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Implementing the Power Combo With the Icom IC-7610

Application Note

Rev 1.1 June, 2018

Background

The Icom IC-7610 can be connected to the KAT/KPA500 combo using the Key signal available on the rear panel of the rig. This Application Note discusses how it can be set up.

Detailed connections and wiring directions

Install the KAT500 and KPA500 Utilities

- Find the latest version of the KPA500 Utility here.
- Find the latest version of the KAT500 Utility here.

For both Utilities, choose the one for the type of operating system you use. Download these Utilities and run them to install the Utility on your system. We will be calling upon the KAT500 Utility later in this Set Up Procedure.

The Utilities will then use the Virtual COM port created by inserting the USB-to-RS232 cable into the computer. You will use this COM port number in the Port tab of the Utilities to get the Utility to 'talk' to the amp and tuner. Please see the HELP facility in the Utilities for more details on how to make the connections.

Connect the Power Combo to a computer

- The KAT500 was shipped with its own KXUSB cable. This will connect directly to the computer.
- The KPA500 requires a similar USB-to-RS232 converter cable. In the amp's case, it needs to have a DB9 connector for the rear of the KPA500's XCVR connector. We provide one in the box with the KPA500 when it ships.

  All Elecraft USB converter cables use FTDI chips due to their ability to support Windows, Macintosh and Linux platforms. Depending on your computer operating system, FTDI drivers may be required to be installed.

Wiring of the Icom 7610 to the KAT/KPA500

We want the KPA500 to be 'armed' for Transmit when the IC-7610 goes into transmit. Icom calls this signal SEND, while Elecraft calls it PA KEY. Please see the diagram below to locate the SEND signal on the back of the IC-7610. This is an RCA jack that we will use to connect to the KAT500, explained in the next step.
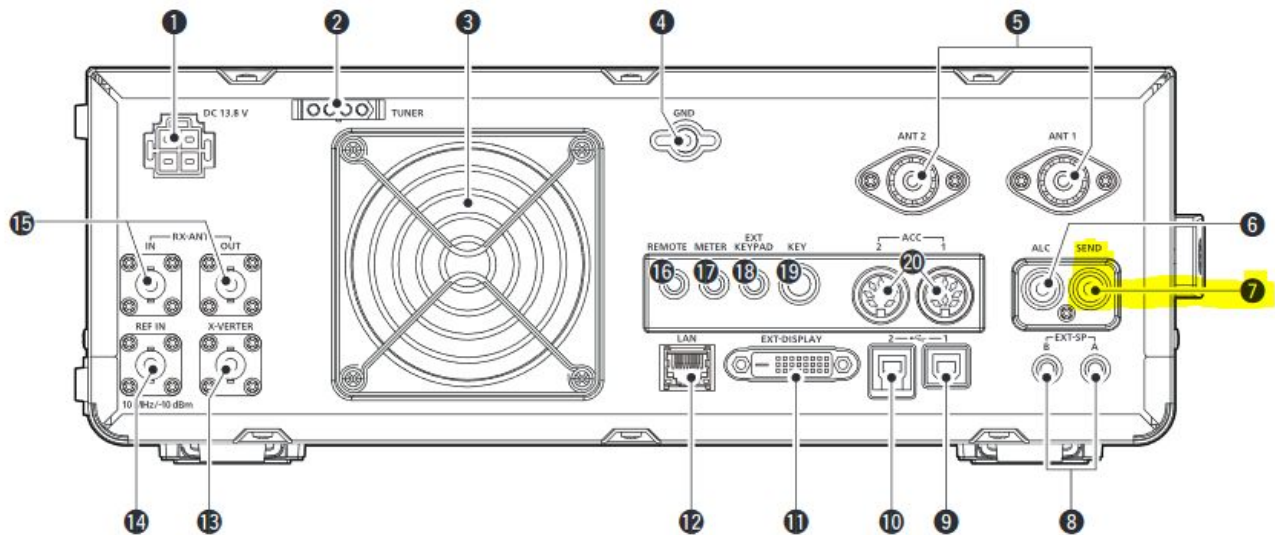
The SEND signal will be used to key the KPA500 and is the same signal routed through the KAT500 to prevent hot switching. Please see the wiring diagram below to see how the connections will be made.
- Cable #3 is the KXUSB that is supplied in the box with the KAT500.
- Cables #4 implements the Icom SEND signal between the KAT500, the KPA500 and the IC-7610. These 2 cables are supplied in the Power Combo boxes. You can use longer ones if needed.

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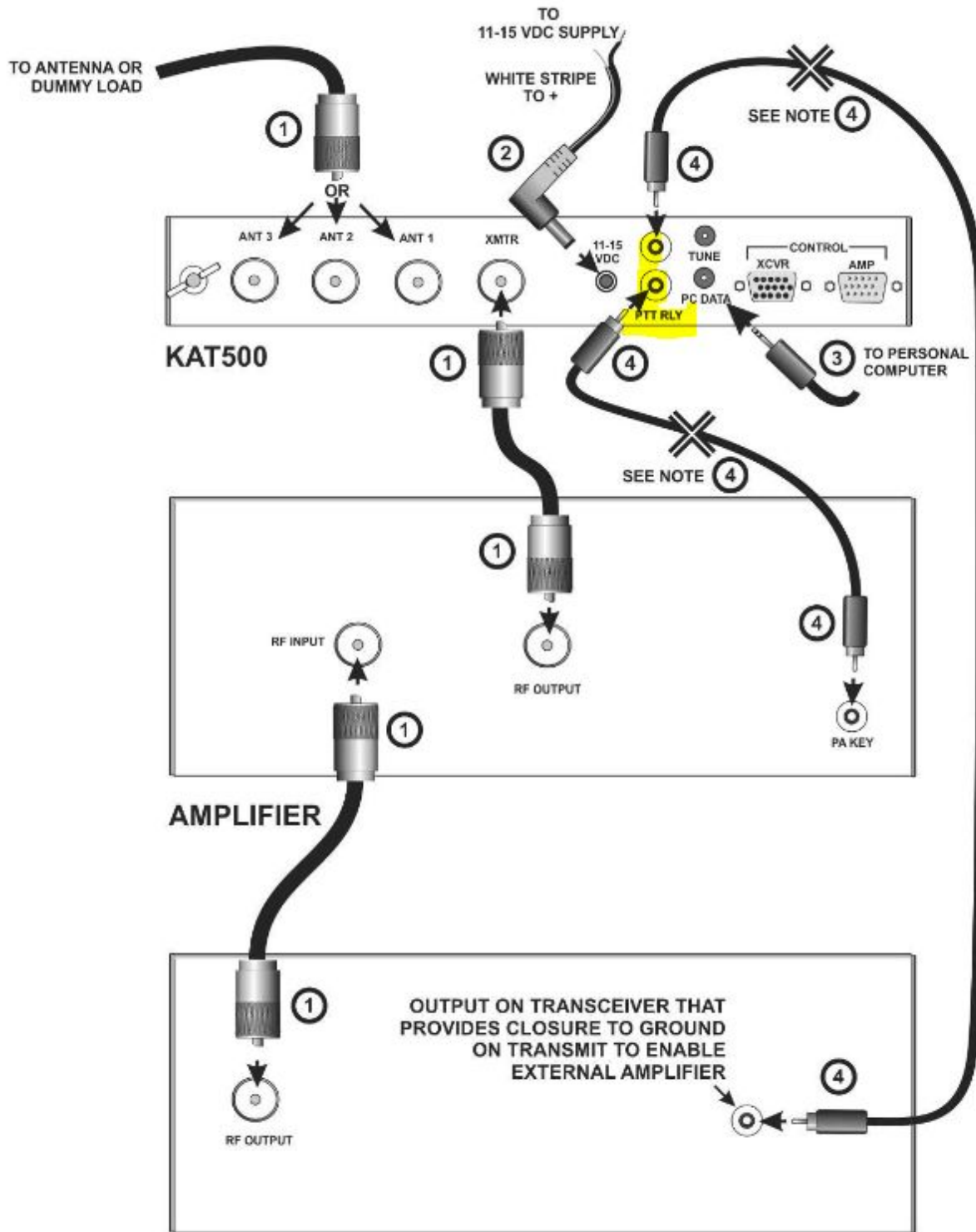
Next, we need to be sure that the KPA500 and KAT500 are optimized to work with each other. For background, we ship both the KAT500 and the KPA500 as if they were going to be used separately.

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That is, their default settings assume that they will be used with non-Elecraft linear amps and transceivers. The next section addresses how to set them up to work closely together.

Procedure to setup your KAT500 with a KPA500

 Please enter the KAT500 Utility and select the Configuration tab then click on the button to Optimize for KPA500.
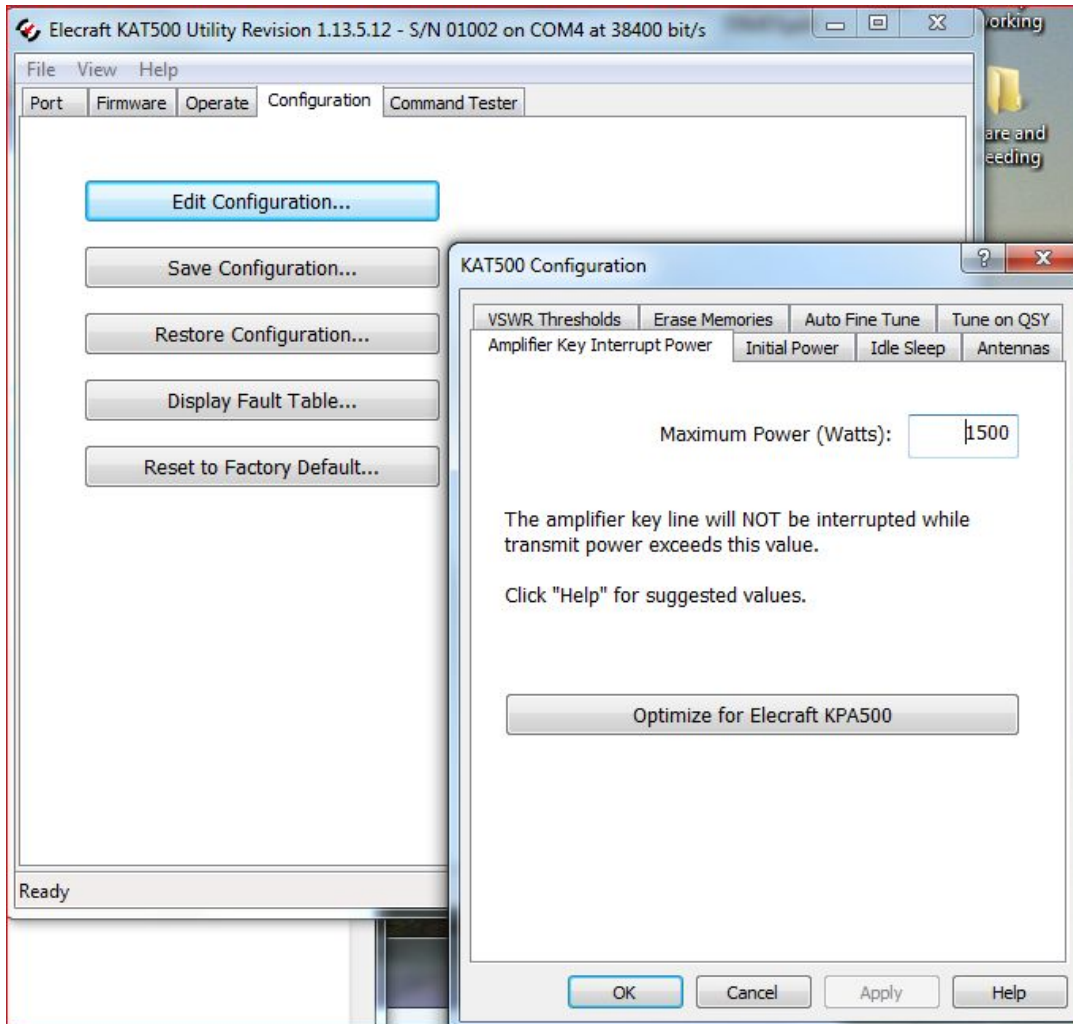
Our last steps involve preparing the KAT500 so that it can use its memory recall feature to quickly QSY to a new band or frequency. We call this "Training the Tuner".

Training the Tuner

Overview

We will be stepping through each band where you have an antenna connected to the KAT500, 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 IC-7610 to emit a steady-state, CW RF signal for the KAT500 to use while it executes a full tune cycle. Since the KAT500 is 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'.

Set up

- On the Icom, set it up to generate 25 watts. We recommend that you set up a way to generate 25 watts of RF with a constant carrier wave (CW) that can be keyed at will. This CW signal at 25 watts will need to be present until the KAT500 has completed a full tune cycle.
- Note that this is different from the TUNE button on the Icom's front panel.
- On the KAT500, select the MAN mode.
- On the KAT500, 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 Icom, select the appropriate band with the Band select button. Then, adjust VFO to the lowest spot in that band where your antenna will work.

For each VFO Setting perform the following to Train the KAT500:

1. Then, Tap the MODE button so that AUTO is enabled. The AUTO LED will stay on solidly. This places the tuner into Automatic mode so that it will remember the settings found during the upcoming tune cycle.
2. Next, Tap the TUNE button on the KPA500. The AUTO LED will now start to Flash. This indicates that the KAT500 is now awaiting the RF needed to execute a full tune cycle.
3. Cause the Icom to send its 25 watts of CW Rf.
4. The KAT500 will begin to clatter as it searches for a low SWR. This is the Full Tune Cycle. The clattering will stop once a low SWR is found and the KAT500 AUTO LED will now be solid. This indicates that the full tune cycle is complete and the results have been memorized.
5. On the Icom, adjust VFO frequency for the upper end of the band where your antenna will operate. Repeat Steps 1-3 above for this setting.
6. Then, move into the middle of the band and repeat Steps 1-3 again.

Train the Tuner on all Bands

- Next, step to other bands where your antenna can operate within a 10:1 SWR ratio. Perform the same steps above as with the first band chosen.
- How do you know how many times per band needed to fully train the tuner?

After successfully tuning, the KAT500 stores the L and C settings or the bypass setting in memory. They will be recalled almost instantly when returning to that frequency later. The entire spectrum from 1.8 through 60 MHz is divided into frequency segments and tuning information is stored for each segment in which you have successfully completed a tune operation.

When starting a tune operation for a frequency segment that has no previously stored L and C values, the KAT500 first tries the settings in the nearest frequency segment that has tuning data. Since retuning is normally required over a narrower frequency range on the lower frequencies to maintain a low SWR, the lower frequencies have narrower segments assigned as follows:

- Below 3 MHz the segments are 10 kHz wide.
- From 3 MHz through 26 MHz the segments are 20 kHz wide.
- From 26 MHz to 38 MHz the segments are 100 kHz wide.
- From 38 MHz to 60 MHz the segments are 200 kHz wide.

The KAT500 also stores the antenna output that you selected for each band.

Training the tuner with all of your antennas

If you have more than one antenna, continue to ANT 2 and ANT 3 ports using the same technique above for those antennas. The KAT500 tuner can remember settings for all 3 antenna ports separately!

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

Once you have fully trained your KAT500 tuner on all bands and all Antennas, you can save your work using the KAT500 Utility. Go to the Configuration tab in the Utility and select Save Configuration to complete your tuner's training.
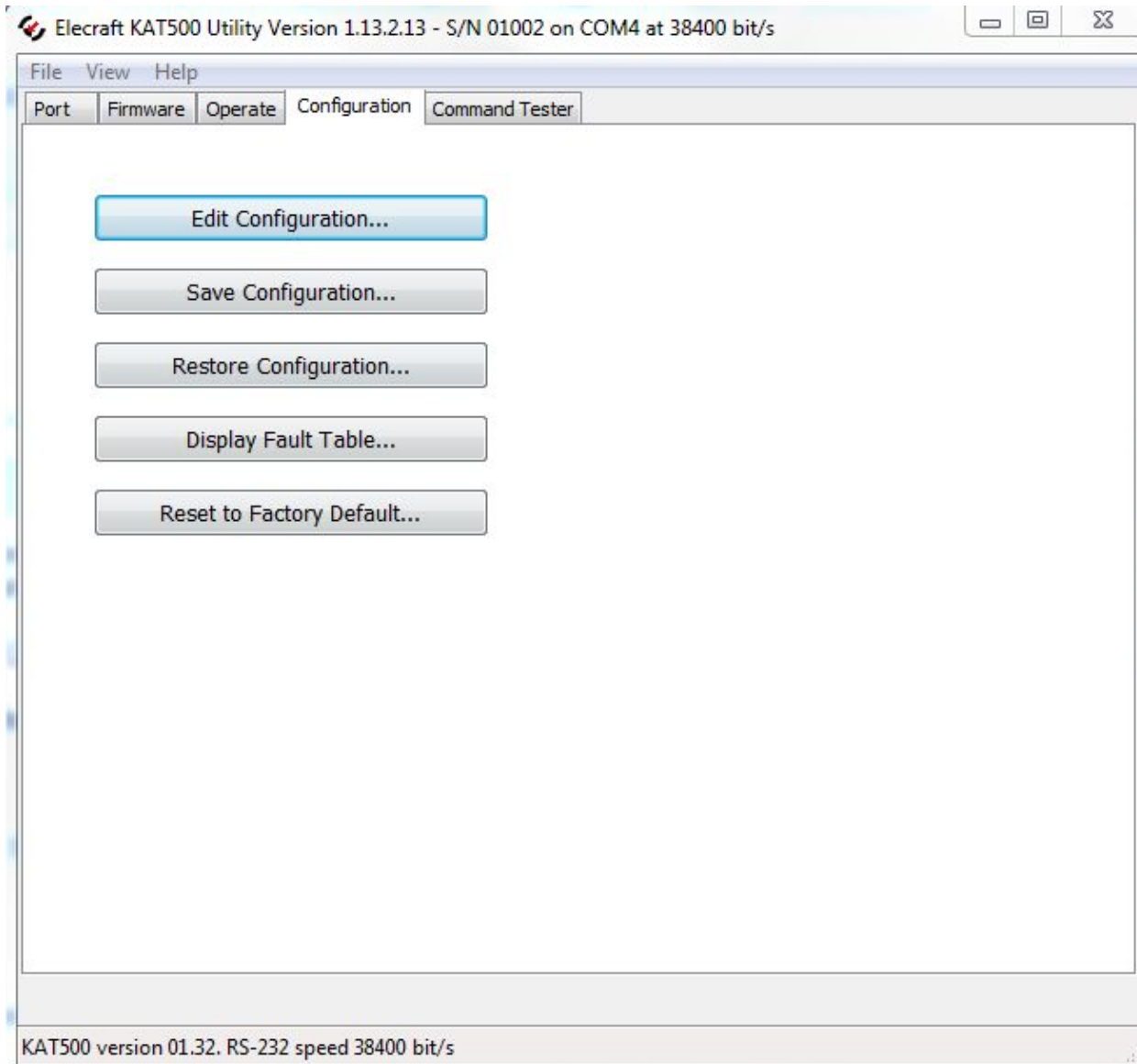
During operation, if you encounter any faults in the KPA500, please send us your configuration file to our Customer Support team (support@elecraft.com) via email for analysis.