

Power Consumption Tests

August 29, 2017

1 Power Consumption Tests

1.1 Object

- Figure out power consumption.

2 Code:

```
In [1]: import GCode
import GRBL
cnc = GRBL.GRBL(port="/dev/cnc_3018")

print("Laser Mode: {}".format(cnc.laser_mode))

from enum import IntEnum
class Tool(IntEnum):
    SPINDLE = 0
    LASER = 1

from enum import IntEnum
class LaserPower(IntEnum):
    CONSTANT = 0
    DYNAMIC = 1

LaserPower.CONSTANT

def init(power = LaserPower(0), feed = 200, laser = 25):
    program = GCode.GCode()
    program.G21() # Metric Units
    program.G91() # Absolute positioning.
    program.G1(F=feed) #
    if power==LaserPower.CONSTANT:
        program.M3(S=laser) # Laser settings
    else:
        program.M4(S=laser) # Laser settings
    return program
```

```

def end():
    program = GCode.GCode()
    program.M5() # Laser settings.
    return program

def square(size=20):
    program = GCode.GCode()
    program.G1(X=size)
    program.G1(Y=size)
    program.G1(X=-size)
    program.G1(Y=-size)
    return program

```

Laser Mode: None

2.1 Test Setup

Power Supply: - CicuitSpecialists CSI3010SW
Position the paper & other things.

```

In [24]: import numpy as np
         import matplotlib.pyplot as plt

```

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In [28]: int(255) == np.uint8(255)

```

Out[28]: True

```

In [33]: def laser_on(pwm):
         if int(pwm) != np.uint8(pwm):
             raise(Exception("UINT8! {}".format(pwm)))
         # Set minimal power setting to focus and position laser
         cnc.cmd("M3 S{:03d}".format(np.uint8(pwm)))
         cnc.cmd("G1 X0 F10") # Laser On

```

```

def laser_off():
    cnc.cmd("M5") # Laser off

```

```

In [32]: laser_on(1)

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```

In [35]: laser_off()

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In [64]: voltage = 12
         current = list()

         results = list()
         for laser_pwm in [0, 10, 25, 50, 100, 150, 200, 255]:

```

```

        result = dict()
        result["laser_pwm"] = laser_pwm
        result["voltage"] = voltage
        laser_on(laser_pwm)
        result["current"] = input("{}V. PWM: {}. Current Output (A):".format(voltage,laser_pwm))
        results.append(result)
    laser_off()
    results

12V. PWM: 0. Current Output (A):.26
12V. PWM: 10. Current Output (A):.52
12V. PWM: 25. Current Output (A):.76
12V. PWM: 50. Current Output (A):1.06
12V. PWM: 100. Current Output (A):1.59
12V. PWM: 150. Current Output (A):1.78
12V. PWM: 200. Current Output (A):1.98
12V. PWM: 255. Current Output (A):2.20

Out[64]: [{'current': '.26', 'laser_pwm': 0, 'voltage': 12},
          {'current': '.52', 'laser_pwm': 10, 'voltage': 12},
          {'current': '.76', 'laser_pwm': 25, 'voltage': 12},
          {'current': '1.06', 'laser_pwm': 50, 'voltage': 12},
          {'current': '1.59', 'laser_pwm': 100, 'voltage': 12},
          {'current': '1.78', 'laser_pwm': 150, 'voltage': 12},
          {'current': '1.98', 'laser_pwm': 200, 'voltage': 12},
          {'current': '2.20', 'laser_pwm': 255, 'voltage': 12}]

In [65]: import json
         with open("power_consumption_12V.json", "w") as fid:
             print(json.dumps(results), file=fid)

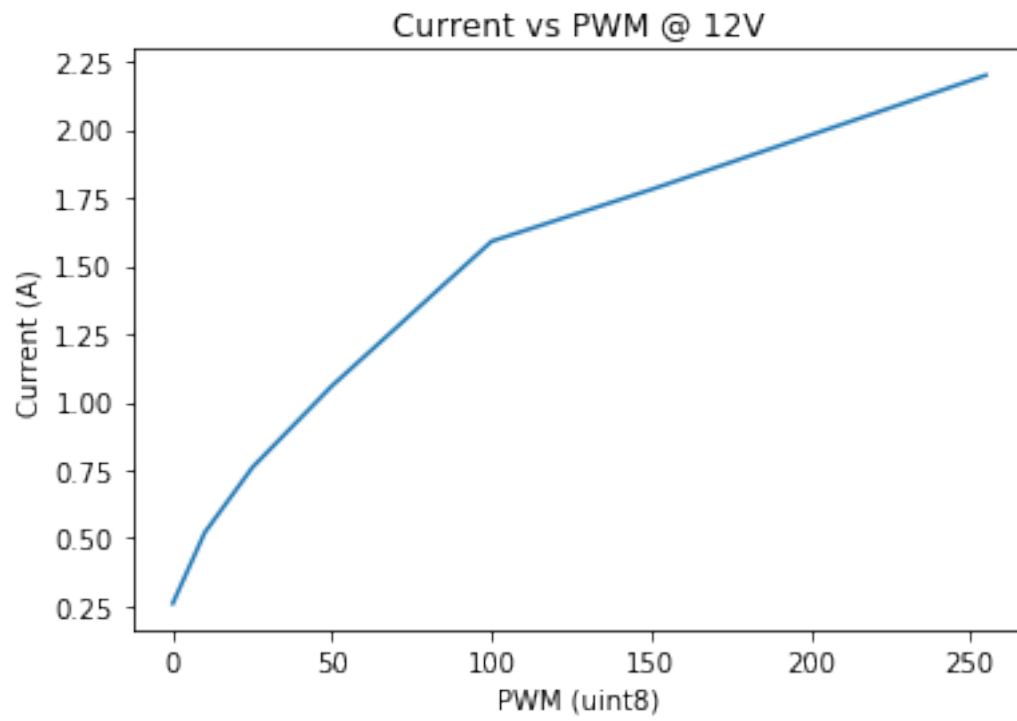
In [66]: %matplotlib inline

In [67]: PWM = [result["laser_pwm"] for result in results]
         CURRENT = [result["current"] for result in results]

         plot = plt.plot(PWM, CURRENT)
         plt.xlabel("PWM (uint8)")
         plt.ylabel("Current (A)")
         plt.title("Current vs PWM @ {}V".format(voltage))

Out[67]: <matplotlib.text.Text at 0x7f5f172e2fd0>

```



```
In [1]: from utils import picture  
picture()
```

