

# 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

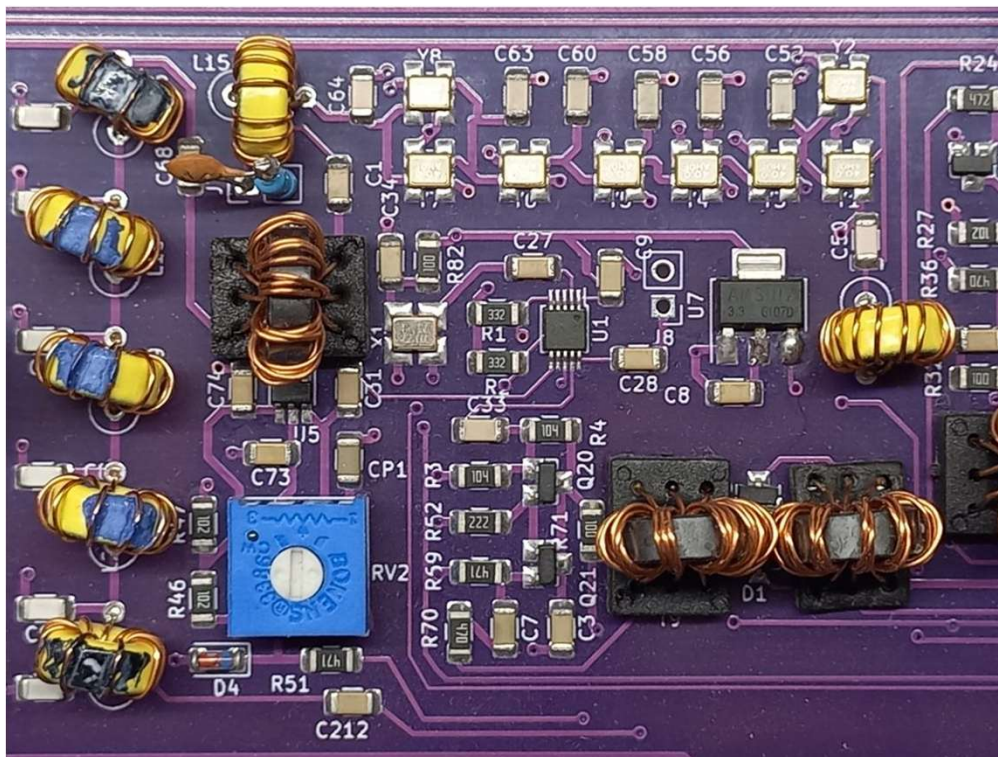
- Receive; 500 KHz to 30 MHz,
- Transmit: 3500-4000, 7000-7300, 10000-10150, 14000-14350, 18000-18200, 21000-21450, 24800-25000, 28000-29700 (KHz)
- Power 25 watts on 80M – 20M, 10 watts higher bands
- Two VFO's
- No internal tuner
- Based on 'Poor Man's SDR' WB2CBA?

# 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)

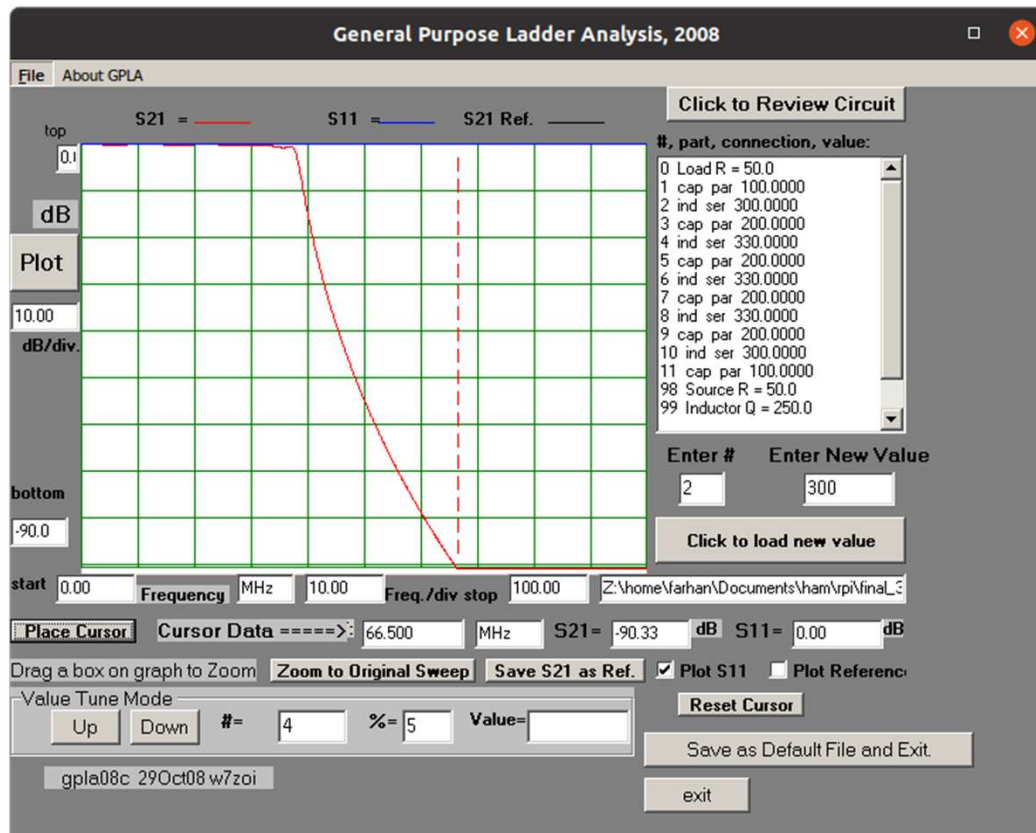
\*diy vague directions (limited success!).. But integration in progress

# Off the Shelf Parts



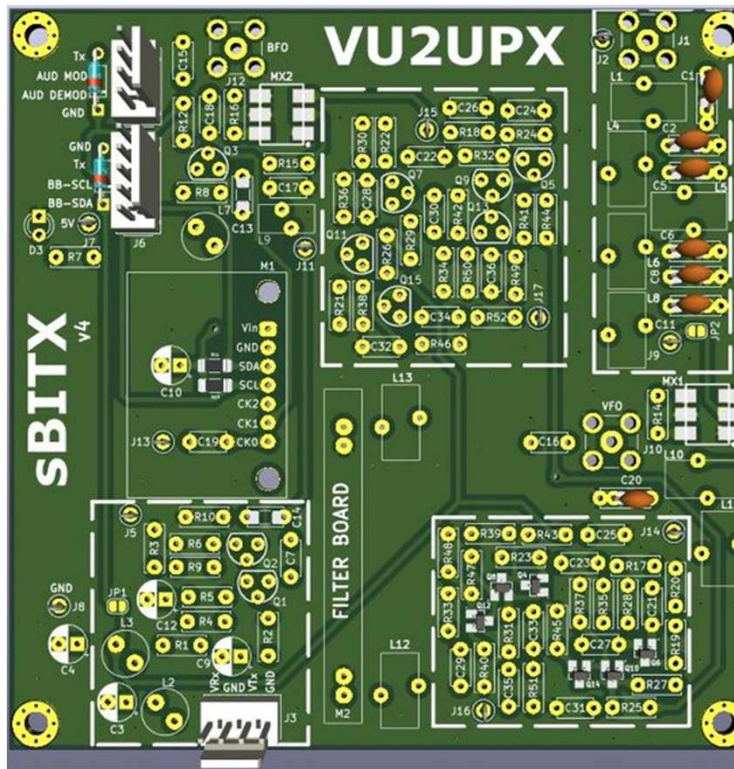
Radio Filter Portion

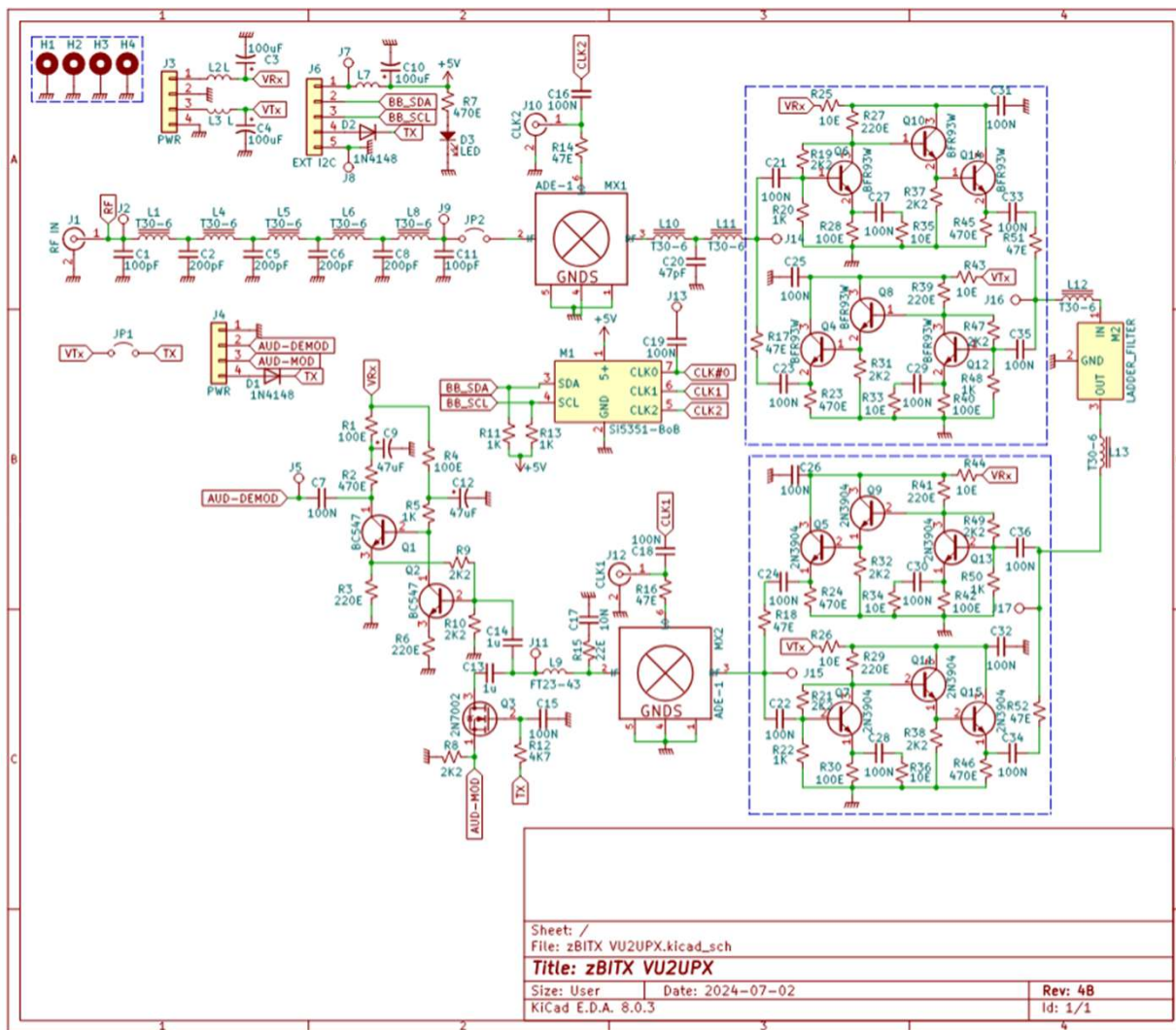
# Low Pass Filter performance





# SDR board sans parts





# 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

Raspberry Pi #2 open frame with sense HAT (why not)

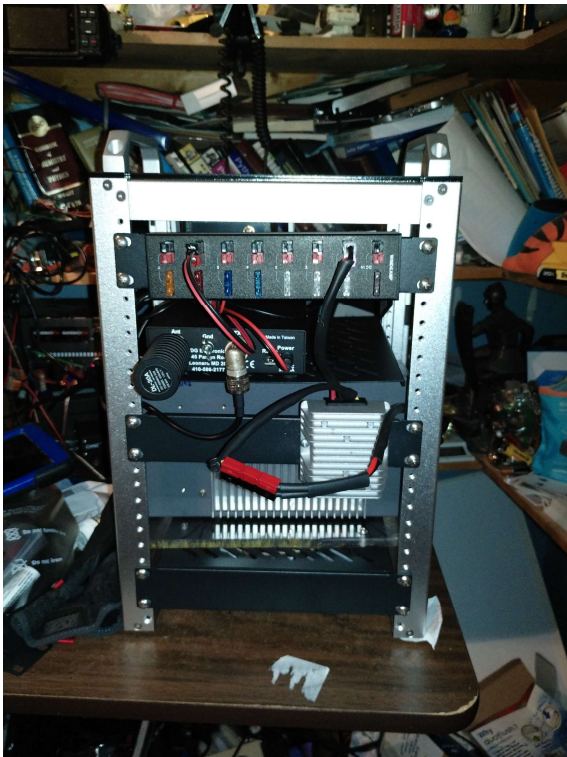
Network Hotspot/Router

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..

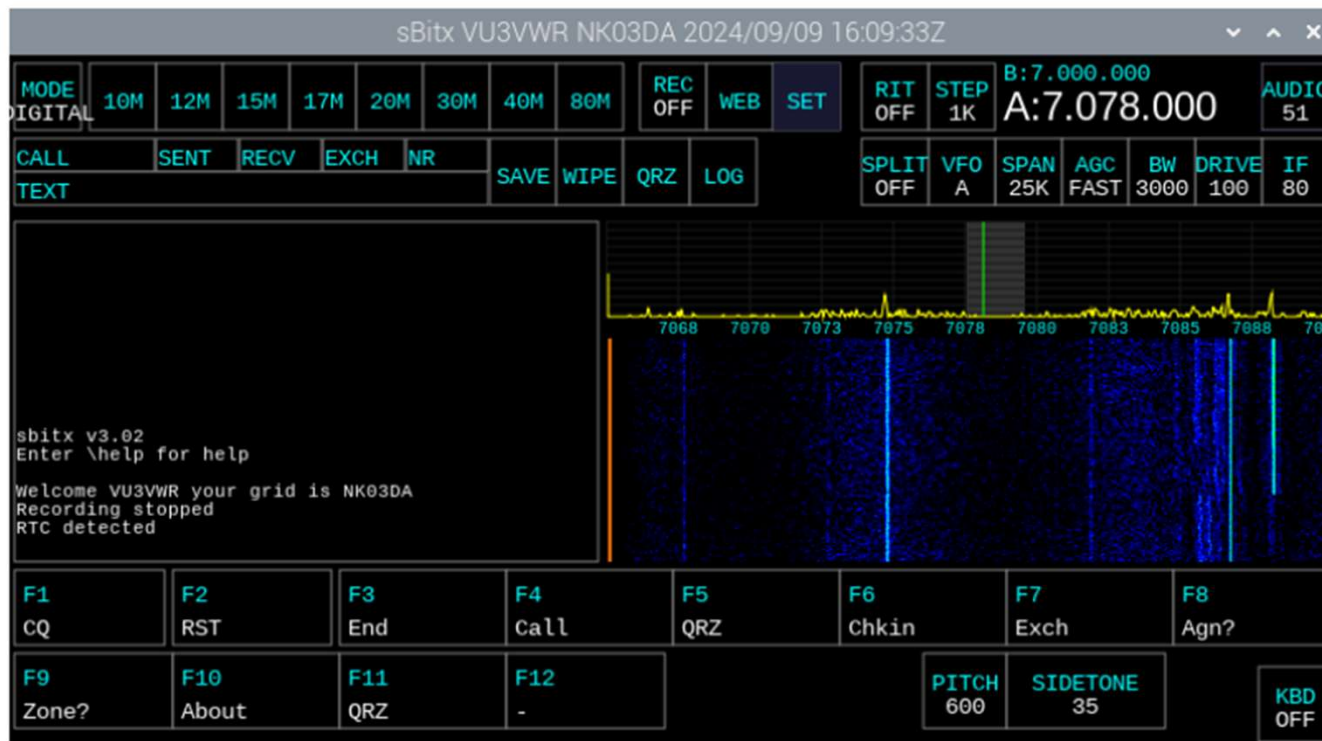
- Radio/ QSO / Logger integrated interface with SDR transceiver
  - CW
  - FT8
  - SSB
  - AM
  - Digital? (Intended to work with 3<sup>rd</sup> party applications)
  - External USB and Bluetooth keyboard via Pi
  - External Screen (wired and wifi internet )
  - External USB interfaces and storage.
  - 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} . tn timer rpt . 73 es cu agn kn sk
- F4 Call, \*
- F5 QRZ, qrz?
- F6 Chkin, ! de {MYCALL} ur rst {SENTRST} es tn timer 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:

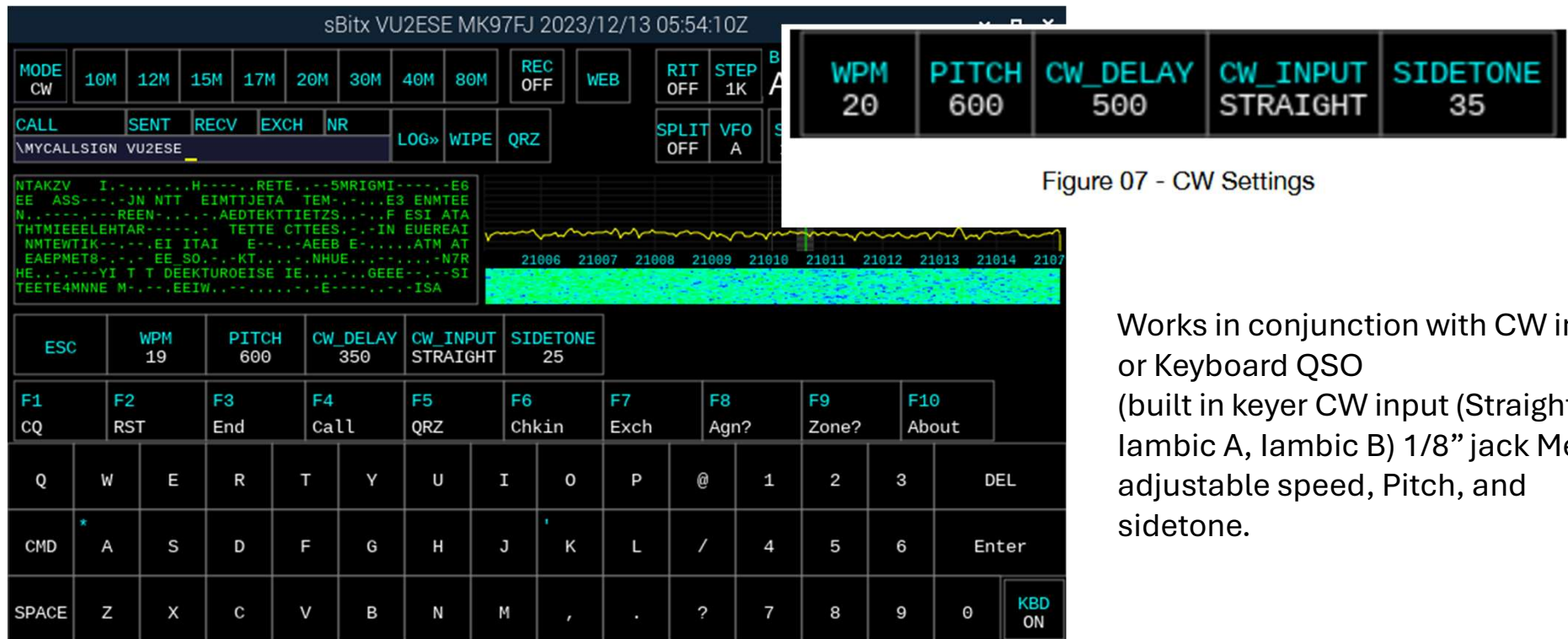
- Band
- Mode
- Presets
- Waterfall/bandscope
- Built in logger

# 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 3<sup>rd</sup> 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 3<sup>rd</sup> party items. More on that latter..



# CW operating screen



# 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

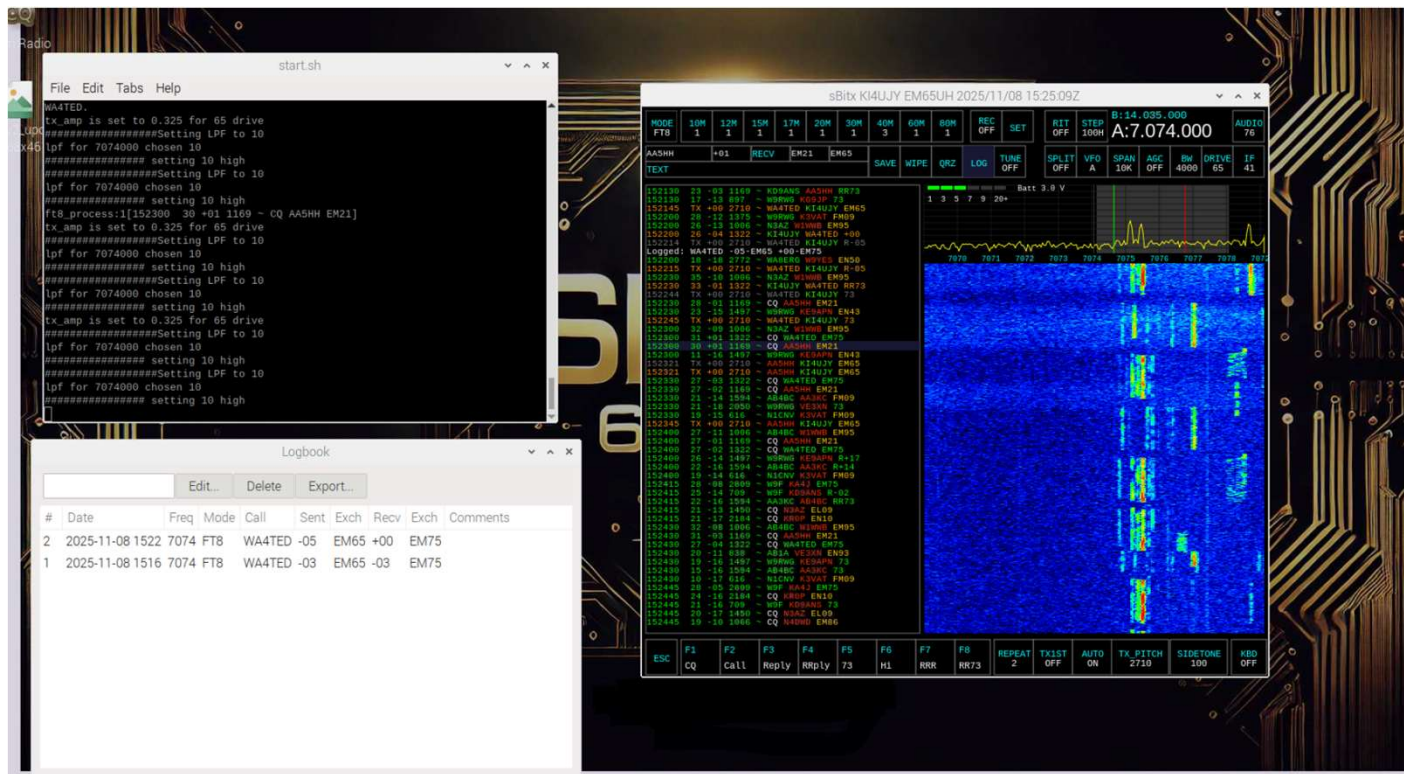
# FT8 Integral Mode



## Features:

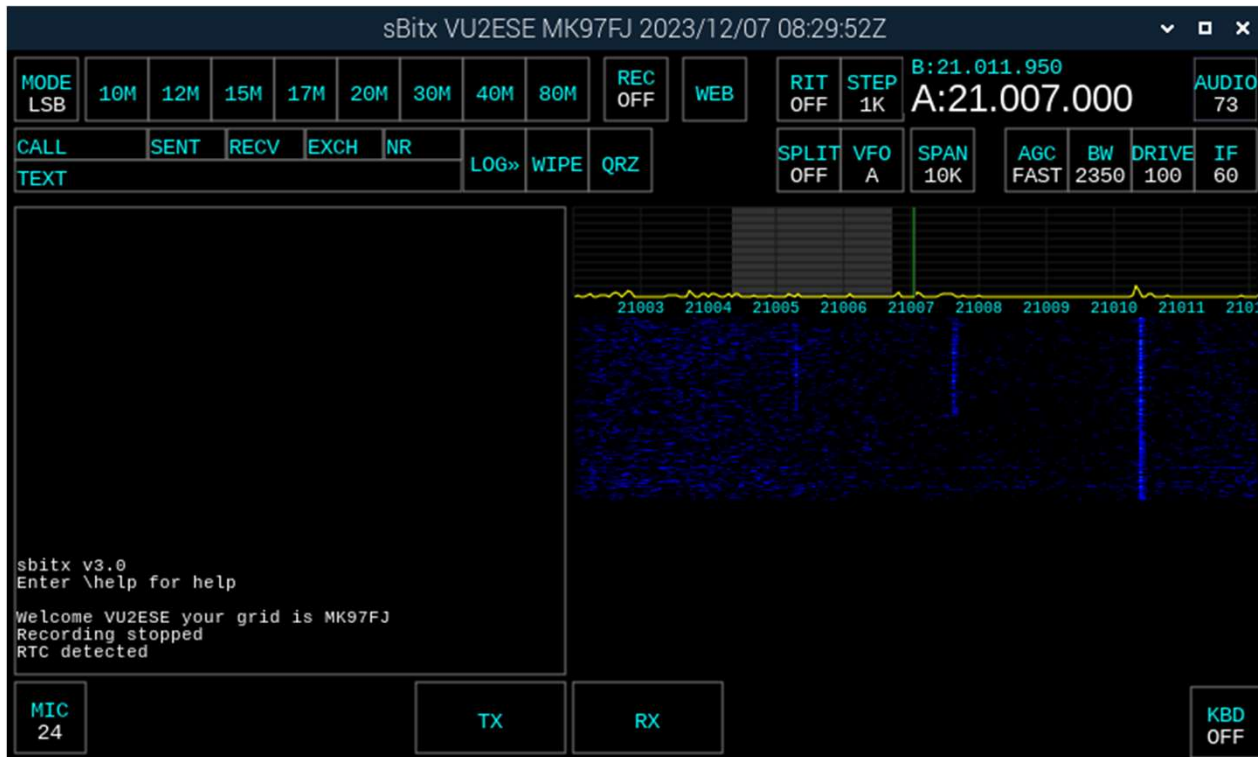
- Real time clock – sync with pi wifi (NTP)
- On screen decode
- Integral logging
- Auto Transmit on TX1st
- Auto QSO feature
- Menu's are configurable (contest, POTA)
- (on board screen is small – suggest using another computer in webpage mode!)

# FT8 in action native SBITX Interface



Auto log and auto  
qso

# SSB Operation

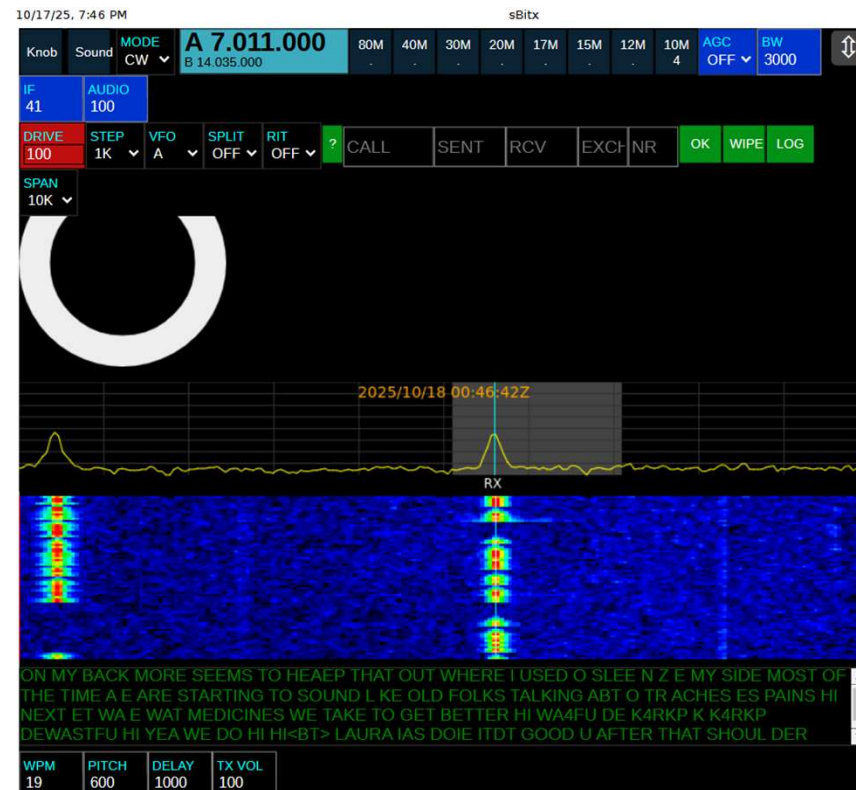


## Features:

- 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

10/27/20, 0:20 PM

MODE **A 7.071.000**  
B 14.035.000

AGC BW

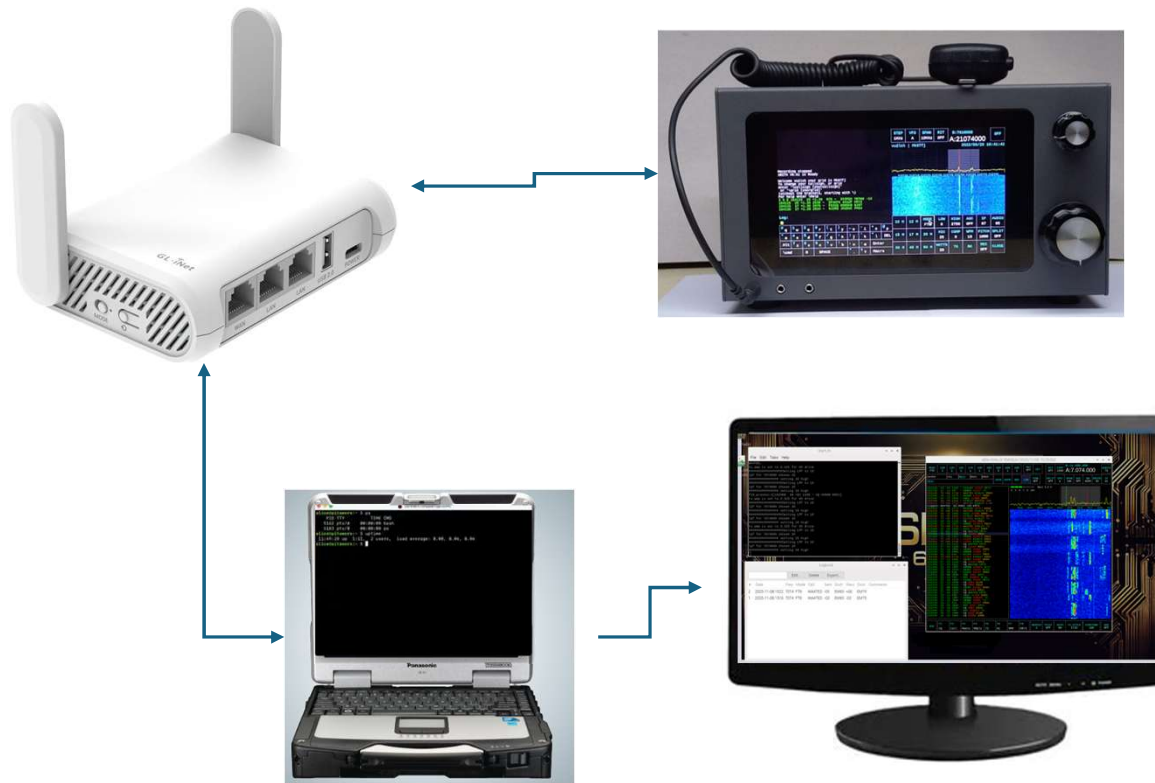
IF AUDIO

DRIVE STEP VFO SPLIT RIT

SPAN

012000	28	+06	4138	KB4JHU VE20PC FN45	011815 TX +00 2400	KP4EPS KI4UJY EM65
012000	26	-01	3959	KT50T KG4MUK EM84		
012000	25	-06	3631	KJ5EKW NE9JJ EN62		
012000	25	-06	3781	CQ N3GHO EN90		
012000	24	+09	4059	CQ W4DJF EM86		
012000	23	-06	3344	PY4PTO N1EN -22		
012000	17	-15	4341	<...> WB8VOM EM79		
012000	16	-12	3184	CQ KP4EPS FK68		
012015	30	+01	3834	AA4RF KM4LCN 73		
012015	29	-06	3322	SP9NR K4LXX 73		
012015	26	+06	3959	WJ0RDN KT50T +03		
012015	24	-14	2191	5K0UA WB9RRU FN31		
012015	23	+22	4234	KQ4LTA K5UF -06		
012015	21	+05	4059	CQ KQ4AS0 EM84		
012015	20	-14	2381	5K0UA PT2TD GH64		
012015	20	-16	1169	5K0UA W6SA R+12		
012015	19	-03	3738	KC1WGS KA4DQJ EM66		
012015	18	-19	4362	W5WNR W9AV EN43		

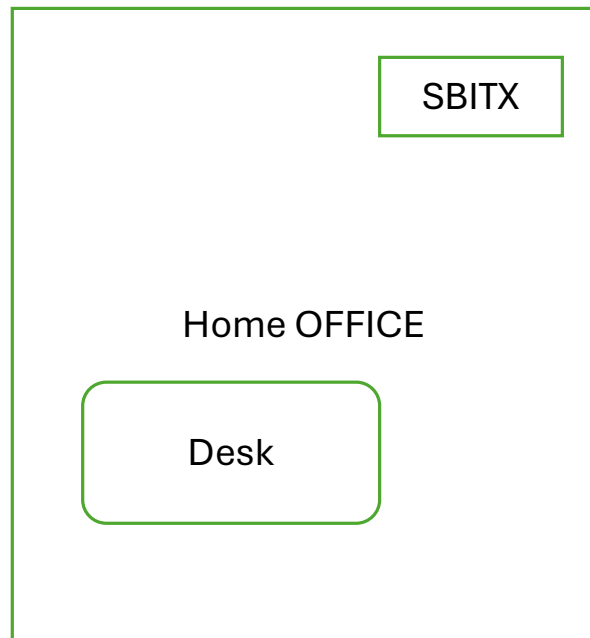
# Sbitx Network Operation – Block diagram



- Sbitx V3.0
- GL.iNet GL-SFT1200 (Opal) Portable WiFi Travel Router, Mini VPN Wireless Router for Fiber Optic Modem, Mobile Internet WiFi Repeater, Dual Band Openwrt...
- PC or linux box running RealVNC viewer
- Or Web Page Radio Controls
- Cat6 or wifi



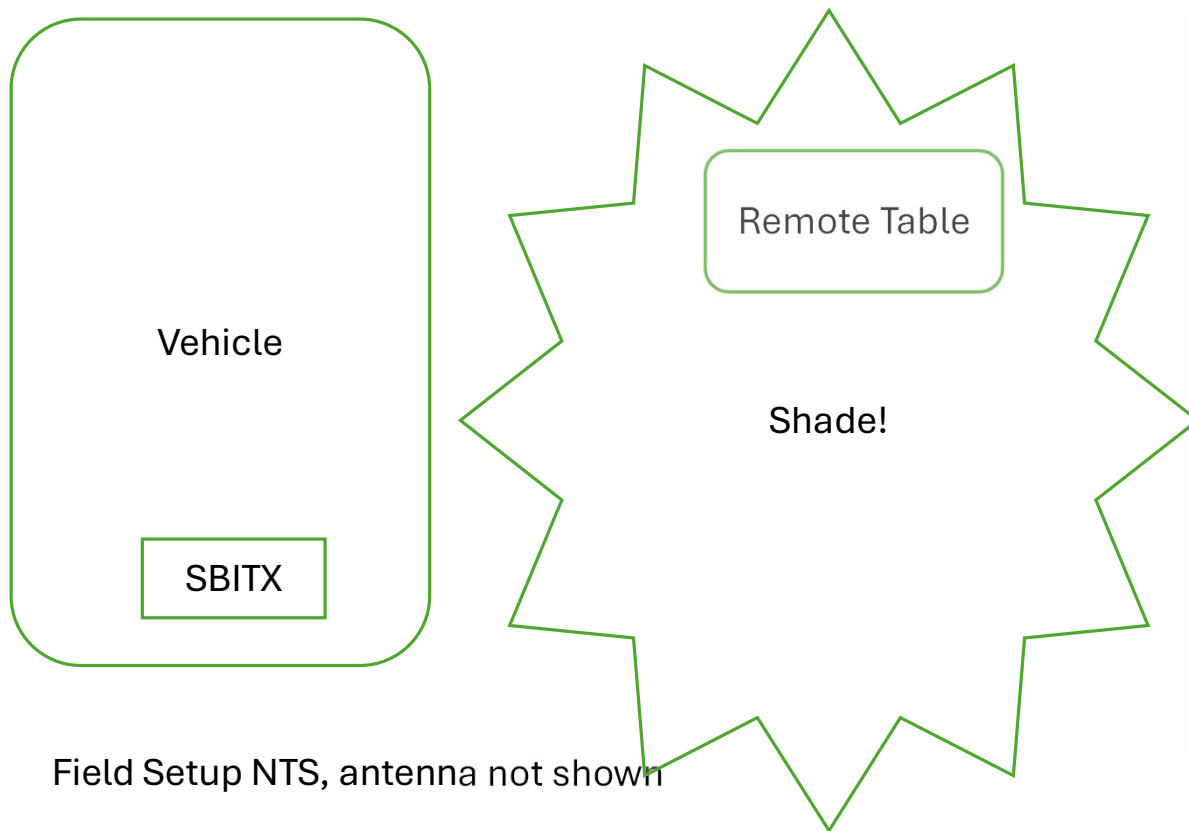
# Network operations and local wifi ..



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..



- 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 3<sup>rd</sup> Party 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)

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

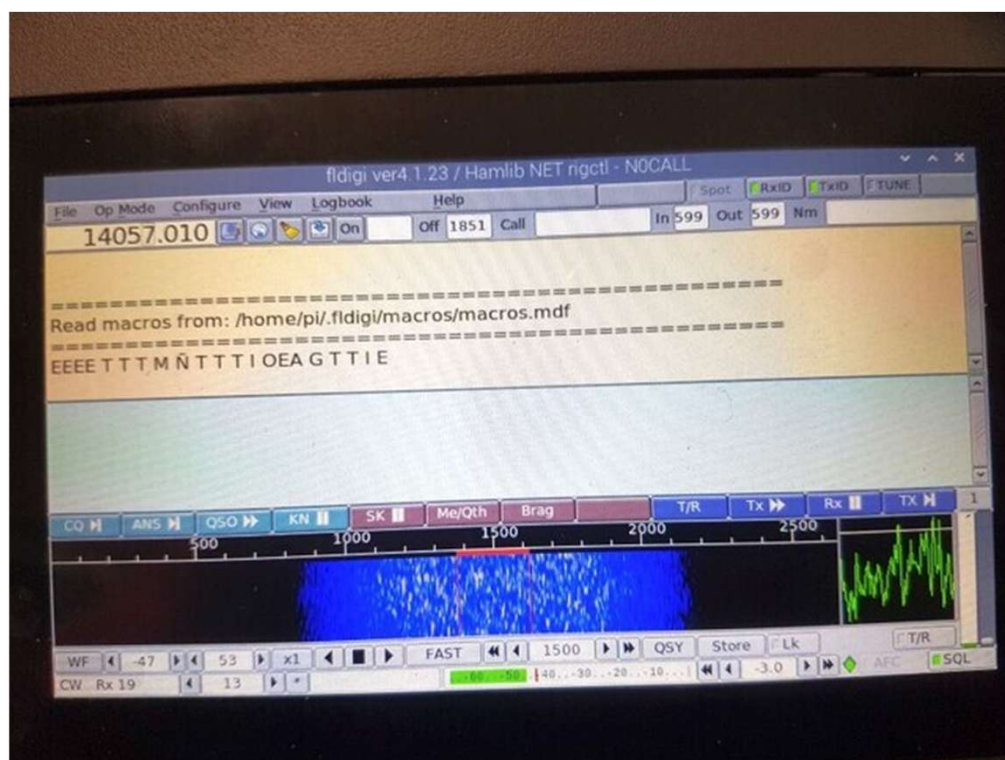
### Using Third-party Software/Modems (per documentation)

- Hundreds of open source software, ranging from FreeDV to FIDigi 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 rigctl)
- 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)**

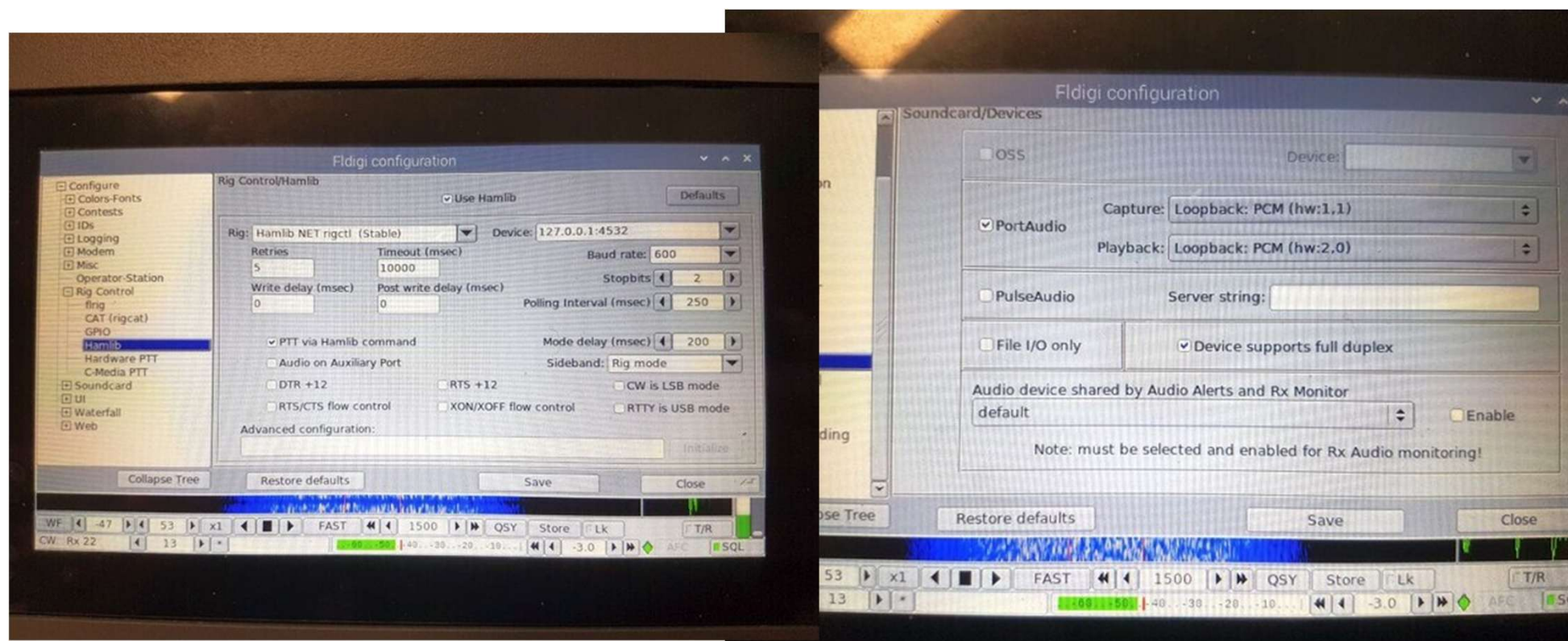
# 3<sup>rd</sup> Party Software Hopes and dreams

- 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 3<sup>rd</sup> 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](https://groups.io/g/BITX20/topic/sbitx_v3/107702921)

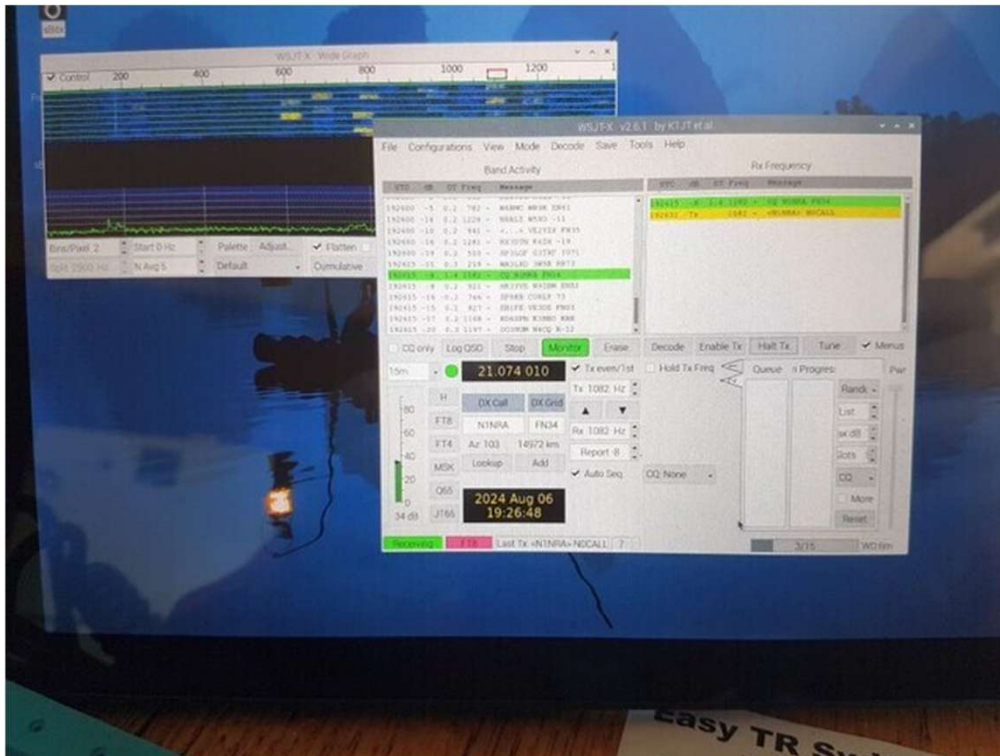
Fldigi – Oldy/Moldy .. But some lucky souls have got it working.. I haven't as of 10/27/2025



# Fldigi – settings – Use Hamlib/SoundCard



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

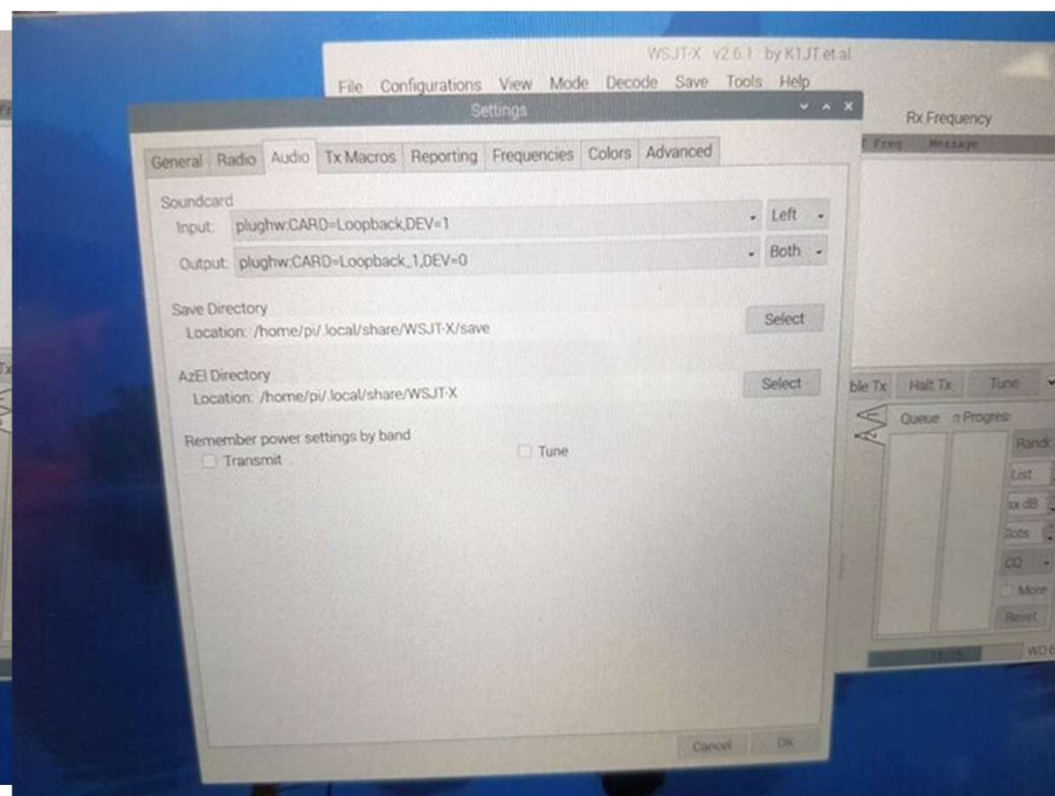
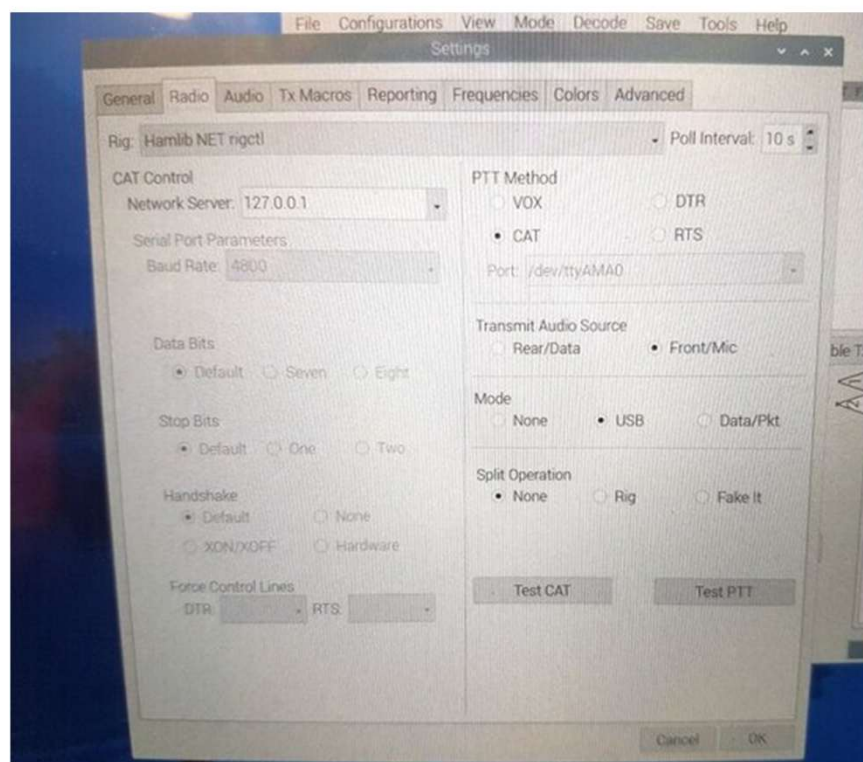


"modes" called **FST4**, **FST4W**, **FT4**, **FT8**, **JT4**, **JT9**, **JT65**, **Q65**, **MSK144**, and **WSPR**

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 there 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 [-hillLnouV] [-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 its 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.
- 3<sup>rd</sup> 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://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>