rusEFi

Connectors (top)

176122-6_2ND P99A
176122-6_2ND P99B
176122-6_2ND P99C

12V-CONST, 12V-SWITCH, START-SIG, DIAG, MUX, HL1, HL3, HL2, HL5, AC-RELAY, DIAG-1, HL6, HL4, TPS-IDL-SW, STOP-LIGH, STEERING-SW, AC-SW, COOL-FAN, BLOWER-SW, REAR-DEFROSTER-SW, HEADLIGHT-SW, NEUTRAL-CLUTCH-SW

CRK2+, CRK2-, CAM+, CAM-, KNOCK-INPUT-1, KNOCK-INPUT-0, CANH, CANL, INJ-04, INJ-03, INJ-02, INJ-01_2

GND, OUTPUT-GND, CPU-GND, INPUT-GND, AN11-HARN, AN9-HARN, AN10-HARN, AN8-HARN, 5V, AN6-HARN, AN5-HARN, AN4-HARN, AN3-HARN, AN2-HARN, AN1-HARN, INJ-05, INJ-07, INJ-08, INJ-09, INJ-10, INJ-11, INJ-12

Sheet: PWR_buck_12V_switcher
12V-SWITCH → Vin   5V-REG → 5V
GND → GND
pg 9
File: PWR_buck_12V_switcher.sch

Sheet: adc_amp_divider — pg 3
5V, AN1-HARN→INP1, AN2-HARN→INP2, AN3-HARN→INP3, AN4-HARN→INP4, AN5-HARN→INP5, AN6-HARN→INP6, AN7-HARN→INP7, AN8-HARN→INP8, AN9-HARN→INP9, AN10-HARN→INP10, AN11-HARN→INP11, AN12-HARN→INP12, 12V-SWITCH→12V_bat
File: adc_amp_divider.sch

Sheet: stm32f407_board — pg 10
VDD, GND, OUT1→PC2, OUT2→PC1, OUT3→PA0, OUT4→PC3, OUT5→PA2, OUT6→PA1, OUT7→PA4, OUT8→PA3, OUT9→PA7, OUT10→PA6, OUT11→PC5, OUT12→PC4
5V, 3.3V
INJ-01_5V→PE6, INJ-02_5V→PE5, INJ-03_5V→PD7, INJ-04_5V→PC13, INJ-05_5V→PE3, INJ-06_5V→PE4, INJ-07_5V→PE1, INJ-08_5V→PE2, INJ-09_5V→PB9, INJ-10_5V→PE0, INJ-11_5V→PB8, INJ-12_5V→PB7
Sheet: inj_12ch — pg 6
INJ-01_2, INJ-02...INJ-12, iGND1, iGND2
File: inj_12ch.sch

Sheet: DD_HIP9011 — pg 5
5V, GND, KNOCK-INPUT-1→KNOCK1, KNOCK-INPUT-0→KNOCK0, OUT, CS, SCK→SCK-2, SO→SO-2, SI→SI-2, INT/HLD→PC0
File: DD_HIP9011.sch

Sheet: mmc_usb_1 — pg 7
5V, 3.3V, GND, CS_SD→PD4, SPI_SCK→PB3, SPI_MISO→PB4, SPI_MOSI→PB5, USART_RX→PC10, USART_TX→PC11, 232-FROM-MCU, 232-TO-MCU
File: mmc_usb_1.sch

Sheet: hi-lo — pg 2
H_IN1→PC7, H_IN2→PE14, H_IN3→PC9, H_IN4→PE12, H_IN5→PE8, H_IN6→PE10
HL1...HL6, 12V-SWITCH
File: hi-lo.sch

Sheet: cps_vrs_io_1 — pg 8
CRANK→PA5, 5V, GND, CAM→PC6
CRK2-, CRK2+, CAM-, CAM+
File: cps_vrs_io_1.sch

Sheet: can_brd_1 — pg 4
3.3V, GND, CAN_RX→PB12, CAN_TX→PB6
CANH, CANL
File: can_brd_1.sch

U4 ITEAD_HC-0X
AIO0, AIO1, PIO0...PIO11
RESET, UART_RTS, UART_CTS, UART_RX, UART_TX
NC-PC15, NC-PC14, NC-PH1, NC-PH0, NC-PA9, NC-PA10, PB2-NC
SPI_MOSI, SPI_CS, SPI_CLK, SPI_MISO
USB_D-, USB_D+
PCM_CLK, PCM_OUT, PCM_IN, PCM_SYNC
PA15, PB1, PC12, PD0, PD1, PD2, PD3, PD5, PD6
C23, C24 0.1uF, GND
VCC 3.3V

Sheet: thermocouple1 — pg 11
3.3V, GND, SCK, MISO→SO, /CS
File: thermocouple_module.sch

Sheet: thermocouple2 — pg 12
3.3V, GND, SCK, MISO, /CS
File: thermocouple_module.sch

Sheet: thermocouple3 — pg 13
3.3V, GND, SCK, MISO, /CS
File: thermocouple_module.sch

Sheet: thermocouple4 — pg 14
3.3v, GND, SCK, MISO→SO, /CS
File: thermocouple_module.sch

PC7, PE14, PC9, PE12, PE8, PE10
PD12, PD13, PD14, PD15, PA14, BOOT0→NC, NRST, PA8, PA13
PC8, PD8, PD10, PD9, PD11
U5 SKRHAAE010 A, B, Center, Com, C, D
PWR_FLAG

S1 HD44780_VCLD
GND, VCC, VLCD, RS, R/W, CS, D0, D1, D2, D3
HD44780_VCC, HD44780_VLCD, HD44780_RS, HD44780_CS
PE7, PE9
HD44780_D4→PE11, HD44780_D5→PE13, HD44780_D6→PE15, HD44780_D7→PB10
D4, D5, D6, D7
DISPLAY_BL
HD44780_VCC, A, K, GND

GND 1k R99 1kpot RV101 HD44780_VLCD
The JP1 jumper is needed because we cannot feed the screen via USB — we would need to disconnect it while the board is on a bench

PROTO AREA
P24, P25, P26 CONN_8X2
5V, 3.3V, GND
P7, P8, P14 CONN_12X2

These two jumpers are here to accomodate stm32f4discovery
These four jumpers are test points
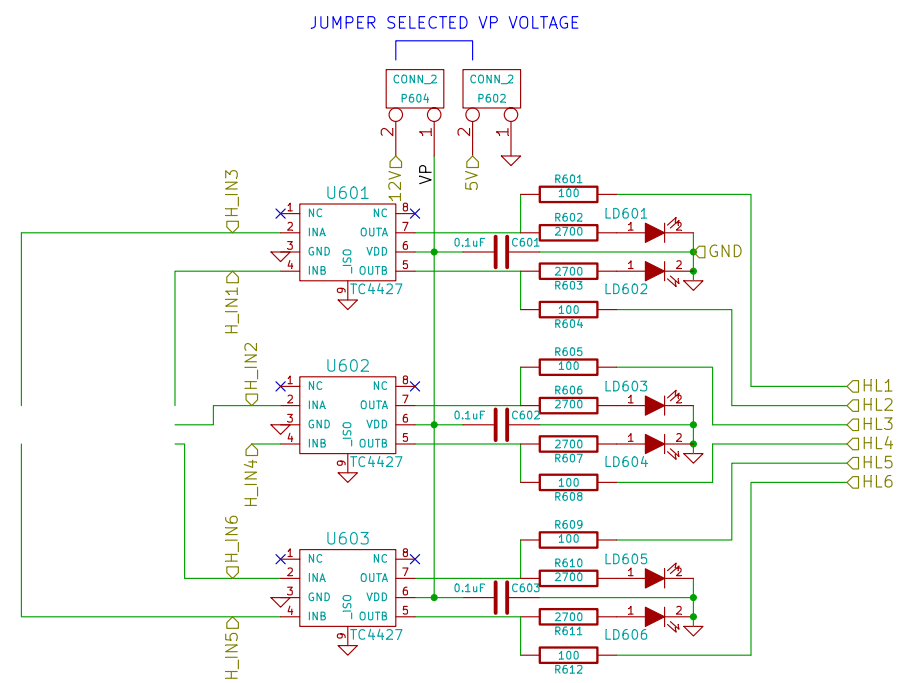GND, 12V-SWITCH, 5V, 3.3V

That's alternative signal OUTPUT — these traces should be routable to PC6 and PA5 via jumpers. Aleternative to W212 and W212 routung of op-amps ch 11 and ch 12
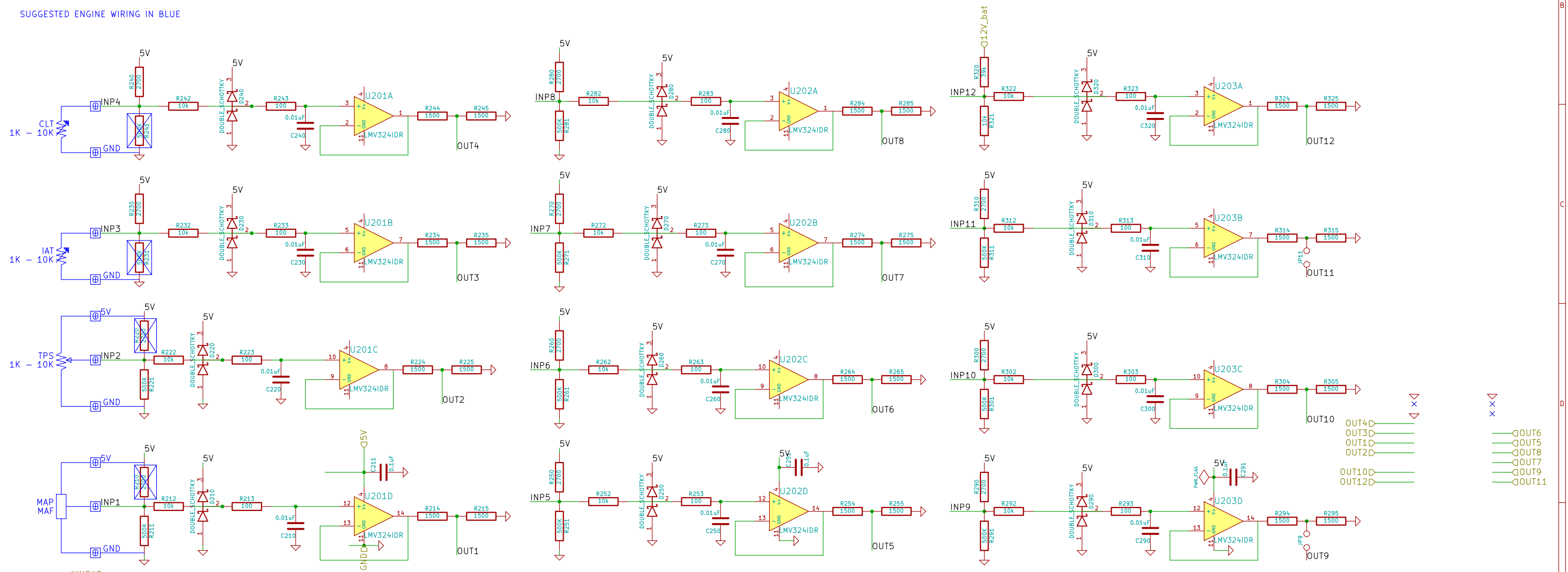CRANK, CAM

rusEFi.com
File: frankenso.sch
Sheet: /
Title: Frankenso
Size: B   Date: 28 mar 2015   Rev: .04
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable   Id: 1/14
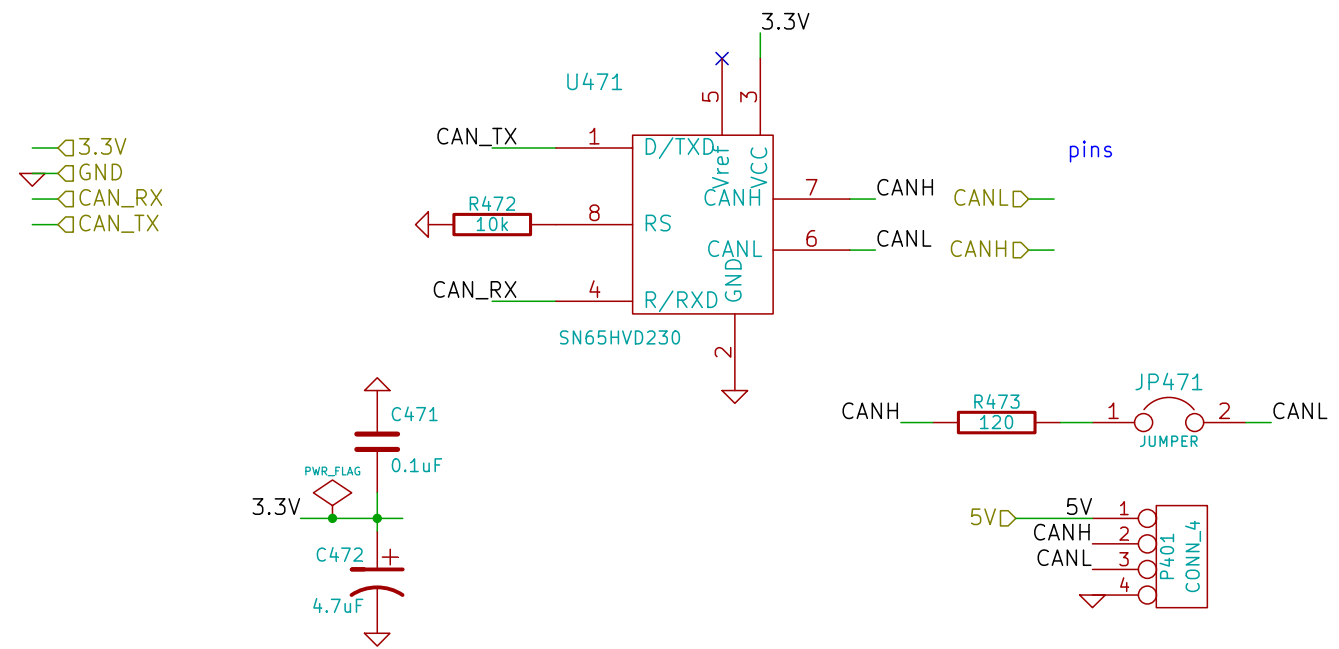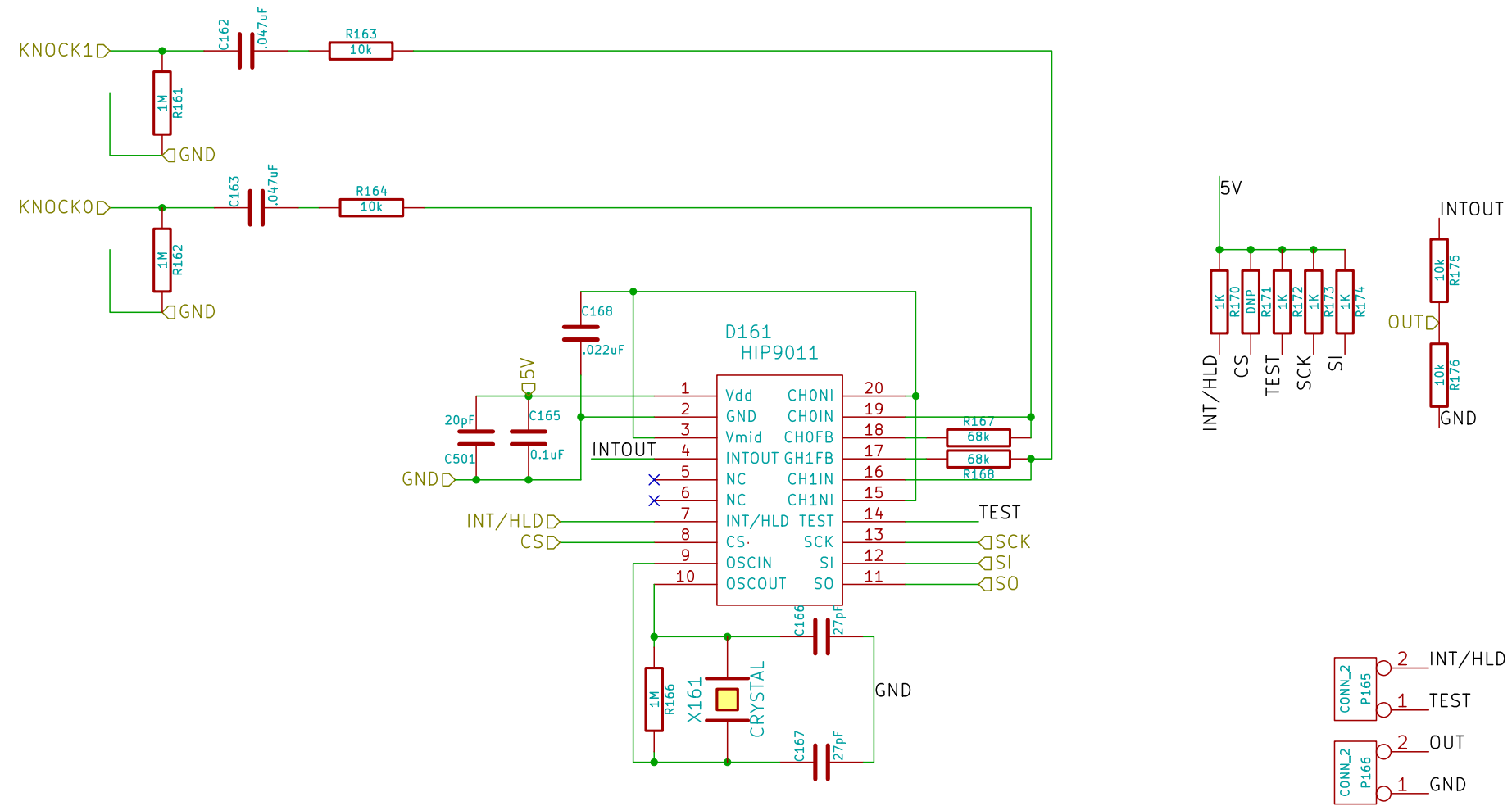
6 channel high / low side driver

JUMPER SELECTED VP VOLTAGE

CONN_2 P604
CONN_2 P602

12VD
VP
5VD

U601
NC NC
INA OUTA
GND VDD
INB OUTB
OSC
TC4427

U602
NC NC
INA OUTA
GND VDD
INB OUTB
OSC
TC4427

U603
NC NC
INA OUTA
GND VDD
INB OUTB
OSC
TC4427

H_IN3
H_IN1
H_IN2
H_IN4
H_IN6
H_IN5

0.1uF C601
0.1uF C602
0.1uF C603

R601 100
R602 2700
LD601
2700 R603 LD602
100 R604

R605 100
R606 2700
LD603
2700 R607 LD604
100 R608

R609 100
R610 2700
LD605
2700 R611 LD606
100 R612

GND

HL1
HL2
HL3
HL4
HL5
HL6

SUGGESTED ENGINE WIRING IN BLUE

CLT 1K – 10K
IAT 1K – 10K
TPS 1K – 10K
MAP MAF

INP4 R240 2700 R242 10k DOUBLE SCHOTTKY D240 R243 100 C240 0.01uF U201A LMV324IDR R244 1500 R245 1500 OUT4
INP3 R230 2700 R232 10k DOUBLE SCHOTTKY D230 R233 100 C230 0.01uF U201B LMV324IDR R234 1500 R235 1500 OUT3
INP2 R220 500k / R222 10k DOUBLE SCHOTTKY D220 R223 100 C220 0.01uF U201C LMV324IDR R224 1500 R225 1500 OUT2
INP1 R212 10k R211 500k DOUBLE SCHOTTKY D210 R213 100 C210 0.01uF C211 0.1uF U201D LMV324IDR R214 1500 R215 1500 OUT1

INP8 R280 2700 R282 10k R281 500k DOUBLE SCHOTTKY D280 R283 100 C280 0.01uF U202A LMV324IDR R284 1500 R285 1500 OUT8
INP7 R270 2700 R272 10k R271 500k DOUBLE SCHOTTKY D270 R273 100 C270 0.01uF U202B LMV324IDR R274 1500 R275 1500 OUT7
INP6 R260 2700 R262 10k R261 500k DOUBLE SCHOTTKY D260 R263 100 C260 0.01uF U202C LMV324IDR R264 1500 R265 1500 OUT6
INP5 R250 2700 R252 10k R251 500k DOUBLE SCHOTTKY D250 R253 100 C250 0.01uF C251 0.1uF U202D LMV324IDR R254 1500 R255 1500 OUT5

12V_bat
INP12 R320 39k R322 10k R321 DOUBLE SCHOTTKY D320 R323 100 C320 0.01uF U203A LMV324IDR R324 1500 R325 1500 OUT12
INP11 R310 2700 R312 10k R311 500k DOUBLE SCHOTTKY D310 R313 100 C310 0.01uF U203B LMV324IDR R314 1500 R315 1500 JP11 OUT11
INP10 R300 2700 R302 10k R301 500k DOUBLE SCHOTTKY D300 R303 100 C300 0.01uF U203C LMV324IDR R304 1500 R305 1500 OUT10
INP9 R290 2700 R292 10k R291 500k DOUBLE SCHOTTKY D290 R293 100 C290 0.01uF C291 0.1uF U203D LMV324IDR R294 1500 R295 1500 JP9 OUT9

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

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

rusEFI.com
File: adc_amp_divider.sch
Sheet: /adc_amp_divider/
Title: Frankenso
Size: B   Date: 28 mar 2015   Rev: .02
KiCad E.D.A. eeschema (2013-07-07 BZR 4022)-stable   Id: 3/14

CAN level shifter

3.3V

U471

CAN_TX — 1 — D/TXD

R472 10k — 8 — RS

CAN_RX — 4 — R/RXD

Vref
CANH — 7 — CANH
CANL — 6 — CANL
VCC
GND

SN65HVD230

3.3V
GND
CAN_RX
CAN_TX

pins

CANH — CANL
CANL — CANH

C471
0.1uF

PWR_FLAG

3.3V

C472
4.7uF

CANH — R473 120 — 1 — JP471 — 2 — CANL

JUMPER

5V — 5V — 1
CANH — 2
CANL — 3
— 4

P401 CONN_4

DD_HIP9011 ver.2
RusEfi.com

KNOCK1 C162 .047uF R163 10k
R161 1M GND

KNOCK0 C163 .047uF R164 10k
R162 1M GND

C168 .022uF

5V

20pF C165 0.1uF
C501 GND

INTOUT

GND

D161
HIP9011

1 Vdd	CH0NI 20	
2 GND	CH0IN 19	
3 Vmid	CH0FB 18	R167 68k
4 INTOUT	GH1FB 17	R168 68k
5 NC	CH1IN 16	
6 NC	CH1NI 15	
7 INT/HLD	TEST 14	TEST
8 CS·	SCK 13	SCK
9 OSCIN	SI 12	SI
10 OSCOUT	SO 11	SO

INT/HLD
CS

R166 1M X161 CRYSTAL C166 27pF
C167 27pF
GND

5V
R170 1K DNP R171 1K R172 1K R173 1K R174 1K

INT/HLD CS TEST SCK SI

INTOUT
R175 10k
OUT
R176 10k
GND

CONN_2 P165   2 INT/HLD   1 TEST
CONN_2 P166   2 OUT   1 GND

LED-red
R427 1K
5V
D414
OPTION FOR IGNITION DRIVER
75 OHM   1/2 WATT

INJ-01
100 OHM   1 WATT

INJ-01_5V   20R R403   1K R404   Q401   iGND2   INJ-01_2

INJ-02_5V   20R R406   1K R405   Q402   INJ-02
5V R438 1K   D415   D416
5V R428 1K   D417   D418

INJ-03_5V   20R R407   1K R408   Q403   iGND2   INJ-03

INJ-04_5V   20R R410   R409 1K   Q404   INJ-04
5V R429 1K   D419   D420
1K R430   D421   D422

iGND1
INJ-01_2
INJ-02
INJ-03
INJ-04
iGND1
INJ-05
INJ-06
INJ-07
INJ-08
iGND1
INJ-09
INJ-10
INJ-11
INJ-12
iGND1

INJ-05_5V   20R R411   1K R412   Q405   iGND2   INJ-05

INJ-06_5V   20R R414   R413 1K   Q406   INJ-06
5V R431 1K   D423   D424
R432 1K   D425   D426

INJ-07_5V   20R R415   1K R416   Q407   iGND1   INJ-07

INJ-08_5V   20R R418   R417 1K   Q408   INJ-08
5V R433 1K   D427   D428
1K R434   D429   D430

INJ-09_5V   20R R419   1K R420   Q409   iGND1   INJ-09

INJ-10_5V   20R R422   R421 1K   Q410   INJ-10
5V R435 1K   D431   D432
1K R436   D433   D434

INJ-11_5V   20R R423   1K R424   Q411   iGND1   INJ-11

INJ-12_5V   20R R426   R425 1K   Q412   INJ-12
5V 1K R437   D435   D436

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

INJECTOR   INJECTOR   RELAY   FUSE   BAT
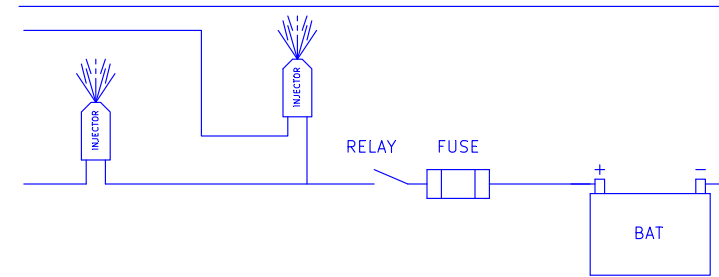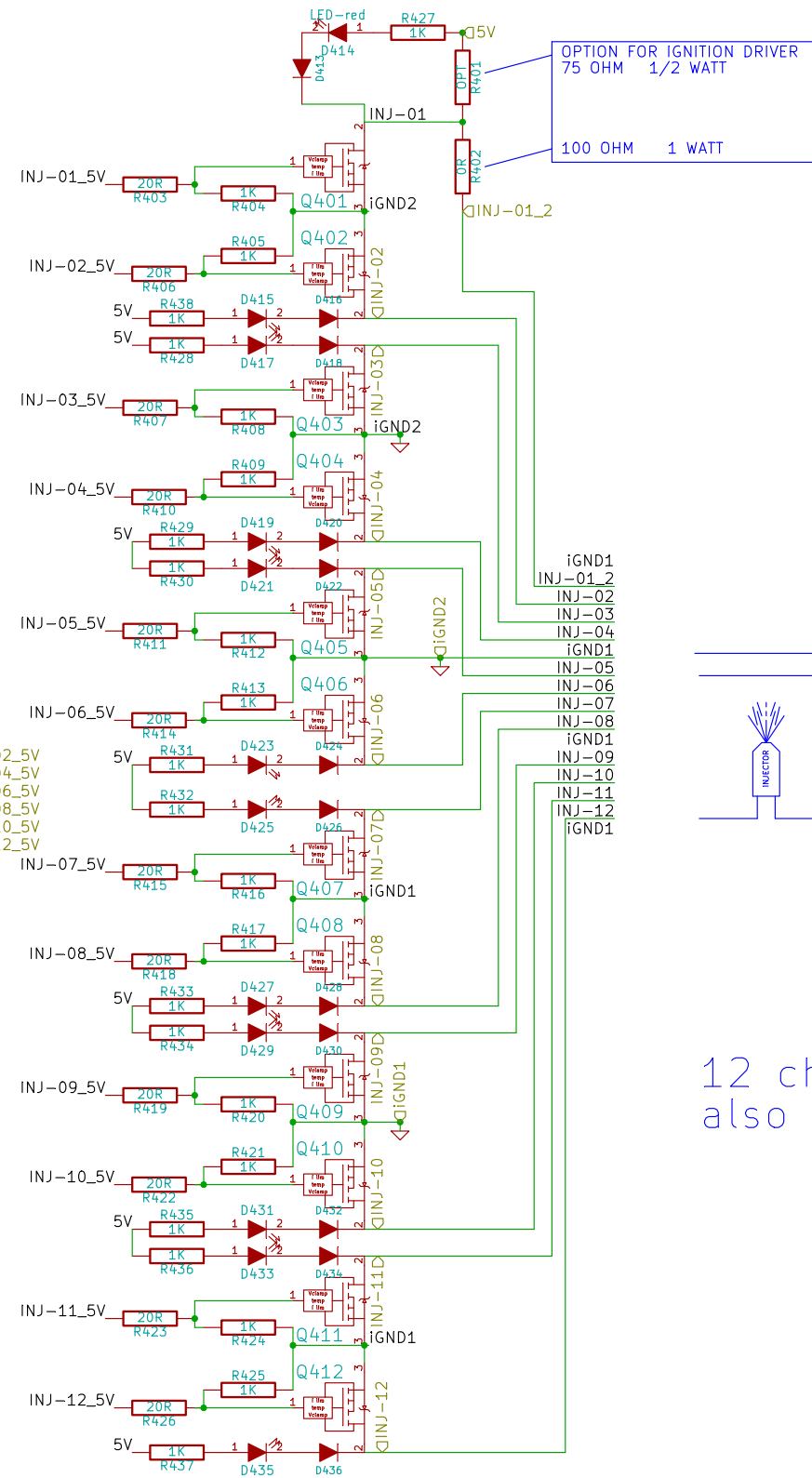
12 channel injector driver
also suitable for fuel pump relay, IAC solenoid etc

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

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
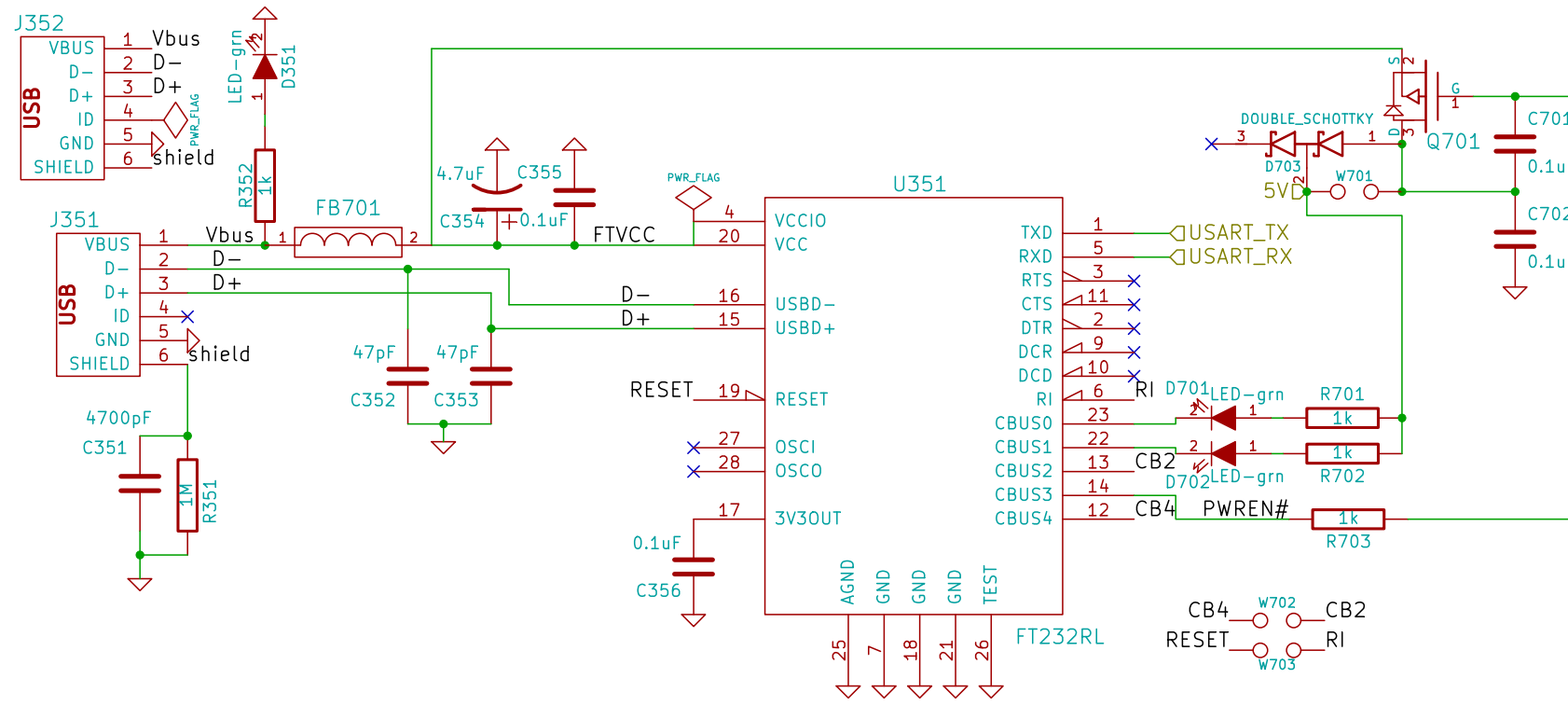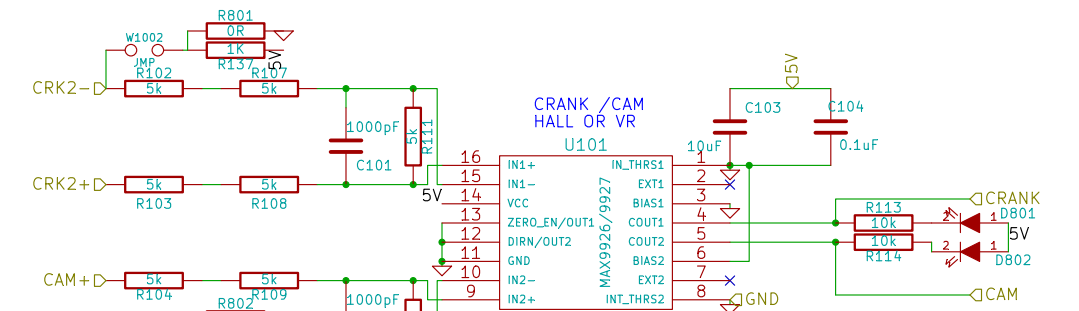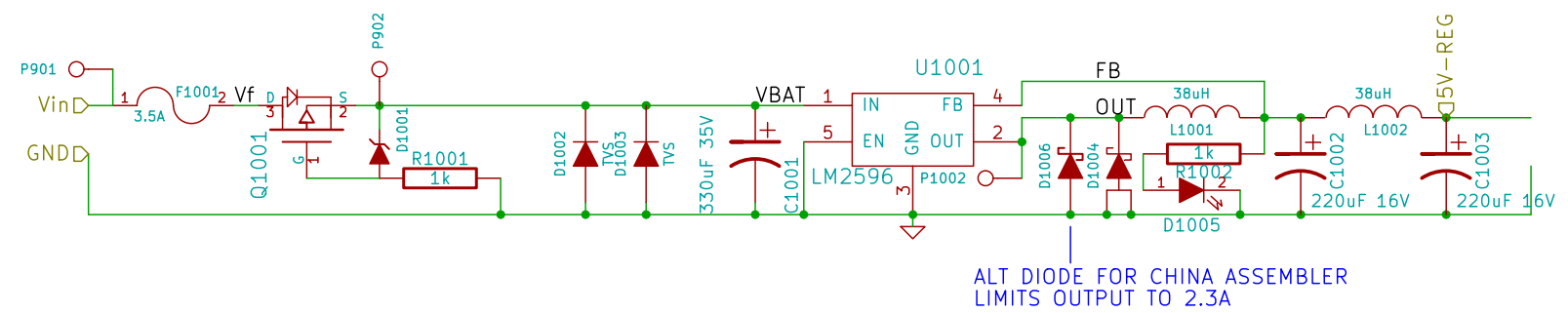

For right conn
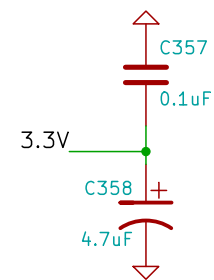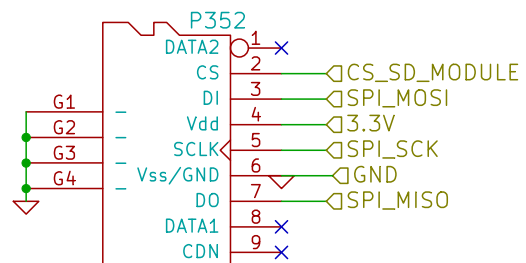
SD card slot
USB TTL module

CRK2−

W1002
JMP
R102
R801
0R
1K
R137
5k 5k
R107

C101
1000pF

CRANK /CAM
HALL OR VR
U101

C103
10uF

C104
0.1uF

5V

CRK2+
R103 R108
5k 5k

5V

16	IN1+	IN_THRS1	1
15	IN1−	EXT1	2
14	VCC	BIAS1	3
13	ZERO_EN/OUT1	COUT1	4
12	DIRN/OUT2	COUT2	5
11	GND	BIAS2	6
10	IN2−	EXT2	7
9	IN2+	INT_THRS2	8

MAX9926/9927

R113
10k
R114
10k

CRANK
D801

5V

CAM+
R104 R109
5k 5k

C102
1000pF

GND

DB02

CAM

W1003
JMP
R802
0R
1K
R141

CAM−
R106 R110
5k 5k

W1002,W1003 are for hall's that need a pull up. Check your hall sensors, many
will want closer to 470 ohm. The 1k is a generic value.
http://www.cherrycorp.com/english/sensors/pdf/connection.pdf

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.

ALT DIODE FOR CHINA ASSEMBLER
LIMITS OUTPUT TO 2.3A

STM32F407VG U1

Left conn P1 CONN_25X2

GNDD / VDDD / GNDD / PC1D / PC3D / PA1D / PA3D / PA5D / PC5D / PB1D / GNDD / PE7D / PE9D / PE11D / PE13D / PB11D / PB13D / PD9D / PD11D / PD13D / PD15D / GNDD

GND / VDD / GND / PC2 / PC0 / PA0 / PA2 / PA4 / PC4 / PB0 / PB2-NC / PE8 / PE10 / PE12 / PE14 / PB10 / PB12 / PB14 / PD8 / PD10 / PD12 / PD14 / NC / GND

Right conn P2 CONN_25X2

GNDD / 5VD / 3.3VD / NC-PH0 / NC-PC14 / PE6D / PE4D / PE0D / PB8D / BOOT0D / PB6D / PB4D / PD7D / PD5D / PD3D / PC12D / PC10D / PA14D / NC-PA10D / PA8D / PC8D / PC6D / GNDD

GND / 5V / 3.3V / NC-PH1 / NC-PC15 / PC13 / PE5 / PE1 / PB9 / VDD / PB7 / PB5 / PB3 / PD4 / PD2 / PD0 / PC11 / PA15 / PA13 / NC-PA9 / PC9 / PC7 / PC5 / GND

Left pin labels (PAx / PBx)

PA0/WKUP/USART2_CTS/UART4_TX/ETH_MII_CRS_/TIM2_CH1_ETR/TIM5_CH1/TIM8_ETR/EVENTOUT
PA1/USART2_RTS/UART4_RX/ETH_RMII_REF_CLK/ETH_MII_RX_CLK/TIM5_CH2/TIMM2_CH2/EVENTOUT
PA2/USART2_TX/TIM5_CH3/TIM9_CH1/TIM2_CH3/ETH_MDIO/EVENTOUT
PA3/USART2_RX/TIM5_CH4/TIM9_CH2/TIM2_CH4/OTG_HS_ULPI_D0/ETH_MII_COL/EVENTOUT
PA4/SPI1_NSS/SPI3_NSS/USART2_CK/DCMI_HSYNC/OTG_HS_SOF/I2S3_WS/EVENTOUT
PA5/SPI1_SCK/OTG_HS_ULPI_CK/TIM2_CH1_ETR/TIM8_CHIN/EVENTOUT
PA6/SPI1_MISO/TIM8_BKIN/TIM13_CH1/DCMI_PIXCLK/TIM3_CH1/TIM1_BKIN/EVENTOUT
PA7/SPI1_MOSI/TIM8_CH1N/TIM14_CH1/TIM3_CH2/ETH_MII_RX_DV/TIM1_CH1N/RMII_CRS_DV/EVENTOUT
PA8/MCO1/USART1_CK/TIM1_CH1/I2C3_SCL/OTG_FS_SOF/EVENTOUT
PA9/USART1_TX/TIM1_CH2/I2C3_SMBA/DCMI_D0/EVENTOUT
PA10/USART1_RX/TIM1_CH3/OTG_FS_ID/DCMI_D1/EVENTOUT
PA11/USART1_CTS/CAN1_RX/TIM1_CH4/_OTG_FS_DM/EVENTOUT
PA12/USART1_RTS/CAN1_TX/TIM1_ETR/OTG_FS_DP/EVENTOUT
PA13/JTMS/SWDIO/EVENTOUT
PA14/JTCK/SWCLK/EVENTOUT
PA15/JTDI/SPI3_NSS/I2S3_WS/TIM2_CH1_ETR/SPI1_NSS/EVENTOUT

PB0/TIM3_CH3/TIM8_CH2N/OTG_HS_ULPI_D1/ETH_MII_RXD2/TIM1_CH2N/EVENTOUT
PB1/TIM3_CH4/TIM8_CH3N/OTG_HS_ULPI_D2/ETH_MII_RXD3/OTG_HS_INTN/TIM1_CH3N/EVENTOUT
PB2/BOOT1/EVENTOUT
PB3/JTDO/TRACESWO/SPI3_SCK/I2S3_CK/TIM2_CH2/SPI1_SCK/EVENTOUT
PB4/NJTRST/SPI3_MISO/TIM3_CH1/SPI1_MISO/I2S3ext_SD/EVENTOUT
PB5/I2C1_SMBA/CAN2_RX/OTG_HS_ULPI_D7/ETH_PPS_OUT/TIM3_CH2/SPI1_MOSI/SPI3_MOSI/DCMI_D10/I2S3_SD/EVENTOUT
PB6/I2C1_SCL/TIM4_CH1/CAN2_TX/DCMI_D5/USART1_TX/EVENTOUT
PB7/I2C1_SDA/FSMC_NL/DCMI_VSYNC/USART1_RX/TIM4_CH2/EVENTOUT
PB8/TIM4_CH3/SDIO_D4/TIM10_CH1/DCMI_D6/ETH_MII_TXD3/I2C1_SCL/CAN1_RX/EVENTOUT
PB9/SPI2_NSS/I2S2_WS/TIM4_CH4/TIM11_CH1/SDIO_D5/DCMI_D7/I2C1_SDA/CAN1_TX/EVENTOUT
PB10/SPI2_SCK/I2S2_CK/I2C2_SCL/USART3_TX/OTG_HS_ULPI_D3/ETH_MII_RX_ER/TIM2_CH3/EVENTOUT
PB11/I2C2_SDA/USART3_RX/OTG_HS_ULPI_D4/ETH_RMII_TX_EN/ETH_MII_TX_EN/TIM2_CH4/EVENTOUT
PB12/SPI2_NSS/I2S2_WS/I2C2_SMBA/USART3_CK/TIM1_BKIN/CAN2_RX/OTG_HS_ULPI_D5/ETH_RMII_TXD0/ETH_MII_TXD0/OTG_HS_ID/EVENTOUT
PB13/SPI2_SCK/I2S2_CK/USART3_CTS/TIM1_CH1N/CAN2_TX/OTG_HS_ULPI_D6/ETH_RMII_TXD1/ETH_MII_TXD1/EVENTOUT
PB14/SPI2_MISO/TIM1_CH2N/TIM12_CH1/OTG_HS_DM/USART3_RTS/TIM8_CH2N/I2S2ext_SD/EVENTOUT
PB15/SPI2_MOSI/I2S2_SD/TIM1_CH3N/TIM8_CH3N/TIM12_CH2/OTG_HS_DP/EVENTOUT

Right pin labels (PEx / PDx / PCx)

PE0/TIM4_ETR/FSMC_NBL0/DCMI_D2/EVENTOUT
PE1/FSMC_NBL1/DCMI_D3/EVENTOUT
PE2/TRACECLK/FSMC_A23/ETH_MII_TXD3/EVENTOUT
PE3/TRACED0/FSMC_A19/EVENTOUT
PE4/TRACED1/FSMC_A20/DCMI_D4/EVENTOUT
PE5/TRACED2/FSMC_A21/TIM9_CH1/DCMI_D6/EVENTOUT
PE6/TRACED3_/FSMC_A22/TIM9_CH2/DCMI_D7/EVENTOUT
PE7/FSMC_D4/TIM1_ETR/EVENTOUT
PE8/FSMC_D5/TIM1_CH1N/EVENTOUT
PE9/FSMC_D6/TIM1_CH1/EVENTOUT
PE10/FSMC_D7/TIM1_CH2N/EVENTOUT
PE11/FSMC_D8/TIM1_CH2/EVENTOUT
PE12/FSMC_D9/TIM1_CH3N/EVENTOUT
PE13/FSMC_D10/TIM1_CH3/EVENTOUT
PE14/FSMC_D11/TIM1_CH4/EVENTOUT
PE15/FSMC_D12/TIM1_BKIN/EVENTOUT

PD0/FSMC_D2/CAN1_RX/EVENTOUT
PD1/FSMC_D3/CAN1_TX/EVENTOUT
PD2/TIM3_ETR/UART5_RX/SDIO_CMD/DCMI_D11/EVENTOUT
PD3/FSMC_CLK/USART2_CTS/EVENTOUT
PD4/FSMC_NOE/USART2_RTS/EVENTOUT
PD5/FSMC_NWE/USART2_TX/EVENTOUT
PD6/FSMC_NWAIT/USART2_RX/EVENTOUT
PD7/USART2_CK/FSMC_NE1/FSMC_NCE2/EVENTOUT
PD8/FSMC_D13/USART3_TX/EVENTOUT
PD9/FSMC_D14/USART3_RX/EVENTOUT
PD10/FSMC_D15/USART3_CK/EVENTOUT
PD11/FSMC_CLE/FSMC_A16/USART3_CTS/EVENTOUT
PD12/FSMC_ALE/FSMC_A17/USART3_RTS/EVENTOUT
PD13/FSMC_A18/TIM4_CH2/EVENTOUT
PD14/FSMC_D0/TIM4_CH3/EVENTOUT
PD15/FSMC_D1/TIM4_CH4/EVENTOUT

PC0/OTG_HS_ULPI_STP/EVENTOUT
PC1/ETH_MDC/EVENTOUT
PC2/SPI2_MISO/OTG_HS_ULPI_DIR/ETH_MII_TXD2/I2S2ext_SD/EVENTOUT
PC3/SPI2_MOSI/I2S2_SD/OTG_HS_ULPI_NXT/ETH_MII_TX_CLK/EVENTOUT
PC4/ETH_RMII_RX_D0/ETH_MII_RX_D0/EVENTOUT
PC5/ETH_RMII_RX_D1/ETH_MII_RX_D1/EVENTOUT
PC6/I2S2_MCK/TIM8_CH1/SDIO_D6/USART6_TX/DCMI_D0/EVENTOUT
PC7/I2S3_MCK/TIM8_CH2/SDIO_D7/USART6_RX/DCMI_D1/EVENTOUT
PC8/TIM8_CH3/SDIO_D0/TIM3_CH3/USART6_CK/DCMI_D2/EVENTOUT
PC9/I2S_CKIN/MCO2/TIM8_CH4/SDIO_D1/I2C3_SDA/DCMI_D3/TIM3_CH4/EVENTOUT
PC10/SPI3_SCK/I2S3_CK/UART4_TX/SDIO_D2/DCMI_D8/USART3_TX/EVENTOUT
PC11/UART4_RX/SPI3_MISO/SDIO_D3/DCMI_D4/USART3_RX/I2S3ext_SD/EVENTOUT
PC12/UART5_TX/SDIO_CK/DCMI_D9/SPI3_MOSI/I2S3_SD/USART3_CK/EVENTOUT
PC13/EVENTOUT
PC14/OSC32_IN/EVENTOUT
PC15/OSC32_OUT/EVENTOUT

Power / control pins

BOOT0 (94) — BOOT0
NRST (14) — NRST
PH0/OSC_IN/EVENTOUT (12)
PH1/OSC_OUT/EVENTOUT (13)
VREF+ (21)
VDDA (22)
VBAT (6)
VSA (20) / VSS (10) / VSS (27) / VSS (74) / VSS (99)
VCAP_1 (49) / VCAP_2 (73)

Components

Reset — SW1 SW_PUSH, C1 0.01uF
R3 10k — VDD
R4 10k — BOOT0
X1 8MHz CRYSTAL, C2 20pF, C3 20pF
PWR_FLAG
C5 0.01uF / C6 / C7 1uF / C8 0.01uF R10 47R FB1 FILTER
C9 0.1uF / C10 0.1uF / C11 0.1uF / C12 0.1uF / C13 0.1uF / C14 0.1uF / C16 1uF
JUMPER3 JP5 BT1 BATTERY_CR2032

User & Wake-UP Button — SW2 SW_PUSH, C4 2u2F, R2, R5 330R, R1 10k — PA0
JP1 R6 680R D1 Green LED-grn — PD12
JP2 R7 680R D2 Orange LED-org — PD13
JP3 R8 680R D3 Red LED-red — PD14
JP4 R9 680R D4 Blue LED-blu — PD15
C15 2u2F / C17 2u2F
X2 32.768kHz CRYSTAL, C21 12.5pF, C22 12.5pF

Ext power — R11 1k, D7 LED-grn, D5 DIODESCH, 5Vi
Ext 5V in — CONN_2 P3
C18 0.1uF, C19 4.7uF
U3 LM2937 (Vin / GND / Vout) — 3.3v VDD
USB power — R12 1k, D8 LED-grn, D6 DIODESCH
J1 USB (VBUS / D- / D+ / ID / GND / SHIELD) Vbus, Shield R14, C20 0.1uF
U2 NUF2101MT1G — D+ / D+out / Vbus / GND / D- / D-out
diodes schottky 20V 1A SD0805S020S1R0
F1002 FUSE, R13 1k, D11 LED-grn — Power line ON
D9 DIODESCH — 3.3V
SWD — CONN_6 (VDD / PA14 / PA13 / NRST / PB3)
J2 USB (VBUS / D- / D+ / ID / GND / SHIELD) Vbus, Shield
GND test P1003 / P1004 5V P1001 / P1002

TCPL−

TCPL+

CONNL_2
P1103

MAX31855
Cold−Junction Compensated
Thermocouple−to−Digital Converter

3.3v
C1102
100nF

P1101 P1102

Via for cable tie

CONNL_2
P1104

1 TCPL−

2 TCPL+

C1101
10nF

GND

U1101

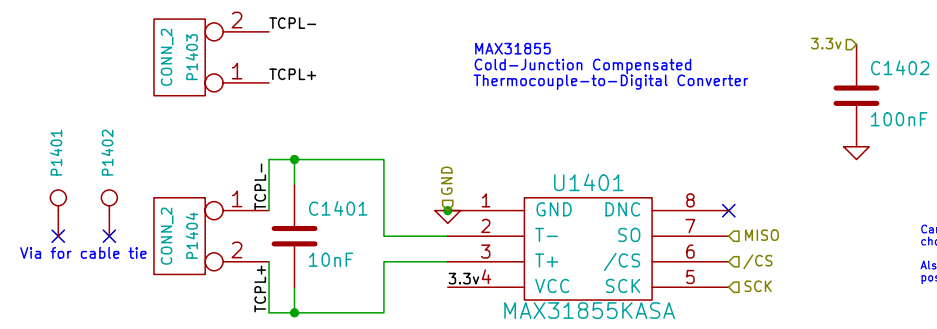| 1 | GND | DNC | 8 |
2	T−	SO	7	MISO
3	T+	/CS	6	/CS
3.3v	4 VCC	SCK	5	SCK

MAX31855KASA

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−juntion 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

File: thermocouple_module.sch

Sheet: /thermocouple1/

Title: Electronic Industrial Temperature Interface (EITI)

Size: A4   Date: 28 mar 2015   Rev: .02

KiCad E.D.A. eeschema (2013−07−07 BZR 4022)−stable   Id: 11/14
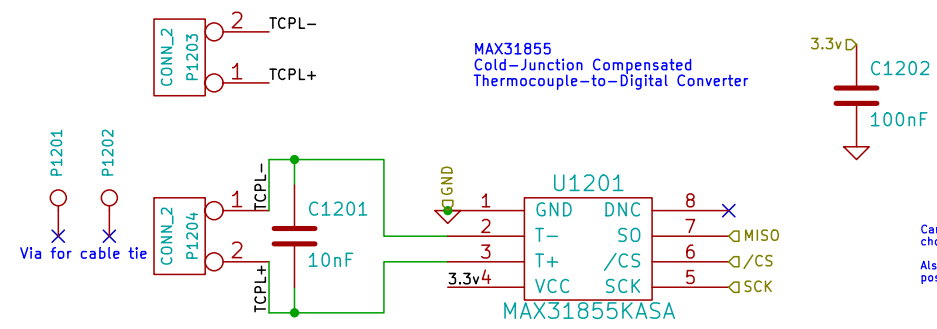
CONN_2
P1203

2 TCPL−

1 TCPL+

MAX31855
Cold−Junction Compensated
Thermocouple−to−Digital Converter

3.3v

C1202

100nF

P1201 P1202

Via for cable tie

CONN_2
P1204

1 TCPL−

2 TCPL+

C1201

10nF

GND

U1201

1 GND   DNC 8
2 T−   SO 7 MISO
3 T+   /CS 6 /CS
4 VCC   SCK 5 SCK

3.3v

MAX31855KASA

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http://datasheets.maxim−ic.com/en/ds/MAX31855.pdf

Mrk Industries

File: thermocouple_module.sch

Sheet: /thermocouple2/

Title: Electronic Industrial Temperature Interface (EITI)

Size: A4 | Date: 28 mar 2015 | Rev: .02

KiCad E.D.A. eeschema (2013−07−07 BZR 4022)−stable | Id: 12/14
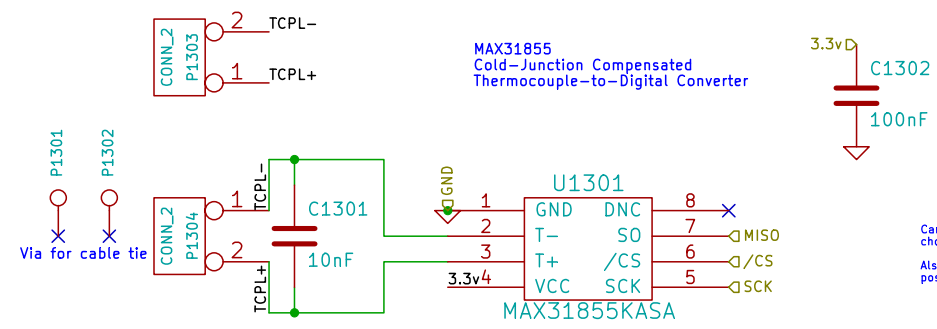
TCPL−

TCPL+

CONN_2
P1303

P1301 P1302

Via for cable tie

CONN_2
P1304

TCPL−

TCPL+

C1301
10nF

MAX31855
Cold−Junction Compensated
Thermocouple−to−Digital Converter

3.3v

C1302
100nF

U1301

1	GND	DNC	8
2	T−	SO	7	MISO
3	T+	/CS	6	/CS
4	VCC	SCK	5	SCK

3.3v

MAX31855KASA

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CONN_2 P1403

2 TCPL−
1 TCPL+

P1401 P1402

Via for cable tie

CONN_2 P1404

1 TCPL−
2 TCPL+

C1401
10nF

MAX31855
Cold−Junction Compensated
Thermocouple−to−Digital Converter

3.3v

C1402
100nF

U1401

1	GND	DNC	8
2	T−	SO	7	MISO
3	T+	/CS	6	/CS
4	VCC	SCK	5	SCK

3.3v

MAX31855KASA

GND

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