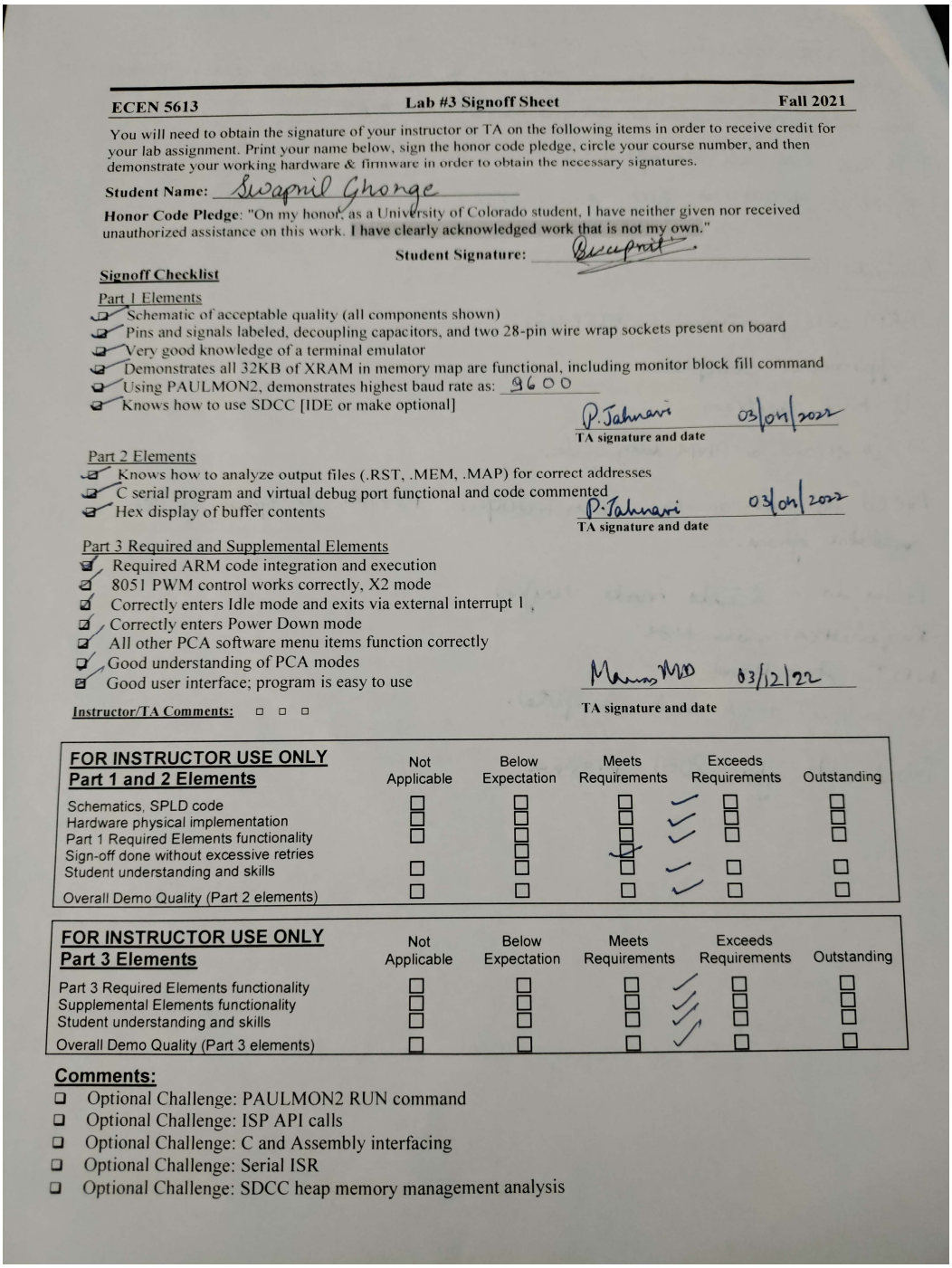
ESD LAB-3 REPORT



ECEN 5613 **Lab #3 Signoff Sheet** **Fall 2021**

You will need to obtain the signature of your instructor or TA on the following items in order to receive credit for your lab assignment. Print your name below, sign the honor code pledge, circle your course number, and then demonstrate your working hardware & firmware in order to obtain the necessary signatures.

Student Name: Swapnil Ghonge

Honor Code Pledge: "On my honor, as a University of Colorado student, I have neither given nor received unauthorized assistance on this work. I have clearly acknowledged work that is not my own."

Student Signature: Swapnil

Signoff Checklist

Part 1 Elements

- ☑ Schematic of acceptable quality (all components shown)
- ☑ Pins and signals labeled, decoupling capacitors, and two 28-pin wire wrap sockets present on board
- ☑ Very good knowledge of a terminal emulator
- ☑ Demonstrates all 32KB of XRAM in memory map are functional, including monitor block fill command
- ☑ Using PAULMON2, demonstrates highest baud rate as: 9600
- ☑ Knows how to use SDCC [IDE or make optional]

P. Tahmasi 03/04/2022
TA signature and date

Part 2 Elements

- ☑ Knows how to analyze output files (.RST, .MEM, .MAP) for correct addresses
- ☑ C serial program and virtual debug port functional and code commented
- ☑ Hex display of buffer contents

P. Tahmasi 03/04/2022
TA signature and date

Part 3 Required and Supplemental Elements

- ☑ Required ARM code integration and execution
- ☑ 8051 PWM control works correctly, X2 mode
- ☑ Correctly enters Idle mode and exits via external interrupt 1
- ☑ Correctly enters Power Down mode
- ☑ All other PCA software menu items function correctly
- ☑ Good understanding of PCA modes
- ☑ Good user interface; program is easy to use

Marcus MSD 03/12/22
TA signature and date

Instructor/TA Comments: □ □ □

FOR INSTRUCTOR USE ONLY Part 1 and 2 Elements	Not Applicable	Below Expectation	Meets Requirements	Exceeds Requirements	Outstanding
Schematics, SPLD code	☐	☐	☐	✓ ☐	☐
Hardware physical implementation	☐	☐	☐	✓ ☐	☐
Part 1 Required Elements functionality	☐	☐	☐	✓ ☐	☐
Sign-off done without excessive retries		☐	☑		
Student understanding and skills	☐	☐	☐	✓ ☐	☐
Overall Demo Quality (Part 2 elements)	☐	☐	☐	✓ ☐	☐

FOR INSTRUCTOR USE ONLY Part 3 Elements	Not Applicable	Below Expectation	Meets Requirements	Exceeds Requirements	Outstanding
Part 3 Required Elements functionality	☐	☐	☐	✓ ☐	☐
Supplemental Elements functionality	☐	☐	☐	✓ ☐	☐
Student understanding and skills	☐	☐	☐	✓ ☐	☐
Overall Demo Quality (Part 3 elements)	☐	☐	☐	✓ ☐	☐

Comments:

- ☐ Optional Challenge: PAULMON2 RUN command
- ☐ Optional Challenge: ISP API calls
- ☐ Optional Challenge: C and Assembly interfacing
- ☐ Optional Challenge: Serial ISR
- ☐ Optional Challenge: SDCC heap memory management analysis

Comments

[•] Add $\overline{WR}$ connection for NVSRAM

[•] 2496 case does not work, @ does not go back to buffer 0 entry, ? does not transmit storage characters and does not clear buffer 0.

[+] Board has all decaps.

[+] Virtual debug is fully functional.

Comments Part3

(+) ARM code functional on MSP432.

(+) Supplemental completed
   i) RGB spectrum
   ii) Command for PWM duty cycle.

(→) Need to work on the User Interface. Provide an option to list available options.

(+) Power down & Idle mode verified

(+) RequiretPCA mode tests

(+) WDT functional.

(+) High speed toggle mode completed.

(+) Good UI for 8051 program.

Part-1 & 2

Things Learnt:

Learnt how to use internal and external memory management.

Learnt how to use serial drivers for memory

Learnt how to change the values in memory location both for Internal XRAM and external XRAM.

Learnt how to use SDCC for for C compilers

Learnt how to change how to use baud rate on Tera Term.

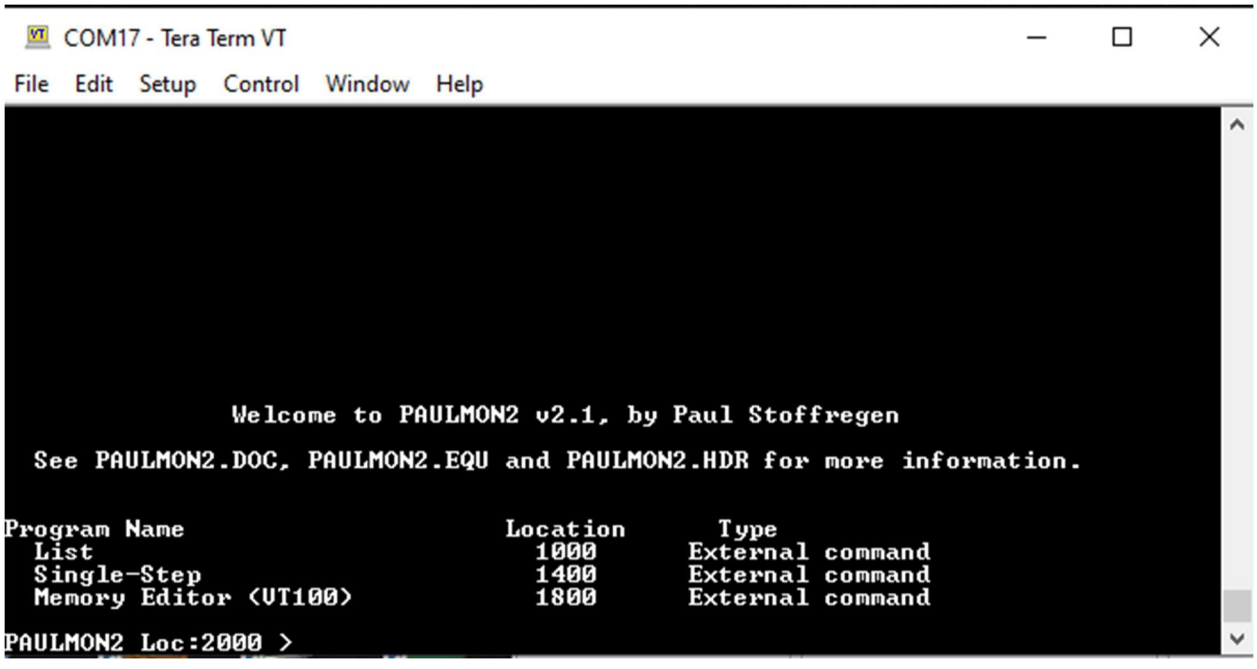
Learnt how to efficiently use FLIP program to program AT89C51RC2.

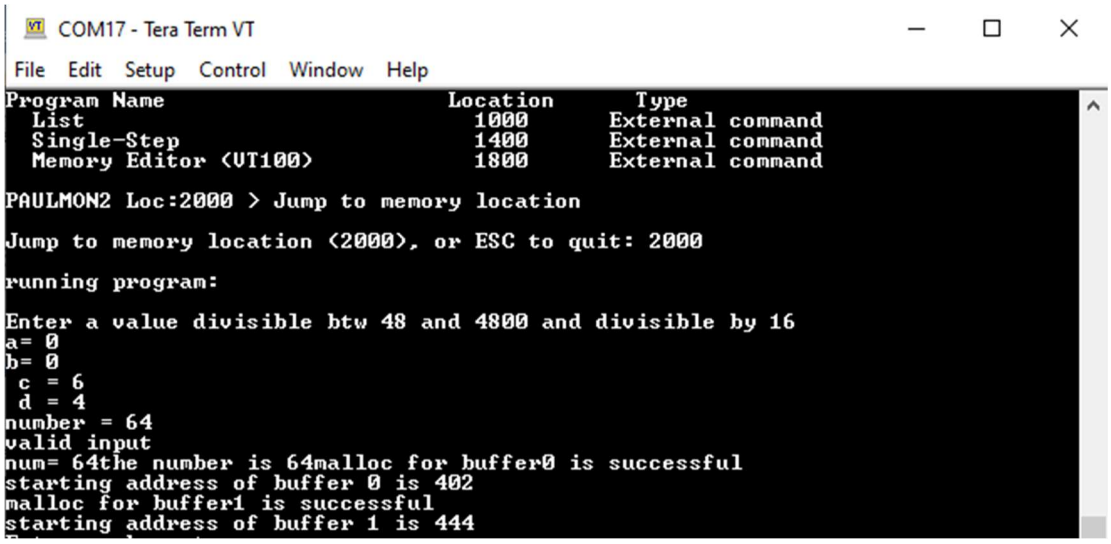
Learnt how to allocate memory of Heap Size 5000 bytes using malloc function

Learnt how to use UART to which accepts command a function.

Learnt how to free a buffer.

Learnt how to change a buffer using +,-,@,? UART commands

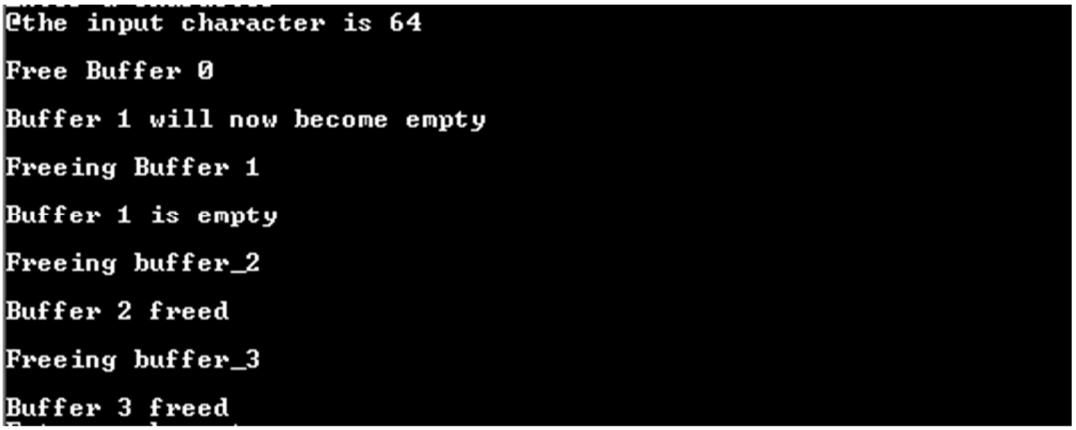




Allocating Buffer of size 64 bytes

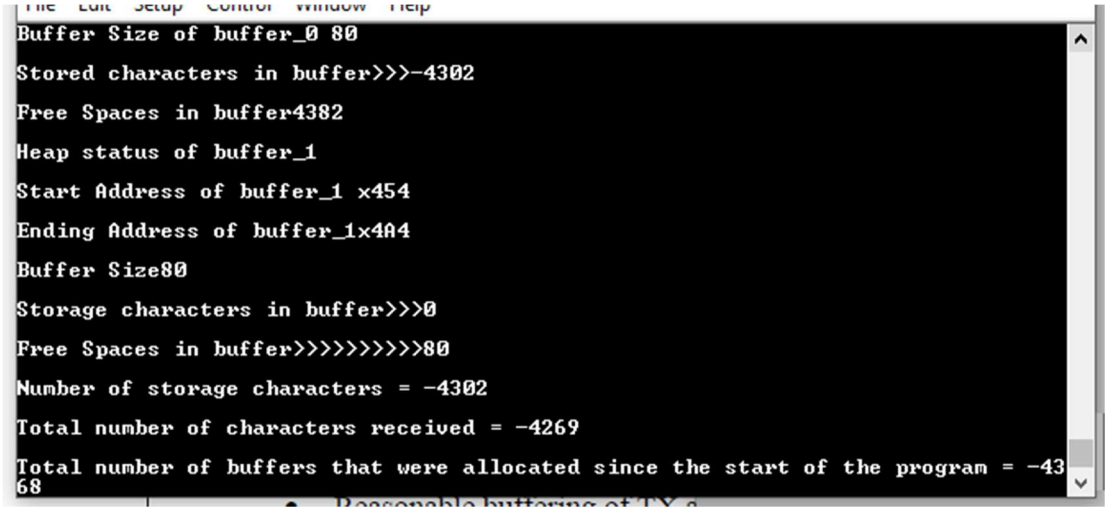
Buffer 1 is deleted by pressing '-'

Adding additional buffer of 46 bytes by pressing '+'



Freeing every buffer created

Buffer is full condition



Details for buffer added by pressing ‘?’

PART-3 Supplemental + Required

1. 8051 Supplemental

Things Learnt:

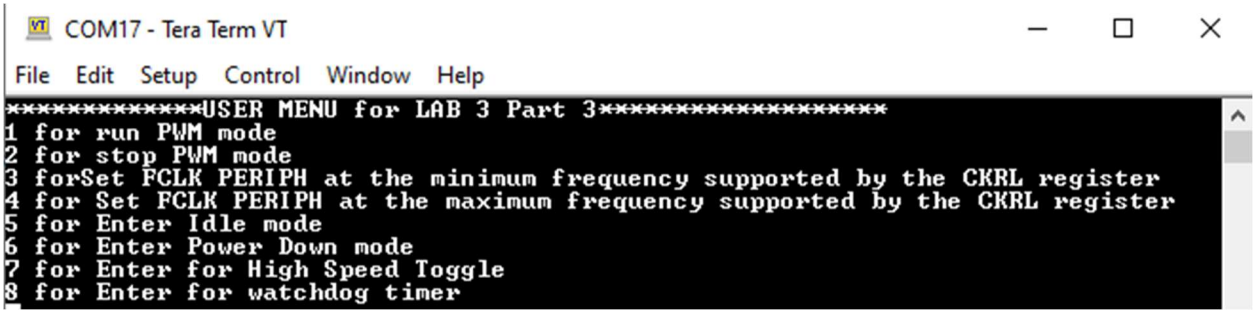
Learnt to configure Programmable Counter Array in 4 modes

Learnt how to set PWM flags

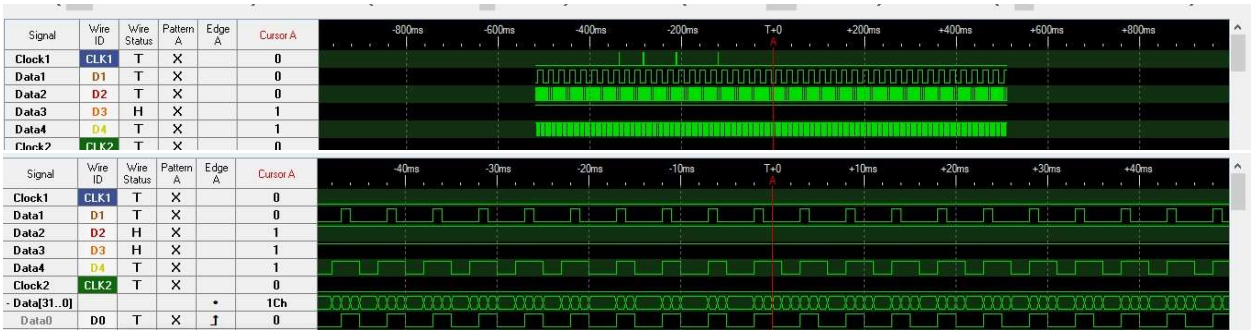
Learnt to stop PWM by setting flags

Learnt to set Maximum and minimum frequency at ALE, PSEN.

Learnt configure Power Down mode, Idle Mode by setting PCON flags

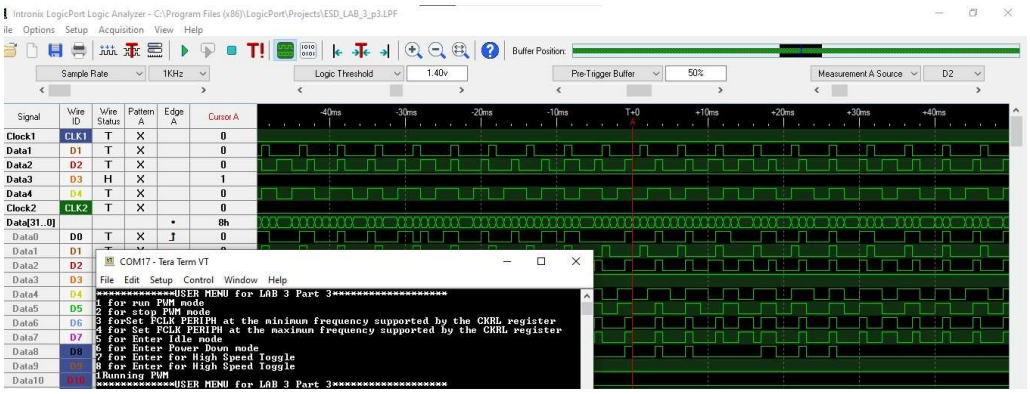


User menu for Modules in PCA modes

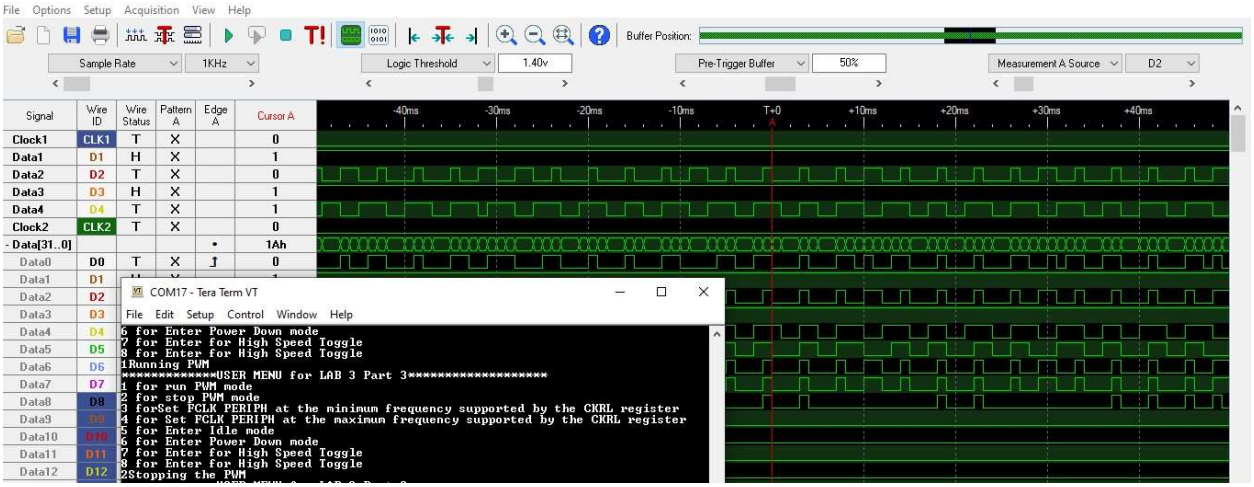


High Speed Toggle

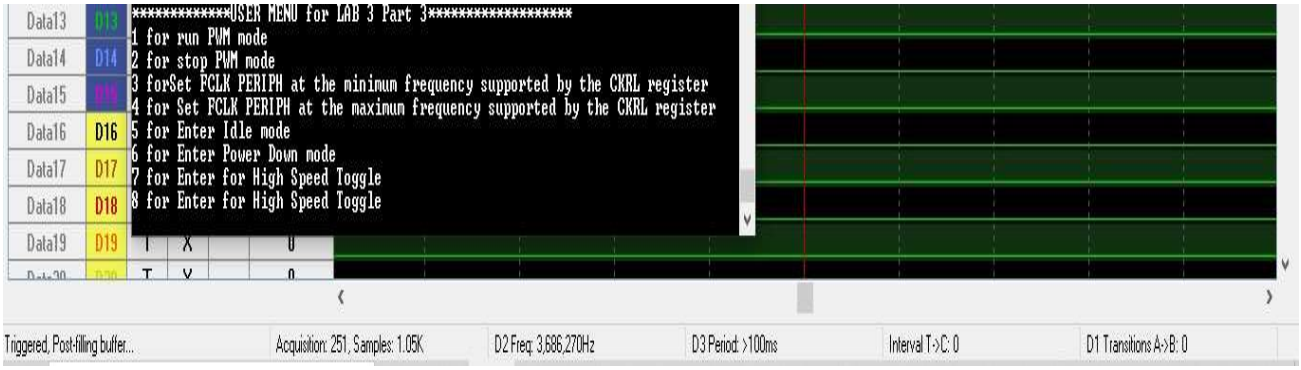
Entering in Power Down Mode



Duty Cycle 25% at port D2



Stopping PWM



Entering Maximum Frequency

Entering Minimum Frequency

2. MSP432 Required + Supplemental

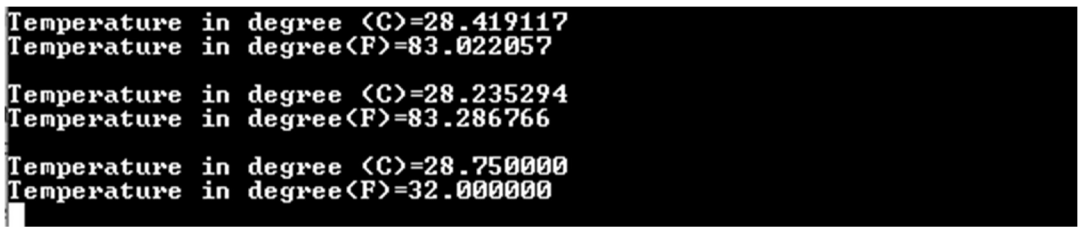
Learnt how to use ADC in temperature Flags

Learnt how to set PWM from examples.

Learnt how to Port mapping

Duty Cycle:

Temperature Values:



Period changing:

```
Period is =500
Period is =1000
Period is =500
```

Spectrum: