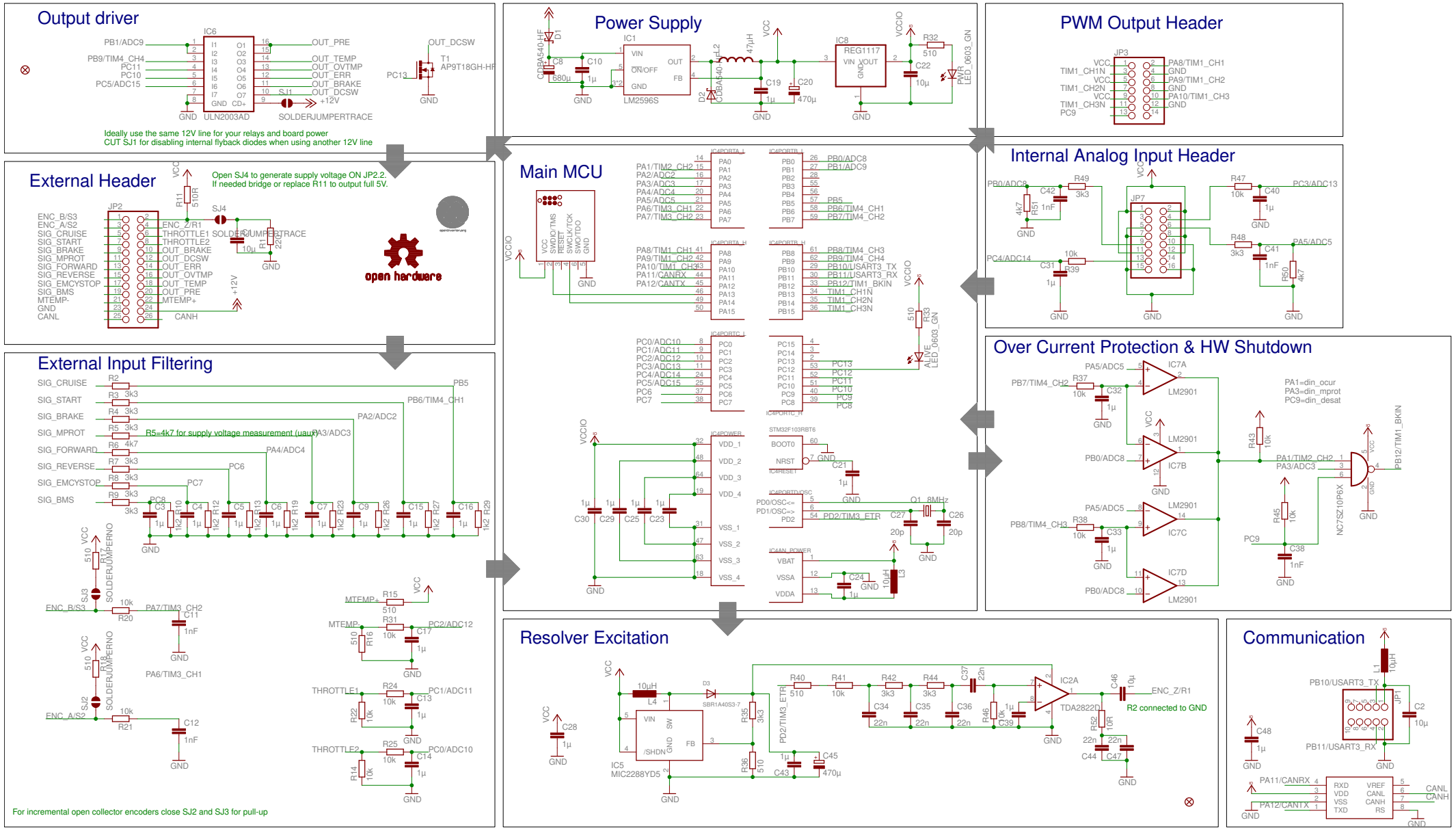
Output driver
IC6
PB1/ADC9
PB9/TIM4_CH4
PC11
PC10
PC5/ADC15
OUT_PRE
OUT_TEMP
OUT_OVTMP
OUT_ERR
OUT_BRAKE
OUT_DCSW
+12V
GND
ULN2003AD
SOLDERJUMPERTRACE
SJ1
OUT_DCSW
T1
AP9T18GH-HF
PC13
GND
Ideally use the same 12V line for your relays and board power
CUT SJ1 for disabling internal flyback diodes when using another 12V line
Power Supply
IC1
LM2596S
CDBA540-HF
D1
D2
L2
47µH
C8
680µ
C10
1µ
C19
1µ
C20
470µ
C22
10µ
IC8
REG1117
VCC
VCCIO
R32
510
PWR LED_0603_GN
PWM Output Header
JP3
PA8/TIM1_CH1
PA9/TIM1_CH2
PA10/TIM1_CH3
TIM1_CH1N
TIM1_CH2N
TIM1_CH3N
External Header
JP2
ENC_B/S3
ENC_A/S2
SIG_CRUISE
SIG_START
SIG_BRAKE
SIG_MPROT
SIG_FORWARD
SIG_REVERSE
SIG_EMCYSTOP
SIG_BMS
MTEMP-
CANL
ENC_Z/R1
THROTTLE1
THROTTLE2
OUT_BRAKE
OUT_DCSW
OUT_ERR
OUT_OVTMP
OUT_TEMP
OUT_PRE
MTEMP+
CANH
R11
510R
SJ4
SOLDERJUMPERTRACE
R1
220R
10µ
Open SJ4 to generate supply voltage ON JP2.2.
If needed bridge or replace R11 to output full 5V.
open hardware
Main MCU
VCCIO
SWDIO/TMS
RESET
SWCLK/TCK
SWO/TDO
PA0
PA1/TIM2_CH2
PA2/ADC2
PA3/ADC3
PA4/ADC4
PA5/ADC5
PA6/TIM3_CH1
PA7/TIM3_CH2
PA8/TIM1_CH1
PA9/TIM1_CH2
PA10/TIM1_CH3
PA11/CANRX
PA12/CANTX
PA15
PB0/ADC8
PB1/ADC9
PB5
PB6/TIM4_CH1
PB7/TIM4_CH2
PB8/TIM4_CH3
PB9/TIM4_CH4
PB10/USART3_TX
PB11/USART3_RX
PB12/TIM1_BKIN
TIM1_CH1N
TIM1_CH2N
TIM1_CH3N
PC0/ADC10
PC1/ADC11
PC2/ADC12
PC3/ADC13
PC4/ADC14
PC5/ADC15
PC6
PC7
PC13
PC12
PC11
PC10
PC9
PC8
STM32F103RBT6
BOOT0
NRST
VDD_1
VDD_2
VDD_3
VDD_4
VSS_1
VSS_2
VSS_3
VSS_4
VBAT
VSSA
VDDA
PD0/OSC<=
PD1/OSC=>
PD2/TIM3_ETR
Q1 8MHz
20p
L3
10µH
Internal Analog Input Header
JP7
PB0/ADC8
PC4/ADC14
PC3/ADC13
PA5/ADC5
R49
3k3
R47
10k
R48
3k3
R51
4k7
R39
10k
R50
4k7
C42
1nF
C31
1µ
C40
1µ
C41
1nF
Over Current Protection & HW Shutdown
IC7A
IC7B
IC7C
IC7D
LM2901
PA5/ADC5
PB7/TIM4_CH2
PB0/ADC8
PB8/TIM4_CH3
PA1/TIM2_CH2
PA3/ADC3
PC9
PA1=din_ocur
PA3=din_mprot
PC9=din_desat
PB12/TIM1_BKIN
NC7SZ10P6X
R37
10k
R38
10k
R43
10k
R45
10k
C32
1µ
C33
1µ
C38
1nF
External Input Filtering
SIG_CRUISE
SIG_START
SIG_BRAKE
SIG_MPROT
SIG_FORWARD
SIG_REVERSE
SIG_EMCYSTOP
SIG_BMS
R5=4k7 for supply voltage measurement (uau)
SOLDERJUMPERNO
ENC_B/S3
ENC_A/S2
PA7/TIM3_CH2
PA6/TIM3_CH1
MTEMP+
MTEMP-
THROTTLE1
THROTTLE2
PC2/ADC12
PC1/ADC11
PC0/ADC10
For incremental open collector encoders close SJ2 and SJ3 for pull-up
Resolver Excitation
IC5
MIC2288YD5
SBR1A40S3-7
L4
10µH
R40
510
R41
10k
R42
3k3
R44
3k3
C37
22n
C34
22n
C35
22n
C36
22n
R46
0k
C39
1µ
IC2A
TDA2822D
C46
10µ
R52
10R
C44
22n
C47
22n
ENC_Z/R1
R2 connected to GND
C28
1µ
C43
1µ
C45
470µ
R35
3k3
R36
510
PD2/TIM3_ETR
Communication
L1
10µH
JP1
C2
10µ
C48
1µ
PB10/USART3_TX
PB11/USART3_RX
PA11/CANRX
PA12/CANTX
RXD
VDD
VSS
TXD
VREF
CANL
CANH
RS
CANL
CANH