AT88xx ENGINE CONTROL UNIT - ARCHITECTURE

Based on Speeduino platform

In progress :)

ARCHI							
	REV0	ORG-EDT					
	REV	MODIF	DESS	DATE	CONTR	DATE	
AT88xx SPEEDUINO ECU	*1901-062 Rev 1.0*	DESIGNER : FRAM DATE : 09/10/2019					
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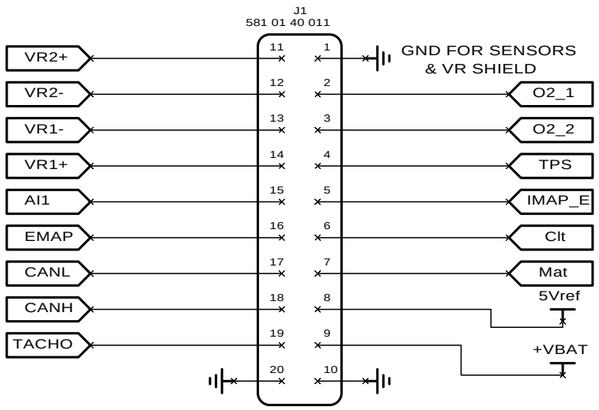
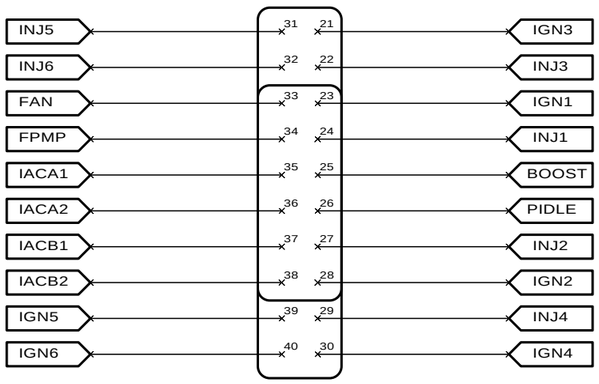
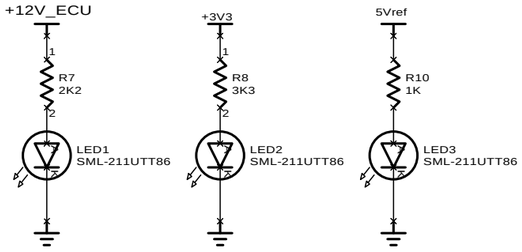
I/O MAIN CONNECTORs





PSU LEDs

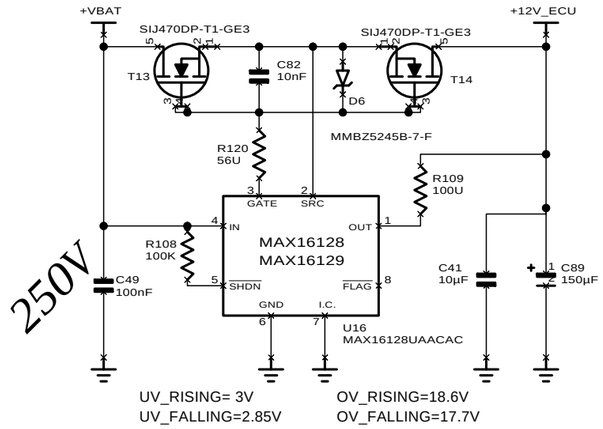


TPs

POWER SUPPLY UNIT

LOAD DUMP/REVERSE VOLTAGE UNDER and OVER VOLTAGE PROTECTION

+30V
0V

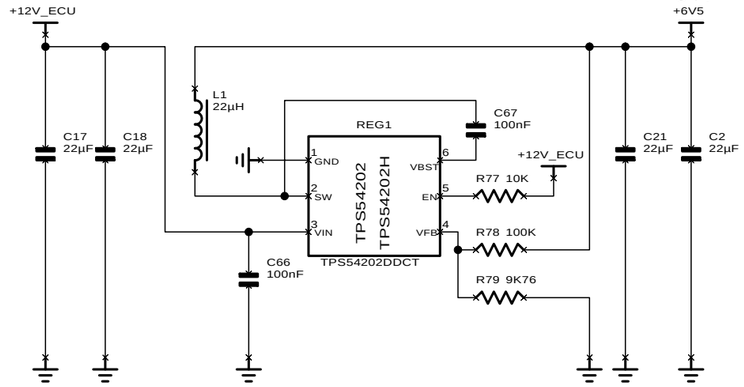


UV_RISING= 3V
UV_FALLING=2.85V

OV_RISING=18.6V
OV_FALLING=17.7V

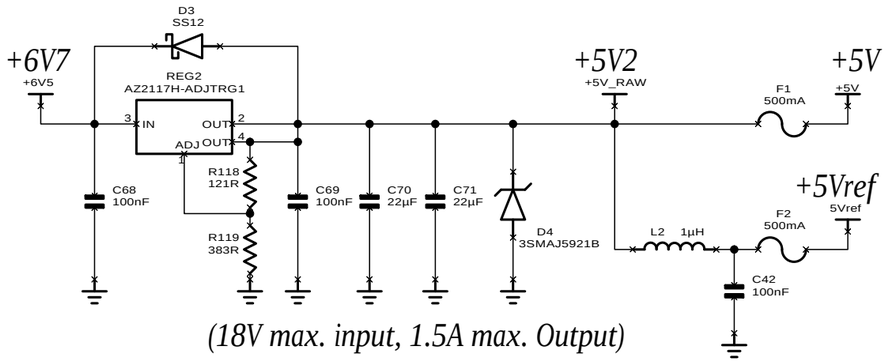
BUCK STEP DOWN VBAT -> 6.7V

+6V7



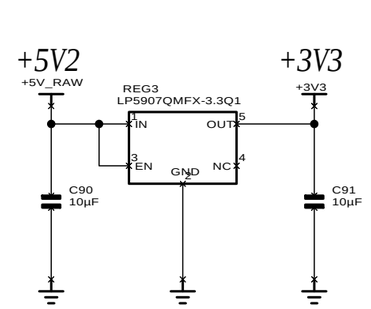
(4V5 to 28V input, 2A Output max.)

LDO REG. 6.7V -> 5V2



(18V max. input, 1.5A max. Output)

LDO REG. 5V2-> 3V3



(2V2 to 5V5 input, 250mA max. Output)

CONNECTOR/PSU	REV	MODIF	DESS	DATE	CONTR	DATE
	REV0	ORG-EDT				

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RTC CRYSTAL

C29 12pF, Q1 32.76800MHz, C78 12pF

ANA I/O

TACHO, CLT_CPU, MAT_CPU, BARO_CPU, IMAP_I_CPU

FLASH

FLASH_IO0, FLASH_IO1, FLASH_IO2, FLASH_IO3, DRV_EN, STEP_CPU, DIR_CPU, IGN5_CPU

U2-A

ATSAMx5xPxx

As close as possible to aref pins

+3V3, C80 100nF

ATSAME54P20A

PORT A

µC

IGN3_CPU, IGN4_CPU, IGN6_CPU, IGN1_CPU

USB

USB_DM, USB_DP

SWD

SWCLK, SWDIO

U2-B

ATSAMx5xPxx

ATSAME54P20A

PORT B

ANA I/O

TACH2_CPU, TACH1_CPU, VBKUP, O2_1_CPU, O2_2_CPU, TPS_CPU, IMAP_E_CPU

FLASH

AI1_CPU, EMAP_CPU, FLASH_SCK, FLASH_CS

CAN

CAN_TX, CAN_RX, CAN_STDBY, FPMP_CPU

UART1 (CAN) COM4 (CAN)

UART3 COM5

TEST, OUT_KNK, INT/HLD, CS_KNK

UART0 COM0

D1/UART0_TX, D0/UART0_TX

SWD

SD_MOSI, SD_SCK, SD_CS, SD_MISO, SWO, SD_CD

U2-C

ATSAMx5xPxx

ATSAME54P20A

PORT C

ANA I/O

BRV_CPU, FAN_CPU, PIDLE_CPU, INJ6_CPU, INJ5_CPU, INJ3_CPU, INJ1_CPU, INJ2_CPU, INJ4_CPU, INJ8_CPU, INJ7_CPU

I2C_1 COM6

SDA_1, SCL_1

EEPROM

UART2 COM1

IGN2_CPU, IGN8_CPU, IGN7_CPU, VBUS_DETC, TX_BT, RX_BT

BT

TXLED, RXLED

U2-D

ATSAMx5xPxx

ATSAME54P20A

SPI - COM7 DOPO=0X00

MOSI, SCK, CS_EEPROM, MISO, BOOST_CPU

PORT D

BATTERY BACKUP

VBKUP, BAT1 BC501SM

EEPROM 4Kb (SPI)

+3V3, R141 4K7, C98 100nF, CS_EEPROM, MISO, MOSI, SCK, VCC, CS, SO, SI, SCK, VSS, U19 25LC040AT-I/OT

SWD INTERFACE

+3V3, R58 1K, J2, SWDIO, SWCLK, SWO, RESET, 20021521-00010T1LF

RESET

+3V3, R32 10K, RESET, C16 100nF

FLASH 64Mb (Quad SPI)

+3V3, R126 100K, C88 100nF, R132 100K, U23, FLASH_CS, FLASH_IO1, FLASH_IO2, FLASH_IO3, FLASH_SCK, FLASH_IO0, R127 22U, GD25Q64CSIGR

µSD CARD (SPI)

SD1, DM3D-SF, SD CARD, SD_CS, SD_MOSI, SD_SCK, SD_MISO, SD_CD, DATA2, CD/DATA3, CMD, VDD, CLK, VSS, DAT0, DAT1, SW1, SW2, SHIELD, C81 100nF

U2-E

ATSAMx5xPxx

ATSAME54P20A

POWER

As close as possible to the vddana pins

C50 100nF, C51 100nF, C77 100nF

As close as possible to the pins

C86 10µF, C5 1µF, C87 100nF, L3 10µH

C24 100nF, C25 100nF, C26 100nF, C27 100nF, C28 100nF, C72 100nF, C73 100nF, C74 100nF, C75 100nF, C76 100nF

As close as possible to the vdd pins

RESET, VDDANA, VDDANA1, VDDANA2, VDDCORE, VSW, VDDIOB, VDDIOB1, VDDIO, VDDIO1, VDDIO2, VDDIO3, VDDIO4, VDDIO5, VDDIO6, VDDIO7, GNDIO, GNDANA, GNDANA1, GND, GND1, GND2, GND3, GND4, GND5, GND6, GND7, GND8, GND9

REV0	ORG-EDT					
REV	MODIF	DESS	DATE	CONTR	DATE	

CPU

AT88xx SPEEDUINO ECU

1901-062 Rev 1.0

DESIGNER : FRAM
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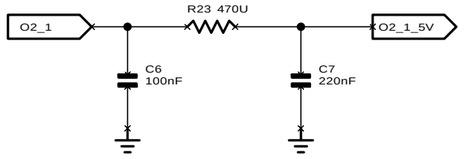
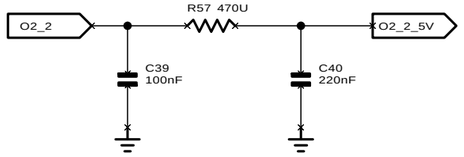
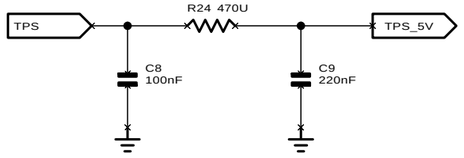
O2 SENSOR 1



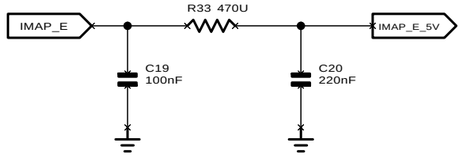
O2 SENSOR 2



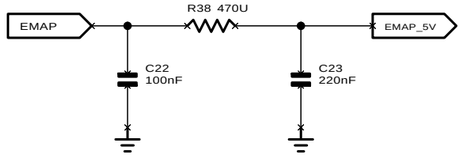
TPS SENSOR



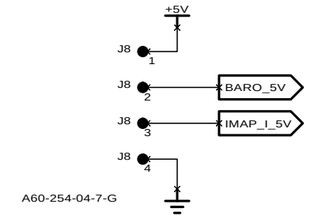
EXTERNAL IMAP SENSOR



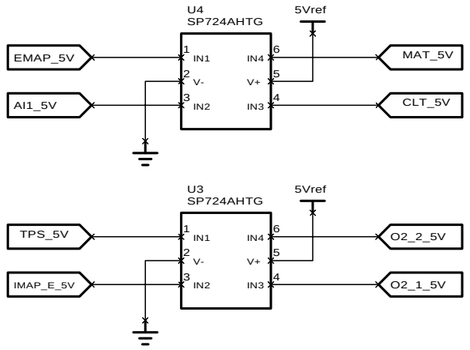
EXTERNAL EMAP SENSOR



INTERNAL IMAP & BARO SENSORS
EXTENSION HEADER FOR DAUGHTER CARD

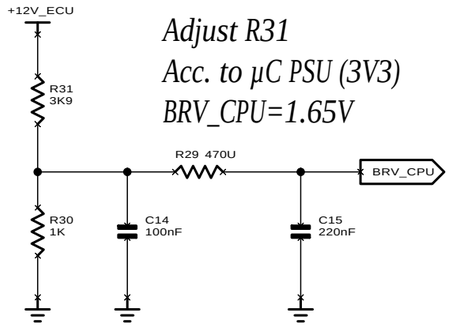


ESD PROTECTION for SENSORs

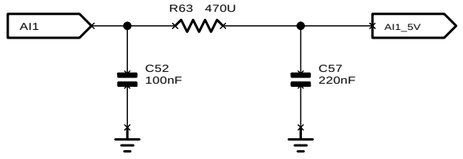


BATTERY REFERENCE VOLTAGE

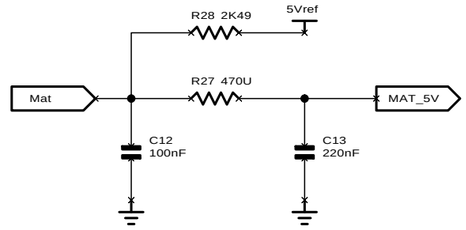
Adjust R31
Acc. to µC PSU (3V3)
BRV_CPU=1.65V



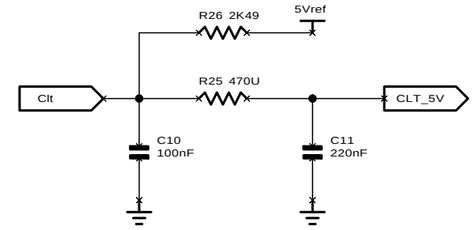
ANALOG INPUT AUX1



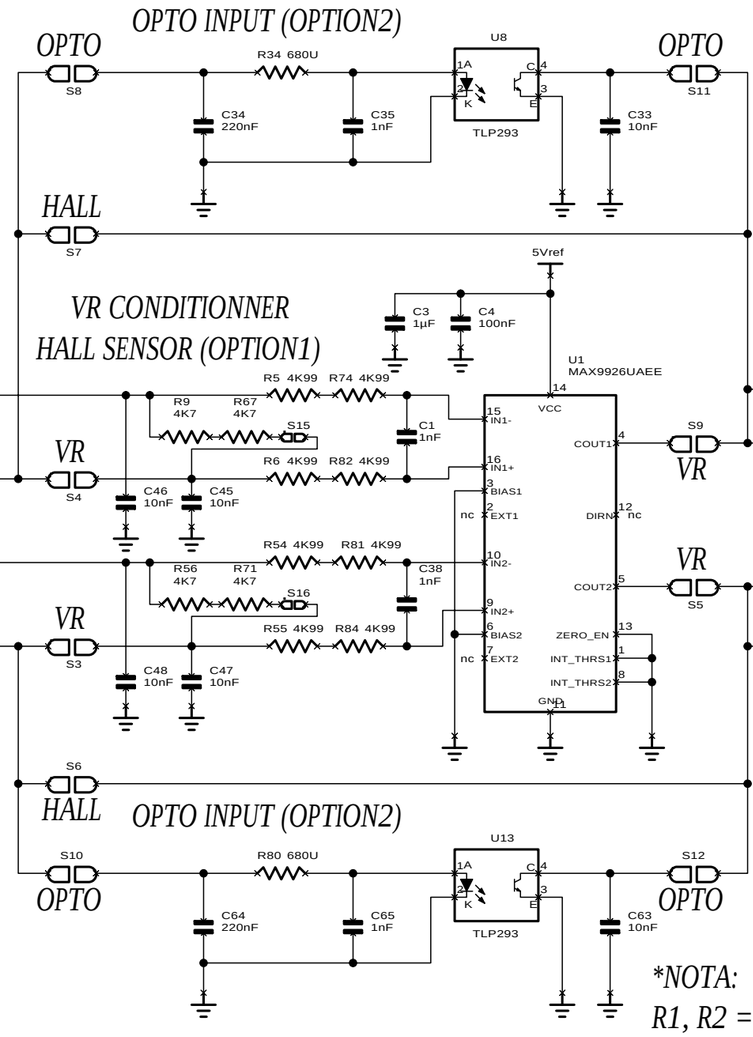
MAT SENSOR



CLT SENSOR



OPTO INPUT (OPTION2)



ANALOG INPUTS/SENSORS						
	REV0	ORG-EDT				
	REV	MODIF	DESS	DATE	CONTR	DATE
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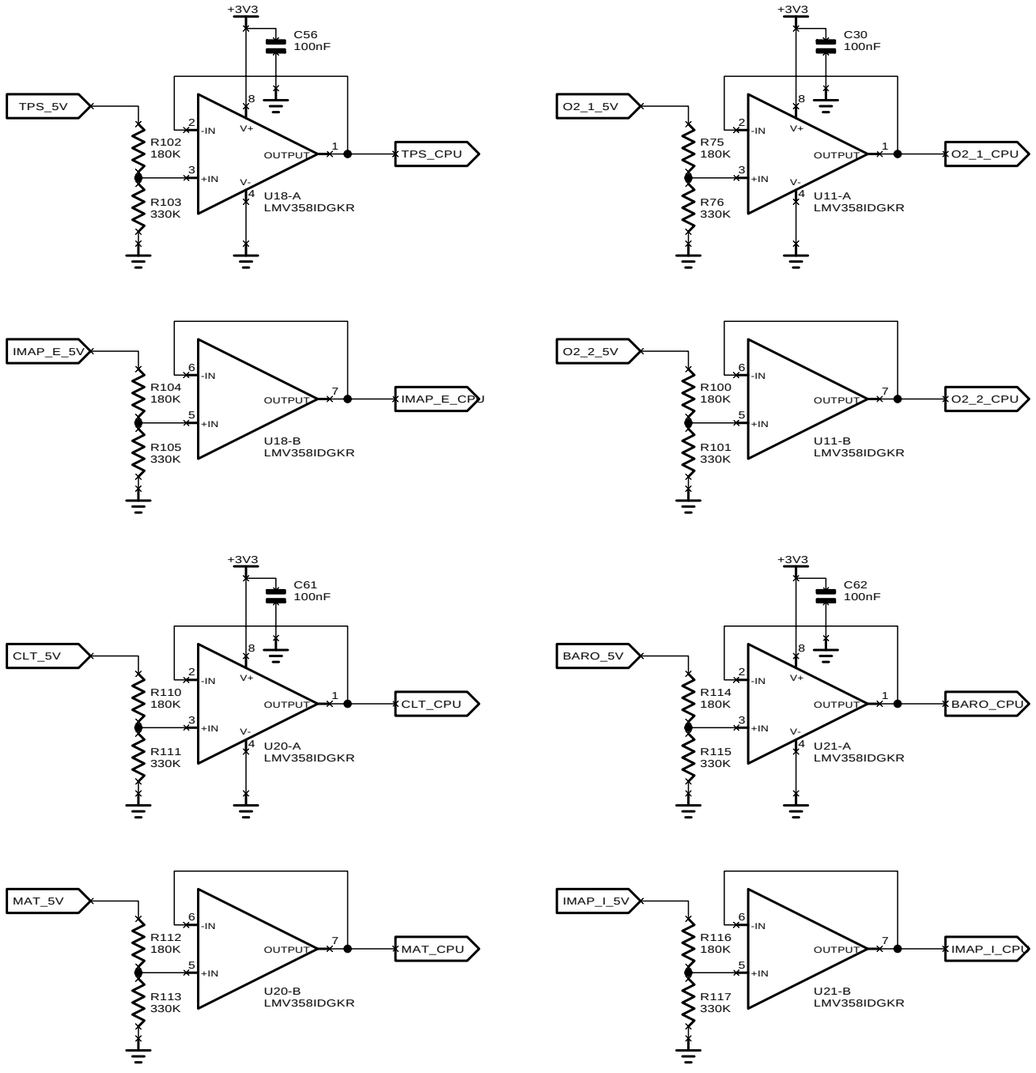
ANALOG LEVEL SHIFTER 5V->3V3 µC



ANALOG LEVEL SHIFTER							
	REV0	ORG-EDT					
	REV	MODIF	DESS	DATE	CONTR	DATE	

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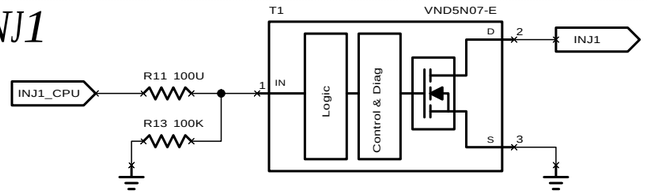
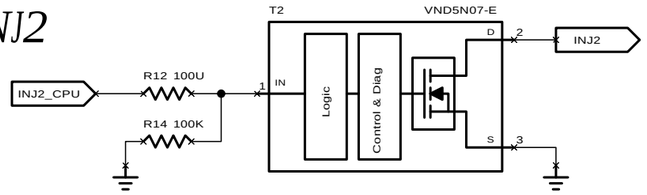
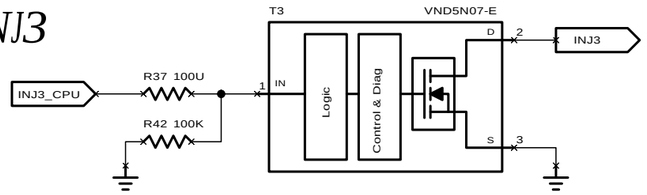
INJ1



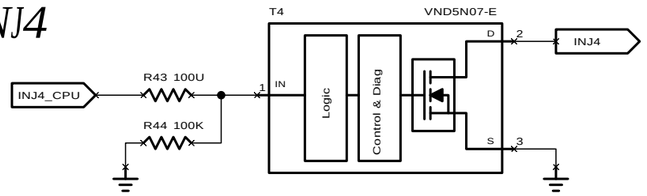
INJ2



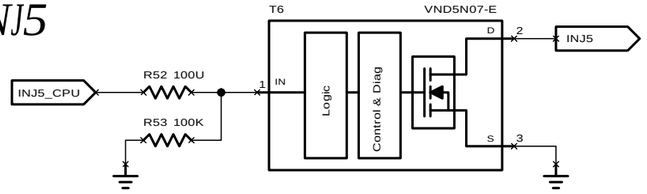
INJ3



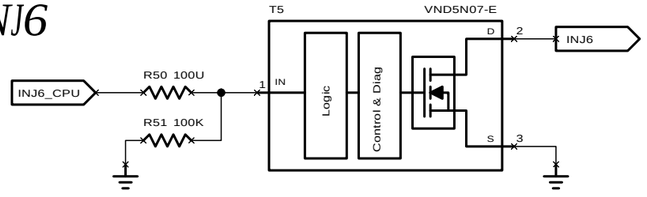
INJ4



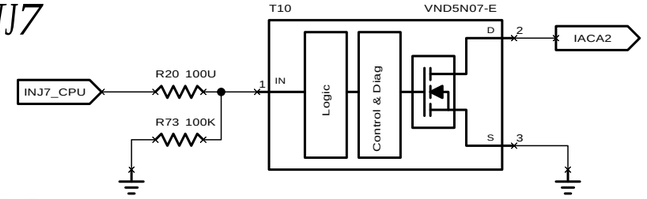
INJ5



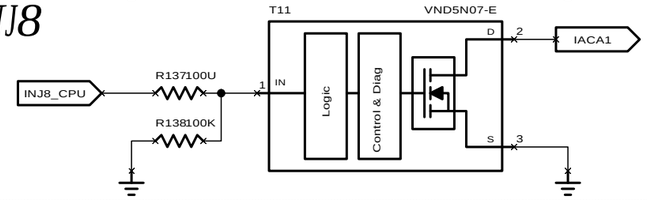
INJ6



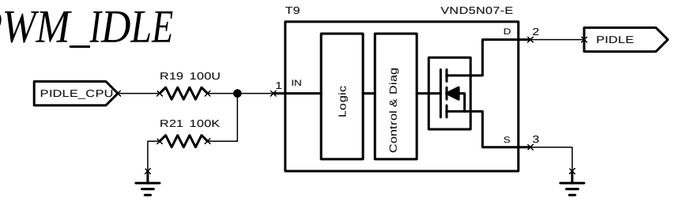
INJ7



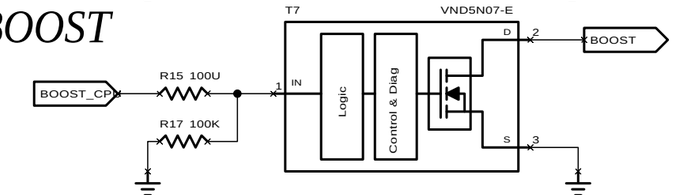
INJ8



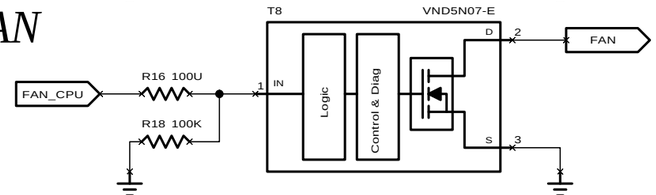
PWM_IDLE



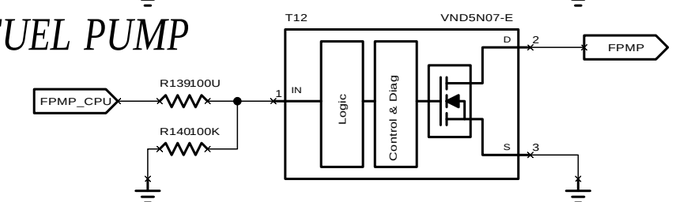
BOOST



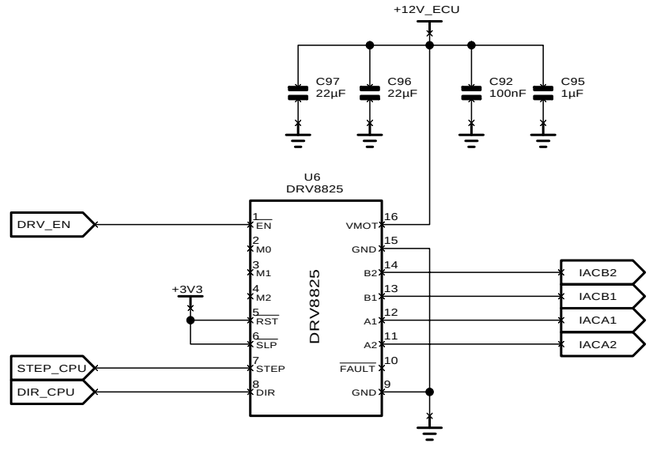
FAN



FUEL PUMP

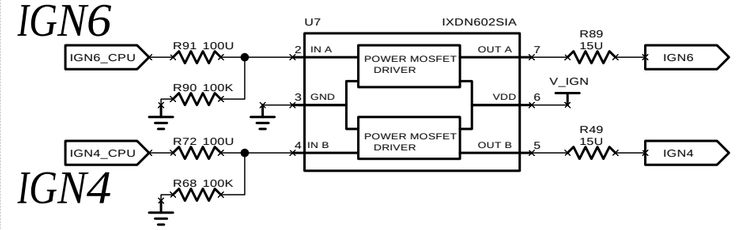


STEPPER DRIVER IDLE



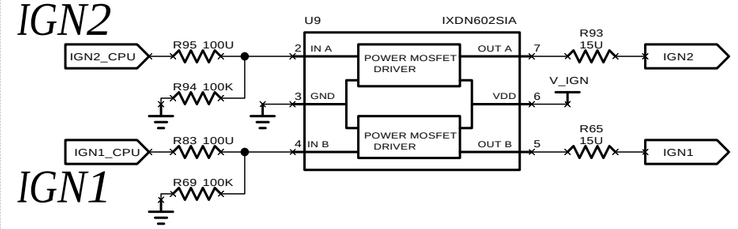
IGNITION/IGBT DRIVER

IGN6



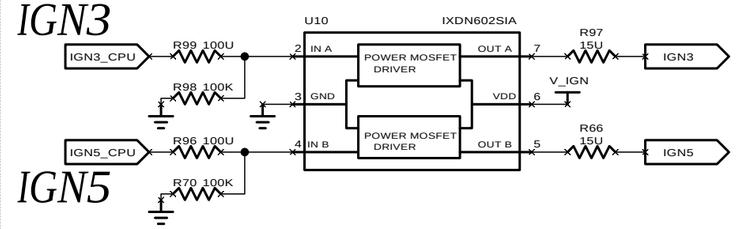
IGN4

IGN2



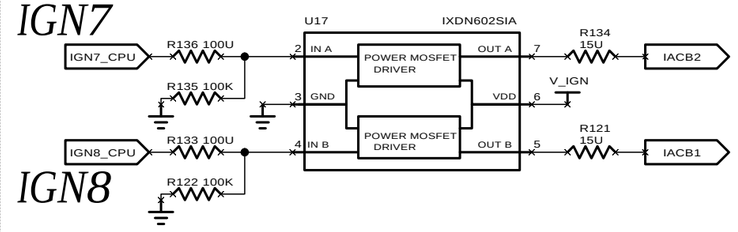
IGN1

IGN3

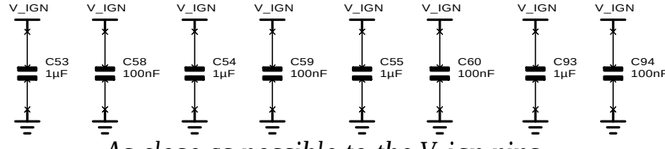


IGN5

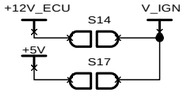
IGN7



IGN8



As close as possible to the V_ign pins



IGNITION DRIVER
POWER SUPPLY SELECTION

INJ/AUX OUT/IGN

REV	MODIF	DESS	DATE	CONTR	DATE
REV0	ORG-EDT				

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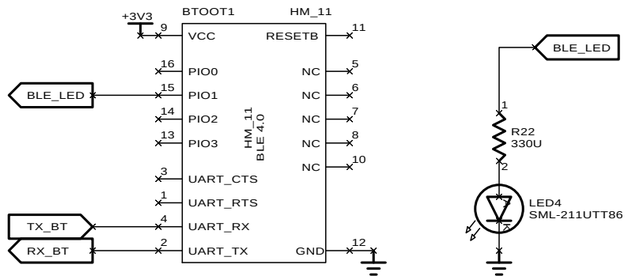
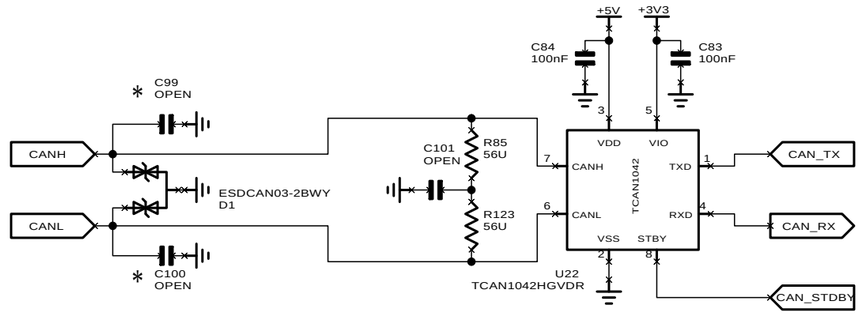
BLUETOOTH HM11 MODULE



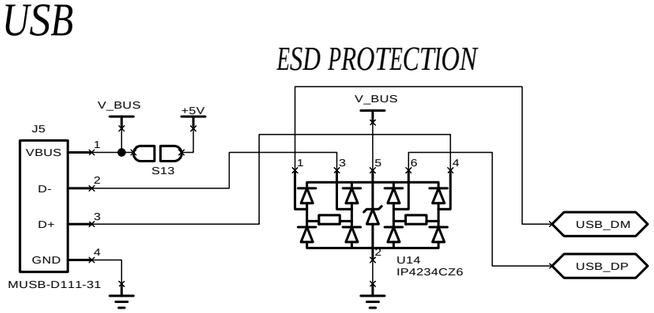
CAN-FD BUS

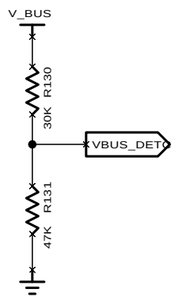


* C99, C100 : Only use on noisy network

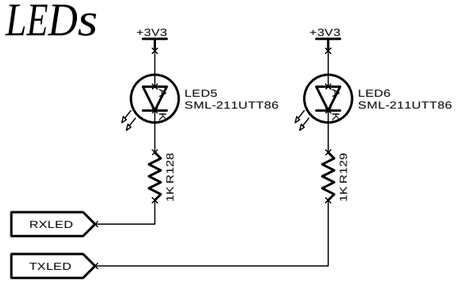
USB

ESD PROTECTION





USB LEDs



BT/USB/CAN COM						
	REV0	ORG-EDT				
	REV	MODIF	DESS	DATE	CONTR	DATE

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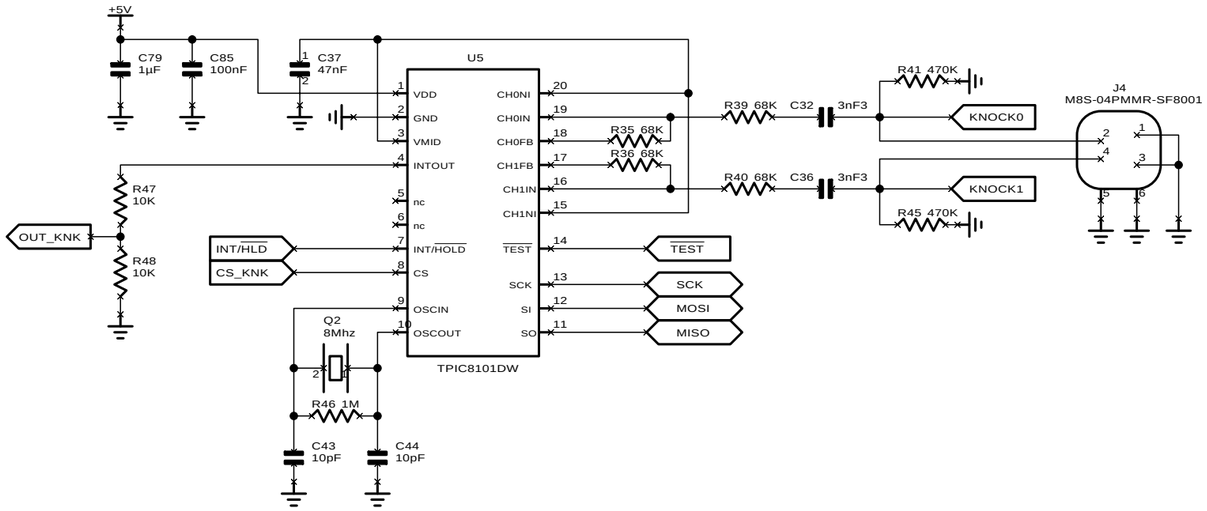
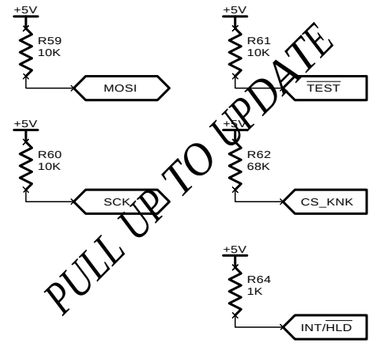
KNOCK SENSOR - DUAL CHANNEL (SPI)





PULL UP TO UPDATE

KNOCK SENSOR							
	REV0	ORG-EDT					
	REV	MODIF	DESS	DATE	CONTR	DATE	

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