

MCU\_Env1



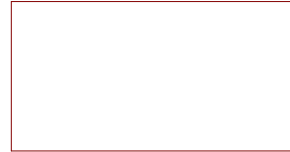
Fichier: untitled.kicad\_sch

Power Leg 1



Fichier: PowerLeg1.kicad\_sch

Power\_mesures\_adaptation



Fichier: Power\_mesures\_adaptation.kicad\_sch

Feeder

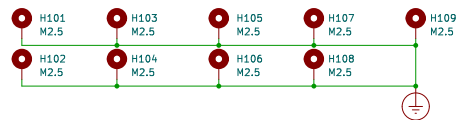


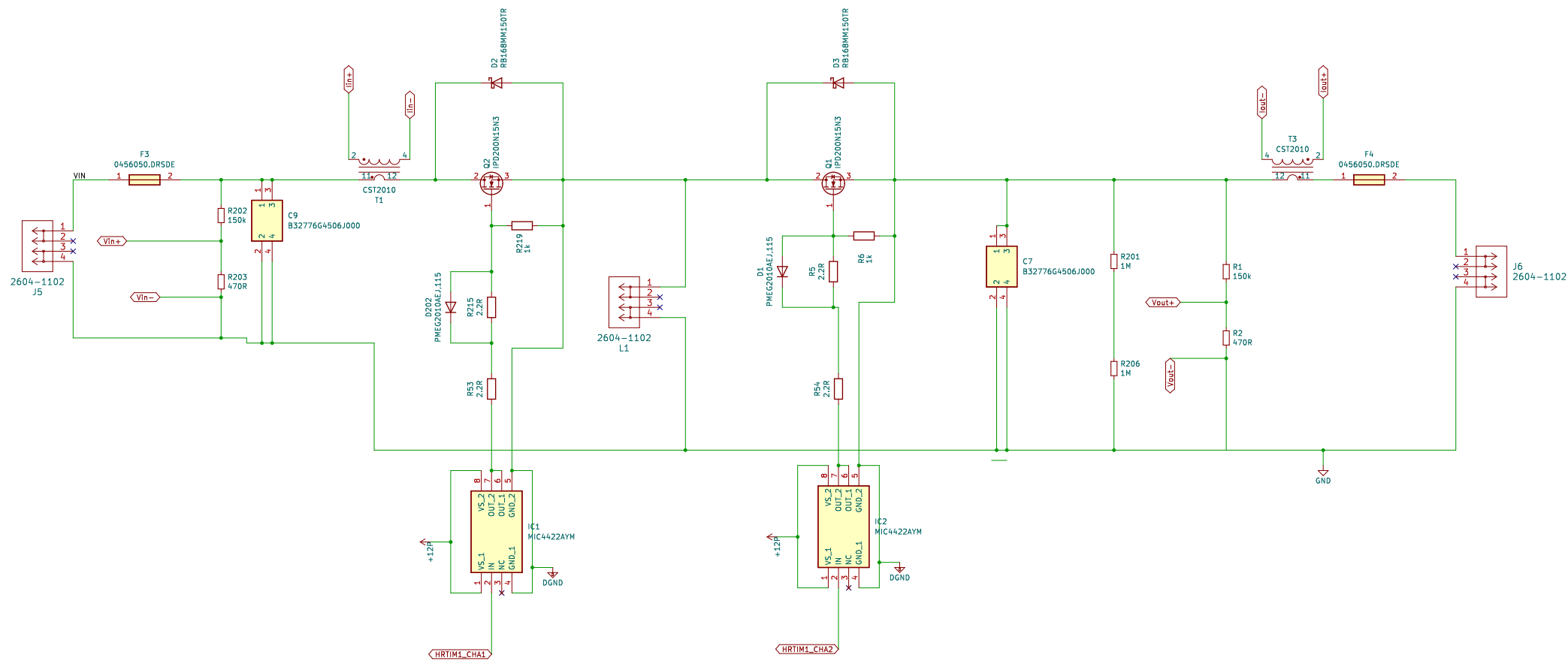
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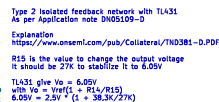
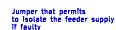
<https://www.falstad.com/circuit/circuitjs.html>

All ceramic capacitor X7R 50V unless specified  
All resistor to be thin film 1/8Watt unless specified

Mechanical housing  
and heatsink holes







This feeder design is based on a Flyback DCM design largely inspired from Application Note DN05109-D

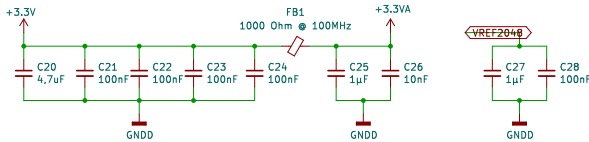
Targeted SPEC:  
 11-110V input  
 6V Output @ 0.5A  
 DCM boundary @ 70% max load



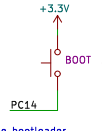
Targeted SPEC:  
11-110V Input  
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Decoupling capacitors chosen as per datasheet 5.16 Power supply scheme fig.16

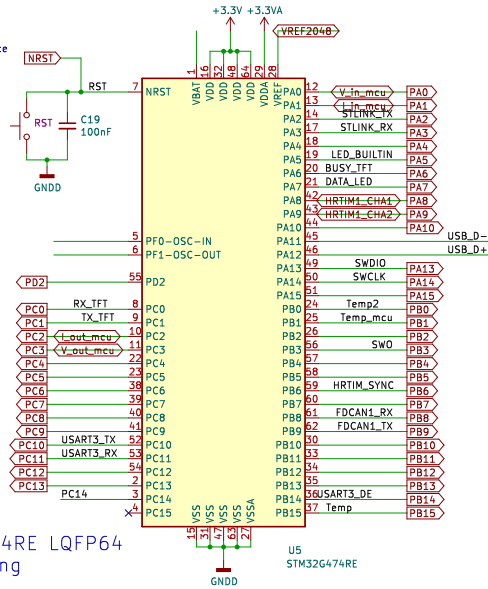


24MHz HSE freq is chosen to match NucleoG474RE design. C3 and C4 are chosen following the rule of thumb :  $C3 = C4 = 2 \times C_{load} + 2 \times C_{stray}$  Where  $C_{stray}$  is the parasitic capacitance Guesstimated at 4pF.



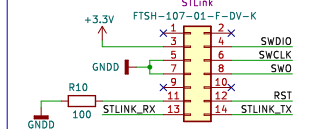
PC14 is chosen as the bootloader physical GPIO as it has no interesting alternate functions.

I2 is tied to PC1 which is ADC1 CH7 or COMP3 INP (in current mode)

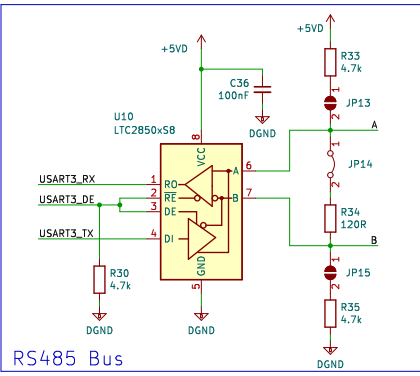
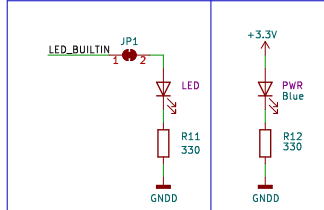


STM32G474RE LQFP64 Pin Mapping

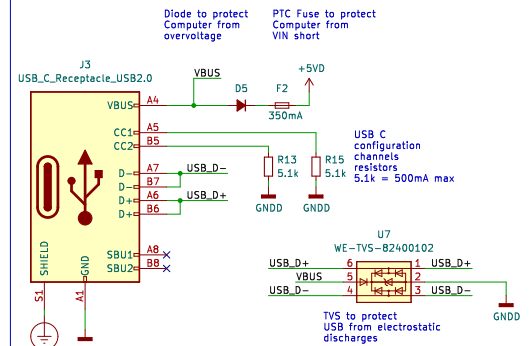
STDC14 / ARM10 connector for debugger connection Compatible with STLINKV3



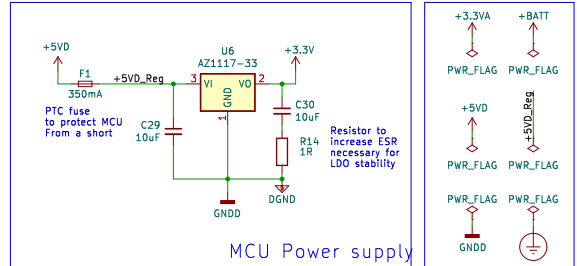
External debug alt ref: 20021121-0001471LF



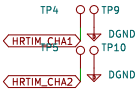
RS485 Bus



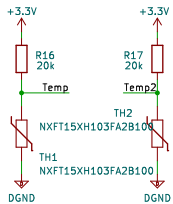
USB and TVS protection



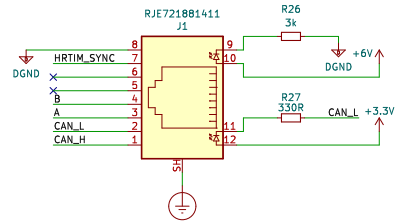
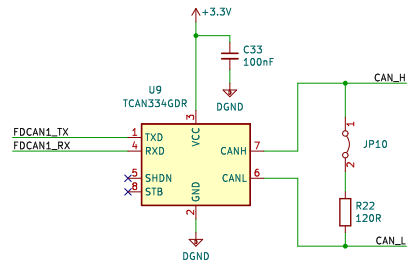
MCU Power supply



Max current flowing 0.12mA  
 $R0 = 10k\Omega$   
 $B = 3450$   
 $R = R0 * \exp(B(1/T - 1/T0))$   
 Temperature sensor is wired to a flexible temp probe attached to the heatsink

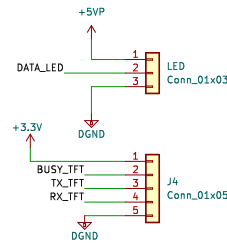


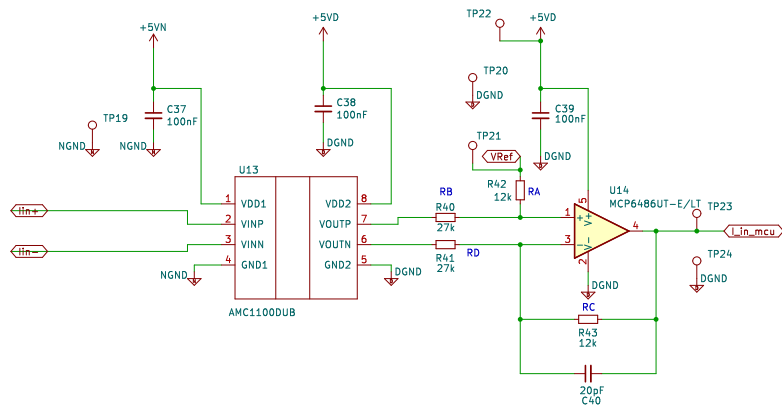
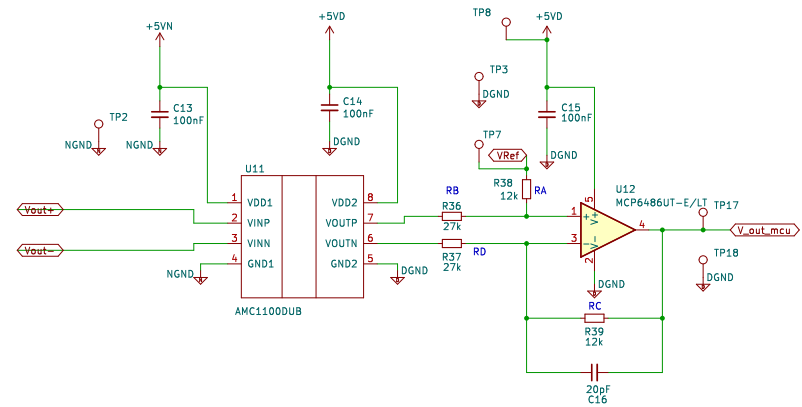
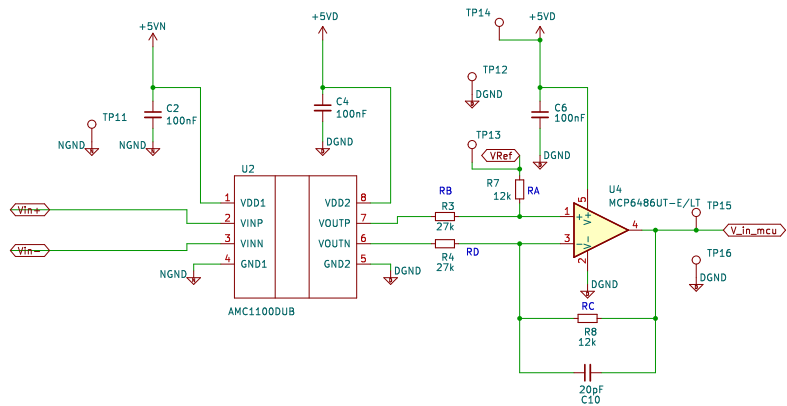
CAN bus



Communication link encompasses  
 - Analog bus  
 - CAN bus  
 - HRTIM sync  
 - RS485 20Mbps bus

Communication RJ45 terminals





#### Low Side Voltage Measurement

Simulation available  
<https://tinyurl.com/2enzfg8c>

Circuit can be seen as non inverting opamp  
 with gain :  $G = 1 + (RC/RD)$  and a potential on non-inverting  
 input equal to Millman's theorem of :  
 $V_+ = ((VOUTP - VOUTN)/RB) + (Vref/RA) / ((1/RB) + (1/RA))$

Measurements are thought for STM32G474RE  
 with either internal reference set to 2.048V (from VREFBUF register) or equivalent external voltage reference.

