

# PWM Performance

# Pulse Width Modulation (PWM)

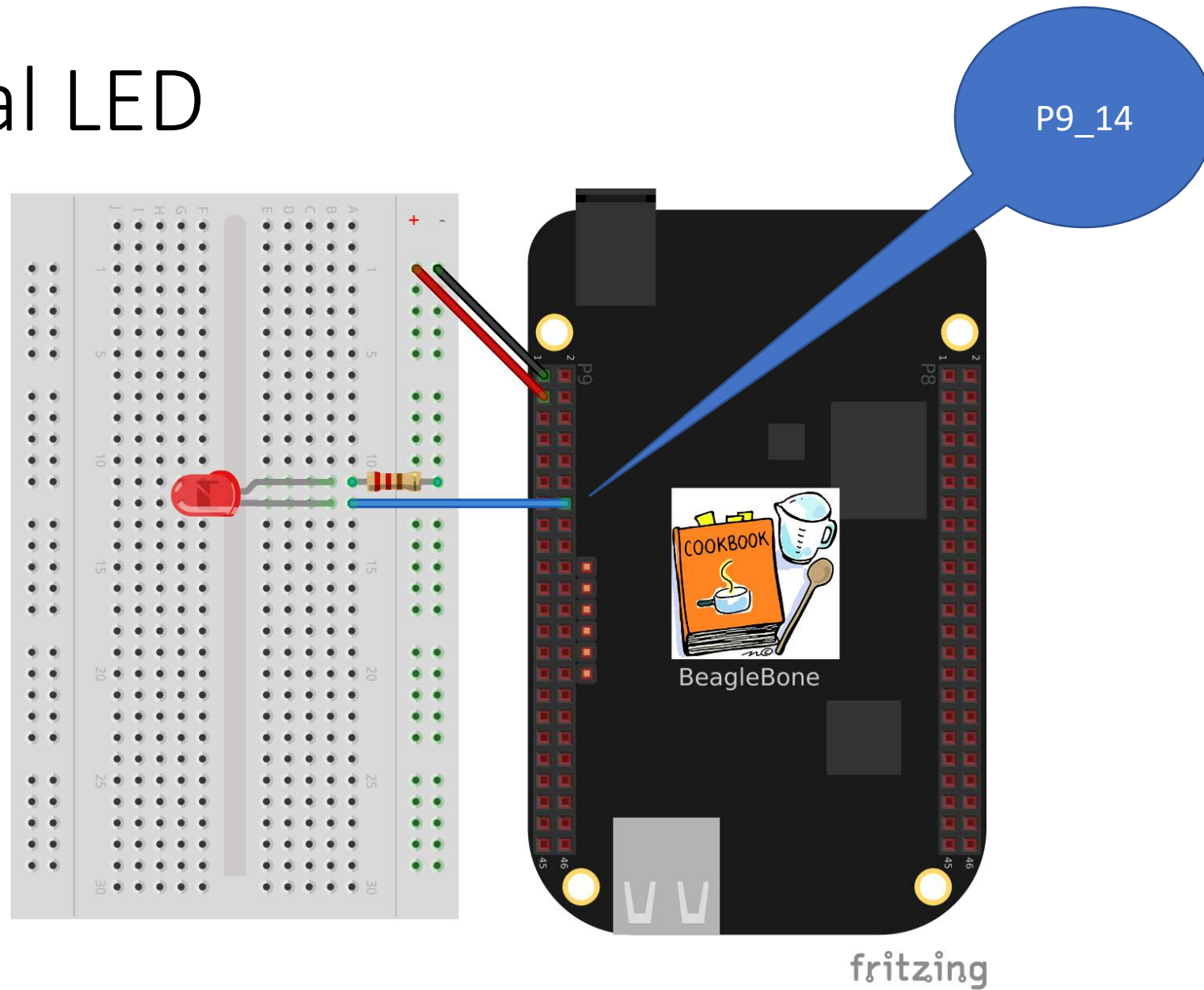
```
#!/usr/bin/env python3
# From: https://learn.adafruit.com/setting-up-io-python-library-on-beaglebone-black/pwm
import Adafruit_BBIO.PWM as PWM
PWM.start(channel, duty, freq=2000, polarity=0)
PWM.start("P9_14", 50)

#optionally, you can set the frequency as well
#as the polarity from their defaults:
PWM.start("P9_14", 50, 1000, 1)

PWM.set_duty_cycle("P9_14", 50)
PWM.set_frequency("P9_14", 100)

exercises/displays/blue/pwm.py
```

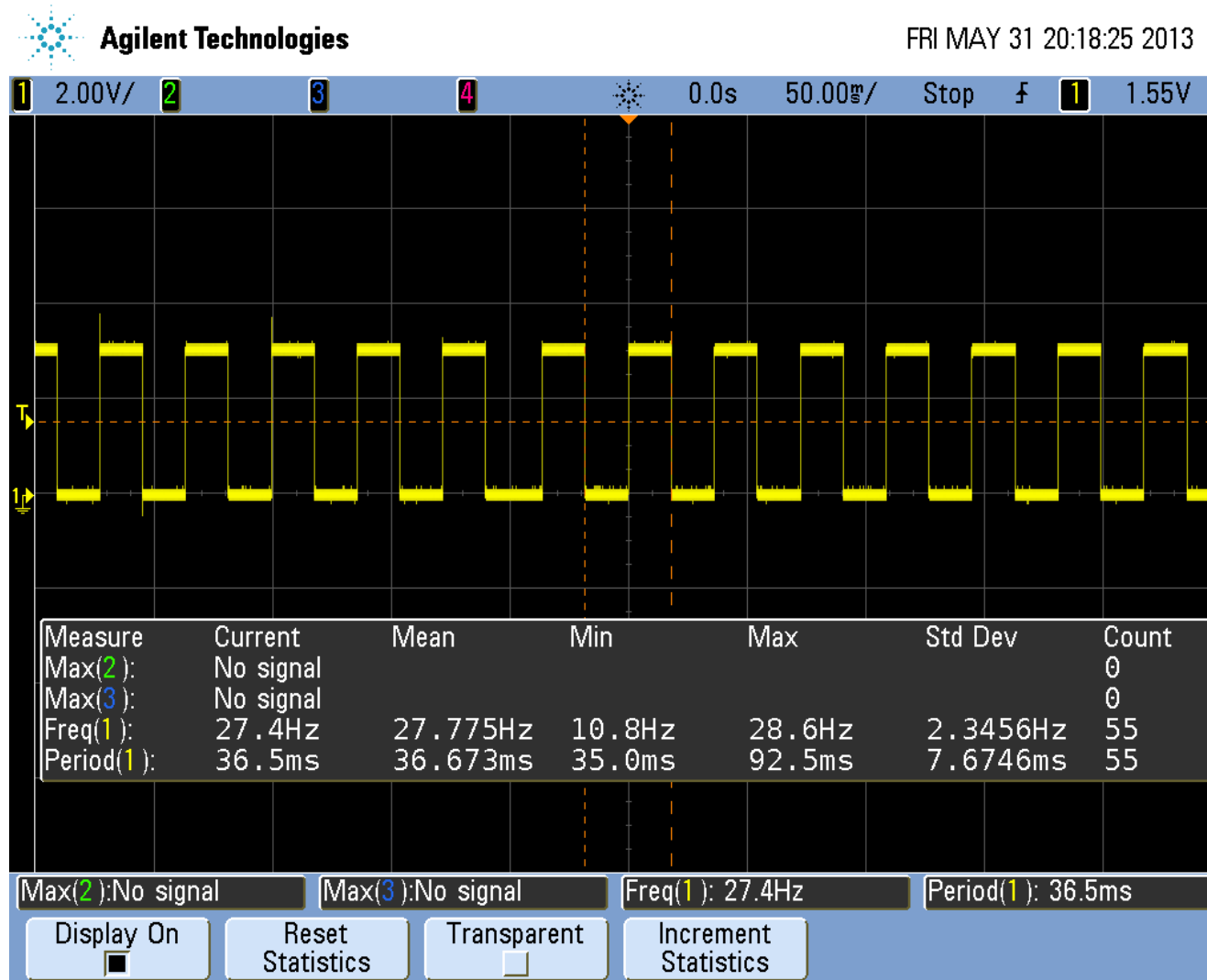
# External LED



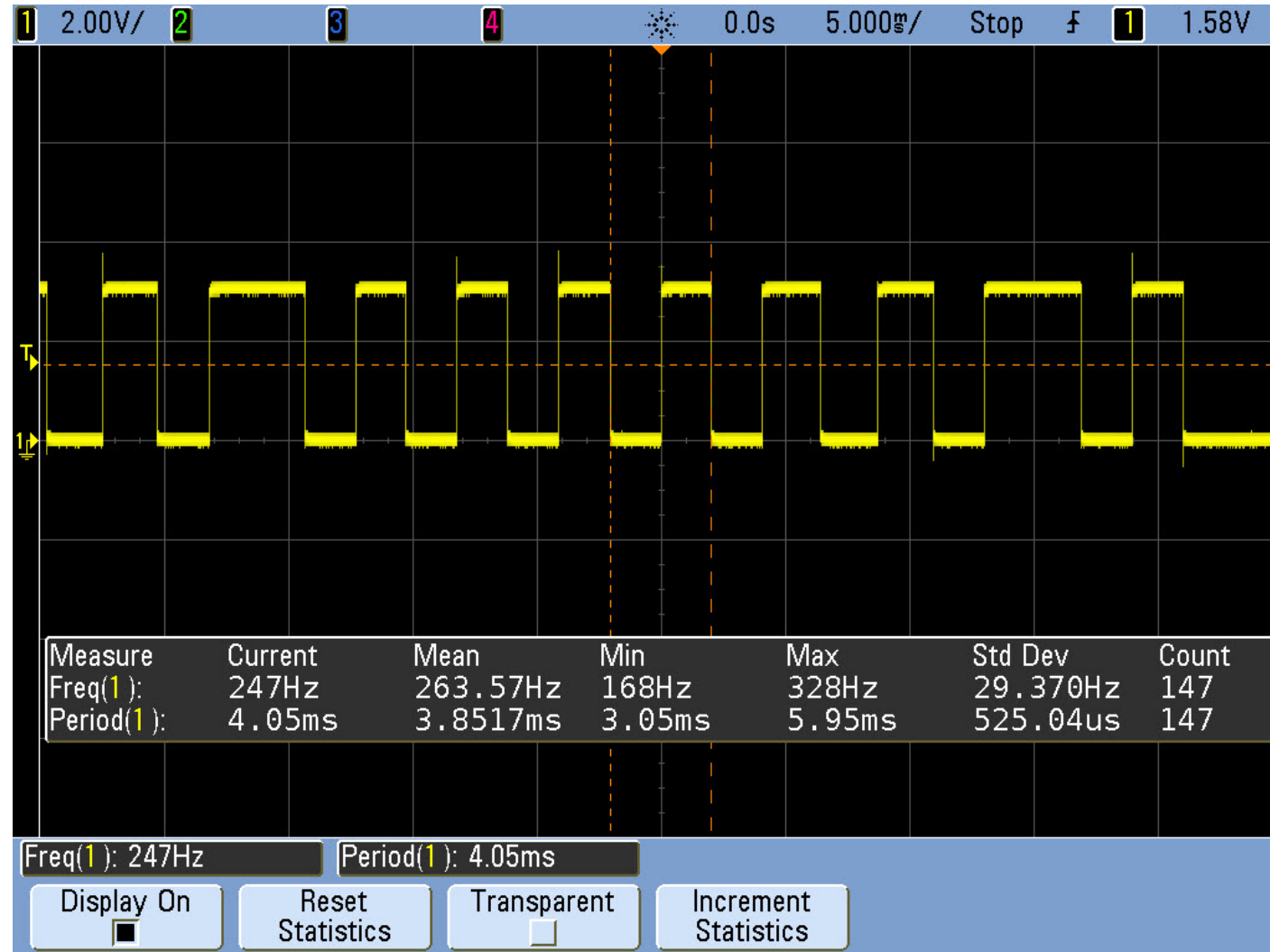
# Performance

- How fast can the Bone handle I/O?
- I wrote a program to toggle a bit
  - BoneScript
  - Shell
  - C

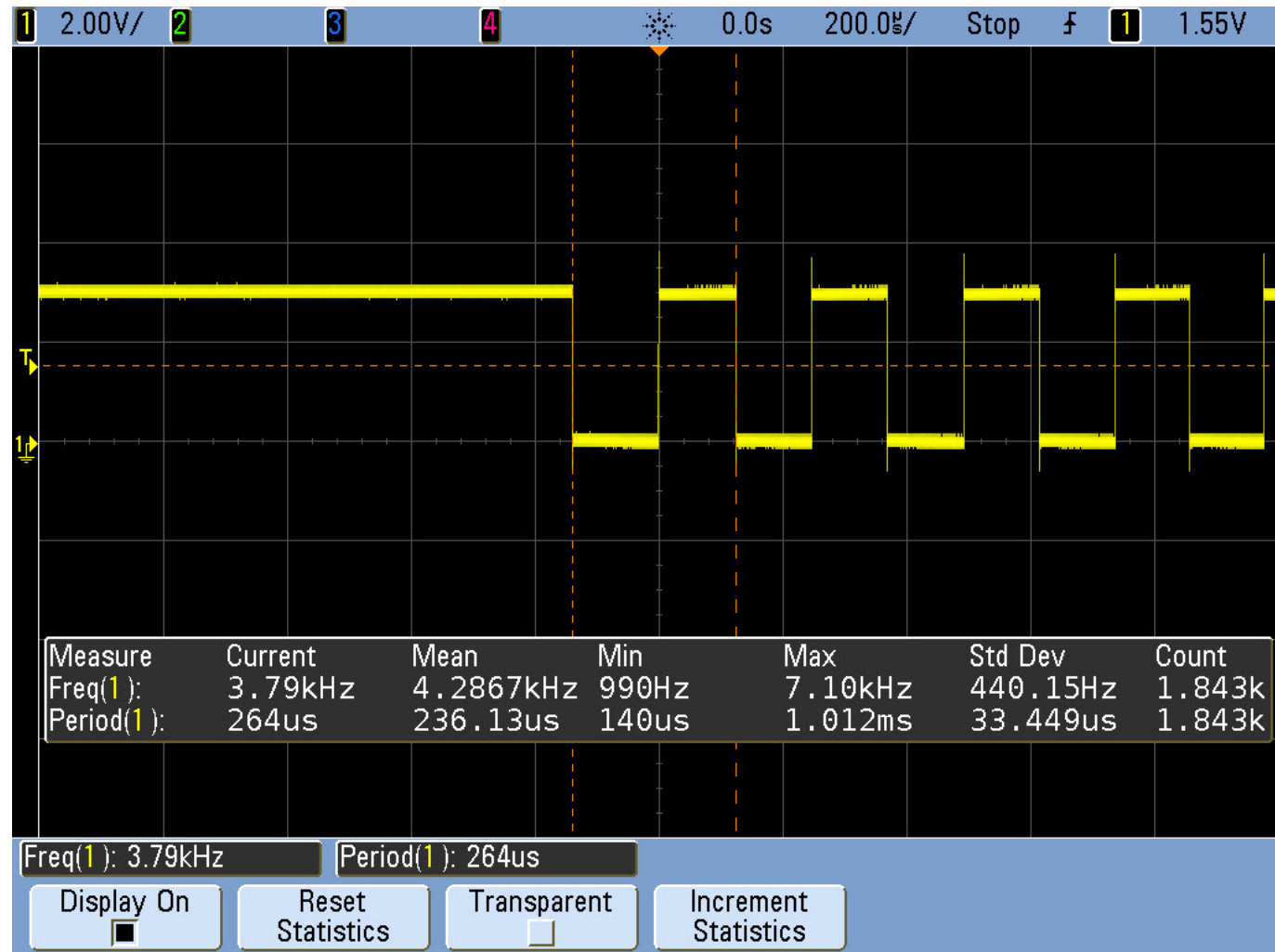
# Performance - Shell



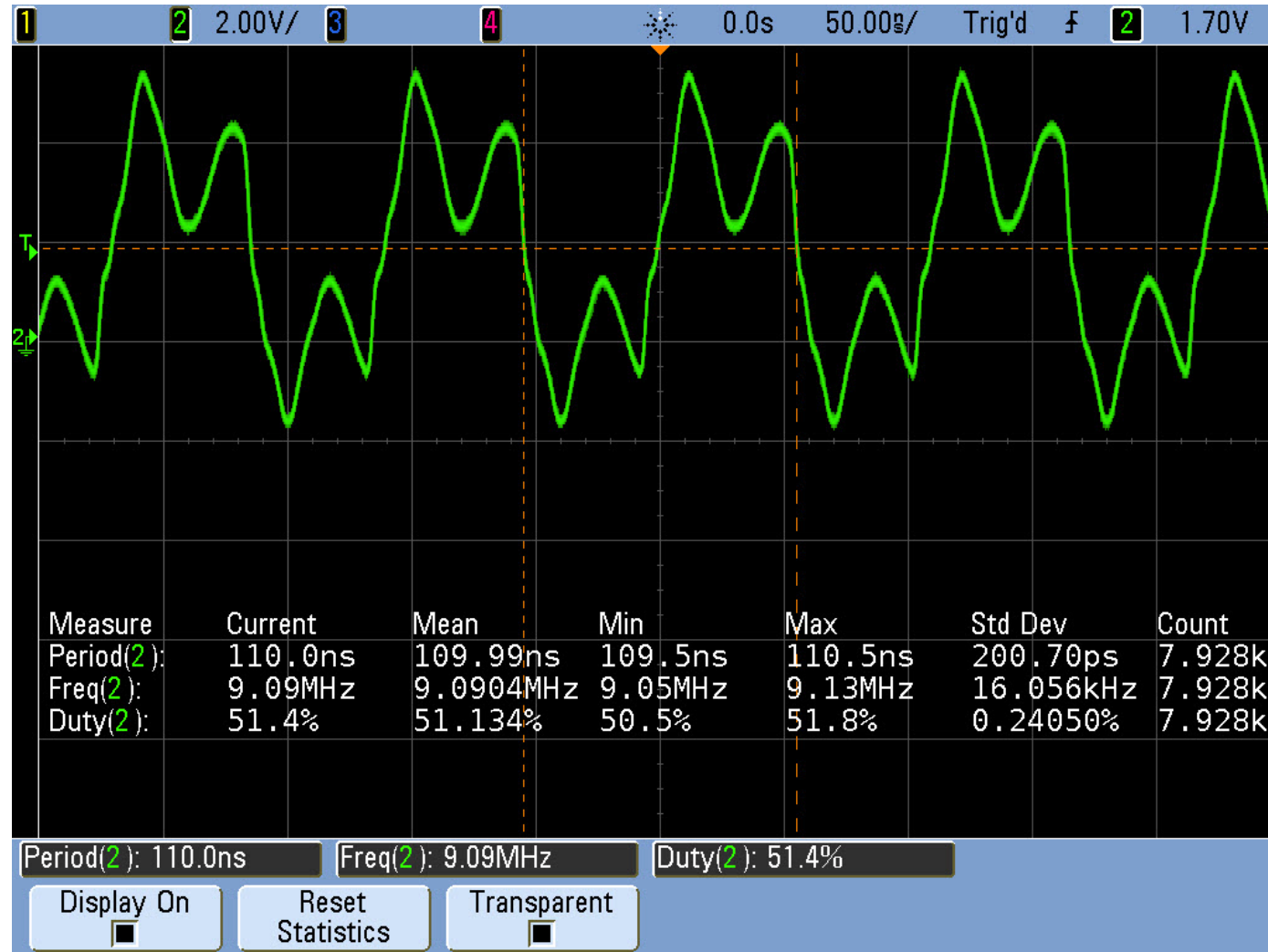
# Performance - BoneScript



# Performance - C



# Performance - PWM





# Performance - Summary

Language	CPU (%)	Mean (ms)	Min (ms)	Max (ms)
BoneScript	40	3.9	3.0	6.0
Shell	52	37	92	93
C	17	0.24	0.14	1.0
PWM	0	109.99 (ns)	109.5(ns)	110.5(ns)