WA3TFS Simple Communications Receiver (May 2020 QST)

INITIAL SETUP:

It is necessary to remove a resistor on the NANO board for it to function correctly. See the NANO MODIFICATION detail. Just heat one end of the resistor with a solder iron and remove it. Program the NANO microprocessor by downloading the software, compiling it and uploading it to the NANO using the Arduino software. Note that there are two versions available. One is for a 1.8" LCD and the other is for a 1.44" LCD. Download from my web site http://wa3tfs.com The only difference is that needed to format the data to download to the LCD properly. Do this before mounting the NANO onto the circuit board. It will be powered by the USB connection during programming. When successfully programmed, mount it onto the circuit board. The proper orientation is shown on the circuit board.

After you have completed the assembly and checked the interconnection wiring EXTERNAL WIRING DIAGRAM to the various volume, gain and BW controls, and the two encoders, it is time to start up the receiver for the first time. Follow this procedure and it will go quickly.

1. Connect a speaker to the audio output SP and SP-G connections. The "G" indicates a ground.
2. Connect an antenna to the ANT and ANT-G connections.
3. Connect 12 VDC to the receiver and turn on the power.
4. Verify the DDS module and the NANO show an illuminated LED.
5. Verify the display shows step and frequency data. (the receiver will always start at 7150.000 kHz and 100 Hz step).
6. Adjust the RF gain control for maximum. (HIGHER voltage equals higher gain).
7. Adjust the volume control for desired loudness.
8. Turn the step control and verify the step display changes up and down. Pressing the control will set the step to 100 Hz. Rotation will set to 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, or 100 kHz .
9. Turn the tune encoder control and verify the frequency displayed changes. Pressing the encoder control will return the frequency to 7150.000 kHz. The receiver will always start at this frequency and may be re-tuned to the band center frequency by pressing the tune encoder at any time.
10. If you have access to a frequency counter, adjust the BFO for 9 Mhz. Be aware the counter may load the oscillator and lower the frequency so couple very lightly to the oscillator. Tuning can be optimized later. A test point is provided on the board.
11. If you do not have a counter, simply tune in an LSB signal on a known frequency such as one of the many nets, and adjust the BFO for the best sounding output. If adjusted correctly, the frequency displayed will show the correct actual frequency of the receive signal and the signal audio will sound as it should. Be sure to have the bandwidth set to maximum when making this adjustment. No further adjustment will then be necessary.
12. Adjust the B/W control and verify that the bandwidth is changing. The receive audio will change tone and at the narrower settings, you may not be able to demodulate a LSB signal. Tune to a CW signal and you will be able to experience a narrow bandwidth to eliminate or diminish nearby signals. Vary the tuning to peak the CW signal.
13. To receive an AM signal, adjust the bandwidth to the widest setting and zero beat the transmit carrier. Turn back the RF gain control as necessary.

After completing this checklist, the receiver is ready to use and no further adjustments are needed. You will find it very useful for listening to SSB, CW, AM and tuning in digital signals as well. The adjustable bandwidth allows copy under crowded conditions and the audio output is adequate for any situation. Frequency stability is excellent making it great for receiving the digital modes and the bright display is readable under just about any lighting conditions. For best operation, set the audio gain to a wanted level and adjust the RF gain as necessary.