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Overview

The sBitx is a whole new generation of radios that brings in all the features and modulation methods into an integrated package.

The radio amateur's demands have changed from just the electronic performance of dynamic range, selectivity etc. to ease of use and integration of modes and other facilities like ease of logging, etc.

In the 1980s, the book Solid State Design for the Radio Amateur, co-authored by Wes Hayward, W7ZOI and Doug Demaw, W1FB, concluded the book with an elaborate, very high performance radio that was the limit of what an amateur in their home-lab could build.

It posed the question:

> What would happen if all the constraints were lifted? What level of equipment performance can the amateur experimenter expect to achieve without the aid of sophisticated instrumentation?

This radio is a reflection of how like the SSB and NBFM, now modes like the PSK31 and FT8 are so ubiquitous that they ought to be available on the radio's mode switch rather than a maze of wires, interface circuitry and an external computer system.

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Introduction

The sBitx is an open source, multi-band, multi-mode, SDR platform covering the HF bands. At it's heart is the popular Raspberry Pi 4 (TM) single board computer that processes the signals digitally, allowing the user to not only experience high performance radio reception but also to "hack" the radio.

The radio covers frequencies from 3 MHz to 30 MHz with maximum power output of 20W (varies according to band) with a visible spectrum displaying a 25 KHz of the selected band. The radio is modular in design and allows users to swap out sections if they desire to do so.

Measuring in at 10″x 6″ x 2″ and weighing in at just 2 kilos, the radio is portable and can be setup for operation from anywhere in a matter of a few minutes.

What's in the box?

- sBitx radio (including SD card)
- Handheld microphone
- DC power cable
- IRF510 MOSFETs - 2 Units
- 3.5mm Stereo plug

Connectors and setting up

1. Connect a tuned 50 Ohm antenna or a dummy load to the BNC connector of the radio.
2. Connect the supplied handheld microphone into the radio.
3. Connect a suitable LiPo battery or use the supplied DC power cable to connect the radio to your shack power supply. Please note that the radio **cannot handle anything more than 14.4 Volts**. The radio can draw upto 6 Amperes of current during transmit, so please ensure that use a suitable power supply. Please pay attention to the polarity.
4. Connect an external keyboard, although this is optional.

Power the radio by turning on the power switch on the side of radio. The radio will power on and the onboard computer will boot up.

After powering on, the main screen should load up.

It's time to set up the Raspberry Pi and the software.

Setting up the Raspberry Pi

When powering on the sBitx for the first time, the Raspberry Pi computer needs to be setup for smooth use. Use of an external keyboard and mouse is recommended. However, you could also tap on the *Start* (the Raspberry Pi icon on the top left of the screen) and navigate to *Accessories>Keyboard* to bring up the onscreen keyboard for use.

First, you will have to setup the local settings such as keyboard layout, time settings and then connect to the internet using ethernet or WiFi. In case you're radio came preconfigured, you can edit the localisation settings in the Raspberry Pi configuration tool, which is accessible via *Start> Preferences> Raspberry Pi Configuration> Localisation*

Next, you will need to connect to the internet. You can connect to WiFi by selecting your home network in the wifi menu on the top right of the radio. If you have ethernet, you can simply plugin the network cable into the LAN port on the right side of the radio.

Figure 01 - WiFi menu

Once the Raspberry Pi is set up, we can now setup the sBitx.

Setting up the sBitx

Start the radio by clicking once on the sBitx icon on the launch bar or on the desktop.

Once the software loads, you are greeted with the main screen of the radio.

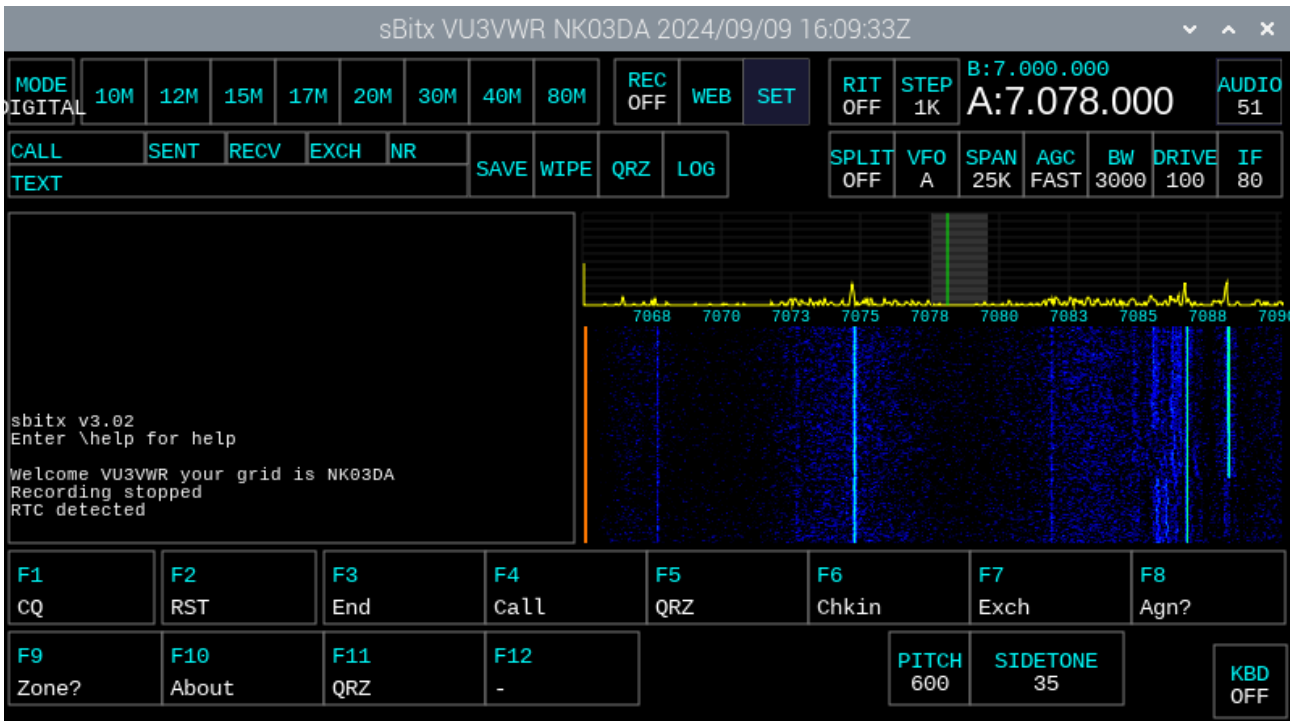

Figure 02 - sBitx Main screen

Before you begin, you will need to set your callsign and grid.

- Press the **SET** button.
- Type in your callsign and grid locator.
- You can also set a PIN used for accessing your radio's interface via an external device like a phone, tablet, or a computer.
- Clicking OK saves the settings.

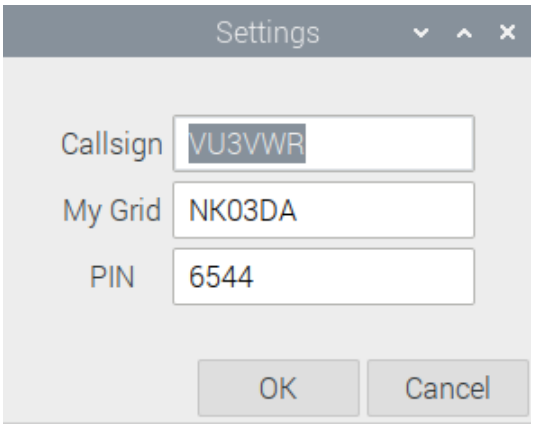

Figure 03 - Setting callsign, grid, and PIN

You can use the grid locator tools like the one from QRZ (https://www.qrz.com/gridmapper) to figure out your current location.

If this is done correctly, your callsign and grid should appear on the title bar of the sBitx application. Your sBitx is now setup and ready to use!

Controls on your radio

Now that your radio has been setup, let's dive into main controls.

Figure 04 - Main controls

1. **MODE**: Tapping the mode button cycles through the various modes.(**LSB**/**USB**/**2TONE**/**DIGITAL**/**RTTY**/**PSK31**/**FT8**/**CWR**/**CW**)
2. **BAND SELECTORS**: This is used to select the band of interest. Tapping the band multiple times, allows the user to cycle through four different frequencies and modes in the band. This is known as band-stacking.
3. **RECORD**: Tappng this starts recording the audio. The recordings are available /home/Pi/sbitx/audio directory in WAV format.
4. **WEB**: This launches a web based user interface for the radio. The web interface comes in handy when using an external monitor or another device to control the radio.
5. **SET**: This is used to set the user details such as callsign, grid, and PiN.
6. **RIT**: Receiver Incremental Tuning allows the receive frequency to be offset by up to 25 KHz from the transmit frequency to compensate for stations that are off-frequency.
7. **STEP**: This allows the user to change the step size of the tuning knob from 10Hz/step to 100KHz/step.
8. **VFO**: This allows the user to toggle between two different frequencies/bands.This also allows the user to operate **SPLIT**.
9. **AUDIO**: This sets the audio volume of the radio. Tapping the function knob selects this option.
10. **IF**: This sets the gain of the IF chain. Adjust this so that band noise is just above the baseline of the spectrum. If this is set too high, the receiver will overload. Too low and the receiver loses sensitivity.
11. **DRIVE**: The drive control sets the transmit output power. Set it to 100 for full transmit power.
12. **BW**: This sets the bandwidth of the receiver. In voice modes, the bandwidth's is set from 300 Hz onwards. That is, if you set BW to 2000 Hz on SSB then audio passband will be from 300Hz to 2300 Hz. In other modes, the bandwidth is centred around the frequency of the **PITCH** control.
13. **AGC**: This allows the user to cycle between the three modes. (Slow, Medium, Fast, Off). For CW, the fast mode is recommended.
14. **SPAN**:This changes the size of the spectrum and the waterfall display between 25KHz and 2.5KHz. A lower span value is recommended for CW and digital modes.
15. **VFO A/B**: This switches between VFO A and B.
16. **SPLIT**: This allows the user to operate split-frequency. When turned on, VFO A is set to a received frequency and VFO B is set to a transmit frequency. This is useful for working pile-ups.

Figure 05- Main controls - SSB

17. **KBD**: This brings up the onscreen keyboard.
18. **TX/RX**: This is the onscreen PTT. Press the Tx or Rx button to switch between transmit and receive.
19. **MIC**: This is used to set the microphone gain.

Logging controls

The sBitx has a simple logger. The logger panel is always visible just below the band switches on the top left side of the window. You may turn on the on-screen keyboard to log your contact..

The log is saved as a text file on the home/Pi/sbitx/data folder.

Figure 06 - Logging controls

1. **CALL**: Enter the callsign of the station.
2. **SENT**: Enter the RST report sent to the station.
3. **RECV**: Enter the RST report received from the station.
4. **EXCH**:: In certain contests or modes, information pertaining to location or contact serial number is sometimes exchanged. For instance, on FT8, the stations exchange each other's location as 4 letter grid squares. The exchange information received from the other station can be manually entered in the **EXCH** field. *(THIS IS AN OPTIONAL FIELD)*
5. **NR**:This can be used to make a note of contest number received or another details. *(THIS IS AN OPTIONAL FIELD)*
6. **SAVE**: Saves the entered information to the log.
7. **WIPE**: Clears all the entered text.
8. **QRZ**: Looks up the entered callsign on QRZ [opens a new browser window.]
9. **LOG**: Opens the log for viewing, editing, or deleting entries.

Mode specific controls

CW

Figure 07 - CW Settings

1. **SIDETONE**: This sets the sidetone volume of the radio.
2. **CW INPUT**: This is used to set the keyed input. (Straight, Iambic A, Iambic B)
3. **CW DELAY**: This sets the time in milliseconds that the radio takes to switch to RX from TX.
4. **PITCH**: This sets the sent and received tone. Adjusting the slider changes the cyan coloured Pitch line on the spectrum display move accordingly. This also allows the CW decoder to pick out the signal you'd like to decode. The CW decoder looks for signals within 100 Hz of the **PITCH** frequency.
5. **WPM**: This sets the speed of the keyed.

FT8/PSK31/DIGITAL/RTTY

Figure 08 - FT8 controls

1. **REPEAT:** This sets the number of times the CQ calls repeats.
2. **TX1ST:** When set to ON, the radio will choose to transmit during the first/third time slot of the minute. If set to OFF, the radio will transmit during the second/fourth time slot.
3. **AUTO:**Automatically respond to the station answering your CQ.
4. **TX_PITCH:** Sets the TX frequency. Use this to find a free spot on the spectrum while calling CQ and to match the RX frequency of the station you're working when answering a call.
5. **SIDETONE:** This sets the volume of the TX monitor heard locally.

Please note that the REPEAT, TX1ST, and AUTO buttons are disabled in PSK31, Digital, and RTTY modes.

QSO MACROS

On **CW/CWR/DIGITAL/RTTY/PSK31** modes, preset messages called *macros*, allows the user to send 12 preset messages with a single key.

Details such as the callsign and the signal report are automatically filled into the macros messages from the log entry, making QSO's a breeze.

For example, the default CW macros are designed for checking into CW nets. Users can create custom macros by simply editing the macros file.

Figure 09 - CW QSO Macros

Let's imagine that you are checking into a **CW** NET and the net control is VU2TS and you can copy VU2TS as 579.

You log VU2TS in the **CALL** text box and 579 in the **SENT** box.
Now, listen to the net until you have a chance to break-in.
Press **F4 Call**. This will send your own callsign just once. We wait until the net control replies to us. We can repeat our callsign by pressing F4 again.
We press **F6 Chkin.** The macros fill the contact's callsign and the signal report entered in the **SENT** box and sends the following message.
VU2TS DE VU2ESE UR RST 579 es tnx fer call. hw cpy? AR K
The net control will reply to us and give us a report of 559. We enter 559 in the **RECV** box.
Press **LOG**. When the **CALL**, **SENT** and **RECV** fields are filled, pressing the **LOG** button will save the QSO as a log entry. The time, frequency, mode, etc., are all picked up from the radio's settings.

At this point, you can continue with the QSO by transmitting more macros or directly sending CW.
You can clear the logger window without having to delete individual entry boxes by pressing the **WIPE** button.
You can interrupt a transmission of a macro generated message by pressing the ESC button or pressing the Escape key on the physical keyboard.

Using the radio

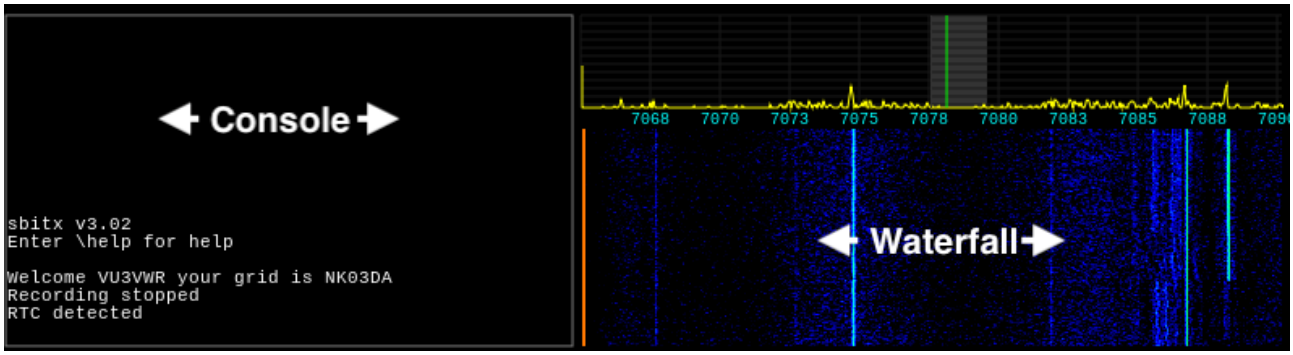

Figure 10 - Waterfall and console

SSB: To operate the radio on SSB,

- Select the band of operation.
- Set the mode to either USB or LSB.
- Set the tuning rate by adjusting the STEP size to 1 KHz. To fine tune, you can decrease this to 100 Hz.
- Tune into a signal or find a empty spot on the waterfall.
- Set the bandwidth between 1.8 KHz to 3KHz. 2.4 KHz is the standard choice.
- If using the supplied hand microphone, set the MIC gain to 25. If using the internal microphone, increase this to 50, as the user might be away from the radio during operation.
- Press the PTT button on the hand microphone to begin transmission. The onscreen PTT (TX/RX buttons) can also be used, when using the built-in microphone.

The on-screen TX/RX buttons can substitute for the PTT. Note that instead of one PTT button there are separate buttons to start transmission and to go back to listening. This is done so that your hands are free to write down things, tune the antenna, type the callsigns into the logger, etc.

- Choose a bandwidth between 1.8 KHz and 3 KHz for voice. A 2.4 KHz bandwidth is a good choice.
- For the supplied hand-held microphone, the **MIC** gain should be set to 25.
- When using the internal mic, increase the **MIC** gain to 50 as the user may be some distance away from the microphone.

To set the radio to operate **SPLIT**, switch on the **SPLIT** option, select **VFO A a**nd set it to the frequency you wish to transmit on. Set **VFO B** to the receive frequency.
While in SPLIT mode, pressing on the **VFO A/B** button will set the RX frequency to the TX frequency. This is very useful when working DX.

CW: To operate the radio on CW,

- Select the band of operation.
- Set the mode to CW.
- Set the frequency.
- Set the bandwidth to 1KHz to 300Hz. The tighter the bandwidth, the lesser the noise.
- Set the CW keyer settings.

- The attached key or keyboard, internal or external, can be used for sending. The macros can also be used.

TIP: The handheld microphone's PTT can also be used as a straight key if you don't have a key handy.

The **PITCH** control sets your sending and receiving audio tone. When you move the slider of the CW pitch control, you can also the see the Cyan coloured pitch line on the spectrum display move accordingly.

- **Decoding CW**: just tune the interesting signal exactly onto the cyan coloured pitch line (in the center of the bandwidth strip) of the spectrum. You may want to set the **SPAN** to 6 KHz or even smaller to be able to tune the CW station's peak in the centre of the grey bandwidth strip that represents the radio's current receiving bandwidth.
- **BW** Use narrow filters to cut out the band noise and QRM. When using narrow filters, it is a good idea to also decrease your tuning **STEP** to 100Hz or 10 Hz, that way, you don't skip over signals without hearing them.

TIP: Use broader bandwidth of around 1 KHz to hunt for weak stations and then reduce the bandwidth to less than 300 Hz to reduce the noise.

- **CW_INPUT** is used to choose between different types of keyers (Straight key, Iambic A and Iambic B).
- In the field or even at home, you may be more comfortable, just typing the CW on an attached keyboard or the on-screen keyboard. You could also use the macros to have "rubber-stamp" QSO's.

CWR: The CW Reverse mode is similar to the CW mode, except that the radio transmits on the LSB. This is useful for cross mode contacts, such as responding in CW to a station operating on LSB.

FT8: To operate the radio on FT8,

- Ensure that time is updated, by connecting the Raspberry Pi to the internet.
- Select the band of operation.
- Set the mode to FT8.
- Set the bandwidth to 4 KHz.
- Set the spectrum span to 10KHz.
- Set AGC to off.
- Set the Tx frequency by moving the red line on the spectrum display empty spot by adjusting the **TX PITCH** slider. Ensure you are operating on a free spot on the spectrum.

TIP: It is best to choose an unoccupied frequency between 300 Hz and 3000 Hz. Most radios on air have crystal filters with restricted bandwidth and they may not hear you unless they are using split frequency operation.

- To call CQ, press the **F1 CQ** button and the CQ will start at the next cycle.
- Watch the band activity for any responses to your CQ. These messages will be highlighted in yellow.
- Keep **AUTO On** to automatically respond to anyone who answers your CQ.
- If **AUTO** is kept **OFF** you will have to select the CQ reply message and initiate the QSO with that callsign.
- **TX_1ST** is used to choose the time slot for calling CQ. If it is turned **ON**, the CQ messages will go out at the first and third 15 second slot of the minute. If it is **OFF**, CQ will be transmitted in the second and fourth 15 second slot of the minute.
- To answer a CQ, choose the callsign from the band activity window. The contact's callsign is copied into the CALL box, their signal report is filled in the RECV box and the EXCH box is filled with grid location from the CQ message.

TIP: The decodes are in a relatively small font to accommodate more lines on the screen. It is possible that your finger may touch another message instead of the intended one. You can drag your finger on the console window until the intended line is chosen.

- Your replies to chosen CQ will be automatically scheduled to transmit during the slot when the contact will be listening.
- The scheduled message is written out in grey colour on the console.
- All the messages to and from you, that contain your callsign are shown in bright orange.
- Upon completion of exchange of the signals reports, the contact is automatically logged.
- If the contact replies to someone else instead of you, you will see those messages here as well. This way you will know that your call didn't succeed and the contact has moved onto another QSO.
- If the caller responds to you, sit back and watch sBitx complete the QSO for you. The logger window will automatically fill the callsign and signal reports, and log the QSO.

RTTY/PSK31 : To operate RTTY/PSK31,

- Switch off the AGC.
- Use the PITCH control to tune into the signal you'd like to decode.
- Adjust the bandwidth to cover just the signal to avoid interference.
- Use the message macros or type out your reply to start transmitting.

DIGITAL: Use the digital mode to allow external apps to communicate with the sBitx. INSERT INSTRUCTIONS

2 TONE: The two tone mode is a test feature used for measuring the transmitter's distortion.

Advanced operation

HEADLESS MODE

The controls of the sbitx can be mirrored on any mobile device connected to the same wifi network as the radio. To do this, start the sbitx application on the radio and simply navigate to "**sbitx.local**" on your external browser. To login, enter the PiN you created during setting up the radio.

Your sbitx is now ready for use! You will be able to access the controls and the audio on your mobile device. Please note that the sbitx cannot transmit audio via the web interface yet.

SETTING UP MACROS:

Each set of macros is stored as a text file in the directory /home/Pi/sbitx/web with the filename extension .mc. They are an easy to understand format and you can create your own macros file with any text editor. The macro files are text files written in the N1MM format.

 # 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 farhan qth hyderabad . rig is sbitx es dipole . hw cpi? ! de * k
F11 QRZ,qrz?
F12 -,-

The macros are mapped to the function keys of any attached keyboard and can also be sent by tapping the macro button. A maximum of 12 macros can be defined.

- In the **WEB** modes, Aal the macro files available are listed in the dropbox next to the macro buttons. You can choose a different macro file depending upon the kind of operation you want to do. CW1 macro file is a good option to begin with.
- The macros will substitute your callsign, grid, the contact's filled callsign, report (from the logger boxes).

ACCESIBILITY

The radio is designed in a way that all the controls are mapped to text commands, which makes the radio accessible to differently abled users.

These commands can be entered in the native UI by preceding the text with a backslash (\) or pressing the **CMD** key of the on-screen keyboard.

In the web UI, press the **CMD** button in the bottom of the page to open the commands console. The commands can be entered directly into the web UI's command console without the backslash.

RADIO COMMANDS

MYCALLSIGN [text]
Sets the operator's callsign. This is used just once when you are setting up your radio with your callsign. If a friend is using the radio, they should set it to their callsign for the macros, FT8, and the logger to work properly.

MYGRID [6 letters]

This is a 6 letter code to indicate the approximate location of your station on Earth.
Sets the operator (your) Maidenhead grid location. It is used just once when you are setting up your radio with your callsign. If the radio's location is changed, you should update the grid location.

FREQ frequency
Sets the operating frequency of the radio. The frequency can be specified in Hz or KHz. You can also use the short form "*f*".
For example, ***FREQ 7035*** or ***f 7035000*** sets the frequency to **7035 KHz**.

AUDIO 0-100
Set the audio volume of the radio's reception.

For example, **AUDIO 50** sets the radio's audio volume to 50.

MODE USB/LSB/CW/CWR/FT8/DIGITAL/2TONE
Chooses from the modes available in the mode selection control. You can use "**m"** instead of "**MODE**."

Set this to **DIGITAL** when using the radio with third party software like FlDigi or WSJT-X.
The **2TONE** mode transmits 2-Tone signal to check the transmitter IMD.

For example, **MODE CW** or **m CW** sets the radio to **CW**.

AGC OFF/SLOW/MED/FAST
Sets Automatic Gain Control's hold time. SSB is best with AGC set to SLOW. CW will require FAST setting for high speed CW and MED for low speed CW. For digital modes like FT8, it is best to switch off the AGC.

For example, **AGC MED** will set the AGC to **medium**.

DRIVE 1-100
Sets the transmit output power level. To set the exact power, monitor the power indicator on screen while changing this value.

For example, **DRIVE 50** sets the output level to 50%.

STEP 10K/1K/100H/10H
Sets the frequency jump with each step of the tuning knob. Use the 10K jump to quickly get to another frequency that far from the current frequency.
As most SSB operation is now on an exact kilohertz boundary, you can use 1KHz steps while tuning for SSB signals.
The lower step rates are useful for narrow band modes like CW. The CW decoder requires that the signal should be cantered inside the audio bandwidth, this needs the signal to be nudged within 100 Hz, using either the 100Hz or the 10Hz steps.

For example, **STEP 1K** sets the tuning step to **1KHz**.

SPAN 25K/10K/6K/2.5K
Sets the spectrum and waterfall width. For non-voice modes, 10 KHz span is preferable as it enables you to see individual narrow band signals clearly.

For example, **SPAN 10K** sets the radio to display **10KHz** of the spectrum.

RIT ON/OFF
Turns Receiver Incremental Tuning ON or OFF. Use this to receive stations that are slightly away from your own transmitting frequency. This is frequently the case with DXing and contesting.

For example, **RIT ON** switches on the RIT.

VFO A/B
Toggles between two VFOs for quickly jumping between two frequencies. The two VFOs are also used to work **SPLIT**, where VFO A frequency is used to receive signals and VFO B is used to transmit signals.

For example, **VFO B** switches to VFO B.

BW 50-5000 (Hz)
Sets the audio bandwidth of the receiver.

In voice modes, the lower edge of the bandwidth is always set to 300 Hz and the higher edge adjusted to the **BW** setting. For instance, in USB mode if the **BW is** set to 1800, then the actual bandpass is from 300 Hz to 2100 Hz.

In non-voice modes, the audio bandwidth is centred around the **PITCH** frequency. For instance, in CW mode if the **BW** is set to 300 and the **PITCH** is set to 600 Hz, Then the filter is set from 450 Hz to 750 Hz.

For example, **BW 500** sets the bandwidth to **500Hz.**

VFOA frequency (Hz)
Directly sets the VFO A frequency.
For example, **VFOA 7015000** sets **VFOA** to **7015KHz.**

VFOB frequency (Hz)
Directly sets the VFO B frequency.
For example, **VFOB 7015000** sets **VFOB** to **7015KHz.**

RIT_DELTA -25000 to 25000 (Hz)
Sets the Receiver Incremental tuning offset. For instance, if the radio is set to 14040KHz, the **RIT** is ON and the **RIT_DELTA** is set to 5000, then the receiver will be tuned to 14045 KHz and on transmit it will go back to 14040 KHz. If the **RIT** is OFF, then this setting has no effect.

For example, **RIT_DELTA 5000** sets **RIT** to **5KHz.**

ESC
Aborts the current transmission of any macro/text.

TX
Switches the radio to transmit

RX
Switches the radio to receive

10M Switches to 10 meter band, if the current frequency is already within 10M band, then it switches to the next frequency of 10M in the band stack.

12M Switches to 12 meter band, if the current frequency is already within 12M band, then it switches to the next frequency of 12M in the band stack.

15M Switches to 15 meter band, if the current frequency is already within 15M band, then it switches to the next frequency of 15M in the band stack.

17M Switches to 17 meter band, if the current frequency is already within 17M band, then it switches to the next frequency of 17M in the band stack.

20M Switches to 20 meter band, if the current frequency is already within 20M band, then it switches to the next frequency of 20M in the band stack.

30M Switches to 30 meter band, if the current frequency is already within 30M band, then it switches to the next frequency of 30M in the band stack.

40M Switches to 40 meter band, if the current frequency is already within 40M band, then it switches to the next frequency of 40M in the band stack.

80M Switches to 80 meter band, if the current frequency is already within 80M band, then it switches to the next frequency of 80M in the band stack.

REC ON/OFF
Toggles the recording of transmitted and received audio into a WAV file. These files are named with the date and time of recording and they are stored in /home/Pi/sbitx/audio.

For example, **REC ON** turns on the audio recorder.

WEB Launches the web UI on the chromium browser at 127.0.0.1:8088

LOGGER CONTROLS

ESC
Aborts the current transmission of any macro/text.

MACRO [filename]
Loads the macro file from the filename specified. The file is expected to be present in /home/Pi/sbitx/web directory. The filename should NOT contain the .mc extension.

For example, **MACRO CW1** loads the **CW1** macro options**.**

CALL [text]
Sets the contact's callsign. This will be used in macros as well as to make logbook entry.

For example, **CALL VU2XZ** will set the calling stations callsign to VU2XZ.

SENT [text]
Sets the signal report of the contact as received at our end. The signal report can be free form as it is reported in dB by FT8, as a two digit value in voice modes, 3 digit value in CW, etc.

For example, **SENT 599** will set the sent signal report to 599.

RECV [text]
Sets the report of our signals given by the contact.

For example, **RECV -58** will set the sent signal report to -58.

EXCH [text]
An optional field for the logbook, this is often the additional information sent by our contact along with the signal report. During contests, this might be a serial number. On FT8, this is the 4 letter grid location.

NR [text]
An optional field for the logbook, this is often the additional information sent by us to our contact along with the signal report. During contests, this might be a serial number. On FT8, this is the 4 letter grid location.

LOG
Saves the QSO into the Logbook. This command does not automatically clear the logger fields as they may still be required if the call is to continue using the macros.

WIPE
Clears all the logger fields.

QRZ [callsign]
Queries qrz.com with the callsign set in **CALL** field. This will launch the browser if it is not already opened.

SENT_EXCHANGE (text)
Sets the text to be sent in exchange by the macros.

For example, **SENT_EXCHANGE NK03DA** sets the radio to send **NK03DA** every time the exchange macro is activated.

CONTEST_SERIAL 0-100000
Sets the initial value of the contact numbers given during a contest. This is picked up by the logger and incremented after every contact is logged.

For example, **CONTEST_SERIAL 100** starts the contest number exchange start value to **100**. Everytime a contact is logged, the radio increments the value by one.

LOW 100-4000 (Hz)
Sets the lower edge of audio bandwidth, This is an internal setting that is calculated and set by the **BW** control.

HIGH 100-4000 (Hz)
Sets the higher edge of audio bandwidth, This is an internal setting that is calculated and set by the **BW** control.

PASSKEY [passkey]
This sets the passkey that is required to login to the sBitx from device or computer.
PASSKEY 123

SSB CONTROLS

MIC 0-100
Sets microphone gain for voice modes. For SSB on sBitx v3, the supplied microphone works well with **MIC** set to 25. Example:
MIC 25

CW CONTROLS

WPM 1-50
Sets the CW sending speed

PITCH 100-3000 (Hz)
Sets the CW sidetone and decoding audio frequency in Hz. The **BW** control centers the audio filter on the **PITCH** frequency.

CW_INPUT IAMBIC/IAMBIC B/STRAIGHT
Sets the sending method of CW. In all these modes, you can intersperse sending through keyboard or macros.

For example, **CW_INPUT IAMBIC** sets the radio's keyed to IAMBIC A mode.

CW_DELAY [100-2000]
How many milliseconds the radio remains in transmit after the last letter is sent.

For example, **CW_DELAY 200** sets the CW delay to 200 milliseconds.

SIDETONE 0-100
Sets the volume of the sidetone when sending the CW.
For example, **SIDETONE 80 s**ets the sidetone volume to 80%.

FT8 CONTROLS

TX_PITCH 300-3000 (Hz)
Sets the transmitting frequency within the audio passband.

For example, **TX_PITCH 1800**, sets your actual transmitting frequency 1800 Hz away from the VFO frequency.

FT8_AUTO ON/OFF
When this control is switched on, it automatically responds to any reply to your CQ transmission and completes the QSO. Often, other stations could call you as soon as one QSO is finished, and this setting will enable the radio to automatically answer the next QSO and so on.

FT8_TX1ST ON/OFF
On FT8, the minute is divided into four 15 second slots. Stations transmit and receive on alternating slots. With **TX_1ST** set to ON, your CQ calls will be transmitted in the first and third slot while you listen for responses on the second and fourth slot of the minute.
This control only affects the timing of the CQ messages that you transmit. When you choose another station's CQ message, the sbitx will automatically transmit on slots that that station is listening on.

FT8_REPEAT 1-10
The maximum number of times any message (like CQ) is transmitted until a response is obtained.

TELNET

TELNETURL [server:port]
Stores the URL of the telnet server.
For example, **TELNETURL dxc.g3lrs.org.ul:7300** sets the Telnet server**.**

TOPEN [server:port]
Opens a telnet session with an RBN or a DX cluster telnet server. It works with ip address as well as domain names.
For example, **TOPEN dxc.g3lrs.org.ul:7300** opens a telnet session on the server.

TCLOSE
Closes the existing telnet session

W [telnet command string]
Writes the remaining text (skipping the space after '\w') to the currently opened telnet server.