

AUTOMATIC RAILROAD CROSSING CONTROLLER

PARTS LIST & SCHEMATICS

RELEASE 2.4

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DISCLAIMER

I hope you will like the ARCC and enjoy using it as much as I have enjoyed creating it, BUT . . .

While every effort has been made to thoroughly test and verify all functions incorporated into the ARCC hardware, please note that it is supplied on an "as is" basis and without warranty of any kind. You use the ARCC hardware design at your own risk. The author and designer will not in any event be held liable for any improper operation of the ARCC system or interference with any other equipment, nor be held liable for any incidental or consequential damages of any sort arising out of its use.

The circuitry of the ARCC is sensitive to damage from electrostatic discharge. Observe proper electrostatic precautions when handling any unit built to the ARCC design and any connecting cables. The use of a properly-grounded wriststrap is highly recommended.

1 PARTS LIST & NOTES

Ref No	Type/Value	Description	Total Reqd
U 1	LM339	Quad Comparator	1
U 2	74HCT132	Quad 2-Input NAND Schmitt	2
U 3	74HCT10	Triple 3-Input NAND	4
U 4	74HCT10	Triple 3-Input NAND	
U 5	74HCT02	Quad 2-Input NOR	1
U 6	74HCT132	Quad 2-Input NAND Schmitt	
U 7	74HCT10	Triple 3-Input NAND	
U 8	74HCT10	Triple 3-Input NAND	
U 9	LM7805	Voltage Regulator +5V 1A	1
BR 1	WO-01	Bridge Rectifier 1.5A 100V	1
D 1	1N4148	Diode	1
D 2	1N4001	Diode 50V 1A	1
Q 1	QSC113	Infra-Red Detector	4
Q 2	2N3904	NPN Transistor	4
Q 3	QSC113	Infra-Red Detector	
Q 4	2N3904	NPN Transistor	
Q 5	QSC113	Infra-Red Detector	
Q 6	2N3904	NPN Transistor	
Q 7	QSC113	Infra-Red Detector	
Q 8	2N3904	NPN Transistor	
Q 9	2N3906	PNP Transistor	1
Q 10	TIP31	NPN Transistor	1
LED 1	QEC113	Infra-Red Emitter	4
LED 2	QEC113	Infra-Red Emitter	
LED 3	QEC113	Infra-Red Emitter	
LED 4	QEC113	Infra-Red Emitter	
LED 5		Green LED	1
R 1	180R	Resistor 0.25W Metal Film	5
R 2	10K	Resistor 0.25W Metal Film	9
R 3	47K	Resistor 0.25W Metal Film	4
R 4	22K	Resistor 0.25W Metal Film	4
R 5	27K	Resistor 0.25W Metal Film	4
R 6	10K	Resistor 0.25W Metal Film	

Ref No	Type/Value	Description	Total Reqd
R 7	33K	Resistor 0.25W Metal Film	4
R 8	1K	Resistor 0.25W Metal Film	5
R 9	180R	Resistor 0.25W Metal Film	
R 10	10K	Resistor 0.25W Metal Film	
R 11	47K	Resistor 0.25W Metal Film	
R 12	22K	Resistor 0.25W Metal Film	
R 13	27K	Resistor 0.25W Metal Film	
R 14	10K	Resistor 0.25W Metal Film	
R 15	33K	Resistor 0.25W Metal Film	
R 16	1K	Resistor 0.25W Metal Film	
R 17	180R	Resistor 0.25W Metal Film	
R 18	10K	Resistor 0.25W Metal Film	
R 19	47K	Resistor 0.25W Metal Film	
R 20	22K	Resistor 0.25W Metal Film	
R 21	27K	Resistor 0.25W Metal Film	
R 22	10K	Resistor 0.25W Metal Film	
R 23	33K	Resistor 0.25W Metal Film	
R 24	1K	Resistor 0.25W Metal Film	
R 25	180R	Resistor 0.25W Metal Film	
R 26	10K	Resistor 0.25W Metal Film	
R 27	47K	Resistor 0.25W Metal Film	
R 28	22K	Resistor 0.25W Metal Film	
R 29	27K	Resistor 0.25W Metal Film	
R 30	10K	Resistor 0.25W Metal Film	
R 31	33K	Resistor 0.25W Metal Film	
R 32	1K	Resistor 0.25W Metal Film	
R 33	100R	Resistor 0.25W Metal Film	1
R 34	10K	Resistor 0.25W Metal Film	
R 35	220R	Resistor 0.25W Metal Film	1
R 36	680R	Resistor 0.25W Metal Film	1
R 37	180R	Resistor 0.25W Metal Film	
R 38	68R	Resistor 0.25W Metal Film	1
R 39	22R	Resistor 0.25W Metal Film	1
R 40	1K	Resistor 0.25W Metal Film	

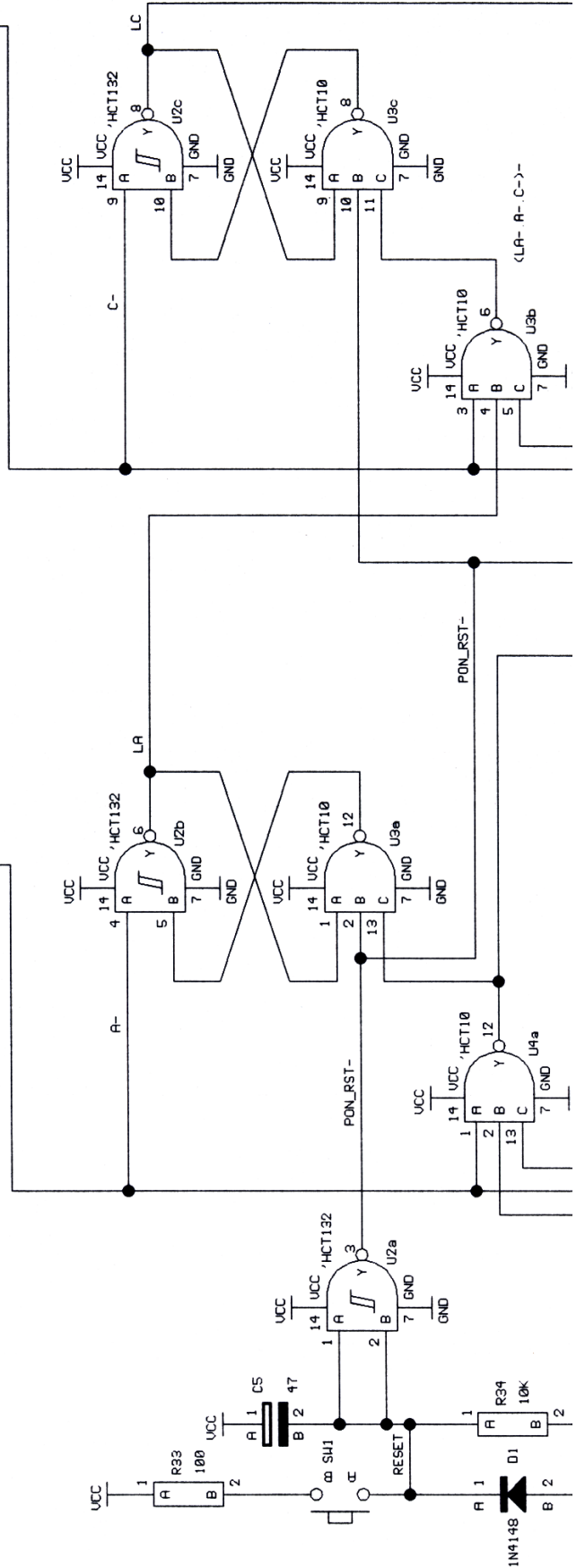
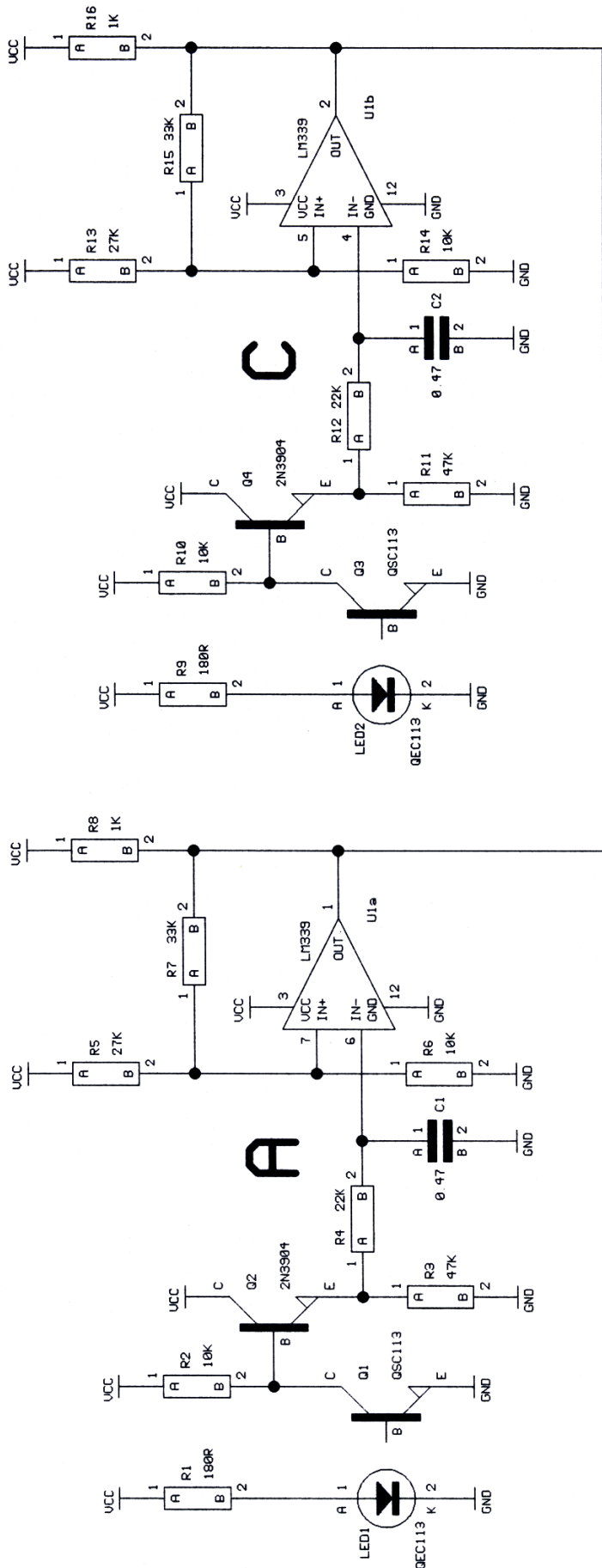
Ref No	Type/Value	Description	Total Reqd
C 1	470nF	Capacitor, Polyester	4
C 2	470nF	Capacitor, Polyester	
C 3	470nF	Capacitor, Polyester	
C 4	470nF	Capacitor, Polyester	
C 5	47uF/16v	Capacitor, Electrolytic	1
C 6	1000uF/63v	Capacitor, Electrolytic	1
C 7	330nF	Capacitor, Polyester	1
C 8	100nF	Capacitor, Polyester	1
C 9	100uF/16v	Capacitor, Electrolytic	1
C 10-17	22nF	Capacitor, Polyester	8
SW 1		Submin Push Switch	1
		4-Pin Header (0.1")	4
		4-Pin Header Connector (0.1")	4
		Terminal Pin (1mm)	16
		Heatsink T220 3.3degC/W	2
		Insulating Washer T220	2
		Stripboard (0.1")	
		22SWG / 21AWG Tinned Copper Wire	
		Stranded Connecting Wire, etc.	

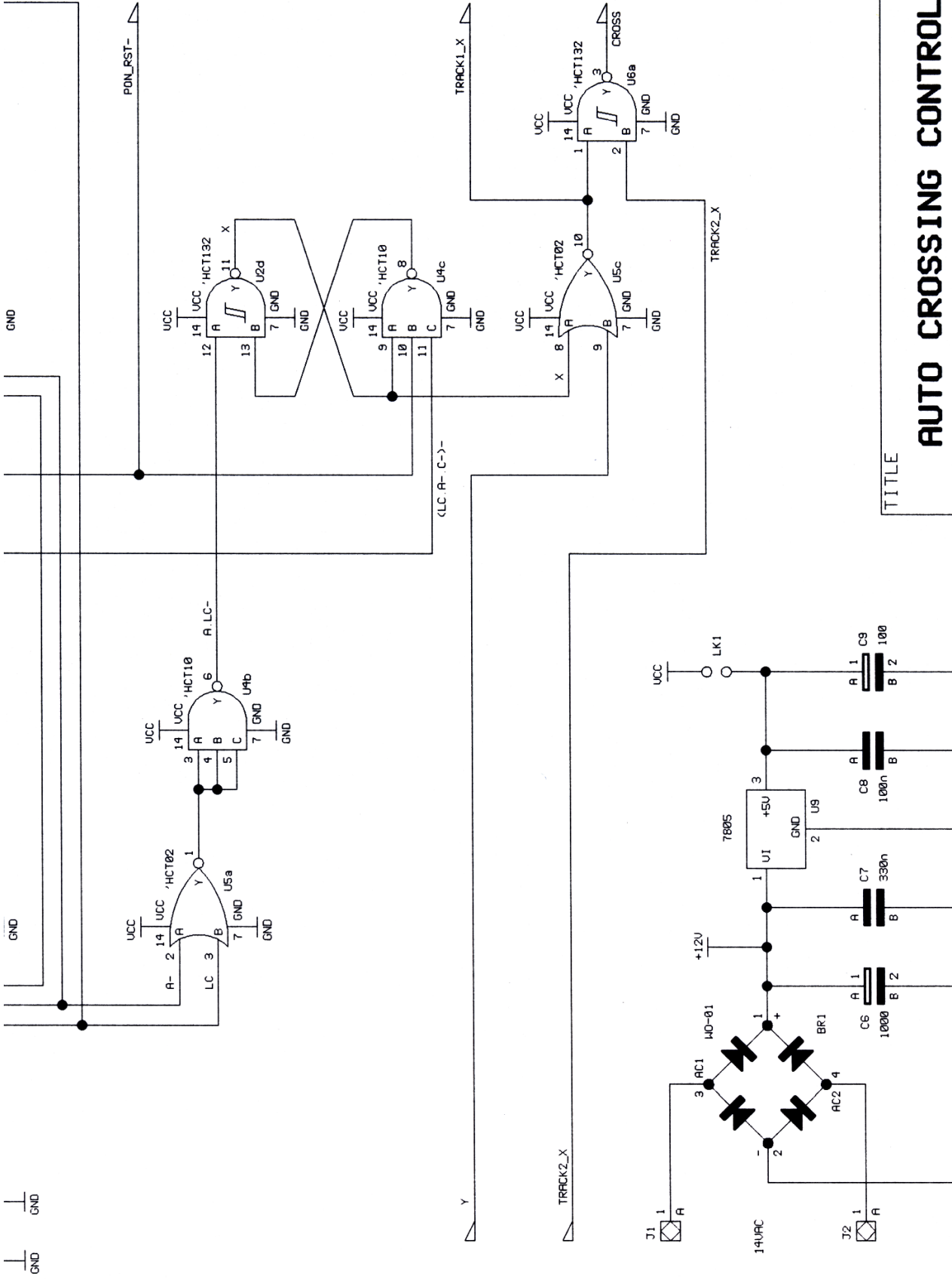
Notes:

ARCC is designed to use **74HCT** Series parts - do NOT substitute any of these devices with 74HC Series parts since the logic thresholds are quite different and will prevent correct operation. If 74HCT devices cannot be obtained, then it is possible to replace them with the equivalent 74LS devices, at the expense of higher power consumption.

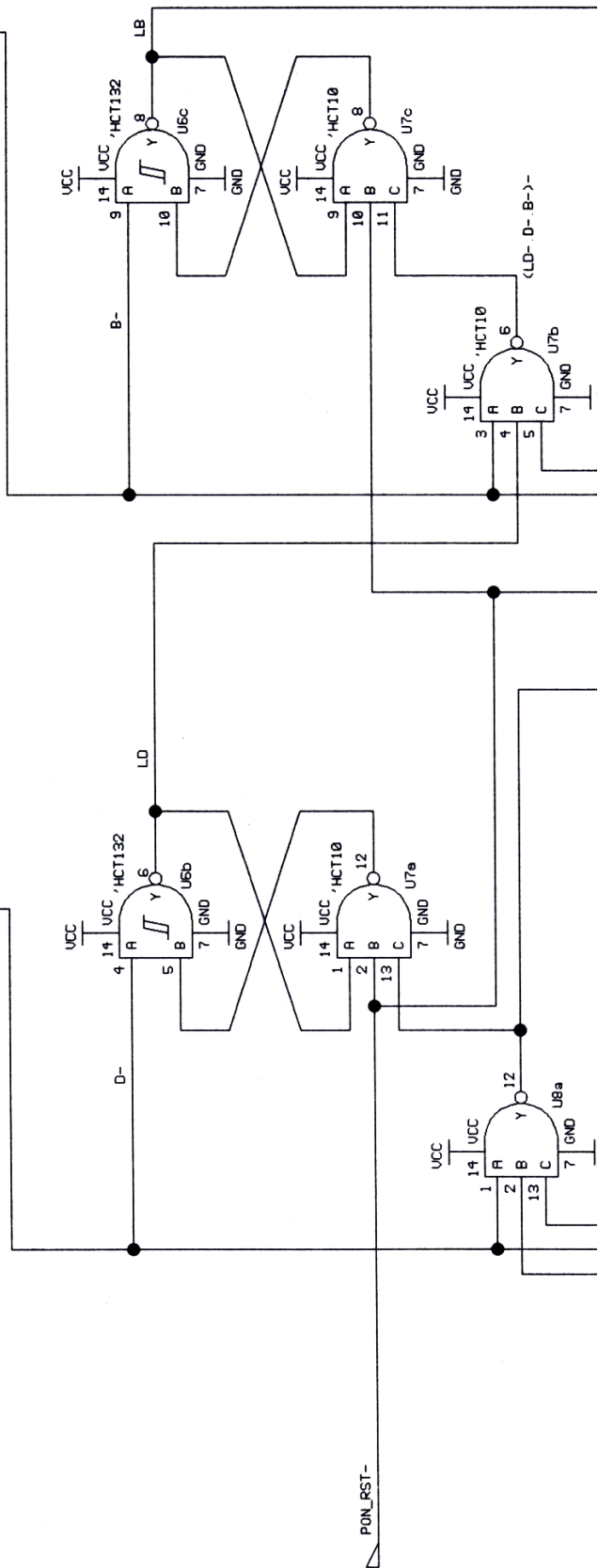
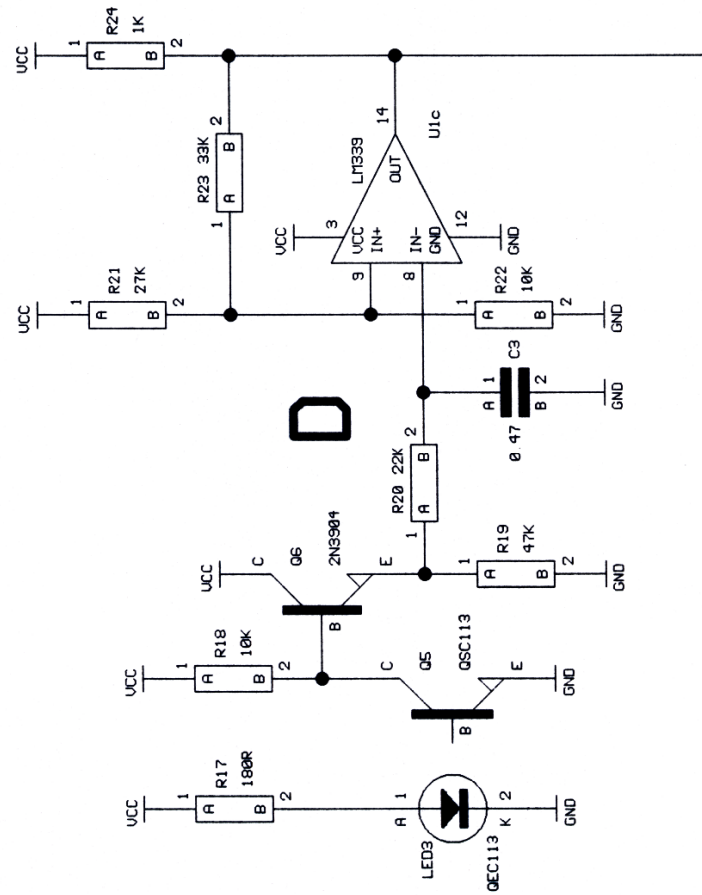
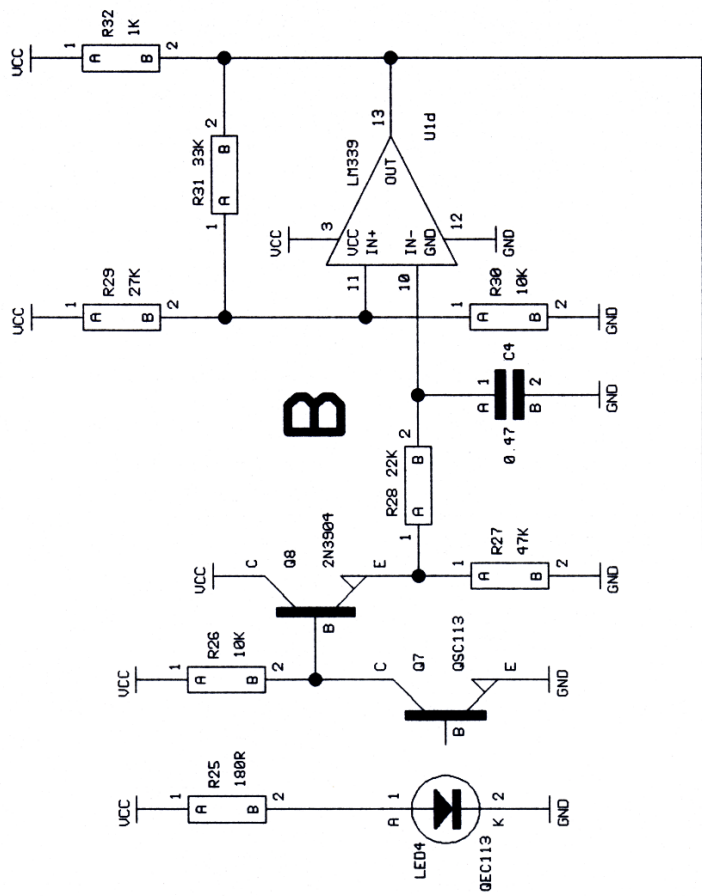
The voltage regulator U9 (LM7805) and power output transistor Q10 (TIP31) can dissipate several watts when the load connected to ARCC takes the maximum current (1 Amp). Hence these devices must be mounted on substantial heatsinks with a thermal coefficient of better than 5 degC per watt.

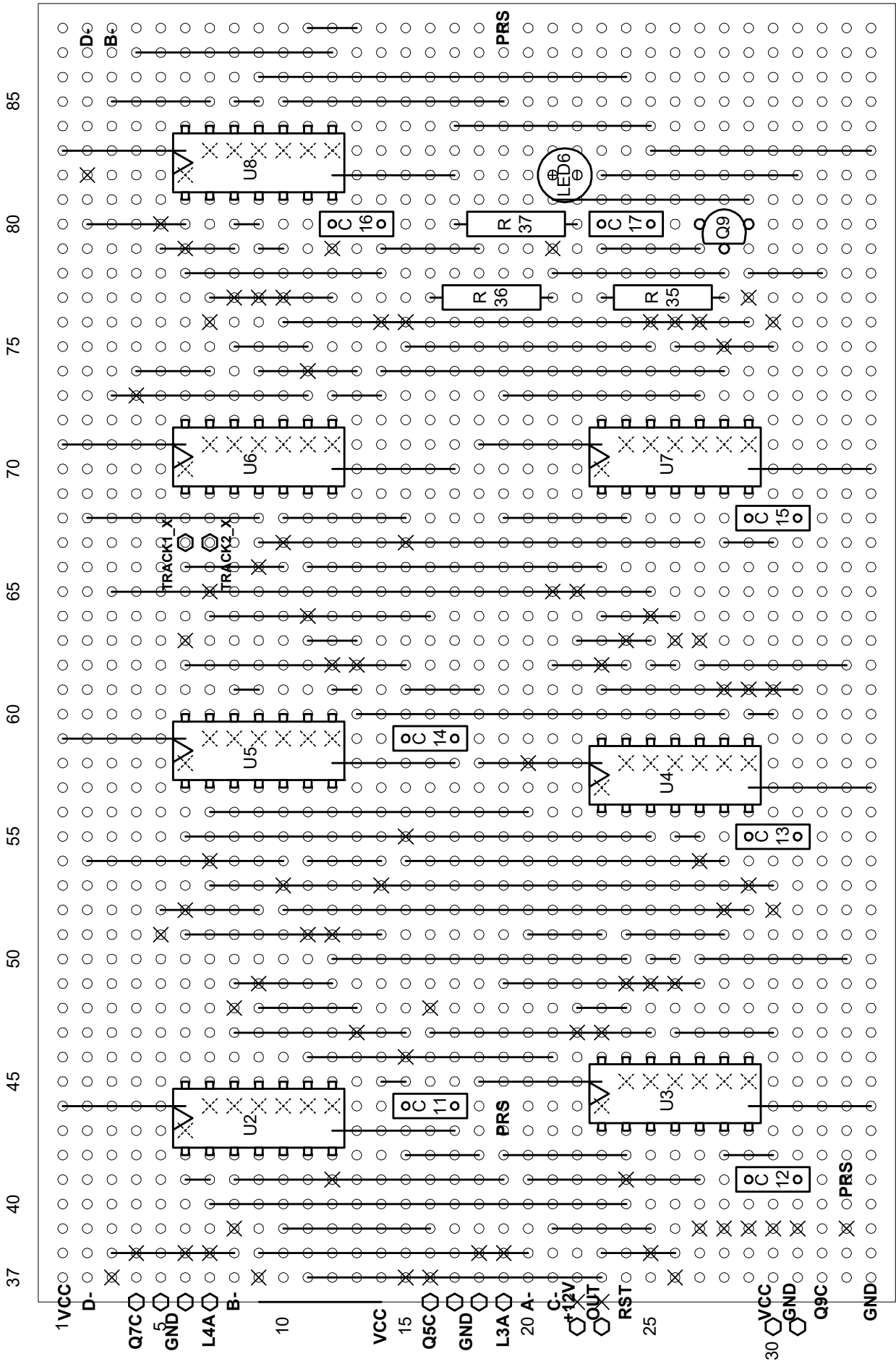
2 DETAILED SCHEMATICS



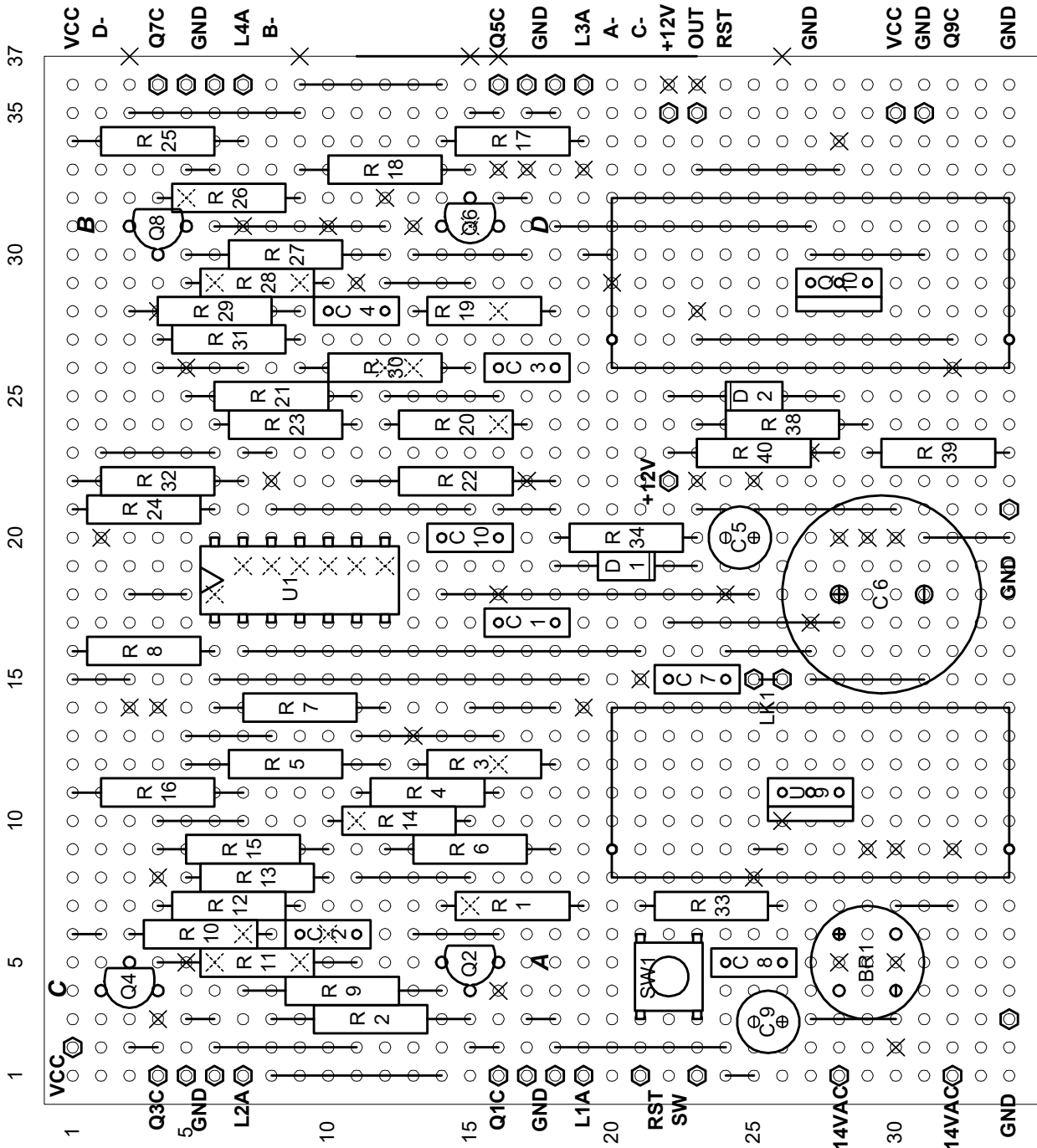


TITLE		VERSION	
AUTO CROSSING CONTROL		2.4	
COPYRIGHT		DATE	
JT CHAMBERLAIN (C) 2000-01		03 MAR 01	
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AUTCRS24.SCH		1 OF 2	

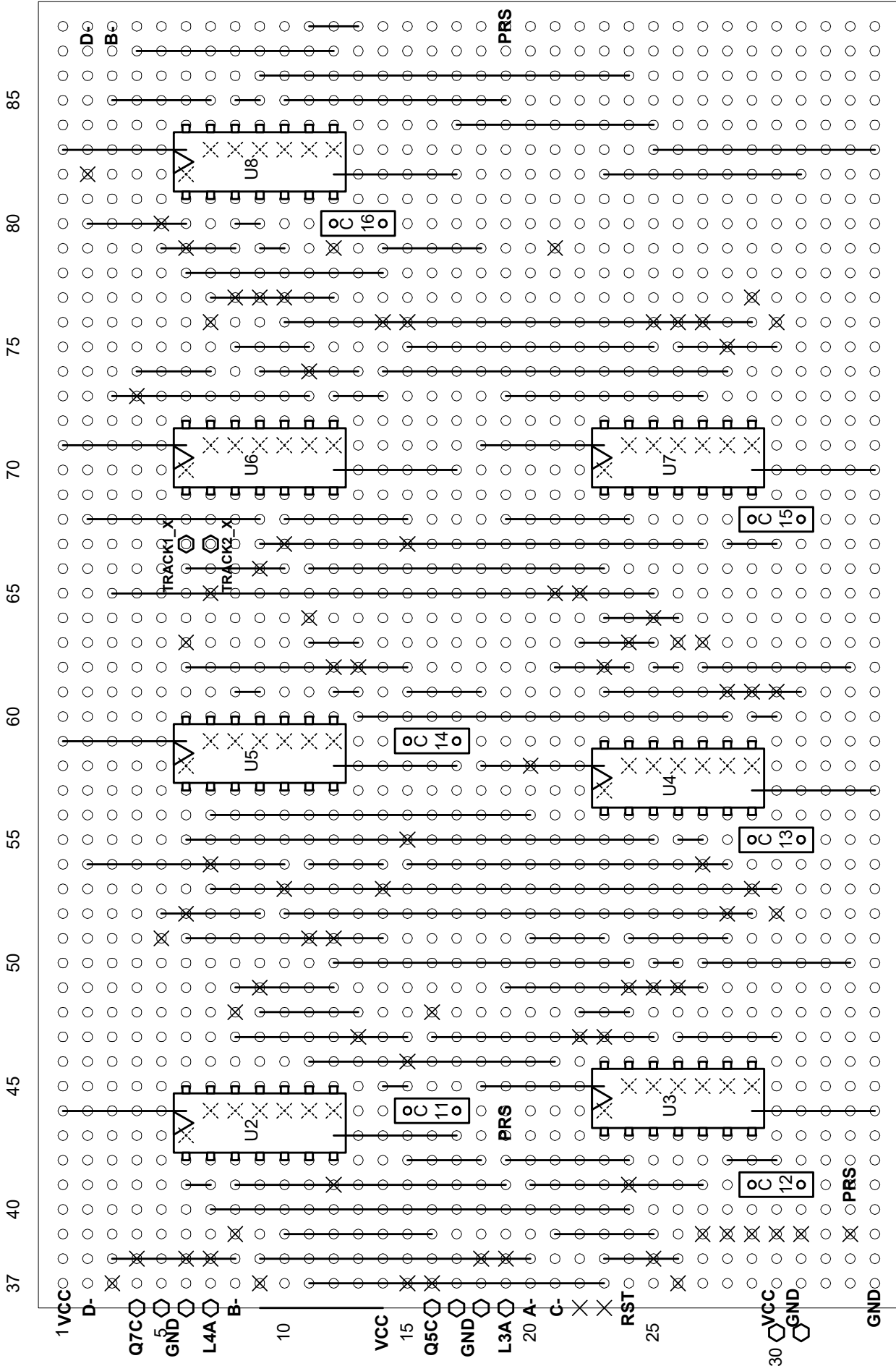




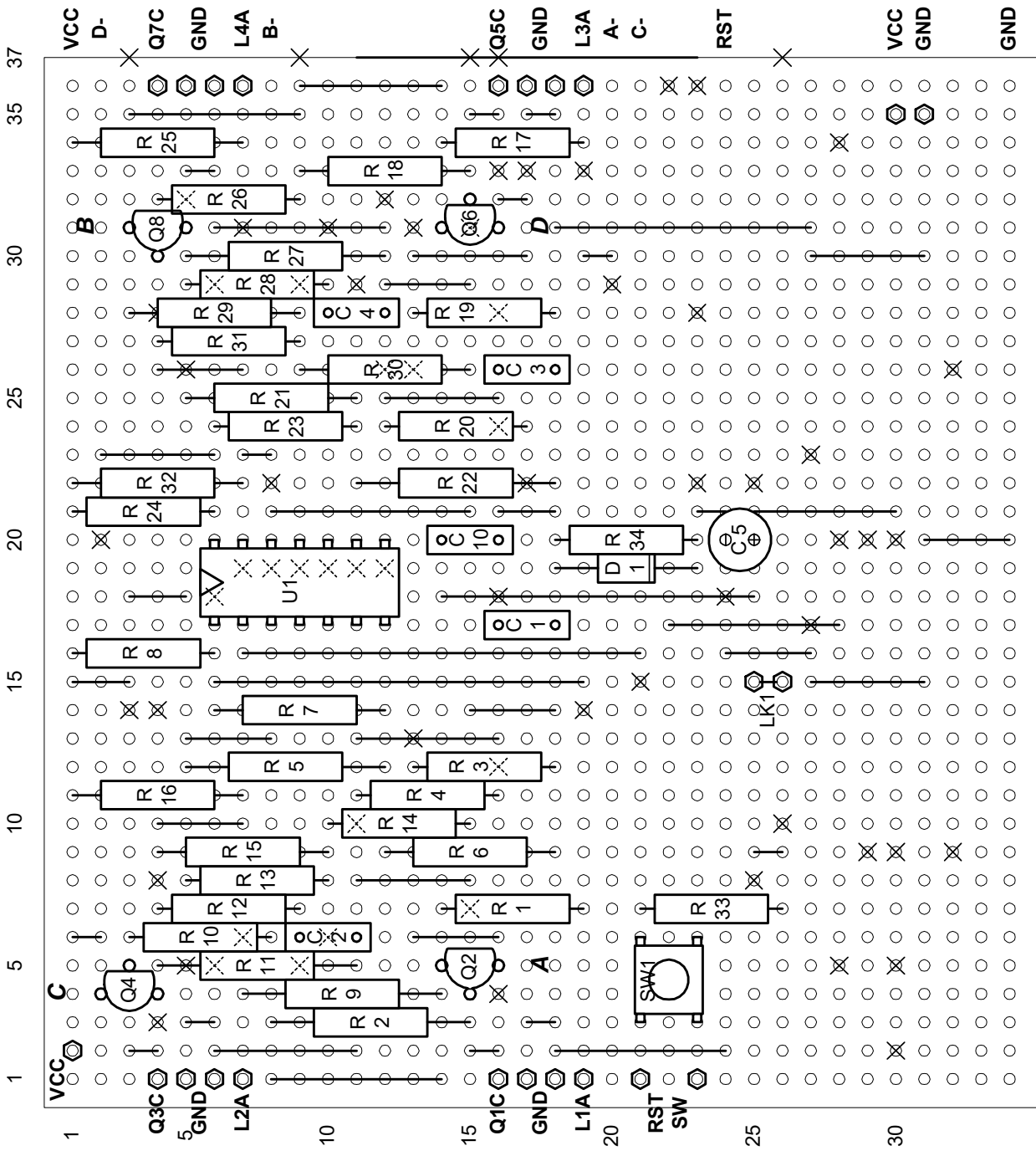
ARCC LOGIC - MASTER



ARCC SENSORS & POWER - MASTER



ARCC LOGIC - SLAVE



ARCC SENSORS & POWER - SLAVE