

# WICEN (Vic.) Inc. Data Communications Subcommittee

## MFJ-1270B Electromagnetic Interference

### (And how to get rid of it)

Source: <http://www.mods.dk/mods.php3?radio=tnc&model=mfj-1270&selectid=1073#1073>

I have recently taken the opportunity to observe electromagnetic compatibility of the MFJ-1270B as used by several of our NET/ROM nodes. (some of this may apply to other brands also.) The initial results were not as good as they should have been. The question was 'Do the TNC's cause interference to co-located sensitive VHF receivers ?' The answer is YES, depending on the situation.

In two different sites measured, the noise coming from the TNC was sufficient to cause 4-7 db worth of desense to a 0.2 uv (12 db SINAD) receiver (145.01). There are two types of noise that radiate from the MFJ-1270B. One type is broadband in nature (probably due to data/address bus activity and DC-DC converter operation) the other kind is harmonics from the crystal oscillator and sub-multiples thereof ( $(4.9152/2) * 59 = 144.998$  MHz). The broadband noise can cause interference on all frequencies if a sufficiently sensitive receiver in a quiet location is involved. The harmonic energy can cause problem on specific frequencies.

This interference is detrimental to the weak signals that several of our nodes are required to operate with. In addition it may cause problem to the communications of our hosts when we share a commercial site.

It is relatively easy to determine if you have a harmonic problem because the receiver noise will quiet when the TNC is turned on. The broadband noise usually can not be heard unless you observe the noise level in the presence of a weak signal. (With the normal antenna connect, inject a signal that provides 10 db of quieting then turn on the TNC and observe the change in noise level. If you have a 0.5 uv receiver or are in an otherwise noisy location you may not be affected. With a 0.2 uv receiver you may lose 6 db of quieting.)

#### Cleaning up the MFJ-1270B

Sufficient reduction in the energy emitted by the 1270B can be had with some relatively simple modifications to the 1270B. These modifications should reduce the broadband noise level to a insignificant level for most sites. Harmonics that cause problems to specific frequency can usually be moved far enough off frequency by 'rubbering' the crystal with the trimmer in the TNC.

1. Scrape the paint from the inside of the cover and the outside of the chassis near the four screws that hold the cover on.
2. Remove the circuit board from the chassis and scrape the paint from the top of the four posts that hold the circuit board.
3. Add a low inductance strap from the mounting hole near the power switch to the ground trace at the edge of the circuit card. (The bottom side of the card works the best.)
4. On the bottom side of the card add a 'small' 0.001 uf capacitor from each of the four active pins on the DIN connector to the ground foil immediately adjacent.
5. Add a ground strap from the foil on the bottom side of the card under the DIN connector. The

ground end of this strap can be left dangling until the card is reinstalled and then looped to the outside of the chassis and grounded with a small self tapping screw on the lip just below the DIN connector.

If you are at a shared site, you owe it to the other services to be a good neighbor.