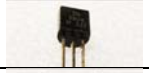
Tools Required

Soldering iron with a fine pointed bit, Long nose pliers, Side snip cutters, Loupe.

First make sure all the parts have been checked and identified using a loupe if necessary.

Reference		Description	Checked
R1		470kΩ ¼W resistor (yellow purple black orange brown)	☐
R2		1kΩ ¼W resistor (brown black black brown brown)	☐
R3		120kΩ ¼W resistor (brown red black orange brown)	☐
C1		100nF capacitor	☐
C2		56pF capacitor	☐
C3		2.2nF capacitor	☐
C4		270pF capacitor	☐
C5		220pF capacitor	☐
C6		100pF capacitor	☐
C7		150pF capacitor	☐
VC1		3-30pF variable trimmer capacitor	☐
L1		150uH inductor (brown green brown silver)	☐
L2		1mH inductor (brown black red silver)	☐
Q1		2N3904 NPN transistor	☐
U1		Pre-programmed PIC12F1572 microcontroller	☐
U2		RDA5807M FM receiver module	☐
BTN1		12mm x 12mm momentary tactile push button	☐
PCB		Printed Circuit Board	☐
Button Cap		Button cap for button	☐
IC Socket		8-pin low profile DIP socket	☐

Additional Consumables Required

Fine fluxed core solder, fine tinned wire, 50 cm red wire, 50 cm black wire (colour is not important).

Assembly

1) Solder the 3 resistors, R1, R2 and R3.

It does not matter which way around the resistors are inserted, though it is neater if they all face the same direction.

2) Solder the 2 inductors, L1 and L2.

It does not matter which way around the inductors are inserted, though it is neater if they all face the same direction.

3) Solder the 7 capacitors. Starting with the larger capacitor C1, then the smaller capacitors C2 to C7.

It does not matter which way around the capacitors are inserted, though it is neater if all the printed values face the same way.

4) Solder the IC socket and the variable capacitor VC1.

The IC socket identification notch should match the PCB silk screen. It does not matter which way around VC1 is inserted, although the way shown on the photo is preferred.

5) Solder the FM receiver module. **Important the module must be correctly oriented as shown on the photo. Once soldered onto the PCB, it may be not possible to remove it without causing damage.**

The module can be soldered directly to the PCB as would any surface mount device.

Or alternatively to allow the module to be removed more easily. Solder ten fine tinned wires to the module edge. Thread the module wires through the PCB eyelets and solder so the module sits a few millimetres above the PCB.

6) Solder the transistor and push button.

Insert the transistor Q1 onto the PCB, observing the correct orientation before soldering.

Depending on the enclosure the converter will be housed within. The button can either be fitted such that it is front facing as shown on the photo, or fitted such that it is rear facing.

7) Attach the button cap to the push button so that it clicks fits.

8) Solder the wires from the battery supply to the BT1 connector on the PCB. The positive wire is connected to +3v terminal and the negative wire to 0v terminal.

Strip one end of the red and black wires, and solder to the AM_ANT1 and the FM_ANT1 PCB pads respectively.

Alignment and Testing

After assembling the converter, carry out the following steps to pair it with an AM radio.

1. Place the red AM antenna wire as close as possible to the AM radio.
2. Place the black FM antenna vertically and away from the AM radio.
3. Turn on the converter by connecting the 3 volt battery supply to the converter.
4. Briefly press the button on the converter to seek to the first FM station.
5. Turn on the AM radio and tune around 950 kHz (316 metres) until the converter frequency is located. The trimmer capacitor VC1 can be adjusted to alter the converter frequency in case a local AM station is also broadcasting on this frequency.

Operation

The single tactile switch button performs multi-function operations depending on how long it is pressed.

1. **Seek to next FM station** – Short press of the button.
2. **Seek to previous FM station** – Long press of the button.
3. **Store current FM station as default station** – Press button for 10 seconds.
4. **Place into standby** – Press button for 30 seconds.
5. **Awake from standby** – Short press of the button.

Happy listening!