

# Fabricatioin Instructions: Circuit Assembly and Test

## INTRODUCTION

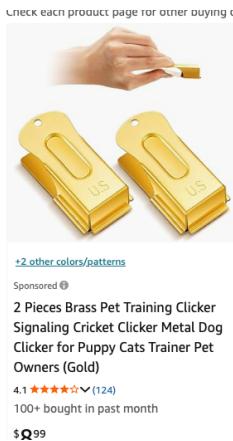
This document provides instructions for programming, assembly, and testing of a new circuit board from the assembly line. New circuit boards arrive unprogrammed meaning that they must programmed and configured before they will work. This is performed by the following steps

- 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)



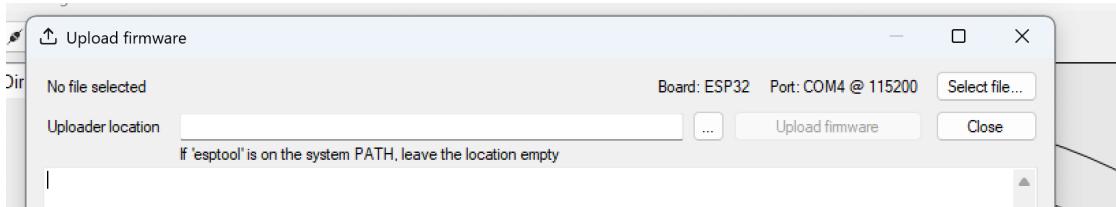
## ASSEMBLE AND TEST

### 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

```
Temp: 20.5
6C 12V: 0.00V 12V supply not present
Sens: .... DIP:
--- VREF_LO: 1.27V
Temp: 20.56C 12V: 0.00V 12V supply not present
Sens: .... DIP:
--- VREF_LO: 1.28V
Temp: 20.56C 12V: 0.00V 12V supply not present
Sens: .... DIP:
--- VREF_LO: 1.28V
Temp: 20.62C 12V: 0.00V 12V suppl
y not present
Sens: .... DIP:
--- VRE
F_LO: 1.28V
Temp: 20.62C 12V: 0.00V 12V supply not present
```

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- 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