Block Post Simulator – PCB Construction

Track Circuit module

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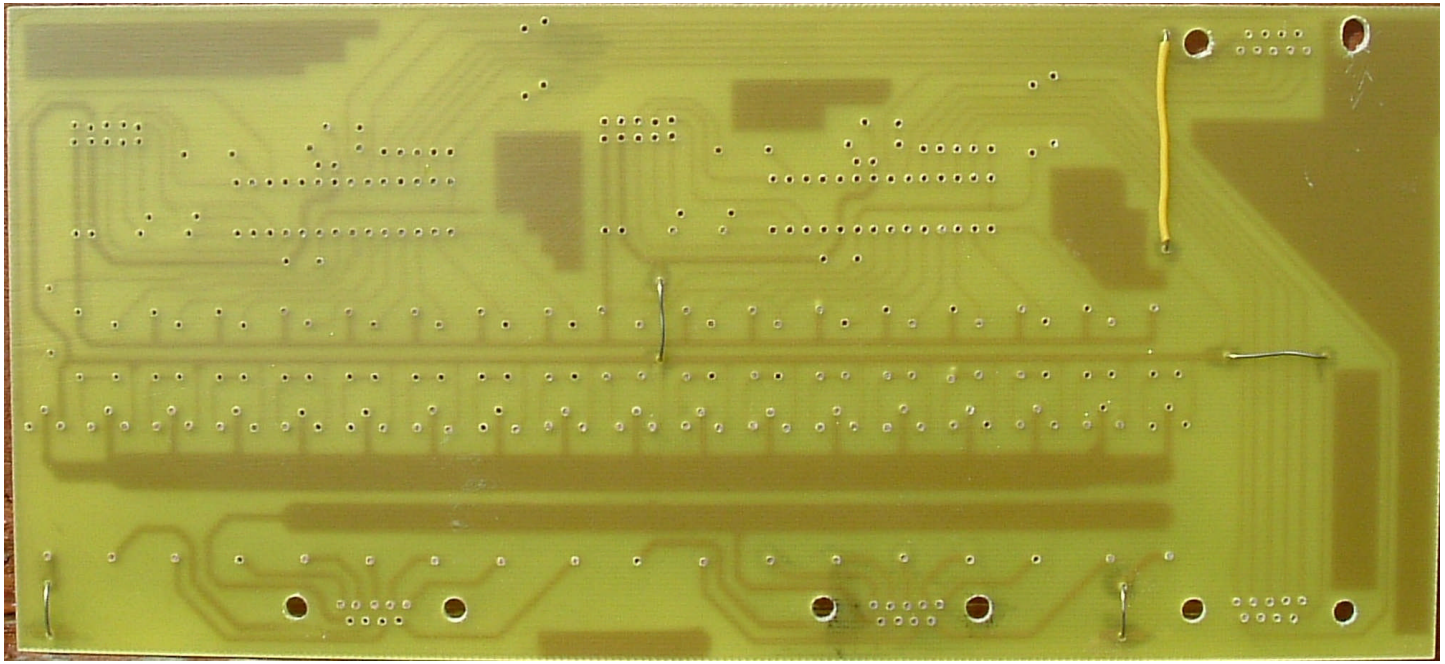
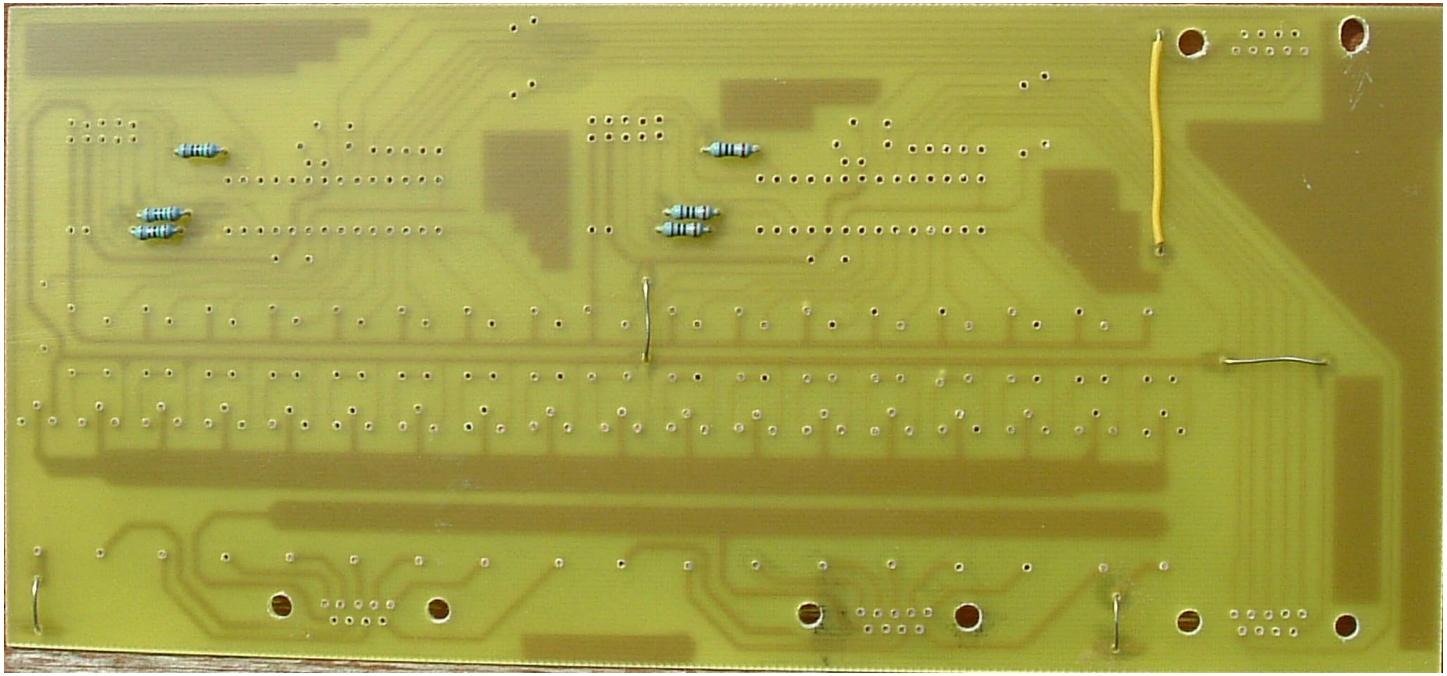
List of Components – Track Circuit module

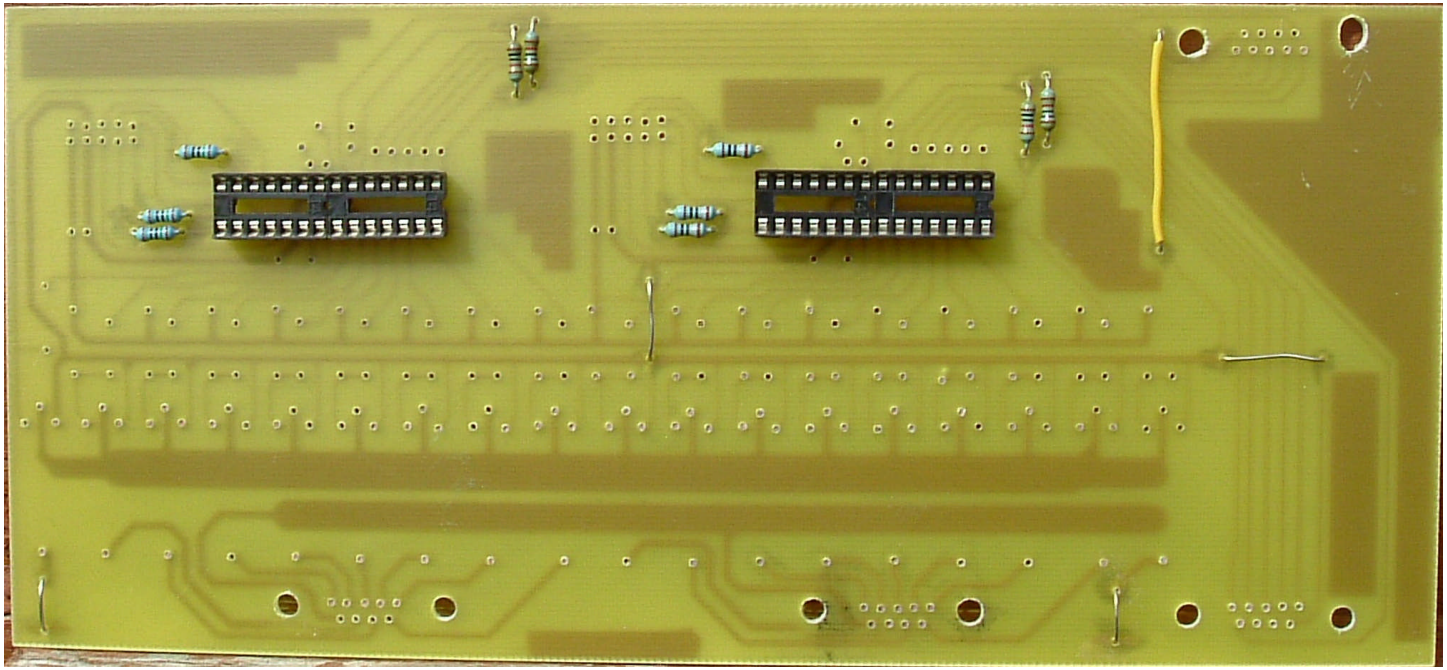
description	quantity	MAPLIN code	comment
100 Ω 0.6 Watt metal film resistor	6	M100R	
150 Ω 0.6 Watt metal film resistor		M150R	
470 Ω 0.6 Watt metal film resistor		M470R	
680 Ω 0.6 Watt metal film resistor		M680R	
10 kΩ 0.6 Watt metal film resistor	6	M10K	
4 x approx 10 kΩ SIL resistor pack	2		not available from MAPLIN
1N4001 diode	6 to 18	QL73Q	one for each track circuit!
47 pF capacitor 0.1 inch pitch	2	RA35Q	
220 nF capacitor 0.2 inch pitch, 25 Volts	4	JL02C	
22 µF, 50 V electrolytic capacitor	2	DT57M	
5V SPST reed relay	6 to 18	JH12N	one for each track circuit!
2 x 5 way IDC plug	2	JB85G	
14 pin IC socket	4	BL18U	use in pairs for 28 pin PICs
9 way right angle D plug	2	FG66W	
9 way right angle D socket	2	FG25C	
20 mA LED – red		WL27E	
20 mA LED – green		WL28F	
20 mA LED – yellow		WL30H	
20 mA LED – orange		WL29G	
4 way DIL switch		JH08J	
7805 voltage regulator		CH35Q	



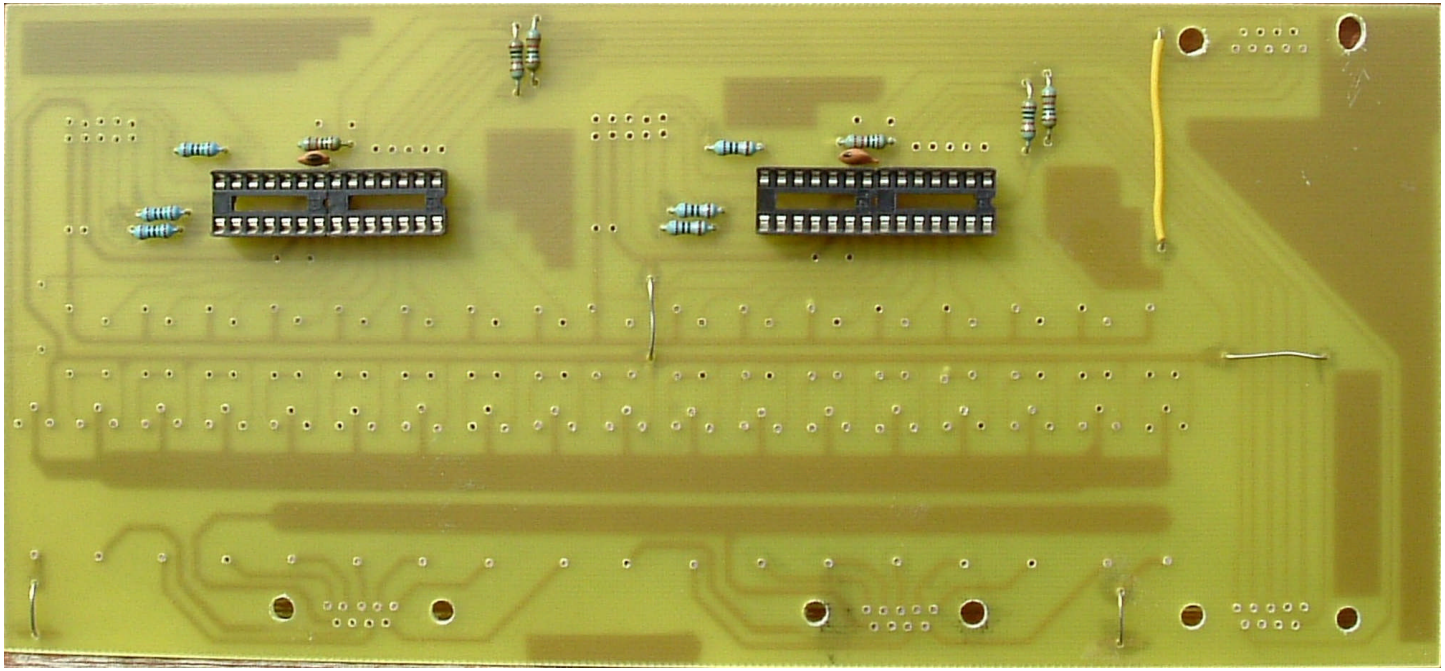
Step 1: The wire links – or most of them.



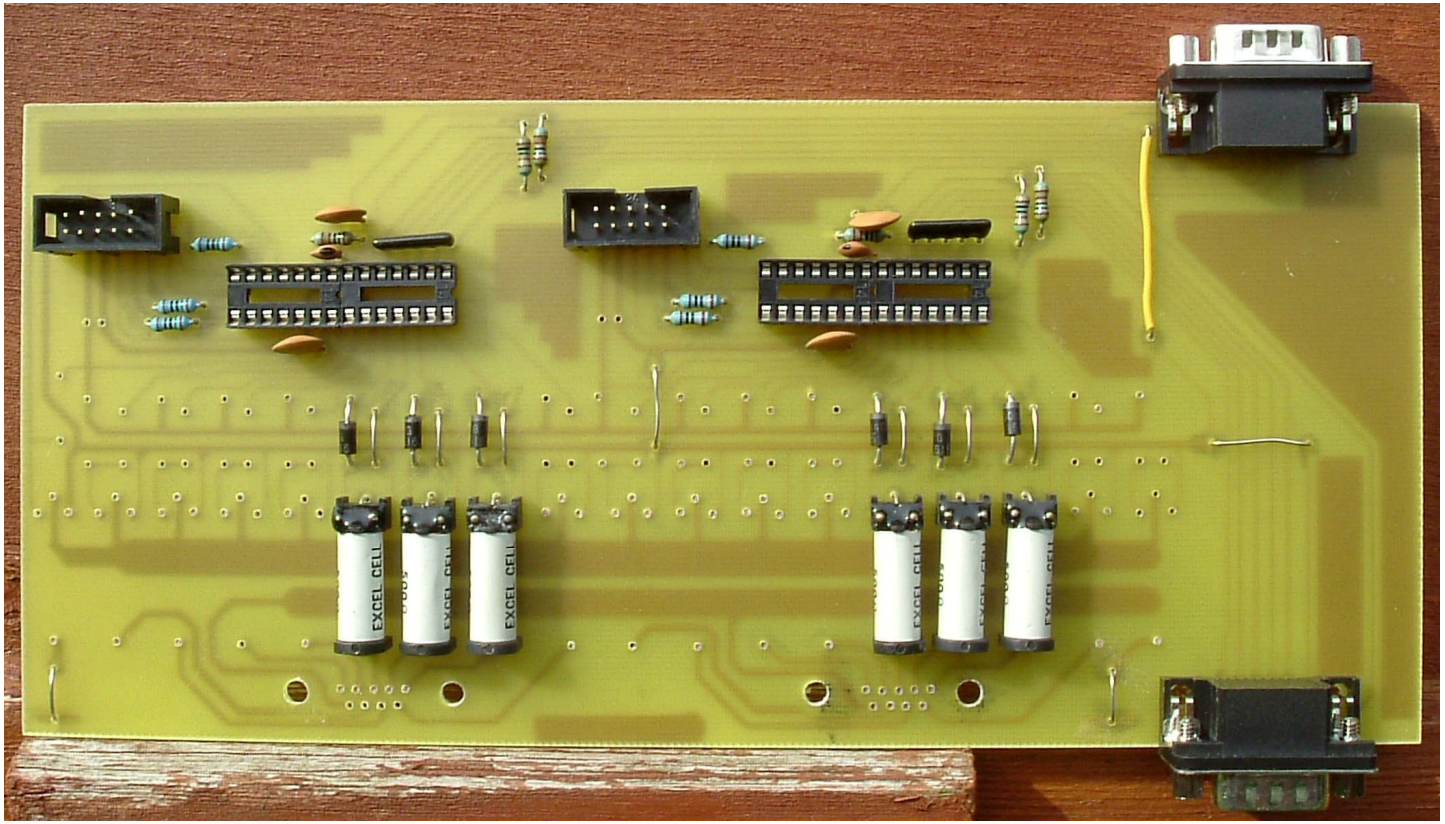
Step 2. These resistors should be about 100 Ω, although the exact value is not critical.



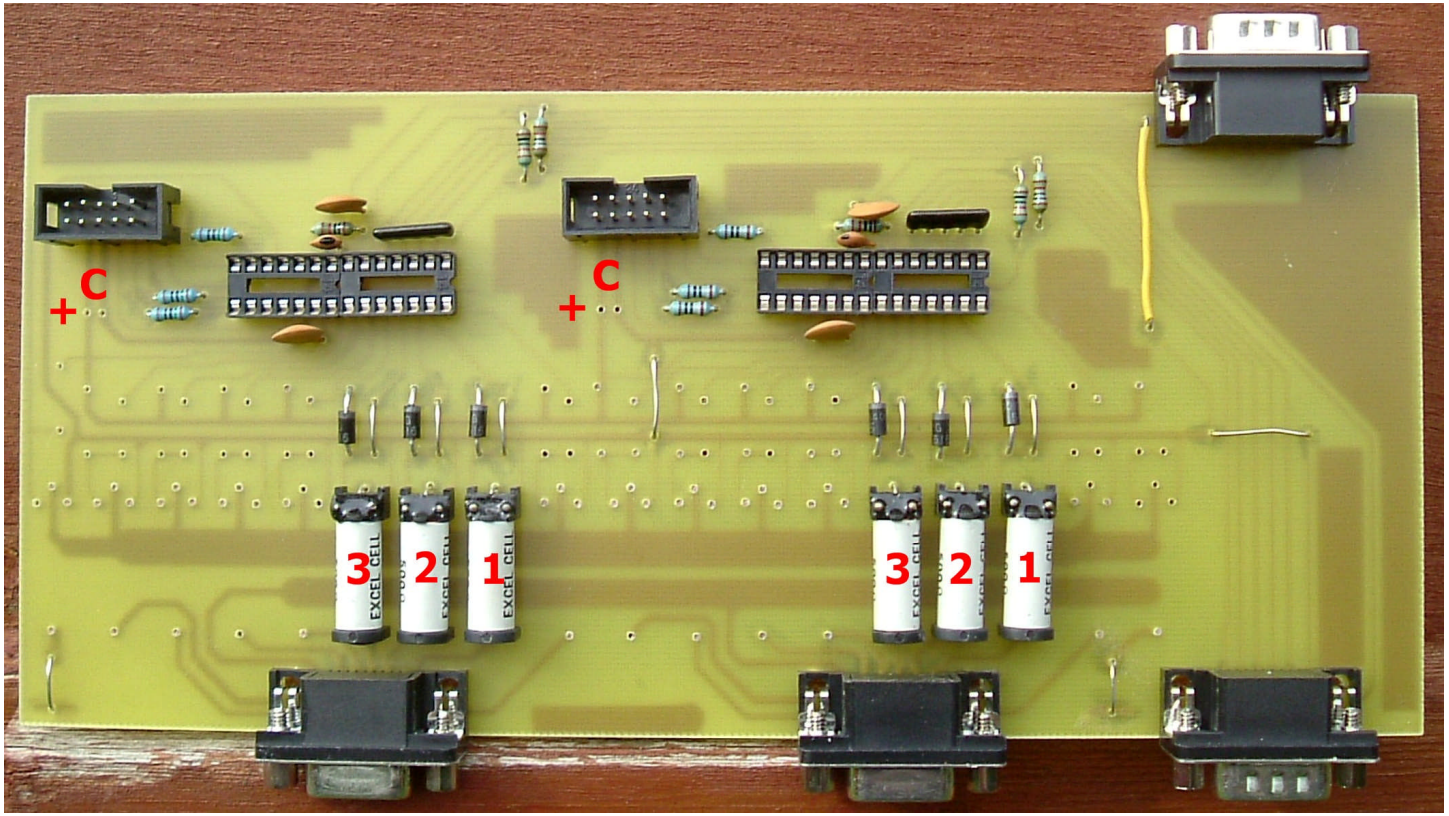
Step 3. Now we have added the IC sockets and 10 kΩ pullup resistors. I have used pairs of 14 pin sockets; note the orientation – the notch (pin 1) is to the right.



Step 4: The timing components for the PICs have been added. These consist of a 47 pF ceramic capacitor and 10 kΩ resistor.

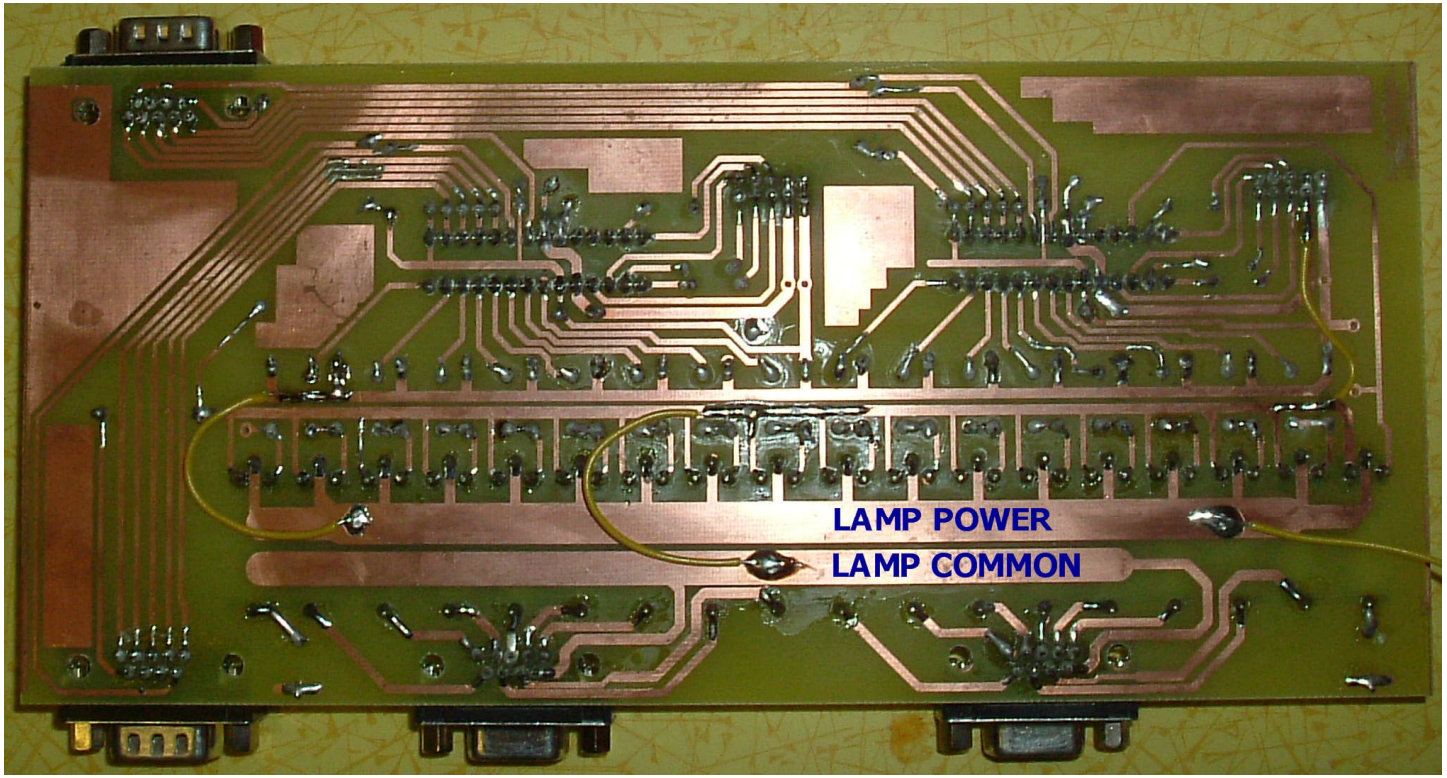


Step 5. In this view the newly added components are:
2x5 way IDC plugs
Reed relays for the TC lamps, their suppression diodes (1N4001) and wire links
Decoupling capacitors – ceramic 100 nF or 220 nF
5x10 kΩ (or similar) SIL resistor packs
Two right angle 9 way D type plugs; these are for the signal inputs to the board



Step 6. Finally we add the two right angle 9 way D type sockets, for the track circuit lamps. The pairs of holes marked with C and + are for electrolytic capacitors (which I didn't have any of when I did these photographs!).

At present the software can only deal with three TCs on each line and the relays are marked accordingly. You will notice the board has been designed to take more reed relays, but the software will have to be modified to use these.



Finally, there is the matter of how to power the track circuit indicators (e.g. lamps). The image shows the LAMP POWER and LAMP COMMON lines; you will have to connect these to a power supply via flying leads.

If – and only if – the indicators are 5 Volt LEDs, the you may use the 0 V and 5 V digital rails. This has been done in the above example, with the yellow wires at the centre and left of the board (with LAMP POWER connected to +5V).

Ignore the two yellow wires at the right hand end of the board.