

Getting Started with Single-Operator, Two-Radio (SO2R) Operation — Part 2

In Part 1, I described how to configure a basic SO2R contesting station from an equipment standpoint. In Part 2, I'll describe some techniques that new SO2R operators can use to interweave contest QSOs between two radios while still remaining a single operator. Although there are many different ways to operate SO2R from basic to advanced, I will focus on some of the basics on how to get started for those new to SO2R. Most of my discussion will relate primarily to CW contesting, although I will also address some aspects of SO2R specifically related to RTTY and SSB contesting. Major contest software such as *N1MM Logger+* and *WriteLog* have specific features to support SO2R. My most recent experience has been with *N1MM Logger+*, so I will use that for any specific examples I discuss.

Some Basic Up-Front Decisions

There are a couple basic decisions you need to make before you dive into SO2R. One decision is what level of automation you are comfortable with. Logging software can be configured to automatically change the focus between Radio 1 and Radio 2 based on what you are doing and where you are in the QSO. This can save a lot of button presses, but it can also be confusing for the beginner, especially if there is a glitch in one of the contacts (e.g., a called station does not come back or needs a repeat). For example, if you are calling CQ on Radio 1 and quickly drop your call sign in on Radio 2 to answer a CQ, auto resume will automatically resume calling CQ on

Radio 1 without operator intervention. If the station on Radio 2 comes back, and you quickly send your exchange, the CQ on Radio 1 will auto resume. This works fine, unless a fill is needed.

Another basic decision is how you want to manage your audio. SO2R can be configured to always present the audio it "thinks" you should be listening to. In most cases, you would be listening to both radios at once, except when you are transmitting, at which time the audio from the transmitting radio would be muted. Most SO2R interface boxes have a way to quickly switch audio to listen to Radio 1, Radio 2, or both. The ~ key in *N1MM Logger+* does the same thing. For most of the contest, I listen to both radios. If a station I am working is very weak, though, I often temporarily mute the other radio.

Finally, you need to decide when you will operate SO2R. In most cases, you would do this for the entire contest. I usually start SO2R right away unless I happen to get off to a fast start and/or have a great run going. In that case, I watch the rate meter. When it starts to drop, I turn up the audio on the second radio and start looking for people to work on the second radio while still CQing on the first. SO2R will be most effective when two bands are open. Some prefer to use SO2R only when things really slow. In that case, alternating CQs on two bands can help you snag a few more contacts than you might normally.

CQ and S&P

CQing on one radio while S&Ping on the

other is probably the most common way SO2R is utilized. This is a good place to start (see Figure 1). The chart illustrates the typical steps to intersperse an S&P QSO on Radio 2 while CQing on Radio 1. The rows in this chart indicate a sequential time slice of variable length. At time *t*, a CQ is called on Radio 1. At time *t+a*, there is no response on Radio 1 nor has a station been found on Radio 2. At *t+b*, a second CQ is kicked off on Radio 1 at the same time NØAT finishes a CQ on Radio 2. At time *t+c*, I send my call sign on Radio 2 in answer to the NØAT CQ. At time *t+d*, I kick off another CQ on Radio 1 while copying (and entering) the exchange from NØAT on Radio 2. At time *t+e*, I send my exchange for NØAT on Radio 2 while KØMD answers my CQ on Radio 1. At time *t+f*, I send my exchange to KØMD on Radio 1 while copying NØAT's acknowledgement on Radio 2. At time *t+g*, I send my exchange to KØMD. At *t+h*, I send my "QRZ" message on Radio 1. *Whew!*

When an interwoven QSO such as this works out, it is a beautiful thing. In reality, however, the timing often does not always work out that well. For example, what if your Radio 1 CQ at *t+b* is only about halfway done when NØAT completes his CQ on Radio 2. One thing you can do is simply wait and hope nobody else calls NØAT while your CQ is finishing. Another thing you can do is abort your Radio 1 CQ and call NØAT on Radio 2 immediately. Although I will do this occasionally, I try to not to do it too often as it really annoys me when I hear an SO2R op continually aborting CQs. If someone else calls NØAT, you can just wait for that Q to finish and call NØAT, which will hopefully be at a better time in your CQ cycle on Radio 1. Another thing that might happen is that the S&P station on Radio 2 might need a fill. If this happens, you will need to quickly change the focus back to Radio 2 and send what he needs. Normally, you will want to wait for Radio 1 to complete what it is doing before going back to Radio 2 for the fill. The problem is that, if you wait too long, the S&P station might get impatient and ask for the fill again. Have some function keys set up for some quick fill messages (section, number, etc.). Also, some SO2R operators find it helpful to have both a "long" and "short" CQ message. The long CQ message is

	Radio #1		Radio #2	
Time	RX	TX	RX	TX
t		CQ Test KØAD		
t+a				
t+b		CQ Test KØAD	CQ Test NØAT	
t+c				KØAD
t+d		CQ Test KØAD	KØAD Ron MN	
t+e	KØMD			TU AL MN
t+f		KØMD AL MN	TU NØAT	
t+g	TU Scott MN			
t+h		TU KØAD		

TX and RX messages for each radio in a typical SO2R CQ/S&P scenario.

used when you are copying something on the other radio to give you a bit more time to do so. Some contesters prefer to use their paddle to provide a fill or say a quick hello. You need to be careful when doing this with SO2R. Even though the cursor may be in the entry window for Radio 2, which does not mean that this radio is the one that will transmit when you use your paddle. In *N1MM+*, I often need to do a Ctrl + left or right arrow to make sure the paddle is connected to the right radio. In general, it is best to not use the paddle at all when doing SO2R.

Dual CQing

Another common technique when using SO2R is to alternately CQ on *two different bands*. This is often referred to as “Dual CQing.” A general rule is to try something different when the rate goes down. If two bands are open but CQ/S&P does not seem to be working, I will often try dual CQing. I have also found dual CQing to be very effective in RTTY contests. More about that later. Figure 2 shows an example of interweaving QSOs when dual CQing. At time *t*, a CQ is called on Radio 1 with no response heard at time *t+a*. At time *t+b*, a CQ is kicked off on Radio 2. At time *t+c*, NØKK responds to the CQ on Radio 2 and his call is entered at the same time a new CQ is initiated on Radio 1. At time *t+d*, the exchange is sent to NØKK on Radio 2 while (at the same time) NØIJ responds to my on Radio 1. At time *t+e*, NØKK’s exchange is copied on Radio 2 at the same time my exchange is sent to NØIJ on Radio 1. At time *t+f*, NØIJ’s is copied and entered on Radio 1 while a QRZ message is sent on Radio 2. At time *t+g*, a QRZ message is sent on Radio 1, and the cycle is complete. Like the previous example, things go well if the timing is right and no fills are required. If not, you need to adjust the best you can.

With both *WriteLog* and *N1MM+*, you can kick off a dual CQ so that the computer will automatically send CQs on alternate radios until someone comes back and you intercede. Sometimes I prefer to do this manually. With *N1MM+*, I hit F1 for the CQ, hit “/” to change focus to the other radio, and then hit F1 again. I keep doing this until someone comes back. This keeps me more engaged and lets me control the rhythm a little better. If, for example, the op coming back to my CQ is sending very fast, I may want to send my exchange before kicking off the CQ on the other radio. On the other hand, if the station coming back is sending very slowly, I would go ahead and kick off the alternate radio CQ.

Moving Stations to Another Band

In contests where multipliers count once per band, you can really improve your score by moving multipliers to an-

	Radio #1		Radio #2	
Time	RX	TX	RX	TX
t		CQ Test KØAD		
t + a				
t + b				CQ Test KØAD
t + c		CQ Test KØAD	NØKK	
t + d	NØIJ			NØKK AL MN
t + e		NØIJ AL MN	TU Kirk MN	
t + f	TU John MN			TU KØAD
t + g		TU KØAD		
t + h				

TX and RX messages for each radio in a typical SO2R dual CQing scenario.

other band to get credit for an additional multiplier. This used to be really popular in the North American QSO Party as well as the CQ WW DX events. Typically, such requests are made by a station that is CQing. Asking a station that is running to interrupt their run to work you somewhere else is bad form. When deciding whether you are going to ask someone to work you on another band, I typically consider whether I can successfully move the multiplier without disrupting my current run rate too much, and whether I have a reasonable chance of hearing the station on the alternate band. If the answer to both these questions is yes, I attempt to move the multiplier. Technically you do not need to be set up for SO2R to do this, but a two-radio setup makes it much easier and less disruptive.

To make the request, I have a function key message set up to say something like “QSY {Other Freq}? *N1MM+* software automatically plugs in the frequency of the second radio. I send this message (on my CQ radio) instead of the normal QRZ message. If the station agrees, I continue CQing on my run frequency but blend in the call on the other band to the requested station. I usually select an “Other Freq” that is high in the band and less likely to be busy. If I am successful in moving and working the multiplier without losing my run frequency, I smile and move on.

I have found that on CW and SSB, requests to move a multiplier normally come in the form of a question (e.g., QSY 21065?). The station either agrees or declines, and you go from there. On RTTY, however, my experience is that the run station merely states where they are active (e.g., TU QRV 21089 DE K0AD QRZ) and continues on with their run. Quick back and forth questions don’t typically work as well on RTTY as they do on CW and SSB.

SO2R on RTTY

For those just getting started in SO2R,

you might want to consider trying SO2R on RTTY even before you try it on CW or SSB. Because the mental step of “copying the code” is not present in RTTY contesting, some feel it is much easier to interweave QSOs on RTTY than it is on CW or even SSB. For the most part, the techniques and equipment described still apply. Some experienced RTTY contesters have found it is practical to do SO3R and beyond on RTTY, because they are freed of the decoding step. One fact of life with RTTY SO2R is that every message with the same text takes exactly the same time to transmit every time. There is really no way to speed it other than shortening the messages. Sometimes, the other op will get impatient (or even disappear) while the RTTY message on the other radio is running to completion. You just have to deal with this the best you can.

You should be careful not to inadvertently wander into Multi 2 or Multi-Multi mode when doing SO2R. This would happen if you ended up, for some reason, transmitting on both radios *at the same time*. This becomes tempting when you are waiting for a transmission to complete before you can get back to someone on the other radio who either just answered your CQ or just completed sending their exchange. Of course, you can abort your transmission on one radio to get back to other radio but you should avoid doing this. In *N1MM+*, the best way to prevent this is to set up the SO2R TX Lockout parameters correctly. I make sure that “Multi-2” in *not* checked and that “First One Wins” is checked.

SO2R on SSB

To be honest, I do not use SO2R on SSB very much. Part of the reason is that I don’t operate that many SSB contests as compared to CW and RTTY events. Another reason is that the time taken for each exchange is often not as precise and can be unpredictable. For example, an experienced contestester might sent their

exchange by merely saying something like "5 9 Ohio." A more casual contesteer might say something like "KØAD Roger your 5 9 Minnesota. You are 5 9 in Ohio. Go Ahead." The lengthier exchanges can affect your timing. If the contest uses serial numbers, it is difficult to use stored macros on the second radio (although it is possible). That said, the techniques are basically the same.

Final Thoughts

SO2R operation has really made operating contests from an average station in the Midwest much more fun for me and allowed me to be more competitive than I might be without it. SO2R does have its critics, and some feel it should be a separate category. I happen to disagree with that opinion but will not address the politics of SO2R at this point.

A few courtesies should be kept in mind when doing SO2R. First, SO2R does not mean that you "own" two frequencies on two different bands. If you lose your run frequency on your CQ radio because you are detained on your second radio, do not try to "reclaim" your frequency by just starting to CQ again. Losing one of your frequencies is one risk of SO2R. Second, try to minimize the number of times you abort a CQ if something goes wrong (or takes too long) on the second radio. Finally, do not run SO2R to "dual CQ" on the same band. There is enough QRM on crowded bands like 20 and 40 meters without taking up two frequencies on the same band. Some contests specifically ban the practice of alternating CQs on the same band.

As I was completing this Part 2 article, I received an e-mail from Rick Tavan, N6XI, who had just read Part 1 and offered a relevant comment on cross-band interference when using SO2R. Rick points out that a major consideration (besides antenna placement, band-pass filtering, and power) is *environmental factors* that can cause re-radiated RFI. Such factors can make a big difference in how to reduce cross-band interference. Rick points out that you can spend lots of dollars on antenna separation and band-pass filters without significantly reducing cross-band interference if these factors are not dealt with. Details on how to deal with these environmental factors is beyond the scope of this article (and my expertise), however.