NSLS-II SRX Beamline Docs Documentation

Release 0.1

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These pages are the documentation of the SRX beamline (5-ID-1) at the NSLS-II.

SRX (5-ID-1) BEAMLINE DOCUMENTATION

1.1 Optics

Placeholder for optics documentation.

1.2 Endstation

1.2.1 Optics

SRX KB mirrors

Introduction

There are two sets of KB mirrors in the SRX endstation, one high-flux pair and one high-resolution pair.

High-flux

Mir:2 - High-flux VFM

Mechanics

- Weak link flexures for all translations
- Vertical translation system has four stepper motors, so is overconstrained. Extra axis is twist, and needs to be maintained at zero.
- Horizontal translation for stripe selection done by two SmarAct actuators. These actuators have limited ability to yaw, and as a result can get stuck.
- Longitudinal translation by single SmarAct actuator.

Motion control

- Delta Tau coordinate system implemented for Mir:2 vertical movements: vertical translation, pitch, roll, twist.
- Twist should be maintained at zero.
- A PLC monitors the twist and deactivates the vertical motors if the calculated twist exceeds a specified value.

Mir:3 - High-flux HFM

Mechanics

- Weak-link flexure for all stages.

- No overconstrained systems.

Motion control

Motion axes

Mirror system	Axis	Motor type	Controller	Notes
Mir:2 (high-flux vertical focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (4)	Delta Tau	Overconstrained mechanical system
	Z	SmarAct (1)	SmarAct MCS	
Mir:3 (high-flux horizontal focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (1)	Delta Tau	

High-resolution

Mir:4 - High-resolution VFM

Mechanics

- Weak link flexures for all translations

- Vertical translation system has two stepper motors, so is not overconstrained.

Motion control

Mir:5 - High-resolution HFM

Mechanics

- Weak link flexures for all translations

- Downstream X translation motor is in line with mirror center, so this motor does not move to implement pitch movement.

Motion control

- Roll motor has approximately +/- 5 degrees of movement.

Mirror system	Axis	Motor type	Controller	Notes
Mir:4 (high-resolution vertical focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (2)	Delta Tau	
	Z	SmarAct (1)	SmarAct MCS	
Mir:5 (high-resolution horizontal focusing)	X	SmarAct (2)	SmarAct MCS	Limited yaw capability
	Y	Stepper (1)	Delta Tau	
	Roll	Attocube ECGt5050	Attocube ECC100	

*(Row label: **Motion axes**)*

Instructions

SmarAct motor closed-loop operation

- To activate closed-loop operation, set the 'Closed Loop' button on the desired axis to Enable.
- Moving the axis will reset this to 'Disable' but the axis will remain in closed-loop.
- The motor should show 'Holding' after the move has complete. 'Stopped' indicates open-loop operation.
- To deactivate closed-loop operation, set the 'Closed Loop' button on the desired axis to Disable. Even if it is already showing Disable, this will move the motor into open-loop operation.
- Pressing 'Stop' will stop movement and put the motor into open-loop.

Mir:5 roll referencing

- Turn on both auto-reference and auto-reset in Advanced display.
- Move axis over full range until 'Referenced' light turns green.
- Turn off both auto-reference and auto-reset.

1.2.2 Detectors

Pixirad detector

IOC

Item	Value
Host name	xf05idd-ioc-det03
IOC process name	det03
Detector interface IP address	192.168.0.2

Boot notes   The BIOS is currently set to network boot before local hard drive boot. To interrupt this, press ESC while the circle spinning next the DHCP is on the screen. This will interrupt the network boot and progress to the local boot. If the screen with PXE Boot comes up, restart the computer and press ESC earlier.

eth0 did not come up with an IPv4 address on initial attempts at connecting to the detector. This was solved by issuing the following commands:

```
$ sudo ifdown eth0
$ sudo ifup eth0
```

For some reason, the above works while `$ sudo ifconfig eth0 down|up` did not work.

1.3 Controls

1.3.1 IOC documentation

A hutch

Servers

Host name	Function
xf05ida-ioc1	IOC server

IOCs

IOC ID	Host	Function	Path (if not standard)
bpm01	xf05ida-ioc1	BPM:01 (AH501D)	
bpm02	xf05ida-ioc1	BPM:02 (AH501D)	
bpm03	xf05ida-ioc1	BPM:03 (TetrAMM)	
bpm04	xf05ida-ioc1	BPM:04 (TetrAMM)	
bpm05	xf05ida-ioc1	BPM:05 (AH501D)	
cam01	xf05ida-ioc1	HFM	
cam02	xf05ida-ioc1	FS:1	
cam03	xf05ida-ioc1	DCM Cam:1	
cam04	xf05ida-ioc1	DCM Cam:2	
cam05	xf05ida-ioc1	BPM:1 (A Hutch)	
cam06	xf05ida-ioc1	BPM:2 (B Hutch)	
cryo1	xf05ida-ioc1	DCM cryocooler	
mc01	xf05ida-ioc1	Slits	
mc02	xf05ida-ioc1	HFM	
mc03	xf05ida-ioc1	DCM	
mc04	xf05ida-ioc1	Mirror fine pitch	
mc05	xf05ida-ioc1	DCM first crystal fine roll	
mc06	xf05ida-ioc1	DCM second crystal fine pitch	
mc07	xf05ida-ioc1	SmarAct - SSA, BPMs	
plc1	xf05ida-ioc1	EPS PLC	
rg-tc1	xf05ida-ioc1	Rack temperature controllers	
ups1	xf05ida-ioc1	UPS	
va01	xf05ida-ioc1	Vacuum	

D hutch

Servers

Host name	Function
xf05idd-ioc1	IOC server
xf05idd-ioc-det1	Xspress3
xf05idd-ioc-det02	Saturn
xf05idd-ioc-det03	Pixirad

IOCs

1.4 Software

Placeholder for software documentation

DOWNLOADS

Download the SRX Documentation as a PDF