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| **Preparation, Installation, and Initiation of Slam Sticks for SNS-PPU Cryomodule Shipments** |
| **Document Number:** | SNSPPU-PR-CMA-SHIP-SSX | **Approval Date:** | 23 Feb 2022 |
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| **Document Owner:** | Peter Owen | **Department Owner:** | SRF Operations |

# Purpose

This document describes the steps to prepare enDAQ shock recorders, also called Slam Sticks (SSX) for SNS-PPU cryomodule (CM) shipments from Jefferson Lab to Oak Ridge National Laboratory

# Scope

This procedure defines the following instructions to prepare SSXs for use on SNS-PPU CM shipments

* Programming SSXs
* Installation on CM and Shipping Frame
* Starting SSXs prior to shipment

# Terms and Definitions

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| **Term** | **Definition** |
| SNS-PPU | Spallation Neutron Source Proton Power Upgrade |
| CM | Cryomodule |
| SSX | enDAQ shock recorders, also called Slam Sticks |

# Roles and Responsibilities

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| **Role** | **Responsibility** |
| CM Assembly Group Lead | Ensure staff follow this procedure in a safe and correct manner |
| CM Assembly Technician | Follow this procedure as per Group and Shipping Lead’s directions |
| SNS-PPU Shipping Lead | Ensure that this procedure is carried out correctly |
| SNS-PPU Project Manager | Review procedure and approve CM to ship |

# SSX Preparation Process

## Requirements

* CM on the trailer
* Eight SSXs
* Double sided table (green peel, any thickness)
* USB cables:
	+ USB cables – Type A to Micro-B
	+ USB hub
	+ ~30 ft of USB extensions, various lengths
* A laptop with [enDAQ LAB Software](https://endaq.com/pages/vibration-shock-analysis-software-endaq-slam-stick-lab) installed, LabView software is optional

## Preparation

### Configure Software

#### Plug each SSX into the laptop, these can be done one at a time or connected all at once

#### Apply the following settings (Figures 1-3):

* + - * + Recording time limit = 36000 seconds (10 hours, or long enough for the drive to ORNL)
				+ Ch 32: all axes turned on, record at 800 Hz
				+ All other recording channels turned off

#### Delete data from the SSXs using one of the two methods below. This does not affect the settings applied in step 5.2.1.2.

* + - * + From the LabVIEW software run the ‘Delete SSX data’ program
				+ Open the ‘DATA’ folder of each drive and delete any files/folders inside

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Figure 1: SSX Configuration Screen

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Figure 2: SSX Configuration Screen

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Figure 3: SSX Configuration Screen

### Install on the CM

#### Install SSXs on the CM as per SNSPPU-PR-CMA-CM-SHIP.

## Start the SSXs

### Start SSXs in Software (Option 1)

#### Using the extensions and hubs, plug all SSXs into the laptop.

Verify all 8 are connected in Windows Explorer, they will appear like flash drives.

If some are not connecting, unplug and re-plug their cable.

Once all SSXs show their recording time set, press Set All Clocks.

#### Start SSXs remotely.

**NOTE this cannot be undone from the laptop.** Once the SSXs are started, the button on the SSX must be pressed to stop them before the timer.

LabVIEW: Run the ‘Remote Start SSX’ program.

OR: press ‘Start Recording’ for each SSX from the Ctrl + D menu in the enDAQ LAB Software.

If any SSX fails to start, unplug, re-plug, and try again.

When the SSXs are running, they will disappear from Windows Explorer and their green light will blink.

Unplug all USB cables from the laptop and SSXs.

### Start SSX Manually (Option 2)

#### Go to each SSX and press the white button with the enDAQ logo. The green light will blink.

#### Try to start all the SSXs in less than 2 minutes.

#### Once all SSXs are running, impart a shock on the trailer to produce a calibrating event. This can be achieved by jumping on the trailer or hitting the red frame with a mallet.

# Release and Revision History

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| **Rev #** | **Major Changes** | **Approval Date:** |
| 1 | Initial version | 23 Feb 2022 |
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# Approvals

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| Document Owner | Peter Owen | Approval and date in DocuShare. | 23 Feb 2022 |
| SRF Quality Engineer | Jacob Harris | Approval and date in DocuShare. | 23 Feb 2022 |
| Project Manager  | Ed Daly | Approval and date in DocuShare. | 23 Feb 2022 |