AMBA APB Memory on FPGA

2020

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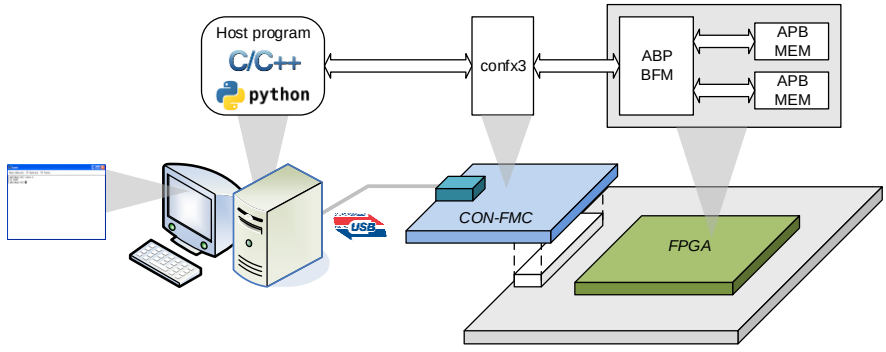
Overall view

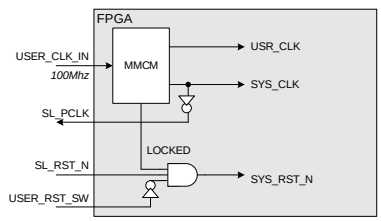


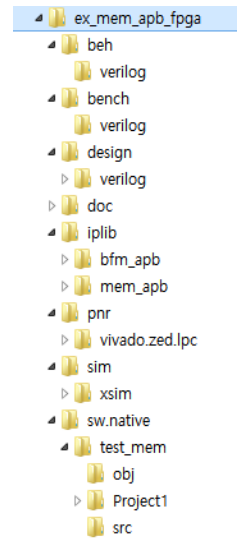
Required packages

- Vivado
- CON-FMC
  - 1. Get the package
    - $ git clone https://github.com/github-fds/confmc.x86_64.linux.2020.06.git
  - 2. Install the package
    - $ cd confmc.x86_64.linux.2020.06
    - $ sudo ./coinstall.sh

Clock and reset

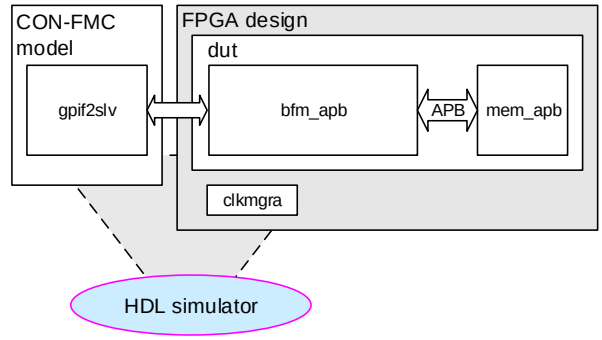
- Directory structure





Simulation

- Note that there are four ‘mem_apb’ blocks with 1Kbyte each
  - starting address:
    - 0x0000_0000, 0x0001_0000, 0x0001_0000, 0x0001_0000
- Go to ‘...../ex_mem_apb_fpga/sim/xsim’ directory and run ‘make’
  - Do not forget to source followings before running
    - $ source /tools/Xilinx/Vivaddo/2018.3/settings64.sh
    - $ source /opt/confmc/2020.06/settins.sh



P&R (implementation) and program FPGA

- Go to ‘...../ex_mem_apb_fpga/pnr/vivado.zed.lpc’ directory and run ‘make
  - $ make
    - or
  - $ make GUI=1

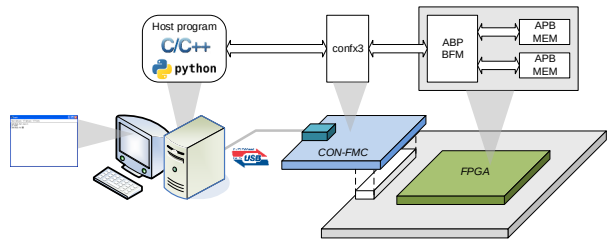
- Setup FPGA board as shown in the following slide
- When ‘fpga.bit’ is ready, download it through USB-JTAG connection
  - Go to ‘...../ex_mem_apb_fpga/pnr/vivado.zed.lpc/download’ directory and run ‘make
  - or invoke ‘Hardware manger’ from GUI and then download the bit-stream.

FPGA board setup

Testing program

- See ‘ex_mem_apb_fpga/sw.native/test_mem/src/mem_api.c’

```
#    define MEM_WRITE(A, B)       BfmWrite(handle, (unsigned int)(A), &(B), 4, 1)
#    define MEM_READ(A, B)        BfmRead (handle, (unsigned int)(A), &(B), 4, 1)
#    define MEM_WRITE_G(A,D,S,L)  BfmWrite(handle, (A), (D), (S), (L))
#    define MEM_READ_G(A,D,S,L)   BfmRead(handle, (A), (D), (S), (L))
```



Running the design

- Go to native software directory and then run ‘make’
  - (do not forget to source ‘CON-FMC’ settings.sh)
  - $ cd ..... ex_mem_apb_fpga/sw.native/test_mem
  - $ make
  - $ make run

Project

- Prepare ‘mem_apb’ using BRAM
- Run following steps.
  - Simulation
  - P&R
  - FPGA running