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NANORACK LASER

Schematic V1.0.0

EFUSE
TPS259470

Regulator 5V
TPS5430DDAR

32x LD/PD

12V_AUX

VBUS   5V

12V_AUX
GND_AUX
VBUS
GND_BUS
I2C_LASER

I2C ISOLATOR
ADUM1250

I2C

I2C

I2C

I2C

I2C

2 x I2C 16bit expander
MCP23017T-E/SS

ADC
ADS1015BQDGSRQ1

DAC
MCP47CVB22-E/UN

I2C 4bit expander
PCA9536

Matrix FET (PNP)

AO3401

1 x ADC: Current Monitor

OPAMP
OPA340

LATCH

FET (NPN)

AO3400

EFUSE

IC1 TPS259470LRPWR

+12_AUX

470K 1%
R1
R2
11K 1%
R3
47K 1%
C1 1uF/25V

IN — OUT — +12
EN/UVLO — PG/AUXOFF 3
OVLO — PGTH/FLT 4
ITIMER ILM GND DVDT

C3 2.2nF/25V
R4 549R 1%
C4 3.3nF/25V

SS54
D1

C2 100uF/20V

GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX

EFUSE

REGULATOR

U1 TPS5430DDAR

+12

C6 1uF/25V
C7 10uF/25V
C10 100uF/20V
C12 1uF/25V
C13 10uF/25V

VIN — PH 8
EN — BOOT 1
TPS_ENA 5
GND — VSENSE 4

C5 0.01uF/25V

L1 15uH/3.5A
SS54 D2

C8 10uF/25V
C9 1uF/25V
C14 10uF/25V
C15 1uF/25V
C11 470uF/6.3V

R5 10K 1%
LED1
R6 1K 1%
R7 3.24K 0.1%

+5

GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX GND_AUX
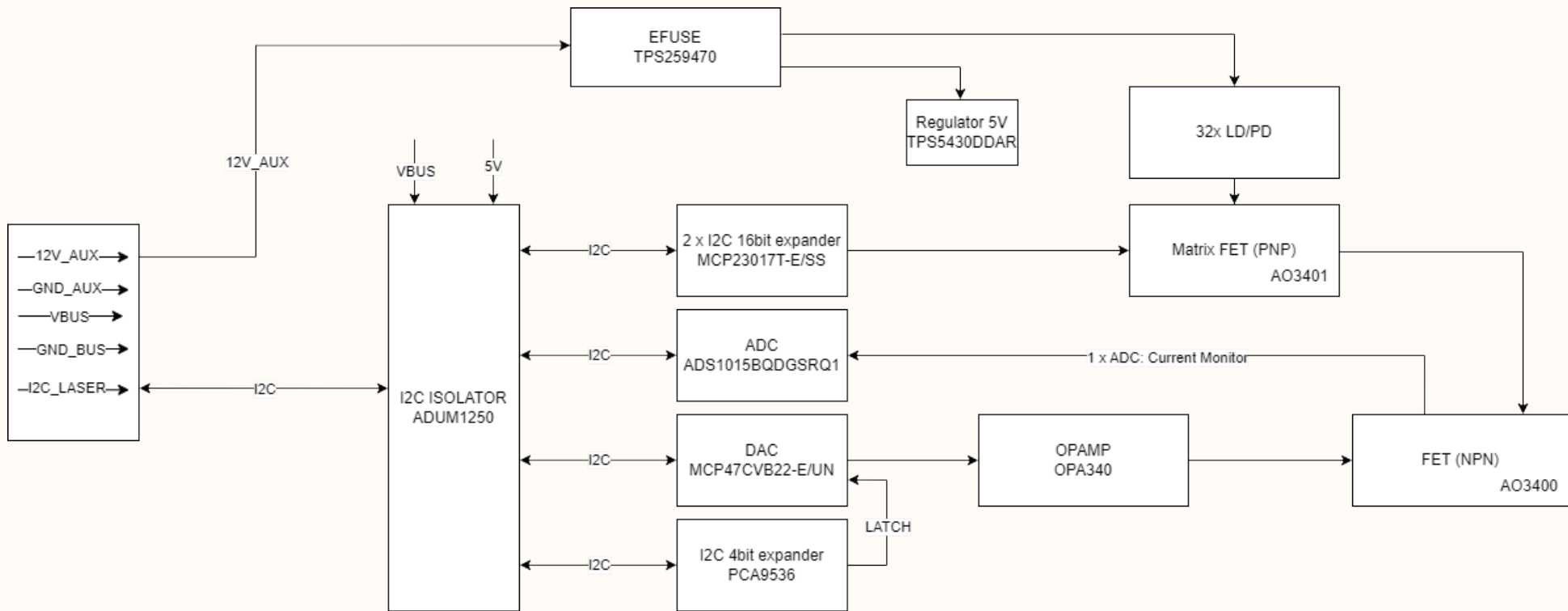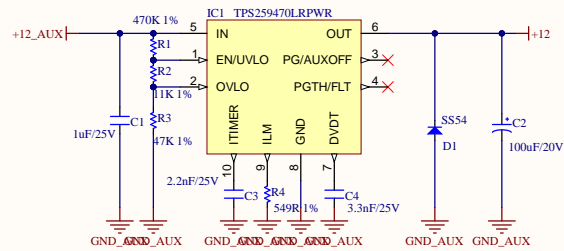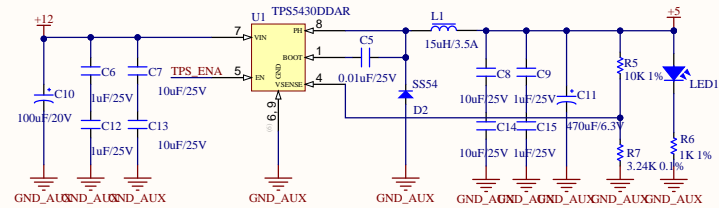
REGULATOR

$$SR\left(\frac{V}{ms}\right) = \frac{V_{IN}(V)}{t_R(ms)}$$

$$C_{dVdt}(pF) = \frac{2000}{SR\left(\frac{V}{ms}\right)}$$

$$I_{INRUSH}(mA) = SR(V/ms) \times C_{OUT}(uF)$$

$$R_{LIM}(\Omega) = \frac{3334}{I_{LIM}(A)}$$

$$R_2 = \frac{R_1 \times 1{,}221}{V_{OUT} - 1{,}221}$$

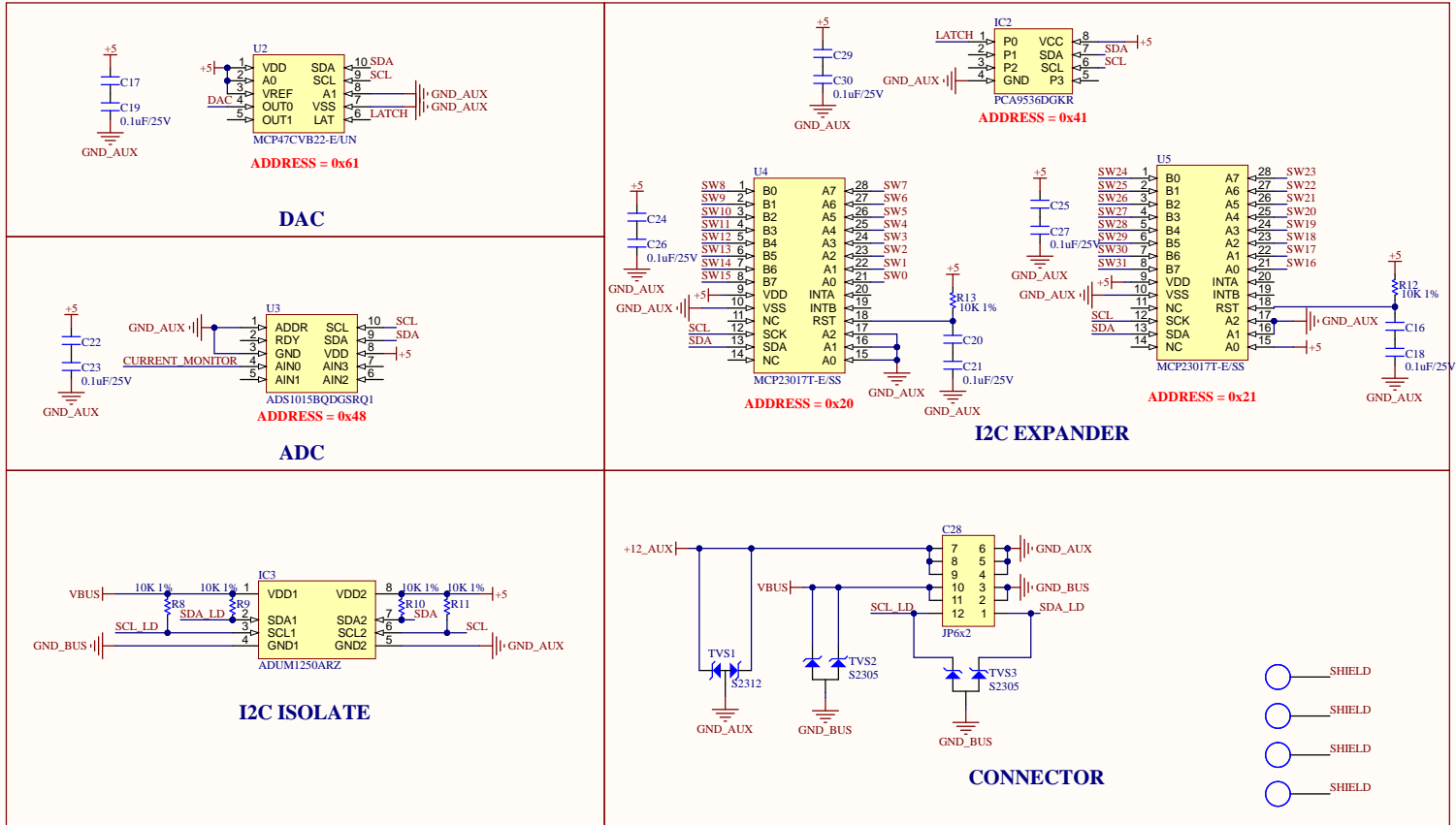## DAC

U2 — MCP47CVB22-E/UN
ADDRESS = 0x61

+5
C17
C19 0.1uF/25V
GND_AUX

Pin		Pin	
1	VDD	SDA	10 SDA
2	A0	SCL	9 SCL
3	VREF	A1	8
4	OUT0	VSS	7
5	OUT1	LAT	6 LATCH

+5 DAC
GND_AUX
GND_AUX

ADC

U3 — ADS1015BQDGSRQ1
ADDRESS = 0x48

+5
C22
C23 0.1uF/25V
GND_AUX

Pin		Pin	
1	ADDR	SCL	10 SCL
2	RDY	SDA	9 SDA
3	GND	VDD	8 +5
4	AIN0	AIN3	7
5	AIN1	AIN2	6

GND_AUX
CURRENT_MONITOR

I2C ISOLATE

IC3 — ADUM1250ARZ

VBUS 10K 1% 10K 1%
R8 R9
SCL_LD SDA_LD
GND_BUS

Pin		Pin	
1	VDD1	VDD2	8
2	SDA1	SDA2	7
3	SCL1	SCL2	6
4	GND1	GND2	5

10K 1% 10K 1%
R10 R11
SDA +5
SCL
GND_AUX

I2C EXPANDER

IC2 — PCA9536DGKR
ADDRESS = 0x41

LATCH
+5
C29
C30 0.1uF/25V
GND_AUX

Pin		Pin	
1	P0	VCC	8 +5
2	P1	SDA	7 SDA
3	P2	SCL	6 SCL
4	GND	P3	5

U4 — MCP23017T-E/SS
ADDRESS = 0x20

+5
C24
C26 0.1uF/25V
GND_AUX

Pin			Pin	
1	B0	SW8	A7	28 SW7
2	B1	SW9	A6	27 SW6
3	B2	SW10	A5	26 SW5
4	B3	SW11	A4	25 SW4
5	B4	SW12	A3	24 SW3
6	B5	SW13	A2	23 SW2
7	B6	SW14	A1	22 SW1
8	B7	SW15	A0	21 SW0
9	VDD		INTA	20
10	VSS		INTB	19
11	NC		RST	18
12	SCK		A2	17
13	SDA		A1	16
14	SCL		A0	15

GND_AUX
SCL
SDA
R13 10K 1%
C20
C21 0.1uF/25V
GND_AUX

U5 — MCP23017T-E/SS
ADDRESS = 0x21

+5
C25
C27 0.1uF/25V
GND_AUX

Pin			Pin	
1	B0	SW24	A7	28 SW23
2	B1	SW25	A6	27 SW22
3	B2	SW26	A5	26 SW21
4	B3	SW27	A4	25 SW20
5	B4	SW28	A3	24 SW19
6	B5	SW29	A2	23 SW18
7	B6	SW30	A1	22 SW17
8	B7	SW31	A0	21 SW16
9	VDD		INTA	20
10	VSS		INTB	19
11	NC		RST	18
12	SCK		A2	17
13	SDA		A1	16
14	SCL		A0	15 +5

GND_AUX
SCL
SDA
R12 10K 1%
C16
C18 0.1uF/25V
GND_AUX

CONNECTOR

+12_AUX
VBUS
SCL_LD
SDA_LD

C28 — JP6x2

7	6
8	5
9	4
10	3
11	2
12	1

GND_AUX
GND_BUS

TVS1 S2312
TVS2 S2305
TVS3 S2305
GND_AUX
GND_BUS
GND_BUS

SHIELD
SHIELD
SHIELD
SHIELD

CURRENT SOURCE

+5

C33
C35
0.1uF/25V
GND_AUX

DAC
C34
C36
0.1uF/25V
GND_AUX

+5
8
IC4A
OPA2340UA
3 +
2
1
4
GND_AUX

I_LD

Q1
AO3400

R14
100R 1%

C37
10uF/25V

R15
1K 1%

R17
10R 1%

GND_AUX

IC4B
OPA2340UA
5 +
6 −
7

R16
1K 1%

CURRENT_MONITOR

C38
10uF/25V

C39
10uF/25V

GND_AUX