ELECRAFT

# KPA1500 Connection to the Flex Radio 6000 Series Radios

Application Note

May 2018, Rev 2.2

Connecting your radio to the KPA1500

You will be connecting the KPA1500 to the TX jack on the rear of the Flex transceiver.

Here's the wiring diagram from the Flex Radio Owners Manual for the Flex Radio 6500 example. Items #6/7/8 can be used to connect to the KPA1500. Select one for the KPA1500. See the SmartSDR Operating Manual to configure the selected TX port for all bands from 160M through 6M.
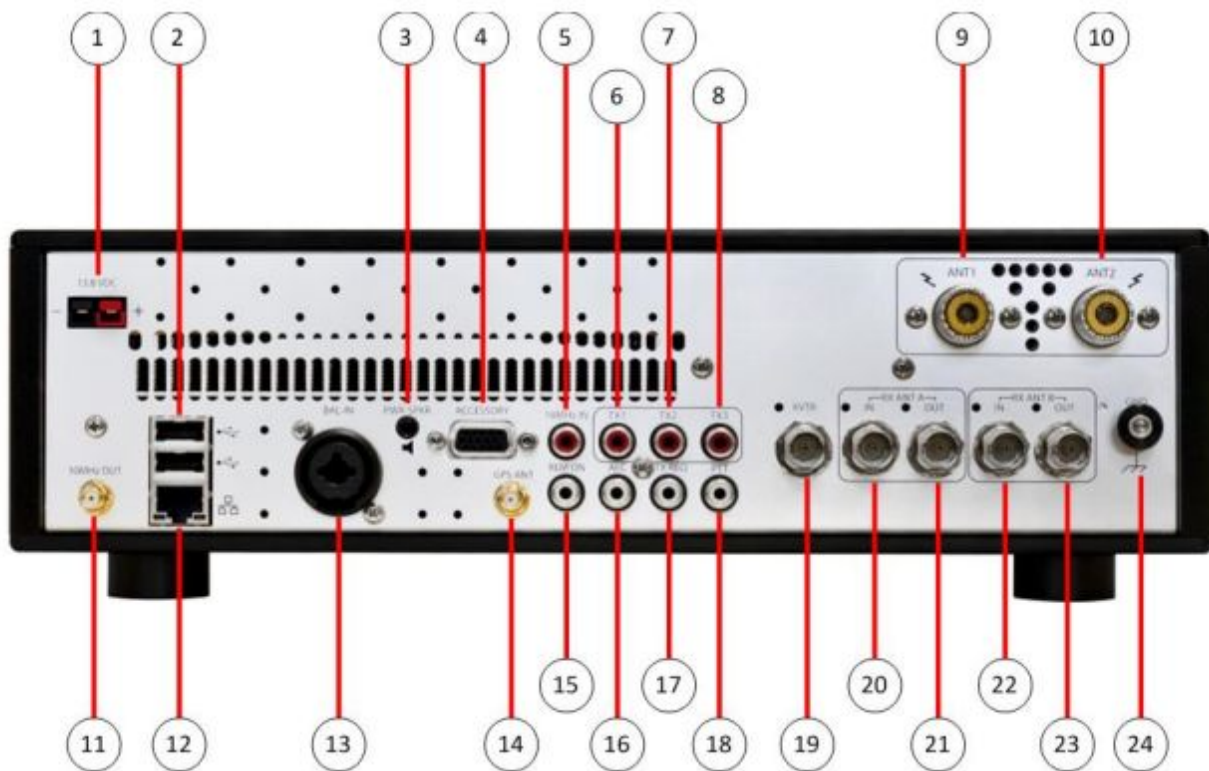

Please follow this table to be sure you've got the Keying cable connected properly. This connection 'arms' the KPA1500 for transmit when the Flex radio goes into transmit.

This is referred to as Basic Mode operation since the KPA1500's frequency counter is used to determine the VFO frequency at the first 'sip' of RF produced in about 100 milliseconds.

Flex Model	Keying Output connector	Connect to KPA1500 connector(see image below)
6300/6400(M)	TX	KEY IN (item #10)
6400/6500(M)	TX1, TX2, TX3	KEY IN (item #10)
6700/6800(M)	Out1, Out2, Out3	KEY IN (item #10)

Connect the other end of the RCA cable to the KPA1500's KEY IN jack (Item #10 in the image below) from the KPA1500 Owner's Manual.
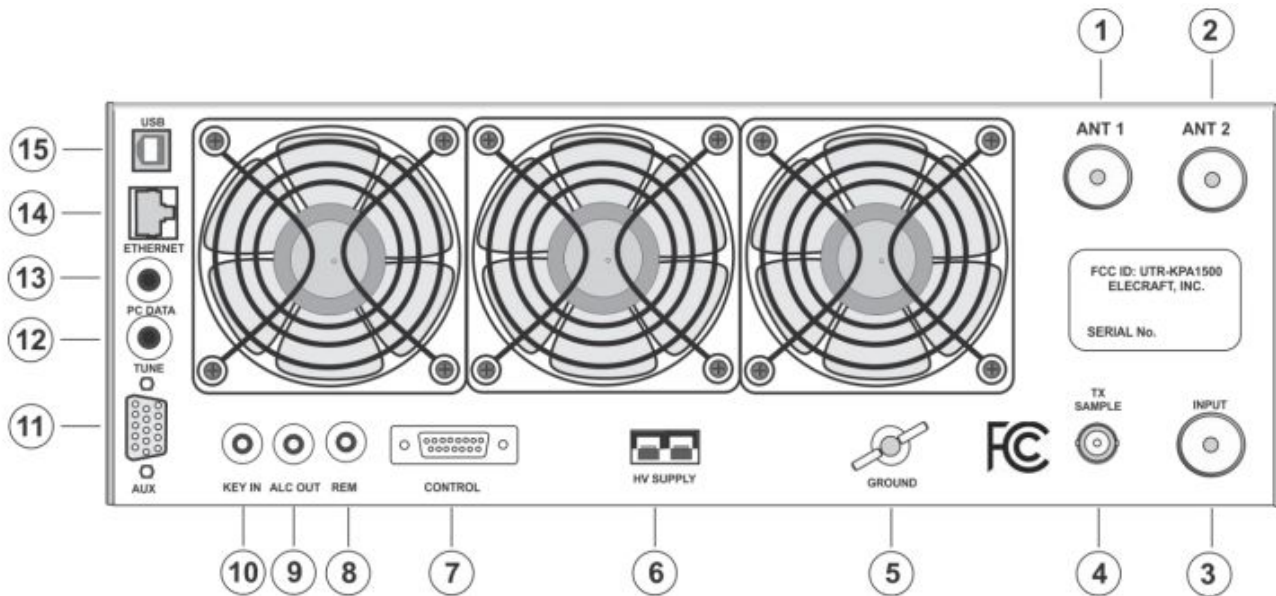
Configuring the KPA1500 to read the VFO frequency on the Flex Radio

*Note: You will need to have SmartSDR version 2.1 or higher running to use this feature.*

Now that we have the hardware connected and configured, we can now set up the KPA1500 to monitor the Flex Radio so that it can automatically read the VFO frequency. This is referred to as Enhanced Mode operation because the KPA1500 can now determine the VFO frequency before the onset of RF. This allows the built-in Automatic Tuner to pre-select the tuning elements as you tune. With this feature, you'll be able to QSY between bands or even across a single band and instantly start transmitting. You must Train the Tuner (see procedure below) for this feature to work best.

- Connect the USB cable to one of the USB ports on the Flex radio.
- Connect the other plug to the KPA1500's XCVR Serial port (item #13). This is a 3.5mm Tip/Ring/Sleeve (TRS) plug.
- Using SmartSDR, configure the Flex port that is created by plugging in the USB cable.
- Select Settings → USB Cables and confirm that a New CAT cable is recognized.
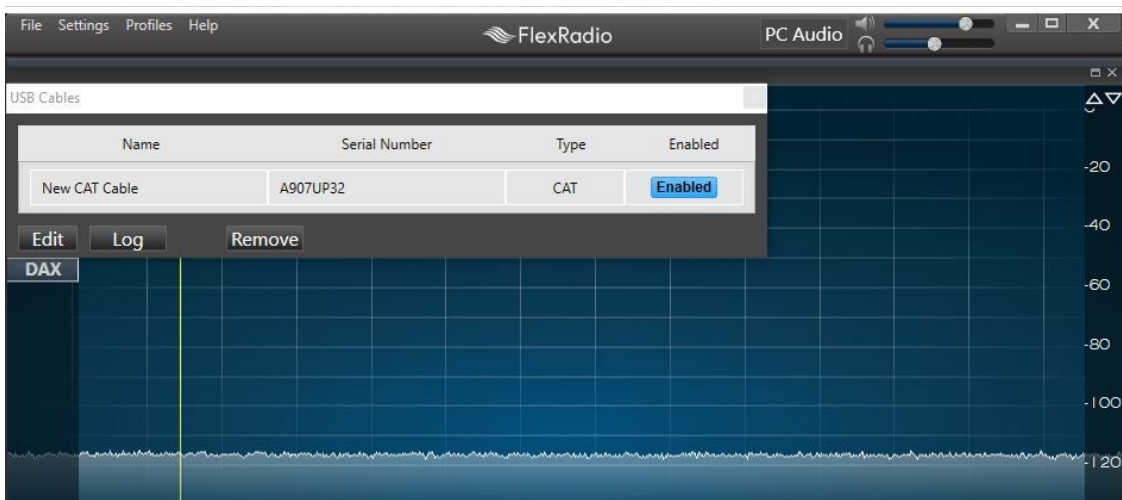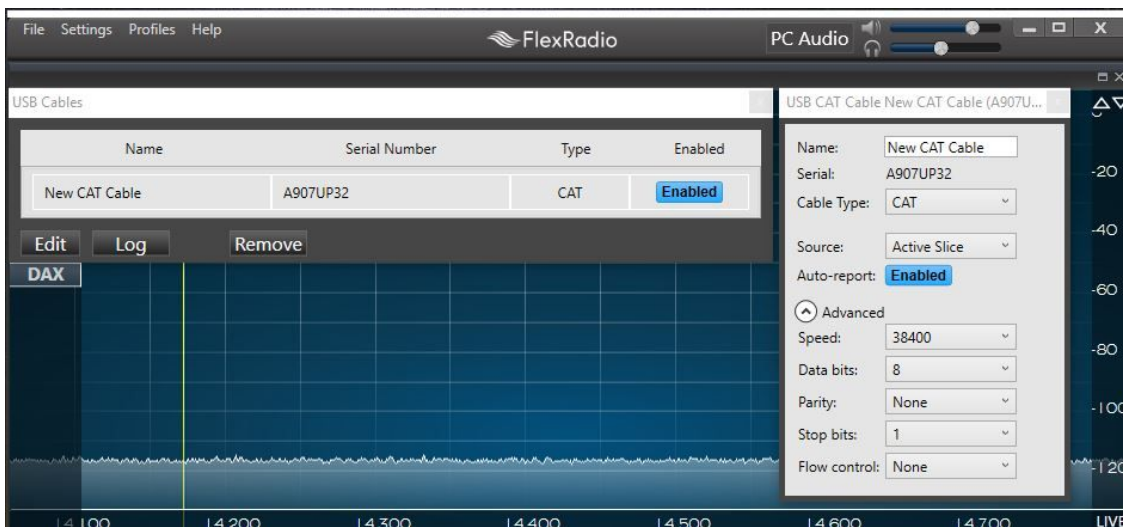
- Click on Edit to bring up this window. Confirm that you have the following values as shown below.
  - Name: New CAT Cable (you can rename this if needed)
  - Cable Type: CAT
  - Source: Active Slice
  - Auto-Report: Enabled
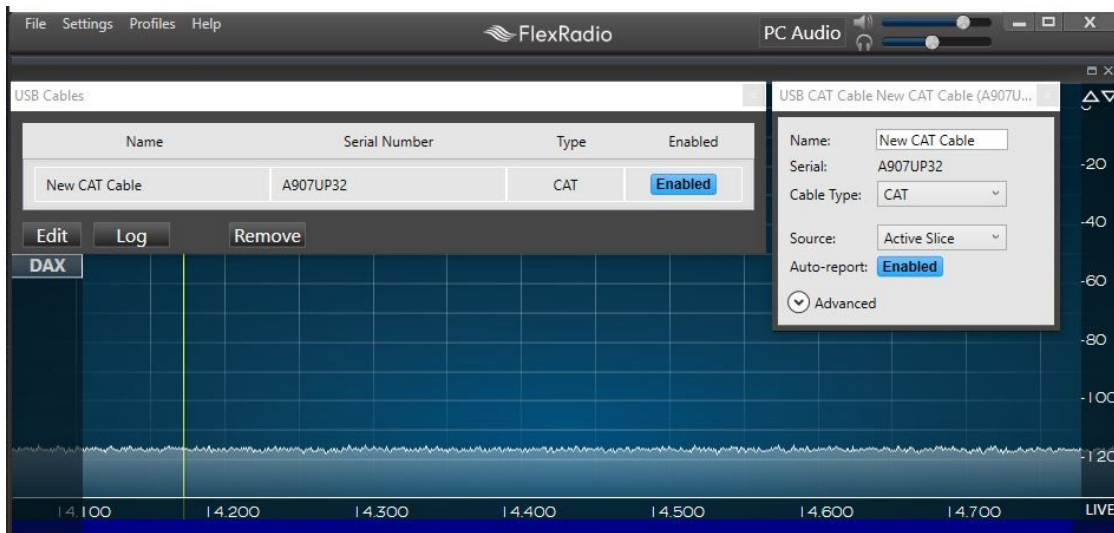
- Click on Advanced (the down arrow) to expand the dialog window to now show the baud rate.
  - Speed: 38400
  - All others: Defaults

Turning our attention to the KPA1500, enter the Menu system and set these items as shown in the table.

KPA1500 Menu item	Value for Flex operating
RADIO	SERIAL
Serial Speed XVVR	38400
TECH MD	ON

Testing to Confirm reading of the Flex VFO

You can inspect one of the status displays on the KPA1500 to confirm that it is reading the VFO frequency and can change bands when you select them on the Flex.

- On the KPA1500, use the Up/Down buttons to select the panel for:
  - XCVR Frequency (monitor this value that is being read from the Flex)
  - TX Count (this is the output of the internal Frequency counter when transmitting)
- In SmartSDR, choose different bands and confirm that the KPA1500 changes bands as you click on them on the screen.
- Then, change frequencies within a band and confirm that the value for XCVR Frequency agrees with the VFO frequency shown in SmartSDR.

Training the Tuner

Procedure for Training the Tuner of the KPA1500

Overview

We will be stepping through each band where you have an antenna connected to the KPA1500, where you'll selecting the top, bottom and places in the middle of each band where you expect to operate. At each of these points, we will be causing the Flex radio to emit a steady-state, CW RF signal for the KPA1500 to use while it executes a Full Tune Cycle. Since the KPA1500 contains an Automatic Tuner, it will remember the settings it finds at each of the points in the band. This is referred to as 'Training the Tuner'.

The following sequence assumes that the Flex and KPA1500 are connected as discussed above.

Set up

- On the Flex, prepare it to produce a constant 25 watts in CW mode.
- On the KPA1500, Tap the ANT button to select the appropriate antenna for the selected band. The ANT LED will light solidly indicating the antenna port selected.
- On the Flex radio, select the the appropriate band. Then, adjust VFO A to the lowest spot in that band where your antenna will work.

For each VFO Setting perform the following to Train the Tuner in the KPA1500

- Tap the ATU TUNE button. The ATU IN light will begin to flash to indicate it is waiting for RF from the transceiver.
- Apply 25 to 50 W of transmit drive. You will hear the relays searching for a match.
- When the relays stop, the ATU IN LED stops flashing, indicating Full Cycle Tune success.
- The resulting match is automatically stored in the appropriate memory bin.
- If a match cannot be found, the red FAULT LED illuminates, NO MATCH is shown on the LCD, and no settings are stored. The ATU can create a match for SWR as high as 10:1.
- If no match is found, make sure the correct frequency band and antenna are selected.
- You can use the KPA1500 Utility Operate panel to observe Full Cycle Tune activity and transmission line/ antenna system SWR.
- If you have multiple antennas on one or more bands, repeat this procedure for each antenna port and frequency combination. The KPA1500 tuner can remember settings for both antenna ports separately.

How do you know how many times per band is needed to fully train the tuner?

See the Appendix of the latest KPA1500 Owners Manual for a table of all the frequencies to make it easier to choose the right ones for your station.

Make it Easy for Your Tuner to Remember what it was Trained to Do

Once you have fully trained your KPA1500 tuner on all bands and all Antennas, you can save your work using the KPA1500 Utility. Go to the Configuration tab in the Utility and select Save Configuration to complete your tuner's training.
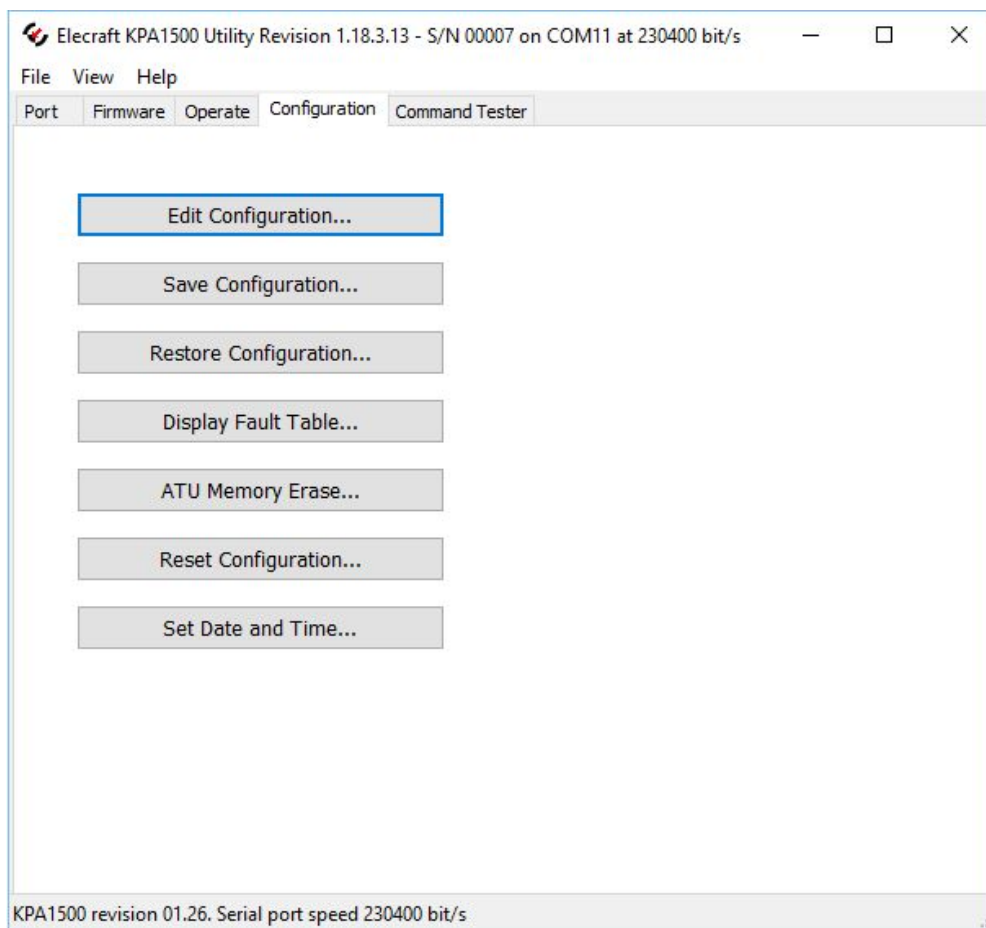
This completes the set up for the KPA1500 and the Flex 6xxx series radios.