



*... for a brighter future*

## *DHCAL Extensions to CALICE DAQ : Status Report*

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# Overview

- Development and testing has been done on notebook Linux PC
- All of the modules requiring modification or development have been coded
- Modules which do not interact with actual hardware have been tested
- Preliminary 'runner' application has been built and tested
- Electronic Logbook functionality has been added
- Some issues remain to be addressed

# Development Status Summary

<b>Module</b>	<b>Purpose</b>	<b>Status</b>	<b>Comment</b>
DaqBusAdapter	Use HAL CAEN Linux bus adapter	Modified	
DaqConfiguration	Customize settings for run types	Modified	Needs additional customization
DaqRunType	Define run types	Modified	Added run type for DHC operation
SubRecordType	Defines types of subrecords	Modified	Added record types to configure and readout DHC
DhcConfiguration	Load configuration records	Coded	Need method to input parameters from external file
DhcbeConfigurationData	Defines structure of DCOL configuration	Coded	
DhcFeConfigurationData	Define structure of DCAL front end configuration	Coded	
DhcEventData	Define structure of front end hit data	Coded	
DhcReadoutConfigurationData	Define structure of settings for readout options	Coded	Needs additional customization
DhcSerialCommand	Template to build command sent to FE chip	Coded	
DhcSerialHeader	Builds structured message sent to FE chips	Coded	
DhcReadout	Manages the configuration and readout of DCOL	Coded	
DhcVmeDevice	Executes the DCOL access via HEL library	Coded	Not tested
DhcLocation	Define physical location of DCOL	Coded	
DhcLocationData	Template to associate DCOL data with location	Coded	
TtmConfigurationData	Define structure of TTM configuration	Coded	
Ttmreadout	Manages configuration and readout of TTM	Coded	
TtmVmedevice	Executes the TTM access via HAL library	Coded	Not tested
TtmLocation	Defines physical location of TTMs	Coded	
TtmLocationData	Template to associate TTM data with location	Coded	
RunLogger	Create automatic ELOG entries at transitions	Coded	

# Operation

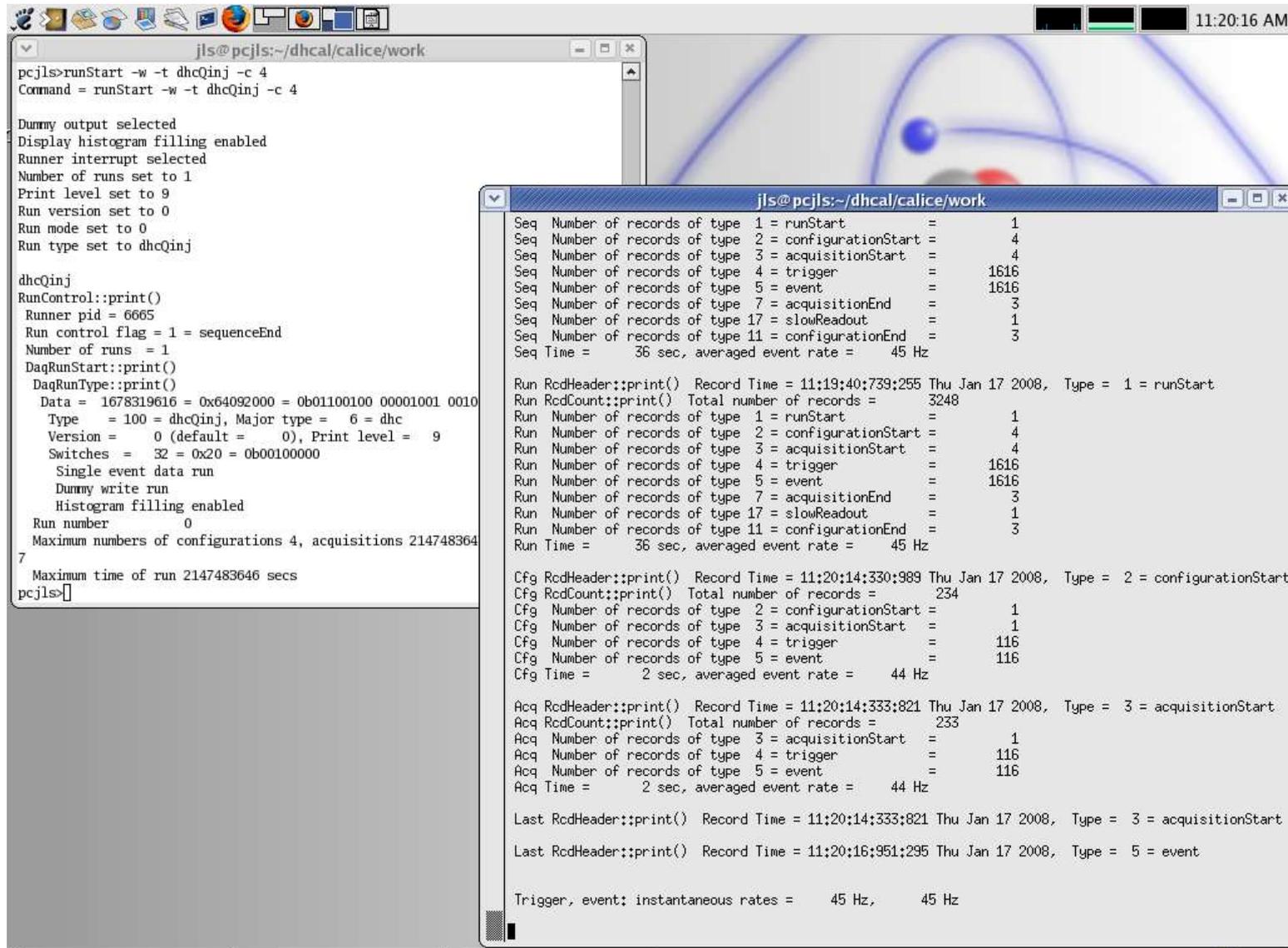
- DAQ program initialized with 'startUp' command, runs in background
- Runs are controlled via 'runStart' and 'runEnd' commands
- Run type selected on 'runStart' command line, e.g. Noise, Qinj or Cosmics
- Runs can also end automatically based on time, number of events or other parameters
- Runs can be sequenced, e.g. cosmics for a specified time interval immediately followed by a noise run.
- Run progress can be monitored

```
pcjls>startUp
Deleting payloads
Log file used: data/log/Log1200590077.out_pcjlsHst
Log file used: data/log/Log1200590078.out_pcjls
pcjls>runStart -h

runStart options:
-w (bool)   Make output file, default +w = true
+a (bool)   Ascii output file, default -a = false
-d (bool)   Enable displays, default +d = true
-i (bool)   Interrupt runner, default +i = true
-t (string) Run type, default crcNoise
-n (int)    Number of runs, default 1
-p (int)    Print level, default 9
-v (int)    Run type version (type-dependent), default 5
-m (int)    Run type mode, default 0
-c (int)    Maximum number of configurations, default 2147483647
-q (int)    Maximum number of acquisitions, default 2147483647
-e (int)    Maximum number of events, default 2147483647
-s (int)    Maximum time of run (secs), default 2147483647

pcjls>
```

# Screen shot of runStart, runMonitor for Qinj run



```
jls@pcjls:~/dhcal/calice/work
pcjls>runStart -w -t dhcQinj -c 4
Command = runStart -w -t dhcQinj -c 4

Dummy output selected
Display histogram filling enabled
Runner interrupt selected
Number of runs set to 1
Print level set to 9
Run version set to 0
Run mode set to 0
Run type set to dhcQinj

dhcQinj
RunControl::print()
Runner pid = 6665
Run control flag = 1 = sequenceEnd
Number of runs = 1
DaqRunStart::print()
DaqRunType::print()
Data = 1678319616 = 0x64092000 = 0b01100100 00001001 0010
Type = 100 = dhcQinj, Major type = 6 = dhc
Version = 0 (default = 0), Print level = 9
Switches = 32 = 0x20 = 0b00110000
Single event data run
Dummy write run
Histogram filling enabled
Run number 0
Maximum numbers of configurations 4, acquisitions 214748364
7
Maximum time of run 2147483646 secs
pcjls>
```

```
jls@pcjls:~/dhcal/calice/work
Seq Number of records of type 1 = runStart = 1
Seq Number of records of type 2 = configurationStart = 4
Seq Number of records of type 3 = acquisitionStart = 4
Seq Number of records of type 4 = trigger = 1616
Seq Number of records of type 5 = event = 1616
Seq Number of records of type 7 = acquisitionEnd = 3
Seq Number of records of type 17 = slowReadout = 1
Seq Number of records of type 11 = configurationEnd = 3
Seq Time = 36 sec, averaged event rate = 45 Hz

Run RcdHeader::print() Record Time = 11:19:40:739:255 Thu Jan 17 2008, Type = 1 = runStart
Run RcdCount::print() Total number of records = 3248
Run Number of records of type 1 = runStart = 1
Run Number of records of type 2 = configurationStart = 4
Run Number of records of type 3 = acquisitionStart = 4
Run Number of records of type 4 = trigger = 1616
Run Number of records of type 5 = event = 1616
Run Number of records of type 7 = acquisitionEnd = 3
Run Number of records of type 17 = slowReadout = 1
Run Number of records of type 11 = configurationEnd = 3
Run Time = 36 sec, averaged event rate = 45 Hz

Cfg RcdHeader::print() Record Time = 11:20:14:330:989 Thu Jan 17 2008, Type = 2 = configurationStart
Cfg RcdCount::print() Total number of records = 234
Cfg Number of records of type 2 = configurationStart = 1
Cfg Number of records of type 3 = acquisitionStart = 1
Cfg Number of records of type 4 = trigger = 116
Cfg Number of records of type 5 = event = 116
Cfg Time = 2 sec, averaged event rate = 44 Hz

Acq RcdHeader::print() Record Time = 11:20:14:333:821 Thu Jan 17 2008, Type = 3 = acquisitionStart
Acq RcdCount::print() Total number of records = 233
Acq Number of records of type 3 = acquisitionStart = 1
Acq Number of records of type 4 = trigger = 116
Acq Number of records of type 5 = event = 116
Acq Time = 2 sec, averaged event rate = 44 Hz

Last RcdHeader::print() Record Time = 11:20:14:333:821 Thu Jan 17 2008, Type = 3 = acquisitionStart
Last RcdHeader::print() Record Time = 11:20:16:951:295 Thu Jan 17 2008, Type = 5 = event

Trigger, event: instantaneous rates = 45 Hz, 45 Hz
```

# *Electronic Logbook - ELOG*

- ELOG package by Stefan Ritt
  - <http://midas.psi.ch/elog/>
- Has been used for ATLAS TDAQ commissioning
- Easy to configure, easy to use weblog.
- Automatic entries can be made via command line client application, 'elog'
- Dedicated server, 'elogd' does not require any other Web server.
- Entries can be viewed, edited with any web browser.
- RunLogger module has been developed to log entries at 'runStart' and 'runEnd' transitions

# ELOG entries created automatically

ELOG RPC - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://localhost:8080/RPC/?last=7

Atlas Collaboration ELOG RPC

demo dhcal RPC

DHCAL RPC Development, Page 1 of 2

New | Find | Select | Import | Config | Help

Full | Summary | Threaded Last week -- Type -- 31 Entries

Goto page 1, 2 Next All

ID	Date	Author	Type	Category	Subject	Text
55	Wed Jan 16 16:00:35 2008	jls	Routine	General	runEnd	End dhcCosmics run200031. 30000 events
54	Wed Jan 16 16:00:30 2008	jls	Routine	General	runStart	Start dhcCosmics run200031.
53	Wed Jan 16 16:00:29 2008	jls	Routine	General	runEnd	End dhcQinj run200030. 2000 events
52	Wed Jan 16 15:59:44 2008	jls	Routine	General	runStart	Start dhcQinj run200030.
51	Wed Jan 16 15:59:07 2008	jls	Routine	General	runEnd	End dhcCosmics run200029. 30000 events
50	Wed Jan 16 15:59:02 2008	jls	Routine	General	runStart	Start dhcCosmics run200029.
49	Wed Jan 16 15:59:01 2008	jls	Routine	General	runEnd	End dhcQinj run200028. 639 events
48	Wed Jan 16 15:58:46 2008	jls	Routine	General	runStart	Start dhcQinj run200028.
47	Wed Jan 16 15:57:16 2008	jls	Routine	General	runEnd	End dhcCosmics run200027. 30000 events
46	Wed Jan 16 15:57:12 2008	jls	Routine	General	runStart	Start dhcCosmics run200027.
45	Tue Jan 15 16:32:55 2008	jls	Routine	General	runEnd	End crcNoise run200026. 28513 events
44	Tue Jan 15 16:32:16 2008	jls	Routine	General	runStart	Start crcNoise run200026.
43	Tue Jan 15 16:19:12 2008	jls	Routine	General	runEnd	End dhcQinj run200025. 500 events
42	Tue Jan 15 16:19:00 2008	jls	Routine	General	runStart	Start dhcQinj run200025.
41	Tue Jan 15 16:14:38 2008	jls	Routine	General	runStart	Start dhcQinj run200024.
40	Tue Jan 15 16:01:56 2008	ils	Routine	General	runEnd	End dhcTest run200023. 500 events

Done

## Entries may be edited with browser

ELOG RPC - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://localhost:8080/RPC/55?cmd=Edit Go

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### DHCAL RPC Development

ELOG

Submit Preview Back

Fields marked with \* are required

Entry time: Wed Jan 16 16:00:35 2008

Author\*: jls

Type\*: Routine

Category: General Add Category

Subject: runEnd

**B** *I* U FONT SIZE COLOR

End dhcCosmics run200031. 30000 events

Done

## Tasks Remaining

- Test HAL modules
  - DhcVmedevice, TtmVmedevice
- Configuration Issues
  - finalize list of defined actions and settings for standard run types
  - provide interface to load commonly changed parameters via external file
    - *type of file? flat text, XML*
  - integrate SQLite database access
- Data file conversion applications
  - convert data files to formats currently used for offline analysis