MT REVIEW

MFJ 1025/1026 Noise Canceling Signal Enhancer

Myth or Miracle?

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MT looked at this most interesting radio accessory a few years back near its release in the late '90s[1], but here is a fresh look at a product that is even more important these days. With today's barrage of consumer electronics producing more noise in the radio frequency (RF) spectrum, many more world band listeners living in apartments, condos, and tight city situations are experiencing severe interference problems at full force.

The author was experiencing a very serious noise issue being created by a brand new high definition TV receiver in the house (1080i maximum resolution - CRT type). The MFJ-1026 was tested to help deal with the interference. Let's see how well the MFJ 1025/1026 Noise Canceling Signal Enhancer dealt with this and with power line noise, and how it was accomplished.

❖ Theory and Hardware Basics

The whole idea of noise canceling gadgets is to reject local interference by placing the undesired noise/signals out of phase by 180 degrees, thus leaving you with clearer reception. It requires you to have two antennas for use: one for the "Main" antenna, the other an "Auxiliary" antenna. For simpler terminology, we will call this the "aux-noise" antenna.

Both models are housed in an attractive, all-metal dark gray cabinet – top cover of steel, bottom half aluminum. The cover is held in place with six self-tapping screws. Four buttons (three on the 1025) and four knobs actually use set screws, not the push-on variety. All knobs had a very good, above average feel when rotated.

Alas, the cabinet paint job left a little to be desired with our test sample. There were chips, nicks and scrapes on our brand new sample fresh out of the box. Four small "stick on" feet are attached to the bottom. The lightweight box still tended to slide around with use, so we opted to replace these with larger ones that helped to cure this issue.

Size is 8-1/2 x 6 x 2-1/2 inches (not including connectors and knobs) – larger than what MFJ lists in their catalog.

A glass type PC board is used and most components used are of a surface mounted variety. Our sample had a minor amount of small solder "beads" splashed (lightly stuck) across the entire area of the board. This was cleaned up before operation was attempted.

The main difference between these two models is that the 1026 has two additional FETs (field effect transistors) that can be used for the aux-noise antenna. These two pre-amp FETs work with the whip antenna as well. It can also be used as an active antenna (or pre-amp) using the aux-noise input, if noise is nil at your location. The 1026 model includes one additional button on the front panel as well to switch this pre-amp in or out.

Alternatively, either version can be used to create a defacto "phased antenna system" with two outdoor antennas (not tested).

The array of jacks in the rear include three SO-239s for the main antenna, aux-noise antenna, and the third for the output to the receiver (or transceiver). The aux-noise antenna input also has an alternative to use an RCA/phono plug instead. There is also an RCA/phono jack for transmit/receive relay for use with a transmitter. This switches the internal bypass relay for transmit uses.

However, this relay does nothing to protect the "aux-noise" antenna FETs. There is a 12-volt 50ma panel lamp connected (hot glued to the PC board) at the aux-noise antenna input to help give some protection from excessive radio frequency energy from a transmitter. But it's a very good idea to use a separate RX/TX relay here as well. We did not use the product with an amateur transmitter in testing, but there have been reports of this light bulb being burned out from excessive input.

With our test sample, two of the three SO-239 antenna connector threads did not screw on properly, so we were forced to re-thread these by taking an unused PL-259 connector's "outer ring" and working this on and off for awhile before the connectors would screw on properly.

The required connection cables are not included. You may need up to three cables for proper operation.

Either version of this MFJ product requires a 12-volt power supply at about 150 ma of current and it, too, is not included. It should be extremely clean as well, so a regulated supply is recommended. In testing, a regulated 12-volt at 1 amp "wall wart" marketed by Jameco Electronics,[2] part number 170245 (about $16.00 plus shipping), was used.

Alternatively, included in the box is a short color-coded wire that has the proper plug on one end and bare leads on the other for connection to a 12-volt power supply. This is the more standard size power plug being used here and is a positive tip. This cable is not fused.

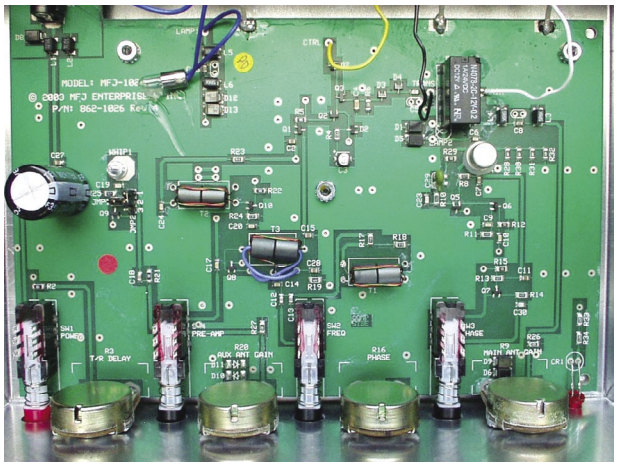
One will find a ground wing nut on the rear panel. Since we did not use this with a transmitter in testing, no extra grounding was used.

❖ Antenna Considerations

If one antenna hears the noise and the other does not, then this system is not going to function at all. The two antennas MUST be receiving the same noise to be effective. In fact, it's even better if the aux-noise antenna is hearing the offending noise a bit more.

One can try using a SW antenna for the aux-noise antenna, but if the interference is very local (and is being picked up by both antennas) then an indoor wire of a longer length (say, 30 feet) can be used. In the case of the 1026 model, there is a telescopic whip antenna included. To counter a local noise-generating device within your house, the whip can work adequately. Or better yet, if possible run an aerial connected by coax cable right up to the device generating the noise.

There is a jumper on the printed circuit board with the 1026 version to select two stages of the pre-amp for use with the rear mounted aux-noise antenna: moderate, maximum and none. Oddly, it was supposed to be in



the "none" position, which was indicated as default in the manual, but with our "factory fresh" test sample, for some reason it was set at "moderate." If you are using the whip antenna with the 1026, both stages are used and the jumper is set open (pins 1 and 2 on JMP2).

Using the 1026 version with any external noise antenna, the owner should try first obtaining the desired null of the phase control without the pre-amp in use (the 1025 version has no pre-amp). When the pre-amp was needed to boost the aux-noise antenna a bit, we found the "moderate setting" to be the most useful and easiest to null. This is going to be dependent on many factors and will vary. For some reason, when Maximum was selected in testing, it was difficult or nearly impossible to find the null.

With the extremely strong TV set noise that we were attempting to null out, the whip antenna on the 1026 version worked as the aux-noise aerial. But for many noise sources this will not be the answer, and the external antenna jack will have to be used with a longer indoor or outdoor noise antenna.

The device behaved itself without any overloading issues. It never hiccupped with any mishmash during testing.

Important Note: Those who use the MFJ-1025 or 1026 with the AOR AR7030 receiver should be certain that the rear mounted "whip" antenna switch is in the NORMAL position. If placed in the "WHIP" setting, the internal whip FET circuit in the AR7030 will give excessive noise.

Both the main and aux-noise antenna inputs have separate high pass filters that cut off signals starting about 1.9 MHz and below. So anyone wanting noise canceling in the medium wave or even 160-meter amateur radio band is going to be disappointed. Four surface-mounted coils can be removed by the owner handy with a soldering iron to remove this high pass filter. Reference is made to this in the owner's manual with no indication on how to do it. On the other hand, if you live near any MW stations, it is not advisable to remove the filter. With the unmodified test sample that still had the filters installed, no local MW intrusions were noted.

In one part of the manual, it indicated that the two antennas should be using the same polarization, either horizontal or vertical. But in testing this, we found it not to be true. We had good results with the two antennas being totally opposite polarities. Later in the same manual, it did say the polarization was not important!

We need to stress again that one needs to have patience, lots of it. It may take quite a bit of experimentation trying different configurations to have success. To come at it logically, one must first ask, where is the interference coming from? If the noise is local within the house, then one might be able to get away with using a simple wire (or just the whip for the 1026 version) for the aux-noise antenna. If it's power line noise, then an outdoor "noise" antenna will more than likely be required.

We tried many different outdoor and indoor antenna configurations, along with different pre-amp settings (using the 1026 model); trying different combinations will be a requirement and not an option here. This is not an accessory for someone who desires plug and play.

❖ How Did It Work?

Now for the main deal here: "Did this gadget make a difference to tame local noise?" Indeed it does, but not without the trial and error of changing knob and pre-amp adjustments and antennas. At first we had no success. It took practice and patience, and plenty of both!

It bears repeating that it takes an equal dose of noise at BOTH the main antenna and aux-noise antenna using the two gain controls. One secret is to keep the main gain control up as far as you can to keep the desired signal up for proper strength. If you are having problems finding the required null, then try turning down the "main" gain slightly after each attempt as covered below.

If you are using an external aux-noise antenna, try it with the pre-amp off first, and then with it on if you cannot match the aux-noise antenna to the main antenna for the noise level.

The "Freq" button needs to be selected as well: "High" for signals approximately higher than 7 to 12 MHz and "Low" for signals approximately lower than 7 to 12 MHz. If that sounds vague, you are right. In general terms, if you have problems finding the desired null as covered next, try the other setting.

We also found that using an actual world band signal for tuning the noise out worked best, but it works just using background noise as well. (Again, this is a suggestion only; nothing is etched in stone.)

Here is the actual procedure we used: Turn the 1025/1026 off (bypassed when turned off). Turn down both gain controls fully counterclockwise. Locate a signal that is awash in the noise or tune to an inactive frequency that also has the noise. Rotate the "Phase" control to the mid "5" position.

Turn power on. Rotate the "Main" antenna gain control to a good level using the S-meter on the receiver (if not all the way clockwise). Make note of the number on the control and turn it back down fully counterclockwise.

Then rotate the "Aux" antenna gain control to the same level (using the S-meter again). Leave it here. Now, go back and rotate the "Main" back to the noted number on the control as done above.

Be sure the "Phase" button is in the normal (pushed in) setting. Now s-l-o-w-l-y rotate the "Phase" control until a null is observed. If you get no null of the noise (or only a null of the desired signal), then try selecting the opposite (invert) position on the "Phase" button. Repeat the "Phase" control adjustment.

It tended to perform better in our tests with local power line noise rather than with the TV set noise. In the case of power line noise, it removed approximately 70 to 100 percent of it. TV set noise was about 50 percent. But even with only half of the TV set "buzz" noise removed, it still enabled enjoyable listening versus turning off the SW receiver entirely. Signal to noise was definitely improved. But no DX was possible, either, even after the MFJ treatment, as some noise still remained.

As we found out in testing, performance of this system will vary with type of antennas used, proper placement, and strength of the noise. The pre-amp with an external AUX antenna on the tested 1026 model was useful as another variable to help with proper operation. The "moderate" preamp setting was the most useful jumper pre-amp position in testing.

When the frequency is moved, one will need to touch up the adjustments, as the noise between the two antennas usually changes as well. So, just as the old SW receivers of the past used manual pre-selection/antenna trimmers, this device operates in that same spirit.

Also bear in mind that this device will only remove *one* noise. If there are multiple noises interfering, this gem can only deal with one of those.

❖ Bottom Line: Try It

This has to be one of the most variable receiver accessories sold in the marketplace, but it can be a lifesaver for someone who is struggling with noise and who has no other options. If one makes the purchase directly from MFJ, they advertise a 30-day money back guarantee, in case it does not solve your specific problem.

There is also a 1-year warranty, but the owner must include a return-shipping fee along with the product.

Pricing: MFJ Direct (**www.mfjenterprises.com**): MFJ-1026 $189.95, MFJ-1025 $169.95 (if ordered from MFJ direct only, 30 day money back guarantee). Other US dealers: MFJ-1026 $169.95~$179.99, MFJ-1025 $154.99~$159.99

1) The MFJ 1026 was reviewed August 1999 *MT* and the MFJ 1025 in May 2003
2) Jameco Electronics , 1355 Shoreway Road, Belmont CA, 94002, tel (650) 592-8097 **www.jameco.com**