SO2V: Exploiting the K3 Subreceiver

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Recently, RTTY guru Ed Muns, W0YK, told me about an exciting new feature added to Writelog which takes advantage of the Elecraft K3 independent subreceiver to emulate SO2R (Single Op 2 Radio). He called it SO2V (Single Op 2 VFO). While not as flexible or efficient as SO2R contesting, SO2V does have the potential to increase operator productivity, i.e. increase your contest score, as well as increase the fun.

Here's how it works:

Recent versions of Writelog have the ability to select two radio operation with both radios on the same com port. This creates two entry windows: one for VFO A and one for VFO B. With the focus in VFO A Entry Window you open a RTTY window (call it RTTY Window A) which will be used to enter and transmit data via VFO A. Similarly, with the focus in VFO B Entry Window you open a second RTTY window (call it RTTY Window B) which will be used to enter and transmit data via VFO B (actually SPLIT mode). Now you have two RTTY windows on the screen, each with its own tuning indicator.

With the K3 subreceiver turned on, VFO B tuning shows up in RTTY Window B and VFO A tuning shows up in RTTY Window A. If you click on a callsign displayed in RTTY Window A, that data is transferred to Entry Window A; if you then send the exchange programmed message, the K3 transmits on the VFO A frequency. Similarly, if you click on a callsign displayed in RTTY Window B, that data is transferred to Entry Window B; if you then send the exchange programmed message, the K3 transmits on the VFO B frequency.

This setup allows several operating advantages:

Search and Pounce

If you set VFO A to one end of the RTTY subband and VFO B to the other end of the RTTY subband, you can tune both VFOs simultaneously while looking for your next QSO. I like to tune VFO A down from the top of the subband and simultaneously tune VFO B up from the bottom of the subband. I stop tuning the VFO which first finds a station and continue tuning the other VFO until I have a second station tuned in. This is actually quite easy to do with RTTY since it is just a matter of watching the tuning indicator; I like to use three tuning indicators in each RTTY Window: Spectrum (tune for aligned twin peaks), XY scope (tune for vertical & horizontal ellipses), and Waterfall (tune for trace alignment). I initiate a QSO in whichever window is QRZ first. When I finish the first QSO I wait until the second window is QRZ and complete that QSO. But I have also started tuning in the first window, looking for the next QSO. I resume tuning both VFOs simultaneously as soon as the second VFO QSO is completed. While this may sound complicated, it really isn't; tuning both VFOs simultaneously is smooth and natural and watching the tuning indicators is straightforward.

Finding Mults While CQing

Let's say you are CQing on your VFO A frequency. You can be simultaneously tuning for signals on the subreceiver whenever you are not transmitting. When you find a new station on the subreceiver, you watch until the timing is synchronized with your CQing, click on the new callsign in RTTY Window B, and initiate a QSO. While this is happening, you may very well see that you have a station responding to your CQ in RTTY Window A. As soon as the QSO is completed in RTTY Window B, you click on the callsign, if any, in RTTY Window A and initiate that QSO. IF no one has responded to your CQ, you would click in the Entry Window A (or press the Up Arrow key) and resume your CQing routine.

Find a good CQ frequency

Actually, it is not necessary to CQ on VFO A and Search on VFO B – you can just as easily CQ on VFO B and Search on VFO A. You can improve efficiency while searching for a good CQ frequency. You follow the Search and Pounce procedure as described previously; if you come upon a clear spot in either VFO you just select the associated Entry Window and start your CQ routine.

Setup the K3

The Elecraft K3 needs to have a subreceiver installed and turned on – tap the SUB button to turn it on. Tune both VFOs to TX DATA on the same band.

Setup MMTTY

Assuming you use the MMTTY plugin for RTTY, you need to install two copies in separate folders. Setup copy one (call it MMTTY1) with the Soundcard set to the Left channel so that this copy of MMTTY will display VFO A signals. Setup the soundcard on the second copy of MMTTY (call it MMTTY2) to the Right channel so that the second MMTTY displays signals received on the subreceiver. Of course, you need to use a standard stereo cable from your soundcard LINE IN to the K3 LINE OUT.

Assuming you use FSK RTTY, you will need two COM ports. Setup MMTTY1 to use FSK on an available COM port and MMTTY2 to use FSK on a different and available COM port. The two FSK keying circuits are wired in parallel to the K3 ACC-1 FSK IN pin. I use a breakout adapter connected to the K3 ACC-1 DB15 connector to facilitate easy wiring. (This adapter is available from Winford Engineering as BRKSD15M-C http://www.winfordeng.com/products/brksd15.php).

Setup Writelog

In Writelog you will need to do the following:

1. In Setup → Ports you need to have two radios configured for rig control. Create a second Rig Type (i.e. another row in the table) to Elecraft K3 and select the same COM port (call it COMM *x)* that the first K3 row uses for rig control. Both radios should also be set to the K3 baud rate (usually 38400).
2. Since this discussion assumes RTTY, in Setup → Ports, be sure you have not selected CW, Rotator, or SO2R controls to use either of the two FSK COM ports.
3. From the Menu: Radio → Number of Radios , select "2".
4. From the Menu: Radio →Headphones Split (so you don't mute the non-focus audio).

5. In Entry Window A (upper) click the Frequency/Mode button (the one that displays the rig frequency and mode) to display the drop down selection box "Log the frequency of QSOs". Select "rig on COMM*x*", where *x* corresponds to the COMM port used for the K3 rig control.
6. Similarly, In Entry Window B (lower) click the Frequency/Mode button (the one that displays the rig frequency and mode) to display the drop down selection box "Log the frequency of QSOs". Select "rig(2) on COMM*x*", where *x* corresponds to the COMM port used for the K3 rig control.
7. With the focus in Entry Window A, select from the Menu: Window → RTTY. If you have never opened a RTTY window before this, select TU Type → MMTTY. You will be prompted to Browse for the MMTTY.EXE file corresponding to MMTTY1. If you have previously configured Writelog to use MMTTY1 for RTTY, it will open. At this point you should have one MMTTY RTTY window with its associated tuning window displayed.
8. Similarly, with the focus in Entry Window B, select from the Menu: Window → RTTY. Assuming you have never opened a second MMTTY RTTY window before this, select TU Type → MMTTY. You will be prompted to Browse for the MMTTY.EXE file corresponding to MMTTY2, i.e. the second installed copy of MMTTY. At this point you should have two MMTTY RTTY windows with their associated tuning windows displayed.

Testing

Verify that that you can tune in RTTY signals with VFO A (the Main receiver) in RTTY Window A and RTTY signals independently with VFO B (the subreceiver) in RTTY Window B.

For testing purposes, put the K3 in TEST mode (press and hold the MODE^/TEST button) or use a dummy load.

With the focus in Entry Window A, type Alt-K to enable sending from the keyboard. You should immediately hear the K3 "diddling" (you may need to increase the MON level). Press the ESC key to terminate the diddling. If you hear just a steady tone, you may need to check the settings in MMTTY1. You can either do this from within Writelog or shut down Writelog and open MMTTY1 independently. Also, check your FSK interface wiring. If the K3 doesn't go into transmit mode, check your Rig control settings in Writelog.

Similarly, with the focus in Entry Window B, Alt-K should produce "diddles". If not, check the configuration of MMTTY2.

Other Possibilities

I see no reason why the SO2V concept wouldn't work on CW or SSB. I haven't tried this because, quite frankly, my brain can't handle the decoding in separate ears. Maybe yours can – give it a try!

I also believe the SO2V concept will work with AFSK RTTY. Again, I haven't even attempted this as I strongly prefer FSK.

Limitations

I would love to be able to have the subreceiver on a different band so that I could be working two bands simultaneously. The K3 subreceiver can be set to a different band from the main receiver if CONFIG:Sub

is set to IND. However, even with this configuration I was unable to get Writelog and the K3 to work together properly. VFO B (the subreceiver) would transmit for a second and terminate. I never could get this to work. I suspect it has to do with antenna selection for the subreceiver, but I haven't looked into this sufficiently. Any ideas?

Experience

I used this technique for the first time in the July 2011 NAQP RTTY contest and achieved my best score ever in this contest. In July 2010, my previous best score was 426 QSOs x 123 Multipliers for 52,398 total points. In July 2011, using SO2V, my score was 465 QSOs x 135 Multipliers for 62,775 total points. This indicates a nice improvement in QSOs, but also a dramatic improvement in multipliers. The equipment was identical both years: K3 to a DB18E SteppIR at 48 feet plus an 80M Inverted Vee. I attribute the increase in multipliers almost entirely to using the SO2V technique since I was unable to move multipliers to other bands due to the relatively slow retuning required by the SteppIR. Needless to say, I intend to use SO2V in future contests.

Conclusion

This article has described a technique for using Writelog with an Elecraft K3 to approximate SO2R using the subreceiver in the K3 and relatively new capabilities in Writelog. This technique has the potential to increase your contest score while having more fun doing it.