SECTION 48

STABILISED MAINS-BATTERY POWER SUPPLIER PS2/48

Introduction

The PS2/48 is a stabilised mains-battery power supplier with +12 volt and −12 volt outputs; both supplies are at 200 mA on mains or 175 mA on battery. The unit is capable of operating in any one of three modes selected by means of a switch on the front panel:

(a) *Charge Only*
In this mode there is no output, but the mains input is used to provide a tapered charging current for the batteries. From the fully discharged state the batteries are half-charged in approximately ten hours and fully charged within thirty hours.

(b) *Battery*
In this mode the outputs are provided solely from two batteries. Each of the batteries has a capacity of 900 mAh at a 10-hour rate and comprises twelve nickel-cadmium cells. A meter on the front panel enables the state of the batteries to be checked. If the mains supply is connected in this mode the batteries receive a trickle charge.

(c) *Mains and Battery*
In this mode the mains provides the supply for the outputs, but if the mains voltage falls below about 210 volts the batteries provide a portion of the output current. Provision is made for the batteries to be trickle-charged.

The PS2/48 is constructed on a CH1/12A chassis with index peg positions 2 and 11. These positions are the same as those for a PS2/13F for which the PS2/48 is an alternative unit. The output pins for the two units differ so that they are only alternatives in equipment wired to take them both.

Circuit Description

The circuit of the PS2/48, shown in Fig. 48.1, is conventional from the mains input to the capacitor across the bridge rectifier. From this is fed a battery charger which comprises an emitter follower with its base stabilised at 18·3 volts. The charging current therefore depends on the state of the battery and decreases as the battery charges. A 680-ohm resistor provides a trickle charge. A diode Type MS2 prevents the battery from discharging through the input circuit. The state of the batteries can be checked by means of a meter backed off by zener diodes. This meter is also used to indicate that mains is being fed to the PS2/48.

The unregulated supplies are fed to two similar cross-coupled complementary series regulator circuits. Only the +12 volt circuit is described. Transistors TR3 and TR5 form a conventional series regulator compound emitter follower. Variations in the d.c. output voltage together with any a.c. signal on the output are fed to the amplifier transistor TR2 via an emitter follower TR4. The base-emitter junction of this emitter follower provides a temperature compensation for changes in the operating point of transistor TR2. The collector load of transistor TR2 is taken to the −12 volt output. This positive feedback ensures that a fault on one supply shuts down both regulated outputs. Resistor R24 provides a current source for transistor TR2 which automatically resets the regulator circuits when the fault is removed.

Excessive current through resistor R7 provides a sufficient base-emitter voltage for transistor TR6 to conduct. The collector current of transistor TR6 flows through resistor R4 shutting down both regulator circuits.

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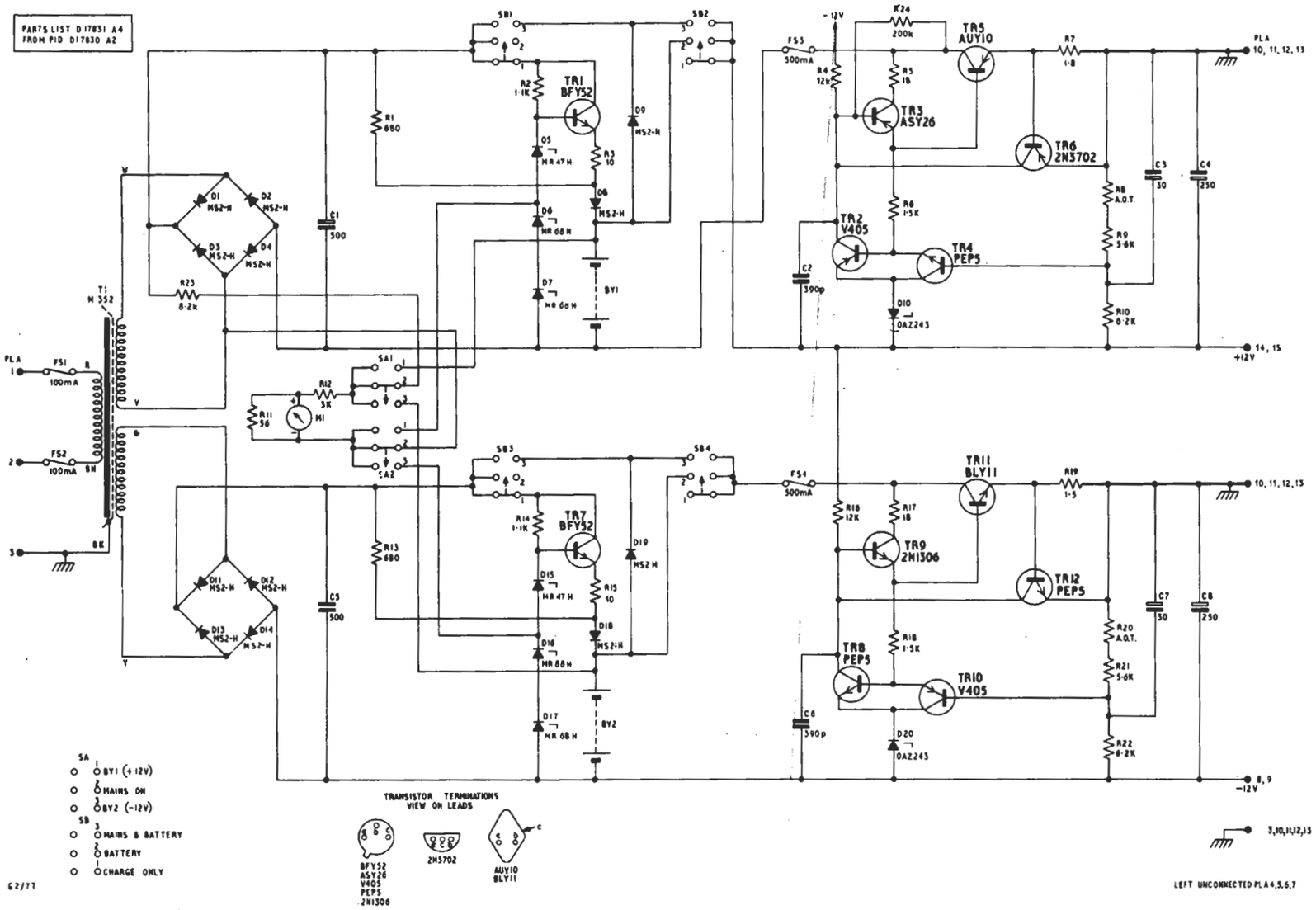
See page 48.3 for Fig. 48.1



48.3

Fig. 48.1 Circuit of the PS2/48