LCLS SXR Three Letter Acronym (TLA) Engineering Specification Document

**Document Approval** (signature/date)

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# Brief Summary:

This document describes the general mechanical, controls and data-acquisition engineering specifications for a generic SXR-TLA instrument.

NOTE TO USERS OF THIS TEMPLATE: This is an example of an Engineering Specification Document for an SXR End Station System. It covers mechanical, controls and detection systems. This document should be completed with the content of an interface control document in mind. That is to say this document provides the specifications of what the end station will do and how it will do it, but it is the ICD that actually contains the detailed list of each interface to the beamline to accomplish the specifications listed in this document. By contact a SXR Instrument Scientist before you begin this document for assistance and examples of previous end station ESD.

Because the controls systems is highly evolved much of this document can be completed by duplicating the previous from the example documents.

# Introduction

* 1. General description of scientific purpose
  2. General description of experimental usage

# Component Specifications

## Component 1

Each component in the overall end station system should be described and specified with respect to the following categories. Sub components in a system can be related as well.

* + 1. Picture or CAD drawing

If available, a picture or illustration of the component should be inserted and can be referenced in the specifications.

* + 1. Mechanical Operation Specification

Describe how the component functions. List possible limitations to operation like mechanical interference, vibration or thermal limitations etc.

* + 1. Hardware Controls Specification

Describe the hardware (motors, cameras, gauges) that will be implemented.

* + 1. Software Controls Specification

Describe specifications of the software to control the hardware.

* 1. Component 2
     1. Picture or CAD drawing
     2. Mechanical Operation Specification
     3. Hardware Controls Specification
     4. Software Controls Specification

## Component 3

# Vacuum Systems

Describe the organization and function of the vacuum system. A functional diagram is appropriate. The description should include all gauges, pumps and valves that need control.

# Detection Systems

Describe the detectors that will be used in the Data Acquisition System. Standard detection devices simply need to be called out whereas detectors that have not been implemented before at LCLS need to be described in detail.

# Controls Systems

Most of the components integrated to EPICS are described in the components specification above. In this section describe the overall integration of all components. Any process that needs to be executed by the controls system (ie pumping, coordinated motion) should be described here. Interlocks that involve multiple systems should be described here.

# Safety

## Seismic

Show seismic safety calculations. Specify anchor points to floor.

## Electrical (Including Grounding)

Show grounding points. Describe safety measures for high voltage.

## Laser

Show laser safety measures. Describe laser radiation hazards.

## 

# Revision History

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| --- | --- | --- |
| **Revision** | **Date Released** | **Description of Change** |
| R003 | 06/24/2012 | Updated format of entire document |
| R002 | 05/17/2012 | Updated contact info in section 8. |
| R001 | 03/26/2012 | Updated contact info in section 8. |
| R000 | 02/02/2012 | Original Release. |