DL PLL COMPLETE KIT

Part Value	Description	Quantity
C1, C2, C7 & C14	0.01uF (10nF, 10,000pF or 103)	4off
C3, C4, C6, C9, C11, C13 C15, C16, C17 & C18	1uF	10off
C5	0.0068uF (6.8nF or 6800pF)	1off
C8	0.1uF (100nF or 100,000pF)	1off
C10	0.022uF (22nF or 22000pF)	1off
C12	47uF	1off
D1-8	1N4148	8off
D9	1N4007	1off
IC1	CD4046BE	1off
IC2	HCF4001BE	1off
IC3	HCF4066BE	1off
IC4	HCF4047BE	1off
IC5	HCF4050BE	1off
IC6	LM555N	1off
LED1	Red 5mm	1off
LED holder		1off
OPA1 & LTC1049		2off
Q1	2N3904	1off
Q2	2N3906	1off
R1 & R2	1k	2off
R3 & R4	1M	2off
R5	15k	1off
R6, R8, R10, R12 & R14	10k	5off
R7, R11 & R19*	100k	2off
R9	56R	1off
R13	1k2	1off
R15	1M2	1off
R16 & R18	8k2	2off
R17	270k	1off
T3	IRFP240	1off
VR1 & VR2	100k multi-turn pot	1off
8pin DIL socket		3off
14pin DIL socket		3off
16pin DIL socket		2off
Sub-miniature SPDT switch		3off
SPST On/ Off switch		1off
2 way terminal blocks		3off
PCB		1off
Case		1off
Meter		1off
Red terminal post		3off

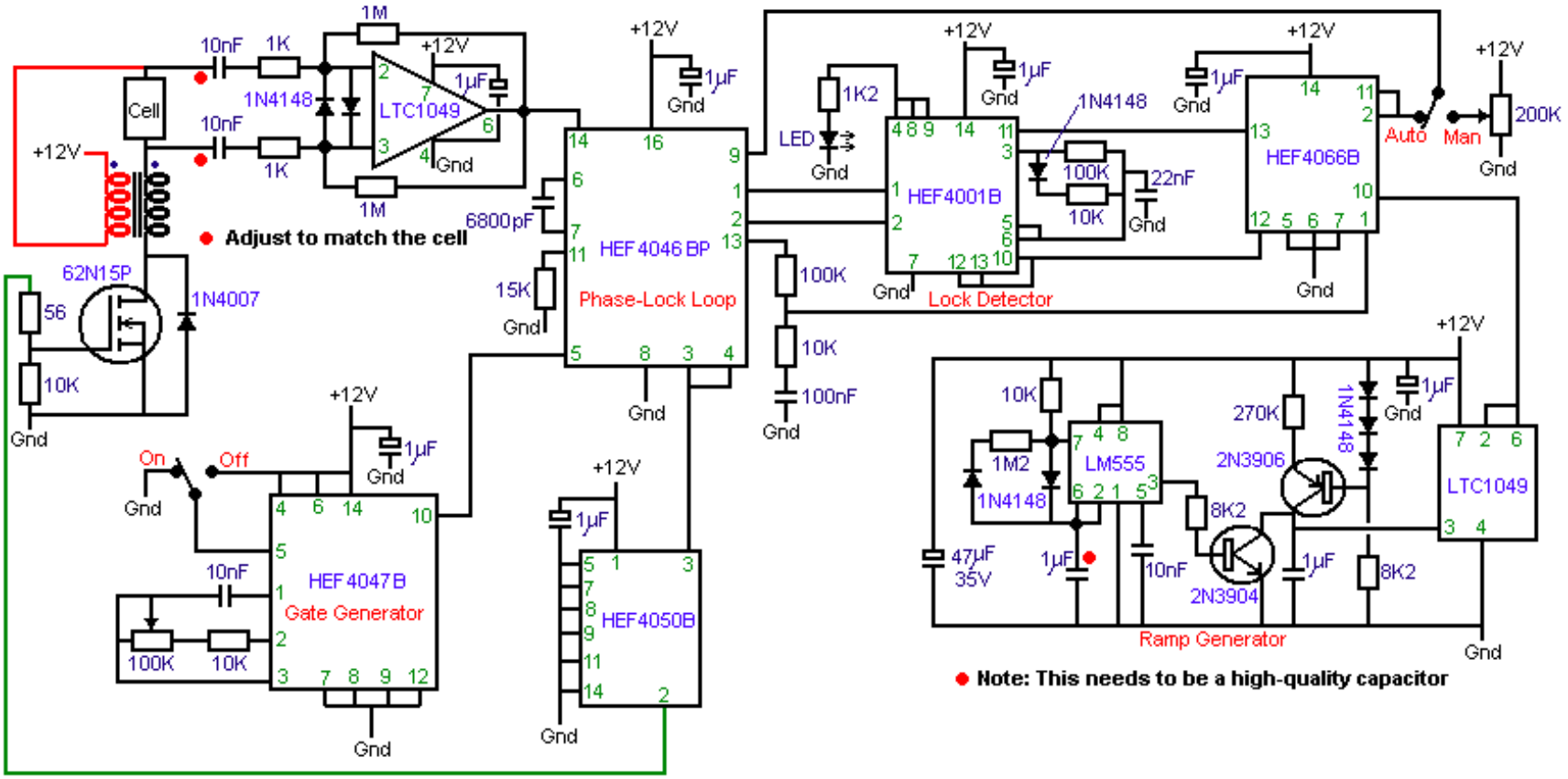
Black terminal post	**3off**
Fuse holder	**1off**
Fuse	**2off**
M3 x 12mm bolt	**2off**
M3 nut	**6off**
Blue crimp terminal	**2off**
Ring terminal	**9off**

***R19 Note this 'extra' 100k resistor is supplied along with a SPDT switch to be used with one of the 100k potentiometers as a 200K 10 turn potentiometer doesn't appear to exist.**

The circuit diagram below is the one created by Patrick Kelly from Dave Lawton's original.

These instructions have only be assembled in September 2013 as prior to this it was assumed all purchasers of this kit were enthusiasts with appropriate levels of knowledge gained from assorted forums accessible on the internet.

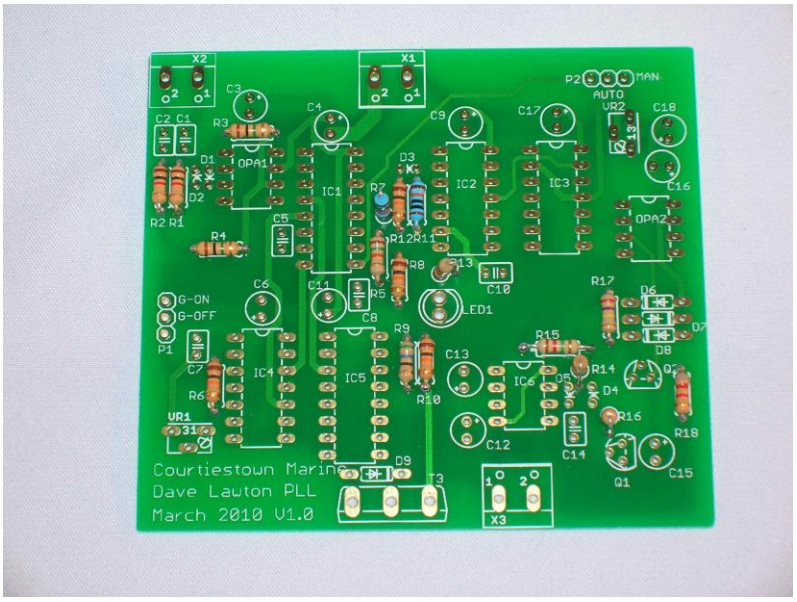
Over a period of time and, particularly since we stopped selling ready built units we seem to get people asking the same questions so we have 'caved in' to these demands and hopefully these instructions will prove sufficient to assist people in assembling these kits.



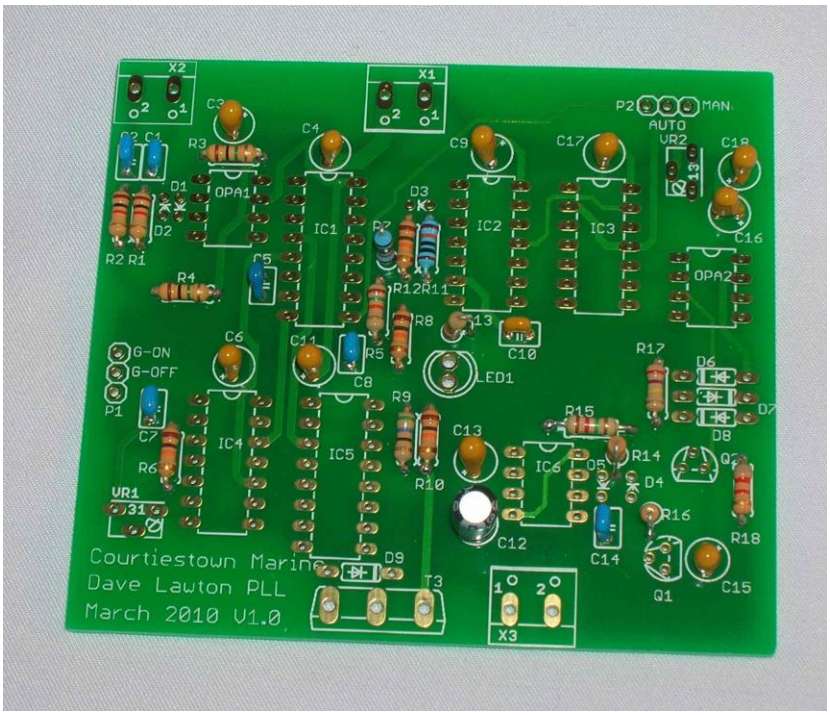
Capacitors are tantalum 35V. Resistors are carbon film 5% 0.33W. Variable resistors are presets (RadioSpares 154-2072 and 154-2094)
Radiospares Part Numbers: LTC1049: 545-5607, HEF4046BP: 306-645, HEF4001B: 333-3303, HEF4066B: 333-1470, 2N3904: 294-312, 2N3906: 294-328, 62N15P: 194-316, 1N4148: 446-8551, 1N4007: 348-5397,

INSTRUCTIONS

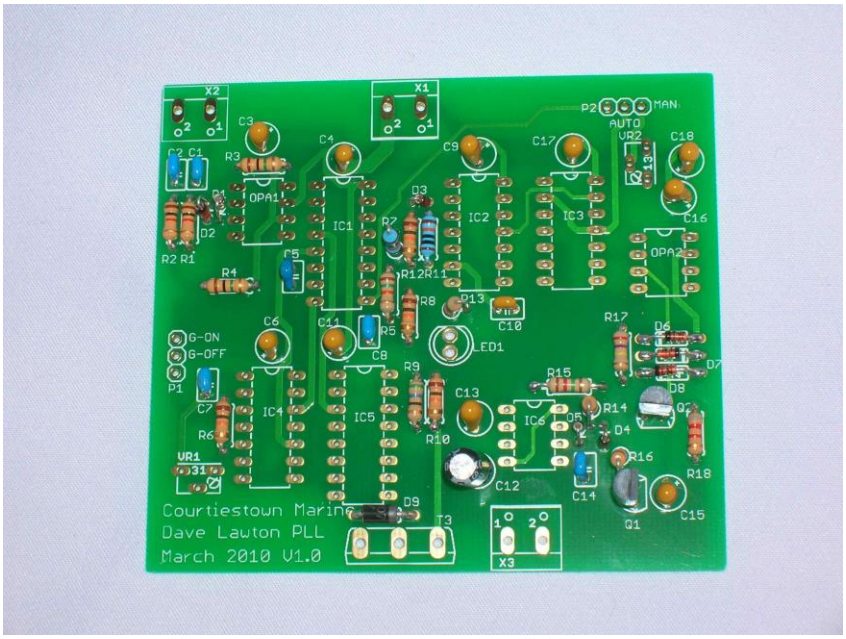
1. Firstly check all components are present.
2. The first step is to solder the resistors to the PCB.



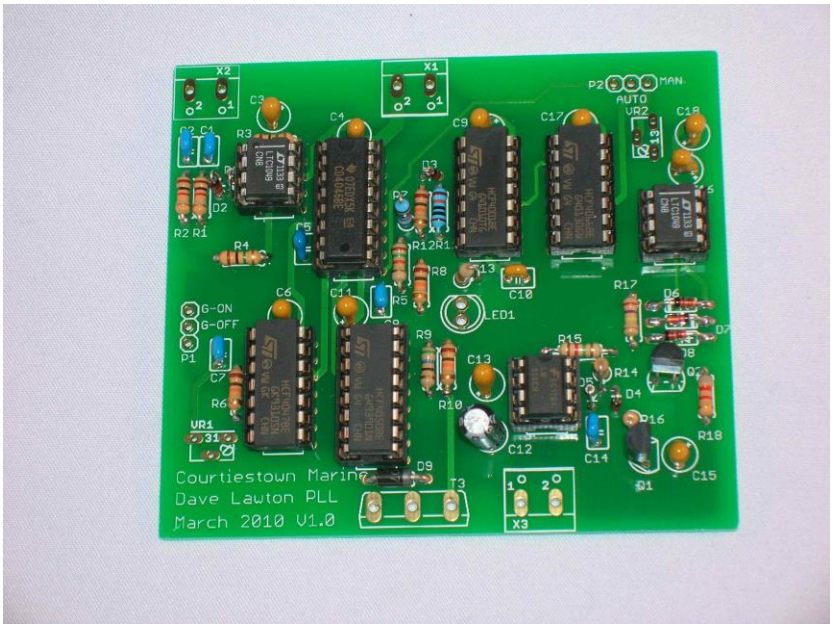
3. Secondly solder the capacitors to the PCB.



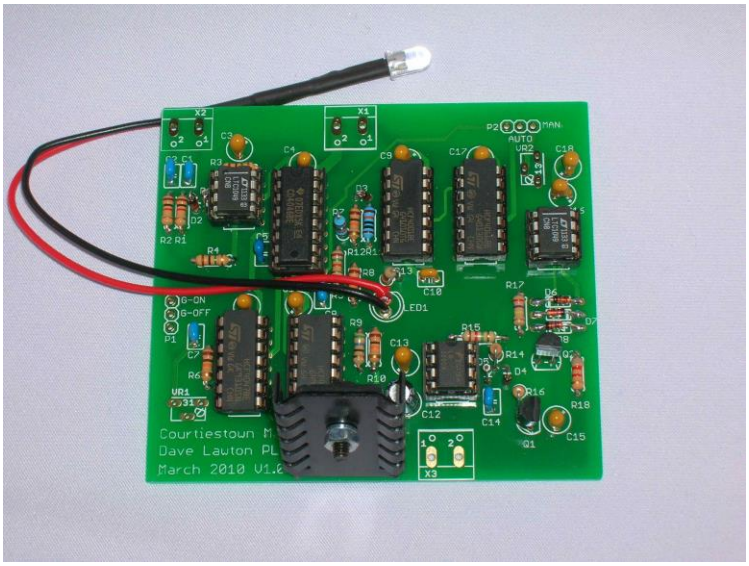
4. Next solder the semiconductors in place.



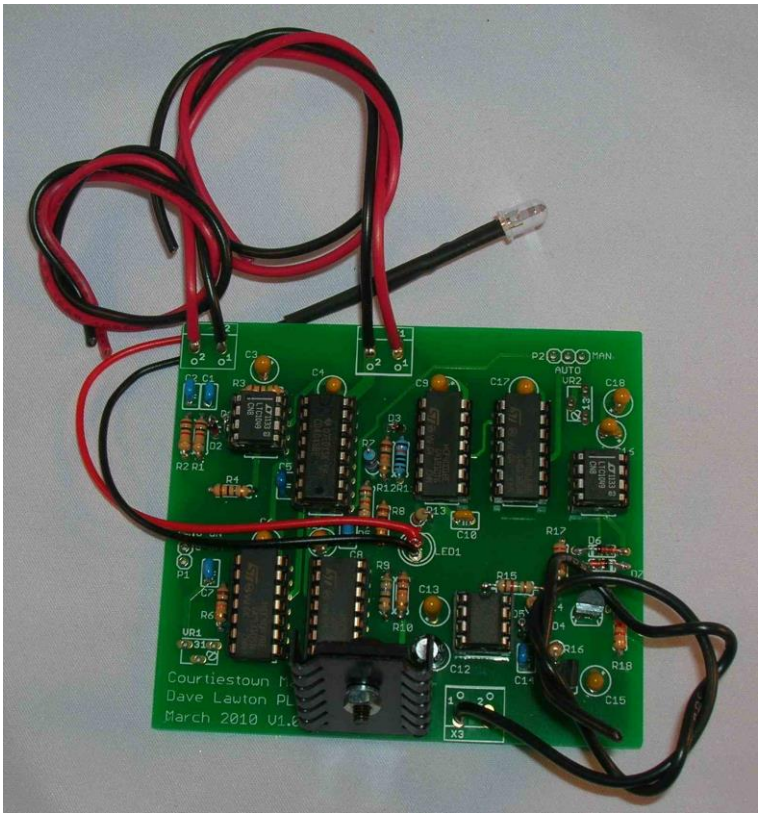
5. Next solder the IC sockets to the PCB and insert the correct IC's in place.



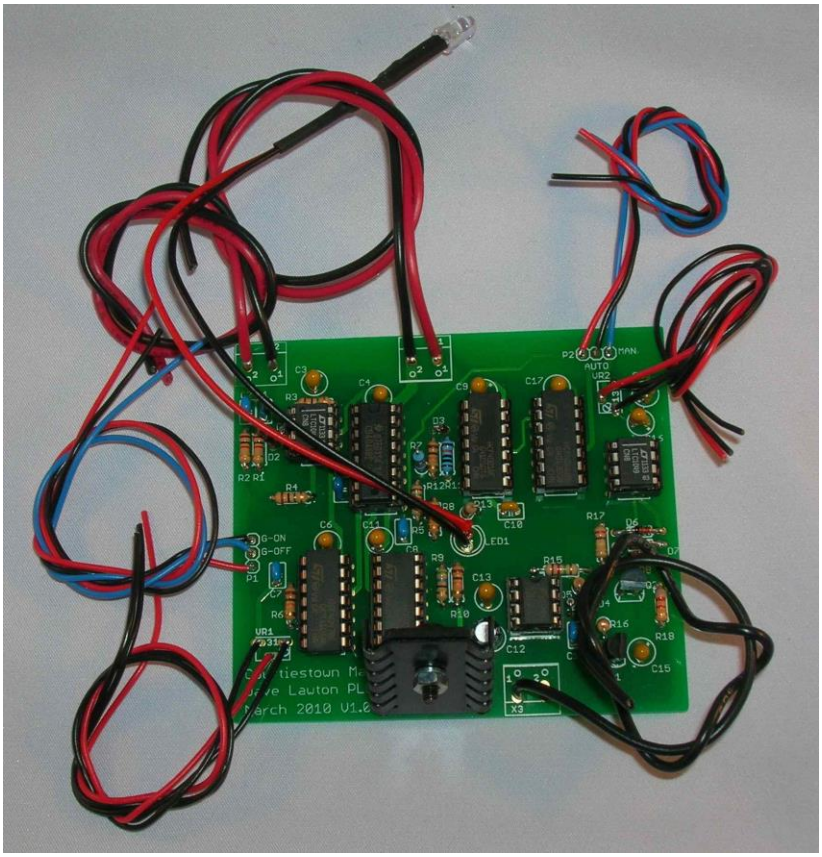
6. Next up is the LED and MOSFET c/w heat sink. I cut the locating tabs off the bottom off the heat sink.



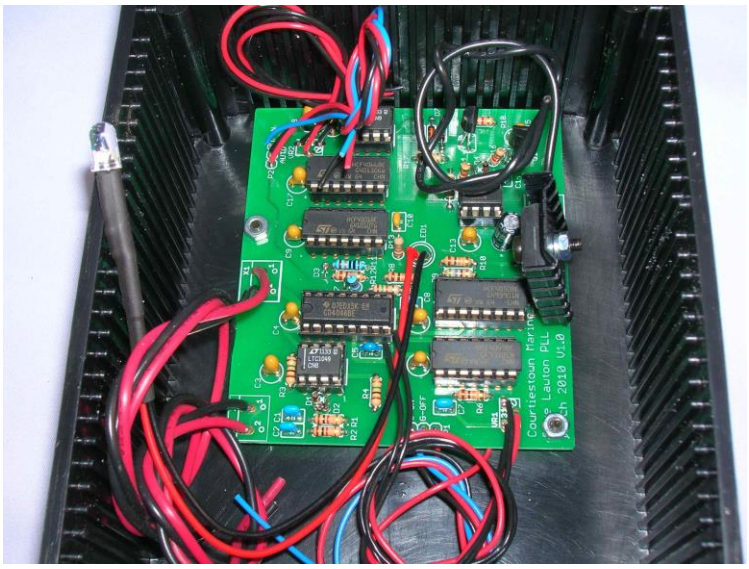
7. Next you can choose whether to solder the connection blocks to the PCB or solder suitable wire to the locations X1/ X2 & X3 (we use 18AWG multi-strand). Note red denotes +ive and black denotes –ive.



8. Then we attach 21cm long lengths of hook-up wire to the P1/ P2 and VR1/ VR2 positions. In the pictures shown for VR1/ VR2 red represents the wiper ad the two black wires connect to either end of the potentiometer track. In the case of P1/ P2 the red wire represents the pole of the SPDT switches, the black wire the ‘Auto’ position and the blue the ‘Manual’ position.

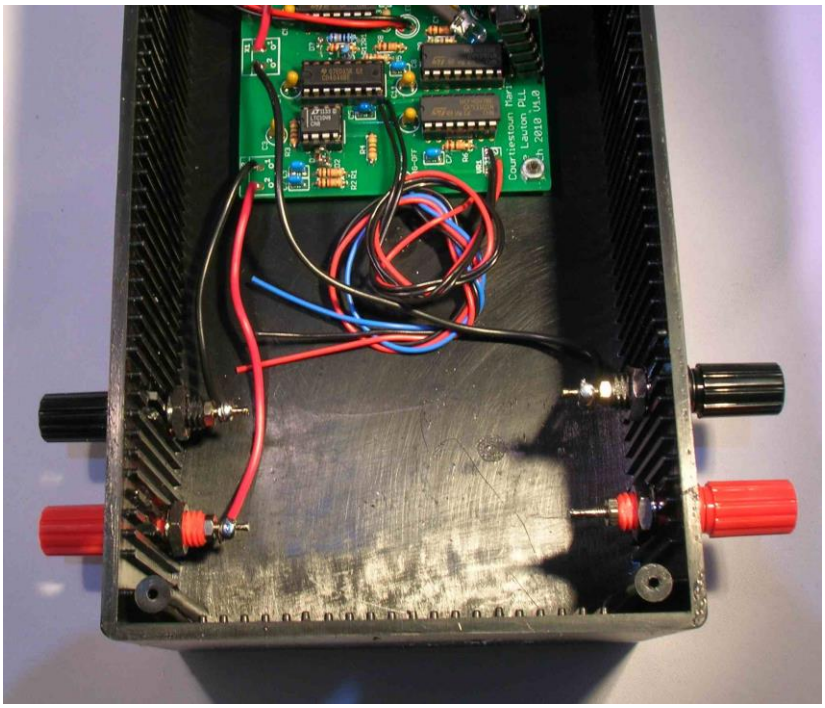


9. You then need to locate the PCB in the case as per the photograph below. You'll need to drill two holes in the PCB, butt the PCB up against the bottom edge of the box and drill through the case bottom. Locate with 2off M3 x 12mm secured with a double nut to space the PCB off the bottom. It is a good idea to attach the rubber feet at this point to stop the case sliding all over the place. Clean the case bottom with the likes of methylated spirits prior to attaching the feet.

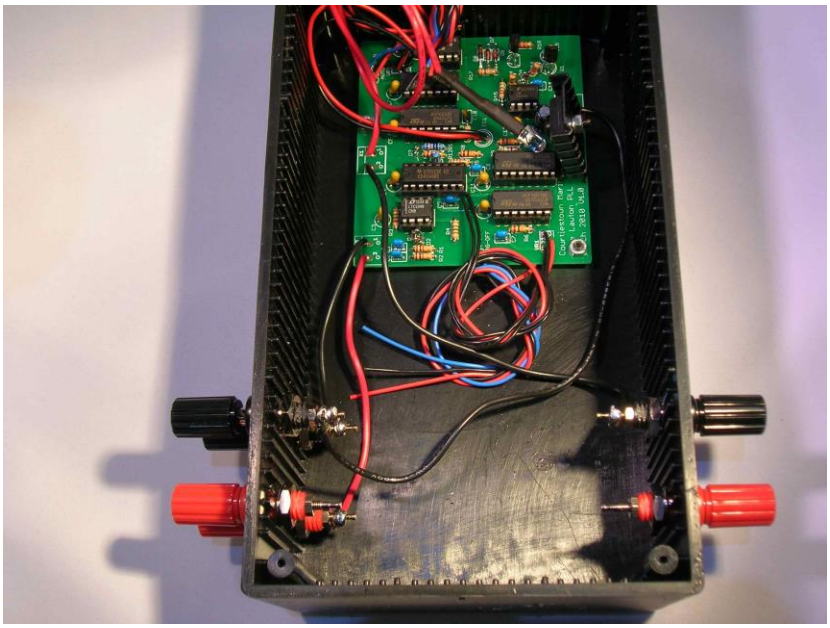


10. When drilling the various holes in the case we supply make sure due thought is given to locating switches/ potentiometers so as to provide clearance for such as the MOSFET heat sink as shown below.

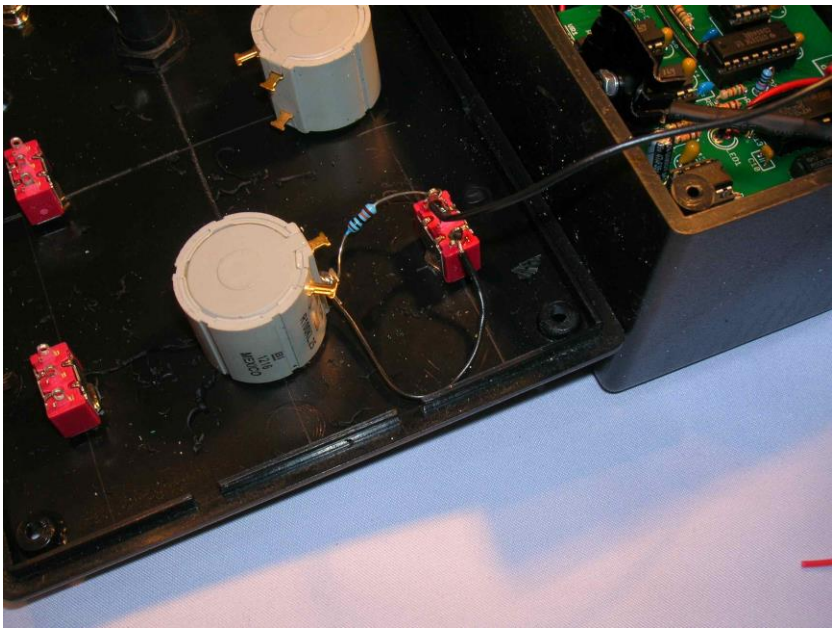
11. The various following photographs show various aspects of wiring the PCB, input/ output terminals and assorted switches/ potentiometers. Firstly the wiring of the Sense terminals, note the upper pair of output terminals are not yet fitted to provide working room and the negative power input terminal.

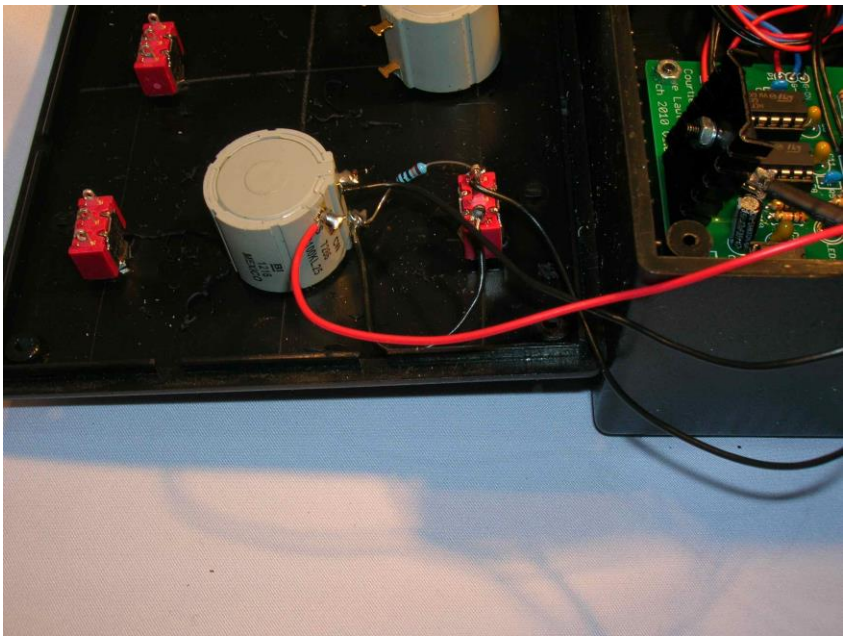


12. Next the wiring of the negative output from the PCB.

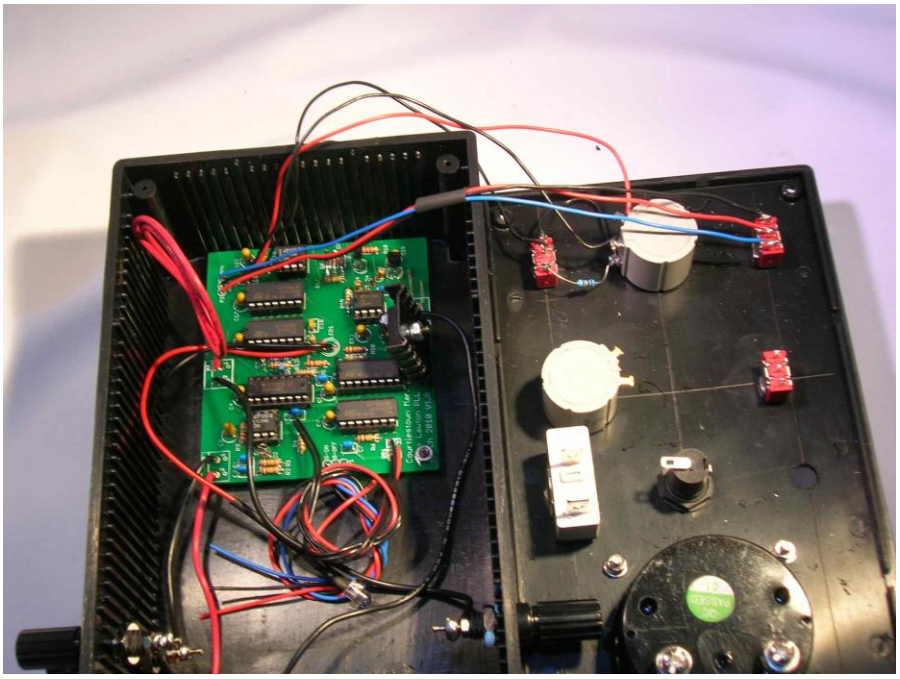


13. Next comes the wiring to the ‘lid’ components starting with the frequency potentiometer and SPDT switch. The frequency potentiometer is a 200k value but a 200k 10 turn potentiometer is not available so it is necessary to use a SPDT switch c/w a 100k fixed resistor so you end up with a 0 – 100k range and a 100 – 200k range.

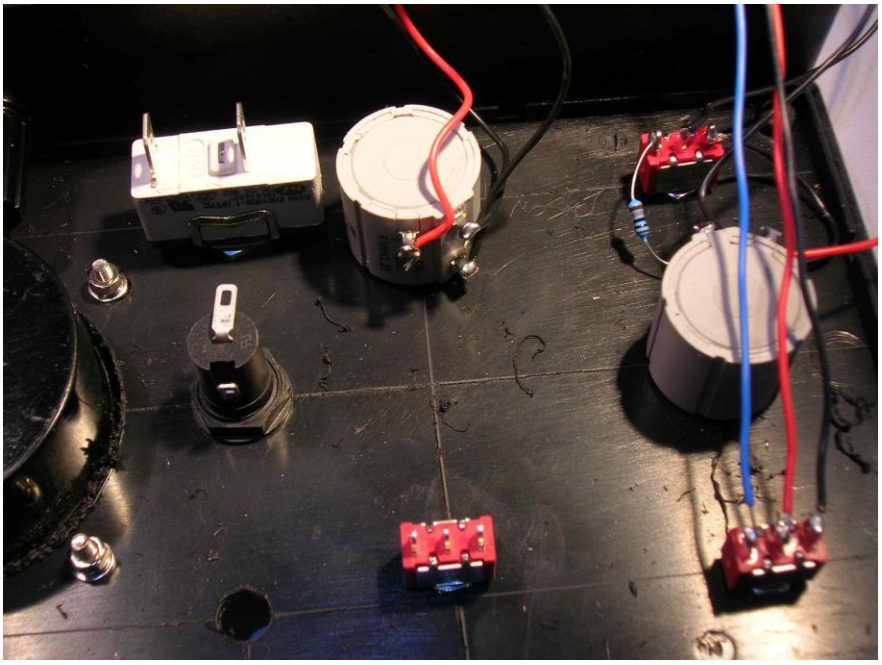




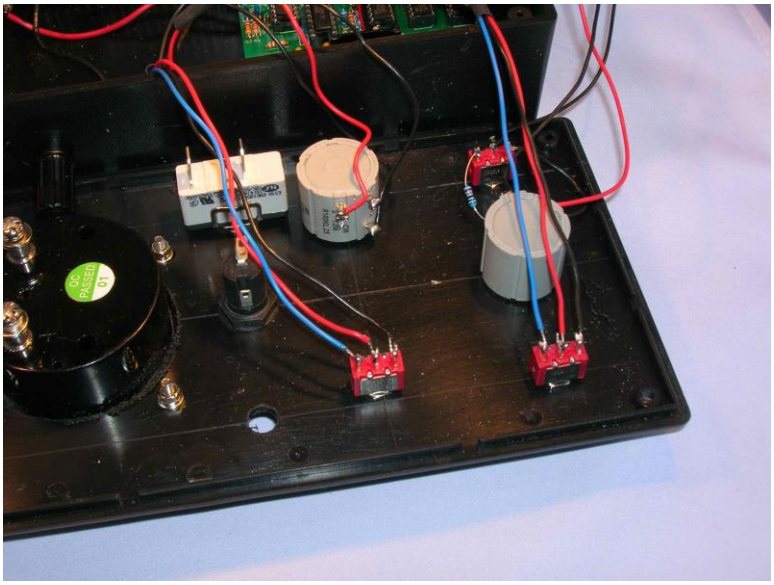
14. Next the wiring for the frequency Auto/ Manual switch



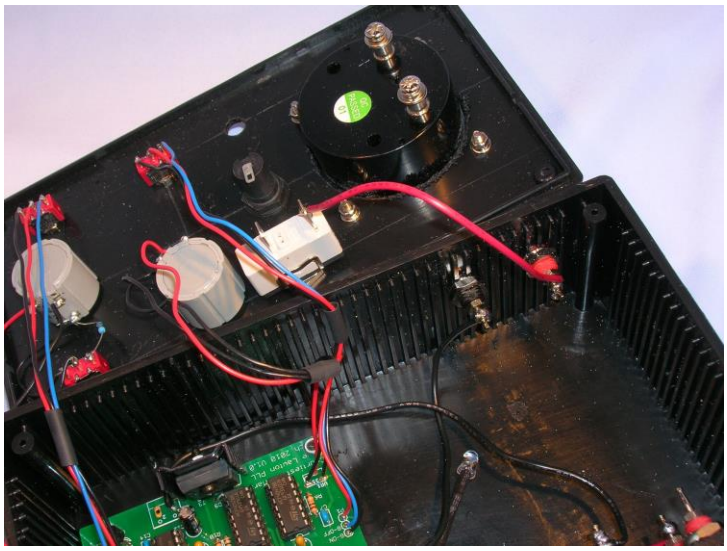
15. Then the wiring of the Gating potentiometer.

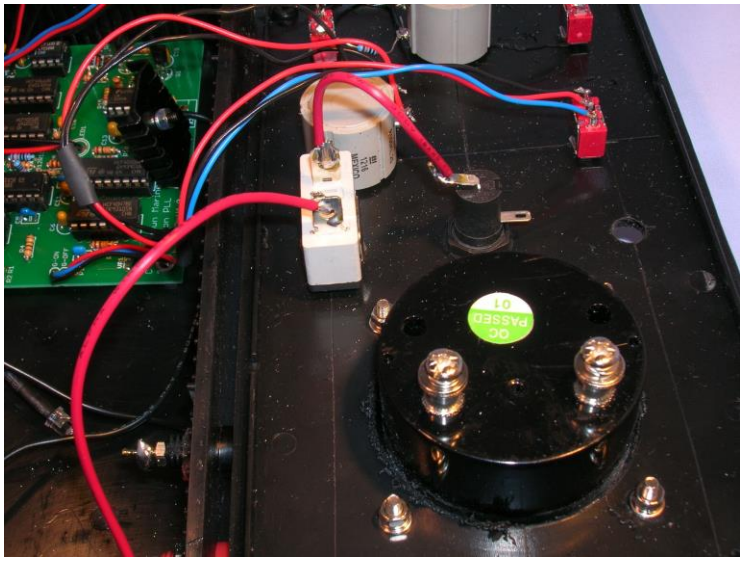


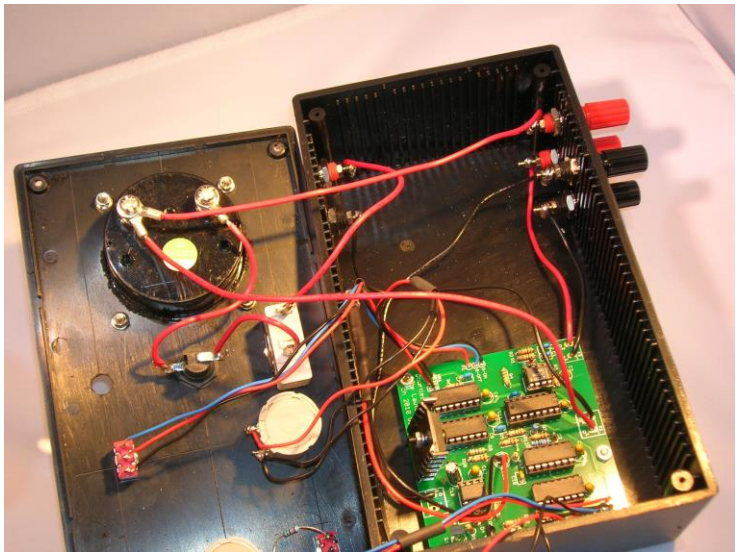
16. Next the wiring of the Gating Auto/ Manual switch.



17. The next series of photographs shows the various stages of connecting the positive wiring from the input terminal through the switch, onto the fuse then the ammeter and on to the PCB and positive output terminal.




QC
PASSED
01



That's it, except for labelling the various switches and potentiometers.

We do receive queries about the method of using this device and I have asked Dave Lawton, on more than one occasion, to provide some specific advice.

Essentially this is a grown up version of the standard PWM device we sell. In that respect it should be connected the same way. The schematic above shows how the device should be connected.

It is fitted with a better quality meter and 10 turn potentiometers permitting more accurate readings and settings to be made.

The default mode is to connect the device to a cell with both the sense and output terminals connected to the cell and leave it to operate in the Auto mode. The PLL chip covers a range from 40Hz – 18kHz as supplied. The optimum 'resonant' frequency is continuously adjusted.

There is also the option to select the gating and frequency manually.

As this is a first pass as of 18/09/13 at full instructions for this kit we would welcome comment from anybody building this device. We can be contacted at sales@courtiestown.org.uk