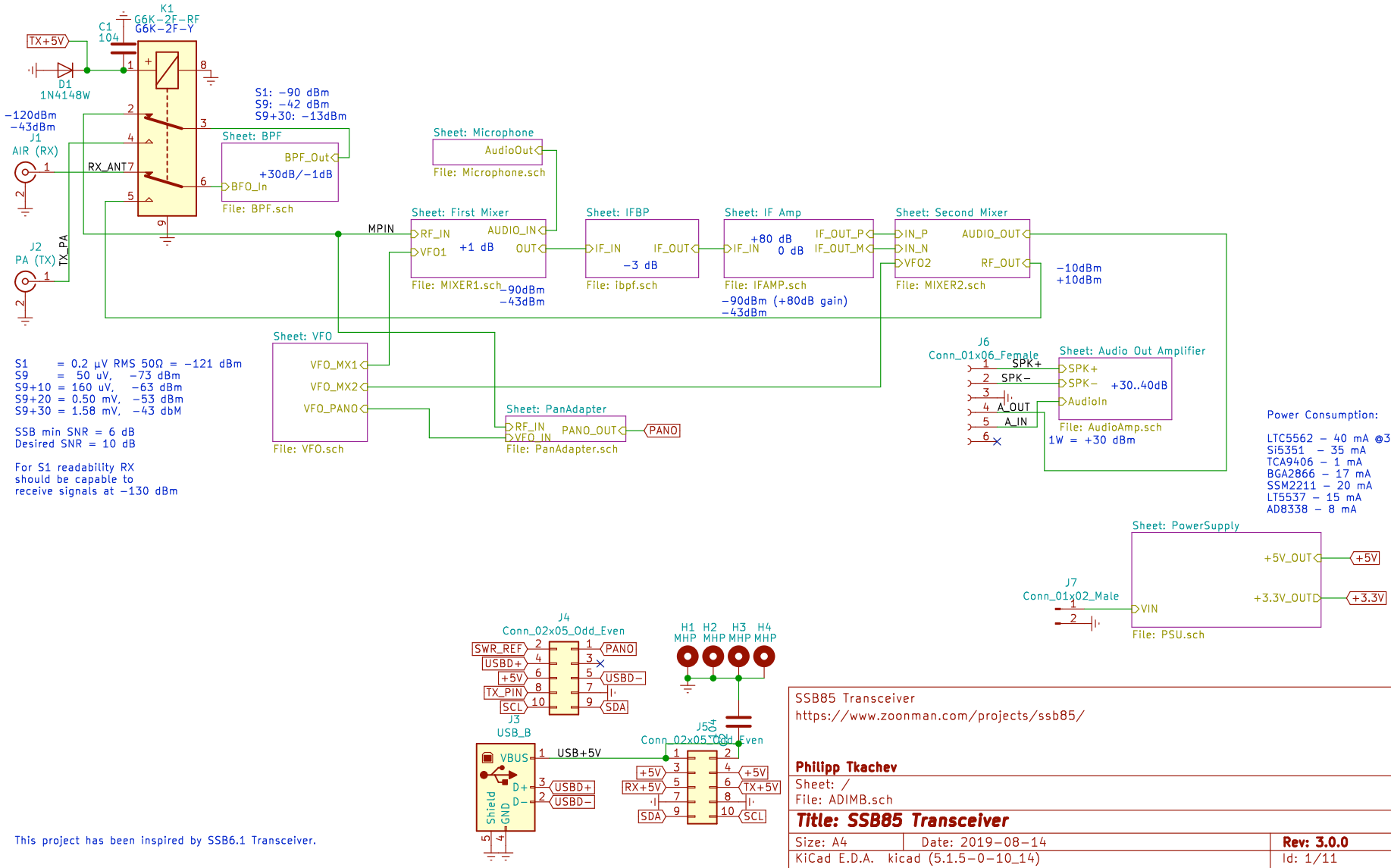
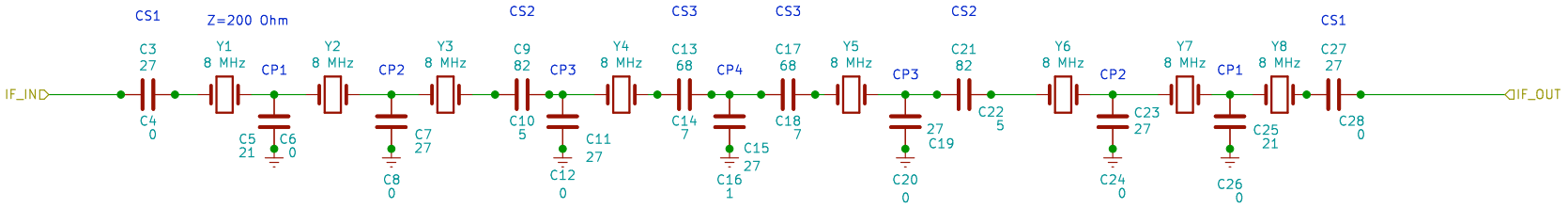

K1
G6K-2F-RF
G6K-2F-Y
C1
104
TX+5V
D1
1N4148W
−120dBm
−43dBm
J1
AIR (RX)
RX_ANT
J2
PA (TX)
TX_PA
S1: −90 dBm
S9: −42 dBm
S9+30: −13dBm
Sheet: BPF
BPF_Out
+30dB/−1dB
BFO_In
File: BPF.sch
Sheet: Microphone
AudioOut
File: Microphone.sch
MPIN
Sheet: First Mixer
RF_IN
VFO1
+1 dB
AUDIO_IN
OUT
File: MIXER1.sch
−90dBm
−43dBm
Sheet: IFBP
IF_IN
IF_OUT
−3 dB
File: ibpf.sch
Sheet: IF Amp
IF_IN
+80 dB
0 dB
IF_OUT_P
IF_OUT_M
File: IFAMP.sch
−90dBm (+80dB gain)
−43dBm
Sheet: Second Mixer
IN_P
IN_N
VFO2
AUDIO_OUT
RF_OUT
File: MIXER2.sch
−10dBm
+10dBm
S1 = 0.2 µV RMS 50Ω = −121 dBm
S9 = 50 uV, −73 dBm
S9+10 = 160 uV, −63 dBm
S9+20 = 0.50 mV, −53 dBm
S9+30 = 1.58 mV, −43 dbM
SSB min SNR = 6 dB
Desired SNR = 10 dB
For S1 readability RX
should be capable to
receive signals at −130 dBm
Sheet: VFO
VFO_MX1
VFO_MX2
VFO_PANO
File: VFO.sch
Sheet: PanAdapter
RF_IN
VFO_IN
PANO_OUT
PANO
File: PanAdapter.sch
J6
Conn_01x06_Female
SPK+
SPK−
A_OUT
A_IN
Sheet: Audio Out Amplifier
SPK+
SPK−
+30..40dB
AudioIn
File: AudioAmp.sch
1W = +30 dBm
Power Consumption:
LTC5562 − 40 mA @3.3V
Si5351 − 35 mA
TCA9406 − 1 mA
BGA2866 − 17 mA
SSM2211 − 20 mA
LT5537 − 15 mA
AD8338 − 8 mA
Sheet: PowerSupply
+5V_OUT
+3.3V_OUT
+5V
+3.3V
J7
Conn_01x02_Male
VIN
File: PSU.sch
J4
Conn_02x05_Odd_Even
SWR_REF
USBD+
+5V
TX_PIN
SCL
PANO
USBD−
SDA
H1 H2 H3 H4
MHP MHP MHP MHP
J3
USB_B
VBUS
D+
D−
GND
Shield
USB+5V
USBD+
USBD−
J54
Conn_02x05_Odd_Even
+5V
RX+5V
SDA
+5V
TX+5V
SCL
This project has been inspired by SSB6.1 Transceiver.
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/
Philipp Tkachev
Sheet: /
File: ADIMB.sch
Title: SSB85 Transceiver
Size: A4
Date: 2019−08−14
Rev: 3.0.0
KiCad E.D.A. kicad (5.1.5−0−10_14)
Id: 1/11

*Work in progress!



Best: http://www.giangrandi.ch/electronics/crystalfilters/xtalfilters.shtml

Alternative: https://www.changpuak.ch/electronics/Quartz_Crystal_Filter_Designer_1.php

fs = 7.99856 MHz
fp = 8.0081 Hz
Cs = 7.5 fF
BP ripple = 0.5 dB (Tchebycheff)
Poles = 8
Target bandwidth = 2.7 kHz

Maximum bandwidth: Bmax = 5.188 kHz

Center frequency: f0 = 8.000291 MHz
Ultimate attenuation: UAtt = 156.5 dB
Filter impedance: Z0 = 771.7 Ohm
CP1 = 21.9 pF
CP2 = 27.1 pF
CP3 = 28.1 pF
CP4 = 28.3 pF
CS1 = 27.1 pF
CS2 = 100.6 pF
CS3 = 86.9 pF

fs = 7.99856 MHz
fp = 8.0081 Hz
Cs = 7.5 fF
BP ripple = 0.1 dB (Tchebycheff)
Poles = 8
Target bandwidth = 2.7 kHz

Maximum bandwidth: Bmax = 4.631 kHz

Center frequency: f0 = 8.000469 MHz
Ultimate attenuation: UAtt = 149.7 dB
Filter impedance: Z0 = 1154.3 Ohm
CP1 = 18.9 pF
CP2 = 25.3 pF
CP3 = 26.7 pF
CP4 = 27 pF
CS1 = 25.3 pF
CS2 = 65.1 pF
CS3 = 55.8 pF

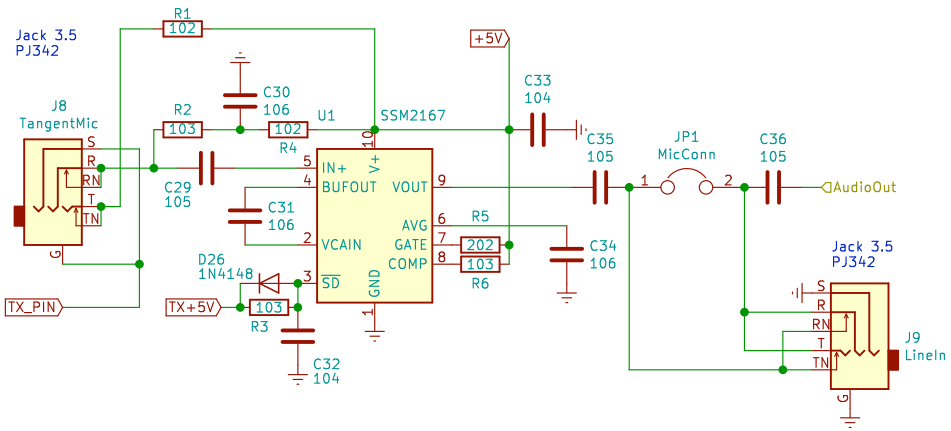
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/
Intermediate frequency band pass filter

Philipp Tkachev

Sheet: /IFBP/
File: ibpf.sch

Title: SSB85 Transceiver: IF BPF

Size: A4	Date: 2019-08-14	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 2/11



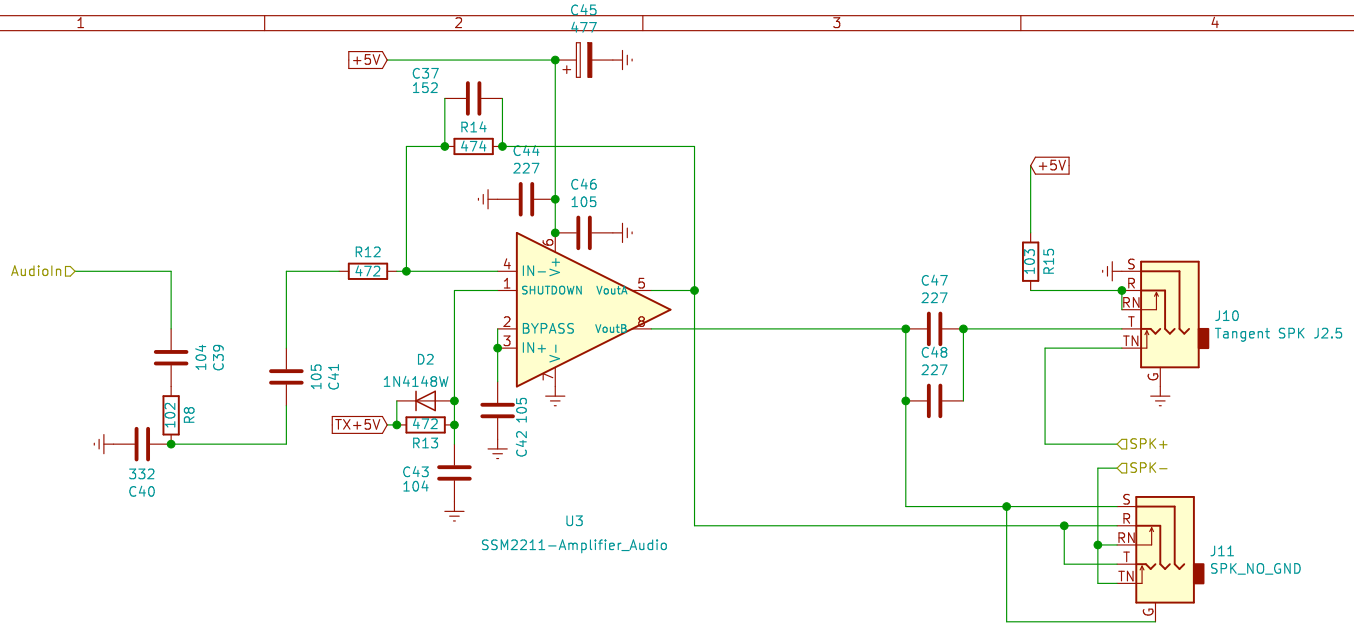
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /Microphone/
File: Microphone.sch

Title: SSB85 Transceiver: Microphone amplifier & compressor

Size: A4	Date: 2019-08-14	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 3/11



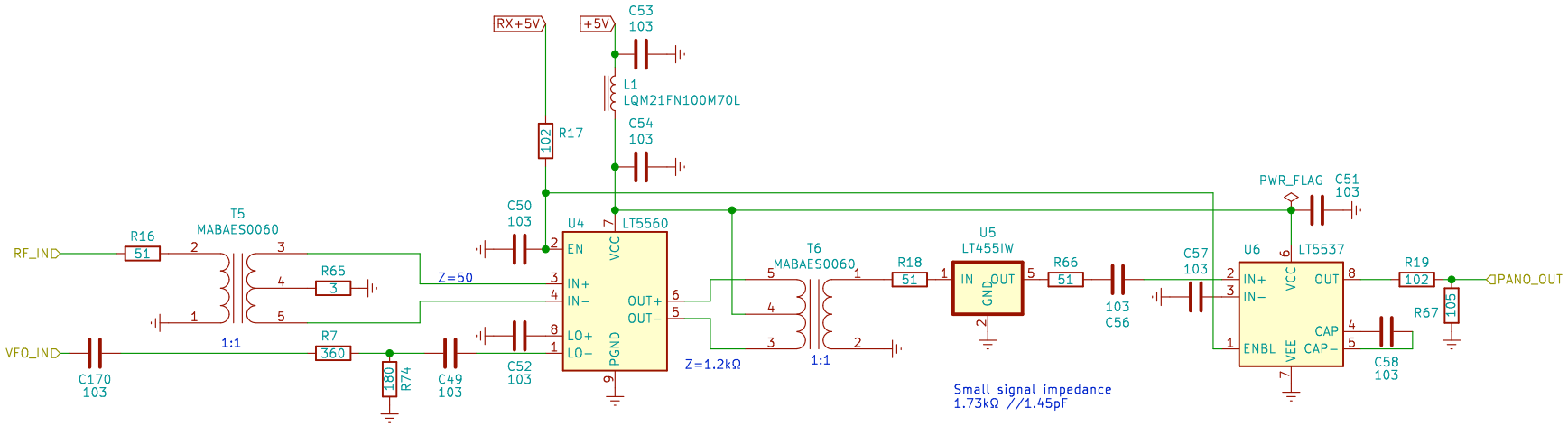
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /Audio Out Amplifier/
File: AudioAmp.sch

Title: SSB85 Transceiver: Audio Amplifier

Size: A4	Date: 2019−08−14	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5−0−10_14)		Id: 4/11



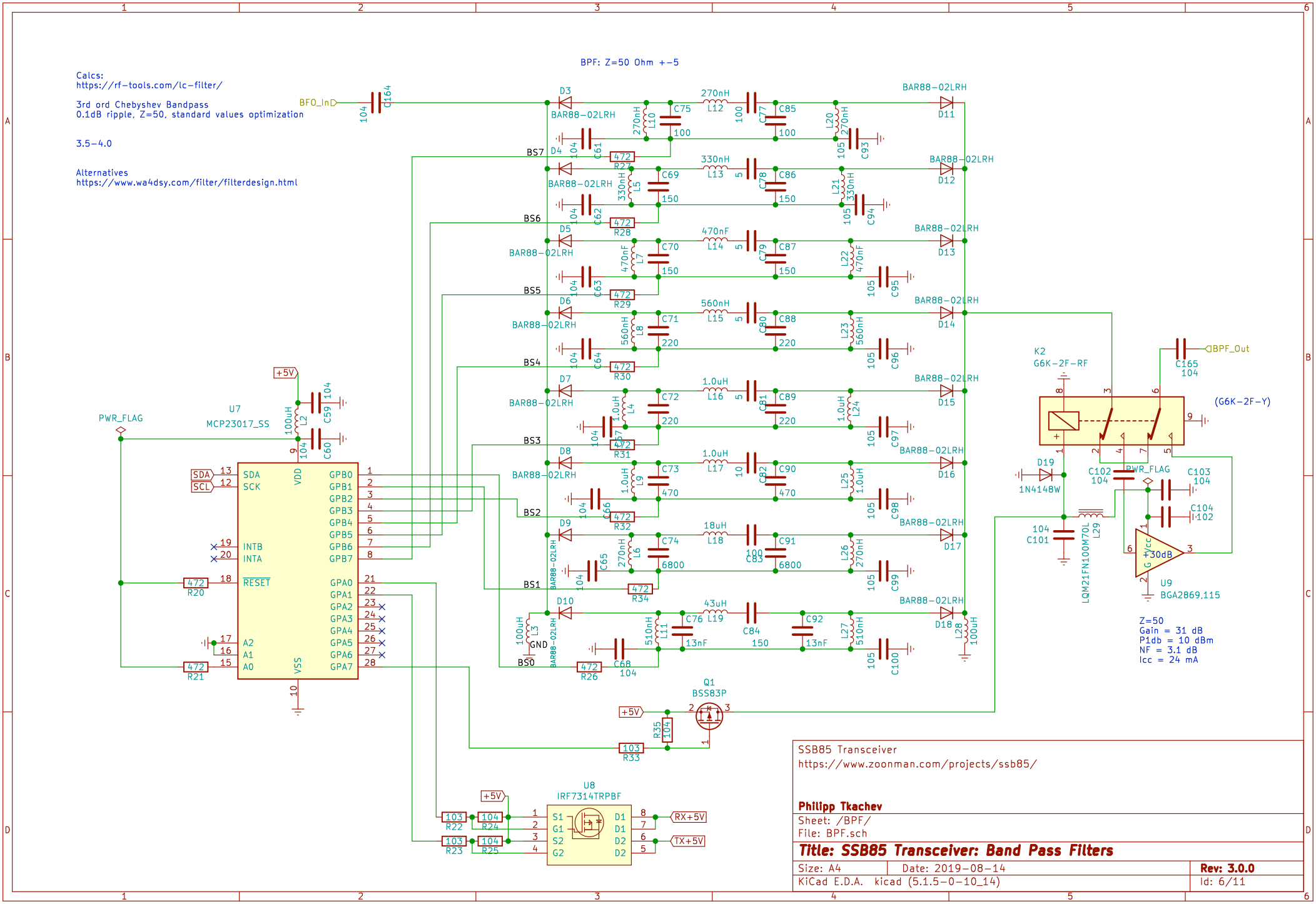
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

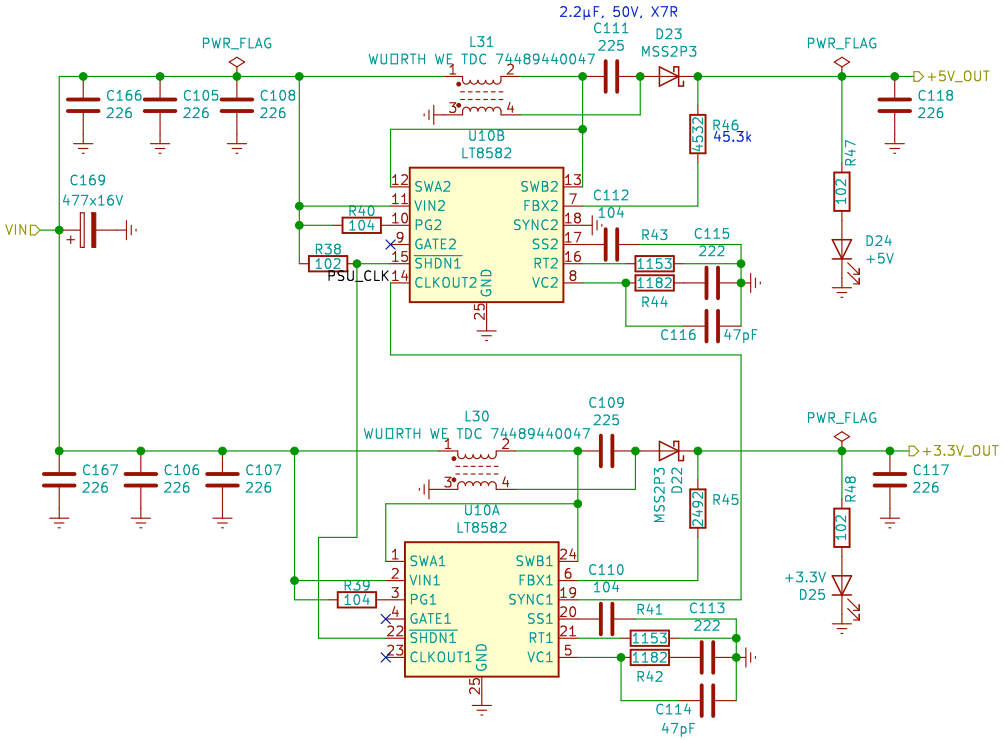
Philipp Tkachev

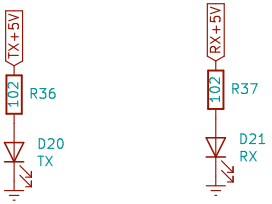
Sheet: /PanAdapter/
File: PanAdapter.sch

Title: SSB85 Transceiver: Panoramic adapter

Size: A4	Date: 2019-08-14	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 5/11


BPF: Z=50 Ohm +-5
Calcs:
https://rf-tools.com/lc-filter/
3rd ord Chebyshev Bandpass
0.1dB ripple, Z=50, standard values optimization
3.5-4.0
Alternatives
https://www.wa4dsy.com/filter/filterdesign.html
BFO_In
BPF_Out
BAR88-02LRH
BS7
BS6
BS5
BS4
BS3
BS2
BS1
BS0
U7
MCP23017_SS
PWR_FLAG
+5V
SDA
SCL
RESET
INTA
INTB
A2
A1
A0
GPB0
GPB1
GPB2
GPB3
GPB4
GPB5
GPB6
GPB7
GPA0
GPA1
GPA2
GPA3
GPA4
GPA5
GPA6
GPA7
K2
G6K-2F-RF
(G6K-2F-Y)
D19
1N4148W
LQM21FN100M70L
U9
BGA2869,115
+30dB
Z=50
Gain = 31 dB
P1db = 10 dBm
NF = 3.1 dB
Icc = 24 mA
Q1
BSS83P
U8
IRF7314TRPBF
RX+5V
TX+5V
GND
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/
Philipp Tkachev
Sheet: /BPF/
File: BPF.sch
Title: SSB85 Transceiver: Band Pass Filters
Size: A4
Date: 2019-08-14
Rev: 3.0.0
KiCad E.D.A. kicad (5.1.5-0-10_14)
Id: 6/11





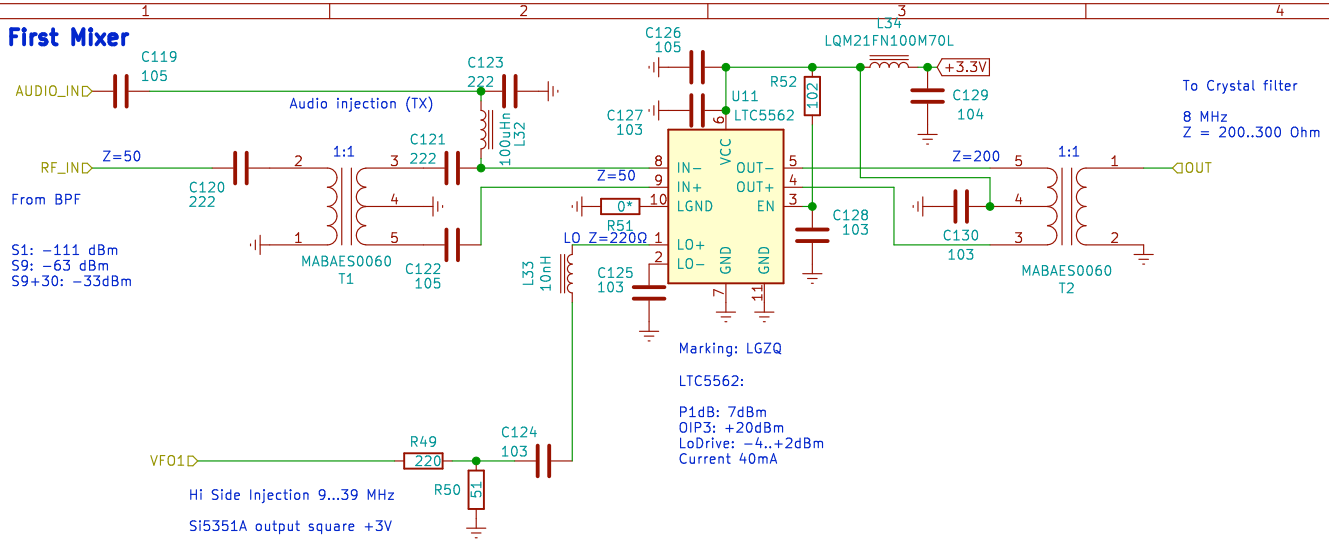
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /PowerSupply/
File: PSU.sch

Title: SSB85 Transceiver: Power Supply

Size: A4	Date: 2019-08-14	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 7/11



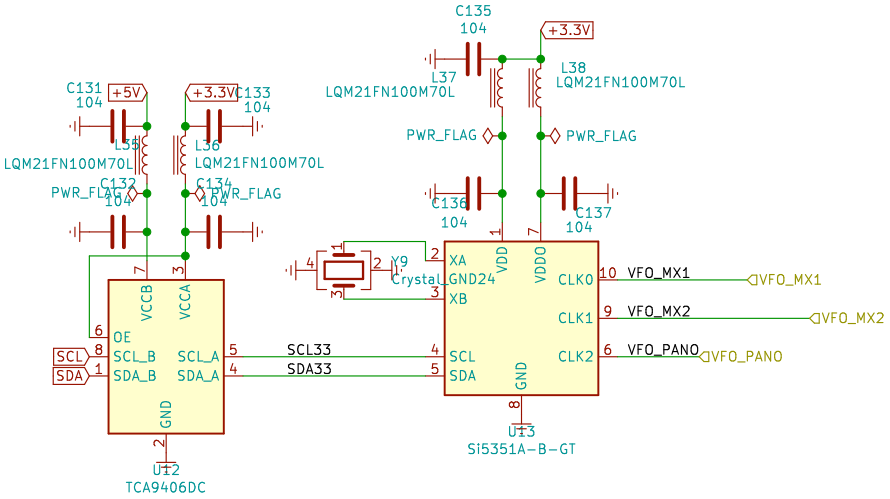
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /First Mixer/
File: MIXER1.sch

Title: Mixer 1

Size: A4	Date:	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 8/11



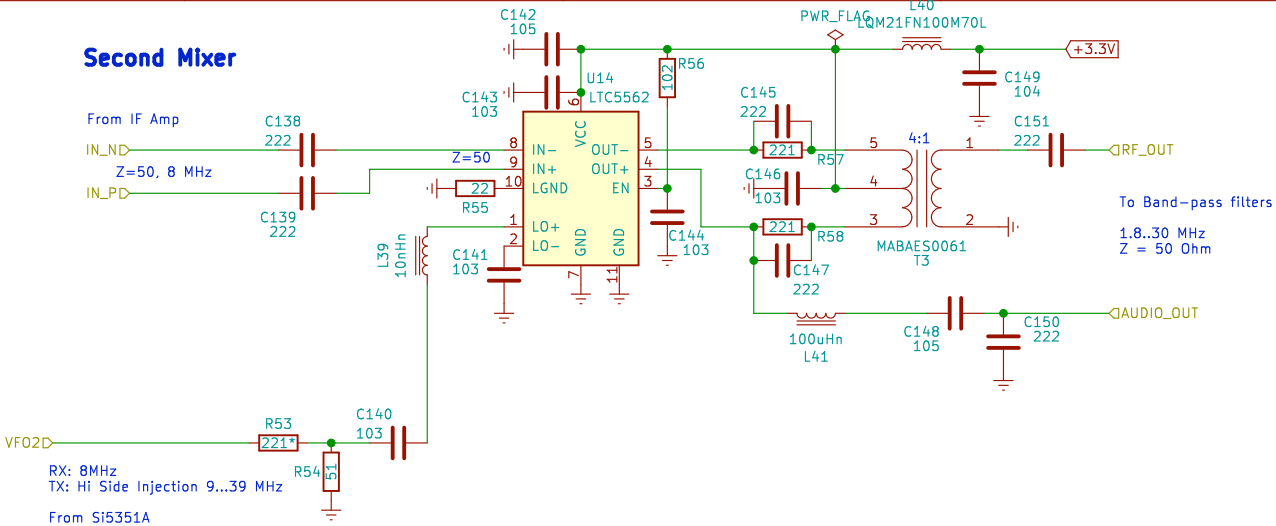
SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /VFO/
File: VFO.sch

Title: SSB85: VFO

Size: A4	Date:	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 9/11



SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

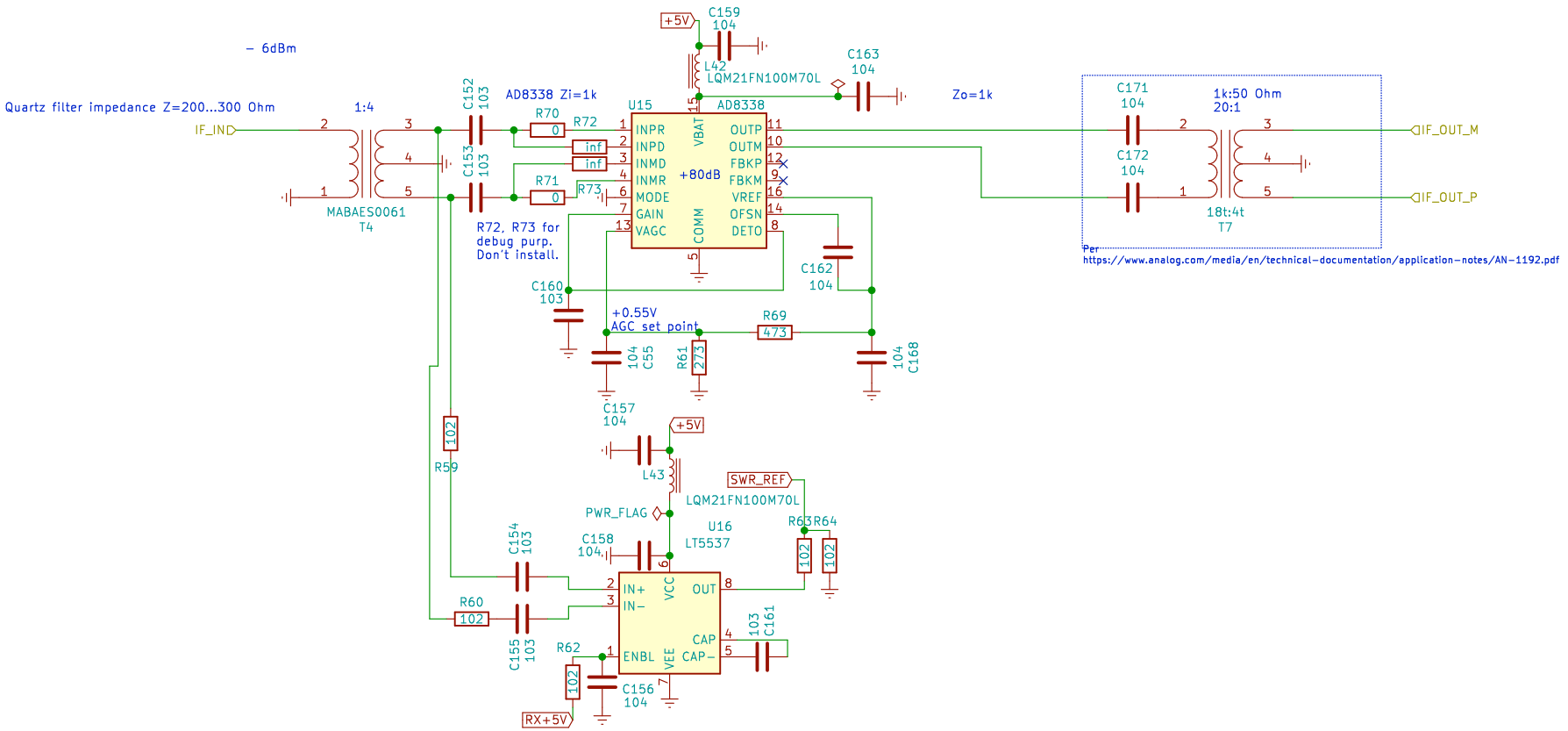
Philipp Tkachev

Sheet: /Second Mixer/
File: MIXER2.sch

Title: SSB85 Transceiver: Mixer 2

Size: A4	Date:	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5−0−10_14)		Id: 10/11

IF Amplifier + Detector



SSB85 Transceiver
https://www.zoonman.com/projects/ssb85/

Philipp Tkachev

Sheet: /IF Amp/
File: IFAMP.sch

Title: IF Amplifier + Detector

Size: A4	Date:	**Rev: 3.0.0**
KiCad E.D.A. kicad (5.1.5-0-10_14)		Id: 11/11