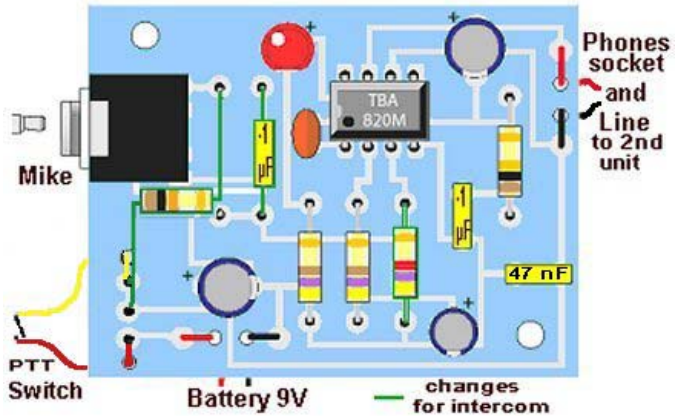
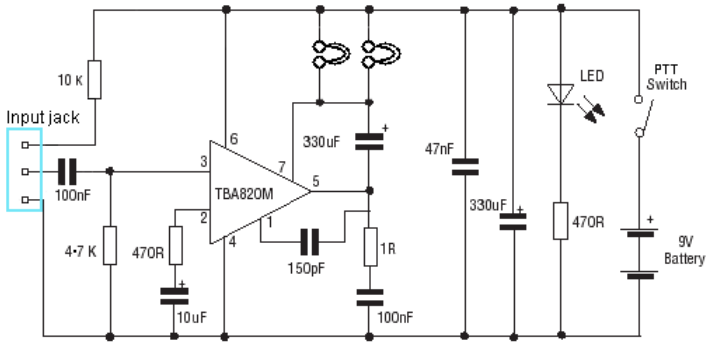
Intercom Project Assembly Instructions



Modified populated circuit board



Modified circuit diagram

The basic amplifier project is supplied by Rapid Electronics Ltd., Severalls Lane, Colchester, Essex CO4 5JS www.rapidonline.com Tel: 01206 751166. This circuit has been modified in a number of ways, so please use these instructions rather than anything on the Rapid Electronics site.

Tools Needed:-

Small Pozidrive screwdriver, soldering iron and stand, solder, edge cutter, small pliers. If you don't have the quick-build kit with prepared box, you will also need 3mm, 4.5mm and 6.5mm drill bits and drill.

The Build:-

The board is straight-forward to populate, but note the following:-

1. the chip holder and chip are the right way round, as marked on the PCB, and the legs of the chip don't get bent up when fitting it
2. the polarity for the electrolytic capacitors and LED is correct (longer wire is +); fit the insulation to the long LED wire before soldering just the tips of the wires so it can be bent to reach the front panel
3. the 10K-Ohm resistor connects to the top switch solder point, but must be bridged to the middle one
4. cut 15cm of wire from the main length for the PTT switch and the headphones socket; join the headphone socket connections as shown. Link the two end connections on the stereo socket.

The Casing:-

The ABS box is easy to drill, and tends not to crack; there are some tips though (* = not quick-build):-

5. *Trim the top 2/3 of the ribs on the inside front – a small wood chisel and hammer works well.
6. *The mike socket needs a 6.5mm (1/4") hole centrally, and centred 8mm from the case edge (seam).
7. *The phone socket and PTT switch need a 6.5mm (1/4") hole central to the gap between the screw boss and outer circuit-board guides and about 1/2-way down; the template gives the relative positions. A 3mm pilot hole is helpful - the mike socket hole is close to the edge so take care not to split the case
8. The board is mounted on the lid with 5mm spacers between; the mike socket must end up central to the case end, and the board edge must reach the outside of the inner lip of the lid (diagram).
9. Put the end of the 10-metre wire through a 4.5mm (3/16") hole in the case back and peel back 15cm of the outer insulation; knot the insulation around the cable inside the box to stop it being pulled out. With 4-core cable, join them in pairs (same colours for both intercoms!) to maintain the signal strength.
10. Stick the battery holder on the lid with double-sided tape, and the labels on the outside of the case; trim the panel label neatly with a small scalpel where the holes are, and fit the sockets carefully to avoid damaging the label. Close up the box and screw together. Finally test to check everything works.

Components:-

1 TBA 820M + 8-pin dil socket	1 47 nF polyester capacitor C5	1 printed circuit board or project board
1 red 3mm or 5mm LED	1 0.1 uF (brown suitcase-shape) R2 (mod)	2 csk M3 x 12mm screws, nuts and locking washer
1 10K resistor (brown, black, orange) R1 (mod)	1 150 pF ceramic capacitor (151) C2	1 ABS box, 100 x 75 x 40mm works
1 4.7K resistor (yellow, violet, red) R3	1 PP3 battery snap (connector)	2 5mm high x 3mm bore spacers
2 470R resistors (yellow, violet, brown) R4, R6	1 PP3 battery holder and double-sided tape	10m 2-core speaker wire, or phone extension
1 1R (brown, black, gold) R5	1 PP3 battery	25mm insulating sleeve for LED
2 330uF electrolytic capacitors C3, C6	1 PCB 3.5mm stereo jack socket	Labels as supplied.
1 10uF electrolytic capacitor C1	1 chassis 3.5mm stereo jack socket	
1 0.1uF polyester capacitor (.1K63) C4	1 push switch (PTT)	

If you have any problems assembling the components, please contact:-

Dave Hall, 01761-490653; e-mail dave at flyers.org.uk; www.flyers.org.uk

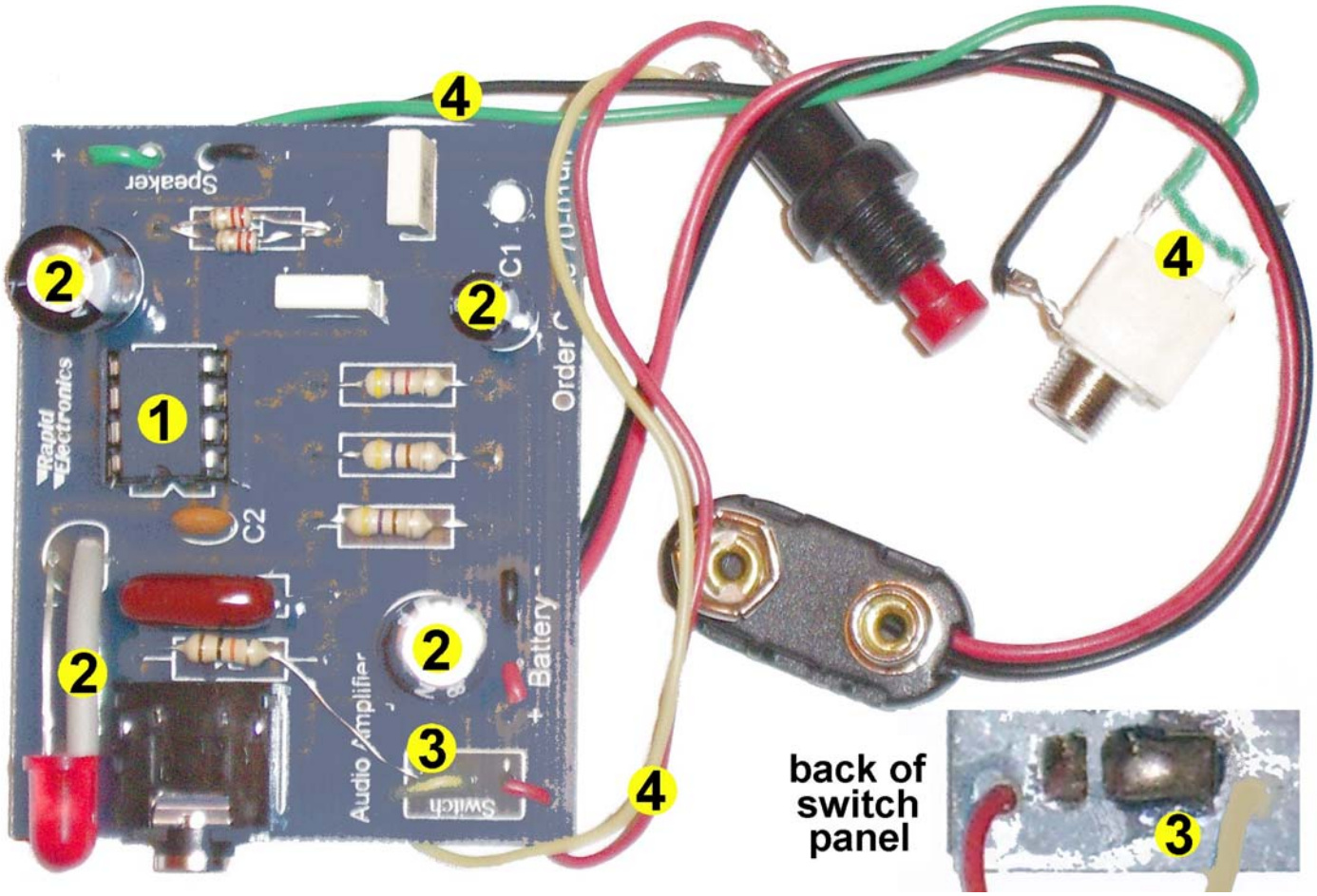
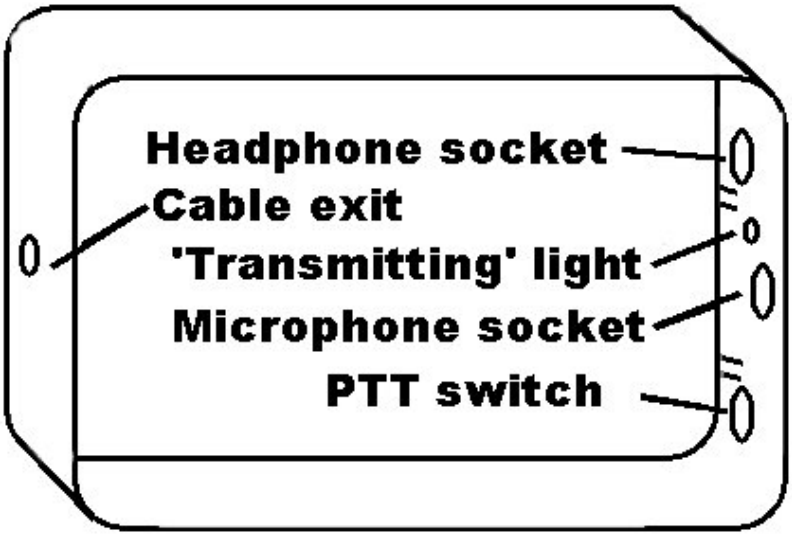
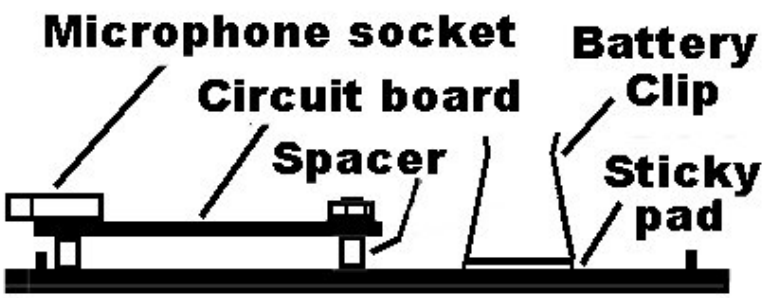


Photo 1

Photo 2

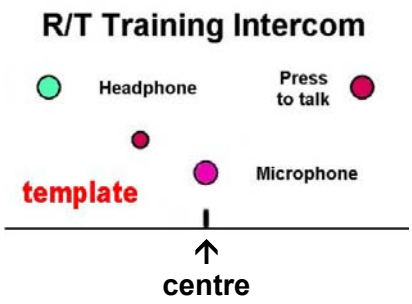
Numbers refer to sheet instructions





Using the Template

(Not needed for quick build kit)



There's a curved moulding mark on the box edge in the centre – line that up with the centre-mark on the line, and stick the label on so the line is along the outer edge of the box seam.

Check the marks for the headphone and PTT switch are central between the screw pillars and the outer circuit board support rail, and the microphone mark is central and 8mm up from the edge.

Supplementary Instructions

Components:-

R1 10K
R2 Cap. 0.1uF (large brown – yes, it is meant to be a capacitor, not a resistor!)
R3 4.7K
R4 470
R5 1R
R6 470
C1 10uF electrolytic
C2 150 pF disc ceramic
C3 330uF electrolytic (subst. 470uF as they couldn't supply 330uF)
C4 0.1uF polyester
C5 47nF polyester

Building:-

Suggest order for soldering components to give most room is:-
Chip holder; mike socket; resistors; small capacitors; large capacitors (check polarity); battery connector; PTT wires; headset (speaker) wires; LED (check polarity and remember to fit insulation). Snip or snap off the long wires after soldering to allow room for soldering the next ones if you're sure they're right!

Remember the battery leads must be red + and black -.

The mod needing two 2R2 resistors in parallel – the wires are thin enough to get both in the holes with care.

The 0.1uF (big brown) capacitor needs the legs bent outwards a bit to fit nicely.

The cream-coloured 3.5mm stereo jack socket for the headphones has been found to give some trouble – prepare all wires as needed, and solder for as little time as necessary.

Check carefully for polarity of battery leads, electrolytic caps and LED before fitting the chip.
It is quite hard to get in, and very easy to bend a leg under. The chips are supplied separately from the component kits in a tube with anti-static warning – however they seem unaffected by normal handling.

Testing:-

Test the circuit before assembling in the box, to give ample room for sorting out problems.

Plug in a battery and headset (pink is mike; green is phones).
Turn up volume control on headset (towards +).
Press PTT button.

LED comes on and you should hear sound in earphones.
If the sound is amplified background, and the mike works in your earphones when you talk, you've probably made a good 'un. Well done!

Some possible faults:-
Whistling problem – remove headphone plug and put back in a few times. Try rotating the plug, unplugging and plugging. The whistling happens when the headphone jack short-circuits.

No headphone sounds – check volume control is turned fully up; check LED is lit; check the upper two contacts on switch area are linked with a solder bridge (see photo 2); check chip is fitted correctly.

No LED when PTT pressed – may be poor joint on switch connections on board, or LED or battery polarity wrong.

There is no data on problems caused by components being wrongly fitted in the circuit – I've always done it correctly! Please pass on any problems you find in the instructions so the next people to build a set can be warned in good time.

Thanks. Dave Hall, December 2006