SECTION 12

STABILISED POWER SUPPLIER PS2/12

12.1 Introduction

The PS2/12 power supplier was designed primarily for use with the Bar and Sawtooth Generator GE1/508A. It consists of two identical rectifier-and-stabiliser circuits fed from separate windings of a mains transformer. The outputs are stabilised at 12 volts, one positive with respect to earth, and the other negative. The unit is built on a CH1/12A chassis, which has indexing-pin numbers 7 and 24.

12.2 General Specification

Mains input voltage	240 volts, a.c.
Maximum output	100 mA at +12 volts. 100 mA at −12 volts.
Hum voltage	Less than 15 mV on each supply.
Mains stabilisation	Less than 0·2 per cent change of output voltage for 20 per cent change of input voltage.
Output resistance	Less than 0·15 ohm for each supply.
Maximum ambient temperature	40 degrees C.

12.3 Circuit Description (Fig. 12.1)

Circuit details of the complete equipment are given in Fig. 12.1. The two supply circuits are identical, so only that producing the negative supply is described.

The a.c. supply from T1 is rectified by the bridge circuit MR5-MR8 and the d.c. is smoothed by reservoir capacitor C4. This feed is applied to the output terminals via the compound emitter-follower TR4 and TR5, which acts as a series voltage-regulator. The stabilising circuit is completed by the amplifier stage TR6.

The TR6 emitter is held by ZD2 at a constant potential of 6·8 volts (nominal) with respect to earth. The TR6 base-voltage is determined by the voltage-divider formed by R11, RV2 and R12 across the output terminals. The operating conditions of TR4 are effectively controlled by the base-emitter voltage of TR6, thus output voltage is controllable by the setting of RV2. For the specified 12-volt output at full load the collector-emitter potential of TR4 is 8 volts.

Any variation of output voltage caused by fluctuation of the mains supply, or change of load, results in an attenuated variation appearing between the base and emitter of TR6. Thus the change is amplified and applied as a correction via TR5 to TR4, which restores the output voltage to its predetermined value. TR5 acts as a coupling stage matching the high-impedance collector circuit of TR6 to the base of TR4.

12.4 Test Procedure

Test apparatus required comprises:

Avometer, Model 8.
Variac transformer.
High-grade oscilloscope.
Two 180-ohm resistors (1-watt rating).

1. Connect the Variac transformer to the mains supply and adjust its output to 240 volts. On the supply unit, connect one of the 180-ohm resistors between PLA12 and PL3 (earth) and the other between PLA14 and PLA3.
2. Connect the power supply unit to the output of the Variac and switch on.
3. Measure the voltages from PLA12 and PLA14 to earth, adjusting RV1 and RV2 to obtain +12 volts and −12 volts respectively.
4. Measure the hum voltage between PLA12 and earth, and between PLA14 and earth; the value in each instance should be less than 15 mV.
5. Vary the mains-input voltage over the range 220-260 volts and check that on each supply (a) output voltage does not change, and (b) hum voltage remains less than 15 mV.

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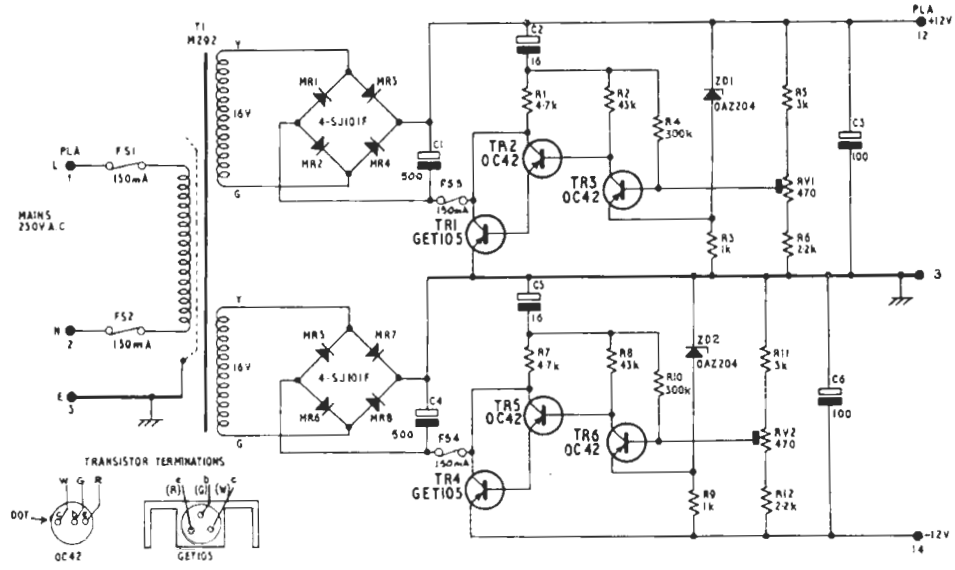
FIG.12.1



COMP	TYPE	TOLERANCE PER CENT	COMP	TYPE	TOLERANCE PER CENT
C 1	U.C.C. SC508/6LS		R 5	ERIE 109 0·25W	±2
C 2	U.C.C. SM90S		R 6	ERIE 109 0·25W	±2
C 3	U.C.C. SC596/7LS		R 7	ERIE 109 0·25W	±2
C 4	U.C.C. SC508/6LS		R 8	ERIE 109 0·25W	±2
C 5	U.C.C. SM90S		R 9	ERIE 109 0·25W	±2
C 6	U.C.C. SC596/7LS		R 10	ERIE 109 0·25W	±2
			R 11	ERIE 109 0·25W	±2
R 1	ERIE 109 0·25W	±2	R 12	ERIE 109 0·25W	±2
R 2	ERIE 109 0·25W	±2			
R 3	ERIE 109 0·25W	±2	RV 1	PLESSEY	
R 4	ERIE 109 0·25W	±2	RV 2	PLESSEY	

STABILISED POWER SUPPLIER PS2/12 : CIRCUIT