TACNPR project

Tatu OH2EAT, Lasse OH3HZB & Tommi OH1GJV & SCOMS team
Special thanks to: Mikko OH2FLO & Vili OH5GE

SUBSHEETS (revB with onboard Ethernet):

cpu

MCU, SRAM, SERIAL

File: cpu-sheet.kicad_sch

radio

Si4463 & RF switching

File: radio-sheet.kicad_sch

RF-PA

RF LNA & PA

File: RF-PA-sheet.kicad_sch

tacbucks

DC/DC converters

File: tacbuck-sheet.kicad_sch

linear-regs

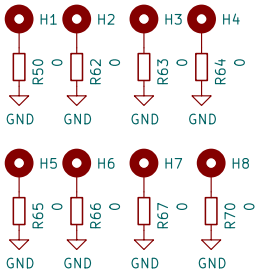
3V3 lin.reg. & terminals

File: linreg-sheet.kicad_sch

ethernet

W5500 Ethernet

File: ethernet-sheet.kicad_sch



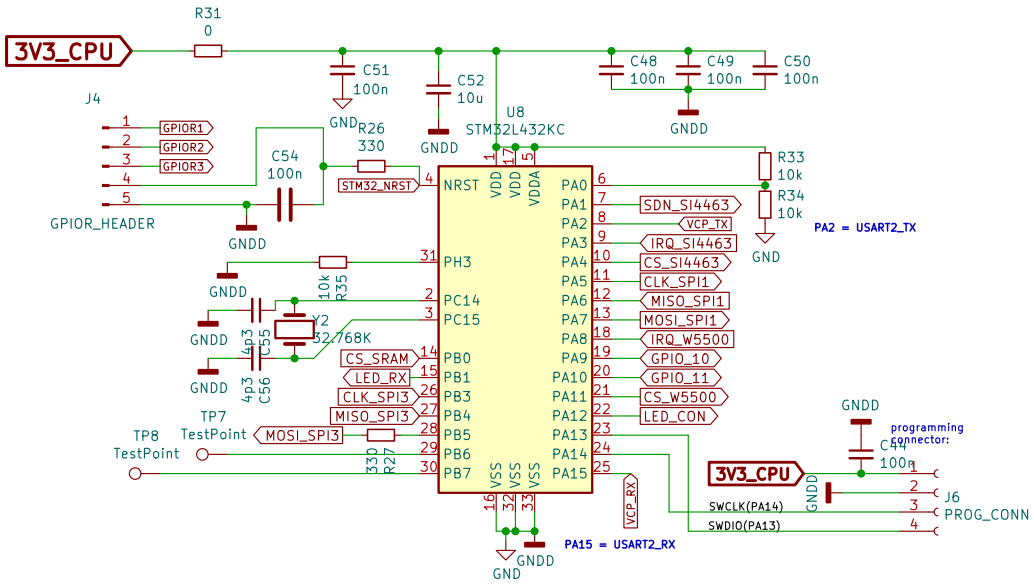
This HAM radio project is licensed under the TAPR Open Hardware License (www.tapr.org/OHL)

TACNPR project

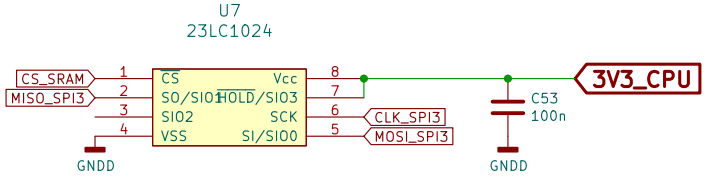
OH1GJV, OH2EAT, OH2FLO, OH3HZB, OH5GE

Sheet: / File: TACNPR.kicad_sch		
Title: TACNPR		
Size: A4	Date: 2021-03-22	**Rev: A**
KiCad E.D.A. kicad 6.0.2+dfsg-1		Id: 1/7

MCU: STM32L432KC (256 kB Flash)

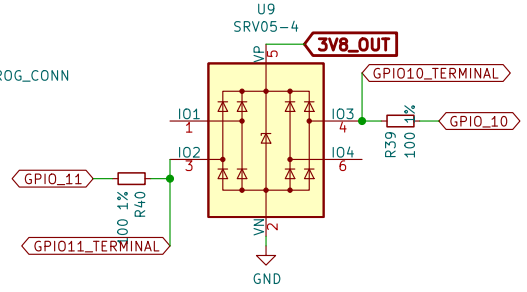


SRAM (23LC1024, 1Mbit)

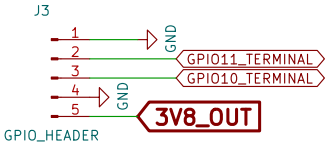


CONN LEDs

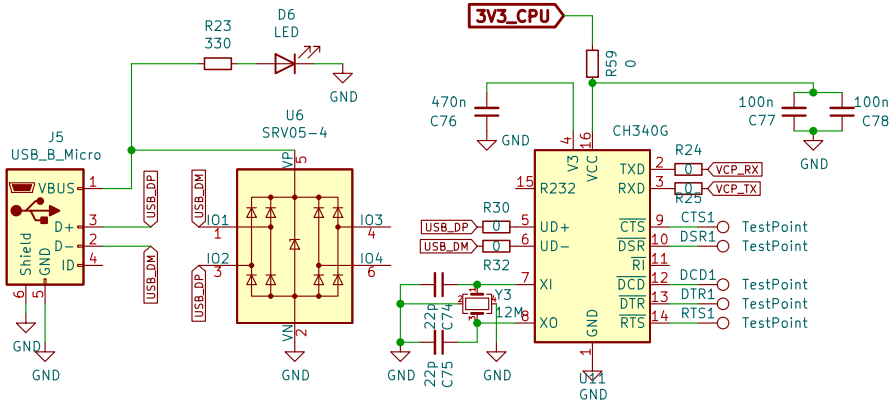
GPIO ESD protection



GPIO header



USB ESD PROTECTION & CH340G SERIAL



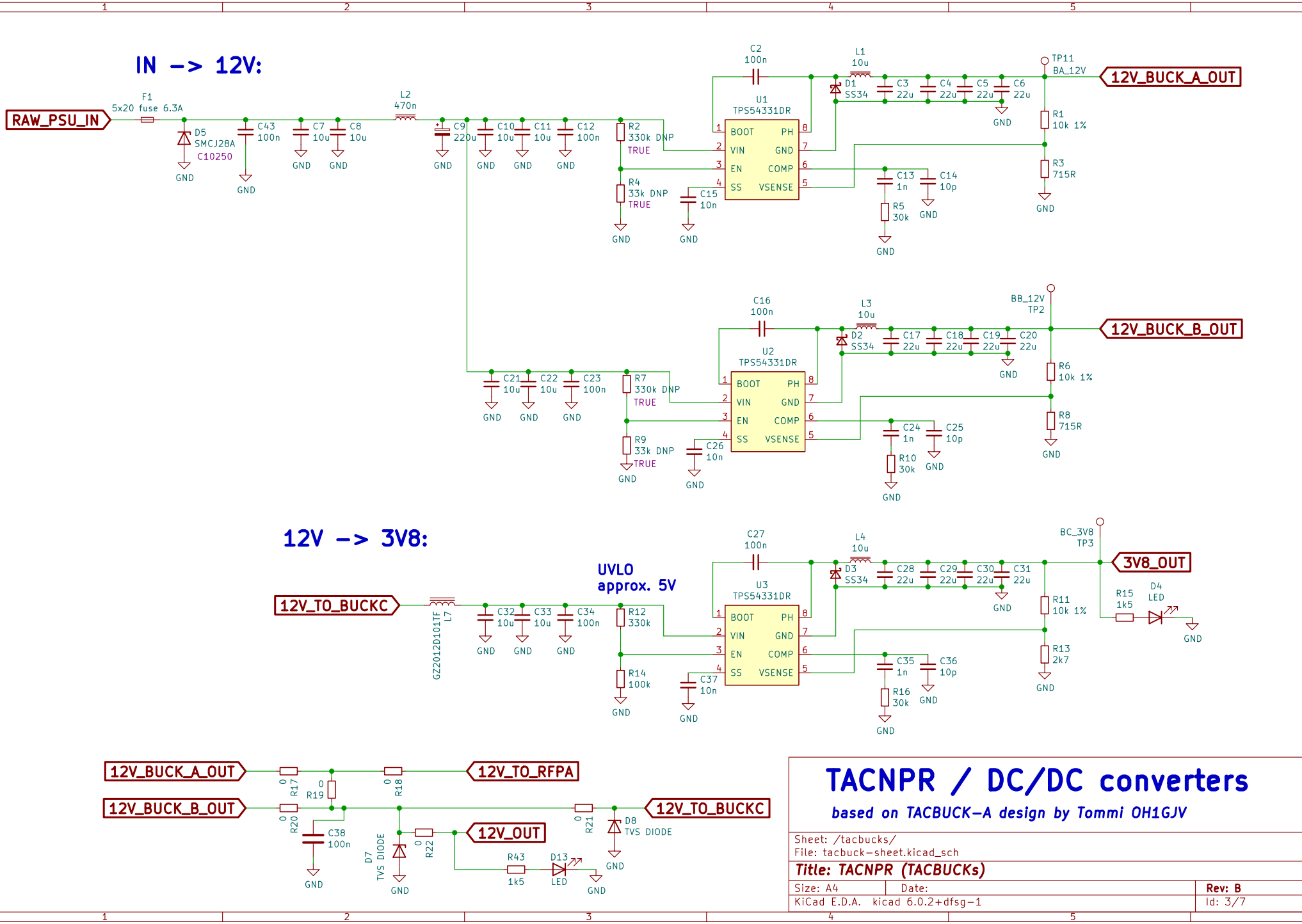
TACNPR / CPU sheet

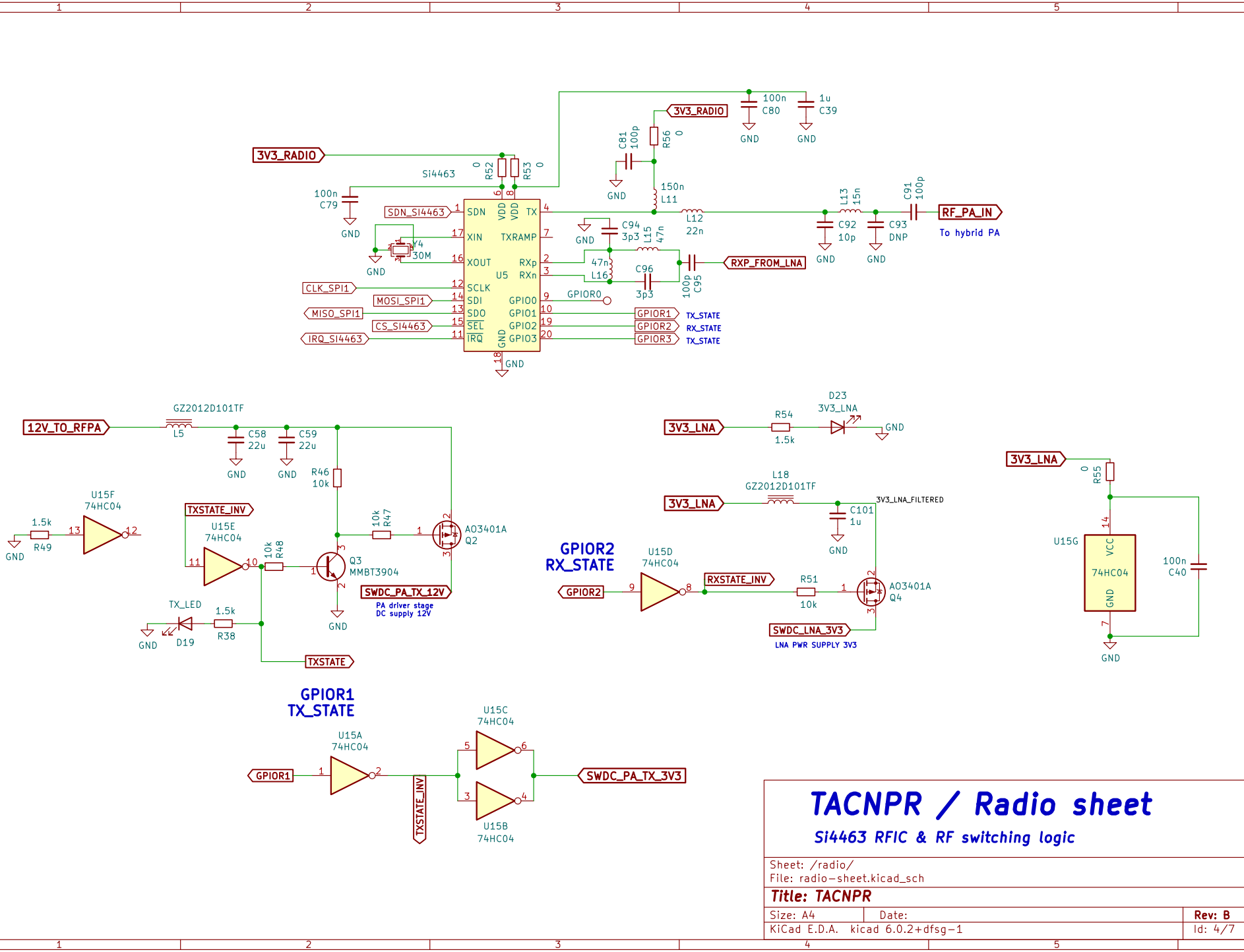
(CPU, SRAM, GPIO, ETHERNET, USB SERIAL)

Sheet: /cpu/
File: cpu-sheet.kicad_sch

Title: TACNPR (CPU sheet)

Size: A4	Date:	Rev: B
KiCad E.D.A. kicad 6.0.2+dfsg-1		Id: 2/7


IN -> 12V:
RAW_PSU_IN
F1
5x20 fuse 6.3A
D5
SMCJ28A
C10250
C43
100n
C7
10u
C8
10u
L2
470n
C9
220u
C10
10u
C11
10u
C12
100n
R2
330k DNP
TRUE
R4
33k DNP
TRUE
C15
10n
U1
TPS54331DR
BOOT
PH
VIN
GND
EN
COMP
SS
VSENSE
C2
100n
L1
10u
D1
SS34
C3
22u
C4
22u
C5
22u
C6
22u
TP11
BA_12V
12V_BUCK_A_OUT
R1
10k 1%
R3
715R
C13
1n
C14
10p
R5
30k
C16
100n
L3
10u
D2
SS34
C17
22u
C18
22u
C19
22u
C20
22u
BB_12V
TP2
12V_BUCK_B_OUT
R6
10k 1%
R8
715R
C21
10u
C22
10u
C23
100n
R7
330k DNP
TRUE
R9
33k DNP
TRUE
C26
10n
U2
TPS54331DR
C24
1n
C25
10p
R10
30k
12V -> 3V8:
UVLO
approx. 5V
12V_TO_BUCKC
GZ2012D101TF
L7
C32
10u
C33
10u
C34
100n
R12
330k
R14
100k
C37
10n
C27
100n
L4
10u
D3
SS34
C28
22u
C29
22u
C30
22u
C31
22u
BC_3V8
TP3
3V8_OUT
R15
1k5
D4
LED
R11
10k 1%
R13
2k7
U3
TPS54331DR
C35
1n
C36
10p
R16
30k
12V_BUCK_A_OUT
12V_BUCK_B_OUT
R17
0
R19
0
R20
0
C38
100n
R18
0
12V_TO_RFPA
12V_TO_BUCKC
R21
0
D8
TVS DIODE
D7
TVS DIODE
R22
0
12V_OUT
R43
1k5
D13
LED
GND
TACNPR / DC/DC converters
based on TACBUCK-A design by Tommi OH1GJV
Sheet: /tacbucks/
File: tacbuck-sheet.kicad_sch
Title: TACNPR (TACBUCKs)
Size: A4
Date:
Rev: B
KiCad E.D.A. kicad 6.0.2+dfsg-1
Id: 3/7



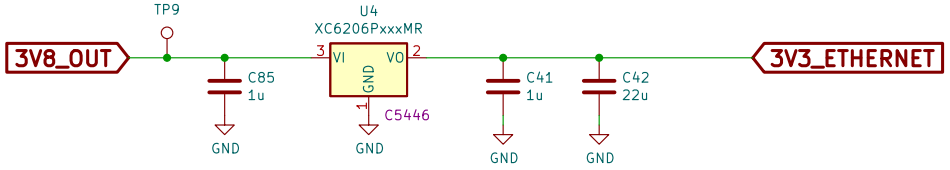
TACNPR / Radio sheet

Si4463 RFIC & RF switching logic

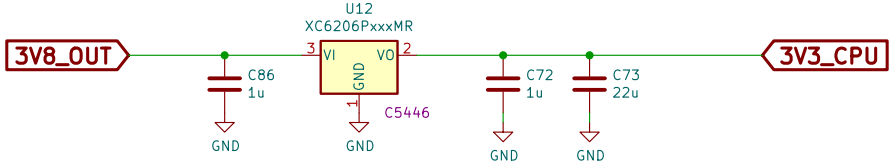
Sheet: /radio/	
File: radio-sheet.kicad_sch	
Title: TACNPR	
Size: A4	Date:
KiCad E.D.A. kicad 6.0.2+dfsg-1	Id: 4/7

Rev: B

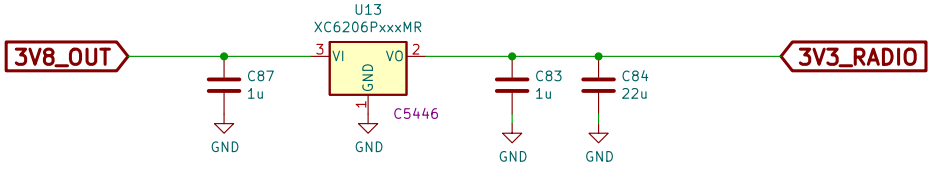
3V3 for Ethernet transceiver



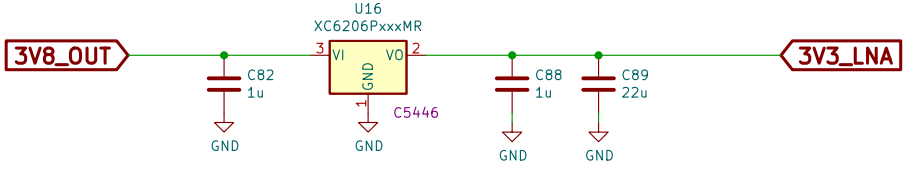
3V3 for STM32 CPU



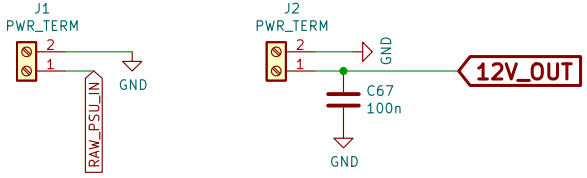
3V3 for Si4463 radio chip



3V3 for LNA



Screw terminals



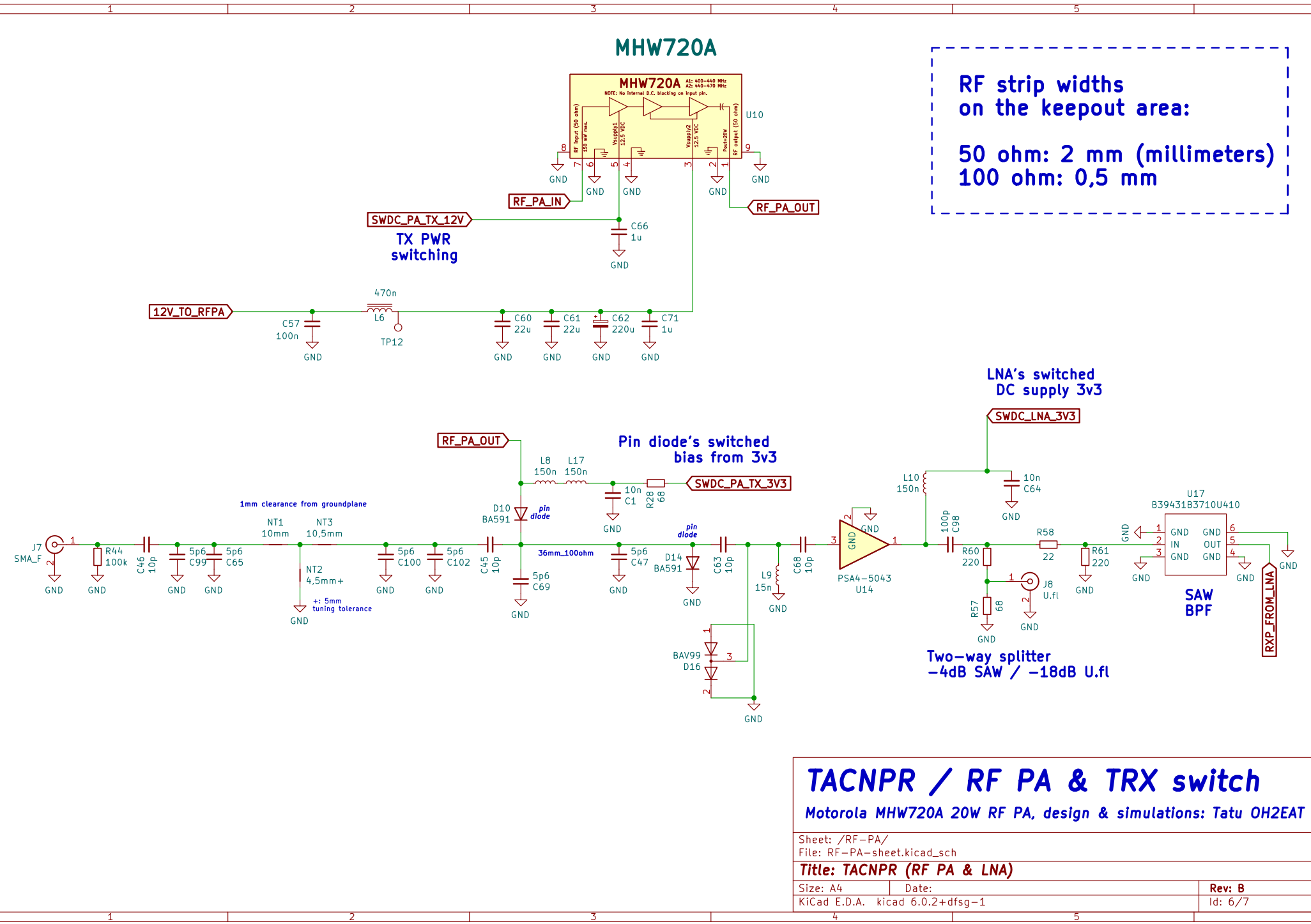
TACNPR / regulators & terminals

3V8 -> 3V3 LDO linear regulators & screw terminals

Sheet: /linear-regs/
File: linreg-sheet.kicad_sch

Title: TACNPR (linear regulators)

Size: A4	Date:	**Rev: B**
KiCad E.D.A. kicad 6.0.2+dfsg-1		Id: 5/7



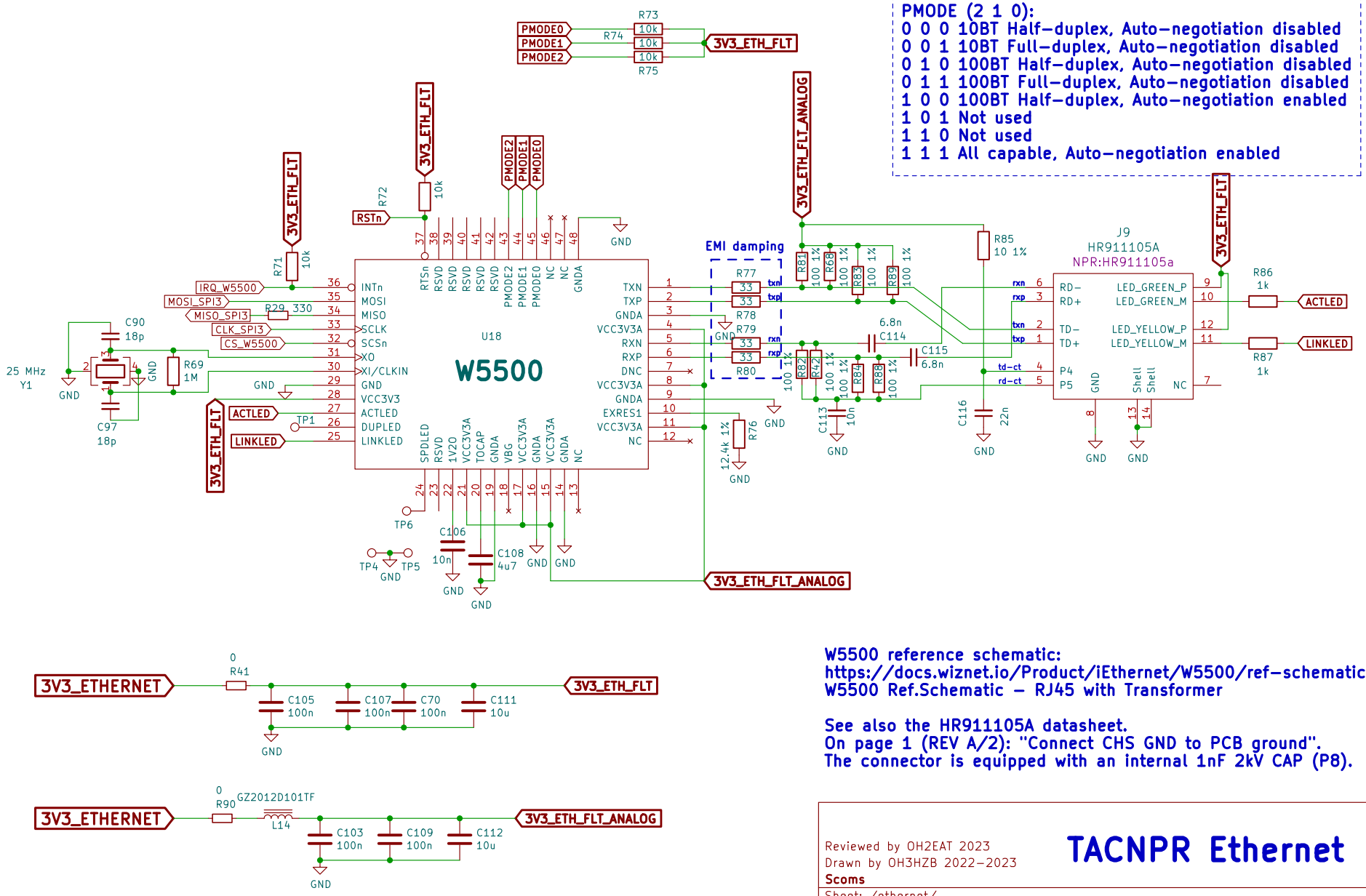
TACNPR / RF PA & TRX switch

Motorola MHW720A 20W RF PA, design & simulations: Tatu OH2EAT

Sheet: /RF-PA/
File: RF-PA-sheet.kicad_sch

Title: TACNPR (RF PA & LNA)

Size: A4	Date:	**Rev: B**
KiCad E.D.A. kicad 6.0.2+dfsg-1		Id: 6/7


PMODE (2 1 0):
0 0 0 10BT Half-duplex, Auto-negotiation disabled
0 0 1 10BT Full-duplex, Auto-negotiation disabled
0 1 0 100BT Half-duplex, Auto-negotiation disabled
0 1 1 100BT Full-duplex, Auto-negotiation disabled
1 0 0 100BT Half-duplex, Auto-negotiation enabled
1 0 1 Not used
1 1 0 Not used
1 1 1 All capable, Auto-negotiation enabled
W5500
U18
J9
HR911105A
NPR:HR911105a
EMI damping
3V3_ETH_FLT
3V3_ETH_FLT_ANALOG
PMODE0
PMODE1
PMODE2
RSTn
IRQ_W5500
MOSI_SPI3
MISO_SPI3
CLK_SPI3
CS_W5500
ACTLED
LINKLED
25 MHz
Y1
INTn
MOSI
MISO
SCLK
SCSn
XO
XI/CLKIN
VCC3V3
TXN
TXP
RXN
RXP
DNC
EXRES1
R73
R74
R75
R72
R71
R29
R69
R77
R78
R79
R80
R81
R68
R83
R89
R85
R82
R42
R84
R88
R76
R86
R87
C90
C97
C106
C108
C113
C114
C115
C116
TP1
TP4
TP5
TP6
W5500 reference schematic:
https://docs.wiznet.io/Product/iEthernet/W5500/ref-schematic
W5500 Ref.Schematic – RJ45 with Transformer
See also the HR911105A datasheet.
On page 1 (REV A/2): "Connect CHS GND to PCB ground".
The connector is equipped with an internal 1nF 2kV CAP (P8).
3V3_ETHERNET
R41
C105
C107
C70
C111
R90
GZ2012D101TF
L14
C103
C109
C112
Reviewed by OH2EAT 2023
Drawn by OH3HZB 2022-2023
Scoms
TACNPR Ethernet
Sheet: /ethernet/
File: ethernet-sheet.kicad_sch
Title: TACNPR (Ethernet)
Size: A4
Date:
Rev: B
KiCad E.D.A. kicad 6.0.2+dfsg-1
Id: 7/7