

The Lark Project
Designer: HamSlices
Thermal Print Engine



Sheet: /
File: Lark.kicad_sch

Title: Lark Print Engine

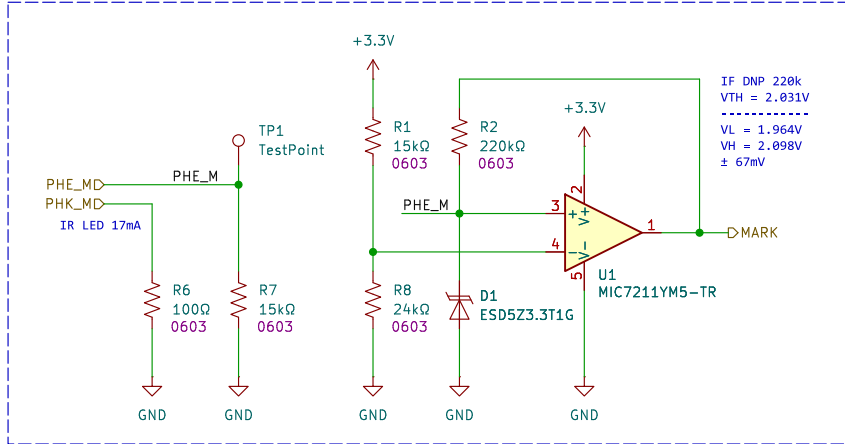
Size: A4
KiCad E.D.A. 9.0.5

Date: 2025-10-08

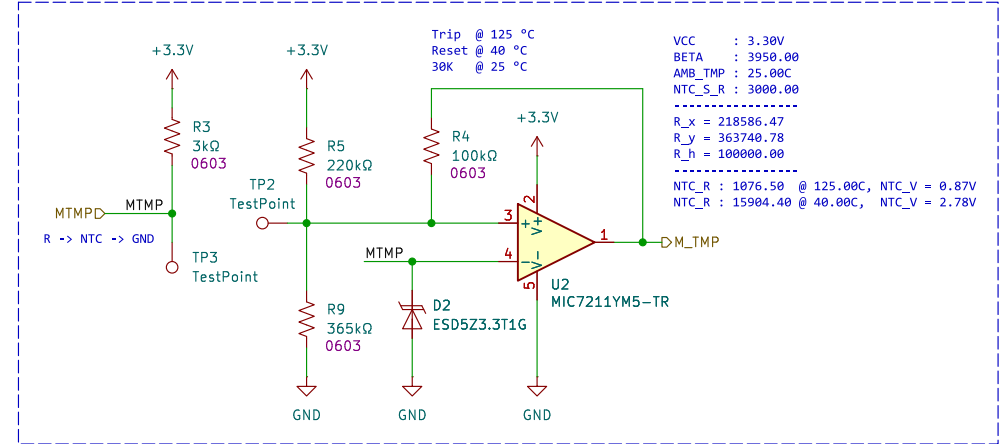
Rev: 01.00.01

Id: 1/13

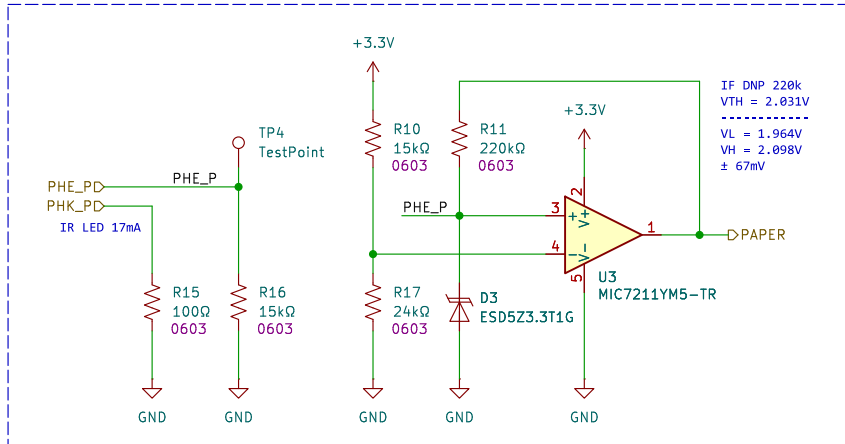
Mark Sensor



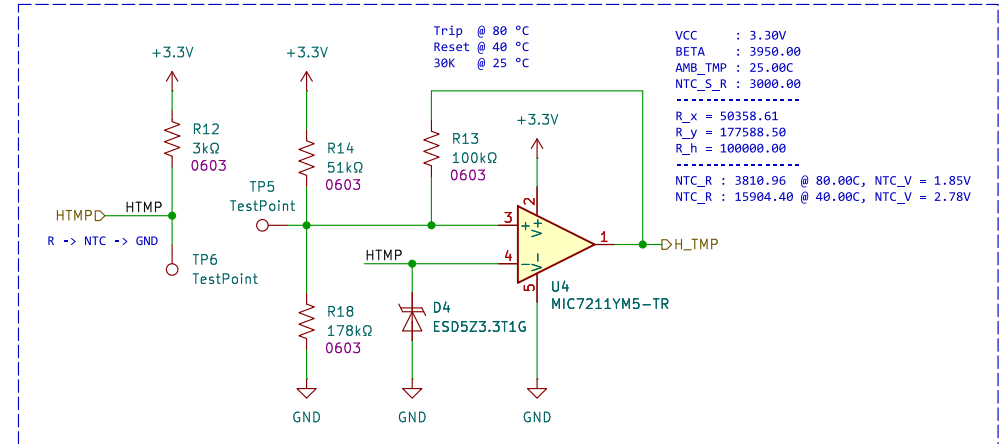
Motor Temperature Sensor



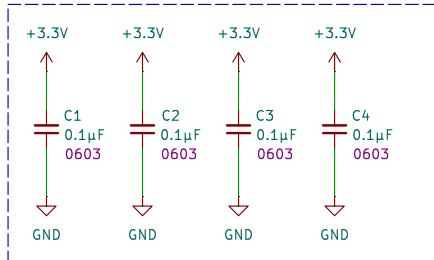
Paper Sensor



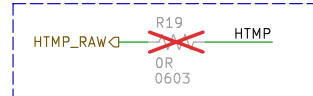
Head Temperature Sensor



Filter Caps



ADC Jumper



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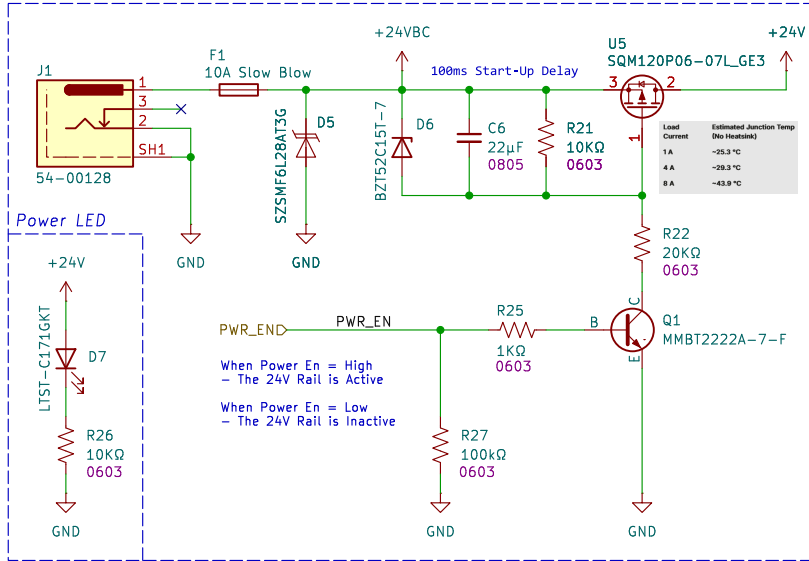
Sheet: /Sensors/
File: Sensors.kicad_sch

Title: Lark Print Engine

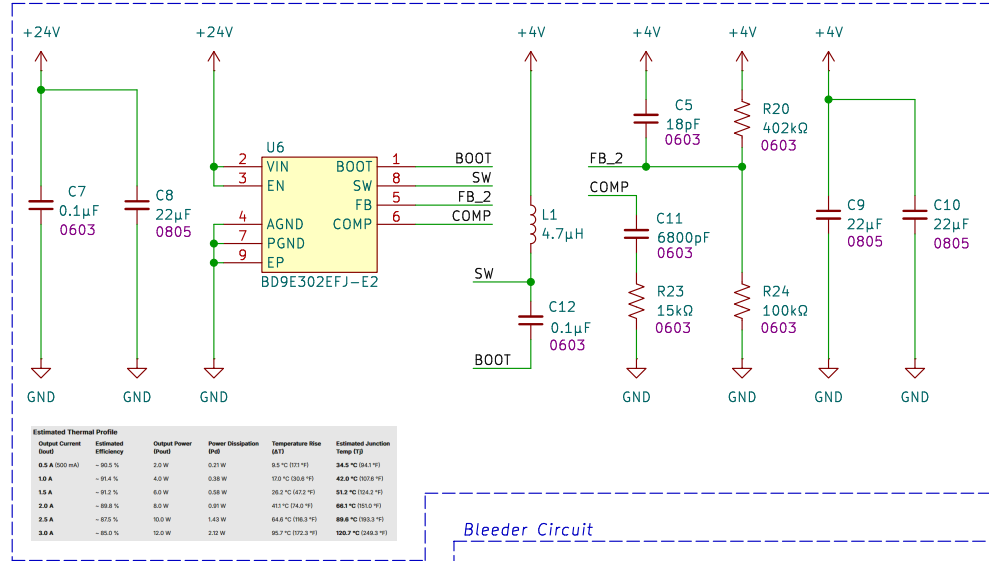
Size: A4 Date: 2025-10-08
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Rev: 01.00.01
Id: 2/13

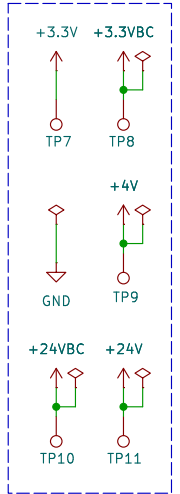
Power Entry



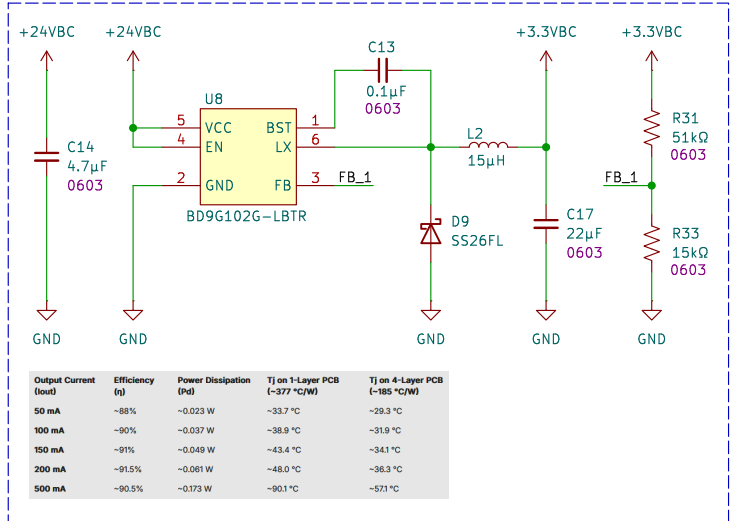
Main Buck Regulator



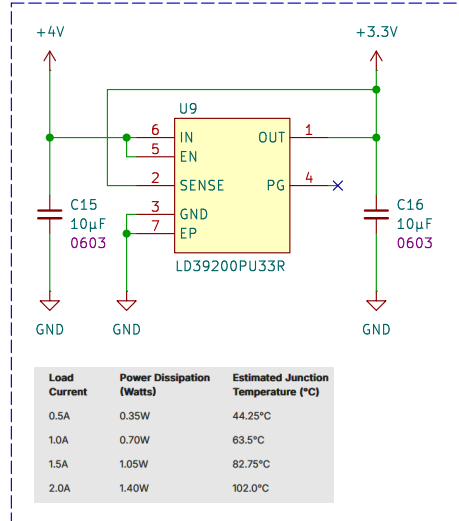
Test Points



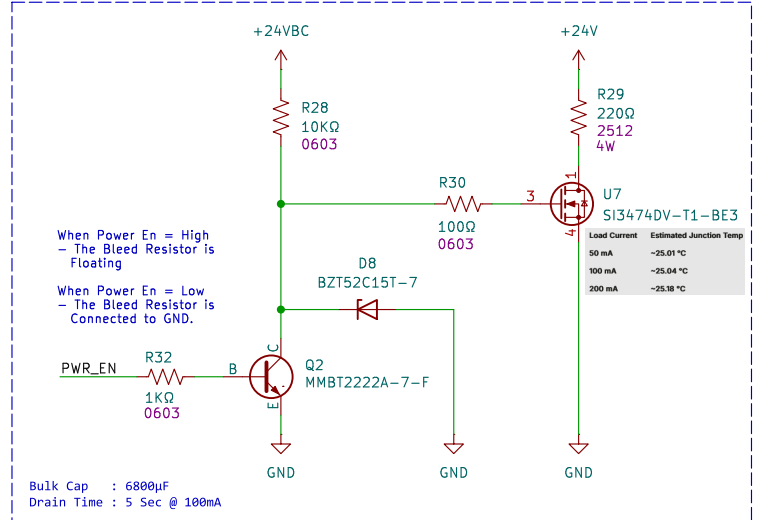
Boot Controller Supply



Main Linear Voltage Regulator



Bleeder Circuit



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Sheet: /Power/
File: Power.kicad_sch

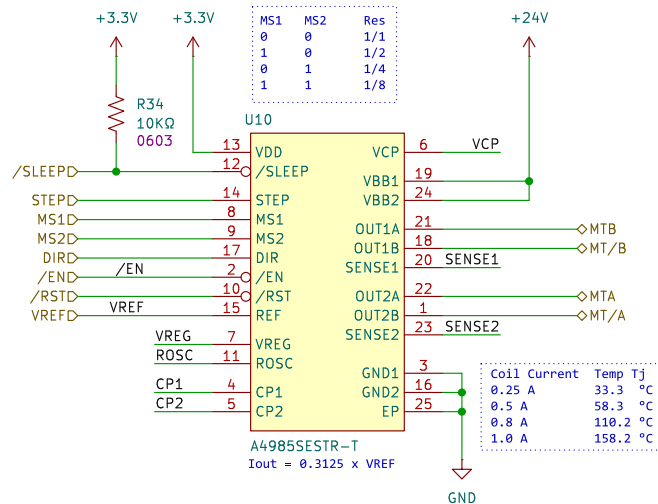
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Size: A4 | Date: 2025-10-08
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Using a 0.4 Ω (400 m Ω) Sense Resistor
Target Coil Current (ITripMAX) Required VREF Voltage

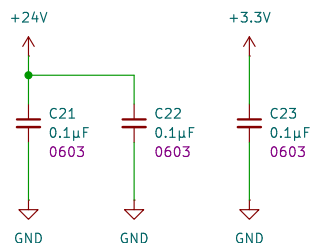
100	mA (0.1 A)	0.33 V
200	mA (0.2 A)	0.66 V
300	mA (0.3 A)	0.99 V
400	mA (0.4 A)	1.32 V
500	mA (0.5 A)	1.65 V
600	mA (0.6 A)	1.98 V
700	mA (0.7 A)	2.31 V
800	mA (0.8 A)	2.64 V
900	mA (0.9 A)	2.97 V
1000	mA (1.0 A)	3.30 V



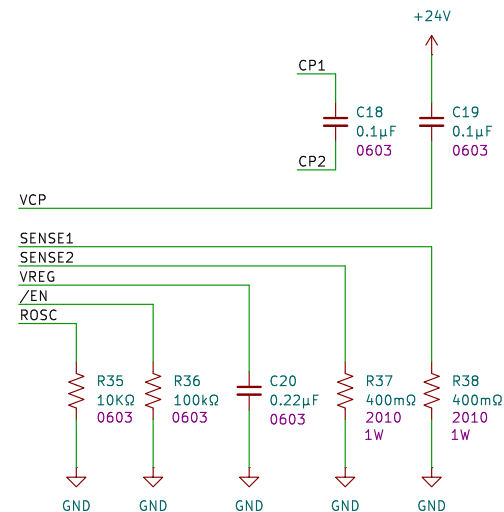
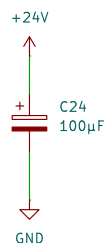
Test Points



Filter Caps



Bulk Cap



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Sheet: /Motor Driver/
File: Motor_Driver.kicad_sch

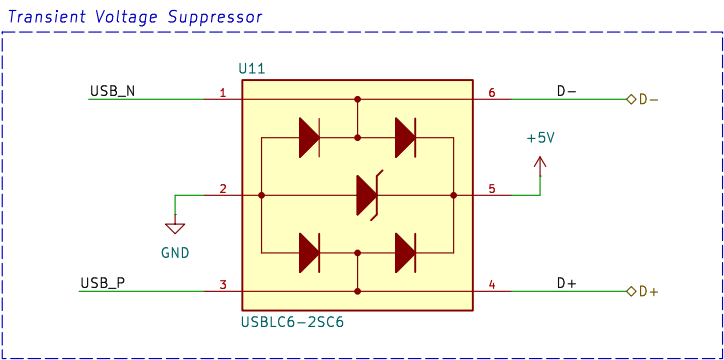
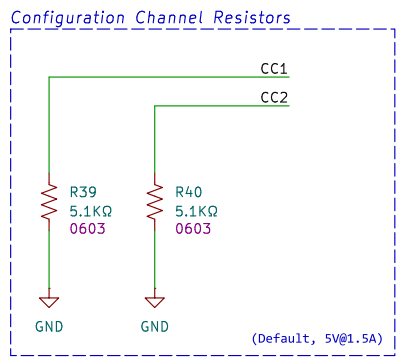
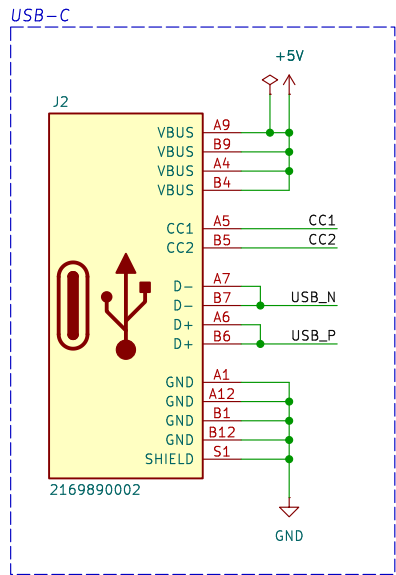
Title: Lark Print Engine

Size: A4 Date: 2025-10-08

KiCad E.D.A. 9.0.5

Rev: 01.00.01

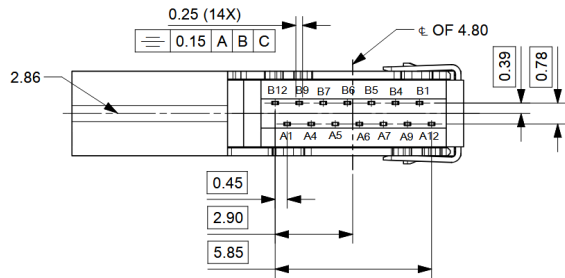
Id: 4/13



Pinout : 2169890002

USB TYPE-C PIN ASSIGNMENTS

PIN NUMBER	SIGNAL NAME	PIN NUMBER	SIGNAL NAME
A1	GND	B12	GND
A4	VBUS	B9	VBUS
A5	CC1		
A6	Dp1	B7	Dn2
A7	Dn1	B6	Dp2
		B5	CC2
A9	VBUS	B4	VBUS
A12	GND	B1	GND



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Sheet: /USB/
File: USB.kicad_sch

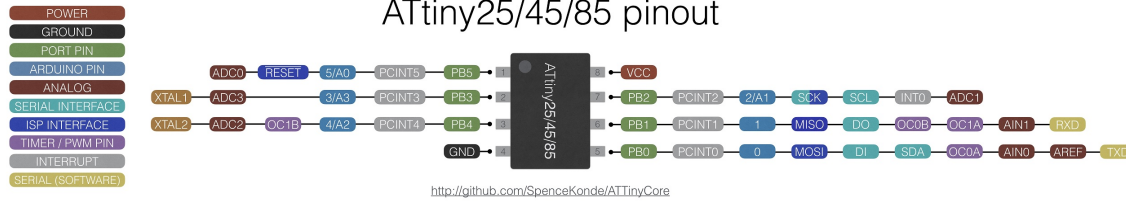
Title: Lark Print Engine

Size: A4
KiCad E.D.A. 9.0.5

Date: 2025-10-08

Rev: 01.00.01
Id: 5/13

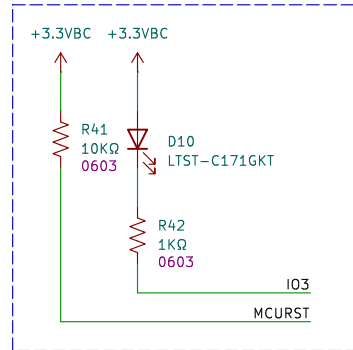
ATtiny25/45/85 pinout



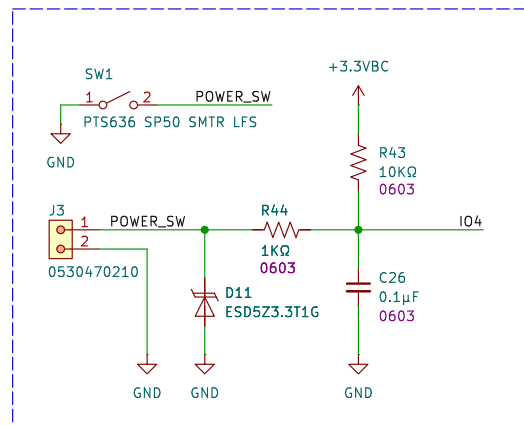
Programmer & Tutorial

- <https://learn.sparkfun.com/tutorials/tiny-avr-programmer-hookup-guide/>
- <https://www.digikey.com/en/products/detail/sparkfun-electronics/11801/5230948>
- <https://tinypurl.com/4sdmahcw>

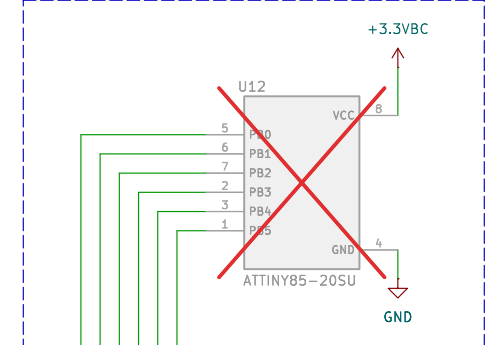
Indicator & Reset pull-up



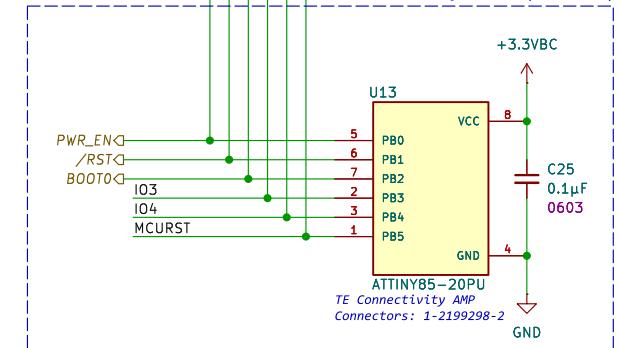
Power Switch



SMD Variant



Through Hole (socketed)



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Sheet: /Boot Controller/
File: Boot_Controller.kicad_sch

Title: Lark Print Engine

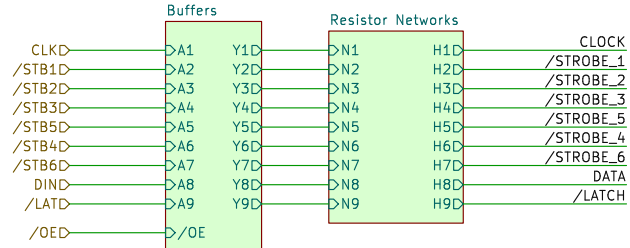
Size: A4 Date: 2025-10-08

KiCad E.D.A. 9.0.5

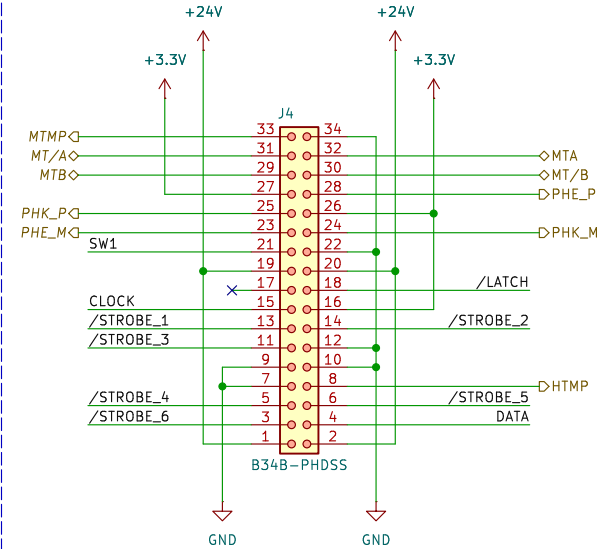
Rev: 01.00.01

Id: 6/13

Line Drivers & R-Newtorks



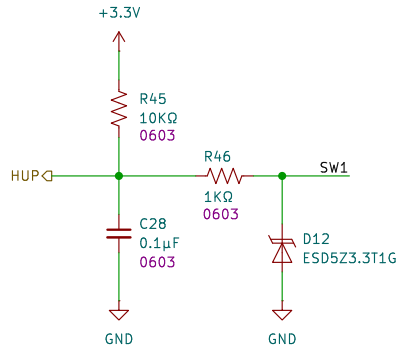
Mech Connector



Mating Connector

No	Signal	I/O	No	Signal	I/O
1	MTMP	I	18	/LAT	I
2	GND	-	19	CLK	I
3	MT_A	I	20	VDD	I
4	MT_A	I	21	/STB1	I
5	MT_B	I	22	/STB2	I
6	MT_B	I	23	/STB3	I
7	VSEN	I	24	GND	-
8	PHE	O	25	GND	-
9	PHK	O	26	GND	-
10	VSEN	I	27	GND	-
11	PHE	O	28	HTMP	O
12	PHK	O	29	/STB4	I
13	HUP	O	30	/STB5	I
14	GND	-	31	/STB6	I
15	VH	I	32	DI	I
16	VH	I	33	VH	I
17	DO	O	34	VH	I

Head Up Switch

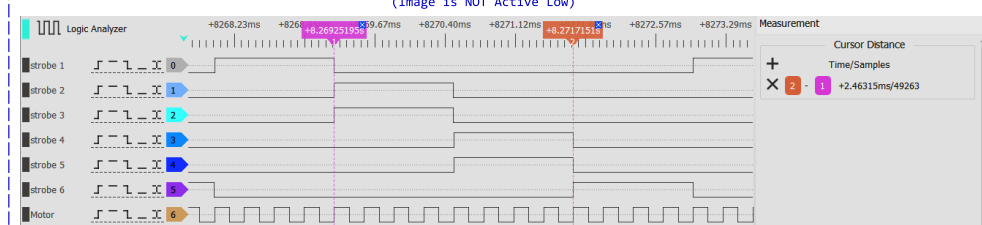


Bulk Cap

2200uF (ECA-1JH6222)	---	MIN---
3300uF (ECA-1HW332)	PSU Current (A)	6.66
6800uF (EEU-HD1V682)	Total Current Demand (A)	9.22
	Allowable Voltage Drop (V)	1
	Stroke Duration (ms)	2.488
	Current Shortfall (A)	2.56
	Cap Size (uF)	6369.28
	Recharge Time (ms)	0.956348
	---	MAX---
	PSU Current (A)	8.43
	Total Current Demand (A)	9.22
	Allowable Voltage Drop (V)	1
	Stroke Duration (ms)	2.488
	Current Shortfall (A)	0.79
	Cap Size (uF)	1965.52
	Recharge Time (ms)	0.233158
	PSU: TR160MB240-01E12 VI	
	---	Mathe---
	Current Short Fall	
	Total_Lamps - PSU_amps	
	Cap Size	
	((Short_fall x Stroke_len) / V_drop) x 1000	
	Recharge Time	
	((Cap x V_drop) / PSU_current) x 1000	

1IPS = 203.2Hz = 4.921ms
 4.921 / 4 = 1.23ms (per strobe)
 2 Strobe cycles = 2.46ms

288 Dots per Strobe at 1500 Ohms Per dot
 1 strobe = 4.6A
 2 strobes = 9.2A



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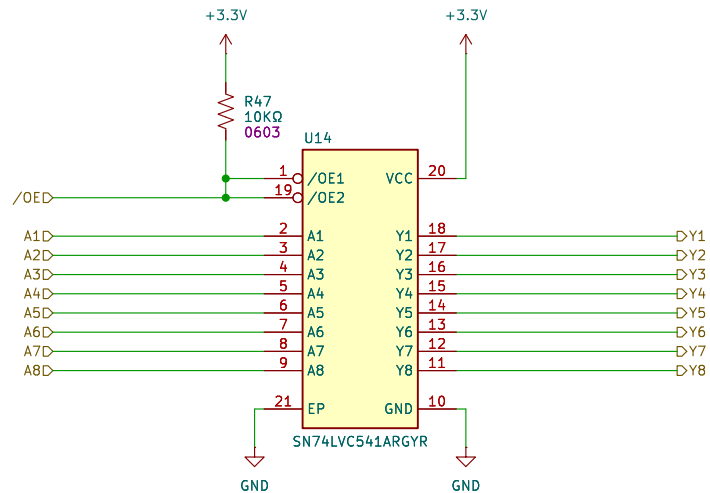
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 File: FTP-68EMCL_Connector.kicad_sch

Title: Lark Print Engine

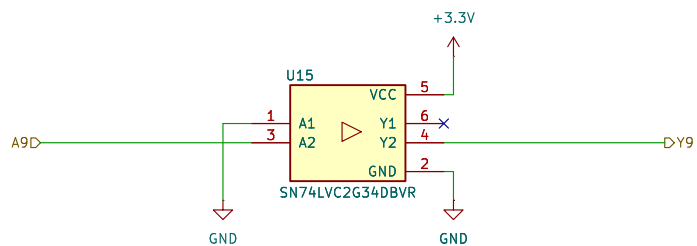
Size: A4 | Date: 2025-10-08
 KiCad E.D.A. 9.0.5

Rev: 01.00.01
 Id: 7/13

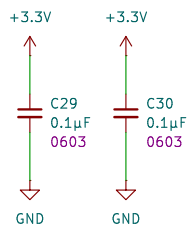
Strobe / Data / Clock, Line Driver



Latch, Line Driver



Filter Caps



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 Thermal Print Engine



Sheet: /FTP-68EMCL Connector/Buffers/
 File: Buffers.kicad_sch

Title: Lark Print Engine

Size: A4

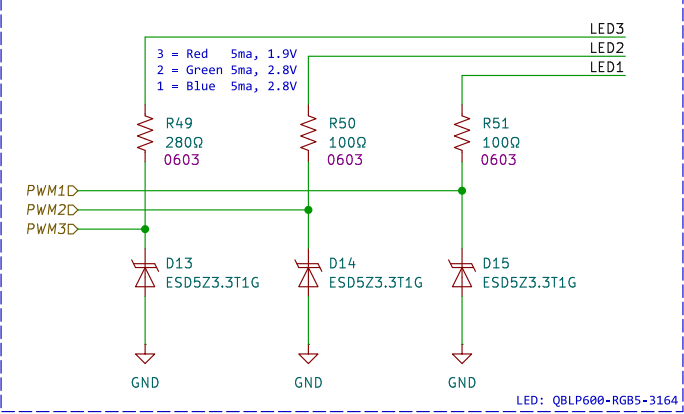
Date: 2025-10-08

Rev: 01.00.01

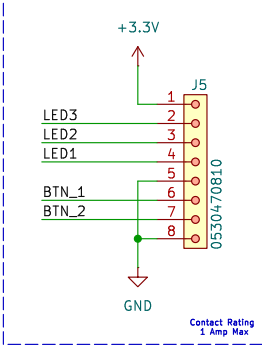
KiCad E.D.A. 9.0.5

Id: 8/13

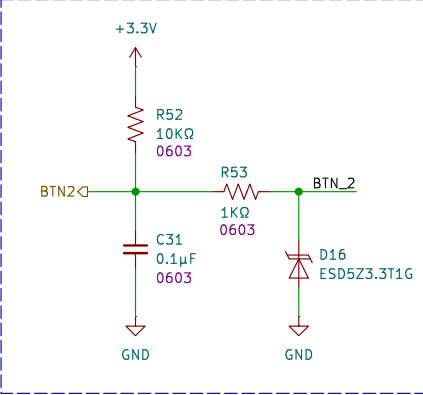
Front IO LEDs



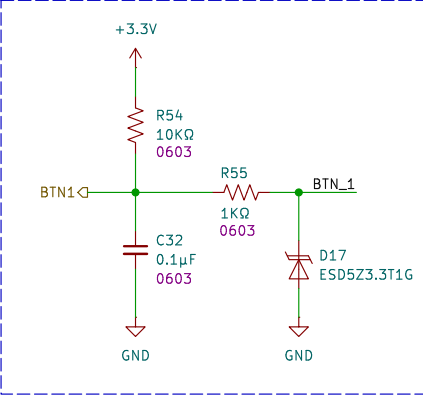
Front IO Connector



Front IO Button 2



Front IO Button 1



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Sheet: /FrontIO/
File: FrontIO.kicad_sch

Title: Lark Print Engine

Size: A4

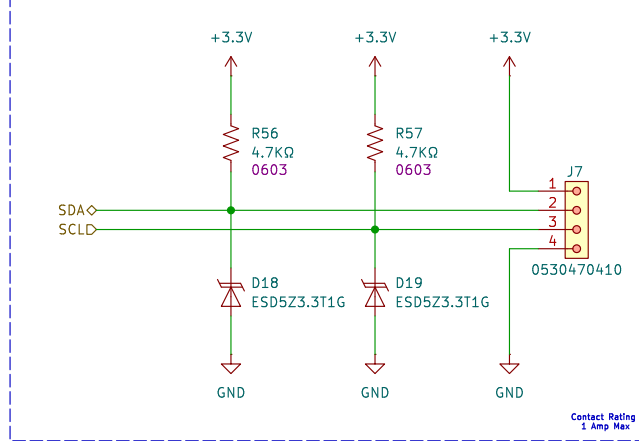
Date: 2025-10-08

Rev: 01.00.01

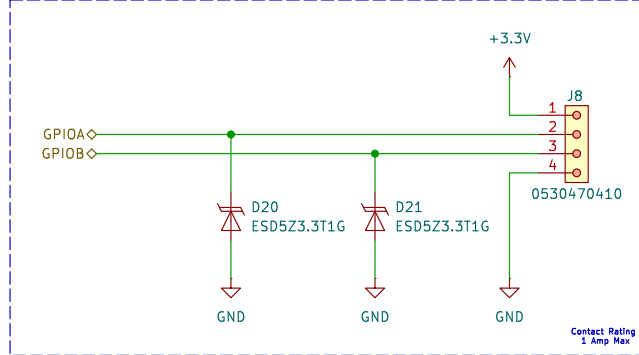
KiCad E.D.A. 9.0.5

Id: 10/13

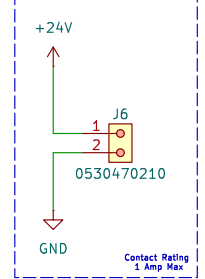
I2C Breakout



GPIO A&B Breakout



AUX 24V Power



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Sheet: /Auxiliary/
File: Auxiliary.kicad_sch

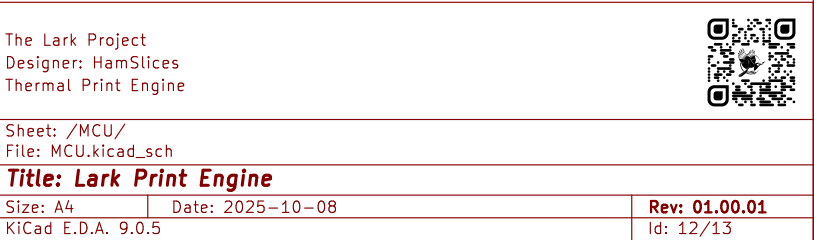
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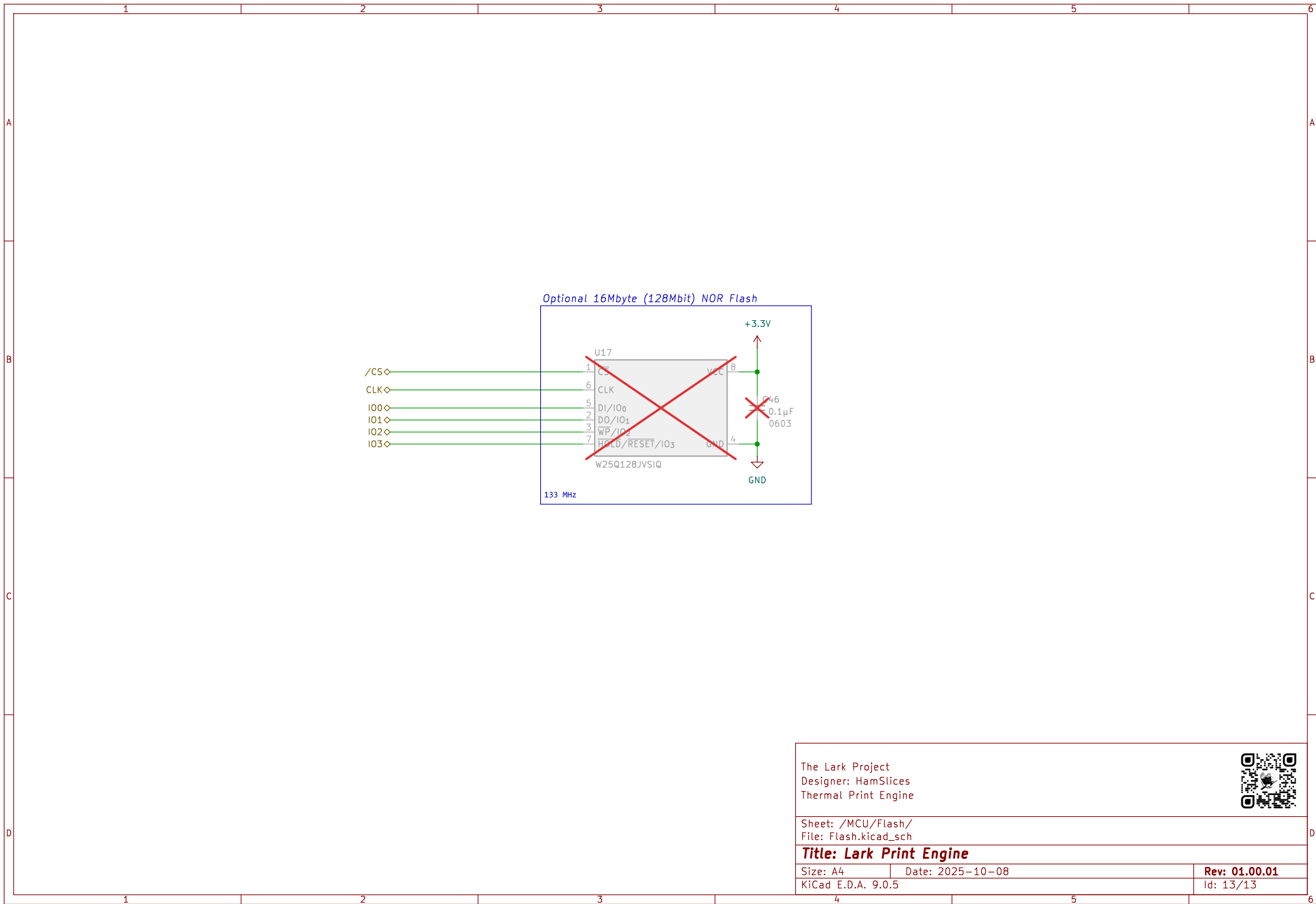
Size: A4
KiCad E.D.A. 9.0.5

Date: 2025-10-08

Rev: 01.00.01

Id: 11/13





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Designer: HamSlices
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Sheet: /MCU/Flash/
File: Flash.kicad_sch

Title: Lark Print Engine

Size: A4 Date: 2025-10-08
KiCad E.D.A. 9.0.5

Rev: 01.00.01
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