1. ========== build the verilator simulator =================================

**shawnliu@shawnliu-Aspire-TC-780:/var/cpu\_testbench/git\_hub/Cookabarra\_SOC$ make all**

and then start the simulator

**shawnliu@shawnliu-Aspire-TC-780:/var/cpu\_testbench/git\_hub/Cookabarra\_SOC$ ./tb**

*Built with Verilator 4.212 2021-09-01.*

*Recommended: Verilator 4.0 or later.*

*This emulator compiled with JTAG Remote Bitbang client. To enable, use +jtag\_rbb\_enable=1.*

*Listening on port 9823*

*Attempting to accept client socket*

*Accepted successfully.*

*================ reset the system from boot\_addr ===============*

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*================ reset the system from boot\_addr ===============*

*================ reset the system from boot\_addr ===============*

*reset the cpu,done*

*================ reset the system from boot\_addr ===============*

*invalid instruction opcode (00), pc= 128, the instruction is (00000000)*

*invalid instruction opcode (00), pc= 128, the instruction is (00000000)*

*dm write dmcontrol, data=0x00000000, dmcontrol =0x00000000*

2. ====================== openocd ==============================

**shawnliu@shawnliu-Aspire-TC-780:/var/cpu\_testbench/git\_hub/Cookabarra\_SOC/openocd$ openocd -f ./openocd\_local\_bitbang.cfg**

Open On-Chip Debugger 0.10.0+dev (SiFive OpenOCD 0.10.0-2020.04.6)

Licensed under GNU GPL v2

For bug reports:

https://github.com/sifive/freedom-tools/issues

Info : only one transport option; autoselect 'jtag'

Info : Initializing remote\_bitbang driver

Info : Connecting to localhost:9823

Info : remote\_bitbang driver initialized

Info : This adapter doesn't support configurable speed

Info : JTAG tap: riscv.cpu tap/device found: 0x1e200a6f (mfg: 0x537 (Wuhan Xun Zhan Electronic Technology), part: 0xe200, ver: 0x1)

Info : datacount=1 progbufsize=0

Warn : We won't be able to execute fence instructions on this target. Memory may not always appear consistent. (progbufsize=0, impebreak=0)

Info : Examined RISC-V core; found 1 harts

Info : hart 0: XLEN=32, misa=0x40001100

Info : Listening on port 3333 for gdb connections

Info : Listening on port 6666 for tcl connections

Info : Listening on port 4444 for telnet connections

3. ============================= gdb =============================

**shawnliu@shawnliu-Aspire-TC-780:/var/cpu\_testbench/git\_hub/Cookabarra\_SOC/sw\_app/bootrom/frondend$ riscv32-unknown-elf-gdb**

GNU gdb (GDB) 8.2.50.20181127-git

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This is free software: you are free to change and redistribute it.

There is NO WARRANTY, to the extent permitted by law.

Type "show copying" and "show warranty" for details.

This GDB was configured as "--host=x86\_64-pc-linux-gnu --target=riscv32-unknown-elf".

Type "show configuration" for configuration details.

For bug reporting instructions, please see:

<http://www.gnu.org/software/gdb/bugs/>.

Find the GDB manual and other documentation resources online at:

<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".

Type "apropos word" to search for commands related to "word".

(gdb) show remotetimeout

Timeout limit to wait for target to respond is 2.

(gdb) **set remotetimeout 20**

3.1 ======== connect to openocd (gdb server) ===========================

(gdb) **target remote localhost:3333**

Remote debugging using localhost:3333

warning: No executable has been specified and target does not support

determining executable automatically. Try using the "file" command.

Ignoring packet error, continuing...

0x80000036 in ?? ()

3.2 =============== access gpr registers ===============================

(gdb) **info reg**

ra 0x5f555555 0x5f555555

sp 0x0 0x0

gp 0xd0580000 0xd0580000

tp 0x80000178 0x80000178

t0 0xff 255

t1 0x0 0

t2 0x0 0

fp 0x0 0x0

s1 0x0 0

a0 0x0 0

a1 0x0 0

a2 0x0 0

a3 0x0 0

a4 0x0 0

a5 0x0 0

a6 0x0 0

a7 0x0 0

s2 0x0 0

s3 0x0 0

s4 0x0 0

s5 0x0 0

s6 0x0 0

s7 0x0 0

s8 0x0 0

s9 0x0 0

s10 0x0 0

s11 0x0 0

t3 0x0 0

t4 0x0 0

t5 0x0 0

t6 0x0 0

pc 0x80000036 0x80000036

(gdb)

3.3 ================= access csr ===============================

(gdb) **p $misa**

$1 = 1073746176

(gdb) **p $mtvec**

$2 = 1

(gdb) **p $mstatus**

$3 = 6280

(gdb) **p $mvendorid**

$4 = 0

(gdb) **p $minstret**

$5 = 513177

(gdb) **p $mcycle**

$6 = 540351

(gdb) **p $mcycleh**

$7 = 0

(gdb) **p $mie**

$8 = 128

(gdb) **p $mtvec**

$9 = 1

(gdb)

3.4 ==================access memory ==========================

(gdb) **x/wx 0x100000**

0x100000: 0x7e40006f

(gdb) x/wx 0x100004

0x100004: 0x53dbd36b

(gdb) x/wx 0x100008

0x100008: 0xafc353cf

(gdb) x/wx 0x80

0x80: 0xe4f6fdf4

(gdb) x 0x80

0x80: 0x003007b7

3.5 ============== load file ===============================

(gdb) target remote localhost:3333

Remote debugging using localhost:3333

warning: No executable has been specified and target does not support

determining executable automatically. Try using the "file" command.

Ignoring packet error, continuing...

0x00000000 in ?? ()

(gdb) **file ./bootrom.elf**

A program is being debugged already.

Are you sure you want to change the file? (y or n) y

Reading symbols from ./bootrom.elf...

(No debugging symbols found in ./bootrom.elf)

(gdb) load

Loading section .vectors, size 0x84 lma 0x0

Loading section .text, size 0xc00 lma 0x84

Loading section .rodata, size 0x2fc lma 0xc84

Ignoring packet error, continuing...

Loading section .data, size 0x10 lma 0xf80

Ignoring packet error, continuing...

Start address 0x84, load size 3984

Ignoring packet error, continuing...

Transfer rate: 255 bytes/sec, 996 bytes/write.

3.5 ============= jump to a address or a function===========

jump function

set $pc=address

(gdb) jump reset\_handler

Continuing at 0x8f8.

Could not write register "pc"; remote failure reply 'E0E'

(gdb) monitor reset halt

JTAG tap: riscv.cpu tap/device found: 0x1e200a6f (mfg: 0x537 (Wuhan Xun Zhan Electronic Technology), part: 0xe200, ver: 0x1)

(gdb)