

How I adjust the MFJ-1026 to null noise.

There seems to be a bit of a trick to quickly and effectively adjust the MFJ-1026 to cancel noise. Below I have listed the steps that I use to adjust the unit on a particular band with specific antennas for the first time. Each band and each set of antennas (auxiliary and main) probably will require different settings. Once I have found the settings for a particular configuration I write them down so I can quickly set them in the future. When I change the frequency of operation significantly on a particular band I usually find that I need to adjust the settings slightly for maximum null. The first adjustment I use is a very slight tweaking of the phase control to make sure it is at a null. Once I am certain it is at a null, then I adjust the auxiliary antenna gain control to maximize the null. I almost never adjust the main antenna gain control once I have found the correct position for it.

The steps I use for initial adjustment are:

1. Turn the gain controls for the auxiliary and main antennas to zero and set the Phase control to 5 and the Phase Button to Normal. Turn the internal MFJ-1026 pre-amp off.
2. Increase the main antenna gain until there is an S3 reading on the receiver S-meter. Record that position and then reset the control to zero.
3. Increase the auxiliary antenna gain until it produces an S3 reading on the S-meter. If the auxiliary antenna has low signal levels you may need to turn the preamp on to get the proper level. The auxiliary gain should be less than 5 to produce an S3 reading. Record this reading.
4. Set the controls for the auxiliary and main antenna gain to the values that produced the S3 level. The level should be higher with both antennas contributing signal. If not, move the Phase control and verify that you have been very lucky and the Phase control setting is just what is required for a null.

The principle of the MFJ-1026 as a noise cancellation device is that the NOISE signals from the two antennas will be exactly equal in amplitude and exactly 180 degrees out of phase when you get the best null. Once you have adjusted the noise amplitudes to S3 you have the first approximation to equal noise amplitude.

5. Vary the position of the Phase control slowly. At some point you can expect to see a null. It may not be deep, but definitely a null. If that doesn't happen as you cover the entire range of the phase control, push the Phase Button and select the opposite phase (Normal/Inverted). You should see some sort of null as you vary the Phase control and the Phase Button.

If you do NOT see a null it may be that the auxiliary antenna and the main antenna have a strange relationship to the noise you are trying to null. The first thing to try is to reduce the signal levels on both Auxiliary and Main controls and run through the phase adjustments again. If that doesn't work reset the Auxiliary and Main controls to the S3 positions and then increase the auxiliary antenna gain very slightly and adjust the phase controls. In the event that doesn't give a null, reset the Auxiliary and Main controls to S3 and slightly increase the main antenna gain and look for the null. If all of these adjustments fail I suggest that you try a different auxiliary antenna and repeat the adjustments. The best auxiliary antenna will be one that is located away from the main antenna and which has sufficient signal (after pre-amplification if necessary) to produce the same noise signal levels as the main antenna. I have not experimented carefully with polarity on the two antennas, it may make a difference. However, I find that I can use a vertically polarized antenna and a horizontally polarized one and get excellent nulls in my particular noise circumstances.

6. Once you do find the position of the Phase control that produces a null, carefully adjust the control for the best null. Then adjust the auxiliary gain for the best null. At this point the noise you have been seeking to cancel should be quite low or non-discernable.
7. Increase the main antenna gain slightly and then adjust the auxiliary antenna gain to restore the null. Repeat this process until the main antenna gain is at least 5 . You can increase the main antenna gain further but if the S-meter indicates more than S1 when there is no signal in the pass band you should reduce the main antenna gain. This should produce the best signal to noise level for the installation that you have.
8. Record the settings of the Auxiliary, Main and Phase controls and the Phase Button and the Pre-Amp button together with the frequency so that you can quickly reset the null when you select that frequency for listening.
9. Under some circumstances if there is a very weak signal in the pass band that you want to copy slight adjustments to the Phase control and the main antenna gain control may make the signal more readable -- especially if you have narrower filters and/or DSP to reduce the noise.

----- end of note ----- Tod Olson, K0TO January 22, 2006