Lacerta MGEN Quick Start Guide

While The Lacerta MGEN Superguider provides many functions for the advanced, it is actually quite simple to use even for a beginner. Here we describe the basic steps to start guiding.

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Lacerta MGEN Superguider consists of a handcontroller and the guidecamera. The handcontrolle has the patch bay on the lower end, with 5 different jacks:

assembling and starting

- first fix MGEN's camera to your guidescope, either by using the T2 thread or an optional adapter to 1,25". You can first estimate where the focal point should be, by measuring the focal length from the lens, and place MGEN's chip approximatly there. Take care to have a stable and not wobbly connection.

now plug in the provided cables in the following order:

- power cable to MGEN's handbox (12V power, middle positive). Watch the 4 red LED's blinking shortly one time – this signals power is connected.

- connect MGEN's camera to handbox using the 8 PIN cable. Take care that the cable is relaxed and does not pull on the camera at any time. If you use the 9x50 finder as guidescope, sling it one time loosely around it's base.
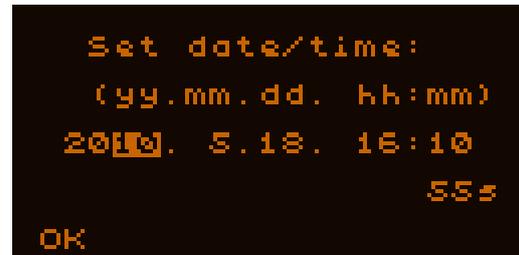
- connect handbox to your mount using the ST4 (6 PIN) cable

- if you want to use MGEN controlling your DSLR or CCD (recommended), connect it to the handbox 3,5mm jack using the proper camera cable

(If you obey this order, there is no danger that you plug the ST4 cable into the wrong port, which may affect the connectors.)

- switch on MGEN's handbox by pressing ESC

- enter date and time using the cursor buttons and SET, only needed if you want to have a time stamp on your guiding file. (You can download it to PC later on and watch what your guiding was like). Press ESC tp proceed.

- open a new file if you want MGEN to write a guiding file (not necessary at beginning).
   See chapter 4.2 for details. Press ESC to proceed.
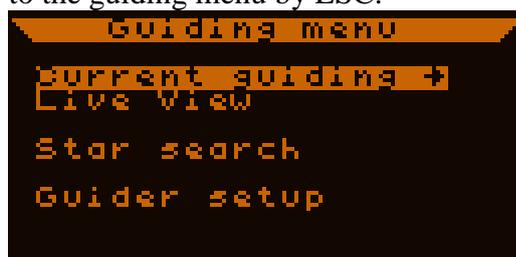

focusing using live view

Now we will focus a guidestar onto MGEN's camera. It is a good practice first to point the guidescope to a bright open cluster, like the Pleiades (Subaru) or the Beehive. So you have plenty of bright stars in the field of view. Be sure your mount has tracking switched on.

Place the cursor on "Guiding" in the main menu and press SET to enter the guiding menu. At first setup, mark "guider setup" and enter by SET. Your guidescope's focal length and Autoguide speed of your mount should be set there approximately, and CCD binning set to 1x1. Standard values are 180mm for the 9x50 finder, and 0,5x for most Goto mounts. Go back to the guiding menu by ESC.

Next, place the cursor on "live view" and press SET to enter live view.

Here you see a view of what MGEN's camera is seeing (M45, Subaru. MGEN on 9x50 Finderscope). On the right there are a few values, we recommend setting them like this when using the 9x50 finder scope:

gain (sensitivity) = 7
xp (exposure time) = 900ms
thr (threshold) =1%

The threshold is a limit value, above it MGEN takes signals as stars, beneath as noise which is cut off. Here in the live view we want to see even the faint stars, so we accept to have some noise too, especially at the left side of the screen. You may need to change the gain and exp setting with other guidescopes, but the given values are a good bet.

If you have estimated your focal distance well, and MGEN's camera is placed near focus already, you should see bigger os smaller dots on the screen – these are the stars. If you do not see any, you need to refocus coarsely or maybe make sure that you really have pointed your guidescope well onto a cluster using an eyepiece again. As you refocus slowly, watch the screen for stars to show up. A help is, if you use a Plössl type eyepiece and focus, you can exchange it with the camera and focus should be only a few mm different, usually you need to travel inwards.

Using the live view, focus until stars appear smallest. Now mark "select" and press SET. A small rectangle appears on the screen, and you can use the directional buttons to move it and place it onto a star.
Mark a brighter star that way, and press SET to enter the guiding window.

If you are eager to try out guiding the first time, you can also skip the next paragraph – it describes the fine-focussing aid MGEN has built in. For guiding, stars do not necessarily be in best focus, but of course it helps to find fainter guide stars.

Fine focussing: In the guiding window (upper right corner shoes "Gui"), you can switch the live display between thee modes entitled "Gui mask" (live view) "profile" (for focusing) and "drifts" (showing live the guide star movements you want to correct by guiding). Use the UP directional button to place the cursor onto the "<<" mark next to the name under the live view screen, and press SET to toggle between the modes. For focusing, we choose the "profile" screen.

The star is depicted not as a dot, but as a converging column from top to bottom. Use careful fine focusing to make that column slim. If your star is too bright, put down the gaun value, to make the star's display dimmer and the column better to interpret. Best is, if you make the column so small, so it does not quite reach the bottom, and focus until it is thinnest and longest. You may want to mark this best focus position on your guidescope, or just fix it and do not remove MGEN's camera any more. So you need to do this only at the first time.
Go back to "gui mask" and watch your focused guide star on the screen.

Calibration

For successful autoguiding, MGEN Superguider needs to know how your mount is moving in the part of the sky you want to take photographs. So it is necessary to let it make a short test run, where it is outputting signals to the mount, and analyses how the guide star is moving accordingly. This is called calibration, and you need to do it every time you choose a new target. Usually it only takes half a minute or so. While the signals are put out visible on the red LED's next to the directional buttons, you see the star moving on the live screen. Here is how to do the calibration.

With your guide star on the screen, place the cursor using the UP button on the page numbers on the bottom right. By pressing SET you toggle between the pages, and for calibration we choose page 2/5. On that page move the cursor up to "calibration" and press SET.

On the Calibration screen mark "Delete cal." if there has already been a calibration before, or press directly "Calibrate". Watch the calibration routine taking place, moving DEC, moving RA and finally finishing and outputting some values. Orthogonality is good over 90%.
The mount is driven to the start position before calibrating, and by pressing ESC twice you return to the guiding window.

Start Autoguiding

This is the sweet part – place cursor on the page switch at bootom right, by pressing SET or LEFT toggle to page 1, mark "AG start" and press SET. Autoguiding starts!

Well, some additional remarks should help getting acquainted!

- On page 1 we see the same values than on the former live view screen: gain – exp – threshold. Just threshold is set to 10% by default, to keep more noise out. If you have a weak guidestar, you can lower this value a bit, or increase gain or exposure time, but not so much noise is appearing. Do not make the guide star too small (1 pixel), that prevents subpixel calculation of the star center.

- on pages 3 and 4 you can adjust the values that determine and fine tune your guiding. Place the cursor on the page number and toggle using LEFT or RIGHT or SET.

there you find following values, which are explained in short:
- Num (number of exposures) – normally set to 1.
You normally want a signal output after every guide star measurement.
- tol (tolerance) – a value that defines how much drift you allow, a good and strong value for the 9x50 finder is 0,1 pixel. If you have a different guidescope add 0,1 for every 200mm focal length.
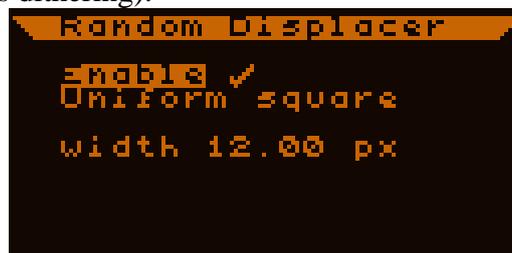- aggr (aggressivity) – how many percent of the calculated correction should be applied. This is set to 70% initially, to feather too strong corrections. Here you can play around later on to make drifts as small as possible, depending on your special mount and seeing.
- mode – there are three guiding modes available, mode 2 being preferred. In that mode signals are output even before the guidestar touches the tolerance limit.

Dithering

In the main menu you find the entry "random displace". This is a special function that greatly helps improving your pictures. It means, that between the exposures of your Deepsky camera the guider directs the guidestar (and your camera) to a little different position, before starting the next exposure. When stacking your exposures later on, the software will stack on the stars and the hotpixels and dark current of your camera will not be stackes but averaged out. Result are smoother pictures with less noise and more weak signal to be extracted in picture processing. This is the gold standard in modern astrophotography.

Of course, you need to synchronize dithering movements and your deepsky exposures. With your DSLR (or even CCD) connected, you can use the fullsized exposure programs available in MGEN, and dithering takes place automatically between the exposures when enabled. If you do not use the exposure program, there will be no dithering. (Exception: You use APT program to trigger MGENs dithering).

This is a hint you do not need to do from the beginning, but we want to encourage you to go ahead, and take full advantage of what MGEN can do for you.

Here are some important values summarized for quick reference

Guider Setup:
Object focus: 180mm
Guide speed 0,5x (also check the value in your mounts controller)
binning 1x1

Live View screen:
Gain 7
exp 900ms
thresh. 1 or 2 (to see all stars and dark-noise)

Guide screen:
Gain 6 or 7 or 8 (depend of guide star!)
exp between 200 and 2000ms (depend of guide star and guiding interval!)
thresh. Between 7 and 10 (to guide ONLY on the Guide-Star)

Guiding values in RA und DEC:
Num 1
tol. 0,10
aggr. 70%
mode 2

Dithering (random diplacement):
enable !!!   10 pixel width recommended

Exposure program:
Set wait time long enough, so your camera can save your photo – at least 5sec recommended. We also recommend not to use mirror lock, it has little influence in deepsky photography.

Guiding file:
If opened at startup, it is written along with your guiding only while using the exposure program. Reason is, to have the guiding file parallel to a particular exposure on your deepsky camera. Use MGEN's software to download it and convert into diagrams. Use it to check the heartbeat of your mount, and get information about possible gear problems, if guiding is not like expected.

happy tracking - your Lacerta MGEN team!

For detailed reference please refer to the manual!

URL: www.teleskop-austria.com