UNLIMITED!

IN THIS feature we hope, from time to time, to be able to publish suggestions submitted by some of our readers on the possible improvement of projects previously described in PRACTICAL ELECTRONICS; short contributions on other subjects may be included. The aim is not to find fault or undermine the abilities or knowledge of our contributors. It may well be that the original article is *par exellence* but it could be improved or adapted to suit individual requirements. The views expressed by readers are not necessarily those of the Editor.

AUTOMATIC SWITCHING OF TAPE RECORDERS

THERE are, of course, alternatives to the method (January 1967 issue) of automatically switching tape recorders. One, basically with less components—and no transistors—is shown in Fig. 1. This unit is simply interposed between the mains supply and the tape recorder. RLA is a Carpenter miniature polarised relay of the twin coil, each-side-stable variety (such as the 5c9, which has 1,600 ohm coils). Coil (b) is connected so that closure of the watch contacts pulls the relay armature "in". It will, of course, remain "in" after the watch contacts have opened again.

Coil (a) is connected so that the circuit completed by the tape foil moves the armature "out". So long as the armature is "in" RLB is energised, completing the mains circuit to the tape recorder. Although, normally, the unit will not be used a vast number of times, the loads switched by the watch contacts and RLA contacts are each inductive and it would be desirable to suppress arcing by wiring a resistor (50–100 ohms) and a capacitor (0·05–0·1μF) in series across each pair of contacts as shown.

Provided the recording period is to exceed the period of closure of the watch contacts (about 35 minutes) a very short piece of tape foil will result in switching off the mains supply to the recorder. One of the short self-adhesive metallic tabs available from some photographic dealers, fixed temporarily to the back of the tape, will do the job simply and conveniently if the tape deck contacts are suitably arranged. Motor over-run will take the tab past the contacts so that the unit ceases to draw current.

For shorter recordings, a good electrolytic capacitor (say 200μF) in series with coil (b) of RLA will allow a "pulse" (whilst the capacitor charges through the coil) to move RLA armature "in", after which only a minute leakage current will flow—not enough to prevent the foil tab moving the armature "out" again at the required time. Obviously the leakage current will continue to flow only until the watch contacts open.

Since the unit draws current only during the period of watch contact closure or the period of the recording —whichever is the longer—consideration could well be given to battery operation, dispensing with a step-down transformer which would continue to be "alive". Either way, the d.c. operating voltage is dictated by RLB: the Carpenter relay of the type mentioned, when in good mechanical adjustment, is capable of operation on less than half a volt and little more than a quarter of a milliamp—which means that each coil could have a quite large series resistance, if desired, to keep consumption to a minimum.

If operation via a transformer and rectification is preferred, the circuit of Fig. 2, which uses an additional relay, has the advantage of shutting off the mains supply to both transformer and tape recorder at the end of the recording. Operation is fairly obvious. Depressing the push-button or microswitch (of the biased-off type) closes the mains circuit to the transformer. Rectified low voltage then energises RLC through RLA contacts, and RLC contacts preserve the mains supply to the transformer when the push-button is released.

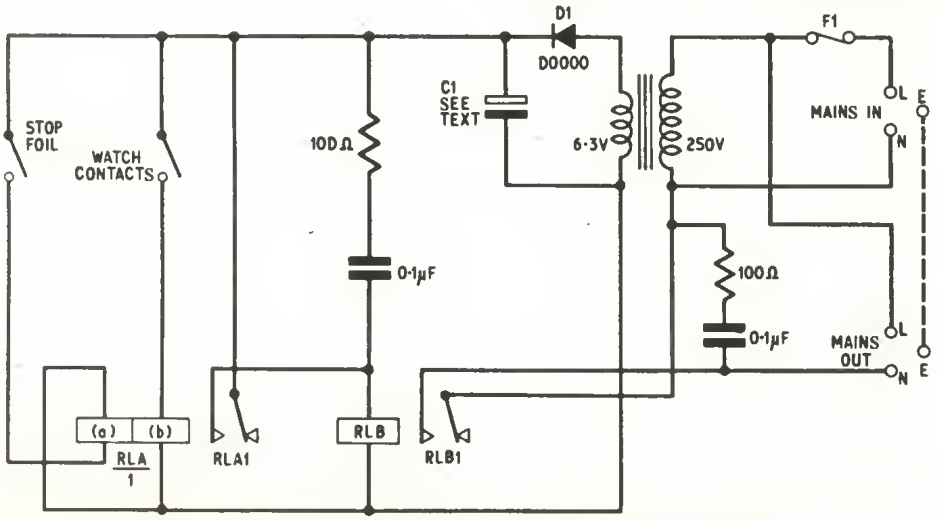

Fig. 1. Simple tape recorder switch using a Carpenter relay

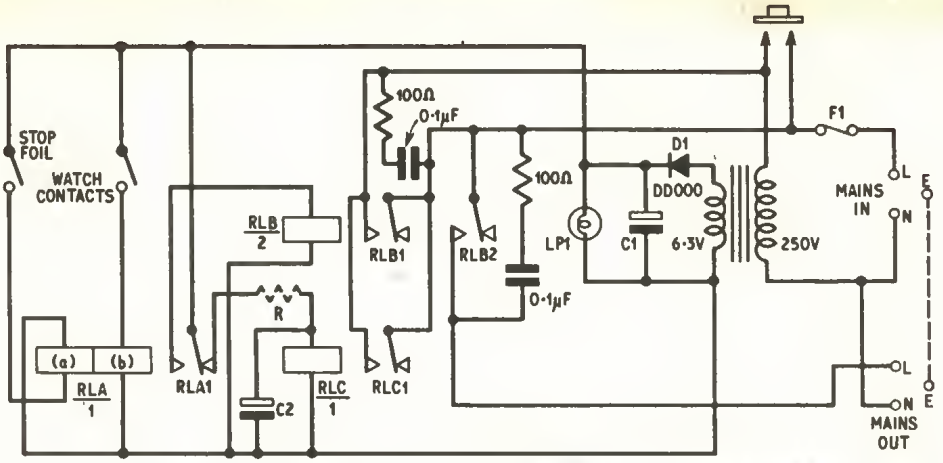

Fig. 2. Improved version of circuit in Fig. 1 to switch off the mains supply at the end of recording

The pilot lamp (which also has another function mentioned later) indicates that the unit is set.

When the watch contacts close, RLA contacts change over, energising RLB in place of RLC, but discharge of the capacitor in parallel with RLC delays its de-energisation long enough for its function to be taken over by RLB, thus preserving continuity of the mains circuit. RLB's second pair of contacts complete the mains supply to the tape recorder.

When the deck contacts are bridged by the foil tab and RLA changes over again there is a fraction of time during which its armature is between its side contacts, touching neither. RLC is already de-energised, and RLB is immediately also de-energised so that the mains circuits to both the transformer and the tape recorder are opened. However, the fraction of time is very small indeed and if sufficient charge remains long enough on the reservoir capacitor C1, RLC will again energise—restoring the mains supply to the transformer, though not, of course, to the tape recorder. During the changeover, RLA (via the foil tab) will briefly take some current from C1 but it will be very little; the pilot lamp will take much more.

On completion of the changeover, C2 presents a temporary virtual short to C1, after which there *may* be some remanent charge on both capacitors at something less than maximum voltage) draining rapidly away via the pilot lamp and RLC coil. If the capacitance of C1 is chosen to be no greater than is necessary to obviate relay chatter, the probability is that all will be well—so long, at least, as the lamp doesn't fail.

There is a simple way of making sure: a resistance R, will make RLC slow to close without disturbing its slow-to-open function—provided RLC, C2 and R all have fairly high values. A little experimenting with alternative values of C and R, with the pilot lamp removed, should quickly ensure satisfactory operation. If necessary, a bleeder resistance can be fitted across C1. Remarks, in respect of Fig. 1, concerning short recordings and inductive loads clearly apply also to the circuit of Fig. 2. All relays should be capable of operating at the supply voltage (6·3V) and have heavy duty contacts.

If the tape recorder to be used has a three-core mains cable, the earth line can obviously also be used as a connection between the control unit and the "earthed" contact of the pair on the deck which are bridged by the tape foil. This leaves a single line connection to be made (e.g. by banana plug) to the insulated deck contact.

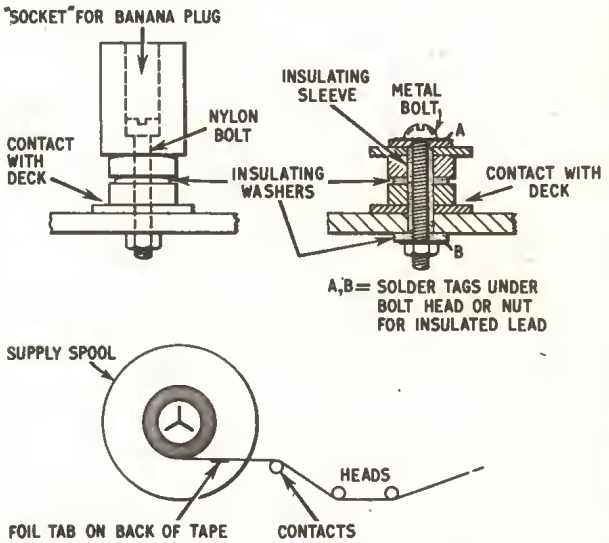

Fig. 3. Insulation of the tape guide and position with respect to the heads

Any rectifier diode rated at about 12V 0·5A will suit for D1.

N.B. Reference to removable self-adhesive foil tabs assumes use of a deck contact assembly similar to those in Fig. 3, which are easily made up. If separately mounted contacts are used, the length of stop foil spliced into the tape should be only marginally longer than the distance between them.

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We would stress that neither this system nor the original system (January 1967) are immune from the possibility of "flats" occurring on the rubber capstan roller if this is mechanically held engaged while the recorder is not running.

SIMPLE SITAR

IN THE "Simple Sitar" (*Ingenuity Unlimited*, March issue) there should be a resistor 220kΩ between TR1 base and the negative supply line. R1 on the published circuit should be 4·7kΩ and R2 220kΩ. The battery voltage is 9V.