3rd Order Butterworth Bandpass
Lower Cutoff Freq. = 1.900 MHz; Upper Cutoff Freq. = 31.00 MHz
https://rf-tools.com/lc-filter/

1N5819HW 4pcs

QCA 7000

8x8mm QFN-68

D8

ARM926

GPIO_1 must be pulled down.

GPIO_2 selects burst mode (3V3)

M25P16 25q16

Atmel AT26DF161-SU 100 MHz 16-Mbits Not for new designs

Atmel	AT26DF161A-SU	70 MHz 16-Mbits
Numonyx	M25P80-VMW6TP	75 MHz 8-Mbits
Numonyx	M25P16-VMW6TP	75MHz 16-Mbits
Macronix	MX25L8005	70 MHz 8-Mbits
Macronix	MX25L1605	86 MHz 16-Mbits

controller
File: controller.kicad_sch

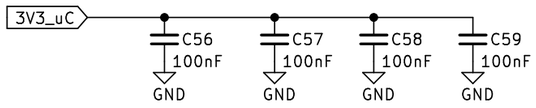
outputdrivers
File: outputdrivers.kicad_sch

spareArea
File: spareArea.kicad_sch

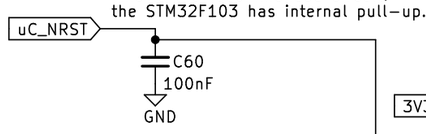
powersupply
File: powersupply.kicad_sch

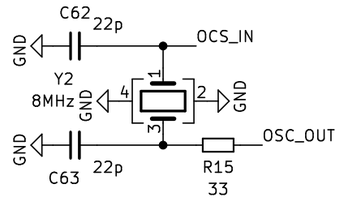
inputs
File: Inputs.kicad_sch

100nF on each VDD/VSS pair of the STM

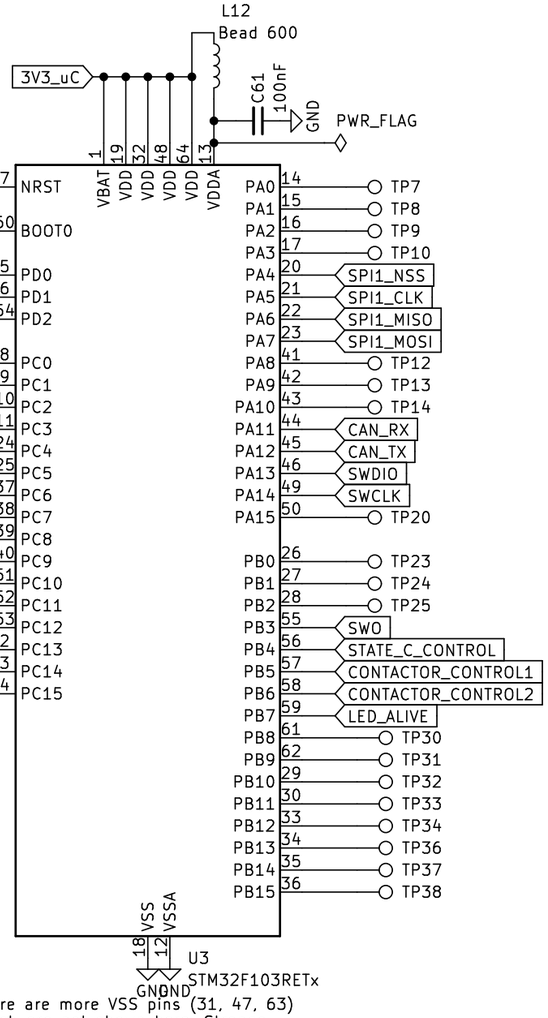


No external pull-up on the reset.
This is the recommended circuit,
the STM32F103 has internal pull-up.

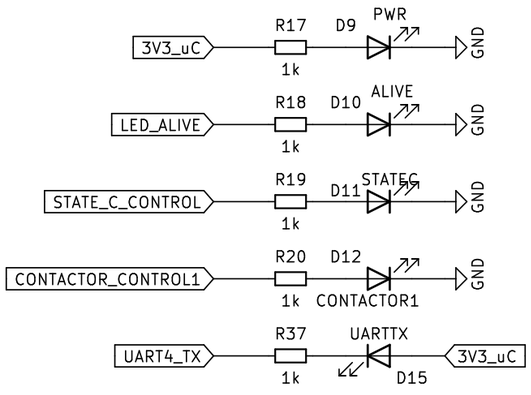




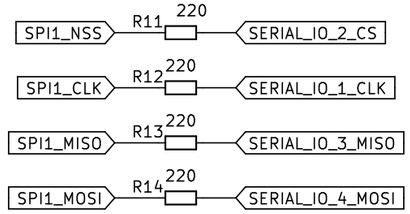
Todo: XTAL frequency, footprint, Cs

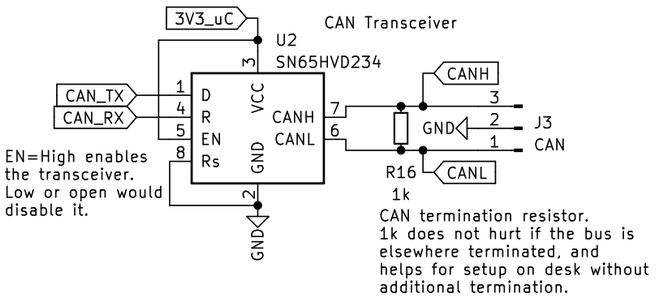


There are more VSS pins (31, 47, 63)
which are not shown here. Strange.
Nevertheless, in the layout they are correct.



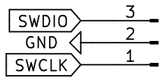
Protection resistors for the case,
that the controller and the QCA are
powered from different sources which
do not synchronously turn on
and off



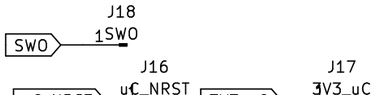


CAN termination resistor.
1k does not hurt if the bus is
elsewhere terminated, and
helps for setup on desk without
additional termination.

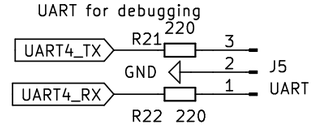
Serial Wire Debug
SWD

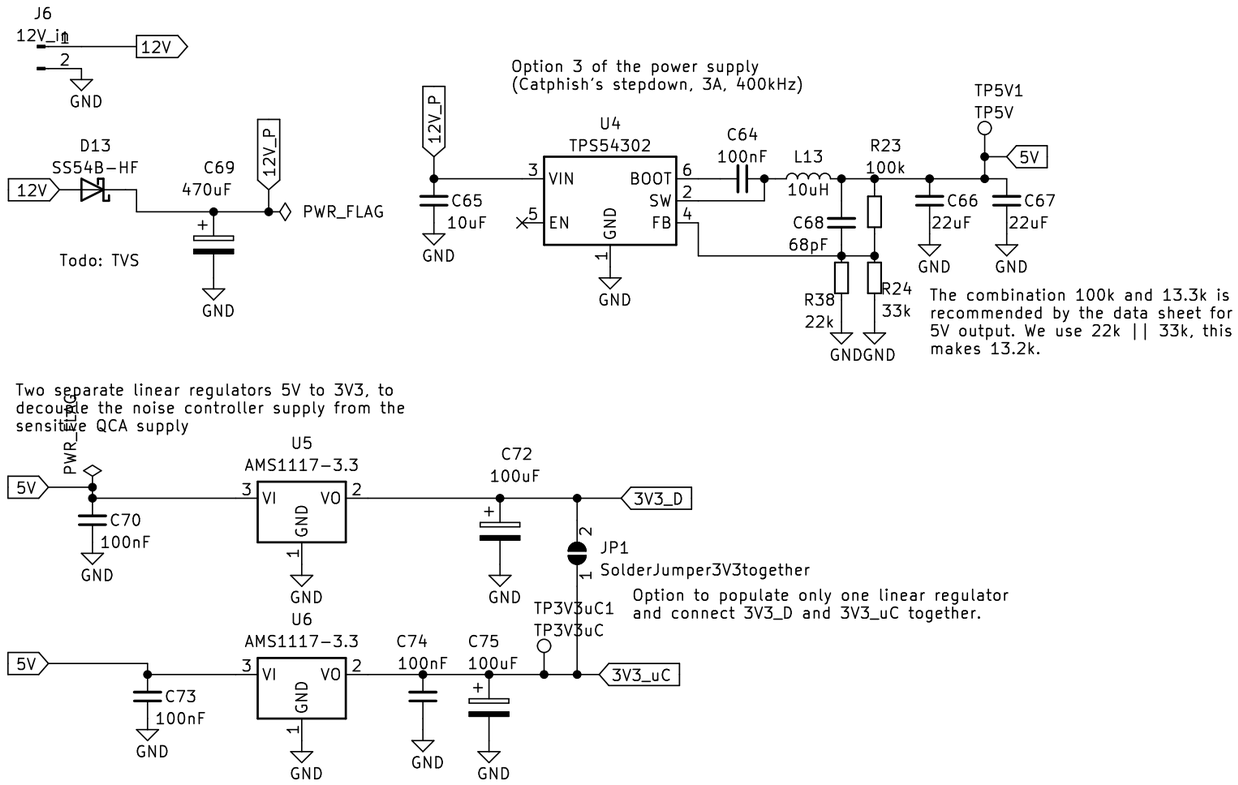


The SWO can be used for tracing.
http://stefanfrings.de/stm32/stm32f1.html#traceswo

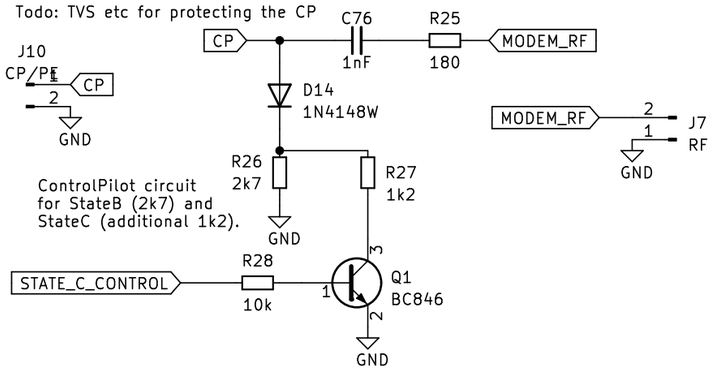


UART for debugging



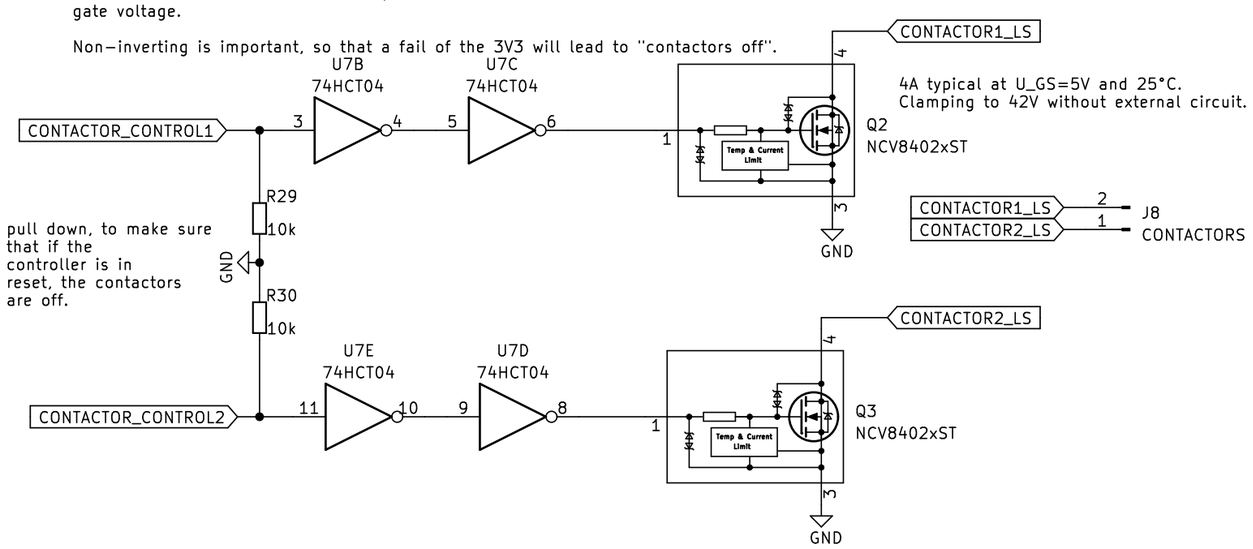

J6
12V_in
12V
2
GND
D13
SS54B-HF
12V
C69
470uF
12V_P
PWR_FLAG
Todo: TVS
GND
Option 3 of the power supply
(Catphish's stepdown, 3A, 400kHz)
12V_P
C65
10uF
GND
U4
TPS54302
3
VIN
5
EN
GND
1
GND
BOOT
6
SW
2
FB
4
C64
100nF
L13
10uH
C68
68pF
R38
22k
GND
R23
100k
R24
33k
GND
TP5V1
TP5V
5V
C66
22uF
C67
22uF
GND
GND
The combination 100k and 13.3k is recommended by the data sheet for 5V output. We use 22k || 33k, this makes 13.2k.
Two separate linear regulators 5V to 3V3, to decouple the noise controller supply from the sensitive QCA supply
PWR_FLAG
5V
C70
100nF
GND
U5
AMS1117-3.3
3
VI
GND
1
VO
2
GND
C72
100uF
GND
3V3_D
JP1
SolderJumper3V3together
2
1
Option to populate only one linear regulator and connect 3V3_D and 3V3_uC together.
TP3V3uC1
TP3V3uC
U6
AMS1117-3.3
5V
C73
100nF
GND
3
VI
GND
1
VO
2
GND
C74
100nF
GND
C75
100uF
GND
3V3_uC

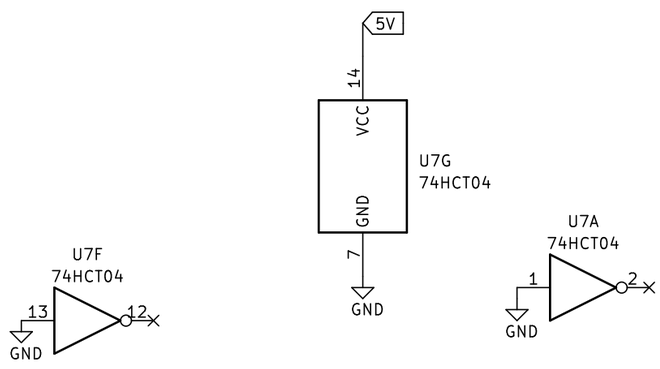
Todo: TVS etc for protecting the CP



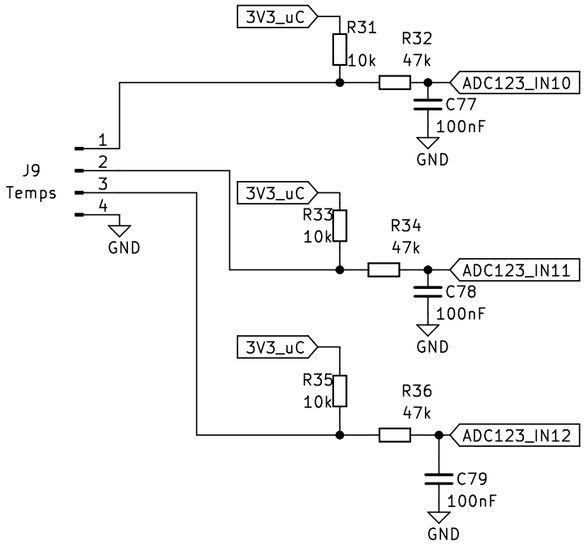
HCT as level shifter from 3.3V to 5V, because the NCV needs at least 5V gate voltage.

Non-inverting is important, so that a fail of the 3V3 will lead to "contactors off".

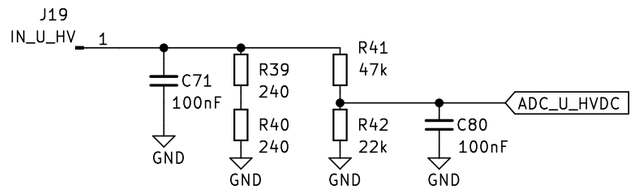


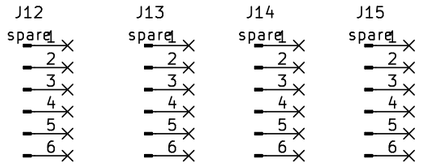


Analog inputs, e.g. for use with NTCs to ground
for temperature measurement
or analog feedback contacts or switches.



Current input for HV DC voltage
measurement as done in LIM, see
https://openinverter.org/forum/viewtopic.php?p=58839#p58839




J12
spare
1
2
3
4
5
6
J13
spare
1
2
3
4
5
6
J14
spare
1
2
3
4
5
6
J15
spare
1
2
3
4
5
6