

# WKUSB3 QUICK START GUIDE

## February 17, 2016 – Revision 1.2

Thank you for purchasing a WKUSB\_SMT kit from K1EL. The first thing to do is to assemble your WKUSB kit. Download the assembly instructions from:

[http://www.hamcrafters.com/files/WKUSB\\_SMT\\_assy.pdf](http://www.hamcrafters.com/files/WKUSB_SMT_assy.pdf)

The assembly document will guide you through final assembly and check out of your WKUSB\_SMT. Please read it all the way through BEFORE you start. WKUSB operates in two modes, standalone and host mode. The assembly guide will instruct you how to do basic checks in standalone mode to make sure it is working properly. Once that is complete the next step is to check out WKUSB\_SMT in host mode, connected to a PC.

**Warning: Please do not use WKUSB3 with the WK2CFGMAC application or with Ham Radio Deluxe (HRD/DM780) releases earlier than 6.2.**

### A word about USB drivers

WKUSB\_SMT uses a USB interface IC manufactured by FTDI. This is one of the most popular USB devices in existence. We depend on their expertise with USB and they do a good job of maintaining reliable USB drivers that run on a PC and interface to their controllers. Most WIN7 and WIN8 computers now ship with the FTDI USB driver preinstalled so you can just plug in WKUSB\_SMT and you are good to go. Older WIN-XP computers may not have a FTDI driver installed so it's a good idea to preinstall the driver before plugging WKUSB\_SMT in. Refer to the file: [http://www.hamcrafters.com/files/ReadMeFirst\\_wk3.pdf](http://www.hamcrafters.com/files/ReadMeFirst_wk3.pdf) for further instructions.

Once the USB driver is installed and you have plugged WKUSB into your PC, refer to Appendix A in this document and determine which com port your WKUSB is assigned to. You will need this piece of information to configure your PC applications so that they can find your WKUSB.



K1EL provides two applications that can be downloaded from here:

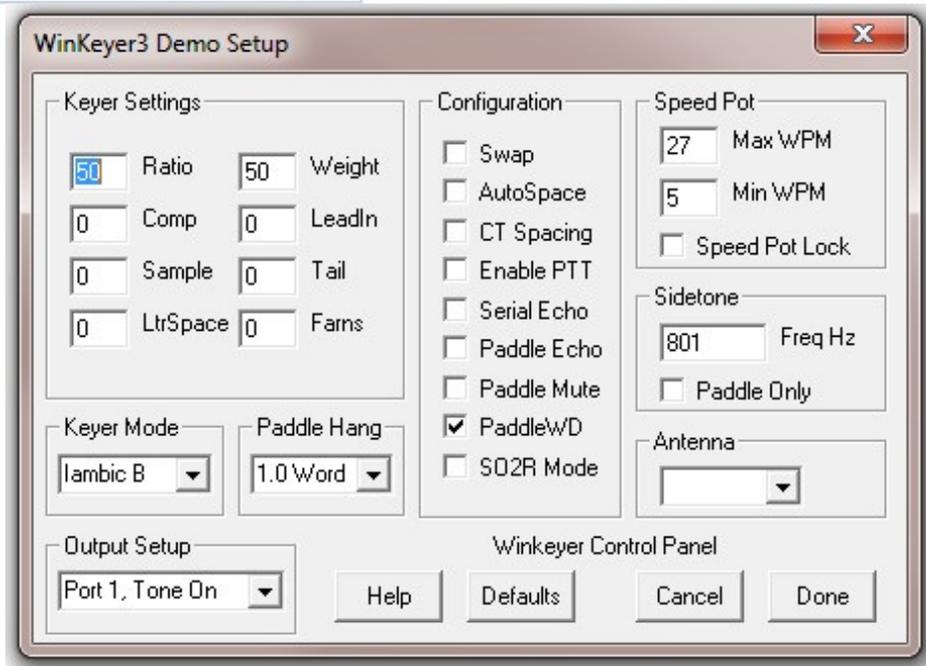
<http://www.hamcrafters.com/wk3apps.html>

WK3DEMO is a general purpose test application that can exercise all of WK3's capabilities. The installation file is called: WK3\_Demo\_Setup.exe

Once the application is installed, start it up and you will see the dialog box show at left. All you need to do to get started is to configure the serial communications port. Click on Setup and the com port selection list is shown. Only the currently active USB com ports are shown. Select the com port that you found in the Device Manager dialog box.

Click on ? in the upper left for a help menu..

Click on Open to connect to WKUSB. If all is well it will show you the WK3 IC version. Click on Setup again and this time you will be shown the Setup dialog box as shown on the next page. This presents all of WK3's various configuration options.



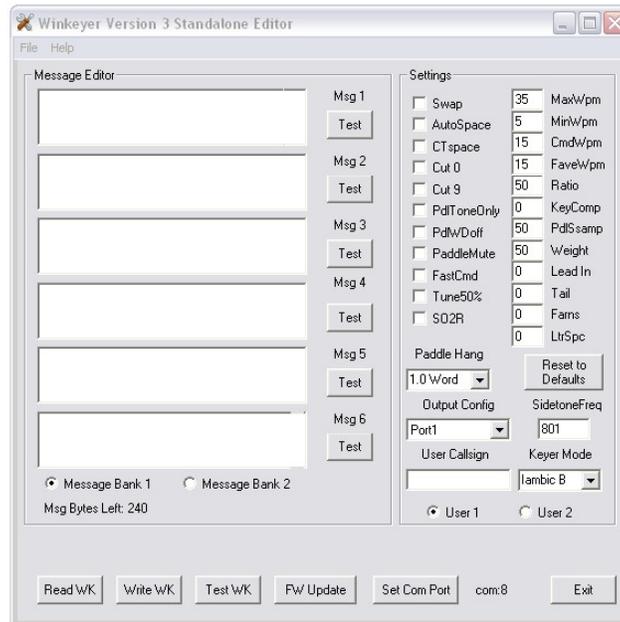
Click Cancel for now and go back to the main dialog box. You can type into the Keyboard entry window and if sidetone is on you will be able to listen to your CW. If serial echo is on then what you type will be echoed in the Outgoing Morse Window.

Now hook up some paddles and test paddle entry. If PdlEcho is on, letters entered on the paddles will be echoed in the Outgoing Morse window. You can use the Setup Dialog to try different keying options. You have to go back to the main dialog to transfer new settings to WKUSB.

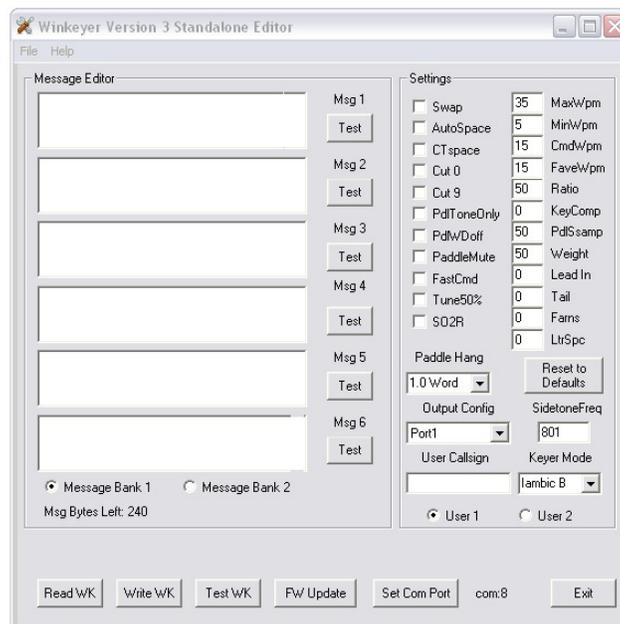
When PotLock is checked, the speed pot will set the WPM rate. The upper and lower WPM limits of the speed pot can be specified. When PotLock is unchecked Up and Down arrows next to the WPM readout will control the speed or you can directly enter a speed.

WKtest is strictly a hardware test tool; it gives you a good view at the operation of WKUSB and assures you that it is operating properly. The next step is to move on to a 'real' application, but before that we will briefly look at standalone mode.

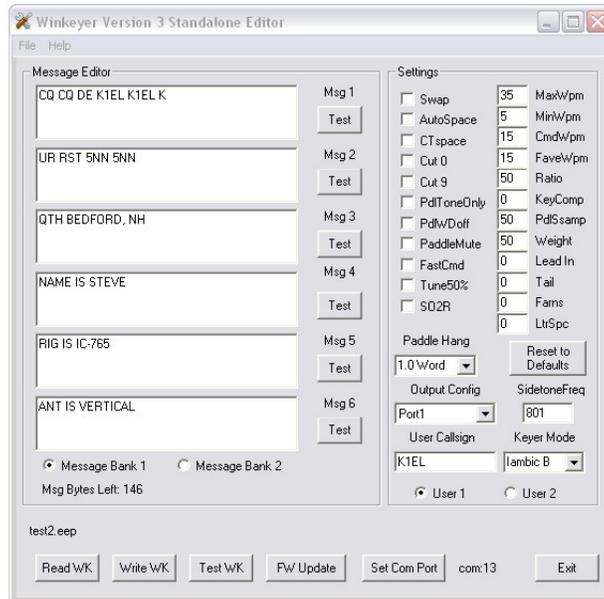
When WKUSB is not connected to a host application it will run in standalone mode. This can be while disconnected from a PC running on batteries or connected to a PC but not connected to a host application. There is an extensive set of standalone capabilities that are described in detail in the file: WK3\_Datasheet\_v1.pdf. The Standalone section starts on page 19. Settings can be entered by paddle commands or through the WK3Tools application which runs on a Windows PC. The WK3tools installation file is called wk3tools\_setup.exe. After installation, start the app up and the following dialog box is shown:



It will be empty since you haven't uploaded the current configuration of your WKUSB. When WKUSB is powered up for the very first time, all settings are loaded with defaults. To view these, connect WKUSB to your PC, set the ComPort and click on ReadWK. After a couple of seconds the dialog box will be updated to show the current settings, in this case you should see:



Now you can go in and tailor the standalone settings the way you want. The biggest timesaver is the ability to load messages. A tally of available message bytes left is shown on the lower left corner. Even though the WKUSB box has only four message pushbuttons, it has the capability to handle 12 in two banks. Don't forget that you have to write the messages back to WKUSB before they can be played.



When you are happy with your settings, or want to update messages, click on WriteWK and the settings will be stored in WKUSB's non-volatile memory. You can then disconnect WKUSB from the PC and all the settings will be ready to go.

### TestWK

This control will tell WK3tools to connect to WKUSB and read back current status. This should be used after setting the com port to be sure WKUSB is accessible. Once the command completes the current firmware revision, supply voltage and message switch status will be displayed.

### Restoring Factory Settings

This dialog button is provided to let you restore WKUSB back to original default settings. All the the control settings are initialized and messages are erased. Don't forget that you need to write this block back to WKUSB when you are done.

### Help File

A help file is included with WK3tools, click on the Help entry on the menu bar. Since the Help file was created for the older WinHelp utility it may not run under Win7 or Win8 (thanks Microsoft) to get around this, there is a utility you can run that will add this capability. The Microsoft website that describes this is: <http://support.microsoft.com/kb/917607>

## Upgrading WK3 Firmware

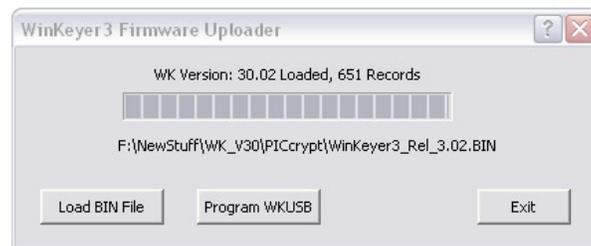
WK3tools can be used to install new firmware revisions in the field. K1EL will post new versions of firmware when they become available:

<http://www.hamcrafters.com/wk3upgrade.html>

There are two version types, one for WKUSB\_SMT and one for upgrading the 14 pin DIP version used in legacy WKUSBs. After you have downloaded the firmware version you wish to download and have placed it in an easily accessible place on your PC, click on the FW Update button. You will be shown this dialog box:



Click on Load BIN File and a file open dialog box will be displayed. Navigate to the image file you downloaded and click OK. The file will be loaded and you will now see something like this:



Verify that the desired version number matches what is displayed and simply click on Program WKUSB to transfer the image file to WKUSB. When the load is complete, a reset command will be given to WKUSB and it will restart and sound a **C** in sidetone. Now you can click Test WK and you should now see the new version number displayed.

## FAQ #1: What is Standalone Mode and How is it different than Host Mode?

The original WinKeyer1 was designed to operate only while connected to a PC, under control of a PC based application, this is Host Mode. WinKeyer obtained power directly from the PC over unused RS232 control lines; if it was disconnected from a PC it was inoperative. Soon hams started putting batteries in WinKeyers and using them standalone, in other words, not connected to a PC. This spawned many requests to add features to make a standalone WK more useful. When WKUSB was designed, we decided to include a complete 'second' keyer in the box and Standalone Mode was born. This second keyer shares the core 'K1EL Keyer Engine' with Host Mode but in All other respects it is independent. It can operate on battery power or connected to a PC. It has its own settings memory and 12 message slots. Commands can be issued via paddle commands or through the use of WK3tools. Standalone settings do not influence Host Mode settings. In Host Mode, keyer settings are stored on the PC by the application and are loaded when you connect to WKUSB. In Standalone Mode the settings reside in EEPROM inside WKUSB. If you disconnect from an application, WKUSB will automatically go into Standalone mode and load saved settings from EEPROM.

## FAQ #2: Are the internal batteries required if always connected to a PC?

When WKUSB is plugged into a PC, power is automatically switched over to USB power by a diode switch.

In other words, WKUSB can operate with or without batteries. With batteries out, you can only use it when connected to a PC USB port. When first plugged in it will start up in standalone mode and then change over to host mode when you start up an application that uses WKUSB. In host mode, the PC app has control of WKUSB settings and messages. If you close the application down, WKUSB will remain powered but will revert back to standalone mode and the settings loaded by WK3tools (or manually by paddle). If you start another host application up WKUSB will go back into host mode.

With batteries installed the functionality is identical with the exception that you can unplug WKUSB from your PC and operate independently in standalone mode. Avoid disconnecting WKUSB from your PC while it is under active control from a host application, this can cause the application to get confused and possibly stop functioning.

## WKUSB Controls and connectors

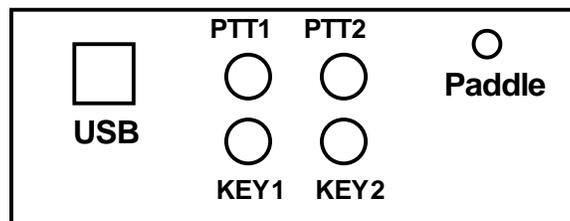
### Front View



There is one knob that is used to set WKUSB's operational WPM rate. In standalone mode the knob will always control speed. In host mode the speed control may or may not have an affect depending on how the app is configured. Some applications only allow you to change the speed by their own controls and will ignore WKUSB's control.

The four pushbuttons on top of the unit are used primarily for standalone mode; the red button is the command/message button while the other three are message buttons. Standalone command operation is described in detail in Appendix B.

### Rear View

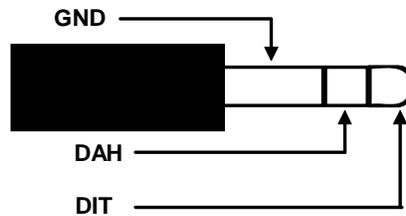


The connectors are labeled clearly, there are six in all:

The leftmost square connector is for the USB cable, it is a type B connector, PC's generally have Type A connectors, a Type A to Type B cable is included with your WKUSB kit.

The four middle RCA jacks are for connecting WKUSB to your transceiver. Two separate Key and PTT pairs are provided. This allows you to connect WKUSB to two different rigs and select the one you want to key under software control.

The paddle connector is located on the right. This is a 1/8 inch stereo jack with the following connections:



## Connecting WKUSB-SMT to your station

Minimally all you need to do is connect the USB cable from WKUSB to a USB port on your PC and connect the key output to the keying input on your rig. Since WKUSB performs the keying function it drives your rig in the same manner as a straight key. In other words there are only two leads, ground and key control. You will need to purchase or make up a keying cable.

K1EL does not sell these cables as of this writing but here is a great source:

<http://www.sweetwater.com/store/detail/CPR103/>

One end of the cable will be an RCA plug and on the other end the connector that will mate to your rig's key input. Usually this is a ¼ inch phone plug. A two wire cable is all that is required to key a typical transceiver. Plug the RCA side into either KEY1 or KEY2 and the other side directly into your transceiver's key input jack. Make sure you disable the internal keyer in your rig (if it has one) and set it up for straight key mode. If you are trying to key a vintage vacuum tube based transmitter, WKUSB-SMT will work fine because it employs solid state relays rated for +\-300V switching at 100ma. This covers grid block keying but it may not be suitable for cathode keying.

If you decide to use keying paddles with WKUSB they plug into the paddle jack input on the back of the unit. A 1/8 inch stereo jack is used on WKUSB for space reasons so if your paddles have a ¼ inch size plug an adapter cable will be necessary.

You can use WKTEST to make sure that WKUSB is keying your rig properly. If you run into problems, make sure you have selected the correct key output port. This is done in Output Config area of WKTEST the dialog box.

95% of all installations will use the KEY outputs only. The PTT outputs are intended for installations that require control of antenna relays or linear amplifiers. PTT is asserted before KEY and is held asserted for the entire transmit interval. The delays are adjustable, look at lead in and tail delays settings.

WKUSB's RCA connectors are electrically isolated from the WKUSB enclosure and ground. This means that you can directly connect to your transceiver with WKUSB connected to your PC and not have to worry about ground loops or RF getting into your PC through a DC path.

The real power of WKUSB is only released when you connect it to your favorite logging or contest application.

## A note about mono vs. stereo keying cables

Some rigs, the Elecraft K3 for example, require the use of a stereo keying connector even though you only connect to tip and sleeve. The ring connection must be left unconnected, a mono connector will ground the ring connection and the rig will not operate properly. It's highly recommended to make your keying cable up using a stereo connector on the rig side and it will save you trouble in the future if you ever want to use WKUSB with various radios.

A standard 1/8" (3.5mm) to RCA stereo cable makes a very nice keying cable. These cables are very common and inexpensive. They are used with video cameras, MP3 players, and other audio devices. They provide a stereo jack on one side and two RCA jacks on the other which is perfect for WKUSB. In most cases you will only use one of the RCA jacks (Key side) and leave the other (PTT) unconnected. If your rig requires a ¼" plug then you would need to find a 1/8" to 1/4" stereo adapter.



**Typical A/V cable that works well with WKUSB**

## Appendix A

### How to find out what COM port your WKUSB is mapped to:

Left click on Start and then right click on *MyComputer*.



Click on *Properties*:



Click on *Hardware*:



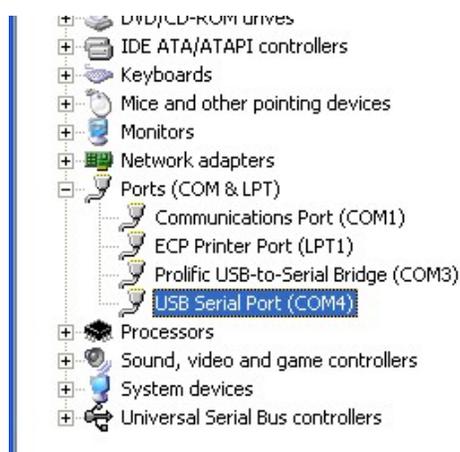
Click on *Device Manager*.



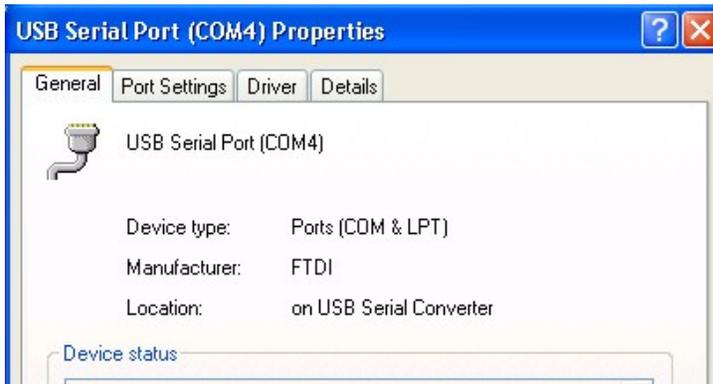
Then Double Click on *Ports (COM & LPT)* to expand the port list:



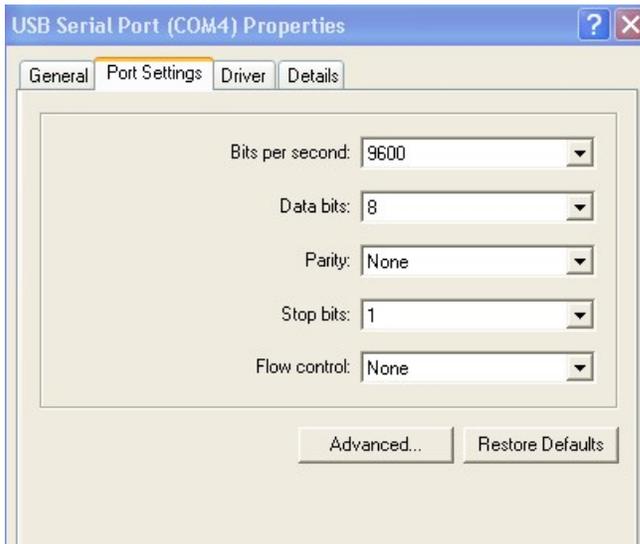
The port labeled *USB Serial Port (COMx)* is the WKUSB port:



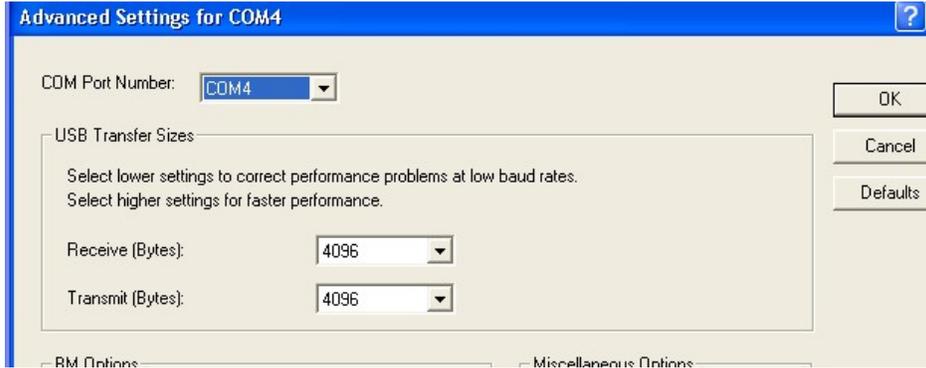
If you want to change the port assignment, double click on USB Serial Port and Then Click on *Port Settings*:



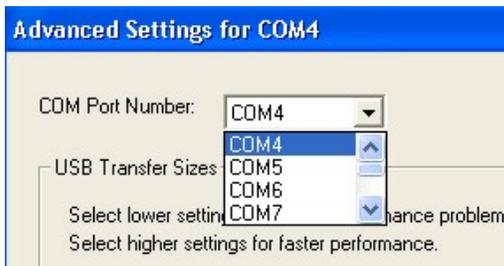
Click on *Advanced*:



Finally you will see the port selection control:



By clicking on the down arrow to the right of the COM Port Number List Box you will get a list of available com ports. Click on the one you want and you are finished.



In the event you installed a new USB com port or reassigned a different port the com port you last used may not be available. In that case you will need to map WKUSB to a new com port.

## APPENDIX B - Winkeyer2 Standalone Mode

**Winkeyer3 (WK3) Standalone Mode is covered in the WK3\_Datasheet\_v1.pdf file starting on Page 19**

WKUSB Assembly Manual:

[http://www.hamcrafters.com/files/WKUSB\\_SMT\\_assy.pdf](http://www.hamcrafters.com/files/WKUSB_SMT_assy.pdf)

Specific information about the WK3 IC used in WKUSB can be found here:

[http://www.hamcrafters.com/files/WK3\\_Datasheet\\_v1.1.pdf](http://www.hamcrafters.com/files/WK3_Datasheet_v1.1.pdf)

### Contact Information

If you have any questions please post them on the K1EL Yahoo group:

[http://groups.yahoo.com/group/k1el\\_keyers/](http://groups.yahoo.com/group/k1el_keyers/)

As a last resort, if you still have questions email K1EL at [k1el.kitsinfo@gmail.com](mailto:k1el.kitsinfo@gmail.com)