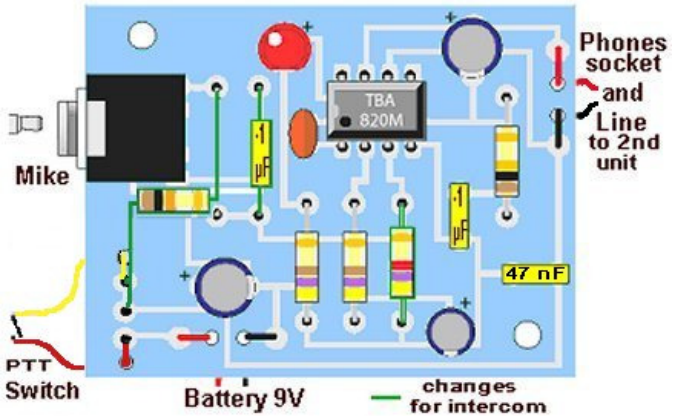
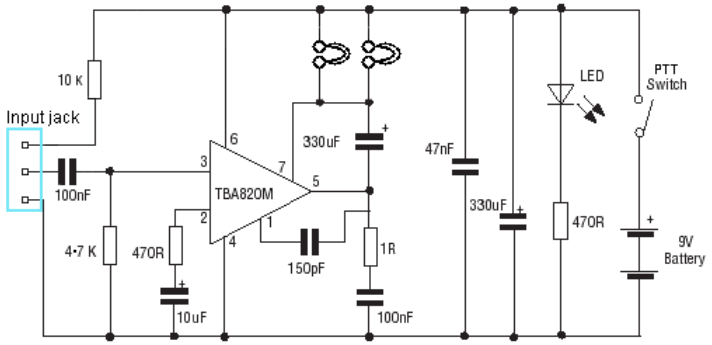
Intercom Project Assembly Instructions



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 the project notes on the Rapid Electronics site.

Tools Needed:-
Small Pozidrive screwdriver, soldering iron and stand, solder, edge cutter, small pliers, thin scalpel.

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 critical (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 middle switch solder point, but must be bridged to the top one.
4. cut 15cm of wire from the main length, for the PTT switch and the headphones socket; join the two rear headphone socket connections as shown, to drive both earpieces.

Fitting in the Casing:-
The ABS box is supplied ready drilled, with the PTT hole 7mm dia, and the mike and phone holes 6.5mm.

5. The board is mounted on the lid with 5mm spacers between; the mike socket is central to the case end, and the board must reach the outside of the inner lip of the lid (see diagram). The mike hole may need opening out slightly if not quite aligned, or the cover fitted with the board mounting screws slightly loose to allow the mike socket some leeway to fit properly, then tightened carefully.
6. Put the end of the 10-metre wire through the hole in the case rear 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 is safest!) to maintain the signal strength. If using a phone extension to allow extra units to be linked, 2 extra units with male phone connectors can be connected using a 3-way phone adaptor, but **DO NOT CONNECT TO A PHONE SYSTEM** !
7. Stick the battery holder on the lid with double-sided tape, and the labels on the outside of the case.

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
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	1 25mm of 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

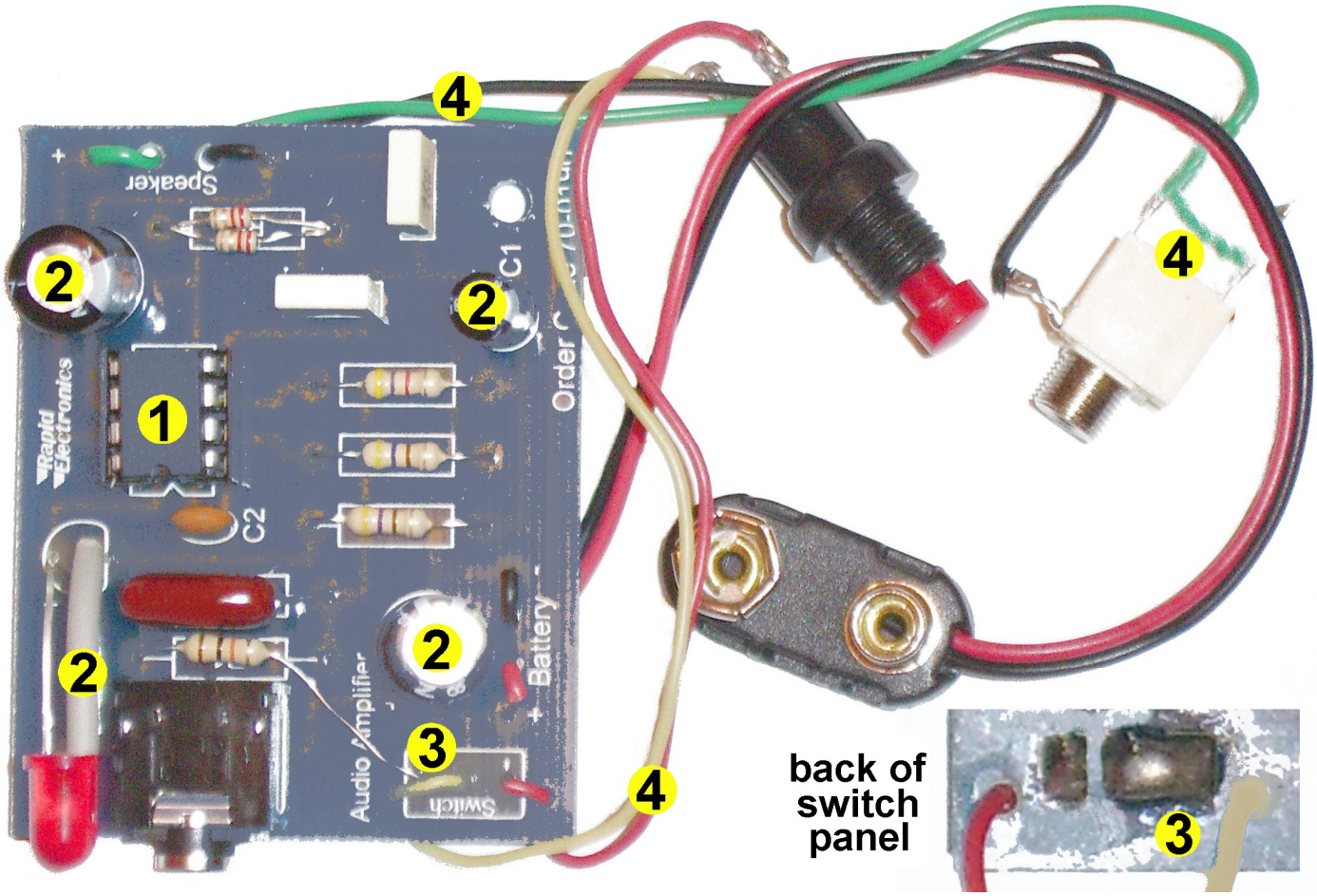
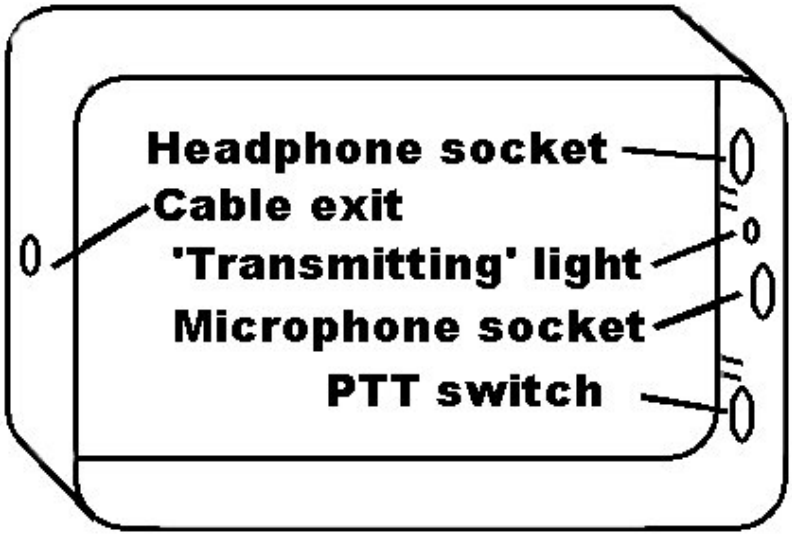
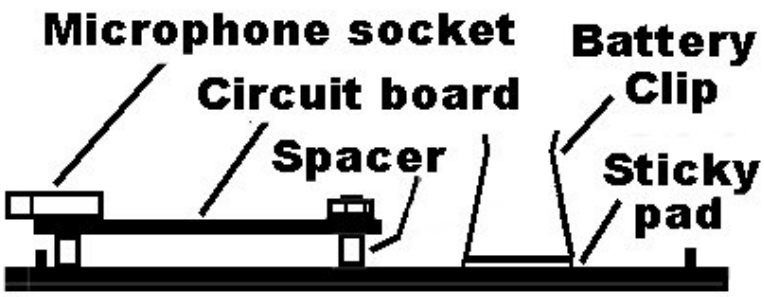


Photo 1

Photo 2

Numbers refer to sheet instructions





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 (acceptable to substitute two 2R2 if 1R not available)
R6	470
C1	10uF electrolytic
C2	150 pF disc ceramic
C3	330uF electrolytic (acceptable to substitute 470uF if 330uF not available)
C4	0.1uF polyester
C5	47nF polyester

Building:-

Suggest order for soldering components to give most room is:-
Chip holder; mike socket; resistors (note R1 goes to the switch and R2 is actually a capacitor); small capacitors; large capacitors (check polarity); battery connector; PTT wires; headset (speaker) wires; LED (check polarity and remember to fit insulation). Cut off wire ends when you're sure they're soldered right!

Remember the battery leads must be red + and black - , and there is a solder bridge across two of the switch contacts (see photo).

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

Take care not to leave the soldering iron on a joint on a plastic item longer than needed or it may melt.

Check carefully the polarity of battery leads, electrolytic capacitors and the LED, then fit the chip (with battery still disconnected). The chip must be fitted the right way round (see notch in photo), and it's 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 into the box, to give ample room for sorting out problems.

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

Hopefully the LED comes on and you should hear sound in the earphones when you talk.
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:-
No LED when PTT pressed – check LED and battery polarity, switch soldering and that the solder bridge has been made (see small photo).

No headphone sounds – check volume control, check LED is lit, chip is in, and right way round (cut-out matches photo). Work the plugs or rub them with 'Scotchbrite' or newspaper to polish off surface deposits. Check microphone socket is flush with surface of box lid, and the plug goes fully in.

Whistling problem – remove headphone plug and put back in a few times. Try rotating the plug, unplugging and plugging, and ensure it is fully in. The whistling happens when the headphone jack short-circuits.

There is no data on problems caused by components being wrongly fitted in the circuit. Please pass on any problems you find so the next people to build a set can be warned in good time.

Thanks. Dave Hall, December 2010