Additional Test Data: MouSeFET Transmitters Revision 7 Comparison of With and Without Thermistor-Bridge Varactor Temperature Compensation 2 July 2016 WN2A

A year had passed after building and testing the MouSeFET Transmitters Revision 7 with the Thermistor-Bridge Varactor Temperature Compensation. In actual QSO's, these transmitters for 80, 40 and 30 meters proved themselves for frequency stability better than the previous versions. The improvements in frequency stability are the result of:

- 1) Installing the VFO and Power Amplifier (PA) PCB's into separate enclosures.
- 2) Improved VFO Supply Regulation with an LM317 regulator verses a Zener diode.
- 3) Use of NP0 Capacitors, Air-Core Inductors
- 4) Thermistor-Bridge Varactor Temperature Compensation.

The author wanted to confirm the improvement in frequency stability especially with regards to item #4 on that list. The tests involved connecting the VFO units output into a Frequency Counter, with 10 dB attenuators between each of the VFO units and Frequency Counter. Each unit was powered-up with the Key-down (grounded) state on J1 pin 8. Each unit underwent two (2) 90 minute tests to see if the stabilization was effective after an initial 20 minute stabilization period, one with Temperature Compensation enabled, one with it disabled. To disable Temperature Compensation, capacitor C40 was disconnected; to enable Temperature Compensation, capacitor C40 was re-connected. No readjustment of the Temperature Compensation potentiometers (RA and RB) were done. The findings show that significant improvement in stabilization occurs after about 20 minutes or less with Temperature-Compensated enabled, whereas it appears that the warm-up drift of a Temperature Compensated disabled unit seem to continue for a longer period, possibly stabilizing at some later time. The following graphs were plotted with the test data taken over the 90 minute period of each unit, in case Temperature-Compensated (Blue Traces) verses the Un Temperature-Compensated (Red Traces). The X-Axis of each graph is minutes, the Y-Axis the Frequency drift in Hertz.

Band	Temperature-Compensation Enabled After 20 Minute Stabilization	Temperature-Compensation Disabled After 20 Minute Stabilization	Improvement: Temperature-Compensation enabled verses disabled
80 Meters	10 Hz	90 Hz	9:1
40 Meters	30 Hz	170 Hz	5.6:1
30 Meters	60 Hz	330 Hz	5.5:1

Table Summary: Frequency Drift after 20 Minute Initial Stabilization.

Conclusion:

The use of the Thermistor-Bridge Varactor Temperature Compensation is definitely worthwhile. It was found to be a very simple method of frequency stabilization, yet still effective.

Software Used to generate this document:

LibreOffice 4.1 used for creating this document in .odt format and convert to .pdf OS: Slacko Puppy Linux Rev 6.3.0. Lightweight, Stable OS

80 Meter Transmitter: TC enabled: Blue Traces; TC disabled: Red Traces



40 Meter Transmitter: TC enabled: Blue Traces; TC disabled: Red Traces



30 Meter Transmitter: TC enabled: Blue Traces; TC disabled: Red Traces

