

Monitoring Multiple Bands with SDRuno

One of the great advantages of an SDR is that it allows an entire band to be quickly scanned visually, so you never have to miss a signal. But we're always hungry for more so how about keeping an eye on other bands as well? The RSP / SDRuno combination allows you to do this as long as the bands of interest fall with the maximum sampled bandwidth of the RSP, i.e. 10MHz.

1. **The quick and easy way** - switch back and forth using the "Band" buttons:

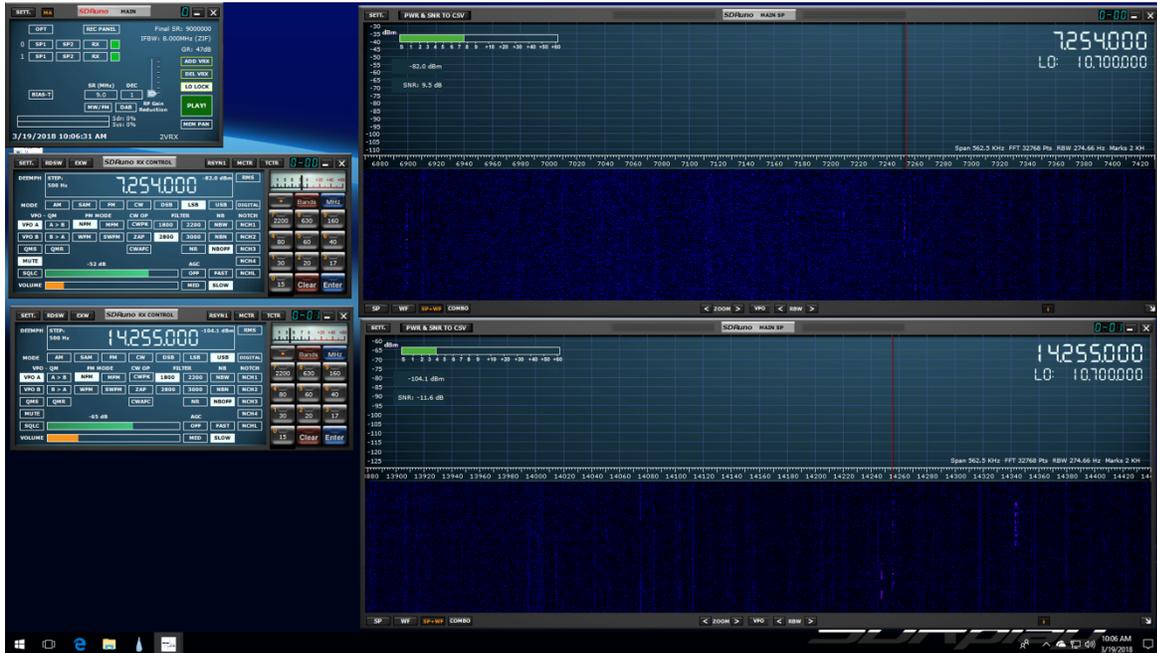


- Let's you examine bands over the entire 1kHz to 2GHz coverage range of the RSP, however...
- Not a true simultaneous view
- If set up as panadapter you may not want to have your rig switching back and forth, but you can use the RSYN1 button to temporarily disable syncing the RSP and the rig

2. **A better way.** Use multiple VRX, one for each band of interest.

- True simultaneous view
- Dedicate one VRX to control your rig, use additional VRX(s) to monitor other bands
- Easily switch rig control from one VRX to another, when you want to work another band

(Note: The features and operation described here are using SDRuno v1.22, specific details may well change – for the better – in future revisions!)



3. Setting it up (some maths required!)

- Bands to be monitored must fall within the sampled “chunk” of spectrum from the RSP (10MHz max, less if your PC cannot support it)
- Example – Monitoring the 40m and 20m bands
 - 40m: 7.0 – 7.3MHz
 - 20m: 14.0 – 14.3MHz
- So we need to sample the spectrum from 7.0 – 14.3 MHz = 7.3MHz
- Therefore we need to use a Sample Rate >7.3MHz, i.e. 8MHz
- Our LO must be set (and locked) to midway through the range, say ~10.5MHz
- Our sampled range is now 10.5 +/-4MHz = 6.5 – 14.5MHz
- Let’s see this in practice...

Open SDRuno. Click on the workspace name in the SDRuno Main window and select an unused Workspace. This will give you a blank screen with only the SDRuno Main window open.

Click on “Add VRX” to create a second VRX. Click on the red box next to the new VRX to enable it:

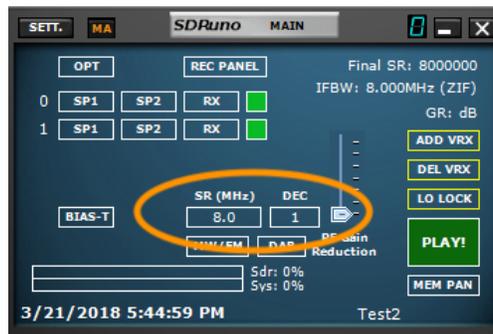


For each VRX click on “RX” and “SP1” to give us a control panel and a spectrum window for each. Arrange the windows as you like, then press “CTRL-W” to save this arrangement to whichever workspace location you prefer. Right click on the Workspace name and give it a name you will recognize later, e.g. “2 VRX test”:



Note: you may also open up other windows to suit, e.g. SP2, EXW or Memory panel. For this example we are only using the bare minimum to avoid clutter!

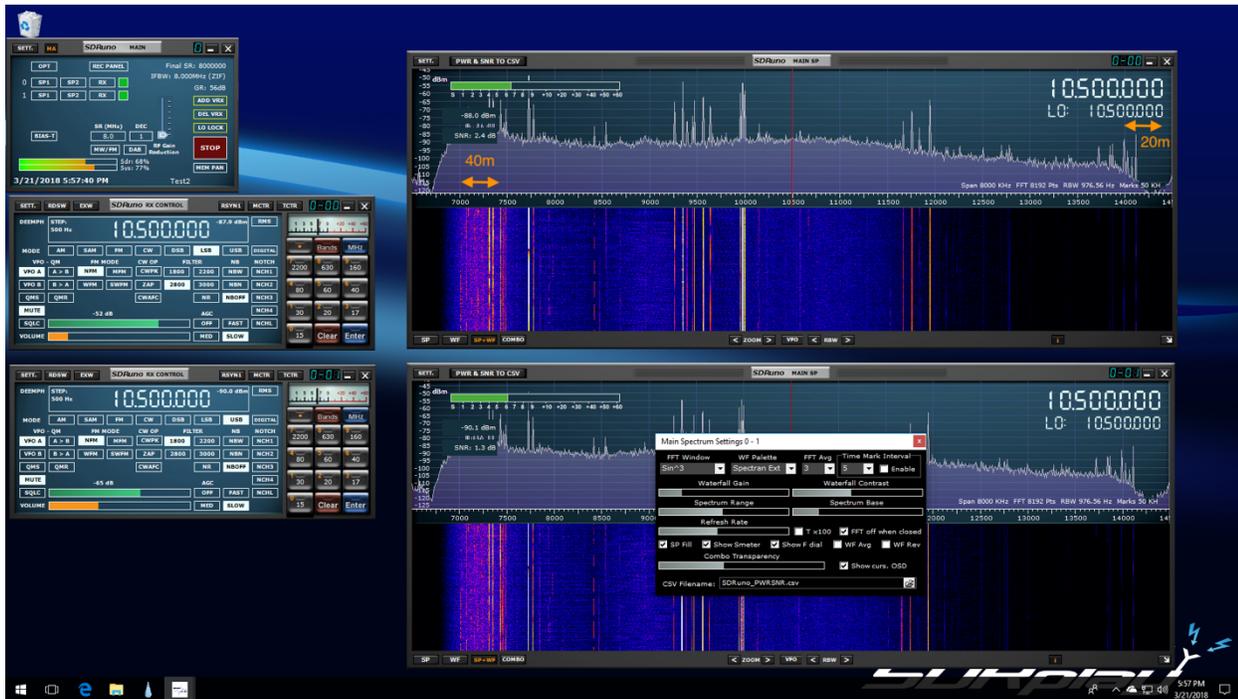
In the Main window set the Sample Rate (8MHz):



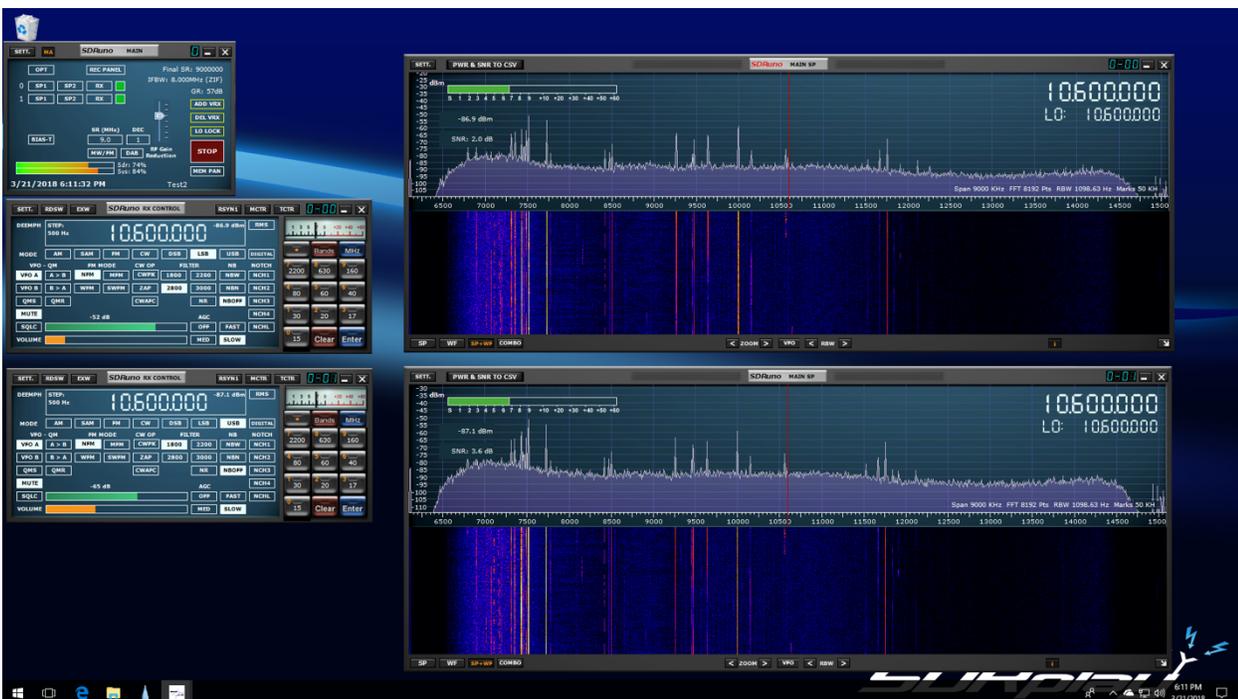
In one of the VRX enter the LO frequency, click on the frequency display to zero it and then type in "10.5m" <enter>. The Main SP window will now show both the Tuned frequency and the LO as 10.5MHz:



Click on Play in the Main window and observe the spectrum:



Observe that while the portion of the spectrum covering 40m is quite flat, there is a quite sharp rolloff above 14MHz in the 20m band! We could increase the LO frequency to help the 20m band, but we will find that we end up with some rolloff at the bottom of the 40m band. The solution in this case is to increase the SR to 9MHz and then we can see we get a flat response for both the 20m and 40m bands:

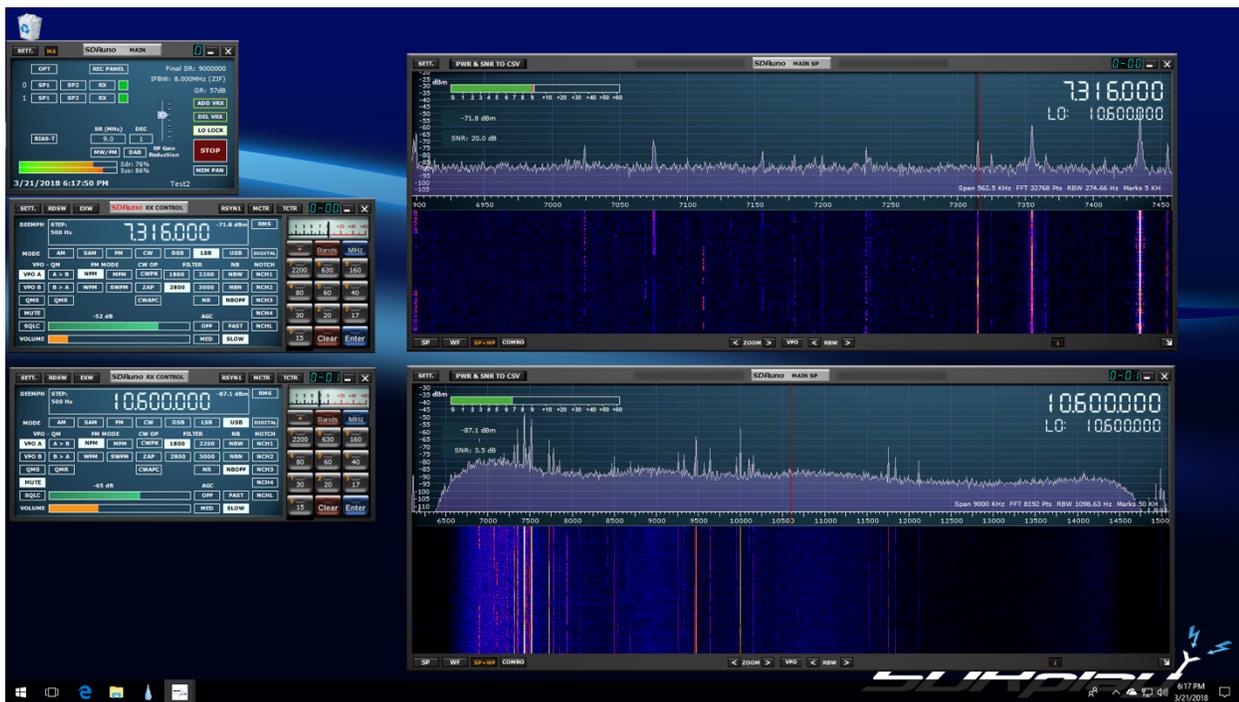


Here you will see that the SR has been increased to 9MHz, and the LO frequency changed to 10.6MHz, resulting in a flat spectrum for both the 20m and 40m bands. Feel free to adjust these parameters to suit whichever bands you are interested in.

Now we can go ahead and lock the LO frequency using the “LO LOCK” button in the Main window.

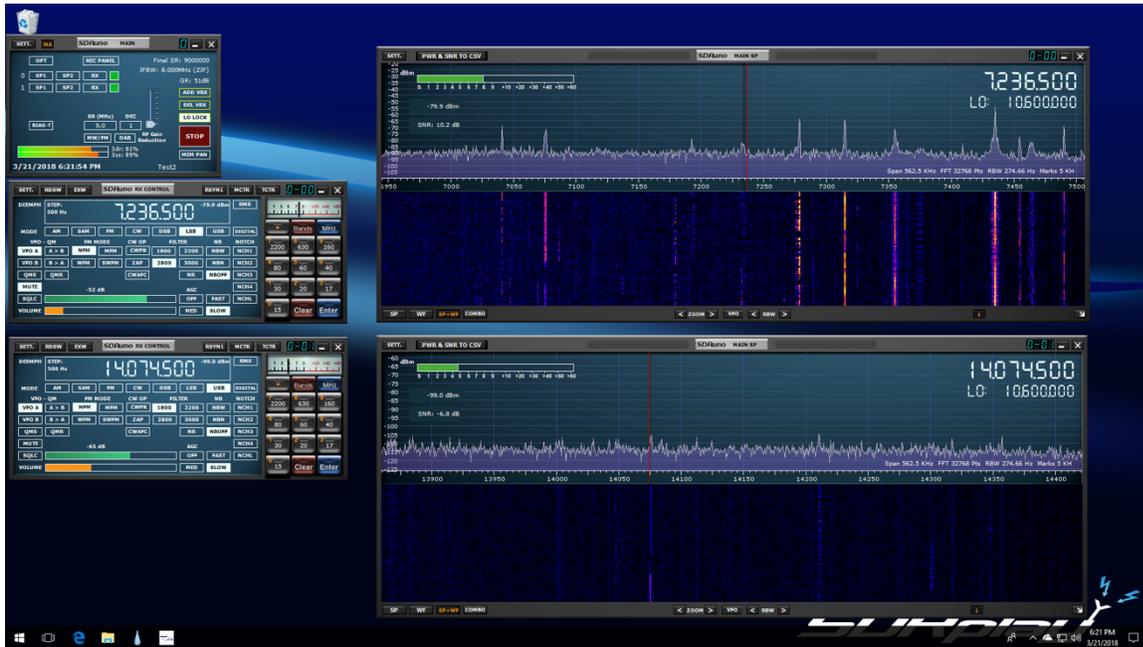
Then, go to SP1 and click on a frequency near the middle of the 40m band. Use the Zoom arrows to zoom in on the spectrum, at this sample rate the maximum zoom will give you 562.5kHz spectrum width. As you zoom in the tuned frequency will return to the center of the display, but if you lose it, just click on the VFO button at the bottom of the window to center it.

Once you have zoomed in all the way, you can drag the frequency axis left and right to center the 40m band in the display:



Now go to the SP1 window for the second VRX and repeat the procedure, but this time click in the middle of the 20m band.

As you zoom in on the spectrum in the lower window you may notice the frequency scale in the upper window has changed to follow suit, don't worry just click on the VFO button at the bottom of the top window to restore the correct frequency display:



4. Three bands?

You may be wondering if you can also monitor 30m, which after all is also within our selected chunk of spectrum (10.6 +/-4.5MHz). The answer is yes you can!

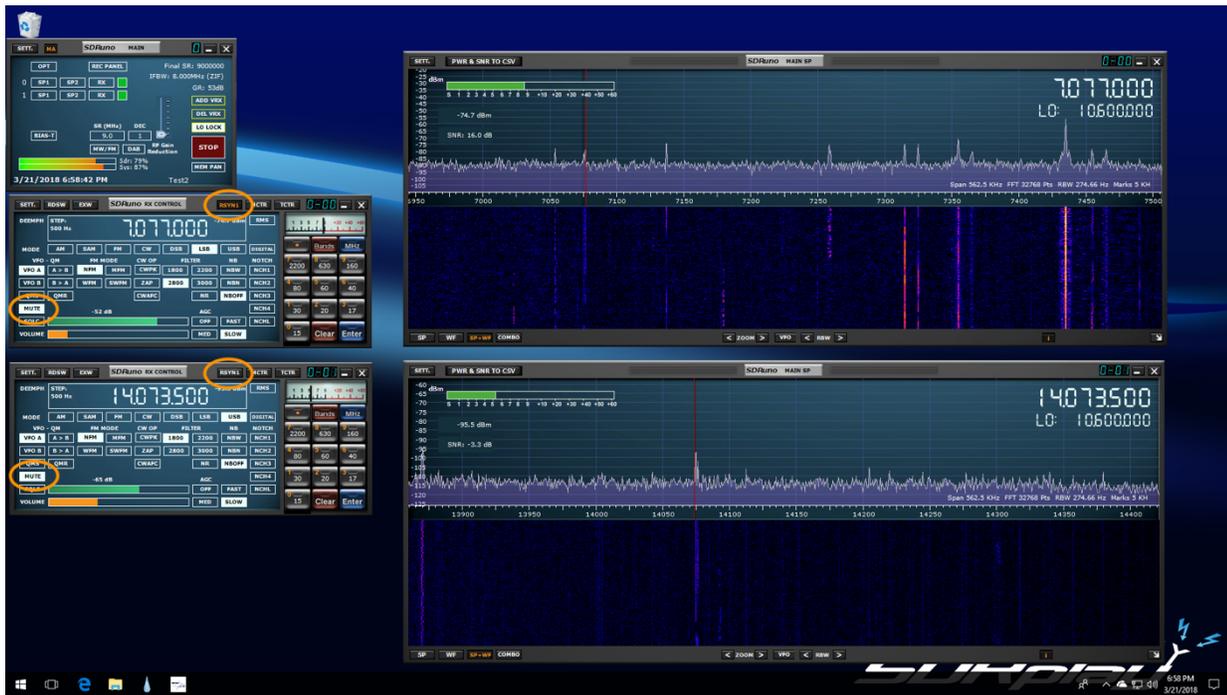
Things can get a bit crowded monitor space wise, but if you have a multi-monitor set up you can go to town with all sorts of windows open. Here's an example showing 3 bands:



5. Panadapters

If you have a panadapter setup via OmniRig you can choose which VRX controls the rig by clicking on the RSYN1 button at the top of the RX Control window:

In a typical scenario you would use one VRX to work a particular band with your rig, muting the audio from SDRuno and listening to received audio through the rig. Meanwhile you can monitor another band in SDRuno using the second VRX. If you see anything of interest you can unmute that VRX and listen, if it's a signal of interest you can then click on the corresponding RSYN1 button to sync your rig to that frequency:



Note: this technique can only work if the RSP has a broad range RF signal to sample, either from a shared antenna or RX out from the rig. If your panadapter is configured to use IF out from the rig then the spectrum the RSP can sample and display is limited by the IF bandwidth of your rig.

6. Review

- Do not use the band buttons!
 - They select specific SR and DEC values to frame one particular band, we want to cover more than one band.
- We need to lock the LO *between* bands and select a SR which covers all the bands of interest
- First set up SDRuno for 2 VRX
- When SDRuno is first started the tuned frequency and the LO are the same so...
 - We can type in our desired LO (10.5MHz) in one of the VRX windows
 - Click on “LO lock” to lock the LO frequency
- Click on “Play”
- Now **click** on a frequency near the center of the band of interest in the first VRX – 7.15MHz
- In the second VRX **click** on a frequency near the center of the second band of interest – 14.15Mhz
- Visit SP1 for each band and use the zoom buttons to match the displayed frequency range with the width of the band of interest
- Use the RSYN1 button in the VRX window to select which band will be sync'd with your rig
 - Switch the rig back and forth between the bands when you see something of interest
- You will probably want to mute the VRX which is tracking your rig (to prevent echoes), and turn up the level on the other band(s) to have a listen to what's going on.
- In this example our sampled spectrum also includes the 30m band so you could also set up a third VRX and monitor that as well!

7. Video

There is a video illustrating the concepts outlined in the application note on our YouTube channel:

<https://youtu.be/ckbOdDjHfbg>

For more information about SDRplay, the RSP family of receivers, other application notes, and further technical information please visit our website at www.sdrplay.com



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