Getting TSW μBITX Software onto the Teensy 4.0

Overview

The Triumvirate Skonk Worx (TSW) has provided an enhanced operating sketch for the μBITX V6 radio project. This enhanced sketch takes advantage of the PJRC Teensy 4.0 board (available for purchase here: (https://www.pjrc.com/store/teensy40.html), which supports a 600 MHz processor, 1024k RAM and 2048 bytes of Flash memory – well beyond the capabilities of the Arduino NANO board the μBITX is based on. This guide will show you how to compile the software and upload that software to the Teensy 4.0. For instructions on how to purchase and build the TSW Teensy 4.0 to NANO plug-in adapter board, see the TSW website http://www.w0eb.com .

Installing the Arduino IDE

First the Arduino Integrated Development Environment (IDE) must be installed on your computer. The latest version (as of this writing) is Ver. 1.8.10. The software is available here: (https://www.arduino.cc/en/main/software) and versions for Linux, MacOSX and Windows are available. Follow the installation instructions on the Arduino website (https://www.arduino.cc/en/guide/HomePage) for your particular OS.

Installing Teensyduino

Next, go to the PJRC website and download the Teensyduino installer found here: (https://www.pjrc.com/teensy/td_download.html). Again, versions for Linux, MacOSX and Windows are available. Save the file to a directory on your hard drive and follow the directions on the PJRC website to run the installer – when it asks you for the directory to install it in, point the installer to the directory in which you installed your Arduino IDE and Teensyduino will be installed and integrated into the Arduino IDE's environment.

Getting the needed AdaFruitILI9341 libraries

Now run the Arduino IDE by clicking on it. From the initial panel, click on the "sketch" dropdown menu, click on "Include Libraries" (alternatively, you can press CTRL-SHIFT-I on your keyboard which will bring up the "Manage Libraries" window). In the "Filter Your Search" section, type "ILI9341" and wait for the IDE to present library options. Hover over "AdaFruit ILI9341" with your mouse and click on "Install". The program will ask you some additional dependencies, click on "Install all". Once this completes, you are ready to download the latest TSW Sketch.

Downloading, compiling and installing the TSW Sketch

Go to the TSW website http://www.w0eb.com/TSW_uBITX_VERSION6_NEW_SOFTWARE/ directory and download the latest (by date/time) version of the TSW software for the Teensy 4.0. Usually there will be only 1 zip file in that directory but at times there may be earlier versions left for experimentation. You should normally download the latest version. Save this file to a separate directory on your hard drive and unpack (unzip) it. You will then have a directory containing all the program files for compile. Copy or move this unzipped directory into the same directory where your Arduino IDE files are.

Next plug your Teensy 4.0 board into a USB port on your computer, using an appropriate cable. Note that many cell phone charger cables are ***not*** wired for data transfer, only power. Be sure to use a USB cable that can transfer data.

With a brand new Teensy, the factory will have loaded a test program that causes the orange (or red) LED to blink once a second. This blinking will start as soon as the Teensy 4.0 is powered up by the +5 volts supplied through the USB programming cable. This is normal. If it doesn't blink, you may have a bad board or a bad cable. If the blinking LED's color is green or blue you most likely have a counterfeit board – you should have bought it direct from PJRC as the counterfeit ones may or may not work – "Caveat Emptor" (let the buyer beware).

Now, run the Arduino IDE. Once the main compiler window comes up, click on the "Tools" dropdown, hover over the "Board" line which will bring up another drop down giving a huge list of different boards that can be used with the IDE. You should see a faint "Teensyduino" at the top of this list and directly under that "Teensy 4.0". Click on Teensy 4.0. That will set the proper board for the IDE's compiler. Click on the "Tools" menu again set USB to "Serial" if it isn't already, Set CPU Speed to 600 MHz, Set "Optimize" to "Faster" Hover your mouse over "Port" and with your Teensy plugged into the USB cable select the serial COM Port that is indicated for the Teensy 4.

Now you have the IDE environment set properly for the Teensy 4.0 board, click on "File", "Open" and find your TSW sketch file in the list of file directories that are shown. Double click on that directory which will bring up another list of actual files. Find the one that has the file extension ".ino" and double click on that one. The compiler window will now open with that .ino file loaded. Click on the "UPLOAD" Icon which is a right pointing arrow inside a green circle. This will compile the software and run the Teensyduino loader once it's finished compiling. If everything is okay, the compiled program will be installed in the Teensy. If the Teensyduino loader asks you, you may have to press the tiny button on the Teensy 4 at which time it will load the program onto the Teensy – this may or may not be necessary as the loader should be set for "Auto" upload as it comes from the PJRC download of Teensyduino.

Manual originally written by Jim, KK0U and revised by W0EB 01/24/2020