

## **Setting up a Meade LX200 GPS, an SBIG ST Series CCD Imager, TheSky6, and CCDSoft – The Basics**

This will explain how to set up a Meade LX200 GPS telescope, an SBIG ST series CCD Imager, with TheSky6 and CCDSoft – assuming TheSky6 and CCDSoft is already installed on the controlling computer.

### **Step 1: Connecting the Telescope to the Computer**

The Meade LX200 GPS telescopes are capable of being controlled by means of the Meade Hand Pad/Controller, and/or control by personal computer. While connected to a computer, the Hand Controller may still be used if needed without any interruption to the computer.

On the fork mount base of the LX200, you will find the face plate where all the cables connect. This is the access panel of the telescope. Here, the power supply, the hand controller, CCD auto-guider cable, and computer serial port will connect. The computer will connect to the telescope by means of the serial port and the cables can be purchased or easily made. For longer cables, a high quality phone line may be used. Once you have the cable connected to the computer serial port and the telescope, verify the connection by using TheSky6.

### **Step 2: Connecting the CCD Imager to the telescope**

Attach the CCD Imager by using the nosepiece that was designed for the camera. If you decide to use the Meade micro-focuser, the nosepiece of the camera will attach directly to the focuser and the two focuser set screws can be secured to the camera (double check this!). If a focal reducer is used, it will attach between the CCD imager and the focuser. If the Meade diagonal is used, the focal reducer will be mounted between the CCD and the diagonal. There are many types of focal reducers as well as a variation of focal reducer positions that will allow different focal lengths. This will be explained later. A word of caution! If the Meade micro-focuser is used with the SBIG CCD, it will come in contact with the fork mount when slewing to certain positions. The maximum slew limits will need to be set when the micro-focuser is used.

### **Step 3: Connecting the CCD Imager to the Computer**

This is a fairly easy step. Most CCD imagers now use USB for computer connection. USB is much faster than the older parallel-port versions and more reliable. But, many parallel-port version CCD imagers are still very active today. If your CCD is a USB version, simply plug it into any USB port on your computer - if it's a parallel version, connect it to the 25 pin parallel port on your computer. There are also adapter kits that

will convert your parallel port CCD imager to USB, but regardless of the conversion, the imager will still work at parallel speed. The other option is to return your CCD imager to SBIG for a rather expensive upgrade.

#### **Step 4: Configuring CCDSoft for Your Imager**

Run CCDSoft and open the “camera” tab. Here you will see the configuration window for the camera control. Select the “setup” tab and then choose your particular camera in the “camera” drop-down menu. Once selected, click the “settings” button and make any adjustments needed for your camera. Also under the “setup” tab, you will need to setup a filter wheel (if used), a focuser (Meade micro-focuser is not supported), and any other necessary settings. Once the CCD is connected to your computer and the power cord is plugged in, turn on the computer, start CCDSoft, open the camera control window and click on “connect”. The software should then show the camera as “connected” under Status, and you should be able to see the temperature setting. Open the temperature setting and verify that the “desired temperature” is set close to the “recommended temperature”. For example: If the “recommended temperature” is  $-5^{\circ}\text{C}$ . and the “desired temperature” is set to  $-30^{\circ}\text{C}$ ., it’s likely the camera will never reach the “desired temperature” and the camera will overwork itself to try and achieve the temperature. If your camera fails to connect and you get an error, you can go to the SBIG Web site for a solution to the particular error (normally a code). Make any further set-up changes needed and disconnect the camera for now.

#### **Step 5: Configuring TheSky6 Professional for the LX200 GPS**

Run TheSky6 Professional from your computer and select “Telescope” > Telescope Set-up > Name: drop down menu > Meade LX200GPS. Once this is selected, choose the correct COM port that will allow the computer to connect to the LX200 GPS (refer to TheSky6 help menu for further assistance and setup options.) Finally, from the main window in TheSky6, select Telescope > Link > Establish. It should now show a connection to the telescope.

Now, run CCDSoft and connect to your camera. At this point, you should have a connection with your telescope and camera.

#### **Step 6: Synchronizing the CCD Imager**

Once you have read the documentation on CCDSoft and have your camera set-up properly, it needs to be synchronized. CCDSoft has an automated synchronization process that can not get any easier. In the “camera control” window, select the auto-guide tab and then click on synchronize. The software will take a series of images and make fine adjustments in your scopes positions. It does this to determine the motion of

the scope drive. Once it completes this process, you will be able to use the auto-guider as well as auto-center objects in your field of view.

### **Step 7: Synchronizing the Telescope with TheSky6**

The CCD imager must be synchronized before performing this step. Look at the planetarium screen of TheSky6 and verify the telescope crosshairs are visible. Manually slew the telescope to a known brighter star and center. In CCDSoft, select the Autoguide tab in the Camera Control window and click the Imager radio button (below it is the guider radio button). Take a short exposure to verify that the known star is within the field of view. If any focusing is needed, it should be done now, but perfect focus is not needed at this point – just get it close. For now, use the LX200 GPS hand controller for focusing. In the CCDSoft Right click on the known star and a menu will appear that has the options “center brightest object” or “center pointer position”. Select “center cursor position”. CCDSoft will then attempt to center the position of the cursor. Once it has completed, take another short exposure and check the star position. It should be closer to the center of the field of view now, but sometimes this process takes 2 or 3 tries before obtaining perfect center. Once the star is centered in the field of view, click on the star in TheSky6 and a window will pop-up. Within this menu, you will see the telescope “sync” option. Click the “sync” button and TheSky6 will ask to confirm the synchronization. Click OK and now the computer and telescope will be synchronized.

By going through these steps, it will give you a good, basic start-up for the LX200 GPS, an SBIG ST series imager, using TheSky6 and CCDSoft. From here, TPoint or equivalent programs can be run to help improve the pointing and go-to accuracy. Remember to keep TheSky6 and CCDSoft upgraded for the best results.

More will be added to this...

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