

Additional DSP Lab Questions

Your DSP Lab report must include all answers requested in this document AND in “How to” slides.

Put this logo in your report to highlight tests you make by yourself (not requested in “How to” or Questions)



Hints : Prefer schematics instead of long text.

Lab1 : dotprod (DSP assembly code)

Dotprod_c

Extract assembly code of function “a_dot_c” (in “dump” option by right clicking in disassembly window and choose “assembly” output format).

If you want to see registers content you can use menu “register->core”.

1. What is FP? (check “register->core”)
2. What is the difference between P and R registers? (have a look to BF533 core architecture in BF533 datasheet and DAG)
3. Where are stored local array of int “a” and local array of int “c”?
4. Where is stored local variable “i”? “i” is coded on 1,2,3 or 4 bytes?
5. Draw a schematic representing the stack with the position of each local variable.
6. Is there some multiple instruction words? Why?
7. Is there some hardware loops? Why?
8. Do you think this code uses MAC? Why?
9. Explain : $P0 = P0 + (P1 \ll 2)$?
10. Comment each line of the assembly code.
11. How many cycles does it take to execute one loop?

Dotprod_asm

1. What are the differences between dotprod_c and dotprod_asm?
2. Where is stored “i”?
3. Is there some multiple instruction words?
4. Is there some hardware loops?
5. Do you think this code uses MAC? Why?

6. How many operation(actions) are performed in this instruction:
"R0=R0+R1(NS) || R1=[P0++] || NOP;" ? which ones?
7. Comment each line of the assembly code.
8. How many cycles does it take to execute one loop?
9. Compared with the compiled (C) version which one is the faster? How many times?
10. What are your conclusions? (hint: a lot of you will answer "asm is faster than C"yes....but why?
(try to be more explicit!))

Lab2 : audio talkthrough (DMA and datapath)

Audio Talkthrough I2S

1. Give a graphic explanation of mask effects (from "how to" questions).
2. What is the sampling frequency? Where is coded the sampling frequency?
3. What is the format of each samples? (how many bits? Where is the MSB? ...)
4. Between BF533 DSP and AD1836 Codec, which one is the I2S bus master? What is the speedrate in bit per second (bps)?
5. Between BF533 DSP and AD1836 Codec, which one is the SPI bus master? What is the speedrate in bit per second (bps)?
6. Which is the DMA channel that get data from input ? Could we take another channel? How?
7. Where are stored the input data in memory (give the buffer name in the C code)? Why (show the corresponding configuration code)?
8. Show and explain the DMA configuration code.
9. Why do we need to configure EBIU?
10. Why we don't need to configure SPORT0 speedrate?
11. Draw a schematic of the data path : from analog input to analog output. Show the data rate and the format of external buses. Your schematic must contains at least : 3 DMAs, 1 CPU, 1 interrupt, 1 I2S, 1 AD1836, 1 SPORT, 1 SPI.
12. Which event trigs the interrupt? Show the configuration code.
13. Optional : change the sampling rate
14. Optional : change the DMA input channel

Audio Talkthrough TDM

1. What are the differences (hardware and software) between the I2C project and the TDM project?

Lab4 : Led blink (Interrupts)

1. Why do we need to configure the EBIU?
2. Which interrupts do we need to configure for this project? Why?
3. Explain all steps to configure each interrupt for this project. You must explain all hardware units we need to configure, why and how(registers and code).
4. Draw a schematic which shows the path taken by the interrupt from the source to the CPU (with all registers to configure to set the path)

5. Explain how interrupts are configured in audio I2S project (LAB2).
6. Optional : change the Timer interrupt number