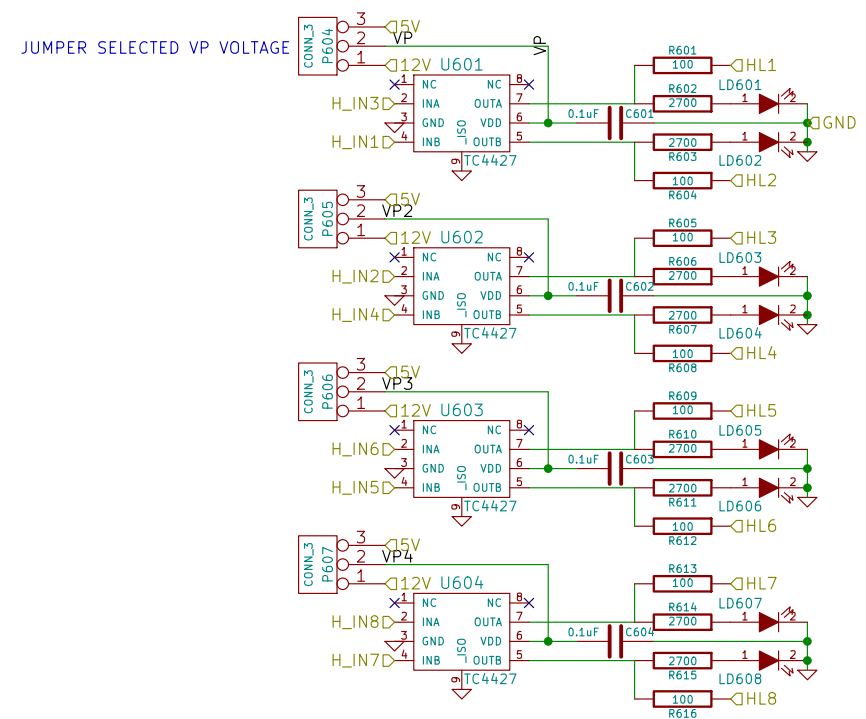


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rusEfi.com		Sheet: /	
File: frankenso.sch		Date: 2016-12-21	
Title: Frankenso		Size: B	
KiCad E.D.A. kicad 4.0.1-stable		Date: 2016-12-21	
Id: 1/15		Rev: .04.2	

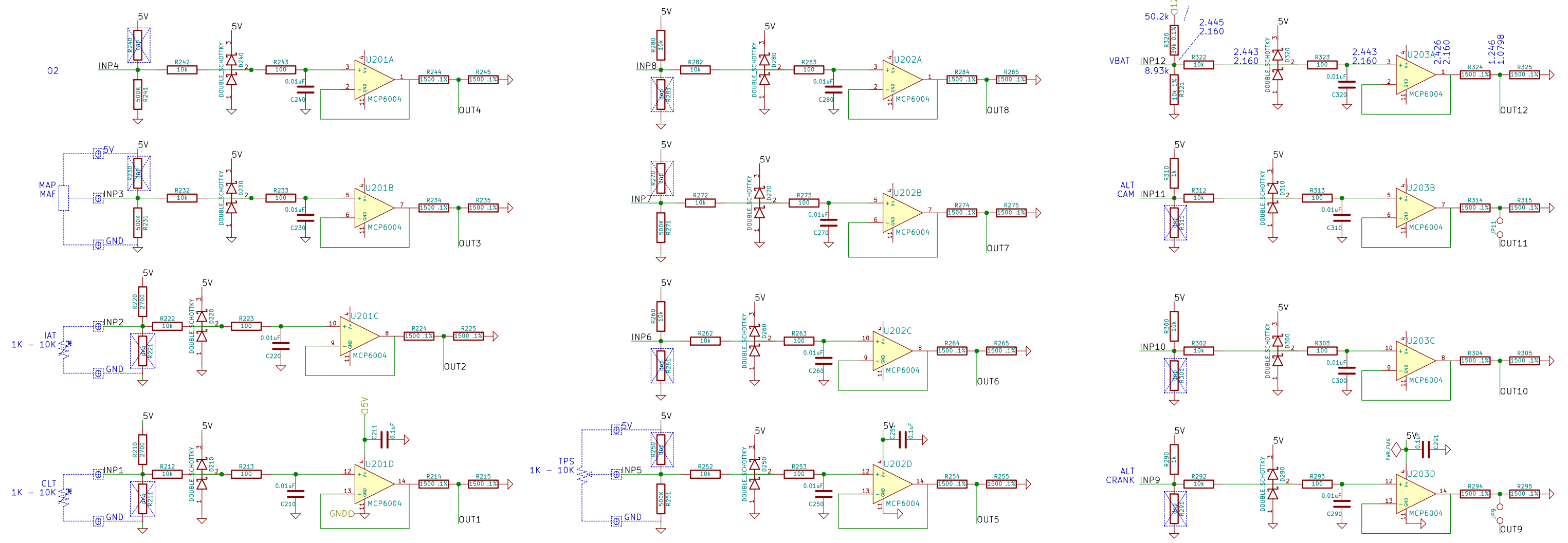
8 channel high / low side driver

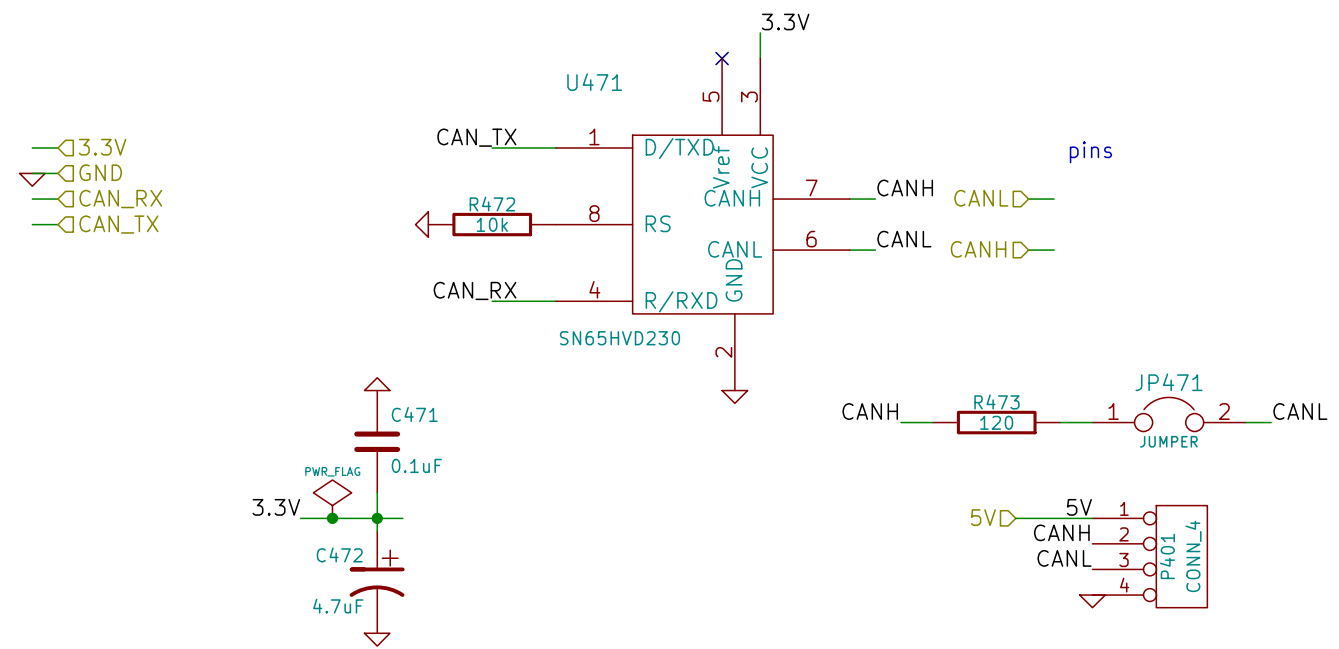


- INP12
- INP11
- INP10
- INP9
- INP8
- INP7
- INP6
- INP5
- INP4
- INP3
- INP2
- INP1

- OUT4
- OUT3
- OUT1
- OUT2
- OUT10
- OUT12
- OUT6
- OUT5
- OUT8
- OUT7
- OUT9
- OUT11

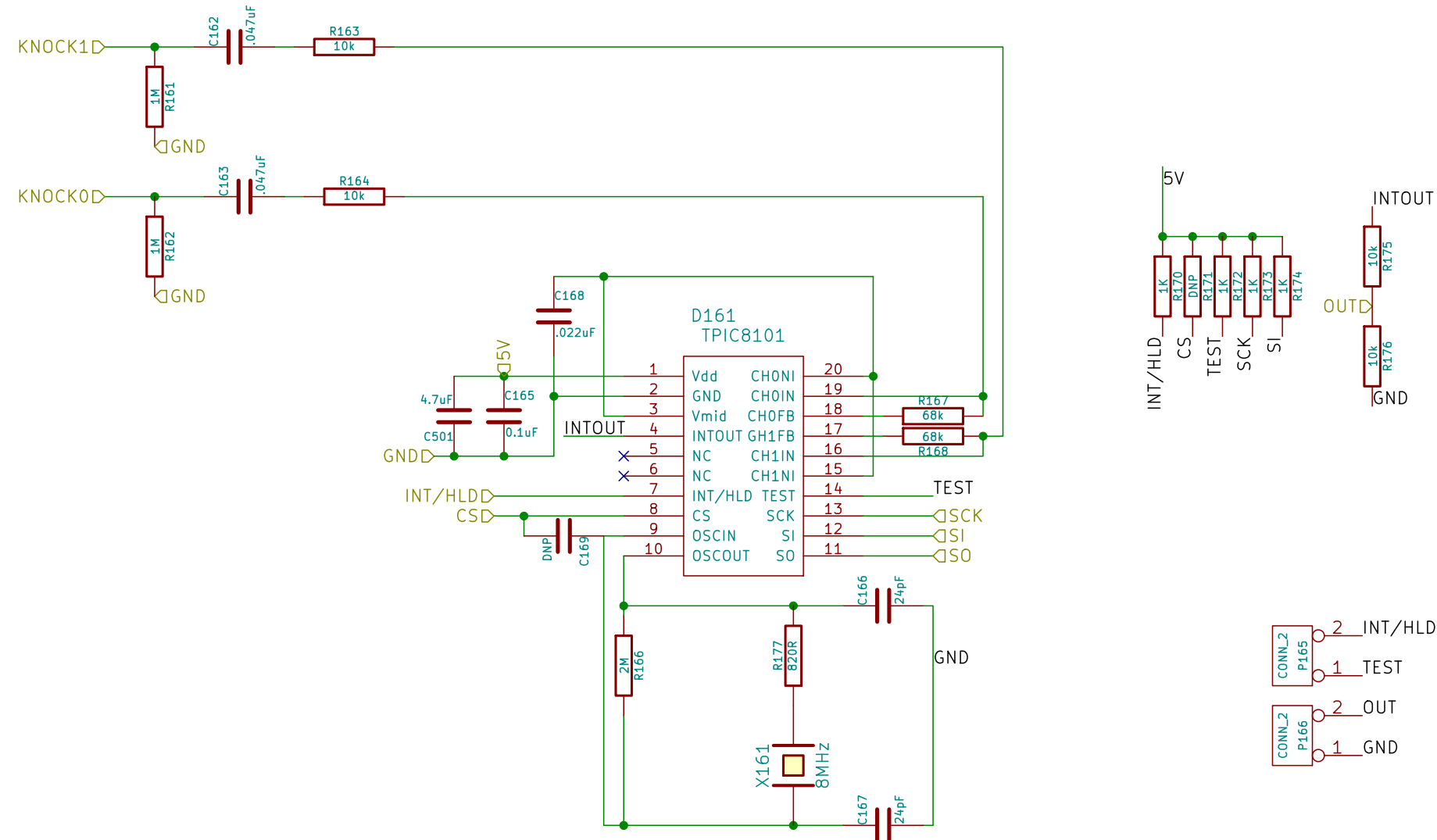
SUGGESTED / DEFAULT ENGINE WIRING IN BLUE





CAN level shifter

DD_HIP9011 ver.2
RusEfi.com

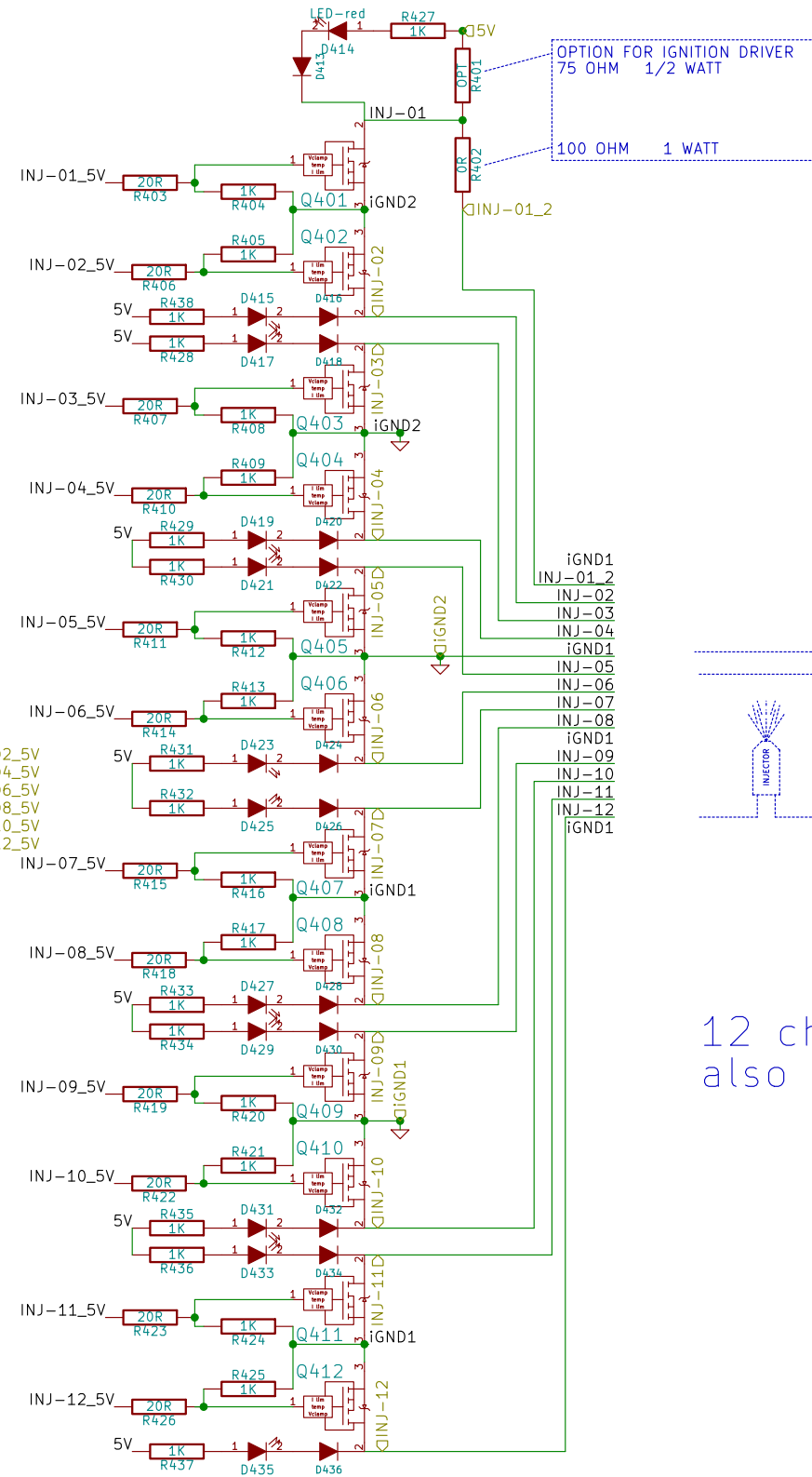


<http://www.crystek.com/documents/appnotes/Pierce-GateIntroduction.pdf>
 PCB per predictions with SaturnPCB has less then 3.5pF traces,
 TPIC pins assumed 5pF
 ESR = 80ohms max
 Rf = 2meg could be between 1meg and 10meg.
 Cload = 18pF per XTAL datasheet
 $C_{load} = \frac{([C_{in}+C1][C2+Cout])}{(C_{in}+C1+C2_Cout)} + PCB_{stray}$
 $C_{load} = \frac{([5+24][24+5])}{(5+24+24+5)} + 3.5 = 18pF$
 $C1=C2=C166=C167 = 24pF$
 $R_s = 1/(2\pi f C2) = 1/(2\pi * 8MHz * 24pF) = 829ohms, 820ohms is close enough = R177$

rusEFI.com	
Sheet: /DD_HIP9011/	
File: DD_HIP9011.sch	
Title: Frankenso	
Size: A4	Date: 2016-12-21
KiCad E.D.A. kicad 4.0.1-stable	Rev: .04.2
	Id: 5/15

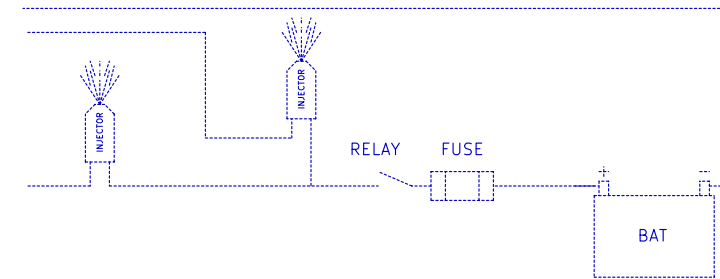
INJ-01_5V
 INJ-03_5V
 INJ-05_5V
 INJ-07_5V
 INJ-09_5V
 INJ-11_5V

INJ-02_5V
 INJ-04_5V
 INJ-06_5V
 INJ-08_5V
 INJ-10_5V
 INJ-12_5V



OPTION FOR IGNITION DRIVER
 75 OHM 1/2 WATT

100 OHM 1 WATT

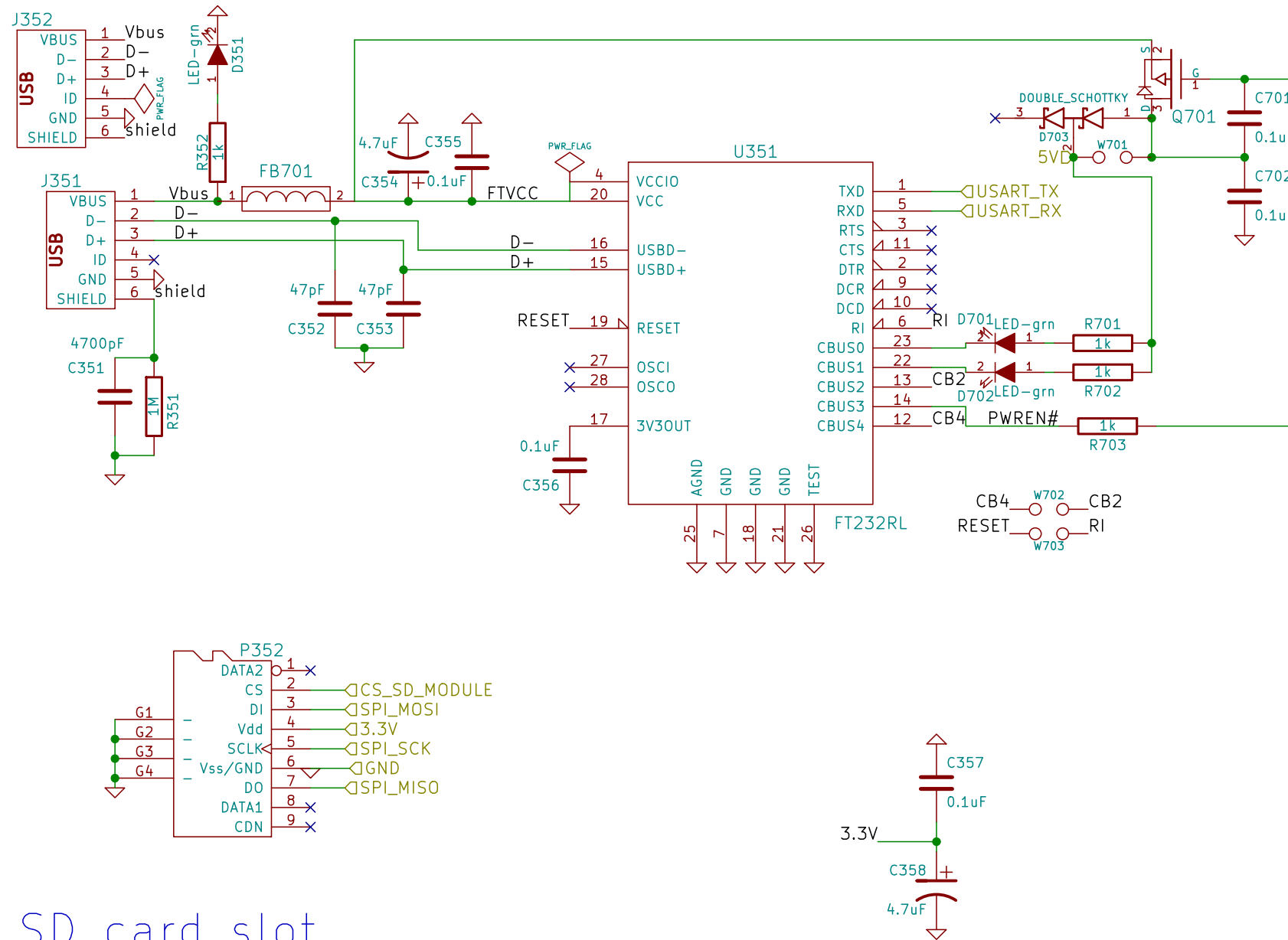


12 channel injector driver
 also suitable for fuel pump relay, IAC solenoid etc

MISC NOTES
 THE GENERAL SYSTEM LAYOUT IS SHOWN IN BLUE, THIS IS NOT THE SUGGESTED SYSTEM WIRING. IT DOES SHOW THE GENERAL OVERALL CIRCUIT LAYOUT TOPOLOGY.
 THE PCB WIRING IS SHOWN IN RED, GREEN WITH A BLUE BUS.
 Screw terminals 1760500000
 Screw connector PCB <http://octopart.com/39522-1007-molex-655409>
 Screw connector harness <http://octopart.com/partsearch#search/requestData&q=39520-0007>

rusEFI.com		
Sheet: /inj_12ch/		
File: inj_12ch.sch		
Title: Frankenso		
Size: B	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 6/15

WJ01 IS A BACKUP PLAN. THE VOLTAGE DROP ACROSS D703 MAY BE NOT TOLERABLE, SO WE HAVE A BACK UP PLAN IF WE NEED TO BYPASS THE DIODE WITH A LOWER VOLTAGE DROP



SD card slot
USB TTL module

rusEFI.com	
Sheet: /mmc_usb_1/	
File: mmc_usb_1.sch	
Title: Frankenso	
Size: A4	Date: 2016-12-21
KiCad E.D.A. kicad 4.0.1-stable	
Rev: .04.2	
Id: 7/15	

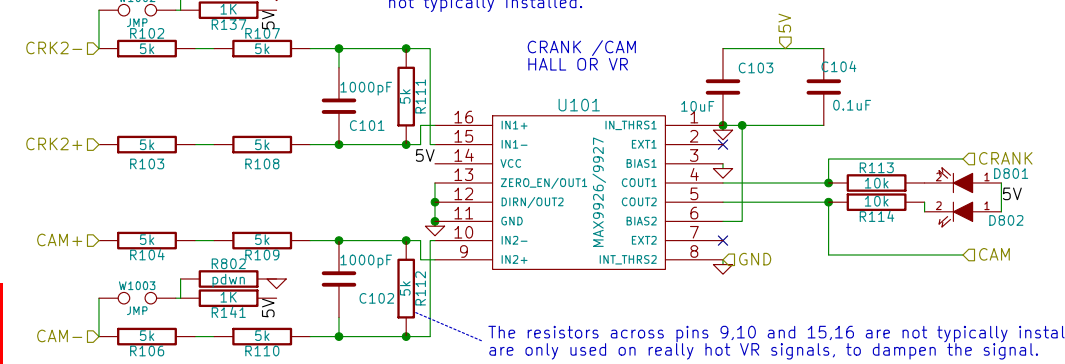
When configured for VR, do not populate W1002 or W1003. These jumpers allow isolation which prevents the VR signal from getting into the 5V or GND.

Many Hall sensors are set as an open collector sinking topology. Those setups require a pull up resistor, and 1k ohm is a common size. You need to match these pull up resistors with your hall sensors requirements. Often you need about 5mA of drive. See snippet from Cherry hall sensors to the right. Some sensors are the inverse, and need a pull down resistor. These are less common. These pull down resistors are noted as R801 and R802 on this page and are not typically installed.



Recommended pull-up resistor values are as follows:

Volts dc	5	9	12	15	24
Ohms	1 k	1.8k	2.4 k	3 k	3 k



The resistors across pins 9,10 and 15,16 are not typically installed, they are only used on really hot VR signals, to dampen the signal.

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Sheet: /cps_vrs_io_1/
File: cps_vrs_io_1.sch

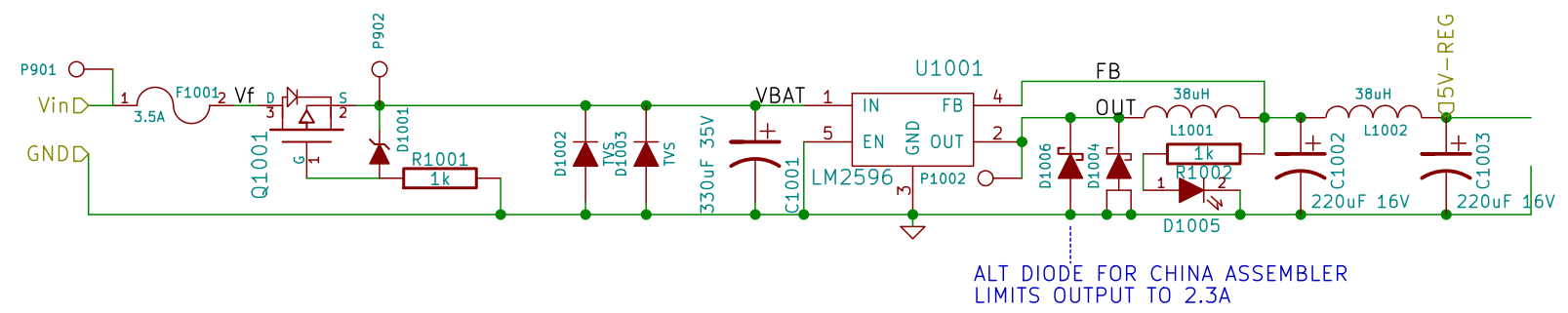
Title: **Frankenso**

Size: B Date: 2016-12-21

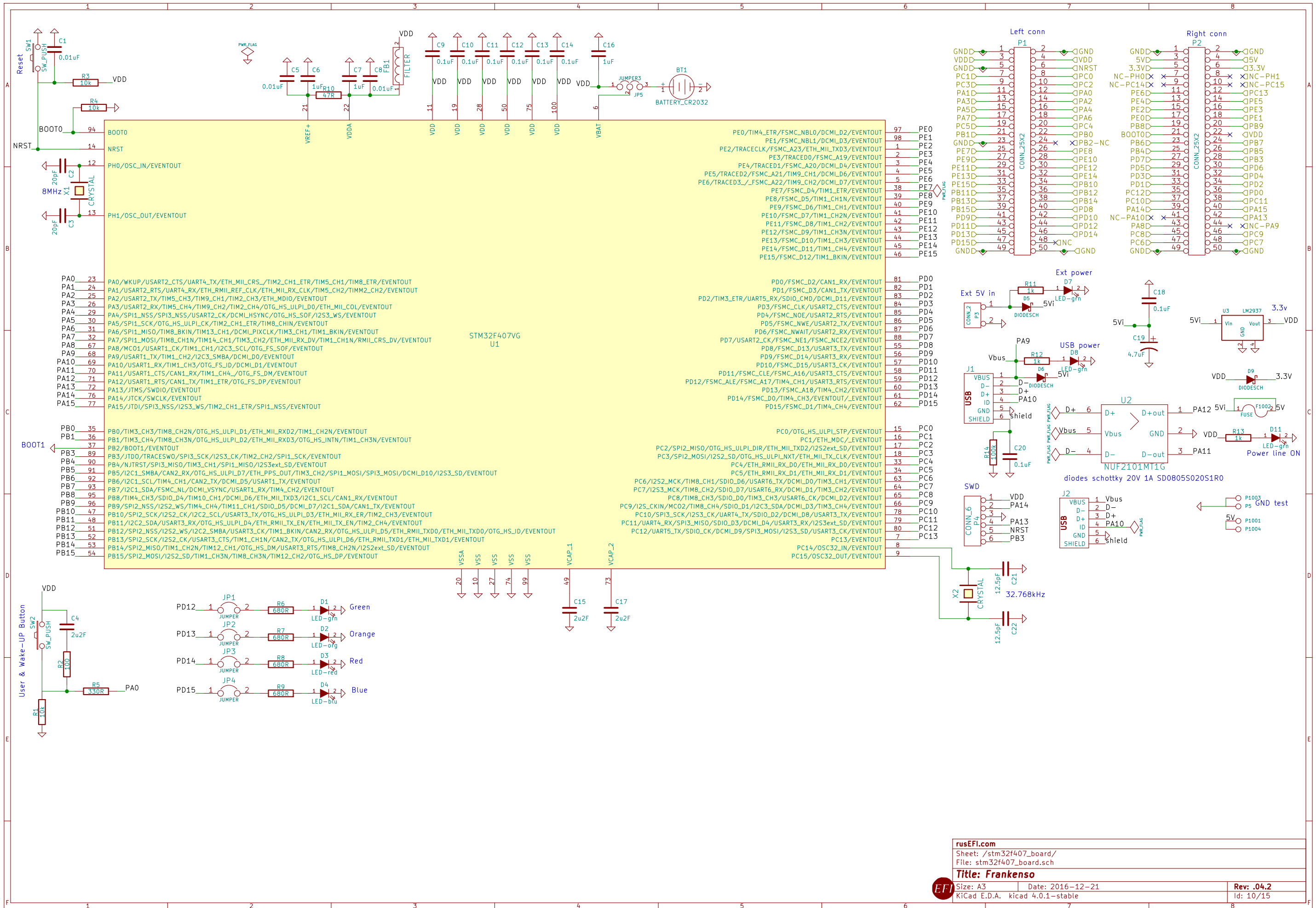
Rev: .04.2

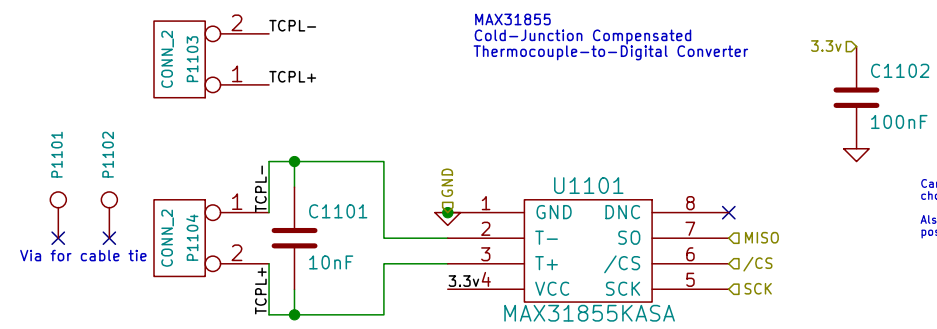
KiCad E.D.A. kicad 4.0.1-stable

Id: 8/15



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Sheet: /PWR_buck_12V_switcher/		
File: PWR_buck_12V_switcher.sch		
Title: Frankenso		
Size: A	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 9/15



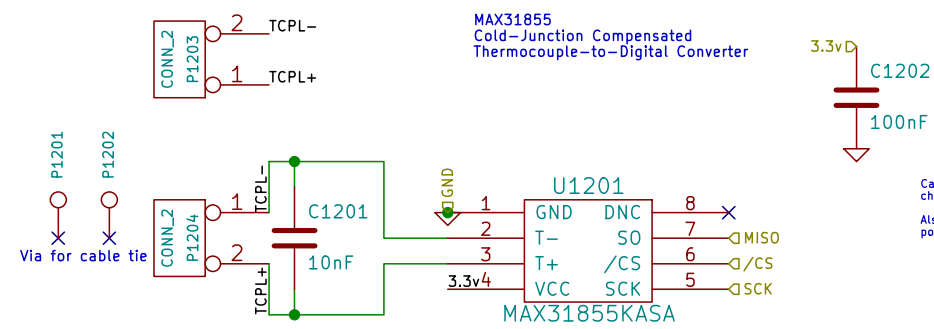


We want a big mass of copper in the TCPL joints, to dampen the cold junction temperature and to make it more measurable with this IC

Datasheet: <http://datasheets.maxim-ic.com/en/ds/MAX31855.pdf>

Care must be taken with the connector chosen for the TCPL to avoid inaccuracies. Also, the connector must be as close as possible to the cold-junction compensation.

Mrk Industries		
Sheet: /thermocouple1/		
File: thermocouple_module.sch		
Title: Electronic Industrial Temperature Interface (EITI)		
Size: A4	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 11/15



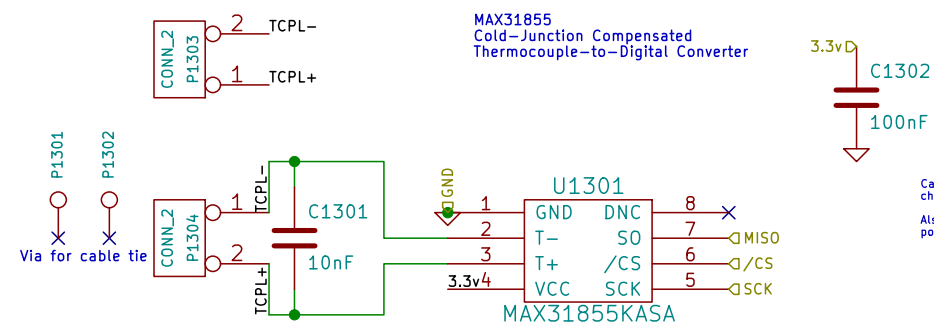
MAX31855
Cold-Junction Compensated
Thermocouple-to-Digital Converter

Care must be taken with the connector
chosen for the TCPL to avoid inaccuracies.
Also, the connector must be as close as
possible to the cold-junction compensation.

We want a big mass of copper in the
TCPL joints, to dampen the cold junction
temperature and to make it more measurable
with this IC

Datasheet:
<http://datasheets.maxim-ic.com/en/ds/MAX31855.pdf>

Mrk Industries		
Sheet: /thermocouple2/		
File: thermocouple_module.sch		
Title: Electronic Industrial Temperature Interface (EITI)		
Size: A4	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 12/15



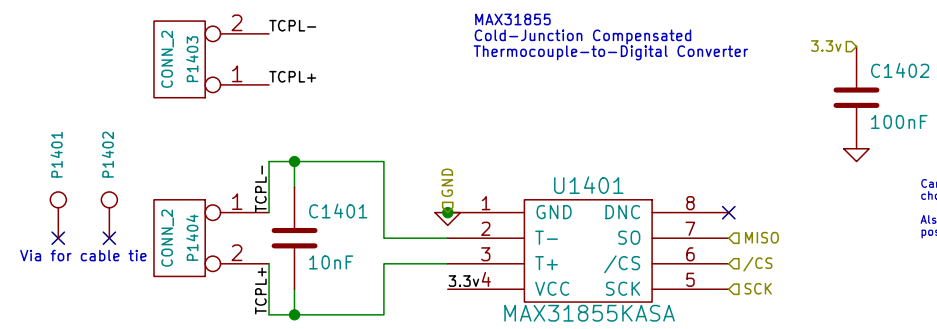
MAX31855
Cold-Junction Compensated
Thermocouple-to-Digital Converter

Care must be taken with the conector
chosen for the TCPL to avoid inaccuracies.
Also, the connector must be as close as
possible to the cold-junction compensation.

We want a big mass of copper in the
TCPL joints, to dampen the cold junction
temperature and to make it more measurable
with this IC

Datasheet:
<http://datasheets.maxim-ic.com/en/ds/MAX31855.pdf>

Mrk Industries		
Sheet: /thermocouple3/		
File: thermocouple_module.sch		
Title: Electronic Industrial Temperature Interface (EITI)		
Size: A4	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 13/15



MAX31855
Cold-Junction Compensated
Thermocouple-to-Digital Converter

3.3v4
C1402
100nF

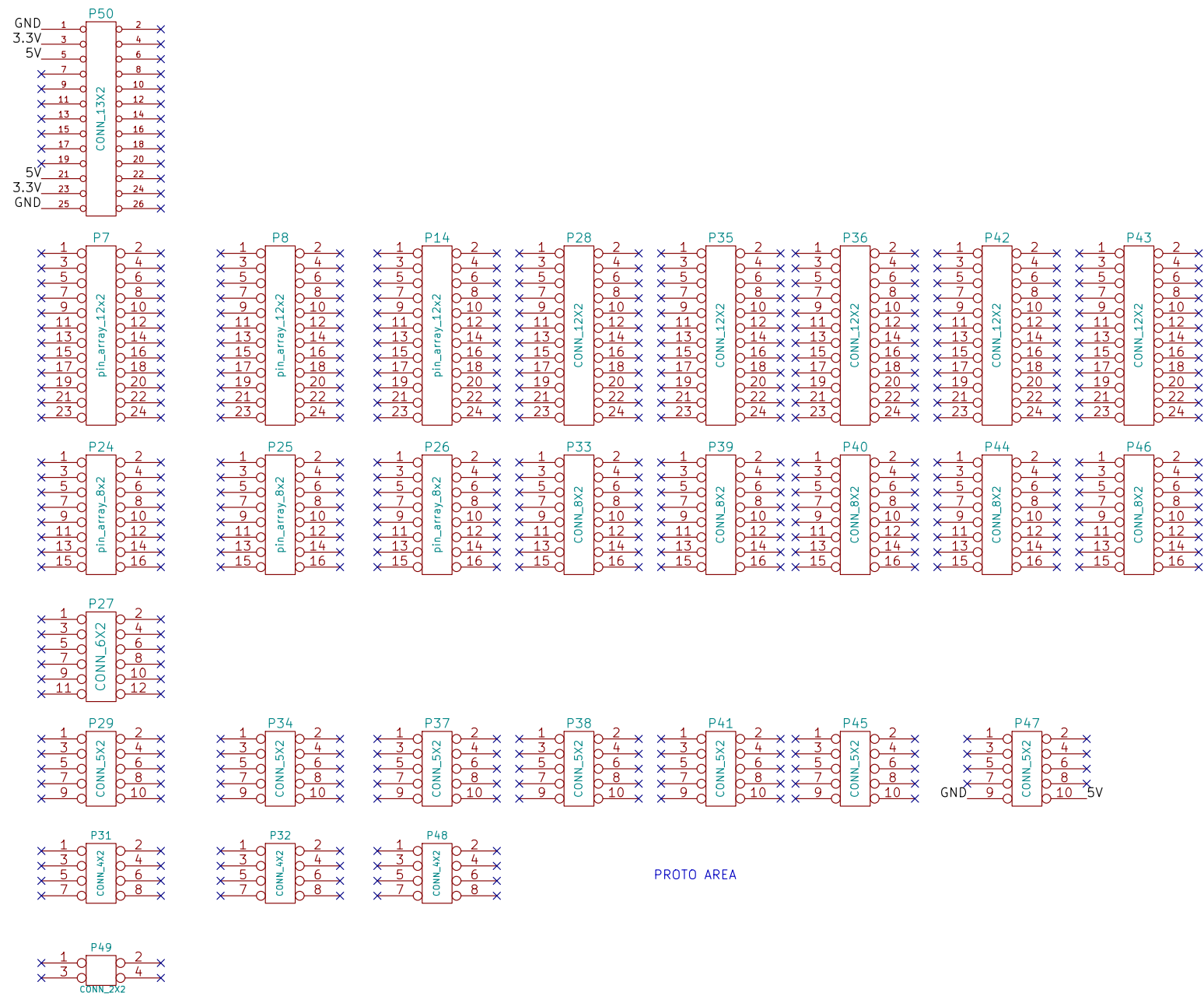
Care must be taken with the connector
chosen for the TCPL to avoid inaccuracies.
Also, the connector must be as close as
possible to the cold-junction compensation.

P1401
P1402
Via for cable tie

We want a big mass of copper in the
TCPL joints, to dampen the cold junction
temperature and to make it more measurable
with this IC

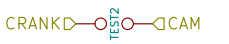
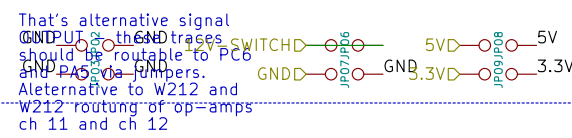
Datasheet:
<http://datasheets.maxim-ic.com/en/ds/MAX31855.pdf>

Mrk Industries		
Sheet: /thermocouple4/		
File: thermocouple_module.sch		
Title: Electronic Industrial Temperature Interface (EITI)		
Size: A4	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 14/15



These two jumpers are here to accommodate stm32f4discovery

These four jumpers are test points



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Sheet: /Misc_Vias/		
File: Misc_Vias.sch		
Title: Frankenso		
Size: B	Date: 2016-12-21	Rev: .04.2
KiCad E.D.A. kicad 4.0.1-stable		Id: 15/15