

# The StarLock Utility

*Version 1.0c*  
19 January 2012

## Introduction

The StarLock Utility program provides the ability to:

- Focusing the Wide and Narrow Field optic.
- Install Firmware Updates
- StarLock Tracking Performance

While your StarLock comes pre-focused and loaded with the latest firmware from the factory, vibration, transport and handling may cause the focus to shift over time. Similarly, Meade is constantly working to improve the performance of the product and it is common for new features or performance improvements in the software to be developed.

Finally, if you use your telescope with a computer in the field, the StarLock utility will allow you to monitor how your image session is going and help you tune the guide rate to optimize performance.

## Installation

The StarLock utility will normally be installed when install the Autostar Suite DVD that comes with your telescope. If you have downloaded the program from Meade's website, the StarLock Utility program is packaged in an install file with a file name of the form *StarLockUtilSetup\_Vx.y.zip*, where x and y are version and sub-version numbers. To install the program, download it to a working directory and execute the program. It will walk you through the setup.

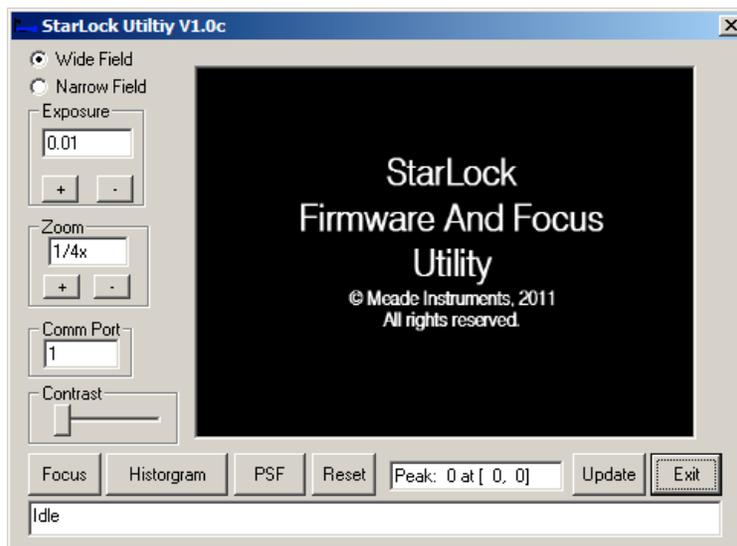
## Connection

In order to run the Utility program the StarLock needs to be attached to a Meade telescope by the StarLock interface cable connected to the "StarLock Telescope Connector" on the left side of the back of the StarLock. The telescope will need to be powered and turned on to supply power to the StarLock. Next you need to attach a standard Meade AutoStar telescope interface cable to the "PC" connector on the right side of rear of the StarLock. This cable is attached to a serial port on the back of your PC or via the USB/Serial connector supplied with your mount.

## Running The Software

From your Start Menu, click on Programs and then StarLockUtility to start the program. Alternatively, you can start the program from within AutostarSuite by selecting **Telescope/StarLock Util.**

When the program begins to execute, the dialog below will appear



Before beginning to use the program, check that the correct COMM port number is entered in the dialog box, and if you have changed serial ports, click on the *Reset Connection* button on the display.

## Focusing

To focus your StarLock click on the *Reset Connection* button. Then, select which imager you wish to focus by clicking on the “Wide Field” or “Narrow Field” button. Now click on the “Focus” button. After a few seconds a “Downloading” progress message should appear on the bottom line of the display.

At this point you should see an image from the StarLock in the main window of the dialog. The sensors on the StarLock are 1280x1024 pixels. In order to speed the update process, the downloaded images are a maximum of 320x240 pixels. The “Binning” control allows you to select how many pixels of the original image are binned together to make the displayed image.

For example, binning 4x4 results in 16 pixels being combined into a single pixel of the final display and image size being 320x240. If you use a lower binning number, the image is cropped, showing you only the center 320x240 pixels of the resulting image.

Typical focusing starts by using a high binning factor until rough focus is achieved. Then you can step down the binning factor until you reach 1x1 to obtain best focus by examining the 320x240 region at the center of the imager.

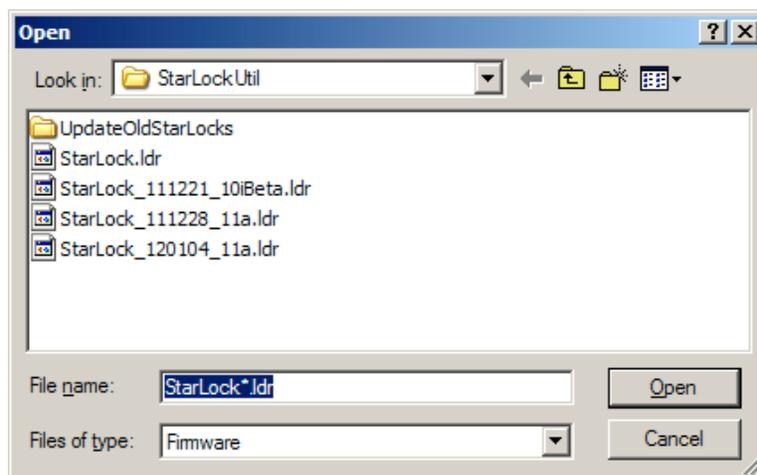
It is therefore important that you target be as well centered as possible as you start focusing.

Additional controls that will be helpful are the “Exposure” control and the “Contrast” control. For most nighttime focusing the contrast control should be set about 2/3rds toward the right. For daylight focusing the contrast should be all the way to the left. This control allows you to look at only a subrange of an image. It is primarily for testing the StarLock using nighttime stars that may be very faint. While rough focusing can be achieved during daylight hours. It will need final adjustment looking at stars to get optimal performance.

During focusing, the location and intensity of brightest feature in the image are displayed below the image and updated each time the image is refreshed. It is important to adjust your exposure downward if your peak values are hitting 255. When targeting an artificial star, best focus is obtained when brightness is peaked.

## Updating

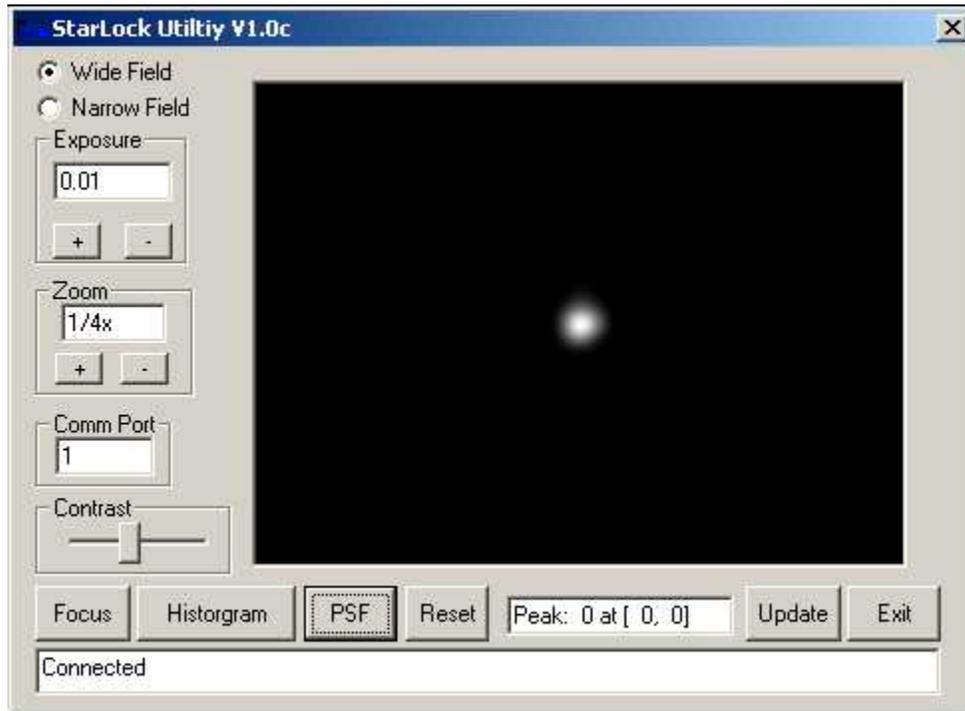
The Utility program also has the ability to load new firmware into the StarLock. The firmware release code must first be downloaded from Meade’s website. It should be put in an easily located directory such as your desktop. The file will be named “StarLock\_Vxy.Ldr”. To update the firmware, establish a serial connection with the StarLock by getting Focus images downloading. Once you have a good connection, click the button again to stop focusing and then click the “Update” button. A file dialog similar to the one below will appear:



Navigate to the new firmware version and either double click on it, or select it and click on “Open”. The status bar at the bottom of the screen will show you the firmware being download. After the firmware has been successfully downloaded and checked for correctness, it will be burned into the StarLock. **DO NOT POWER OFF THE COMPUTER OR TELESCOPE DURING THIS PROCESS.** Once the new firmware has been successfully burned into the StarLock a message indicating the operation is complete will be posted on the bottom of the display. Close the StarLock Utility program and cycle the telescope power off and then on again to complete the update.

## Monitoring StarLock Guiding

There are two different methods of monitoring StarLock guide performance. The first method is to look at the guiding history as a “Point Spread Function”. This presentation basically sums up the images of the guide star at each guide update cycle. It provides a good prediction of how well tracking is going and on the seeing conditions. To use this method, click on the PSF button.

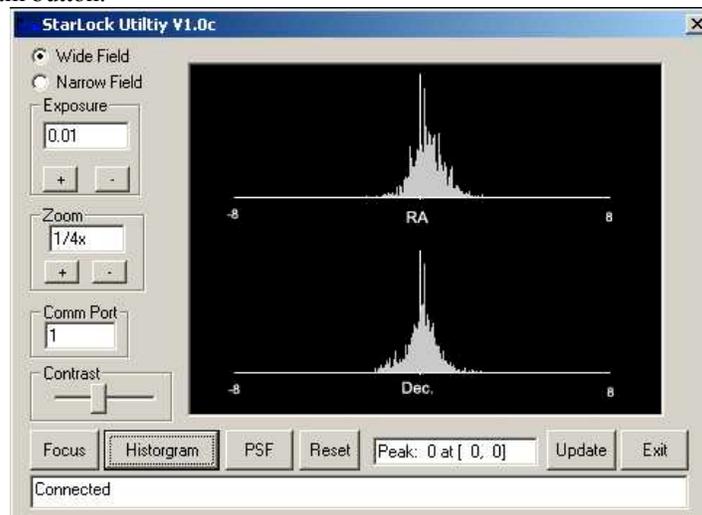


The field of view of the display is approximately 20 arc seconds across. If your star is stretched horizontally, you are either not tracking aggressively enough, or you are tracking too aggressively. Change the Guide Rate setting under the StarLock menu on the telescope, reset the PSF and start a new measurement, if your star gets worse, change the Guide Rate in the other direction. Adjust your rate for best results with your seeing conditions.

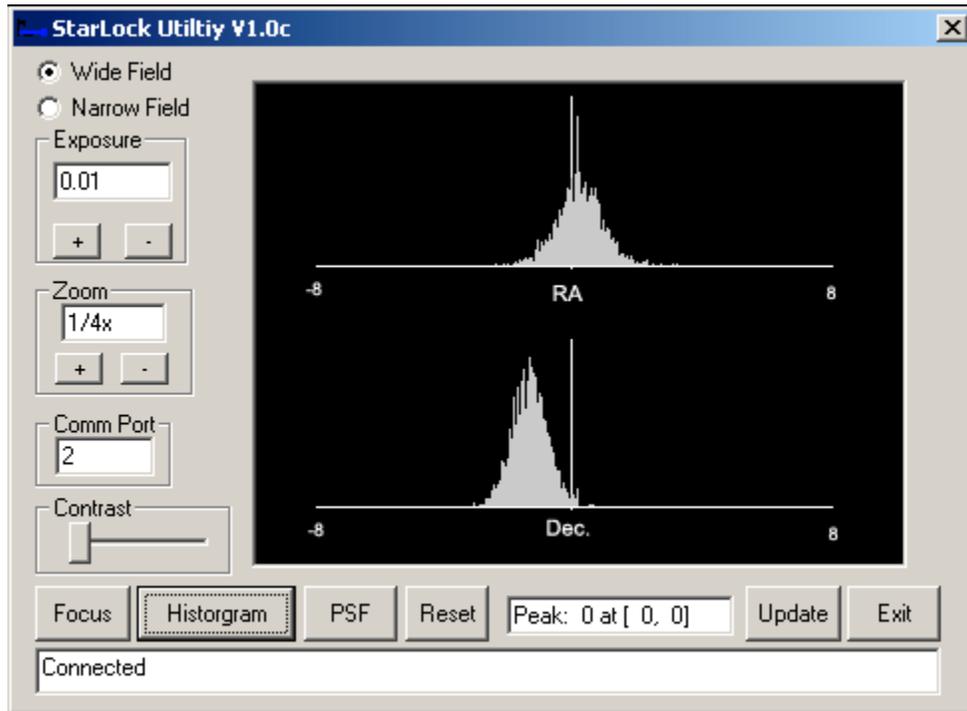
In general, if seeing is poor, you will need to reduce your guide rate so you do not chase seeing. Under better conditions you can increase guide rates until over correction starts to make the scope jump back and forth across the star making it too wide again.

## Histograms

The other way to monitor tracking is with the histogram function. This plots how many corrections are made at each distance. The result is typically a Gaussian distribution function. The plot will tell you about seeing and your alignment quality. To make this measurement click on the Histogram button.



The example above is pretty typical. You can see that both the RA and DEC corrections are plotted in the range of  $-8$  to  $+8$  arc seconds. The width of the distribution is an indication of seeing conditions. In this case seeing is about  $1/5$  to  $2$  arc minutes. Both distributions are pretty symmetric and centered on zero. This indicates a good telescope alignment.



The plot above tells you that the scope is not too well aligned. Notice that the DEC guide corrections are not centered around zero. This is because the object is drifting down in Declination due to the scope being poorly polar aligned. While the StarLock is succeeding in tracking the star, you will get field rotation over time due to scope misalignment and may not be able to point to targets near the poles. When you see this type of plot it is time to drift align, or realign your scope.

If you see an RA histogram with two humps, you are guiding too aggressively and need to reduce you Guide Rate.