K3 INTERFACING WITH COMPUTER FOR WSJT-X MODES

SUMMARY

The K3 is an amazing radio that includes built-in audio interfacing cables, which simply need to be connected to the LINE IN and LINE OUT jacks on the computer's sound card. In addition (as shown below) the K3 can be very simply set up to respond to computer commands via the serial port to put the radio automatically into XMIT mode. Note that the default K3 settings are NOT to activate the keying of the PTT line from the serial port. However, as explained below, the RTS and/or DTR lines can be easily activated to respond to computer commands. Relevant information is displayed from the K3 OWNERS MANUAL.

PTT VIA THE COMPUTER SERIAL PORT FROM THE WSJT PROGRAM

WSJT version 5.9.7 switches BOTH the RTS and DTR lines to +DC voltage when it tries to put the XMTR into XMIT. No option is available to choose which one you want to use (as was the case in earlier versions) is available in the current WSJT version of the program. Therefore, the PTT function in the K3 SETUP MENU can be assigned to respond to either or both of the RTS and DTR lines. That should enable the computer to key up the K3 PTT line automatically. This is really the only safe way to operate successfully with an amplifier, since the program sequences the PTT turn on before it begins to send tones through the audio cables, thereby preventing any "hot switching" relay problems.

FROM THE ELECRAFT WEBSITE:

What computer connections does the K3 have?

The K3 has the features of most high-end "sound card interfaces" built in. Transformer-coupled stereo line out is K2, the K3 uses included. This enables you to have the main receiver and the subreceiver feed into your computer for various data modes. Transformer-coupled line input is provided, for various digital modes or other external audio sources for transmit.

The RS232 serial interface supports RTS and DTR inputs. These can be configured by use of a set up menu so either signal can be PTT, KEY or both. This meets the needs of most data mode and logging programs. We used RS232 to support users of still-popular DOS mode logging and other utility programs, as well as computers with legacy ports. Elecraft also sells a USB-to-RS232 cable that has been tested with the K3 to allow users of more modern computers complete access to the interface.

The serial port is also the means by which you can remotely control the K3. The port supports all standard data rates up to 38,400 bits per second. Firmware updates for the DSP and control processor, as well as the flash-based programmable logic, are supported via the K3 firmware update utility. It only takes a few minutes to completely reload the entire radio's firmware.

Unlike the K2, the K3 uses a standard RS-232 cable for control. We're not planning on offering extra cables at this time since these are so common.

The K3 can send and receive data simultaneously at up to 38,400 baud. You can use a standard, straight through 9-conductor cable, or a cable wired for an Elecraft K2 or K2/100 transceiver. If you're building your own cable, you can use as few as three wires (RXD, TXD, and ground; see table below). DTR and RTS are optional.

The table uses EIA standard descriptions, which are from the perspective of the computer. These differ from some K2 documentation, even though the connections are functionally identical.

Pin #	Description
1,8,9	Not used
2	RXD IN (data to PC from K3)
3	TXD OUT (data to K3 from PC)
4	DTR (see PTT and Keying, below)
5	Ground (RF isolated)
6	RTS (see PTT and Keying, below)

Serial Port Setup: Set *CONFIG:RS232* for the desired baud rate. Software should be set up at the same rate; 8 data bits, no parity, 1 stop bit. PTT and Keying: **The DTR and RTS signals are not used as RS232 hardware handshaking lines. Instead, the K3 can be configured to use either of these signals as PTT IN or KEY IN via the CONFIG:PTT-KEY menu entry.** No external level translation is required, since these are RS232-compatible inputs. The default for both signals is *inactive* (unused). Refer to your software documentation to see if PTT or keying via RS232 lines is available. If a PC or other device asserts RTS or DTR *while* you're in the *PTT-KEY* menu entry, the K3 will enter TEST mode as a precaution.

MENU CONTROL LOCATION FROM K3 OWNERS MANUAL:
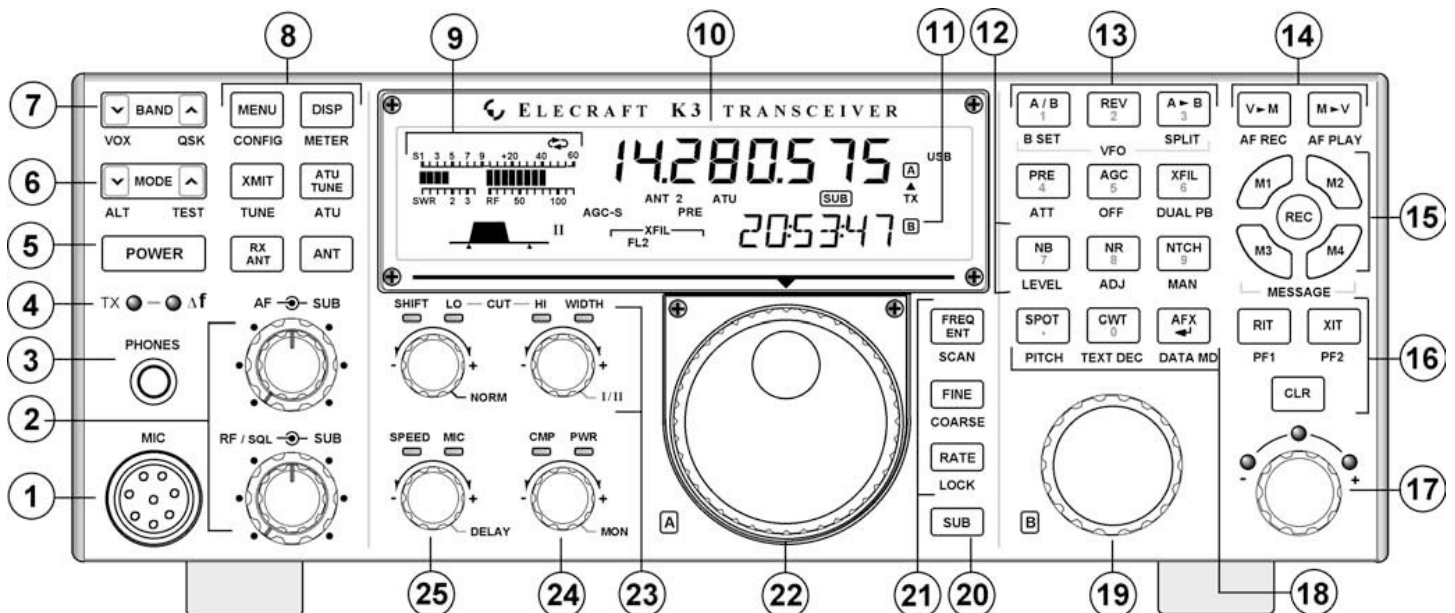
- MENU & **CONFIG** {8} access the MAIN and CONFIG menus. VFO B selects entries; VFO A changes parameters. In general, CONFIG menu entries are used less often.
- Tapping DISP {8} within menus shows information about each entry on VFO B (pg 49).

- Up to 10 menu entries can be assigned to programmable function switches. **PF1** and **PF2** {16} are dedicated programmable functions. Any of **M1** -**M4** {15} can be used as Tap and/or Hold programmable functions if they're not being used for message play (pg 49).

FROM PAGE 49 OF THE K3 OWNERS MANUAL:

Menu Functions

There are two groups of menu functions: MAIN and CONFIG. Tap **MENU** to access the MAIN menu; hold to access the CONFIG menu. You can hold **MENU** to Menu entries that you'd like quick access to can be assigned to programmable function switches (pg. 13). Tapping **DISP** while viewing the menu shows help information about the present menu entry in the VFO B display area. For most entries, the default parameter value is shown in parentheses at the start of the help text. Long help text strings can be interrupted by tapping any switch.

FROM PAGES 50 AND 52 OF THE K3 OWNERS MANUAL:

CONFIG Menu

Tech Mode Entries

Menu entries that include [T] are *tech mode* entries. These are only visible if *CONFIG:TECH MD* is set to **ON**. They are are normally left at their defaults. Entries further described as "Advanced" or "Troubleshooting" should be changed with caution. The default values are strongly recommended for "Advanced" functions; tap **DISP** to see the default value, which appears in parentheses at the start of the help text.

ENTRY	DEFAULT	DESCRIPTION
PTT-KEY	**OFF-OFF**	Allows selection of RTS or DTR RS232 lines to activate PTT or key the K3. See pg. 18. Note: If a computer or other device asserts RTS or DTR while you're in this menu entry, the K3 will switch to TEST mode (zero power output) as aprecaution. The TX icon will flash as a reminder. To avoid this, make sure software applications have flow control and/or keying options turned OFF while you're changing the PTT-KEY selection

PROPER MODE SETTING

For all digital modes, the K3 should be set to use DATA A in DATA mode.

PROPER LINE INPUT AUDIO SETTING

It is important that you do NOT overdrive the K3 with the computer sound card. Set the Windows playback device (probably the speaker on your sound card) to 0 dB, WSJT-X to full power, and then adjust the incoming line gain on the K3 (using the front panel MIC gain knob with the main CONFIG MENU setting at MIC SEL and MIC+LIN set to OFF) so that the audio on the K3 ALC meter during transmit shows 4 bars plus an intermittently flashing 5th bar. Refer to the following excerpt from the K3 User Manual for how to adjust the level on the LINE IN.

Menu Functions

There are two groups of menu functions: **MAIN** and **CONFIG**. Tap `MENU` to access the MAIN menu; hold `CONFIG` to access the CONFIG menu. You can also hold `CONFIG` to switch from one menu to the other. Menu entries that you'd like quick access to can be assigned to programmable function switches (pg. 21).

Tapping `DISP` while viewing the menu shows usage information in the VFO B display area. For most entries, the default parameter value is shown in parentheses at the start of the help text.

MAIN Menu

Entry	Default	Description
AFX MD	Delay 5	Audio Effects. Selections: **DELAY 1-5** (quasi-stereo); **BIN** (L/R phase shift)
ALARM	OFF	Set alarm/Auto-Power-On time. Tap `1` to turn alarm on/off; tap `2` / `3` to set **HH**/**MM**.
LCD ADJ	8	LCD viewing angle and contrast. Use higher settings if the radio is used at or above eye level. If adjusted incorrectly, bar graphs will be too light or heavy during keying.
LCD BRT	6	LCD backlight brightness. Use **DAY** in bright sunlight, **2 to 8** for indoor lighting.
LED BRT	4	LED brightness (relative to LCD backlight brightness). Exception: if *LCD BRT* is set to **DAY**, LEDs are set to their maximum brightness.
MIC SEL	FP, low range, bias off	Mic/line transmit audio source, mic gain range, and mic bias. Source selections: **FP** (front panel 8-pin **MIC** jack), **RP** (rear panel 3.5 mm **MIC** jack), and **LINE IN** (rear-panel **LINE IN** jack). Tap `1` to toggle between .Low and .High mic gain range for the selected mic. Tap `2` to turn mic **BIAS** on/off (turn on for electret mics). For the front-panel mic only, tap `3` to turn on an additional gain stage. *Use this only with very low-output mics.* An apostrophe will appear after the **H**, e.g. **H'** .
MIC+LIN	OFF	If set to **ON**, and *MIC SEL* is set for **FP** or **RP**, the present mic OR line input can be used for transmit audio. NOTE: Setting *MIC SEL* to **LINE** overrides the *MIC+LIN* menu entry (its parameter becomes "N-A"). When *MIC+LIN* is in effect, rotating the MIC control shows MIC gain. The op has to set *MIC SEL* to **LINE** temporarily to adjust LINE IN gain.
MSG RPT	6	Message repeat interval in seconds (**0** to **255**). To repeat a message, *hold* `M1` – `M4` rather than *tap*. A 6 - 10 sec. interval is about right for casual CQing. Shorter intervals may be needed during contests, and longer for periodic CW beacons.