sBitx – HF SDR Transceiver
sBitx V3
from HF Signals

user review by
KI4UJY

HF Signals was founded by Ashhar Farhan, VU2ESE

Company

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sBitx: (some Configuration ~~Assembly~~ Required)

The sBitx-v3 measures 10"x 6" x 2" and weights about 4 pounds (2Kgs)
Comes preloaded with all software and configurations – just set CALL SIGN, Grid Square and your good to go.. (IF only this were true..)
SOME ASSEMBLY REQUIRED , USE ONLY AS DIRECTED , SIDE EFFECTS INCLUDE , LOST TIME..

Basics:

- sBitx v3 – Board Only $180 | sBitx v3 – Full Radio with RPI4/2GB $399*
- Open Source
- 25 watt max
- Raspberry Pi4 w/ integrated touchscreen
- CW, FT8, Digital , Upper, Lower Side Band and Am – baked in
- Integrated Ham Radio Software Suite
- Web-based Remote Operation*
- Add a second screen with the Pi HDMI port*

*modification required for second screen – web based operation is great!
RealVNC remote operation is not bad either..

Frequencies

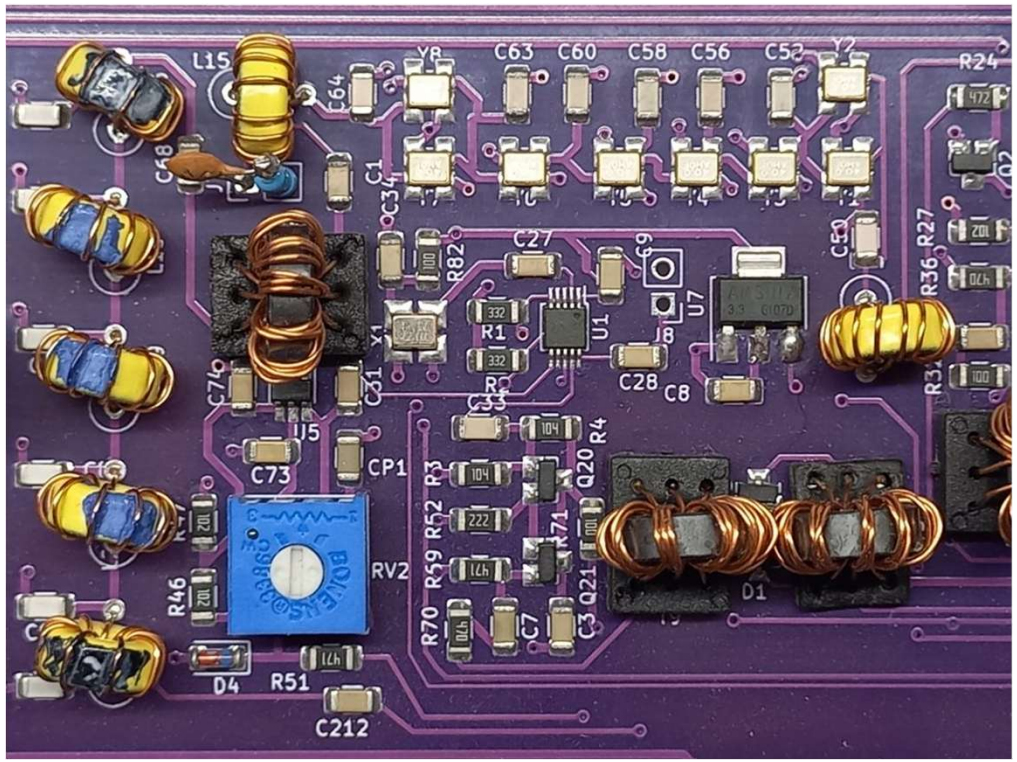
- Receive; 500 KHz to 30 MHz,
- Transmit: 3500-4000, 7000-7300,10000-10150, 14000-14350, 18000-18200, 21000-21450, 24800-25000, 28000-29700 (KHz)
- Power 25 watts on 80M – 20M, 10 watts higher bands
- Two VFO’s
- No internal tuner
- Based on ‘Poor Man’s SDR’ WB2CBA?

Details

- Macro’s , QSO’s for each mode
- Memories for each band
- Built in Logger (FT8 Only?)
- Receive 600 mA, transmit up to 6A
- Built in mic and onscreen keyboard (gag)
- External microphone and CW keyer input.
- DIY integration with FlDigi, PAT (Winlink), POTA software (*)
- The sBitx-v3 measures 10"x 6" x 2" and weights about 4 pounds (2Kgs)

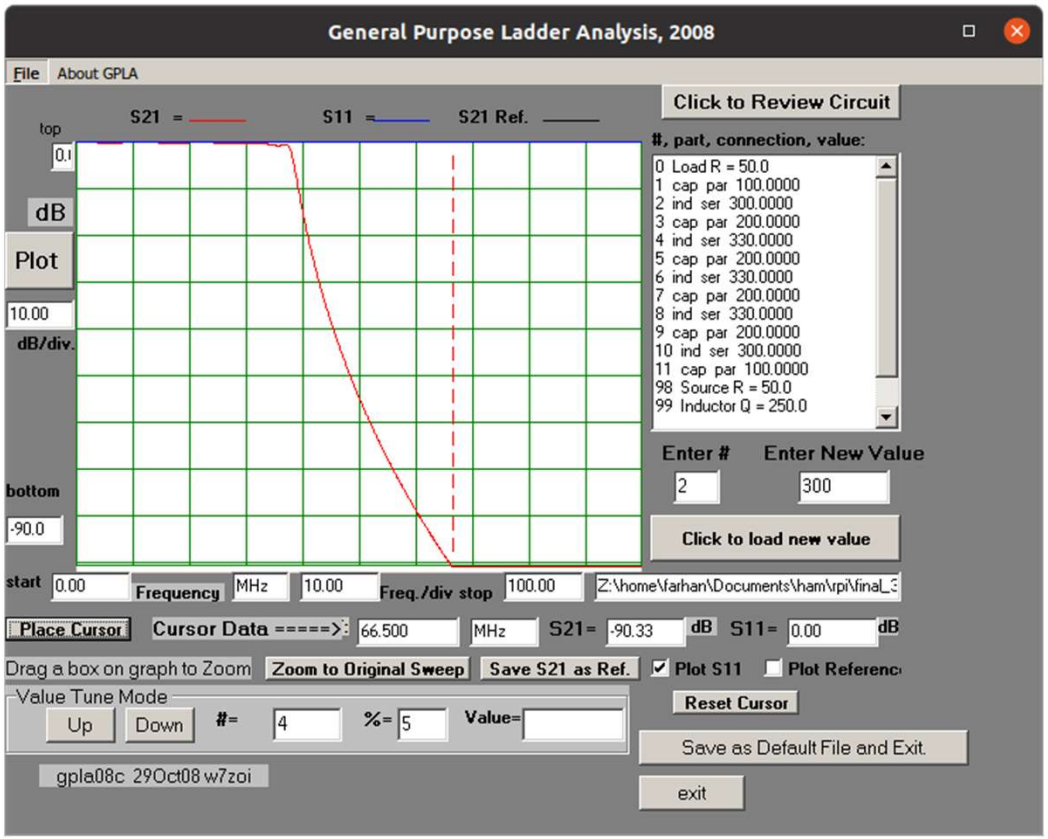
*diy vague directions (limited success!).. But integration in progress

Off the Shelf Parts

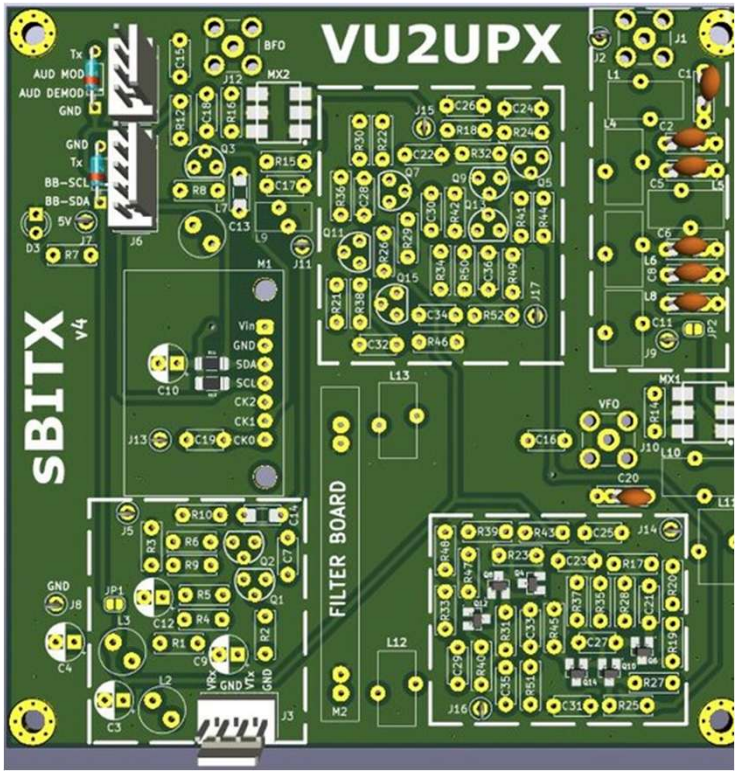


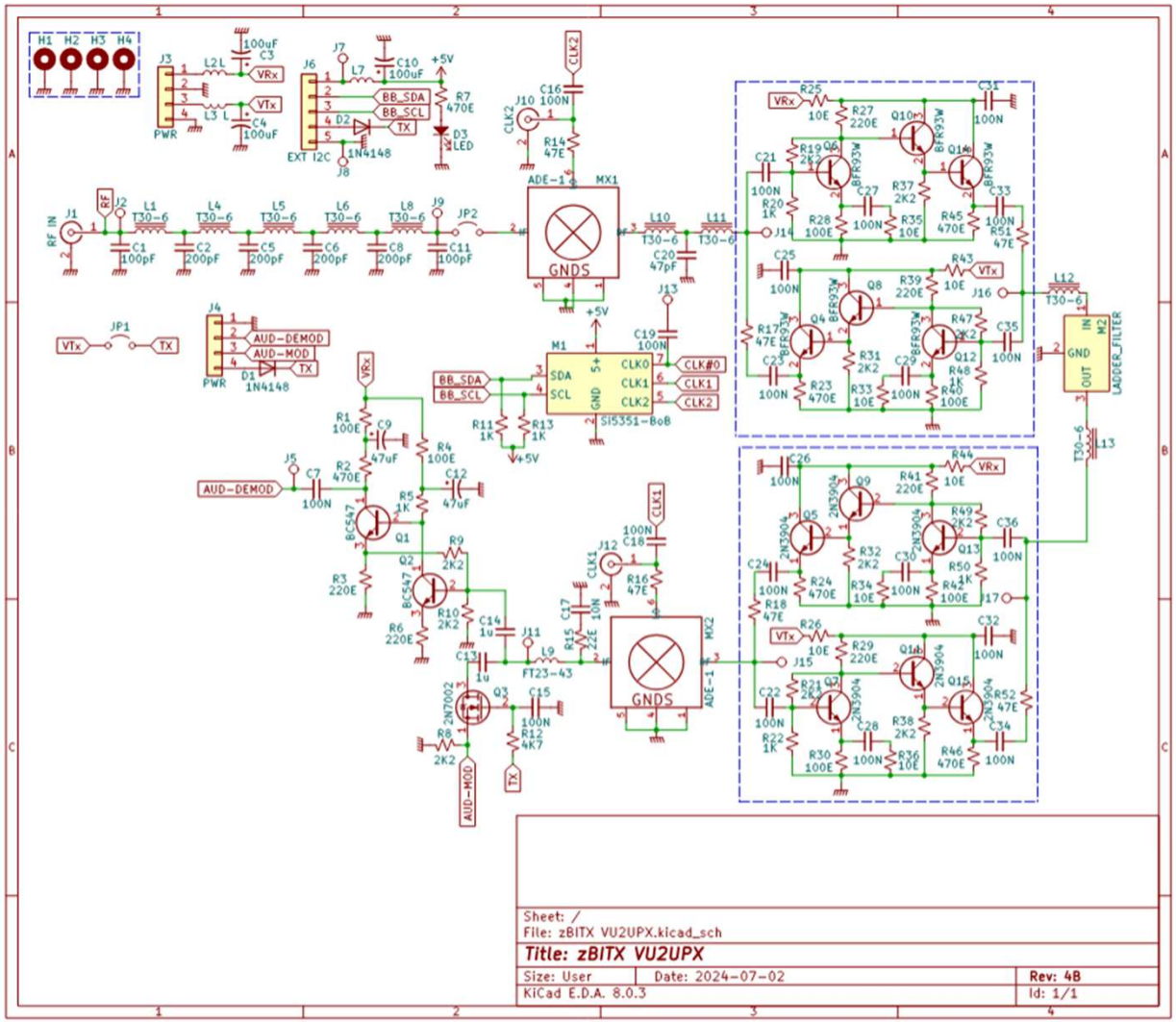
Radio Filter Portion

Low Pass Filter performance



SDR board sans parts



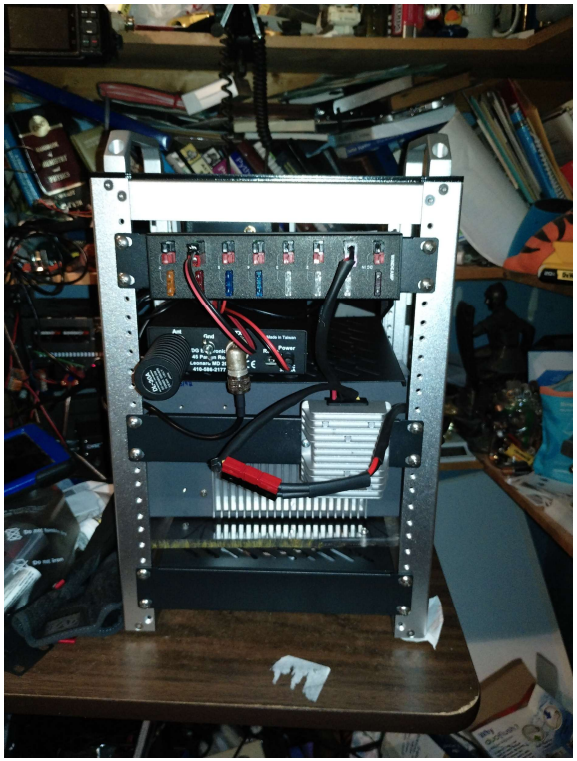


H1 H2 H3 H4
J3
PWR
L2L
L3 L
C3 100uF
C4 100uF
VRx
VTx
J6
EXT I2C
J7
J8
L7
C10 100uF
+5V
R7 470E
D2 1N4148
D3 LED
BB_SDA
BB_SCL
TX
J10
CLK2
C16 100N
R14 47E
ADE-1
MX1
GNDS
J1
RF IN
RF
J2
L1 T30-6
L4 T30-6
L5 T30-6
L6 T30-6
L8 T30-6
J9
JP2
C1 100pF
C2 200pF
C5 200pF
C6 200pF
C8 200pF
C11 100pF
L10 T30-6
L11 T30-6
C20 47pF
J13
C19 100N
M1
SDA
SCL
GND
CLK0
CLK1
CLK2
CLK#0
Si5351-BoB
R11 1K
R13 1K
+5V
J4
AUD-DEMOD
AUD-MOD
D1 1N4148
JP1
J5
C7 100N
R1 100E
C9 47uF
R2 470E
R4 100E
C12 47uF
R5 1K
BC547
Q1
R3 220E
Q2
R9 2K2
R10 2K2
R6 220E
C14 1u
C13 1u
J11
L9 FT23-43
C17 10N
R15 22E
J12
C18 100N
R16 47E
MX2
ADE-1
Q3
2N7002
R8 2K2
C15 100N
R12 4K7
R25 10E
R27 220E
Q10
BFR93W
C31 100N
R19 2K2
Q6
C21 100N
R20 1K
R28 100E
C27 100N
R37 2K2
R35 10E
R45 470E
C33 100N
R51 47E
J14
C25 100N
R43 10E
R39 220E
Q8
J16
L12 T30-6
R17 47E
Q4
R47 2K2
C35 100N
Q12
R31 2K2
C23 100N
R23 470E
R33 10E
C29 100N
R48 1K
R40 100E
LADDER_FILTER
IN
M2
GND
OUT
T30-6
L13
C26 100N
R44 10E
R41 220E
Q9
2N3904
Q5
R49 2K2
C36 100N
R32 2K2
C30 100N
Q13
C24 100N
R24 470E
R34 10E
R42 100E
R50 1K
J17
R18 47E
R26 10E
C32 100N
R29 220E
Q14
J15
R21 2K2
Q7
Q15
R52 47E
C22 100N
C28 100N
R38 2K2
C34 100N
R22 1K
R30 100E
R36 10E
R46 470E
Sheet: /
File: zBITX VU2UPX.kicad_sch
Title: zBITX VU2UPX
Size: User
Date: 2024-07-02
Rev: 4B
KiCad E.D.A. 8.0.3
Id: 1/1

KI4UJY – Build – suitcase transportable – mini networking rack – go box (suitcase)

11” Home Networking Rack
Drawer/Shelf (table top or park bench operation)
Sbitx
Tunner (LDG) rated 100 watts
Rasberry Pi #2 open frame with sense HAT (why not)
Network Hotspot/Router
SDR receiver
Added a second screen – using a gamer portable HDMI screen powered by USB
No room for CW external keyer.. (built in keyer CW input (Straight, Iambic A, Iambic B) 1/8” jack

Rear View



Anderson Power Pole power distribution
RF connections
120 Watt 12 volt regulator*
Cooling fins sBitx
USB to 12 volt adapter

*sBitx ‘s low noise power supply rated for 11 to 13.8 (14.4 from my Lipo4fe is too high had to use a separate regulator to 13.8 for overvoltage protection)

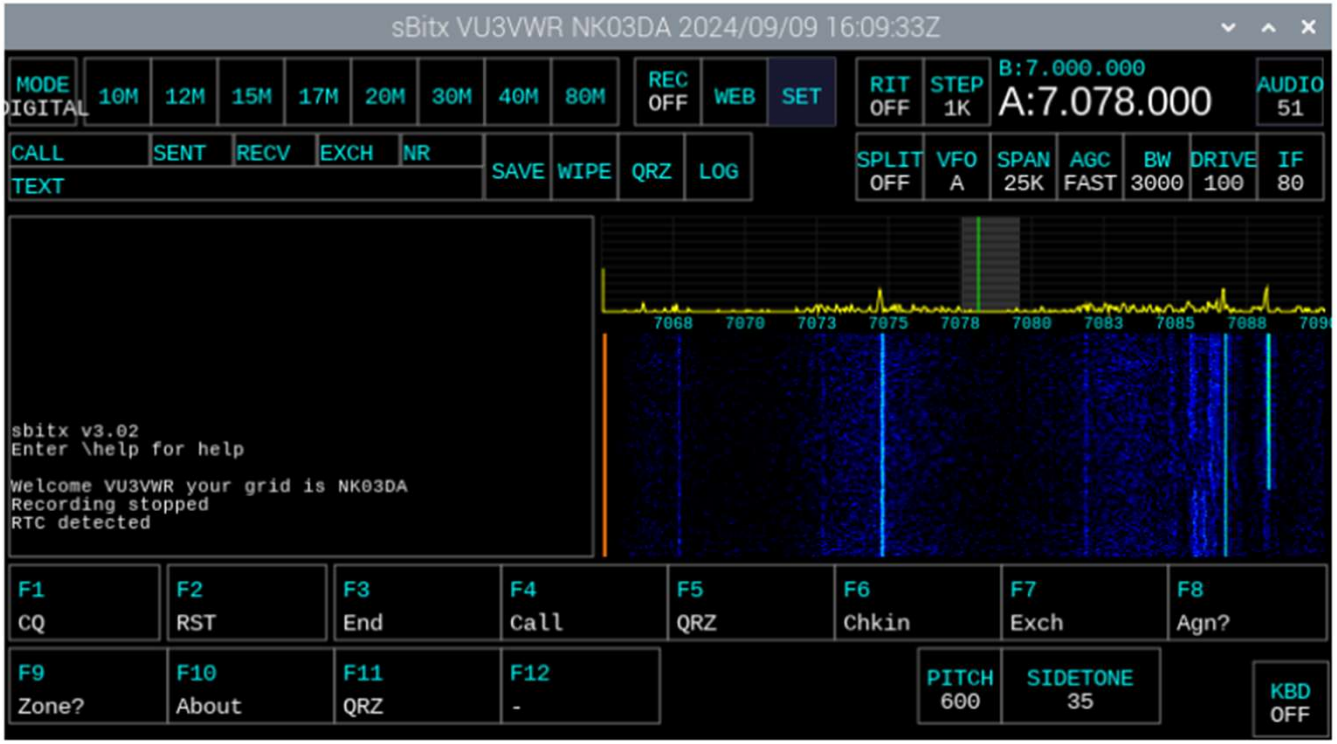
The Good..

- Radio/ QSO / Logger integrated interface with SDR transceiver
  - CW
  - FT8
  - SSB
  - AM
  - Digital? (Intended to work with 3rd party applications)
  - External USB and Bluetooth keyboard via Pi
  - External Screen (wired and wifi internet)
  - External USB interfaces and storage.
  - Touch Screen integrated with pi
- Stay within your license and privilege !
- Documentation and user groups on-line abound

The best – Macros (CW)

- # Sample macro file for regular dxing
- F1 CQ, cq cq cq de {MYCALL} {MYCALL} {MYCALL} ar k
- F2 RST, * ur rst {SENTRST} {SENTRST} kn
- F3 End,! de {MYCALL} . tnx fer rpt . 73 es cu agn kn sk
- F4 Call, *
- F5 QRZ, qrz?
- F6 Chkin, ! de {MYCALL} ur rst {SENTRST} es tnx fer call . hw cpy? AR K
- F7 Exch,! de * ur rst {SENTRSTCUT} {EXCH} K
- F8 Agn?,agn?
- F9 Zone?,zn?
- F10 About, ! de * . my name is Michael Hamby. rig is sbitx es dipole . hw cpi? !
- de * k
- F11 QRZ,qrz?

Onboard: Typical Operating Screen



Features:

- Band
- Mode
- Presets
- Waterfall/bandscope
- Built in logger

Sbitx Learning Curve

- Menu's interact with Mouse/ touch screen and knobs.
- Mode specific
- Always operate with either an antenna connected or dummy load – accidental xmit is a real possibility
- Menu's are lagging , and especially if the system is loaded up with 3rd party applications running..
- Preference would have been to have a virtual radio front end and interface to wsjtx/Klog and Grid Tracker – but that would require custom software – but it is achievable ..
- DIY radio setup with some working software supplied and some not so working 3rd party items. More on that latter..

CW operating screen

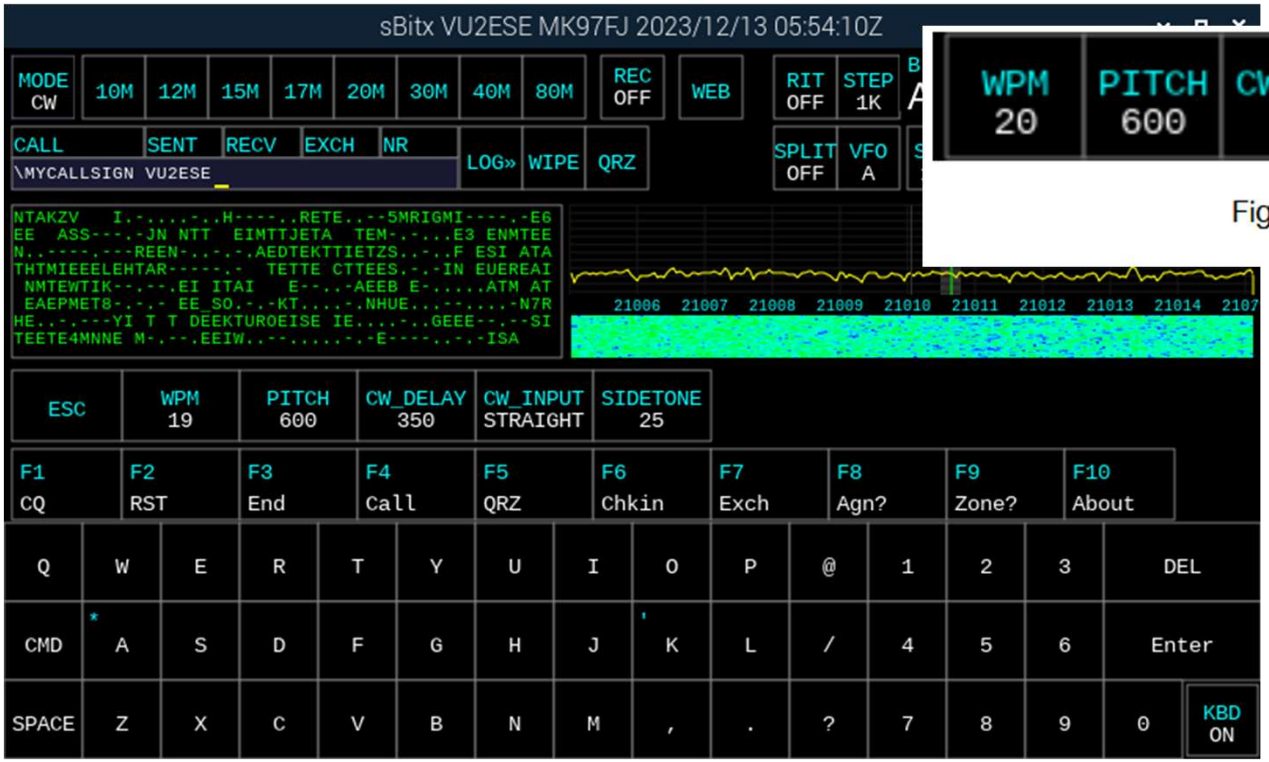


Figure 07 - CW Settings

Works in conjunction with CW input or Keyboard QSO
(built in keyer CW input (Straight, Iambic A, Iambic B) 1/8” jack Menu adjustable speed, Pitch, and sidetone.

CW Details

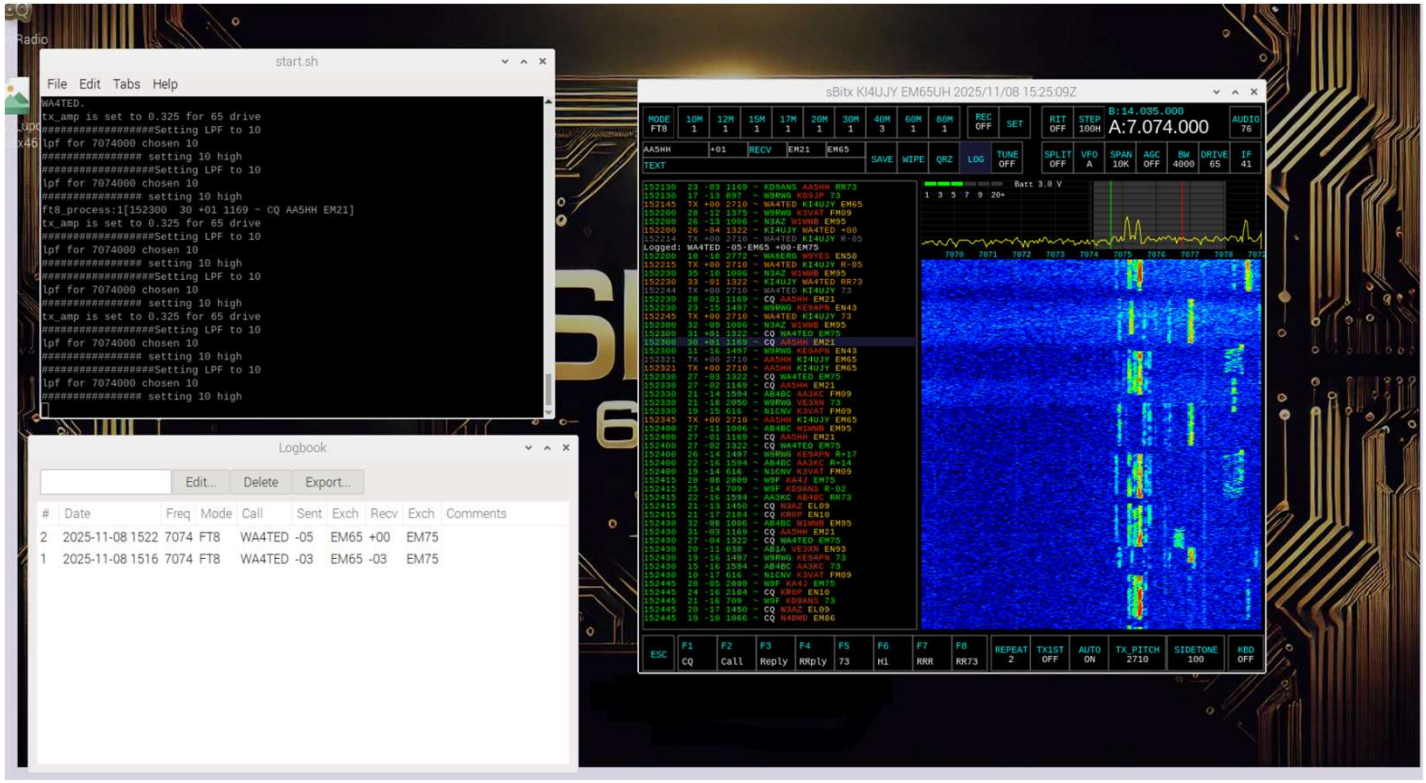
- The sidetone generation system provides audible feedback when sending Morse code with the K3NG CW Keyer. This audio output allows operators to hear what they're sending in real-time, even when operating in practice mode or when the transmitter output is disabled. For information about actually keying the transmitter, see TX Keying and PTT.
- CW filters from 100 Hz to 3 KHz with minimum ringing
- Noiseless, electronic T/R and band switching with diodes.
- A very sensitive CW decoder
- Intersperse paddle/straight key sending with keyboard and macros
- Integrated logger with macros to generate standard messages.
- The microphone’s PTT can also be used as a straight key if you don’t have the key handy

FT8 Integral Mode

Features:

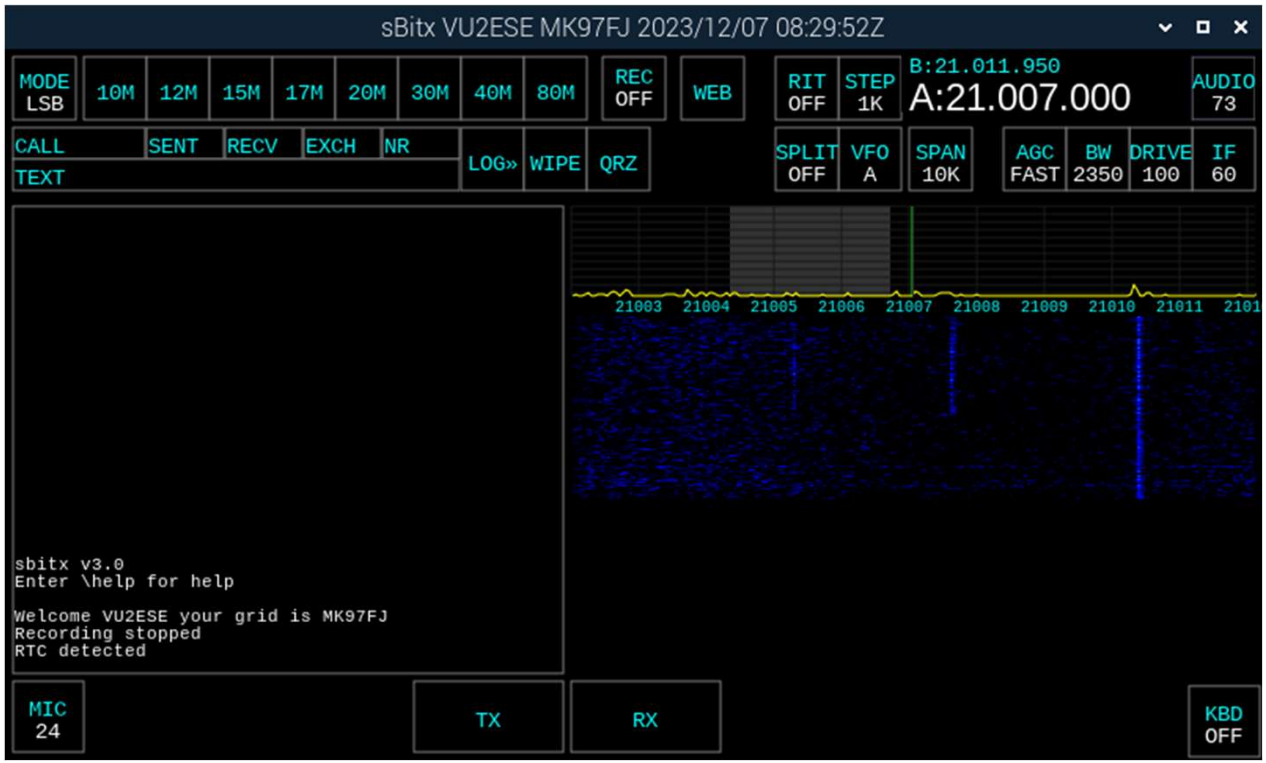
- Real time clock – sync with pi wifi (NTP)
- On screen decode
- Integral logging
- Auto Transmit on TX1st
- Auto QSO feature
- Menu’s are configurable (contest, POTA)
- (on board screen is small – suggest using another computer in webpage mode!)

FT8 in action native SBITX Interface



Auto log and auto qso

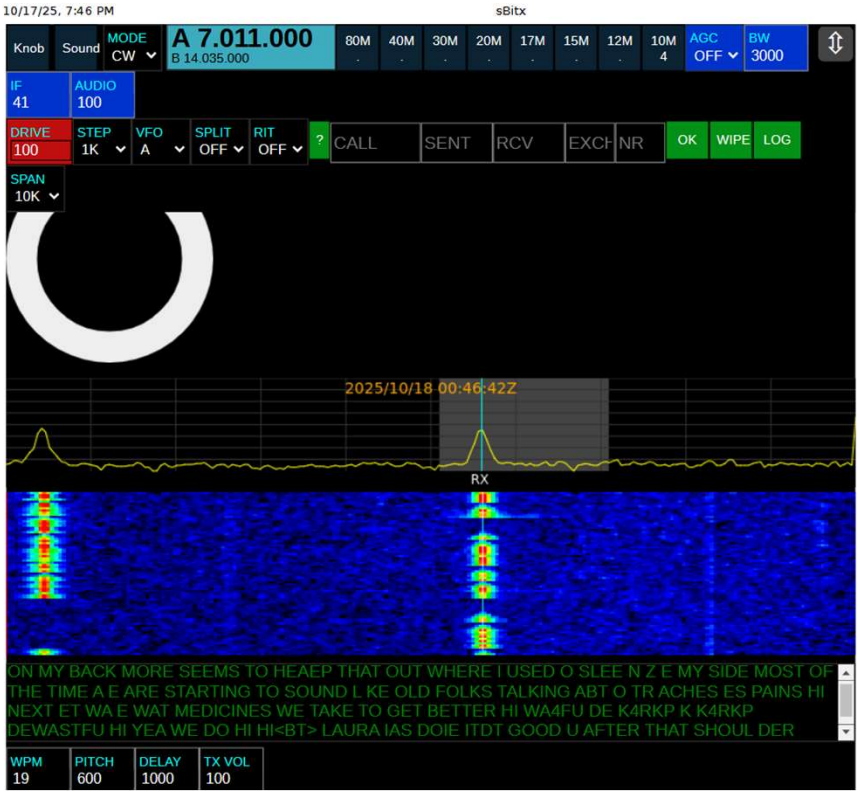
SSB Operation



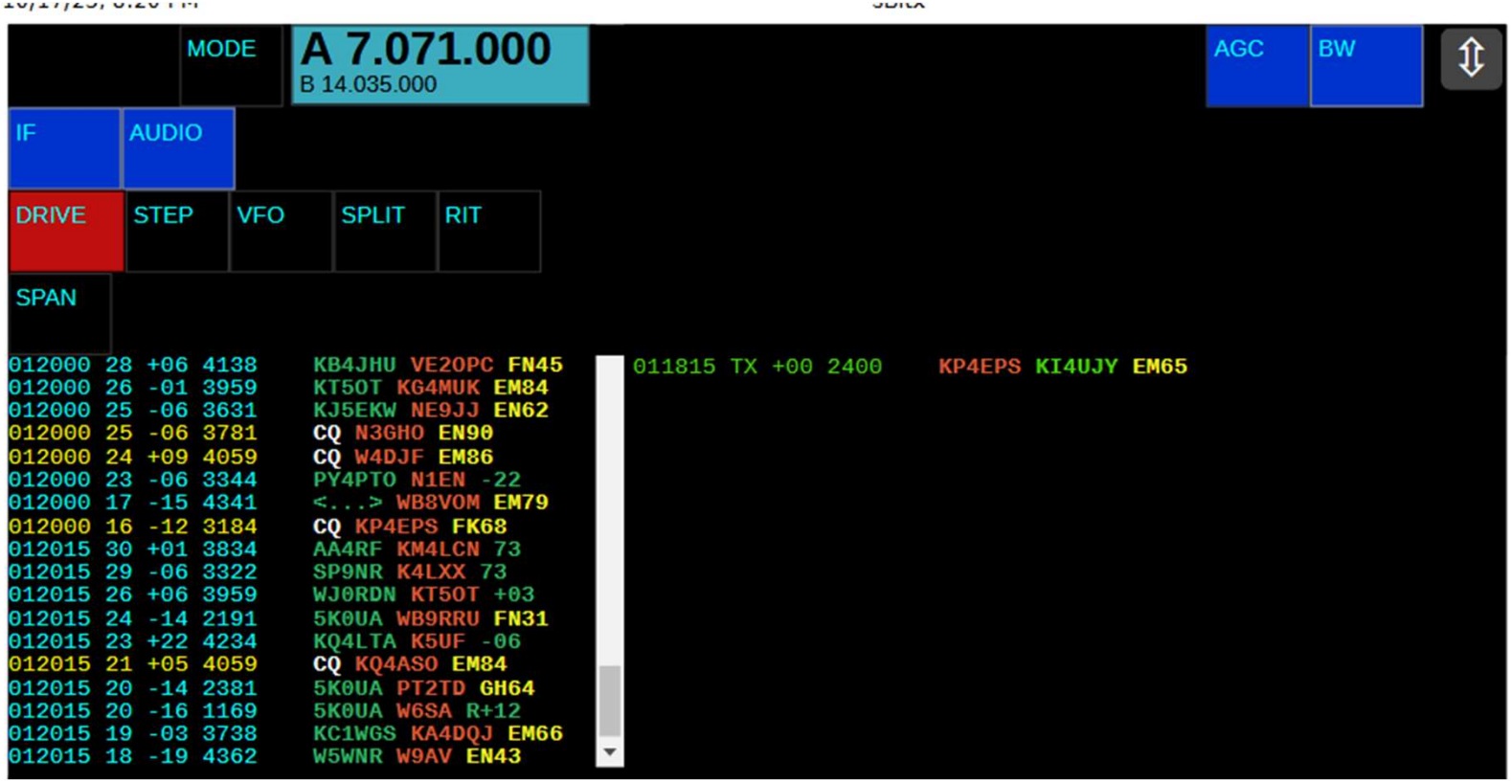
Features:

- Comes with external HT quality microphone
- Internal microphone
- Power limits per band..

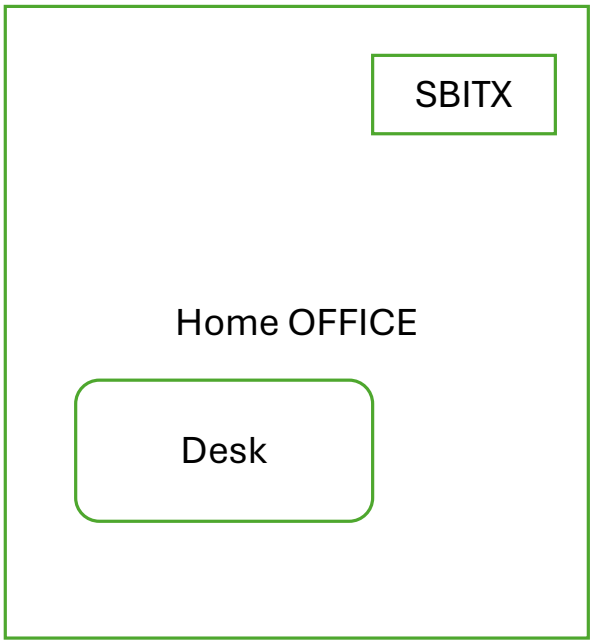
Tablet or Browser Operation (remote over wifi) (router with local network in my build)



FT8 com log – JHU heard from KY



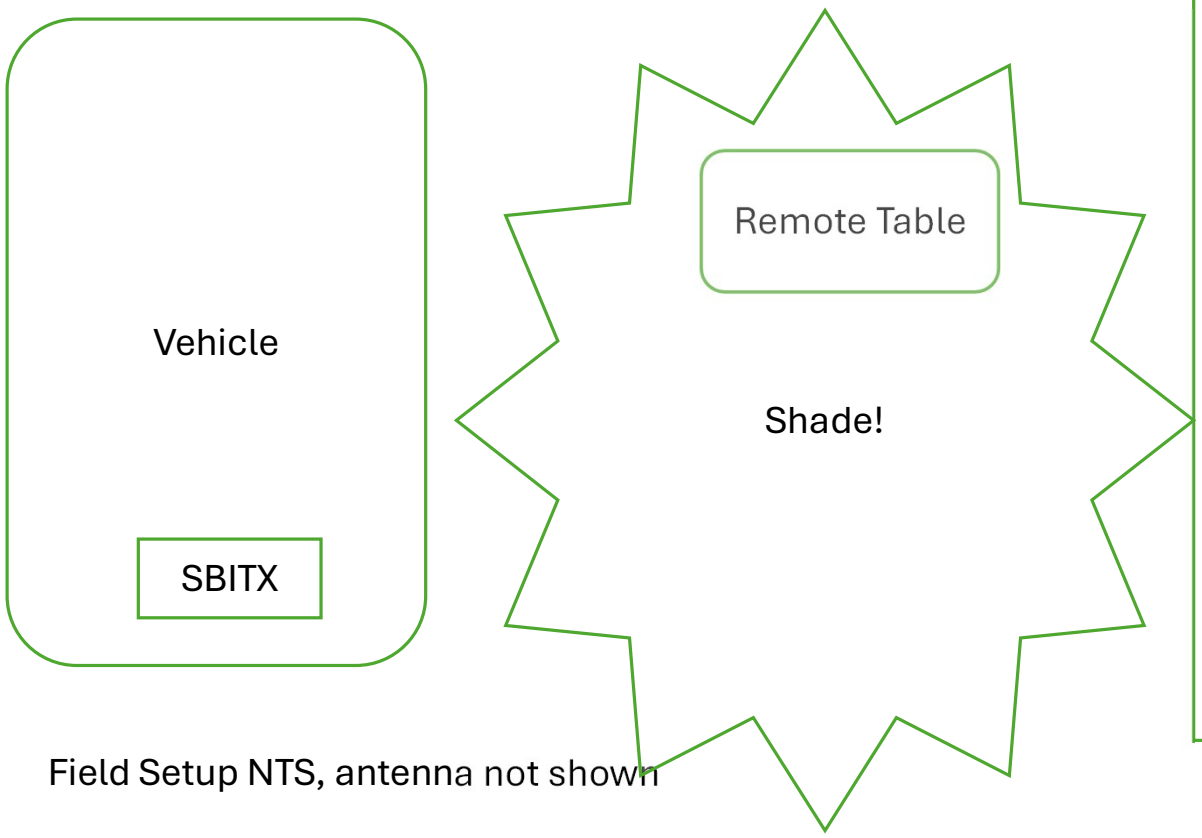
Network operations and local wifi ..



Home Setup Real advantage (one desk/one chair for home office/radio

- Radio and computer do NOT have to be adjacent
- Operation via Webpage or RealVNC
- Iambic paddle via cable from Desk (CW) with cord and speaker
- (radio can even be in a different room..)

Parks on the Air/Camping..



Field Setup NTS, antenna not shown

- Radio and computer do NOT have to be adjacent
- Operation via wifi: Webpage or RealVNC
- Iambic paddle via cable from Desk (CW) with cord and speaker

The Ugly

- Integration with 3rd Pary Ham radio applications is … DIY
- Plug and Pray..
- Requires Linux and application layer understanding to troubleshoot.. (If only there was an engineer with some computer science / linux background handy)
- Haven’t dove into the linux system logs yet to see where the faults occur…
- Ham Lib Rig Ctrl (appears to be where the fault lies)

3rd Party Applications where things get weird and wacky – some assembly required – frustration, heartbreak, and disappointment abound ..

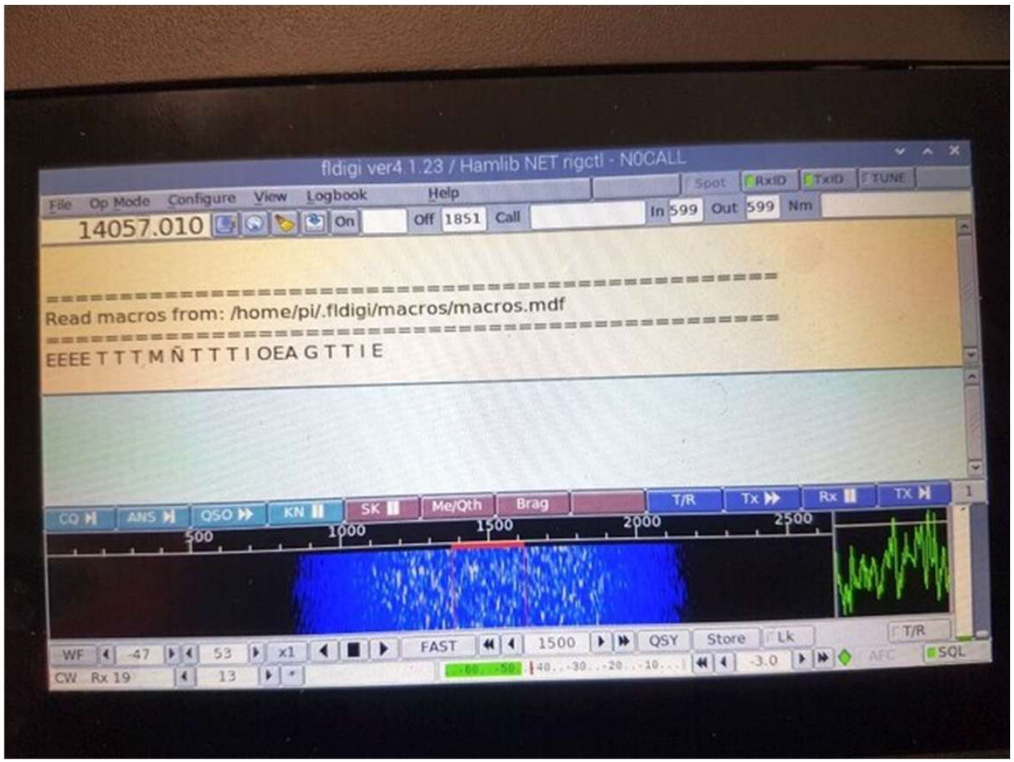
Using Third-party Software/Modems (per documentation)

- Hundreds of open source software, ranging from FreeDV to FlDigi to WSJT-X, are available on Raspberry Pi. To run them on sBitx:
- Set sBitx Mode to DIGITAL
- Enable Hamlib in the third-party software's setting.
- From the third party software, choose **Hamlib NET rigctl** as the radio.
- Set the Network server to 127.0.0.1, port 4532 (standard for NET rigctrl)
- Set the **PTT** Method to **CAT**
- Set the **Mode** (if prompted) to **USB**
- Choose **plughw:CARD=Loopback_DEV=1** as the Input/Record Audio. Alternatively, you can also choose **Loopback: PCM(hw:1,1)**
- Choose **plughw:CARD=Loopback_DEV=0** as the Output/Playback Audio. Alternatively, could also choose **Loopback: PCM (hw:2,0)**

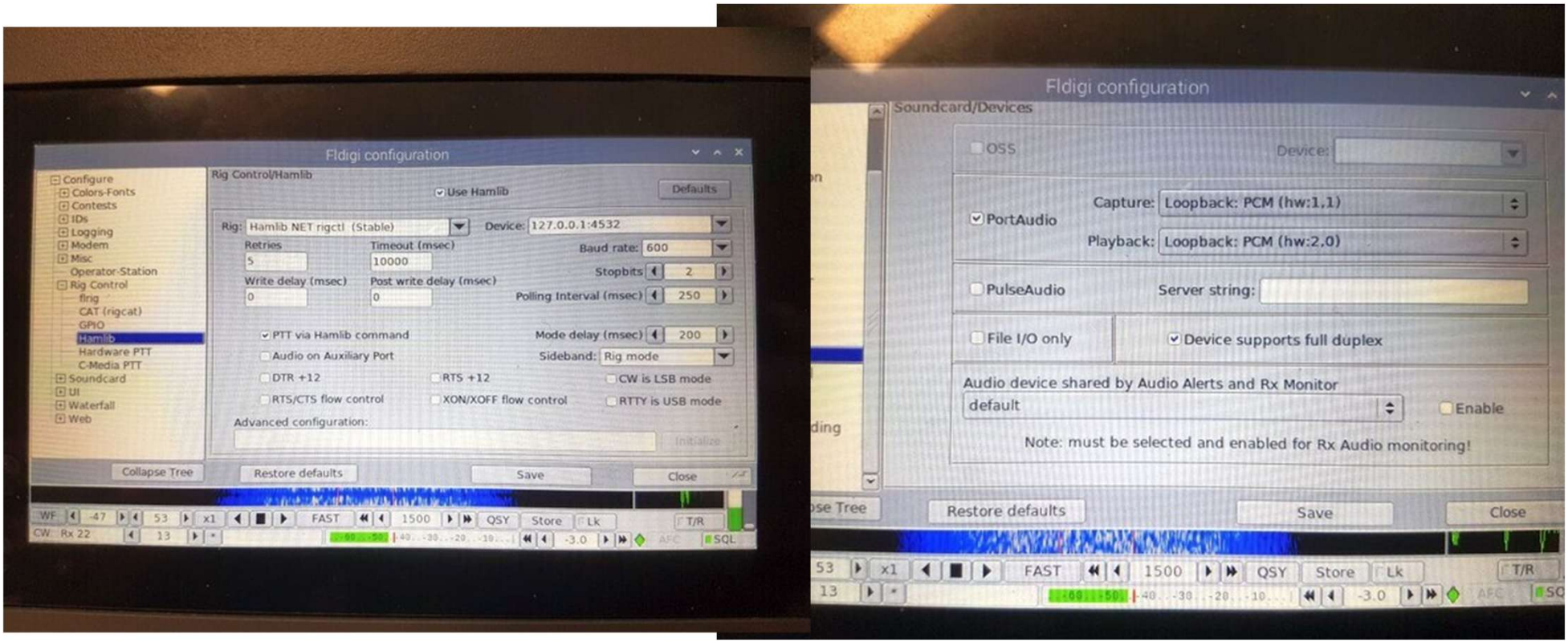
3rd Party Software Hopes and dreams

- In search of a working Hamlib NET rigctl solution (progress update)
  - WSJT-X – appears to work (does decode) – doesn't transmit!
  - Fldigi – appears to work (does decode) – doesn't transmit!
  - PAT (winlink in linux) – your own your own kid..
- Use of Hamlib ties the port up , changing mode requires a power cycle – especially true of WSJT (you must reboot to restart an instance)
- Very Laggy takes some time for 3rd party and Sbitx to 'sync' up
- Error messages from Ham Lib
- Searching the internet for wisdom .. Even consulted the oracle (chat GPT)
- https://groups.io/g/BITX20/topic/sbitx_v3/107702921

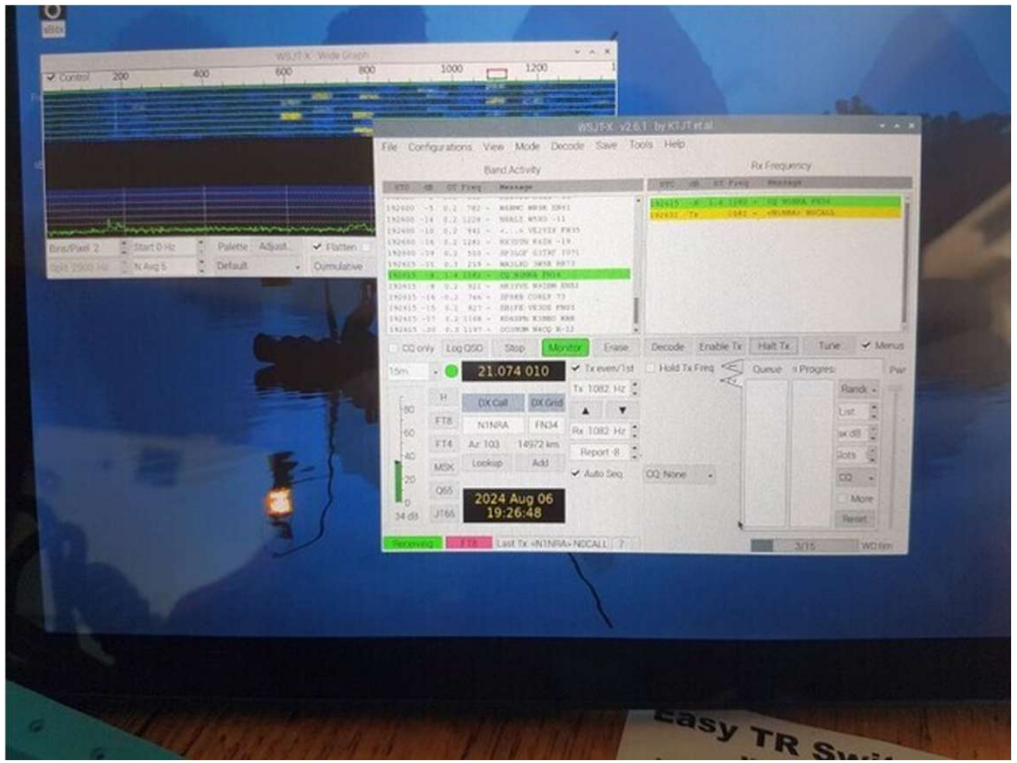
Fldigi – Oldy/Moldy .. But some lucky souls have got it working.. I haven’t as of 10/27/2025



Fldigi – settings – Use Hamlib/SoundCard



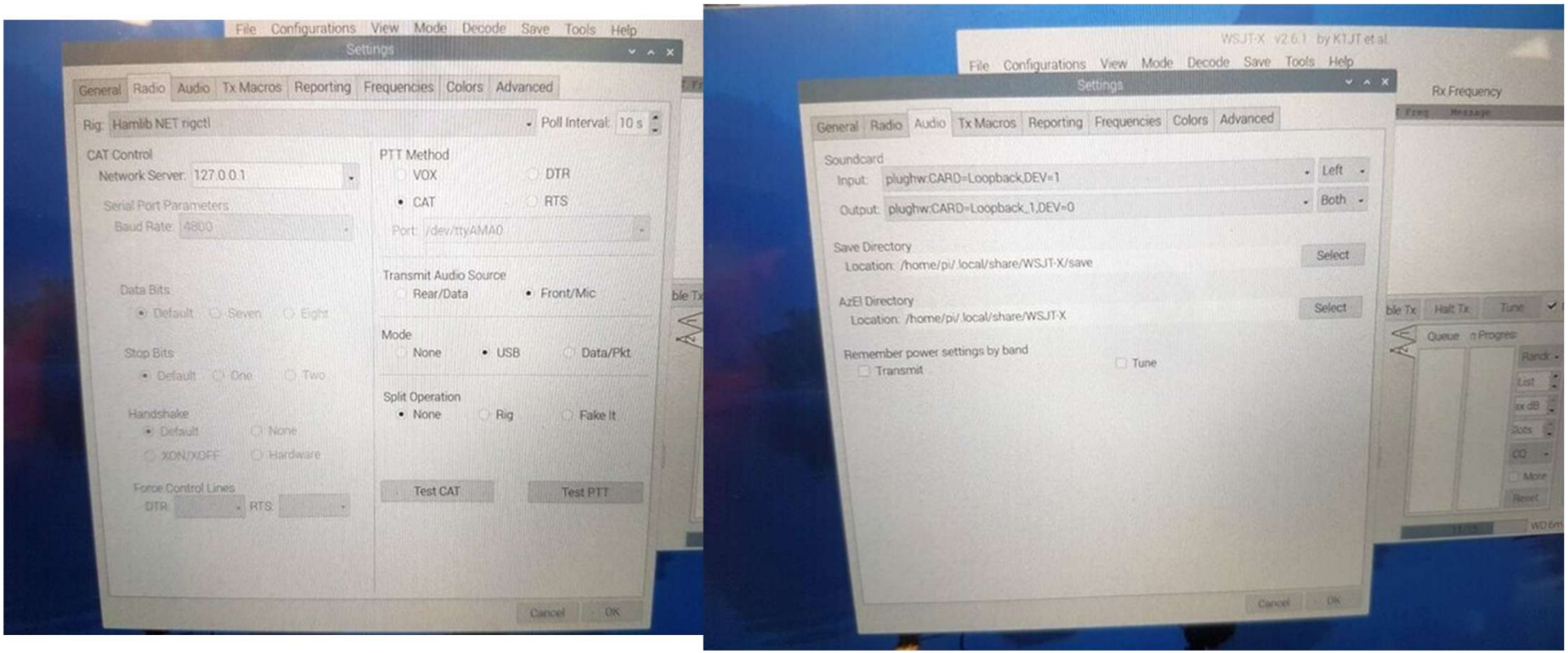
FT 8 WSJTx – would like to run wspr with this rig.. (to dream the impossible dream..)



"modes" called **FST4, FST4W, FT4, FT8, JT4**, **JT9**, **JT65**, **Q65**, **MSK144**, and **WSPR**

FT8 is very popular – contact based QSO - minimalistic

WSJT-X – settings



Wsjtx_notes.txt

- Before installing
- sudo apt --fix-broken install
- Download the 32 bit package from the wsjt-x page (the one with armhf in the name),
- sudo dpkg -i wsjt...
- you may have to run if it complains about the locales
- sudo pkg-reconfigure locales
- On WSJT-X
  - File > Settings > Radio, Choose "Hamlib NET", the NetServer is set to "127.0.0.1"
  - File > Settings > Radio, Set PTT Method to CAT, Mode to USB
  - File > Settings > Audio, Input Set to "plughw:CARD=Loopback,DEV=1", "Left"
  - File > Settings > Audio, Output Set to "plughw:CARD=Loopback1,DEV=0", "Both"
- add the line to /etc/rc.local
- sudo modprobe snd-aloop enable=1,1,1 index=1,2,3

AuxCom Winlink (Pat) the good the bad the really really .. ugly

- Pat uses ham lib rigctl to interface to the sbitx sdr transceiver
- Out of the box the interface appears to be misconfigured
- Gui Pat control is ‘clunky’
- Since ham lib rigctl and ARDOP are both Tcp/IP based three is a potential for running Pat remote to the Sbitx from another installation of Pat (a second computer)
  - Pat configure localhost statement to be replaced by sbitx IP address
- ARDOP appears to have been superseded ..
- Makes this a potential game changer for AuxCom
- IF ONLY IT WORKED!!! BUT HOPE SPRINGS ETERNAL…

Ham Library – the secrete sauce..

- RIGCTL
  - Rigctl [-hiIlLnouV] [-m id] [-r device] [-p device] [-d device] [-P type] [-D type] [-s baud] [-c id] [-t char] [-C parm=val] [-v[-Z]] [command|-]
  - Control radio transceivers and receivers. rigctl accepts commands from the command line as well as in interactive mode if none are provided on the command line.
  - Keep in mind that Hamlib is **BETA** level software. While a lot of backend libraries lack complete rig support, the basic functions are usually well supported.
  - Please report bugs and provide feedback at the e-mail address given in the BUGS section below. Patches and code enhancements sent to the same address are welcome.

Winlink (Pat) the good the bad the ugly

- **Starting the web server**
- Start Pat in **http** mode:
- $ pat http
- 2016/03/15 01:34:40 Starting HTTP service (http://localhost:8080)...
- What you long to see:
- pat --listen winmor,ardop,ax25,telnet http
- 2016/03/15 01:40:49 ft897 ready. Dial frequency is 5.347.00 MHz.
- 2016/03/15 01:40:50 WINMOR TNC v1.5.7.0 initialized
- 2016/03/15 01:40:50 ARDOP TNC (ARDOP TNC_0.4.3.8-BPQ) initialized
- 2016/03/15 01:40:50 Listening for incoming traffic (winmor,ardop,telnet,ax25)...

Pat Under the hood: (rough notes) – work in progress

- Rig control appears to be broken in the out of the box configuration
- https://themodernham.com/setup-pat-winlink-on-raspberry-pi-with-rigcontrol/
- https://github.com/la5nta/pat/wiki/ARDOP
- https://github.com/la5nta/pat/wiki/The-command-line-interface#configure
- https://github.com/la5nta/pat/wiki/Rig-control
- Rig control notes:
- Get a list of radio identifiers:
- rigctl –l
- Find the Sbitx on the list (id ###)
- Start the daemon:
- rigctld -m ### -r /dev/ttyUSB0 -s 4800 **(this is dubious)**

- Now that rigctld is ready to accept connections on it's default port (4532), you'll need to configure Pat.
- To make Pat aware of your rig, open up the config (~/.wl2k/config.json or use pat help to find the config directory) and add a new rig under the hamlib_rigs-section:
- "hamlib_rigs": {
- "my_precious_rig": {"address": "localhost:4532", "network": "tcp"}
- },

Sbitx Summary

- It’s inexpensive*,
- Fairly Compact* , Decent Power
- Okay for POTO/ camping (suitcase packable)
- Native FT8 has a learning curve
- CW will probably be great!
- Goal is to use it with a remote Linux Tough Pad computer (with a sun readable screen)
- Using external monitor for setup and troubleshooting)
- Dummy load a requirement or antenna get all these interfaces working.
- 3rd Party Software does not require Signal Link USB or CAT interface (all virtual) both a blessing and an obscene curse..

References

- https://www.hfsignals.com/index.php/sbitx-v3/
- Online support group:
- https://groups.io/g/bitx20
- Full source code, circuit and explanations on github.com/afarhan/sbitx
- https://www.vu2ese.com/index.php/2022/07/20/the-sbitx-the-sdr-for-the-homebrewer/
- https://www.sbitx.net/
- https://hamlib.sourceforge.net/html/rigctl.1.html
- https://github.com/la5nta/pat/wiki/ARDOP