FSK RTTY Keying via USB or Serial Port with the Elecraft K4 Transceiver

Windows Setup Instructions

This document describes how to configure Windows, the K4, and MMTTY for FSK keying without using any external hardware or the K4 ACC connector. Please refer to the following links for logger-specific RTTY setup:

N1MM: https://www.rttycontesting.com/tutorials/n1mm/plus/
Writelog: https://www.rttycontesting.com/tutorials/writelog/xmmt-support-for-mmtty-2tone/
Win-Test: https://docs.win-test.com/wiki/RTTY#Win-Test_RTTY_configuration
DXLog.net: http://dxlog.net/docs/index.php/Menu_Options#RTTY_configuration

Quick Start

1. To prevent unwanted keying, use Windows Device Manager to **disable** the **Serial Enumerator** and **Modem Ctrl At Startup** options on all FTDI virtual serial ports
2. Configure **MMTTY** to use **EXTFSK** for keying on the K4's second virtual serial port. Select **FSK** on **DTR**, **PTT** on **RTS**, and select the K4's **USB AUDIO CODEC** as the SoundCard used for Reception
3. Set K4 **MENU:**
   Serial USB-PC2 DTR = FSK
   Serial USB-PC2 RTS = PTT
   FSK Dual-Tone RX Filter = OFF
   FSK Polarity = NORM
4. Configure Windows for Maximum CPU Performance

How it works

When the Elecraft K4 is connected via USB cable to a PC, Windows creates a USB AUDIO CODEC (a sound card) and two FTDI virtual serial ports. The K4 also has a third legacy 9-pin serial port. The **DTR** line (RS232 pin 4) of any of these ports may be used by MMTTY and other FSK software for well-timed RTTY keying when Windows and MMTTY are properly configured. **This feature is new to the Elecraft K4, and is not supported by the Elecraft K3.** FSK and PTT keying via Pin 1 and Pin 4 of the K4 ACC connector is also supported, as in the K3, but you do not have to do that with the K4.

FSK COM port on/off keying is only supported on a **DTR** line, so **PTT keying** will be on the **RTS** line (RS232 pin 7). The serial port used for FSK keying must *not* be the same port that is used by logging software for rig control or PTT.

Step By Step Details

**First, determine the COM ports assigned to the Elecraft K4.**

To prevent Windows from unwanted keying of your K4 at connect time, change the default FTDI **Serial Enumerator** and **Modem Ctrl At Startup** options:

1. Open the Windows Device Manager
   Shortcut: Windows Key + R (Run): **devmgmt.msc**

2. Scroll down and expand the section labeled **Ports (COM & LPT)**

3. If you're not sure which serial ports represent the K4, remove the USB cable from the K4, and note which serial ports disappear, then reconnect the USB cable. In this example, **USB Serial Port COM3** and **COM4** have been assigned to the Elecraft K4. Right click on each **USB Serial Port** and select **Properties**.
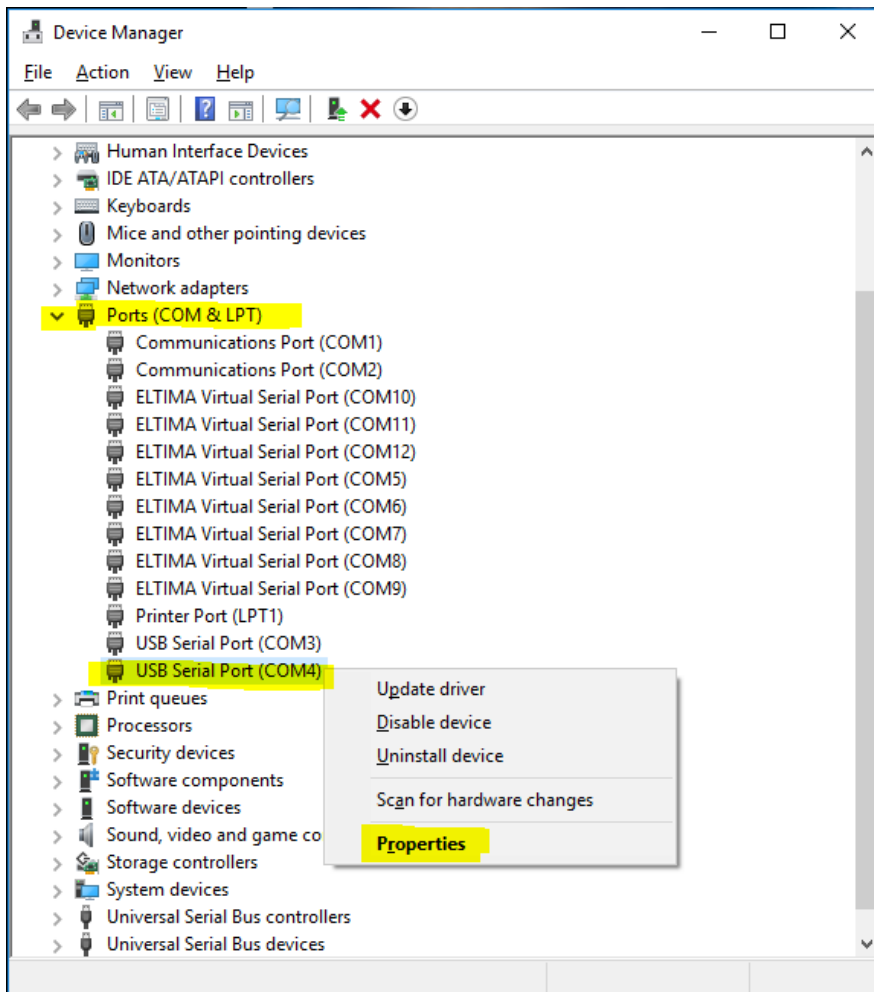

4. Click on the **Port Settings** tab, then click the **Advanced...** button:
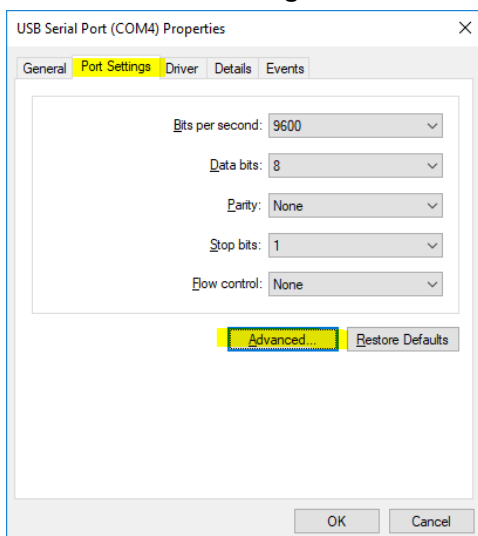
5. *Remove* the checkmark next to **Serial Enumerator**
(This legacy option was primarily needed for serial mice and serial modems, see
http://www.ftdichip.com/Support/Knowledgebase/index.html?serialenumerator.htm)

Add a checkmark next to **Disable Modem Ctrl At Startup**
(This legacy option was also used by legacy serial port modems, see
http://www.ftdichip.com/Support/Knowledgebase/index.html?disablemodemctrlatstartup.htm):
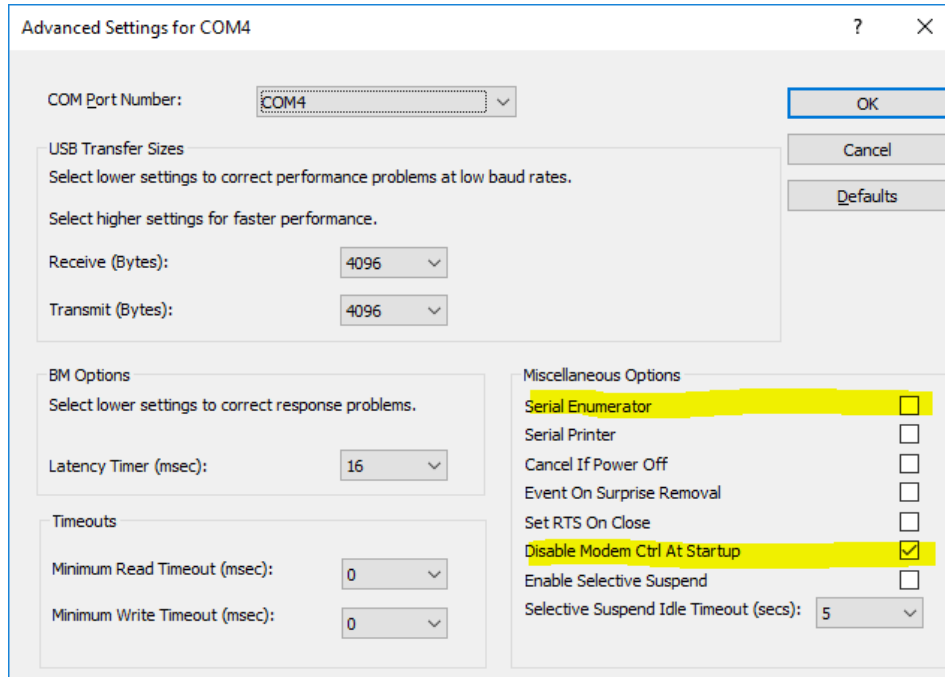
6. Click **OK**, then click **OK** again, and close the Device Manager. The next time you connect a USB cable or reboot Windows, no spurious control signals will be generated to key your transceiver.

7. If using the K4 legacy RS232 port for FSK keying or PTT, disable **serenum** in the Windows Registry, as described on **slides 29 to 33** in this presentation: https://bit.ly/USBserial2021

If needed, install MMTTY, EXTFSK, and EXTFSK64 (for 64-bit Windows):

8. Download and install MMTTY from https://hamsoft.ca/pages/mmtty.php

9. If **Extfsk.dll** is not installed automatically, download **ExtFSK106.zip** from
https://hamsoft.ca/pages/mmtty/ext-fsk.php
Extract **Extfsk.dll** (only) from EXTFSK106.zip and copy to the MMTTY installation folder

10. If **EXTFSK64.fsk** and **inpout32.dll** is not installed automatically, download **EXTFSK64E.zip** from
https://www.qsl.net/ja7ude/extfsk/indexe.html
Copy **EXTFSK64.fsk** and **inpout32.dll** from EXTFSK64E.zip to the MMTTY installation folder

Configure MMTTY

11. Start MMTTY

12. From the MMTTY main menu, select **Option(O)**, then select **Setup MMTTY(O)**

13. On the **Demodulator** tab, at the bottom, set the **HAM Default** pitch to **915** Hz, which is the default **K4 FSK Mark-Tone**
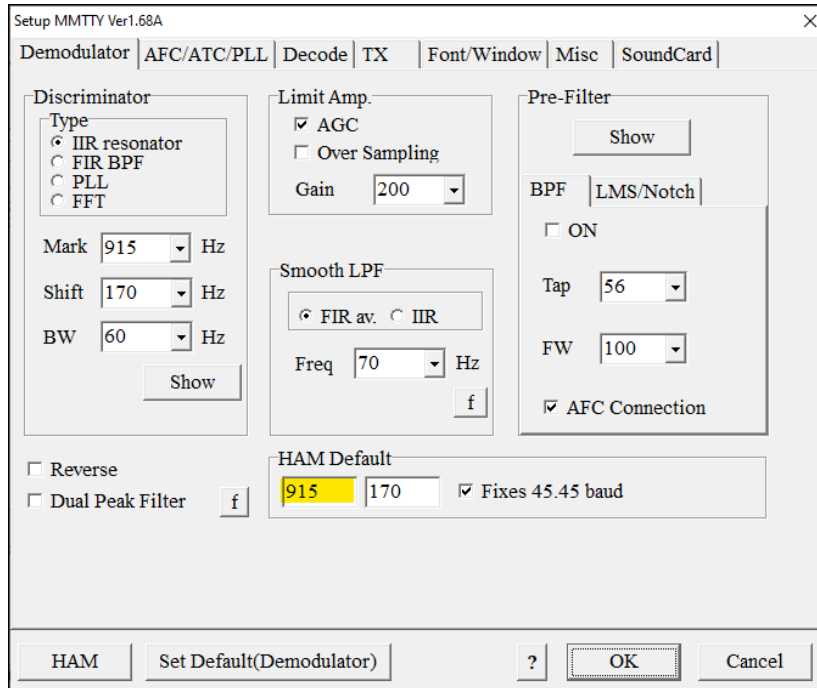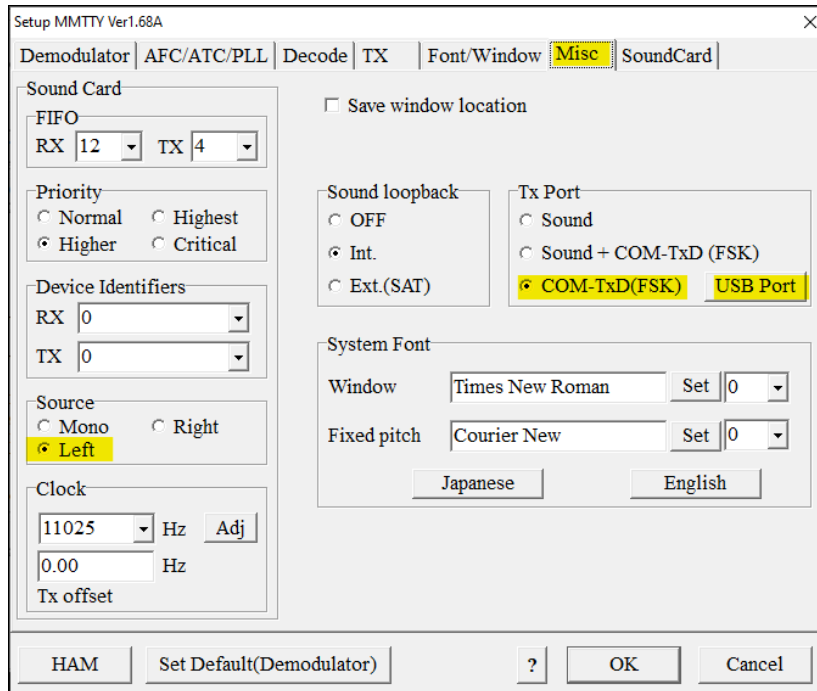

14. Select the **TX** tab, and set **Port** to **EXTFSK** or **EXTFSK64**, and set **Your Callsign**. On 64-bit Windows systems, either will work, but EXTFSK seems to use less CPU resources.
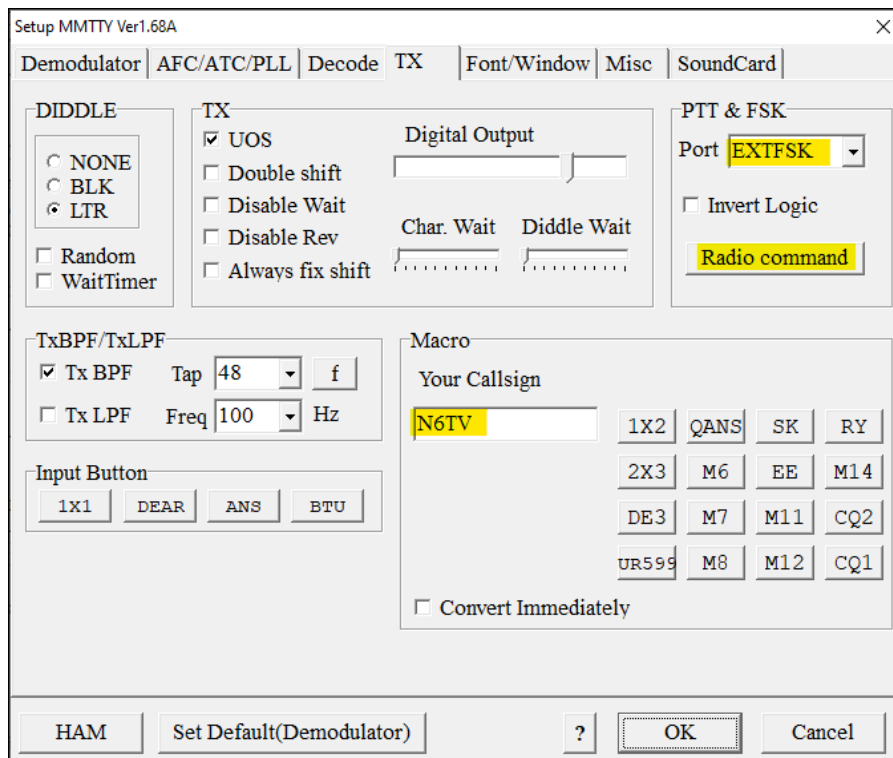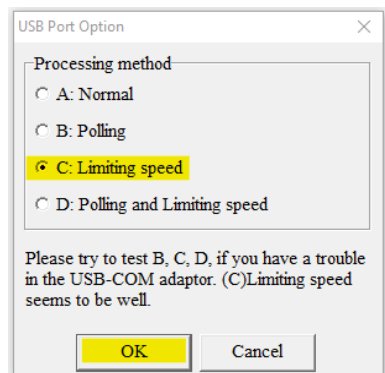
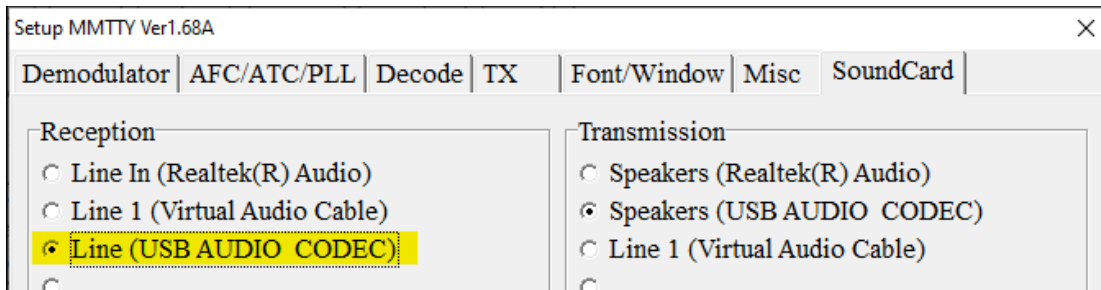15. Click the **Radio command** button, set **Port** to **None** and **Group** to **Clear** and click **OK**
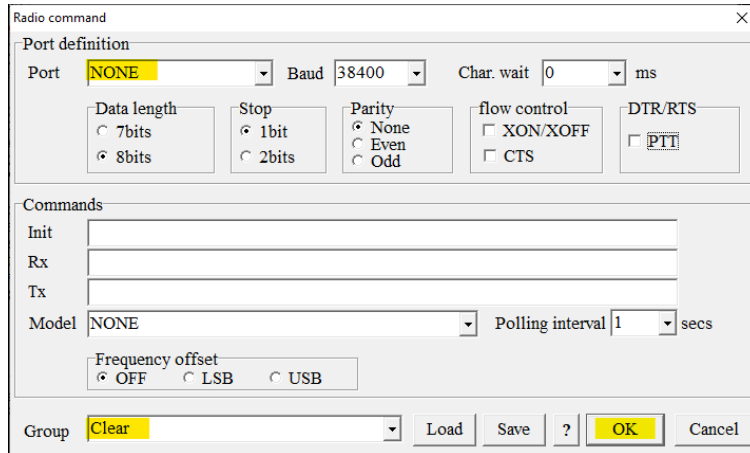
16. Select the **Misc** tab and set **Tx Port** to **COM-TxD(FSK)** and **Source** to **Left**, then click the **USB Port button**

17. Set the **Processing method** to **C: Limiting speed** and click **OK**

18. Select the **SoundCard** tab and set **Reception** to the K4 **Line (USB AUDIO CODEC)**:

If you're not sure which sound card is K4, remove the USB cable from the K4, restart MMTTY and note which sound card disappeared from the SoundCard tab, then reinsert the cable and select it.

19. Click **OK** to close the Setup MMTTY menu. A new **EXTFSK** pop-up dialog should appear, though by default it may be minimized to the Windows taskbar, so click to open it.

20. Assuming the *first* K4 virtual serial port is being used for rig control software, set the EXTFSK **Port** to the *second* K4 virtual serial port as noted in Step 3. Do *not* use the same port as the logging software, and do *not* use the EXTFSK port anywhere in the logging software.

   Set **FSK output** to **DTR** and **PTT output** to **RTS**
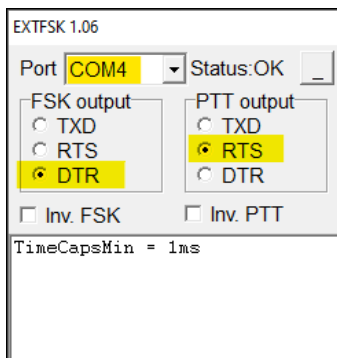
**Configure the K4 Menus for FSK Keying via DTR and PTT via RTS**

21. Tap **Menu** and scroll to the **Serial USB-PC2:** section (2nd virtual serial port), and set **DTR** to **FSK** and **RTS** to **PTT** as shown. (If using the 9-pin connector for FSK instead of USB, set **Serial RS232: DTR** to **FSK** and **RTS** to **PTT** instead of the Serial USB-PC options.)
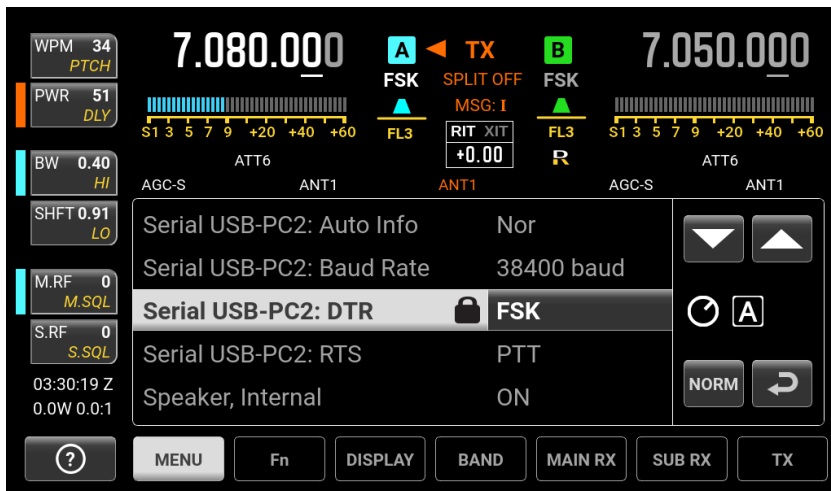

22. When using MMTTY or other external decoders, set **FSK Dual-Tone RX Filter** to **OFF**, and **FSK Polarity** to **NORM**. Tap the K4 S-Meter to display the K4 Mini-Pan which has vertical lines to to assist with centering RTTY signals in the K4 passband
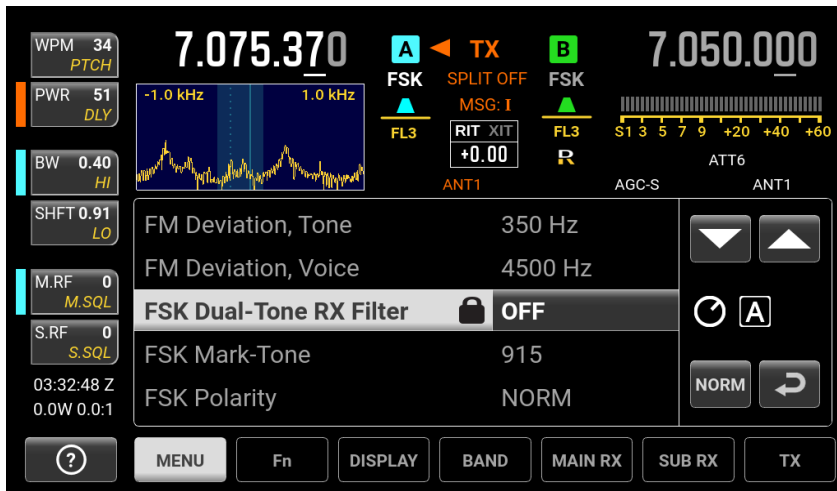
23. In MMTTY, click the **HAM** button to reset the MMTTY audio filter to 915 Hz to match the default **FSK Mark-Tone**. Make sure none of the other MMTTY buttons such as **ATC**, **NET**, **Not.** or **AFC** are selected, just **UOS**
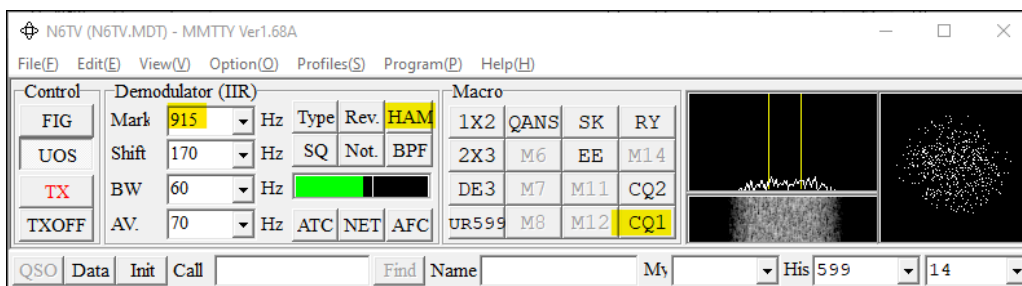
24. Set the K4 **MODE** to **FSK**. Tap **MAIN RX > LINE OUT** and rotate the VFO A knob to adjust the **LEFT** channel **LINE OUT** level so that band noise appears at the bottom of the MMTTY spectrum display as shown above.
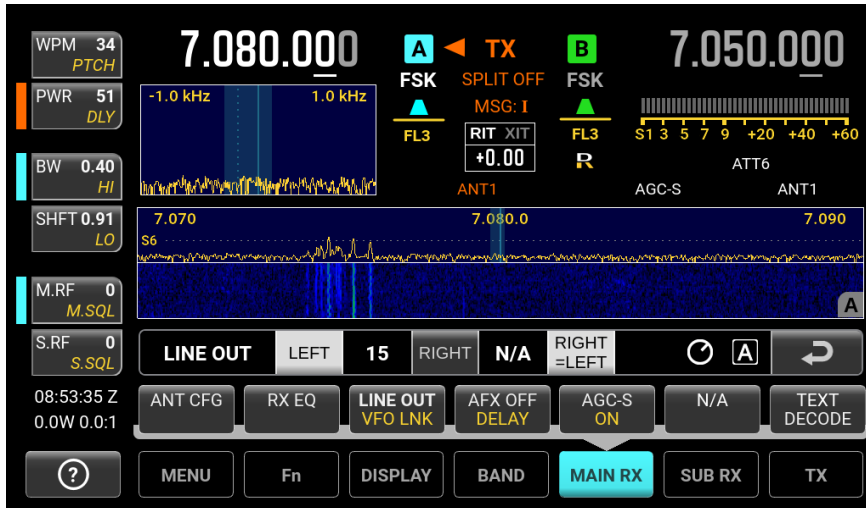
25. To **test FSK transmission**, set **MODE** to **FSK** and enable K4 **TEST** mode (hold **XMIT** button), then press one of the message buttons in MMTTY, such as the **CQ1** button highlighted in Step 23. The Power and ALC meters should appear and normal FSK modulation tones should be heard in the K4 audio monitor. If you hear only a solid tone, verify that the proper serial port has been selected with DTR set to FSK, and that only MMTTY is generating PTT, not the logging software.

26. Disable **TEST** mode, and call CQ a few times, check the Reverse Beacon Network to see if you have been spotted (change "n6tv" to your callsign in the URL below):

    http://reversebeacon.net/dxsd1/dxsd1.php?f=0&c=**n6tv**&t=dx

27. **If you are not being spotted**, click the **Inv. FSK** box in MMTTY, call CQ again, and check the RBN.
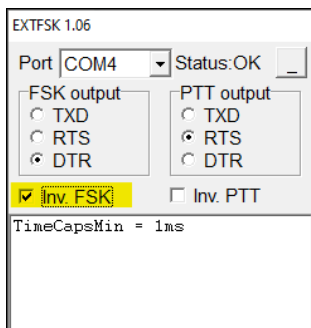
    (Some early versions of the K4 require inverted FSK keying, and only support setting one DTR pin to FSK).

28. To ensure the best FSK timing, set your CPU Mode to its highest performance setting, as detailed on **slides 65 and 66** of this presentation: https://bit.ly/USBserial2021 .

29. Configure your logging software to use MMTTY as documented in your logging software documentation.

73,
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