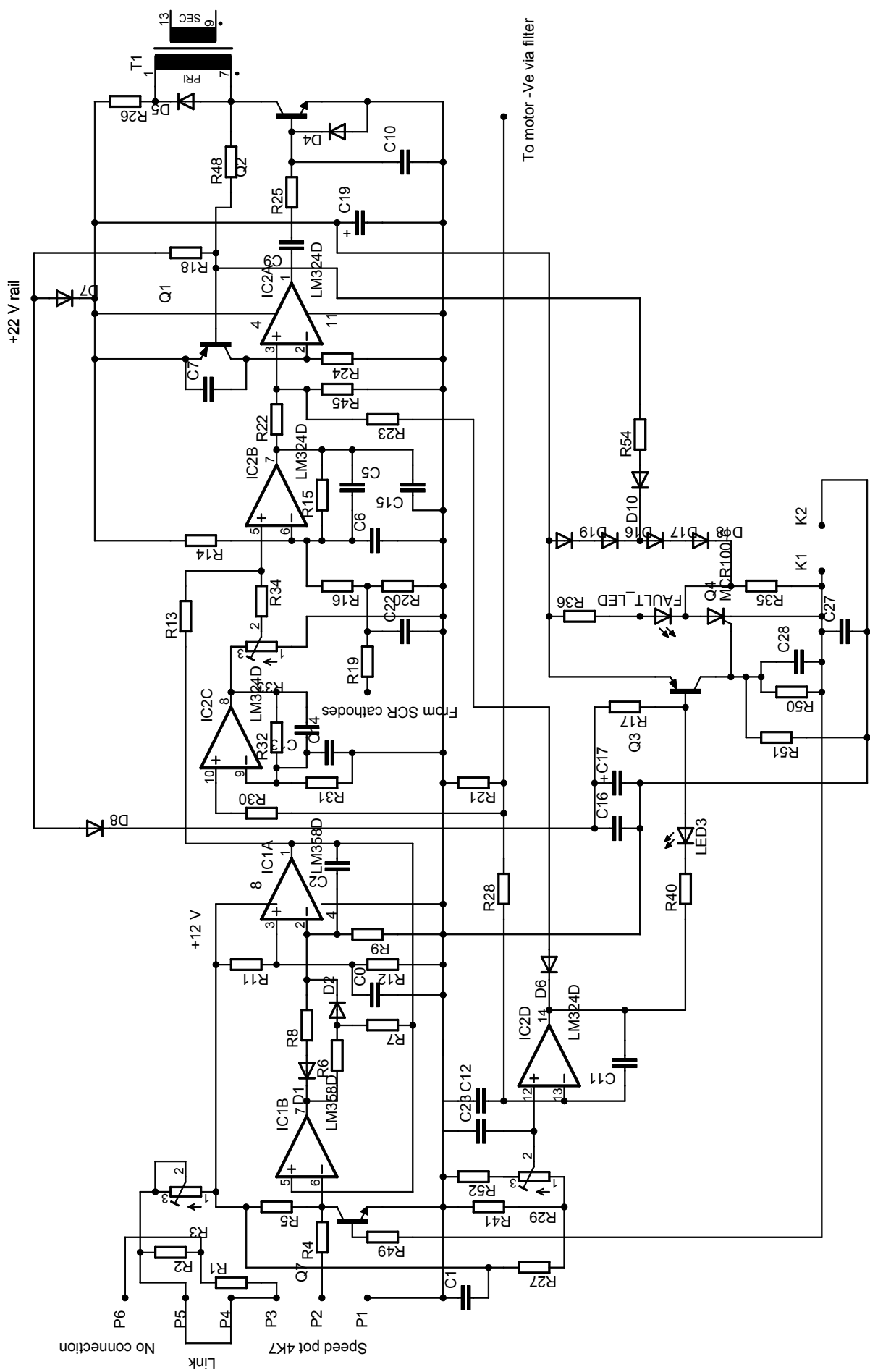
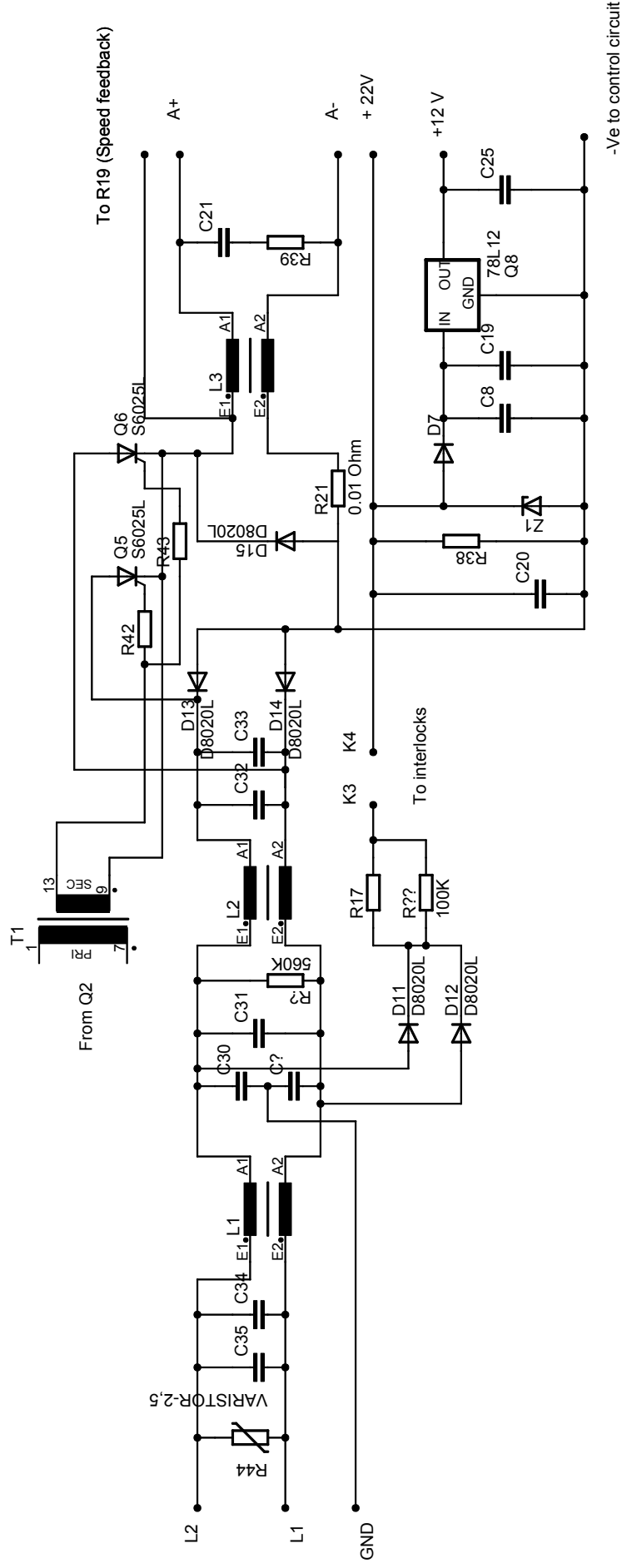


Control circuit. (This may contain errors as it was traced from board.)



Power section



Information on sieg X3 speed controller PCB

Note I could not read any values on the SMD capacitors

Board part number ? XMT-2360 SN2666012

Power diodes D8020L (Littlefuse) 20 A 800V £1.12 +vat from Farnell code 1046539 D13 D14 D15

SCR's S6025L (Littlefuse) 25 Amp 600V £1.30 +vat from Farnell code 1046980

IC1 LM358
IC2 LM324

R1	15K	(P3)	(P6)	
R2	7K5	(P5)	(P6)	
R3	Pot		(Max speed)	
R4	10K		(IC1 pin6, Q7 collector)	
R5	2M2	(P2)	(IC1 pin 6)	
R6	22K	(+12V)	(D2-, R7)	
R7	3K3	(IC1 pin 7)	(R6, D2-)	
R8	510K	(=-ve)	(D1-)	
R9	510K	(IC1 pin 2)	(IC1 pin 2, C2, D2+, R8, C24)	
R11	56K	(+12V)	(IC1 pin 3, R12, C0)	
R12	3K3	(-ve)	(IC1 pin 3, R11, C0)	
R13	22K	(IC2 pin 5, R34)	(IC1 pin 1)	
R14	1 M	(IC2 pin 6, C5, R16,R15, C6)	(+21V	
R15	330K	(C5, IC2 pin 6, R16, R14, C6)	(C5, IC2 pin 7, R22)	
R16	10K	(IC2 pin 6, C5, R14, R15, C6)	(R19, R20,C22)	
R17	15K	(D1+, D12+)	(K3)	
R18	47K	(+22 V rail)	(Q1 base, R48, R54)	
R19	150K	(Q5 cathode, Q6 cathode)	(C22, R16, R20)	
R20	3K3	(-ve)	(R45, R23, IC2 pin3)	
R22	100K	(IC2 pin 7, C5, R15)		
R21	0.01 ohm	current sense resistor		
R23	22K	(D6-) (R45, R22, IC2 pin3)		
R24	47K	(-ve)	(IC2 pin 2, Q1 collector, C7)	
R25	3K3	(C9)		
R26	47R	(D7+)		
R27	47K	(+12V)	(T1, D5+)	
R28	47K	(IC2 pin 3)	(R29, R41)	
R29	Pot	(Marked CL)	(R21, R30)	
R30	47K	(IC2 pin 10)	(Current limit ????)	
R31	22K	(-ve)	(R21, R28)	
R32	2M2	(IC2 pin 8)	(IC2 pin 9, R32, C14, C13)	
R33	Pot	(Marked IR)	(IC2 pin 9)	
R34	100K	(IC2 pin 5, R13)	(Current feedback gain to compensate for motor resistance ??)	
R35	100K	(Q4 anode)	(R33 slider)	
			(Q4 cathode)	
R38	7K5	(-ve)		
R39	1K	(C21)	(+ 22V rail)	

R40	3K3	(IC2 pin 14, C11)	(LED 3 +)
R41	470	(-ve)	(R27, R29)
R42	Marked 470 (47 ohm)	I think these readings are the caused by the gate to source	
R43	Marked 470 (47 ohm)	resistance of the SCR's	
R44	300V 80J MO VARISTOR 14N471K		
R45	2M2	(-ve)	(IC2 pin3, R22,R23)
R47	3K3	(D8+) (Q3 base, LED3 cathode,)	
R48	15K	(Q1 base, R18, R54)	(Q2 anode, D5-, T1)
R49	100K	(Q4 emitter, K1, C28, R50)	(Q7 base)
R50	1K5	(C28, Q4 emitter, R49, K1)	(C28, Q4 base, Q3 collector R51)
R51	15K	(-ve)	(Q3 collector, Q4 base, R50, C28)
R52	10K	(-ve)	(R29)
R54	4K7	(D10-)	(Q1 base, R18, R48)
C0	22 uF 50V		
C1	SMD	(-ve)	(+12 V)
C2	1 uF ? (Marked 105)		
C5	220 nF	(R15, IC2 pin 6, R6, R14)	(R15, IC2 pin 7, R22)
C6	SMD	(-ve)	(IC2 pin 6, C5, R14, R15, R16)
C7	100 nF	(+21V)	(IC2 pin 2, Q1 collector, R24)
C8	SMD	(-ve)	(D7+ +22V rail)
C9	SMD	(IC2 pin1)	(R25)
C10	SMD	(-ve)	(Q2 base, D4+)
C11	SMD	(IC2 pin 13, R28, C12)	(IC2 pin 14, D6+, R40)
C12	SMD	(-ve)	(IC2 pin 13, R28, C11)
C13	SMD	(IC2 pin 8)	(IC2 pin 9)
C14	SMD	(-ve)	(R31, R32, C13, IC2 pin9)
C15	SMD	(-ve)	(IC2 pin 7, C5, R15, R22)
C16	SMD	(-ve)	(C17+, D8+, R17)
C17	4.7UF 50V	(- to -ve)	(+ to D8+, C16, R17)
C19	100 uF 35 V	(- to -ve)	
C20	SMD	(-ve)	(+ 22V rail)
C21	100 nF 275 V AC		
C22	SMD	(-ve)	(R20, R16, R19)
C23	SMD	(-ve)	(IC2 pin 12, R29 slider)
C24	SMD		
C25	22 uF 50 V	(- to -ve)	(+ to +12 V)
C26	SMD	(R30, R28, R21)	(-ve)
C27	SMD	(-ve)	(K1, R49, Q4 cathode, C28, R50)
C28	SMD	(R50, Q4 emitter, R49, K1)	(R50, Q4 base, Q3 collector)
C29 ?	HM472M	(May be transient suppressor not capacitor)	
C30	HM472M	(May be transient suppressor not capacitor)	
C31	0.47 uF 2175 V AC		
C32 ?	Probably 0.47 uF 275 V AC		
C33	Probably 0.47 uF 275 V AC		
C34	0.47 uF 275 V AC		
C35	HM472M	(May be transient suppressor not capacitor)	

Q1	Surface mount (PNP)			
Q2	2N5551 NPN 160 V / 300 mA			
Q4	MCR100 - 6 Thyristor			
Q3	Surface mount (PNP)			
Q5	S6025L (Littlefuse) 25 Amp 600V	£1.30 +vat from Farnell	Code 1046980	
Q6	S6025L (Littlefuse) 25 Amp 600V	£1.30 +vat from Farnell	Code 1046980	
Q7	2N5551 NPN 160 V / 300 mA			
Q8	LM78L12 12 volt / 100ma regulator			
D1		(- to R8)	(+ to R6, IC1 pin7)	
D2		(- to R6)	(+ to IC1 pin2, R8)	
D4	SMD	(- to supply -ve)	(+ to Q2 base, R25)	
D5	SMD	(- to T1, Q2 collector, R48)	(+ to T1, R26)	
D6	SMD	(- R23)	(+ IC2 pin 14, C11,R40)	
D7	SMD	(- to + 22V rail)	(+ +21v to IC2 pin 4 and other points)	
D8	SMD	(- to + 22V rail)	(+C17+, C16, R47)	
D10	SMD	(- to R54)	(+ to D16+, D17-)	
D11	1N4007			
D12	1N4007			
D13	D8020L (Littlefuse) 20 A 800V			
D14	D8020L (Littlefuse) 20 A 800V			
D15	D8020L (Littlefuse) 20 A 800V			
D16	SMD	(- to D19 +)	(+ to D17 -, D10+)	
D17	SMD	(- to D16+, D10+)	(+ to D18-)	
D18	SMD	(- to D17+)	(+ to Fault LED socket, Q4 collector, R35)	
D19	SMD	(- to +21V rail)	(+ to D16-)	
Z1	1N4748 Zenner 22V			
External speed control pot 4K7				