MOTOR SUPPLY GENERATOR GE1/4

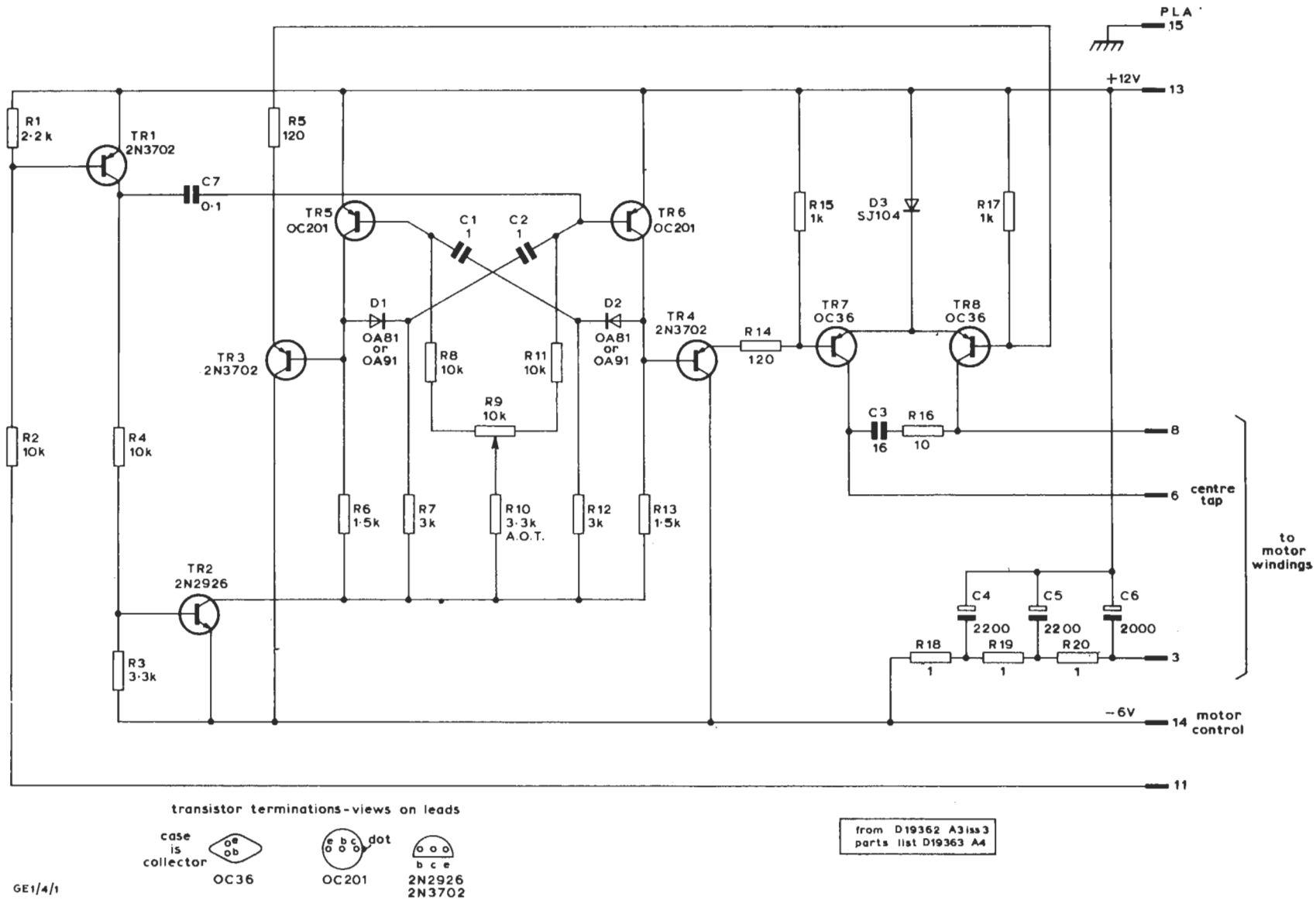

Fig. 1. Circuit of the GE1/4

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Introduction

The GE1/4 generates a 37-Hz 30-volt p-p output suitable for powering an induction motor in an assoiciated tape reproducer[1,2]. The generator requires −6 and +12 volt d.c. supplies.

Components are mounted on a printed wiring board which is fixed to a CH1/18C chassis with index pegs in positions 6 and 40.

Circuit Description (Fig. 1)

The generator comprises an astable multivibrator and associated switching and output circuits.

An external earth connection applied to PLA11 causes TR1 and TR2 to saturate and complete the negative supply rail to multivibrator TR5 and TR6. The initial connection of the earth to PLA11 causes a positive transition at the collector of TR1 which is passed by capacitor C7 to the base of TR6. TR6 is driven towards cut-off and TR5 conducts; this ensures that the multivibrator starts reliably. Diodes D1 and D2 prevent the negative-going edges of the square waveform from being rounded off by the timing capacitors C1 and C2. The value of resistor R10 is chosen so that the correct frequency of 37 Hz is generated and the unity mark/space ratio of the output waveform is obtained by adjustment of variable resistor R9.

An output from each collector is passed by separate stages TR3 and TR4 to output transistors TR7 and TR8 which are connected as a difference amplifier. The collector load for each of these transistors is half the winding of the associated motor. Diode D3 ensures that the output transistors are cut off when the motor is not running.

C3 and R16 suppress negative-going transients at the collectors of the output transistors, and C4 to C6 with R18 to R20 form a decoupling network for the 6-volt negative supply.

Test Procedure

Apparatus Required

Tape Reproducer RP4/3
Oscilloscope
12-volt power supplier
6-volt power supplier

Tests

1. Connect the power suppliers and switch on.
2. Connect pin PLA11 to chassis.
3. Check that the waveform at the base of transistor TR4 is a square-wave of about 15 volts p-p with a minimum d.c. level of −4·0 volts.
4. Check that the mark/space ratio is unity and if necessary adjust resistor R9.
5. Check that the periodic time of the waveform is 27 ms. The value of resistor R10 is chosen to obtain the correct periodic time.
6. Check that the mark/space ratio is still correct.
7. Disconnect pin PLA11 from chassis.
8. Connect the motor in the RP4/3 to the output of the generator.
9. Connect pin PLA11 to chassis and check that the motor starts.
10. Check that the motor stops when pin PLA11 is disconnected from chassis.
11. Check, with the motor running, that the waveforms at pins PLA6 and PLA8 are identical and that each has an amplitude of 30 volts p-p.

Table 1 gives certain d.c. potentials in the circuit.

TABLE 1

Measuring Point	*Volts with M.V.B. Off*	*Volts with M.V.B. On*
PLA3	−6	0
TR1 Base	+12	+11·3
TR1 Collector	−6	+11·6
TR2 Base	−6	+11·6
TR2 Collector	+12	−5·6
TR7 Base	+12	

References to Typical Associated Equipment

1. Tape Reproducer RP4/3.
2. Automatic Fault Reporter PA2M/7A.

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