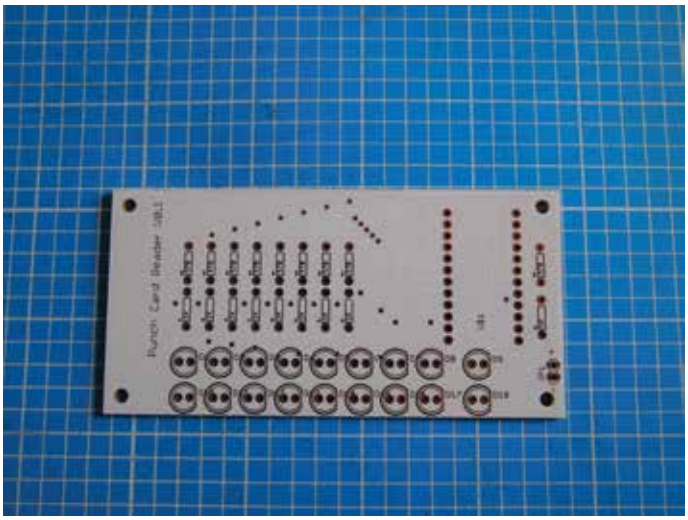
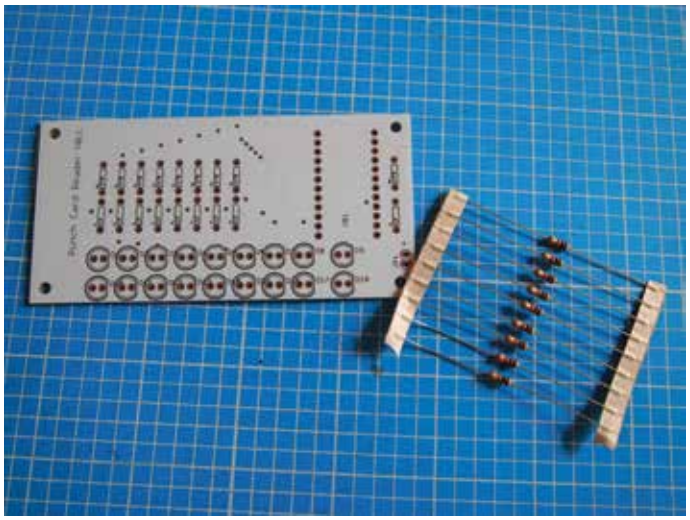
1)



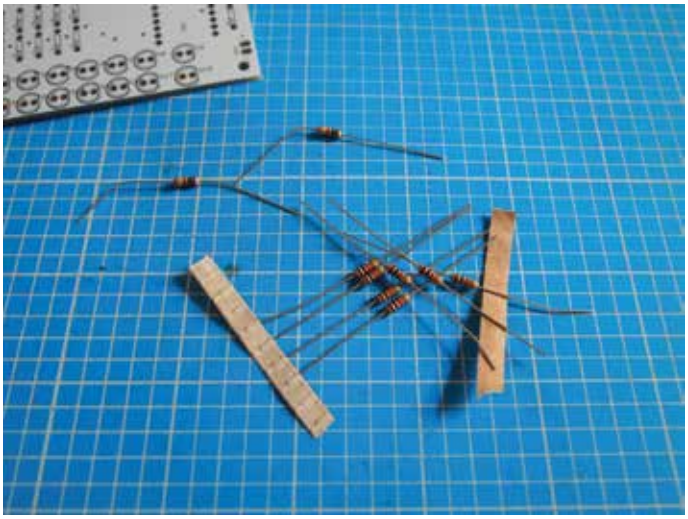
Start with Main(top) circuit.

2)



Get out 9 x1k resistors - these have stripes col Brown Black Red Gold

3)

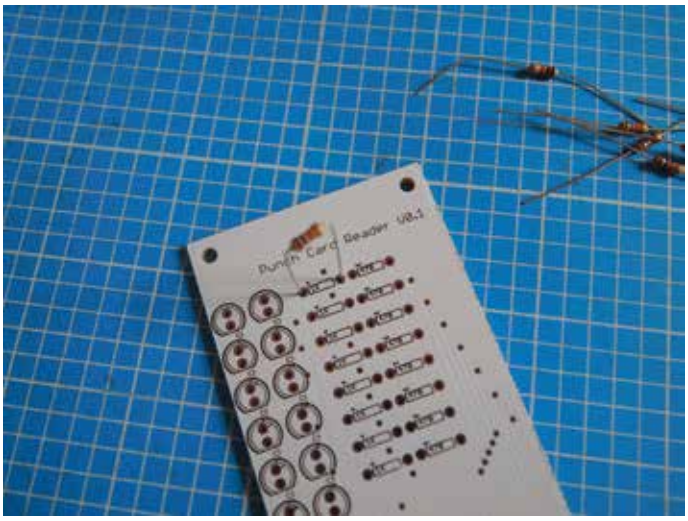


Remove paper tape from ends of resistors

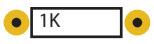
4)

Bend legs of each resistor at 90 degrees, close to ends

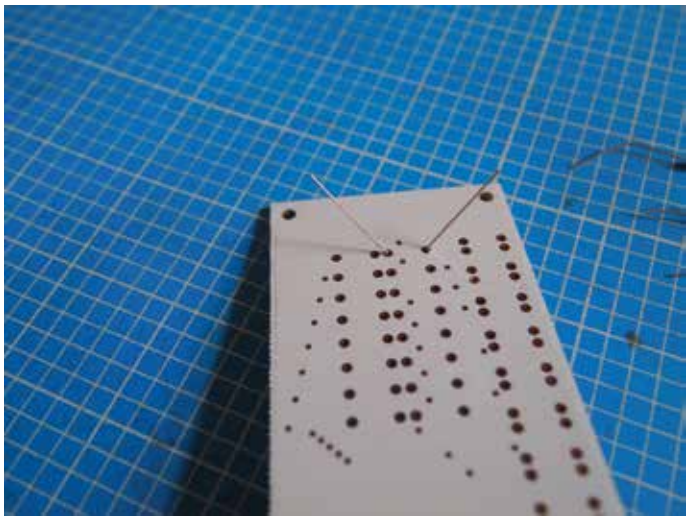
5)



Locate position for 1K resistors on board and insert legs into two holes

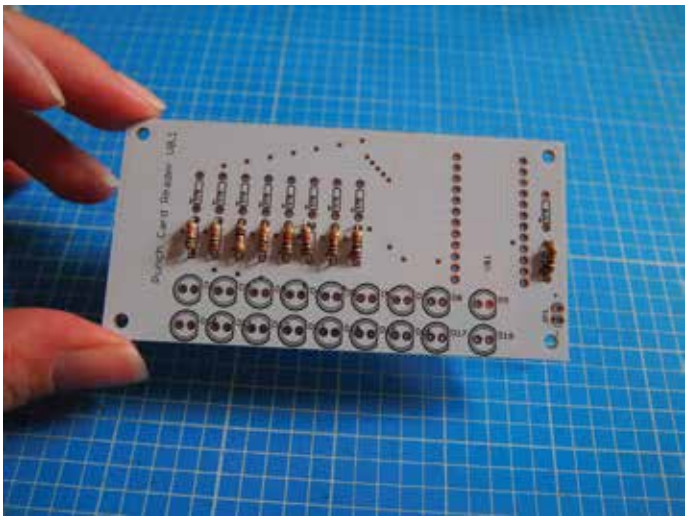


6)



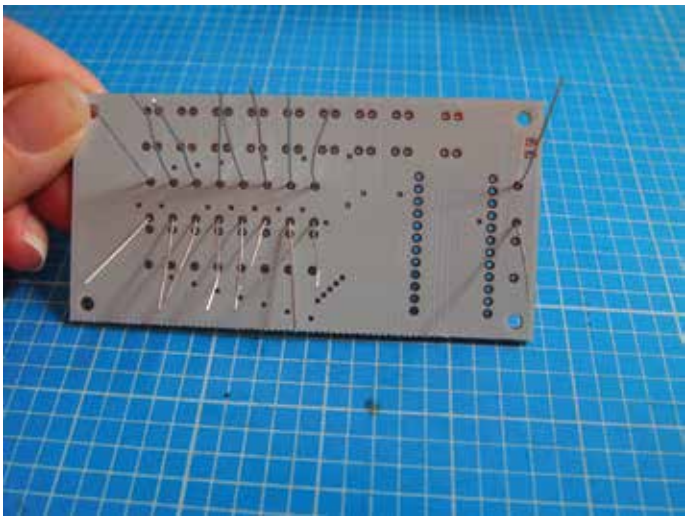
Push legs fully through the holes and bend to about 45 dgrees on the back to keep at it position before soldering

7)



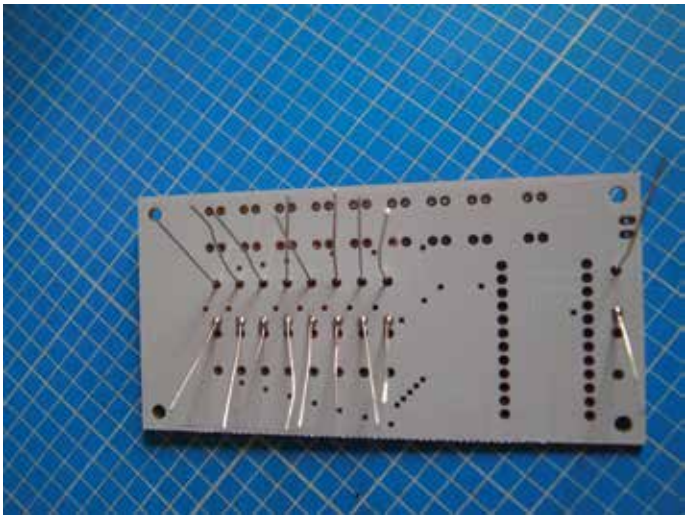
Insert the remaining 8 1k resistors onto th top board (one is positioned to the far right)

8)



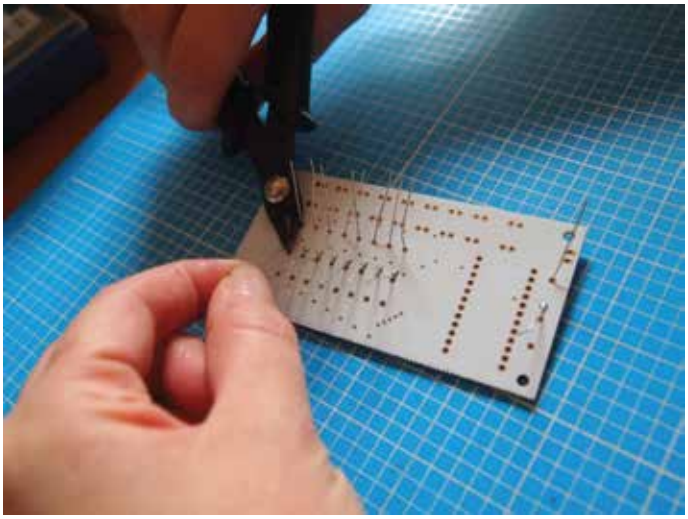
Bending all legs on the back

9)



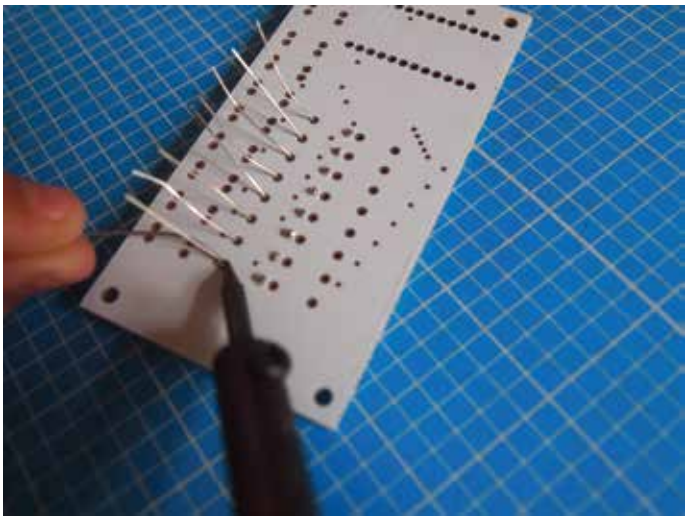
Solder one side of each resistor on the back

10)



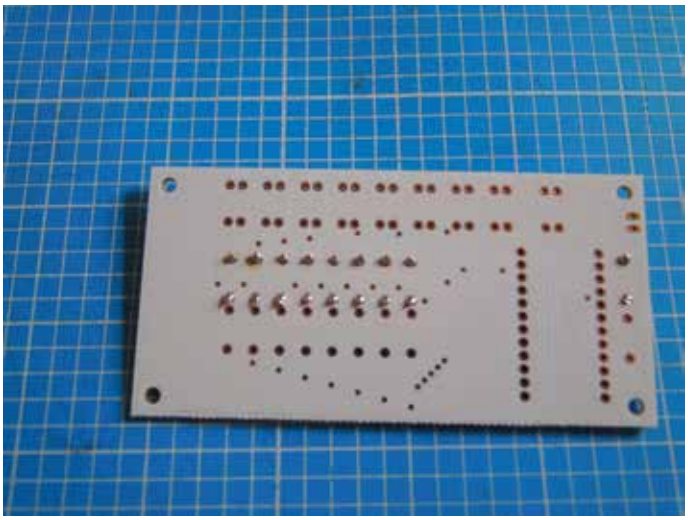
Using wire cutters, trim each soldered leg close to the solder joint

11)



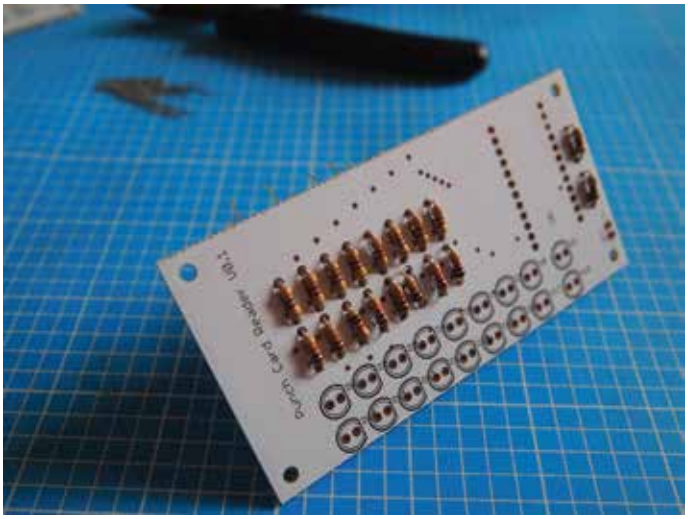
Solder other leg on each resistor

12)



Trim remaining legs

13)

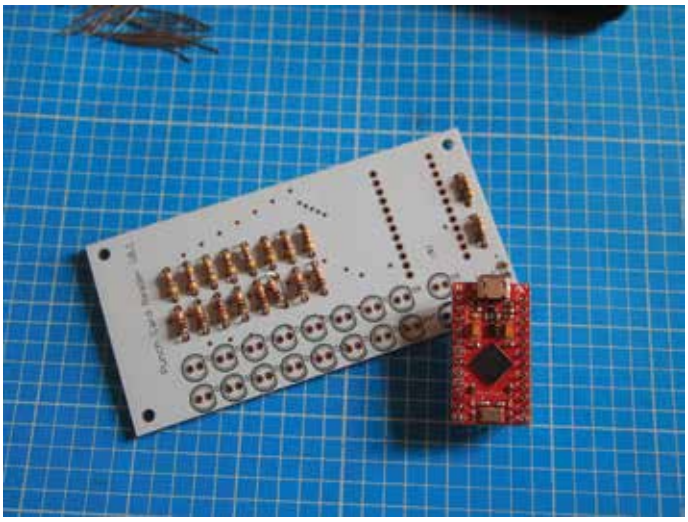


Find the 9 x 470 resistors (Yellow - Purple - Brown - Gold) and insert into the marked 470 positions, solder and trim

14)

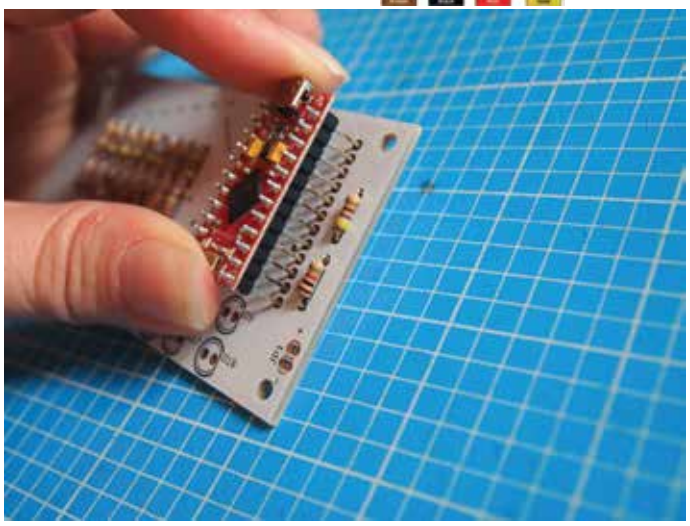
Repeat the process to solder remaining 9 x 1k resistors to the bottom board, attaching to the side with the screen print visible

15)



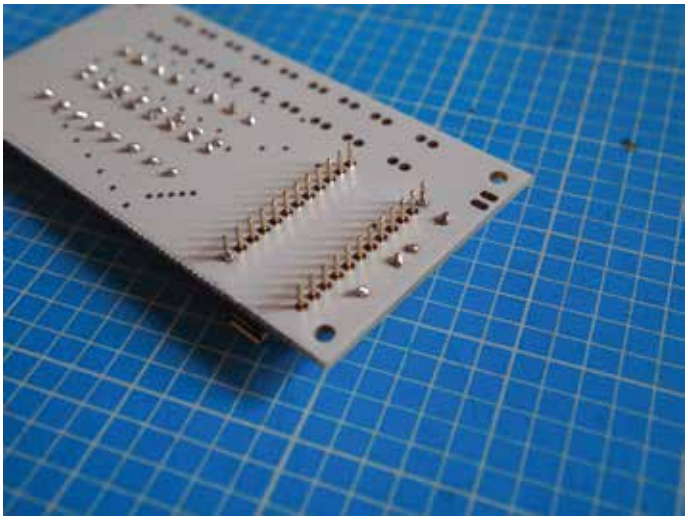
Find the red Pro Micro Arduino board

16)



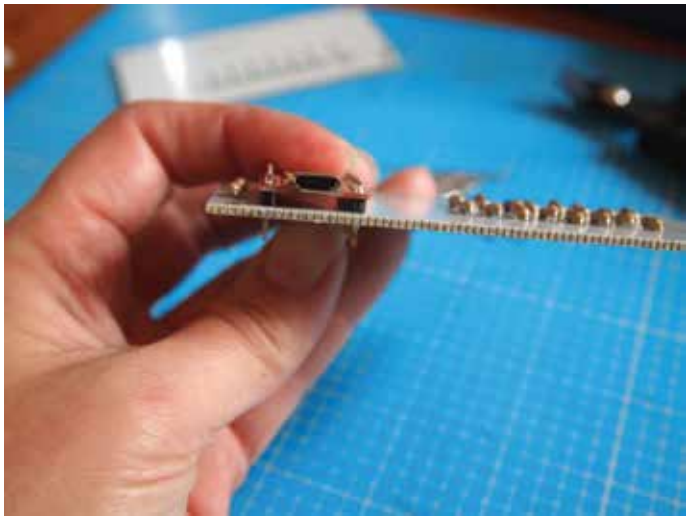
Insert legs of the Pro Micro into 12 x 2 legs into the 24 holes on the main board, with micro usb connector positioned at the edge of the board

17)



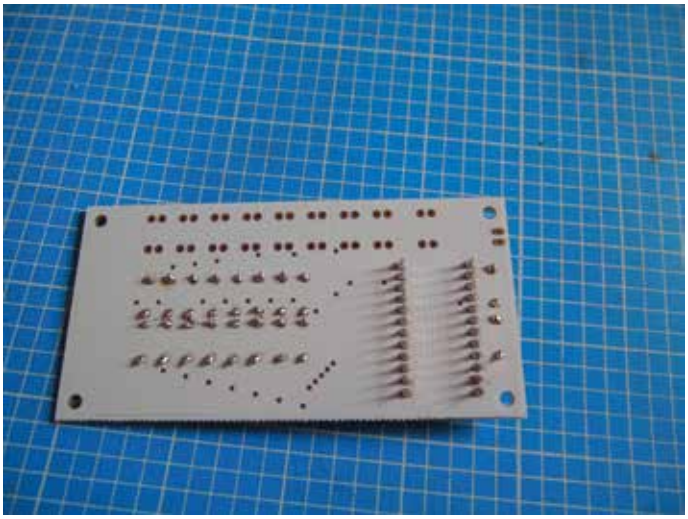
Turn over, and solder just the top right leg and bottom left leg to the board first to hold in position

18)



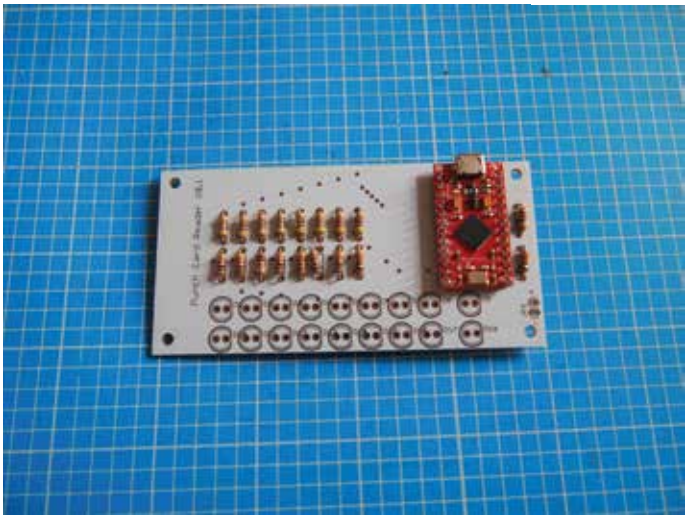
Check that the Pro Micro is flat against the circuit board

19)



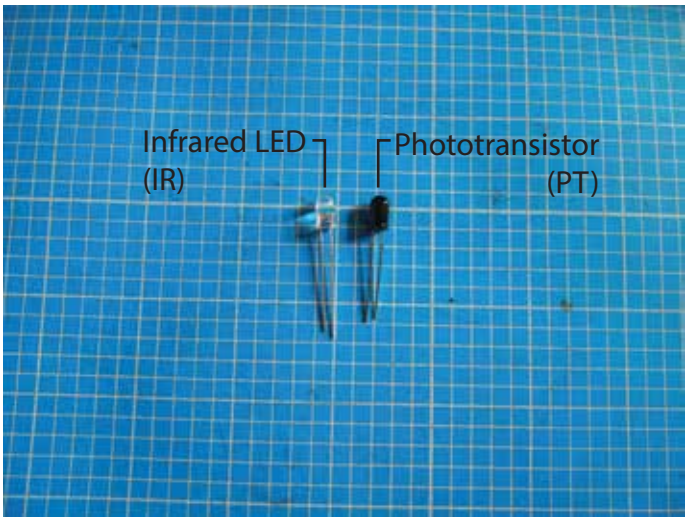
Solder remaining legs to the board and trim slighty. Note the legs are harder to cut than the resistors and be sure to cover with something

20)



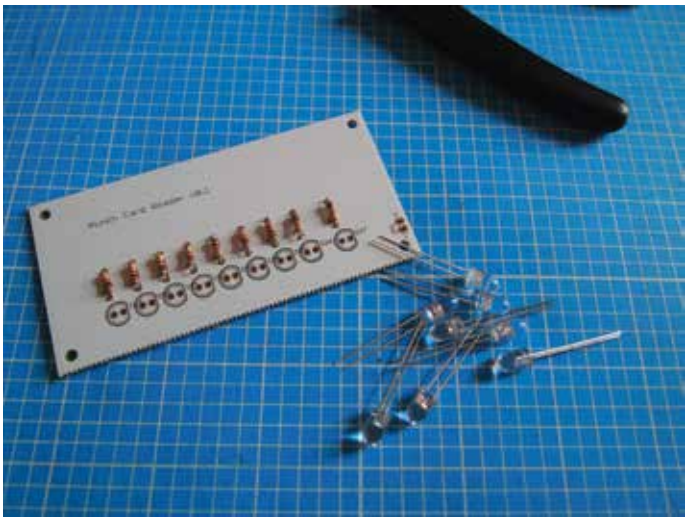
The top board should now look like this

21)



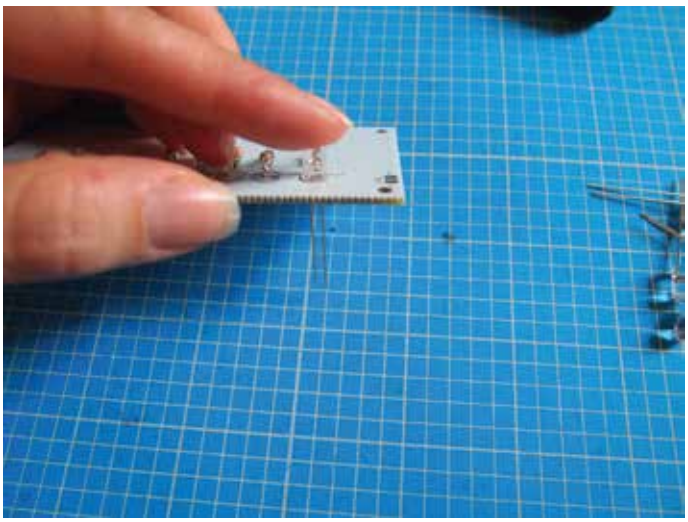
Next we will solder the Infrared LEDS and Phototransistors. Note the +ve and -ve leg labels above

22)



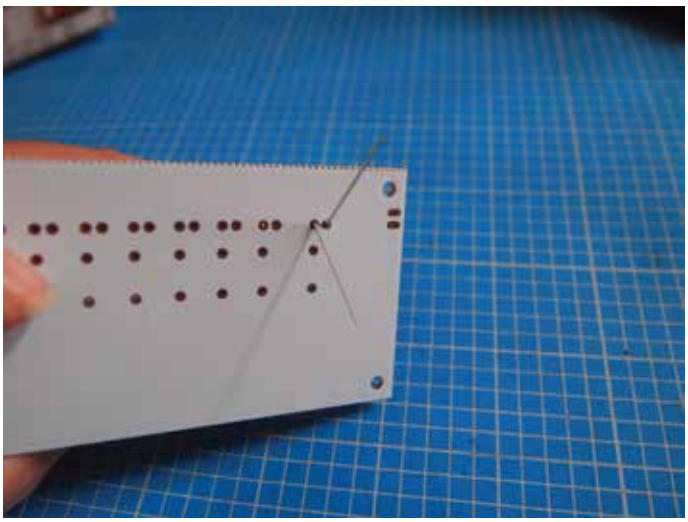
Locate the bottom board and 9 IR Leds

23)



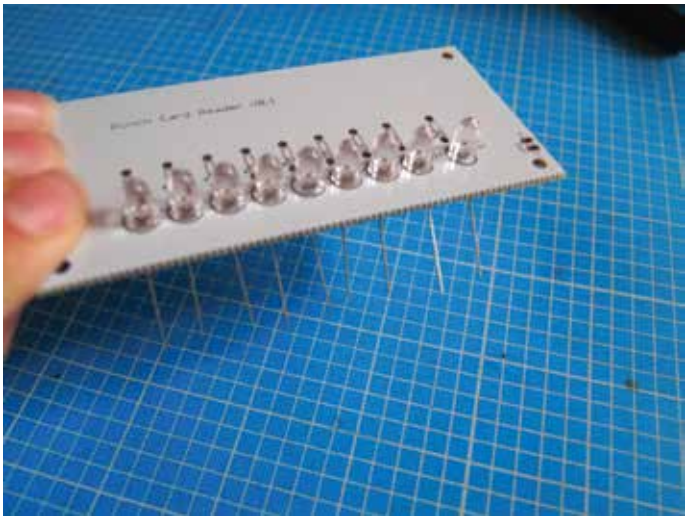
Insert the legs of one IR Led into the holes in the symbol, long leg towards the flat edge of the circle. The Led also has a flat edge on this side

24)



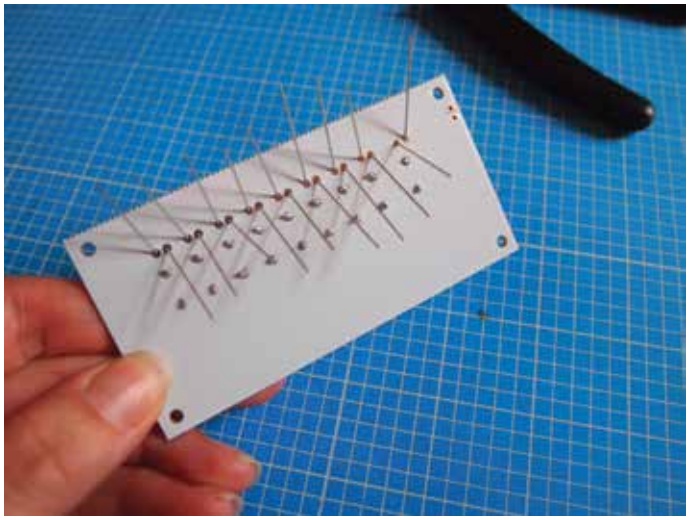
Bend the legs on the back to hold in place

25)



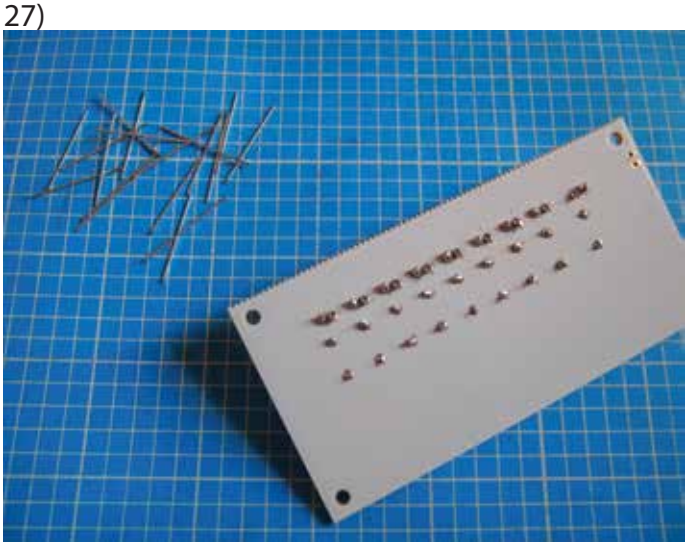
Insert the remaining 8 IR Leds and bend legs

26)



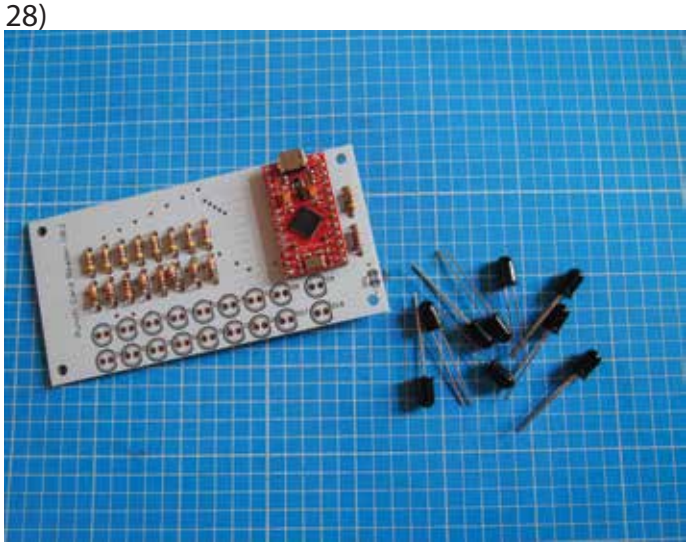
Solder all the legs on the back

27)



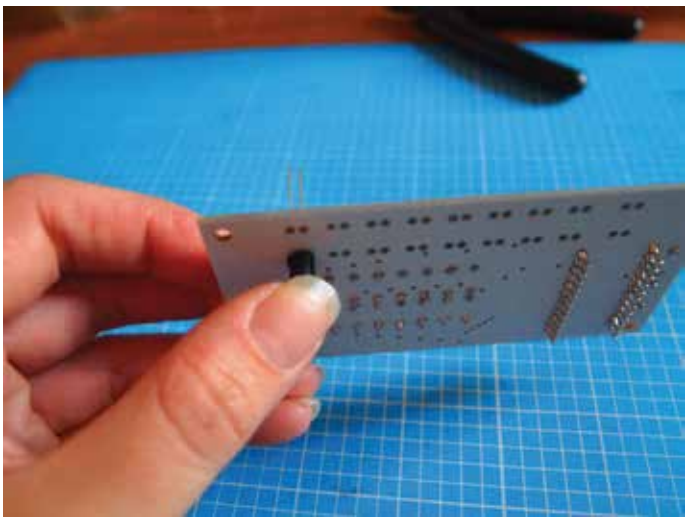
Trim the legs

28)



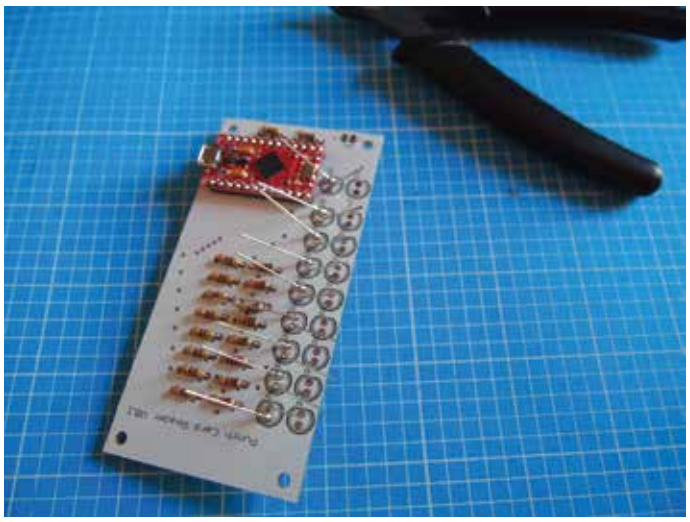
Return to the top main board and locate the 9 Phototransistors

29)



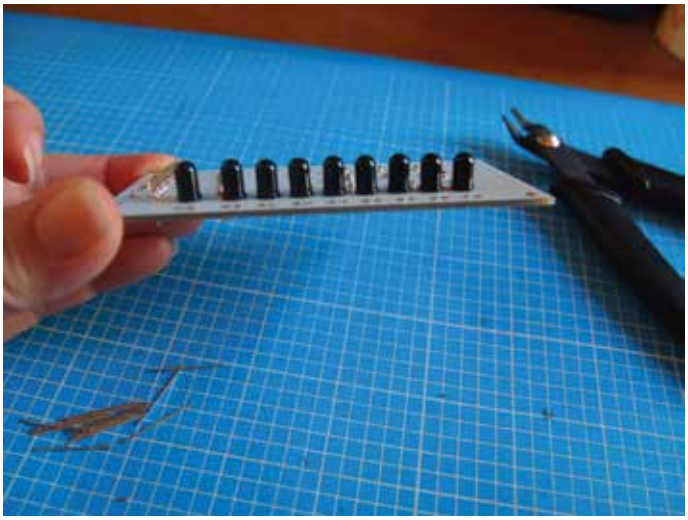
Insert each PT from the underside of the board again positioning the flat edge of the PT towards the flat side of the symbol

30)



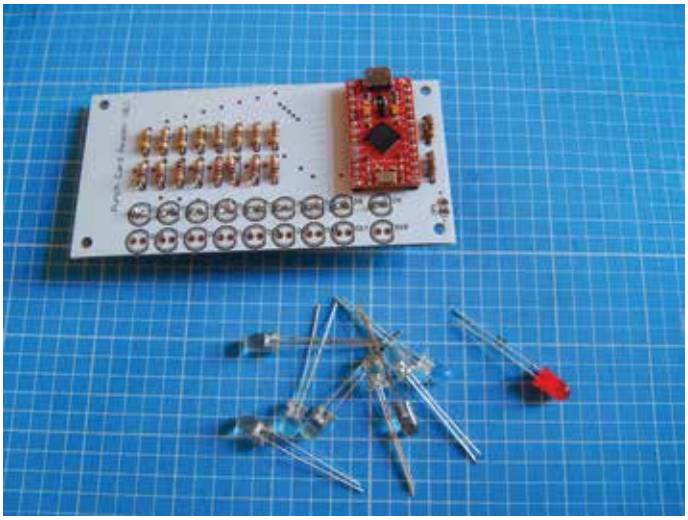
Insert all PTs and bend legs before soldering

31)



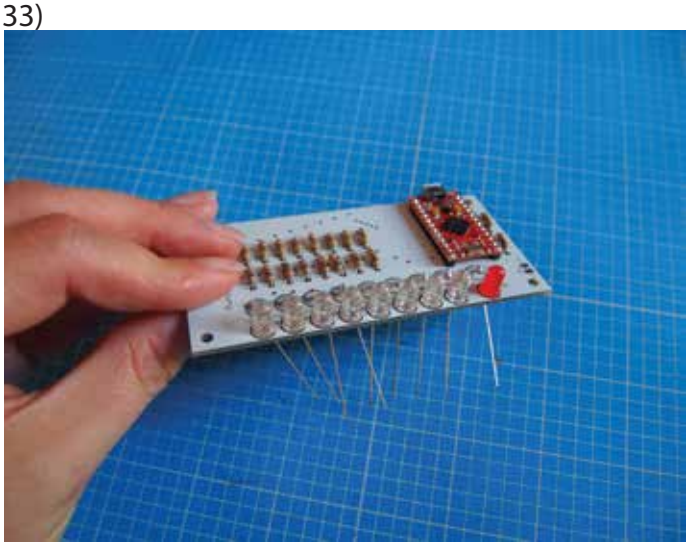
Once soldered, trim the legs and check to ensure the PTs are sitting flat against the board. Warm the solder while pushing the PT carefully if not

32)



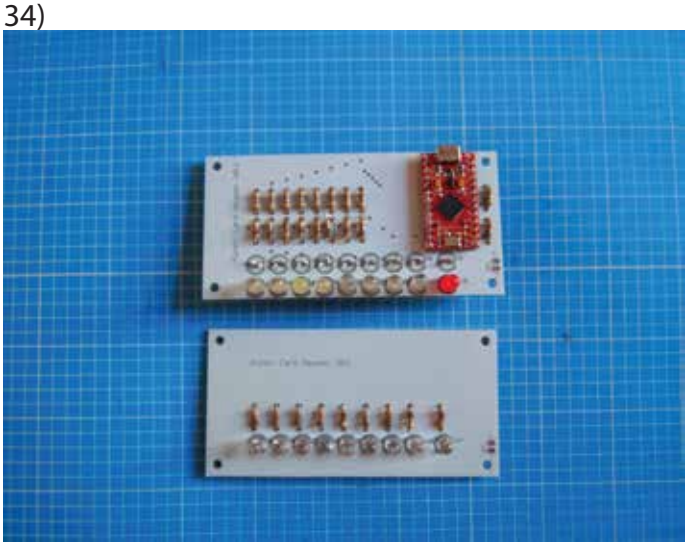
Locate 8 white LEDs and 1 coloured one

33)



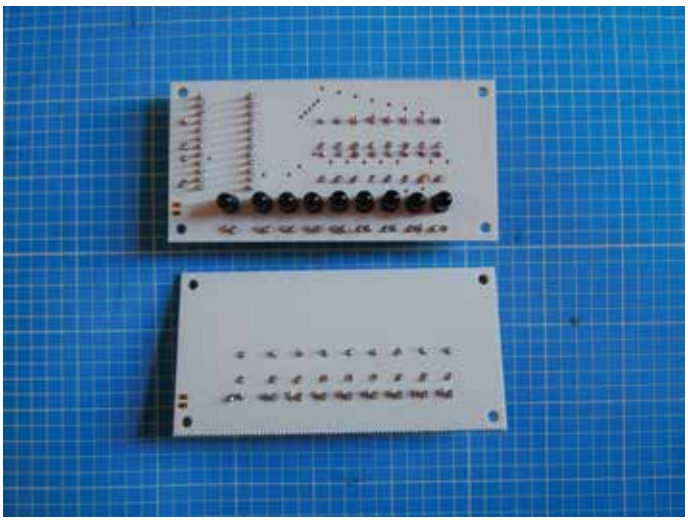
Insert all 9 into the top board, coloured one on the far right, position flat edges to the flat side of the synbol again. Solder as before and trim legs

34)



All components are now attached to both boards

35)

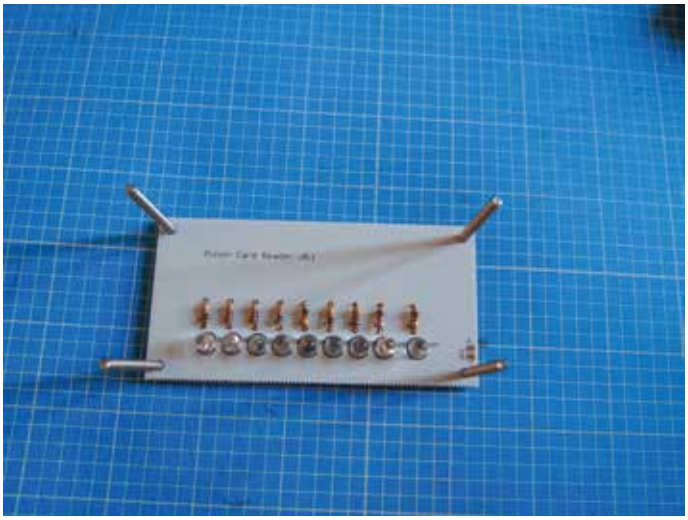


Back biew of both boards

36)

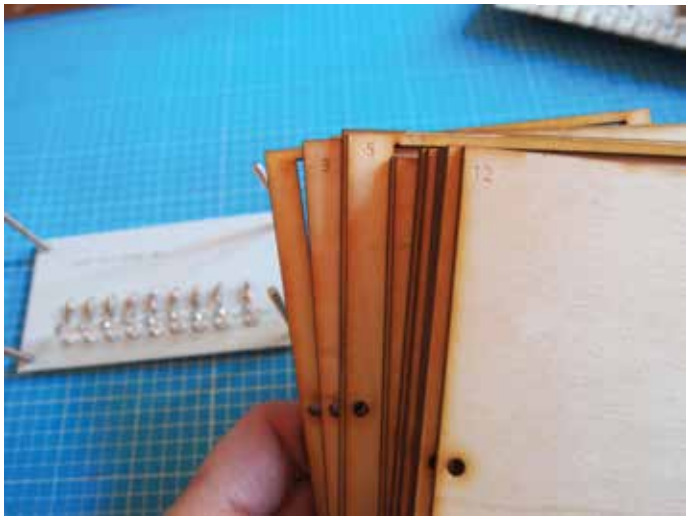
Take the bottom board (with IR Leds on) and locate 4 bolts

37)



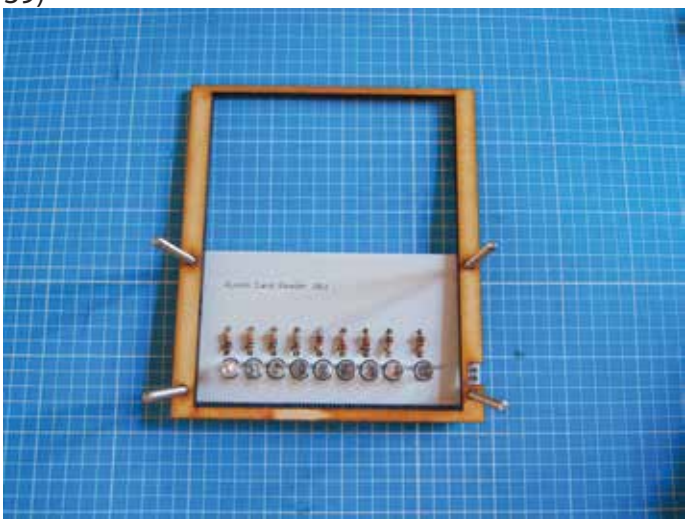
Thread the bolts through the 4 holes on the bottom board from the underside

38)



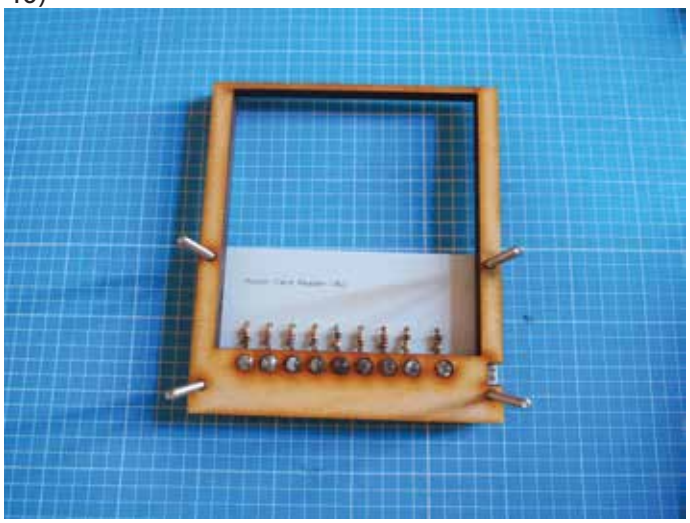
Locate the wood stack layers, all are numbered

39)



One at a time, thread wood layers onto the bolts 1.....

40)

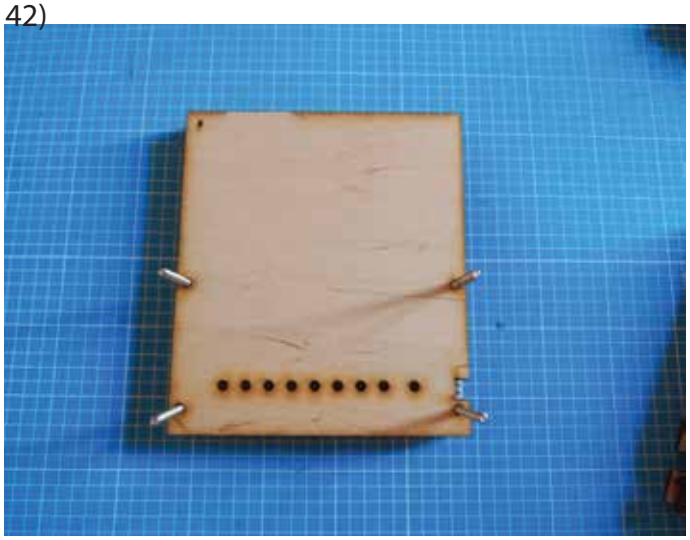


.....2.....

41)

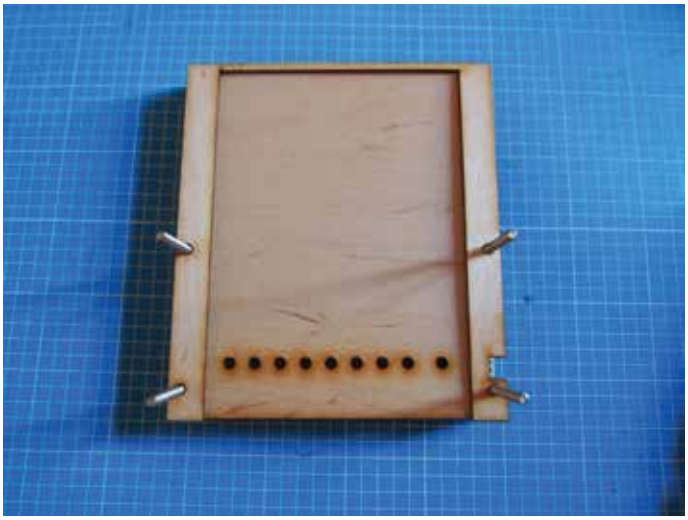
.....3.....

42)



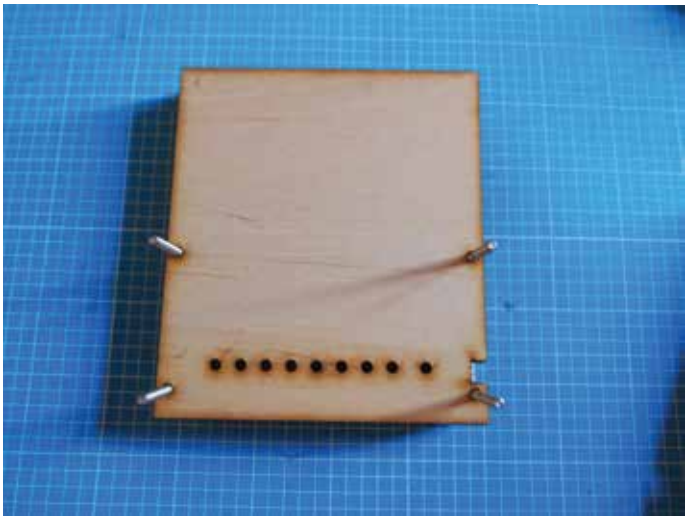
.....4.....

43)



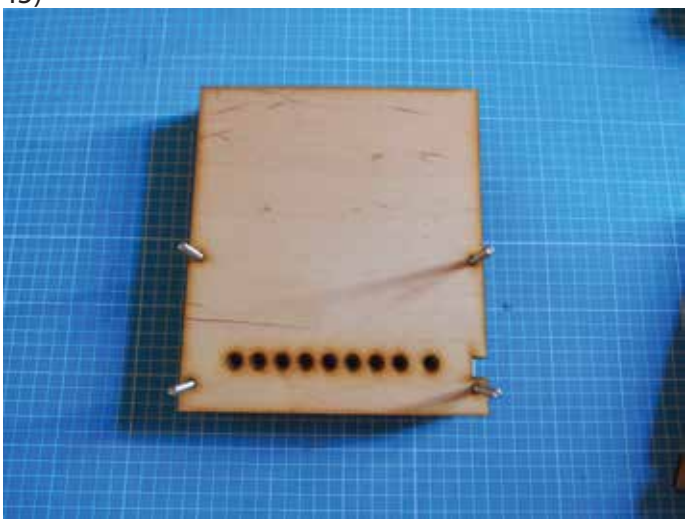
.....5.....

44)



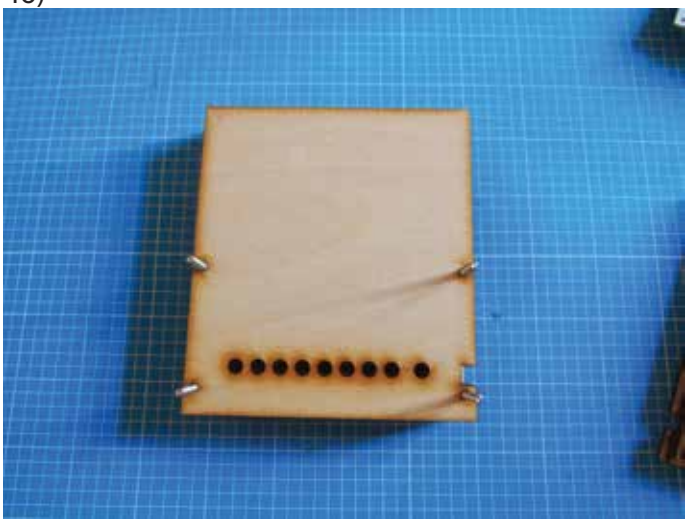
.....6.....

45)



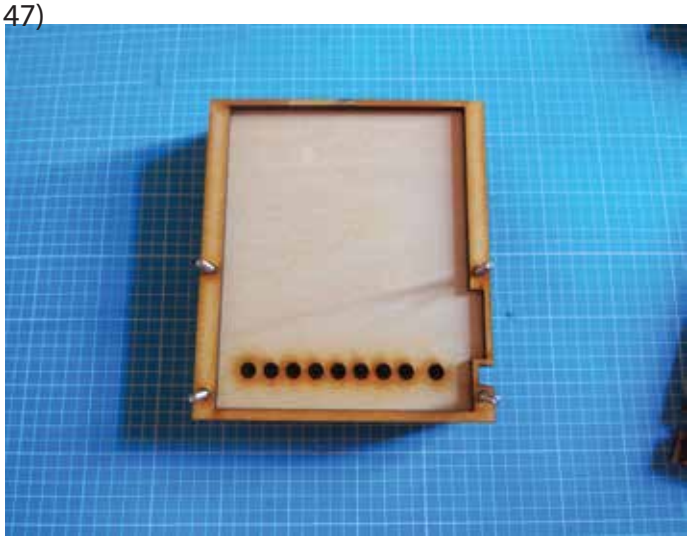
.....7.....

46)



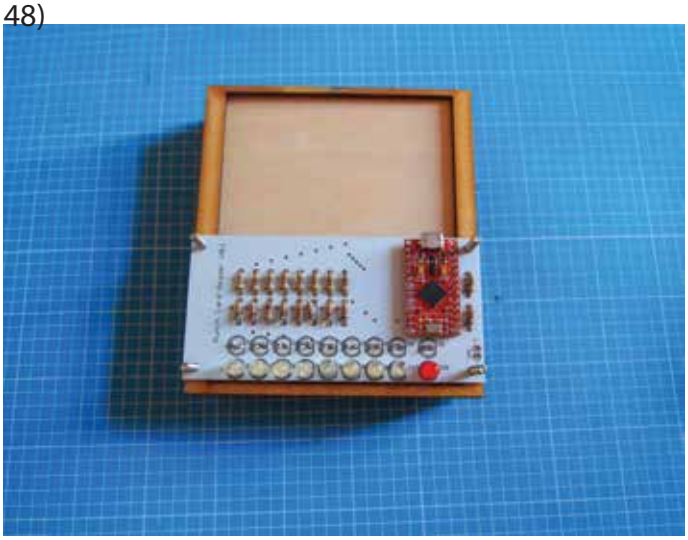
.....8.....

47)



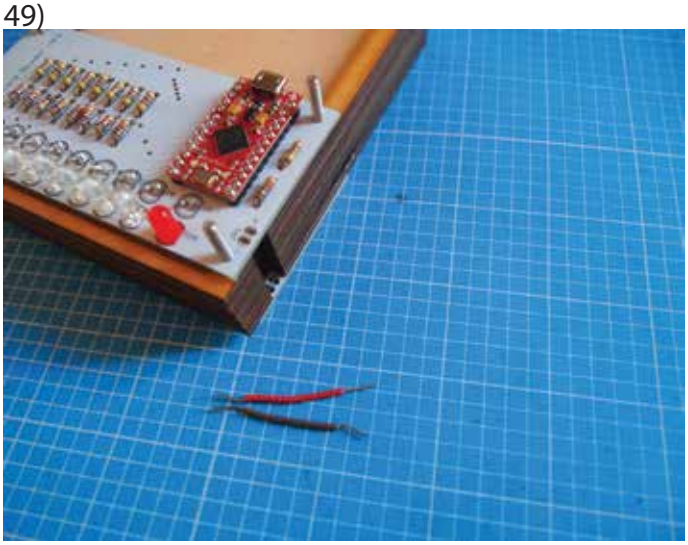
.....9.....

48)



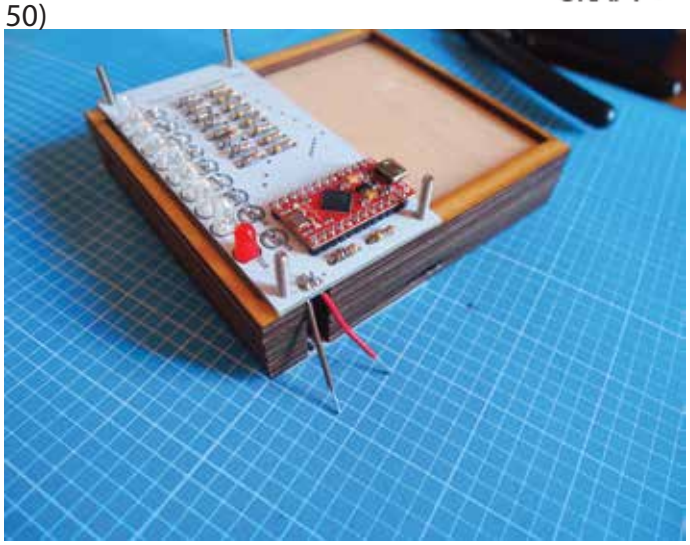
After layer 9, add the top circuit board, being careful to push the PTs into the holes in the stacks below

49)



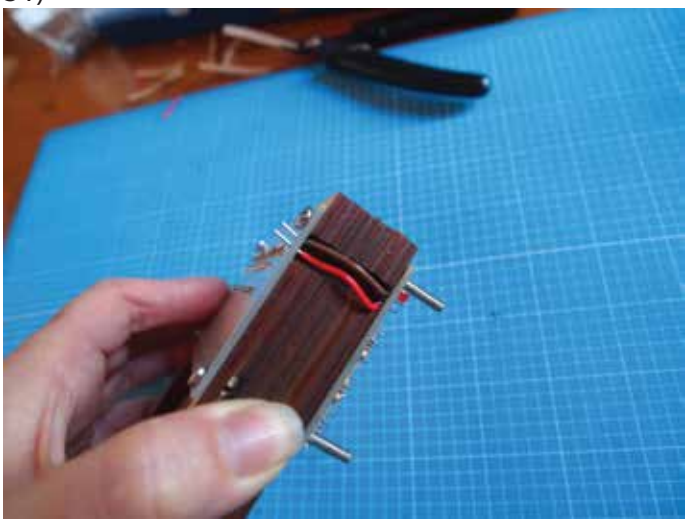
Loate the 2 jumper wires

50)



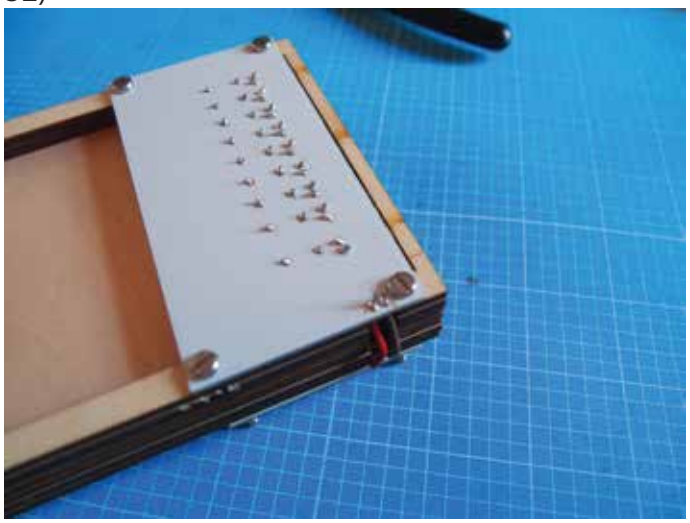
Insert wire ends into the +ve and -ve holes at the side f the top board and solder into position

51)

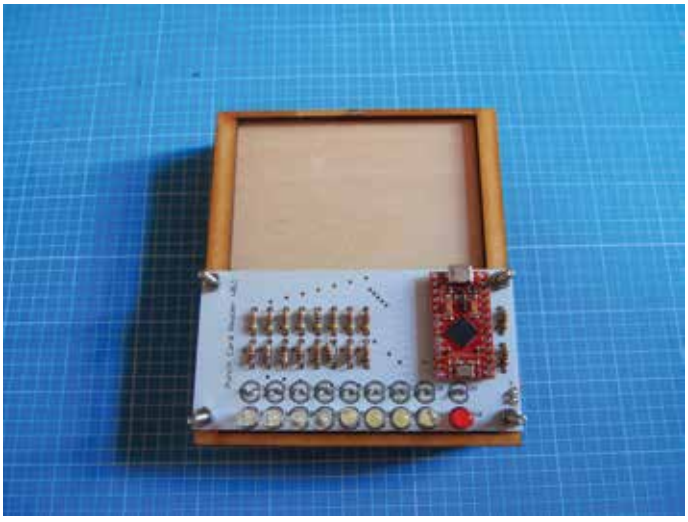


Turn over and push the other end of the wires into the same holes on the bottom board

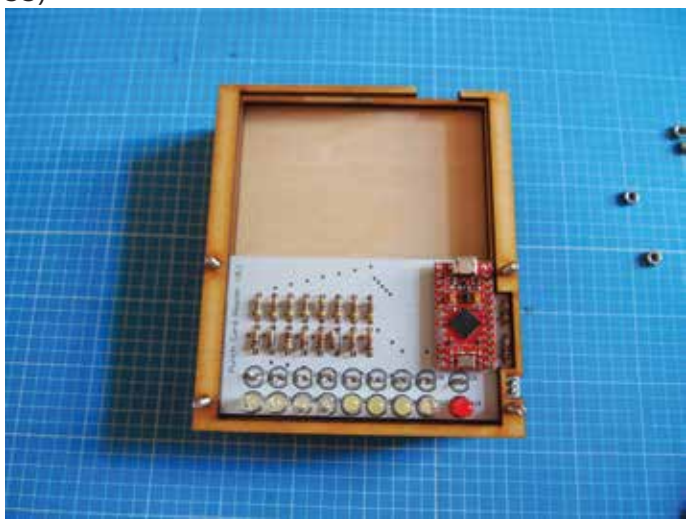
52)



solder into position and trim all ends.

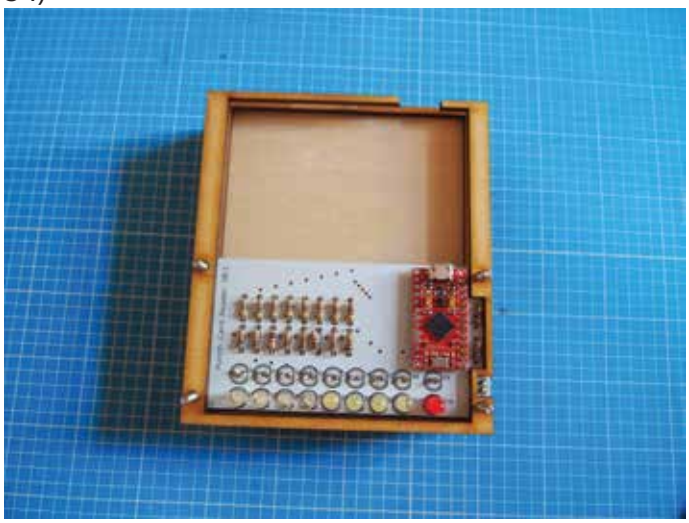


53)



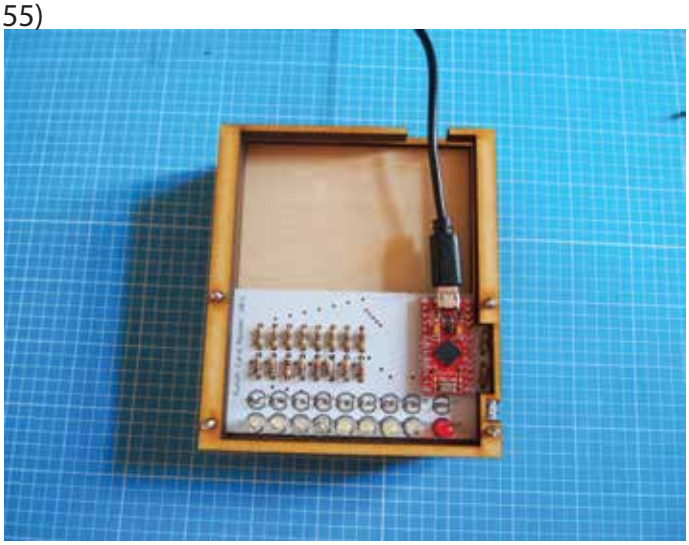
continue to stack final wood layers.....10....

54)



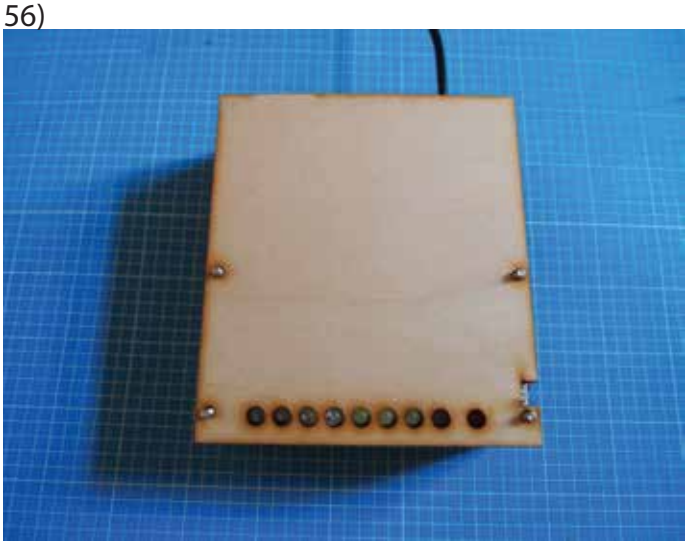
.....11.....

55)



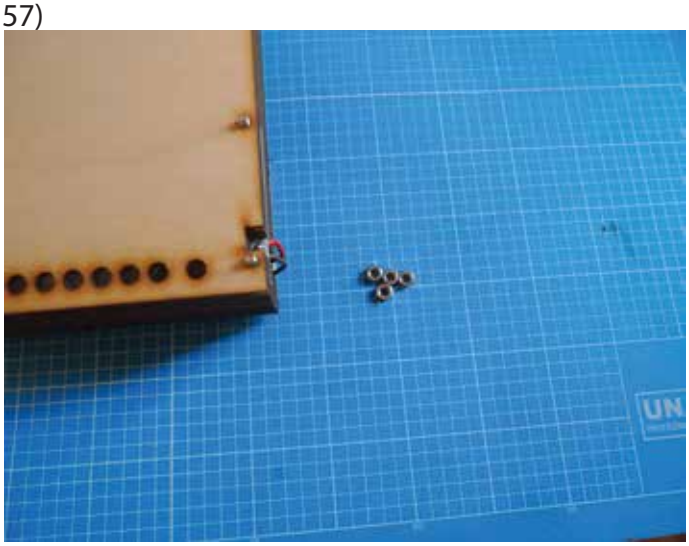
Insert USB cable into Pro Micro and lay cable into gap at back of the stack

56)



Add final layer....12

57)



Locate 4 nuts

58)

Fasten nuts onto the bolst to secure the stack

PATTERN
CRAFT