Instructions after succeeding in booting Linux on COPPER CPU

Nov. 8, 2013 S. Yamada

1, How to install COPPER driver on COPPER CPU

1-1, get driver source code

~~svn co https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/driver/cprdist-0.1.0~~

svn co https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/driver/cprdist-0.1.5

or download the latest version from

https://belle2.cc.kek.jp/~twiki/bin/view/Detector/DAQ/COPPER

(Updated on Nov.8, 2013)

1-2, How to compile and install COPPER drivers

To avoid an error message below during installation of modules, please check notices,

"insmod: error inserting 'daq/cprdist-0.1.0/drv/copper.ko': -1 Invalid module format"

NOTICE : the version of compiler(/usr/bin/gcc) should be
same as the one used for kernel compilation or PXE server's gcc version.
You can check the version by % /usr/bin/gcc --dumpversion

NOTICE : If you try to compile drivers on a PXE server and COPPER_CPU's linux kernel is different from
the one used on PXE server, please modify KERNEL_VERSION in drv/Makefile and cprfin_fngeneric/Makefile.

```
% make clean
% make
% cd cprfin_fngeneric/
% make
% cd ..
% /bin/su
# ./initd_copper start
# ./initd_cprfin_fngeneric start
```

check if drivers are successfully installed.

```
% /sbin/lsmod
```

Module Size Used by
cprfin_fngeneric 9808 0
copper 30208 0

1-3, How to install COPPER drivers modules automatically

1, correct path of module and script
e.g.)
insmod ./drv/copper.ko -> Need to modify
action $"Making nodes: " ./src/mkdevs.sh -> Need to modify

2, copy initd_copper and initd_cprfin_fngeneri files
[on COPPER CPU] # cp initd_copper /etc/init.d/copper
[on COPPER CPU] # cp initd_cprfin_fngeneric /etc/init.d/cprfin_fngeneric

If you boot many COPPER CPUs w/ one boot server, note that those files may be common to all COPPER boards,
unless you specify them in /tftpboot/copper/snapshot/files.

3, use chkconfig to register
[on COPPER CPU] # chkconfig --add copper
[on COPPER CPU] # chkconfig --add cprfin_fngeneric

4,
Maybe it will work.
It is better to place drivers under /lib/modules.

2, Configure CPLD before using an unused HSLB

2-1, download a CPLD configuration directory

svn co https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/HSLB

2-2, Configure CPLD

1, Get a CPLD configuration file

Use 130621_HSLB_cpld_readback.jed

2, Attach HSLB on COPPER and turn on the power of COPPER

3, Download the file to CPLD on HSLB

- Prepare USB-JTAG adapter
- Connect between your PC and CPLD
- Use impact to download the file to CPLD

3, How to donload FPGA firmware and check data from HSLB

3-1, download a utility folder

svn co https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/test_program

3-2, Download firmware to FPGA on HSLB

% ./hslb/boothslb -abcd ./hslb/hslb.bit

"-abcd" specify slots for HSLB cards

If you fail to download firmware, please try following

- Check if CPLD on HSLB is already programmed.
- Check if copper and cprfin_fngeneric have already been installed

  % /sbin/lsmod
- Install drivers again

  # driver/cprdist-0.1.0/initd_copper stop

  # driver/cprdist-0.1.0/initd_copper start

  # driver/cprdist-0.1.0/initd_cprfin_fngeneric stop （do not use “restart”）

  # driver/cprdist-0.1.0/initd_ cprfin_fngeneric start
- Download firmware to CPLD on HSLB again.（basically not necessary）.

3-2, Read data in COPPER FIFO

% ./copper/record-nakao -abcd

"-abcd" specify slots for HSLB cards

3-3, Use HSLB as a dummy data producer for test

1, Download a test firmware which make a HSLB produces

dummy data with size of about 256byte and 1Hz rate

% ...daq/copper/test_program/hslb/boothslb -abcd ./bit/HSLB_1Hz256B.bit

"-abcd" specify slots for HSLB cards

2, Read data

% ...daq/copper/test_program/copper/record-nakao -abcd

4, How to get and install TTRX device driver

4-1, download a device driver

svn co https://belle2.cc.kek.jp/svn/trunk/software/daq/copper/driver/ttrx/ttrxprogs-20060413-for-SL5

4-2, follow instructions in README in the directory

Please read 1-2 to avoid “Invalid module format” error.