Fabricatioin Instructions: Circuit Assembly and Test

INTRODUCTION

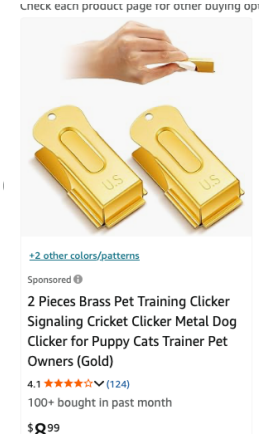
This document provides instructions for programming, assembly, and testing of a new circuit board from the assembly line. New circuit boards arrive unprogrammed meaning that they must programmed and configured before they will work. This is performed by the following steps

- Assemble into the target
- Flashing firmware – Putting software onto the board
- Selftest
- Serial number injection
- First Run

PREPARATION

Before beginning the assembly, the following software packages are required

- FreeETarget PC Client
- Dog training clicker (Amazon ASIN B0CS3MG3BQ or similar)



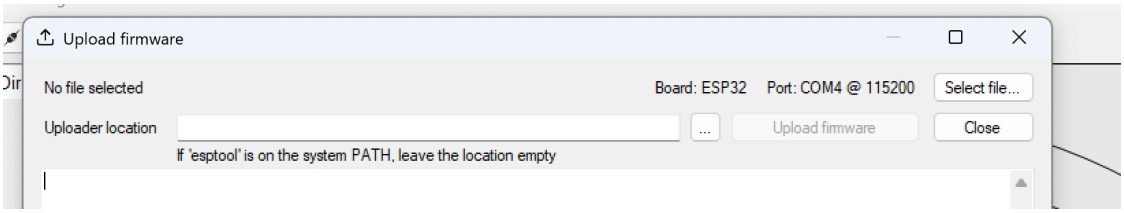
ASSEMBLE AND TEST

Assemble Into the Target

Assemble the circuit into the target as you normally would; circuit, sensors, cable, witness paper drive, LED illumination, and USB cable

Flash Firmware

Using the PC Client, connect to the circuit as normal, and download the production software into the circuit board.



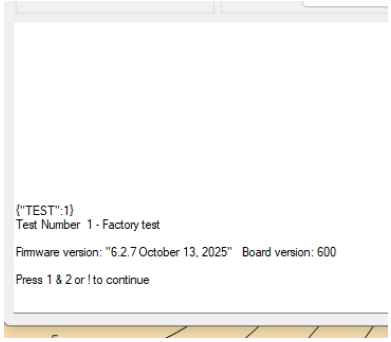
Use the freeetarget.bin file

IMPORTANT

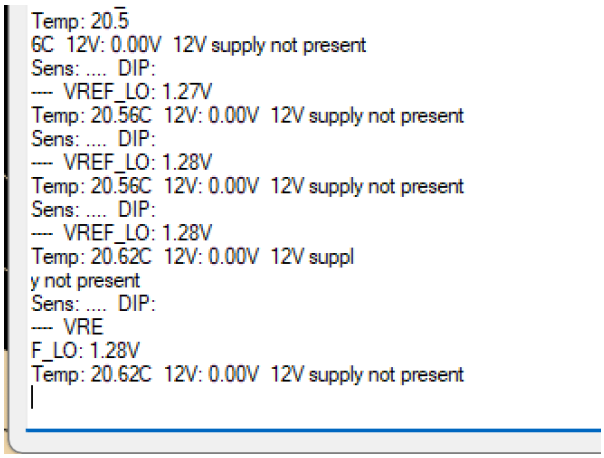
- Each circuit will result in a new COM port being allocated, for example the first circuit would be COM3 while the second circuit would be COM4 and so forth
- The PC client recognizes the target only when launched. Attaching a second target requires that the PC client be closed and reopened.

Self Test

Once the firmware has been flashed, the circuit will restart itself and determine that this is the first time the software has been run. It will immediately enter a self test that allows you to ensure that the circuit works as expected.

- Connect to the target using the PC Client.
- The target will output some dialog and start the test
- 

- Press and hold buttons 1 & 2 to start the test



- The program will cyclically exercise the circuit
    - The witness paper motor will advance in steps
    - The LED illumination will get brighter and then go off
    - The temperature should be approximately the room temperature
    - The 12V supply should be nominally 12V
    - VREF_LO should be nominally 1.25V
- Cover one of the sensors and click the dog clicker near the sensors
    - The self test will report what sensors have detected the clicker
    - Uncover the sensor and click the dog clicker
    - The self test will report the ‘missing’ sensor
- The circuit passes if:
    - All four sensors have detected sound
    - Switches 1 and 2 were pressed
    - VREF_LO is 1.25V +/- 0.125 volts
    - V12 is between 10 and 14 volts
    - The motor advances
    - The LEDs change brightness
    - The test reports PASS
- Press ! to end the test
- You will be prompted to enter the serial number
    - Enter the serial number and press !

This completes the self test and the target will go into service.

- RDY LED blinks
- Console reports the startup sequence and ends with RUNNING