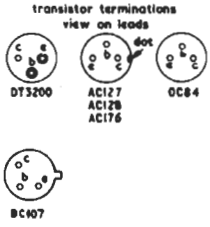
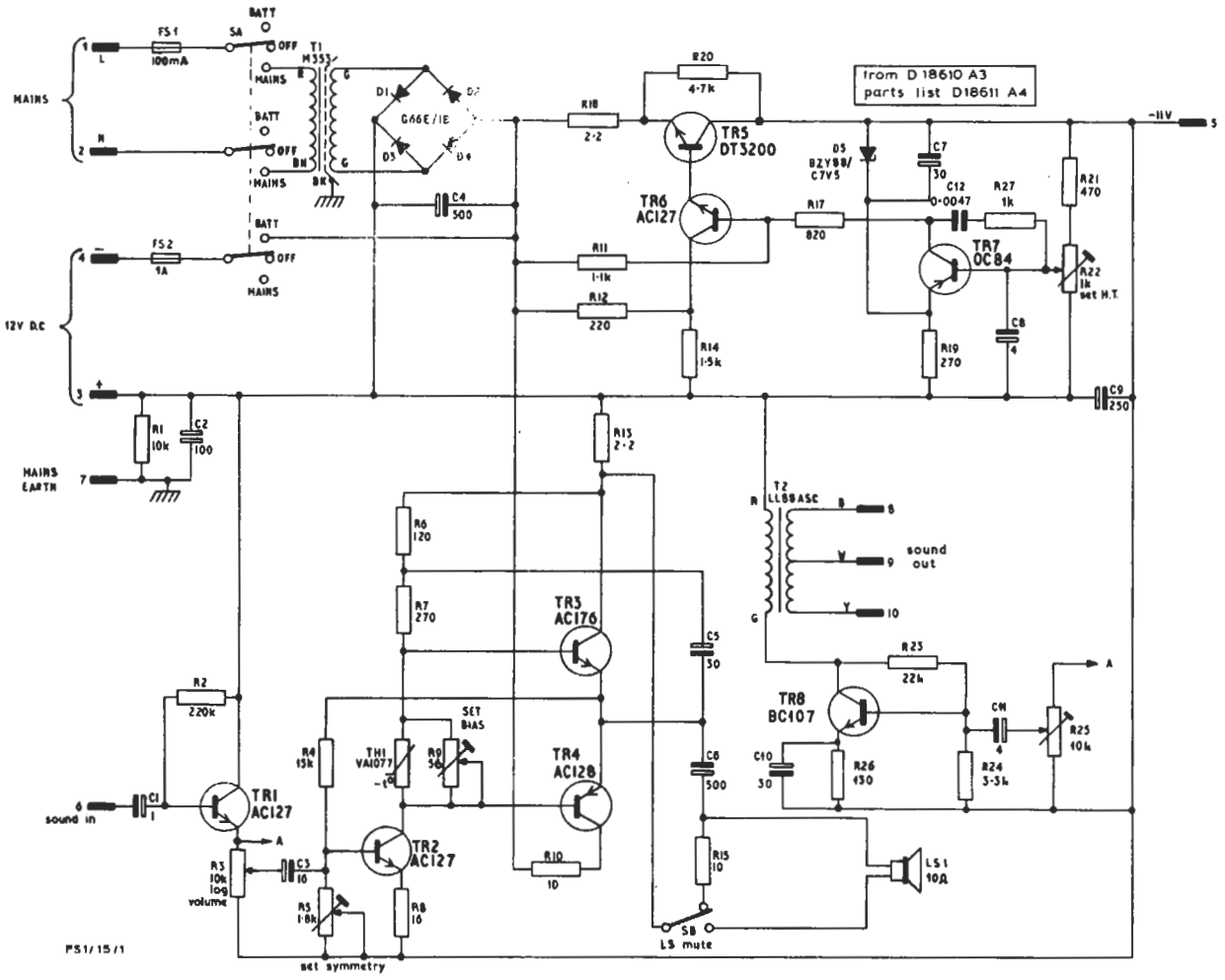
Audio Amplifier

The input transistor of the audio amplifier operates as an emitter follower and feeds the complementary push-pull loudspeaker circuit and the balanced output circuit, each of which has its own level control.

Maintenance

Routine maintenance is not required, but the following checks may be made if the performance becomes suspect.

Fig. 1 Circuit of the PS1/15
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1. With a 90-ohm resistor across pins 3 and 5, check the output voltage with an Avometer model 8. If necessary, adjust to 11 V by means of R22.
2. Check that the output voltage collapses if a 5.5 ohm resistor is connected to pins 3 and 5 and restores immediately the resistor is removed.
3. Apply a 1 V p-p sinewave between pins 3 and 6 and connect an oscilloscope to the junction of C6 and R15. Adjust the *Set Bias* control for minimum cross-over distortion. Adjust the *Set Symmetry* control R5 for equal positive-going and negative-going excursions of the sinewave.
4. Check that the maximum unclipped output is at least 8 V p-p and that the input for 1 V p-p output is 0.25 V p-p.
5. Connect a 600-ohm resistor across pins 8 and 10. With an input to pin 6 of 0.5 V p-p at 1 kHz, and with R3 at its mid point, set R25 for 2.2 V p-p signal across the 600-ohms load.

Reference

1. Designs Department Specification 8.254(67)

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