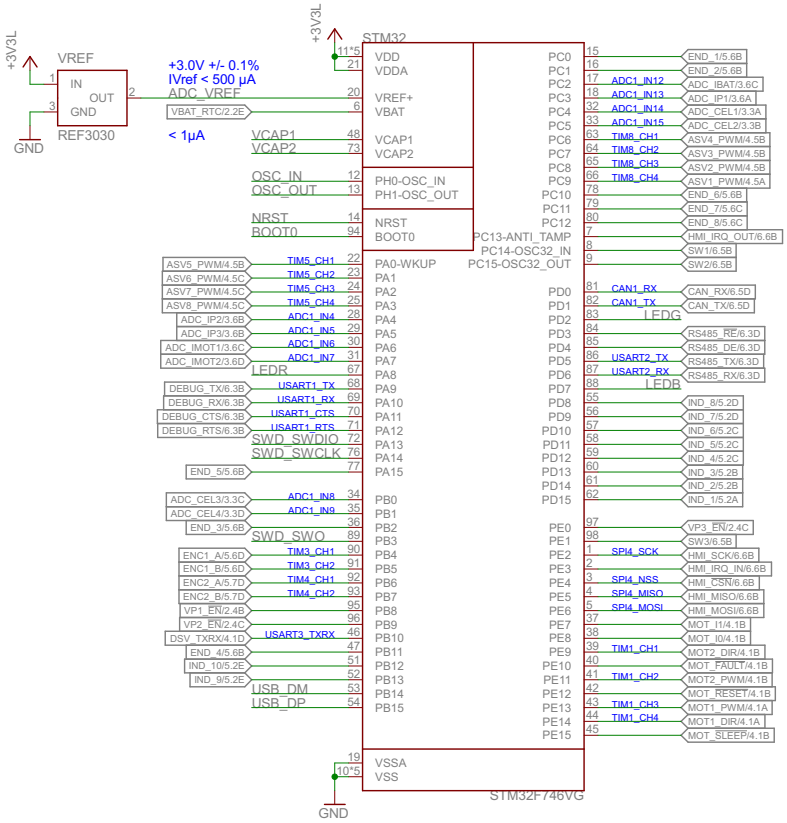
STM32F746 - LQFP100

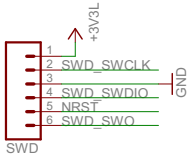
ARM Cortex-M7 MCU @ 216 MHz CPU and FPU

1MB Flash / 320 kB SRAM



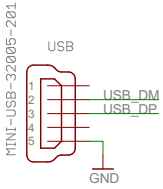
ST-LINK SWD Interface

Programing & Debuging

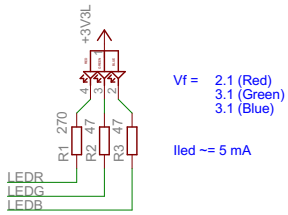


USB

OTG High-Speed, Device mode



Activity / Debug LEDs

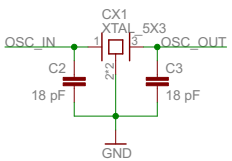


Logos

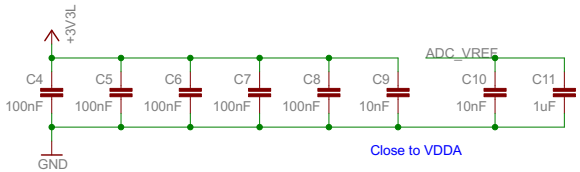
I GREBOT

Layers Indicator

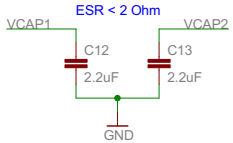
External Crystal Oscillator (30 ppm)



Decoupling capacitors

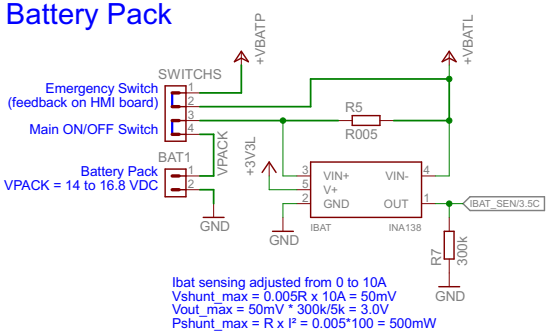


Internal regulator tanks



I GREBOT	
BlueBoard_v1	1/6
Microcontroller	
Paul M.	
28/11/2015 00:17:21	

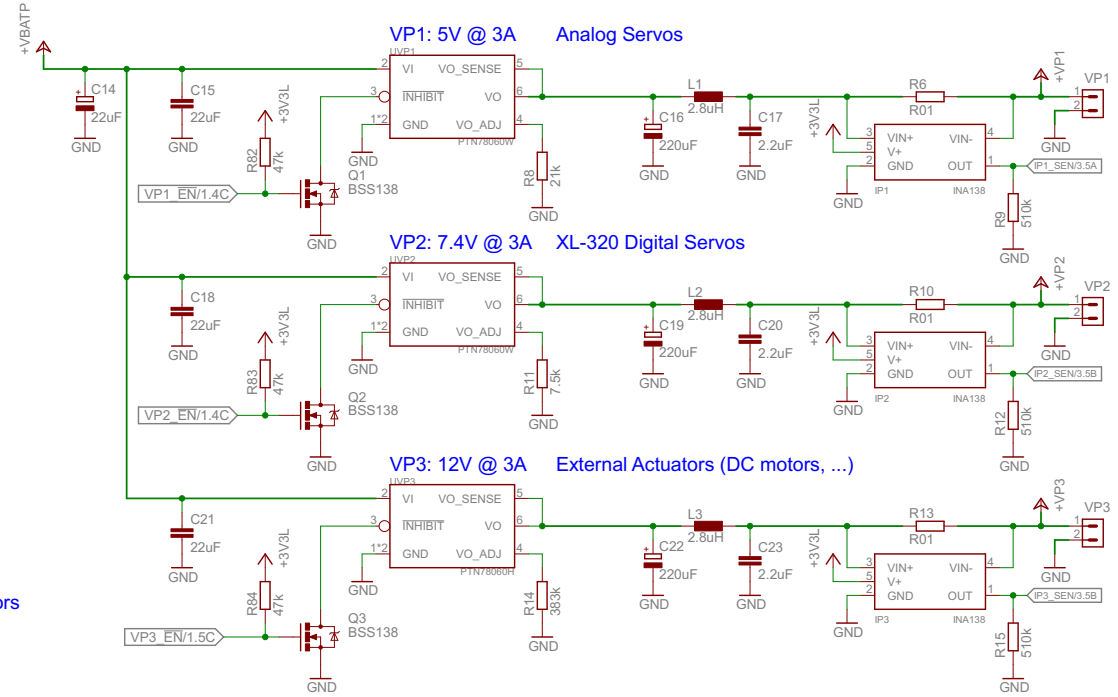
Battery Pack



Ibat sensing adjusted from 0 to 10A
Vshunt_max = 0.005R x 10A = 50mV
Vout_max = 50mV * 300k/5k = 3.0V
Pshunt_max = R x I² = 0.005*100 = 500mW

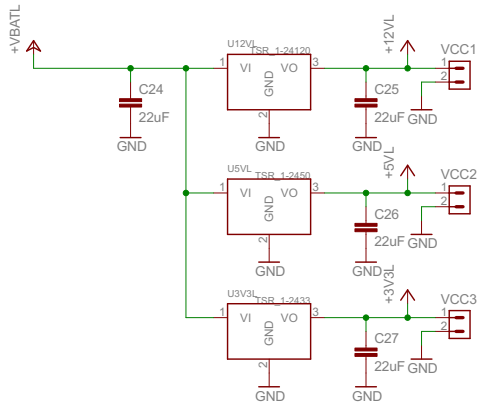
Power domain Power-supplies

High efficiency DC/DC modules, 6A



Logic domain Power-supplies

High efficiency DC/DC modules, 1A
Logic 12V, 5V and 3V3

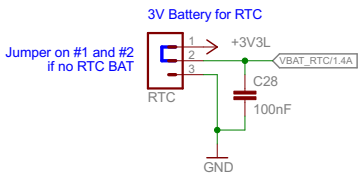


Industrial Sensors

Quadrature Encoders, LEDs

General Purpose

3V Battery for RTC



CR1225:
~ 48 mAh
Life expectancy 5+ years

INA138 Computations:

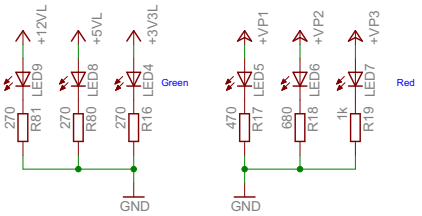
Vshunt = Rshunt x Ishunt

Vout = Vshunt * Rsense / 5000

Vshunt_max = 10mR x 3A = 30mV

Vout_max = 30mV * 500k/5k = 3.0V

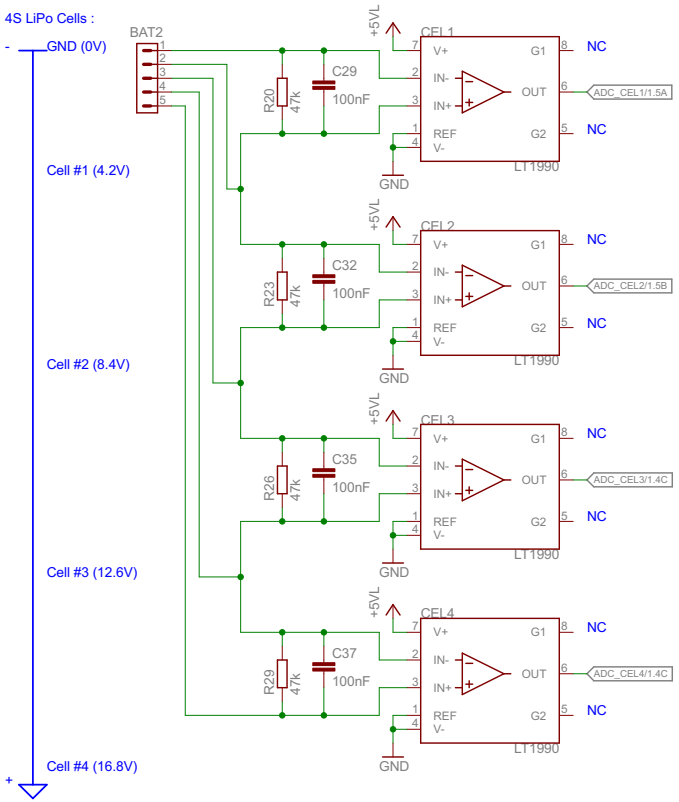
Pshunt_max = Rshunt . Imax² = 90 mW



I GREBOT	
BlueBoard_v1	2/6
Power-Supplies	
Paul M.	
28/11/2015 00:17:21	

4 x Battery cells monitors

Precision difference amplifier with 85V Common-Mode input voltage

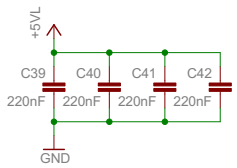


G1, G2 Open => Gain = 1V/V

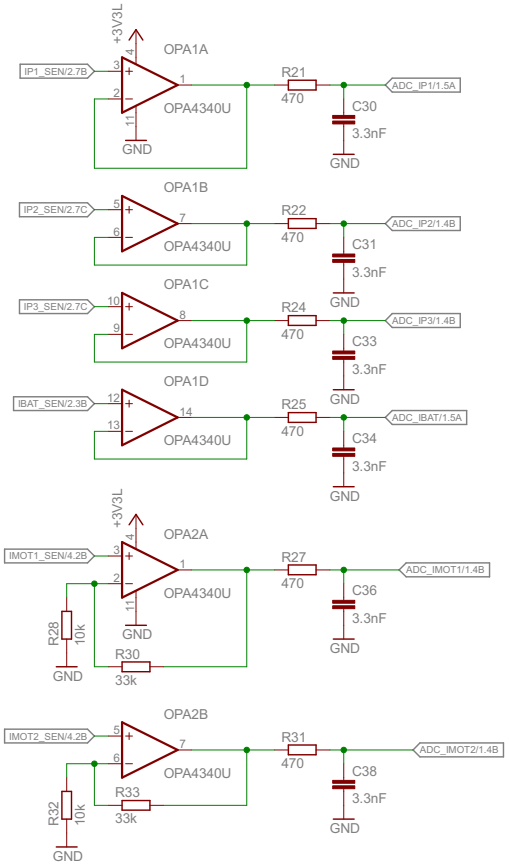
CELx VOUT = [2.7;4.2]V (1 cell LiPo voltage)

CELx_MEAS = 10/(10+3.9) ~= 0.72 x VOUT = [1.94;3.02V]

Decoupling capacitors



6x Unitary / Gain buffers for A/D drive



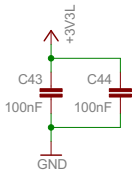
MOTx_SEN trip voltage = [0;685] mV

G = 1 + Rfeedback / Rin- = 1 + 33k/10k = 4.3 V/V

ADC Input = [0;2.95] V

Output Filter: fcut_-3dB = 1/(2 x Pi x 500 x 3.3e-9) ~= 100kHz

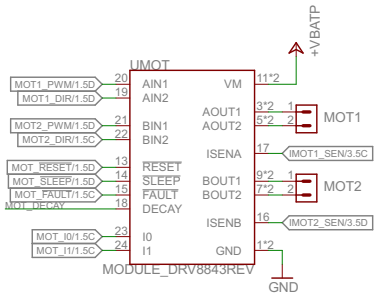
Decoupling capacitors

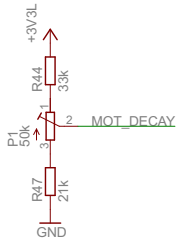


I GREBOT	
BlueBoard_v1	3/6
Monitoring	
Paul M.	
28/11/2015 00:17:21	

2 x Main Motors, 2.5A

Supplied straight from battery (+VP)





Shunt resistors are 2 x 0.50; 1W (stacked)

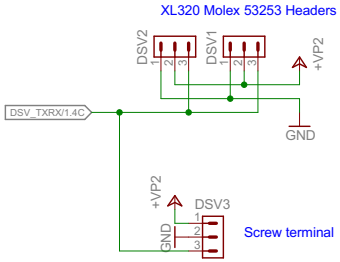
Ichop_max = Vref / (5 x RIsense) = 3.3 / (5 x 0.25) = 2.6A

PRmax = R x I² = 0.25 x 2.6² = 1.6W < 2W

Mixed decay mode :
MOTA_DECAY = 0.7V to 2.2V
MOTA_DECAY < 0.8V => Slow decay mode
MOTA_DECAY > 2.0V => Fast decay mode

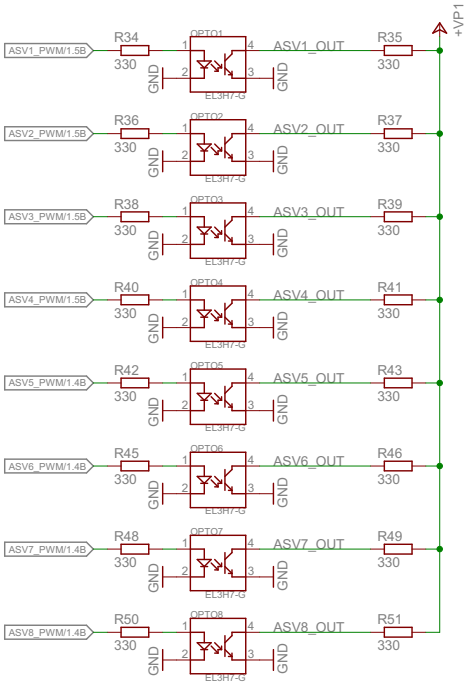
Digital Servos

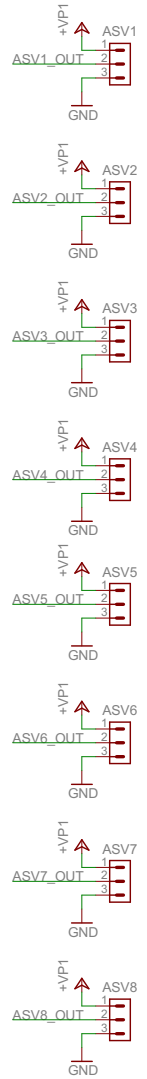
Supplied from +VP2 (7.4V, 6A)



8x Opto-isolated Analog Servos

Supplied from +VP1 (5V, 6A)

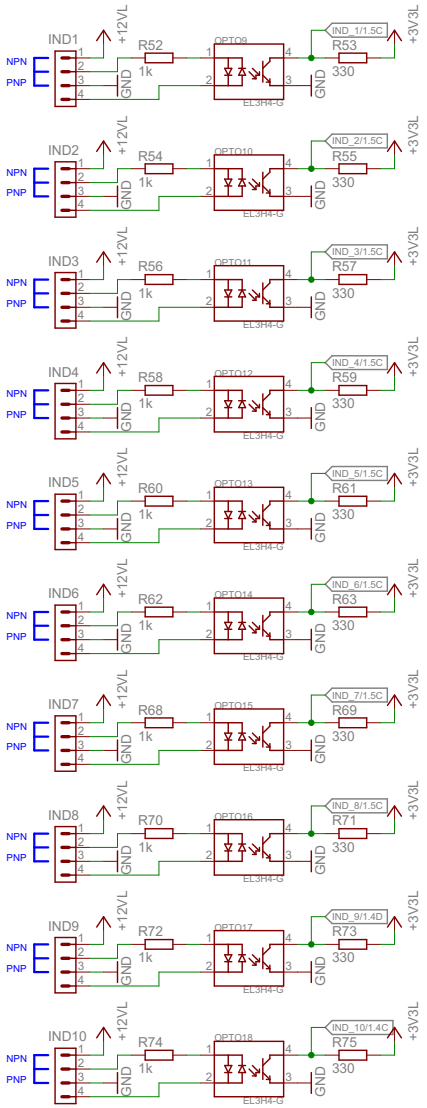




I GREBOT	
BlueBoard_v1	4/6
Actuators	
Paul M.	
28/11/2015 00:17:21	

10 x Opto-Isolated Industrial Sensors

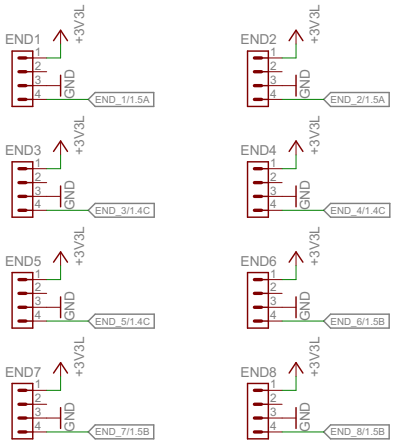
Connect the pin #2 to +12VL (pin #1) or GND (pin #3)
To select between NPN or PNP sensor configuration
Pin #4 is the signal input



8 x Endstops

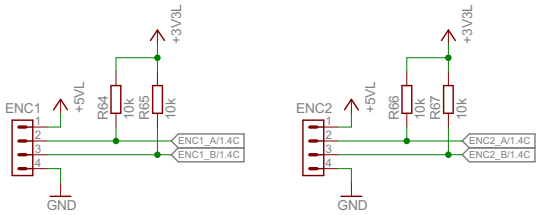
Endstops sensors can also be connected to Industrial Sensors Connectors

Simply use the NPN configuration



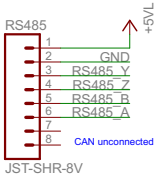
2 x Quadrature Encoders

A & B channels in single, Open-collector



External Sensors Interface

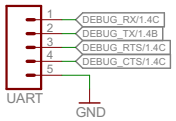
RS485 and CAN Interfaces for external sensor module boards



I GREBOT	
BlueBoard_v1	5/6
Sensors Interfaces	
Paul M.	
28/11/2015 00:17:21	

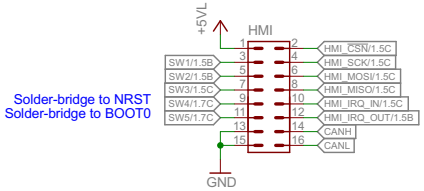
UART Connector

General-Purpose debug



Extension board connector

To be used with HMI or can be used to interface legacy boards

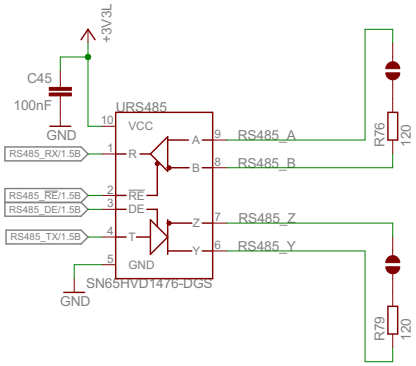


Solder-bridge to NRST
Solder-bridge to BOOT0

All interface signals have 3V3 swing

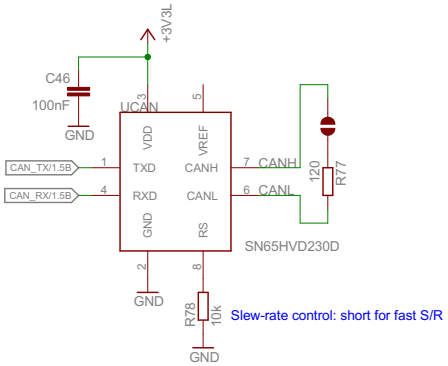
RS485 Interface

Full-duplex Interface



CAN Interface

For Igrebot's legacy boards



Slew-rate control: short for fast S/R

Contact solder-bridges if interface is one of the last CAN/RS485 node on the bus

I GREBOT	
BlueBoard_v1	6/6
Communication	
Paul M.	
28/11/2015 00:17:21	