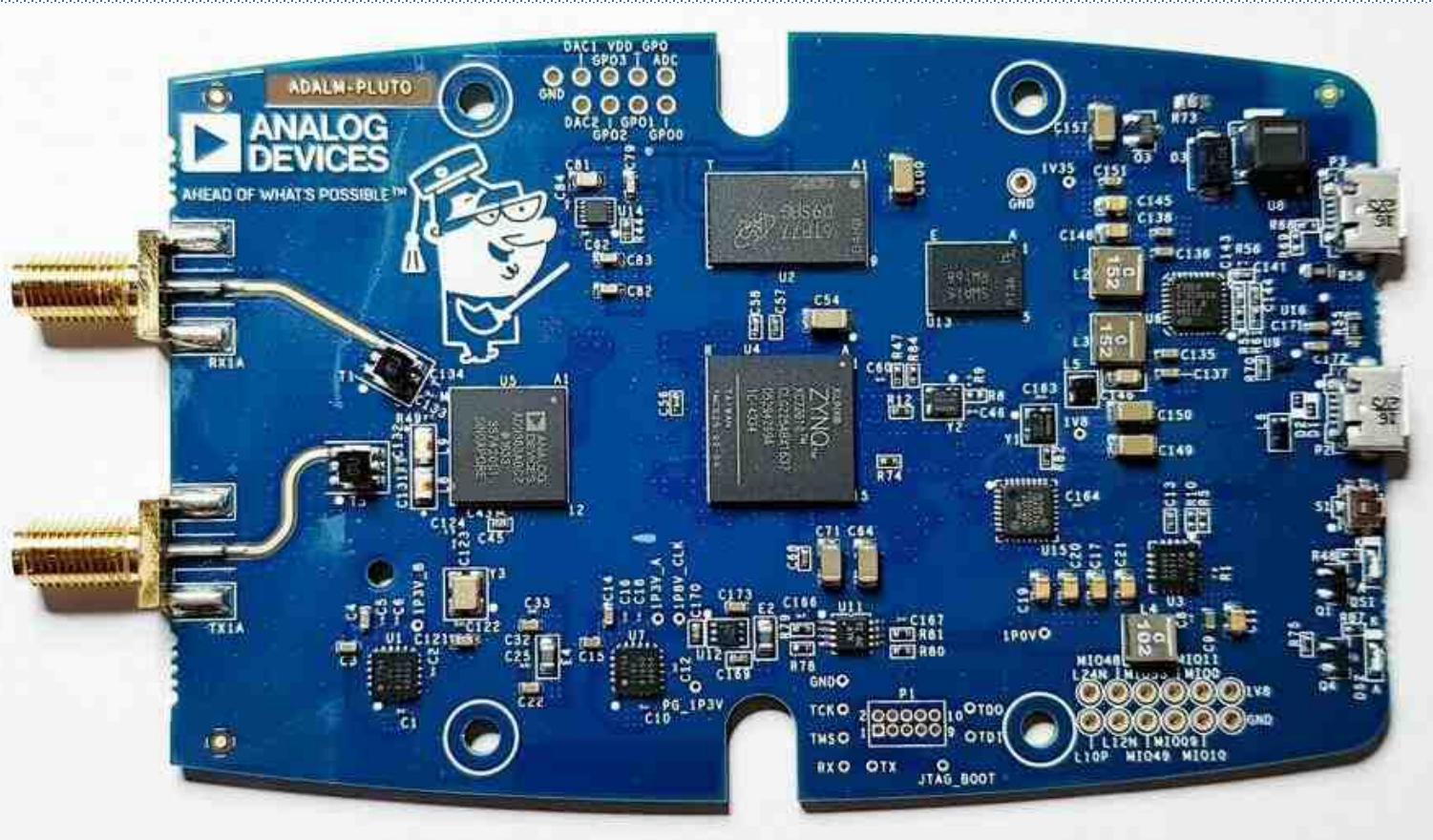


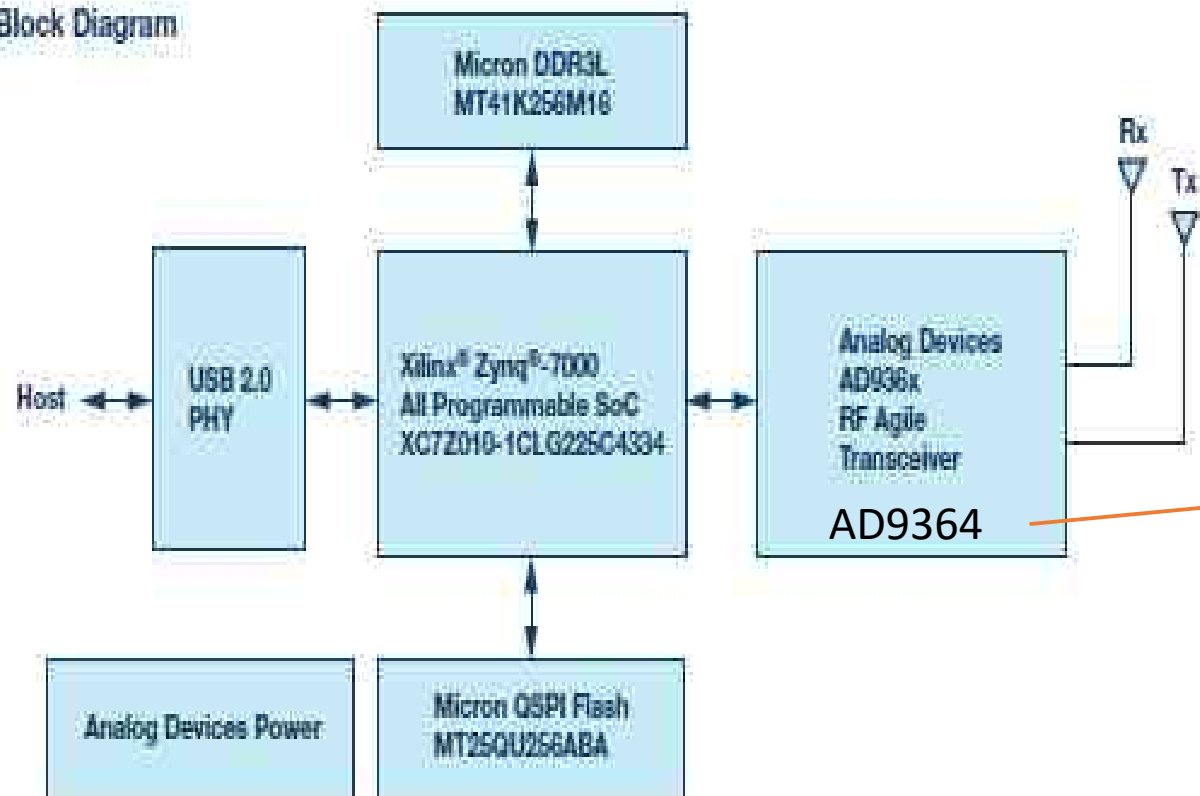
EME and Adalm PLUTO



Mirek Kasal, OK2AQ



Simplified Block Diagram



MOUSER : 4808.- Kč

Specifications	Typical
Power	
DC Input (USB)	4.5 V to 5.5 V
Conversion Performance and Clocks	
ADC and DAC Sample Rate	65.2 kSPS to 61.44 MSPS
ADC and DAC Resolution	12 bits
Frequency Accuracy	±25 ppm
RF Performance	
Tuning Range	70 MHz to 6 GHz
Tx Power Output	7 dBm
Rx Noise Figure	<3.5 dB
Rx and Tx Modulation Accuracy (EVM)	-34 dB (2%)
RF Shielding	None
Digital	
USB	2.0 On-the-Go
Core	Single ARM Cortex®-A9 @ 667 MHz
FPGA Logic Cells	28k
DSP Slices	80
DDR3L	4 Gb (512 MB)
QSPI Flash	256 Mb (32 MB)
Physical	
Dimensions	117 mm × 79 mm × 24 mm 4.62" × 3.11" × 0.95"
Weight	114 g
Temperature	10°C to 40°C

Advantages:

- Low Price
- Freq. Range 70 MHz - 6 GHz
- High Sample Rate - Bandwidth
- Small Size
- Matlab Support
- Many Users – Many Applications
- Perfect Design - 10 layers PCB
- IIO Oscilloscope

ADC/DAC 12 bit

Disadvantages:

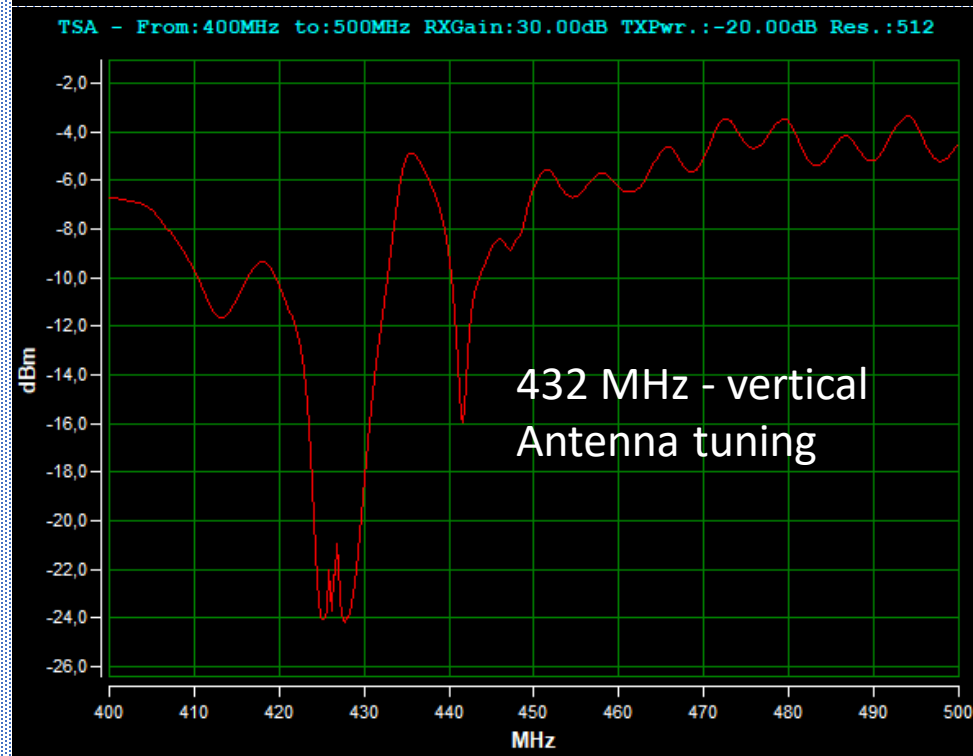
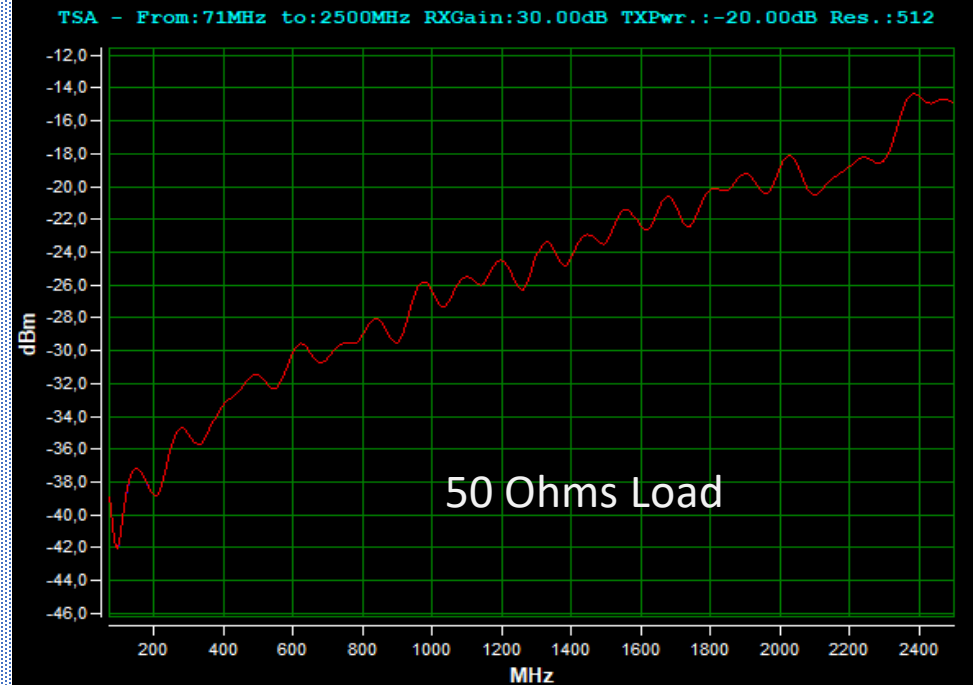
- RF Shielding is missing
- Low Freq. Stability
- PTT Solution
- Latency



Spectrum analyzer + Tracking Oscillator

+

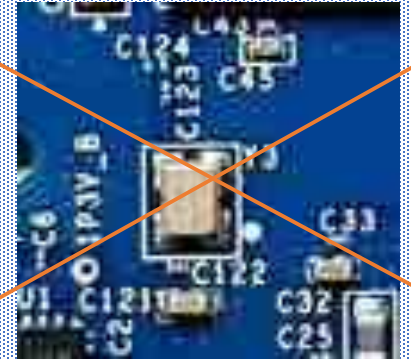
Directional Coupler





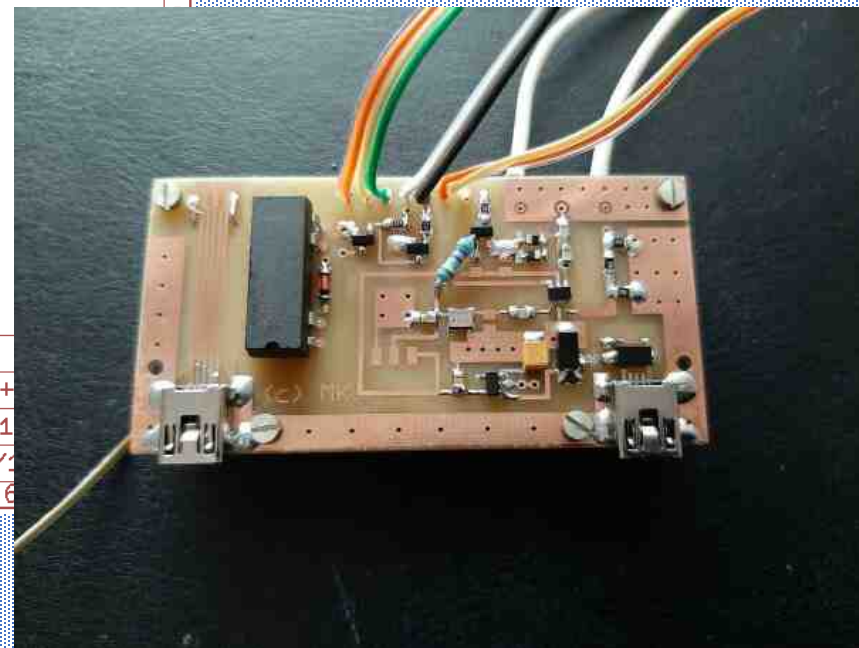
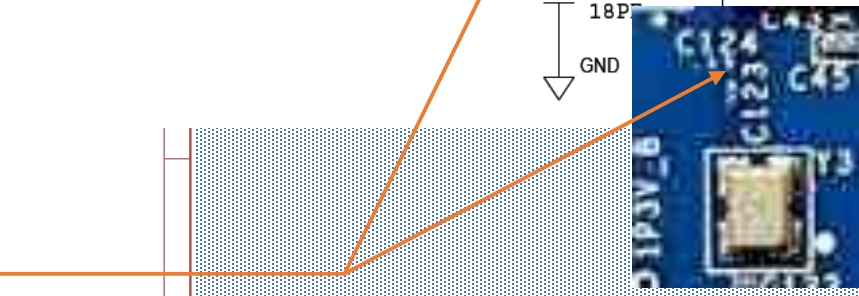
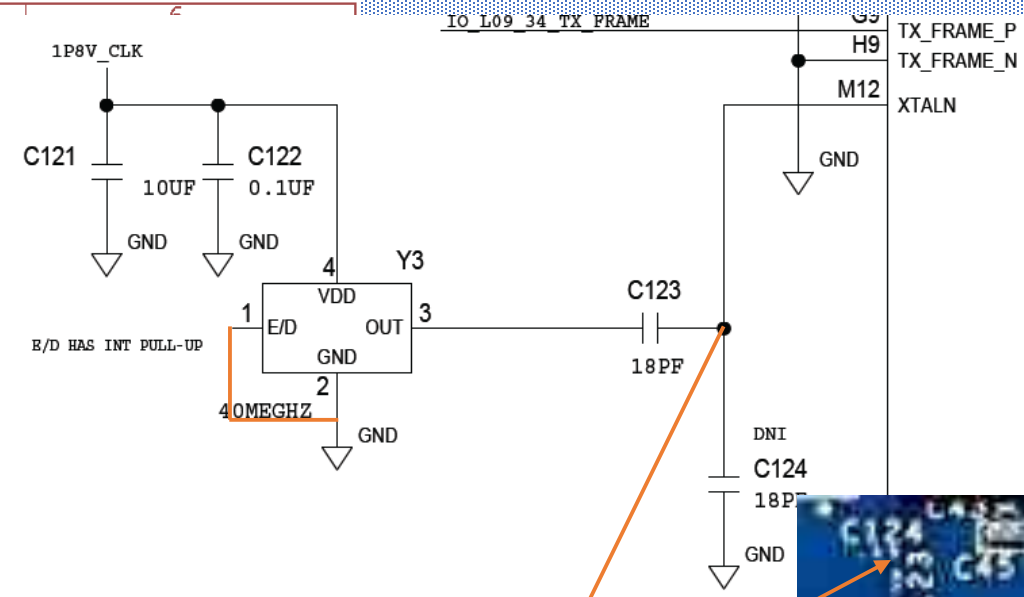
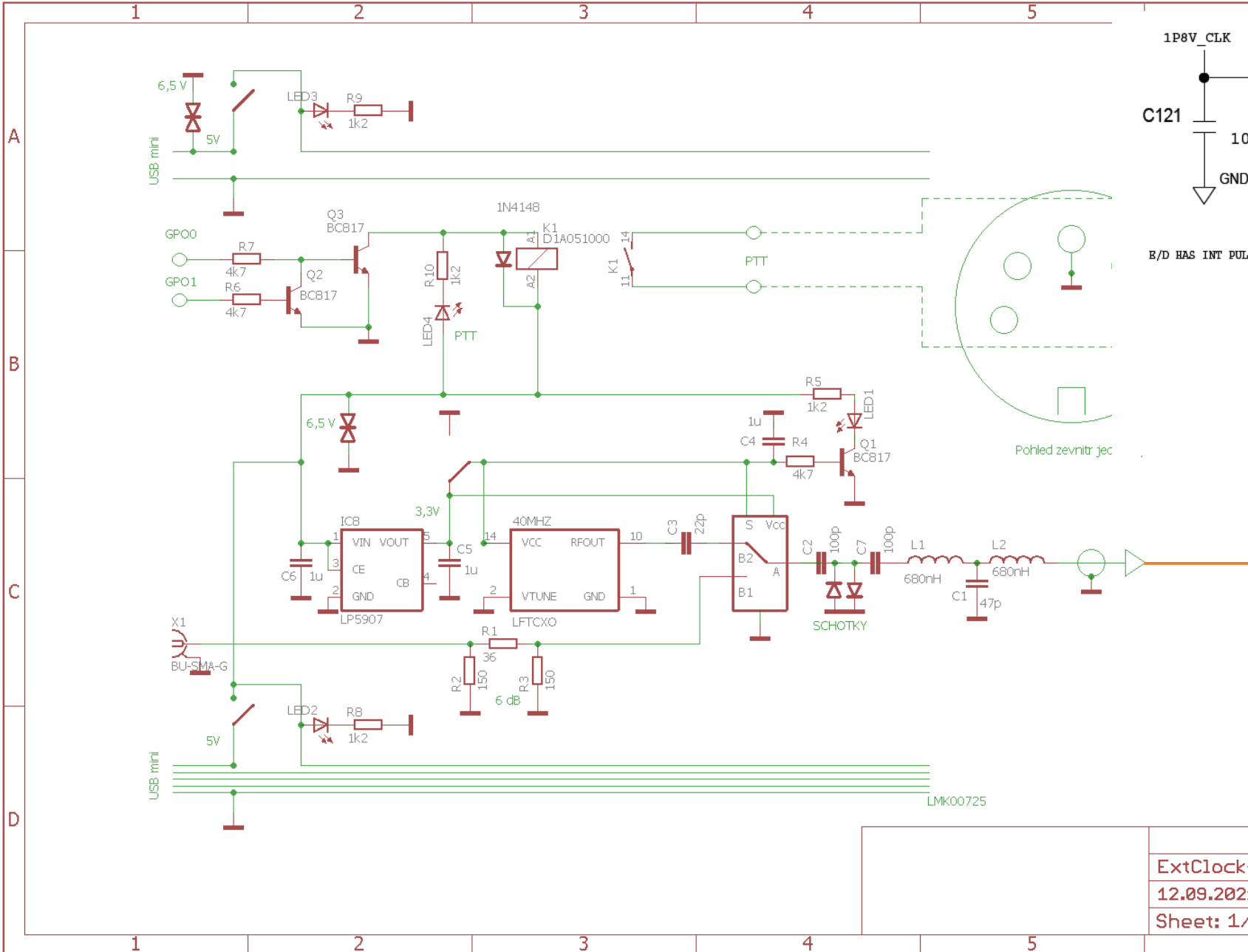
Disadvantages:

- RF Shielding is missing
- **AI Box**
- Low Freq. Stability



Another TCXO 0,5 ppm
External GPSDO

- PTT Solution
- Firmware F50EO
- GPO0 + GPO1



ExtClock+
12.09.2021
Sheet: 1/2

Latency

WSJT-X v2.4.0 by K1JT, G4WJS, K9AN, and IV3NWX

File Configurations View Mode Decode Save Tools Help

Single-Period Decodes							Average Decodes								
UTC	dB	DT	Freq	Message			UTC	dB	DT	Freq	Message				
1843	-9	4.0	2340	:	NOCTR	SM6CKU -12	q0	1843	-9	4.0	2340	:	NOCTR	SM6CKU -12	q0
1845	-9	4.0	2336	:	NOCTR	SM6CKU -12	q0	1845	-9	4.0	2336	:	NOCTR	SM6CKU -12	q0
1847	-9	3.8	2330	:	NOCTR	SM6CKU RR73	q0	1847	-9	3.8	2330	:	NOCTR	SM6CKU RR73	q0
1848	-24	3.9	2373	:	SM6CKU	NOCTR 73	q0	1848	-24	3.9	2373	:	SM6CKU	NOCTR 73	q0
1849	-21	3.5	2494	:	NOCTR	IK7EZN JN90	q0	1849	-21	3.5	2494	:	NOCTR	IK7EZN JN90	q0
1851	-21	3.5	2494	:	NOCTR	IK7EZN JN90	q0	1851	-21	3.5	2494	:	NOCTR	IK7EZN JN90	q0
1852	-24	4.0	2358	:	IK7EZN	NOCTR -23	q0	1852	-24	4.0	2358	:	IK7EZN	NOCTR -23	q0
1853	-23	3.5	2493	:	NOCTR	IK7EZN R-23	q0	1853	-23	3.5	2493	:	NOCTR	IK7EZN R-23	q0
1855	-19	3.5	2494	:	NOCTR	IK7EZN R-23	q0	1855	-19	3.5	2494	:	NOCTR	IK7EZN R-23	q0
1857	-20	3.5	2494	:	NOCTR	IK7EZN RR73	q0	1857	-20	3.5	2494	:	NOCTR	IK7EZN RR73	q0
1858	-23	3.9	2335	:	IK7EZN	NOCTR 73	q0	1858	-23	3.9	2335	:	IK7EZN	NOCTR 73	q0
1859	-20	3.5	2494	:	TNX	73 SKIP	q0	1859	-20	3.5	2494	:	TNX	73 SKIP	q0

Log QSO Stop **Monitor** Erase Clear Avg Decode Enable Tx Halt Tx Tune Menus

23cm **1 296,074 094** Tx even/1st

DX Call: SM6CKU DX Grid: JO67 F Tol: 50 Submode: C

Az: 347 881 km Rx: 2494 Hz Report: -15

Lookup Add T/R: 60 s Sh Auto Seq Call 1st Tx6

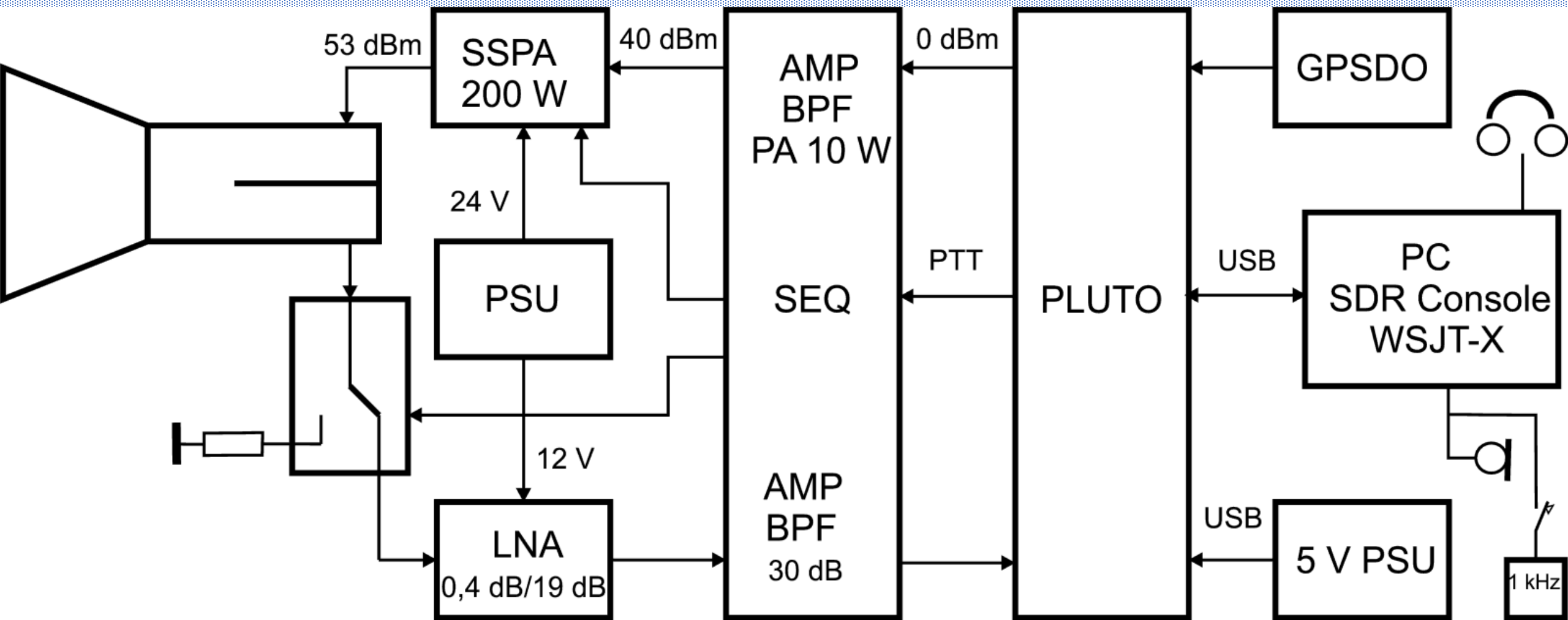
2021 čvn 14
19:00:02

Generate Std Msgs

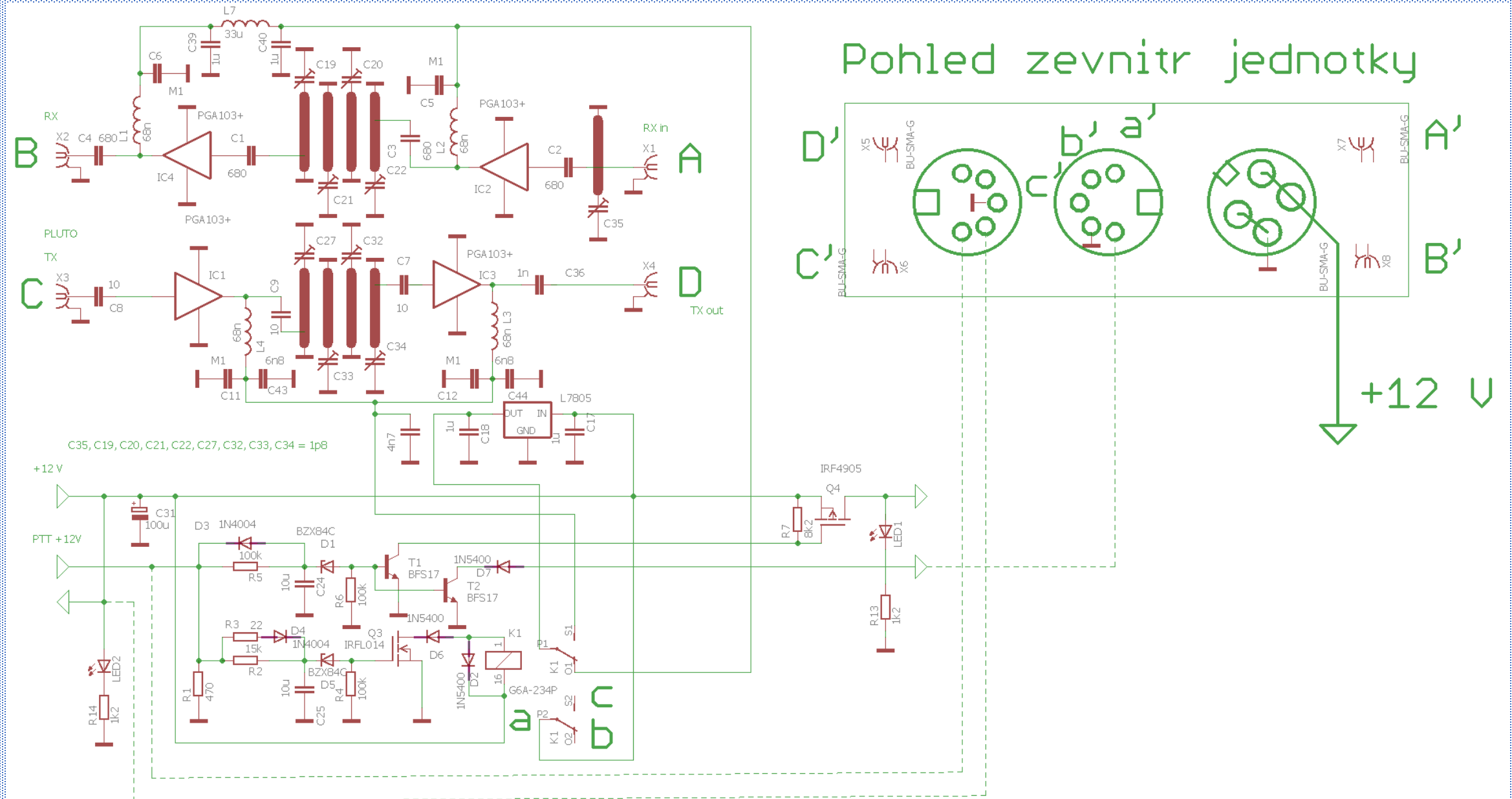
Next	Now
LA3EQ OK2AQ JN89	<input type="radio"/> Tx 1
LA3EQ OK2AQ -15	<input type="radio"/> Tx 2
LA3EQ OK2AQ R-15	<input type="radio"/> Tx 3
LA3EQ OK2AQ RR73	<input type="radio"/> Tx 4
LA3EQ OK2AQ 73	<input type="radio"/> Tx 5
CQ OK2AQ JN89	<input checked="" type="radio"/> Tx 6

Receiving **O65-60C** 0 0 2/60 WD:10m

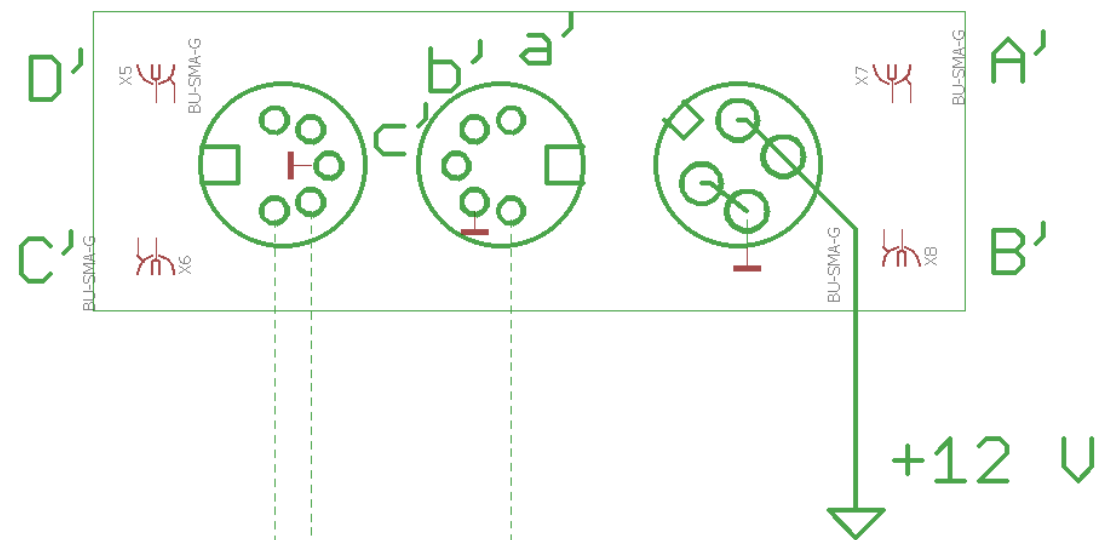
EME SETUP

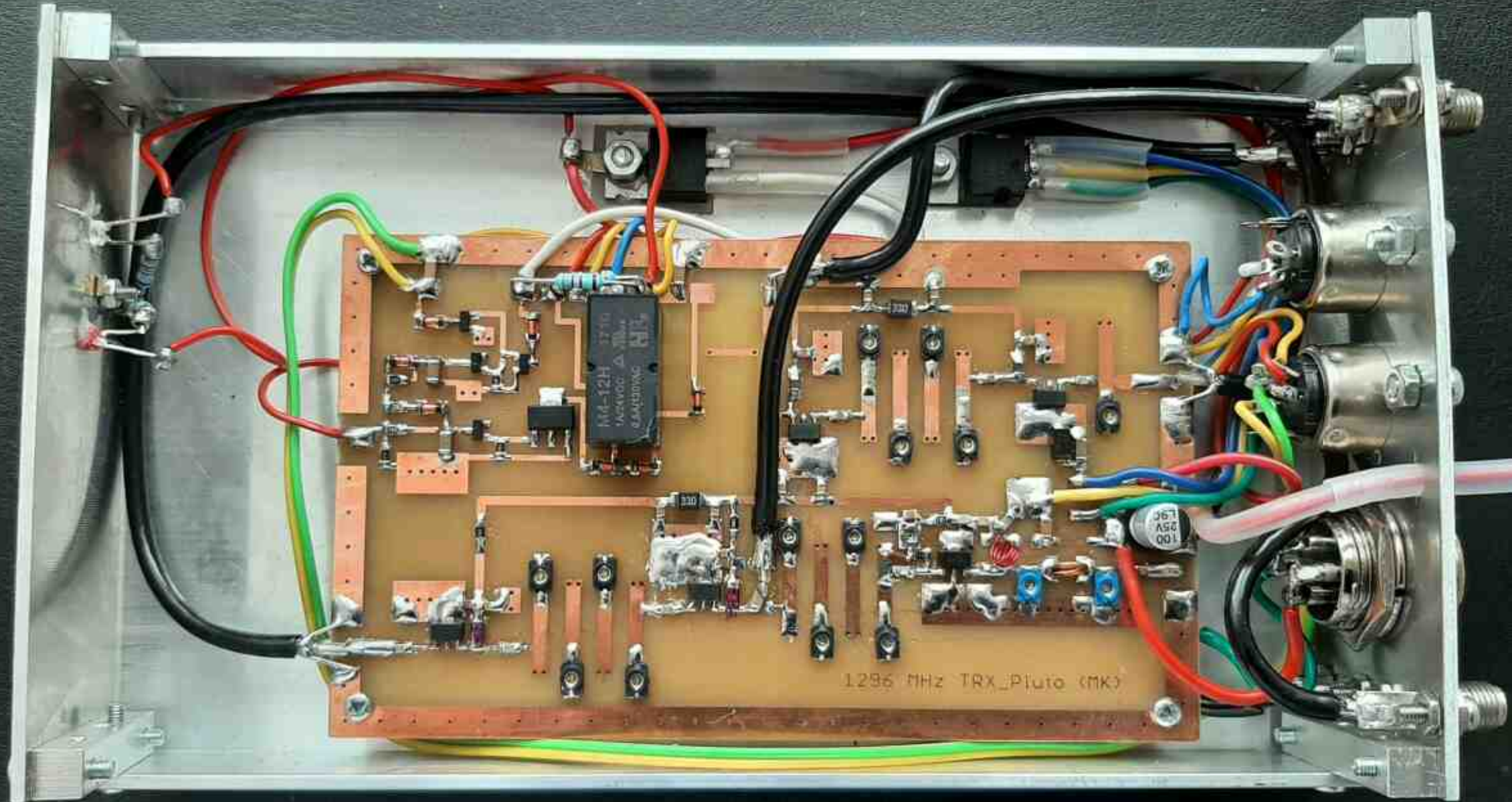


1296 MHz FRONT END



Pohled zevnitř jednotky





Home View Receive Transmit Rec/Playback Favourites Memories Tools Help

Style

Receive

RX 1 100 - 2900 Hz

1.296.065.000

Line 1 (Virtual Audio Cable)

IF Display

Mode

Filter

1296.050 1296.100 1296.150

UTC
14:50:12

1296.000 1296.100 1296.200

Transmit

TX 100 - 2900 Hz

1.296.065.000

Sync RX RX → TX TX → RX

Sync RX LSB USB AM FM CW

TX Tone Tune ...

23cm

Drive 84

Meter

PWR 0 1 2 W

SWR 1 1.1 1.5 2 3 4

DRV 0 25 50 75 100 mW

IPA 0 25 50 75 100 mA

VDD 12 13 14 15 V

ALC 0 25 50 75 100 125

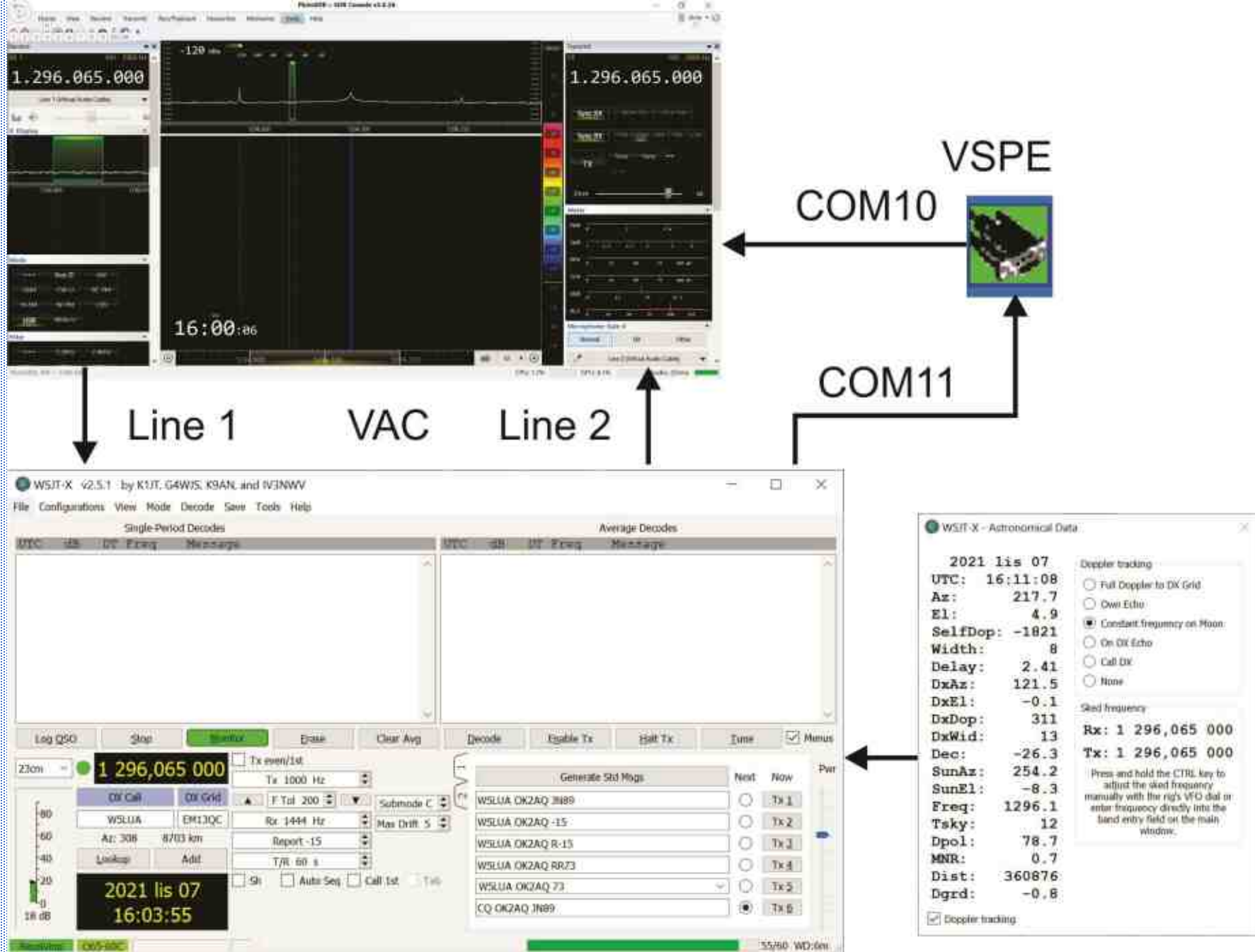
Microphone: Gain 0

Normal DX Other

Line 2 (Virtual Audio Cable)

PlutoSDR, BW = 3.000 MHz

CPU: 1.9% GPU: 9.7% Audio: 115ms



VB-AUDIO Software

Audio Mechanic & Sound Breeder

Home Audio Apps Audio Pro Support Licensing WebShop

Virtual Audio Cable Voicemeeter Banana Potato VBAN Spectralissime

Playback

Select a playback device below to modify its settings:

- CABLE Input
VB-Audio Virtual Cable
Ready
- Speakers
High Definition Audio Device
Ready

Recording


Select a recording device below to modify its settings:

- CABLE Output
VB-Audio Virtual Cable
Ready
- Microphone

VB-CABLE Virtual Audio Device.

VB-CABLE is a virtual audio device working as virtual audio cable. All audio coming in the CABLE input is simply forwarded to the CABLE output.

Download and Install VB-CABLE Driver Now!

 VBCABLE_Driver_Pack43.zip
(1.09 MB - OCT 2015 / XP to WIN10 32/64 bits)

INSTALLATION: Extract all files and Run Setup Program in administrator mode. Reboot after installation.

OK2AQ EME Virtual Audio Cable (VAC) - conn... x +

vac.muzychenko.net/en/ Pozastaveno

Aplikace TK5EP's QRA locato... WAVEGUIDE CUTOF... OK VHF Club HB9Q | LOGGER HB9Q | EME OK2KKW home site

Vyberte jazyk
Používá technologii Google Překladač

Virtual Audio Cable (VAC)

20+ years of experience. Connects audio apps together since 1998.

Main Description Usage Manual Download Purchase Support History

About

Latest version: [4.66](#)

Virtual Audio Cable (VAC) is an audio bridge between applications that transmits sounds (audio streams) from app to app, from device to device.

VAC creates a set of [virtual audio devices](#). Each device simulates an audio adapter (card) whose output is internally connected to the input, making a loopback. If an application plays audio to the output, the sound will not be audible because the signal is looped back to the input. But if another application records from the input, it receives the sound produced by the first app.

Such virtual devices are named *Virtual Cables*. The "Virtual Cable" term is used only in VAC description,

RegistryReviverSet...exe Konektor_audio.pdf Zobrazit vše x

Driver

Cables Clients Streams

Worker threads
 Up to Prio

Timer res, mcs Log level Max NC

Cable

Format range
 SR .. BPS .. NC ..

Connected source lines
 Mic Line S/PDIF

Ms per int Stream fmt Capture port WR Volume control

Max inst Clock corr ratio Render port WR Channel mixing

Enable spk pin Use PortCls

Cable	MS	SR range	BPS range	NC range	Stm fmt limit	Vol ctl	Ch mix	PortCls	Current format	Rc stms	Pb stms	Signal levels	Oflows	UFlows
1	3	22050..48000	8..16	1..2	Cable range	Off	On	Off	ExtPCM/48000/16/2(3)	1	1			2
2	3	48000..192000	8..16	1..2	Cable range	Off	On	Off	ExtPCM/48000/16/2(3)	1	0			8

07.11 17:08:41.752 Cable 2: Format set to ExtPCM/48000/16/2(3)

QPC freq, MHz System timer res, mcs

- Audio
- Controllers
 - CAT (Serial Port)
 - ▶ Port Selection
 - Mode Mapping
 - I/O Monitor
 - I/O Test
 - MIDI
 - Tmate
- Display
- Performance
- Receive
- Recording
- Tuning
- Auto-Mute
- Identities
- Start
- USB Relay

Serial ports enabled for CAT control (logbooks, scanners, ...) using the TS-2000 protocol

Speed: 57,600

Refresh

View

[Online help](#)

	Port	Speed	Location	Manufacturer	Description
<input type="checkbox"/>	COM4	57,600	USB Composite Device	Analog Devices, Inc.	PlutoSDR Serial Console
<input checked="" type="checkbox"/>	COM10	57,600	<unknown>	<unknown>	<unknown>
<input type="checkbox"/>	COM11	57,600	<unknown>	<unknown>	<unknown>

This program supports the use of serial ports for exchanging information with third-party programs such as logbooks. Normally you use virtual serial ports, for example those created using the VSP Manager by K5FR or VSPE from Eterlogic or com0com (Sourceforge).

Protocol: in your logbook program select the **Kenwood TS-2000** protocol.

Note: you cannot use a serial port for a third-party program and at the same time use it to connect to an external radio unless these programs use OmniRig or similar.

You connect the third-party program to one end of the serial cable and this program to the other. The third-party program sends commands to this program, for example to set the frequency and mode. The serial port cannot be used to monitor and synchronise another radio



OK

Cancel

Settings

General Radio Audio Tx Macros Reporting Frequencies Colours Advanced

Rig: Kenwood TS-2000 Poll Interval: 1 s

CAT Control

Serial Port: COM11

Serial Port Parameters

Baud Rate: 57600

Data Bits

Default Seven Eight

Stop Bits

Default One Two

Handshake

Default None
 XON/XOFF Hardware

Force Control Lines

DTR: RTS:

PTT Method

VOX DTR
 CAT RTS

Port: COM1

Transmit Audio Source

Rear/Data Front/Mic

Mode

None USB Data/Pkt

Split Operation

None Rig Fake It

Test CAT Test PTT

OK Cancel

Settings

General Radio Audio Tx Macros Reporting Frequencies Colors Advanced

Soundcard

Input: Line 1 (Virtual Audio Cable) Mono
Output: Line 2 (Virtual Audio Cable) Mono

Save Directory

Location: C:/Users/Mirek/AppData/Local/WSJT-X/save Select

AzEl Directory

Location: C:/Users/Mirek/AppData/Local/WSJT-X Select

Remember power settings by band

Transmit Tune

OK Cancel

Hardware details

Device name: mini GPS Reference Clock
 Made by: Leo Bodnar Electronics
 Firmware version: 1.14
 Serial number: G63924 Blink

Settings

Output Hz: 40000000 Set frequency
Factory defaults Advanced <<<

Status

GPS signal OK PLL lock OK

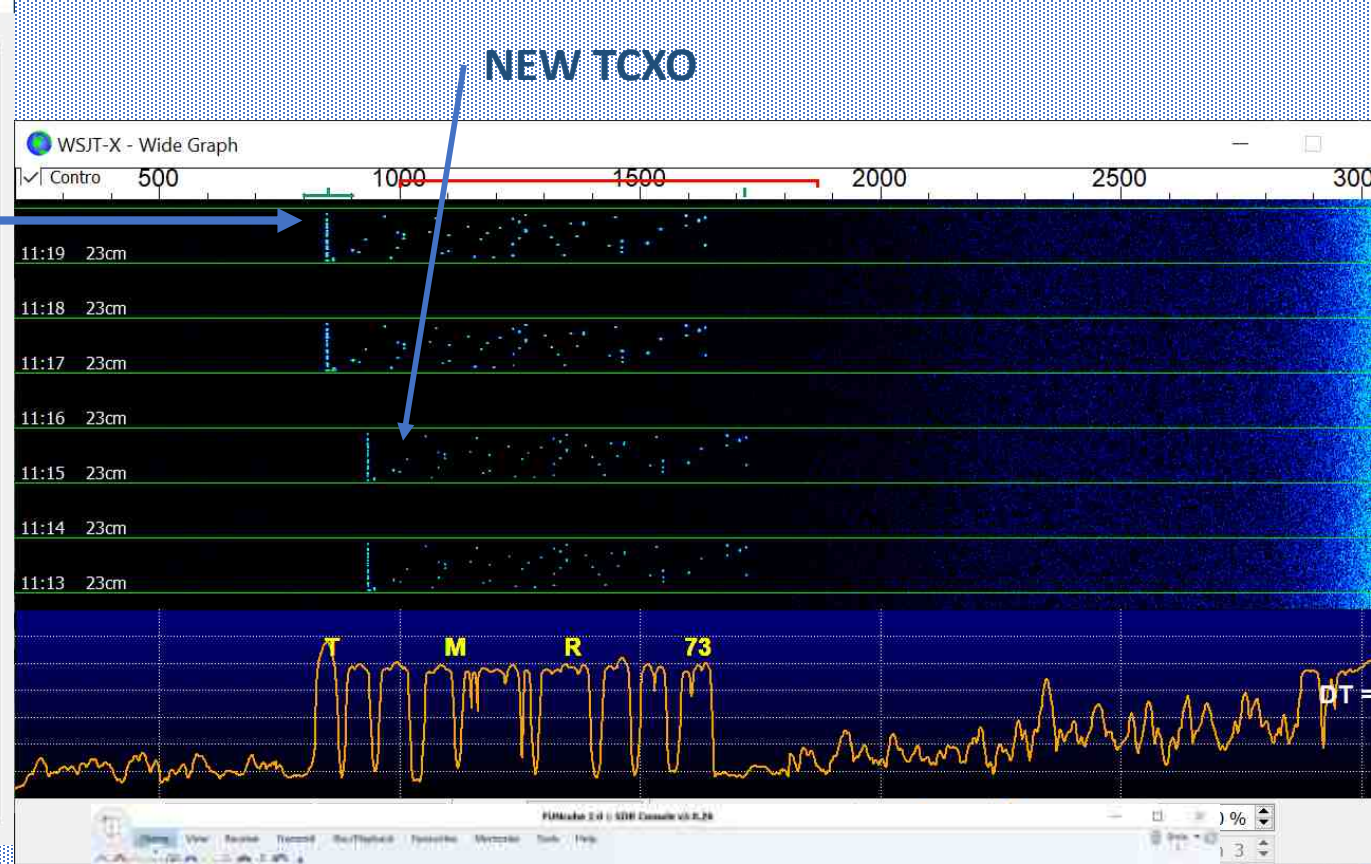
Advanced

Output drive strength: 16mA Enable output
 Enable output

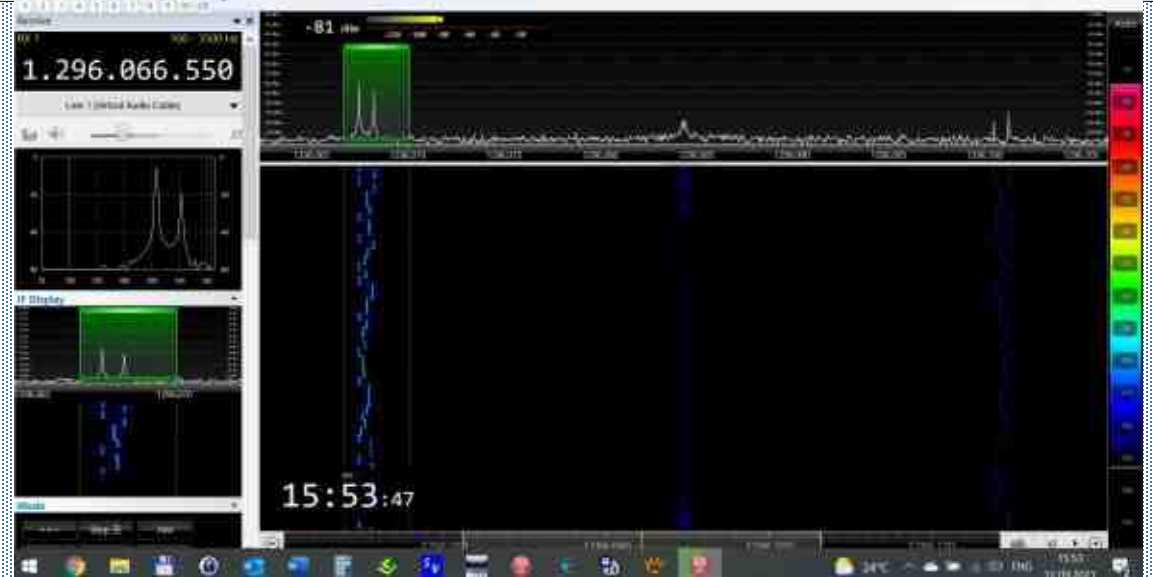
175000	GPS reference, Hz
1	N31
11	N2_HS
3200	N2_LS
11	N1_HS
14	NC1_LS
15	BW

Update

Position: 49,2286534, 16,6326492, 357,300
 UTC: 2021.09.12 15:52:46

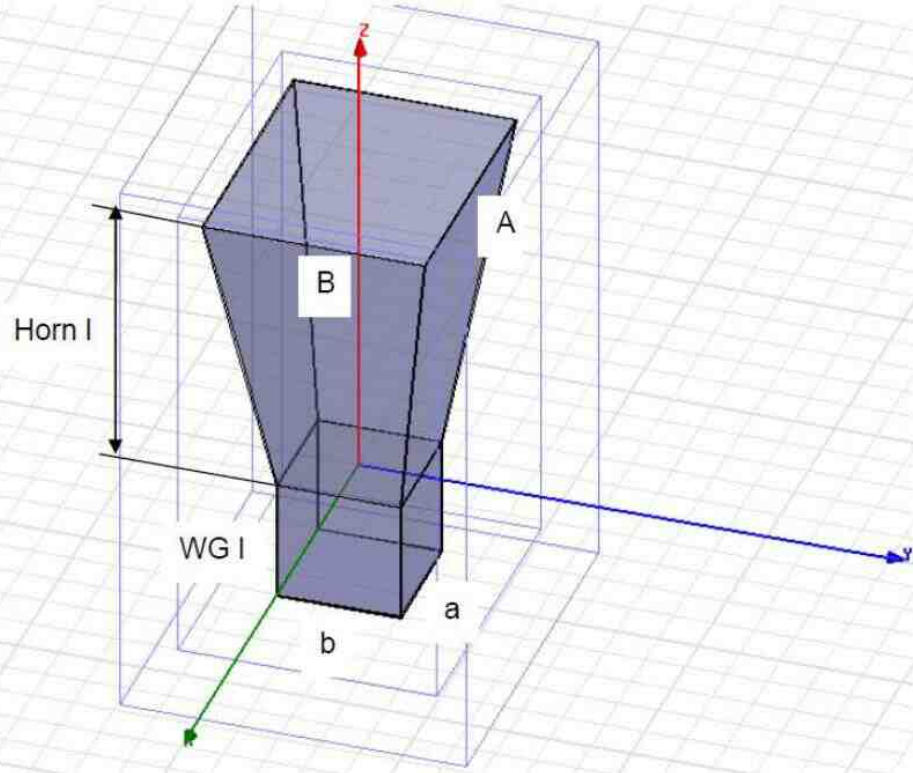


GPSDO Leo Bodnar Configuration

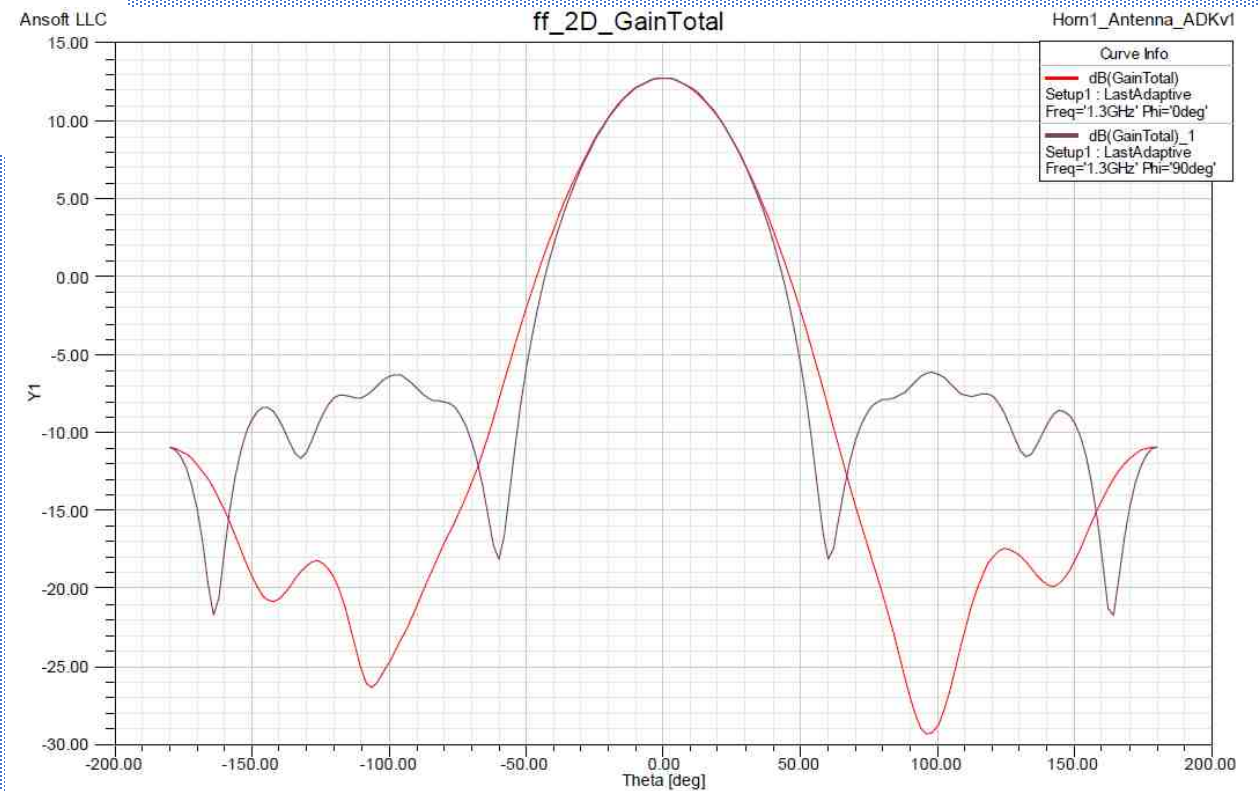
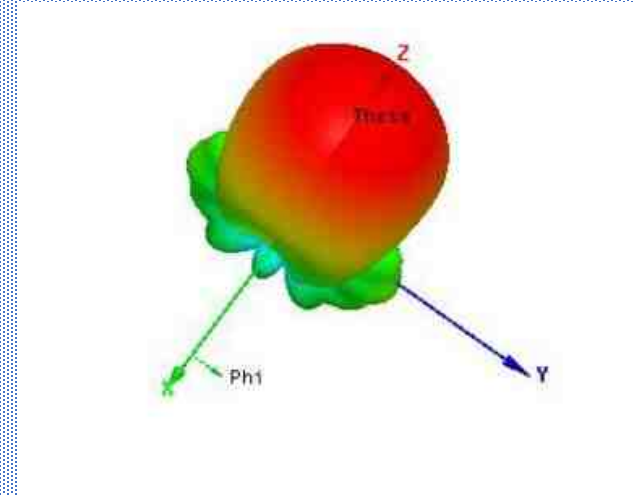




10 W

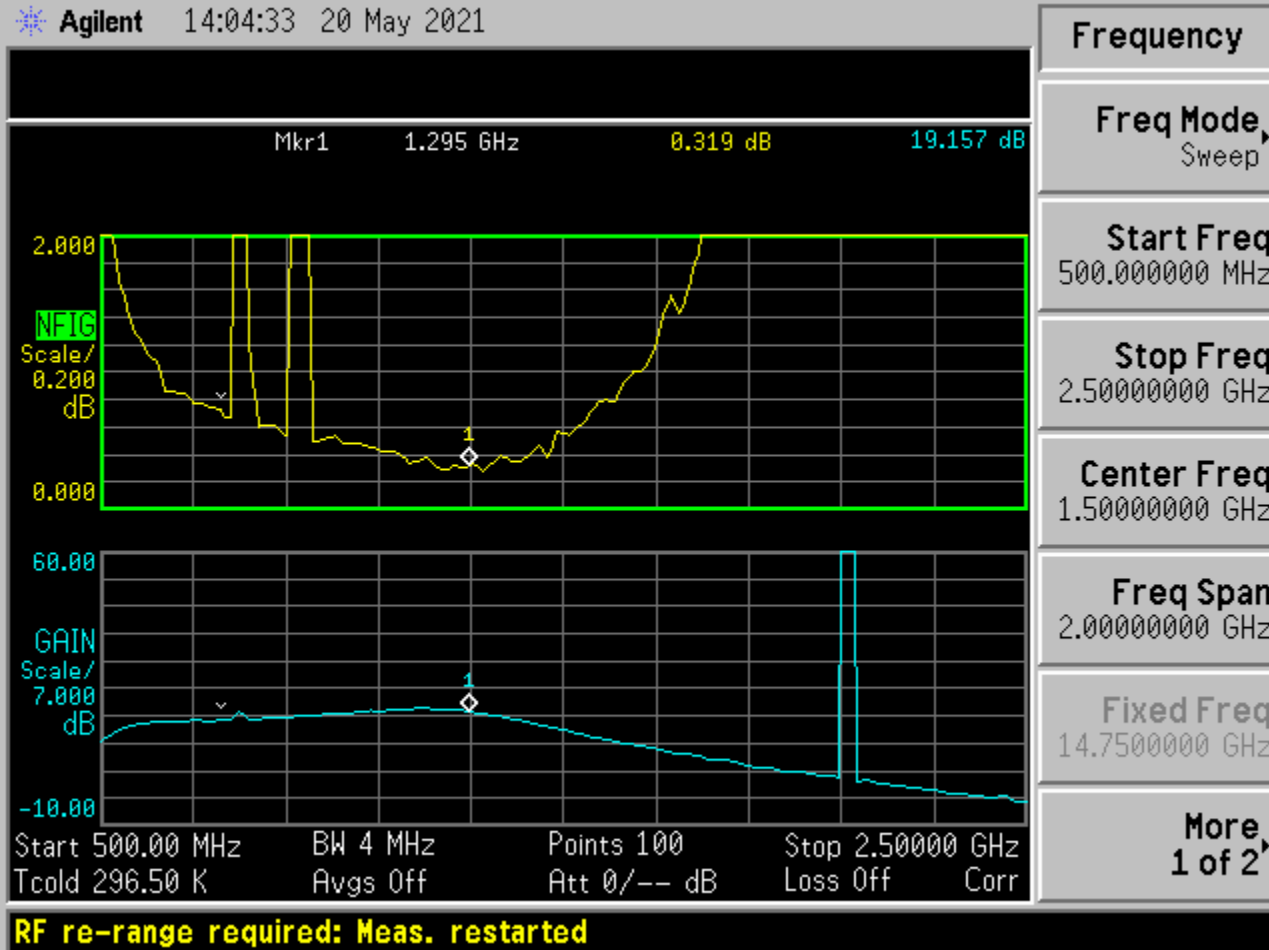


$a = b = 150 \text{ mm}$
 $\text{WG I} = 150 \text{ mm}$
 $A = 335 \text{ mm}$
 $B = 270 \text{ mm}$
 $\text{Horn I} = 400 \text{ mm}$

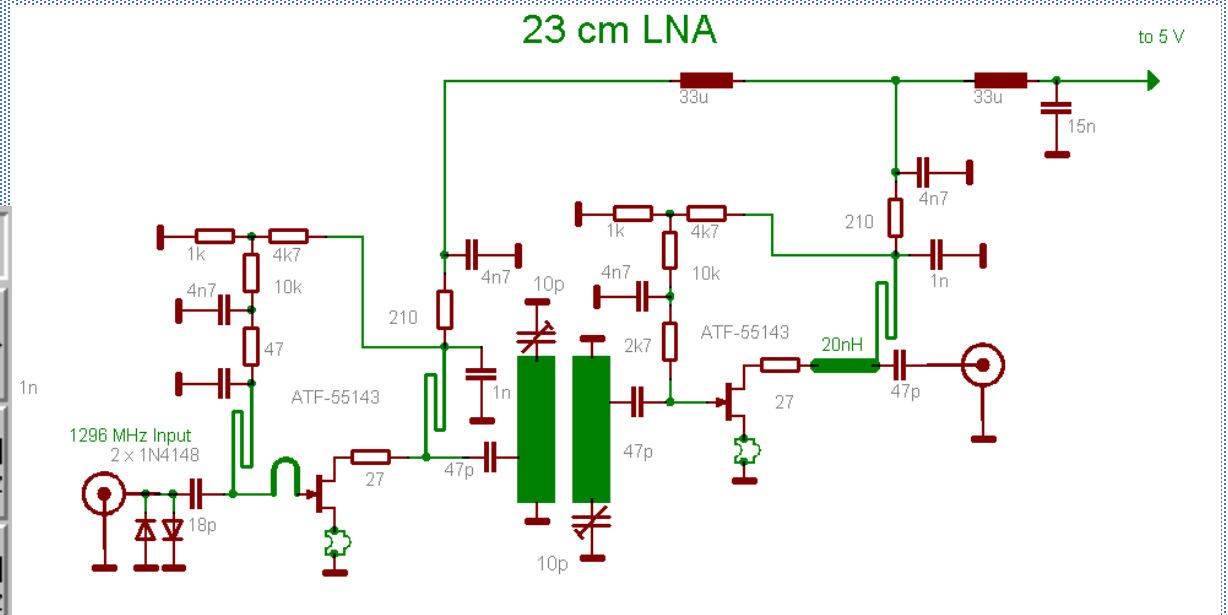


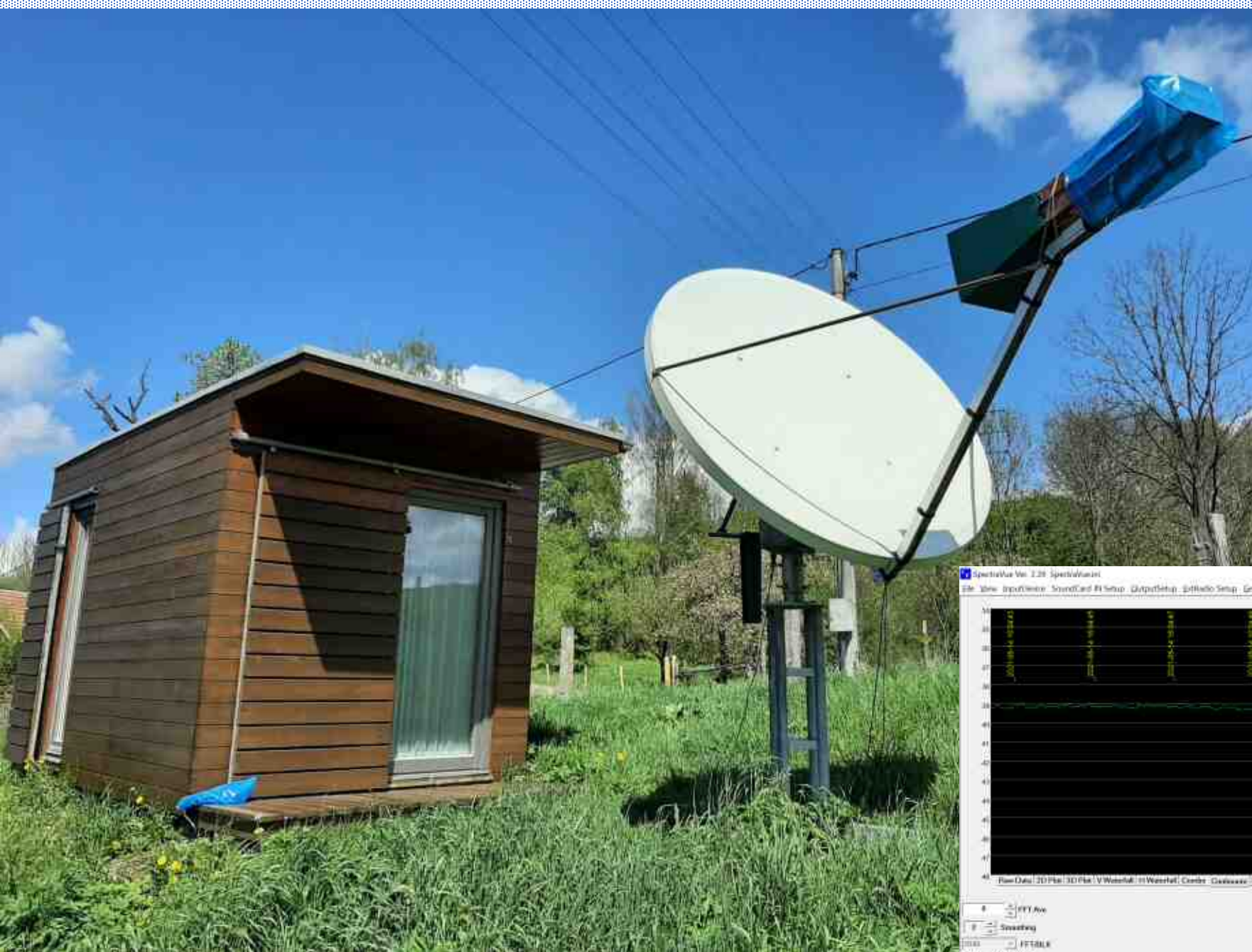
LNA

1. Stage

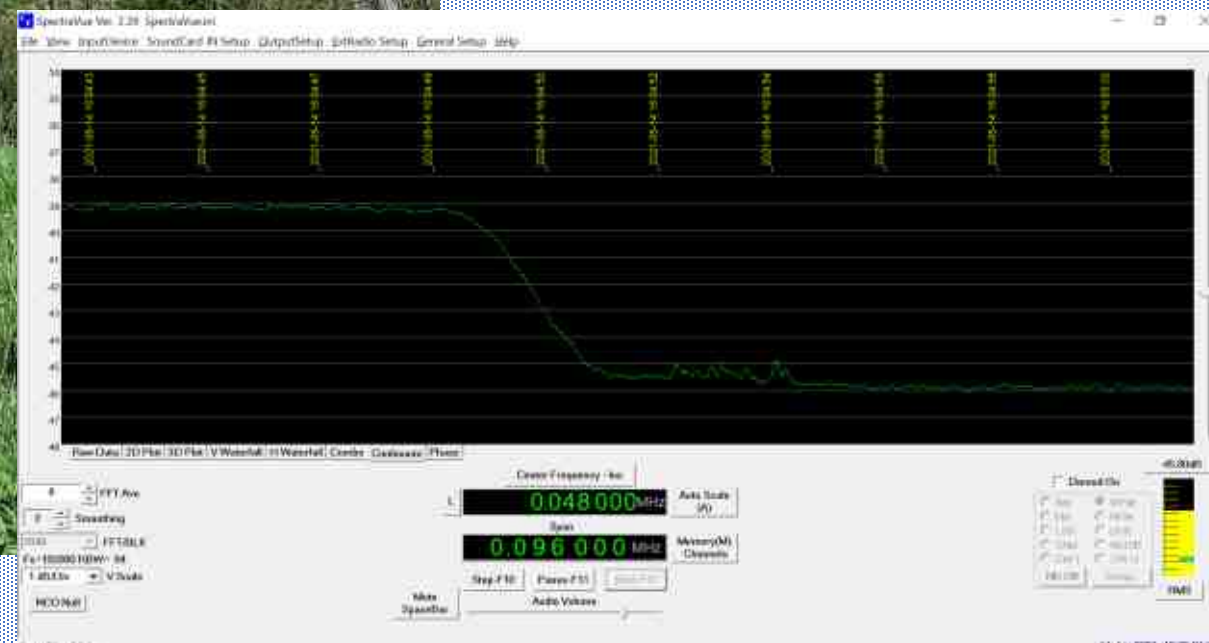


2. and 3. Stage





SN/CS = 7 dB
SFU = 71



Decoded JT65 & Q65

OK2DL	6 m	1 kW	-9
AA6I	3,6 m	350 W	-19
HB9Q	10 m	1 kW	-4
AA4MD	3,6 m	350 W	-18
DL7YC	4,9 m	250 W	-15
OK1KIR	6,1 m	1 kW	-9
W7EME			-27
UA3PTW	5,8 m	1 kW	-10
OK1DFC	2,6 m	1 kW	-17
OK1CA	10 m	500 W	-11
PA3FXB	2,9 m	350 W	-22
SM6CKU	8 m	200 W	-9
UA9FAD	3 m	100 W	-19
KB2SA	1,9 m	535 W	-16
KB2SA	1,9 m	50 W	-25
IK7EZN	2,4 m	150 W	-19
KA1GT	3,1 m	240 W	-15
FR5DN			-15
KN0WS	4,8 m	200 W	-6
LZ4OC	2,2 m	400 W	-9

DK3WG	3 m	500 W	-16
RA4HL	3 m	500 W	-15
DJ3JJ	2,5 m	320 W	-7
IK1FJI	3,2 m	1 kW	-10
KD5FZX	5 m	800 W	-11
N1AV	4,2 m	400 W	-16
IK2DDR	3,7 m	250 W	-18
N6NU	3 m	100 W	-22
GM0PJD	3,6 m	110 W	-20
DL6SH	8 m	400 W	-8
ES3RF	3 m	200 W	-21
N9JIM	1,5 m	500 W	-23
LA3EQ	1,9 m	250 W	-22
N0CTR	2,4 m	300 W	-23
I0NAA	5 m	250 W	-19
G7TZZ	3 m	100 W	-21
OM4XA	3 m	200 W	-19
DF3RU	6 m	750 W	-9
ZS5Y	3,8 m	150 W	-25

+ about 12 CW Stations

1296 MHz EME Experimental Setup



PA 200 W

THANK YOU FOR YOUR ATTENTION