

EECS 700 PROJECT 2: Microblaze MCS

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The MCS is configured and instantiated with the given processor specifications. As I used `xil_printf` in the C code , allocated 16kB of memory space for the MCS.

IO bus peripherals are implemented,

1. Pushing any switch on the board glows the corresponding LED.
2. Complex MAC works.
3. RAM with 32 bit by 256 lines implemented. I used RAM just to pass input data from C code. DFT output is directly read using `in32` function in C.

32 point DFT is implemented and tested by giving the input sequence of all ones. The expected DFT result is 32,0,0,0.....0,0. And the result I observed with the DFT implemented is close to the expected result (results are printed in hexadecimal on putty with MSB four bits representing real part and last four bits represent imaginary part).

The DFT is approximately equal to the exact DFT output, this is because of the approximation made with the floating twiddle factor. I multiplied the floating twiddle factor by 64 and then rounded the resulted number. Once I multiply the accumulation result with the twiddle factor, I divided the output by 64 (by right shifting by 6 bits). Because of these rounding and shifting of bits, the produced DFT is just close to actual DFT output.

Results:

COM19 - PuTTY

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1. Access to on-board LEDs

Push a switch to glow the corresponding LED

2. CMAC

Reading A: 0x32FFFE

Reading B: 0xFFD403FE

Reading CR: 0x139E

Reading CI: 0xFFFFFC0D

Result DR: 0x1302

DI: 0xC401

3. Proc RAM

RAM Write Addr-Data: 0x0 - 0x10000
RAM Write Addr-Data: 0x1 - 0x10000
RAM Write Addr-Data: 0x2 - 0x10000
RAM Write Addr-Data: 0x3 - 0x10000
RAM Write Addr-Data: 0x4 - 0x10000
RAM Write Addr-Data: 0x5 - 0x10000
RAM Write Addr-Data: 0x6 - 0x10000
RAM Write Addr-Data: 0x7 - 0x10000
RAM Write Addr-Data: 0x8 - 0x10000
RAM Write Addr-Data: 0x9 - 0x10000
RAM Write Addr-Data: 0xA - 0x10000
RAM Write Addr-Data: 0xB - 0x10000
RAM Write Addr-Data: 0xC - 0x10000
RAM Write Addr-Data: 0xD - 0x10000
RAM Write Addr-Data: 0xE - 0x10000
RAM Write Addr-Data: 0xF - 0x10000
RAM Write Addr-Data: 0x10 - 0x10000
RAM Write Addr-Data: 0x11 - 0x10000
RAM Write Addr-Data: 0x12 - 0x10000
RAM Write Addr-Data: 0x13 - 0x10000
RAM Write Addr-Data: 0x14 - 0x10000
RAM Write Addr-Data: 0x15 - 0x10000
RAM Write Addr-Data: 0x16 - 0x10000
RAM Write Addr-Data: 0x17 - 0x10000
RAM Write Addr-Data: 0x18 - 0x10000
RAM Write Addr-Data: 0x19 - 0x10000
RAM Write Addr-Data: 0x1A - 0x10000
RAM Write Addr-Data: 0x1B - 0x10000
RAM Write Addr-Data: 0x1C - 0x10000
RAM Write Addr-Data: 0x1D - 0x10000
RAM Write Addr-Data: 0x1E - 0x10000
RAM Write Addr-Data: 0x1F - 0x10000

Real part , Imaginary part(last four bits) are represented as signed numbers

DFT Result:

X(0): 0x200000

X(1): 0x2FFFD

X(2): 0x1FFFD

X(3): 0x1FFFF

X(4): 0x2

X(5): 0xFFFF0001

X(6): 0x1FFFF

X(7): 0x1FFFF

X(8): 0x0

X(9): 0xFFFF

X(10): 0xFFFF

X(11): 0xFFFF

X(12): 0xFFFF

X(13): 0xFFFF

X(14): 0xFFFF

X(15): 0xDC99E258

X(16): 0x0

X(17): 0x0

X(18): 0x0

X(19): 0x0

X(20): 0x0

X(21): 0x0

X(22): 0x0

X(23): 0x0

X(24): 0x0

X(25): 0x10000

X(26): 0x10000

X(27): 0x10000

X(28): 0x10000

X(29): 0x10000

X(30): 0x10000

X(31): 0x10000