

## **ADSC Quantum 210 Startup Procedure:**

**12/10/1 RH**

The following procedure assumes that you have already powered up the framebuffer PC's, and their monitor and the KVM switch and further assumes that you have booted up Windows NT on both PC's.

The main system power switch is located on the left side of the front panel of the "Firewall box" (the panel with the big yellow button). To turn the main power "ON" push **in** on the **top** of this black rocker switch. The exhaust fan in the top of this rack should come on. Check that the 8 fans inside the detector have come on, too.

Check the oil level in the vacuum pump making sure the level is up near (but not above) the top mark beside the sight glass. Switch the vacuum pump on. Make sure both "Kurt J. Lesker" vacuum gauges in the equipment rack above the Firewall box are powered on (The Power ON toggle switch should be in the "up" position and the TC/SP switch should also in the up "TC" position).

Wait for a few minutes after the vacuum pump has started and check that the vacuum in the line between the pump and the detector (the LINE vacuum gauge on the left) reads below ATM and is gradually dropping, indicating that the basic vacuum connections are OK. Wait a few more minutes until the LINE vacuum reading is lower than 70 microns (70 millitorr). Open the valve on the side of the detector (the side toward the back wall of the hutch at X6) using a medium sized flat-blade screwdriver by turning the valve in the counter-clockwise direction. Turn several turns until you have gone all the way to the stop and then turn about a quarter turn in the clockwise direction so you don't leave the valve open "tight" (with some risk of leakage around the valve stem packing).

Pump on the detector until the readings on both of the two vacuum gauges are well below 50 microns (millitorr). If the detector has been valved off for a period of days or weeks the pumpdown time will be hours and it is best to pump overnight. Typical pressure readings in the morning are 15 microns for the LINE vacuum and 35 microns for the DETECTOR vacuum. When the DETECTOR vacuum reading is at below 50 microns you can proceed to power up the detector system.

At the front panel of the firewall box the red "Vacuum Sensor Alert" light will now be off (because the vacuum reading is now good enough to satisfy the vacuum interlock requirement) and the red "Flow Stopped" light will now be on (indicating that you have not yet started the coolant flow from the chiller).

Check that the chiller is filled with the proper amount of coolant. The coolant is a mixture of 70% water and 30% ethylene glycol. The coolant level should reach about 1" above the "corner" on the front of the semi-transparent reservoir as viewed from the front of the chiller. The fill port for the coolant reservoir is under the metal door on top of the chiller.

On back of chiller switch black switch into "UP" position (the chiller will not start just yet).. On the front panel of the Firewall box push **and hold** the big yellow "System Start" button until the green "Normal Operation" light comes on and stays on **solid** (not blinking on and off) indicating good, continuous water flow through the detector and back to the chiller. You will hear the chiller start to run just as you push the big yellow "System Start" button.

The temperature is normally already set to 12 degrees C. It will take a few minutes for the display of actual coolant temperature to read "12". Also at this time check that the pressure reading on the gauge on the front of the chiller reads 28psi (+/-2psi).

Next on the front panel of the detector power supply switch the "Controller Power" on by pushing the rocker switch **in** at the **right** and also switch the "Cooling Power" on by pushing the "Cooling Power" switch **in** at the **right**.

Using the KVM switch for switching back and forth between the desktops of the two framebuffer PC's start the "OPERATE Detector" process in **each** framebuffer PC by double clicking on the "OPERATE Detector" icon in each desktop. Watch the text that is displayed in each window to verify that the last line is:

```
Mod_load_tables: any_fail: 0
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On **either** frame buffer PC (**not** both) double-click the icon for the "Quantum Console" to open the CCD temperature control GUI.

Click on "CONNECT to Detector Process".

Switch cooling power switch "ON".

Click on "ENABLE Temperature Control".

(The current CCD temperatures will be displayed in degrees C)

Enter a temperature of 0 (zero) in the white box at the upper right.

Click on "SET Temperature". This requests that the thermoelectric cooling circuits cool the four CCD's to 0 degrees C. It will take 10 to 20 minutes for the four modules to be

"Ready at Final Temperature" with temperature very near 0 degrees for each of the four CCD modules.

Next click on "Ramp to Cold Operating Temp". Click "OK" to the question.

This starts an automated process of ramping the temperature of each of the four CCD's down in increments of 5 degrees C until the final cold operating temperature of - 45 degrees C is reached. The process takes about 1 hour. During this time you will see a series of messages displayed in the GUI that are either "Ramping to...(some temperature)" or "Stabilizing at...(some temperature)". Finally you will get a message for each module that says "Ready at Final Temperature" and the temperatures displayed will be near - 45 degrees C, the normal operating temperature for the 4 CCD's in the detector.

Click on “ENABLE Data Collection and EXIT” to close the temperature control GUI. The CCD’s will be held at – 45 C indefinitely until you open the temperature control GUI and give the command to go to some other temperature. **WARNING:** you must close the temperature control GUI now before you can use the detector to collect X-ray data

**Important note (do not skip this step):** Close and then reopen the “OPERATE Detector” process in **each** framebuffer PC. New, reinitialized copies of these two processes are required for stable communication with the data collection GUI at the UNIX workstation.

Start the data collection GUI at the UNIX workstation and proceed with X-ray data collection.

## **ADSC Quantum 210 Shutdown Procedure**

At the UNIX workstation shut down the data collection GUI with the command:

### **ccdsys shutdown**

On the desktop of either framebuffer PC double click on "Quantum Console" to open the CCD temperature control GUI.

Click on "CONNECT to Detector Process".  
Click on "ENABLE Temperature Control".

Click on "Warm up Detector to +10 C". This will start the process of gradually warming the 4 CCD's in the detector to +10 degrees C. This process takes about 1 hour.

During this time each of the CCD's is allowed to passively warm up in steps of 5 degrees C. You will see messages in the four reporting windows in the GUI such as "Ramping to...(some temperature)" or "Stabilizing at...(some temperature)". Finally you will get a message for each module that says "Ready at Final Temperature" and the temperatures displayed will be near +10C.

Next on the front panel of the detector power supply switch the "Cooling Power" off by pushing the rocker switch **in** at the **left** and then switch the "Controller Power" off by pushing the "Cooling Power" switch **in** at the **left**. The small green lights on these two switches will both go dark.

Shut the chiller power off using the black plastic switch on the **back** of the chiller.

### **WARNING**

**Do not** shut the chiller off using the buttons on the **front** panel or you will get caught in a logical trap when you try to restart the system later. Use the black, plastic switch on the **back**.

The red "Flow Stopped" light will now be lighted on the front panel of the firewall box.

Under normal conditions you are done now. The detector system is completely shut down except for the vacuum pump, which is still running. The vacuum pump should be left running whenever possible. Room temperature pumping on the detector is the best thing to do during scheduled shutdowns of the synchrotron ring. The detector vacuum system should be shut off only in exceptional circumstances such as

- Scheduled facility AC power shutdowns
- Maintenance on the vacuum pump itself (or the vacuum connections)

--Plans to move the detector to another location or ship it back for service

In these special cases only close the vacuum valve on the side of the detector and then shut off the vacuum pump. After shutting off the vacuum pump you can then shut off the main power switch (the black rocker switch) on the left side of the front panel of the firewall box. Push in on this switch at the **bottom** to shut of the main system AC power.