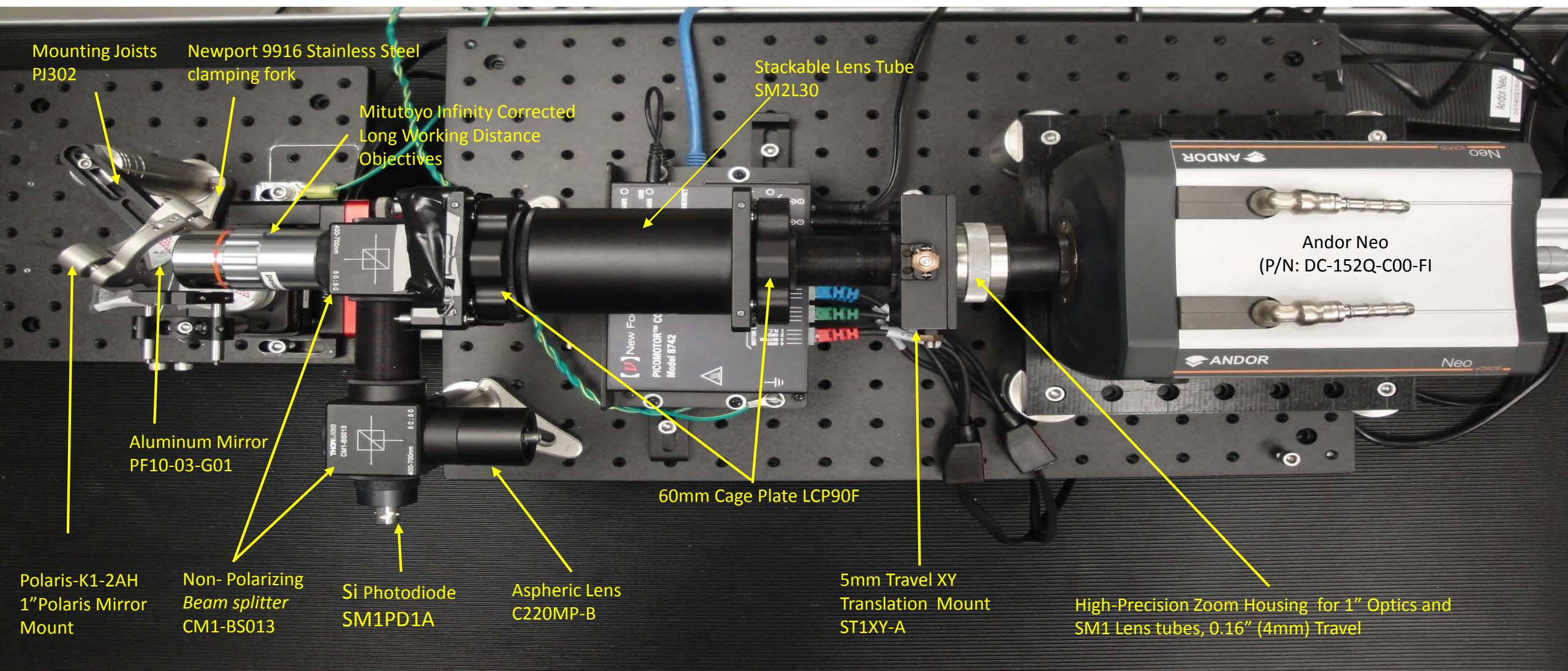


Andor Scintillator Microscope Quick Start Guide from the APS Detector Pool (dp@aps.anl.gov)



Mounting Joists PJ302

Newport 9916 Stainless Steel clamping fork

Mitutoyo Infinity Corrected Long Working Distance Objectives

Stackable Lens Tube SM2L30

Andor Neo
(P/N: DC-152Q-C00-FI)

Aluminum Mirror PF10-03-G01

60mm Cage Plate LCP90F

5mm Travel XY Translation Mount ST1XY-A

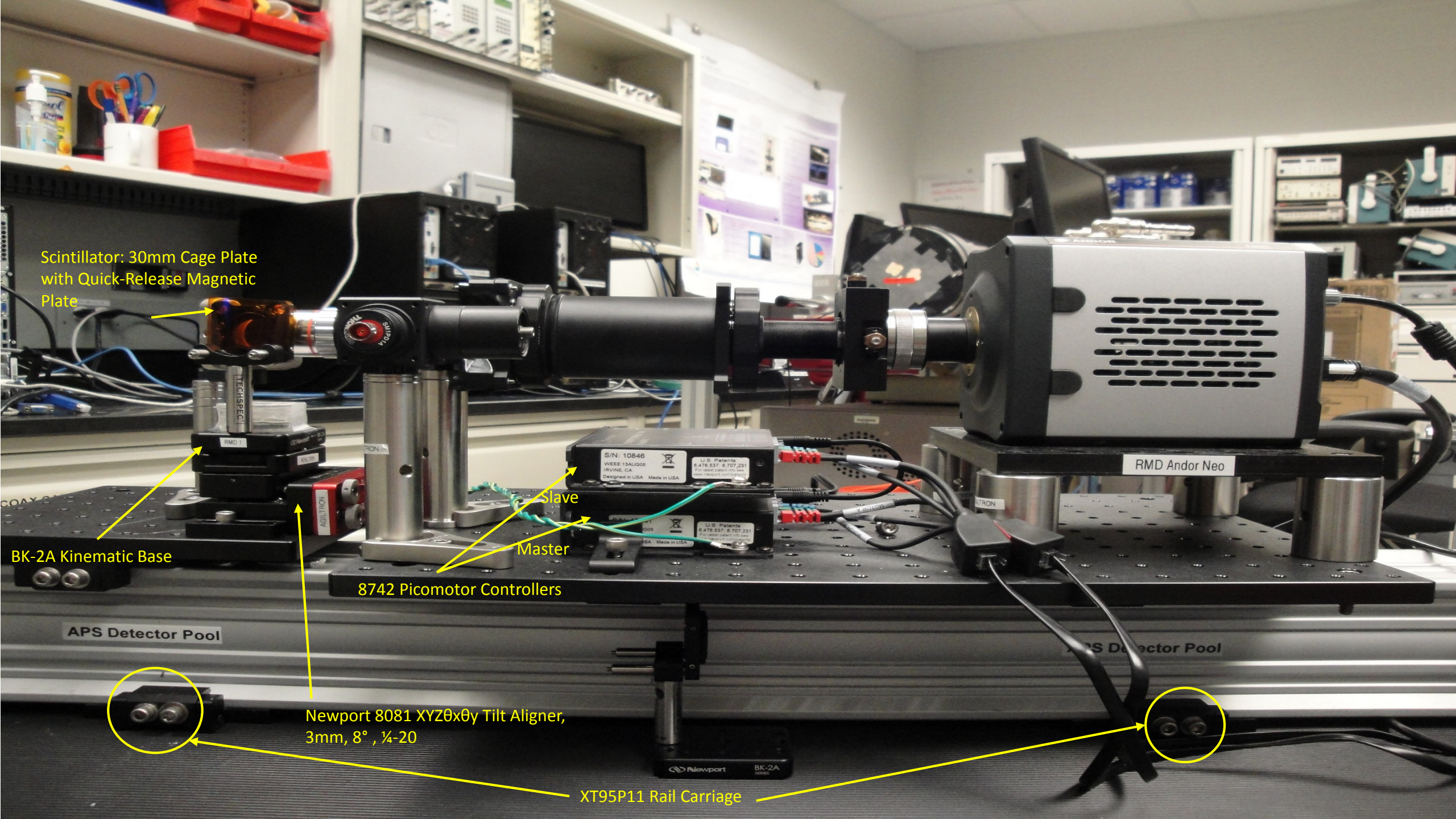
High-Precision Zoom Housing for 1" Optics and SM1 Lens tubes, 0.16" (4mm) Travel

Polaris-K1-2AH 1" Polaris Mirror Mount

Non-Polarizing Beam splitter CM1-BS013

Si Photodiode SM1PD1A

Aspheric Lens C220MP-B



Scintillator: 30mm Cage Plate with Quick-Release Magnetic Plate

RMD Andor Neo

S/N: 10846
WEEE 13AL006
IRVINE, CA
Designed in USA Made in USA
U.S. Patents
6,476,537; 6,707,231
For more detail visit the
Newport.com website

Slave

Master

8742 Picomotor Controllers

BK-2A Kinematic Base

APS Detector Pool

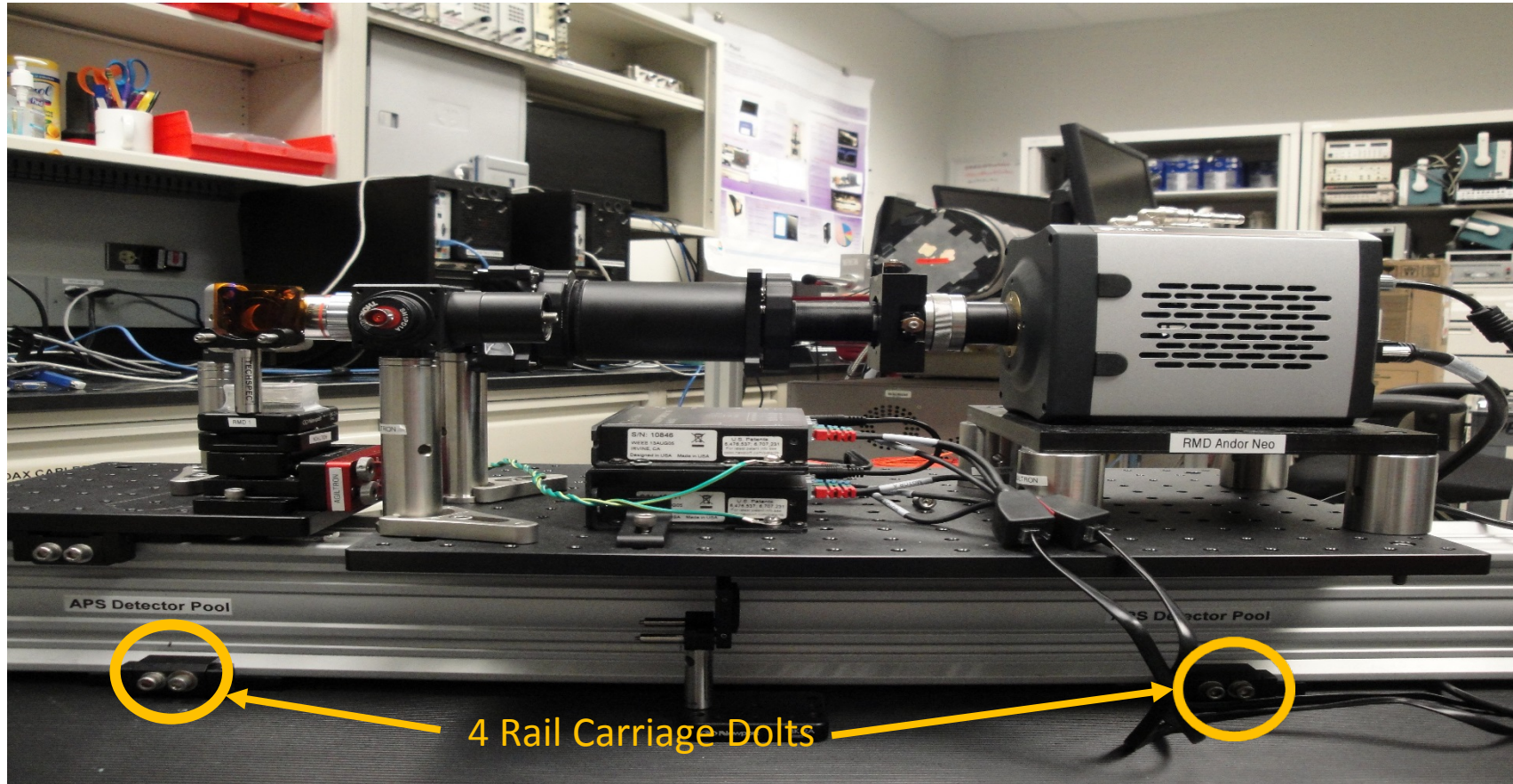
Newport 8081 XYTheta Tilt Aligner,
3mm, 8°, 1/4-20

XT95P11 Rail Carriage

APS Detector Pool

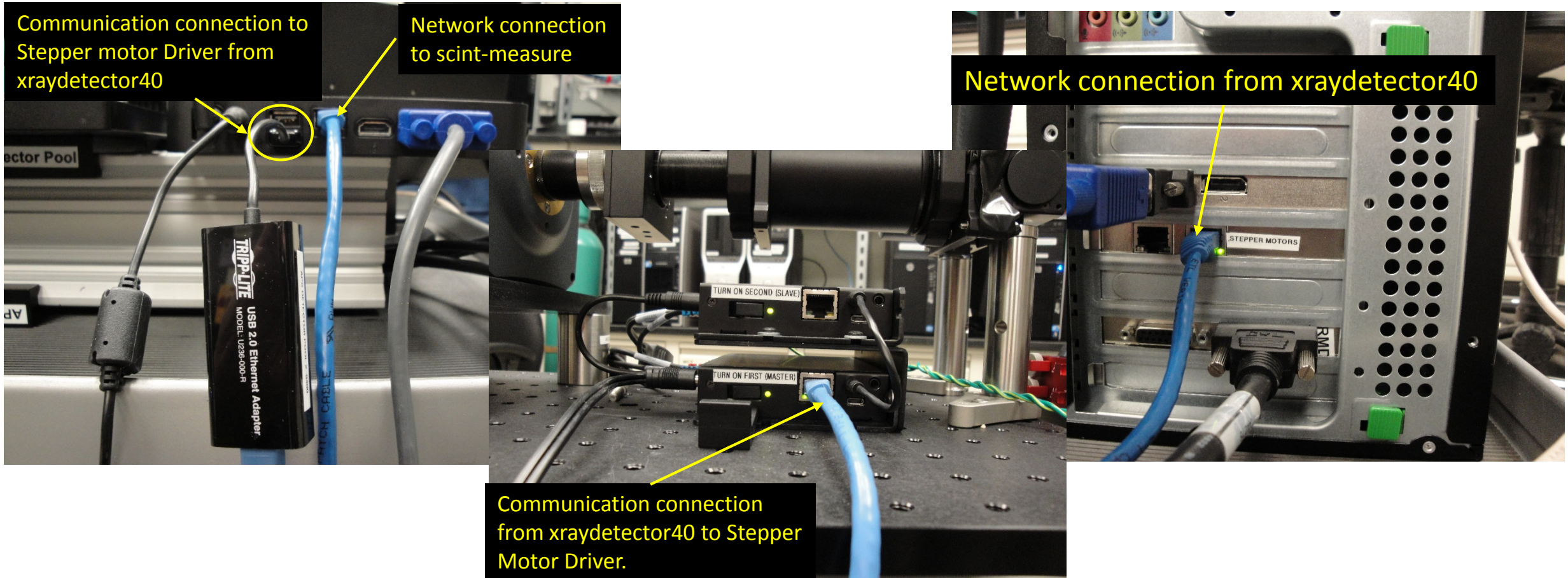
Newport BK-2A

1. Before removing Scintillator Microscope rail from cart, remove / disconnect all cables from camera and stepper motors for **PERSONAL SAFETY** and to prevent equipment damage.
2. Loosen 4 Rail Carriage bolts (3/16" allen wrench) located on bottom side of rail, so rail can be removed from cart. 1 pair on camera end and 1 pair at stepper motor end.

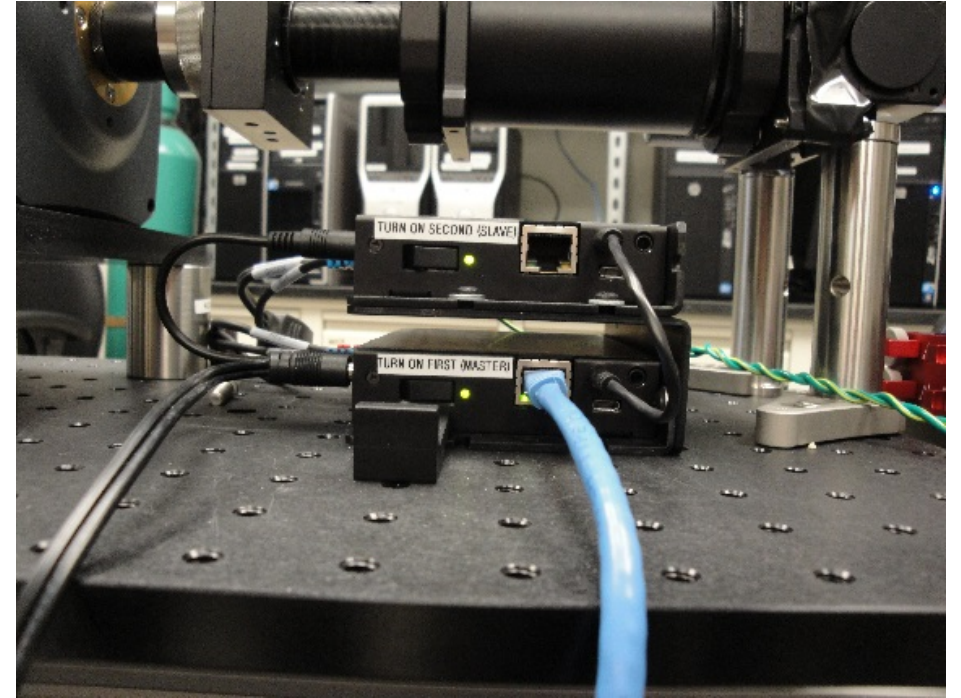


3. Before lifting rail from the rail carriage verify all cabling is removed. Rail is very heavy and awkward to lift, if you do not feel comfortable lifting on your own, ask a coworker for assistance. To remove system from Rail Carriage, stand on opposite side of the 4 Rail Carriage bolts, slightly tilt the system away from you and lift the system out of the Rail Carriage.
4. Secure Andor Scintillator Microscope to your optics table.

5. Verify grounding wires (green / yellow stripe) from stepper motor drivers and stepper motors are attached to triplite power strip grounding lug located at the back of power strip, if you are using the Detector Pool supplied power strip. Or verify your optics table is properly grounded and attach the stepper motor grounding wires to the optics table.
Grounding of the stepper motors needs to be done before any power is supplied!
6. Once grounding has been establish and verified connect all other cabling.
7. The system is comprised of two computers:
 - scint-measure, a linux machine and the main computer
 - Xraydetector40, a windows machine from which the stepper motors will be controlled
8. Verify connections between scint-measure, xraydetector40 computers and stepper motor drivers, as represented in the following images:



9. Turn on stepper motor drivers, located on 12"x 18" bread board below stackable lens tube. Motor drivers are labeled Master and Slave, Master needs to be turned on first, then Slave.



10. Log into scint-measure , click on the Applications menu, then click on Detector Pool EPICS startup, then choose Andor from Select Detector Box. Start the IOC, medm and image j.

11. Next go the medm GUI verify **Array Callbacks** are enabled. Next click on **ALL** in the Plugins section to set up Ports.

Area Detector Control - sm_andor3:cam1:

Setup

asyn port ANDOR
EPICS name sm_andor3:cam1:
Manufacturer Andor
Model DC-152Q-C00-FI
Serial Number SCC-02292
Firmware Vers. 13.9.12.132
Software Vers. 3.10.30003.5
Controller ID 3
Debugging

Shutter

Shutter mode
Status: Det. Closed EPICS
Open/Close
Delay: Open Close
EPICS shutter setup

Collect

Exposure time 0.050
Acquire period 0.138
Frame rate 7.259
Max transfer rate 30.358
Images 1
Images complete 2050
Exp./image 1
Image mode
Trigger mode
Software trigger
Acquire Done
Detector state Idle
Status
Image counter 2050
Image rate
Array callbacks
Buffers max/used 0 0
Buffers alloc/free 1 1
Memory max/used (MB) 0.0 10.5
Buffer & memory polling

Plugins

All

Readout

	X	Y
Sensor size	2560	2160
Binning	<input type="text" value="1x1"/>	<input type="text" value="1x1"/>
Region start	<input type="text" value="1"/>	<input type="text" value="1"/>
Region size	<input type="text" value="2560"/>	<input type="text" value="2160"/>
AOI control	Yes	
Image size	2560	2160
Image size (bytes)	8294400	
Encoding	<input type="text" value="Mono12Packed"/>	
Shutter mode	<input type="text" value="Global"/> Global	
PreAmp gain	<input type="text" value="High well capacity12-bit (1)"/>	
Readout rate	<input type="text" value="100 MHz"/>	100 MHz
Overlap	<input type="text" value="Yes"/>	Yes
Noise filter	<input type="text" value="Yes"/>	Yes
Readout Time	0.0274	

Attributes

File

Cooler

Cooler On
Temperature -15.00 -16.1
Status Stabilised
Fan On

12. Verify Image1 is set to enable and the Port box is indicating TRANS1. Then go the TRANS1 (3rd row down), set to “enable” and check that Port is indicating “ANDOR”.

This option allows you to rotate the image to the Desired orientation.

sm_andor3: Common Plugins									
Plugin name	Plugin type	Port	Enable	Blocking	Dropped	Free	Rate		
Image1	NDPluginStdArrays	TRANS1	Enable <input checked="" type="checkbox"/>	Enable	No <input type="checkbox"/>	0	5	0.00	<input type="button" value="More"/>
PROC1	NDPluginProcess	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
TRANS1	NDPluginTransform	ANDOR	Enable <input checked="" type="checkbox"/>	Enable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
CC1	NDPluginColorConvert	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
CC2	NDPluginColorConvert	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
OVER1	NDPluginOverlay	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ROI1	NDPluginROI	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ROI2	NDPluginROI	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ROI3	NDPluginROI	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ROI4	NDPluginROI	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
STATS1	NDPluginStats	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
STATS2	NDPluginStats	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
STATS3	NDPluginStats	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
STATS4	NDPluginStats	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
STATS5	NDPluginStats	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ROISTAT1	NDPluginROIStat	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
CB1	NDPluginCircularBuff	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
ATTR1	NDPluginAttribute	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileNetCDF1	NDFileNetCDF	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileTIFF1	NDFileTIFF	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileJPEG1	NDFileJPEG	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileNexus1	NDPluginFile	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileMagick1	NDFileMagick	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>
FileHDF1	NDFileHDF5 ver1.8.13	ANDOR	Disable <input type="checkbox"/>	Disable	No <input type="checkbox"/>	0	21	0.00	<input type="button" value="More"/>



sm_andor3:Trans1:

asyn port	TRANS1		
Plugin type	NDPluginTransform		
Array port	ANDOR	ANDOR	
Array address	0	0	
Enable	Enable <input checked="" type="checkbox"/>	Enable	
Min. time	0.000	0.000	
Callbacks block	No <input type="checkbox"/>	No	
Queue size/free	21	21	
Array counter	0	2050	
Array rate	0.00		
Dropped arrays	0	0	
# dimensions	2		
Array Size	2560	2160	0
Data type	UInt16		
Color mode	Mono		
Bayer pattern	RGGB		
Unique ID	2050		
Time stamp	1485201699.261		
Attributes file	<input type="text"/>		
Array callbacks	Enable <input checked="" type="checkbox"/>	Enable	
asyn record	<input type="checkbox"/>		

Transform Type

None <input type="button" value="F"/>	Mirror <input type="button" value="7"/>
Rot90 <input type="button" value="7"/>	Rot90Mirror <input type="button" value="7"/>
Rot180 <input type="button" value="J"/>	Rot180Mirror <input type="button" value="J"/>
Rot270 <input type="button" value="L"/>	Rot270Mirror <input type="button" value="L"/>

13. Close CommonPlugins window

14. Go back to the medm screen (Andor3.adl). Under the heading Collect set image mode to Continuous.

Area Detector Control - sm_andor3:cam1:

Setup

asyn port ANDOR
EPICS name sm_andor3:cam1:
Manufacturer Andor
Model DC-152Q-C00-FI
Serial Number SCC-02292
Firmware Vers. 13.9.12.132
Software Vers. 3.10.30003.5
Controller ID 3
Debugging

Shutter

Shutter mode
Status: Det. Closed EPICS Closed
Open/Close
Delay: Open Close
EPICS shutter setup

Collect

Exposure time 0.050
Acquire period 0.138
Frame rate 7.259
Max transfer rate 30.358
Images 1
Images complete 2050
Exp./image 1
Image mode Continuou
Internal
Trigger mode
Software trigger
Acquire Done
Detector state Idle
Status
Image counter 2050
Image rate 0.00
Array callbacks Enable
Buffers max/used 0 0
Buffers alloc/free 1 1
Memory max/used (MB) 0.0 10.5
Buffer & memory polling

Plugins

Readout

	X	Y
Sensor size	2560	2160
Binning	<input type="text" value="1x1"/>	<input type="text" value="1x1"/>
Region start	<input type="text" value="1"/>	<input type="text" value="1"/>
Region size	<input type="text" value="2560"/>	<input type="text" value="2160"/>
AOI control	Yes	
Image size	2560	2160
Image size (bytes)	8294400	
Encoding	<input type="text" value="Mono16"/>	
Shutter mode	<input type="text" value="Global"/> Global	
PreAmp gain	<input type="text" value="high well capacity12-bit (1)"/>	
Readout rate	<input type="text" value="100 MHz"/>	100 MHz
Overlap	<input type="text" value="Yes"/>	Yes
Noise filter	<input type="text" value="Yes"/>	Yes
Readout Time	0.0274	

Attributes

File

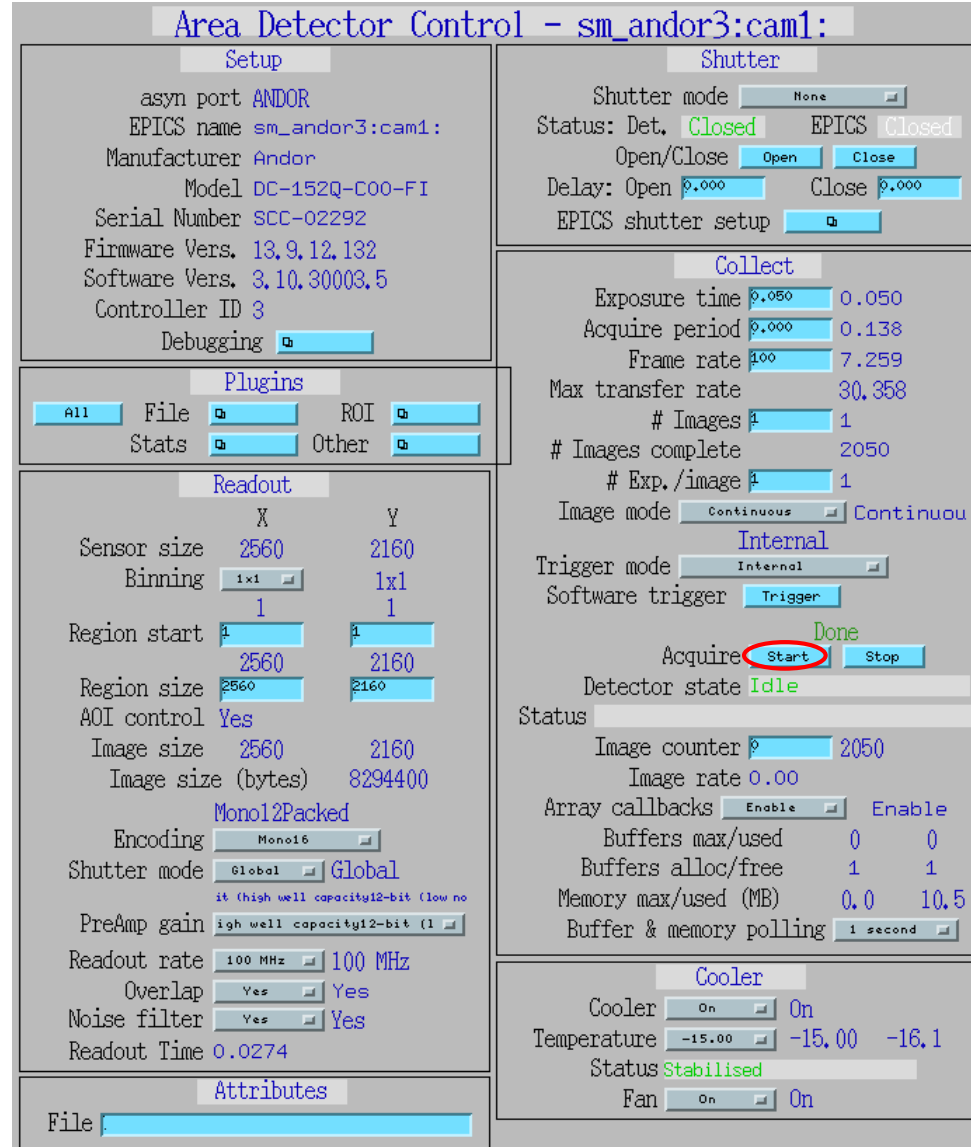
Cooler

Cooler On
Temperature -15.00 -16.1
Status Stabilised
Fan On

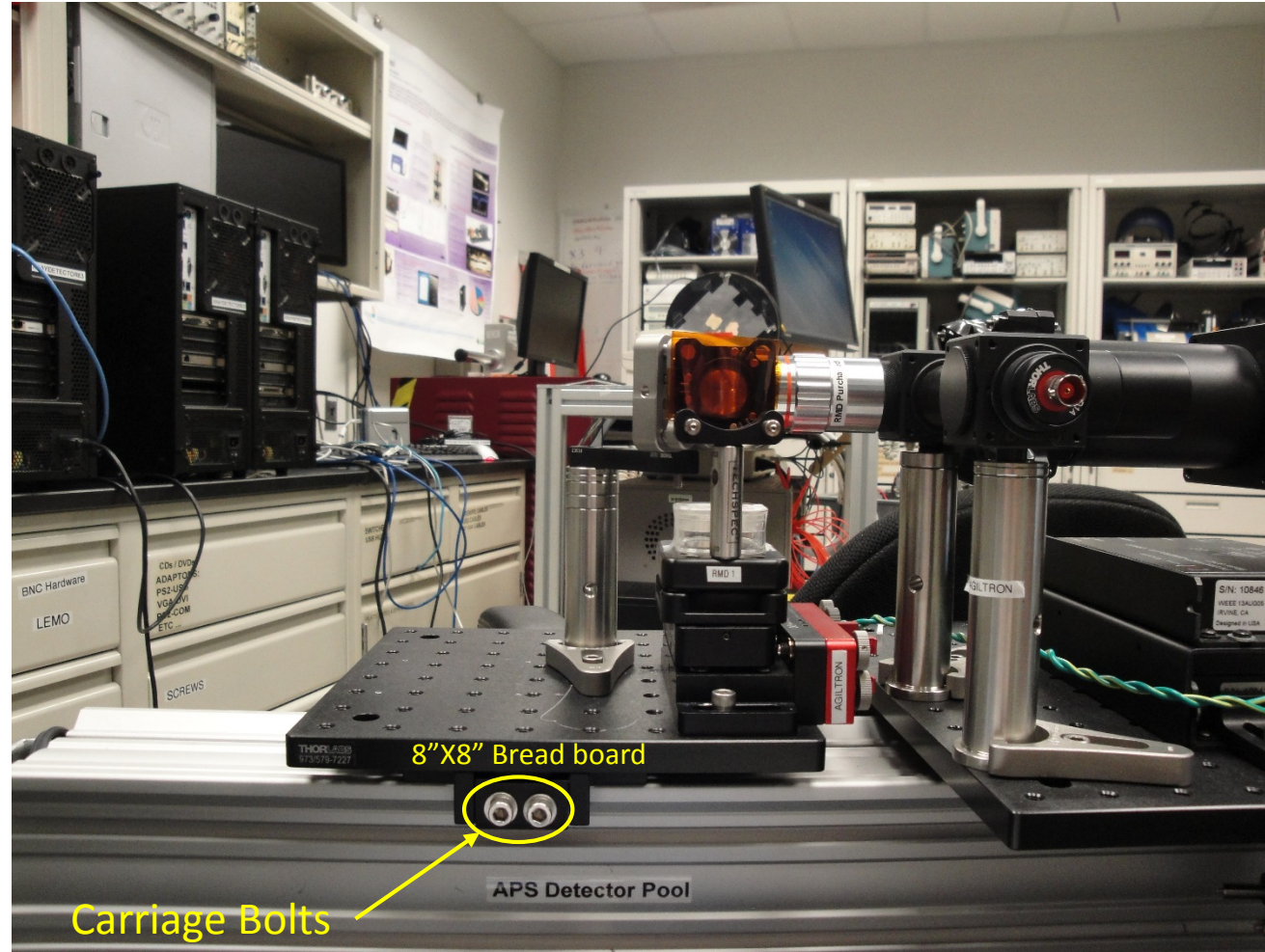
15. Image-j click start.



16. Click start on the medm screen and verify there is an image displayed.



17. If no clear image is shown then you will have to do a rough focusing.
- A. Loosen two carriage bolts below the 8"x8" bread board.
 - B. Slowly move the bread board back and forth until the image is clear. Please use caution when doing this as not to damage mirror or objective.
 - C. When image is clear, retighten the two carriage bolts. You will probably have to re-focus using the stepper motor system.



18. Using stepper motors to focus on image

A. Click on xrd40_Desktop icon, this will automatically log you into the stepper motor computer. Click OK, this will take you to xrd40 desktop.

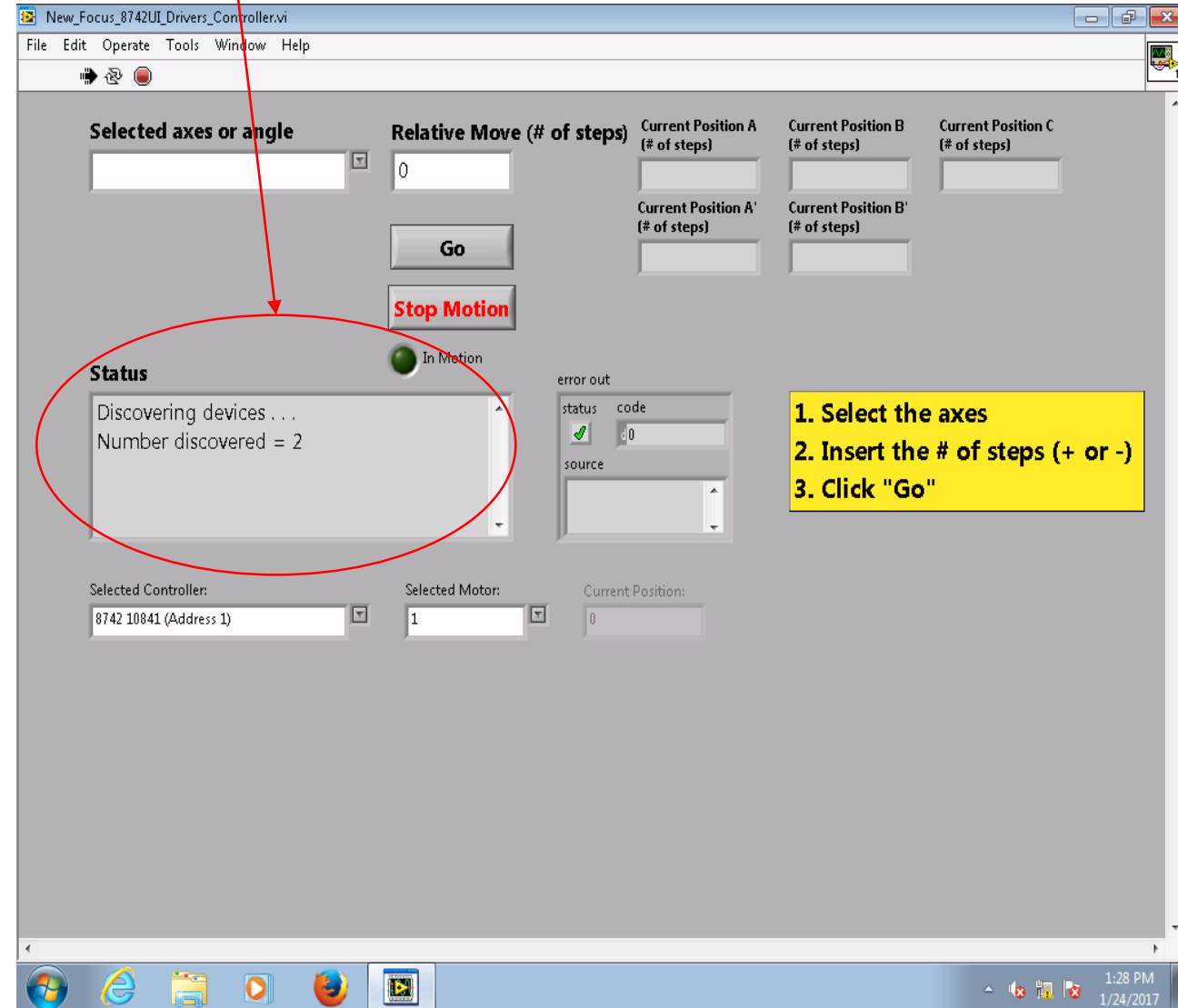
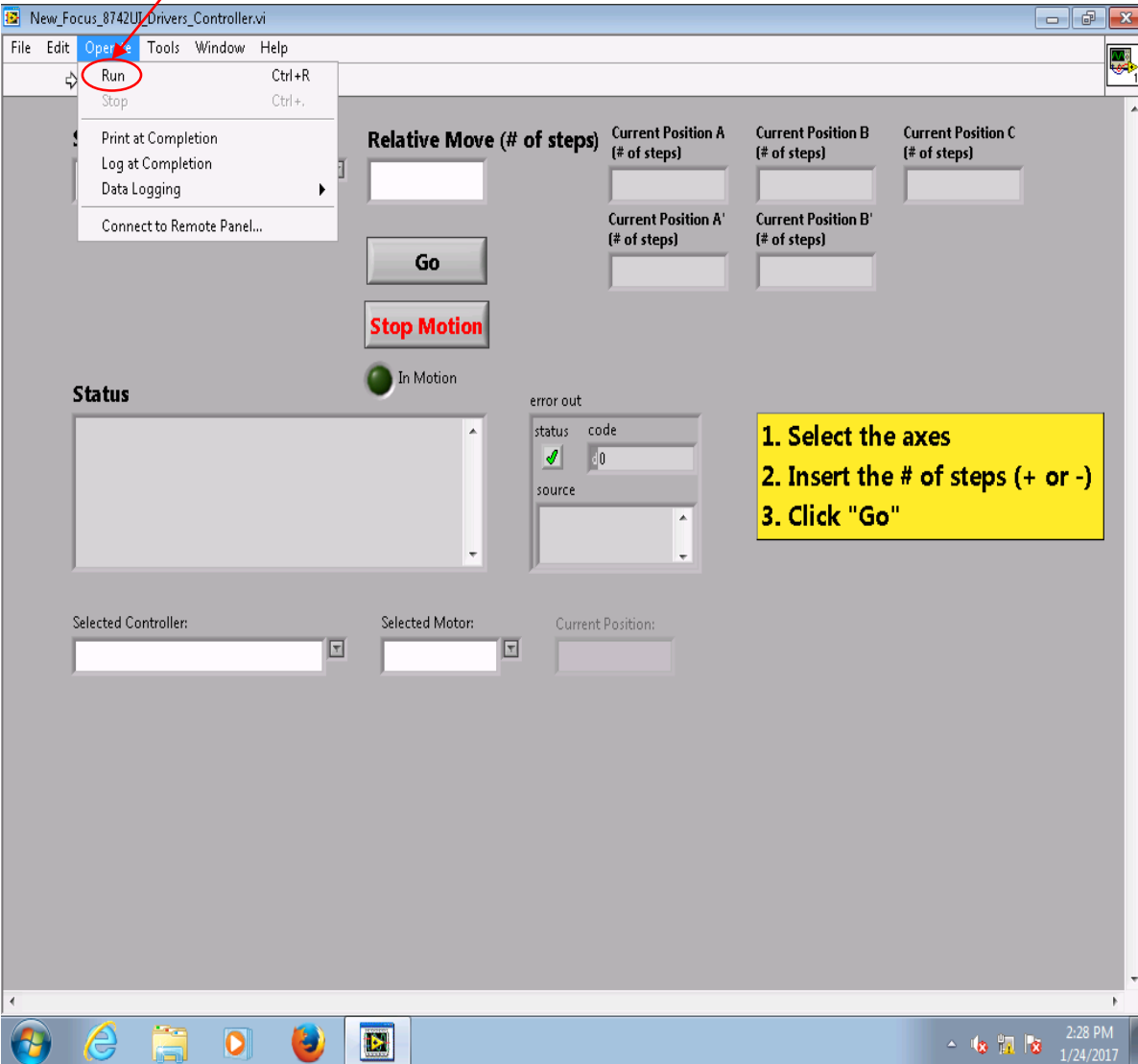


C. Next Click on the New_Focus_8742_Drivers_Controller icon to access the stepper motors GUI.



D. Click on Operate at the top then click Run (or in alternative click on the white arrow).

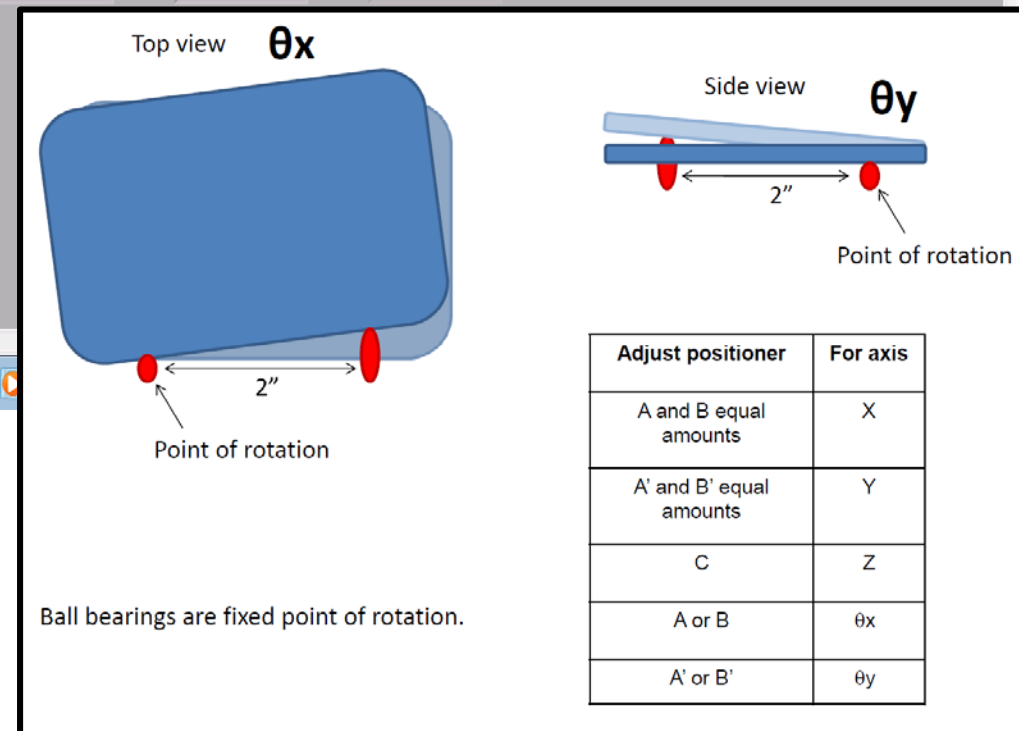
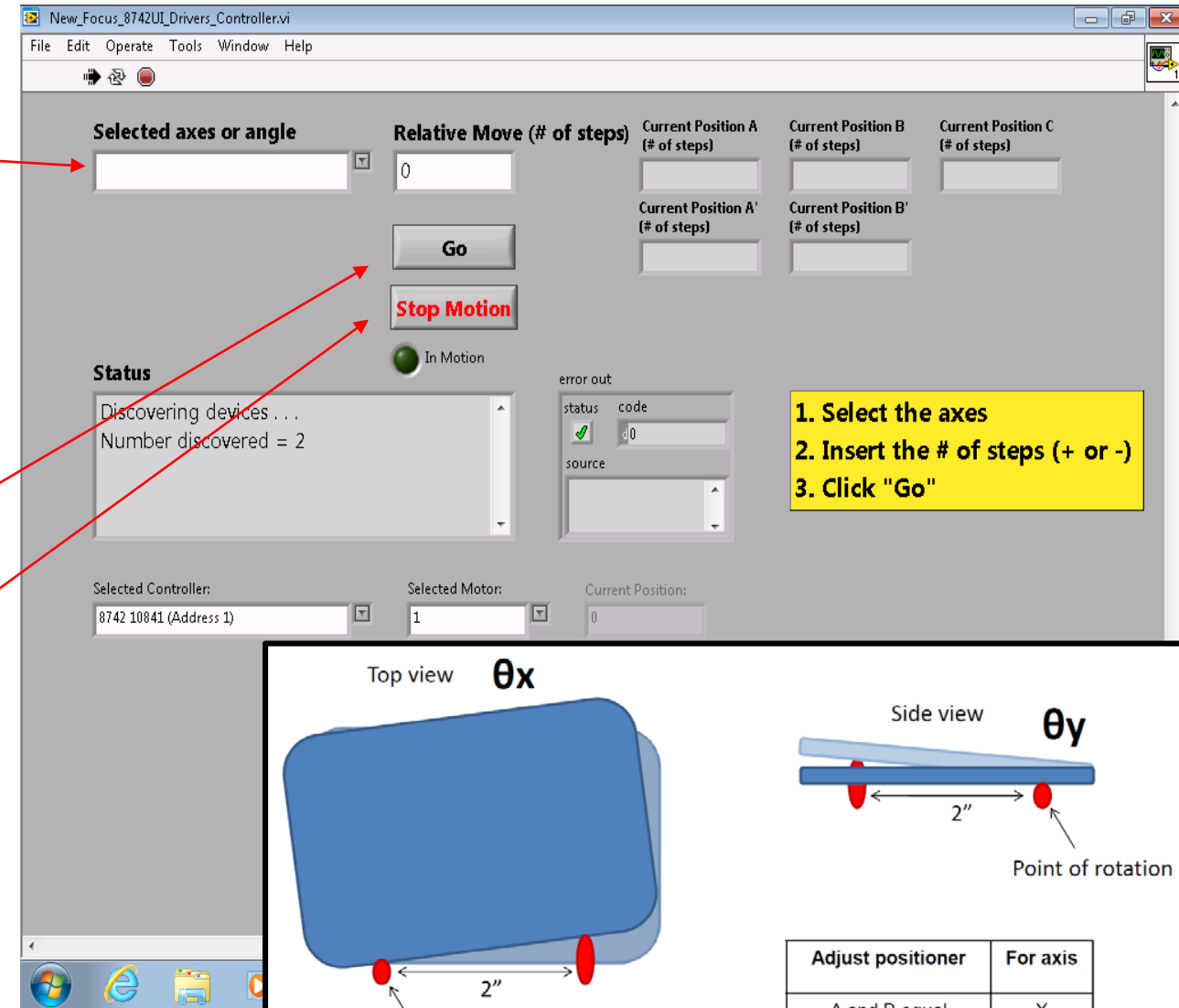
In the status window, when system is ready to be used "Number discovered = 2" system will appear. In case of error message like: "No device found", try to run again the program by clicking on the white arrow.



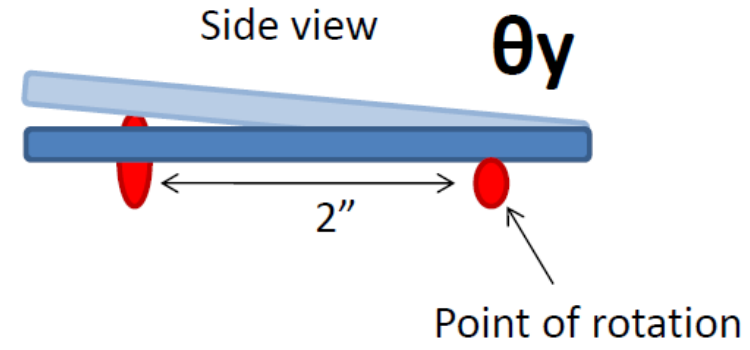
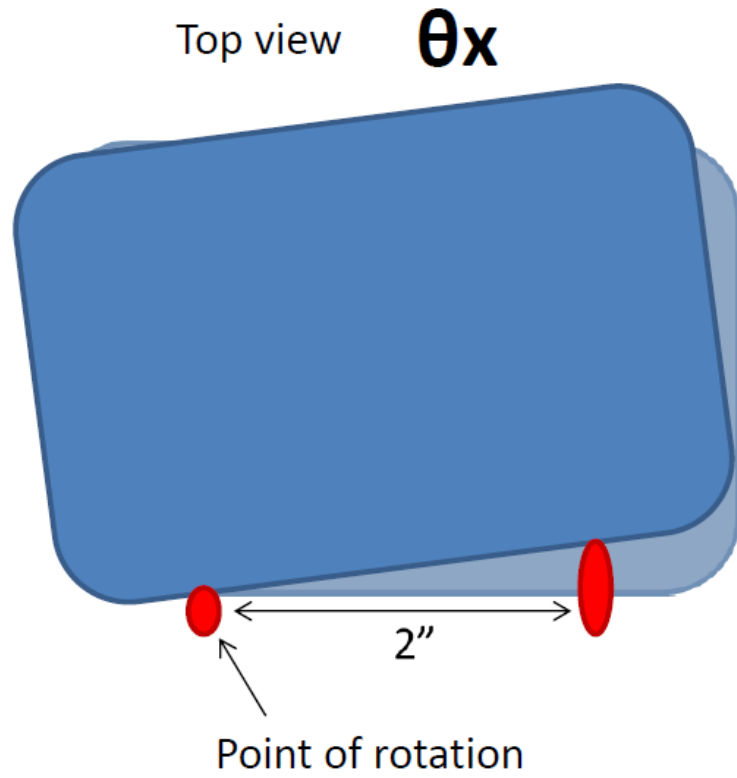
When done, stop the program by clicking on the red button.

E. To operate the motors:

- Select the axes (x, y or z) or the angle (theta-x or theta-y) along which to move the scintillator.
 - z (i.e. the in line direction) is the most useful axes. Usually the system is already in focus in all other directions.
 - The movement in any direction (except z) requires the use of two motors, which move of the same (absolute) amount in sequence. Therefore when setting any movement (except in the z direction) a sequence of 2 consecutive movement will happen. The movement is completed only at the end of both sequences.
- Type the number of steps (either positive or negative).
- Click "Go".
- Wait until the motion is complete. The system will not allow any other instruction until completion.
- The motors motion can be stopped before the reach of the set of number of steps, by clicking on the "Stop Motion" button.



F. When done, stop the program by clicking on the red circle.



Ball bearings are fixed point of rotation.

Adjust positioner	For axis
A and B equal amounts	X
A' and B' equal amounts	Y
C	Z
A or B	θ_x
A' or B'	θ_y