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ECE 231 Lab 4  
PWM and Timestamping on BeagleBone Black

**Part I: Linux Commands**

|  |  |
| --- | --- |
| Setting Up the PWM | Setting Up GPIO |
| >> cd /sys/class/pwm/pwmchip7  >> echo 1 > export  >> cd pwm-7:0  >> echo 1000000000 > period  >> echo 250000000 > duty\_cycle  >> echo 1 > enable  \* divide period and duty cycle by 100 to get 100 Hz & again to get 10000 Hz | >> cd /sys/class/gpio/gpio67  >> echo in > direction  >> echo rising > edge |

**Part II: Jitter Distribution Plots**

**Figure 1: Jitter Distribution for 1 Hz & 25% DC**

**Figure 2: Jitter Distribution for 100 Hz & at 25% DC**

**Figure 3: Jitter Distribution for 10000 Hz & at 25% DC**

**Part III: Mean and Standard Deviation**

|  |  |
| --- | --- |
| Frequency: | 1 Hz |
| Mean | 1.000611608 |
| Standard Deviation | 0.025524508 |

|  |  |
| --- | --- |
| Frequency: | 100 Hz |
| Mean | 0.000000433 |
| Standard Deviation | 0.118358114 |

|  |  |
| --- | --- |
| Frequency: | 10000 Hz |
| Mean | -0.000021214 |
| Standard Deviation | 0.0161163501 |

**Part IV: Comparisons and Observations**

The means for the 100 Hz sample and the 10000 Hz sample both improved (lowered) from the previous lab. The average jitter increased by 0.066 from the last lab, indicating the jitter got worse. The standard deviations for the 1 Hz frequency improved from the last lab in that it decreased. A lower standard deviation indicates lower variation in a data set and vice versa. The standard deviation for the 100 Hz and 10000 Hz increased by 100 and 30 fold respectively indicating an increase in overall data variation. Overall, the data appears to have improved a lot, especially in the 100 Hz frequency.