INGENUITY UNLIMITED

A selection of readers' suggested circuits. It should be emphasised that these designs have not been proven by us. They will at any rate stimulate further thought.
This is YOUR page and any idea published will be awarded payment according to its merits.

TAPE MOTOR CONTROLLER

THE mechanical governor provided on a recently acquired portable tape recorder motor posed problems of electrical noise and mechanical wear. Thus it was decided to replace it with an electronic system to control motor speed both within a given speed setting as did the original governor and from speed to speed as is often achieved using different sized pulleys.

The circuit of the system is shown in Fig. 1 where current supply to the motor is controlled by TR3, itself controlled by the base voltage of TR1. A basic d.c. bias is applied to the base of TR1 from the Zener circuit and chain, R1, VR1/VR2. This sets the main motor speed.

Regulation of the speed about the selected value is supplied by detecting motor shaft speed using a pick-up coil and magnet assembly as shown in Fig. 2. The coil provides an a.c. voltage to D2 which thus gives a d.c. bias at the base of TR1. As the voltage fed back depends on the rotational speed of the motor speed control over a wide range is possible.

Under normal operating conditions the voltage from emitter follower TR1 appearing across R2 is about 2V. An increase in speed raises this value making D3 conduct through R3 and TR2 conducts heavily. This cuts the bias on TR3 to slow the motor.

Similarly, a decrease in motor speed reverses the process.

Supply voltages from 8 to 15V are acceptable and in addition to exhibiting good quick-start properties, the equipment provides almost twice motor voltage on full stall condition.

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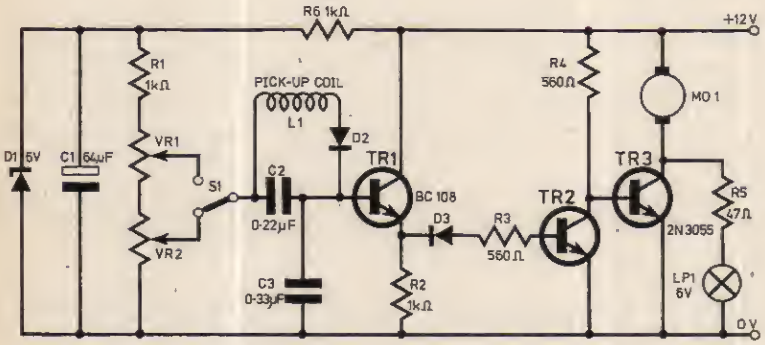

Fig. 1. Circuit diagram for the tape motor controller

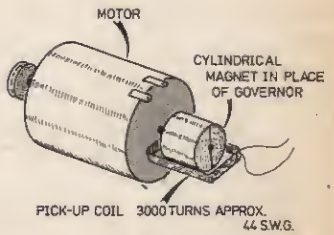

Fig. 2. Pick-up coil and magnet arrangement

I.C. LAMP FLASHER

THE DTL integrated circuit type 9944 is a cheap dual buffer amplifier in one dual-in-line package and can be used to make a reliable, economical lamp flasher.

In the circuit, diagram Fig 1, the two amplifiers are cross-connected with capacitors C1 and C2, the values of which determine the frequency. The circuit becomes a multivibrator with the lamp LP1 in one collector.

Numbers in the circuit are the i.c. pin numbers.

If C1 and C2 are 100μF (over 8V rating), a flashing rate of 30 per minute is obtained. Any 6V low current bulb may be used or the circuit could be used to operate a relay.

The Mullard equivalent i.c. is the DTL FCH 121, but the pin numbering is different. On this device, pins 1 and 8 are 6 and 8. Cross-connect pins 8 with 13 and pins 1 with 6, using the capacitors C1 and C2. Also pin 7 is +6V and pin 14 is ground (neg).

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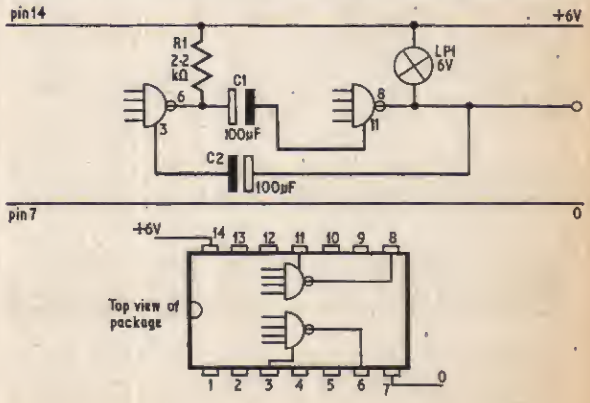

Fig. 1. Circuit diagram and i.c. connections for the simple flasher