

Alarm Handler and BeamLine Monitoring

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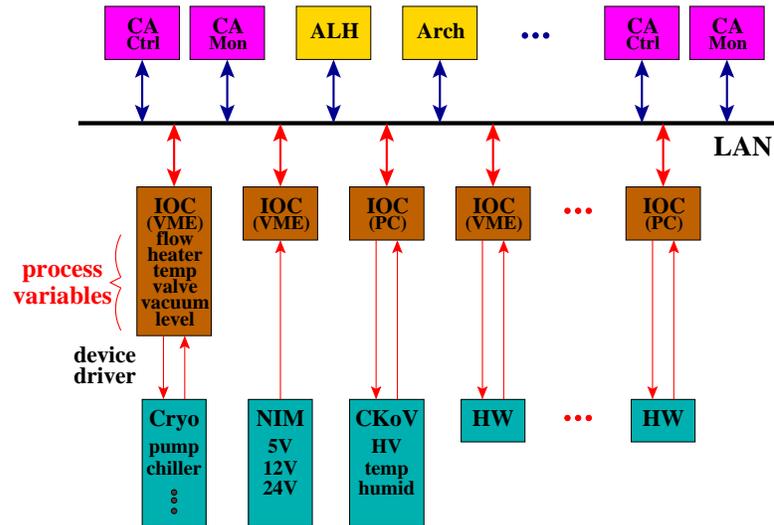
Abstract

This document describes the use of the Alarm Handler and how it is tied to Slow Monitoring of hardware systems using EPICS. No previous knowledge of EPICS is required.

1 Introduction

1.1 Introduction to EPICS

EPICS stands for **E**xperimental **P**hysics and **I**ndustrial **C**ontrols **S**ystems. It is an open source software package which is developed and supported by an international community.



Briefly, EPICS provides a uniform means of connecting to a wide variety of hardware devices, via device drivers which are connected to EPICS support drivers. This connection allows the developer to write IOCs (Input Output Controllers) in which Process Variables, or “PVs” are defined which represent attributes of the device to which the IOC is connected. Examples of PVs might be current, voltage, temperature, pressure, level, etc. The IOCs might be processors in VME crates, linux pcs, windows pcs, etc.

The backbone of the EPICS system is a local area network. All of the IOCs are either directly connected, or connected via a gateway, to the LAN.

The other components of EPICS are **C**hannel **A**ccess clients, or CAs. These are user interfaces to the PVs, and might be of graphical user interfaces, plots, gateways, Alarm Handlers, and Channel Archivers. When a CA is in need of a PV, it broadcasts that need over the LAN; the IOC which has the PV, then answers back and establishes a connection with the CA.

1.2 Alarm Handler Description

The EPICS Alarm Handler is specific type of Channel Access. Its purpose is to monitor the values of selected Process Variables, PVs, and raise alarms if any of their values go out of tolerance. There are four states of interest to the user:

1. Not Connected - this will always show up as white for the device
2. Minor Alarm - this will show up as yellow for the device
3. Major Alarm - this will show up as red for the device
4. Normal - this will show up as whatever color was specified by the designer

An audible alarm is also sounded when a new alarm appears that has not yet been acknowledged.

The alarm limits are set for selected PVs in their IOCs. The Alarm Handler either periodically scans or monitors the value of its PV, compares that value to the limits, and sets an alarm if the value is out of tolerance.

2 Operation

2.1 Starting the Alarm Handler

In the MLCR, the Alarm Handler should always be run from *micecserv*, so as to display it on the large, wall mounted screen. It can also be run from *heplnw17* using the same procedure described below.

Starting the Alarm Handler is accomplished by typing from a command line prompt:

```
alh beamline.alhConfig&
```

This command will start the Alarm Handler which views all elements of the MICE beamline; i.e. the ISIS, Target, Decay Solenoid, D1-D2, Q1-Q9, and eventually beamstop and diffuser. Other Alarm Handlers will be set up shortly for PID, Tracker, etc.

What will appear in the upper left corner of the screen is an icon window with a white flashing box labelled “BeamLine_Elements”. Click on this button and a new, larger “main” window appear with a list of groups of elements.

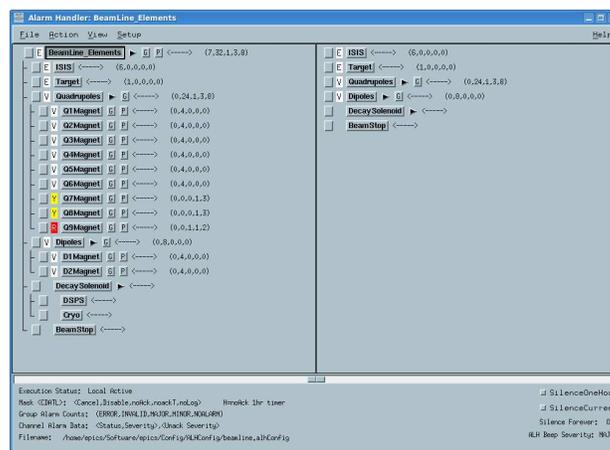


2.2 Using the Alarm Handler

When the main window is opened, the list of groups of elements is collapsed. To view the individual elements in a group, click on the black arrow to expand the group. The screen is also split into two columns. If a box with the element name is clicked, then the right side displays the different alarms states which are monitored for that device. If the group box is clicked, then the right side of the window expands the elements in the group.

For each element, there are:

- two boxes to the left
- a box with the group/element name
- one or two boxes to the right
- and some text



To the left of each group or individual element are two small boxes. These boxes give the alarm state of each element. Note that the highest alarm level is always displayed. The left box is a button, which when clicked, acknowledges the alarm. The right box is the historic record of the last highest alarm state of this device.

2.3 Stopping the Alarm Handler

The Alarm Handler should **NOT** be stopped in the MLCR! However, if it’s used for monitoring outside of the MLCR, it can be stopped using the “X” button in the top right hand corner of the original icon window which came up when starting the Alarm Handler. It will ask you to confirm that you want to exit.

3 Conclusion

This document describes both the Alarm Handler and Monitoring of various beamline elements. In future drafts of this document, these two descriptions will be separated.