

## CDet module commissioning DAQ instructions

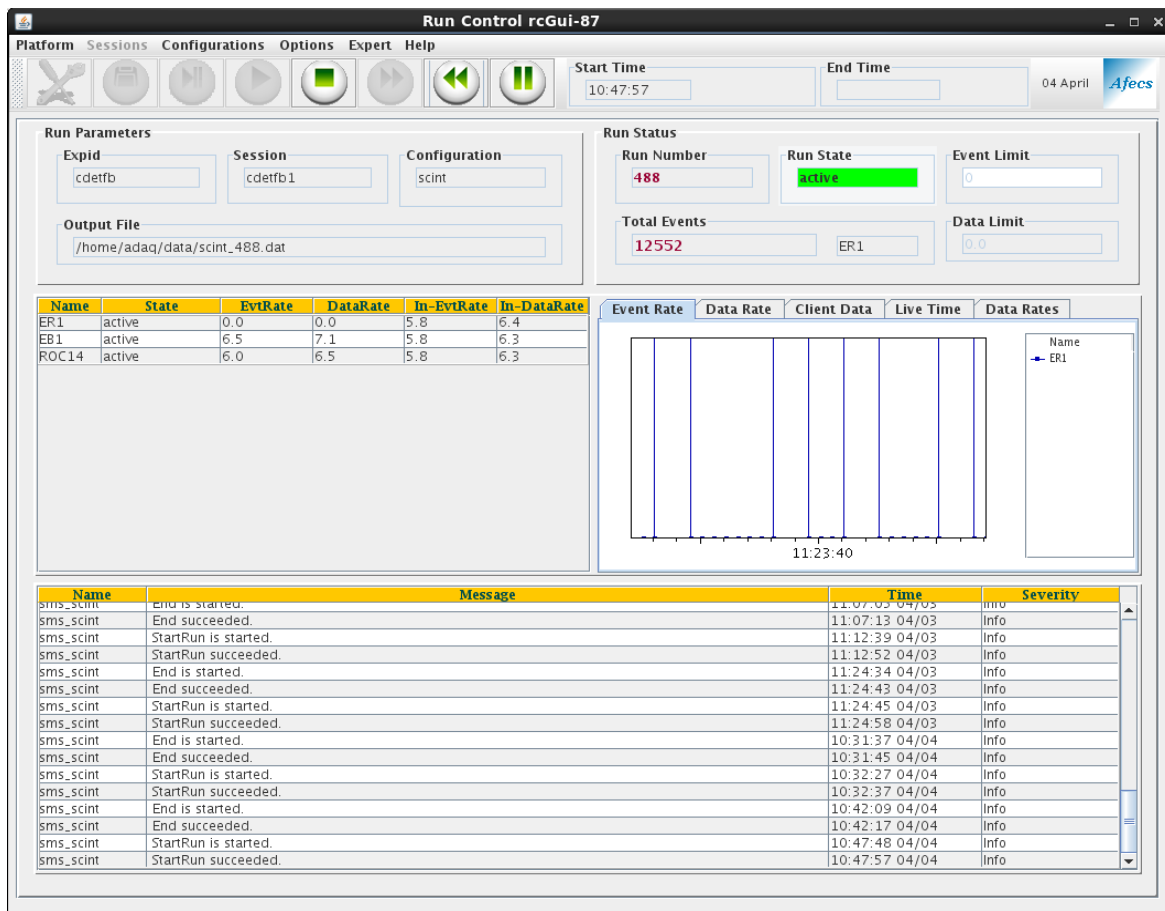
## Part 1: Setup the environment on sbs2 from scratch. TO DO IF SBS2 GETS POWERED OFF

Please **DO NOT** skip steps, **NOR** do them out of order (for example, there is a reason if ROC14 is (re)started after CODA); if you mess, you may get strange errors from the GUIs. Passwords are on pc.

1. Start up the crates
2. Boot sbs2. User adaq
3. On desktop "CODA":
  - Open a terminal; type:  
msqld
  - Open a second terminal; type:  
startcoda
  - wait for the main coda window to appear before change desktop! More on it in part 2
4. On desktop "ROC":
  - Open a terminal; connect to port server:  
telnet cdetts2 2006
  - Note: DO NOT type nor press the escape character, or else you will dispatch the reboot command to the machine in front of you...which means you are going back to step 2.
  - Just press return, a "->" prompt appears, then type  
reboot
  - After a few seconds, it will. It will be done when you see the following lines  
Start sending statistics...  
callbackControl: Do not understand the command: session/control/setSession
5. On desktop "HV":
  - Open a terminal; log into rpi3:  
ssh [pi@rpi3](#)
  - then type:  
./start\_hv
  - Open a terminal; log into sbs:  
ssh [adaq@sbs1](#)
  - then type:  
cd slowc  
./hvs rpi3
  - At this point, the HV GUI should appear after a few seconds
  - Switch to tab "s9"
    - channel L9.0 is the PMT
    - channels L9.1 and L9.3 are the top and bottom trigger respectively
6. On desktop "DATA ANALYSIS":
  - To start the raw event viewer:
    - Open a terminal; type  
cd data  
xcefdmp
  - To be (finally) ready to analyze data:
    - Open a terminal; type  
cd scint\_decode

7. Main setup done! You can now start taking precious data; refer to parts 2 and 3 for how-tos.

## Part 2: How to use CODA



This is the main CODA window. Notice in particular the buttons, the run number, the run status, the session type (must be cdetfb1), the current configuration (must be scint) and the menus. The most important buttons are Configure, Stop and Restart

How to start a run:

- **Before even thinking to start a run, make sure that the correct configuration (“scint”) / session (“cdetfb1”) are loaded.** If not:
  1. Click on options, coda 2 database, run types, then click on “scint”, “ok” and “translate”.
  2. Click on options, coda 2 database, run sessions, then click on “cdetfb1”, “ok”  
If “scint” and/or cdetfb1 is **not** there, something went terribly wrong, probably a system crash. Contact Mark Jones and hope he can recreate the database file.
  3. Actually load the scint configuration:  
Click on configurations (the menu entry, not the button), then “cool”, select “scint”, “ok”
  4. In the platform menu, select disconnect, then connect
  5. Click on the configure button, and you are ready to go!
- **The Restart button should be green** now. Click on it. It may take a while before the run really starts, do not worry. CODA needs a few initialization steps to be done (configure the machines, activate them, then start the run); the Restart button takes care of them in just one click.
- The run number and output file are automatically updated. Normally there is no need to repeat steps 1-4 for every run.

How to stop a run:

- Click on the **stop button**. It may take a little while for the restart button to become green again.

### Part 3: Data analysis

Let us suppose you want to analyze data from run number **RUNNO**.

As explained in part 1, a terminal session is supposed to be open in desktop “Data Analysis”, and cd'ed to /home/adaq/scint\_decode

In that directory, you can modify the pre-analysis source code Fastbus\_main1.C. It read the raw data saved by CODA and save them in a root file named after the run, eventually overwriting it. If you edit Fastbus\_main1.C, you will need to compile it through the provided makefile; just run make. The executable version has been called fbana.

An helper root script, .init.C, has been created. It takes as argument the run number, then open the associated root file, reads the tree (“t”) with raw data, defines a few plot\_something functions (have a look at them if you want, the names and parameters should be auto-explicative, and of course there are comments) and a few shortcuts to conveniently access the ADC/TDC channels (starting from 0) from the modules in the first slot (0), which is currently the only one which is used.

For example, let us say that for some reason you want to histogram ADC channel 5, when ADC channels 4 and 6 have less than 40 counts, TDC channel 8 gives both a trailing edge value > 200 and a leading edge value < 300:

```
t->Draw(“a5”,”a4<40 && a6<40 && t8>200 && l8<300”)
```

The equivalent “long” version, which does not take advantage of the shortcuts, is

```
t->Draw(“adc[0][5]”,”adc[0][4]<40 && adc[0][6]<40 && tdct[0][8]>200 && tdcl[0][8]<300”)
```

where the first index, [0], identifies the modules in the first ADC/TDC slot, which is currently the only one which is used.

How to analyze data:

1. ./fbana **RUNNO** 14  
the output file will be named sbs\_**RUNNO**\_14.root.  
The first of the two mandatory arguments is the run number to be analyzed, the second one is the ID of the ROC (use 14); it is possible to give some optional arguments to fbana: 1) the number of events to analyze (default = 1000000), and, 2) calculate pedestals? 1 = yes, nothing or 0 = no
2. root -l  
.x init.C(**RUNNO**)
3. Note that **you can pre-analyze a run while CODA is still acquiring**. In order to update the root file, just repeat step 1. Of course, in the root session, you should then .x init.C(**RUNNO**) again, so that you can use the newer dataset.

How to view raw data (can be useful for debug purposes)

1. In a terminal on sbs2, go to /home/adaq/data, then xcefdmp
2. Click on “open”, “data source”, “open”.  
On the right side of the window there is a list of data files, double click on the one you want to open. To update the list of available files, for example to show a just created run, click on filter
3. Click on “view next” two times. This skips the pseudo events “start” and “go”. Use also to navigate events
4. Click on “ROC 14”, a new window opens. Here are the raw data for the event.

Refer to the modules documentation to interpret the header and data words. Note that ADC/TDC are delimited by the following conventional hex values

Between 0xda000011 and 0xda000022 → ADC; between 0xda000022 and 0xda000033 → TDC

## Appendix: General troubleshooting

- **How to restart CODA**

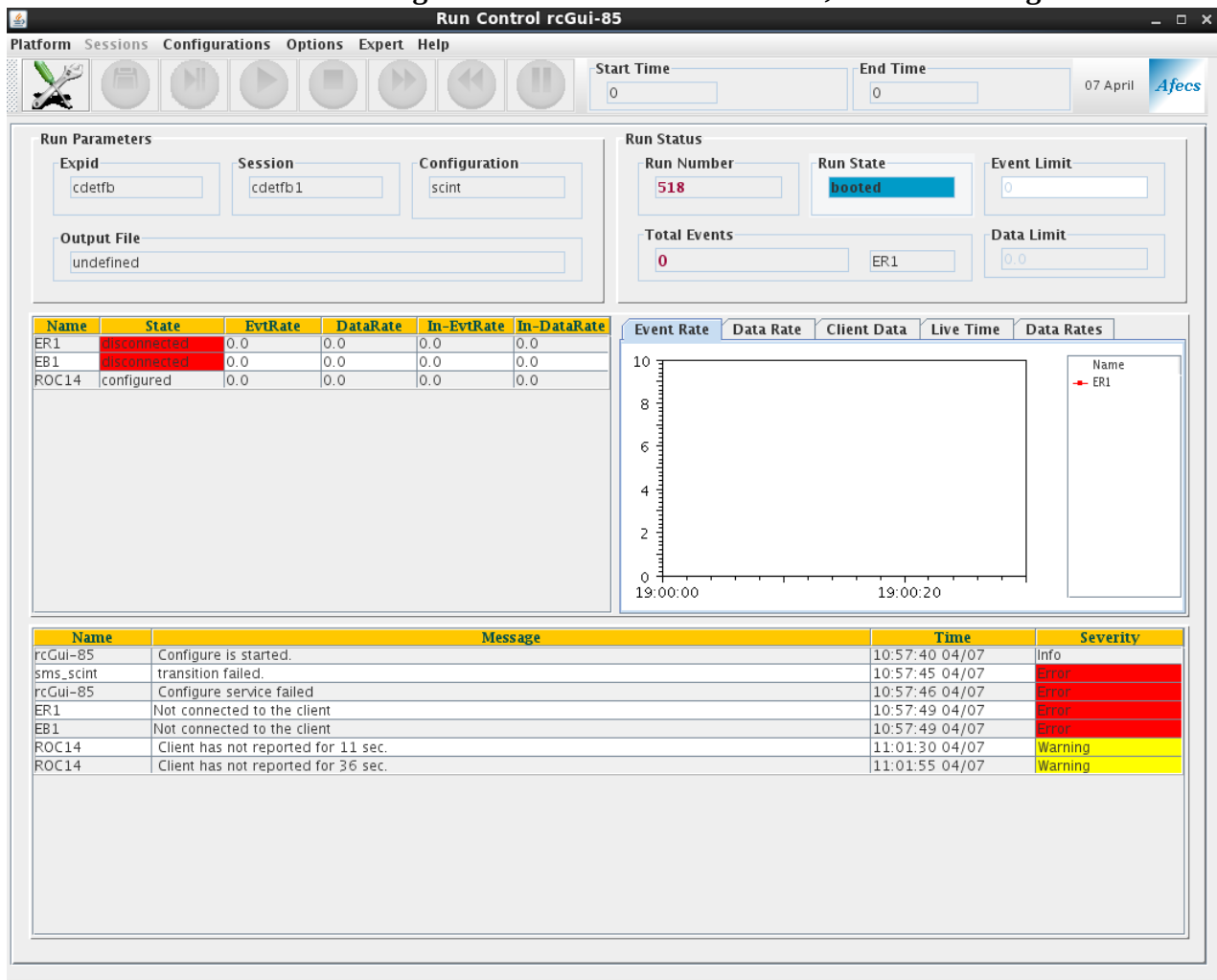
You first need to kill it via terminal using the command  
kcodea

with no arguments. Then

startcodea

as in step 3 of the setup. Then load configuration/session, as explained in part 2.

- **When I click on the “configure” button of the CODA GUI, I see something like this**



First check if the configuration and session are correct (“scint” and “cdetfb1” respectively). There may be or may be not an error in the red window.

Try the configure button again. If it does not work:

Try restarting CODA (of course do the config steps again), then reboot ROC14.

Try the configure button again. If it still does not work:

Restart the crate. Just in case, restart CODA.

Try the configure button again. If it still does not work:

Probably the database file is screwed up. Let an expert like Mark Jones have a look at it.

- **ROC14 does not respond to CODA requests**

Most of the time, this happens when steps 3 and 4 of the setup are done out of order. First restart CODA, then reboot ROC14. In this order. Refer to point 4 of part 1 for further instruction on how to reboot ROC14.

- **An alarm regarding HV is flashing!**

Click on it to acknowledge. Then go to “HV” desktop.

FYI, In the HV GUI, “Status” is supposed to be 1 if the corresponding channel is powered on, 0 otherwise. Everything else means there is (still) a problem.

One, rarely more, channel label in the HV GUI is flashing red. It issued the alarm. Now, cycle on its “Ch.En.” box a few times, it should recover (meaning that “status” should eventually become 1, AND the channel label has a non-flashing white background)

- **The red window in CODA desktop shows a java runtime error complaining about a string or something, and/or CODA behaves a bit strangely**

Try and restart CODA

- **I need to modify the startup/control scripts of ROC14**

Please make sure you know what you are doing! Such scripts are on sbs1, in the paths

/home/adaq/prog\_sbsvme14

/home/adaq/vxworks/sbsvme14\_sbs2.boot

/home/adaq/crl/cdet\_scint.crl

if you edit the last one, namely the control script, then cd where it is, and type  
makelist cdet\_scint.crl ppc

- **The “Total event” counter in the CODA GUI is off by a few events**

Every time a run starts, 2 “events” will be counted anyway, even if no data is acquired. These “events” are the “Start” and the “go” CODA pseudo-events. Just ignore them. At the end of the run, an additional pseudo event, namely the “end” event, will be counted as well. The number of real events is therefore the number reported by “Total events” minus 3.