

Tic Tac Radio

THIS MEDIUM WAVE receiver measures about 60x36x15mm when constructed in a "Tic Tac" mint box. From the circuit in Fig. 1 it will be seen that the well-known TRF radio IC, ZN414, is used. This is followed by a single audio amplifier. This IC is often used alone for earphone reception, but the addition of an amplifier considerably boosts the volume.

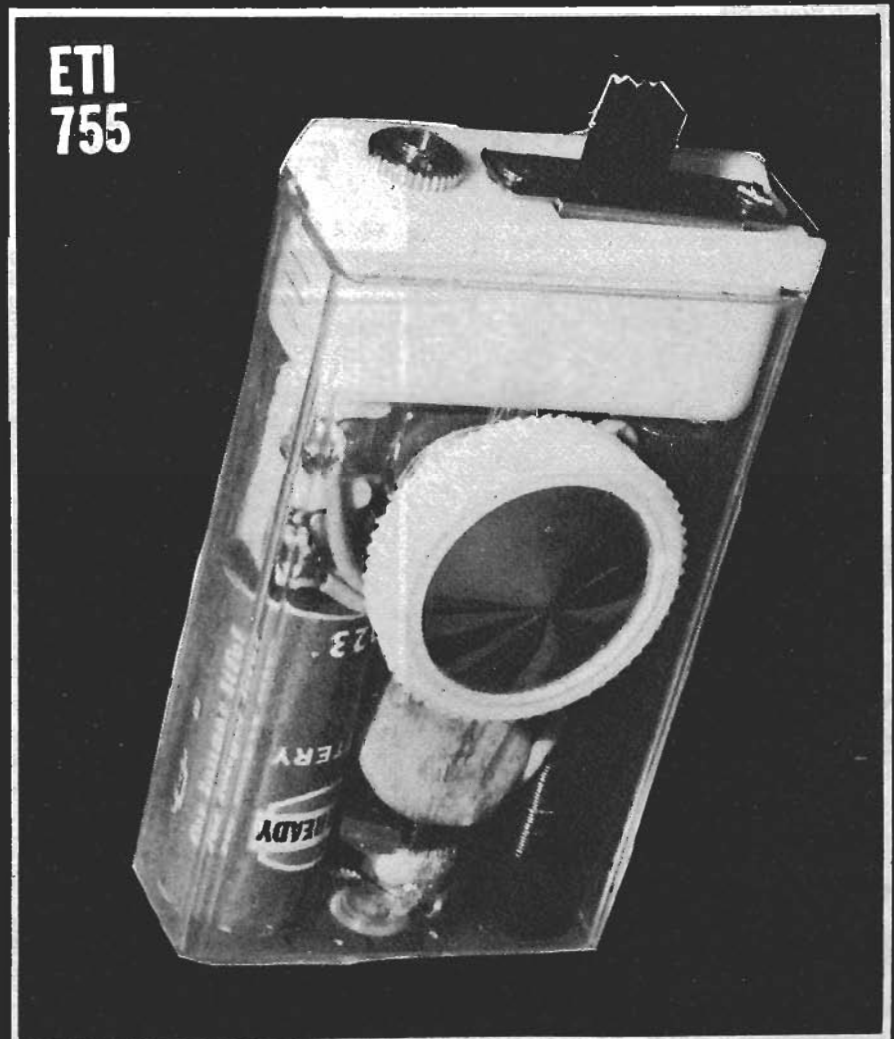
The normal medium wave band is tuned by the compression trimmer VC1, which is available with a shaft fitted so that a standard control knob can be used. The audio output is to a 2.5mm jack socket via the isolating capacitor C4 (to ensure that the operating conditions for Q1 are not upset by the DC resistance of the phone or headset. A crystal earpiece can also be used.

COMPONENTS

An important consideration in building a miniature radio is the actual size of the components. C1 and C2 are easily obtained low voltage ceramic discs; C3 and C4 are small bead capacitors. The resistors are standard 1/3 or 1/4 watt.

Cut the board so that it will slip into the case. A part of the board is then cut away to allow the battery to fit. VC1 is fitted to the board by its bush, which is cut or filed down to avoid unnecessary projection.

The box lid takes the miniature slide switch with no modification to



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the slot. Two small bolts hold the switch. The switch and jack are placed inside the lid as in Fig. 2.

FERRITE ROD

This will have to be cut from a longer rod. File a groove all round the rod 42mm from one end. The rod can then be broken by hand. Start to wind the 32swg enamelled wire 6mm from one end and fix with adhesive. Wind on eighty turns, side by side, and glue the wire again. Finally cement the rod to the perforated board.

WIRING

All leads etc can be seen in Fig. 2. It is important to keep the connections close to the board. Avoid large joints or the depth will prevent the radio fitting in the case. It is best to fix S1 and the jack to the lid before fitting the board.

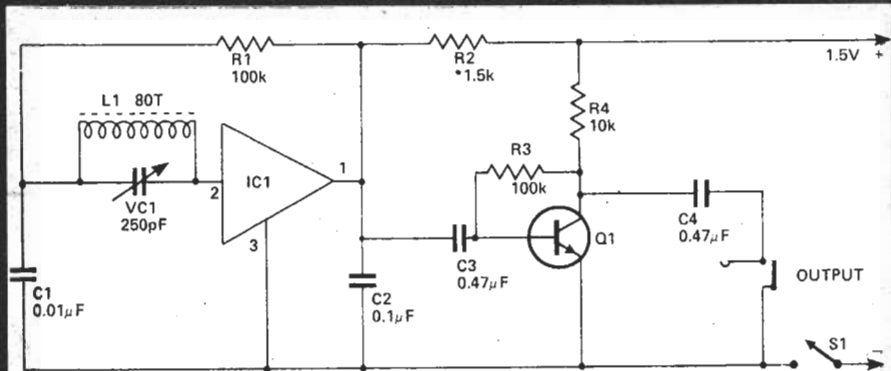
Before S1 and the socket are fitted connect projecting leads for negative line, C4, and battery negative. Battery connections are soldered to the cell.

RESISTOR R2

Here 1.5k should be suitable. The actual layout of leads and components is likely to vary from that of the prototype and this increases the chances of instability. This would be manifest by IC1 oscillating so that whistles accompany reception with some signal levels, or on some frequencies. A check can easily be made before fitting the radio in its box. If reception is satisfactory (as is likely) R2 can be left at 1.5k. If R2 can be reduced in value, possibly to 1.2k or 1k, without whistles arising, this will increase gain. (R2 should not be less than 470 ohm).

BOX AND VC1

Push the receiver into its box and mark the position of the adjusting screw of VC1. Remove the radio and drill this point right through (so that



(* MAY BE ADJUSTED)
Fig. 1. Circuit of the miniature receiver.

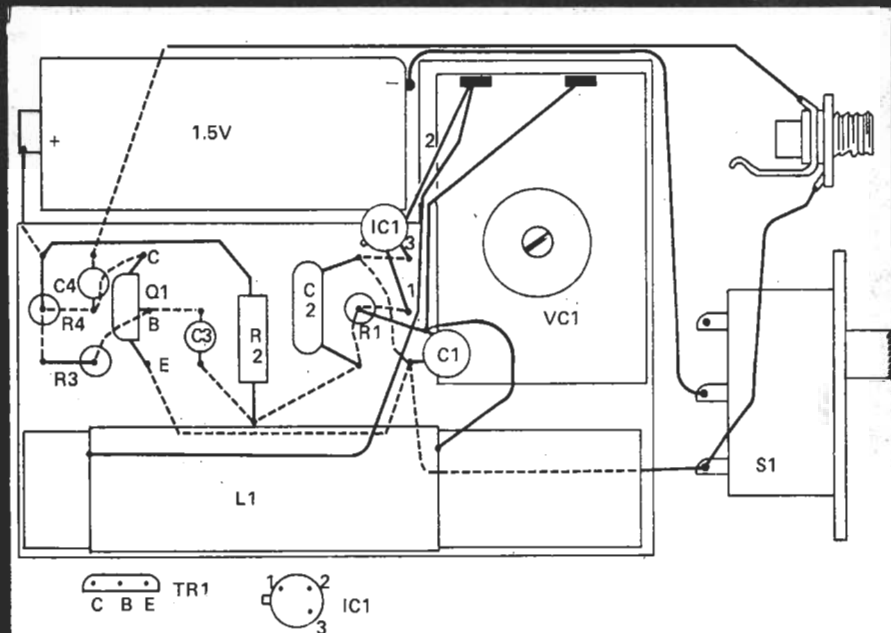


Fig. 2. Wiring and semi-conductor leads.

PARTS LIST

R1	100k	¼W	5%
*R2	1.5k	¼W	5%
R3	100k	¼W	5%
R4	10k	¼W	5%
C1	0.01µF	disc ceramic	
C2	0.1µF	disc ceramic	
C3	0.47µF	tantalum bead	
C4	0.47µF	tantalum bead	

* (may need adjustment)

VC1 Type TP4 250pF compression trimmer with Z236 spindle (Home Radio, Mitcham)

IC1 ZN414

Q1 ZTX300

L1 80 turns 32 swg enamelled wire on 42 x 9mm ferrite rod.

D23, 1.5V cell, small knob, 2.5mm jack socket, miniature slide switch, 42 x 30mm 0.15in matrix perforated board, "TIC TAC" mint box.

the bush and nut can fit in the bottom hole in the box). Use a sharp drill with light pressure, or ream out the hole. Be careful because the material is brittle.

With the receiver replaced, completely remove the adjusting screw, taking care not to displace the washers, and screw in the shaft. The latter is cut back to 6mm so that a small knob can lie near the box. This is a push-

fit over a flat filed on the shaft.

PHONES

Best reception of all is with a good pair of high impedance headphones (the Heathkit GD-396, 2k impedance, will be ideal). Where a miniature earpiece is required, this should be a high impedance unit, or volume is to be severely reduced.