

# TSW Software for the Teensy 4.0

## Raduino Adapter Version 5.1

From the Triumvirate Skonk Worx, [www.w0eb.com](http://www.w0eb.com)

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Teensy 4 adapter mounted on a V5 uBITX running TSW's version of the factory 5.1 software.

This software is available for download from [www.w0eb.com](http://www.w0eb.com) in the “Files” section. It operates almost exactly as the factory’s version V5.1 and this manual covers ONLY TSW’s changes to the original which has been compiled to operate with a PJRC Teensy 4.0 MPU instead of the Arduino NANO.

**ATTENTION!** Because PJRC has NOT updated their TeensyDuino add in to the Arduino IDE to operate with the latest IDE, you will have to download a previous version, IDE V1.8.9, install it in a SEPARATE DIRECTORY (NOT “program files(X86)). Once you have done that, go into THAT IDE’s directory, go to the Libraries directory and DELETE the LiquidCrystal directory completely.

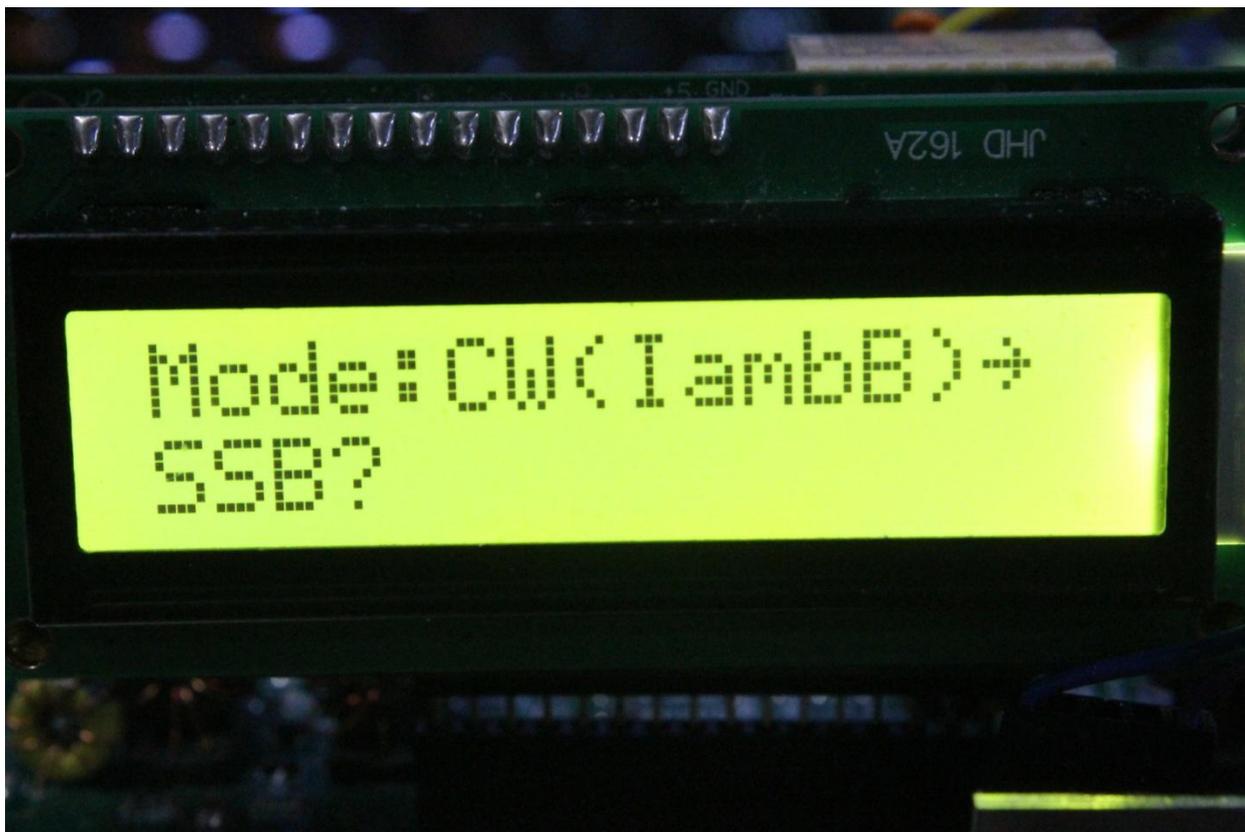
Do NOT delete the LiquidCrystal directory under “Hardware – Teensy – Libraries” though as this is the one that is needed to compile the software.

There are many advantages to using a Teensy 4.0 in place of the original NANO. The T4 is MUCH faster – 600 MHz processor vs the NANO’s 16 Mhz, T4 has 512K+ of RAM, much larger Flash memory, larger EEPROM for storing variables & program constants to name just a few. It’s clock oscillators operate on different frequencies which get rid of a bunch of “birdies” that plague the NANO MPU Raduino’s.

The only operational changes TSW made to the original software was to improve the CW keyer by using separate dot and dash wires and used the “Timer Interrupts” to allow other things to happen in the software while the key paddles are not pressed instead of having to constantly poll the inputs to see if a key press occurred. This way the keyer can operate much more efficiently and other processes don’t interfere with it.

You will have to re-wire your key paddle jack. First of all, the two resistors used with the original software MUST be removed. Next make sure the DOT paddle (normally the tip connection) goes to the A6 line (P1 pin 2 on the Raduino) which is the same as it did on the original. If you had the 4.7K resistor connected between pin 2 and +5V you can remove it or leave it alone as it doesn't affect the operation. The DASH paddle (normally the ring connection) must be connected to the A7 line (P1 pin 1 on the Raduino). The only other wiring change is for the Hand Key. You have two choices here, you can add a separate Hand Key jack and connect it to the Microphone's PTT terminal (normally the "ring" connection on a stereo jack (supplied with the original uBITX kit) as we use the PTT line for hand key operation to keep it separate from the paddles. This also allows both to be connected at the same time and the Hand Key has precedence in the interrupt keyer over the paddles so you can have automatic switch between the paddles and hand key by just pressing the key.

This change necessitated a slight modification in the "Settings" menu of the software. Where you normally selected the KEY mode (HAND, Iambic A or Iambic B), you now have a third selectable mode, SSB. This was necessary to keep the PTT line from also triggering the sidetone during the time PTT was pressed using the microphone in SSB operation.



Since most people have complained (myself included) about the “Accelerated” tuning making it hard to pick a proper frequency and not have it jump around while tuning a station, using the “Function” press of the encoder switch, a medium long press will step an “Underscore Cursor” under the tuning digits through each digit in turn. Once you have it where you want it, that digit will control the encoder’s tuning increment allowing for slower (all the way down to the rightmost digit) or faster tuning. The original “Band Select” menu was not changed and works just like the original factory software.



Several examples of the underscore cursor's position.

For all other operations, you will need to refer to the factory's instructions as the calibration routines and all other operation of the uBITX have remained unchanged. This manual covers ONLY TSW's changes/additions to the original NANO software when we ported it to the Teensy 4.0.

During testing, it was noted that the annoying "Tuning Clicks" and many of the internal "Birdies" were either gone completely or reduced to a level where any atmospheric noise in the receiver covered them to the point they

were not noticeable. This is one of the really nice advantages of using the Teensy 4.0 as the MPU instead of the factory supplied NANO.

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