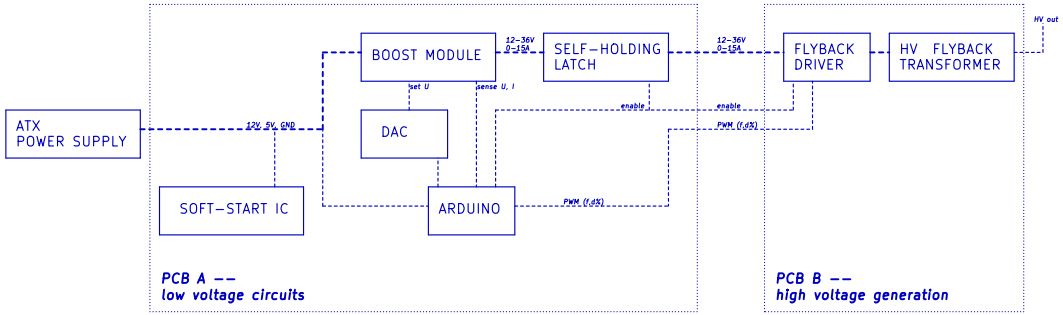
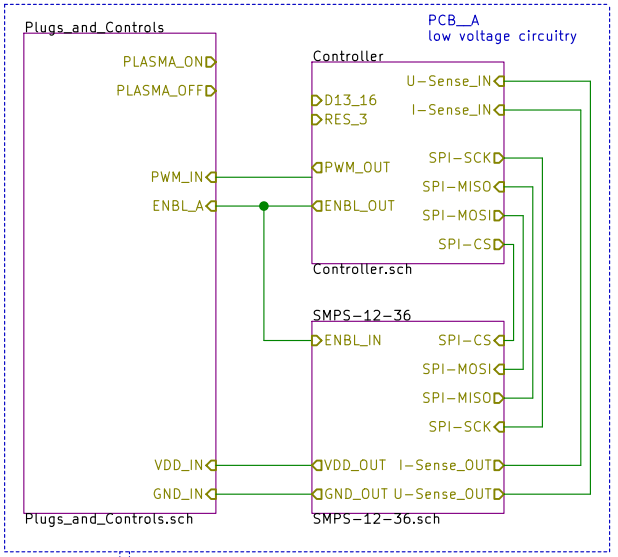
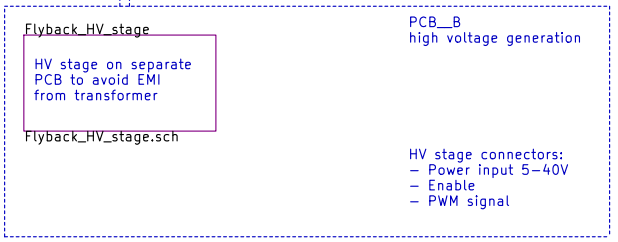
BLOCK DIAGRAM







TODO SELECT SMPS FETS
TODO SELECT SMPS SHUNT

NOTES

Boost regulator has internal Vref=1.2V. Therefore set DAC VoutB=1.2V.
DAC VoutA maps directly N=0...4095 to Uset=0...36V.
DAC CS via Arduino pin 8.

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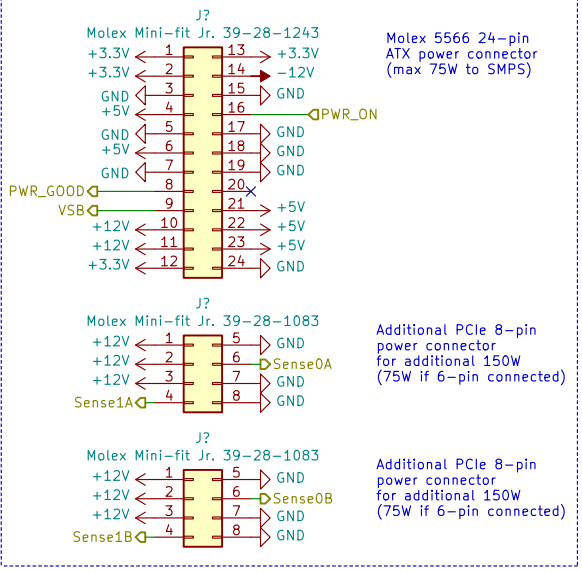
Sheet: /
File: Plasma–PSU_Eurocard_Flyback.sch

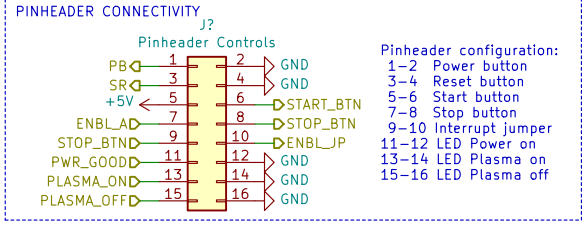
Title: Plasma–PSU_Eurocard_Flyback

Size: A4	Date: 2020–04–08	**Rev: 0.0.4**
KiCad E.D.A. eeschema (5.1.2)–1		Id: 1/5

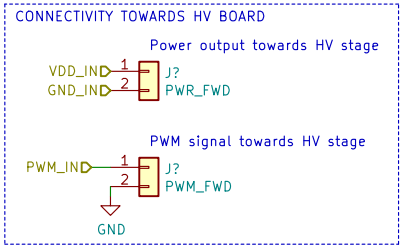
POWER CONNECTORS



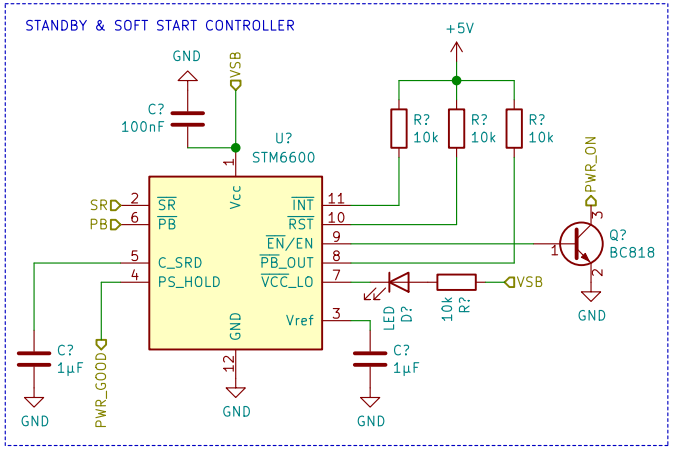
PINHEADER CONNECTIVITY



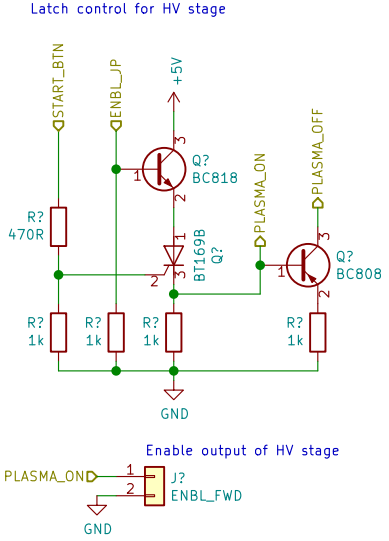
CONNECTIVITY TOWARDS HV BOARD



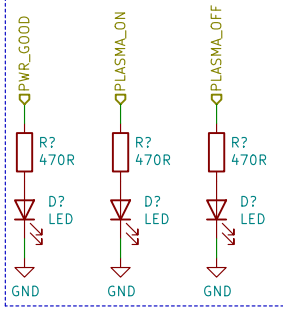
STANDBY & SOFT START CONTROLLER



Latch control for HV stage



On-board control LEDs



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Sheet: /Plugs_and_Controls/
File: Plugs_and_Controls.sch

Title: Plasma-PSU_Eurocard_Flyback

Size: A4	Date: 2020-04-08	**Rev: 0.0.4**
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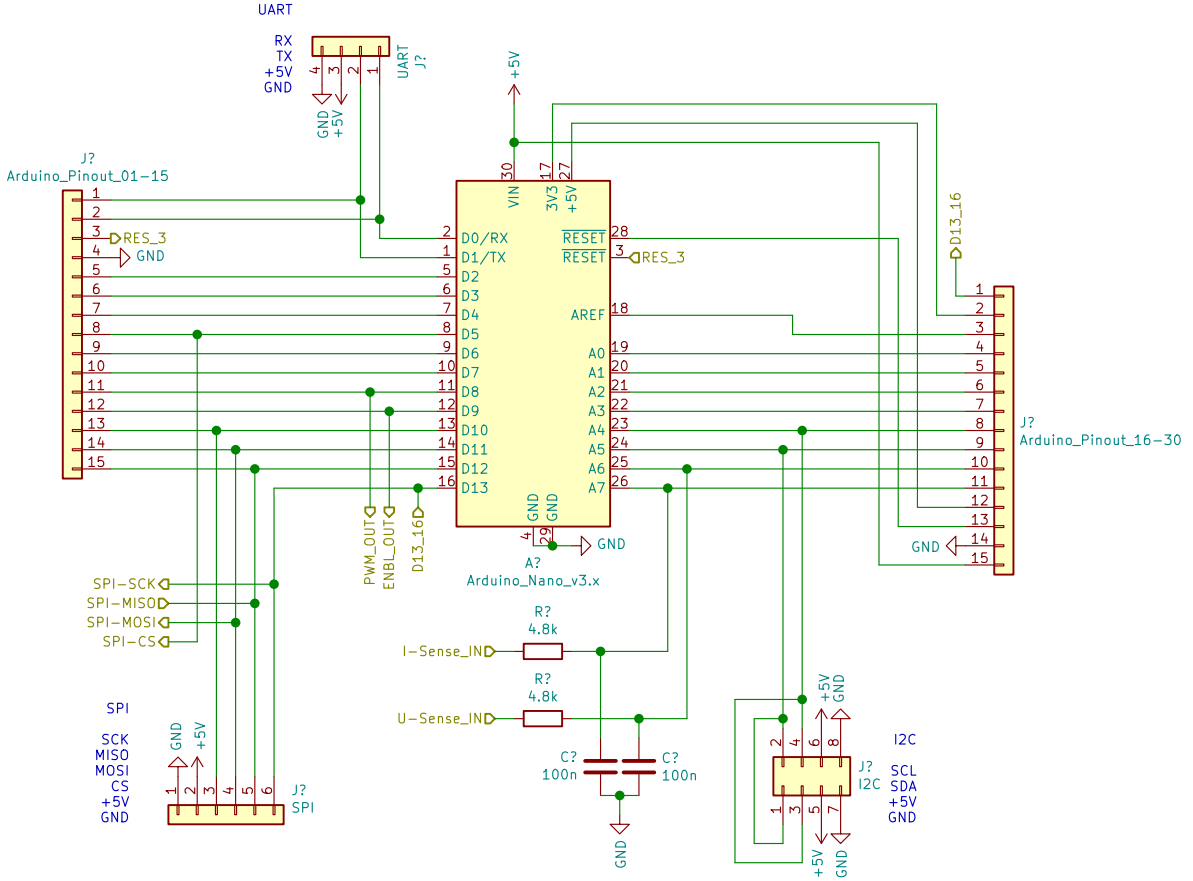
Configuration:
PWM via timer1 on D8 / pin11)
ENBL signal on D9 / pin 12
U-CTRL via SPI with CS on pin 8
U sensing on A6 / pin 25
I sensing on A7 / pin 26
UART on D0 & D1 / pin 2 & 1
I2C signal on A4 & A5 / pin 23 & 24



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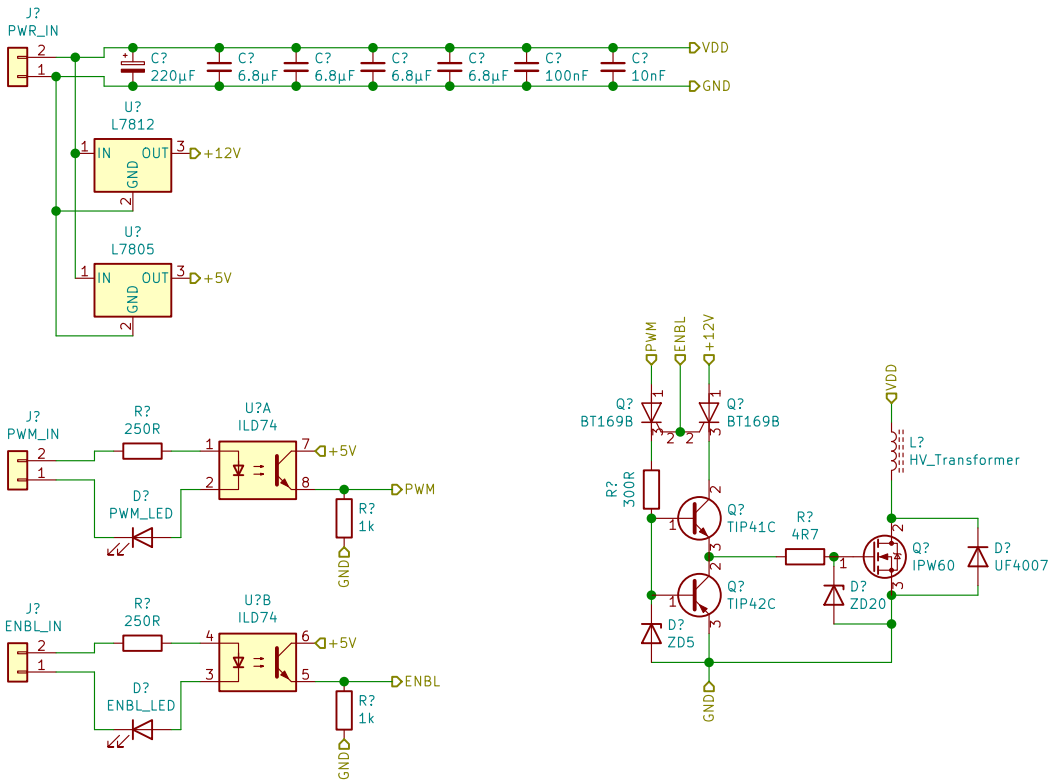
Sheet: /Controller/
File: Controller.sch

Title: Plasma-PSU_Eurocard_Flyback

Size: A4	Date: 2020-04-08	**Rev: 0.0.4**
KiCad E.D.A. eeschema (5.1.2)-1		Id: 3/5



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Sheet: /Flyback_HV_stage/
File: Flyback_HV_stage.sch

Title: Plasma–PSU_Eurocard_Flyback

Size: A4	Date: 2020–04–08	**Rev: 0.0.4**
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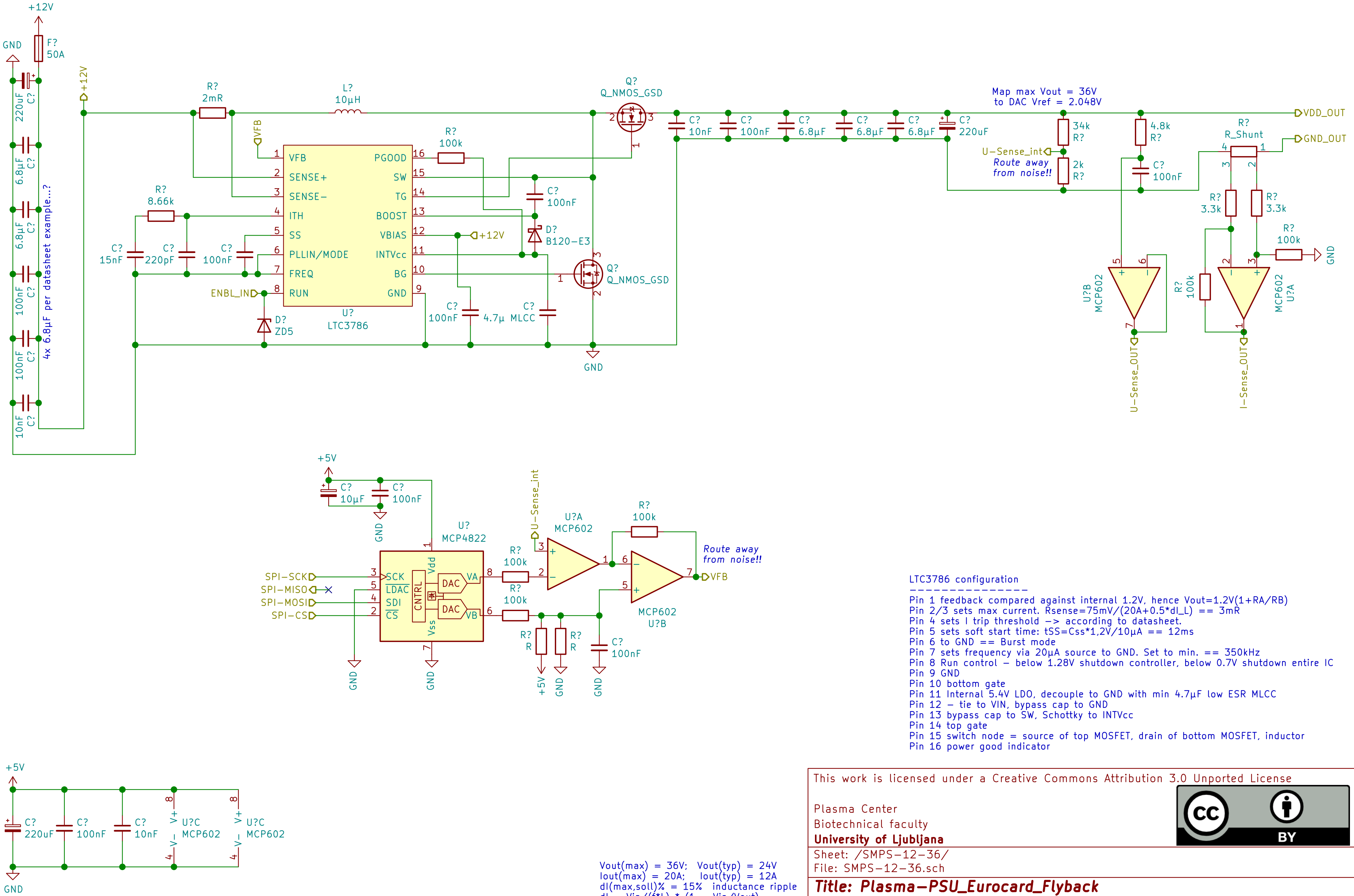

LTC3786 configuration

Pin 1 feedback compared against internal 1.2V, hence Vout=1.2V(1+RA/RB)
Pin 2/3 sets max current. Rsense=75mV/(20A+0.5*dI_L) == 3mR
Pin 4 sets I trip threshold −> according to datasheet.
Pin 5 sets soft start time: tSS=Css*1,2V/10µA == 12ms
Pin 6 to GND == Burst mode
Pin 7 sets frequency via 20µA source to GND. Set to min. == 350kHz
Pin 8 Run control − below 1.28V shutdown controller, below 0.7V shutdown entire IC
Pin 9 GND
Pin 10 bottom gate
Pin 11 Internal 5.4V LDO, decouple to GND with min 4.7µF low ESR MLCC
Pin 12 − tie to VIN, bypass cap to GND
Pin 13 bypass cap to SW, Schottky to INTVcc
Pin 14 top gate
Pin 15 switch node = source of top MOSFET, drain of bottom MOSFET, inductor
Pin 16 power good indicator

Vout(max) = 36V; Vout(typ) = 24V
Iout(max) = 20A; Iout(typ) = 12A
dI(max,soll)% = 15% inductance ripple
dI = Vin/(f*L) * (1 − Vin/Vout)
=> L = 10 µH (+/−10%)

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Sheet: /SMPS-12-36/
File: SMPS-12-36.sch

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KiCad E.D.A. eeschema (5.1.2)-1		Id: 5/5