HOW TO – HEP A Lab May 2013

Starting MTS DATE from scratch:

1. Power up all FECs, which means turning on ATX's (4):
    a. One directly, three other ones on power strip
        i. Note, if just toggling power, the ATX in Eurocrate might not turn back on righty away b/c off the capacitor inside; toggle again and wait a little longer. To check, look through crack b/w power supply and first FEC at power regulator in back. Only after ALL LEDs are off, will the ATX turn back on. Look especially for one red LED, which will slowly fade as the capacitor fully discharges. When ATX is back correctly all red LEDs and one blue LED will be on.
        ii. Confirm power to FECs by looking for green LEDs on FECs themselves and 3+3 LEDs on 2 Netgear switches
    b. Power strip also turns on 5V DC converter
2. Login to MTS DATE PC and start DATE
    a. Username: MTSUser pwd: MH#... (standard user password)
    b. Ignore Updates pop up window. "NEVER Update SLC5!"
3. Turn on HV for Detectors
    a. Open another Linux terminal
    b. Become root: > su sdf… (standard root password)

    > minicom

(If there is a com problem, e.g. due to toggling of NIM power, try unplugging and replugging USB cable on CAEN module side or typing >minicom –s and changing the port to ttyusb1 or 2 depending on which it is set to)

Now BLINDLY type "caen"

If you get stuck, hit "Q" and go to previous menu (in general)

> d (for display); brings up main status display

Use space bar to toggle HV Off <---> On

>G toggles b/w individual control and grouped control

To change values: type into one space and hit enter; if in group mode will be applied to all channels. Works even during ramping.

Standard settings for minicom are as follows:

- Vset = 4200V (2000V for pedestal runs)
- Iset = 1550 uA
- MaxV = 4250
- Ramp up = 75V/s
- Ramp Down = 50V/s
- Trip = 0.001s
- Power down = Ramp

4. Start up DATE
    a. > ./date.sh (as MTSUser not root)
        i. Starts up a bunch of processes; eventually brings up
            1. DATEDAQ_TEST_DAQ::DAQ_TEST_CONTROL, which is the main control GUI
            2. InfoBrowser for messages
            3. And two DAQ_TEST windows to display info about the current run
        ii. Configure Ethernet in PC so we can talk to switches
            1. Needs to be done as “root”; so in terminal window
                a. > su
                b. > Password: sdf….! (our std. pwd for root on Linux PCs)
                c. > ./ethernet_init.sh
            2. > exit (to get out of root account)
        iii. Now use DATE GUI
            1. Take control of DAQ by clicking on lock symbol and selecting green DAQ control

2. Work from left to right in GUI
    a. Click on first right arrow; this connects to the LDC (Local Data Collector) and pops up two DAQ_TEST windows: LDC(1) and LDC status display:
        i. Aloneldc: host206-118.physci.fit.edu
    b. Under “Connected Run Parameters” click on “Define”, which pops up another window “Define”; select “LDC” button; here we usually only change:
        i. Max. number of sub-events (std. 300,000 for data runs and 5000 for pedestal runs); note: “0” means infinite; i.e. continuous running
        ii. Local Recording device: local file name for events; set to whatever is appropriate to paper logbook; e.g /mnt/raid/leadbox3x18may2.raw (Warning: overwriting files is very possible so make sure to check it is a different file name)
        iii. Click big “Apply tagged values to selected items” button in lower right-hand corner
        iv. Close the “Define LDC” window
        v. Hit “Ok” button on Define window and then “YES” on pop up window
    c. In main GUI, click next right arrow; and decide if we want to actually save the data to file. If no, leave “Local Recording OFF”; to save: ON.
    d. When first toggling power on for the DAQ, take some test data first without recording to make sure everything is running okay.
    e. Hit “Start Processes”
    f. InfoBrowser sends many messages about configurations
    g. In main GUI “Ready to start” button turns green.
    h. Now start data taking even w/o HV to check proper APV functioning: On right-most block: “Data Taking”: Hit “Start” to open up all DAQ ports
3. But in order to actually receive data, in terminal type the command “StartRun”, which actually tells the FECs to send data to DATE.

a. If all is well, then DAQ_TEST reports incoming event rates etc. after a few seconds

b. Data files will show up in /mnt/raid directory with file extension .raw

5. Now monitor events with AMORE

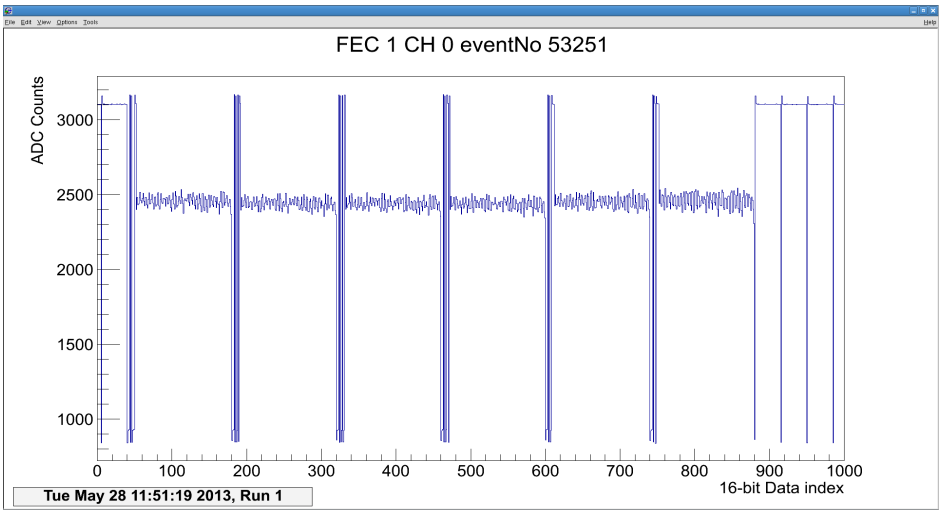
   a. Open two more terminals

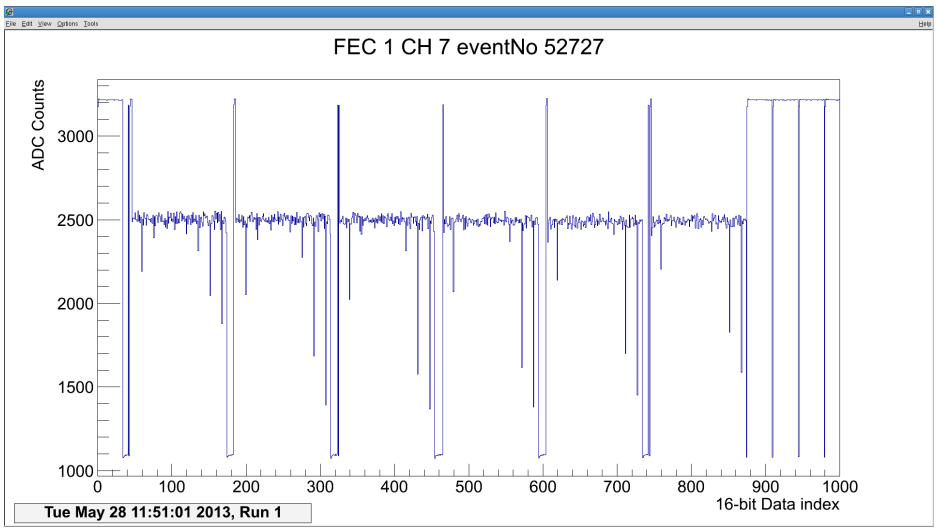
      i. In the first terminal type “OnlineDataRun” (for a Pedestal Run type”OnlinePedRun”)

         1. For the first nonpedestal run of the day you need to make sure you change the file “OnlineDataRun.sh” in the amoreSRS folder. The only thing you should have to change is the pedestal file to the name of the pedestal file you should have created just before starting the data run.

      ii. In the second terminal type “amoreGui”

      iii. Be sure to check all the Raw Data Plots which are in the tabs labeled RawFEC1-6 the plots should look like the plots below





NOTE: If the plots do not look like this immediately stop the run and reset the FEC that is displaying bad plots. Then start a new run with the same name and check to see if that plot is fixed. If this does not work you can also try removing the HDMI cable that is attached to the bad APV from the FEC and also from the APV itself.

6. At the end of any run
    a. In DATE Terminal> StopRun to stop sending data from FECs
    b. End the amore agent by pressing control-c in order to only use data from the next run
    c. Go back to Start Processes in DATE Main Gui and proceed as above (make sure to use a new file name if the run completed successfully)

If full disk on MTS PC:

If the RAIDed disk on the DATE MTS PC fills up because there are too many big run files in /mnt/raid, then copy older files over to the T3 cluster:

You can run the script “cleanup.sh” in order to easily backup files to the cluster and make space on the MTS PC.

How to process data OFFLINE with AMORE

On AMORE PC:

1. Login as AmoreUser (pwd… MH#... std pw for users);
2. In ~/amoreSRS Directory:

   (a) Open file ProcessMTSData.sh/ProcessMTSDataNoPedestals.sh with gedit

   (b) At top of file we find the statement:

   #These lines are most important

   Change them accordingly:

   - listOfFiles=”filename1 filename2 …” (Only use single space b/w filenames)
   - pedestalFile=”pedestalfilename”
   - agentToUse=”SRS01” or SRS02 or SRS03 (diff. agent names that use same publisher); avoid using SRS02 on the MTSPC, this is used for online data processing
   - scenario= “scenarioname”

   and save the file.

   (c) Using 2 agents at same time is optimal; when running 2 in parallel, they need to have DIFFERENT agentToUse names.

3. Open new terminal and go again to ~/amoreSRS. Enter the following into the terminal

   > ./ProcessMTSData.sh

   a. If there is an issue with the processing you can kill the agent fully with CTRL-C, but you need to do it multiple times to kill all processes inside the script. You can also use Ctrl-Z which will kill agent, but then need to force quit the agent by entering the following >Kill -9 PID

>Ps aux | grep amore

Will show list of processes to kill by hand

In case of pedestal problem with an APV, e.g. “Zero data for APV… APV header level”:

Make copy of mapping file and inside the script use it then:

mapping= “~/configFileDirSRSNew/mapping….cfg”

Open the mapping file and first modify APV Header level, e.g. set to 1600 (from 1300 default).

If still not working, and need to mask bad channels, comment out line and renumber APV numbers for all APVs after the bad ones BY HAND.

There are flags in the script that allow to turn on POCA and Hit output files: YES or NO

Note: Processing takes a long time; With 2 processes running simultaneously; the MTS PC can process about 4.4 ev/s or 86400*8.8=760k events per 24 hours or close to 2 and a half files. The Amore PC can process ~6.1 ev/s or 86400*12.2 = 1054k events in 24 hours or a little more than 3 files.

How to prepare offline POCA plots

On AMORE PC:

Poca plots are stored on the Amore PC in the directory: /home/AmoreUser/PocaResults.

Poca text files are also stored on the Amore PC in the directory: /home/AmoreUser/results/pocaResult. If data is processed on other computers, the Poca text files are copied to the cluster in the directory: /mnt/nas1/g4hep/results/PocaResults. They are then moved to the common PocaResults directory on the Amore PC.

To prepare a Poca plots, concatenate the desired text files into a single text file and move it to an appropriate subdirectory of .../PocaResults that properly describes the current scenario.

Next open up eclipse by opening a new terminal and typing >cd eclipse and then >./eclipse. Now copy the concatenated Poca text file into the directory PocaTextFiles in the workspace. From there edit the following lines in PocaConfig.txt.

InputFile1: (Name of the concatenated file)

outputDir: /home/AmoreUser/PocaResults/(ScenarioName)/All

Those should generally be enough to get the generic Poca Plots. You can look through the config file and change other things in order to get more specific things out of your plots.

Side Detector Analysis

In order to create Detector analysis plots (Side, TopBottom, Mixed plots) you must seperate the whole Poca files into the different event types. To do this we use a program on the cluster. So copy the concatenated Poca file along with a concatenated Hit Text file on to the cluster in the /home/g4hep/geant4/examples/mytestapps/MikeP/documents/ReadHitFile/

Then open up a terminal and ssh to the cluster. Cd into the directory your Hit Text and Poca files are and type in the terminal >./main (Name of HitTextFile) (Name of Poca File). This should give you three new files that have been seperated into event types. (If the other files are not produced the number of events in the HitTextFile and the Poca file are different go back and make sure the same files are being concatenated and if the program still does not work look at the individual files and make sure the processing didnt stop and restart without being deleted first) From there do the same process you did to make the original Poca plots for these three new files.

Alignment Analysis

In order to properly align the detectors of the MTS we use data from an empty station in addition with an alignment code to create new mapping files. After processing the empty station data concatenate the Hit Text File and copy it to this directory "/home/AmoreUser/workspace/Alignment.Histogram/Data"

Open a terminal and cd to "home/AmoreUser/workspace/Alignment.Histogram/src" then type ./Alignment filename mappingfile #of iterations this will create residual plots and you can than change the detector shifts in your mapping file by the mean of the residual distribution in the plots that are created.