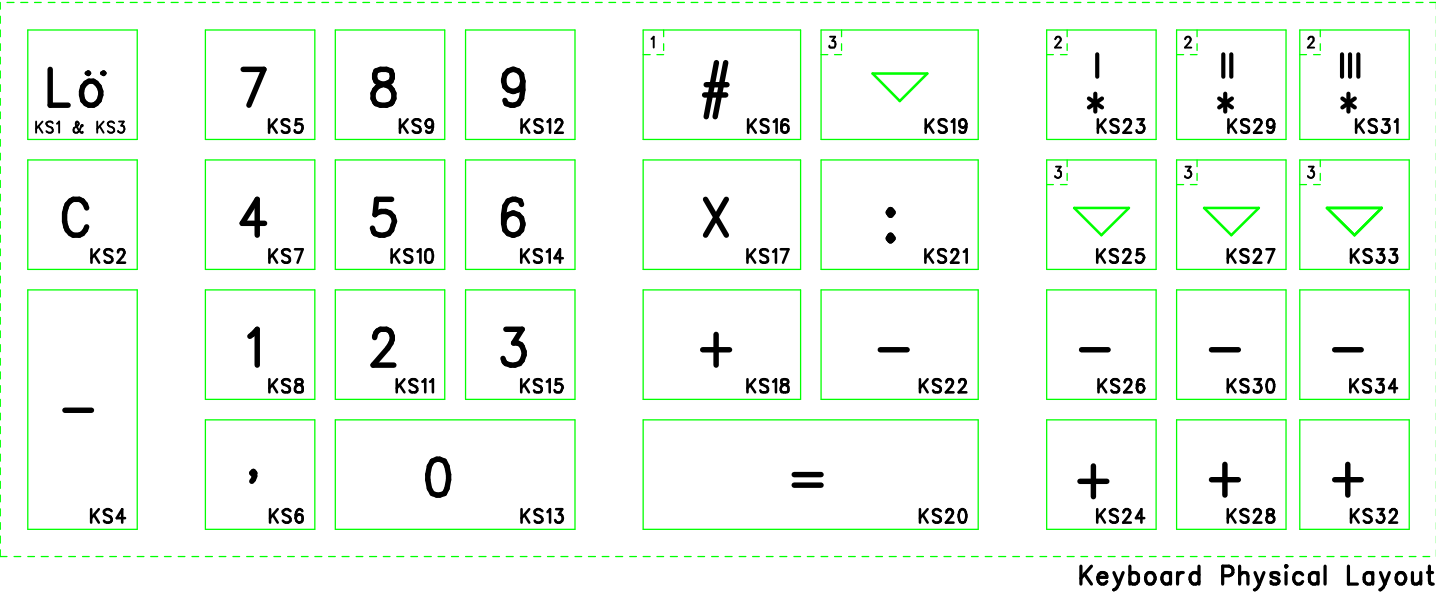
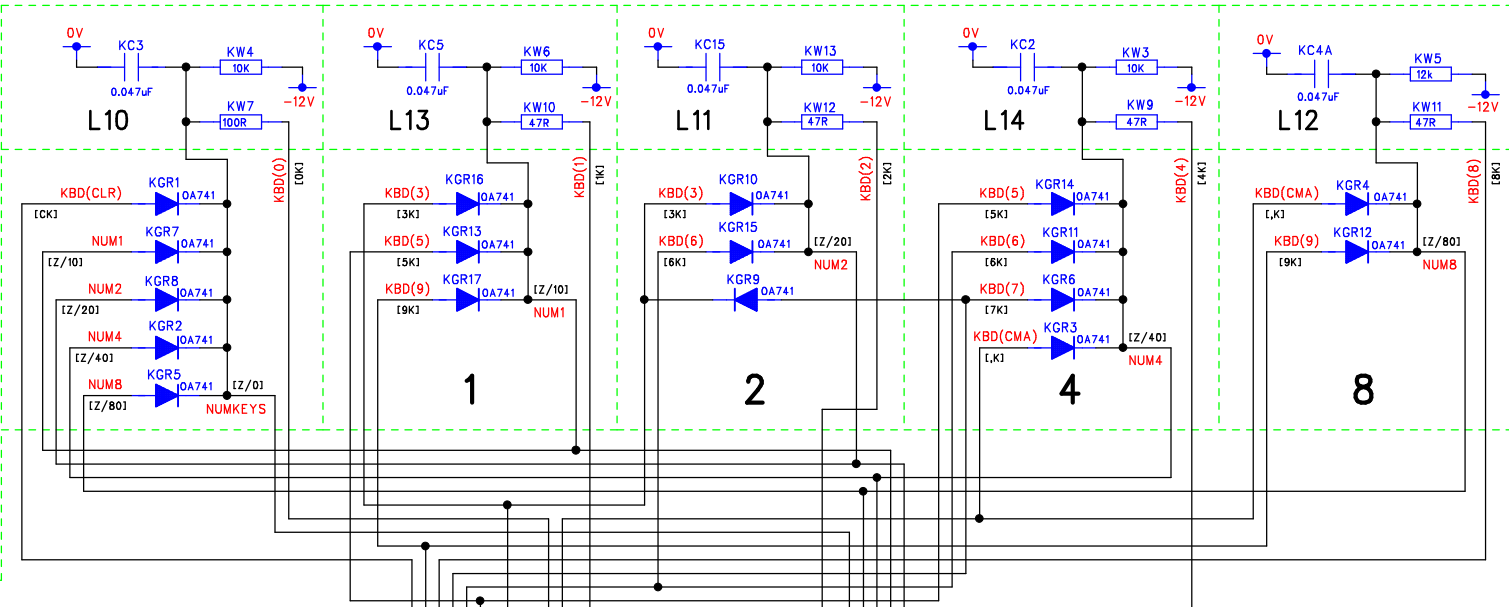




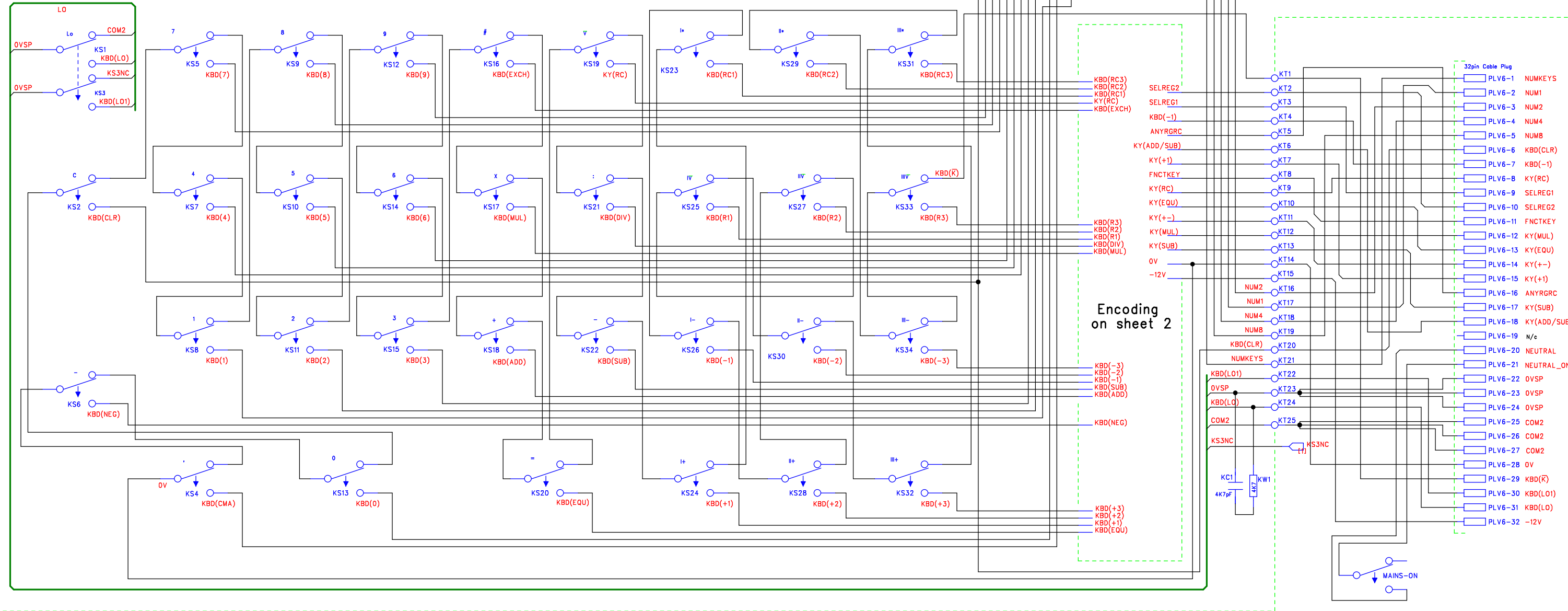
Notes -

1	#	Exchange operands	4	-	Negate entry
2	I II III	Recall (clears memory)			
3	✓	Recall only			

RevNo	Revision note	Date	By	Checked
-	-	-	-	-



Keyboard PCB 224-301-014a



Encoding on sheet 2

Keyboard & Digit Key Encoder

These diagrams are referenced to 0V - Logical 1 = -12V, logical 0 = 0V



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Pcb Dwg # =

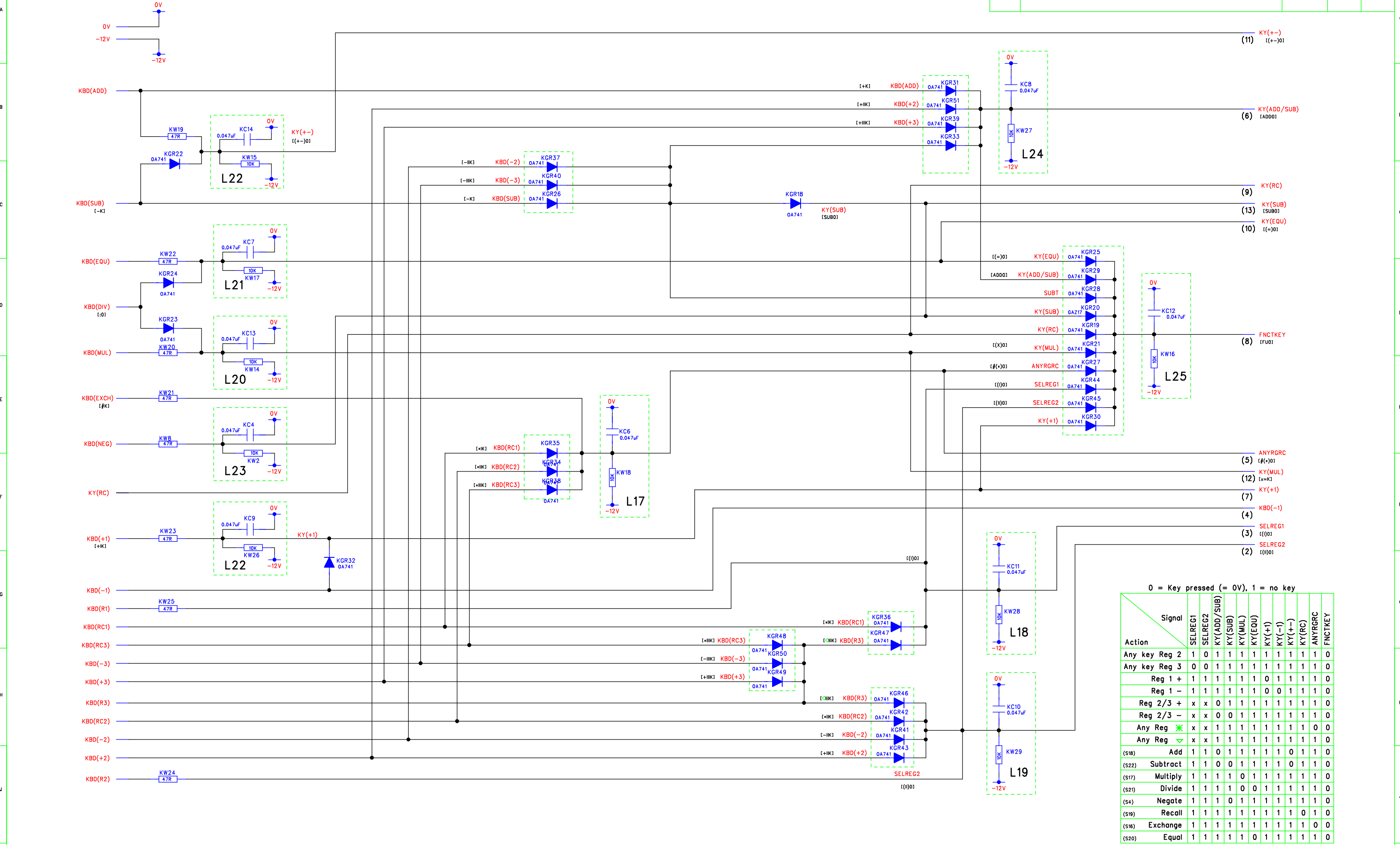
Name	Date
MD Hatch	15/8/2017
Checked	-

Scale Nts

Sheet	1
Next Sheet	2
Drawing Number	Soemtron 222

Title
Soemtron ETR 222 Calculator
[Keyboard Circuit & Layout]
[PCB = 224-301-014a]

A2 Issue A



0 = Key pressed (= 0V), 1 = no key												
Signal	SELREG1	SELREG2	KY(ADD/SUB)	KY(SUB)	KY(MUL)	KY(EQU)	KY(+)	KY(-)	KY(+/-)	ANYRCRC	FNCTKEY	
Action												
Any key Reg 2	1	0	1	1	1	1	1	1	1	1	0	
Any key Reg 3	0	0	1	1	1	1	1	1	1	1	0	
Reg 1 +	1	1	1	1	1	1	0	1	1	1	0	
Reg 1 -	1	1	1	1	1	1	0	0	1	1	0	
Reg 2/3 +	x	x	0	1	1	1	1	1	1	1	0	
Reg 2/3 -	x	x	0	0	1	1	1	1	1	1	0	
Any Reg *	x	x	1	1	1	1	1	1	1	1	0	
Any Reg <	x	x	1	1	1	1	1	1	1	1	0	
(S18) Add	1	1	0	1	1	1	1	1	0	1	0	
(S22) Subtract	1	1	0	0	1	1	1	1	0	1	0	
(S17) Multiply	1	1	1	1	0	1	1	1	1	1	0	
(S21) Divide	1	1	1	1	0	0	1	1	1	1	0	
(S4) Negate	1	1	1	0	1	1	1	1	1	1	0	
(S19) Recall	1	1	1	1	1	1	1	1	0	1	0	
(S16) Exchange	1	1	1	1	1	1	1	1	1	0	0	
(S20) Equal	1	1	1	1	1	0	1	1	1	1	0	

Function & Register Key Encoder

These diagrams are referenced to 0V - Logical 1 = -12V, logical 0 = 0V



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Pcb Dwg # =

	Name	Date
Drawn	MD Hatch	28/02/2024
Checked	-	-

Scale

Nts

Sheet

2

Next Sheet

3

Drawing Number

Title
Soemtron ETR 222 Calculator
Keyboard Function Encoding
Circuit Diagram

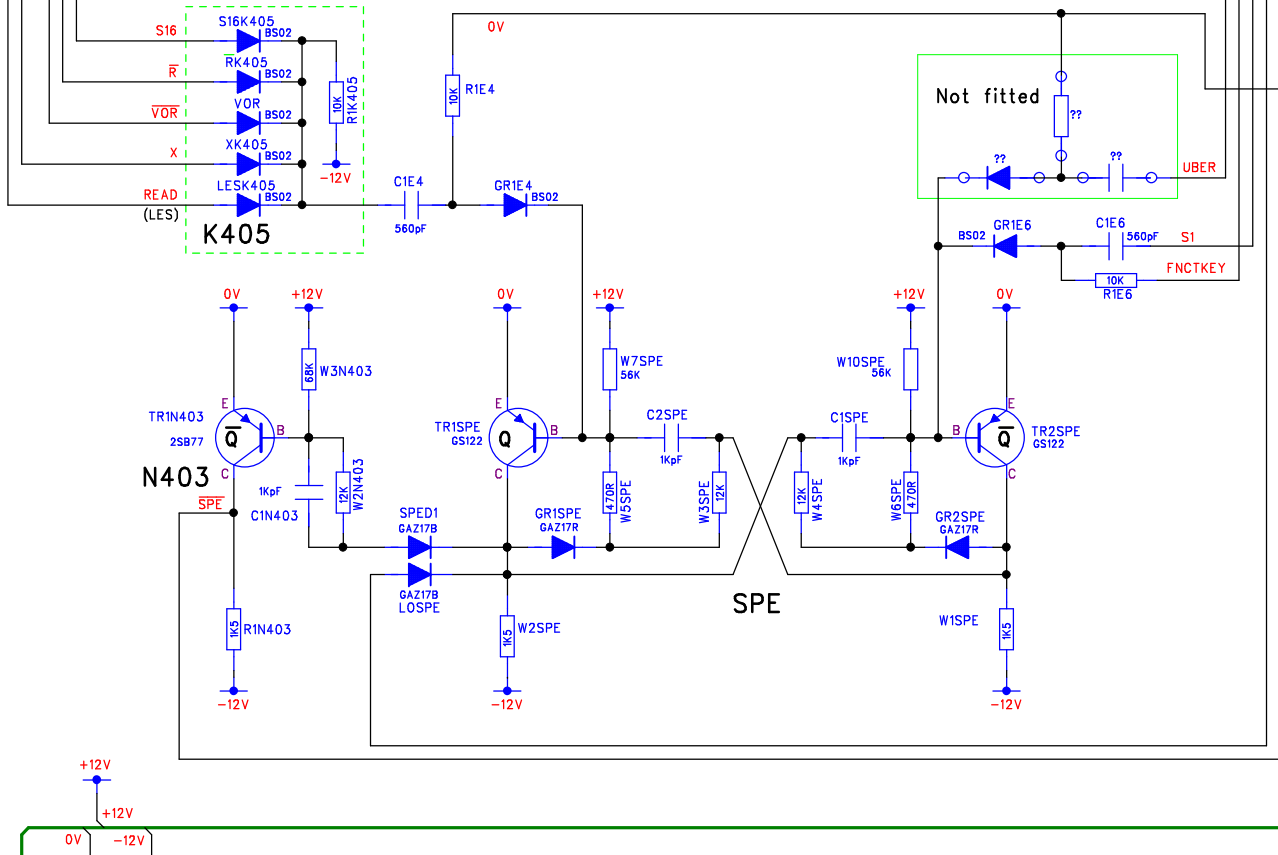
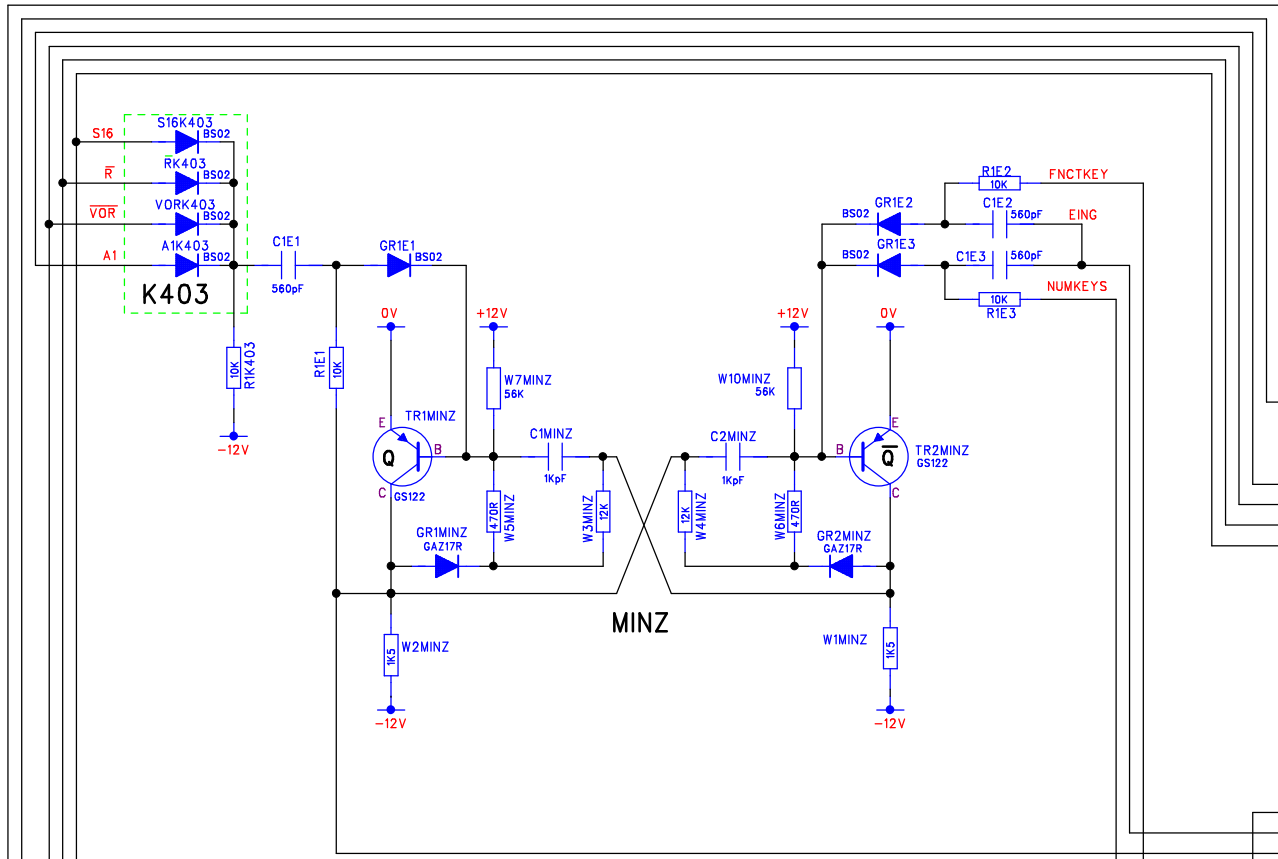
Soemtron 222

A2 Issue

A

PCB = 05-222-0000-5b (comp)
PCB = 05-222-0000-5a (track)

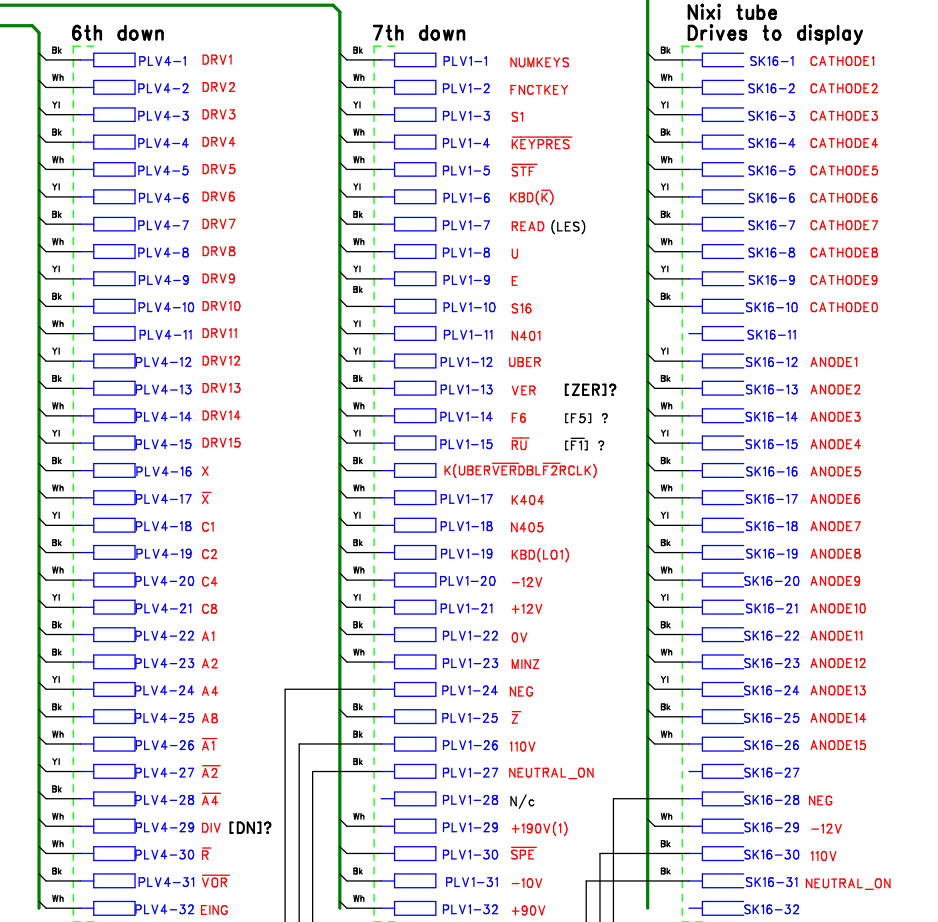
RevNo	Revision note	Date	By	Checked
-	-	-	-	-



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- UKBD [4,5,6]
- RU -10V
- CATHODE9
- CATHODE8
- CATHODE7
- X
- AB
- CATHODE6
- CATHODE5
- CATHODE4
- CATHODE3
- CATHODE2
- CATHODE1
- CATHODE0
- VER
- A2
- A4
- AT
- A4
- X
- N401
- A2
- A1
- VOR
- R
- S16
- E
- F6
- DIV
- K404
- READ
- U
- KBD(R)
- CB
- C2
- C1
- Z
- C4
- S1
- EING
- MINZ
- UBER
- FNCTKEY
- NUMKEYS
- KBD(L01)
- SPE
- N405
- N401
- STF
- KEYPRES
- 0V
- +12V
- 12V
- 12V
- ANODE15
- DRV14
- ANODE14
- DRV15
- DRV11
- DRV10
- DRV9
- DRV12
- DRV13
- ANODE13
- ANODE12
- ANODE11
- ANODE10
- ANODE9
- DRV7
- DRV8
- DRV6
- DRV5
- DRV4
- DRV3
- DRV2
- DRV1
- ANODE8
- ANODE7
- ANODE6
- ANODE5
- ANODE4
- ANODE3
- ANODE2
- ANODE1
- +190V(1)
- +90V

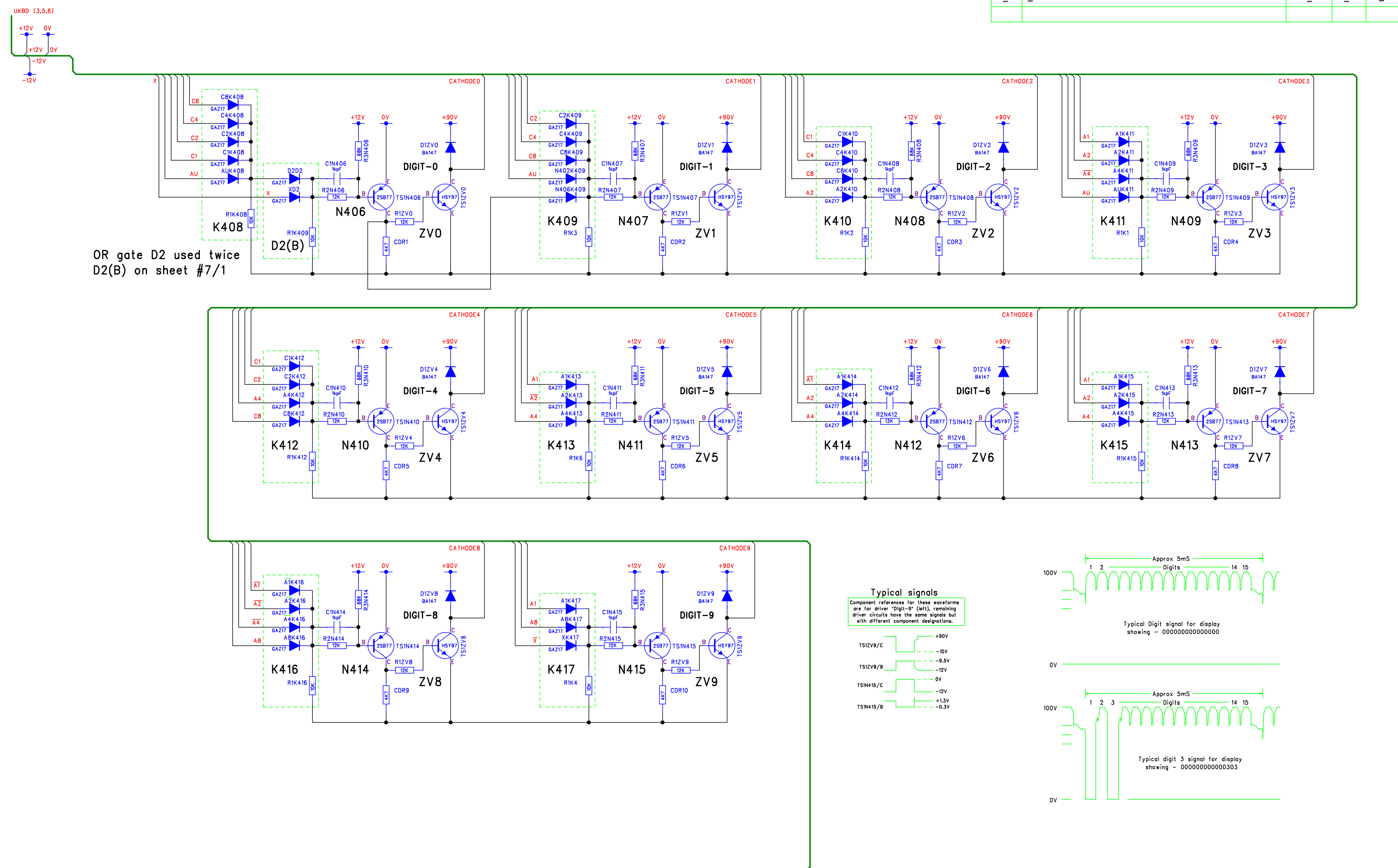
- 1 = LHS (Track side)
- UK1 Yellow
- UK2 Black
- UK3 Yellow
- UK4 White
- UK5 Black
- UK6 White
- UK7 Black
- UK8 Yellow
- UK9 White
- UK10 Black
- UK11 Yellow
- UK12 White
- UK13 Black
- UK14 Black
- UK15 Black
- UK16 Yellow
- UK17 White
- UK18 Black
- UK19 Black
- UK20 Black
- UK21 Black
- UK22 N/c
- UK23 Black
- UK24 Black
- UK25 White
- UK26 Black
- UK27 Yellow
- UK28 White
- UK29 White
- UK30 White
- UK31 White
- UK32 White
- UK33 White
- UK34 Yellow
- UK35 Yellow
- UK36 Black
- UK37 Yellow
- UK38 Black
- UK39 White
- UK40 Yellow
- UK41 White
- UK42 White
- UK43 Yellow
- UK44 White
- UK45 Black
- UK46 Yellow
- UK46A Yellow
- UK47 Yellow
- UK48 White
- UK49 White
- UK50 Black
- UK51 Yellow
- UK52 White
- UK53 White
- UK54 White
- UK55 White
- UK56 Black
- UK57 Yellow
- UK58 White
- UK59 Black
- UK60 Black
- UK61 Yellow
- UK62 Yellow
- UK63 Black
- UK64 Yellow
- UK65 White
- UK66 Black
- UK67 Yellow
- UK68 White
- UK69 Black
- UK70 White
- UK71 Yellow
- UK72 White
- UK73 Black
- UK74 Yellow
- UK75 White
- UK76 Black
- UK77 Black
- UK78 Yellow
- UK79 White
- UK80 Black
- UK81 Yellow
- UK82 White
- UK83 Black
- UK84 Yellow
- UK85 White
- UK86 White
- 86 = RHS (Track side)



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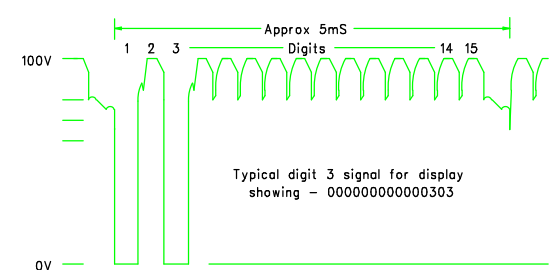
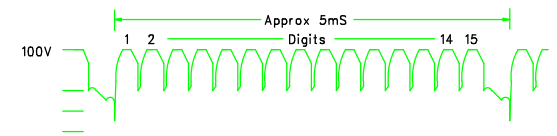
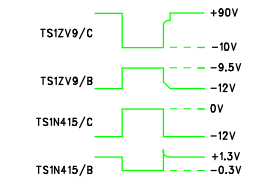
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Drawn			Next Sheet	4	Display Drivers Under Keyboard PCB	
Checked			Drawing Number		Soemtron 222	
					A2	Issue A

RevNo	Revision note	Date	By	Checked
—	—	—	—	—



OR gate D2 used twice
D2(B) on sheet #7/1

Typical signals
Component references for these waveforms are for driver "Digit-9" (left), remaining driver circuits have the same signals but with different component designations.



- Notes:
1. All wire 24 AWG minimum unless specified otherwise
 2. All mains wire to be 18 AWG, 600V

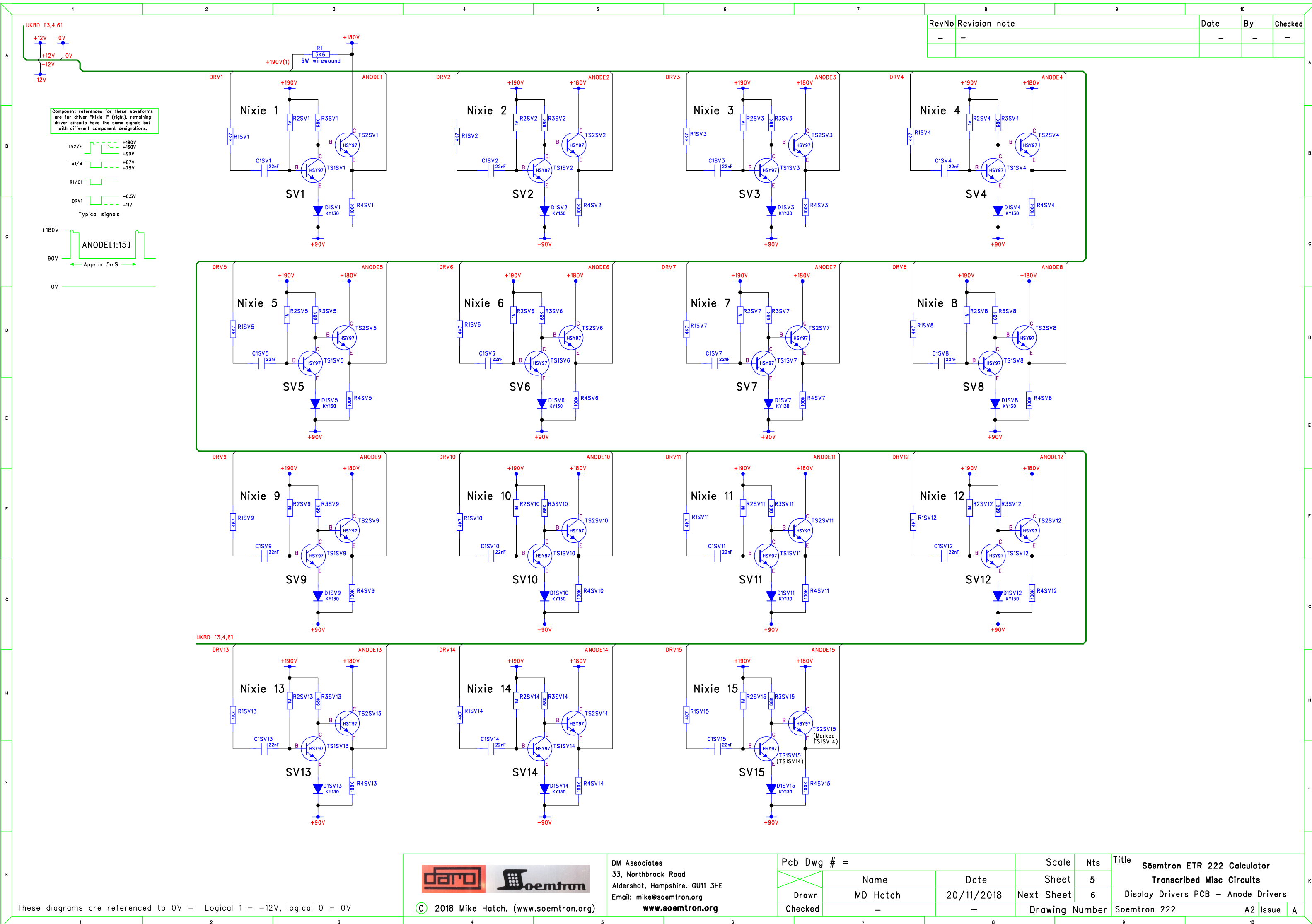


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Pcb Dwg # =		
Drawn	Name	Date
Checked	MD Hatch	20/11/2018

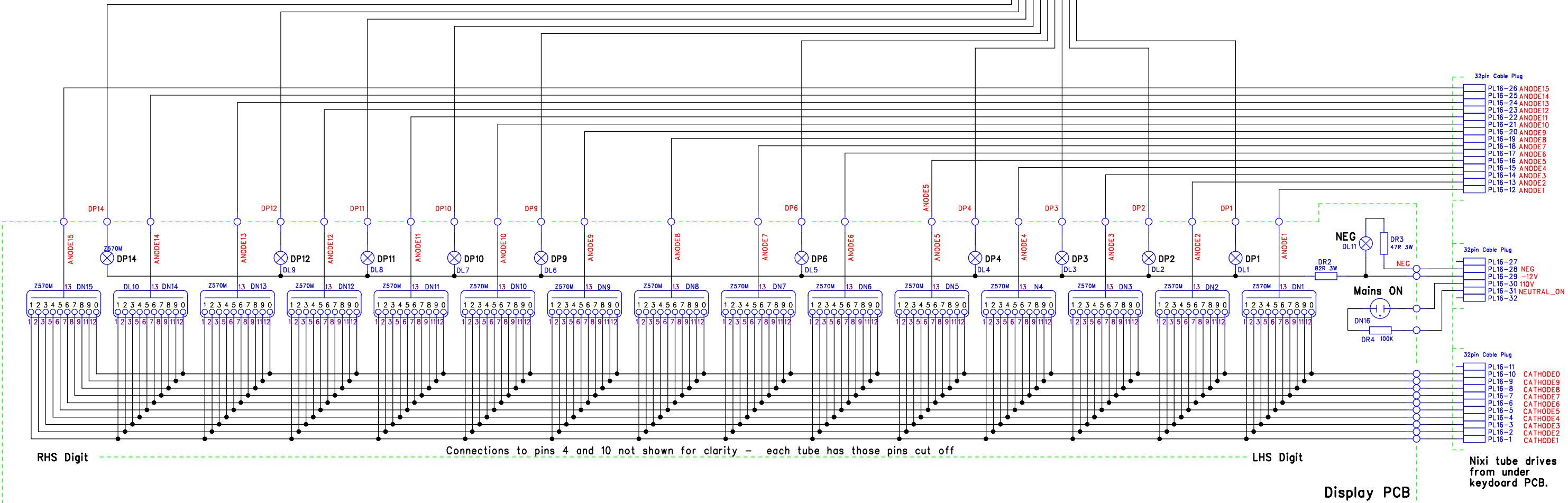
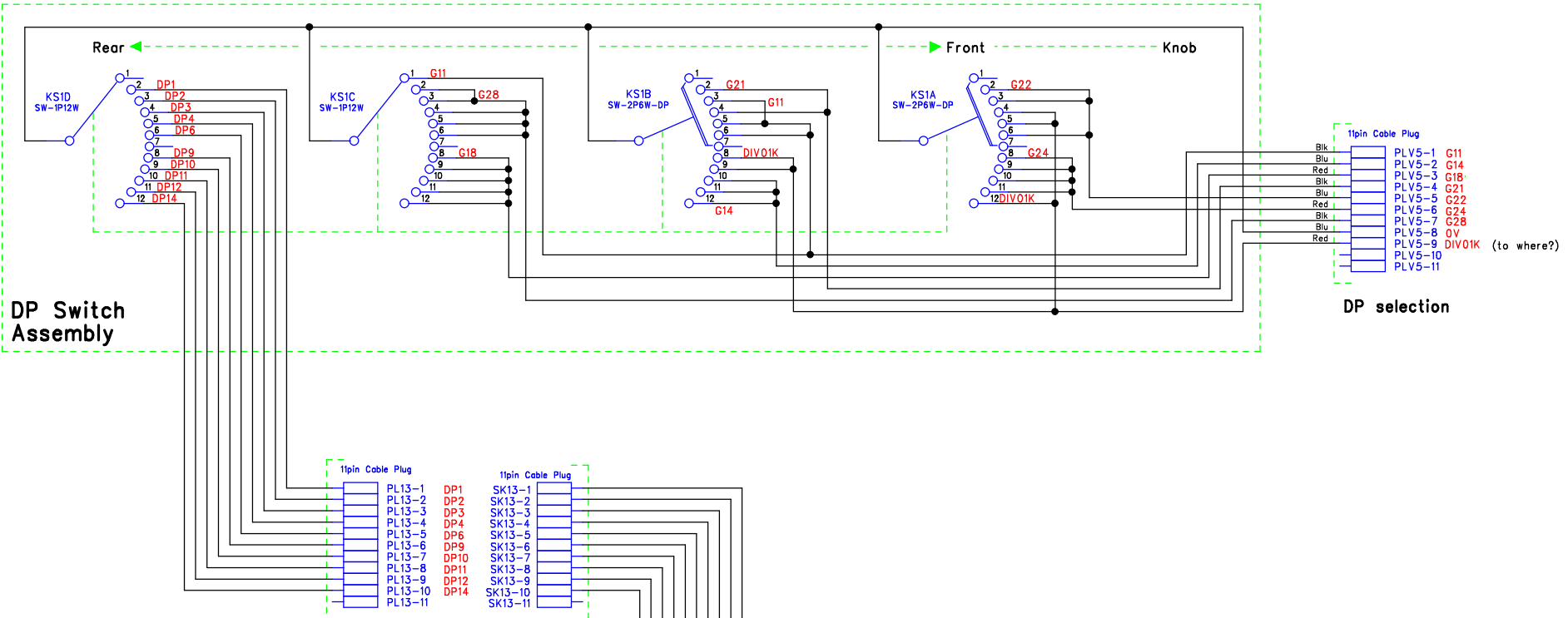
DO NOT MANUFACTURE FROM NUMERICAL ISSUE DRAWINGS			
Scale	Nts	Title	
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Next Sheet	5	Transcribed Misc Circuits	
Drawing Number	XXXX	Display Drivers PCB – Cathode Drivers	
A2		Issue	A



RevNo	Revision note	Date	By	Checked
-	-	-	-	-

Decimal Point Switch Wiring Table (X=0V)

Switch position →		1	2	3	4	5	6	7	8	9	10	11	12
Pin	Function	0	1	2	3	4	6	Z	9	10	11	12	14
KS1D	PL4/1	2	X										
"	PL4/2	3		X									
"	PL4/3	4			X								
"	PL4/4	5				X							
"	PL4/5	6					X						
"	PL4/6	8						X					
"	PL4/7	9							X				
"	PL4/8	10								X			
"	PL4/9	11									X		
"	PL4/10	12										X	
KS1B	PL3/1	G11	X		X		X	X		X	X	X	X
"	PL3/2	G14				X	X	X			X	X	X
KS1C	PL3/3	G18							X	X	X	X	X
KS1B	PL3/4	G21		X		X			X		X		
KS1A	PL3/5	G22		X	X		X		X	X			X
"	PL3/6	G24		X	X	X	X		X	X	X	X	
KS1D	PL3/7	G28		X	X	X	X	X		X	X	X	X
KS1A/B	PL3/9	DIV01K		X	X	X	X	X		X	X	X	X



These diagrams are referenced to 0V - Logical 1 = -12v, logical 0 = 0V



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Pcb Dwg # =

Name	Date
MD Hatch	11/10/2017
Checked	-

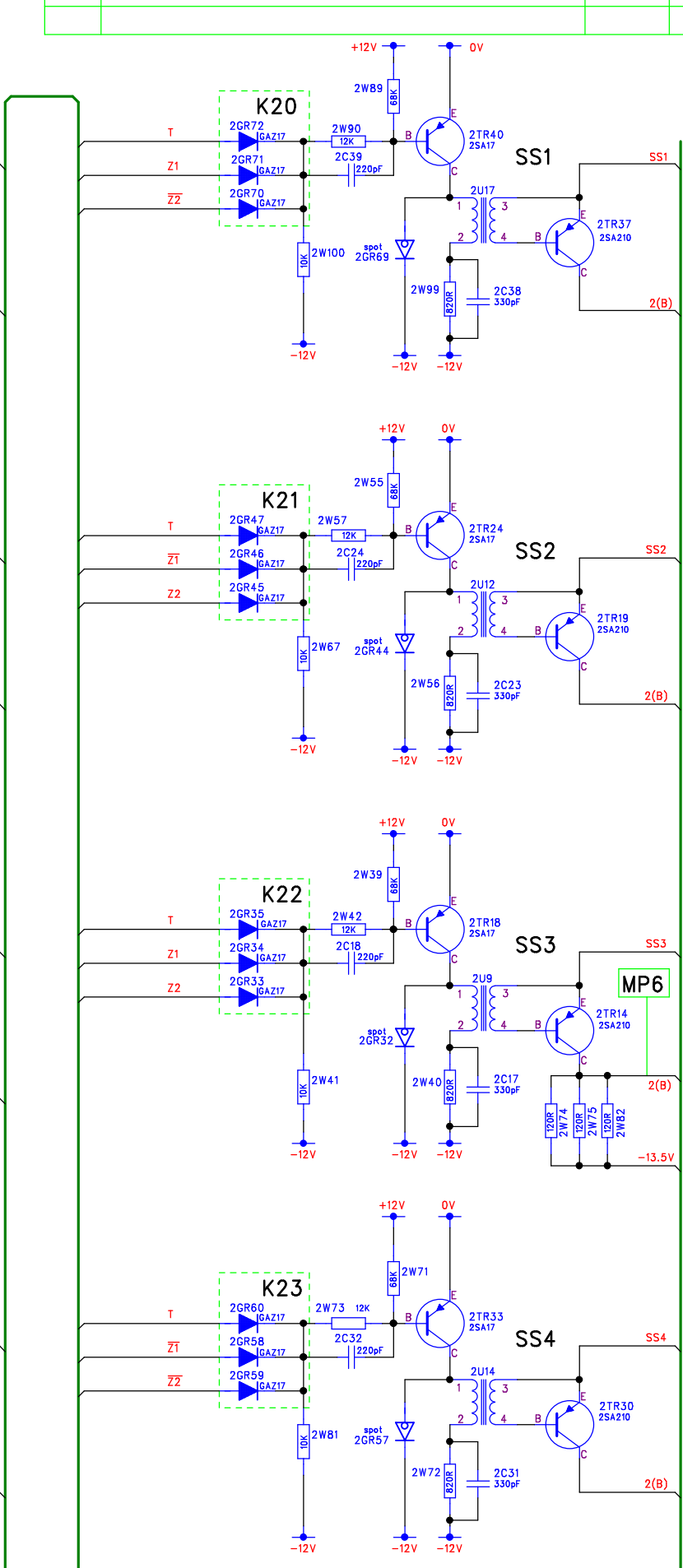
Scale	Nts
Sheet	4
Next Sheet	8
Drawing Number	Soemtron 222

Title	Issue	By	Checked
Soemtron ETR 222 Calculator DP Selection and Nixie Display Circuit diagram	A2	Mike Hatch	Mike Hatch

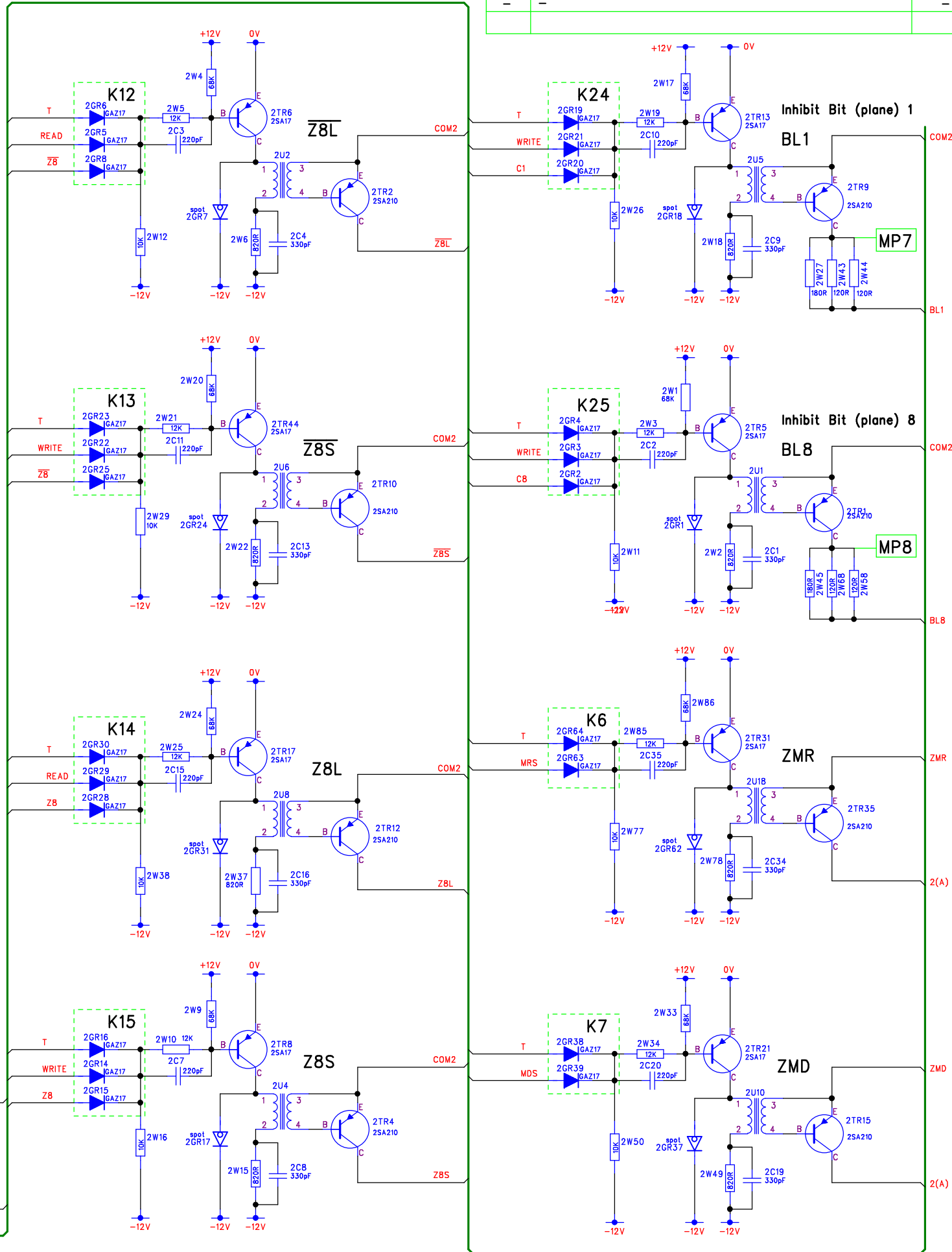
RevNo	Revision note	Date	By	Checked
-	-	-	-	-

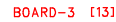


RevNo	Revision note	Date	By	Checked
-	-	-	-	-



	Name	Date	Sheet	10	Soemtron 222 Calculator Transcribed Misc Circuits Board 2/1 – Core Drivers				
	Drawn	MD Hatch	15/8/2017	Next Sheet					11
	Checked	–	–	Drawing Number					Soemtron 222





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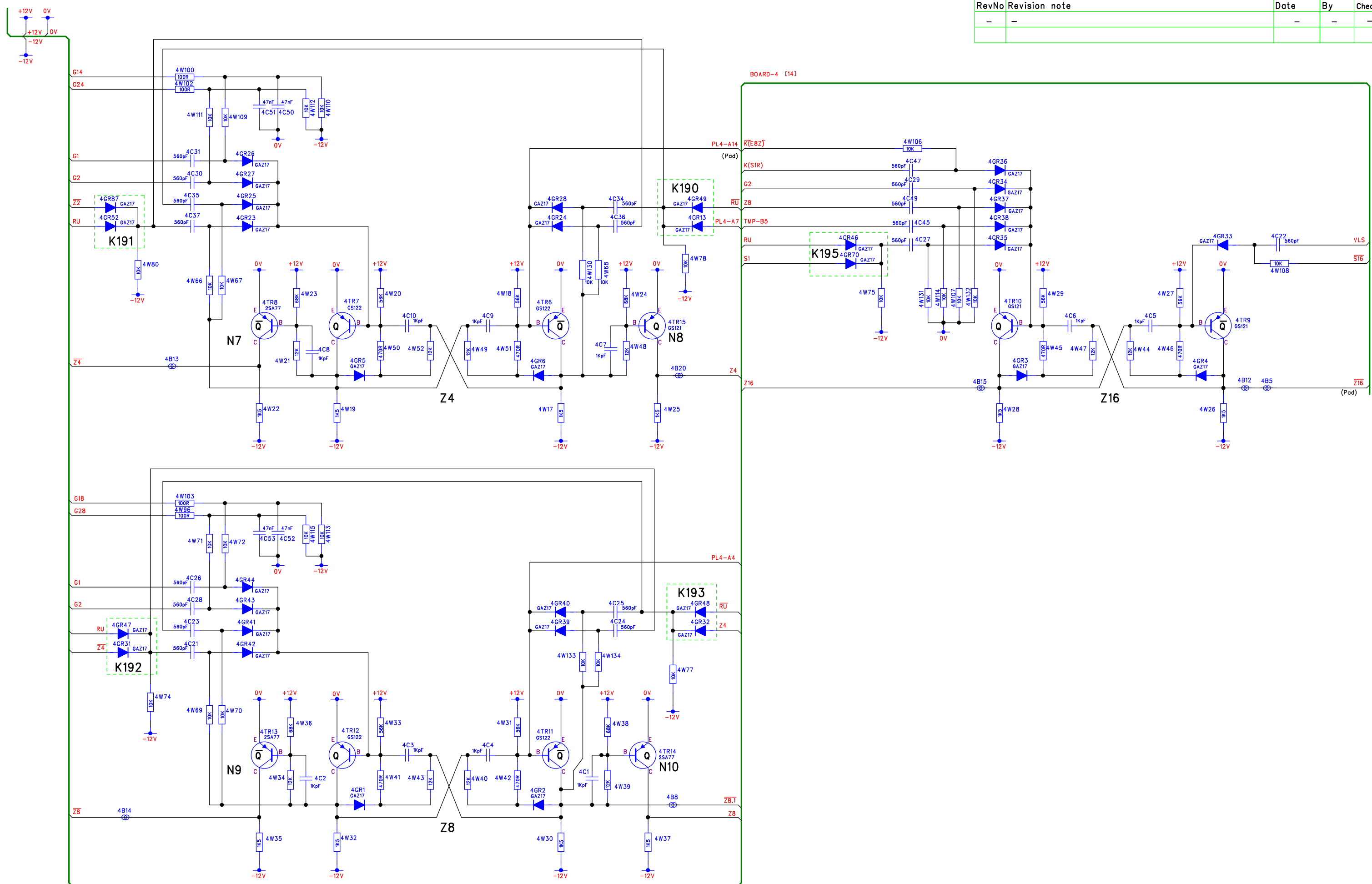
	Name	Date	Sheet	12	Soemtron 222 Calculator Transcribed Misc Circuits Board 3/1 – B1, B2, VOR				
	Drawn	MD Hatch	15/8/2017	Next Sheet					13
	Checked	–	–	Drawing Number					Soemtron 222

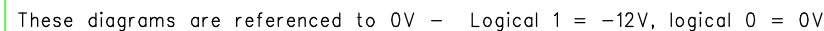


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	Drawn	MD Hatch	15/8/2017	Next Sheet				
	Checked	–	–	Drawing Number	Soemtron 222	A2	Issue	A

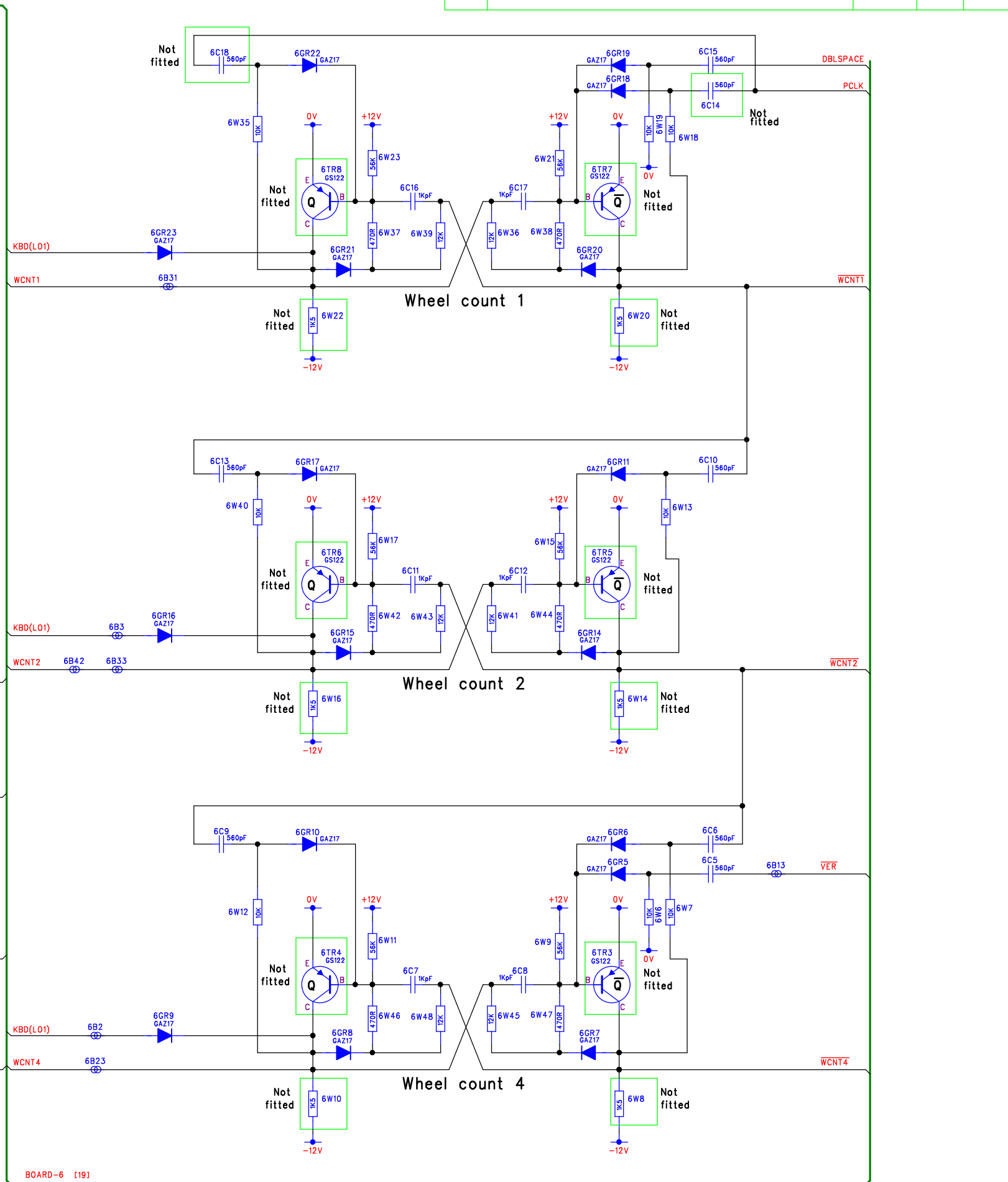
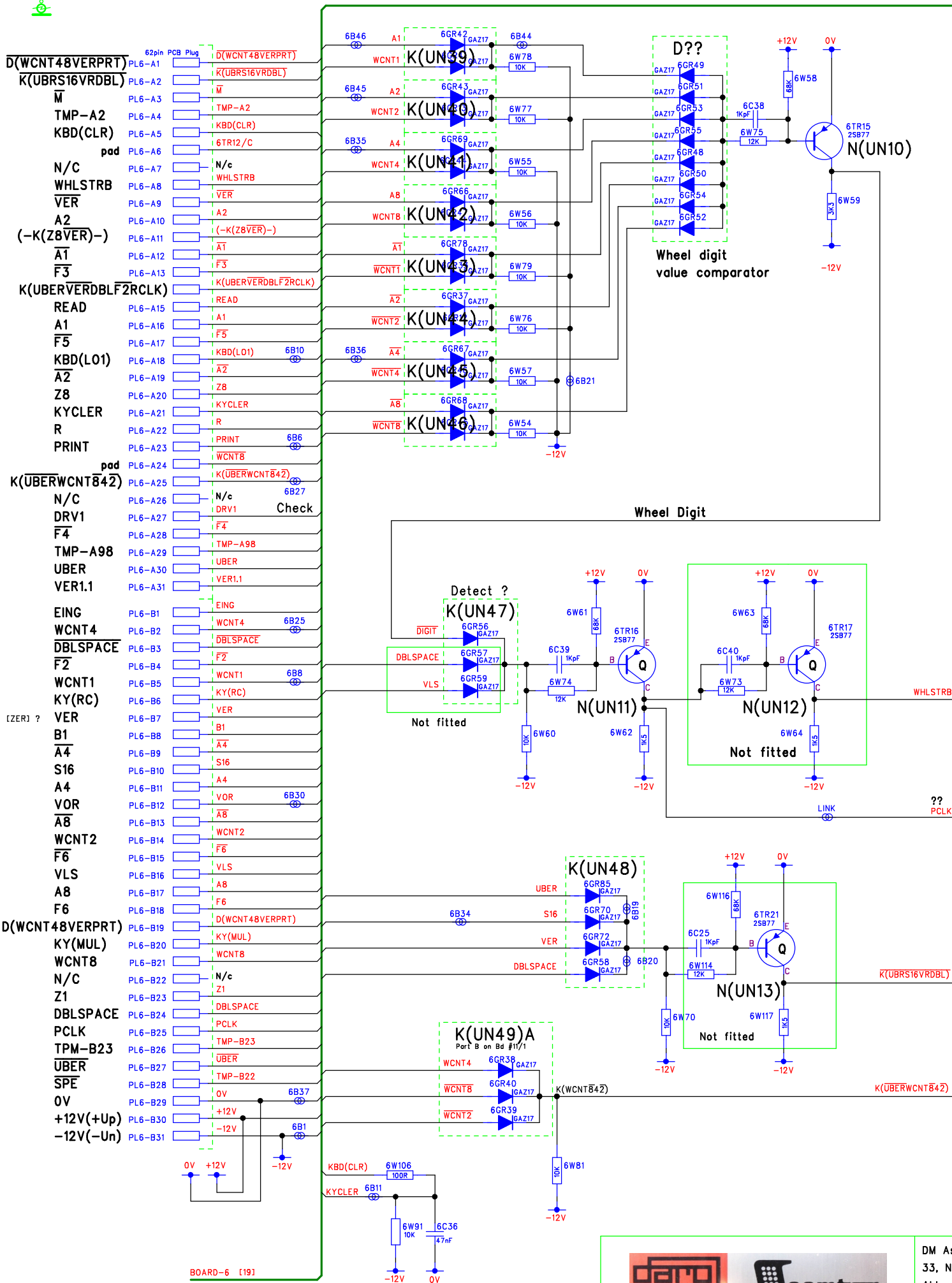
RevNo	Revision note	Date	By	Checked
—	—	—	—	—





Comp side -
Solder side - 3969- 224-307-006-b
Date coded - 35/68

RevNo	Revision note	Date	By	Checked
-	-	-	-	-

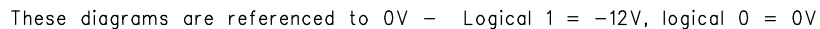


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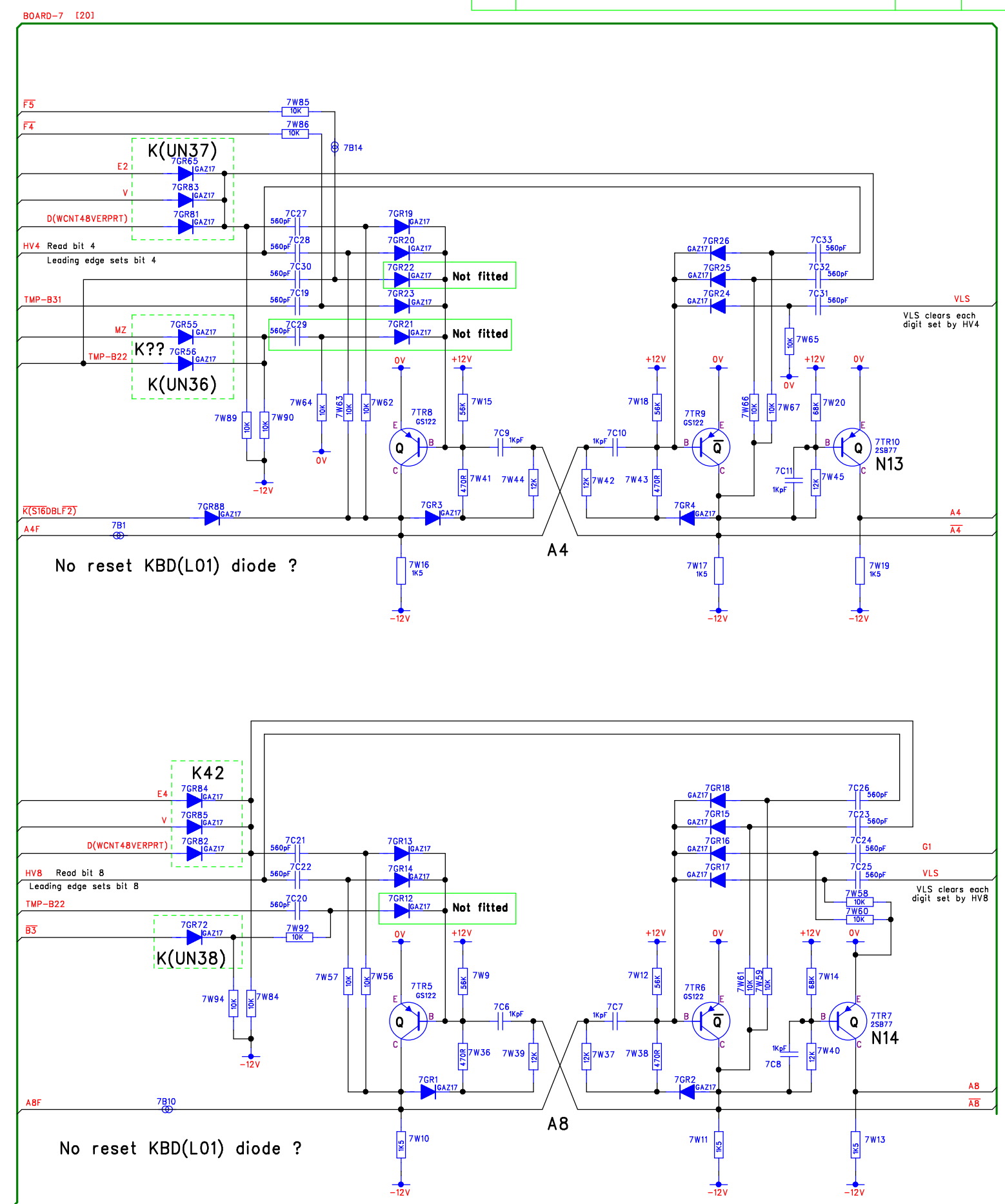
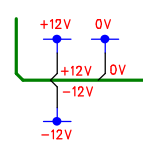
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Drawn	Name	Date	Sheet	Soemtron ETR 222 Calculator	
Checked	MD Hatch	15/8/2017	Next Sheet	Transcribed Misc Circuits	
			Drawing Number	Board 6/1 - Wheel Count (1, 2, 4)	
				Soemtron 222	
				A2 Issue A	



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	Name	Date	Sheet	20	Soemtron 222 Calculator			
Drawn	MD Hatch	15/8/2017	Next Sheet	21	Transcribed Misc Circuits			
Checked	—	—	Drawing Number	Soemtron 222	A2	Issue	A	

RevNo	Revision note	Date	By	Checked
–	–	–	–	–



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Pcb Dwg # =

	Name	Date
Drawn	MD Hatch	15/8/2017
Checked	—	—

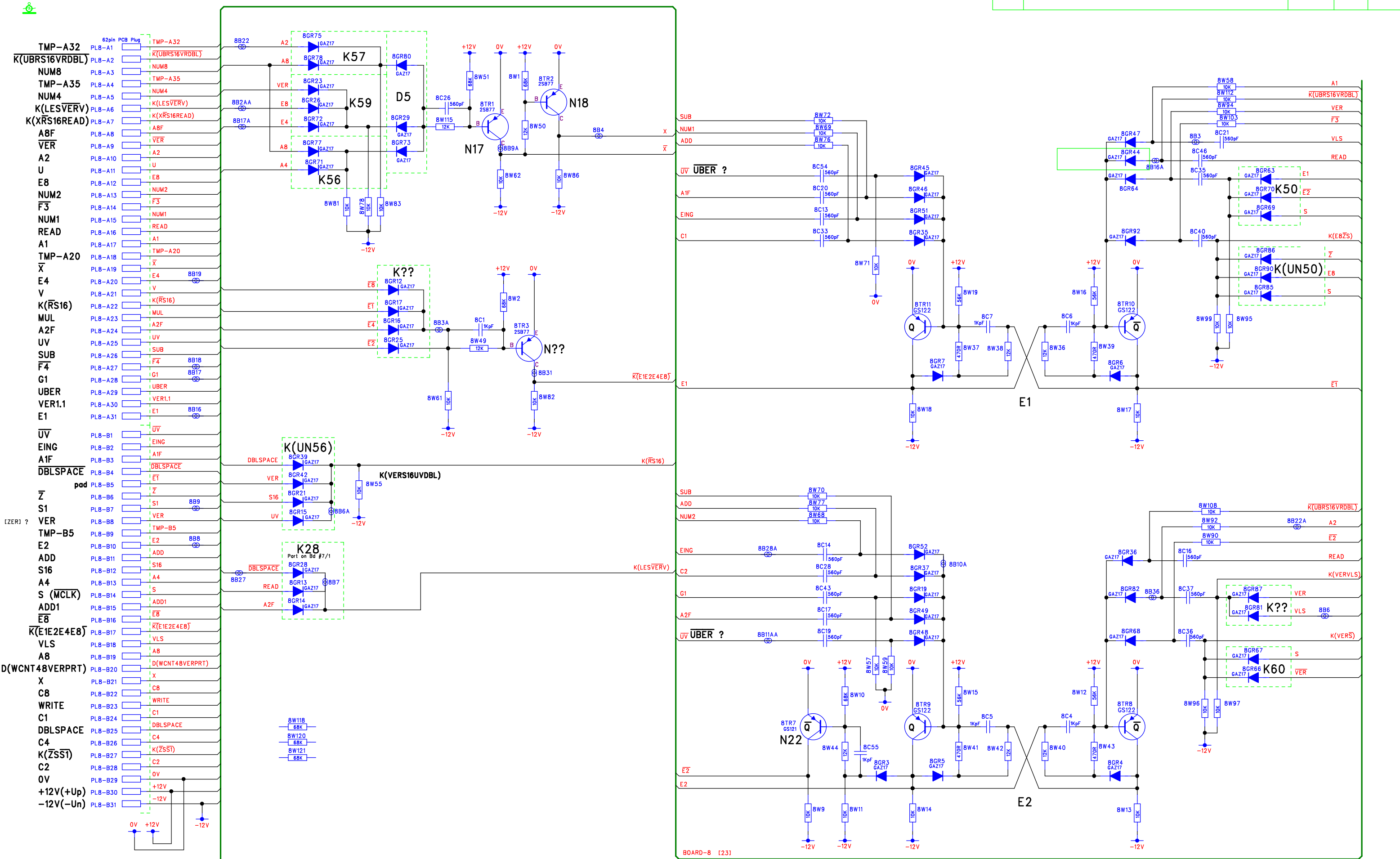
Scale	Nts
Sheet	21
xt Sheet	22
Drawing Number	

Title Soemtron ETR 222 Calculator Transcribed Misc Circuits Board 7/2 - A Register (A4, A8)			
Soemtron 222	A2	Issue	A

These diagrams are referenced to 0V - Logical 1 = -12V, logical 0 = 0V

Comp side -
Solder side - 3952- 224-307-008-a
Date coded - 40/69

RevNo	Revision note	Date	By	Checked
-	-	-	-	-



These diagrams are referenced to 0V - Logical 1 = -12V, logical 0 = 0V

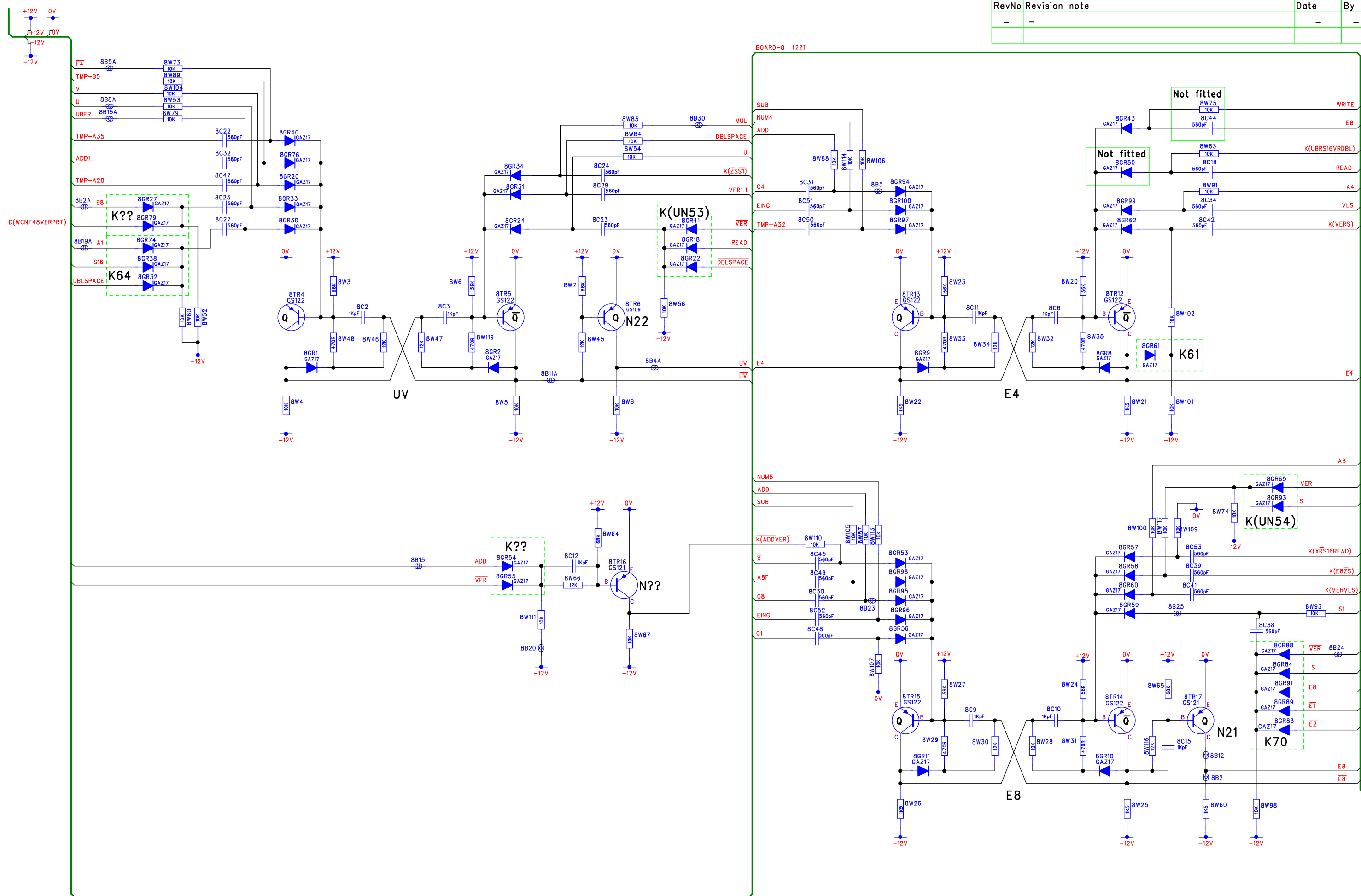


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Pcb Dwg # =			Scale	Nts	Title		
			Sheet	22	Soemtron ETR 222 Calculator		
Drawn			Next Sheet	23	Transcribed Misc Circuits		
Checked			Drawing Number		Board 8/1 - E Register (E1, E2)		
					Soemtron 222		
					A2 Issue A		

RevNo	Revision note	Date	By	Checked
—	—	—	—	—



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Pcb Dwg # =

	Name	Date	Sheet	23	Soemtron 222 - E4, E8 Transcribed Misc Circuits Board 8/2 – E Register (E4, E8)			
	Drawn	MD Hatch	15/8/2017	Next Sheet				
	Checked	–	–	Drawing Number	Soemtron 222	A2	Issue	A

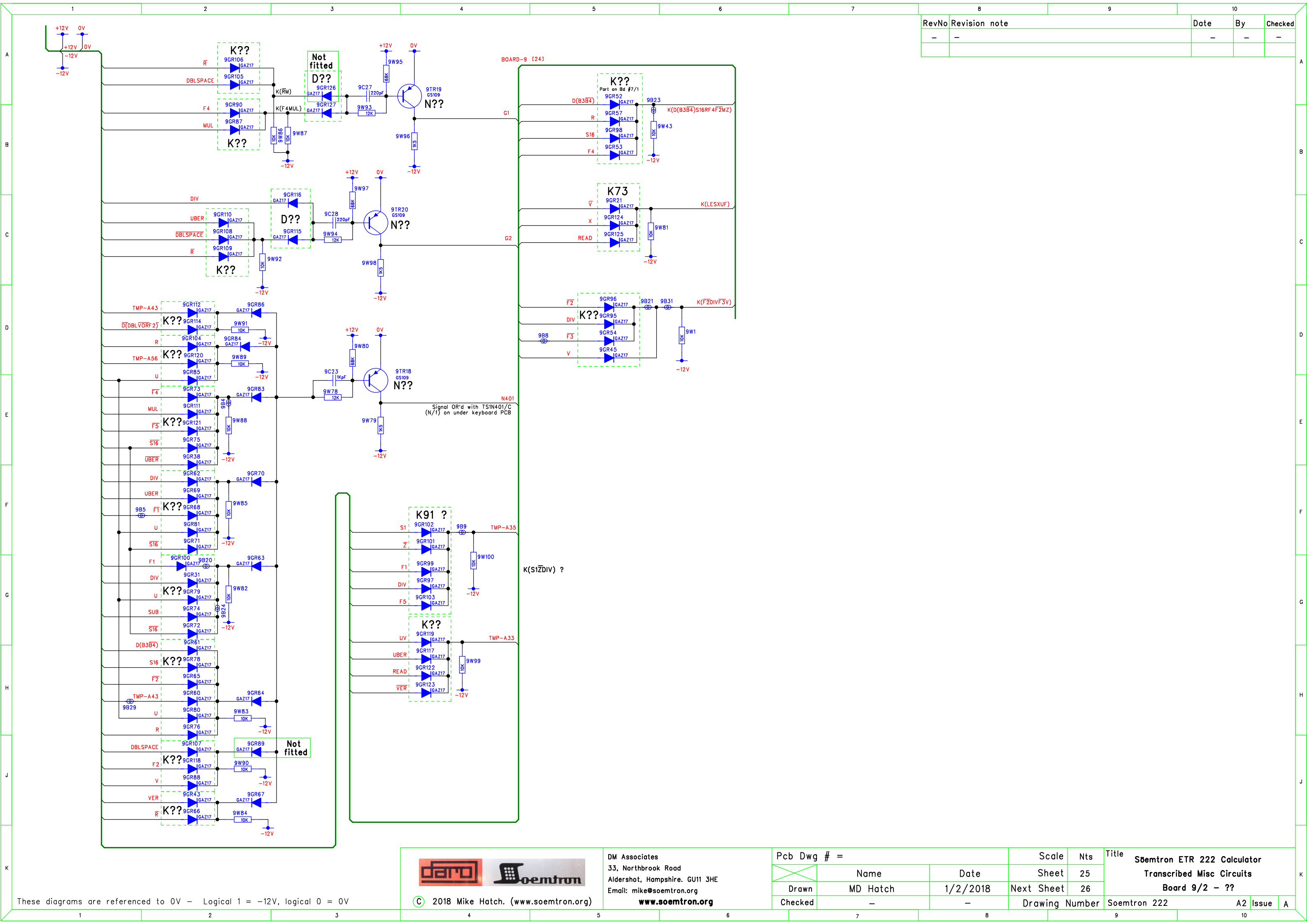
These diagrams are referenced to 0V - Logical 1 = -12V, logical 0 = 0V



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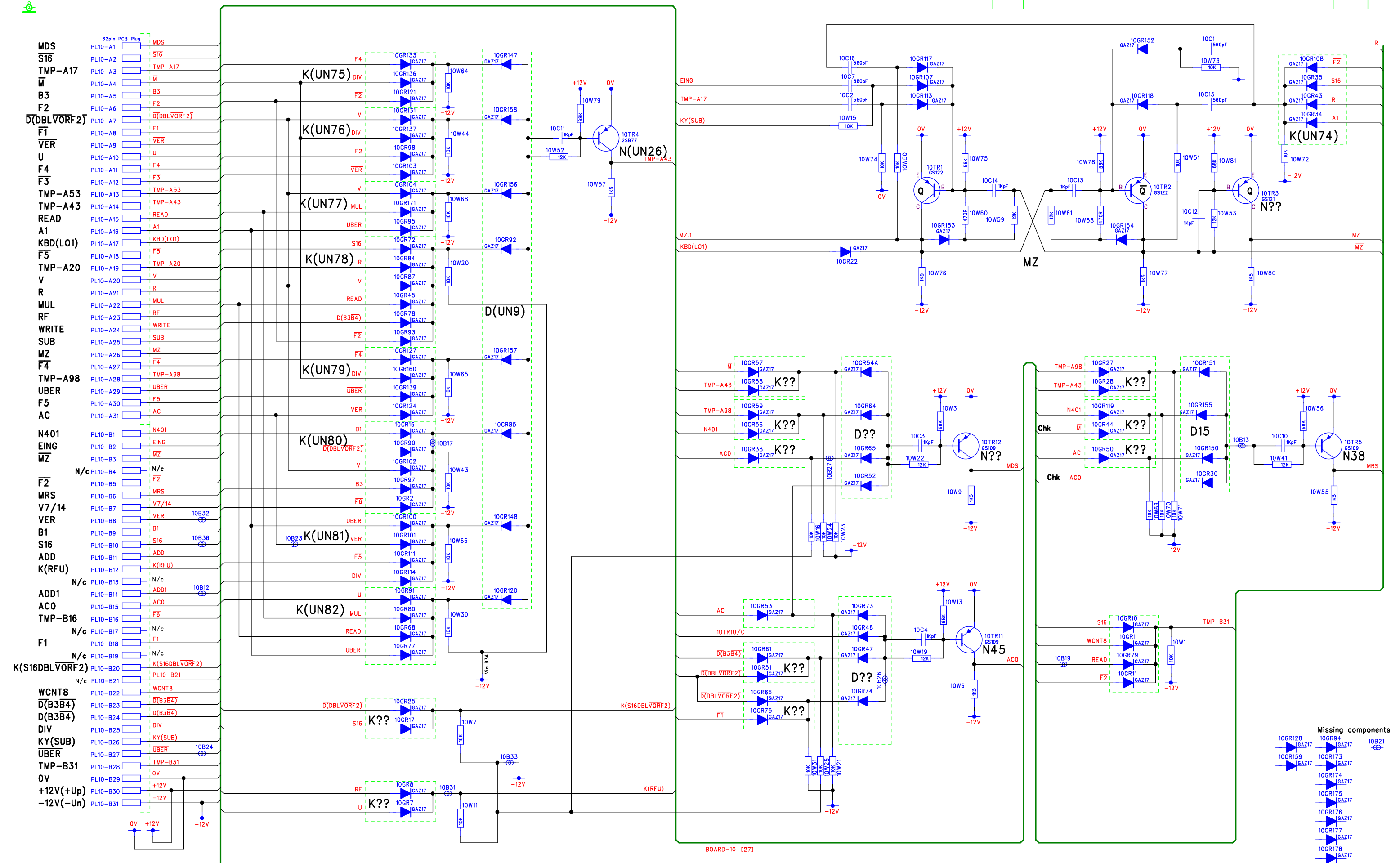
Pcb Dwg # =

	Name	Date	Sheet	24	Soemtron 222 Calculator Transcribed Misc Circuits Board 9 /1 – Read/Write, S1, V			
	Drawn	MD Hatch	1/2/2018	Next Sheet				25
	Checked	–	–	Drawing Number				Soemtron 222



Comp side -
Solder side - 224-307-010a 3970
Date coded - 34/68

RevNo	Revision note	Date	By	Checked
-	-	-	-	-



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Pcb Dwg # =

Name	Date
MD Hatch	15/8/2017
Checked	-

Scale

Nts

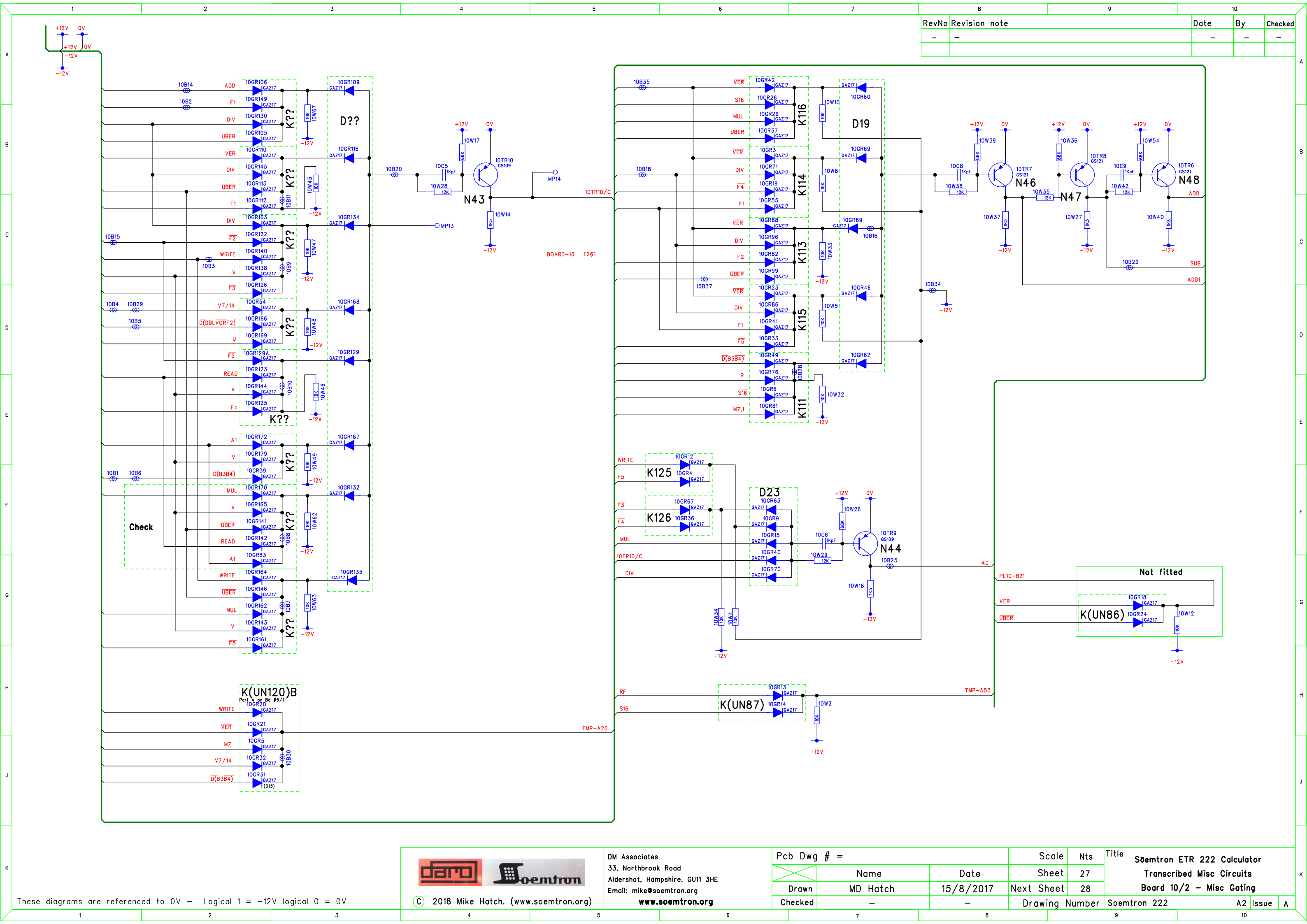
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Soemtron ETR 222 Calculator
Transcribed Misc Circuits
Board 10/1 - 3MZ + Gating

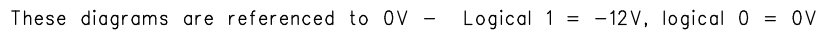
Sheet 26
Next Sheet 27
Drawing Number

Soemtron 222

A2 Issue A



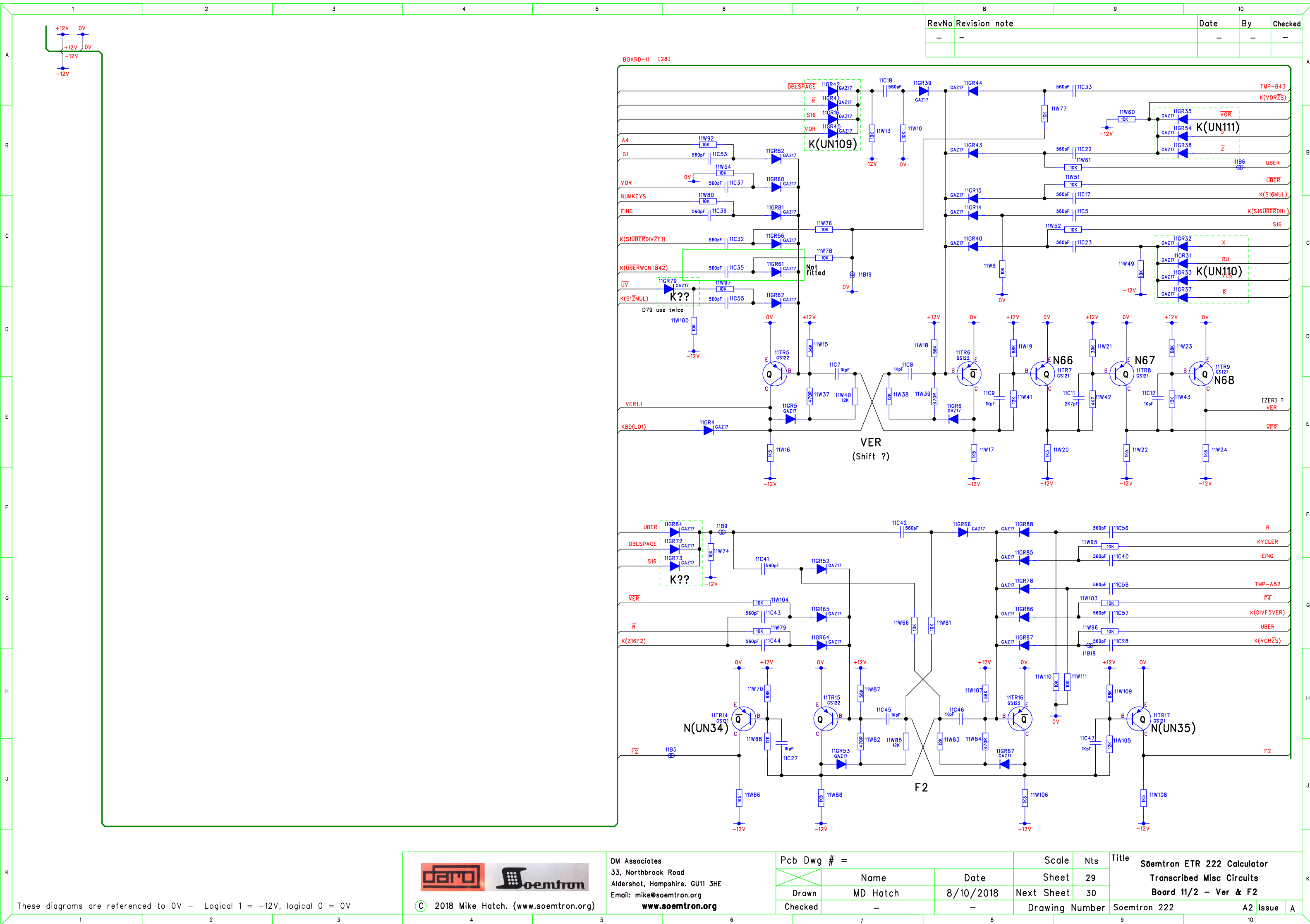
RevNo	Revision note	Date	By	Checked
-	-	-	-	-



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	Name	Date	Sheet	28	Transcribed Misc Circuits Board 11/1 – UBER & ?			
	Drawn	MD Hatch	8/10/2018	Next Sheet				
	Checked	–	–	Drawing Number	Soemtron 222	A2	Issue	A

Title Soemtron ETR 222 Calculator
 Transcribed Misc Circuits
 Board 11/1 – UBER & ?

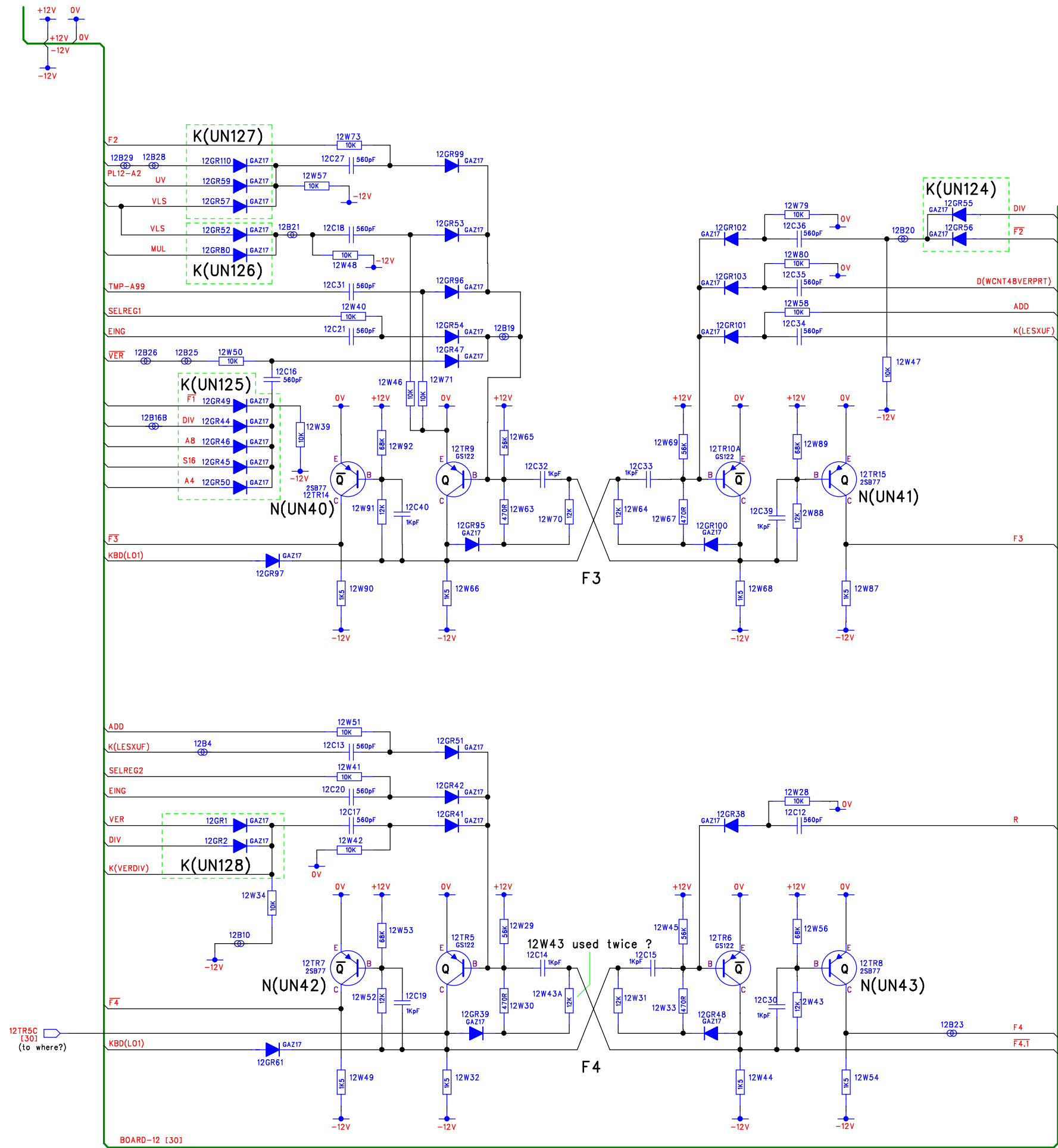




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	Name	Date	Sheet	30	Soemtron 222 Calculator Transcribed Misc Circuits Board 12/1 – F1 & F5				
	Drawn	MD Hatch	15/10/2018	Next Sheet					31
	Checked	–	–	Drawing Number					Soemtron 222

RevNo	Revision note	Date	By	Checked
–	–	–	–	–

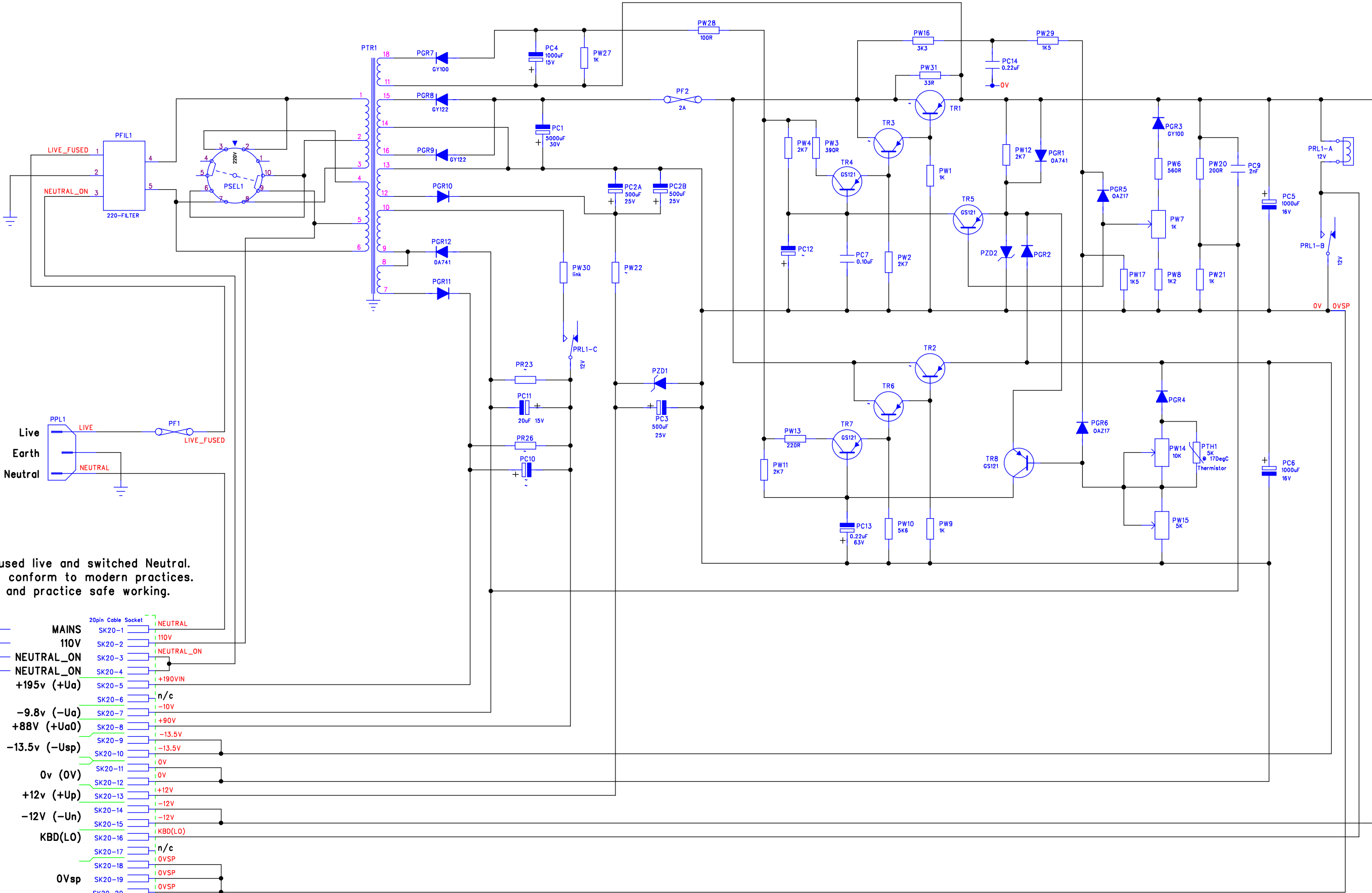


Pcb Dwg # =			Scale	Nts	Title Soemtron ETR 222 Calculator Transcribed Misc Circuits Board 12/2 – F3 & F4		
	Name	Date	Sheet	31			
Drawn	MD Hatch	15/10/2018	Next Sheet	32			
Checked	—	—	Drawing Number				
			Soemtron 222		A2	Issue	A

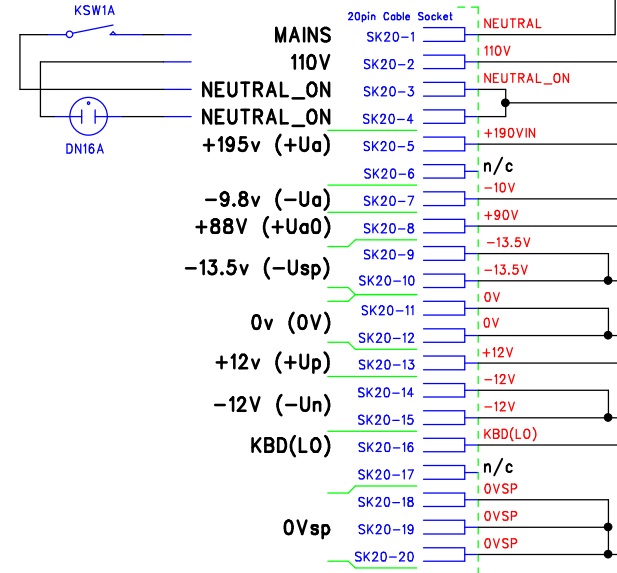
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RevNo	Revision note	Date	By	Checked
-	-	-	-	-



The 222 is Fused live and switched Neutral.
This does not conform to modern practices.
Exercise care and practice safe working.



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Pcb Dwg # =

Name	Date
MD Hatch	30/1/2024
Checked	-

Scale

Nts

Sheet	32
Next Sheet	33
Drawing Number	Soemtron 222

Title

Soemtron ETR 222 Calculator
Power Supply Wiring
Circuit Diagram

