**KG7IFO CW Practice trainer and Fist Analyzer**

**Abstract**

This CW straight key reader and playback generator is yet another entry in beginner’s practice tools for learning CW. My goal was to be able to send morse messages with a minimum of embarrassment. To accomplish this, I developed a C++ application for the Arduino Uno R4 WiFi platform, although with slight modification, it should be portable to other Arduino devices or non-Arduino machines. Actually, it was originally developed for an NXP K22 processor. The main restriction in its present form is that it requires a DAC (Digital Analog Converter) in the hardware, though using PWM hardware is also an option. This is because it evolved out of my Audio Frequency Tone generator project, which, you might guess, can produce audio tones in the 16-20Khz range in Sine, Square, Triangle, and Sawtooth modes. The functions that made it into my CW trainer are a user interface option to change the side tone from 100 to 1000Hz, and the tone changes to a US dial tone (remember dial tones?) if you hold the key down for a long time (~2 seconds). The Arduino application records the dits and dahs from the key operator, along with detailed timing information. This information is them passed on to a Python user interface application running on a Windows or Linux/Unix computer. Originally, this interface was a UART serial bus, but, since I got my hands on the Uno WiFi device, it also can talk over your local network using UDP protocol.

I’ve included a Power Point schematic in the \docs folder showing my configuration. I’ve also included photographs in the appendix of this document showing how I’ve laid it out. My implementation uses my fiend’s (W7BWH) original straight key on loan to me and uses a midrange stereo speaker, so tones down near 100Hz roll off rapidly. To drive the speaker off of the DAC (3.3VP-P) I divide by ten before coupling it to the LM386 to minimize clipping.

**Operation**

Two software components are required to run the trainer, both found in Github:

1. The Python User interface, which can run in a Windows or Linux environment:

<https://github.com/reuterl/KG7IFO_CWTrainer--Fist_Analyzer_UI.git>

This requires Python 3.10 or higher and PyQt6 (or higher?) and pyserial.

>pip install pyqt6

>pip install pyserial

Once these are installed, you can run the UI from the command line while in the project top directory:

>python main.py













