

# SPUPNIC ON

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CAVEAT: Details are changing fast around this instrument, so these notes might not be 100% accurate??

## Checklist:

Items to check	Checked
Instrument on Telescope	
Lodestar Acq. Camera/XY slide mounted & connected	
Lodestar rear-of-slit camera mounted & connected	
PLC comms connected	
Science CCD comms connected	
SubSystems power up	
<b>Functional tests, PLC</b>	
? Comparison mirror IN/OUT	
? Comparison mirror IN/OUT	
? Arc Lamps 1 & 2 ON/OFF	
? Slit illumination ON/OFF	
? Hartmann shutters A & B IN/OUT	
? Rear of slit mirror IN/OUT	
? Grating angle adjustment	
? Slit width adjustment	
? Filter wheel selection	
<b>Functional tests, Science Detector:</b>	
? CCD readout ? bias frame	
? CCD readout ? ARC image	
<b>Functional tests, TCS:</b>	
? XYslide reset/position initialize	
? Acq. Camera imaging ? view the slit	
<b>Functional test, rear-slit viewing camera:</b>	
? Image shows the slit	

*TODO: CLI startup & general computer interaction*

Note in Fig. 1 keyboard/mouse peripherals have been omitted for clarity

### **Vacuum Pumping and LN2 filling:**

1. The day before, connect the vacuum pump using the 500mm long vacuum hose (see Fig. 1) and pump-down overnight.
2. The next morning, check that the vacuum got down to the 10<sup>-6</sup> mbar range.
3. Shortly before mounting the instrument, while still vacuum pumping, start filling the cryostat with LN2.
4. After the first flask, close the cryostat vacuum valve and stop the pump.
5. Continue filling slowly until full, indicated by LN2 boiling in the outer funnel. When full, using a glove, quickly remove the inner funnel and dump the excess LN2 back in the filling flask.

### **On the Telescope:**

1. Ensure that the telescope is switched OFF
  2. Mount the instrument on the telescope (mechanical responsibility)
  3. Mount XYslide and Acquisition/autoguider camera
  4. Connect cabling and services:
  5. Numbered list item
    - At the instrument services panel (Fig. 2), connect the instrument mains supply, compressed air feed, and RS232 comms cable.
    - Check that the air pressure is 600KPa at the south pier and 300KPa on the instrument. See Fig. 5
    - The USB cable to the Lodestar acquisition camera.
    - XY slides cables (x4)
    - Dual optical fibre to the SDSU CCD controller. (Note that the SDSU fibre is an individual dual fibre cable fed thru the axis). Note the colour coding for the SDSU fibre (Rx cable connector is marked ?R?) ? see Fig. 3.
    - Connect the PLC RS232 cable to the RS232 connection point at the NW corner of the mirror cell.
    - Connect the rear-of-slit viewing camera USB cable to the USB/fibre convertor in the fibre box on the east side of the mirror cell.
1. Power up:
    - SDSU PSU (only 3 leds will be on ? see Fig. 4)
    - XY-Slides (south side of telescope - see Fig. 6)

Note: Fig. 4 shows the SDSU CCD controller after it has been fully initialized. In this state the detector is powered up. After a power up sequence or a reset (hard or soft), only three LEDs will be on ? in which state the detector is NOT YET powered up.

### **In the Warm Room:**

- Install the computer systems as per Fig. 7 below.
- Fire up the TCS software and check functionality as follows:
  1. Check that the XY slide initializes correctly (reset button on the emergency stop box on the north pier)
  2. Lodestar Acquisition CCD camera operational ? start exposures, check the readout occurs properly. (Note that the regular control box for the acquisition mirror is empty since it is not present.)
- On the SpUpNIC computer:
  1. Ensure that the SpUpNIC fibre is plugged in. When the fibre is correctly connected AND BOTH the computer and CCD controller are powered up, a green LED is ON on the interface (Fig 8).
  2. Ensure the dual monitors, keyboard & mouse are connected.
  3. Ensure the LAN cable and RS232 connector (to the PLC) are connected (Fig. 8).
- Check that the Lodestar industrial PC is installed (Fig. 7).
- At the back of the TCS-rack:
  1. check that the RS232 PLC cable is connected to the fibre, and the channel selector switch is correctly set (Fig 9, bottom insert box).
  2. check that the USB connection to the Lodestar rear-of-slit camera is plugged in to the USB-to-fibre convertor (Fig. 9, top insert box).
  3. check that the USB connection to the Lodestar acquisition camera is plugged in to the USB-to-fibre convertor, located on the right-hand side of the rear-of-slit camera fibre convertor.

**Check out the software/instrument functionality:**

- Power up the SpUpNIC PC (if not already running).
- Log in: User name: CCD - the usual password.
- Launch the instrument software by single clicking on the two desktop icons (in the sidebar):

SpUpNIC SpUpNIC QuickLook

- Position the Instrument Control GUI (SpUpNIC) on Monitor 1 and the Quicklook GUI (Detector Image display) on Monitor 2.

Note: You will be navigating between three tabs (top-left of Monitor 1) on the SpUpNIC Instrument Control GUI. Figs. 10, 11 & 12 show the Main View, Advanced and Engineering View tabs respectively.

- Test the CCD functionality as follows:

1. On the Main View, Panel 4 (Fig. 10) set 'Exposure Type' to BIAS, '# Exposures' to 1, and click 'Expose?'. The CCD raw image should look something like Fig. 13, with an average count around 600 (mouse-over image).
2. Check the CCD temperatures (Engineering View tab, Panel 3 (Fig 12): CCD 167.8K, cold finger 85K (both  $\pm 0.5K$ ). At the first fill the cold finger takes ~20 minutes to reach 94K then another ~1 hour to settle at 85K, and the CCD takes ~3 hours to reach 167K. Raw Image in the top pane, transect through the spectrum in the lower pane

- Initialise the PLC controlled mechanisms: Advanced tab, Panel 1 (Fig. 11) click the 'INIT ALL ? PLC subsystem?' button to initialise the PLC system.
- Check the instrument moving parts. Note that items a ? f are best checked by clicking directly on the relevant items on the Main View tab, Panel 6 (Fig. 10):

1. Move the offset guide mirror IN/OUT of beam.
2. Move the comparison ARC mirror IN/OUT of beam.
3. Switch the ARC lamps (1 & 2) on/off.
4. Check the slit illumination: with guide mirror OUT beam use the acquisition camera viewing system to check the slit illumination on/off control.
5. Check the Hartmann Shutters (A & B) operation (ignore warning ? it will disappear after a few seconds).
6. Check the rear of slit mirror.
7. Change the grating angle.
8. Change the slit width.
9. Select different filters.

- Do an ARC test exposure:

1. Slit width 1.5? (slit setting 10).

On the Telescope:

2. In the Main View tab, panel 2 (Fig. 10) check which grating is currently mounted and set the corresponding grating angle as per table 1:

The following three items are operated from the Main View tab, Panel 2 (Fig. 10). Select a value/number and click ?Go?:

8. a. b. Table 1: Suitable grating angle for a reasonable ARC exposure
- | Grating Number | Angle |
|----------------|-------|
| 4              | +5°   |
| 5**            | -3°   |
| 6              | +11°  |
| 7              | +15°  |
| 8              | +12°  |
| 9              | +1°   |
| 10             | -7°   |
| 11             | +7°   |
| 12             | +14°  |

5\*\* -3°

6 +11° 7 +15° 8 +12° 9 +1° 10 -7° 11 +7° 12 +14°

\*\* Note: for grating 5 use lamp 1 (CuNe)

- c. Main View tab, panel 6 (Fig. 10): Click on lamp 2 (CuAr) and the Arc-mirror will move In-beam automatically. NB: For grating 5, use lamp 1 (CuNe). d. In Panel 4 (Fig. 10): Select ?ARC? from the Exposure Type drop-down menu, type ?10? seconds as exposure time and click ?Expose?.

- e. Check that ARC lines are visible (see Fig. 15). Note that the appearance of the transect panel graph depends on user selection of which row is used. f. Very important: Switch OFF the Arc lamp by clicking it in panel 6 (Fig. 10).

9. Check the Lodestar rear-of-slit camera by single clicking on the desktop icon (in vertical side bar)

Lodestar

- a) To test: with slit open and slit illumination on, click "<https://topswiki.sao.ac.zacontinuous>" button (Figure 16) to take a run of 2 second exposures. Click "<https://topswiki.sao.ac.zaStop cont>" to finish when satisfied that there is light on the slit.

Figure 16: Screenshot of Potter's lodestar GUI