Notes:

Make sure that the PCB grounds do not touch the inside of the case and isolate the TO-220 voltage regulators from the end panels of the case with silicone insulators and use plastic isolators on the metal screws.

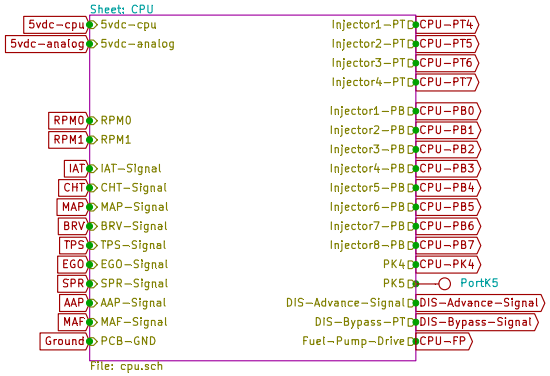
5vdc-cpu = VDD

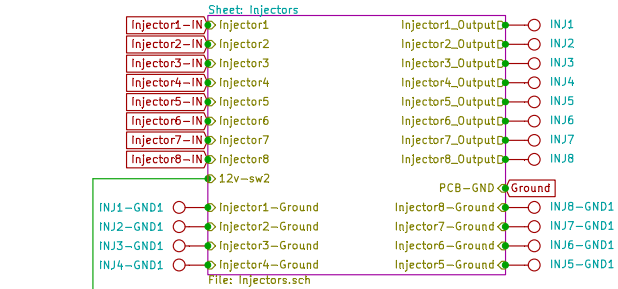
5vdc-analog = VCC

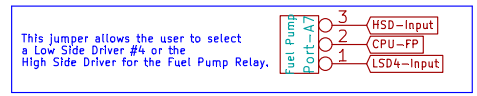
Components that are missing from design changes:

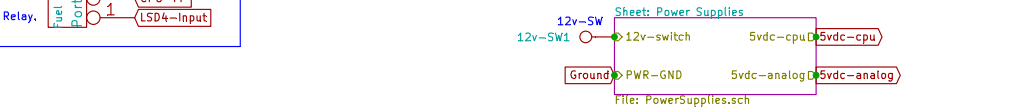
C45, C46, C50, R62, R86, R93, R94, R96, R97, R98, R99

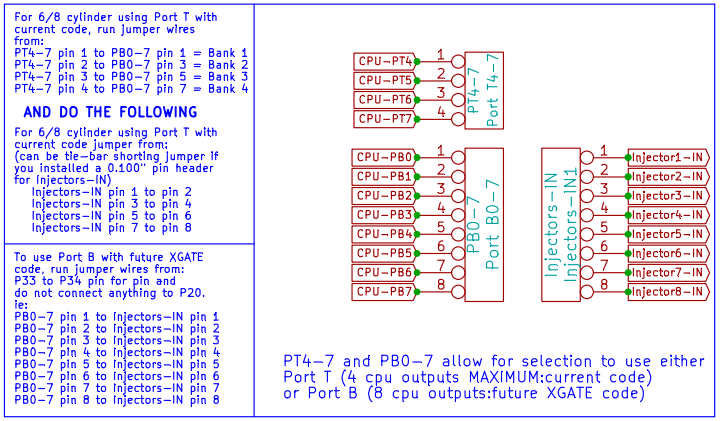
This PCB is intended to be used with either the specified Context Engineering enclosure or retro-fittted into a factory ECU enclosure.

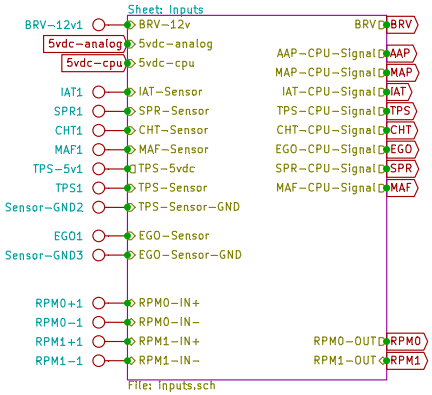




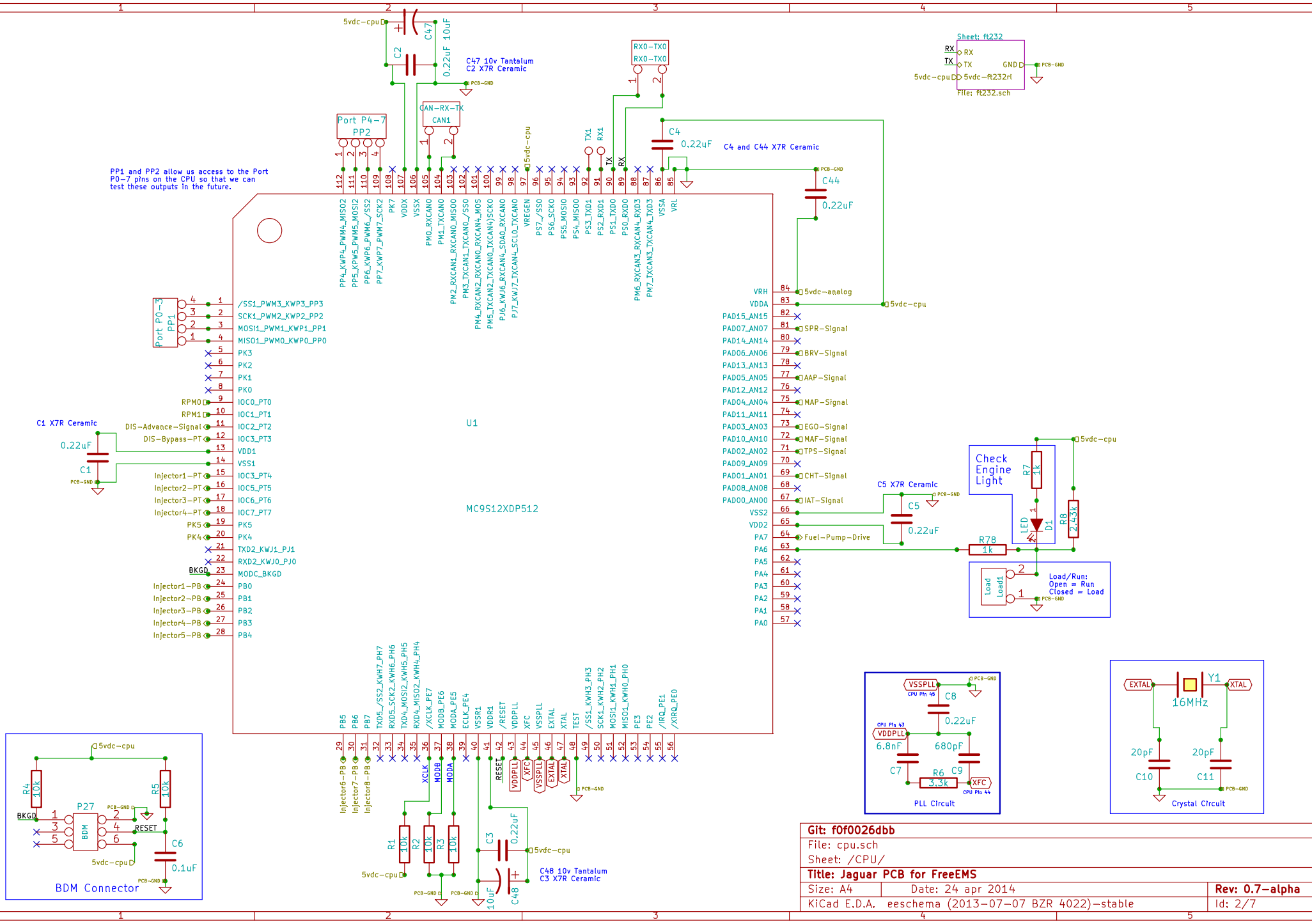


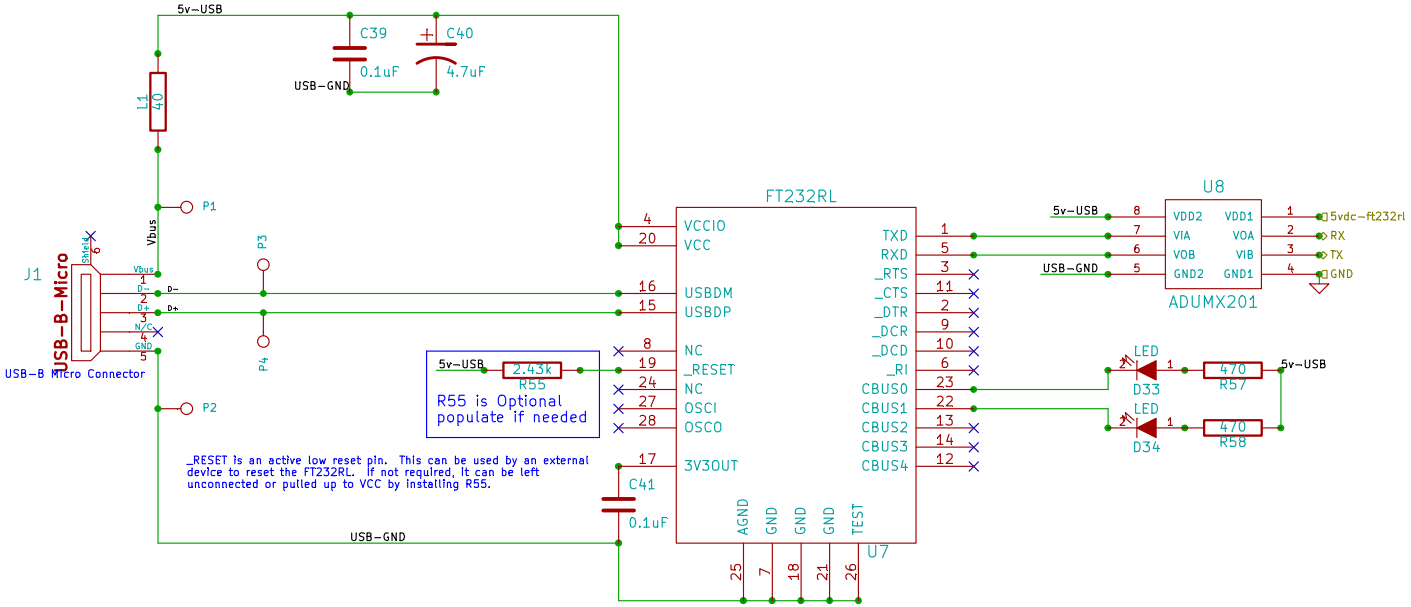






Git: f0f0026dbb		
File: Jaguar.sch		
Sheet: /		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 may 2014	**Rev: 0.7-alpha**
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable		Id: 1/7


U1
MC9S12XDP512
PP1 and PP2 allow us access to the Port P0-7 pins on the CPU so that we can test these outputs in the future.
Port P4-7
PP2
Port P0-3
PP1
CAN-RX-TX
CAN1
C47 10v Tantalum
C2 X7R Ceramic
C4 and C44 X7R Ceramic
C1 X7R Ceramic
C5 X7R Ceramic
C48 10v Tantalum
C3 X7R Ceramic
Sheet: ft232
File: ft232.sch
Check Engine Light
Load/Run:
Open = Run
Closed = Load
PLL Circuit
Crystal Circuit
BDM Connector
Git: f0f0026dbb
File: cpu.sch
Sheet: /CPU/
Title: Jaguar PCB for FreeEMS
Size: A4
Date: 24 apr 2014
Rev: 0.7-alpha
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable
Id: 2/7



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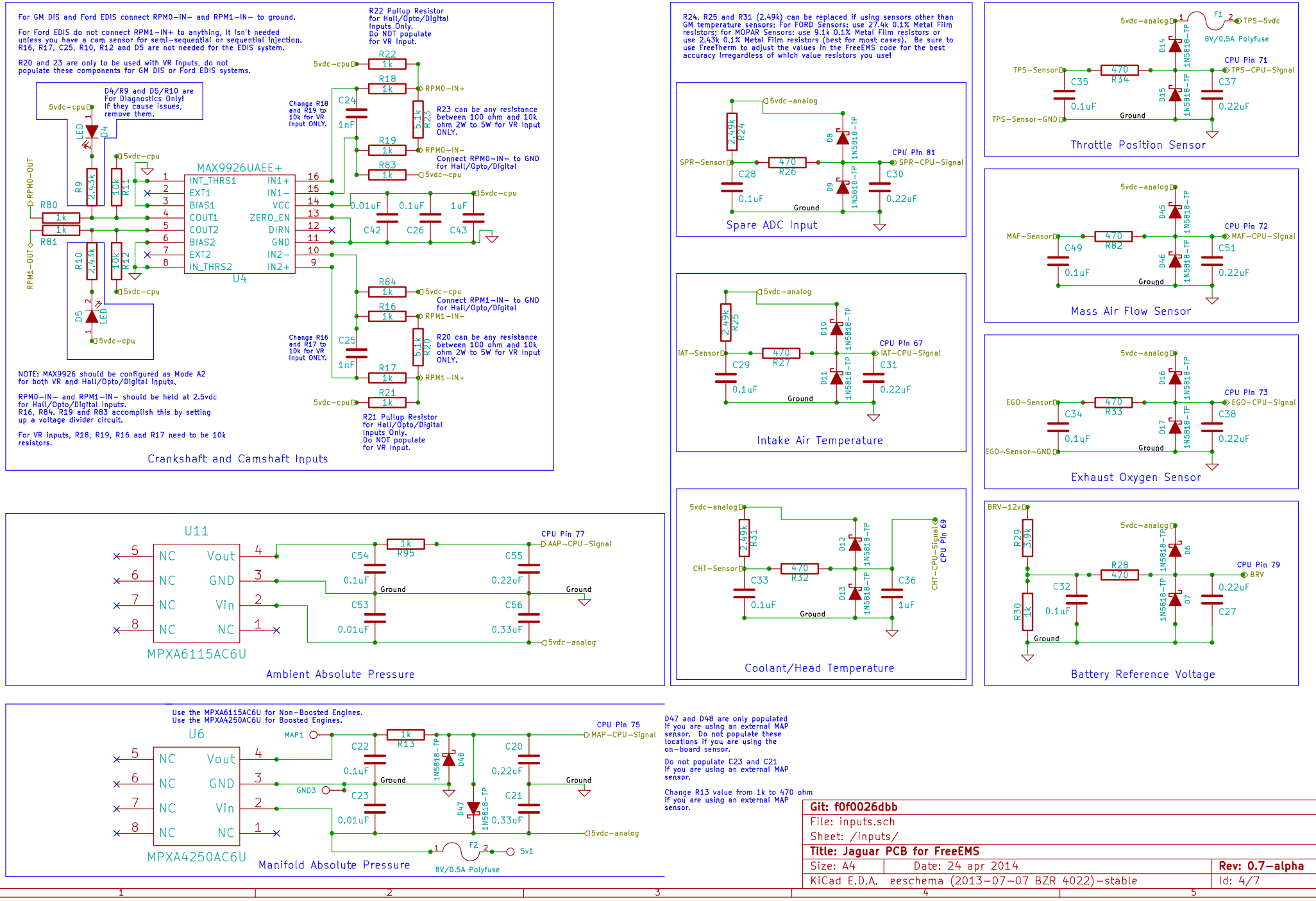
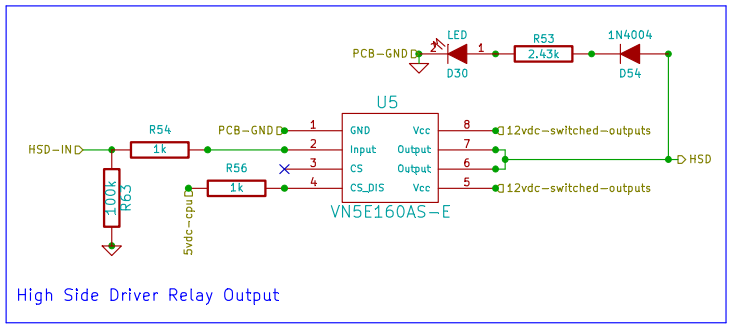
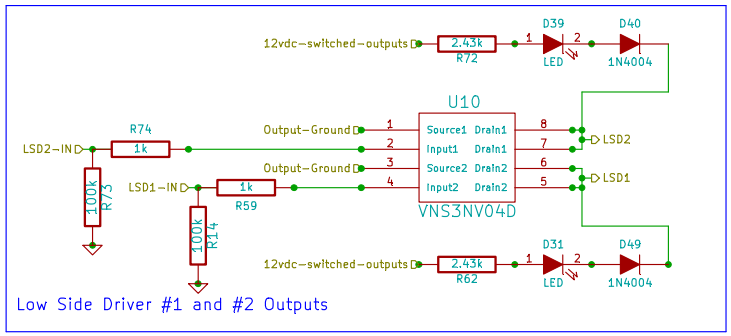
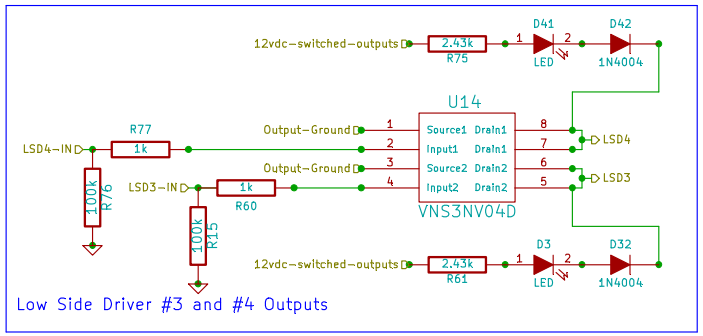
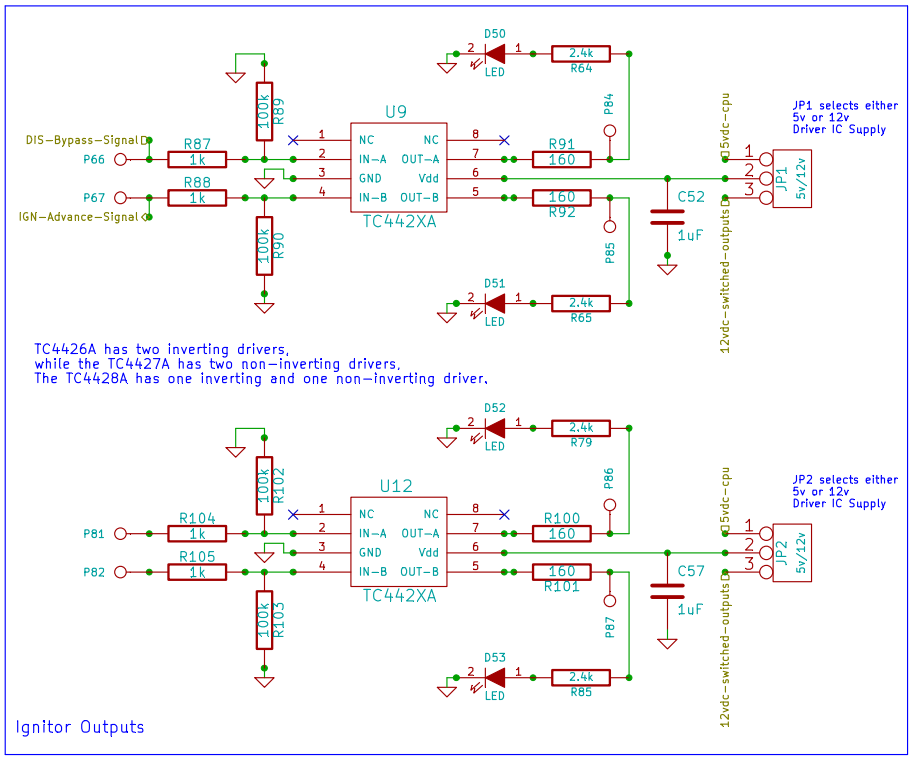
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 apr 2014	**Rev: 0.7-alpha**
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable		Id: 3/7


For GM DIS and Ford EDIS connect RPM0-IN- and RPM1-IN- to ground.
For Ford EDIS do not connect RPM1-IN+ to anything, it isn't needed unless you have a cam sensor for semi-sequential or sequential injection. R16, R17, C25, R10, R12 and D5 are not needed for the EDIS system.
R20 and 23 are only to be used with VR inputs, do not populate these components for GM DIS or Ford EDIS systems.
D4/R9 and D5/R10 are For Diagnostics Only! If they cause issues, remove them.
R22 Pullup Resistor for Hall/Opto/Digital Inputs Only. Do NOT populate for VR input.
Change R18 and R19 to 10k for VR input ONLY.
R23 can be any resistance between 100 ohm and 10k ohm 2W to 5W for VR input ONLY.
Connect RPM0-IN- to GND for Hall/Opto/Digital
Connect RPM1-IN- to GND for Hall/Opto/Digital
Change R16 and R17 to 10k for VR input ONLY.
R20 can be any resistance between 100 ohm and 10k ohm 2W to 5W for VR input ONLY.
R21 Pullup Resistor for Hall/Opto/Digital Inputs Only. Do NOT populate for VR input.
NOTE: MAX9926 should be configured as Mode A2 for both VR and Hall/Opto/Digital inputs.
RPM0-IN- and RPM1-IN- should be held at 2.5vdc for Hall/Opto/Digital inputs. R16, R84, R19 and R83 accomplish this by setting up a voltage divider circuit.
For VR inputs, R18, R19, R16 and R17 need to be 10k resistors.
MAX9926UAEE+
INT_THRS1
EXT1
BIAS1
COUT1
COUT2
BIAS2
EXT2
IN_THRS2
IN1+
IN1-
VCC
ZERO_EN
DIRN
GND
IN2-
IN2+
U4
Crankshaft and Camshaft Inputs
R24, R25 and R31 (2.49k) can be replaced if using sensors other than GM temperature sensors; For FORD Sensors: use 27.4k 0.1% Metal Film resistors; for MOPAR Sensors: use 9.1k 0.1% Metal Film resistors or use 2.43k 0.1% Metal Film resistors (best for most cases). Be sure to use FreeTherm to adjust the values in the FreeEMS code for the best accuracy irregardless of which value resistors you use!
Spare ADC Input
Intake Air Temperature
Coolant/Head Temperature
Throttle Position Sensor
Mass Air Flow Sensor
Exhaust Oxygen Sensor
Battery Reference Voltage
U11
MPXA6115AC6U
Ambient Absolute Pressure
Use the MPXA6115AC6U for Non-Boosted Engines.
Use the MPXA4250AC6U for Boosted Engines.
U6
MPXA4250AC6U
Manifold Absolute Pressure
8V/0.5A Polyfuse
D47 and D48 are only populated if you are using an external MAP sensor. Do not populate these locations if you are using the on-board sensor.
Do not populate C23 and C21 if you are using an external MAP sensor.
Change R13 value from 1k to 470 ohm if you are using an external MAP sensor.
Git: f0f0026dbb
File: inputs.sch
Sheet: /Inputs/
Title: Jaguar PCB for FreeEMS
Size: A4
Date: 24 apr 2014
Rev: 0.7-alpha
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable
Id: 4/7

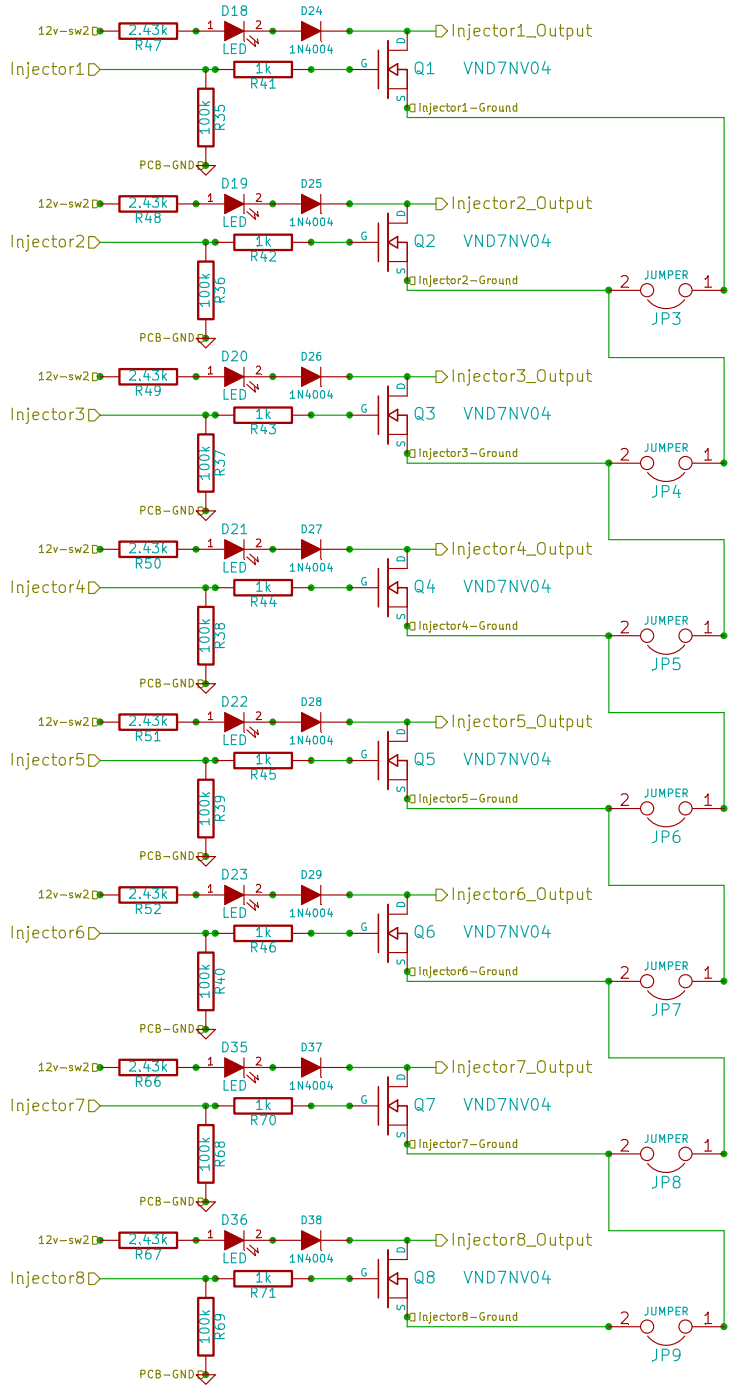








Git: f0f0026dbb		
File: Outputs.sch		
Sheet: /Outputs/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 may 2014	**Rev: 0.7-alpha**
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable		Id: 5/7



Git: f0f0026dbb		
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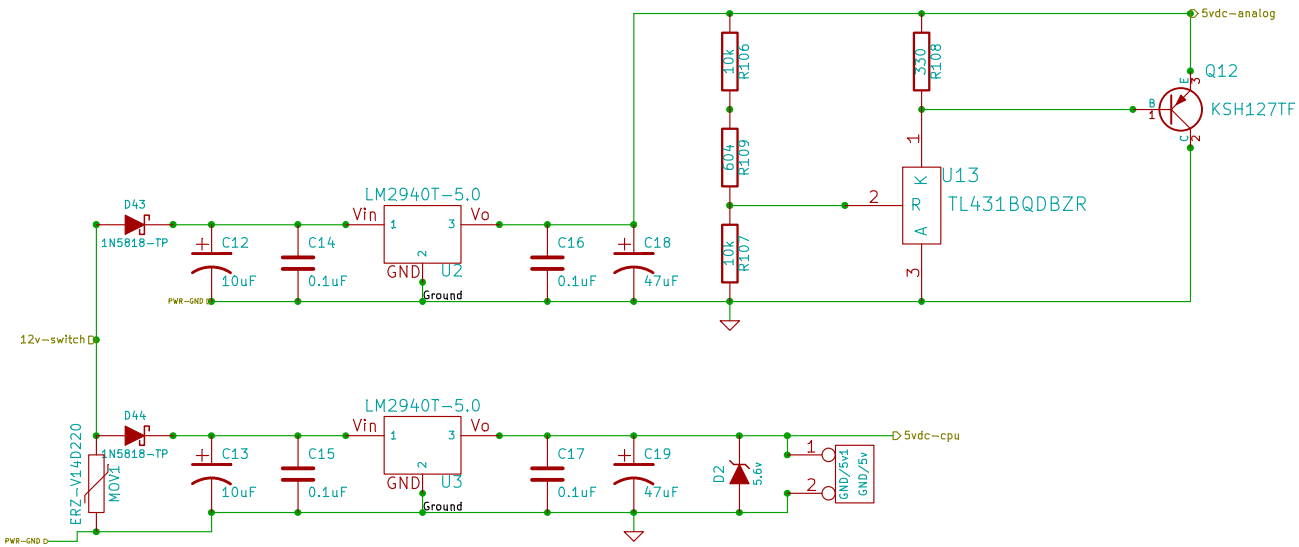
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 25 may 2014	**Rev: 0.7-alpha**
KiCad E.D.A.	eeschema (2013-07-07 BZR 4022)-stable	Id: 6/7



C14, C15, C16 and C17 are 50v X7R Ceramic capacitors.

C12 and C13 are 35v Tantalum capacitors.
C18 and C19 are 10v Tantalum capacitors.

Git: f0f0026dbb		
File: PowerSupplies.sch		
Sheet: /Power Supplies/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 apr 2014	**Rev: 0.7-alpha**
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable		Id: 7/7