

# Calo Layer-1 Online Software

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# CaloL1 SWATCH

## Cell

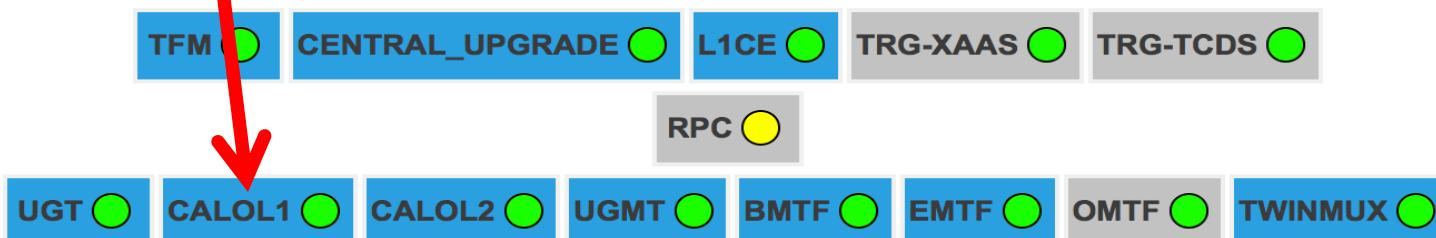
# CaloL1 and Online SW

- Make sure you have a tunnel set up to access .cms pages
  - See RCT Twiki:  
[https://twiki.cern.ch/twiki/bin/view/CMS/RCTOps#Accessing\\_Online\\_Cluster\\_Webpage](https://twiki.cern.ch/twiki/bin/view/CMS/RCTOps#Accessing_Online_Cluster_Webpage)
- The L1 Page (<http://l1page.cms/main/FirstPage>) shows an overview of the status of the CALOL1 swatch cell
  - Blue rectangle: in global, gray rectangle: in local
  - To access the CALOL1 cell, click on CALOL1

## Run 268536 - Running

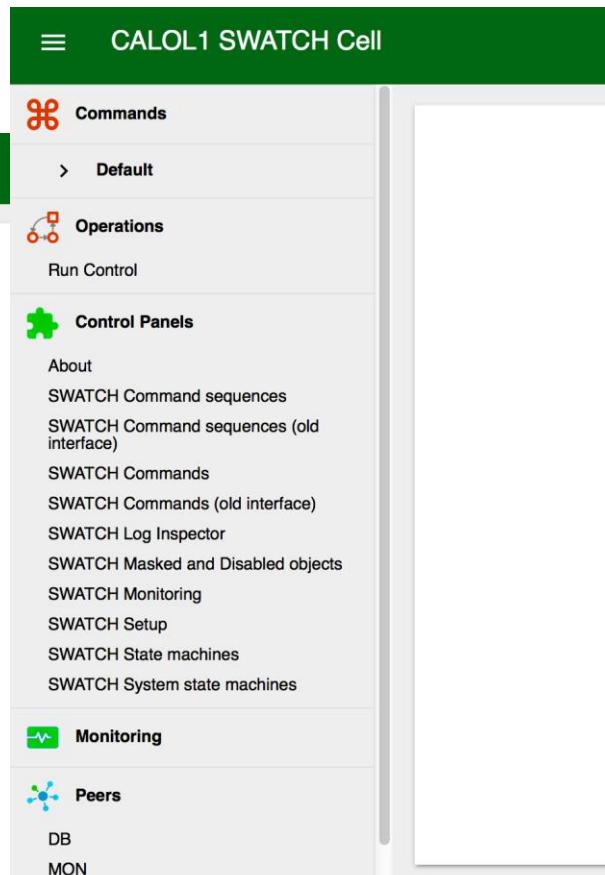
I1\_hlt\_circulating2016/v9 - UN\_INITIALIZED - UN\_INITIALIZED

1 h, 36 min, 48 sec - 0.0 Hz



# CaloL1 swatch cell

- When the swatch cell initially loads on your browser it will usually appear unhelpful



- By clicking the left bar, options will appear to monitor the stats of the cell or change configurations

- Operations → Run Control
- Control Panels → Host of selections

# Operations/Run Control

- Click Operations → Run Control
- Run Control displays current config.
  - Bold shows current State of the cell along with available Transitions that can be executed from that State
  - Any error messages (or success notifications) from the previous transition will be printed below

CALOL1 SWATCH Cell

Commands

> Default

Operations

Run Control

**RUNNING** 

PAUSE STOP RESET

T = 7000ms last: 5s ago

C

Successfully completed system FSM transition 'start!'

Configuration Key (string)  
CALOL1\_Base\_Key

FED Map (string)  
0&0%1&0%2&0%3&0%4&0%5&0%6&0%7&0%8&0%9&0%10&0%11&0%12&0%13&0%14&0%15&0%16&0%17&0%18&0%19&0%20&0%21&0%22&0%23&0%24&0%25&0%26&0%27&0%28&0%29&0%30&

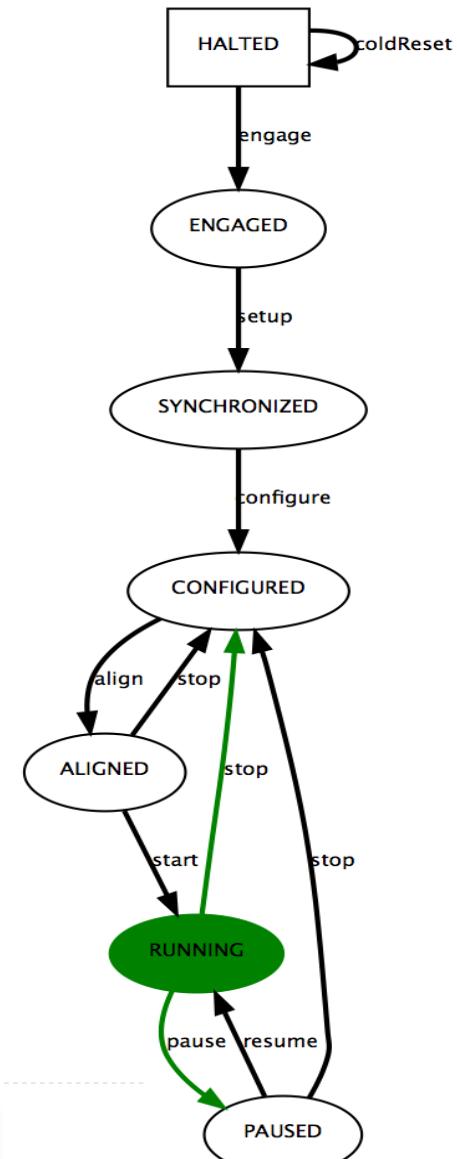
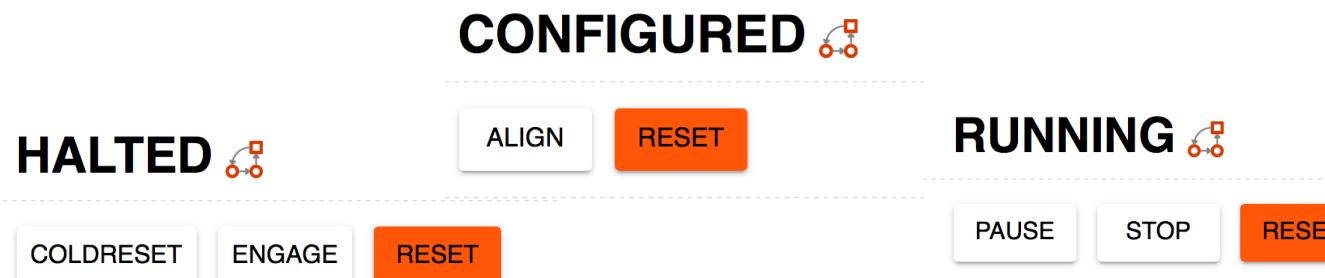
Run Number (unsigned long)  
268565

Run Settings Key (string)  
CALOL1Base\_rs/v1

TTC Map (string)  
{HO=0, LTC\_TRG=0, LPM\_RPC=0, EE+=3, EE-=3, CALSTAGE1=0, CALTRIGUP=3, MUTFUP=3, LPM\_HCAL=0, TIBTID=0, DT+=0, LPM\_CSC=0, DT-=0, DT0=0, LPM\_BRIL=0,

# CaloL1 States / Transitions

- The CaloL1 swatch cell is always in a defined State or making a transitions from 1 defined State to another State
- See the schematic to the right for a diagram of:
  - States in ovals / rectangles
  - Transitions as arrows connecting various States
- Click flow chart button next to state to see this diagram



# Operations/Run Control

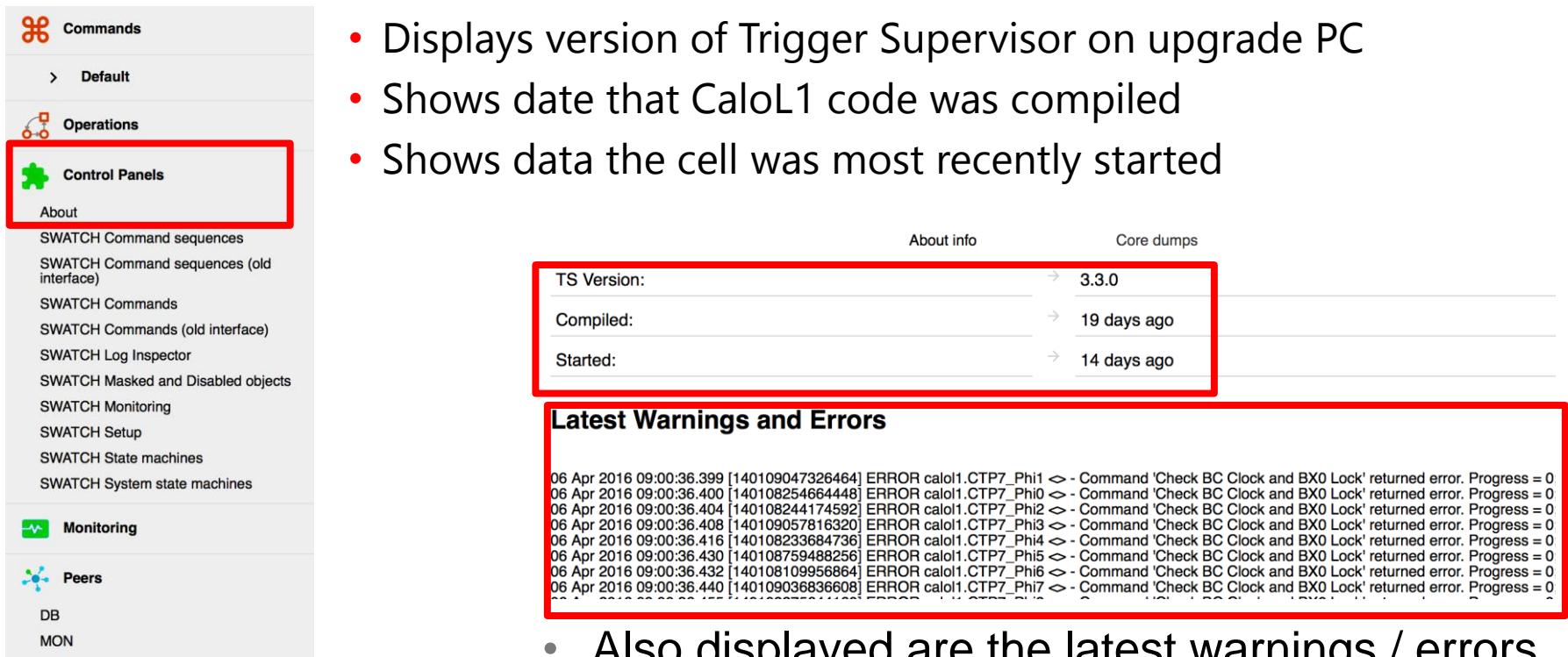
The settings used for the current run are displayed here:

- Configuration Key (more in DB section)
- The FED Map representing the included/excluded subsystems and their components
- Current run Number
- Run Settings Key (this is associated with link and tower masking, more later)

Configuration Key (string)
CALOL1_Base_Key
FED Map (string)
0&0%1&0%2&0%3&0%4&0%5&0%6&0%7&0%8&0%9&0%10&0%11&0%12&0%13&0%14&0%15&0%16&0%17&0%18&0%19&0%20&0%21&0%22&0%23&0%24&0%25&0%26&0%27&0%28&0%29&0%30&
Run Number (unsigned long)
268565
Run Settings Key (string)
CALOL1Base_rs/v1
TTC Map (string)
{HO=0, LTC_TRG=0, LPM_RPC=0, EE+=3, EE-=3, CALSTAGE1=0, CALTRIGUP=3, MUTFUP=3, LPM_HCAL=0, TIBTID=0, DT+=0, LPM_CSC=0, DT-=0, DT0=0, LPM_BRIL=0,

# Control Panels: About

- The most helpful areas for checking the status of our system and debugging potential issues are in the Control Panels left bar
  - “About”



The screenshot shows the Control Panels interface with a red box highlighting the 'About' section. The 'About' section displays the following information:

	About info	Core dumps
TS Version:	→ 3.3.0	
Compiled:	→ 19 days ago	
Started:	→ 14 days ago	

Below the 'About' section is a red box highlighting the 'Latest Warnings and Errors' section, which lists the following errors:

```

06 Apr 2016 09:00:36.399 [140109047326464] ERROR calo1.CTP7_Phi1 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.400 [140108254664448] ERROR calo1.CTP7_Phi0 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.404 [140108244174592] ERROR calo1.CTP7_Phi2 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.408 [140109057816320] ERROR calo1.CTP7_Phi3 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.416 [140108233684736] ERROR calo1.CTP7_Phi4 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.430 [140108759488256] ERROR calo1.CTP7_Phi5 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.432 [140108109956864] ERROR calo1.CTP7_Phi6 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0
06 Apr 2016 09:00:36.440 [140109036836608] ERROR calo1.CTP7_Phi7 <- Command 'Check BC Clock and BX0 Lock' returned error. Progress = 0

```

- Also displayed are the latest warnings / errors

# Control Panels: Log Inspector

- The most helpful areas for checking the status of our system and debugging potential issues are in the Control Panels left bar
  - “Log Inspector”



**SWATCH Log Inspector**

**Loggers**  
[calo1\\_swatch\\_trigger.cms.l1ts-calo1.p:3333.calo1::Cell.instance\(21\)](#)

**Messages**

```

Wed Apr 6 11:23:07 2016 : CTP7_Phi5 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : CTP7_Phi0 > Finished command 'TMT Cycle Config'
Wed Apr 6 11:23:07 2016 : CTP7_Phi0 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : CTP7_Phi6 > Finished command 'TMT Cycle Config'
Wed Apr 6 11:23:07 2016 : CTP7_Phi6 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : CTP7_Phi11 > Finished command 'TMT Cycle Config'
Wed Apr 6 11:23:07 2016 : CTP7_Phi11 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : CTP7_Phi13 > Finished command 'TMT Cycle Config'
Wed Apr 6 11:23:07 2016 : CTP7_Phi13 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : CTP7_Phi15 > Finished command 'TMT Cycle Config'
Wed Apr 6 11:23:07 2016 : CTP7_Phi15 > Finished transition 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : Finished system action 'stop'. Entering state 'Configured'
Wed Apr 6 11:23:07 2016 : create_3_AMC13 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi16 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi0 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi14 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi4 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi13 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi6 > Finished action 'stop'
Wed Apr 6 11:23:07 2016 : CTP7_Phi17 > Finished action 'stop'

```

# Control Panels: Masked and Disabled

- The most helpful areas for checking the status of our system and debugging potential issues are in the Control Panels left bar
  - “Masked and Disabled Objects”



**SWATCH masks and enable panel**

**Masking and disabling console**

FED Enable Mask:  Apply Dynamic Masks

Message

Disabled objects - Full List

**Masked Objects - Full List**

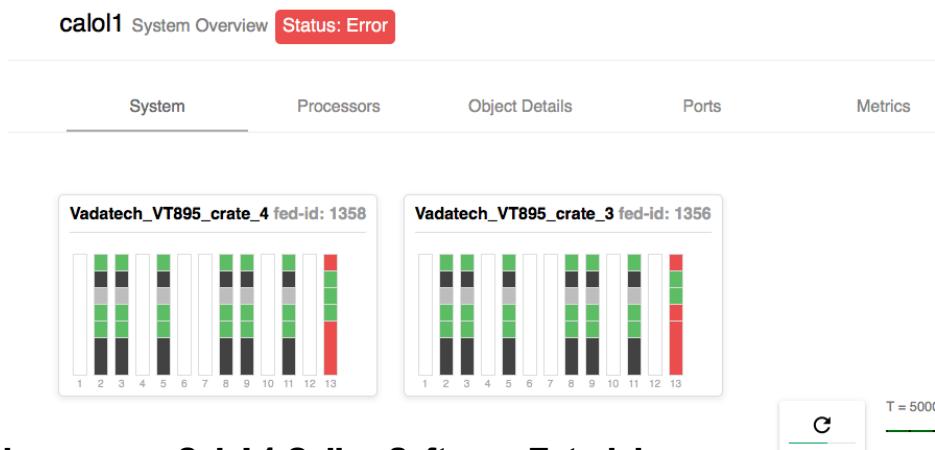
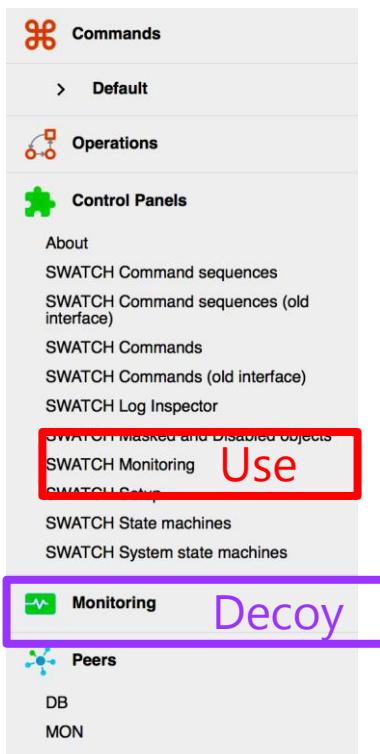
```
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_00
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_01
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_02
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_03
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_04
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_05
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_06
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_07
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_08
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_09
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_10
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_11
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_12
calo1.CTP7_Phi0.inputPorts.Pos_HCAL_LINK_13
calo1.CTP7_Phi0.inputPorts.Pos_HF_LINK_00
calo1.CTP7_Phi0.inputPorts.Pos_HF_LINK_01
calo1.CTP7_Phi0.inputPorts.Neg_HCAL_LINK_00
calo1.CTP7_Phi0.inputPorts.Neg_HCAL_LINK_01
```

# Control Panels: Monitoring

- The most helpful areas for checking the status of our system and debugging potential issues are in the Control Panels left bar

- “Monitoring”

- Monitoring provides a range of views of the system
- Default view is broken down by crate showing 6 CTP7s per crate in their associated hardware slot along with the crate's AMC13
  - For detailed information on each and the associated color coding you can scroll down...



# Control Panels: Monitoring

- Detailed Crate View and per-card summary seen by scrolling down from default view and expanding on of the “Processor Vadatech\_VT895\_crate\_X” crates by clicking on it

⌘ **Commands**

- > Default

⌚ **Operations**

⚙️ **Control Panels**

- About
- SWATCH Command sequences
- SWATCH Command sequences (old interface)
- SWATCH Commands
- SWATCH Commands (old interface)
- SWATCH Log Inspector

⌚ **SWATCH Masked and Disabled Objects**

⌚ **SWATCH Monitoring** Use

⌚ **SWATCH Setup**

⌚ **SWATCH State machines**

⌚ **SWATCH System state machines**

📈 **Monitoring**

-Decoy

🌐 **Peers**

DB

MON

Processors Vadatech\_VT895\_crate\_3 ▾

Processor ID	Slot	Status					
CTP7_Phi3	2	Unknown	Good	Unknown	NoLimit	Good	Good
CTP7_Phi4	3	Unknown	Good	Unknown	NoLimit	Good	Good
CTP7_Phi5	5	Unknown	Good	Unknown	NoLimit	Good	Good
CTP7_Phi6	8	Unknown	Good	Unknown	NoLimit	Good	Good
CTP7_Phi7	9	Unknown	Good	Unknown	NoLimit	Good	Good
CTP7_Phi8	11	Unknown	Good	Unknown	NoLimit	Good	Good

TTC / DAQ ▾

AMC13 ID	Crate	Status	ttc	evb	slinkXp0	amcports
crate_4_AMC13	Vadatech_VT895_crate_4	Error	Error	Good	Good	Good
crate_3_AMC13	Vadatech_VT895_crate_3	Error	Error	Good	Good	Error
crate_2_AMC13	Vadatech_VT895_crate_2	Error	Error	Good	Good	Good

Internal Links ▾

# Control Panels: Monitoring

- For a detailed Processor view, click “Object Details” along the top, and select the processor of interest from the drop down
- Clicking any link (represented as a square under Input/Output Ports) or title under “Monitorables” will bring you to a more detailed view of that object

calo1 Component view Status: Error

System	Processors	Object Details	Ports	Metrics
Selected object CTP7_Phi3	Component Status: Unknown Monitoring: Enabled	Monitors	Stub Info Path: calo1.CTP7_Phi3 Hardware type: CTP7 Role: Layer1Processor Creator: calo1::CTP7Processor URI: 3 Address table: amc-s2e10-46-02 Crate: Vadatech_VT895_crate_2 Slot: 2	T = 5000ms last: 3s ago
	Input ports	ttc readout algo inputPorts outputPorts		
	Output ports			
		Current action: No running actions		

CTP7\_Phi3 ▾ Monitoring: Enabled

ttc ▾ Monitoring: Enabled

readout ▾ Monitoring: Enabled

algo ▾ Monitoring: Enabled

inputPorts ▾ Monitoring: Enabled

outputPorts ▾ Monitoring: Enabled

# Control Panels: Monitoring

- “Ports”
  - A scrollable display of all of our input ports can be easily seen by click Ports
  - The view is broken down by CTP7 iPhi region
  - Again, clicking on any port (box) will take you to a detailed view of the associated metrics with that link

calo1 Ports Summary Status: Unknown

System Processors Object Details Ports Metrics

T = 5000ms last: 5s ago

Input Ports		Output Ports	
CTP7_Phi0			
Input Ports	██████████	██████████	██████████
Output Ports	██████████	██████████	██████████
CTP7_Phi1			
Input Ports	██████████	██████████	██████████
Output Ports	██████████	██████████	██████████
CTP7_Phi2			
Input Ports	██████████	██████████	██████████
Output Ports	██████████	██████████	██████████
CTP7_Phi3			
Input Ports	██████████	██████████	██████████
Output Ports	██████████	██████████	██████████

**Input Port Details** Click link for details

Monitoring: Enabled

Port ID	Monitoring	Masked Tower Mask	BX0 Errors	Checksum Errors	crcErrors	isAligned	isLocked
Pos_ECAL_LINK_00	Good	Enabled	False	0	0	0	True
Pos_ECAL_LINK_01	Good	Enabled	False	0	0	0	True
Pos_ECAL_LINK_02	Good	Enabled	False	0	0	0	True
Pos_ECAL_LINK_03	Good	Enabled	False	0	0	0	True
Pos_ECAL_LINK_04	Good	Enabled	False	0	0	0	True

A red arrow points from the “Input Port Details” section to the “Monitoring” column of the table.

# Control Panels: Monitoring

- Object Details → AMC13 details
- Some important details can be found here:
  - Is the CaloL1 system experiencing back pressure from other systems?
  - Error counters for TTC related metrics
    - Some error conditions are not well chosen for CaloL1. In particular, a handful of bc0Errors isn't worrying

ttc

Monitoring: Enabled

Metric ID	Value	Last updated (UTC)	Monitoring	Error Condition	Warning Condition
resyncCount	1090519040	2016-04-08 08:00:46	Enabled	N/A	N/A
ttcDoubleBitErrors	0	2016-04-08 08:00:46	Enabled	> 0	N/A
ttcSingleBitErrors	0	2016-04-08 08:00:46	Enabled	> 0	N/A
bc0Errors	0	2016-04-08 08:00:46	Enabled	> 0	N/A
bc0Counter	61296	2016-04-08 08:00:46	Enabled	N/A	N/A
clkFreq	40079000	2016-04-08 08:00:46	Enabled	< 3.99e+07 or > 4.01e+07	N/A

Selected object: crate\_2\_AMC13

Component Status: Good

Monitoring: Enabled

AMC ports: [green icons]

Monitorables:

- ttc
- eVB
- slinkXp0
- amcports

Current action: No running actions

T = 5000ms last: 4s ago

Stub Info

Path	calol1(crate_2_AMC13)
FedId	1354
Role	Layer1DAQTT
Creator	swatch::amc13::AMC13Manager
URI_T1	chttp-2.0://ctrl-s2c16-10-01:10203?target=amc-s2e10-46-13-11:50001
URI_T2	chttp-2.0://ctrl-s2c16-10-01:10203?target=amc-s2e10-46-13-12:50001
T1 address table	file:///opt/cactus/etc/amc13/AMC13XG_T1.xml
T2 address table	file:///opt/cactus/etc/amc13/AMC13XG_T2.xml
Crate	Vadatech_VT895_crate_2

Monitoring: Enabled

slinkXp0

Metric ID	Value	Last updated (UTC)	Monitoring	Error Condition	Warning Condition
packetsSent	0	2016-04-08 08:01:47	Enabled	N/A	N/A
words	0	2016-04-08 08:01:47	Enabled	N/A	N/A
eventsSent	0	2016-04-08 08:01:47	Enabled	N/A	N/A
wordsSent	0	2016-04-08 08:01:47	Enabled	N/A	N/A
events	0	2016-04-08 08:01:47	Enabled	N/A	N/A
backPressureTime	0	2016-04-08 08:01:47	Enabled	N/A	N/A
linkUp	true	2016-04-08 08:01:47	Enabled	N/A	== 0
packetsReceived	1	2016-04-08 08:01:47	Enabled	N/A	N/A
initialized	true	2016-04-08 08:01:47	Enabled	== 0	N/A
backPressure	false	2016-04-08 08:01:47	Enabled	N/A	== 1
revision	1578106881	2016-04-08 08:01:47	Enabled	N/A	N/A

# Control Panels: Input Port Details

Input Port Details is where we will do the majority of our diagnosing

- Tower Mask: hex number specifying which towers are masked (more later)
- BX0 Errors: Number of mismatches between bunch crossing zero signal received on the link, and that propagated by TTC (40 MHz)
- Checksum Errors: number of times the link received the wrong information
- crc Errors: ignore for now
- isAligned: did the link align initially?
- isLocked: is the link currently locked and in sync?
- Everything should always be green.
- O(a few) Checksum/BX0 errors will not cause an alarm
  - “warning” at 1000
  - “error” at 5000

Input Port Details									
Monitoring: Enabled									
Port ID	Status	Monitoring	Masked Tower Mask	BX0 Errors	Checksum Errors	crcErrors	isAligned	isLocked	
Pos_ECAL_LINK_00	Good	Enabled	False	0	0	0	true	true	
Pos_ECAL_LINK_01	Good	Enabled	False	0	0	0	true	true	
Pos_ECAL_LINK_02	Good	Enabled	False	0	0	0	true	true	
Pos_ECAL_LINK_03	Good	Enabled	False	0	0	0	true	true	
Pos_ECAL_LINK_04	Good	Enabled	False	0	0	0	true	true	

# Run Settings and Masking

# SWATCH Database

- Configuration parameters, run settings, and masks are set in the online database
- Keys select one or more modules specifying parameters
- Modules are stored as xml files
  - To change a parameter or mask, download the xml file, edit it, upload it as a new module, and make a new key
  - ... and tell the L1DOC to use your new key
  - ... and put it on [this TWiki](#)
- Make changes via the Level 1 Configuration Editor (L1CE)
  - From L1 Page, click DataBase→L1 Configuration Editor
- Hardware is described in a JSON format (hopefully will never change)

# Tables (types of keys/modules)

- **CALOL1\_RS**
  - Run settings, including masks
- **CALOL1\_RS\_KEYS**
  - Keys that specify which CALOL1\_RS files to use
- **CALOL1\_ALGO**
  - Not currently used. Will eventually contain LUTs
- **CALOL1\_HW**
  - Hardware description (JSON)
- **CALOL1\_INFRA**
  - Configuration parameters that should be transferred offline
- **CALOL1\_KEYS**
  - Specify ALGO, HW, and INFRA files to use

# Parameter XML Example

```
<infra id="calo1">  
  <context id="processors">  
    <param id="alignBX" type="uint">54</param>  
    <param id="alignSubBX" type="uint">4</param>  
    <param id="DAQDelayLineDepth" type="uint">435</param>  
    <param id="tmtCycleConfig" type="uint">0</param>  
    <param id="exampleVector" type="vector:uint">0, 1, 2</param>  
  </context>  
  <context id="daqttcs">  
    <param id="bcnOffset" type="uint">3433</param>  
    <param id="slinkMask" type="uint">1</param>  
    <param id="localTTC" type="bool">false</param>  
    <param id="ocrCmd" type="uint">8</param>  
    <param id="resyncCmd" type="uint">4</param>  
  </context>  
</infra>
```

# Parameter XML Example

```

<infra id="calo1">
  <context id="processors">
    <param id="alignBX" type="uint">54</param>
    <param id="alignSubBX" type="uint">4</param>
    <param id="DAQDelayLineDepth" type="uint">435</param>
    <param id="tmtCycleConfig" type="uint">0</param>
    <param id="exampleVector" type="vector:uint">0, 1, 2</param>
  </context>
  <context id="daqttcs">
    <param id="bcnOffset" type="uint">3433</param>
    <param id="slinkMask" type="uint">1</param>
    <param id="localTTC" type="bool">false</param>
    <param id="ocrCmd" type="uint">8</param>
    <param id="resyncCmd" type="uint">4</param>
  </context>
</infra>

```

Type of module: infra, algo, or run-settings
  
id: name of system ("calo1")

# Parameter XML Example

```

<infra id="calo1">
  <context id="processors">
    <param id="runNumber" type="uint">999999</param>
    <param id="alignBX" type="uint">54</param>
    <param id="alignSubBX" type="uint">4</param>
    <param id="DAQDelayLineDepth" type="uint">1</param>
    <param id="tmtCycleConfig" type="uint">1</param>
  </context>
  <context id="daqttcs">
    <param id="bcnOffset" type="uint">3433</param>
    <param id="slinkMask" type="uint">1</param>
    <param id="localTTC" type="bool">false</param>
    <param id="ocrCmd" type="uint">8</param>
    <param id="resyncCmd" type="uint">4</param>
  </context>
</infra>

```

Context id: which objects this applies to

- “processors” for all CTP7s
- “daqttcs” for all AMC13s
- Specify individual processors by name, e.g. “CTP7\_Phi2” for the CTP7 at RCTPhi=2 or “crate\_3\_AMC13” for the AMC13 in crate 3

# Parameter XML Example

```

<infra id="calo1">
  <context id="processors">
    <param id="alignBX" type="uint">54</param>
    <param id="alignSubDx" type="uint">4</param>
    <param id="eDepth" type="uint">435</param>
    <param id="fig" type="uint">0</param>
    Type: may be "int", "uint", "bool",
    "float", or "string"
    <param id="exampleVector" type="vector:uint">0, 1, 2</param>
  </context>
  <context id="daqttcs">
    <param id="bcnOffset" type="uint">3433</param>
    <param id="slinkMask" type="uint">1</param>
    <param id="localTTC" type="bool">false</param>
    <param id="ocrCmd" type="uint">8</param>
    <param id="resyncCmd" type="uint">4</param>
  </context>
</infra>

```

Parameter id: name of parameter

A vector of any other type is specified "vector:type", and its values are comma-separated

# Parameter Miscellany

- LUTs use the table type, detailed [here](#)
- If multiple commands have parameters with the same name, they can be differentiated with the “cmd” subtag
  - <param id=“varName” cmd=“commandName” type=...>
- Each XML can only have one module, but can have multiple contexts
- Full XML file documentation [here](#)

# Link Masking

- Link masks are specified in XML modules similar to the parameter files
- Specify which CTP7 via the context, and the individual link by name (example on next slide)
- If you forget the syntax, the base link mask module CALOL1\_RS/StaticLinkMask has several examples as comments
- Masking a link zeros its TPs, disables its monitoring, and allows the trigger to configure even though it's bad
- The error message in the CaloL1 cell (also sent to DAQ) says exactly which link(s) failed

# Link Mask XML Example

```
<run-settings id="calo1">  
  <context id="CTP7_Phi0">  
    <mask id="inputPorts.Pos_ECAL_LINK_10" />  
  </context>  
  <context id="CTP7_Phi7">  
    <mask id="inputPorts.Neg_HCAL_LINK_11" />  
    <mask id="inputPorts.Neg_HF_LINK_00" />  
  </context>  
</run-settings>
```

# Link Mask XML Example

```
<run-settings id="calo1">
  <context id="CTP7_Phi0">
    <mask id="inputPorts.Pos_ECAL_LINK_10" />
  </context>
  <context id="CTP7_Phi7">
    <mask id="inputPorts.Neg_HCAL_LINK_11" />
    <mask id="inputPorts.Neg_HF_LINK_00" />
  </context>
</run-settings>
```

Masks are always run-settings modules

CTP7(s) specified as in parameter files

# Link Mask XML Example

```

<run-settings id="calo1">
  <context id="CTP7_Phi0">
    <mask id="inputPorts.Pos_ECAL_LINK_10" />
  </context>
  <context id="CTP7_Phi7">
    <mask id="inputPorts.Neg_HCAL_LINK_11" />
    <mask id="inputPorts.Neg_HF_LINK_00" />
  </context>
</run-settings>

```

"inputPorts" specifies the type of object to mask (input link)

Positive or negative eta

Which calorimeter ("ECAL", "HCAL", or "HF")

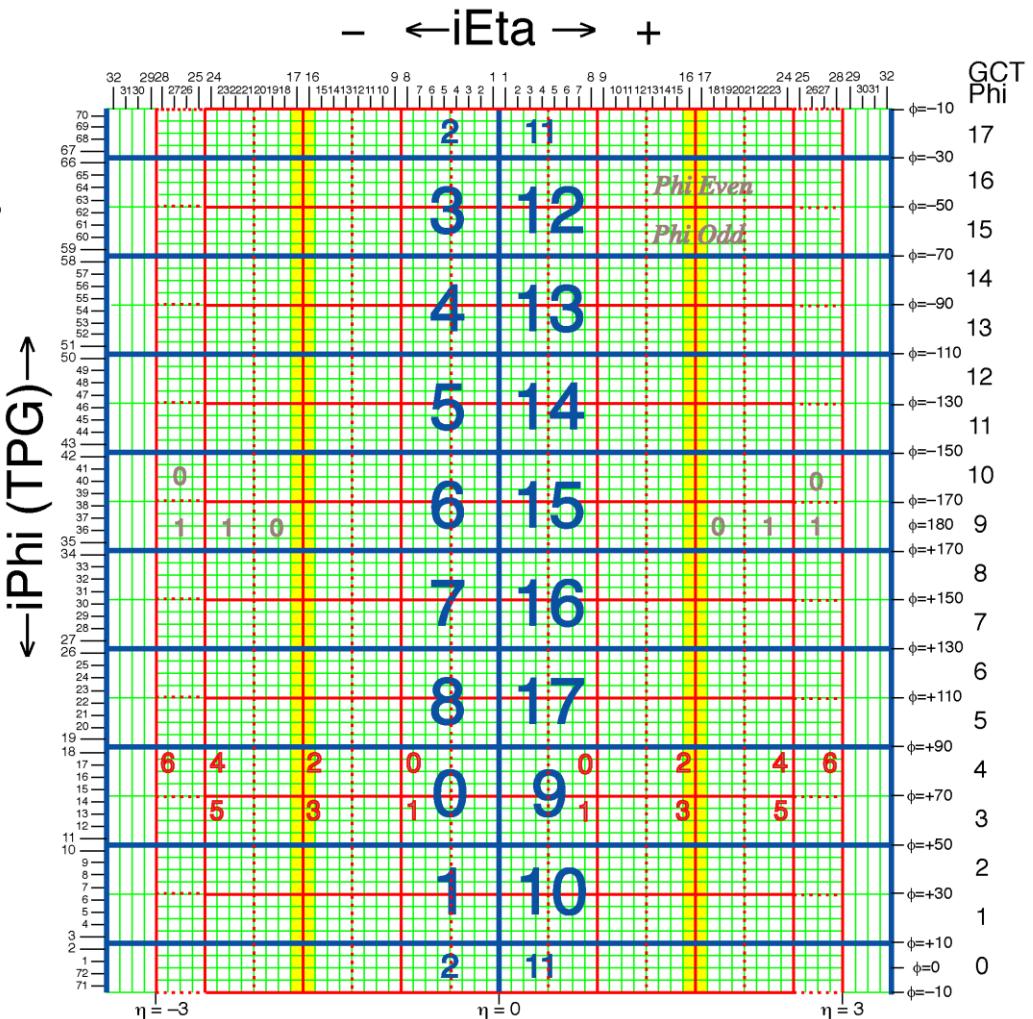
Specific link  
 ECAL: 00-15  
 HCAL: 00-13  
 HF: 00-01  
 Note leading 0!

# Tower Masking

- Maybe some day SWATCH will have a unified system for tower masking. Until then, masks are passed as parameters
- Each link's mask is an 8-bit (ECAL/HCAL) or 11-bit (HF) number where each bit is one tower
  - ... except for ECAL links 8, 9, 11, and 12, which cover only 4
- Overall mask for a CTP7 is two vectors of 32 unsigned ints
  - One for +eta, one for -eta
  - 16 ECAL links, then 14 HCAL links, then 2 HF links
- Reminder: calo tower map [here](#)

# Reminder: Calo Tower Map

- CTP7 specified by “GCT Phi”
- Tower specified by iEta (plus or minus), iPhi
- Ignore blue, red, and gray numbers



# ECAL Link/Tower Mapping

	ECAL Link															
iPhi offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
y+3	3	7	3	7	3	7	3	7	3	7	3	7	3	7	3	7
y+2	2	6	2	6	2	6	2	6	2	6	2	6	2	6	2	6
y+1	1	5	1	5	1	5	1	5	1	5	1	5	1	5	1	5
y+0	0	4	0	4	0	4	0	4	0	4	0	4	0	4	0	4
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	iEta	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14

Note pairs of 4-tower links  
 Links 9 and 13 still use towers 4-7

# HCAL Link/Tower Mapping

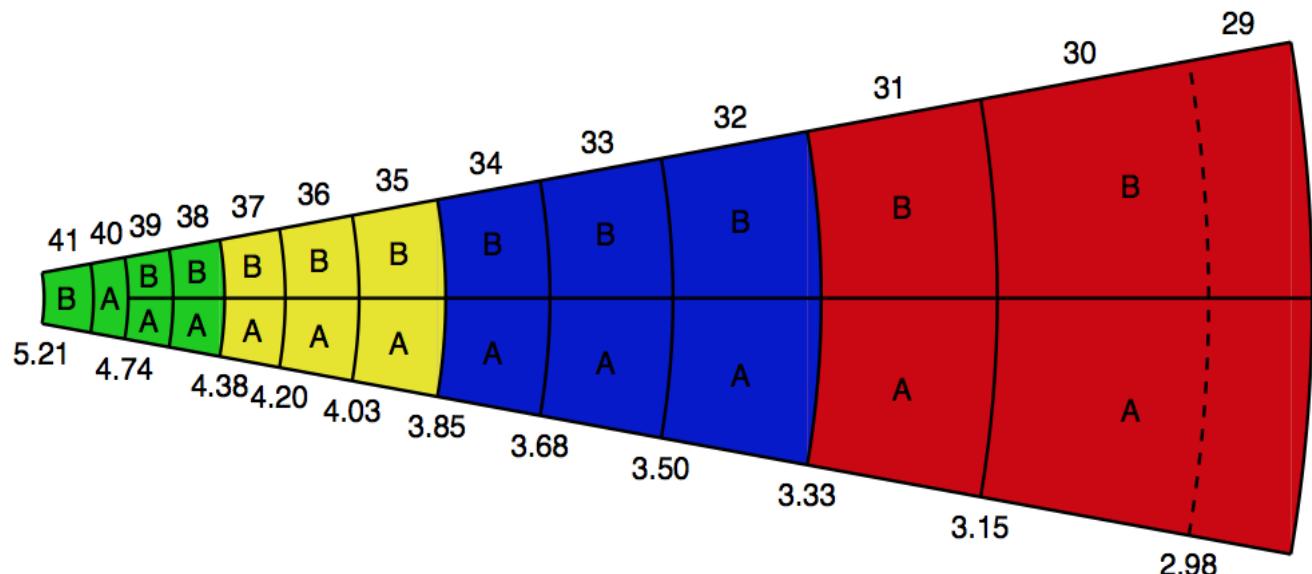
	HCAL Link													
iPhi offset	0	1	2	3	4	5	6	7	8	9	10	11	12	13
y+3	3	7	3	7	3	7	3	7	3	7	3	7	3	7
y+2	2	6	2	6	2	6	2	6	2	6	2	6	2	6
y+1	1	5	1	5	1	5	1	5	1	5	1	5	1	5
y+0	0	4	0	4	0	4	0	4	0	4	0	4	0	4
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
iEta														

HCAL links are the 16<sup>th</sup>-29<sup>th</sup> items in the vector of tower masks  
 So HCAL link 7 is vector entry 23

# HF Link/Tower Mapping

- 30<sup>th</sup> and 31<sup>st</sup> entries in vector
  - Link 0 (30): A, link 1 (21): B
- 11 bits each

Bit	iEta
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
10	40(A)/41(B)



# Tower Mask XML Example 1

- Beam splash mask with all towers masked except  $i\text{Eta} = \pm 1$

```

<run-settings id="calol1">
  <context id="processors">
    <param id="towerMaskPosEta" type="vector:uint">0xF0,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0x7FF, 0x7FF</param>

    <param id="towerMaskNegEta" type="vector:uint">0xF0,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,
    0xFF, 0xFF, 0x7FF, 0x7FF</param>
  </context>
</run-settings>

```

# Tower Mask XML Example 2

- Mask ECAL tower at iEta=-12, iPhi=53

```
<run-settings id="calol1">
  <context id="CTP7_Phi13">
    <param id="towerMaskPosEta" type="vector:uint">0x00,
    0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x000, 0x000</param>
    <param id="towerMaskNegEta" type="vector:uint">0x00,
    0x00, 0x00, 0x00, 0x40, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
    0x00, 0x00, 0x000, 0x000</param>
  </context>
</run-settings>
```

# Tower Mask XML Example 2

- Mask ECAL tower at iEta=-12, iPhi=53

```
<run-settings id="calol1">
    <context id="CTP7_Phi13">
        <param id="towerMaskPosEta" type="vector:uint">0x00,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00</param>
        <param id="towerMaskNegEta" type="vector:uint">0x00,
        0x00, 0x00, 0x00, 0x40, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x00</param>
    </context>
</run-settings>
```

iPhi=53→CTP7\_Phi13

iEta=±12→link 5 (zero-indexed!)

6<sup>th</sup> tower→binary mask 01000000→hex tower mask 0x40

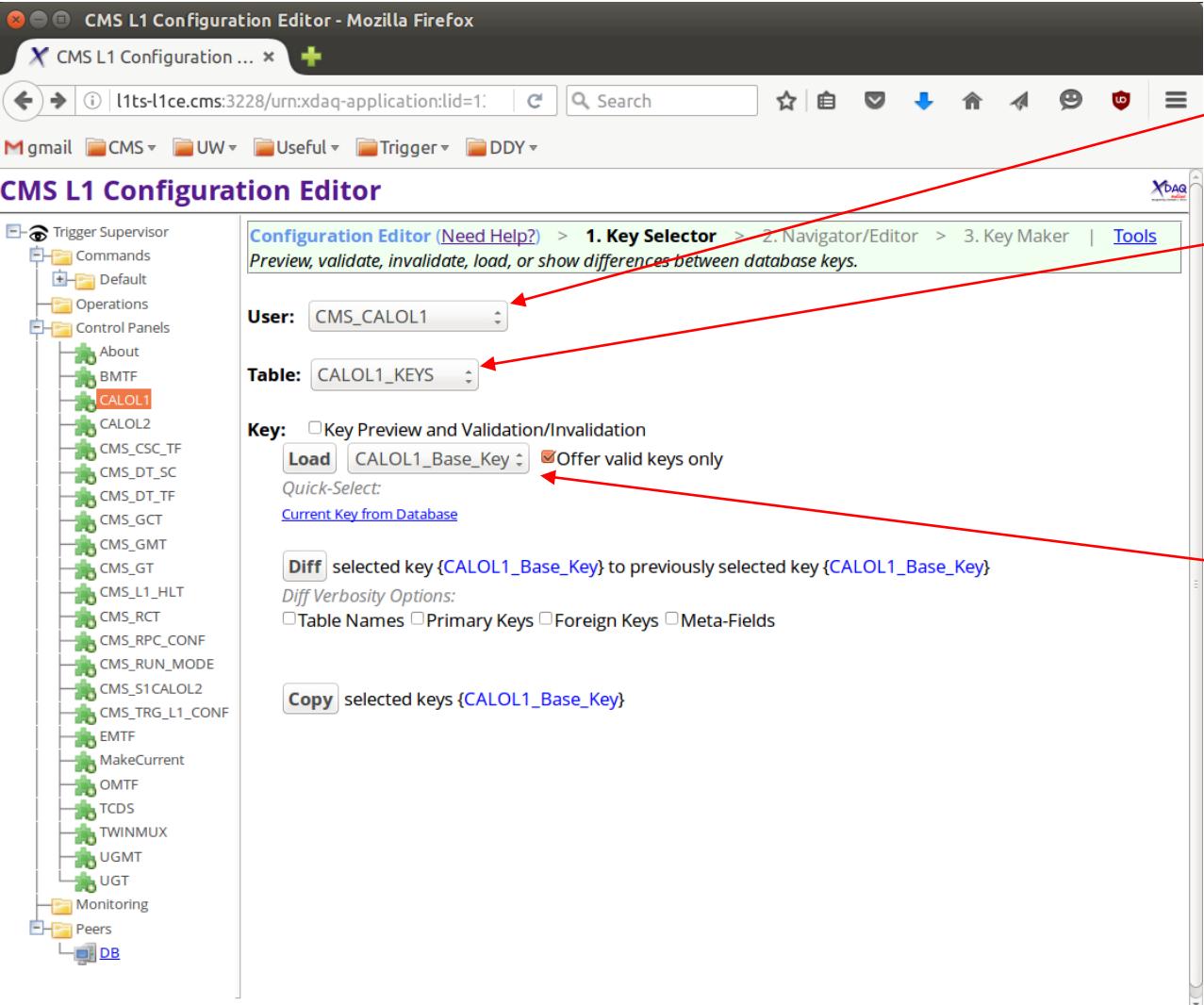
# L1CE

CMS L1 Configuration Editor - Mozilla Firefox

User: CMS\_CALOL1

Table: module type

Select a current key to edit and click load



**CMS L1 Configuration Editor**

Configuration Editor (Need Help?) > 1. Key Selector > 2. Navigator/Editor > 3. Key Maker | Tools

Preview, validate, invalidate, load, or show differences between database keys.

User: CMS\_CALOL1

Table: CALOL1\_KEYS

Key:  Key Preview and Validation/Invalidation  
 CALOL1\_Base\_Key  Offer valid keys only  
 Quick-Select:  
[Current Key from Database](#)

**Diff** selected key (CALOL1\_Base\_Key) to previously selected key (CALOL1\_Base\_Key)  
 Diff Verbosity Options:  
 Table Names  Primary Keys  Foreign Keys  Meta-Fields

**Copy** selected keys {CALOL1\_Base\_Key}

Trigger Supervisor

- Commands
- Default
- Operations
- Control Panels
- About
- BMTF
- CALOL1**
- CALOL2
- CALOL2\_TF
- CMS\_CSC\_TF
- CMS\_DT\_SC
- CMS\_DT\_TF
- CMS\_GCT
- CMS\_GMT
- CMS\_GT
- CMS\_L1\_HLT
- CMS\_RCT
- CMS\_RPC\_CONF
- CMS\_RUN\_MODE
- CMS\_S1CALOL2
- CMS\_TRG\_L1\_CONF
- EMTF
- MakeCurrent
- OMTF
- TCDS
- TWINMUX
- UGMT
- UGT
- Monitoring
- Peers
- DB

# L1CE

CMS L1 Configuration Editor - Mozilla Firefox

l1ts-l1ce.cms:3228/urn:xdaq-application:id=13/Default?\_sessionid=

**Check box to edit**

**Click to save full XML**

**CMS L1 Configuration Editor**

Trigger Supervisor

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- Default
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- BMTF
- CALOL1**
- CALOL2
- CMS\_CSC\_TF
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- CMS\_L1\_HLT
- CMS\_RCT
- CMS\_RPC\_CONF
- CMS\_RUN\_MODE
- CMS\_S1CALOL2
- CMS\_TRG\_L1\_CONF
- EMTF
- MakeCurrent
- OMTF

Configuration Editor (Need Help?) > 1. Key Selector > 2. Navigator/Editor > 3. Key Maker | Tools

Buffer:  Edit

- : StaticLinkMask/v1 [CALOL1\_RS]

Up 1 Level | ← Prev Node | → Next Node | Show Exported

Field	Buffer
ID [CALOL1_RS_KEYS, CALOL1_RS_KEYS]	StaticLinkMask/v1
DESCRIPTION	Static Link Mask
AUTHOR	
CREATION_DATE	2016-03-23T14:46:26.034899Z
CONF	<pre>&lt;run-settings id="calol1"&gt;   &lt;!-- Some static masking examples. Remove comment tags to enable masks. --&gt;   &lt;!-- &lt;context id="CTP7_Phi0"&gt; --&gt;   &lt;!-- &lt;mask id="inputPorts.Neg_ECAL_LINK_09" /&gt; --&gt;   &lt;!-- &lt;mask id="inputPorts.Pos_ECAL_LINK_10" /&gt; --&gt;   &lt;!-- &lt;mask id="inputPorts.Neg_HCAL_LINK_11" /&gt; --&gt;   &lt;!-- &lt;mask id="inputPorts.Pos_HCAL_LINK_12" /&gt; --&gt;</pre> <p><b>Save to File</b></p> <p>Here will appear the download link</p>

# L1CE

CMS L1 Configuration Editor - Mozilla Firefox

l1ts-l1ce.cms:3228/urn:xdaq-application:lid=13/Default?\_sessionid\_=0x7f53ac

**CMS L1 Configuration Editor**

Trigger Supervisor

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  - CMS\_DT\_SC
  - CMS\_DT\_TF
  - CMS\_GCT
  - CMS\_GMT
  - CMS\_GT
  - CMS\_L1\_HLT
  - CMS\_RCT
  - CMS\_RPC\_CONF
  - CMS\_RUN\_MODE
  - CMS\_S1\_CALOL2
  - CMS\_TRG\_L1\_CONF
  - EMTF
  - MakeCurrent
  - OMTF

Configuration Editor (Need Help?) > 1. Key Selector > 2. Navigator/Editor > **3. Key Maker** Tools

Buffer:  Edit **Your name:** Bucky  Auto-Fields  Offer valid keys only

: AnAwesomeMask/v1 [CALOL1\_RS]

Up 1 Level | ← Prev Node | → Next Node | Node is modified. Revert | There are 1 queued changes (1 Buf, 0 Sys). **Flush** | Discard | Show Exported

Field	Buffer
ID	[CALOL1_RS_KEYS, CALOL1_RS_KEYS] AnAwesomeMask/v1
DESCRIPTION	A mask to rock your face!
AUTHOR	Bucky
CREATION_DATE	2016-04-06T16:21:21.563458Z

CONF

```
<run-settings id="calol1">
<!-- Some static masking examples. Remove comment tags to enable masks. -->
<!-- <context id="CTP7_Phi0"> -->
<!-- <mask id="inputPorts.Neg_ECAL_LINK_09"/> -->
<!-- <mask id="inputPorts.Pos_ECAL_LINK_10"/> -->
<!-- <mask id="inputPorts.Neg_HCAL_LINK_11"/> -->
<!-- <mask id="inputPorts.Pos_HCAL_LINK_12"/> -->
```

Browse... awesomeMask.xml Upload File

**Select and upload XML**

**Click "3. Key Maker" to continue**

**Your name and press Enter**

**"Flush" anything typed into the form often**

**Name for module/key**

**Verbose description**

# L1CE

CMS L1 Configuration Editor - Mozilla Firefox

CMS L1 Configuration ... +

l1ts-l1ce.cms:3228/urn:xdaq-application:lid=13/Default?\_sessionid\_=0x7f53ac

Search

Gmail CMS UW Useful Trigger DDY

CMS L1 Configuration Editor

Trigger Supervisor

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  - CMS\_GMT
  - CMS\_GT
  - CMS\_L1\_HLT
  - CMS\_RCT
  - CMS\_RPC\_CONF
  - CMS\_RUN\_MODE
  - CMS\_S1CALOL2
  - CMS\_TRG\_L1\_CONF
  - EMTF
  - MakeCurrent
  - OMTF
  - top

Configuration Editor (Need Help?) > 1. Key Selector > 2. Navigator/Editor > 3. Key Maker | Tools

Create new database key from modified buffer content.

User	Table	Key to Insert	Modifications	Status
CMS_CALOL1	CALOL1_RS	AnAwesomeMask/v1	DESCRIPTION: A mask to rock your face!	Ready to insert

Please authenticate CMS\_CALOL1 with password:



Password can be found in  
/nfshome0/centraltspro/secure/cms\_calol1.txt