ELIMINATING FREQUENCY JUMPS ON 2 M WHEN USING THE K3EXREF AND K144XV PLL LOCK MODULE

The K3EXREF option allows the K3 to be closely locked to an external 10-MHz reference. Some K3 owners reported a periodic frequency jump of up to 40 Hz on 2 meters (using the K3's K144XV module with PLL lock option) when the K3EXREF board was added. We found that the K3EXREF was causing a shift in the 49.380-MHz reference oscillator frequency. This can be fixed with a simple modification to the KREF3 module.

Technical Details

In order to lock to an external reference, the K3EXREF module counts the frequency of the 49.380-MHz reference oscillator for about one second, repeating about every four seconds. During this count time, the circuitry draws about twice as much current as when it's static (it goes from 7 mA to 15 mA). When it's drawing more current, it slightly decreases the supply voltage to the reference oscillator, causing a small frequency shift observable at 2 meters and possibly even on 6 meters.

The fix is to bypass two inductors on the KREF3 module (***not*** the K3EXREF) that are in series with the 5-V supply. These inductors have a resistance in the 3-ohm range. These inductors were included in the circuit as a precaution, along with other decoupling circuitry, against leakage of signals on the KREF3 module into the rest of the radio. However, we shorted out the inductors and found that the signal leakage did not increase. But the short does prevent the reference oscillator frequency shift.

Modification Procedure

1. Unplug the K3EXREF module from the KREF3 module.
2. Remove the KREF3 module from the K3, first noting the locations of all coax cables plugged into it.
3. Solder short wire jumpers onto the KREF3 module at exactly the locations identified by arrows in the photos below. You can use component leads or any type of solid hookup wire.
4. Reinstall the KREF3 module and reattach all coax cables. Plug the K3EXREF module back into the KREF3.