

# Adding an APRS Digipeater to VHF Repeater

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APRS has matured through the years into full-fledged operational system. Just not too many years ago, it was plagued by expensive GPS units, lack of coverage by digipeaters, and no map support.

Now all that has changed. GPS units are cheap and MapQuest can map anything down to the sidewalk in front of your house, and there a lot more digipeaters on 144.390.

While digipeater coverage is way better than it was, there are still lots of area that have little or no coverage. Fortunately, there is an easy way to add that capability without much trouble at all.

The trick is to share the existing two meter voice repeater with the digipeater by adding a second duplexer. What?? Put a two meter repeater and a two meter digipeater on the same antenna? Yep, and it's pretty easy to do just by following a couple of simple guidelines.

First, the two meter voice repeater needs to be in the upper 146 or anywhere in the 147 range. The repeaters in the 145 segment of the two meter band are too close to properly work without a lot of loss (and it would be more expensive).

The next part is to find a second duplexer that will work properly. There are two types that seem to work the best. First is the "res-lok" series from Sinclair. These are the Q2220, Q2222, and Q2330. It does not include the Q202 series. Pretty much any of the res-lok units will work very well. These are usually identifiable by their square construction design.

Another type that will work is the notch types. These look like UHF duplexers but are actually notch filters for VHF. Some of these will go down to 144.39, but be sure to check first.

First let's do an example with the Q2220 duplexer. Say your repeater is on 147.150 TX and 147.750 RX. Let's also say that you have a single antenna and a properly working duplexer for the repeater.

The res-lok duplexers have a pretty low Q, so it just happens that bandpass bandwidth is right around 600 KHz. Also the depth of the notch at -80 db is right around 600 KHz wide. This works out perfectly for adding it to a repeater with 600 KHz channel separation.

On a couple of duplexers, I've had to adjust the loop to increase or lower the Q to get it just right. You want to make the adjustment so you end up with at least 80 db of rejection

from the digipeater frequency (144.390) and the center freq of your repeater (147.450). When adjusted, you should have less than 1.0 db of loss in each of the pass bands.

Then, you simply run the low freq output of the new duplexer to the digipeater and the high freq output to the original repeater duplexer and its all set. See the diagram below.

Our local group has set up several this way in the Southern Maryland area on existing repeaters and filled a few more counties with APRS coverage. One repeater is a 50 watt Master II with a Sinclair Q-202 duplexer. The antenna is a super station master at 300 feet. The digipeater is some pretty standard 50 watt Yaesu mobile radio.

The coverage was nothing short of spectacular. While the voice repeater had a typical mobile distance limit of about 25 to 30 miles, the digipeater (N3PX-2) consistently picked up mobiles in the 35 to 40 mile range. In addition, it picks up other digipeaters up around the 100 miles mark nearly every day (no band openings).

With digipeaters like this, it would just take one every few counties to cover a large area. Use <http://www.db0anf.de/app/aprs/stations/digiusermap-N3PX-2> to see what it's picking up from day to day.

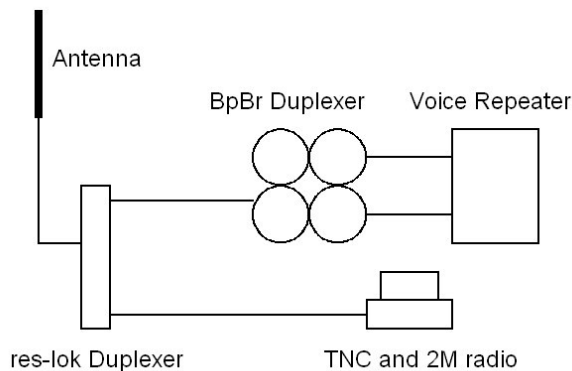
The only drawback is a small amount of additional loss. In our system, the Q2220, we ended up with 0.8 db of loss on the voice repeater side and would never be noticed by the users. Check the isolation chart below.

If you need to run a little closer spacing (for a voice repeater in the 146 range), the Q2330 may be needed. If you are on the upper end of the two meter band (like 147.390), then the Q2222 will work.

This was a great project and created some new projects in our local club. Now we have APRS nets and talk about it at our club meetings and in the club newsletter.

## Digipeater Duplexer

Adding a digipeater to an existing 2M voice repeater



## Digipeater Duplexer Isolation

Tuning a duplexer for adding a digipeater to voice repeater

