

ADVANCED Q-STICK DXING TECHNIQUES

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The original article on the QUANTUM STICK (Q-STICK) gave brief construction details and rudimentary operating instructions. I alluded to more advanced operating techniques so I'd like to provide a little more information on these techniques so you can use your Q-STICK and portable radio to improve reception quality and increase your probability of nabbing some tough DX.

NULLING

With some radios, mounting the Q-STICK directly on the radio's cabinet has little if any effect on the radio's nulls of stronger stations. With other radios, however, because the gain of the Q-STICK is so high, its magnetic field can couple with not only the radio's ferrite antenna, but also with front-end circuitry and components. The result is: shallow, less useable nulls. The solution is to *not* permanently mount the Q-STICK on your radio if you anticipate ever needing to null a strong station. Instead, use the Q-STICK unattached and position it at a distance (an inch or so) from the radio so that both the radio's null and the Q-STICK-induced signal peak are preserved. Later in this article I'll describe a method of deepening your radio's null (through "phasing") using the Q-STICK.

MINOR Q CONTROL

As mentioned in the original article, changing the distance of the Q-STICK from the radio alters in an inverse fashion both gain and tuning sharpness, or "Q." While this Q control does not provide the degree of sharpening of, say, a Q-multiplier, it can be useful in some situations. For example, the Superadio III has two IF bandwidths, "wide" and "ridiculously wide," with the result being slop from even moderately strong stations appearing on adjacent channels. Here in Pensacola, WVTJ-610 kHz (a low-powered and over-modulated fire-and-brimstone station across town) splatters its signal distractingly when I'm trying to listen to the sports station, WSUN-620 kHz, down in St. Petersburg even though I have WVTJ in a partial null and the SRIII in its less wide IF position. De-coupling (i.e., increasing the Q) of the Q-STICK by moving it out onto the folded-down SRIII carrying handle and re-peaking WSUN results in a clean signal from the station downstate.

Q-MULTIPLICATION WITH THE QUANTUM LOOP AND STICK

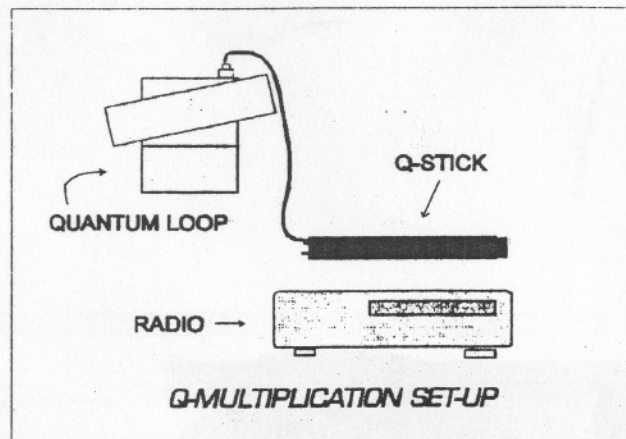
If you happen to own both the QUANTUM LOOP (or any other loop with gain control) and Q-STICK, you can invoke Q-multiplication (or regeneration) by carefully manipulating a couple of variables. For easiest manipulation, all of the components (i.e., radio, loop, coupler) should be small enough to allow their relative positions to be easily controlled. The theory underlying the technique is really very simple: Signal gathered by the QUANTUM LOOP is routed to the Q-STICK which re-radiates the signal to the radio's internal ferrite rod; if this radiation field is sufficiently strong to also extend back to the QUANTUM LOOP's head, the QUANTUM LOOP will re-tune and re-amplify the signal. This cyclical process results in a stronger, sharper signal. By carefully controlling the amount of Q-STICK-radiated signal the QUANTUM LOOP's head picks up, the degree of signal gain and sharpening can be controlled. In practice, the technique is straightforward:

1. Connect the QUANTUM LOOP's output to the external antenna jack of the Q-STICK and place the Q-STICK in its normal peaking position near your portable radio.
2. Tune to a station and peak the QUANTUM LOOP with the Q-STICK in either its "bypass" or "tuned" mode (your choice).
3. Slowly increase the gain of the QUANTUM LOOP until squealing or "motorboating" occurs.
4. Then carefully reduce the gain of the QUANTUM LOOP until the squealing or "motorboating" just stops.

You should now notice an increase in the gain of the signal and, by tuning your radio back and forth, above and below, the station's frequency, note a tightening of the passband. This sharpening of Q can be of potential use in reducing adjacent channel slop as well as in digging out split-frequency foreign DX.

If you were not able to get oscillation (squealing) even with the QUANTUM LOOP's gain wide open, simply move the QUANTUM LOOP a little closer to the radio/Q-STICK set-up. The coupling of the Q-STICK's radiated signal back to the QUANTUM LOOP's head can also be controlled by the relative orientations of the QUANTUM LOOP's head and Q-STICK (maximum coupling occurs when

the two are parallel, of course). The possible combinations of Q-STICK and QUANTUM LOOP variable settings are too numerous to detail in this article and are situation-dependent, so experiment. You'll note that this technique increases both gain and Q simultaneously (unlike the preceding Q-control technique where there is an inverse relationship between the two variables).



POOR MAN'S PHASING

Over the years, numerous articles have appeared in the DX press on the joys and benefits of "phasing." Pattern controlled loops described by Nelson, Litnow, and others and a series of excellent articles by Connelly, Lankford, Schatz, et al. have detailed techniques of using, and methods of building, devices to manipulate the relative phases and amplitudes of two combined signals. Even I've tinkered around with various phasing schemes and can attest to the desirability of adding this capability to your DX arsenal. If you have the patience and a reasonably steady pair of hands, you can effect exactly the same kinds of results with a Q-STICK and your portable radio.

Successful phasing with the Q-STICK requires that the level of the signal coupled to your portable radio be exactly equal to the level of the signal being picked up by your radio's internal ferrite rod antenna. Therefore, you must move the Q-STICK farther from the radio than usual, then manipulate its angle relative to the radio's ferrite rod antenna, and finally, "touch up" the tuning of the Q-STICK to effect the null. My first attempts with this technique of controlling the combined cosine patterns of two loops met with very nice success. For example, the biggest slopper in Pensacola is WRNE-980 kHz, a 10 kW rhythm & blues/gospel station directly across the bay from me. It so decimates the vicinity of 980 kHz that DXing from 970 to 990 kHz requires extreme nulling antics when I'm using my QUANTUM LOOP. On my first attempt at using the Q-STICK as a "poor man's phasing device," I was able to totally eliminate WRNE on 980 kHz and hear Nashville (this used to be WSIX but I haven't logged it in a while) battling a Cuban on the frequency. Let me quickly state, though—this was not quick and easy! As phasing always is, it was a touchy proposition, but it *can* be done. Practice has made it quicker and somewhat easier and a radio with an S-meter is almost a necessity, especially while learning the technique. I used the Sony ICF-2010 (and its 10-LED signal indicator) for these initial tests and managed to hear WQXI, Atlanta and R. Reloj, Cuba under local WSWL-790 kHz; neat zydeco music on KVOL, Lafayette, LA under semi-local WEBY-1330 kHz (these two are about 180 degrees apart making KVOL impossible with a standard loop); WIOD, Miami under local WVTJ-610 kHz; and several unIDs on local station frequencies of 1230, 1370, and 1450 kHz. (These loggings are identical to those I get with my "serious" desktop communications rx's and phasing unit set-up, so "poor man's phasing" refers only to equipment costs, not to diminished performance.)

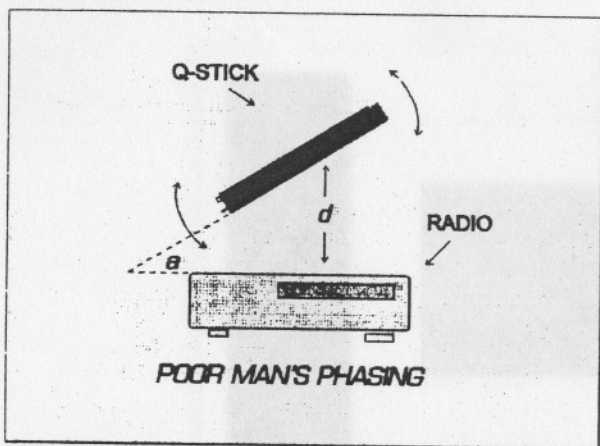
So, how do you do it? Following are the general steps I followed to "phase out" a dominant station.

1. Clear off your desktop so that you have enough room to rotate your radio and move the Q-STICK about.
2. Tune to your dominant "to-be-phased" station and peak the Q-STICK for maximum signal.
3. Without touching the tuning knob of the Q-STICK, remove it from the immediate vicinity of

your radio and rotate the radio for a maximum null of the dominant station. On strong stations that peg the S-meter, lower RF gain (if your radio has that provision) so that you get a more responsive S-meter reading; don't forget to increase the gain once the nulling process is complete.

4. Place the Q-STICK on the desktop about 3" from the top of the radio and slowly vary the distance ("d") between the radio and Q-STICK while simultaneously varying the angle ("a") between the Q-STICK and radio. At some combination of "d" and "a" there will be a maximal deepening of the radio's null. With me, this process looks like I'm steering the Q-STICK as I grip both ends and slide it around the desktop. The null point is very sharp and sudden and a close eye must be kept on the S-meter. I have not yet worked out the trigonometry on angle "a," but intuition and practical results suggest that 45 degrees is a good point at which to start your search for the maximal null.

5. Once this null deepening point is found, a very minor adjustment of the Q-STICK's tuning knob or a very slight adjustment of the orientation of your radio (whichever is easier) effects the final phase tweaking and should send your dominant station the rest of the way into the noise. Aural cues (signal fluttering, noise increase, etc.) in both Steps 4 and 5 can also let you know that you are zeroing in on the proper point. At night, when signal levels are higher, you may never get a "0" reading on your S-meter because the "underneath" stations' signals will take over. A sharp ear to the dominant station's presence must supplement the nulling procedure, therefore.



The preceding is not a pretty process. It is almost guaranteed to draw looks of perhaps sympathy or concern from family and friends as you "divine" your way around the desktop with this DXer's equivalent of the Quija planchette. Fortunately, there is an easier way...

PHASING WITH THE QUANTUM LOOP AND STICK

Using an external loop that has a gain control can make the preceding set of steps significantly easier. The steps are essentially the same but instead of steering the Q-STICK around the desktop, place it near the radio in its normal peaking positions and manipulate "d" with the QUANTUM LOOP's gain control and "a" by rotating the loop head...much easier. (If the range of control of "d" by the gain control is insufficient, move the Q-STICK farther from the radio and start over.)

Although I have yet to try it, it would seem possible to connect a nondirectional antenna (i.e., a whip or short longwire) to the radio's external antenna jack (if plugging it in didn't disconnect the ferrite rod) thereby making the ferrite rod antenna nondirectional. This would allow combining the nondirectional signal source with the loop's figure-8 pattern to create a cardioid. Then you would also have a very easy-to-control "steerable null" that you could swing through 360 degrees (by rotating the QUANTUM LOOP's head) in order to not only null a dominant pest but also, conversely, to perhaps clean up a desired dominant station's signal by placing the null on a weaker offending station. All of the portable radios I use for DXing disconnect the ferrite rod when an external antenna is plugged in so I connected a nondirectional whip to the Q-STICK's external antenna jack. Unfortunately, my first series of tests were not very fruitful. I tried using an unamplified 34" whip as well as a 19" active whip (MFJ-1022) but never got total nulling of my local stations. I think that this may have been due to either an interaction between the whip and Q-STICK (they, in my test set-up, had to be located in close proximity)

or I needed to add an in-line pot to the whip to help with the phasing. I'll have to spend a little more time on this; in theory, this whip set-up should work though....

CLOSING REMARKS

So, there you have it, a series of techniques that should surely aid you in your pursuit of DX. In my humble opinion, these techniques will place the "portable radio MW DXer" on near equal footing with the well-equipped megabucks communications rx DX shack. In fact, these techniques with my modified Sony ICF-2010 allow me to out-DX my Drake R-8 when it's equipped with only a longwire or conventional loop (adding phasing capabilities, however, pushes the R-8 back out in front). Yeah, the 2010 is not quite an R-8 but adding a Q-STICK gives me a passive antenna booster, a tuned external antenna coupler, and Q sharpening and phasing capabilities. Add a QUANTUM LOOP and I get even more gain, a regeneration mode, and easier phasing...all in all, a sort of "Swiss Army knife" assortment of DX tools for the serious portable radio MW DXer...

Construction details for both the QUANTUM LOOP and Q-STICK have appeared in past club bulletins. If you'd rather just purchase an already assembled unit, request a catalog from me at RADIO PLUS+ ELECTRONICS, 3635 Chastain Way, Pensacola, FL 32504 ((904) 432-8208). Best of DX and 73's...GT

