

# **RigPi Station Server**

## **USER MANUAL**

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# Introduction

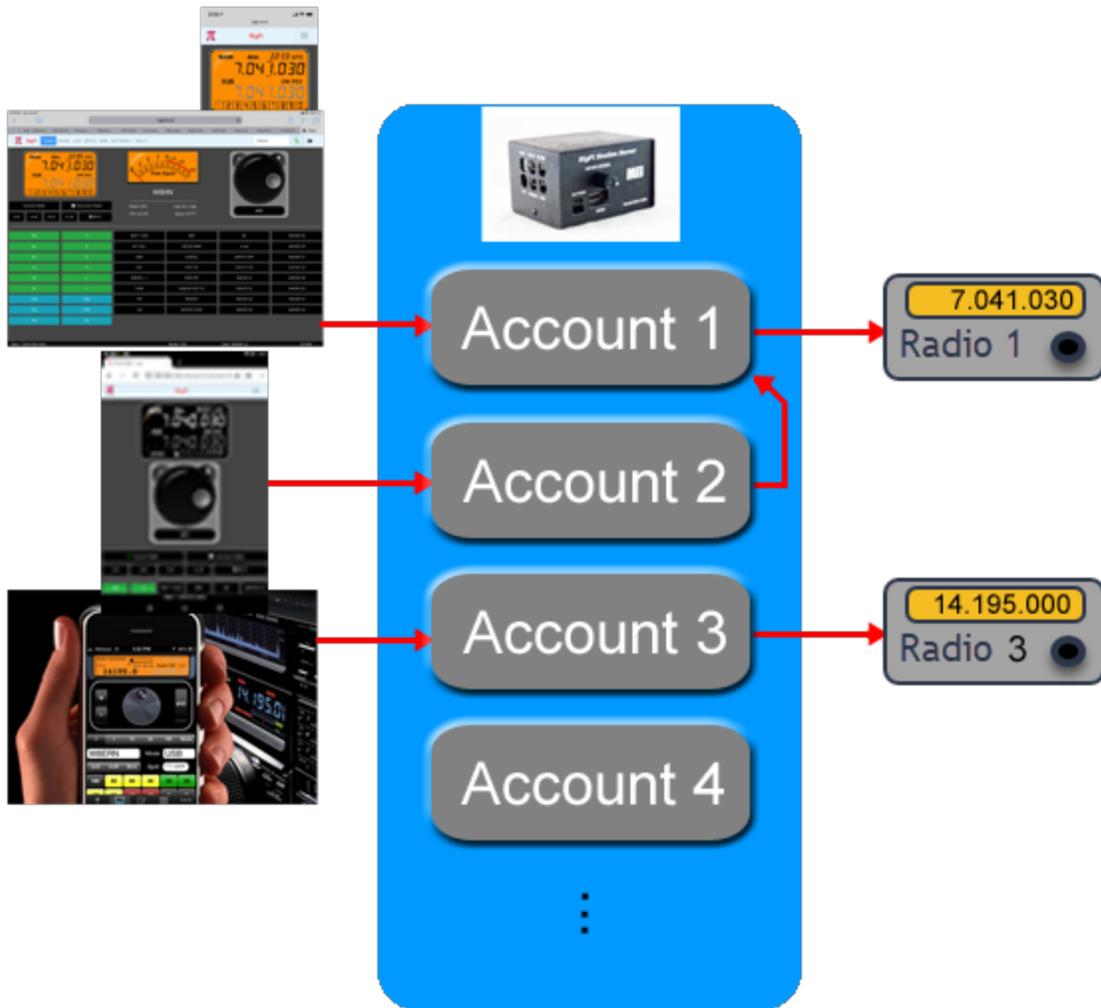
## 1 Introduction

### MFJ-1234 RigPi™ Station Server v 1.0



RigPi Station Server (RSS) is a computer system designed to control your station and facilitate on-the-air activities. RSS introduces a radically new way of station control by using a server model for allowing multiple users and radios to be accommodated simultaneously through standard Internet browsers.

## RSS Block Diagram



Account	Controlled Radio	Controlled By
Account 1	Radio 1	iPad and iPhone
Account 2	Radio 1 through Account 1	Google Nexus
Account 3	Radio 3	iPhone using CommCat Mobile

Account	Controlled Radio	Controlled By
Account 4	Not used	None

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## 1.1 Welcome to RSS

### Welcome to RigPi Station Server!

RigPi Station Server (RSS) is an easy-to-use multi-operator, multi-radio (MOMR) amateur radio control, logging, CW keying, spot management and call lookup system.



RSS is based on a Raspberry Pi computer running Linux plus RigPi Keyer and RigPi Audio boards. RigPi Keyer uses the popular K1EL WinKeyer chip for keyboard or paddle input. RigPi Audio is used for Voice-Over IP (VoIP) and remote operations, or for digital modes and I/Q spectral display (panadapter).

The Raspberry Pi is a small computer providing processing, 1GB RAM, four USB ports, Ethernet port, Wi-Fi and Bluetooth. The RigPi Keyer and RigPi Audio boards are connected through Raspberry Pi GPIO connectors.



RSS is browser based. It can be used with any Internet browser including those on Windows, Mac, Chromebook, Android, iOS and Linux computers, laptops, and phones. You can open RSS web pages on several devices at once. Because RSS is multi-radio, one browser can control one radio and a second browser can control another radio.



In addition to browser access, CommCat Mobile for iOS and [CommCat](#) for Windows can connect to RSS for radio control.

RSS radio control uses Hamlib, a library of over 200 radio models and 30 rotors. As new radios and rotors are added you can update the lists to keep current.

Other programs are provided with RSS for ham radio and general use. Fldigi and WSJT-X provide a wide range of digital modes. TQSL prepares and uploads log files to ARRL LoTW. Included software can replace programs on a desktop PC, including an email client, and Office software including word processing, paint, spreadsheet, and database programs. You can even play games on RSS!

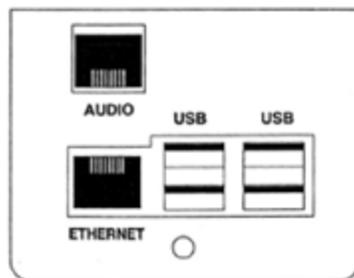
RSS uses open source HTML5, PHP7, jQuery and Ajax, and MySQL (MariaDB). The three Tuner panels, frequency, s-meter, and tuning knob are proprietary and provided as closed source under a distribution license. RSS uses Twitter Bootstrap for responsive web pages. You can easily view and modify RSS programs to make changes or add your own features. No specialized software coding tools are required.

## 1.2 Quick Start Guide

### What is Needed

1. RigPi Station Server (RSS)
2. 5-volt, 3-amp Power Supply with a micro USB connector
3. An Ethernet cable or Wi-Fi connection to your router
4. Another computer or mobile device on the same network, or
5. A monitor with HDMI input, USB keyboard and USB mouse
6. Optional audio cables for VoIP or digital mode software, CW and PTT keying cables
7. For remote operations, Mumble VoIP client on your mobile device

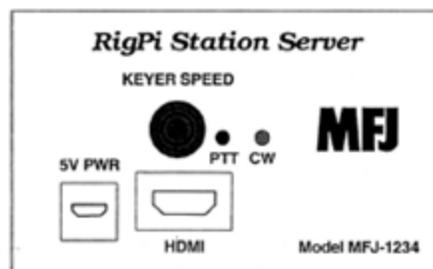
## Connecting RSS Using an Ethernet Connection



AUDIO uses same jumper blocks and cables as MFJ-1204

USB USB2 connections on Raspberry Pi3 board  
ETHERNET Raspberry Pi 3 Ethernet connection on board.

1. Connect an Ethernet cable from your router to RigPi Station Server.



5V PWR 5V supply line.  
HDMI HDMI video only. Audio disabled.

2. Plug in the RSS 5-volt power supply.

The two lights below the RSS KEY jack indicate power (red) and activity (green). The green light blinks as RigPi boots.

3. On another computer or mobile device connected to the same network, open a browser window. Navigate to [rigpi.local](http://rigpi.local).

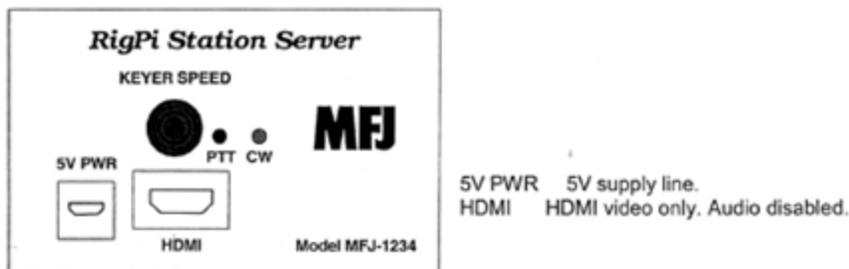
Apple Bonjour is required on Windows computers to find rigpi.local. See the Technical topic in Help for more information on Bonjour.

Without Bonjour, you can use the RigPi IP address instead. Log in to your router and look at connected devices. You will see the Raspberry Pi listed there along with its IP address.

4. The RSS Login screen appears after RSS has completed the boot process. (See below.)

## Connecting RSS Using a Wi-Fi Connection

RSS has built-in Wi-Fi if an Ethernet cable isn't convenient. If you need to connect using Wi-Fi rather than using an Ethernet connection, a monitor/keyboard/mouse must be connected to RSS.



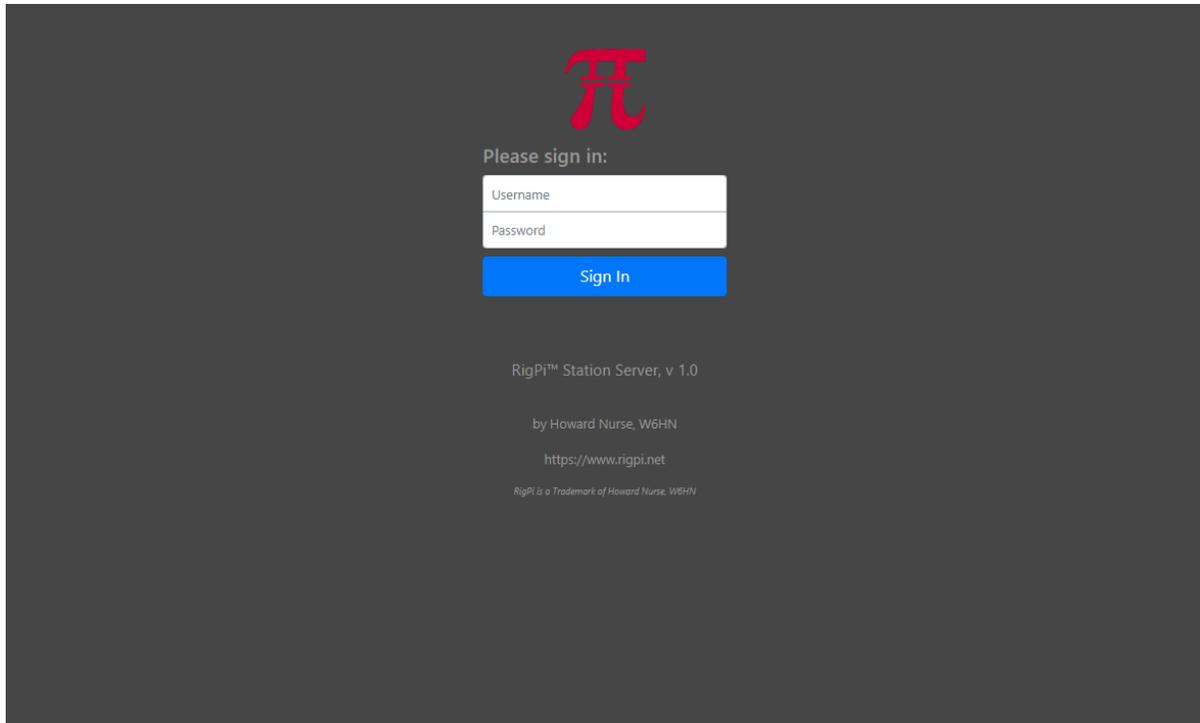
1. Connect a computer monitor having an HDMI input, USB keyboard and USB mouse to RSS.
2. Plug in the RSS 5-volt power supply.

The two lights below the RSS KEY jack indicate power (red) and activity (green). The green light blinks as RigPi boots.

3. The Raspbian PIXEL Desktop appears after RSS has completed the boot process.
4. In the upper-right corner of the Desktop click the Network icon (Up/Down arrow).
5. Select Turn on Wi-Fi, then click the Network button again.
6. Select the network you wish to join from the list.
7. In the Pre Shared Key box enter your Wi-Fi password, then click OK.
8. While the Desktop is open, click the Raspberry Menu icon and navigate to Preferences>Raspberry Pi Configuration>Localisation.
9. Enter the Locale, Timezone, Keyboard and Wi-Fi Country for your location.

10. Click the RSS icon (a Pi symbol) to start RSS. The RSS Login screen appears.

## Exploring RSS



1. RSS is shipped with Username 'admin' and no Password.
2. Enter admin in the Username box.
3. Press Enter (no Password has been assigned).
4. The RigPi Express Setup window appears

**Express User Settings** < BACK REVIEW NEXT >

Please enter or edit the information in the boxes below. Click REVIEW to confirm the changes, then click NEXT to continue.

Express Setup helps you enter your amateur call and location, select a radio, and get started rapidly.

Express Setup appears when you log into RigPi with the Call set to ADMIN, below.

1. Replace ADMIN in the Call box with your call.
2. Replace admin in the Username box with a unique word to use when you log in. The Username is case insensitive, do not include space characters.
3. Enter a password in RigPi PWD if you will be connecting to RSS through the Internet.
4. Your optional state abbreviation and grid square can be used to help filter Telnet sites for spot monitoring.
5. Callbook settings can be left blank to use the onboard FCC database or enter your QRZ XML credentials to use the QRZ subscription service.

These settings and more can be accessed through the SETTINGS menu.

To skip Express Setup, click any menu tab, above.

Call ADMIN Username admin RigPi PWD Enter new password (optional)

Fill Below from Callbook

First Your first name State Your state 2-letter abbrev (if applicable) Grid Sq Your Maidenhead grid

Callbook

QRZ User QRZ username for XML access QRZ PWD QRZ password for XML access

No Radio User: ADMIN (admin) 19:35z

RSS Express Setup has two windows, each containing settings required to get you going rapidly. Express User Settings allows you to enter your Call, location, and optional QRZ XML subscription credentials. Express Radio Settings, which comes configured with the Hamlib simulated radio, Dummy, lets you set up your own radio. You can continue to use Dummy by skipping the Express Radio Settings.

## Shutting Down

**Never disconnect the RigPi Station Server power supply without shutting down first. Disrupting the power before shutting down can corrupt the memory card.**

1. Go to SETTINGS>System.
2. Click the Shutdown button.
3. Wait for the green activity light to stop blinking.
4. Disconnect the power.

**Enjoy RigPi! Additional Help is available**

- RSS Toolbar Help
- Online forum: [RigPi Forum](#)
- RigPi online help: [Online Help](#)
- PDF Help file: [Help PDF](#)
- MFJ Online technical support: [support](#)
- MFJ telephone support: 1-662-323-0549

### 1.3 What's New

This topic will contain information about new features as they are added, bug fixes and other improvements.

### 1.4 Raspberry Pi Desktop



The Raspberry Pi Desktop is similar to many graphics desktops. The Raspberry Menu button in the upper left is similar to a Windows File menu. Most buttons and icons have a right-mouse menu for additional options. You can access the Desktop by connecting an HDMI monitor to RSS, or by using VNC Viewer to access it from a browser.

	Function	Description
1	Raspberry	Applications Menu
2	Web Browser	Chrome browser
3	Terminal	Shell access to RSS
4	RigPi	Start RigPi in Chrome browser
5	VNC	VNC Server--use VNC Viewer to connect from another computer.
6	Bluetooth	Bluetooth enabled
7	LAN	LAN/Wi-Fi active connections
8	Speaker	Audio enabled
9	Percent	CPU Load
10	USB IO	Set up static names for USB connections
11	RigPi	Start RigPi in Chrome browser
12	Mumble Autostart	Control boot behavior of Mumble client.

### Setting up the Raspberry Pi

When you first start RSS you will need to make changes to the Raspberry Pi to adjust to your needs and location. These settings are done through the Applications Menu (1) >Preferences>Raspberry Pi Configuration menu item.

The Configuration window has four tabs at the top: System, Interfaces, Performance, and Localisation (sic). Your RSS has most settings already customized for you, but there are several Localisation settings you need to change: Locale, Timezone, Keyboard and Wi-Fi Country.

Finally, if you want to enable Wi-Fi, click the up/down arrow button (7) on the right side of the RPi menu bar. Left-click, then click Turn On Wi-Fi and follow the instructions.

## 1.5 Universal Functions

Each RSS window has functions that are present on all other RSS windows.

Function	Where is it	Description
RSS Logo	Red "Pi" logo at left end of the RSS Menu bar	Click to open the RigPi web site: <a href="https://rigpi.net">https://rigpi.net</a>
RSS Menu Bar	Top of RSS window	A menu bar is provided to open RSS windows. Several menu items have drop-down lists showing additional options. The SETTINGS menu is shown in full for ADMIN users, access level 1. The Users and System options are not shown for access level 2. The SETTINGS menu is not shown at all for access level 3.
Callsign Lookup	Right end of RSS Menu bar	Look up callsigns using the RSS FCC Database, or the optional QRZ XML subscription database. Type a call and press Enter on your keyboard or click the magnifying glass button to look up a call. The focus call is carried from window-to-window, and restored the next time you start RSS. (QRZ XML access requires an Internet connection and a paid subscription.)
Log Out	Right end of RSS Menu bar	Log out from the current RSS account.
Radio Status Bar	Bottom of RSS window	The radio status bar at the bottom of each RSS window shows Main frequency, Sub frequency (if Split is turned on), mode, the current user and user name, and the current UTC time.

### Callsign Lookup

The Callsign Lookup panel shows detailed information for the entered call. The information comes from the onboard FCC database, or if enabled with a username and QRZ password, from the QRZ XML service. At the bottom of the panel you can control your

rotor by clicking Rotate or Stop. Set up you rotor in SETTINGS>Rotor. Note RSS comes with the Hamlib Dummy rotor installed for you.

## W1AW ×

Arrl Hq Operators Club, **W1AW**  
225 Main St  
Newington, CT 06111 UNITED STATES  
[W1AW@ARRL.ORG](mailto:W1AW@ARRL.ORG)

County: Hartford  
Latitude: 41.714775  
Longitude: -72.727260  
Distance: 2617 Mi, 4212 Km  
Bearing: 68 Deg  
Grid: FN31pr  
DXCC: US Number: 291  
CQ Zone: ITU Zone:  
WPX: W1  
Source: QRZ

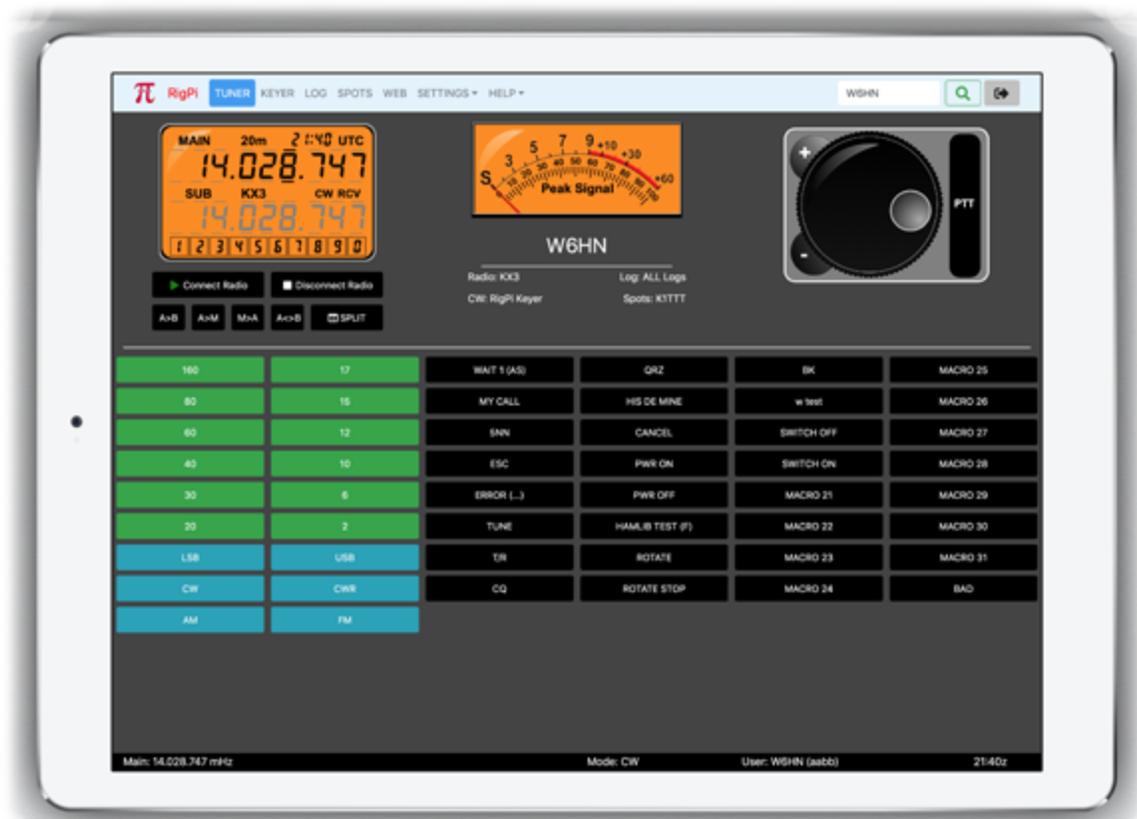


68° Rotate Stop Close

## 1.6 RSS on Mobile Devices

RSS can be used on any mobile device that provides an Internet browser. Here are several samples of how the Tuner window appears on several devices.

### iPad Pro



Single connection to one radio, landscape mode

### iPhone X



One connection to RSS, one radio, Tuner, portrait mode



One connection to RSS, one radio, Tuner, landscape mode

## Nexus 10 (Android)



One connection to RSS, one radio, Tuner, portrait mode

## **Samsung Galaxy (Android)**



One connection to RSS, one radio, Tuner, portrait mode

## 1.7 Passwords

Using custom passwords is critical to the security of your RSS if you intend to connect to and control your station from the Internet. There are a number of passwords used in RSS. Here is a list with the default values and the procedures for changing them.

Name	Username Default	Password Default
RSS Login	admin	blank (none)
VNC	pi	7388
Raspberry Pi Login	pi	7388
PhpMyAdmin	root	7388
VoIP Server password to join server		7388

Name	How to Change	Notes
RSS Login	SETTINGS > Accounts > Edit	Once you enter a password you can change it but not set it to blank. Usernames and passwords can be any combination of upper and lowercase characters but no spaces are allowed.
VNC	VNC > Options > Security	Uses the computer credentials. Use VNC Viewer on a remote computer to connect to the RSS Desktop.

Name	How to Change	Notes
Raspberry Pi Login	Raspberry Pi Configuration > System > Change Password	The Username can't be changed in Raspberry Pi Configuration.
PhpMyAdmin	PhpMyAdmin> User accounts > Change Privileges > Change Password	PhpMyAdmin is used to access and edit RSS databases.
VoIP Server password to join server	From RSS Terminal: <code>sudo nano /etc/mumble-server.ini</code> then look for serverpassword	The Mumble server runs on the Raspberry Pi. You can also use remote Mumble servers. Users logging into the server must be told this password.

## 1.8 Accounts

RSS accommodates multiple user accounts. Each account has a unique user name, controls one radio, but can have the same call as other accounts. Two accounts can control two radios. The maximum number of accounts/radios is limited by the computing resources of RSS. Tests have shown this limit to be 4 or 5 accounts/radios active at one time.

Each account is like a separate logging/control program. Accounts have the following independent functions:

- Log in and Out
- Allow multiple users to access that account
- Personal call sign
- Assigned security level to limit access
- Control a single radio
- Control a single rotor
- Programmable set of macros
- Frequency/mode band memories
- Key CW for that radio
- Maintain a log
- Receive spots from a unique source
- Search call books and display results

### Log In and Out

The user name and password are entered in the Log In window to access an RSS account. (Usernames can be any combination of upper and lower case characters, but no space characters are allowed.) Click the Log Out button in the top right corner of any RSS window to log out. Once logged out you can then log back in to the same account or a different account using the user name and password (if any) for that new account.

When you create an account a password not required. This is useful if you will not be accessing RSS from outside your local network. Once you create a password for an account you can edit but not remove a password through the Account Settings window.

## **Access Level Assignment**

A user with access level 1 (the most permissive) can create new and edit existing accounts and assign a security level, user name and password for all accounts.

A user with access level 2 does not see the Account and System Settings menu items in SETTINGS.

A user with access level of 3 or higher does not see SETTINGS at all.

## **Allow Multiple Users to Access that Account**

By sharing the account user name and password, multiple users can log in and use that account. This is useful if you want to access your account through multiple devices or have multiple RSS windows open at the same time. All users signed in to an account control the same radio, rotor, CW Keyer and call book database. (It is also possible to share a radio from different accounts.)

## **Personal Call Sign**

Each account has an assigned call sign. The call sign is used in CW Keyer macros and Telnet Spot access. An account can have the same or different call sign from that used in other accounts.

## **Control a Single Radio per Account**

One radio can be controlled in each account. If you have more than one radio, set up an equal number of accounts, one for each radio. RSS uses the Hamlib library to provide a wide selection of manufacturers and radio models. A particular radio may not be fully supported by Hamlib even though it is listed. See the Technical Help Topic to learn more about determining what radio features are supported.

Each account and external programs can share an account's radio using a Hamlib radio called NET rigctl. See the Technical Help Topic for information on sharing radios.

## 1.9 Acknowledgements

The RigPi project would not have been possible without the help of many. The following are especially thanked for their help with testing, proof reading and feature suggestions.

- Mike, WB8CXO
- Jim, K8JK
- Tom, W5KUB
- Larry, K0LEJ
- Mike, N6MQL
- Marty, WA1VIN

And from MFJ Enterprises:

- Martin, K5FLU
- Ben, KB5ZO

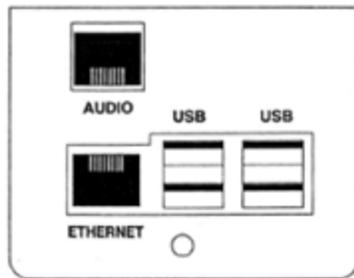
# RSS Connections

## 2 RSS Connections

The Raspberry Pi provides a number of connections. Here is a list:

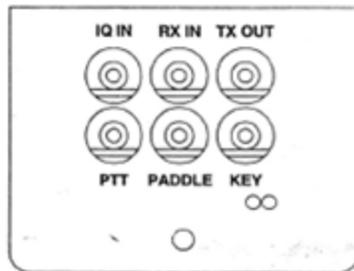
- USB 2.0 (4)
- Gigabit Ethernet
- 802.11ac/n wireless LAN (2.4 and 5 GHz Wi-Fi)
- Bluetooth 4.2 Bluetooth Low Energy (BLE)
- HDMI video/audio
- 3.5 mm audio out
- Micro USB power

The RigPi Audio and RigPi Keyer have their own connections described in the following topics.



AUDIO uses same jumper blocks and cables as MFJ-1204

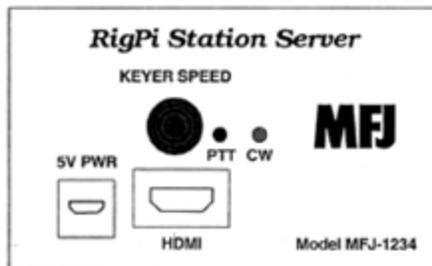
USB USB2 connections on Raspberry Pi3 board  
ETHERNET Raspberry Pi 3 Ethernet connection on board.



3.5mm Jacks

IQ IN Tip left line, ring right line.  
RX IN Tip left line or mic.  
TX OUT Tip left channel out. Ring PTT from Pi3 GPIO.

PTT Tip PTT from Winkeyer chip, ring NC.  
Paddle Tip dot, ring dash.  
KEY Tip key, ring NC.



5V PWR 5V supply line.  
HDMI HDMI video only. Audio disabled.

## 2.1 Radio Control

RSS controls each radio through one of the four USB connectors. If your radio has a classic serial port, a serial-to-USB adapter is required.

If you are using ADMIN as your call you can use the Express Radio Settings window to configure the radio connection. Normally you will use SETTINGS>Radio>Basic or SETTINGS>Radio>Advanced. Advanced settings may be necessary if you have changed any of the default settings on your radio. If not, Basic settings will work best.

In Basic settings, select the Manufacturer, Model and Port from the drop-down menu lists. If the radio USB cable is the only one plugged in, the port will usually be /dev/ttyUSB0. Click Connect Radio.

If the radio doesn't connect, please see the Radio>Advanced topic in the Settings section of this Help.

### Connecting to a Radio through a TCP port

It is possible to connect to a radio through an Internet connection rather than through a USB port. For example, your radio may accept an Ethernet connection for CAT control, or you may be using a serial-to-Ethernet or serial-to-Wi-Fi adapter.

For an Ethernet connection, enter the IP and port in the Port box in Radio Settings. If I had a radio connected to 192.168.1.80, port 4999, I would type the following in the Port box:

192.168.1.80:4999

You must type this information into the box, it does not appear in the drop-down list for Port options. When you save the Radio settings, the IP:Port value is saved.

## 2.2 Rotor Control

### Important

**RigPi uses your location and the location of a remote station to predict the correct bearing. You must enter your location's latitude and longitude in SETTINGS>Accounts>Account Editor for this to work.**

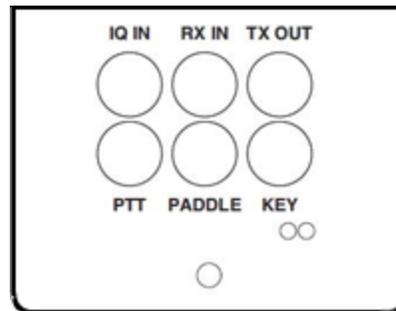
RSS controls each rotor through one of the four USB connectors. If your rotor controller has a classic serial port, a serial-to-USB adapter is required.

Use SETTINGS>Rotor to configure your rotor.

In Rotor settings, select the Manufacturer, Model and Port from the drop-down menu lists. If the rotor USB cable is the only one plugged in, the port will usually be /dev/ttyUSB0. Save the new settings and restart the Radio connection. The Rotor is initialized with the radio at the same time.

## 2.3 RigPi Audio

RigPi Audio can be used with VoIP or digital mode and spectrum analyzer programs. RigPi Audio is connected to RSS through the Raspberry Pi GPIO header, it does not connect via USB. Right-click the Speaker icon on the top right end of the RSS Desktop menu bar to confirm that the RigPi Audio driver, `audioinjector-pi-soundcard`, is listed and selected. See the Alsamixer Help Topic if you need to troubleshoot.



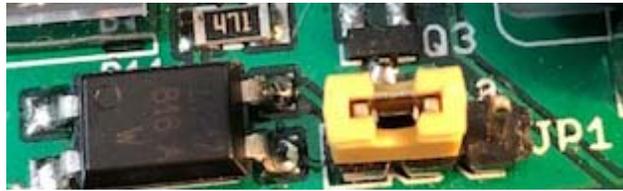
### RX IN

Connect the audio out from your radio to the RX IN 3.5mm jack. The tip and sleeve connections are isolated through a transformer to reduce the possibility of hum.

RX IN can be set up to provide a line or microphone input. The default is line input with a maximum of 2-volts peak-to-peak. To accommodate lower level audio sources, the RX IN input can be switched to a microphone level input. This is done using a program called Alsamixer. See the Alsamixer topic in Other Programs to learn how to use Alsamixer.

### TX OUT

Connect TX OUT to your radio audio input. The tip and sleeve connections are isolated through a transformer to reduce the possibility of hum. The TX OUT ring connection has several purposes. Normally it is used to control the PTT connection on your transmitter. By changing a jumper on the RigPi Audio board you can use it to turn on power to an Elecraft KX-3 radio. As shown below, the jumper JP1 is in the normal PTT position. Connect the jumper between pins 2 and 3 for the KX-3 Power On position.



The easiest way to connect audio to a radio is through a rear-panel accessory (Data) input jack. Most radios that provide this connection also require PTT at that jack to switch audio input from the front-panel microphone jack to the accessory jack. The PTT connection on the ring of the TX OUT connector can be used for this purpose.

### **I/Q IN**

The I/Q input connection provides a way to connect the IQ signal from many radios such as SDR and the Elecraft KX-3 to perform spectral analysis. Similar to "Panadaptors" that were available years ago, an I/Q display shows a graph of signal level vs frequency over a wide bandwidth. The bandwidth in RSS is limited to 96 kHz as determined by the sampling rate of the audio chip used.

The I/Q input uses the left and right stereo inputs to the audio chip. The signals are not transformer isolated. Use Alsamixer to make sure RigPi Audio is in the Line Input mode.

### **RigPi Audio with Mumble VoIP**

Mumble is software that provides 2-way audio between your radio and a remote device, such as a mobile phone. A Mumble server (named Murmur) is installed on RSS and always runs in the background. Mumble clients connect to Murmur for passing audio. One Mumble client is installed on RSS and is normally started when RSS boots. Mumble clients on other devices connect to the same Murmur server where input and output audio is heard by all connected clients.

The Mumble client in RSS connects to your radio. Receive audio is fed to the client input and client output is fed to the radio mic input. The radio audio is provided to and from Mumble through the RigPi Audio board.

### **Setting up RigPi Audio for VoIP**

RigPi Audio can accept audio through a microphone or line input source. If your radio has high output level (no more than 2-volts peak-to-peak) you should use the line input. If your radio audio output is low (no more than 200-mV peak-to-peak), use the microphone input. RSS uses the microphone audio input to start. If you want to use line input, the input selection is made through Alsamixer.

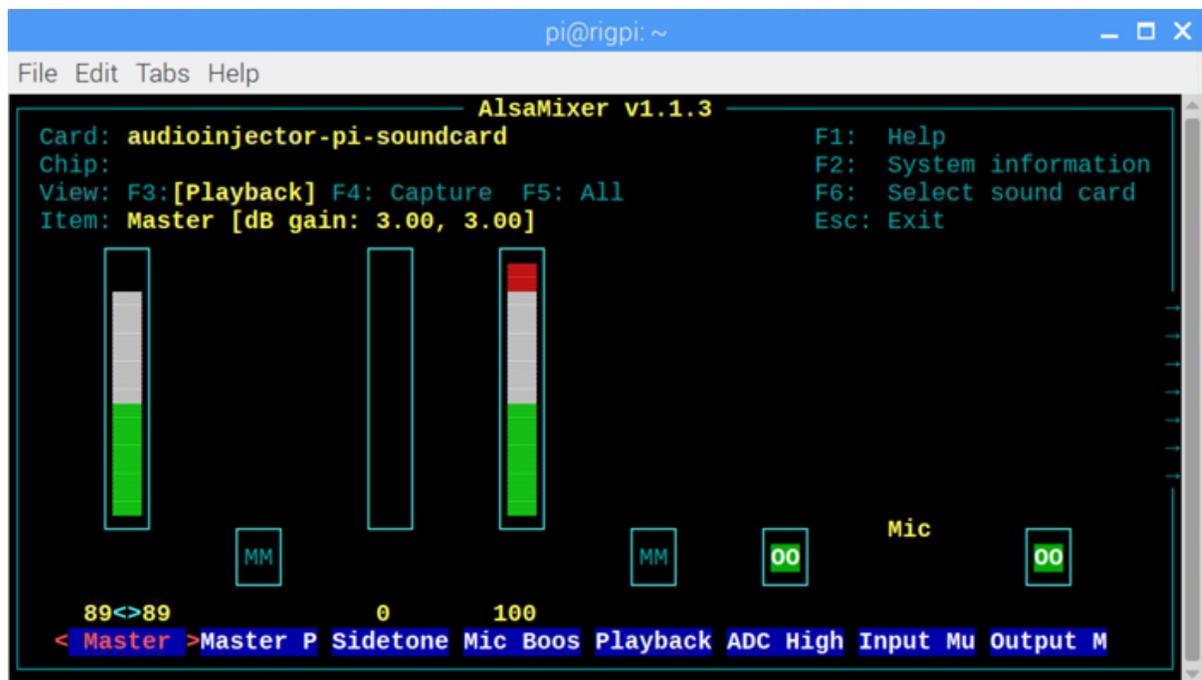
Use the RX IN connector for audio from the radio and TX OUT for audio to the radio. You can also use a cable customized for your radio from MFJ. The custom cable connects to the RJ-45 connector on the USB/Ethernet end of the RSS cabinet. The left channel is used for input and output. These connections are transformer-isolated.

RigPi Audio does not have any onboard adjustments. RigPi Audio levels can be set through Application Menu (1)>Preferences>Audio Device Settings, or through a program called Alsamixer.

In Audio Device Settings, use the Playback and Capture tabs to increase or decrease levels.

Alternatively, start Alsamixer from the Terminal window on RSS Desktop. Open Terminal and type:

```
alsamixer<return>
```



Note the following:

Use left/right arrow keys to move between settings

Playback options (F3)

1. Card: audioinjector-pi-soundcard (RigPi Audio), use F6 to select
2. Master gain set high, use up and down arrow keys to adjust

3. Mic Boost set high, use up and down arrow keys to adjust
4. ADC High Pass On, use M key to toggle
5. Input Mux Mic, use up/down arrow keys to adjust
6. Output Mixer On (OO, use M key to toggle

Capture options (F4)

1. Line [Off, Off], use Spacebar to toggle
2. Mic On, use Spacebar to toggle
3. Mic Boost (high), up/down arrow keys adjust
4. Capture (high), up/down arrow keys adjust

### **Mumble Clients**

On Windows, Macintosh and iOS, use the client named Mumble. The client for Android devices is named Plumble. They all operate in the same way. Start Mumble (or Plumble) and open the Favorite Servers settings. Click the + button to add a new Favorite.

Complete the Description, Address, Port, Username and Password settings. The Address holds the IP for the Murmur server, the Port defaults to 64738, Username can be your call, and password 7388 (unless you have changed it).

### **Radio Quirks**

Most radios provide audio connections that are straightforward. Some radios, notably Kenwood, can provide audio connections through a Data connection on the rear panel.

#### **Kenwood radios with a Data connector**

Since the radio normally expects audio to come through the microphone connector, a switch signal must be provided to the Data connector. The switch signal is normally PTT. This means that you must make three connections if you are using the rear panel Data connector: audio in, audio out, and PTT.

#### **Audio routing determined by menu settings**

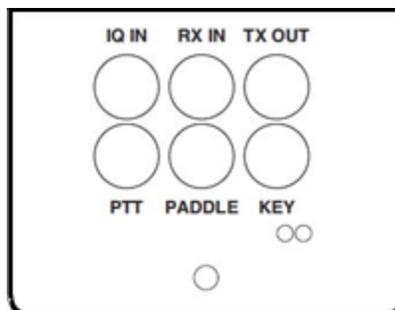
It may be necessary to change menu settings in your radio to provide an audio path through a rear panel connector. Some radios, such as the Yaesu FT-950, only allow transmit audio to pass through the Data connector using the PSK mode.

### **Mumble Settings**

See No RigPi Audio in the Troubleshooting topic.

## 2.4 RigPi Keyer

RigPi Keyer is a versatile Morse code generator based on the popular K1EL WinKeyer3 IC. It connects to the Raspberry Pi through the GPIO header and uses the onboard serial port, ttyS0.



The RigPi Keyer settings are located in `SETTINGS>Keyer`. Morse can be sent by typing on a keyboard, through a custom Macro, or by means of a keying paddle. It is possible to use a straight key as well as a paddle.

The WinKeyer3 IC has an extensive set of programming commands, many of which are used in RigPi. You can also create Macros using these commands for special purposes.

RigPi Keyer has a PTT switching circuit that normally follows PTT commands from RigPi. You can also use the WinKeyer3 PTT circuit independently through commands. Independent control means that you can use the RigPi Keyer PTT for remote control purposes, such as controlling a power switch. See the Technical RigPi Keyer PTT topic of Help to learn more about extended uses of RigPi Keyer PTT.

RigPi Keyer can be used with a paddle or straight key plugged into the PADDLE jack with or without a radio connected. The KEYSPEED control also works when the keyer is not under RigPi control and when using any of the main RigPi windows.

## 2.5 Internet Connections

RSS is designed to operate without Internet access. This feature makes it convenient when taking RSS away from your home for portable or mobile operation. Several non-critical features that do rely on Internet access are listed below:

1. QRZ XML Call look up service (Callbook)
2. Google map (Web)
3. Get FCC Database (System settings)
4. Spots (Spots and Spots settings)
5. LoTW downloads and submissions

Even if you do not have an Internet connection you can use RSS Wi-Fi to connect to other computers. It is easy to set up an ad hoc network so other computers or mobile devices can communicate. Wi-Fi can also be used in lieu of an Ethernet cable to connect to a router.

Here is a link to several messages on Stack Exchange that give instructions for setting up Wi-Fi ad hoc networks on the Raspberry Pi and for making the Raspberry Pi IP static so it doesn't change when you reboot.

[Click to see Static Instructions](#)

## 2.6 Remote Connections

RSS can be accessed from anywhere via the Internet. Access must be made available through RSS settings. All user accounts must be password protected before you allow any access.

Three ports must be opened: one for a browser, a second for VoIP, and a third for VNC viewer.

Browsers, by default, connect to port 80 on a server. This access port must not be blocked by a router or firewall. Your router's advanced settings provides a way to forward connections from the outside to a specific LAN IP and port.

The LAN IP for RSS can be found on the System settings page (SETTINGS>System). It will be an address like 192.168.1.20. The RSS browser port and Mumble port must be able to transverse your router. This is called Port Forwarding.

Many routers provide a way to translate an incoming port to a different port. This translation provides a higher level of security than simply forwarding port 80. Set the External Starting and Ending port to something like 7488. Set the Internal Starting and Ending ports to 80. Your router will now accept an incoming connection on port 7488 and forward it to port 80 on rigpi.local. When away from home you would instruct your browser to connect to port 7488. If your router does not provide port translation, open port 80 instead and you will connect to the default browser port, 80.

The default Mumble port is 64738. This port must be forwarded through your router. You can use the same translation trick as with browser connections, but you must also tell the mumble client which port to use if not the default.

VNC Viewer gives you access to the RSS Desktop from any device. VNC Viewer clients are available for most operating systems and devices. To use VNC Viewer from a remote location you must forward the port used by VNC. The default port for VNC viewer is 5900.

## Configure Your Router's Port Forwarding

The following instructions apply to a Netgear R8500 Router. The steps for your router will be different.

Netgear routers do port forwarding by assigning port numbers to a "service" that is associated with the application you want to run.

To open the ports for RSS:

1. Type the router's address in an Internet browser's address bar. (By default the router's address is 192.168.0.1 or 192.168.1.1). The Setup Wizard appears.
2. Enter the router's username and password.
3. Under Advanced, click Advanced Setup, then Port Forwarding on the left menu bar (varies slightly by Router)  
A Port Forwarding Screen appears
4. Click Add Custom Service. The Custom Services window opens.
5. Enter RSS for the service name.
6. Select TCP/UDP in the Service Type drop-down .
7. Enter 7488 in the External Starting Port box.
8. Enter 7488 in the External Ending Port box.
9. Remove the check for Use the same port range for Internal Port.
10. Enter 80 in Internal Starting Port.
11. Enter 80 in Internal Ending Port.
12. Enter the LAN IP for RSS in the Internal IP address
13. Click Apply
14. To add Port Forwarding for Mumble, click Add Custom Service and follow the same steps.
15. Use Mumble for the name. TCP/UDP for the type and 64638 in the External Port boxes.
16. Enter 64738 in the Internal Port boxes.
17. Enter the LAN IP for RSS in the Internal IP address
18. Click Apply

19. To add remote VNC viewer access to open RSS Desktop, click Add Custom Service and follow the same steps.
20. Use VNC for the name. TCP/UDP for the type and 5900 in the External Port boxes.
21. Enter 5900 in the Internal Port boxes.
22. Enter the LAN IP for RSS in the Internal IP address
23. Click apply
24. Click Logout to exit from router settings

With RSS running, open [canyouseeme.org](http://canyouseeme.org) with your browser and confirm that ports 5900, 7488 and 64638 are open.

To connect to RSS using a browser when away from home, enter the WAN IP (from SETTINGS>System) followed by a colon and 7488:

97.222.46.198:7488

The WAN IP above is fictitious, use your own. Now you can log in and control your radio from anywhere Internet access is available.

To connect Mumble on your remote client, open the Edit window for the rigpi server connection and change the port to 64638.

## Important Port Forwarding Note

Some Internet Service Providers supply a Modem that contains a single-port router. If you use an external router with such a device, port forwarding will not work without extra settings. Here is an article on the web that explains the 2-router problem. If port forwarding doesn't appear to work for you, please read this article.

[Click to Go to PortForwarding.com](http://PortForwarding.com)

Note: Port Forward is an excellent resource for help if you run into trouble with port forwarding. They also sell programs to aid with the process. Most port forwarding issues can be solved without the need for other programs.

## Password Protection

Since RSS is now open to the Internet, add passwords to all accounts before proceeding.

## 2.7 Using a Dynamic DNS Service

Your Internet IP can change from time-to-time, especially if you reboot your Internet modem. If you are away when this happens, you won't be able to access RSS remotely until you know the new WAN IP. One way to solve this problem is to use a dynamic DNS service. One such service is available from

<https://www.dyn.com>.

The Dyn product, Dynamic DNS Pro, costs from \$55/year up to \$220 for 5 years. You can also find free services. With Dynamic DNS you can choose a domain, such as w1aw.dyndns.org. When you connect from a remote location you use this URL. If your Internet IP happens to change, the domain stays the same.

# Views

### 3 Views

A view is a web page viewed through any browser. Each view has common elements, a navigation bar at the top and a status bar at the bottom.

#### Navigation Bar



- Navigate to <https://www.rigpi.net> by clicking the RigPi logo or RigPi name
- TUNER...WEB: opens window
- SETTINGS: contains a list of settings windows, click the down-arrow.
- Search box: enter call to look up in the FCC database or option QRZ XML online service. Press enter or click the magnifying glass to look up
- Exit RigPi

#### Status Bar



- Main frequency (shows red when no radio connected)
- Split frequency (shows when radio is in the split mode)
- Mode
- User, user's call and account username
- UTC Time

### 3.1 Tuner



#### 1: Navigation Bar

- Navigate to <https://www.rigpi.net> by clicking the RigPi logo or RigPi name.
- TUNER...WEB: opens window.
- SETTINGS: contains a list of settings windows, click the down-arrow.
- Search box: enter call to look up in the FCC database or optional QRZ XML online service. Press enter or click the magnifying glass to look up.
- Exit RigPi.

#### 2: Tuning Knob



- Tap/click the detent and rotate knob to tune higher/lower in frequency. The tuning scale is determined by the underlined digit in the frequency readout of the Frequency Panel.
- Tap/click the plus or minus button to move up or down in frequency.
- Tap/Click the PTT button to engage the RSS PTT function, This is momentary, for as long as you press the button.

### 3: Macro Bank

- 32 programmable macro buttons (SETTINGS>Macros). Can be used to send CW, control the radio through Hamlib commands, control the radio through Hamlib "w" commands unique to the selected radio, and system commands (disabled by default).

### 4: Status Bar

- Main frequency (shows red when no radio connected)
- Split frequency (shows when radio is in the split mode)
- Mode
- User, user's call and account username
- UTC Time
- Only Main Frequency is displayed in narrow screens

### 5: Band and Mode

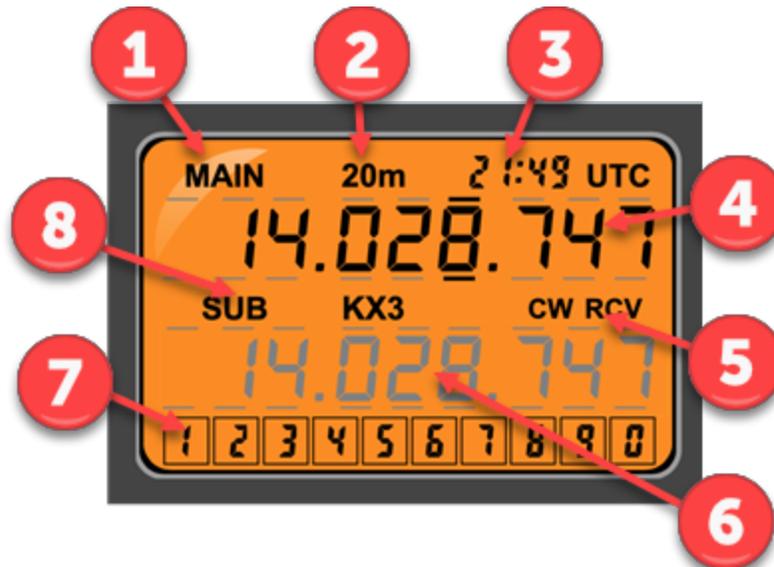
- Tap a Band button to change bands or a Mode button to change modes. Each band has a memory for the frequency and mode last used on that band.

### 6: Radio Connection and VFO



- Connect Radio (Green: connected; Red: not connected; Rotating Arrows: connecting)
- Disconnect Radio
- VFO/Memory operations
- See below for details

## 7: Frequency Panel



When screens are wide enough to display the RSS S-meter, the frequency panel, above, is used.



For narrow screens, where the S-meter is hidden, this format is used.

- Displays the Main and Sub VFO frequencies, band, the current UTC time, operating mode and receive/transmit status.
- A keypad is included to set the frequency of selected digits. See below for all tuning options.

- The Main and Sub frequencies have bars above and below each digit. When a digit is selected the bars above and below the digit are bold. Tap/Click a digit to select it. The selected digit sets the tuning resolution for the Knob and typed digits. Click the lower half of a digit after selection to tune down and the upper half to tune up.
- Change the color theme of the Frequency Panel using Account Settings (SETTINGS>Accounts>Edit). Four options are provided: Orange, Night, LCD, and High Contrast. This setting also affects the S-Meter.

Callout	Use
1	Information for Main VFO
2	Current band
3	Time (GMT)
4	Main frequency
5	Mode and transmit/receive status
6	Sub VFO information
7	Keypad for entering digits
8	Sub label and radio name
9	Tap to open keypad
10	S-meter

## 8: S-Meter

- Shows signal strength when in receive and an option reading when in transmit. There is no way to adjust the calibration of the S-meter. Some radios may not support S-meter and/or optional transmit queries through CAT. The S-meter is not shown on narrow screens. See the Advanced Radio settings (SETTINGS>Radio>Advanced) for more information on the optional transmit readings.
- Change the color theme of the S-meter using Account Settings (SETTINGS>Accounts>Edit). Four options are provided: Orange, Night, LCD, and High Contrast. This setting also affects the Frequency Panel.

## 9: Info Panel

- The Info Panel lists currently selected RSS options, including radio name, selected CW keyer, current log, and spots source. The Info Panel is not shown in narrow screens.

## Radio Connection and VFO Buttons



Button	Function
Connect Radio	Connect the radio for this account. You must set the radio up the first time in SETTINGS>Radio. Green: connected; Red: not connected; Rotating Arrows: connecting
Disconnect Radio	Disconnect the radio for this account.
A>B	Copy the Main frequency to the Sub frequency.
A>M	Copy the Main frequency to the RSS frequency memory. This function does not use the memory in the radio.
M>A	Copy the frequency in the RSS memory to the Main VFO
A<>B	Swap the Main and Sub VFO frequencies.
SPLIT	Turn on split for the radio. The Main VFO is used for receiving and the Sub VFO is used for transmitting. Some Hamlib radios do not support split operation. Others cause readout flicker when reading or setting split frequency. Split polling can be turned off in Radio settings (SETTINGS>Radio>Advanced).

## Frequency Tuning

Tuning options allow you to tune both Main and Sub VFO's in many ways.

Option	Operation	Mobile Device Support
Knob	Rotate to tune up or down. Click a digit to set resolution.	Yes
Knob +	Tune up one step, determine resolution by clicking a digit.	Yes
Knob -	Tune down one step, determine resolution by clicking a digit.	Yes
Click digit	Click digit to select, then click upper half to tune up or lower half to tune down.	Yes
Mouse wheel (or Shift+Mouse wheel)	Rotate to tune up or down, click digit to set resolution.	No
Keyboard >	Move selection to next digit to right.	No
Keyboard <	Move selection to next digit to left.	No
Keyboard ^	Tune selected digit up.	No
Keyboard v	Tune selected digit down.	No
Type frequency	Select starting digit, then type new frequency.	No
Type frequency (2)	Tap/click starting digit, then tap/click numbers in the keypad.	Yes

## Push-to-Talk

Several ways to engage Push-to-Talk (PTT) are provided. PTT uses CAT and solid state switches on the RigPi Keyer and RigPi Audio boards. See SETTINGS>Radio>Advanced for PTT hardware options. See also Keyer settings for alternative ways to use the RigPi Keyer board PTT.

Option	Operation	Mobile Device Support
PTT to right of Knob	Momentary PTT	Yes
T/R Macro button	Toggle PTT	Yes
Spacebar	Momentary PTT	No

### 3.2 Keyer



## 1: Sent CW

- Displays CW already sent to transmitter. Only RigPi Keyer and WinKeyer support this function.
- Clear the sent data by clicking/tapping CLEAR LEFT.

## 2: Typed CW

- CW characters sent to the Transmitter or waiting to be sent. All keyers support this function.
- Clear by click/tap CLEAR RIGHT.

## 3: CW Keyboard special characters

- See below

Button	Function
HOLD	Allow type-ahead without transmitting.
REPEAT	Repeat characters in 'to be sent' panel.
CLEAR LEFT	Clear all text from the left panel.
CLEAR RIGHT	Clear all text from the right panel.
TUNE	Put the RigPi Keyer or WinKeyer in the Tune mode (key down). Use Macro ESC or CANCEL buttons or keyboard ESC key to cancel TUNE.
SPEED +5	Increase the current speed by 5 cps.
AR	Send AR prosign.
SK	Send SK prosign.
KN	Send KN prosign.
BT	Send BT prosign.
@	Send @ sign.

Button	Function
--------	----------

SPEED -5

Decrease the current speed by 5 cps.

### 3.3 Log



#### 1: Navigating

Use the Log navigation bar at the top left of the log under the RSS navigation bar to move from page-to-page. Up to 25 QSOs are shown on each page. Navigate to any page in your log using the drop-down page list.

#### 2: Log Name and Log style

Each log has a name and a style. By using distinct names you can maintain separate logs, such as for contests or different accounts.

The name and style are shown at the center of the Log navigation bar. The number after the style shows the number of contacts for that log.

Each log has its own style appropriate for its use. A log can be designed for any purpose, such as Field Day, a DX contest, or for general use. Use the Log Designer (SETTINGS>Log Designer) to design or modify the fields and field order that appear in each log.

The log style can be changed to a different style from the Style (book icon) button. The Log can be selected from the Log (folder icon) button.

Log styles are created and edited in the Log Designer window. Accounts can share logs and log styles.

### **3: Add a new Contact**

Click the + (plus) button to add a contact to the current Log. The Log Editor window opens where you can add details for the contact and load information from the Callbook Lookup. See the Log Editor topic for details.

### **4: Filtering QSO's**

Click the filter (funnel icon) button to show contacts matching the call in the Callbook lookup box in the top right of the RSS navigation bar. Click the filter button again to show all contacts.

### **5: Export/Import ADIF**

Amateur Data Interchange Format (ADIF) is the data import/export standard for amateur radio logs. It allows logbook data to be easily transferred from one program to another. ADIF is also the basis for submission of logs to the ARRL Logbook of the World (LoTW) and other online logging systems. All downloads compress the ADIF file to the ZIP format. Export transfers the ADIF from RSS to the local downloads folder usually on another computer. Import transfers an ADIF file to RSS.

#### **Export to Downloads Folder**

Download all QSO's in the current log to the Downloads folder. If using RigPi from the RSS Desktop, the Downloads folder is the one for RSS. If connecting to RSS from a remote computer, the Downloads folder for that computer is used.

The file is given a name like rigpi<YOURCALL><Logname>-<n>.zip. For example, a file containing my Mobile log would be named rigpiW6HNMobile.zip (first download) or rigpiW6HNMobile-1.zip (second download).

To download all QSO's from all logs, select the ALL Logs option from the Log list (folder icon).

### **Export Selected Q's**

Download the selected QSO's. To select QSO's the Select column must appear in the Log. The Select column can be added using the Log Designer opened from SETTINGS>Log Designer.

### **Export for LoTW**

Download all QSO's in the current log with a subset of fields appropriate for LoTW.

### **Export Selected Q's for LoTW**

Download selected QSO's in the current log using a subset of fields appropriate for LoTW.

### **Import**

Upload files must not be compressed and have an extension .adi. For example, my upload file might be named W6HN-11-12-2018.adi. RigPi asks you to identify the file you wish to upload. RigPi then proceeds to import the adi file into the currently open logbook.

## **6: Editing an Existing Contact**

Click the Edit button on the left end of a logged contact to open the Log Editor for that contact. See the Log Editor topic for details.

## **7: Delete Contacts**

Click the Delete button on the right end of a QSO line to delete that contact.

### **Entire Log**

In the drop-down menu, deletes all contacts from the currently open log. If ALL Logs is selected, all QSO's are deleted from all logs.

### **Selected Q's**

In the drop-down menu, deletes the selected QSO's from the currently open log. To select QSO's the Select column must appear in the Log. The Select column can be added using the Log Designer opened from SETTINGS>Log Designer.

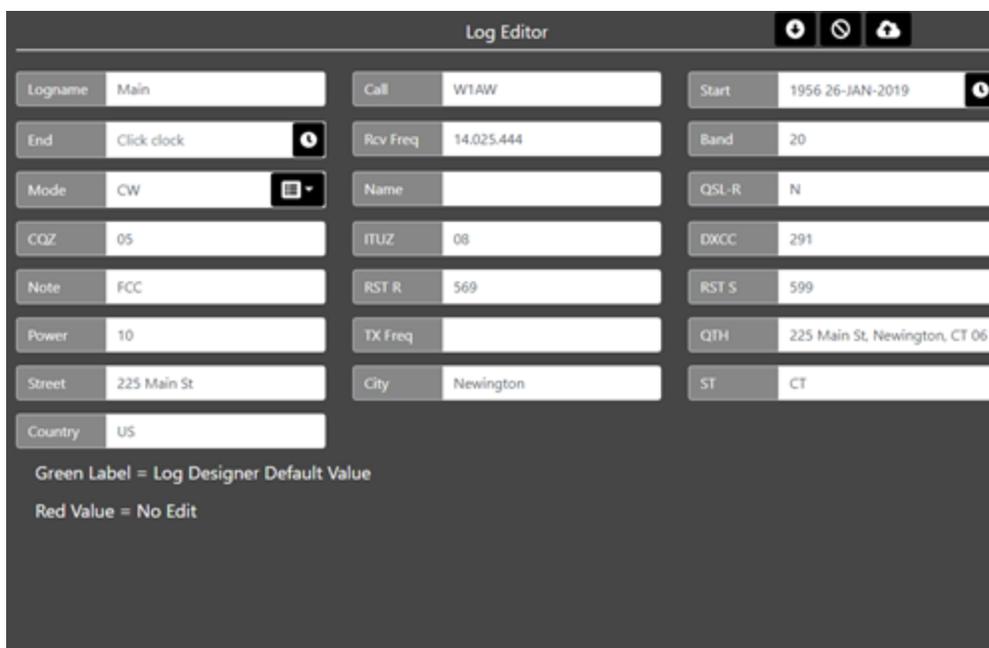
## Sorting Contacts

Click the Up/Down arrowhead in a column header to sort the log by that column. Click again to sort in the opposite direction. To return to date order, click the Start header.

### 3.3.1 Log Editor

Use the Log Editor to add new or edit existing contacts. The Log Editor is opened by clicking an Edit button on the Log window, or by clicking the + button at the top to start a new contact.

The Log Designer (SETTINGS>Log Designer) sets the fields, field order, and label for each edit box. You can also set defaults for each field and select the contents you want to appear in a drop-down list.



The screenshot shows the 'Log Editor' window with the following fields and values:

Logname	Main	Call	W1AW	Start	1956 26-JAN-2019
End	Click clock	Rcv Freq	14,025,444	Band	20
Mode	CW	Name		QSL-R	N
CQZ	05	ITUZ	08	DXCC	291
Note	FCC	RST R	569	RST S	599
Power	10	TX Freq		QTH	225 Main St, Newington, CT 06
Street	225 Main St	City	Newington	ST	CT
Country	US				

Green Label = Log Designer Default Value  
Red Value = No Edit

Fill fields from the callbook for the call in the Call field by clicking the down-arrow at the top. The onboard FCC database is used unless you have enabled the online QRZ XML option.

Cancel any changes by clicking the stop button at the top.

Save the contact by clicking the cloud up-arrow at the top.

Information coming from a default setting in the Log Designer is designated by the label for that field given a green color. If a field has been designated as "no edit," such as a record number, the value is shown in red.

### 3.4 Spots

The screenshot shows the RigPi Spots interface. At the top, there are navigation tabs: RIGPI, TUNER, KEYS, LOG, SPOTS, WEB, SETTINGS, and HELP. The SPOTS tab is active. Below the tabs, there are buttons for 'Connect' and 'Disconnect', and a status indicator 'All Spots: Call Worked this Band'. The main area is a table of spots with columns: DX #, Frequency, From, Time, Note, Entity, DXCC, Sp Cont, and Mode. A band map on the right shows a frequency scale from 14.000 to 14.060 MHz, with a red bar at the bottom and a green bar at the top. A search icon is in the top right corner.

DX #	Frequency	From	Time	Note	Entity	DXCC	Sp Cont	Mode
S19AM	7.097.000	ON1DX	2146		Sweden	284	EU	RTTY
S19AM	7.097.000	ON5OF	2146	in FJON5OF	Sweden	284	EU	RTTY
W1MK	3.573.000	UR0QK	2146	FT8 trx QSO 73!	US	291	EU	CW
R125IL	1.822.000	R7GA	2145	TNX QSO! 73!	European Russia	54	EU	USB
V31DL	18.100.000	JF1KKV	2145	ft8 cq -15 hrd.	Belize	66	AS	CW
E44AAZ	10.136.000	K3DQB	2145		Spain	281	NA	RTTY
PVBAL	14.295.000	N2JF	2145		Brazil	108	NA	USB
WB2KHO	14.205.000	EA7JWF	2144		US	291	EU	USB
HK4GSO	14.074.000	PD0LK	2144	-07 TNX MAURICIO FT8 QSO 73 Le	Colombia	116	EU	RTTY
YV50IE	10.136.000	SQ2HL	2143	ft8 trx	Venezuela	148	EU	RTTY
E5KV	14.022.000	KG7V	2143		Spain	281	NA	CW
R125IL	1.822.000	IZ4DYU	2143		European Russia	54	EU	USB
YL2GB	3.796.000	UT9EU	2143	cq dx	Latvia	145	EU	LSB
SQ9BZN	10.137.100	EA5WO	2143	FT8	Poland	269	EU	RTTY
CU3EM	3.573.000	UR0QK	2143	FT8 trx QSO 73!	Azores	149	EU	CW
PVBAL	14.295.000	KX1X	2143		Brazil	108	NA	USB
VE1CHW	7.163.200	SM6DDQ	2142	Corr. callign. Sri.	Canada	1	EU	LSB

The RigPi spots shows DX spots provided by one of a large number of DX Cluster Telnet sites. The site you wish to use is selected in SETTINGS>Spots. See the Settings Spots window topic for details. Click a spot to tune instantly to the frequency and operating mode reported for that spot.

A band map centered on the Tuner frequency shows all nearby spots. Click a spot to tune to the reported frequency and mode for that spot.

#### 1: Spot Source

- RigPi is connected to this Telnet spot source.

#### 2: Connect/Disconnect

- Connect to specified Telnet site, or disconnect.

### 3: Spot Filter and Spot Color

- Spots are filtered by the Band and Mode options selected in the Filter (funnel icon) drop-down list.
- Spots are colored depending on the color rule selected in the Color (paintbrush icon) drop-down list.

### 4: Color Rule

- Spots are colored depending on the color rule selected in the Color (paintbrush icon) drop-down list.
- Call fields are colored by call rules.
- Entity fields are colored by entity rules.

Color	Rule
None	No color used
Teal	Call worked before (logged)
Green	Call confirmed
Orange	Call worked before on this band (logged)
Red	Call confirmed on this band
Teal	Entity worked before (logged)
Green	Entity confirmed
Orange	Entity worked before on this band (logged)
Red	Entity confirmed on this band

### 5: Spot Filter

- Spots are filter based on Band and Mode by selections in this drop-down list.

Filter	Rule
Band	All Spots: all spots (no band filter)
Band	Follow Me: spots on same band as Tuner
Band	HF: HF spots
Band	Low Bands: low band spots
Band	High Bands: high band spots
Band	WARC: spots on WARC bands
Band	VHF/UHF: UHF/VHF spots
Band	160
Band	80
Band	60
Band	40
Band	30
Band	20
Band	17
Band	15
Band	12
Band	10
Band	6
Band	2
Mode	Show All: all spots (no mode filter)

Filter	Rule
Mode	Follow Me: spots using same mode as Tuner
Mode	Only CW: only CW spots
Mode	Only Phone: only phone spots
Mode	Only Digital: only digital spots

## 6: Frequency

- Current operating frequency

## 7: Band Map

- Spots near operating frequency

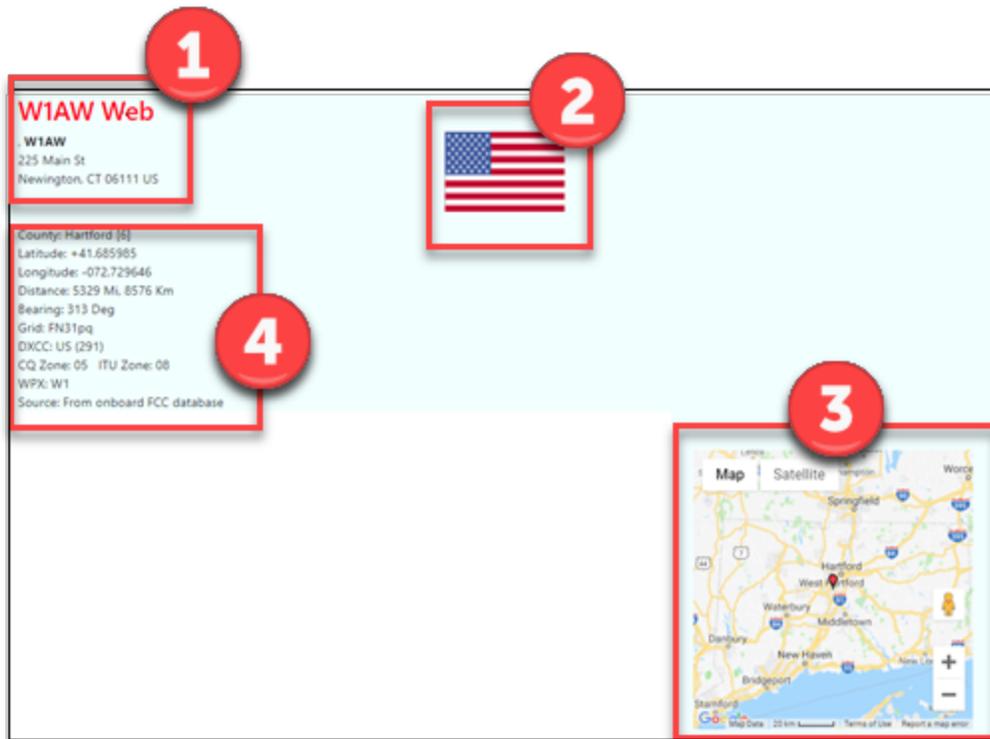
## 8: Spots

- Click spot to tune to spot frequency and mode.

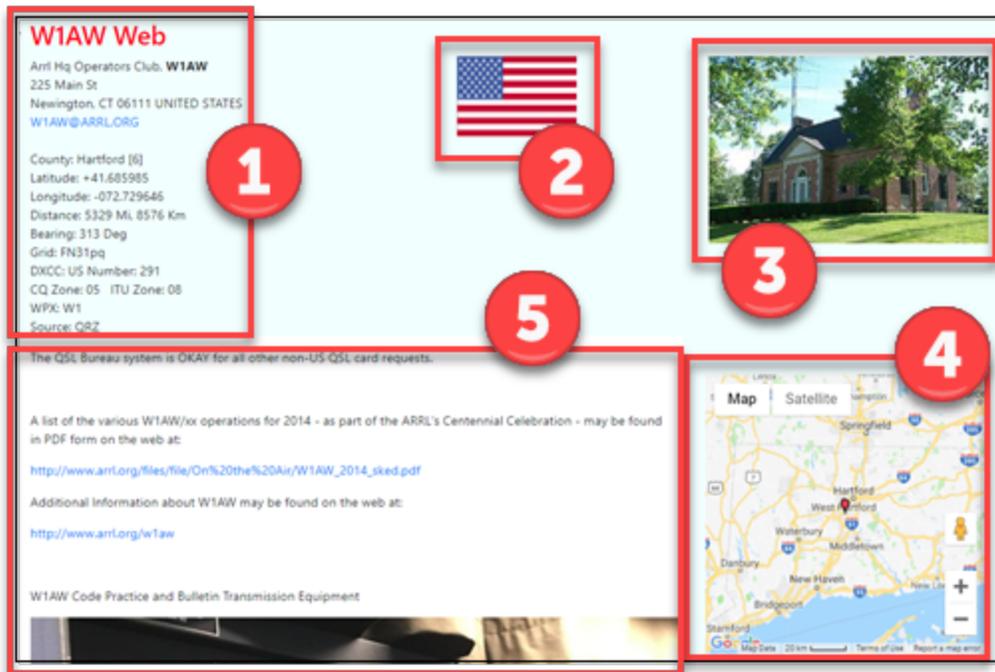
## 9: Spot List

- Spots from current DX Cluster Telnet site.
- Sort the list by clicking the header, again to show the opposite order.
- With the mouse pointer over a spot box the Filter, number of minutes since spotter, and spotter are displayed in a tool tip.

3.5 Web



Web page for W1AW obtained from FCC data



Web page for W1AW obtained from QRZ XML data

Callbook data for the Web page is obtained from the FCC database installed on RSS (US calls), entity databases installed on RSS (US and other calls), or QRZ data obtained through the QRZ.com XML subscription service. When the QRZ service is used, more information is included, especially for non-US calls. This extra information can be additional station details, the primary photo, and biographical text (which can also include additional photographs).

## **FCC Data**

The FCC amateur radio database is provided with RSS. An update function is provided in System settings (SETTINGS>System) that can be used periodically to update the data.

### **1: Contact Information**

### **2: Entity Flag**

### **3: Google Map**

- Centered on approximate coordinates
- Zip code is used for US calls.
- Country center is used for non-US calls.

### **4: Additional Info**

- RSS Entity databases provide this information.

## **QRZ Data**

QRZ data is available on QRZ.com through a subscription service. More information on their subscription plans can be found on the QRZ.com site. RSS requires a QRZ username and QRZ password to utilize this service.

### **1: Contact Information**

### **2: Entity Flag**

### **3: Primary Photo**

- This photo is the image shown when you look up a call on QRZ.

#### **4: Google Map**

- The map is centered on coordinates from the QRZ database.

#### **5: Biographical Info**

- The text is taken from the Biography in the QRZ database for this call.
- The text may include images and animated gifs.

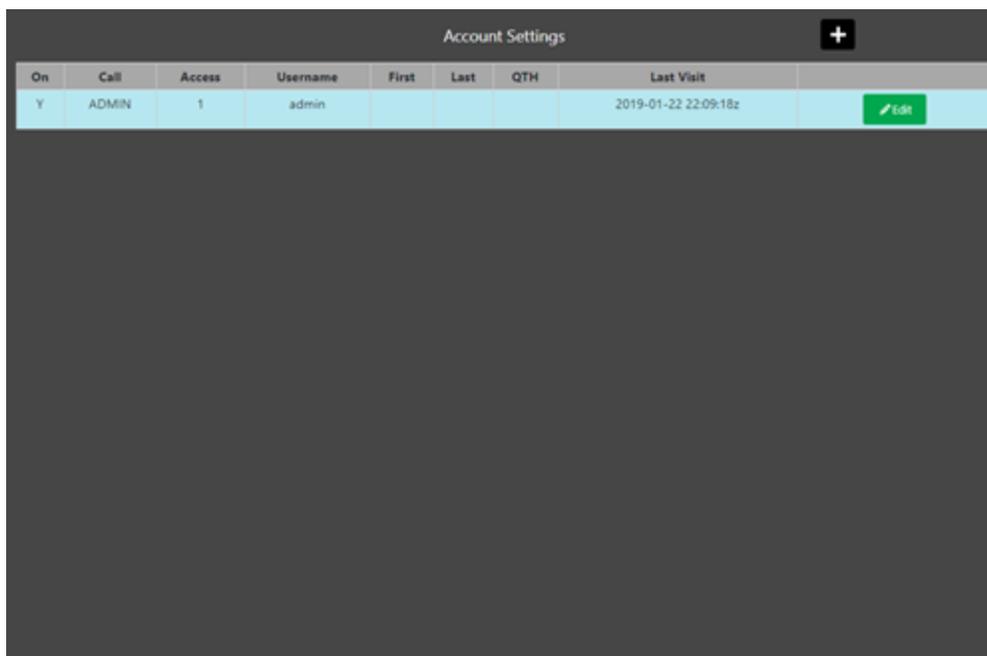
This page is intentionally left blank.  
Remove this text from the manual  
template if you want it completely blank.

# Settings

## 4 Settings

RSS is customized using settings windows. The settings, except for System, are unique for each account.

### 4.1 Account



On	Call	Access	Username	First	Last	QTH	Last Visit	
Y	ADMIN	1	admin				2019-01-22 22:09:18z	<a href="#">Edit</a>

All accounts having access to RSS are listed in the Account settings list (SETTINGS>Accounts). The list shows whether or not the account is connected, the access security level for that account plus more. Account Settings is only available for Access level 1 accounts.

#### Editing User Accounts

Edit any user account by clicking the green Edit button at the right end of each list line.

#### Deleting User Accounts

The primary account, ADMIN at first, can't be deleted. Accounts added after the primary account can be deleted by clicking the red Delete button at the right end of each row in the Account list.

#### Creating new User Accounts

In the Account Settings window, click Add (plus button at top) to add a new account. Use the guidelines above to complete the form. Once the account is saved the Login window appears so you can test the new account or return to another account.

See the table below for information about each column in the Account Settings list.

Function	Name	Note
User connected	On	Y if that user is connected, otherwise N
Callsign	Call	Call for the account user
Access Security	Access	1-10, 1 = Admin account with full privileges, 2 or higher = Guest account with no access to settings
Account Username	Username	Username for that account
First name	First	First name for user
Last name	Last	Last name for user
User location	QTH	Location of user
Last time on	Last Visit	Date and time the account last accessed

#### 4.1.1 Account Editor

The Account Settings window shows a list of all RSS accounts. When you start RSS the first time, a single account named admin with callsign ADMIN is the only account in the User list. Open the Account window from the SETTING Menu.

### Personalizing the ADMIN Account

The screenshot shows the 'Account Editor (User: Admin)' interface. At the top, there's a navigation bar with 'RigPi' logo and menu items: TUNER, KEVER, LOG, SPOTS, WEB, SETTINGS, HELP. A search bar contains 'W1AW'. The main form is divided into several sections:

- Access:** 1
- Call:** ADMIN
- Username:** admin
- RigPi PWD:** Enter new password
- Deadman:** 10
- Theme:** Orange
- Personal Information:**
  - First: First name
  - Last: Last name
  - Street: Owner's street name and number
  - City: Owner's city name
  - County: Owner's county name
  - State: Owner's state name
  - Country: Owner's country name
  - ZIP: Owner's ZIP code
  - Cont: Owner's continent name
  - Email: Owner's email address
  - Phone: Owner's phone number
  - Grid Sq: Owner's Maidenhead grid
  - Latitude: Owner's latitude
  - Longitude: Owner's longitude
  - M Lat: Owner's mobile latitude
  - M Lon: Owner's mobile longitude
  - M Grid: Owner's mobile Maidenhead grid
- Sync WSJTX Log** (checkbox)
- Sync Fldigi Log** (checkbox)
- Callbook:**
  - QRZ User: QRZ username for XML access
  - QRZ PWD: QRZ password for XML access

The status bar at the bottom shows 'No Radio' (red), 'User: ADMIN (Admin)', and '18:48z'.

The ADMIN account cannot be deleted, but it can be reassigned. You must edit the ADMIN account to make it your own. Click the green Edit button on the right end of the ADMIN line to open the Account Editor. Three fields are critical and should be changed: Call, Username, and password.

**Call** Enter your callsign, replacing ADMIN. Your own call must be entered to connect to spot clusters.

**Username** Use any Username you wish. Usernames must be unique and are used to identify accounts. The Username is case insensitive and there are no length restrictions except it must be at least one character.

**RigPi PWD** Passwords are optional. If you will be opening RSS to the Internet to operate remote, a password is essential. The password for ADMIN is blank so you can easily sign in the first time. Once you enter a password you will be required to use that password from then on.

Other optional special fields:

**Access** ADMIN has an access level of 1. All RSS settings can be accessed through an account when the Access is set to 1 for that account. If

the Access is set to 2, that account does not have access to Account or System settings. Access 3 blocks all settings. A guest account can be set up with an Access value greater than 1.

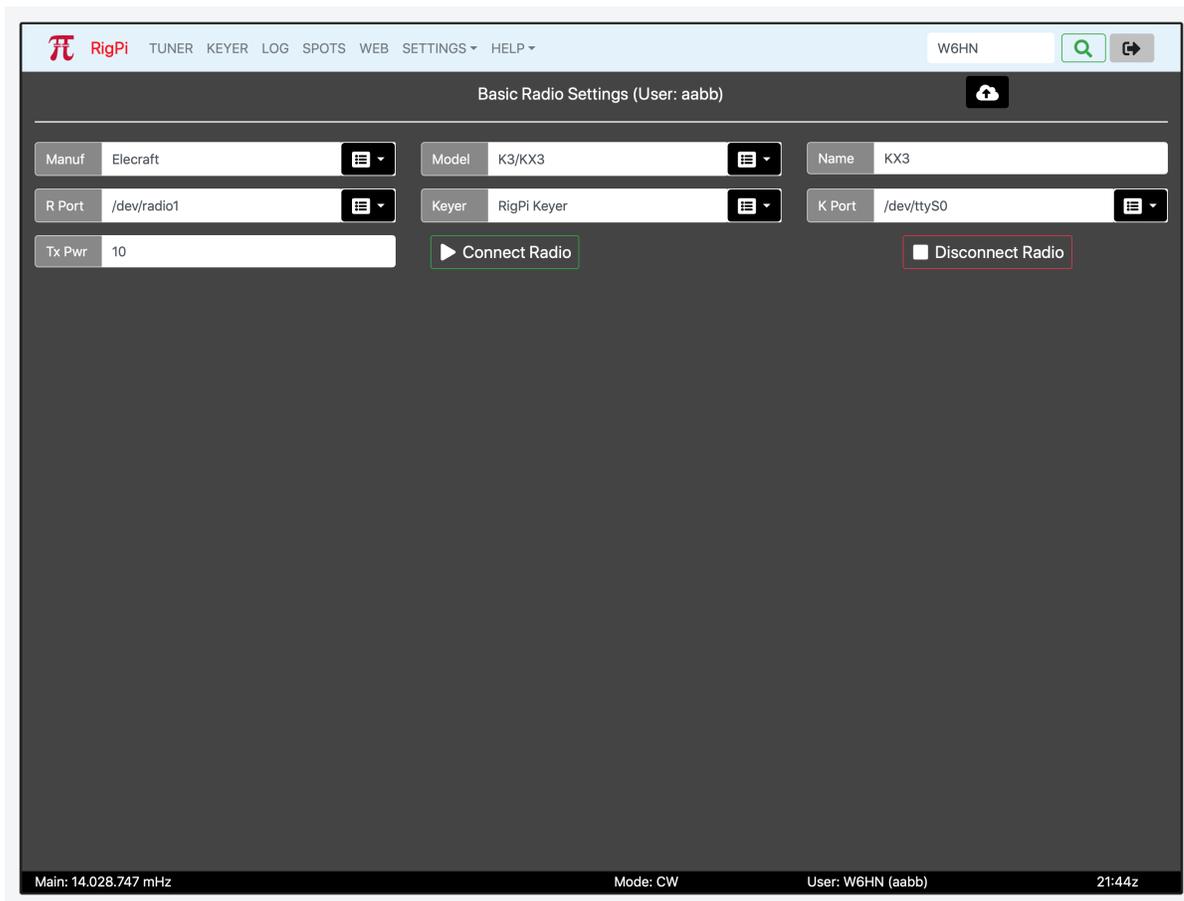
<b>Latitude/Longitude</b>	Callsign lookup uses your latitude and longitude to compute the distance to a DX station. Longitudes west of 0 are negative numbers. Latitudes south of the Equator are negative numbers.
<b>Sync WSJT-X Log</b>	Contacts logged in WSJT-X are automatically transferred to the selected log for this account. See the WSJT-X Help topic for details.
<b>Sync Fldigi Log</b>	Contacts logged in Fldigi are automatically transferred to the selected log for this account. See the Fldigi Help topic for details.
<b>Deadman</b>	Limits transmit time to the number of minutes entered in the text box. This prevents unwanted transmitting if remote control is lost while in transmit. Set Deadman to 0 to override this function. If transmit is blocked, reconnect the radio to reset the Deadman timer.
<b>Theme</b>	Select the Theme for the Tuner window. Four themes are provided: Orange, Night, LCD, and High Contrast.
<b>QRZ User</b>	If you wish to use the QRZ XML subscription service to look up calls, you must enter your QRZ username and QRZ password. QRZ XML is a subscription service. If you do not have a QRZ account, RSS uses the FCC database in RSS to look up info for US call signs, and an RSS entity database to find information about non-US call signs.
<b>QRZ Password</b>	Password for QRZ XML service.

The remainder of the Account fields are self-explanatory and are optional.

Click the cancel (Stop icon) to ignore any changes you have made. Click save (cloud up-arrow button) to save the changes.

## 4.2 Basic Radio

Two Radio Settings options are provided in the RigPi SETTINGS Menu. Basic Radio settings take advantage of the Hamlib default settings for each radio. If you have made changes to the radio default Baud rate, stop bits, or RTS/DTR settings in your setup, use Advanced Radio settings. Advanced Radio settings also provide additional troubleshooting aids.



Most settings options use a drop-down list of options. Click the down arrow on the right end of an option that uses a list from which to choose. Click the option you wish to set and that option appears in the settings box.

To save changes, click the cloud up arrow at the top of the window. Use Disconnect Radio followed by Connect Radio to apply changes. Connect Radio also saves changes before applying them.

Function	Label	Notes
Radio Manufacturer	Manuf	Select the company that manufactured your radio. A special "Hamlib" manufacturer can be used for special purposes, see the Technical>Sharing Radios, Rotors and Keyers topic.
Radio Model	Radio	Once you have selected a Manufacturer, the Model list shows all supported models from that manufacturer.

Function	Label	Notes
Radio Name	Name	Enter the name you want to use for this radio. This radio name appears in the Tuner window, in many alert dialogs, and in your log. The Model name is added to the Name box automatically, but you can change it. For example, the model K3/KX3 appears in the Elecraft list. You can change the Radio Name to KX3, K3 or K3s, depending on your actual radio.
Radio Port	R Port	The Port drop-down list shows all active ports connected to serial devices through a USB port. If you have a single radio connected to RigPi, there will be one entry in the list. With more than one radio or serial device, pull the radio USB connector out, refresh the page, and see what port is missing. Rebooting RSS can cause the port numbers to change. See the USB ID item in the Other Programs Topic to see how to assign a name to the connection that does not change after a reboot.
CW Keyer	Keyer	Select RigPi Keyer, via CAT, WinKeyer, or None from the drop-down list. RigPi Keyer is available for one account. Other accounts can choose one of the other options. The WinKeyer option is used for a standalone K1EL WinKeyer connected through a USB port. See the Keyer Settings topic for more information about RigPi Keyer and WinKeyer.
K Port	CW Port	RigPi Keyer uses /dev/ttyS0 for control. Via CAT does not require a separate port, it uses the radio port. WinKeyer requires a separate USB port. See Radio Port, above, for using the USB ID utility to name USB cables to prevent them from being changed with a reboot.
Transmitter Power	TX Pwr	The default power level used by your transmitter. This value is used in logging.
Connect Radio	Connect Radio	Connect the defined radio and keyer to RigPi. The Connect Radio button also saves any changes you have made in settings.

Function	Label	Notes
Disconnect Radio	Disconnect Radio	Disconnects the defined radio and keyer.

### 4.3 Advanced Radio

Two Radio Settings options are provided in the RigPi SETTINGS Menu. Basic Radio settings take advantage of Hamlib default settings for each radio. If you have made changes to the radio default Baud rate, stop bits, or RTS/DTR settings in your setup, use Advanced Radio settings. Advanced Radio settings also provide additional troubleshooting aids.

The screenshot displays the 'Advanced Radio Settings (User: aabb)' web interface. At the top, there is a navigation bar with 'RigPi' and menu items: TUNER, KEYER, LOG, SPOTS, WEB, SETTINGS, and HELP. A search bar contains 'W6HN'. The main settings area is organized into a grid of fields, each with a dropdown arrow on the right:

- Manuf: Elecraft
- Radio: K3/KX3
- Name: KX3
- R Port: /dev/radio1
- Baud: default
- Stop: default
- R DTR: default
- R RTS: default
- CI-V: default
- PTT: None
- Tr Mtr: Output Power Default
- Mtr Cal: 6

Below the grid are two tabs: 'Serial Defaults' (selected) and 'Radio Capabilities'. A 'Disable Split Polling' checkbox is also present. At the bottom of the settings area are three buttons: 'Connect Radio', 'Test Radio', and 'Disconnect Radio'. The status bar at the very bottom shows: 'Main: 14.028.747 MHz', 'Mode: CW', 'User: W6HN (aabb)', and '21:45z'.

Most settings options use a drop-down list of options. Click the down arrow on the right end of an option that uses a list from which to choose. Click the option you wish to set and that option appears in the settings box.

To save changes, click the cloud up arrow at the top of the window. Use Disconnect Radio followed by Connect Radio to apply changes. Connect Radio also saves changes before applying them.

Function	Label	Notes
Radio Manufacturer	Manuf	Select the company that manufactured your radio. A special "Hamlib" manufacturer can be used for special purposes, see the Technical>Sharing Radios, Rotors and Keyers topic.
Radio Model	Radio	Once you have selected a Manufacturer, the Model list shows all supported models from that manufacturer.
Radio Name	Name	Enter the name you want to use for this radio. This radio name appears in the Tuner window, in many alert dialogs, and in your log. The Model name is added to the Name box automatically, but you can change it. For example, the model K3/KX3 appears in the Elecraft list. You can change the Radio Name to KX3, K3 or K3s, depending on your actual radio.
Radio Port	R Port	The Port drop-down list shows all active ports connected to serial devices through a USB port. If you have a single radio connected to RigPi, there will be one entry in the list. With more than one radio or serial device, pull the radio USB connector out, refresh the page, and see what port is missing. Rebooting RSS can cause the port numbers to change. See the USB ID item in the Other Programs Topic to see how to assign a name to the connection that does not change after a reboot.
Radio Port Baud Rate	Baud	The Baud rate for the selected radio. Hamlib defaults to the highest Baud rate permitted by the radio. You can change the radio Baud rate in the radio menu. Leave the RSS Baud rate set to default if you are using the fastest Baud rate possible in the radio.
Radio Port Stop Bits	Stop	The stop bits for the selected radio. Leave this set to default if you have not changed the stop bits from the factory settings.

Function	Label	Notes
Radio Port DTR	R DTR	Determines the DTR state of the radio port. The options are: default, high, and low. To use the Hamlib default for the radio, select default.
Radio Port RTS	R RTS	Determines the RTS state of the radio port. The options are: default, high, and low. To use the Hamlib default for the radio, select default.
Icom CI-V number	CI-V	Icom radios are identified by a hexadecimal number unique to each radio. To use the Hamlib CI-V default number, enter default. Do not include a hex identifier such as 0x or H. This value only changes if you modify it from the radio menu.
Hardware PTT	PTT	Determines how the PTT circuits respond. The options are: None, ON when transmitting (default), and ON when radio connected. This option controls both Audio PTT and Keyer PTT outputs. See the Keyer Settings topic for more control over Keyer PTT operation.
Transmit Meter	TX Mtr	Select the parameter you want displayed by the Tuner S-Meter when in transmit. The options include Output Power Default, SWR, ALC, Mic Gain, and Meter. The readings supported by Hamlib with your radio can be found in the capabilities list shown when you click Radio Capabilities. Look in the Get Level list. None, one, or all options may be supported. Hamlib does not support real time power output reporting. Output Power Default shows the static setting for maximum power output set in your radio. See Mtr Cal, below, for calibrating the meter.
Meter Calibration	Mtr Cal	The value reported by the radio for the reading you have chosen can be calibrated with this option. If your transmitter has a maximum power output of 100 watts, you have selected Output Power Default, setting the Mtr Cal to 100 gives a full scale indication of 100. If you have set the maximum power output to 50 watts, setting Mtr Cal to 500 gives a reading of 10 on the meter. See below.

Function	Label	Notes
Serial Defaults	Serial Defaults	Click to show the defaults used in Hamlib for connecting to the radio.
Radio Capabilities	Radio Capabilities	Provides a list of all set and read capabilities for the selected radio.
Disable Split Polling	Disable Split Polling	Some radios, such as Icom, do not provide a way to directly read the split VFO frequency. Instead, the frequency is read by swapping VFO's. This causes flickering on the split frequency readout. While the flickering doesn't cause changes in frequency, it can be disconcerting. Put a check in the Disable Split Polling option to prevent the reading of the split frequency VFO to stop the flickering. Keep in mind that any manual changes to the split frequency made on the radio are not known by RigPi. Split reading for some radios is not supported by Hamlib even though the radio provides a means of doing so. Use Radio Capabilities to determine if your radio fits into this category.
CW Keyer	Keyer	Select RigPi Keyer, via CAT, WinKeyer, or None from the drop-down list. RigPi Keyer is available for one account. Other accounts can choose one of the other options. The WinKeyer option is used for a standalone K1EL WinKeyer connected through a USB port. See the Keyer Settings topic for more information about RigPi Keyer and WinKeyer.
CW Port	K Port	RigPi Keyer uses /dev/ttyS0 for control. Via CAT does not require a separate port, it uses the radio port. See Radio Port, above, for using the USB ID utility to name USB cables to prevent them from being changed with a reboot. The CW Port parameters are not adjustable. The WinKeyer3 IC and WinKeyer devices use 1200 Baud with one stop bit.
Transmitter Power	TX Pwr	The default power level used by your transmitter. This value is used in logging.

Function	Label	Notes
Connect Radio	Connect Radio	Connect the defined radio and keyer to RigPi. The Connect Radio button also saves any changes you have made in settings.
Test Radio	Test Radio	Attempts to connect to the radio using the settings values and creates a report that is displayed. The report can give helpful information when the radio isn't connecting. To share the report, select all the text, copy, then paste it to a destination, such as an email.
Disconnect Radio	Disconnect Radio	Disconnects the radio

#### Tr Mtr Example

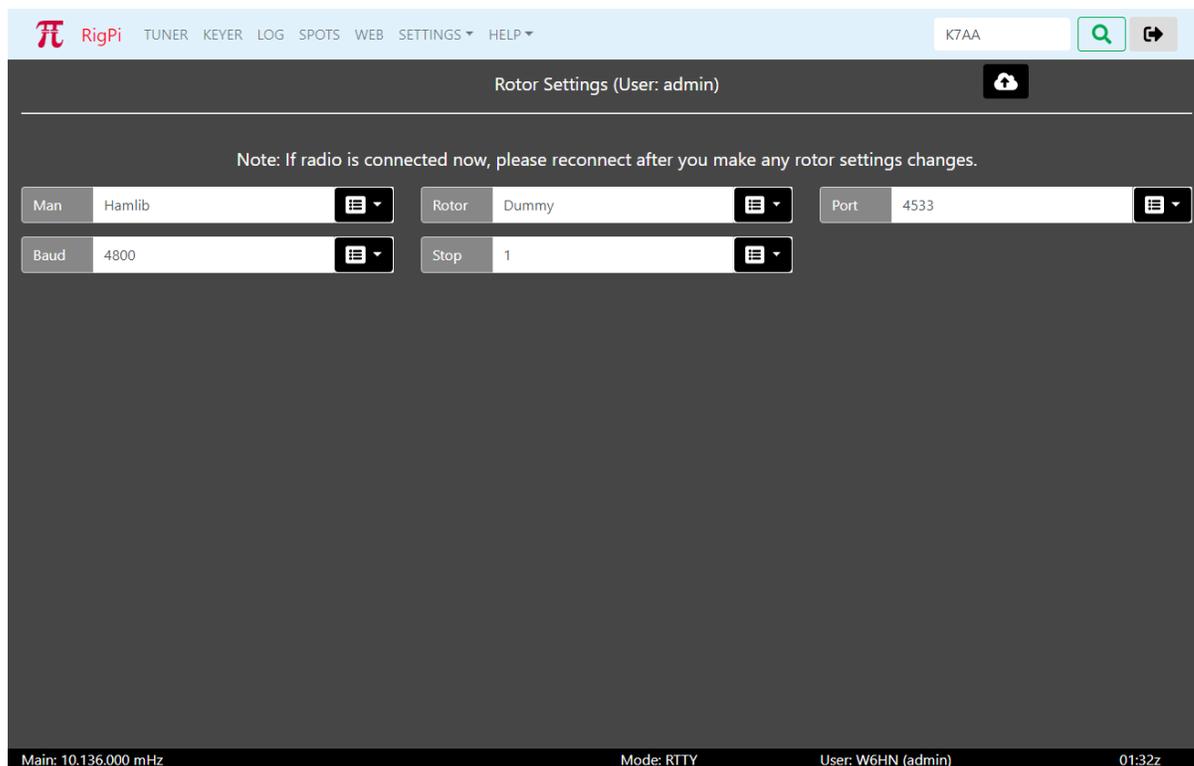
Here is a list of the readings are supported by Hamlib for the TS-570S. This list is extracted from the Radio Capabilities button in Radio>Advanced.

```
PREAMP(0..0/0) ATT(0..0/0) AF(0..0/0) RF(0..0/0) SQL(0..0/0) RFPOWER(0..0/0)
MICGAIN(0..0/0) KEYSPE(0..0/0) AGC(0..0/0) SLOPE_LOW(0..0/0) SLOPE_HIGH(0..0/0)
STRENGTH(0..0/0)
```

The only two readings that appear to apply to the TS-570S in transmit are RFPOWER and MICGAIN. The best option is the "Output Power Default" selection in Radio>Advanced>Tr Mtr which is RFPOWER in the list above. That is a static reading, it reads the max level the radio is set to, not what is being transmitted. The Mtr Cal sets the max level calibration of the meter. So if you enter 200 for Mtr Cal and you have your transmitter set to 100 watts max, the bottom digit scale on the meter should be 50 when in transmit.

## 4.4 Rotor

One rotor can be assigned to and controlled through each account. 30 Rotor models are supported by Hamlib from 21 manufacturers. The screen shot shows the rotor configured for the Hamlib Dummy rotor which provides a rotor simulation.



Most settings options use a drop-down list of options. Click the down arrow on the right end of an option that uses a list from which to choose. Click the option you wish to set and that option appears in the settings box.

To save changes, click the cloud up arrow at the top of the window. If you make changes to Rotor Settings while a radio is running, restart the radio in the Tuner, Radio Basic or Radio Advanced windows.

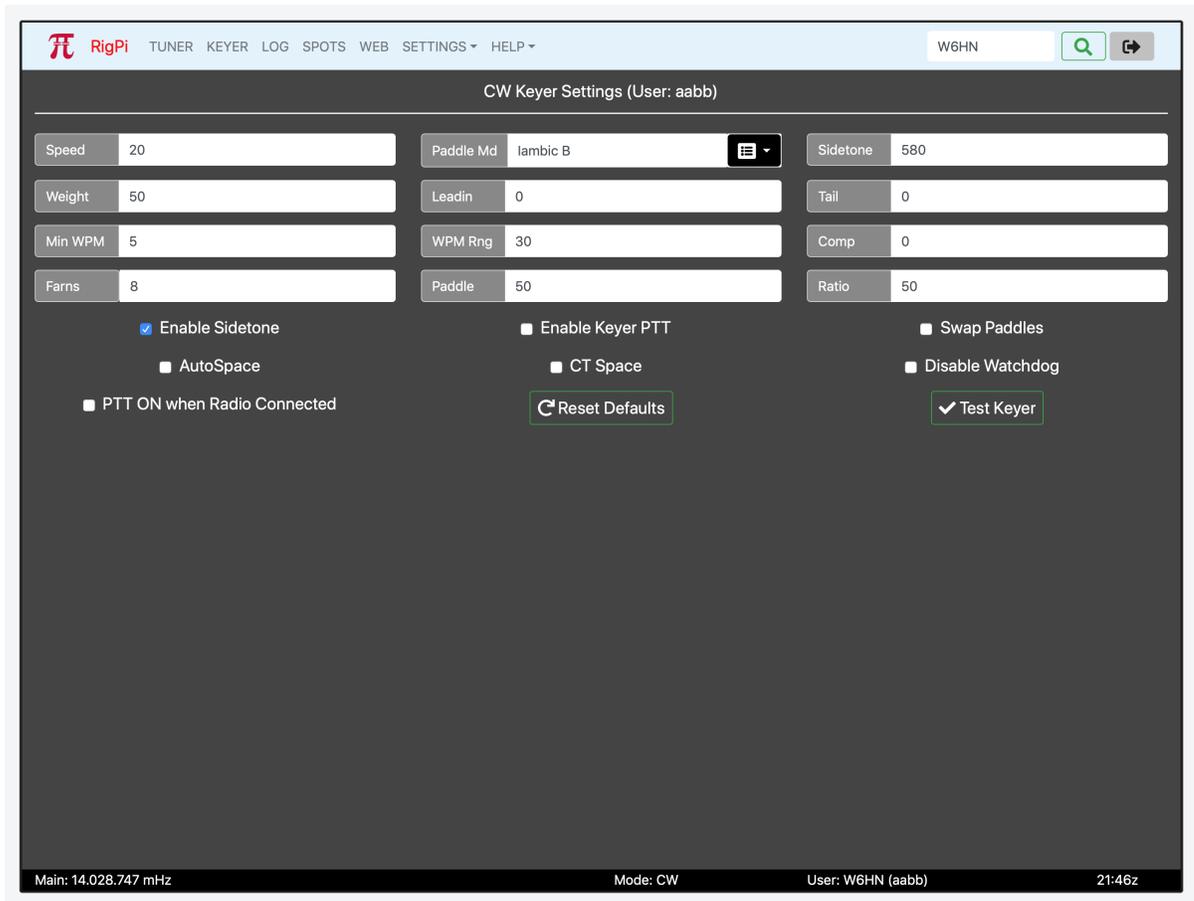
Function	Label	Notes
Rotor Manufacturer	Manuf	Select the company that manufactured your rotor. A special "Hamlib" manufacturer can be used for special purposes, see the Technical>Sharing Radios, Rotors and Keyers topic.
Rotor Model	Rotor	Once you have selected a Manufacturer, the Model list shows all supported models from that manufacturer.
Rotor Port	Port	The Port drop-down list shows all active ports connected to serial devices through a USB port. If you have a single radio connected to RigPi, there will be one entry in the list

Function	Label	Notes
		plus the rotor. With more than one serial device, pull the rotor USB connector out, refresh the page, and see what port is missing.
		Rebooting RSS can cause the port numbers to change. See the USB ID item in the Other Programs Topic to see how to assign a name to the connection that does not change after a reboot.
		For the Hamlib Dummy rotor use the value for Rigctl Port in System Settings plus 1. For example, to use Hamlib Dummy, set the Man to Hamlib, the Rotor to Dummy, and the Port to 4533.
		To share a rotor, use the Rigctl Port for that radio plus 1. For example, to share a rotor assigned to radio port 4534, use port 4535 for the rotor, and Net rotctl for the Rotor.
Rotor Baud	Baud	Baud rate for the serial connection to the rotor.
Stop Bits	Stop	Number of Stop bits used by the rotor serial connection.

## 4.5 Keyer

The CW Keyer Settings window is used for the RigPi Keyer, or external K1EL WinKeyer. These settings do not affect keying via CAT except for Speed. Once you have entered new settings you can test the keyer by clicking the Test Keyer button.

The RigPi Keyer can be assigned to one account. Additional accounts can use keying via CAT or WinKeyer. There are no limits to the use of the via CAT option or to the number of external WinKeyers.



Most settings options use a drop-down list of options. Click the down arrow on the right end of an option that uses a list from which to choose. Click the option you wish to set and that option appears in the settings box.

## RigPi Keyer and WinKeyer options

The Notes below are adapted from K1EL's WinKeyer3 IC data sheet.

[Click to see WinKeyer Data Sheet](#)

Function	Label	Notes
Keyer Speed (WPM)	Speed	
Paddle Keying Mode	Paddle Md	RigPi Keyer supports iambic A, B, Ultimatic, and Bug keying modes. In iambic mode, RigPi Keyer sends dits and dahs automatically based on which

Function	Label	Notes
		paddle you press. In bug mode RigPi Keyer sends the dits and you manually send the dahs. You also can use bug mode to operate in straight key mode or if you want to key through RigPi Keyer with a different keyer, simply set bug mode and use the dah input to key RigPi Keyer.
Keyer Sidetone (Hz)	Sidetone	The sidetone frequency is continuously adjustable between 500 and 4000Hz
Keyer Weight	Weight	A value of 50 selects no weighting adjustment. Values less than 50 reduce weighting and values greater than 50 increase weighting. Note that weighting does not affect sending speed because any increase in keyed time is subtracted from spacing time. Reduction in weighting results in a thinner sounding keying while increased weighting results in a heavier sound. Since weighting tracks speed, a given weighting will sound the same at all speeds.
Keyer PTT Lead-In Time	Leadin	RigPi Keyer provides a transmitter PTT output for each key output that can be used to switch a transmitter or linear amplifier over to transmit mode in advance of actual CW keying. You have control over the time delay between when PTT is asserted and when CW keying starts, this is lead-in. You also have control over how long the transmitter will stay in transmit after keying has stopped. The Tail setting determines the delay used for CW sent by an internal message or CW sent by RigPi.
Keyer PTT Tail Time	Tail	See Keyer PTT Lead-IN Time, above
Speed Pot minimum WPM	Min WPM	Min WPM and WPM Range set the limits for the speed pot. Min WPM sets the lowest value returned; WPM Range indirectly specifies the maximum value returned. For example if Min WPM=10 and WPM Range=15, the full pot swing

Function	Label	Notes
		values, min to max, would be 10 to 25 WPM. Note that the max value is Min WPM+WPM Range.
Speed Pot WPM range	WPM Rng	See Min WPM, above
Keyer Keying Compensation	Comp	Keying Compensation allows a fixed amount to be added to the length of all dits and dahs. QSK keying on modern transceivers can cause shortening of dit and dah elements which is especially noticeable at high speeds. RigPi Keyer can compensate for the shortening by adding a uniform length to each dit and dah element. The adjustments are made in one-millisecond steps and the maximum adjustment allowed is 250 m Secs. Key compensation is very similar to Weighting in that an adjustment added to a dit or dah is then subtracted from the spacing between them so the overall speed is not changed. The difference between weighting and compensation is that compensation is independent of speed, so if 10 m sec of key compensation is selected, 10 m sec will be always be added regardless of speed. Be aware that at high speeds, large values of key compensation can reduce inter-element space to zero.
Slow CW Farnsworth maximum speed	Farns	Farnsworth spacing is useful for CW practice because it encourages you to learn characters by sound not individual dits and dahs. When Farnsworth is enabled, letters are sent at a fixed rate of nn WPM while spacing between characters is determined by the sending WPM rate. When the WPM rate is set above the Farnsworth WPM, Farnsworth is automatically disabled.

Function	Label	Notes
Paddle timing	Paddle	This setting controls when RigPi Keyer will start looking for a new paddle press after sensing the current one. If there is not enough delay, the keyer could send unwanted dits or dahs. If there is too much delay, the operator is held back because they can't paddle ahead. The default value is one dit time (50) and is adjustable in percent of a dit time. Faster operators report a setting somewhat less than default is optimal. If the paddle sensitivity is set to zero, dit and dah paddle memory is disabled.
Dot/Dash ratio	Ratio	Modifies the ratio of dit time to dah time. Standard ratio is 1:3 (dit:dah) when ratio = 50. The formula to determine dah/dit ratio is: $DAH/DIT = 3 * (ratio/50)$ . A value of 50 selects 1:3, a value of 33 would select 1:2, and a value of 66 would select 1:4. This causes an intentional distortion of the Morse waveform. Some ops use this option to make their CW sound less "machine like" but a little goes a long way!
Turn sidetone on/off	Enable Sidetone	Enable the RigPi Keyer sidetone for paddle and RigPi keying.
Keyer PTT mode	Enable Keyer PTT	Keyer PTT is turned on when the WinKeyer IC sends CW. To re purpose the WinKeyer IC PTT so it can set PTT independently (through programmable Macros), remove the Enable Keyer PTT check.
Left/right paddle swap	Swap Paddles	Reverse the dit/dah paddle control. Useful for left handed operation.
Keyer sending autospace	AutoSpace	Autospace works in the following way: If you pause for more than one dit time between a dit or

Function	Label	Notes
		dah, RigPi Keyer will interpret this as a letter-space and will not send the next dit or dah until the full letter-space time has been met. The normal letter-space is 3 dit spaces. RigPi Keyer has a paddle event memory so that you can enter dits or dahs during the inter-letter space and RigPi Keyer will send them as they were entered. With a little practice, autospace will help you to send near perfect Morse.
Contest spacing	CT Space	Shortens the time between characters by one dit space.
Control Keyer Watchdog	Disable Watchdog	RigPi Keyer has a paddle watchdog counter that disables the key output after 128 consecutive dits or dahs. RigPi Keyer assumes that this is an unintended condition and keying outputs are turned off. Sidetone remains on to alert the user. Paddle watchdog is on by default but it can be turned off by setting this mode bit.
Use PTT for other applications	PTT ON when Radio Connected	Forces PTT to turn on when a radio is connected and under control. This is useful for antenna bypass switches and similar applications. See below.
Reset Defaults	Reset Defaults	Restores the original RigPi Keyer default values.
Test Keyer	Test Keyer	Sends two 'V' characters.

## Keyer PTT

RSS has "Normal PTT" and "Keyer PTT." Normal PTT is what you expect when you tap PTT on the Tuner window, push-to-talk. Keyer PTT can be used for other purposes.

Normal PTT from the Tuner PTT or macro switches does two things. It sends the CAT PTT command to the radio and simultaneously controls the hardware switches on the Keyer and

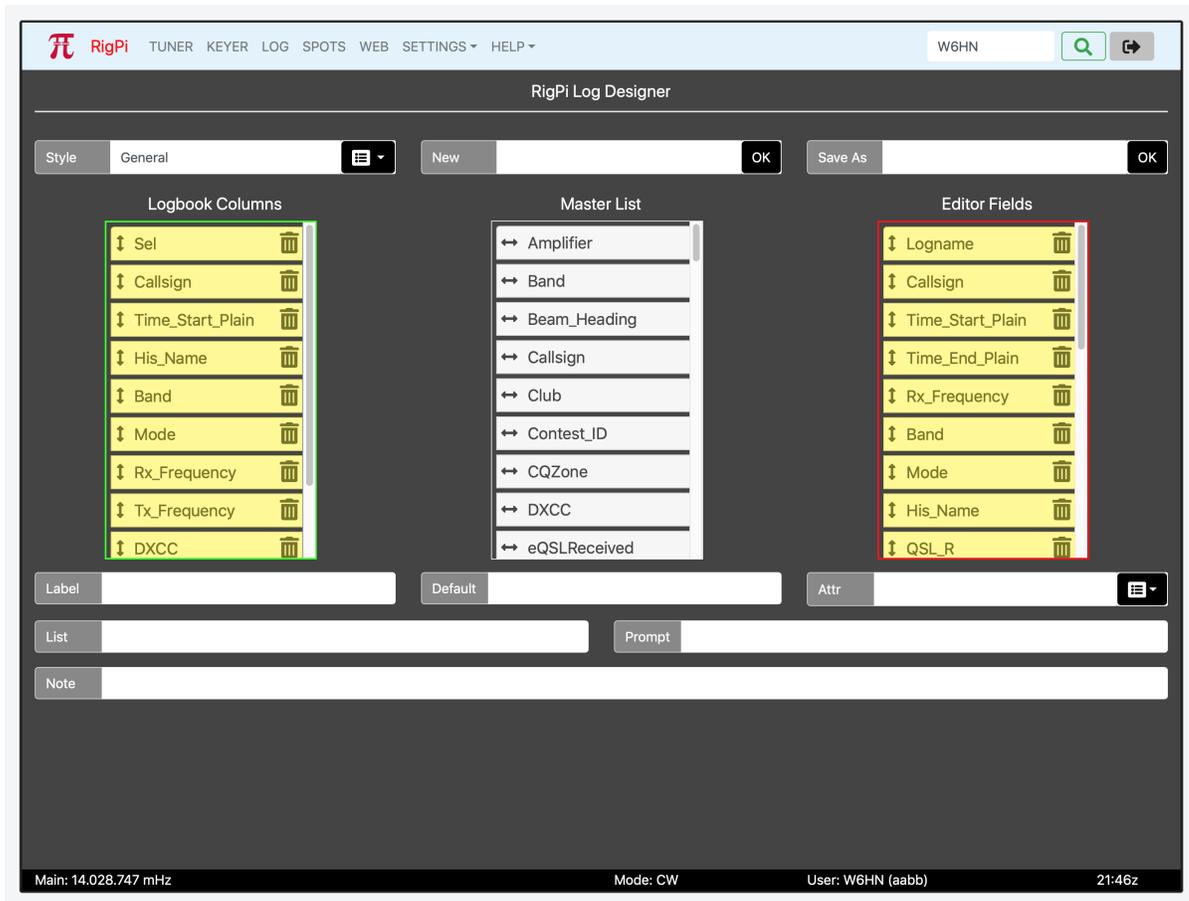
Audio boards. The Keyer PTT switch goes from tip to sleeve (grounded) on the Keyer PTT connector while on the Audio board it goes from ring to sleeve (not grounded).

There is an alternate way to control Keyer PTT on the Keyer board. This alternate PTT is controlled by the K1EL WinKeyer3 IC. When PTT is "enabled" in Keyer settings, this PTT operates whenever there is outgoing CW. You can set the lead-in delay and tail delay to take care of amplifier switching. When PTT is "disabled" in Keyer settings, you can control the WinKeyer3 IC PTT through software. This latter control can be used by a macro and by the "PTT when radio connected" option in Keyer settings.

Keyer PTT and RigPi PTT always engage the PTT on the Keyer board. Since RSS doesn't know when the CW Keyer is sending CW, the "PTT enabled" Keyer PTT is the only way to control the radio or amplifier if switching is necessary. If that switching isn't necessary, "disabled" Keyer PTT can be used for other purposes.

## 4.6 Log Designer

The Log Designer provides a drag-and-drop way to modify existing log styles, or to design new ones. A log style is assigned to each log, but you can change the assigned style by making a selection through a drop-down list in the RSS Log window.



The top three boxes include one to select a style you wish to edit, a second to start a new style, and a third to save a style with a different name.

The three lists include a master list of log fields (white, center), fields assigned to the current style for the log (yellow, left) and finally a list to show the fields assigned to the log editor (yellow, right). Items in the yellow lists can be dragged up or down to change their order, or removed from that list by deleting. Items in the master list can be dragged and inserted into either yellow list.

The fields at the bottom are for labeling and setting defaults for the selected field.

Function	Label	Notes
----------	-------	-------

Field Label	Label	Appears in the column headers for the Log, and at the left end of the field for the Log Editor.
-------------	-------	---

Function	Label	Notes
Optional default for the selected field	Default	Add a default for this field. The default is always added to the field where it can be edited.
Field attribute	Attr	The Field Attribute determines how the field is used. See below.
List of options for drop-down lists	List	Determines a default list for a list field, such as for Mode. See below.
Field prompt	Prompt	Appears in each field as a place holder unless there is a default.
Field notes	Note	Description of the field

## Field Attribute

Each field is assigned an attribute depending on how the list is used.

Attribute	How it appears	Note
None	Field has label and text box	No attributes assigned to this field.
Set Time	Field has clock icon on the right, click to set the current time	Click the clock icon to enter the current time into the field. The time may be edited.
Drop-Down List	Drop-down list, click list icon on left	Contents of drop-down list. Use the List field to enter a comma-delimited list. For example, CW,PHONE,DIGITAL for modes. If a Drop-down list is not defined for modes, all modes will be in the list.

Attribute	How it appears	Note
No Edit	Field is disabled	Do not allow editing of this field. Used for record numbers or for any field that should not be changed.
Caps	Field converted to capital letters	Use for callsign fields or any field that should be in upper case.
Add periods	Adds two periods to frequencies	10 meter CW example: 28.027.123

## 4.7 Spots

The Spots function connects to a Telnet spot cluster using your callsign. Enter your callsign in `SETTINGS>Accounts>Account Editor`.

Spot Settings list contains an extensive list of known DX Cluster Telnet sites. Click a site to use it as a source for spots in the Spots window. Retain Time is the number of minutes before spots are deleted from the Spots window list.

If you wish to use a site close to your location, the Spot Site Filter (Funnel) has selections for All Clusters, Closest to Me, and My US State. Closest to me uses the Grid Square value entered for the current account in Account Settings. The US two-letter abbreviation is also taken from Account Settings.

Spot Settings (User: aabb)

Retain Time: 10 Minutes

Connect Disconnect

Current node: K1TTT Spot Clusters

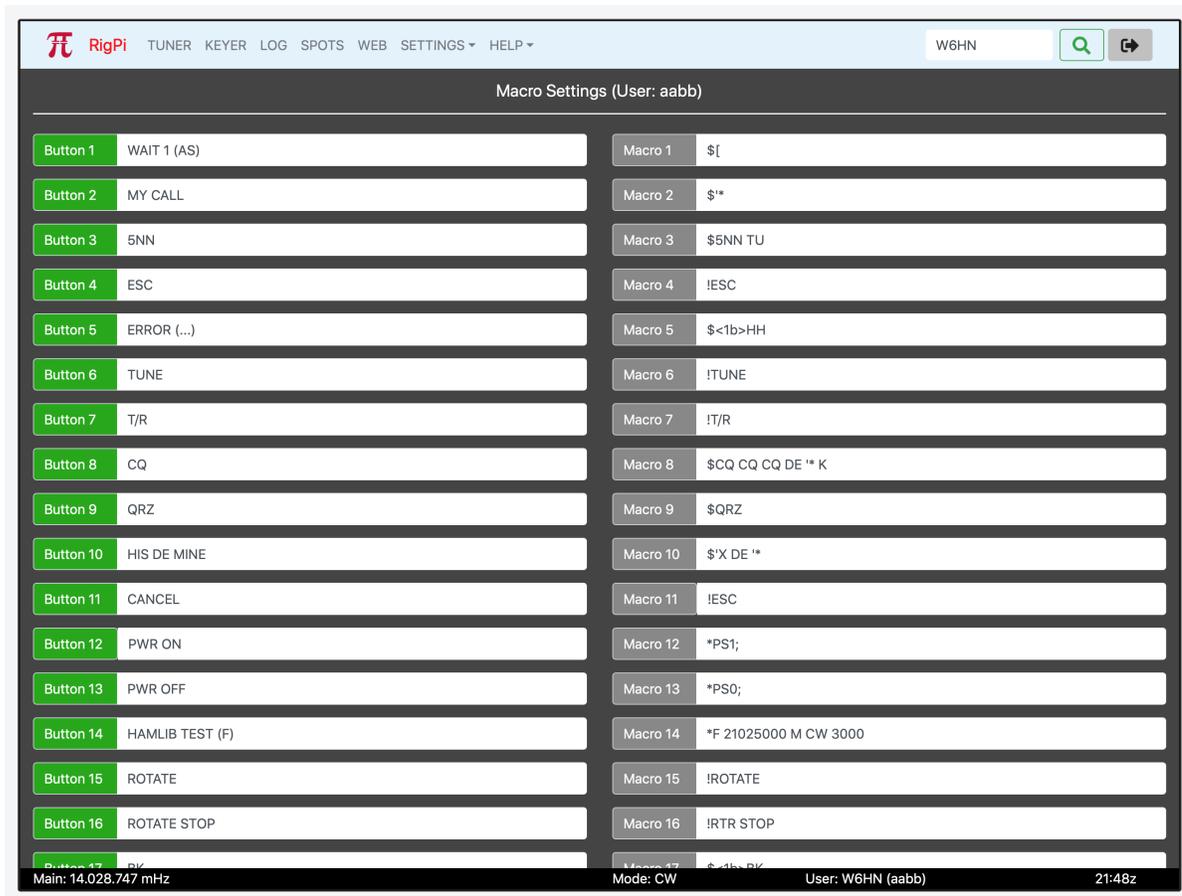
Node	IP	Port	Location	Notes
4Z5LZ-2	cqplanet.com	7300	Modiin	Home Page DX Spider ver. 1.55
9A0CSI	dx.ham.hr	7300	Sibenik	DX Spider ver. 1.51
9A0DXC	9a0dxc.hamradio.hr	8000	Zagreb	Node information DX Spider ver. 1.55
9A0DXV	9a0dxv.hamradio.hr	8000	Varazdinske Toplice	DX Spider ver. 1.55
9H1LO-1	dx.9h1lo.net	7300	Sliema	Home Page DX Spider ver. 1.55
9K2HN	62.150.41.82	8000	Kuwait City	AR-Cluster ver. 4.4.14
9M2PJU-1	9m2pju.hamradio.my	7300	Kuala Lumpur, West Malaysia	Hamradio.my DX Spider ver. 1.55
BA4RF	lowband.club	7300		DX Spider ver. 1.55
BD5RV	dx.jsdxc.net	7300	Nanjing	Jiangsu DX Club DX Spider ver. 1.55
BG2RVL-9	dx.5iyou.cn	7300	Dalian, Liaoning	DX Spider ver. 1.55
BH1SCW-3	3.207.69.56	7300	Beijing, China	Home Page DX Spider ver. 1.55
CE4UYP-5	146.83.196.31	9000	Chillan	Radioclub Los Heroes Chillan DxNet ver. 5.4.3.2
XQ8FGC-10	xq8fgc.cx2sa.net	9000	Punta Arenas, Magallanes	DxNet ver. 5.4.3.2
CS0RCL-7	cs0rcl.hopto.org	9000	Olhao, Algarve	Radioamador Clube de Loule DxNet ver. 5.4.3.2
CS5SEL-5	hamradio.isel.ipl.pt	41112	Lisboa	NRISSEL - Instituto Superior de Engenharia de Lisboa (IPL) DX Spider ver. 1.55
CS6ARC-10	cluster.no-ip.org	7300	Coimbra	DX Spider ver. 1.54
CT1ENQ-5	ct1enq.myvnc.com	35000	Guimaraes	AR-Cluster ver. 4.4.26
CS3MAD	cs3mad.dyndns.org	7300	Funchal	Madeira Island Radio Club DX Spider ver. 1.52
CX2SA-6	cx2sa.net	9000	Salto, Salto	Home Page DxNet ver. ver. 5.4.3.2
DB0ERF-5	www.db0erf.de	41113	Erfurt	DX Spider ver. 1.55
DB0FHN-6	db0fhn.efi.fh-	730	Nuernberg	Home Page DX Spider ver. 1.55

Main: 14.028.747 mHz Mode: CW User: W6HN (aabb) 21:47z

## Notes:

1. Spot clusters are not shown that 1) do not list a port number or 2) include a reference to CW Skimmer spots.
2. Filter "Closest to me" uses the first two characters of the Grid Sq entered in Account settings for the current account.
3. Filter "My US State" uses the 2-character state entered in Account settings for the current account.

## 4.8 Macros



RSS provides 32 programmable macro keys. The keys are available in the Tuner and CW Keyer windows. Each macro has a space to enter a button caption and a command. The total length of all macros is 2000 characters per account. Macros can be used in a number of ways:

- CW messages
- Hamlib Commands
- Direct radio commands
- Special commands

### CW Messages

CW Messages start with a \$ character. The message can consist of ASCII printable characters, special control characters, or a combination of both. RigPi Keyer and External WinKeyer share the same control characters. The control characters are defined in the WinKeyer3 data sheet.

[Click to see WinKeyer Data](#)

For example, one WinKeyer3 control character, 1bH, is used to combine consecutive characters to create a prosign. The prosign BK is formed by the CW command \$<1b>BK. This is a combined ASCII printable and control character CW message.

A printable ASCII message might be \$5NN TU for the signal report plus "Thank You."

Special CW keying characters that can be used in a RigPi Keyer or WinKeyer3 macro (prefaced by \$):

Character	Result
'*	Your call sign (apostrophe + asterisk)
'X	DX call
<1b>AR	AR
<1b>AA	AA
<1b>BK	BK
<1b>BT	BT
<1b>CL	CL
<1b>KN	KN
<1b>SK	SK
<1b>AS	AS

Character	Result
!ESC	Stops a CW message that is being transmitted or stops the tune mode
!TUNE	Key down (use ESC or CANCEL macro to stop)

## Hamlib Commands

RSS uses the Hamlib library to control radios and rotors. The library is documented online on the Hamlib developer's web site.

[Click to see Hamlib commands](#)

The rigctlid utility is used for radio commands while the rotctlid is used for rotor commands. Preface rigctlid and rotctlid command with \* (asterisk). For example, to create a macro to set the main VFO frequency to 14.222.220 MHz, use the macro \*F 14222220. Note the space between the F and 1. Many commands return a value from the radio. For example, the macro \*f returns the current main frequency from the radio. Return values are shown in a modal alert box. If an invalid command is used in a macro and error message is displayed.

## Direct Radio Commands

A special Hamlib rigctlid command, w, is used to send commands to radios when there is no rigctlid native command. For example, to set the squelch on an Elecraft KX3 to 50, use the command \*0w SQ050. The w command is prefaced by an asterisk and the number 0 or 1. Some radio commands elicit a response, others don't. Use 0 for commands for which the radio doesn't respond and 1 if a response is expected. The command shown in the Macro screen shot sets the frequency of a Kenwood or Elecraft radio to 15 meters. \*0w FA00021025000; Commands that return values from the radio show the resulting data in a modal dialog box. For example, \*1w FA; returns the current main frequency from Kenwood and Elecraft radios. If an invalid command is used in a w custom command an error message is shown.

Some radios, such as Icom and many Yaesu radios, require the use of hex numbers in w commands. Use the notation \0xNN (NN=a valid hex number) for these radios. Return values will also be hex numbers and may not display in a meaningful way.

## System Commands

System command macros are disabled by default since they can be a serious security risk. If you aren't careful, you can issue commands that will damage important RSS files. If you wish to experiment, uncomment the exec line in programs/systemExec.php. Be careful! **Do NOT enable this function if your RSS is accessible from the Internet.**

Preface system commands with #. For example, to program a macro to reboot RSS, use the command #sudo reboot.

## Combining Commands

Several custom macros can be used in a single macro. This includes rigctld and rotctld \* commands and w commands using radio CAT commands. Here are several examples. It may take experimentation to get the commands in the right order

Command	What Happens	Note
*F 14055444 M CW 3000	Tune radio to 14.055.444 CW with a passband of 3000 Hz	Uses Hamlib commands
*S 1 VFOB I 14058222	Set radio to split mode, transmit on 14058222	Uses Hamlib commands

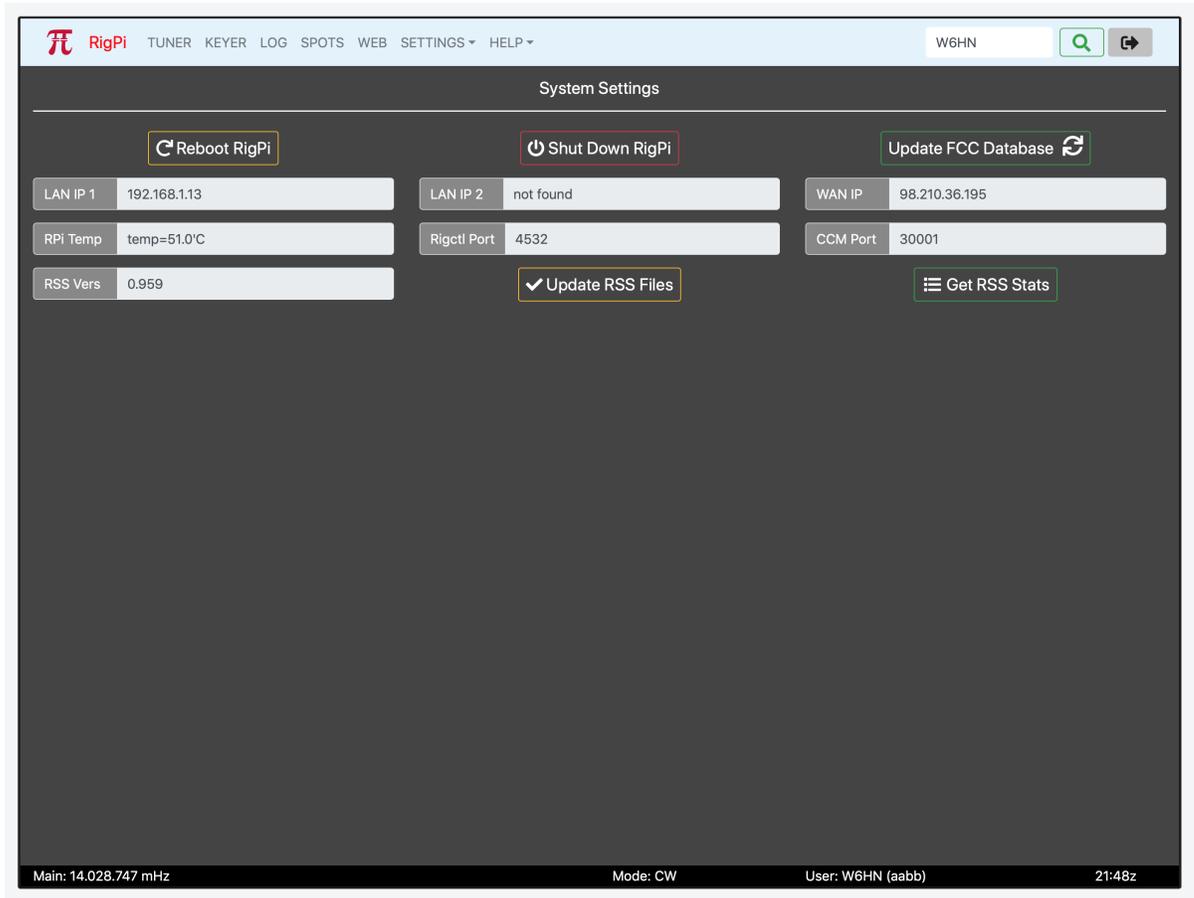
## Other Special Commands

Special '!' commands that can be sent using a macro key include the following:

Command	What Happens
!T/R	Toggles Transmit/Receive
!ROTATE	Turn your station rotor to the DX bearing
!RTR STOP	Stop rotor immediately

## 4.9 System

System Settings provides information about system aspects of RSS and buttons to reboot RigPi or shut it down. System Settings is only available for Access Level 1 accounts.



- |                  |   |
|------------------|---|
| Reboot RigPi     | Restarts RigPi. Any active user accounts must be restarted along with connecting radios.  |
| Shut Down RigPi  | Use the Shut Down button before disconnecting power to RigPi. Wait for the green activity light to stop blinking for proceeding. Not doing so could damage the RigPi memory card.     |
| Get FCC Database | Refreshes the FCC callsign lookup database loaded on RigPi. The refresh process takes about 15 minutes to complete. Note the entire FCC database is updated by the FCC once per week. |

LAN IP 1	RSS can connect to the Internet through Ethernet and/or Wi-Fi. If only Ethernet or Wi-Fi is used, LAN IP 1 is the IP address for that connection. Use LAN IP 1 for the LAN IP if you are setting up port forwarding in your Internet router.
LAN IP 2	If RSS is connected to the Internet through an Ethernet connection and through Wi-Fi, the Ethernet connection is shown in LAN IP 1 and the Wi-Fi address is shown in LAN IP 2.
WAN IP	WAN IP is the public IP of your connection to the Internet. This is the IP you can use to connect to RSS when away from home. You must set up port forwarding in your router for RSS and Mumble to operate remotely.
RPi Temp	Shows the temperature of the CPU chip on the Raspberry Pi. The core temperature goes up as the Raspberry Pi gets more heavily loaded. The maximum operating temperature is rated for 80-deg C. If the temperature goes above 85-deg, the CPU is throttled. Normally you will see the temperature under 50-deg C.
Rigctl Port	The port used to control the radio for the current account. Use this port number if connecting to another application (such as Fldigi) and you want to have both RSS and the other application control the radio. You can also use this number to connect a second (or more) accounts to the current radio. Enter the port number in the Port field in Basic or Advanced Radio settings.
CCM Port	The port used to connect CommCat Mobile or CommCat to RSS to control the current radio.
RSS Vers	The current RSS version number
Update RSS Files	Update the RSS files to the most recent version. The update is a two-step process. The first step checks version numbers. If the version check shows an update is available, the second step installs the files from the RigPi web site. See Update RSS Files in Other Programs.
Get RSS Stats	Provides a brief summary of RSS Statistics, including time since last reboot, number of connected users, and system loading.

## Other Programs

## 5 Other Programs

Additional Ham software provided with RigPi Station Server is accessed through the Raspbian PIXEL Desktop. Click Pi Menu>Ham Radio to access the added ham programs.

### Using RigPi Station Server with WSJT-X

WSJT-X is designed to provide reliable communications in extreme weak-signal conditions. WSJT-X, written by Joe Taylor, K1JT, is installed on RigPi Server. Frequency and Mode data are shared between RigPi and WSJT-X, and QSO information logged in WSJT-X is automatically transferred to RigPi Log.

To start WSJT-X, from the Raspberry Pi Desktop, open the applications menu and select Ham Radio>wsjtx. The first time you start WSJT-X you are invited to enter your callsign and Grid locator.

Connect to a radio from the Settings>Radio panel. Start RigPi Station Server and connect the radio. Use the following values:

1. Rig: Hamlib NET rigctl
2. Network Server: localhost: 4532. The port will be different depending on which RSS account you are using. The port number corresponds with the radio you are using in RSS. Radio 1 uses port 4532, radio 2 uses port 4534, and so on.
3. Audio:

WSJT-X Manual: [Click to open WSJT-X manual](#)

WSJT-X User Forum: [User Forum](#)

### Using RigPi Station Server with Fldigi

Fldigi is a multi-mode digital communications program, written by Dave Freese, W1HKJ and team.

1. Rig: Hamlib NET rigctl
2. Audio: Configure>Sound Card>Audio>Devices. Check 'PortAudio'. Capture: 'audioinjector-pi-soundcard'; Playback 'audioinjector-pi-soundcard'. Check 'Device supports full duplex.'

Fldigi Manual: [Fldigi Manual](#)

Fldigi User Forum: [User Forum](#)

### Using TQSL for LoTW Uploads

LoTW/TQSL Manual: [tQSL Quick Start](#)

LoTW/TQSL User Forum: [tQSL Forum](#)

## 5.1 Overview

Additional ham radio programs are installed on RSS. The Other Programs topic provides information that relates to RSS and the program. For complete Help for each program, please refer to the respective program's web site.

Most of these programs are provided on an 'as-is' basis. Support for configuring, using and updating these programs is provided by the program authors and their user communities.

- WSJT-X
- JS8Call
- Fldigi
- Flrig
- Flarq
- Message Aggregator
- TrustedQSL (TQSL)
- USB ID
- Mumble Autostart
- RSS Updater
- phpMyAdmin
- Audacity
- Alsamixer
- Nano

## 5.2 WSJT-X

WSJT-X is a popular digital mode program that is preloaded on RSS. Detailed instructions are beyond the scope of this manual, please refer to the WSJT-X web site:

[WSJT-X Manual](#)

This Help topic covers use of WSJT-X in RSS.

### Radio Connection

RSS and WSJT-X both use the Hamlib radio control library. Using the Hamlib "Net rigctl" radio selection in WSJT-X it is possible to have both RSS and WSJT-X control the radio.

Connect RSS to your radio in SETTINGS>Radio. Go to WSJT-X File>Settings>Radio. Select Hamlib NET rigctl for Rig and localhost:<RSS Port> for Network Server. You can now control frequency from WSJT-X or RSS.

The RSS port is determined by the account you wish to use in RSS. Use the port number shown in RSS SETTINGS>Radio>Rigctl Port.

## Logbook Connection

Contact logged in WSJT-X are automatically transferred to the active log in RSS for the account specified by the sync option in RSS SETTINGS>Users>Edit>Sync WSJT-X Log. Log data are transferred using the N1MM Logger+ Broadcasts options in WSJT-X File>Settings>Reporting. RSS expects a connection on N1MM Server port number 12060.

## Audio Connection

RigPi Audio is used to provide input and output audio for Fldigi. Since RigPi Audio is limited to one application at a time, make sure VoIP is disconnected. Choose 'sysdefault:CARD=audioinjectorpi' in the Input and Output drop-down lists in WSJT-X File>Settings>Audio>Soundcard.

### 5.3 JS8Call

JS8Call is a derivative of the WSJT-X application, structured and redesigned for message passing. It is not supported by, nor endorsed by, the WSJT-X development group.

This Help topic covers use of JS8Call in RSS.

## Radio Connection

RSS and JS8Call both use the Hamlib radio control library. Using the Hamlib "Net rigctl" radio selection in JS8Call it is possible to have both RSS and JS8Call control the radio.

Connect RSS to your radio in SETTINGS>Radio. Go to JS8Call File>Settings>Radio. Select Hamlib NET rigctl for Rig and localhost:<RSS Port> for Network Server. You can now control frequency from JS8Call or RSS.

The RSS port is determined by the account you wish to use in RSS. Use the port number shown in RSS SETTINGS>Radio>Rigctl Port.

## Logbook Connection

Contact logged in JS8Call are automatically transferred to the active log in RSS for the account specified by the sync option in RSS SETTINGS>Users>Edit>Sync WSJTX Log. Log data are transferred using the N1MM Logger+ Broadcasts options in JS8Call12060 File>Settings>Reporting. RSS expects a connection on N1MM Server port number 12060.

## Audio Connection

RigPi Audio is used to provide input and output audio for Fldigi. Since RigPi Audio is limited to one application at a time, make sure VoIP is disconnected. Choose 'sysdefault:CARD=audioinjectorpi' in the Input and Output drop-down lists in JS8Call File>Settings>Audio>Soundcard.

## 5.4 Fldigi

Fldigi is a popular digital mode program that is preloaded on RSS. Detailed instructions are beyond the scope of this manual, please refer to the Fldigi web site:

[Fldigi Web Site](#)

This Help topic covers use of Fldigi in RSS.

## Radio Connection

RSS and Fldigi both use the Hamlib radio control library. Using the Hamlib "Net rigctl" radio selection in Fldigi it is possible to have both RSS and Fldigi control the radio.

Connect RSS to your radio in SETTINGS>Radio. Go to Fldigi Configuration>Rig>Hamlib. Select Hamlib NET rigctl (Beta) for Rig and localhost:<RSS Port> for Network Server. You can now control frequency from Fldigi or RSS.

The <RSS port> is determined by the account you wish to use in RSS.. Use the port number shown in RSS SETTINGS>Radio>Rigctl Port.

## Logbook Connection

Contacts logged in Fldigi are automatically transferred to the active log in RSS for the account specified by the sync option in RSS SETTINGS>Users>Edit>Sync Fldigi Log.

## Audio Connection

RigPi Audio is used to provide input and output audio for Fldigi. Since RigPi Audio is limited to one application at a time, make sure the Mumble Client used for VoIP is not

running. Choose 'default' in the Capture and Playback drop-down lists in Fldigi Configuration>Audio.

Use the PortAudio capture and Playback configuration in Configure>Sound Card.

## 5.5 Flarq

Flarq is a messaging/file transfer program that works in conjunction with Fldigi. See the Flarq web site for more information.

[Flarq Web Site](#)

## 5.6 Message Aggregator

Message Aggregator implements the server side of the message protocol used by WSJT-X. WSJT-X is a client of the protocol.

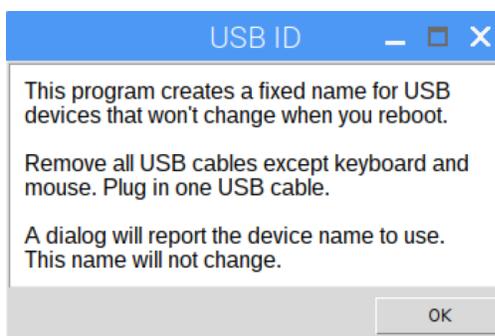
## 5.7 TrustedQSL

Open source libraries and utilities to support using digital signatures for Amateur radio QSL information. It can be used to digitally sign and upload QSOs to the ARRL's Logbook of the World (LoTW) online service and to manage the Callsign Certificates used when digitally signing. TQSL accepts QSOs in a log file whose format is either ADIF or Cabrillo, which RSS can create.

## 5.8 USB ID

If you have more than one device (radio and/or rotor) connected through USB ports, the port number assigned when you reboot may change. What was ttyUSB0 for radio 1 and ttyUSB1 for radio 2 can be reversed. The list order can change because response timing may vary when you reboot even though no changes have been made.

A utility program is provided on the RSS Desktop and in the Ham Radio menu to rename the ports and make them stable. The program is name USB ID.



The original port continues to be listed as ttyUSBx. Once you run USB ID, the connect for that radio or rotor will be listed as radiox, where x will remain unchanged. You might see radio1 which is the same as ttyUSB2.

## Clearing the Radio list

At some point you may wish to clear the list of radios USB ID maintains to have a fresh start. Here is how to do that:

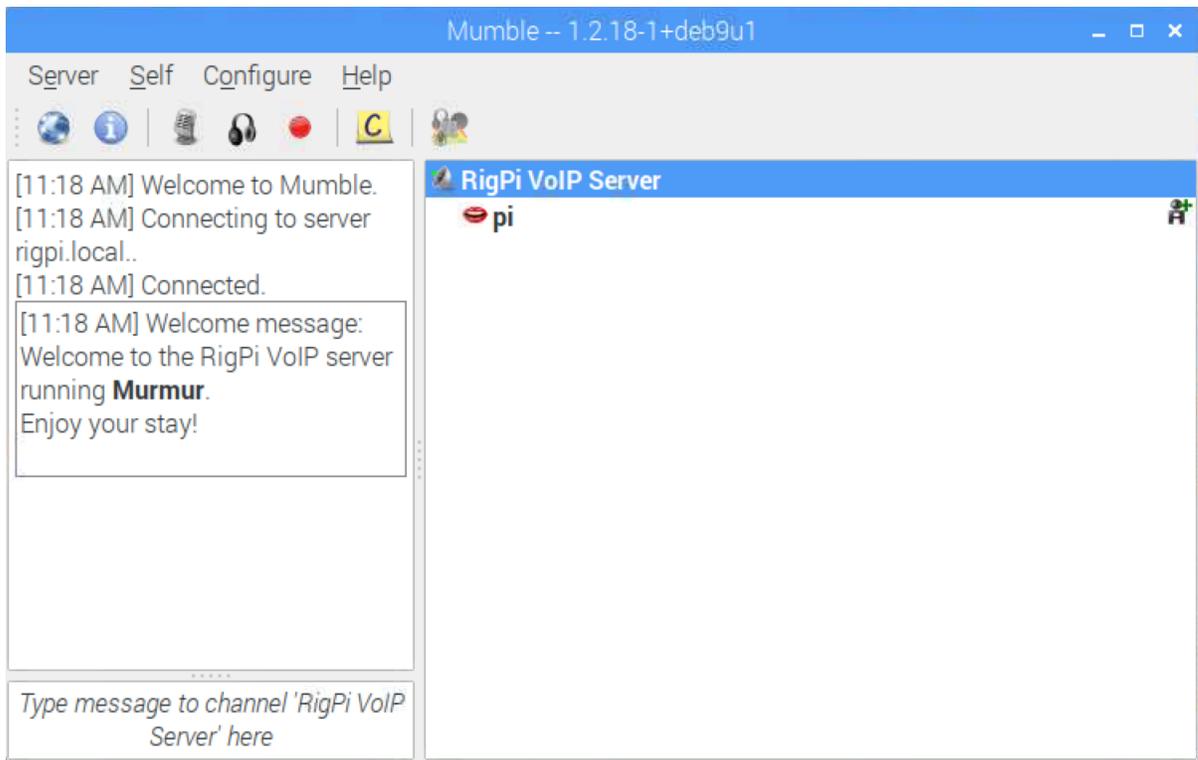
1. From RSS Desktop, open Terminal
2. Type `sudo su` <return>
3. Type `cd /etc/udev/rules.d` <return>
4. Type `rm 99-hamdevices.rules` <return>
5. Type `touch 99-hamdevices.rules` <return>

## 5.9 Mumble

Mumble is an open source VoIP system. A VoIP server called Murmur is installed on RSS along with the Mumble client. The RigPi Audio board normally provides an input and output path for Mumble client, although USB audio sound devices can also be used. One radio can be connected to the Mumble client. Remote Mumble clients can also connect to the server and receive and send audio. Mumble clients are available for all popular operating systems.

The Murmur Server is named RigPi VoIP Server and the configured Mumble Client is named pi. Mumble can be started manually from the RSS Desktop Menu by selecting Internet>Mumble. A utility named Mumble Autostart is in the Internet menu as well as on the RSS Desktop. Run Mumble Autostart to have Mumble start automatically when RSS is rebooted.

When you start Mumble the Mumble window opens on RSS:

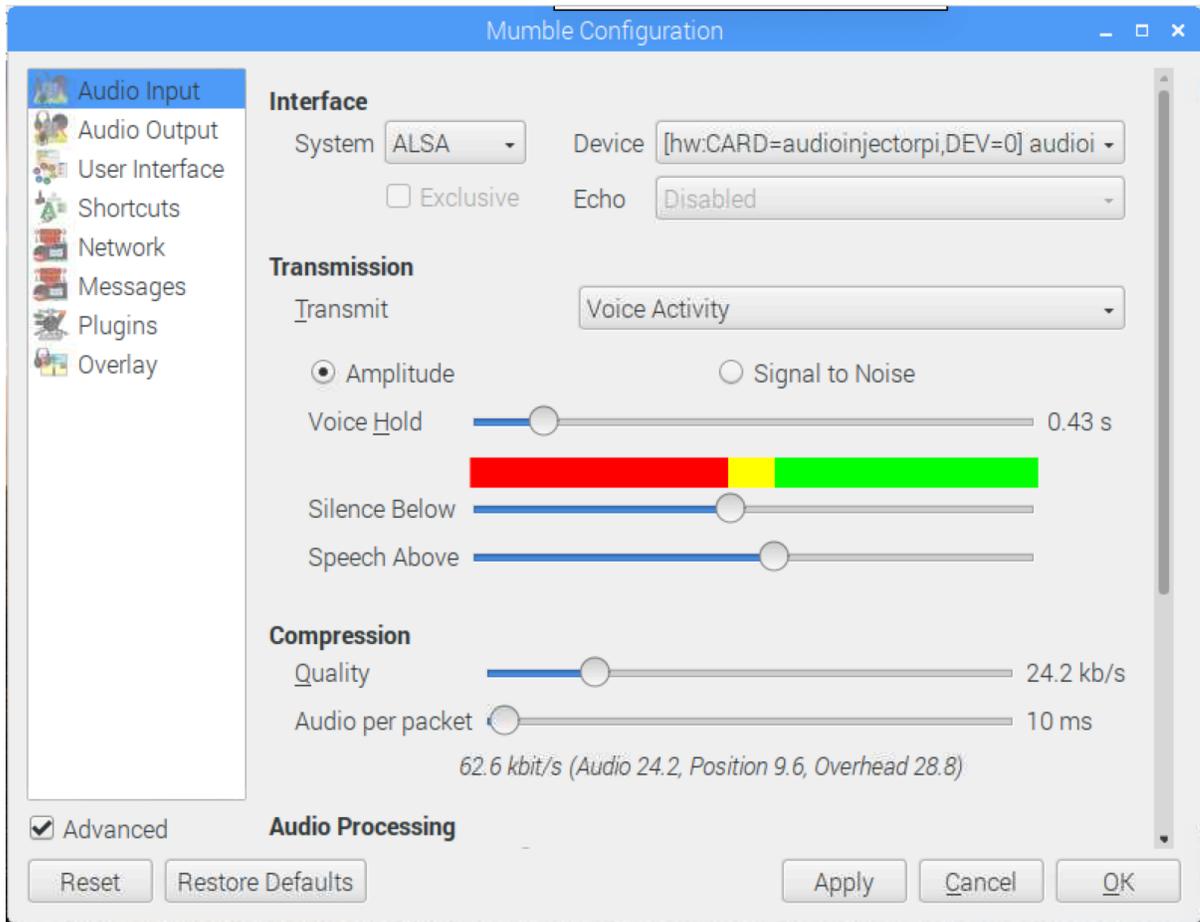


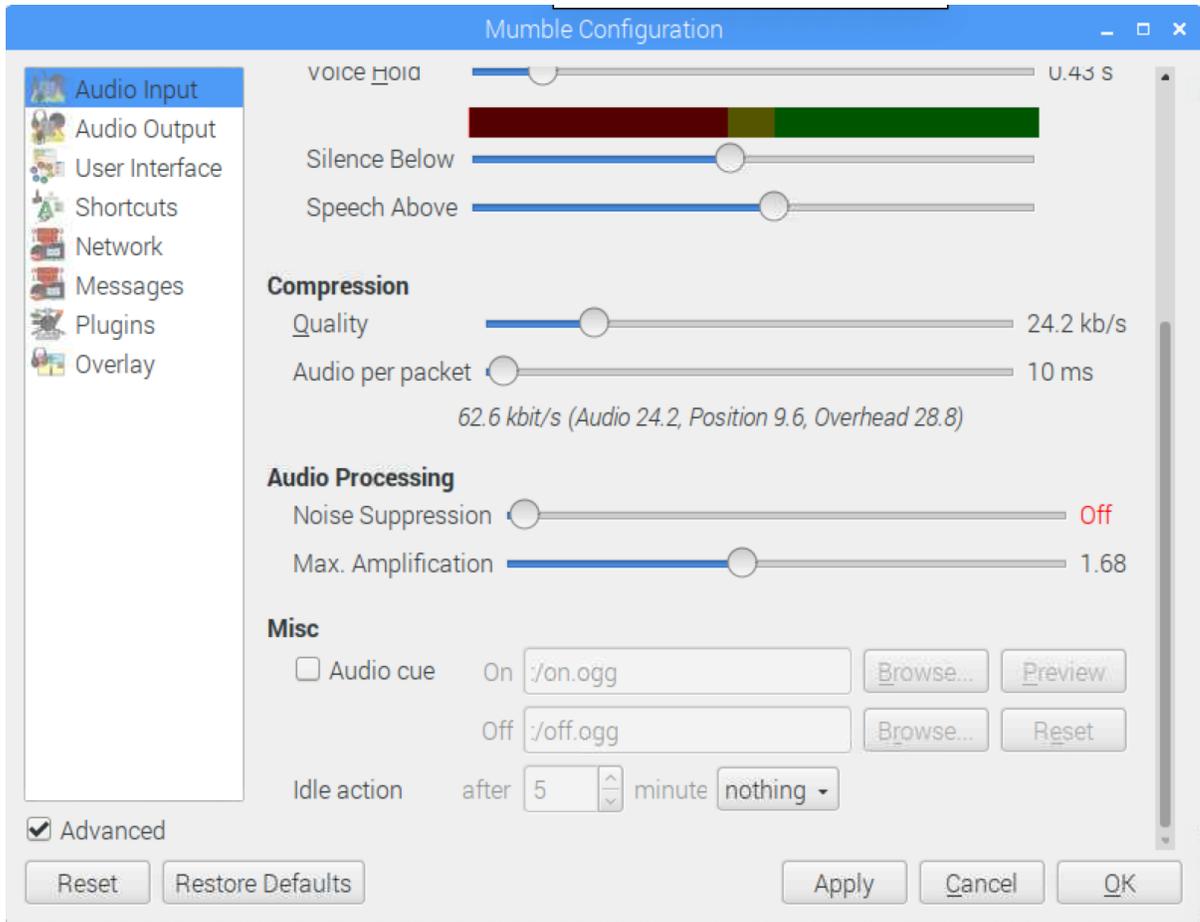
## Mumble Settings

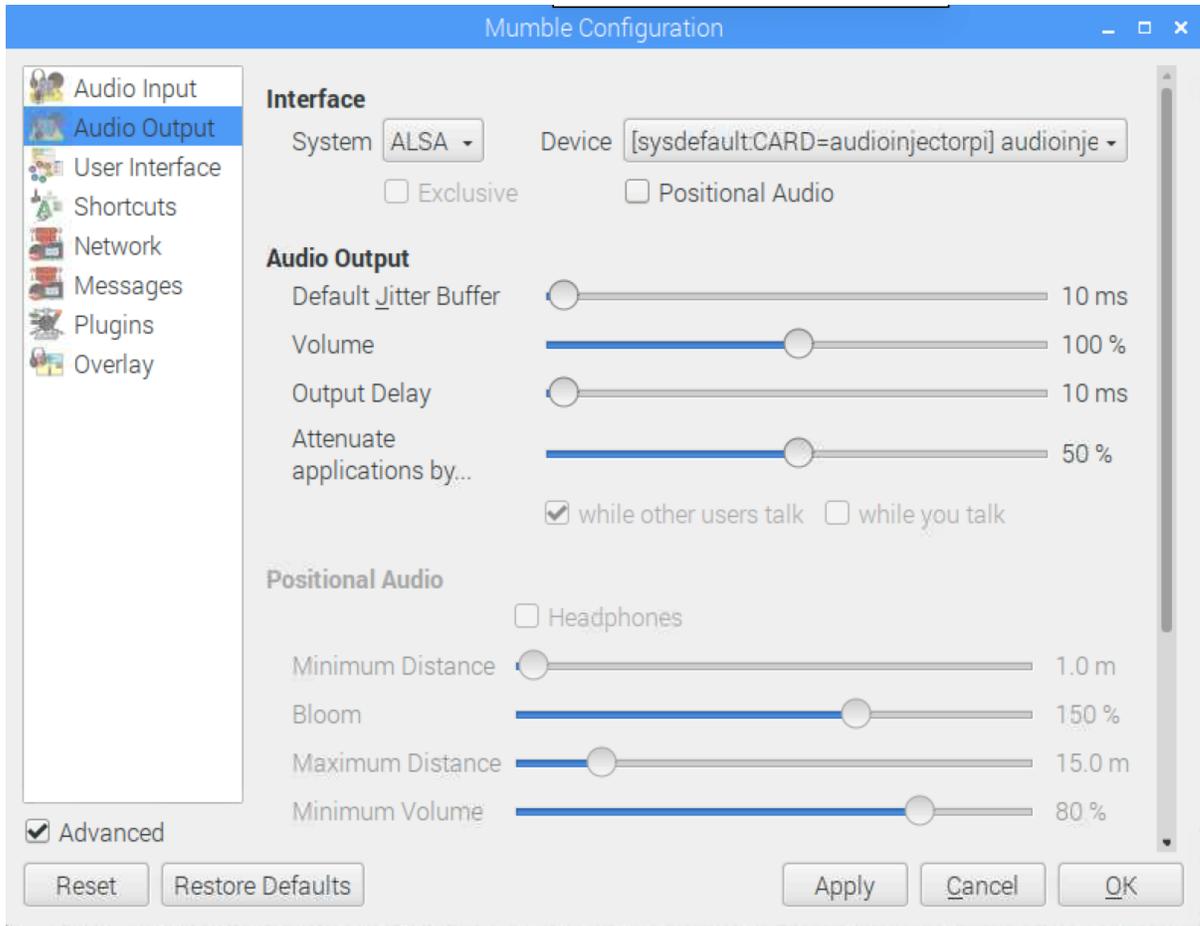
Mumble normally uses RigPi Audio for input and output audio. The driver for RigPi Audio is set as the default audio device for RigPi. It is named `audioinjector-pi-soundcard`. You can also use USB soundcard dongles with RigPi Mumble.

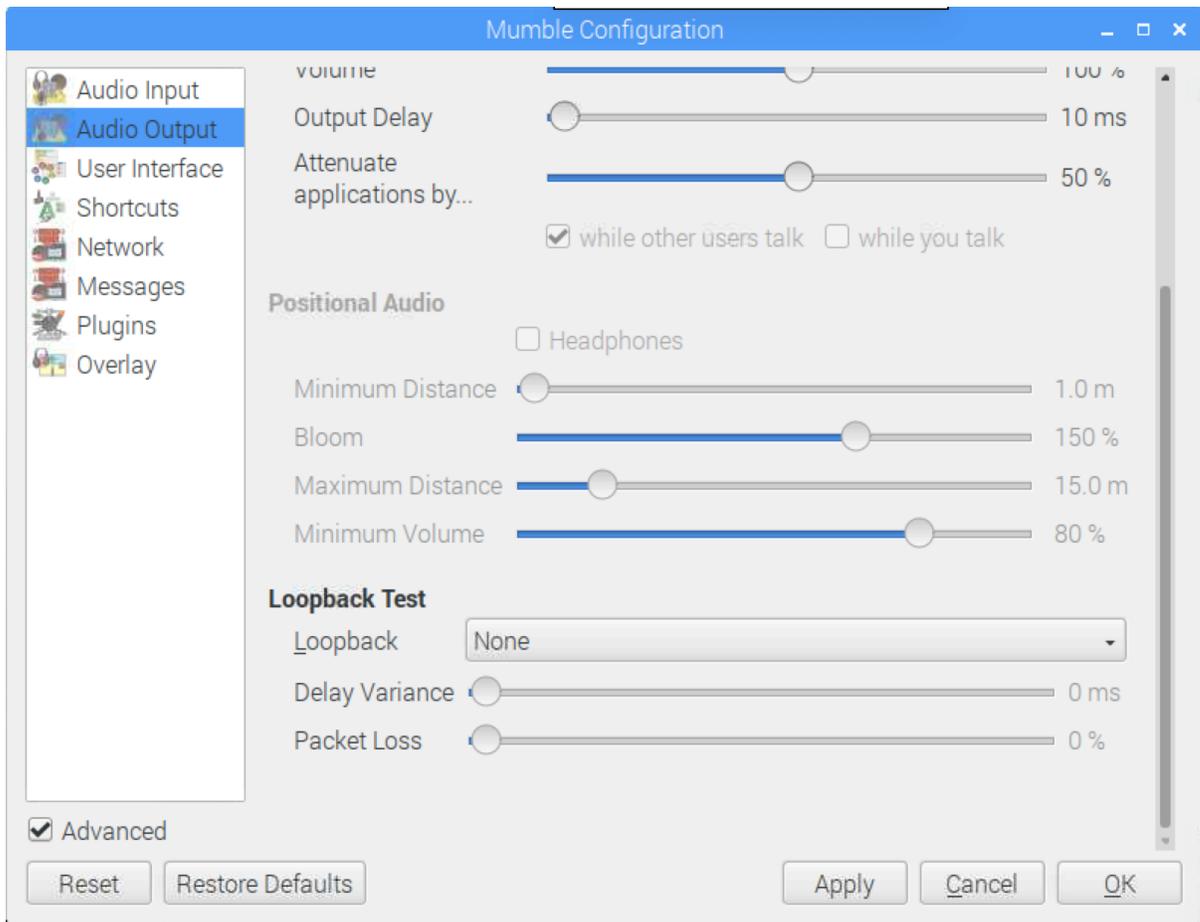
Refer to Mumble Help for setting up Mumble. One setting that applies to Mumble in RSS is found in the Audio Processing group of Mumble Configure>Settings>Audio Input. Set the Noise Suppression to Off with the slider moved to the left end. If Noise Suppression is enabled the normal background noise on HF can cause distortion and clicking in the audio output. (See screen shot below.)

Mumble can send audio continuously, by use of a PTT key, or by detecting the presence of audio. Four screen shots are shown below to include all audio in and audio out settings.









In Mumble Configure>Settings>Network enable the 'Reconnect automatically' and 'Reconnect to last server on startup' options.

## Managing Accounts

If you wish to remove clients that have been registered, set up a new user with username SuperUser. The SuperUser can delete registered accounts.

## Using a Remote Server

RSS is not restricted from using an external Mumble server. If RSS is connected to the Internet and you expect to have a large number of users, a remote mumble server may be attractive.

Mumble servers are available for free or low cost. Commercial server companies typically charged based on the number of "slots" you want to use. A slot is a unique user logged in to the server. Server fees typically run less than \$2 per month. Details for connecting to a

remote server are beyond the scope of this manual, but instructions are usually given on the server you choose.

## Running more than one Mumble client

Since RSS is multi-user, one wonders if it is possible to run audio from more than one radio through RSS. The short answer is yes! RSS can serve multiple users for rig control AND audio.

There are two requirements.

1. You need one (or more) audio IO device in addition to RigPi Audio. This can be done with a USB audio dongle. For my tests I used a Griffin dongle, but any inexpensive USB/Audio devices should work well.
2. The second (and subsequent) Mumble clients must be started in a special way.

To start the second client, go to the RSS Desktop Menu and open Run... In the Run box, type `mumble -m -n`, press enter, and off you go. The `-m` parameter signifies a multiple instance and `-n` says assign a new security credential to that instance.

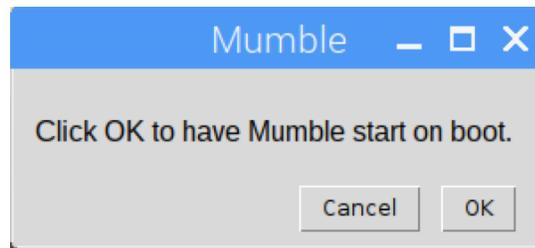
Now you can log in. I used `pi2` as the username. With two clients you see both users in the client lists, `pi` and `pi2`. The user connected with its primary client is shown in bold. Assign the audio dongle to the second client. Now you can connect the audio to/from two rigs.

Since all users hear all other users, you will hear audio from both radios. That has interesting possibilities, such as monitoring 2 repeaters at once. You may want to keep the audio from the two radios separate, in which case there is a way to do that. Mumble provides channels, users can be assigned to channels, and the audio is separated.

### 5.10 Mumble Autostart

Mumble Autostart is a program that controls how Mumble is started. Mumble can be started manually through the Menu Internet>Mumble option or by having it start automatically when RSS is started or rebooted.

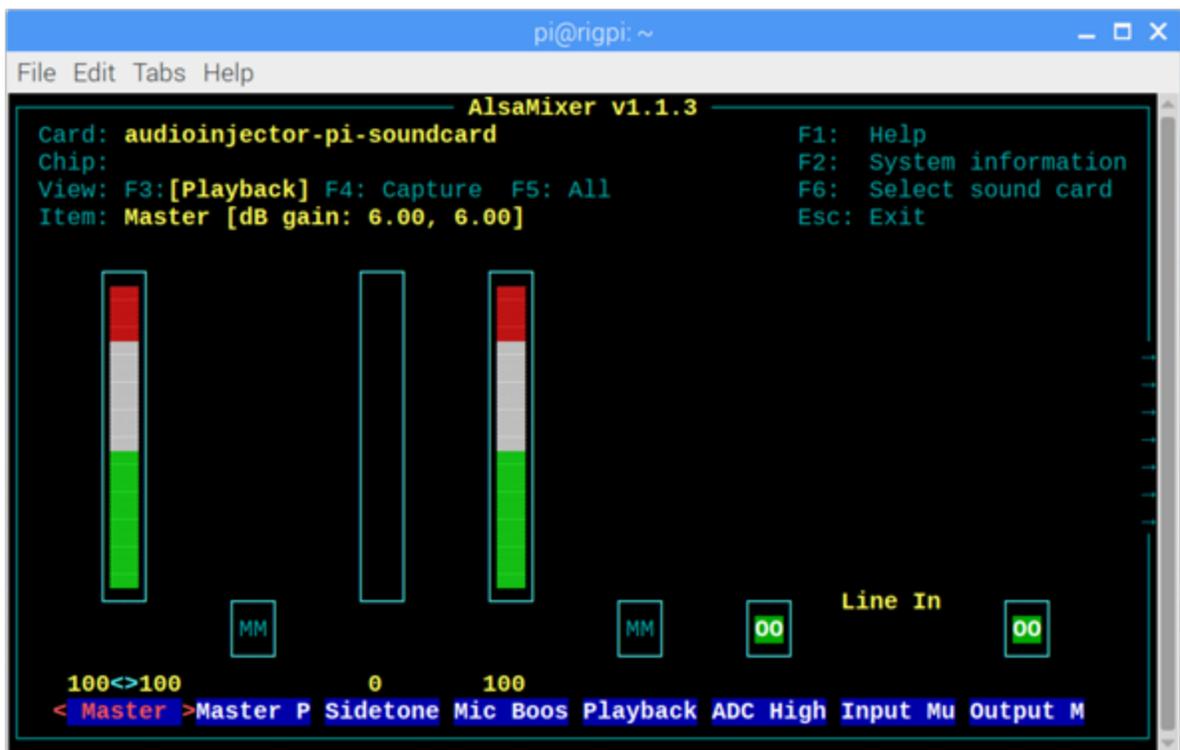
The Mumble Autostart program icon is in the Internet menu, and also located on the RSS Desktop.



## 5.11 Alsamixer

RigPi Audio doesn't have settings of its own, but a Linux utility named Alsamixer is included with RSS for that purpose. The driver used for RigPi Audio is `audioinjector-pi-soundcard`.

To start Alsamixer go to RSS Desktop and open the Terminal. Type `alsamixer` followed by return.



- Left and right arrow keys select a setting
- M key toggles MM settings
- Tab to change View
- Up and Down arrow keys to change levels

RigPi Audio uses either Line or Mic Inputs depending on settings. The Line Input accommodates input voltages up to 2-volt peak-to-peak. Line input uses the left channel, it is not stereo.

## 5.12 Update RSS Files

Updating the files for RSS is done automatically when a new version is detected, or manually from the SETTINGS>System menu. Updates provided on the <https://rigpi.net> server are downloaded to RSS, unzipped and copied to the correct RSS folders. Only files newer than a corresponding file are updated. The update retains all user settings and databases.

To update manually:

1. In RSS go to SETTINGS>System and click Update RSS Files. If a new version is detected, click OK to proceed.
2. When the update is done click OK to reboot RigPi to refresh all files.

Updating RSS files does not update any system files or other installed programs. See Updating the Raspbian Operating System in the Technical>System topic.

## 5.13 Connecting to RSS with External Programs

### Connecting Multiple Programs to RSS

RSS combined with CommCat provides another layer of flexibility. The screen shot below shows RSS, CommCat and PowerSDR all linked together. Not shown is CommCat Mobile running on an iPad also connected to RSS.



A frequency change in one programs is reflected in all programs.

PowerSDR is connected to CommCat through a free Virtual Port programs called CommCat VP. This program is available for download from <http://www.commcat.com>. Here are the details on how this is done.

The KX3 CAT command set is used to connect to RSS through a TCP connection. The use of "KX3," below, is used for this purpose even though you are controlling a different radio through RSS.

1. Open RSS in a browser. RSS is controlling the radio.
2. Start CommCat VP which in turn starts CommCat.
3. In CommCat>File>Settings>Radio A, connect to KX3 through Remote IP <RSS Lan IP> on port <RSS CommCat Mobile Port>. In CommCat VP open a serial port after putting a check in the associated CAT box.
4. Start PowerSDR and connect as a TS-2000 to the CommCat VP COM port.

RSS, CommCat, VP, and PowerSDR all show the same frequency and mode. Each can control the radio connected to RSS.

To connect CommCat Mobile, start CommCat Mobile and go to Settings>Remote Control. In Radio IP enter the RSS LAN IP address and the RSS CommCat Mobile port shown in RSS SETTINGS>System. Select the K3/KX3 (thru Internet) radio. Now all programs can be controlled from your iPad or iPhone.

## 5.14 Panadapter

IQ Panadapter software is not provided with RSS. Here is a link to AA6E's web page that describes the Tiny Python Panadapter originally published in the April 2014 issue of QST. An I/Q connection is provided on RigPi Audio to provide wide-band audio to Panadapter programs.

[AA6NE Panadapter](#)

**Technical**

## 6 Technical

Information about technical aspects of RSS are contained in this section.

### 6.1 Troubleshooting

#### Radio won't connect

When you try to connect a radio by using the Connect Radio button and the connection fails, take a close look at the error message to get clues. The normal failure is "Connection Refused" with a suggestion to check settings.

First verify that the radio is on and the USB cable associated with that radio is plugged in to RSS. Check the Port option in SETTINGS>Radio to make sure the radio port is in the drop-down list.

Try rebooting RSS from SETTINGS>System>Reboot RigPi to see if that fixes it.

The Connect Radio and Disconnect Radio buttons on the Tuner window require the radio to be set up in SETTINGS>Radio first. If it hasn't been set up, RSS won't be able to connect. (RigPi is initially configured with a "dummy" radio simulation so you can use Connect Radio with no further settings required.)

If you have more than one USB device connected to RSS (several radios, rotor controls or an external WinKeyer), the port assigned to each cable can change when you reboot. What was /dev/ttyUSB0 connected to radio A may now be connected to radio B, and radio A is /dev/ttyUSB1. In SETTINGS>Radio>Port you can select another port to see if the radio will connect.

RSS has a utility program that will prevent port changes from happening in the future. See the Help topic Other Programs for more information on USB ID.

Next try starting the rig connection manually. This requires the use of the RSS Desktop Terminal. The manual connection requires the use of the Hamlib model number for your radio. In SETTINGS>Radio click Radio Capabilities. At the top you will see Caps dump for model: xxx, where xxx is the model number. Make note of this number.

To clear any radio control remnants, reboot RSS from the System Settings window.

Open Terminal by double-clicking the black prompt icon at the top of the RSS Desktop and type the following (214 happens to be the model number for the Kenwood TS-2000):

```
rigctl -m 214 -r /dev/ttyUSB0
```

and see what is reported. The report should give more clues, which might simply be "Timed out." More diagnostic information can be obtained by using the "v" parameter such as below:

```
rigctl -m 214 -r /dev/ttyUSB0 -vvvv
```

If nothing is learned, we need to check that the port is correct. Get a list of available ports by typing (lower-case L):

```
ls /dev/ttyU*
```

If more than one USB port is listed, try the rigctl commands with the other ports.

Once you are able to get rigctl started, a prompt "command:" is shown. Type f followed by Enter and see if the reported frequency is correct. Type Ctrl+C to exit and stop the rigctl process.

If you are able to connect to and control the radio, we can start the RigPi using a test mode. Starting in test mode requires that a file in RigPi be edited with a text editor. This can be done from RSS Terminal using the Nano text editor with these commands:

```
cd /var/www/html/programs  
sudo nano hamlibDo.php
```

Near the top you will see a line that reads "\$test=0;" which we need to modify. Use the cursor arrow keys to move the insertion point to the front of the number 0, press Delete, then type the number 1.

Slightly further down, after "}else{," you need to change the variable \$tUsername='admin'; so that it shows your username.

Type Ctrl+O to save the file and Ctrl+X to exit Nano.

Start hamlibDo by typing this line:

```
php hamlibDo.php
```

See if there are any error reported. If there don't appear to be any errors, open a RigPi browser and see if you can control the radio.

The report shown in Terminal includes the command to start rigctld. Try entering the complete line in Terminal and press Enter. See if there are any error reported.

If none of these steps gets the radio connected, it is time to check the USB cable and radio for problems. This can be done running a control program on another computer by moving the USB cable to that computer.

For a helpful guide providing additional information, here is a link to the Hamlib FAQ:

[Hamlib FAQ](#)

## No RigPi Audio

RigPi uses the RigPi Audio board for VoIP, digital modes, or even for a spectrum analyzer (panadapter). If RigPi Audio doesn't appear to be working, there are a number of tests we can use to isolate the problem.

RigPi Audio can receive/send audio through the RJ-45 connector on the USB end of the RigPi unit or from the 3.5 mm jack end. We will use the 3.5 mm jack end. If using the RJ-45 connection, remove that cable for now.

RigPi Audio uses a Linux device driver named `audioinjector-pi-soundcard`.<sup>\*</sup> All drivers and settings required for RigPi Audio are initially set and do not require changes.

Right-click the Speaker icon at the top of RSS Desktop to make sure the `audioinjector` is shown as the selected device. If it isn't in the list, try rebooting RSS from the RigPi `SETTINGS>System` menu. If it fails to appear, the RigPi Audio board may have a problem.

To look for errors on booting, open RSS Terminal and type the following:

```
dmesg | grep audio
```

You will see a list of possible errors. The last line should say

```
[ 3.940624] audioinjector-stereo soc:sound:wm8731-hifi <-> 3f203000.i2s mapping ok
```

which says the board is connected. If not, the RigPi Audio board probably needs repair.

Next we will try some audio tests using Linux programs through RSS Terminal.

Plug in a high impedance set of ear buds to the TX OUT connector. Type the following command (c2 says 2 channels):

```
speaker-test -c2
```

You should hear pink noise in the left ear bud, then silence, followed by pink noise.

Here is a tone test:

```
speaker-test -t sine -f 2000 -c2
```

You will hear a 2000 Hz tone in the left ear bud.

Finally, a voice test:

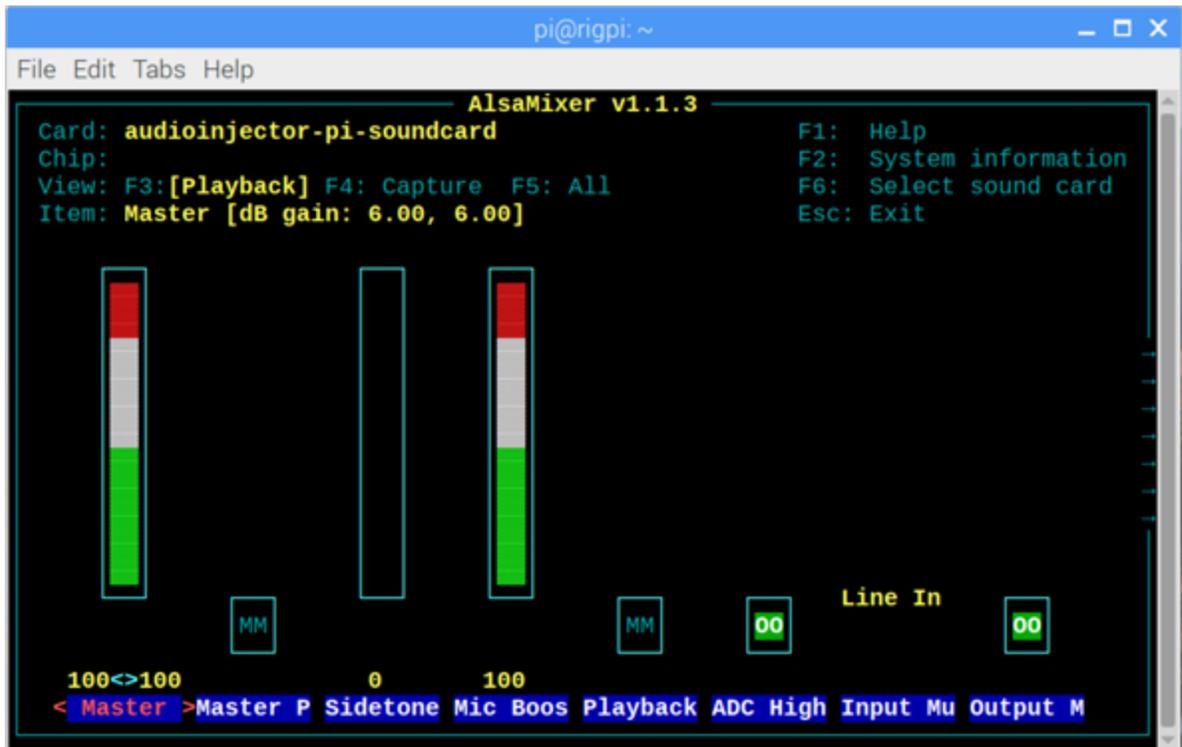
```
speaker-test -t wave -c2
```

You will hear a woman's voice in the left ear bud.

If any of these test fail, we can use the Linux program named AlsaMixer from RSS Terminal to check the settings. Type

```
alsamixer
```

The following settings are used for RigPi Audio:



Master Gain

100<>100

Master P	OFF (MM)
Sidetone	0
Mic Boost	100
Playback	OFF (MM)
ADC High Pass Filter	ON (OO)
Input Mux	Line In
Output Mux	ON (OO)

\*Audio Injector makes audio boards for the Raspberry Pi. RigPi Audio uses the same audio IC as their Audio Injector Stereo Card. Visit Audio Injector at <http://www.audioinjector.net>.

## Can't connect to Mumble server

Mumble server starts automatically when RigPi boots. First we can make sure Mumble server is actually running, then we'll check the Mumble log.

To confirm the Mumble is running:

In Terminal, type:

```
ps -ef | grep mumble-server
```

The command should show:

```
mumble-+ 582 1 0 12:22 ? 00:00:00 /usr/sbin/murmurd -ini /etc/mumble-server.ini
```

The results confirm that the murmur (mumble server) daemon is running, using the mumble-server.ini initialization file.

To make sure we can connect to the default Mumble port, type:

```
nc -vz rigpi.local 64738
```

You should see this response:

```
Connection to rigpi.local 64738 port [tcp/*] succeeded!
```

If these tests are successful, we can check the Mumble server log. Type:

```
sudo cat /var/log/mumble-server/mumble-server.log
```

Here is the response:

```
...
<W>2019-01-23 12:22:25.792 Initializing settings from /etc/mumble-server.ini
(basepath /etc)
<W>2019-01-23 12:22:25.815 Meta: TLS cipher preference is "ECDHE-ECDSA-AES256-
GCM-SHA384:ECDHE-RSA-AES256-GCM-SHA384:ECDHE-ECDSA-AES128-GCM-
SHA256:ECDHE-RSA-AES128-GCM-SHA256:AES256-SHA:AES128-SHA"
<W>2019-01-23 12:22:25.815 OpenSSL: OpenSSL 1.1.0j 20 Nov 2018
<C>2019-01-23 12:22:25.850 Successfully switched to uid 116
<W>2019-01-23 12:22:28.784 ServerDB: Opened SQLite database /var/lib/mumble-
server/mumble-server.sqlite
<W>2019-01-23 12:22:28.814 Resource limits were 0 0
<W>2019-01-23 12:22:28.814 Successfully dropped capabilities
<W>2019-01-23 12:22:33.835 OSInfo: Failed to execute lsb_release
<W>2019-01-23 12:22:37.123 Murmur 1.2.18 (1.2.18-1) running on X11: Linux 4.14.79-v7+:
Booting servers
<W>2019-01-23 12:22:45.343 1 => Server listening on [::]:64738
<W>2019-01-23 12:23:32.814 1 => Announcing server via bonjour
<W>2019-01-23 12:23:33.002 1 => Registration needs nonempty 'registername',
'registerpassword' and 'registerurl', must have an empty 'password' and allowed pings.
<W>2019-01-23 12:23:33.003 Object::connect: No such slot
MurmurDBus::userTextMessage(const User *, const TextMessage &)
```

If connection attempts have been made they are included at the end of the log. Check these lines for an indication of why the connection was not made.

Mumble gives access to more settings through an account named SuperUser. Try logging in using that username with password 7388.

Finally, visit the Mumble Help pages to additional help. Here is a link to the instructions for logging into a Mumble server:

[Mumble Help](#)

## RigPi Audio Input Level Too Low

RigPi audio can be high level line-input of up to 2-volts peak-to-peak, or low level microphone input (200-mv peak-to-peak). In addition, the input levels can be adjusted. These settings are done through AlsaMixer. See the AlsaMixer topic in Other Programs.

## 6.2 Raspberri Pi Settings

You may wish to change many Raspberry Pi settings such as screen resolution. There are two ways to proceed:

1. From the Raspberry Pi Desktop, click the Menu button (raspberry) at the top left. Select Preferences>Raspberry Pi Configuration.
2. From Terminal, enter `sudo raspi-config`.

## 6.3 Rigpi.local on Windows computers

The domain `rigpi.local` can be used as an easy way to connect to RigPi using a browser on another computer. Many operating systems automatically support the use of `.local` addresses with the exception of Windows. Bonjour may already be installed on your Windows computer, especially if you have installed Apple iTunes in the past.

Apple Bonjour, one popular way to add `.local` support to Windows is available as a free download from Apple. Search for Bonjour for Windows and you will find the site providing the download. Except for Microsoft Edge, most browsers will open RigPi using `rigpi.local` once Bonjour has been installed.

If you are using Microsoft Edge, a program called Fiddle can be run at the same time as Edge so the `.local` addresses will work. Here is a link to the Fiddler download site:

[Fiddler](#)

To start Fiddler, use the Search function in Taskbar to find fiddler. Then right-click and select Run as Administrator. Once Fiddler is running, navigate to `rigpi.local` in Edge.

## 6.4 RigPi Keyer PTT

The WinKeyer IC used for CW keying has an independent PTT capability that can control the PTT output from RigPi Keyer. This special Keyer PTT operates in parallel with the normal RigPi PTT. To use RigPi Keyer PTT, the Keyer must be assigned to the account for which you want to use it.

RigPi PTT, configured in Radio settings, controls the PTT jacks on both boards, RigPi Keyer and RigPi Audio. Keyer PTT also controls the PTT line on RigPi Keyer, no matter whether RigPi PTT is on or not. Keyer PTT can be used to control an external device, such as a remote power switch or an antenna bypass switch.

Keyer PTT is controlled by custom macros. Two macros are pre-programmed in the RigPi Macro bank to accomplish this: SWITCH ON (\$<18> <01>) and SWITCH OFF (\$<18> <00>). In SETTINGS>Keyer, remove the check from Enable Keyer PTT to switch to independent control using Macros.

RigPi PTT	Macro Switch	Audio PTT Out	Keyer PTT Out
On	On	On	On
On	Off	On	On (Off with jumper 201 removed)
Off	On	Off	On
Off	Off	Off	Off

RigPi PTT (Radio Settings) has 3 options: None, ON when transmitting, and ON when radio connected. This third option overrides Key PTT since it is on whenever the radio is connected. Keyer PTT and Audio PTT are both on continuously. If RigPi PTT is set to None, Audio PTT never turns On, and Keyer PTT is controlled by the Macros. By removing jumper 201 on the RigPi Keyer board, RigPi PTT has no control over the Keyer PTT.

The Keyer PTT can be used to control an external power switch. Candidate power switches include:

MFJ-1172



Digital Loggers IoT Control Relay



## 6.5 Sharing Radios, Rotors and Keyers

### Radio

RSS allows multiple radios to be connected and controlled. Each radio is connected through a unique USB port. One rig is assigned to each account. Another account can share the same radio, but the connection is slightly different.

There are two ways to share a radio in use on another account.

1. Open a new browser window and sign in using the other account's username and password. The keyer and rotor assigned to the main account are always available in newly opened browsers connected to the same account.
2. Instead of a physical radio and USB port (ttyUSBn) in Settings>Radio>Basic or Advanced for the second account, select Hamlib, NET rigctl, as the manufacturer and

radio. In Port, enter the port number for the main account's Radio number you want to use. Port numbers start with 4532 for Radio 1, and go up 2 for each Radio number. Radio 2 will be 4534, etc. So if account 3 wants to use the radio already connected for account 2, enter 4534 as the port number. You can also see the rigctl port to use in SETTINGS>System>Rigctl Port.

Use option 2 if you wish to use Hamlib in another program, and have RSS connected to the same radio. Fldigi and WSJT-X, provided with RSS, can be the primary rig control program. Once Fldigi/WSJT-X are running and in control of the radio, connect RSS to Hamlib Net rigctl with the same port, usually 4532, used by the other program.

You can do it the other way around. RSS can be the controlling program, set up Fldigi or WSJT-X so they follow RSS by using Hamlib Net rigctl in the other program with the port number as above.

## Rotors

Each account has a unique rotor. If you have more than one rotor but only one radio, you can set up a second account using Option 2, above, and assign the second rotor to that account. Rotors use a port one above the radio port. If the radio port is 4532, the rotor port is 4533.

## Keyers

RSS supports the internal RigPi Keyer, keying through radio CAT commands, and external K1EL WinKeyers.

Only one account can use RigPi Keyer. If you log into that account with a second or third browser (option 1, above), the assigned keyer will do fine. If you have an account for a second or third radio, use CW keying via CAT, or use an external WinKeyer connected through a USB port.

CAT CW Keying does not echo characters back to RSS so the Transmitted CW box in the Keyer window will remain blank. Not all prosign CW characters are accepted by CAT Keying.

## 6.6 Supported Radio Features

Hamlib supports over 200 radios. Not all controllable features are supported. Custom macros can be created using Hamlib commands, but only if that particular feature is supported. You can also use the special "w" Hamlib command in a macro to send native

commands directly to a radio, but even this approach may not be supported for a particular command.



Go to RigPi SETTINGS>Radio>Advanced and use the Radio Capabilities button to show a list of all features for the selected radio supported by Hamlib.

The Hamlib library is in a constant state of improvement and enhancement. New radios are frequently added. Here is a link to the Hamlib forum where these developments are discussed:

[Hamlib Forum](#)

## 6.7 Programming

The following languages and tools were used in the development of RigPi.

### Programming Languages

The following languages are used in RSS. They are all free tools with widespread support on the Internet.

- CSS
- HTML5
- Bootstrap4
- PHP7
- JavaScript/jQuery
- AJAX
- MySQL/MariaDB
- TCP API for controlling RSS
- Python 3

### Programming Tools

I used the following tools while developing RigPi. I have no relationship with the authors of any of these applications.

#### FileZilla

FileZilla is a free client program for ftp file transfers. It is available for most platforms including Windows and Mac OS X/macOS.

Here is the link for further information about FileZilla:

### [FileZilla](#)

#### **phpMyAdmin**

phpMyAdmin is used for editing, modifying, and backing up MySQL databases. It is installed on RigPi. Access phpMyAdmin through a browser:

<http://rigpi.local/phpmyadmin>

Username is root, password 7388. These must be changed if you open RigPi to the Internet.

Here is the link for further information about phpMyAdmin:

[phpMyAdmin site](#)

#### **Coda**

Available for the Mac and iOS mobile devices, Coda by Panic Inc. is a powerful text editor, previewer and file manager. It is a commercial product, not free.

Here is the link for further information about Coda:

[Coda site](#)

#### **Perfect Widgets**

A tool to create dynamic HTML5 gauges. Designed for Windows. It is a commercial product although there is a free personal/non-commercial version.

Here is the link for further information about Perfect Widgets:

[Perfect Widgets site](#)

#### **Help+ Manual**

Help+Manual is a commercial program to write and publish Help files using Windows.

Here is the link for further information about Help+Manual:

[Help+Manual site](#)

### Safari with Developer extensions

Developer tools, especially the JavaScript console, are provided with Safari.

## 6.8 System

### Swap Space

Usually the Linux Swap Space is not used in RSS. Many programs requiring compiling (such as Fldigi) require at least a 512 MB swap space. Providing swap space when not necessary can reduce the life of an SD card. See this link for further details on managing Swap Space:

[Swap info](#)

### Backing up the RigPi Memory Card

The Micro SD memory card for the Raspberry Pi has a limited lifetime. Write cycles are usually more critical in determining the life of an memory card because the space to be taken by a write must be cleared first. Wear leveling is used to distribute write cycles so one portion of the memory space is not used constantly. It is suggested that you use a memory card having at least two times the space needed to leave room for wear leveling.

To provide insurance against corrupting a memory card, it is wise to back it up to a second card, a USB memory stick, or as an image to a fixed drive. The simplest way to back up the SD Card is by using a program available through the Accessories menu on the RSS Desktop.

The SD Card can be backed up to a USB memory stick or to another SD Card. The latter requires a spare card and SD Card USB adapter. Plug the USB stick or adapter into a spare USB connector on RSS.

Click the Raspberry icon to open the Applications Menu. Click Accessories, then select SD Card Copier. Follow the instructions given in SD Card Copier Help.

Card specifications:

Type: Micro SD

Size: 16GB

Class: 10

Speed: 80MB/s or faster

## Updating the Raspbian Operating System

Updates to the Raspbian operating system occur often. To keep current, use these commands in Terminal to update the package list and upgrade the software:

Update system package list: `sudo apt-get update`

Upgrade software: `sudo apt-get dist-upgrade`

## 6.9 Panels

The Graphics User Interface (GUI) used in the RSS Tuner window is based on a commercial product "Perfect Widgets" by Perpetuum Software. The Frequency, S-meter and Tuning Knob panels use HTML5 JSON technology to provide a modern look. This is proprietary software.

[Perfect Widgets site](#)

It is possible to modify RSS code to set your own values in each panel. By means of an online inspector, you can see the tree structure of the respective JSON object.

[JSON code inspector](#)

The Perfect Widgets development tools are proprietary. The RSS panels are developed using a "Developer's License." A limited free version of Perfect Widgets is available on the Perpetuum web site.

## Perfect Widgets 2.0

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Last modified on September 07, 2012.

## 6.10 Schematics

Schematics for the RigPi Audio and RigPi Keyer boards can be downloaded through the following link:

[RigPi Schematics](#)

### RigPi Audio Circuit Description

The RigPi Audio board is based on the Cirrus Logic WM8731 (U1) low power stereo codec. It supports a stereo input and mono output. The left input and output channels are transformer isolated for hum reduction. Both stereo input channels are available for I/Q signal processing. This input path is not transformer isolated.

The WM8731 is controlled through the Raspberry Pi GPIO connector.

GPIO 1 (Pin 12) BCLK: Digital Audio Bit Clock, Pull Down,  
GPIO 19 (Pin 35) LRC: DAC Sample Rate Left/Right Clock  
GPIO 20 (Pin 38) ADCDAT: Digital data out  
GPIO 21 (Pin 40) DACDAT: Digital data in  
SDA (Pin 3) SDIN: 3-Wire MPU Data Input / 2-Wire MPU Data Input  
SCL (pin 5) SCLK: 3-Wire MPU Clock Input / 2-Wire MPU Clock Input

The WM8731 can convert input data with up to a 96kb sample rate.

Additional GPIO pins used for RigPi Audio:

GPIO 17 (Pin 11): PTT  
GPIO 27 (Pin 13) DS: Clock for KX3 Power On voltage doubler  
GPIO 22 (Pin 15): KPTT: Toggle for KX3 Power On

Connectors:

J1: Raspberry Pi GPIO connector  
J2: 3.5 mm jack for I/Q input (stereo, unisolated)  
J3: 3.5 mm jack for left channel audio input (tip, transformer isolated)

J4: 3.5 mm jack for audio (tip), PTT (ring), and KX3 (ring) power on signal

J5: Connector to route audio to the RigPi jumper board

Jumpers:

JP1: KX3/PTT (1-2 for KX3 Power On pulse, 2-3 for normal PTT)

JP2: Audio In selection (1-2 for stereo -no transformer isolation-, 2-3 for left mono - transformer isolated- input)

Elecraft KX3 Power on circuit

Transistor Q1 inverts and buffers a clock from the GPIO connector to feed a voltage doubler diode pair, D3. Q2 turns on emitter follower, Q3, to supply a short 7-volt pulse to turn on a KX3 through the ring connector on the KX3 microphone input.

## RigPi Keyer Circuit Description

The K1EL WinKeyer3 CW Keyer IC provides all of the programming for its many features. The keyer is controlled through the internal serial port on the Raspberry Pi, ttyS0.

RXD (Pin 8): Receive data (from keyer)

TXD (Pin 10): Transmit data (to keyer)

Connectors:

J201: Raspberry Pi GPIO connector

J202: 3.5 mm jack, PTT out (tip is PTT, ring is 5V pull-up)

J203: 3.5 mm jack, Paddle input (tip is DOT, ring is DASH)

J204: 3.5 mm keying output (tip keys, ring not used)

J205: speaker connection

J206: PB-NET (allows external switches to play back internal memory, not used)

J207: Programming connector, not used

Jumpers:

JP201: PTT enable (1-2 enables GPIO PTT, otherwise, GPIO PTT not used)

6.11 Glossary

Term	Definition
<b>ARRL</b>	The American Radio Relay League ( <b>ARRL</b> ) is a worldwide organization of amateur radio operators with its headquarters in Newington, Connecticut, USA.
<b>Account</b>	RSS provides user accounts with usernames and passwords. Each account manages a radio, keyer, and rotor.
<b>Ajax</b>	Asynchronous JavaScript and XML is a method of building interactive applications for the Web that process user requests immediately.
<b>API</b>	Application Programming Interface
<b>Bootstrap</b>	An open source toolkit for developing web content with HTML, CSS, and JS provided by Twitter.
<b>CAT</b>	Computer Aided Transceiver. A protocol for controlling radios.
<b>Client</b>	A computer or mobile device connected to RSS.
<b>CSS</b>	Cascading style sheets. <a href="#">Cascading style sheets</a> are used to format the layout of Web pages.
<b>Download</b>	Transfer data to a client, such as a PC, to RSS
<b>GPIO</b>	General Purpose Input Output, a connection used by the Raspberry Pi for controlling external devices.
<b>Hamlib</b>	A radio and rotor library developed to facilitate control of ham equipment
<b>JavaScript</b>	An object-oriented computer programming language commonly used to create interactive effects within web browsers.
<b>jQuery</b>	A concise and fast JavaScript library that can be used to simplify event handling, HTML document traversing

Term	Definition
<b>LoTW</b>	Logbook of the World, a service from ARRL that provides secure electronic QSO confirmations.
<b>MariaDB</b>	A community-developed fork of the MySQL relational database management system intended to remain free under the GNU GPL.
<b>MOMR</b>	Multiple-operator, multiple-radio, supported by RSS
<b>MySQL</b>	An Oracle-backed open source relational database management system (RDBMS) based on Structured Query Language (SQL)
<b>PHP</b>	PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. PHP is the acronym for PHP: Hypertext Preprocessor. (It originally meant "Personal Home Page.")
<b>Raspberry Pi</b>	A small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation
<b>RSS</b>	RigPi Station Server
<b>Upload</b>	Transfer data from a client, such as a PC, to RSS
<b>TQSL</b>	Trusted QSL provides secure transfer of logs to and from the Logbook of the World
<b>VoIP</b>	Voice over IP, the technology used to provide 2-way audio to and from RSS for remote operations. RSS uses the free, open-source program Mumble to provide VoIP.