Notes:

Jumpers labeled JP5 and JP6 are crossover wires,nothing more. This was done to ease single sided PCB Prototype testing.

J2 is the TE Connectivity Automotive Grade water resistant connector. The 35 positions will allow for modifications to the board for additional inputs/outputs as this design only uses 27 positions. My samples to test have arrived, http://www.te.com Part #'s:

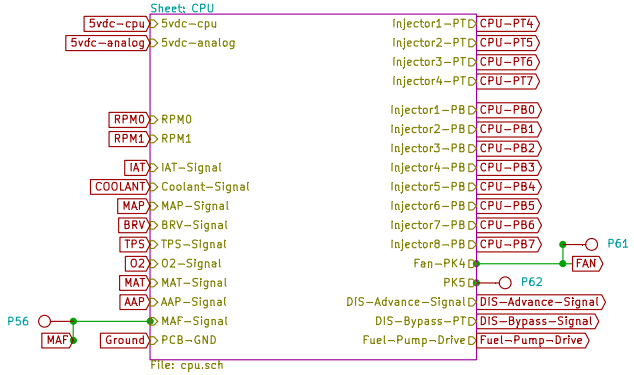
1-776163-2 Right Angle 35 Position Header (Natural Color)
OR
1-776231-2 Vertical 35 Position Header (Natural Color)
1-776231-2 Vertical 35 Position Header (Natural Color)
776164-2 35 Position AMP SEAL Plug Assembly (Natural Color)

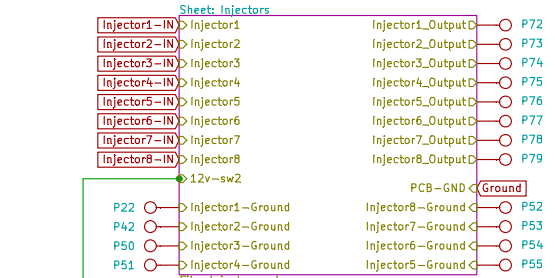
Make sure that the PCB grounds do not touch the inside of the case and isolate the TO-220 voltage regulators from the end panels of the case with mica insulators and use plastic screws.

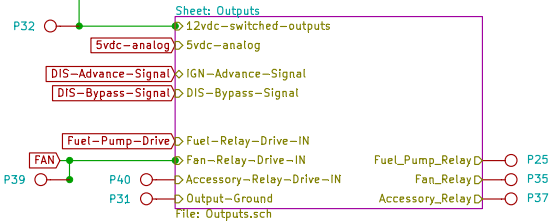
5vdc-cpu = VDD

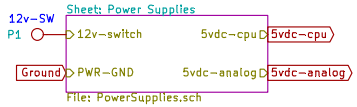
5vdc-analog = VCC

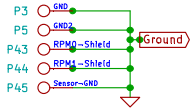
INJ-GND and INJ-GND2 are isolated to only be used by the Injector FETs









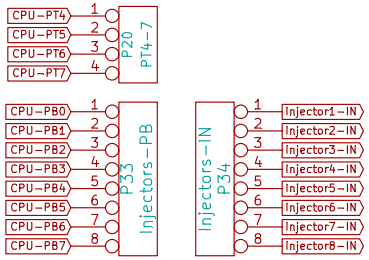


For 6/8 cylinder using Port T with current code, run jumper wires from:
P20 pin 1 to P34 pin 1 = Bank 1
P20 pin 2 to P34 pin 3 = Bank 2
P20 pin 3 to P34 pin 5 = Bank 3
P20 pin 4 to P34 pin 7 = Bank 4

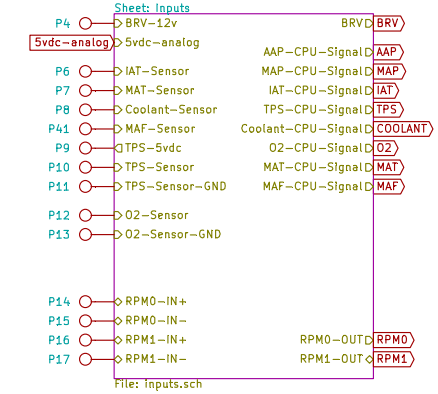
AND DO THE FOLLOWING

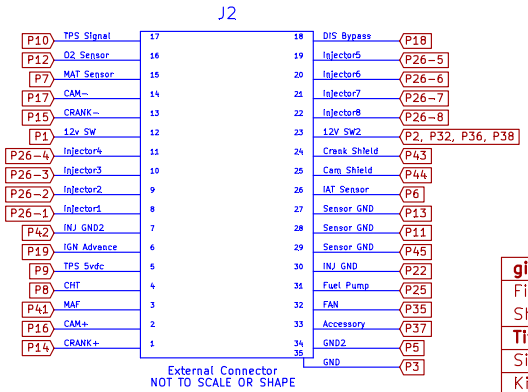
For 6/8 cylinder using Port T with current code jumper from: (can be tie-bar shorting jumper if you installed a 0.100" pin header for P34)
P34 pin 1 to P34 pin 2
P34 pin 3 to P34 pin 4
P34 pin 5 to P34 pin 6
P34 pin 7 to P34 pin 8

To use Port B with future XGATE code, run jumper wires from:
P33 to P34 pin for pin and do not connect anything to P20.
ie:
P33 pin 1 to P34 pin 1
P33 pin 2 to P34 pin 2
P33 pin 3 to P34 pin 3
P33 pin 4 to P34 pin 4
P33 pin 5 to P34 pin 5
P33 pin 6 to P34 pin 6
P33 pin 7 to P34 pin 7
P33 pin 8 to P34 pin 8

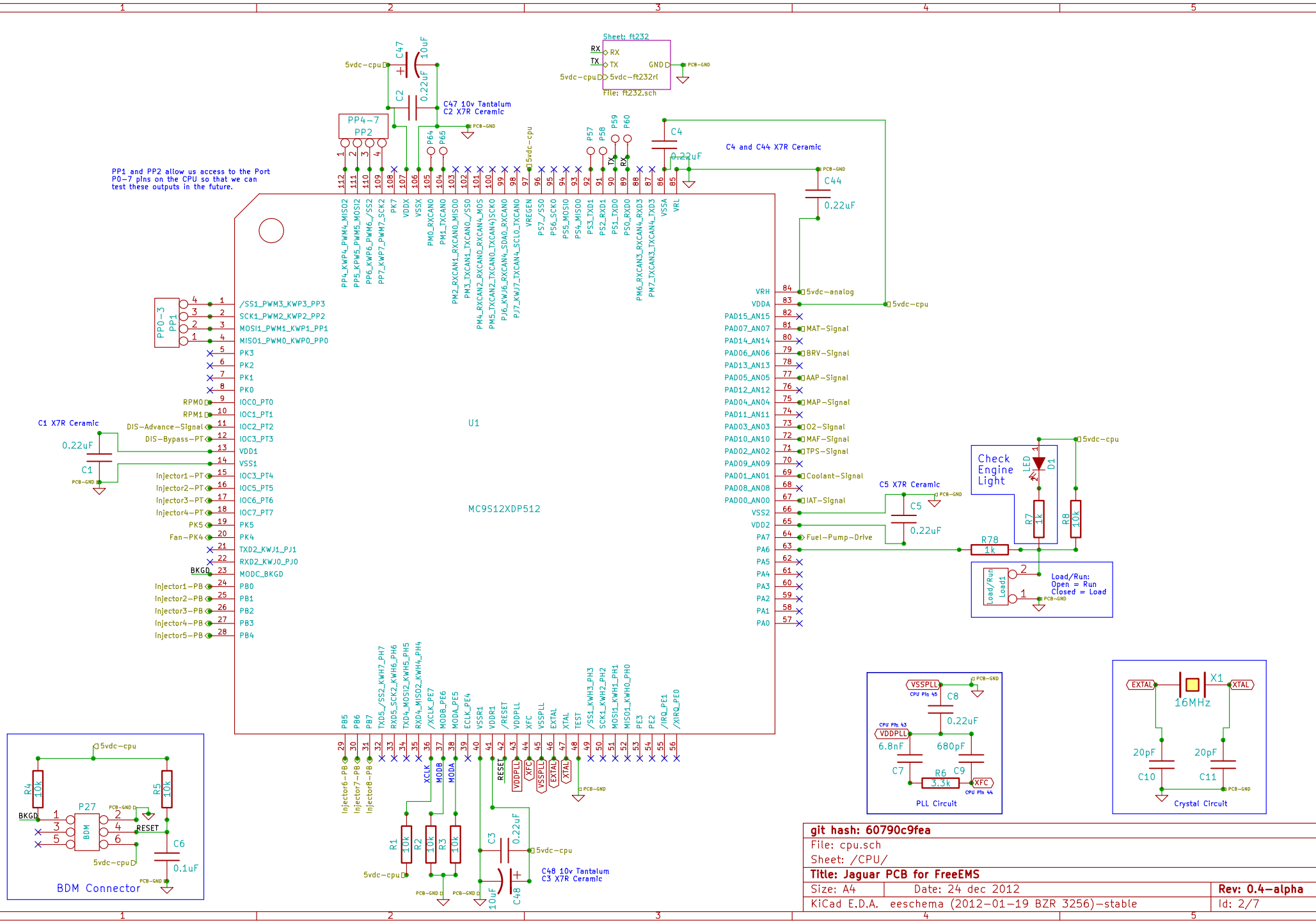


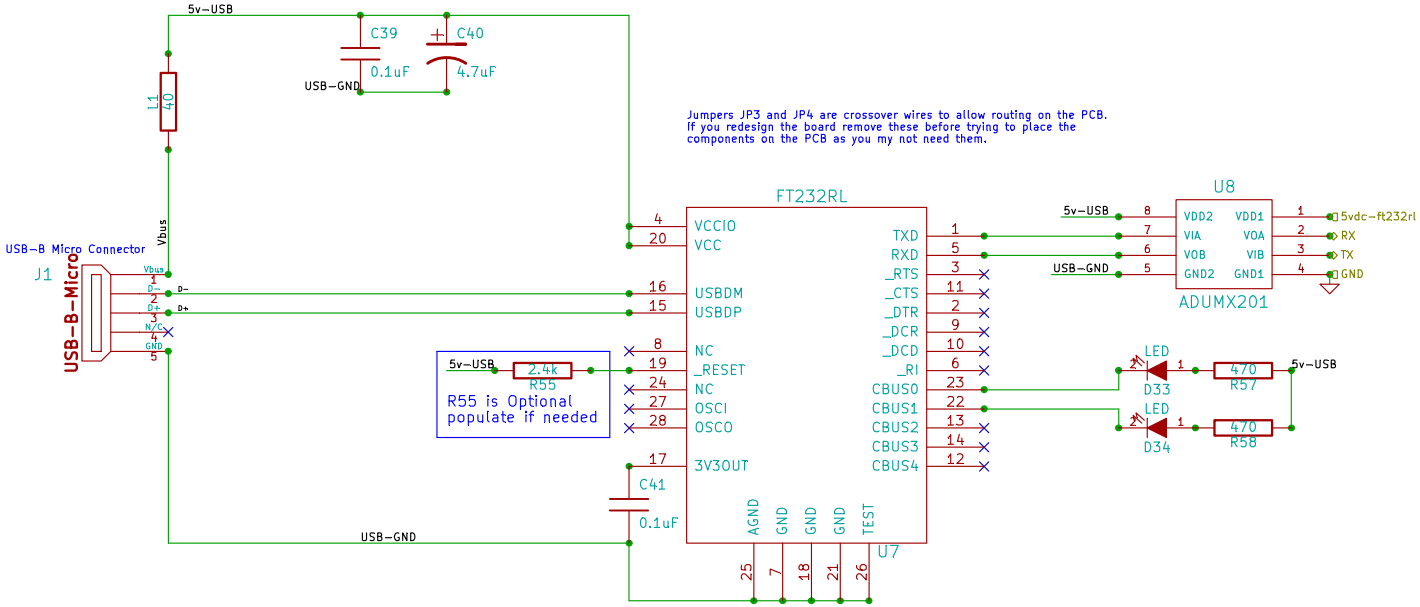
P20 and P34 allow for selection to use either Port T (4 cpu outputs MAXIMUM:current code) or Port B (8 cpu outputs:future XGATE code)



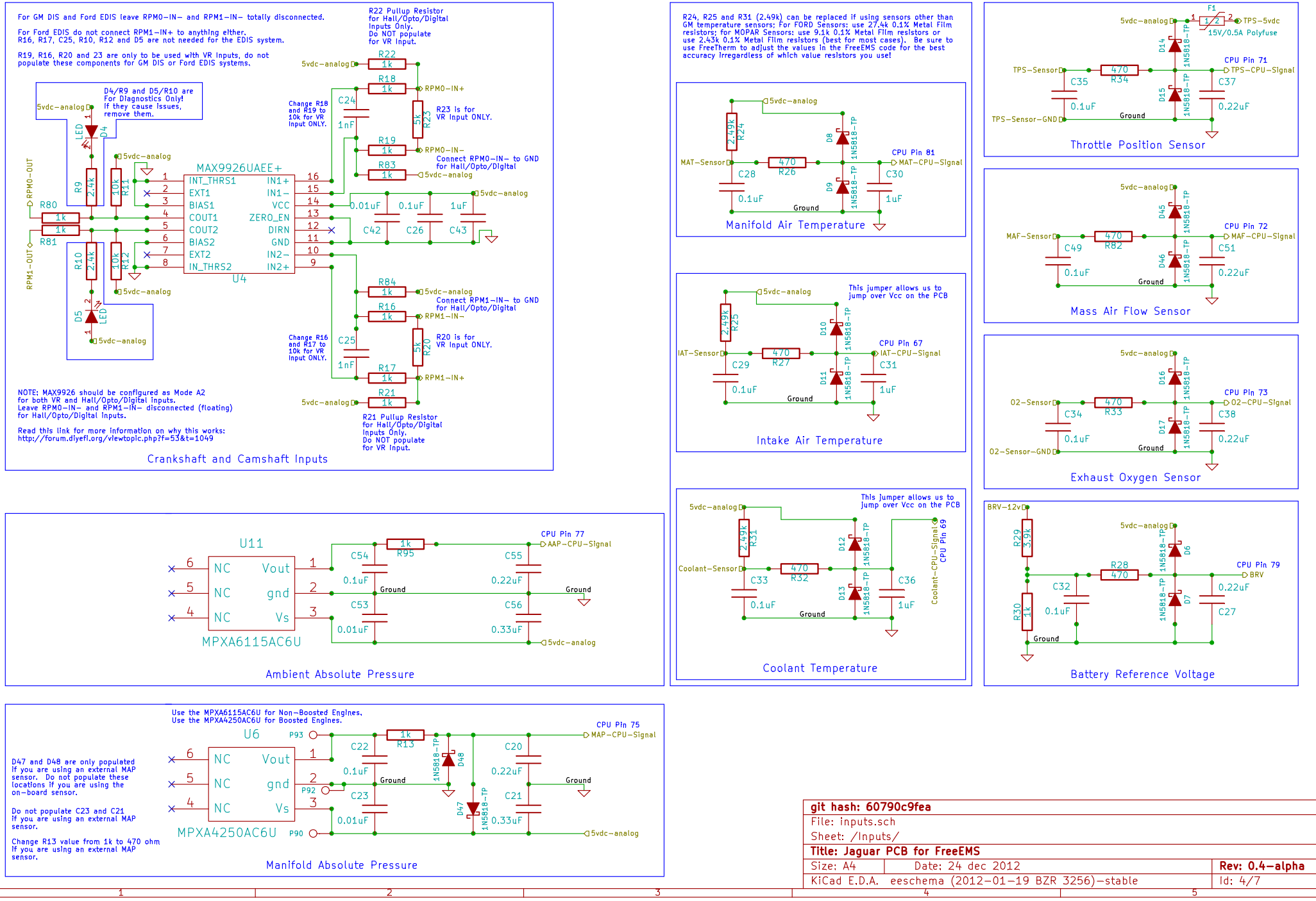


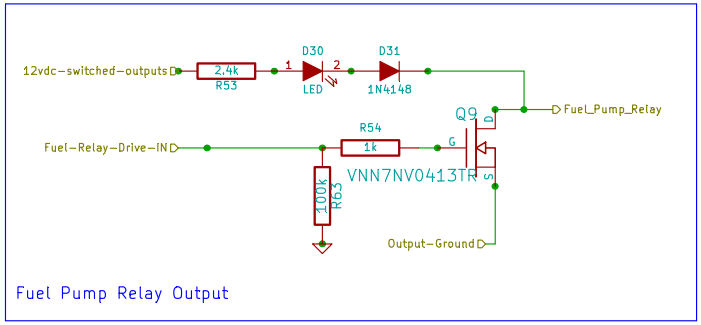
git hash: 60790c9fea		
File: Jaguar.sch		
Sheet: /		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 dec 2012	**Rev: 0.4-alpha**
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 1/7


Sheet: ft232
RX
TX
GND
5vdc-ft232rl
File: ft232.sch
5vdc-cpu
PCB-GND
C47
10uF
C2
0.22uF
C47 10v Tantalum
C2 X7R Ceramic
PP4-7
PP2
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.
C4
0.22uF
C4 and C44 X7R Ceramic
C44
0.22uF
U1
MC9S12XDP512
PP0-3
PP1
/SS1_PWM3_KWP3_PP3
SCK1_PWM2_KWP2_PP2
MOSI1_PWM1_KWP1_PP1
MISO1_PWM0_KWP0_PP0
C1 X7R Ceramic
C1
0.22uF
DIS-Advance-Signal
DIS-Bypass-PT
Injector1-PT
Injector2-PT
Injector3-PT
Injector4-PT
Fan-PK4
BKGD
Injector1-PB
Injector2-PB
Injector3-PB
Injector4-PB
Injector5-PB
5vdc-analog
MAT-Signal
BRV-Signal
AAP-Signal
MAP-Signal
Coolant-Signal
IAT-Signal
O2-Signal
MAF-Signal
TPS-Signal
Fuel-Pump-Drive
C5 X7R Ceramic
C5
0.22uF
Check Engine Light
LED
D1
R7
1k
R8
10k
R78
1k
Load/Run
Load1
Load/Run:
Open = Run
Closed = Load
BDM Connector
P27
BDM
RESET
R4
10k
R5
10k
C6
0.1uF
R1
10k
R2
10k
R3
10k
C3
0.22uF
C48 10v Tantalum
C3 X7R Ceramic
C48
10uF
PLL Circuit
VSSPLL
VDDPLL
C8
0.22uF
6.8nF
680pF
C7
R6
3.3k
C9
XFC
Crystal Circuit
X1
16MHz
EXTAL
XTAL
20pF
C10
20pF
C11
git hash: 60790c9fea
File: cpu.sch
Sheet: /CPU/
Title: Jaguar PCB for FreeEMS
Size: A4
Date: 24 dec 2012
Rev: 0.4-alpha
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable
Id: 2/7

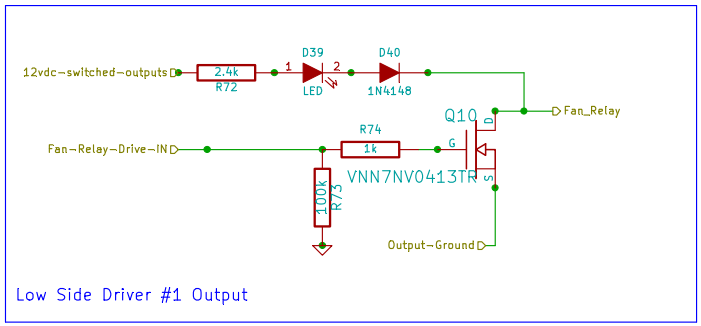


git hash: 60790c9fea		
File: ft232.sch		
Sheet: /CPU/ft232/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 dec 2012	**Rev: 0.4-alpha**
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 3/7

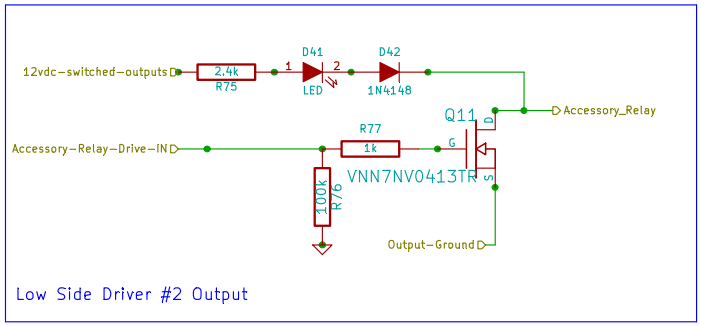

For GM DIS and Ford EDIS leave RPM0-IN- and RPM1-IN- totally disconnected.
For Ford EDIS do not connect RPM1-IN+ to anything either.
R16, R17, C25, R10, R12 and D5 are not needed for the EDIS system.
R19, R16, R20 and 23 are only to be used with VR inputs, do not populate these components for GM DIS or Ford EDIS systems.
R22 Pullup Resistor for Hall/Opto/Digital Inputs Only. Do NOT populate for VR input.
D4/R9 and D5/R10 are For Diagnostics Only! If they cause issues, remove them.
Change R18 and R19 to 10k for VR input ONLY.
R23 is for VR Input ONLY.
Connect RPM0-IN- to GND for Hall/Opto/Digital
Change R16 and R17 to 10k for VR input ONLY.
Connect RPM1-IN- to GND for Hall/Opto/Digital
R20 is for VR Input ONLY.
R21 Pullup Resistor for Hall/Opto/Digital Inputs Only. Do NOT populate for VR input.
MAX9926UAEE+
INT_THRS1
EXT1
BIAS1
COUT1
COUT2
BIAS2
EXT2
IN_THRS2
IN1+
IN1-
VCC
ZERO_EN
DIRN
GND
IN2-
IN2+
U4
NOTE: MAX9926 should be configured as Mode A2 for both VR and Hall/Opto/Digital inputs. Leave RPM0-IN- and RPM1-IN- disconnected (floating) for Hall/Opto/Digital inputs.
Read this link for more information on why this works: http://forum.diyefi.org/viewtopic.php?f=53&t=1049
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!
Manifold Air Temperature
Intake Air Temperature
This jumper allows us to jump over Vcc on the PCB
Coolant Temperature
Throttle Position Sensor
Mass Air Flow Sensor
Exhaust Oxygen Sensor
Battery Reference Voltage
MPXA6115AC6U
Ambient Absolute Pressure
Use the MPXA6115AC6U for Non-Boosted Engines.
Use the MPXA4250AC6U for Boosted Engines.
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.
MPXA4250AC6U
Manifold Absolute Pressure
git hash: 60790c9fea
File: inputs.sch
Sheet: /Inputs/
Title: Jaguar PCB for FreeEMS
Size: A4
Date: 24 dec 2012
Rev: 0.4-alpha
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable
Id: 4/7



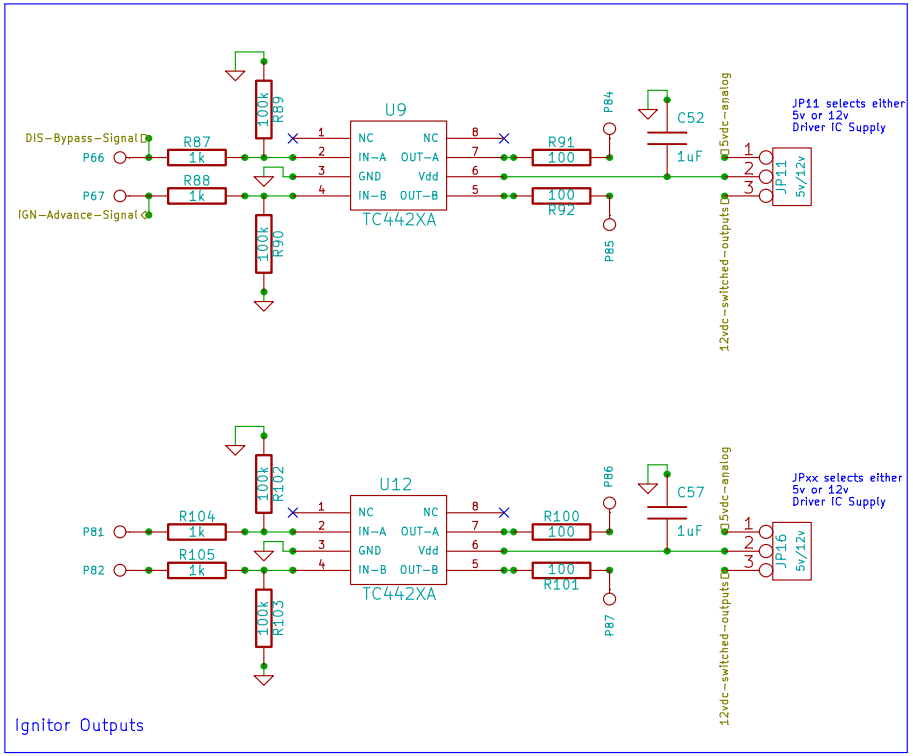
Fuel Pump Relay Output



Low Side Driver #1 Output

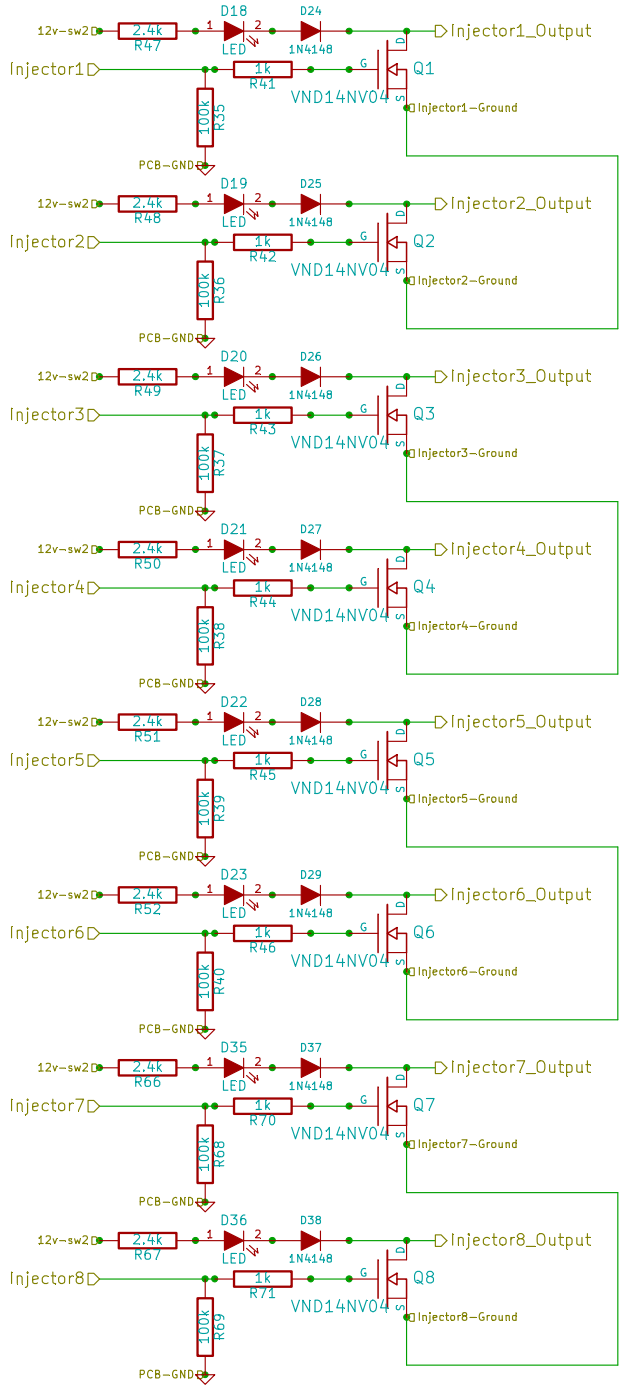


Low Side Driver #2 Output



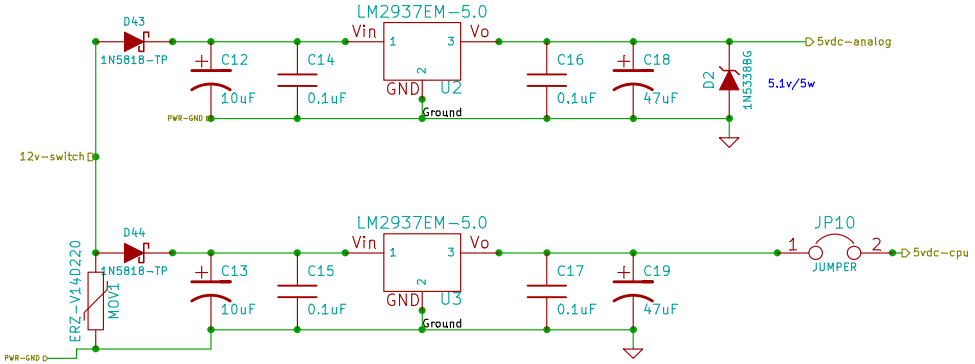
Ignitor Outputs

git hash: 60790c9fea		
File: Outputs.sch		
Sheet: /Outputs/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 dec 2012	**Rev: 0.4-alpha**
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 5/7



git hash: 60790c9fea		
File: Injectors.sch		
Sheet: /Injectors/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 dec 2012	**Rev: 0.4-alpha**
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 6/7

JP9 and JP10 allow you to build the power supply
circuits and test them before connecting them
to the rest of the board.



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 hash: 60790c9fea		
File: PowerSupplies.sch		
Sheet: /Power Supplies/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 24 dec 2012	**Rev: 0.4-alpha**
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 7/7