

Modifying the USB-FOB

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Intro

Before we start, I will explain what we will be doing first to modify this FOB. Sourcing these USB FOB's, you need to make sure it has the square CM108 chip on the FOB as wires are required to be soldered on to the chip. They can be found on Ali-express, e-bay or your local electronics shops. Some of these FOB's do use the CM108 but has a blob over the chip so you will not be able to solder any wires to them, so make sure you do not buy this type as they cannot be modified.

Looking at your FOB, what you will be doing is to first remove the green and pink 3.5mm jack sockets, plus capacitor C2 and resistors R6 and R7 off the board. These components are not required anymore. Be careful when removing the sockets, not to damage the PCB pads on the board.

Once we have removed the 3.5mm jack sockets and C2, these pads will be numbered 1 – 12 and capacitor C2, 1 – 2 as shown in figure 1, so just imagine the numbers are there. This is shown below as we will connect wires plus components to them.

This will become the circuit boards reference to add the components and also needed, is to break some tracks between certain numbers.

To break the tracks, this is best to use a craft knife, being very careful not to cut yourself while breaking the tracks.

Make sure you break the track and to test it is open circuit, you can use a ohm meter for continuity. If it shows a short then the track has not been cut so re check etc.

Onto the Modification.

Removing the 3.5mm Sockets. First remove the pink and green sockets. There are a couple of ways to do this.

Using solder wick, by heating the pad and removing any solder, or heating up each pad and sliding your craft knife between the pad and socket as you go. Do not force them otherwise you may damage the board or lift the pad.

Tip: By applying fresh solder to each component/pad first, this will apply flux and can make removal a lot easier. You DO NOT want to overheat the board. If using solder wick while heating wipe off any solder and then using a craft knife to slide in-between the pad and socket.

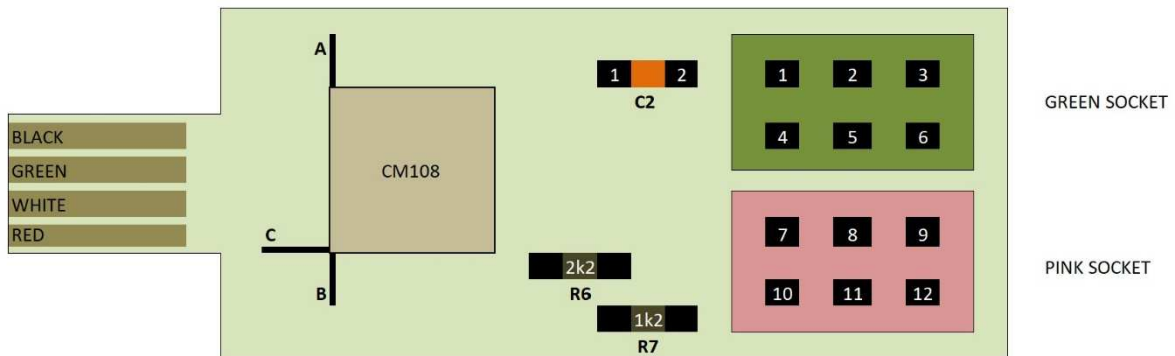


Figure 1

After remove the components C2, R6 (2k2) and R7 (1k2) you do not need these anymore.

After removing C2 we are going to label each side of the cap pad 1 and pad 2.

Looking at figure 2 below, before you add any components, break the tracks between the pads shown with an **X**

These are between numbers;

8 and 11

2 and 5

7 and 8

Using a multi meter check for continuity to make sure you have no connection. See Figure 2.

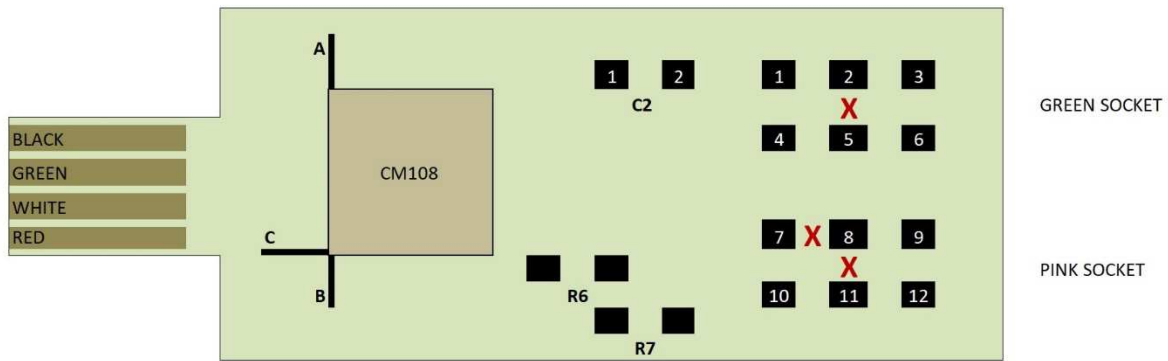


Figure 2

Figure 2 now shows the components removed and tracks cut plus the board numbered. You will also see the IC CM108 marked with A,B and C. These are where you will connect wires to.

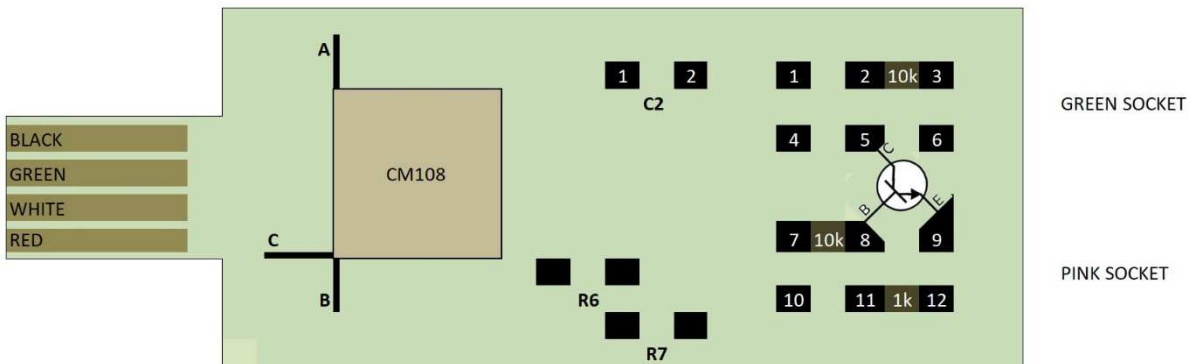
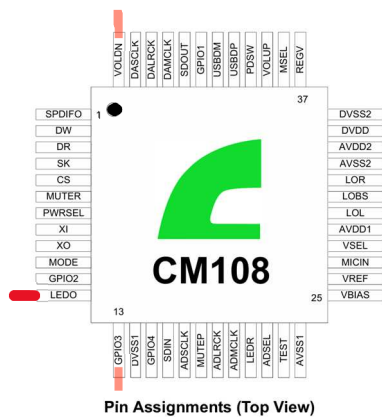
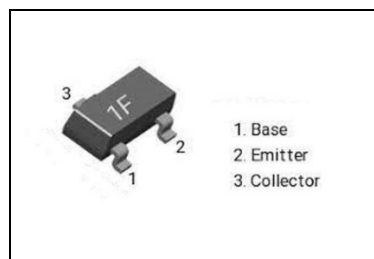


Figure 3

Next add the SMD resistors between the following pads
 10k resistor between pad 2 and 3
 1k resistor between pad 11 and 12
 10k resistor between pad 7 and 8
 Add the transistor 2N3904 or 1F or equivalent NPN.
 Base to pad 8, Emitter to pad 9, Collector to pad 5
 I have included a diagram of the 1F transistor with reference marking. Shown in Figure 3

1F Pinout



Pin Assignments (Top View)

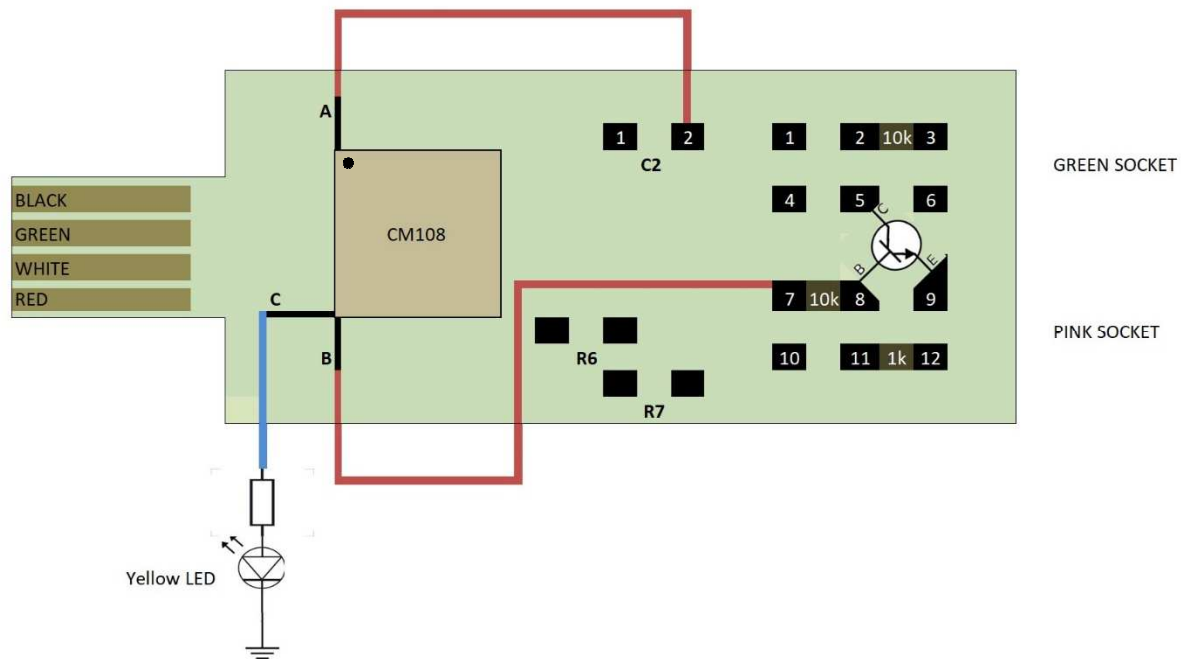


Figure 4

Add 3 wires to the chip CM108. Marked A, B and C on diagram. I used fine transformer wires to solder to the IC.
 A goes to pad 2 of C2 (A is pin 48 of IC CM108)
 B goes to the pad labelled 7 (B is pin 13 of IC CM108)
 C goes to a long wire which will go to a 100 Ω resistor and Yellow LED later. (C is pin 12 of IC CM108)
 (This is the heartbeat LED)
 Shown in Figure 4
 See the pin assignments above on the CM108, the connections A, B and C are highlighted in red

Wiring Diagram to Baofeng BF888S

PAD

1	Black wire	Connect to radio TX	Add 10K in series to Mic
2	White wire	Connect to radio COS	Pin1 of IC
5	Red wire	Connect to radio PTT	PTT Switch
7	Brown wire	Connect to radio Green LED	Add 470 ohm to LED's Anode.
10	Yellow wire	Connect to radio RX	RHS of volume control. It may need a 10K to reduce volume.

I fitted a blue wire which is soldered to the earth of the radio and soldered to the RJ45 earth of the pi.

NOTES

Use a 330 Ω for the Red LED connected to anode's LED
 Use a 470 Ω for the Green LED connected to anode's LED
 Use a 100 Ω for the Yellow LED connected to anode's LED
 Use a 15K to 18K Ω for the Blue LED connected to anode's LED. This resistance varies due to the brightness and type of LED.
 All Cathodes of the LED's, are connected together and connects to chassis or ground.

I fitted the 10K resistor on the radio's mic input and used a bit of heat-shrink over the resistor to prevent shorting out.
 If needed fit a 10K on the right-hand side of the volume control to reduce the volume and again the resistor was fitted in series on the radio side and the other side of the resistor to the yellow wire. Fit heat-shrink over this resistor too.