Notes for operation of POETS
050615ff aasg

Check-Out and Check-In

The system should be checked out to ONE point of contact from the POETS Master, currently *aasg*. When the system is returned, it will be checked back in by the point of contact and the POETS Master together. They will ensure that all components have been returned, identify and fix any hardware problems, and ensure that all data have been transferred properly off of the external hard disks.

General Information

Setup all items and connect cables **before** providing power
- in particular, the GPS should NOT be attached to the computer when either are powered

Be aware that the camera is limited by the length of the camera/computer cable (we have 3- and 6-m cables), the GPS external trigger cable (< 3-m), and the power adaptor cable. Some, or all, of these things may be attached to the telescope along with the camera to avoid problems.

The computer must have a keyboard attached to power on.

The passwords for the MITPoets Blue, Green, and Yellow computers are KBO_occ1, KBO_occ2, KBO_occ3, respectively.

Notes on using GPS software

The GPS receives data when powered on. Provide the largest sky-view possible for the antenna. To view the number of satellites, timing and position information, click on the "Spectrum TM-4 Control Software" icon on the desktop.
- The "time valid" square will turn bright blue with the time is valid (takes a few 10s of seconds, when 5 satellites are available)
- The "reference ready" square will turn bright blue when the position is valid (takes ~ few minutes, when 5 satellites are available)
- Can offset the local time from UT by clicking on "Local Time" or the "12:01" icon (second from the left in the icon menu).
- Can provide approximate latitude and longitude by clicking on the words. This speeds up the time required for "reference ready".

- To synchronize the PC clock, select the clock face icon (three from the right in the icon menu). Tests show the clock runs faster than the GPS by ~ 2 sec/day.
- Note that there is a delay based on the length of the antenna. The cables we use are LMR-195, which has 1.27 ns/ft delay. That means +21 ns delay for the 5-m cable and +104 ns delay for the 25-m cable. Enter this number in the "User Time Bias" window (access by the +/- icon at the bottom of the GPS software).
- We usually run the GPS in Timing Mode Static (where location is known and satellites just are used to get timing). To measure your location accurately, change the mode to Auto Survey. This procedure takes a few hours (allow at least 3-4) and will return your position to an accuracy of a few tens of meters.

Notes on using camera software

To start the camera, click on the "Ixon" icon on the desktop.

- When the software is opened, the shutter is automatically CLOSED. To open the shutter, select the "hardware" tab, "shutter control," and "permanently open". While taking images, this should be set at "permanently open".
- Upon starting the software, check that the temperature is set. Select the "hardware" tab, and "temperature". The cooler should be on, and the temp. can go down to –65º C air-cooled.
- Click on the white wrench icon to alter camera settings. We typically use "Kinetic" acquisition mode, with frame transfer checked. Note that the default mode should be 1Mhz Conventional. The pre-amp gain must be selected at the highest value (e.g. x4.7 or x2.4) for the most sensitive e~/ADU, which is that in the spec. sheet (make sure to note this setting in the observation log, since the value is not in the header).
- The standard setup is that images or cube are taken and afterward you store using "save as" .sif or .fit files. To spool fits files, ensuring that data for each frame are saved rather than at the end of the cube, select the "spooling" tab, check "enable spooling" and "fits" and enter a file stem path, and format (typically unsigned 16-bit integer). To automatically update the file numbers, check "Use Append Settings from Auto Save tab". Then go to the "Auto-Save" tab, check "Auto Increment". To get the standard *filestem.###.fits* format, use a start value of 1 and pad width of 3.
- You can see what the camera will image by clicking on the video camera icon. This uses your settings but does not save (just provides a preview).
- To take the acquisition you set up, click on the camera icon.
- If the software hangs on any frame, click on the red circle icon to stop the sequence. If spooling, the frames taken will be available (the data cube will just be short the final frame).
- The remote control icon can be used to change exposure time and EMG while previewing.

Notes on using GPS for accurate image timing

To use the GPS for accurate image timing:

- In the camera software, under setup acquisition (the white wrench icon), select "external start" triggering. Set up the exposure sequence and fits file spooling to your preference.
- Click on the camera icon to acquire the image. You will not see a preview, because the software is waiting for an external trigger.
- In the GPS software, click on the "POP Status" square. Select POP mode "One-Shot," with positive polarity. Set the start time (UT) and pulse width (10 usec works). Select OK.
- The software will start taking images at the set start time. If using a time stamp (can enable this by clicking on the orange, postage stamp icon either before taking the images or after), the date/time should be correct for all images EXCEPT spooled fits files. The timestamp on these will be from when the acquisition was started (by clicking the camera icon) rather than when data were taken as a result of the start pulse. In this case, one can use the relative time stamp and note that the first frame was taken within ~ 4 usec of the GPS POP start time.
- To have every frame triggered by GPS pulse, under camera setup acquisition, select "External" triggering and set the exposure time to 0. Note the "Minimum Trigger Period" so that you know the minimum repeat time allowed. Now each image in your Kinetic Series Length will wait for signal from the GPS to read out. Go to the GPS software and click on "POP status". Select POP mode "POP Repeat" and set the cycle time (in ms). Keep the pulse width at 10 us. Set the time to start and click ok. Make sure that the camera has been told to start (click on camera icon) prior to the GPS start time, but is started after setting up the GPS triggering.

Notes on power
The camera has a power adapter covering the range 100-250V, 47-63Hz, 0.8 A (the camera requires 7.5V and 4 A).

The GPS power adapter comes with interchangeable prongs. It covers the range from 100-240 V ~ .4 A, 47-63 Hz (converts to 24V, 0.4A). The prongs we have are US, Euro, AUS, and UK.

The computer and monitor are on universal power.

We have adapters for the KVM transmitter and receiver (which nominally require 120 V, 60 HZ, 24V for an output of 24VDC, 5A).

Some Troubleshooting
If "Data Allocation Failure" occurs when trying to open a large data cube in the camera software, enable virtual memory. This is under the "File" tab, "Virtual Memory".