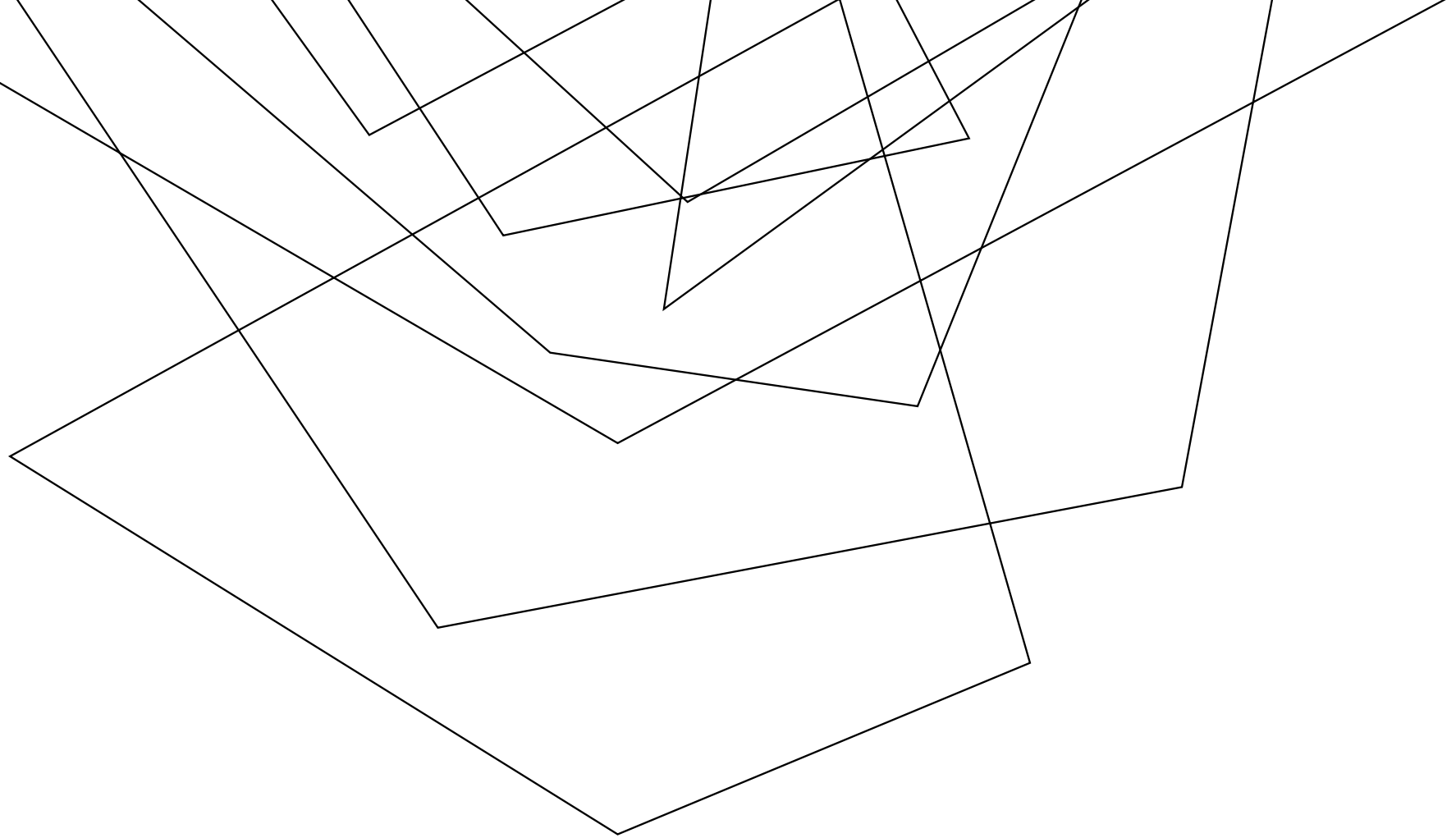


FUN WITH THE RTL | SDR –

BUILDING A PANADAPTOR ON THE WICKED CHEAP

Jon – N1ILZ

AGENDA

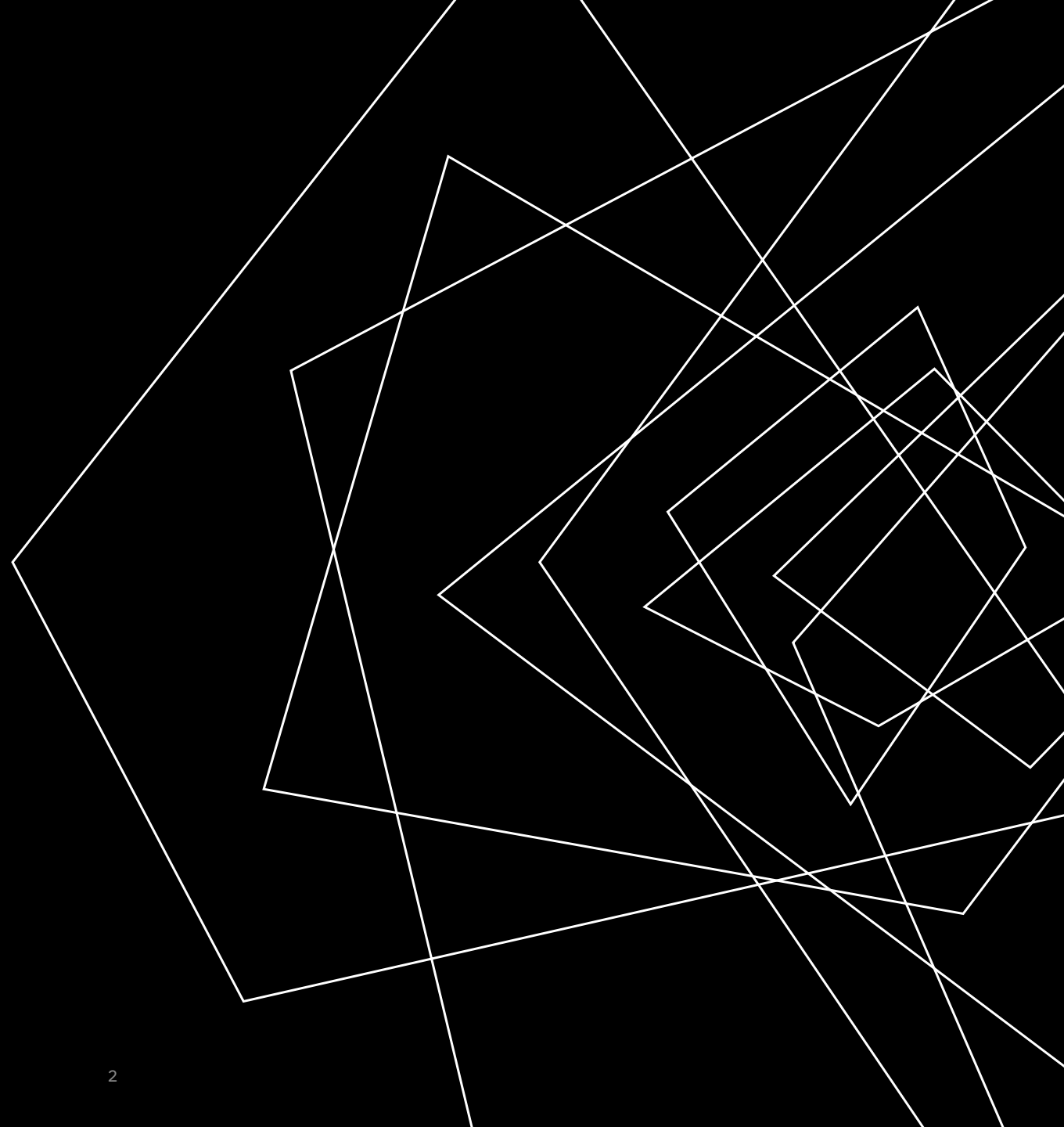
Introduction

Primary goals

Block Diagram

Details

Summary

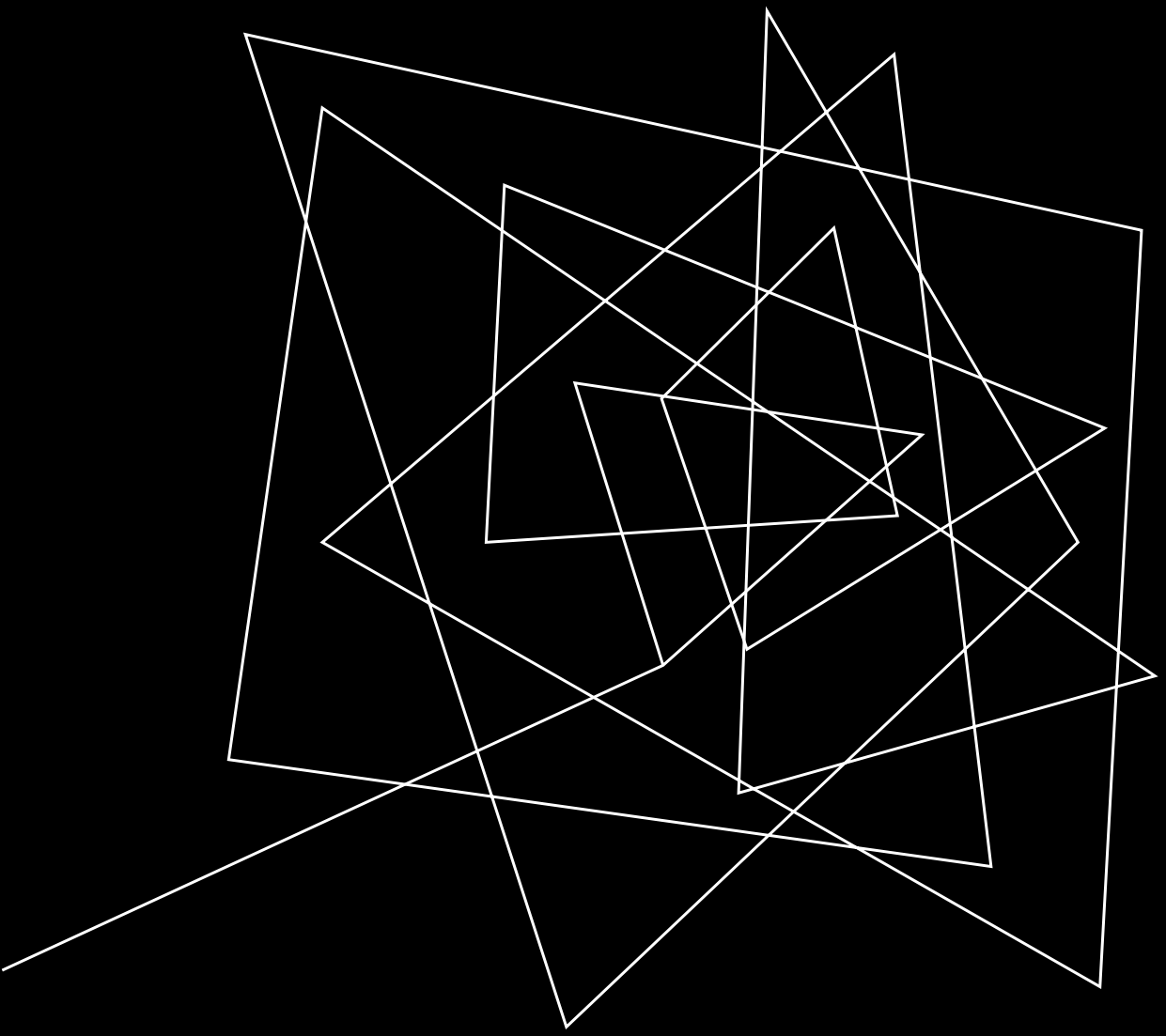


INTRODUCTION

I love the panadaptors (band displays) available on newer rigs, like the IC-7300 and the Flex Radios.

I'm ~~cheap~~ frugal. Can I create an 80% solution for much less than the cost of a new HF rig?

YES!

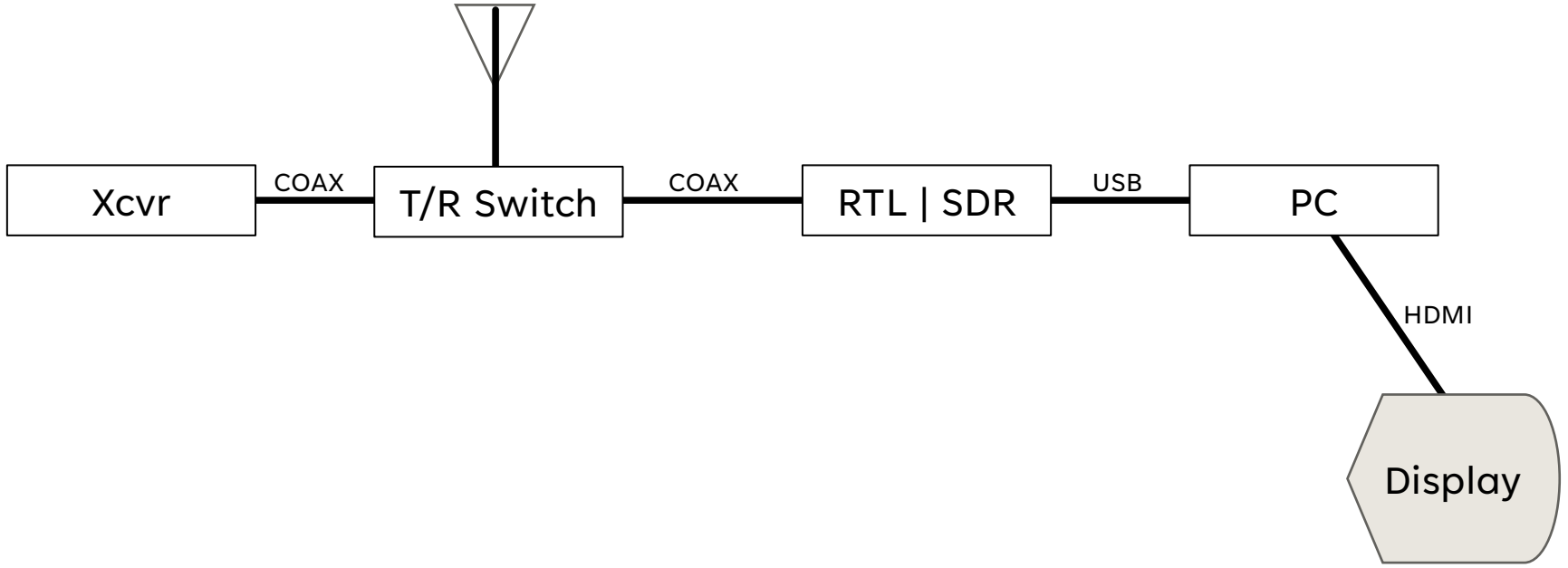


PRIMARY GOALS

Simple, inexpensive, "good enough" panadaptor

Explore RTL-SDR platform for future experiments

SYSTEM BLOCK DIAGRAM



COMPONENTS

T/R SWITCH

MAY be built in to your XCVR

Or: MFJ-1708B-SDR, SDR RF SENSING T/R SWITCH WITH SO-239

$139.95

https://mfjenterprises.com/products/mfj-1708b-sdr

COMPONENTS

RTL | SDR

Dongle-only on amazon.com [$33.95]

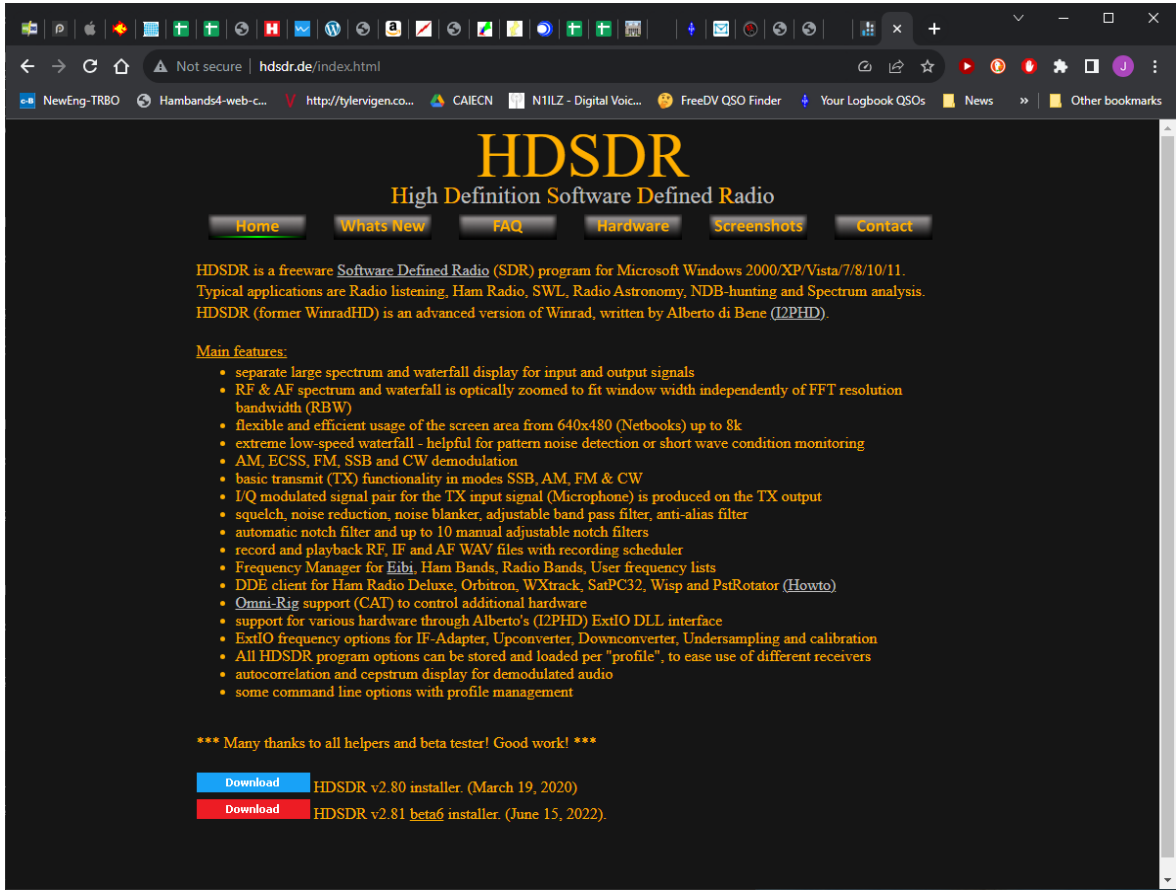
https://www.amazon.com/RTL-SDR-Blog-RTL2832U-Software-Defined/dp/B0BMKZCKTF/ref=sr_1_3?crid=W9C3OO734530&keywords=rtl-sdr%2Bdongle&qid=1692664857&sprefix=rtl-sdr%2Caps%2C136&sr=8-3&th=1

COMPONENTS

HDSDR Software

N1ILZ recommendation: HDSDR. Freeware; download at

http://www.hdsdr.de/

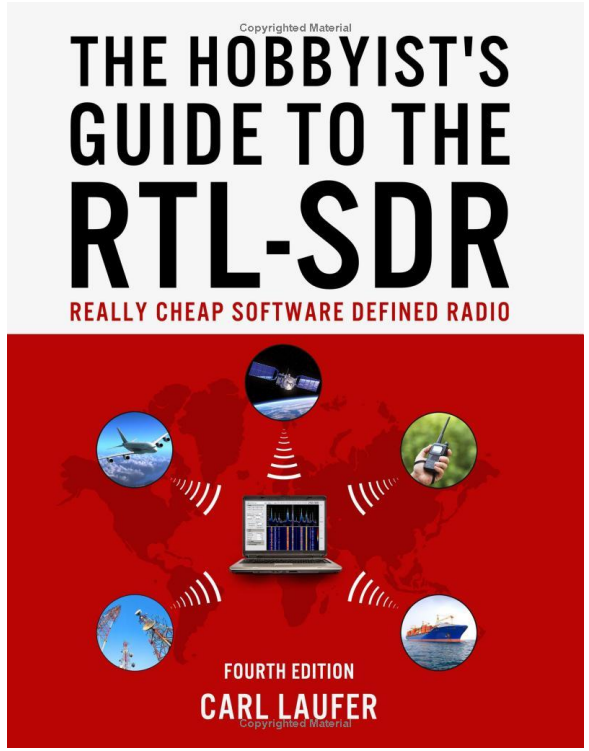


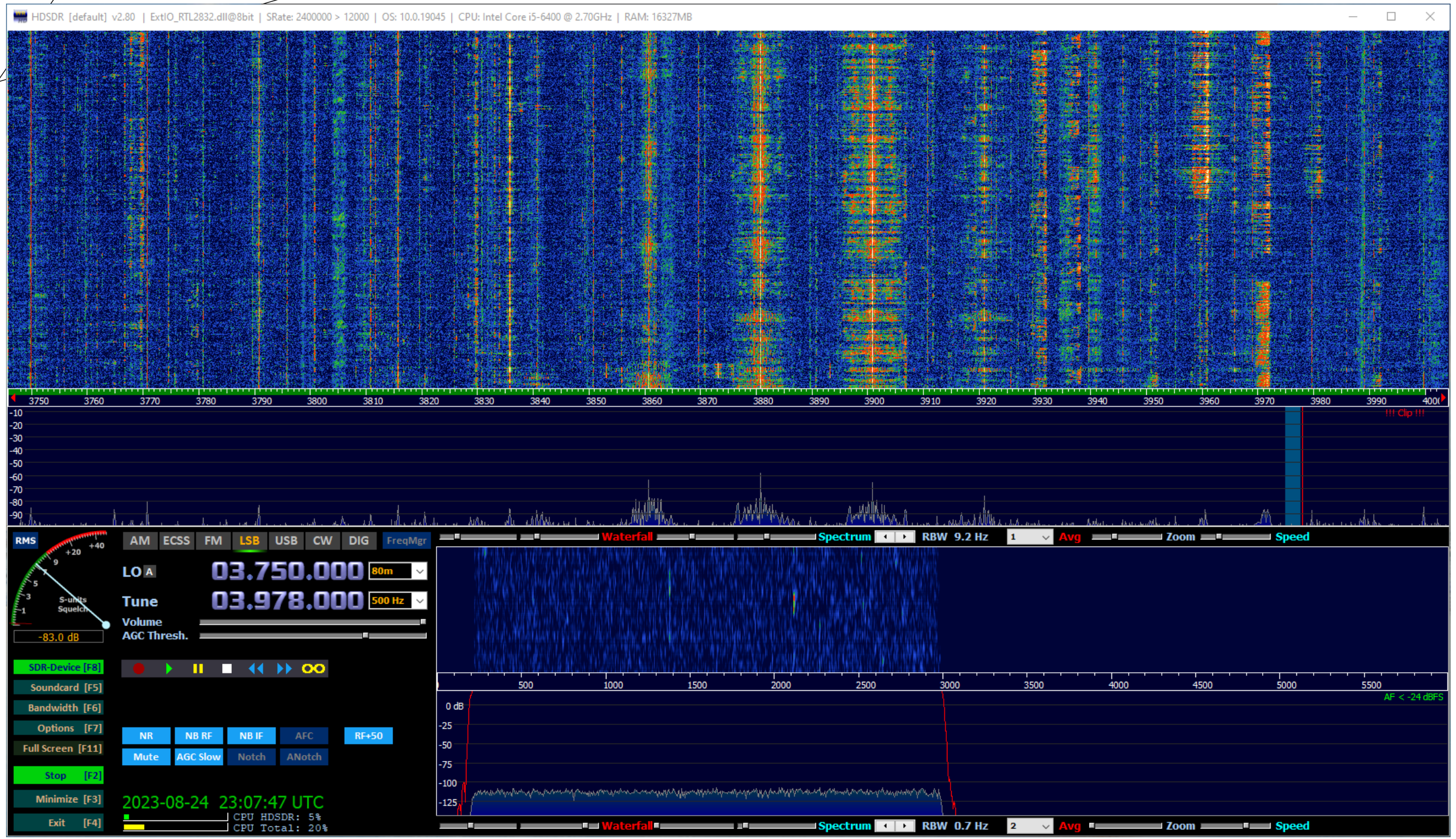
COMPONENTS

RTL | SDR BOOK (optional)

Useful book with lots more about the RTL-SDR [$24.95]

https://www.amazon.com/Hobbyists-Guide-RTL-SDR-Software-Defined/dp/1514716690/ref=sr_1_1?crid=1UBTZH2P45B6D&keywords=rtl-sdr+book&qid=1692823816&sprefix=rtl-sdr+book%2Caps%2C183&sr=8-1




HDSDR [default] v2.80 | ExtIO_RTL2832.dll@8bit | SRate: 2400000 > 12000 | OS: 10.0.19045 | CPU: Intel Core i5-6400 @ 2.70GHz | RAM: 16327MB
3750 3760 3770 3780 3790 3800 3810 3820 3830 3840 3850 3860 3870 3880 3890 3900 3910 3920 3930 3940 3950 3960 3970 3980 3990 4000
-10 -20 -30 -40 -50 -60 -70 -80 -90
!!! Clip !!!
RMS
+40 +20 9 7 5 3 1
S-units Squelch
-83.0 dB
AM ECSS FM LSB USB CW DIG FreqMgr
LO A
03.750.000
80m
Tune
03.978.000
500 Hz
Volume
AGC Thresh.
SDR-Device [F8]
Soundcard [F5]
Bandwidth [F6]
Options [F7]
Full Screen [F11]
Stop [F2]
Minimize [F3]
Exit [F4]
NR NB RF NB IF AFC RF+50
Mute AGC Slow Notch ANotch
2023-08-24 23:07:47 UTC
CPU HDSDR: 5%
CPU Total: 20%
Waterfall Spectrum RBW 9.2 Hz 1 Avg Zoom Speed
500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500
AF < -24 dBFS
0 dB -25 -50 -75 -100 -125
Waterfall Spectrum RBW 0.7 Hz 2 Avg Zoom Speed

AREAS FOR FUTURE EXPLORATION

BI-DIRECTIONAL CAT INTEGRATION WITH RIG

HDSDR tracks tuning changes on rig; point-and-click on HDSDR to change rig frequency

Uses freeware virtual COM ports and virtual serial cables

More than a little "black magic"

INTEGRATE WITH DIGI-MODE DECODING SOFTWARE

"Should" be possible to connect HDSDR with decoding software for DMR, DSTAR, etc.

Requires "virtual audio cables"

Requires decoding software, which might not yet exist

SUMMARY

Cobbling together a cheap-but-good-enough panadaptor was an excellent introduction to the RTL|SDR device

The project is not as slick as commercial panadaptors, but it's good enough

Plenty of room for further evolution

THANK YOU

Jon W McCombie – N1ILZ

508-246-4982

n1ilz@arrl.org