LOIS MANUAL for MagIC

The user can run LOIS either directly on the host computer or remotely from another networked computer via a remote ssh session. At Magellan 1I, the observer will run LOIS remotely from the Observer Workstation - an account should be provided upon your arrival. After logging into the Observer Worksation you will need to ssh to magic.lco.cl under the observer account.
 # xhost +magic
 # ssh observer@ magic (password will be provided by the instrument specialist)

You will need to prepare your local data directory for the observing session (there is a separate data disk attached to magic.lco.cl mounted as /DATA ; cd into this directory and make a subdirectory for the night. This is just a temporary data storage for the night and should be erased at the end of each night or at least at the end of the run. Data can (and should) also be written directly to the observer workstation, where they can be stored during your run. Tape drives are available on this machine to copy your data for transport home.

Startup

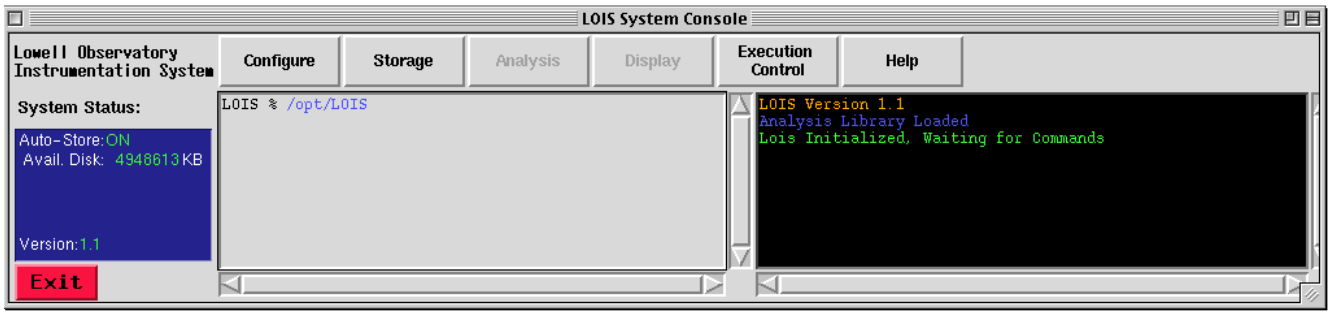
First, be sure that the CCD electronics have been powered ON (the power supply is the grey box to the upper left of the camera when the system is in the standard horizontal position).
To start LOIS from the observer user account, type

 # startlois.machinename

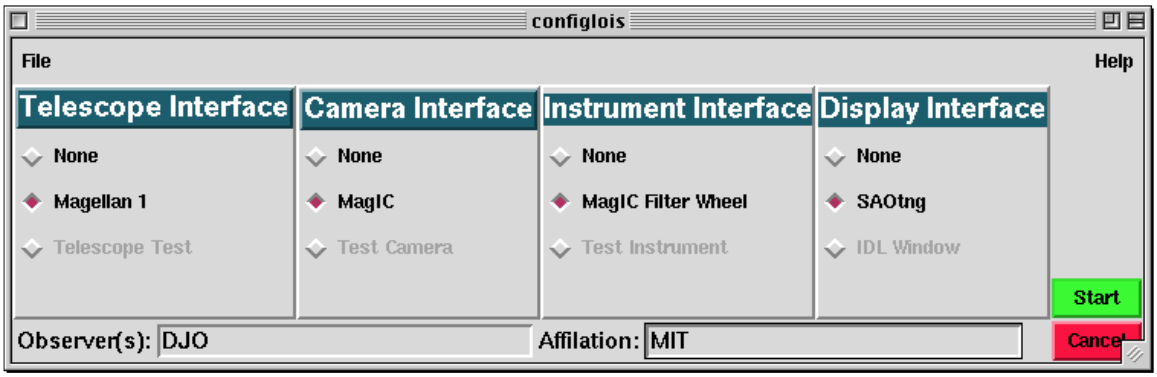
The current machinename should be substituted in the above command (at Magellan II, the current observer workstations are ZORRO or GUANACO). The start script should properly configure the required environment variables and path names, start the default display tool (ds9), and start the main LOIS program.

- First, the display tool window will appear on the screen.
- Next the "LOIS System Console" will appear at the bottom of your screen.

-Refer to “LOIS System Console” module document-

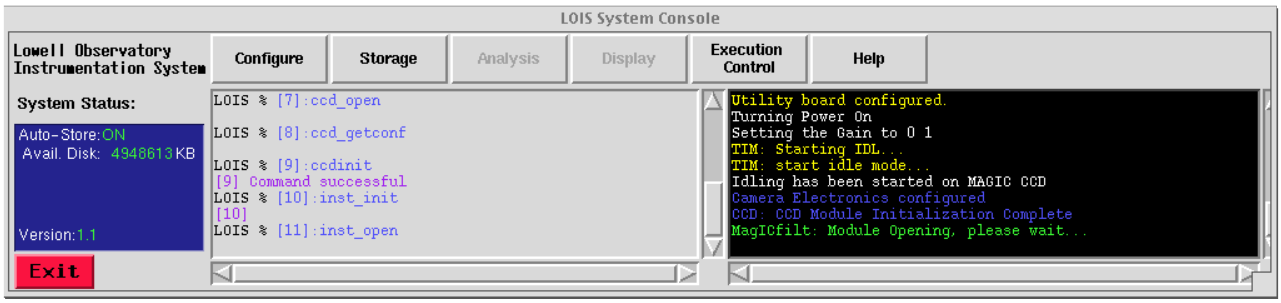


To prepare the current LOIS session, at the "LOIS System Console" window, click on the "Configure" button. The Configuration Window will popup:

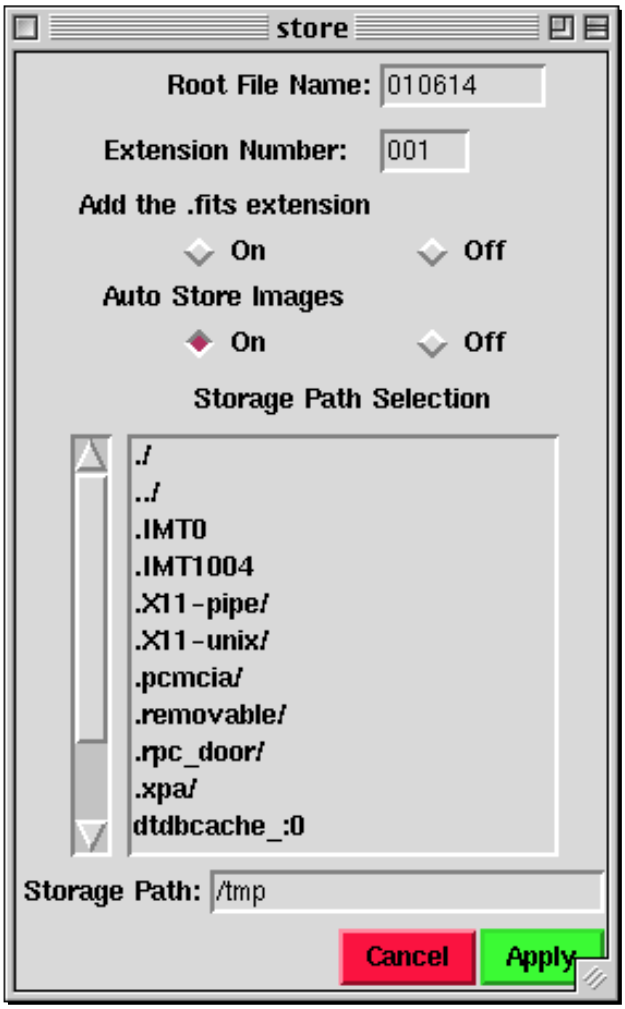


In the "Configure" window, type in the observer and affiliation information and click on "Start". The default configuration is for the Magellan 1 telescope module, the MagIC camera module, the MagIC Filter Wheel instrument module and the SAOtng (ds9) display interface. You have the option to disable any of these modules. After choosing your configuration, fill in the fields for Observer and Affiliation and press start.

Now, the camera, instrument, and telescope modules will be loaded and initialized. This process can take a few minutes, mostly for the initialization of the filter wheels. Three new GUI elements should appear; “Camera Control Module”, “Instrument Module”, and “Telescope Control Module”. For more information, refer to the module documents corresponding to the specific modules in your current configuration. Information regarding what is being loaded and what else is occurring can be found in the LOIS Console window log screen:



First, at the "LOIS System Console" window, click on the "Storage" button.
The Storage window will appear.



In the "Storage" window, set the pathname and file structure for the data and click on "Apply". You should store your data on magic.lco.cl in /DATA/whatever_directory_you_created. To be sure that the storage path exists, select the path via the GUI rather than typing a pathname. If you type a path that does not exist then the storage will not properly activate. The storage path is actually written to a configuration file in the observer account on magic.lco.cl at /home/observer/.lois/storage/fits.cfg and it is this file that will need to be edited if an incorrect path is set since the storage GUI in LOIS will not properly load with a bad default path.

[Remote Data Storage: Direct copy of data files from the running LOIS session to the observer workstation can be set up in advance by the instrument specialists. This is done via a script in the observer account named .remotedata – it is of the following form:
/usr/bin/rcp /tmp_space/$1 obsmag1a@guanaco.lco.cl:/home/obsmag1a/DATA/$1
where you should only change the user (obsmag1a or obsmag1b) and the data directory that you intend to write to…Note that this data directory and path are local on the Observer Workstation and do not correspond to the /DATA directory that you will temporarily store data to on magic.lco.cl. If you create new data directories on guanaco or zorro for each night of your run, then you will need to update this file each night.]

Once the proper data paths are set up, the instrument is ready for operations. All further operational details can be found in the module documents.

The system should be started and tested ahead of your observing run by the instrument specialist and should remain ready to be powered for your run. Under these conditions the operations of MagIC under LOIS have proven quite robust and the standard startup procedure should work. In the case that any odd error messages occur during the startup, simply exit the current LOIS session and run the start script again. If problems persist, then you should exit LOIS and cycle power on the CCD control electronics (a standard, off-on switch on the gray box next to the CCD control electronics) and the filter wheel (push in the large, red button on the power box to power down, then twist and pull it out to power up), then restart LOIS with the start script.

If the system is completely hung (not a likely occurrence);

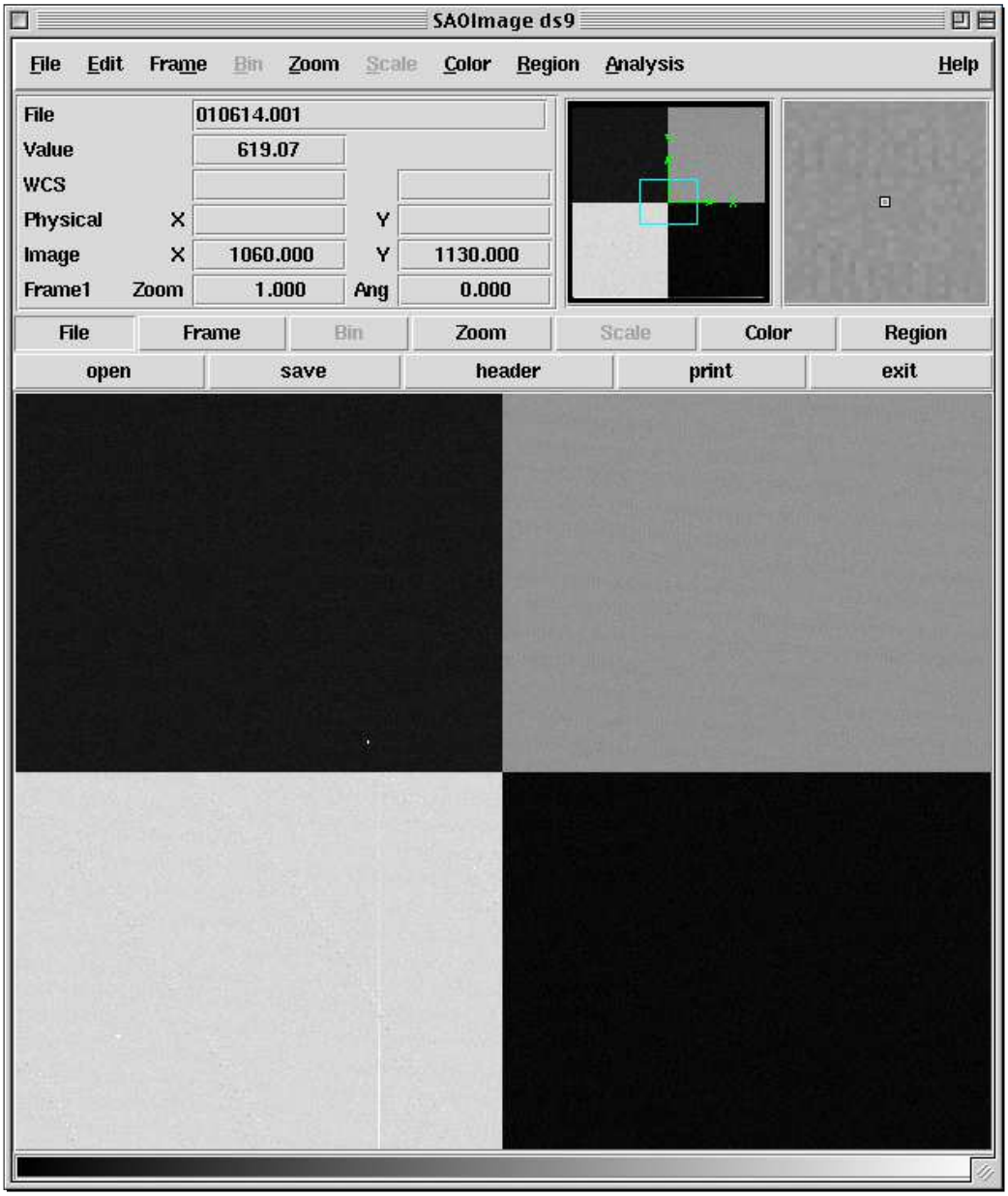
- reboot the instrument host computer magic.lco.cl, located downstairs (use boot -r)
- recycle power on electronics (grey power supply box) and filter wheel (red button)
- start over.

Shutdown

To shutdown the system at the end of a night, **first home the filter wheel**. Then simply hit the "Exit" button on the "LOIS Console Window". It will popup a dialog box to verify your request.

After you exit the LOIS session, you should turn off the power to the CCD electronics (the grey box). Please remember to home the filter wheel prior to ending the session. Also, remember to remove your local copy of data from the host computer magic.lco.cl prior to the end of your observing run. The data copy on magic.lco.cl is intended as a temporary backup, not the primary data storage, which should be located on the observer workstation.

Display Tool



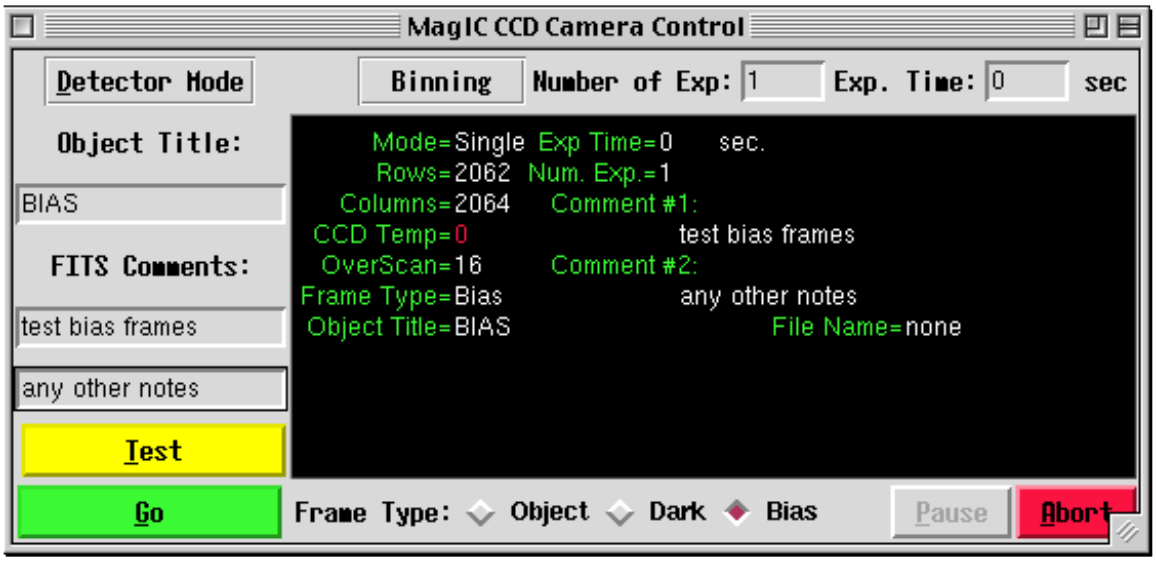
This tool is a standard implementation of SAOimage ds9 and is fully documented with its own help files.

All images are automatically displayed to the ds9 window.
For modifying the display (for future images) a useful LOIS commands is:

LOIS% : disp_set state=on min=XXX max=XXX scale=<log|linear|raw|auto>

Camera Module

The Camera is controlled through the "MagIC CCD Camera Control" module.



Detector Mode: currently Quad amp readout gain of 1 (approx 2e/ADU) is the default mode. Single amp readout mode is also implemented though not fully tested.

Binning: currently 1x1 binning is default (2x2 binning has also been tested and implemented).

Number of Exp: enter the number of exposures in a sequence.

Exp Time: enter the required exposure time in seconds.

Object Title: enter the object title. This will be entered into the FITS header as Object.

FITS Comments: provides two comment lines for the FITS header.

Frame Type: selection for frame type in the FITS header - Object opens the shutter, Dark and Bias do NOT open shutter.

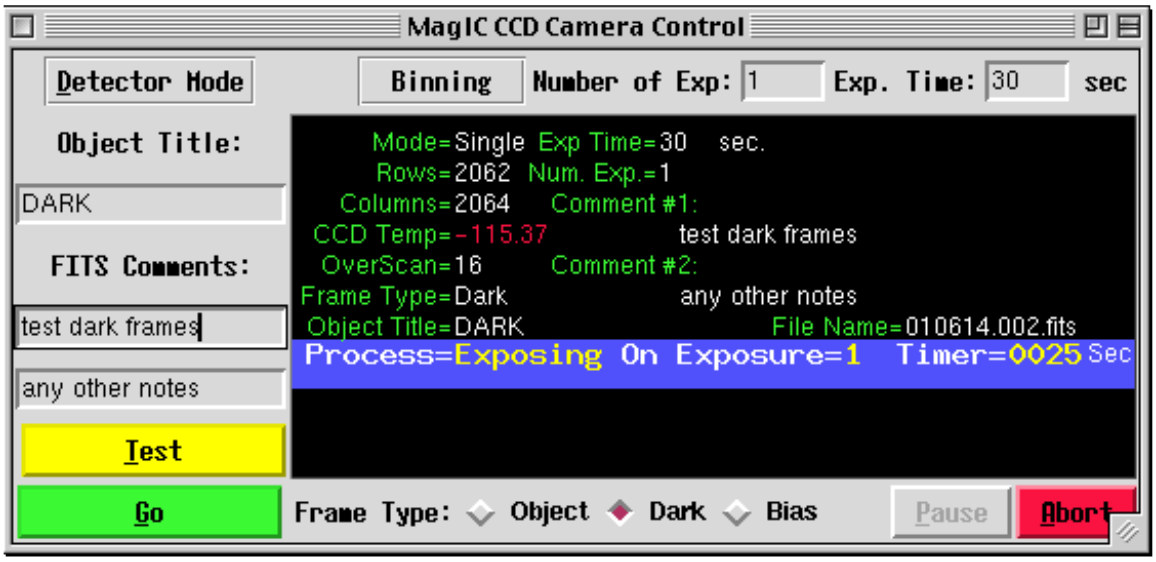
Test: takes the current exposure and writes to the temporary file "test.fits". This file will be overwriten by subsequent Test images (or it can be renamed and saved).

Go: takes the current exposure (sequence) and writes the data to the configured data directory. These files will not be overwritten on the host machine even if you use the same filename

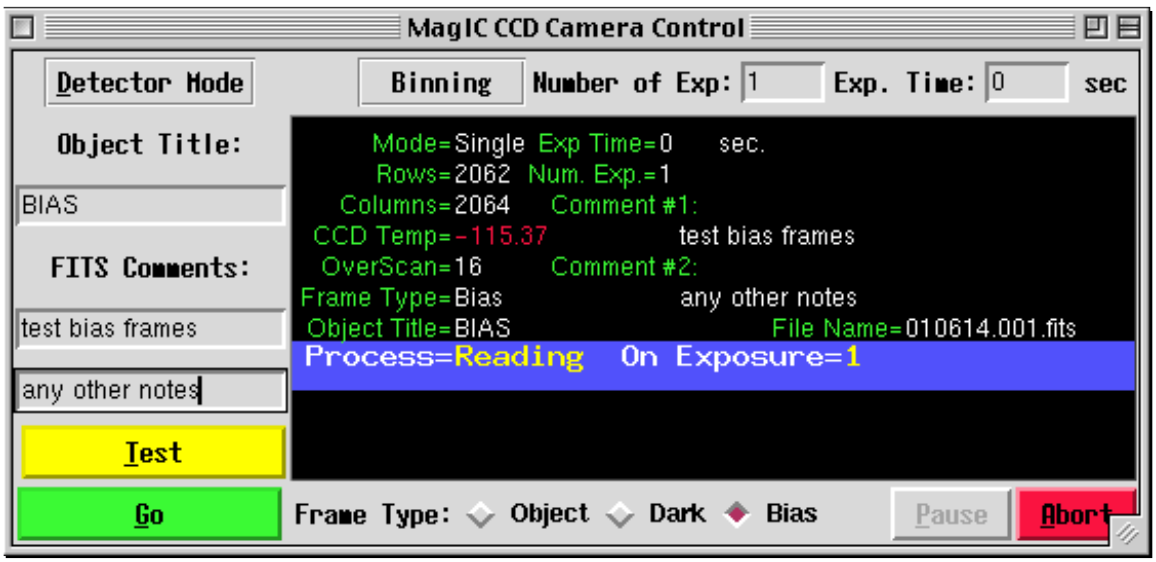
Abort: abort the current exposure or the current series of exposures: this does not handle aborting scripts at this point.

All information entered into the input fields will be mirrored to the Status window and recorded in the FITS header.

After you choose either Test or Go, the Process bar will keep you notified of what is occurring. While exposing, a timer will countdown :



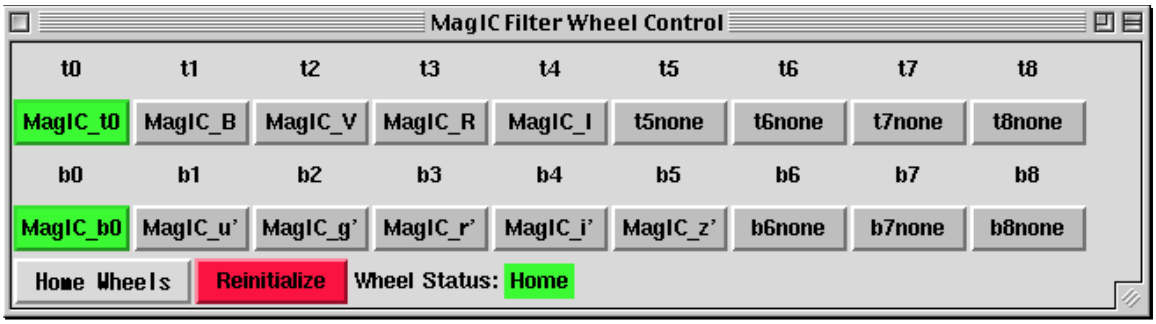
Once the exposure is complete the Process bar will indicate Reading until the file is readout and the system is ready for the next action.



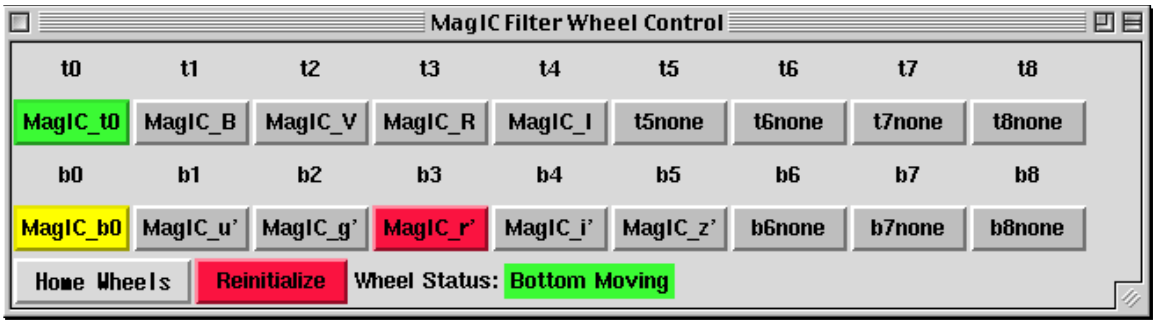
Instrument Module

The filter wheel is controlled through the "MagIC Filter Wheel Control" window.

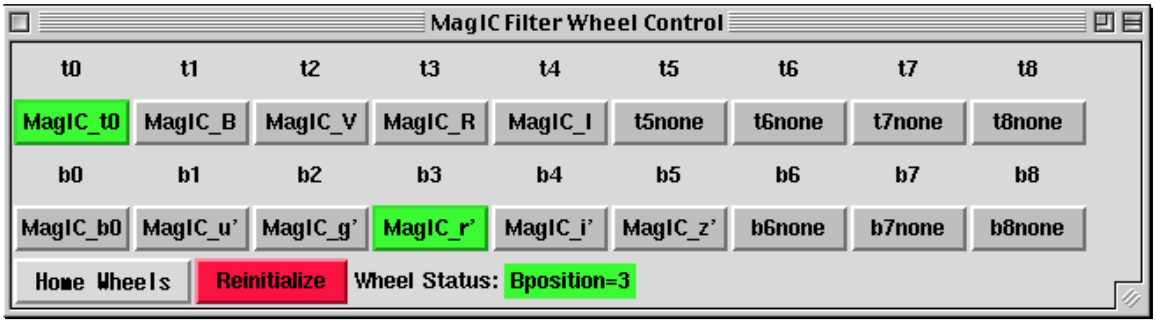
At startup, the GUI will popup with no filter names on each of the wheel positions. The wheels first need to be initialized and this is part of the opening procedure. Once initialization is complete the wheel positions should all have the correct filter identified or be marked as XXnone.



To move the filter wheels, click on the desired filter name buttons. The current filter on the wheels will be lit green. If moving to another filter position, the previous filter on the wheels will be lit yellow and the chosen filter on the wheels will be lit red.



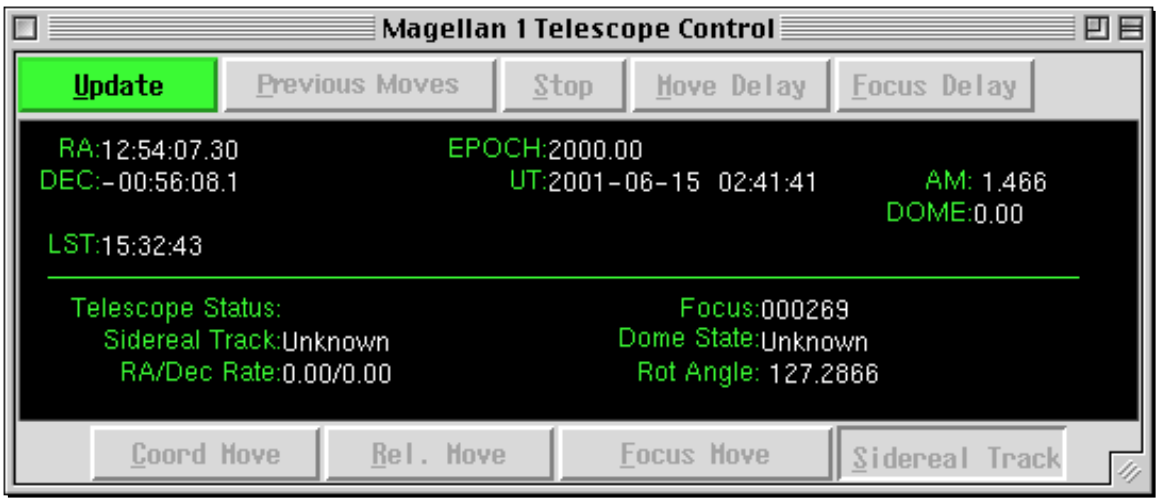
When the filter is in position it will be lit green: only 2 filters should be lit green at any one time and one of those filters should be in the open position (on the LEFT side of the display)



BE SURE THAT THE WHEEL NOT CONTAINING THE DESIRED FILTER IS IN THE OPEN POSITION.
To home the filter wheels, click on the "Home Wheels" button. When the filter wheels are done moving, the home filter positions will be lit green. Please home the filter wheels at the end of the night.

Telescope Control System Module

The "Magellan II Telescope Control Module" provides a communication link to the Magellan II TCS. Current communication is limited to information gathering, although the module is designed to be able to send commands to the TCS when that is an available option in the future.



This is NOT a real time display of the TCS information. In order to have current information, you will need to select the Update button.

Whenever you take an exposure (either via Test or Go), the TCS module will automatically be updated at the beginning of the exposure and the following information will be included in the FITS header:
RA:
Dec:
Epoch:
Airmass:
Focus:
Rotator Angle:

WARNING: Do not update the telescope module during an exposure or else the most recent update information will be written to the header instead of the original exposure information.

Scripts

Tcl scripts can be written to take a series of single and multiple exposures. LOIS currently looks for scripts in the top level startup directory, /home/observer.

An example of a script may look like this:

```
procedure_name{} {
filter wheel=0 pos=3
filter wheel=1 pos=6
go frame=object nexp=1 etime=7
filter wheel=0 pos=4
filter wheel=1 pos=8
go frame=object nexp=2 etime=2
}
```

The filter command line will move the filter wheels:

The wheel variable can either be 0 or 1, top or bottom filter wheel respectively.

The pos variable can have values between 0 and 8, filter position on the wheel.

The go command will take an exposure:

The frame variable is the frame type for the exposure, the options are bias, dark, or object.

The nexp variable is the number of exposures of the specified frame type and exposure time to take. This variable cannot have a value less than one.

The etime variable is the exposure time in units of seconds.

To run the script, type "source script_file_name" at the LOIS% prompt in the “LOIS System Console” window.

When you want to run the script, at the LOIS% prompt, type "procedure_name".

WARNING: scripts do not properly abort, so please only use tested scripts or use at own risk.

Problems and Recovery

If problems are encountered during a running LOIS session, the best course of action is to simply exit and restart the system.

Operational Issues

Catalog Files:

At the folded port on the CLAY telescope, the rotator angle offsets (to be included in the .CAT files) for target positions are different that those adopted at the Nasmyth ports. The rotator offsets should be 30 degrees south of the zenith and 210 degress north of the zenith in order to have the CCD aligned with the cardinal directions.