

## Notes:

J2 is the TE Connectivity Automotive Grade water resistant connector.  
There is a separate board design for this connector found in the  
connector/pcb directory in the Jaguar repository.

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 T0-220 voltage regulators from the end panels of the case  
with silicon insulators and use plastic isolators on the metal screws.

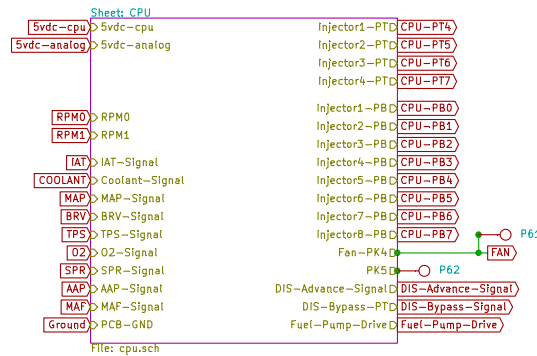
5vdc-cpu = VDD

5vdc-analog = VCC

INJ1-GND and INJ2-GND are connected together but isolated from the rest  
of the PCB grounds and are used by the Injector # 1 & 2 drivers.  
INJ3-GND and INJ4-GND are connected together but isolated from the rest  
of the PCB grounds and are used by the Injector # 3 & 4 drivers.  
INJ5-GND and INJ6-GND are connected together but isolated from the rest  
of the PCB grounds and are used by the Injector # 5 & 6 drivers.  
INJ7-GND and INJ8-GND are connected together but isolated from the rest  
of the PCB grounds and are used by the Injector # 7 & 8 drivers.

Components that are missing from design changes:

C45, C46, C50, D3, D32, R14, R15, R56, R59, R60, R61, R62, R64,  
R65, R79, R85, R86, R93, R94, R96, R97, R98, R99, U5, U10



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

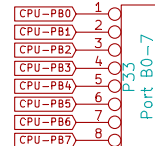
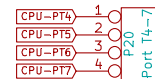
### AND DO THE FOLLOWING

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)

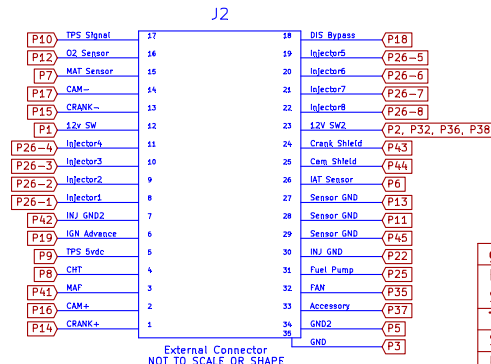
P34 pin 1 to P34 pin 2  
P34 pin 3 to P34 pin 4  
P34 pin 5 to P34 pin 6  
P34 pin 7 to P34 pin 8

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:

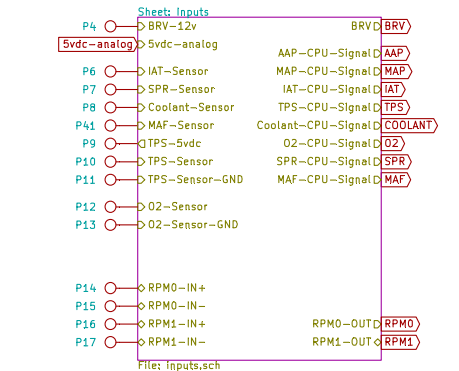
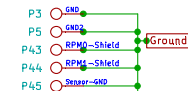
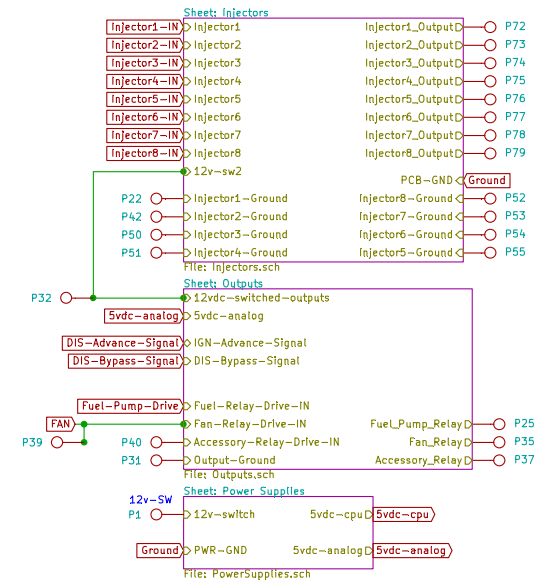
P33 pin 1 to P34 pin 1  
P33 pin 2 to P34 pin 2  
P33 pin 3 to P34 pin 3  
P33 pin 4 to P34 pin 4  
P33 pin 5 to P34 pin 5  
P33 pin 6 to P34 pin 6  
P33 pin 7 to P34 pin 7  
P33 pin 8 to P34 pin 8



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)



External Connector  
NOT TO SCALE OR SHAPE



git hash: xxxxxxxxxxxx

File: Jaguar.sch

Sheet: /

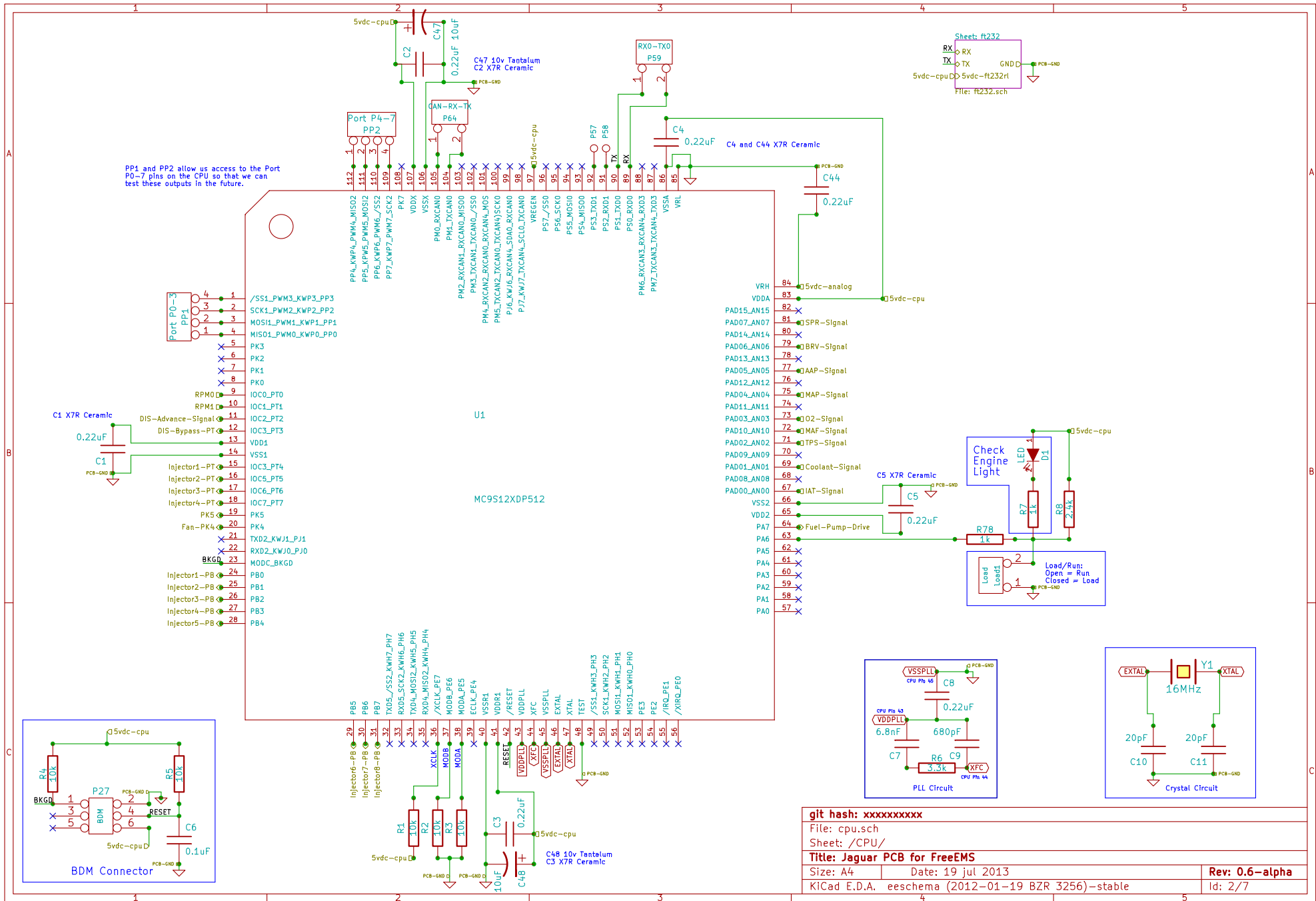
Title: Jaguar PCB for FreeEMS

Size: A4 Date: 19 jul 2013

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Rev: 0.6-alpha

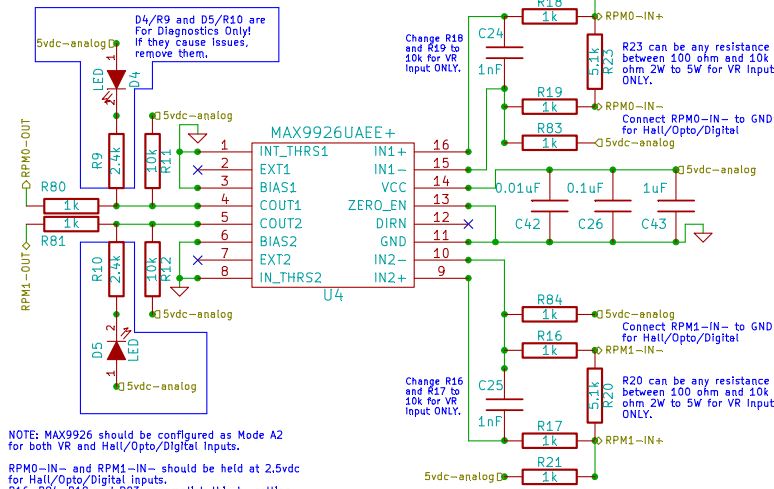
Id: 1/7





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.

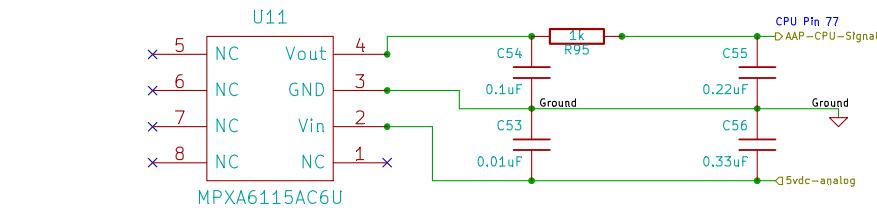
R20 and R23 are only to be used with VR inputs, do not populate these components for GM DIS or Ford EDIS systems.



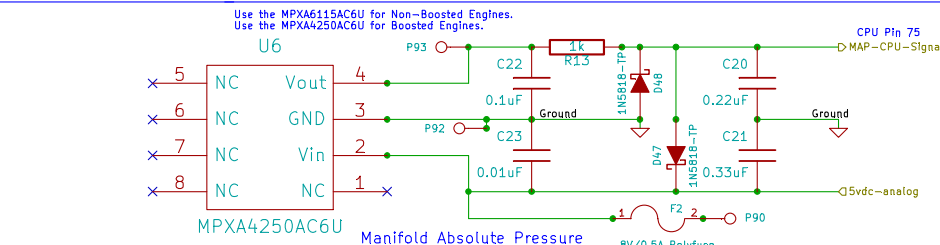
Crankshaft and Camshaft Inputs

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.

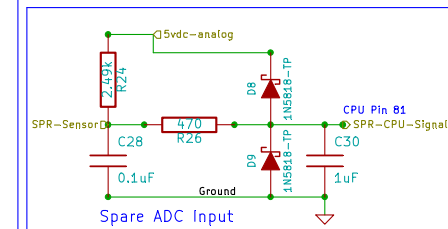


Ambient Absolute Pressure

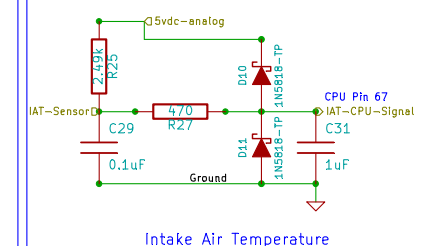


Manifold Absolute Pressure

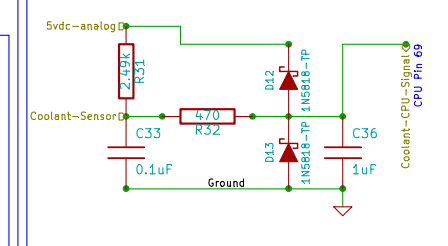
R24, R25 and R31 (2.49k) can be replaced if using sensors other than GM temperature sensors: For FORD Sensors: use 27.4k 0.1% Metal Film resistors; for MOPAR Sensors: use 9.1k 0.1% Metal Film resistors or use 2.43k 0.1% Metal Film resistors (best for most cases). Be sure to use FreeTherm to adjust the values in the FreeEMS code for the best accuracy regardless of which value resistors you use!



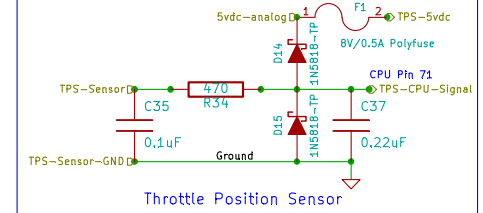
Spare ADC Input



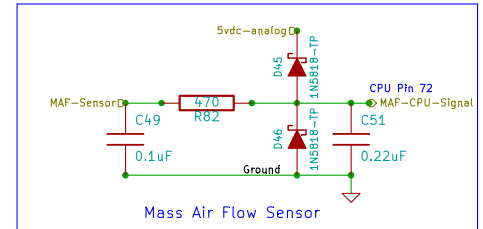
Intake Air Temperature



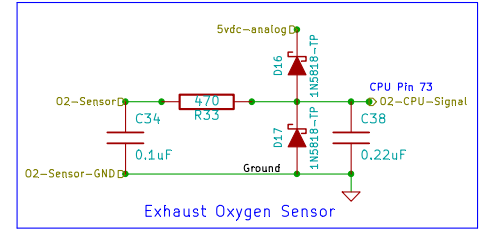
Coolant Temperature



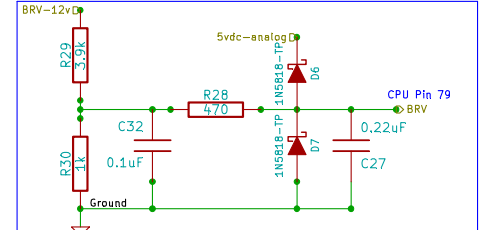
Throttle Position Sensor



Mass Air Flow Sensor



Exhaust Oxygen Sensor



Battery Reference Voltage

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 hash: xxxxxxxxxx

File: inputs.sch

Sheet: /Inputs/

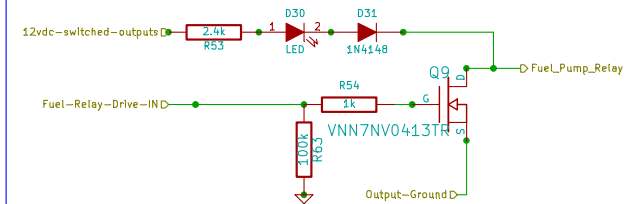
Title: Jaguar PCB for FreeEMS

Size: A4 Date: 19 jul 2013

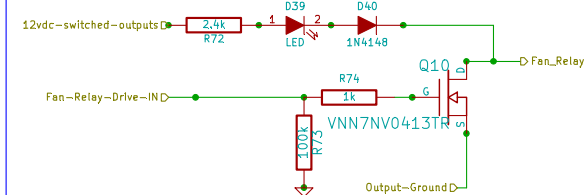
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Rev: 0.6-alpha

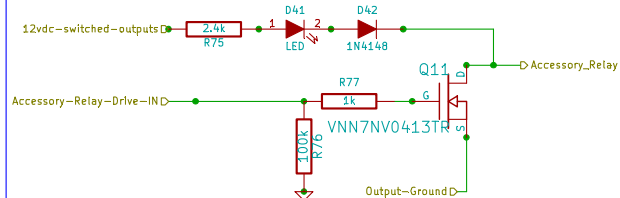
Id: 4/7



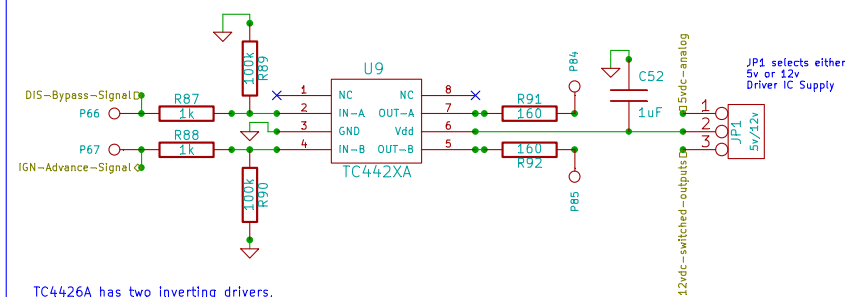
Fuel Pump Relay Output



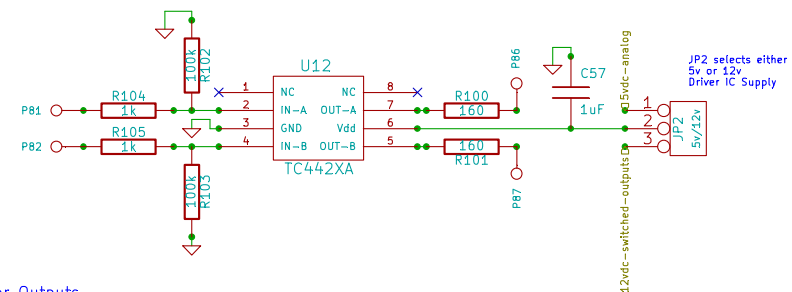
Low Side Driver #1 Output



Low Side Driver #2 Output

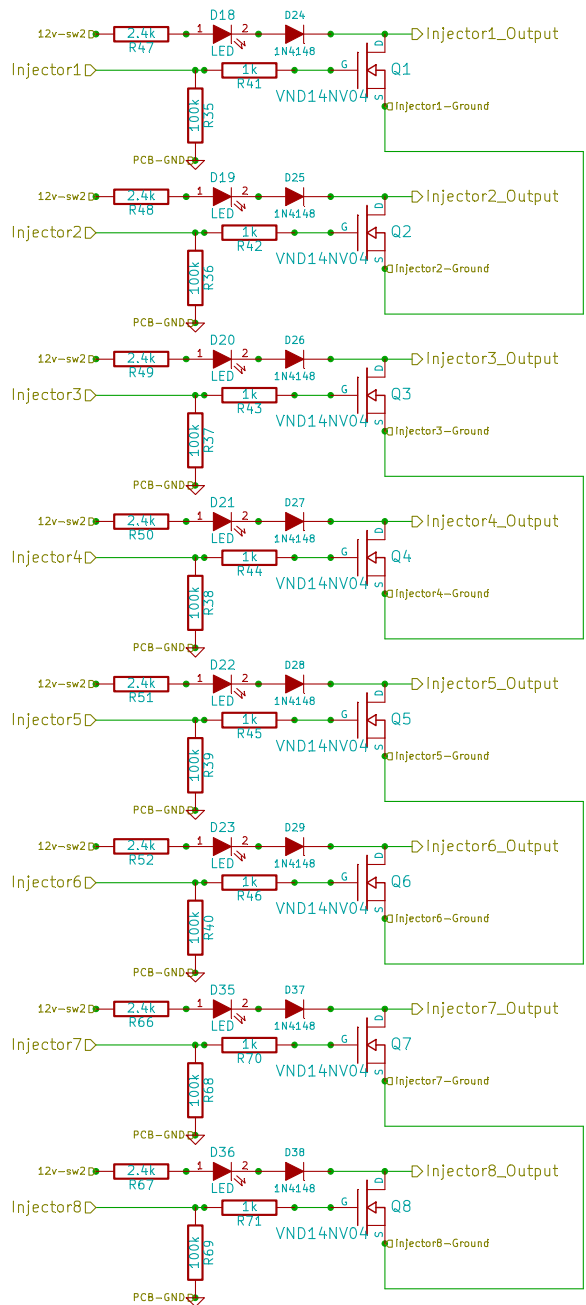


TC4426A has two inverting drivers,  
while the TC4427A has two non-inverting drivers.  
The TC4428A has one inverting and one non-inverting driver.



Ignitor Outputs

git hash: xxxxxxxxxx	
File: Outputs.sch	
Sheet: /Outputs/	
Title: Jaguar PCB for FreeEMS	
Size: A4	Date: 19 jul 2013
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Rev: 0.6-alpha	
Id: 5/7	



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File: Injectors.sch

Sheet: /Injectors/

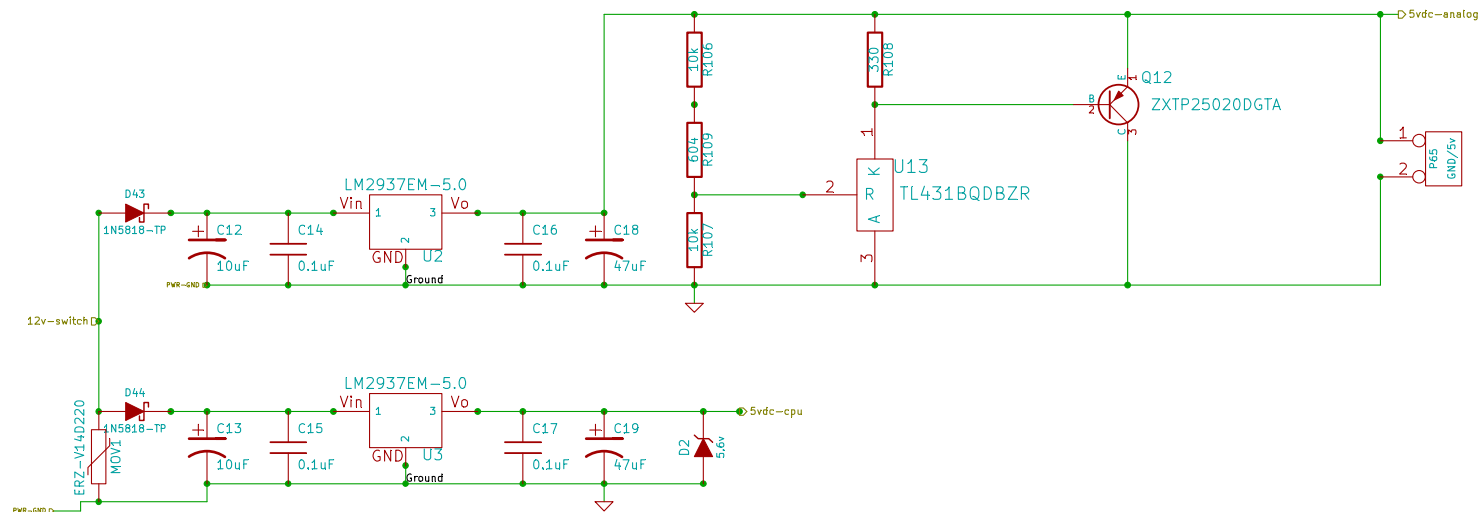
Title: Jaguar PCB for FreeEMS

Size: A4 Date: 19 jul 2013

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Rev: 0.6-alpha

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 hash: xxxxxxxxxx		
File: PowerSupplies.sch		
Sheet: /Power Supplies/		
Title: Jaguar PCB for FreeEMS		
Size: A4	Date: 19 jul 2013	Rev: 0.6-alpha
KiCad E.D.A. eeschema (2012-01-19 BZR 3256)-stable		Id: 7/7