

# Multiple camera sync extension for autofocus and filters

## Master sequence

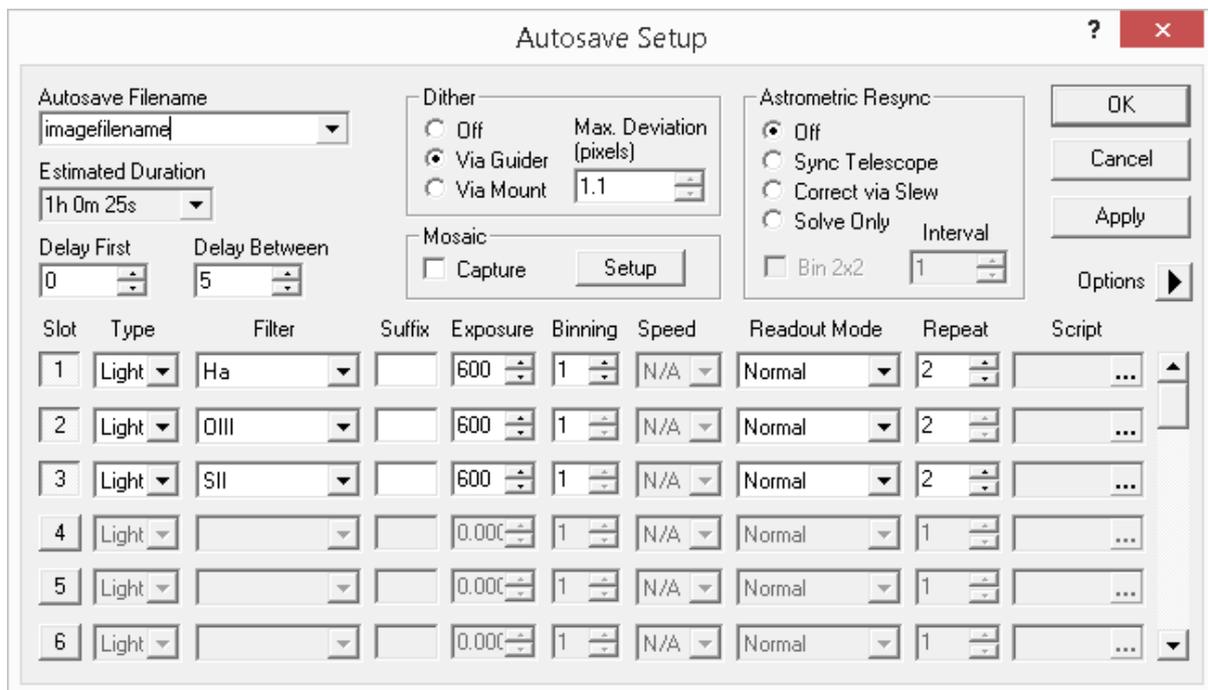
We need to refocus after n frames.

The master MUST use a sequence, as this does the dithering etc.

It is not possible to interrupt a sequence, refocus and then continue the sequence from where we left off. If we abort a sequence part way after n frames, it will rerun again from the beginning which is not desirable.

So the master sequence must be set to run one batch of images, after which we refocus and rerun.

e.g. The master sequence



Or possibly just one slot

Autosave Setup

?
✕

Autosave Filename  
imagefilename

Estimated Duration  
1h 0m 25s

Delay First: 0  
Delay Between: 5

Dither

Off    Max. Deviation (pixels): 1.1

Via Guider

Via Mount

Astrometric Resync

Off

Sync Telescope

Correct via Slew

Solve Only    Interval: 1

Bin 2x2

OK

Cancel

Apply

Options ▶

Slot	Type	Filter	Suffix	Exposure	Binning	Speed	Readout Mode	Repeat	Script
1	Light	Luminance		600	1	N/A	Normal	6	...
2	Light	OIII		600	1	N/A	Normal	2	...
3	Light	SII		600	1	N/A	Normal	2	...
4	Light			0.00C	1	N/A	Normal	1	...
5	Light			0.00C	1	N/A	Normal	1	...
6	Light			0.00C	1	N/A	Normal	1	...

When our program detects the end of the sequence it performs the following events on the master maxim.

- Guider stopped
- Autofocus started (not using the script, but commanding maxim/focusmax directly)
- Wait for autofocus
- Restart guider (possibly with reacquire guidestar)
- Re-run the sequence.

Now we must consider the slave.

Currently the slave is setup with one single exposure (saved in a sequence file)

Autosave Setup

?
✕

Autosave Filename  
imagefilenameslave

Estimated Duration  
10m 0s

Delay First: 0  
Delay Between: 5

Dither

Off    Max. Deviation (pixels): 1.1

Via Guider

Via Mount

Astrometric Resync

Off

Sync Telescope

Correct via Slew

Solve Only    Interval: 1

Bin 2x2

OK

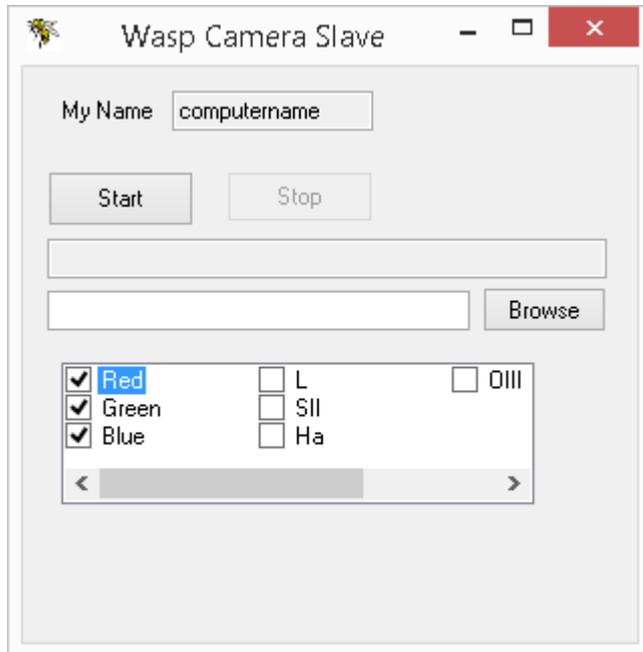
Cancel

Apply

Options ▶

Slot	Type	Filter	Suffix	Exposure	Binning	Speed	Readout Mode	Repeat	Script
1	Light	Luminance		600	1	N/A	Normal	1	...
2	Light	OIII		600	1	N/A	Normal	2	...
3	Light	SII		600	1	N/A	Normal	2	...
4	Light			0.00C	1	N/A	Normal	1	...
5	Light			0.00C	1	N/A	Normal	1	...
6	Light			0.00C	1	N/A	Normal	1	...

Currently, the software starts this single image sequence on the slave each time an exposure starts on the master. However, we wish to rotate the filters for each exposure. This means the software will need to have a list of filters through which we will rotate. The list of filters would come from Maxim e.g.



So, each time the master tells the slave to start an exposure, it will automatically amend the SEQ file (this is just a text file) to use the next checked filter in the list, looping.

### Now the autofocusing.

As discussed above, when the master reaches the end of the sequence, it stops the guider and initiates an autofocus.

The master program will send a message to the slave to initiate autofocus.

During the slave autofocus, the slave program will send status messages back to the master on the status of the autofocus.

The master will now wait

- It will poll the master maxim for the status of the master autofocus.
- It will poll the message from the slave program for the status of the slave autofocus.

When BOTH have completed the autofocus, it will restart the guiding, and rerun the current sequence.

### So, to summarise workflow

1. User starts guiding and sequence on master.
  - a. As each exposure starts on the master, a message is sent to the slave to start an exposure.
  - b. The slave will edit the single sequence file to have the next filter in the checked list.
  - c. The slave will run the single sequence file.
2. Master software detects end of sequence.

3. Master software stops guider
4. Master software tells master maxim to start autofocus
5. Master software tells slave software to start autofocus
  - a. The slave software will command maxim to start an autofocus
6. The master waits until the master autofocus and the slave autofocus have finished.
7. The master restarts the guider
8. The master reruns the original sequence.

For example, if the master is set to do 5 x 600s with a single filter and the slave is checked to do R,G and B, then the slave images would be

RGBRG (focus)

BRGBR (focus)

GBRGB (focus)

All the slave exposures would be the same duration. We can also set the suffix field to match the filter name.