

Observational Astronomy

ASTR 2401

Texas Tech University

**OBSERVING MANUAL**

The steps outlined below are a guide to setting up and shutting down at the observatory and using the computerized control system for rapid and easy location of celestial objects. This system, known as **GOTO**, is often much easier to use than manual pointing, or "star-hopping". However, there are a number of procedures that must be followed in order to avoid damage to the telescopes. You should fully familiarize yourself with these setup and shutdown procedures **BEFORE** heading out to the observatory.

**AT NO TIME TRY TO MOVE ANY OF THE TELESCOPES BY HAND. ONLY USE THE HAND CONTROL OR THE COMPUTER!**

## **12" Meade LX200 GPS Telescopes**

### **Startup**

1. When you first come into the building, you will need to get a red torch from the box on the bench in the classroom. Whoever is in charge of the night, make sure that you enter into the logbook the time of arrival and departure, which telescopes were used, and for what purpose, and the number of persons attending.
2. Once you have done this, go into the roll-off building and remove the roof lock. This is located in the south-west corner of the building at the base of the roof. Remove the metal bar and leave it on the bench in the corner.
3. Get the gloves from the small drawer on the south end of the east bench. You will need these to protect your hands from the wire when opening the roof. Using the electric motor, roll back the roof. You will need to hold the wire to keep tension on the wire that is **UNWINDING**. The roof can roll back about 6 feet past the end of the building. **Be careful not to roll it all the way to the stops!** Sometimes the motor may stall due to friction in the roof rollers. If this happens, **QUICKLY** use the hand winch to wind to roof back until the motor picks up again.
4. Once the roof is open, take the dust cover off the telescope. Be careful not to dislodge the telescope caps. Once it is off, put the cover inside the cupboard on the north side of the computer.
5. Take off the telescope cover and the cover on the finderscope and put them in the drawer above cupboard where you put the dust cover.
6. Turn on the telescope. The switch is on the panel at the base of the telescope.
7. While the telescope is starting, turn on the computer monitor and if the computer is off, turn it on as well.

8. Once the computer has booted up, start the program that controls the telescope. This program is called "**The Sky**". If the computer was on when you arrived, the program should already be running. Check for it on the task bar at the bottom of the screen. If it is not running, start it up. You will find a shortcut to this program on the desktop, near the top right. Double click on this icon to start the program.
9. Once the telescope has finished starting up, press "**MODE**" on the hand paddle twice. You should now see "**Daylight Saving: YES?**" or "**Daylight Saving: NO?**" depending on whether or not daylight saving time is in operation. If the correct one is displayed, press "**ENTER**". If it is not displayed, call the professor.
10. Now the hand paddle should be displaying a time. Use the up/down buttons at the bottom of the hand paddle to enter the **CORRECT** value for the time. Then press "**ENTER**".
11. Now the hand paddle should be displaying a date. Use the up/down buttons at the bottom of the hand paddle to enter the **CORRECT** date. Then press "**ENTER**".
12. Once this is done, the hand paddle should display "**ALIGN**". Press "**MODE**" twice, and the hand paddle should now display "**SETUP**".
13. Once this is displayed, you are ready to start moving the telescope.
14. If you are using the telescope for visual observing, slew the telescope towards the south so that the back of the telescope is accessible. If the CCD is connected, you will need to remove it and place it in the case which you will find in the cupboard. Make sure you put the cap on the CCD.
15. Once the CCD is removed, get the visual back adapter, the star diagonal and the eyepieces from the drawer. Screw on the adapter and then put in the star diagonal. Then you can put whichever eyepiece you want into the star diagonal.
16. Once you have done this, use the 4 slew buttons on the telescope hand control to slew the telescope to a bright star that you know the name of. (**NOT Polaris!**) Using the finderscope and the slew buttons, move the telescope until the star is centered on the crosshairs of the finder. You can vary the speed at which the telescope moves by pressing the "**SPEED**" button and then scrolling through the slew rates using the up/down buttons. Press **ENTER** after you have chosen the speed you want. Once you have the star centered on the crosshairs, look through the main telescope and center the star in the view of the main telescope.
17. Once you have the star centered, press the "**STAR**" button on the hand paddle and then if "**NAMED**" is displayed, press **ENTER**". Now scroll through the names using the up/down buttons until you come to the name of the star you have in view.

18. Once you have the name of the star displayed, press **“ENTER”**. The hand paddle will now display some information about the star.
19. Now press **“ENTER”** again, and hold the button down for several seconds. When you release it, the hand paddle should display **“PRESS ENTER IS SYNC”**. Press **“ENTER”** again and the hand paddle should read **“SYNCHRONISED”**.

**EXTREME CAUTION!!! MAKE SURE YOU HAVE CENTRED ON THE CORRECT STAR BEFORE SYNCHRONISING!!!!**

20. Once you have the telescope synchronized, it is time to move to the computer and **“The Sky”**.
21. In **“The Sky”**, go to the list of menus at the top of the screen and find **“Telescope”**.
22. Click on this menu and then from the list that appears, highlight **“Link”** and then **“Establish”**. This will connect the telescope to the computer and placed it under the control of **“The Sky”**.
23. Once the computer is talking to the telescope, go back to the **“Telescope”** menu and highlight **“Motion Controls”**.
24. Now look along the second row of icons, and you will see near the middle what looks like a pair of binoculars. This is the **“Find”** icon. Click on this icon, and a menu window will open. From the list in the top right hand window (under **“Common Names”**), choose **“Common Star Names”**. From the list on the right, then choose the star that you just pointed the telescope at. Once you have highlighted this star, its name will appear in the box at the bottom of the menu window. Now click on the button labelled **“Find”**. This will close that **“Find”** window and open another window labelled **“Object Information”** which has details of the star.
25. Along the top of this window is a series of menus. Click on the one labelled **“Telescope”**. In the middle of the window, near the left edge, is a button labelled **“Sync”**. Click on this button and then **“Synchronize in existing model”** in the window that appears. The program now knows that the telescope is pointing at that star.
26. Now (in theory) you can find any object you wish by using the **“Find”** window, and then slewing the telescope to that object by using the icon that looks like a telescope at the bottom of the **“Object Information”** window. After each move, if you may have to center the object, but it should be close.

**Shutdown**

1. In “**The Sky**”, click on the “**Telescope**” menu at the top of the screen. Then highlight “**Link**” and then “**Terminate**”. This will disconnect the computer from the telescope. Then shut down the computer and the monitor.
2. If you have been doing visual observing, remove the eyepiece, the star diagonal, and the visual back from the telescope and screw on the silver cap. Put all of the accessories away in their boxes and put them away in the drawer.
3. Using the slew keys at the top of the telescope hand control, move the telescope until the forks are horizontal and the telescope is pointing north, almost parallel to the forks. Now you can **switch off the telescope**.
4. Now put the caps on the front of the telescope and on the finderscope.
5. Next, put the dust cover over the telescope, making sure to completely cover the telescope and the base, and also making sure not to knock the cover off the finderscope.
6. Now close the roof and replace the roof lock. While closing the roof, you will need to make sure that the cable on the spool that is winding up is very symmetric and tight. Otherwise the roof will not fully close before the wire becomes taut!

Make sure you leave the torch in the box in the classroom where it is easy for the next person to find when they enter the building, and **make sure that the doors are locked**.

## **20” Planewave Cassegrain Telescope Startup**

1. When you first come into the building, you will need to get a red torch from the box on the bench in the classroom. Once you have this and can see, climb the ladder into the dome and open the dome shutter. This is done by moving the lever on the floor of the dome at the northern side. (on your right from the top of the ladder).
2. While the shutter is opening, turn on the telescope. There are three switches for this, all at the base of the telescope. The first one is at the end of the power strip. Once you have turned that on, there are two toggle switches on the electronics box facing the power strip. Turn on both of these. The lights on the box should turn on.
3. Once the dome shutter is open, **make sure the lever is in the neutral position** (middle) and then unplug the cable and attach it to the inside of the dome with the Velcro. This will stop it dangling when you rotate the dome.

4. The computer should already be switched on, so all you need to do is turn on the monitor.
5. Now uncover the telescope. First take off the plastic covering and place it under the table out of the way. Then take off the two grey covers and place them on the table, then the main cover, (**being careful not to hit the secondary mirror!**) and put that on its side against the wall beside the table.
6. Once you have done this, it is time to move to the computer. The software that controls the telescope is called "**The Sky**". You will find a shortcut to this program on the desktop, near the top right. Double click on this icon to start the program.
7. Once the program is running, go to the list of menus at the top of the screen and find "**Telescope**".  
Click on this menu and then from the list that appears, highlight "**Link**" and then "**Establish**". This will connect the telescope to the computer and place it under the control of "**The Sky**".
8. Once the computer is talking to the telescope, go back to the "**Telescope**" menu and click on "**Motion Controls**". This will give you a small window which will allow you to move the telescope to center objects. This is usually much easier than using the hand paddle, especially when you are imaging with the CCD.
9. Now look along the second row of icons, and you will see near the middle what looks like a pair of binoculars. This is the "**Find**" icon. Click on this icon, and a menu window will open. From the list in the top right hand window (under "**Common Names**"), choose "**Common Star Names**". From the list, choose a bright star that you know and that is above the horizon. Once you have highlighted this star, its name will appear in the box at the bottom of the menu window. Now click on the button labelled "**Find**". This will close that "**Find**" window and open another window labelled "**Object Information**" which has details of the star.
10. At the bottom of this window are a number of icons. Towards the right is one that looks like a telescope. If you click on this icon, the computer will move the telescope to the star. **DO NOT** touch the telescope while it is moving and **DO NOT** try to use the hand control before it has stopped moving.
11. Now look through the telescope (or take a short image if you are using the CCD) and see if the star is visible. It "**should**" be visible, but is unlikely to be centered. In this case use either the "motion controls" window on the computer (easiest if you are imaging) or the hand paddle (easiest if you are using the telescope visually) to center the star. (If you are using the "motion controls" window, make sure that the "**slew rate**" is set to "**center**")

12. Both the “motion controls” window and the keypad have 4 buttons for moving the telescope north, south, east, and west. Use these buttons to center the star in the view. Get the star as close to the center as you can, but do not spend too much time on this.
13. If the star is **not** in the view, then you will have to search for it. Using either the hand paddle or the “motion controls” window, move the telescope in a spiral pattern until you find the star. If you cannot locate it after a couple of minutes, then come and get your instructor.
14. Assuming you have centered correctly (and on the correct star!), you should now be able to find any object you wish by using the “**Find**” window, and then pointing the telescope at that object by using the icon that looks like a telescope at the bottom of the “**Object Information**” window. After each move, if you have to center the object, click on the “**Sync**” button to update the telescope pointing.

### **Shutdown**

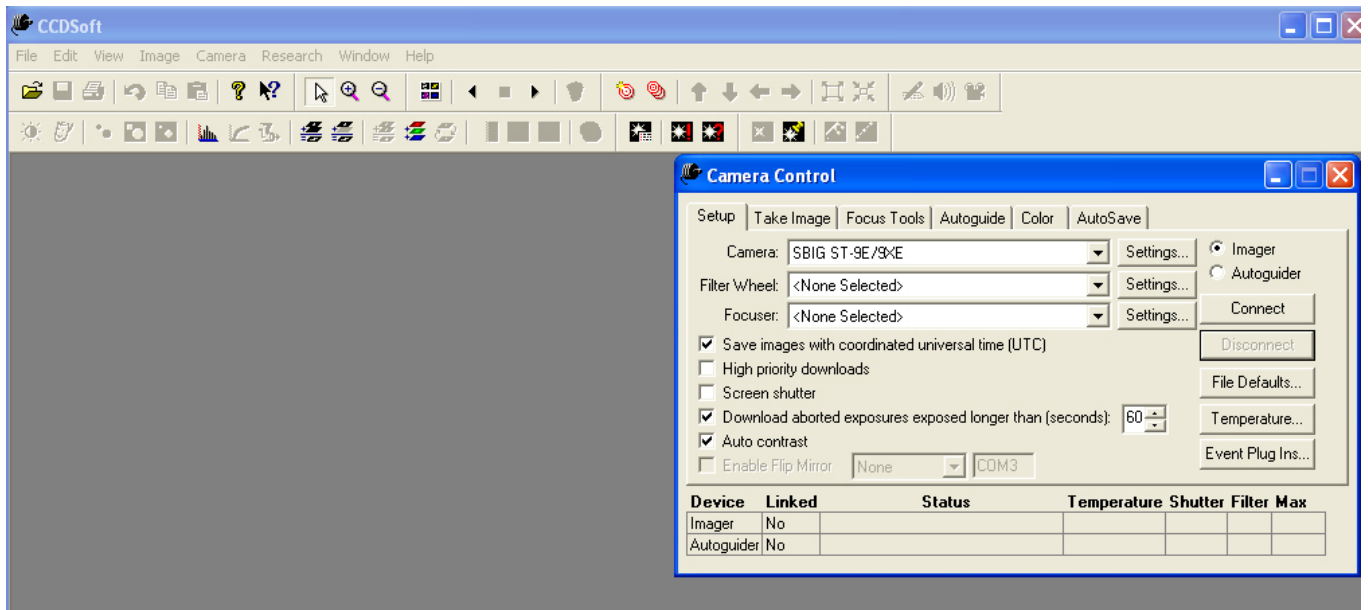
When you have finished observing, you will need to shut down the telescope. If you have been imaging with the CCD, you can do this while you are taking your dark frames.

1. In “**The Sky**”, click on the “**Telescope**” menu at the top of the screen. Then highlight “**Link**” and then “**Terminate**”. This will disconnect the computer from the telescope. You will get an message at this point asking if you want to send the telescope to its “park” position. If this appears, click “**Yes**”. This will move the telescope to its park position.
2. Once the telescope is parked, you can **switch off the telescope and put the covers back on**. First put on the main mirror cover, then the 2 caps and finally the plastic cover.
3. Now plug in the hanging cable for the slit cover and close the slit. While the shutter is closing, go back to the computer and close “The Sky” and if you have finished taking your dark frames, also close down “CCDSOFT”. You do not need to shut down the computer, just turn off the monitor.
4. Once the slit is closed and **the telescope is switched off**, you can leave. Make sure you leave the torch in the box in the classroom where it is easy for the next person to find when they enter the building, and **make sure that the door is locked**.

## Imaging with the CCD's using CCDSoft

Set up your telescope and attach the CCD to the telescope. **When using the 20" telescope**, the plugs should be pointing **towards** the right with the sides of the CCD as close as possible to being at a right angle to the declination axis. **When using the 12" telescopes**, the plugs should be pointing **upwards** with the sides of the CCD as close as possible to being parallel to the telescope forks.

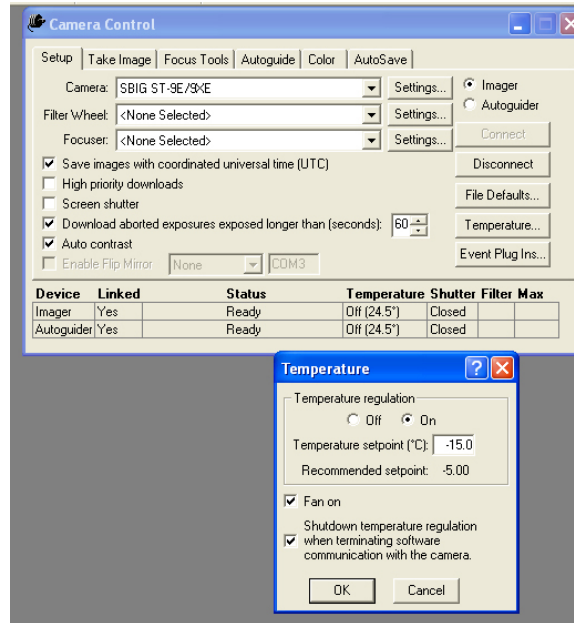
Power up the telescope and the computer and start **"The Sky"** and **"CCDSOFT"**. Plug in the CCD to the power and make sure it is connected to the computer via the USB cable. In **"CCDSOFT"**, the **"Camera Control"** window should be open. If it is not, go to the **"Camera"** menu and click on **"Setup"**. This will bring up the **"Camera Control"** window.



Click the **"Setup"** tab and check the settings. **"Camera"** should be either **"ST-9E/9XE"**, **"ST-8E/8XE"** or **"SBIG STL Large Format Cameras"**, depending on which CCD you are using. **"Filter Wheel"** should be **"CFW9"**, **"STL Internal filter wheel"** or **"None Selected"** depending which CCD you are using and if the CCD has a filter wheel attached. (Check with the course instructor if you are not sure!) The **"Settings"** tabs should not need to be touched. Now click **"Connect"** to connect the computer to the CCD. If for some reason an error message appears, get the course instructor.

Once the camera is connected, click on **"Temperature"** and set the temperature to about 30°C below the current air temperature. If you do not know what the temperature is, then set the temperature for -20°C. Make sure the **"Fan on"** box is checked.





## Taking Calibration Images:

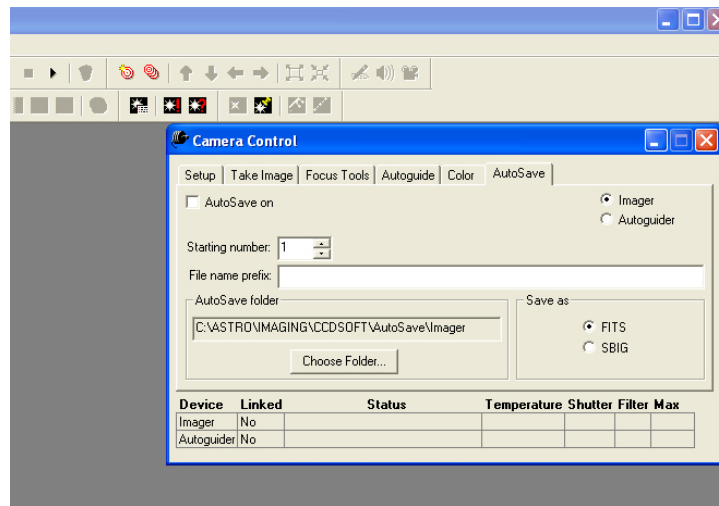
As discussed in class, raw images will be very “noisy”, lots of very bright spots and possibly dark “donuts”. The bright dots are caused by electronic noise within the CCD chip and the dark “donuts” are caused by dust in the telescope optics. In order to remove these you need to take calibration frames.

The first images you need to take are **flat fields**. Usually these are best taken in twilight, however sometimes, particularly later in the semester, this will not be possible so you would need to take images of a region with no bright stars or non-stellar objects, moving the telescope a little between exposures. Under those circumstances you would use “**The Sky**”, move the telescope to a region of the sky containing no bright stars (nothing brighter than magnitude 8) and no non-stellar objects. The area towards the southwest is a suitable area. You would then take 8 – 10 images of about 1 minute exposure, using either “**The Sky**” or the hand paddle to move the telescope a short distance in one direction and then take another image. If any image has a bright star or a non-stellar object such as a galaxy in the view, you will need to move the telescope away from that region and retake the image.

If it is still twilight when you are ready to get your flatfield images, life is much simpler! Simply slew the telescope towards the bright sky in the west using the hand paddle. Go to the “**Take Image**” menu, and set the “**Image Frame**” to “**Light**”. Then go to the “**Focus Tools**” menu and take a test image of about 0.1 seconds. Once the image is displayed, put the cursor on the center of the image and read the pixel data value at the bottom left of the screen. You want this value to be between about 10,000 and 35,000. If the value is too low, increase the exposure a little. If it is too high, wait about 1 minute and try again.

Once you have the exposure set, go back to the “**Take Image**” menu, set the exposure to what you found, the number of images to 10, and “**Image Reduction**” to “**None**”. However, **Before** you take the images you need to set the “**AutoSave**” so the computer will automatically save your images.

To do this, go to the “**AutoSave**” menu and check the “**AutoSave On**” box. In the “**File name prefix**” window, enter the name you want to call the images, (in this case I suggest “flatfield”) and then set the starting number. (usually 1 if you are taking your first image of a set) In the “Choose Folder” window, also set the folder to which you will save the images.



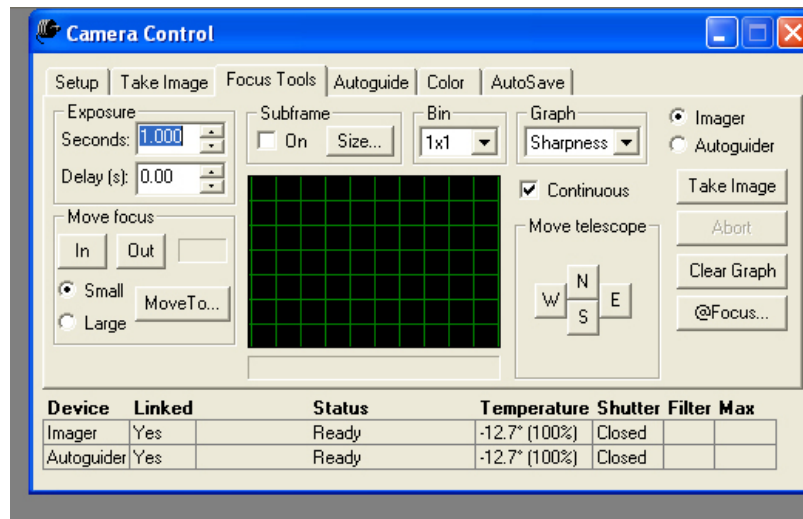
Once you have done all this, you are ready to take your flatfield images, so you can go back to the “**Take Image**” menu and take the images. Remember “**Sub-frame**” box **MUST** be **UNCHECKED**.

Once you have your flatfield images, you will need to take dark frames for your flat field images. For your flatfield images, you should take 5-10 dark frames and they must be the same exposure time as the flatfield images. To take these, set the “**Image Frame**” to “**Dark**”, set the number of images you want to take to 5 or 10, using the “**Series of**” box, and the exposure time to the same as for your target images. Then under the “**AutoSave**” menu name the images “**flatdark**”.

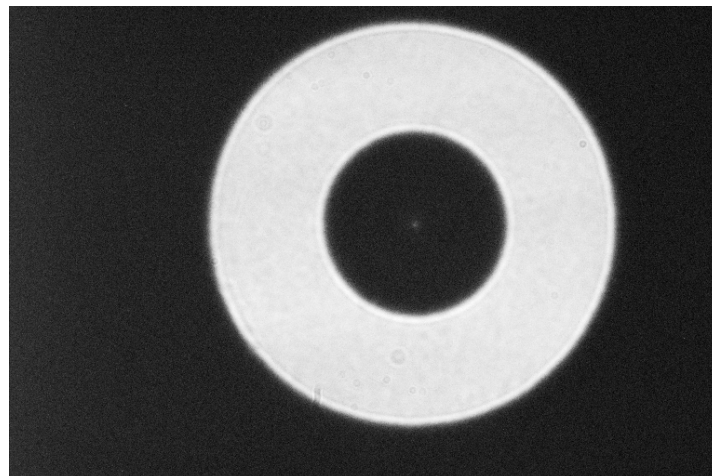
Once you have finished with your flatfield images and flatdark images, you need to take the other calibration frames, **dark frames**. These will remove the electronic noise generated within the CCD chip. For your target images, you should take 5 dark frames and they must be the same exposure time as the images of your target. To take these, set the “**Image Frame**” to “**Dark**”, set the number of images you want to take of that object using the “**Series of**” box to 5, and the exposure time to the same as for your target images.

Once you have your calibration frames, you are *almost* ready to start taking your images. However there are still a couple of steps you need to take before you can start these.

Using “The Sky”, slew the telescope to your first object. Now click on the “Focus Tools” tab. Here set the “Exposure” for 3 seconds, and the “Bin” for 1x1. Set “Image” to “Light” and “Reduction” to “None”. Also, make sure the “Continuous” box is **UNCHECKED**. Now you are set to take a test image to check if the star is in the CCD field of view.



Once the image is downloaded, what you will most likely see is a very large “donuts” and your object most likely will be situated off center. The “donuts” are out-of-focus stars.



### Focusing:

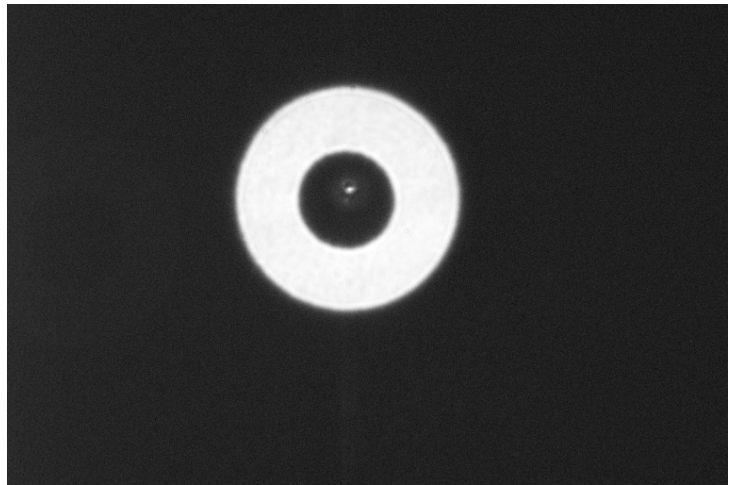
Focusing is critical to getting good images! You should take care to get the focus as sharp as possible!

Using the "Focus Tools" in the "Camera Control" menu, Set the exposure time to about 1 second, depending on the brightness of your focusing star. Then make sure the "Continuous" box is **CHECKED**. Now click the "Take Image" button. The computer will start taking images continuously so you can see what is happening while you are adjusting the focus.

### If you are using the 12" telescopes

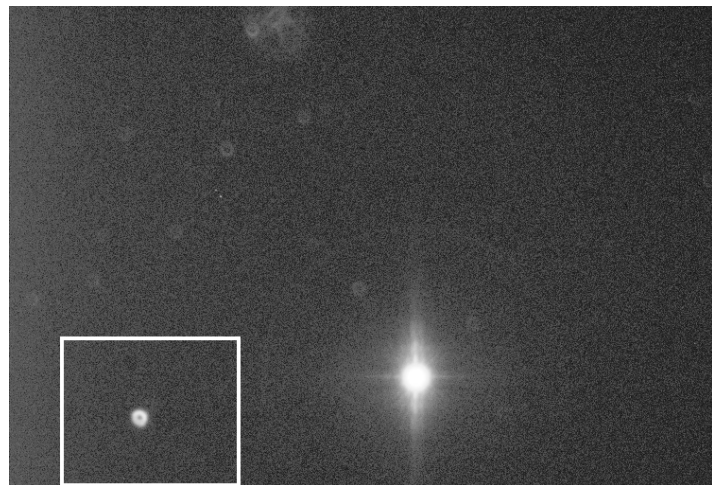
These telescopes do not have a motorized focuser, so you will need to adjust the focus by hand. This can be tricky, and when you are getting close to focus, you will need to turn the focus knob by **VERY** small amounts.

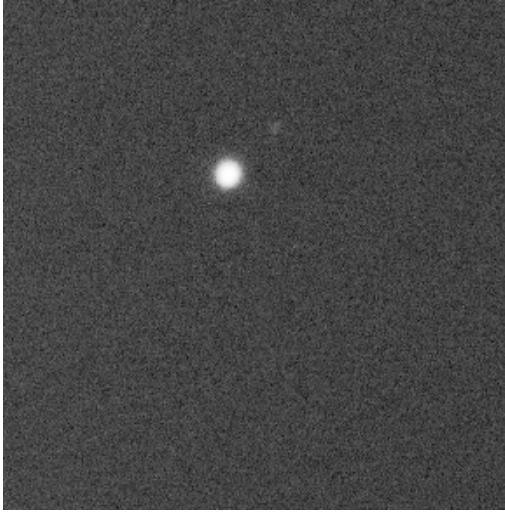
Turn the focus control knob on the telescope, a small amount in one direction. Then take an image and see what has happened to the star. If the "blob" has become smaller, you turned the knob in the correct direction. If it became larger, you need to turn it in the opposite direction.



Keep turning the knob and taking images until the star is as sharp as you can make it. The amount to turn the knob depends on how close to accurate focus you are. The closer you get, the smaller the knob should be turned. If the star starts getting larger, you will have gone too far and you will need to back up a little. Avoid going back and forth past focus as much as possible as the focusing mechanism has some slack. Keep going until you get the star focused as well as you can.

One way to help speed up focusing is to use a sub-frame. This will make the image downloading much quicker. To do this, pick a region of the image that contains a moderately bright star and use the mouse to draw a box around this star, but make it large enough to have several stars of differing brightness in the box. Then start imaging and focusing as described above.

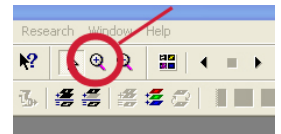




## If you are using the 20" telescope

Using the keypad on the back of the telescope, press either the up or down button for a few moments. Then take an image and see what has happened to the star. If the “donut” has become smaller, you moved the focuser in the correct direction. 😊 If it became larger, you need to the other button to move the focuser in the opposite direction. ☹

Keep taking images until the “donut” becomes just a small dot. When the stars become small dots it is often useful to zoom in on the image as it makes it easier to see how good the focus is. To do this, click on the toolbar at the top of the screen that has a magnifying glass icon with a “+” inside. Then click on the image to zoom in. Enlarge the image window so that you can see the entire image.



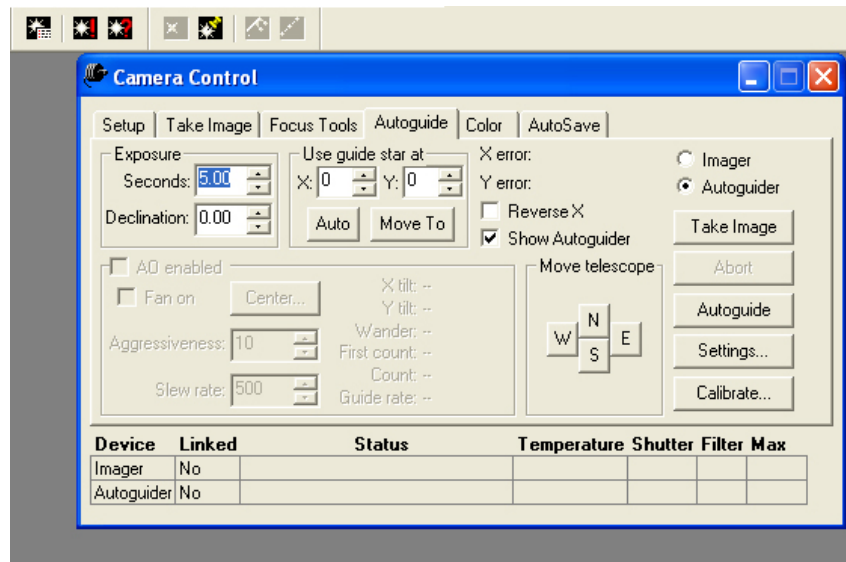
Continue to take images and pressing the appropriate button on the keypad. The amount to press depends on how close to accurate focus you are. The closer you get, the smaller the amount of time you press the button. If the star starts getting larger, you will have gone too far and you will need to back up a little. Keep going until you get the star focused as well as you can.

## Autoguiding:

Once you have the telescope focused, **UNCHECK** the “**Continuous**” box and the “**Subframe**” box. Then take a short (~5 sec) exposure. If your target object is not exactly in the center, move the telescope until it is, taking ~5 second exposures each time you move the telescope. Once you have the object centered, synchronize “**The Sky**” with your target object. Once you have

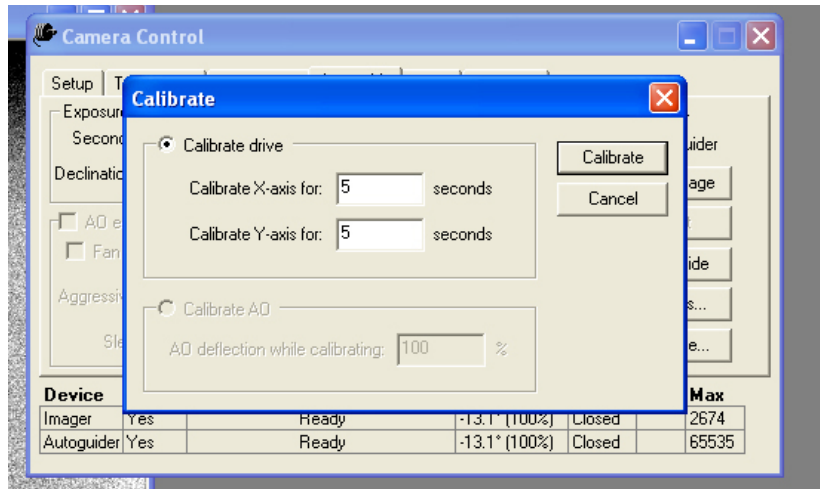
done this, check **“The Sky”** to see if there is a star in the Autoguider box. If there is not, then move the telescope until there is one, making sure that you do not move the object you are after out of the frame!

Before you can start taking images of your target, you need to set up the autoguider. No telescope mount ever follows the stars perfectly, so active tracking is required to avoid the stars trailing and ruining your images. This is the job of the autoguider. Go to the **“Autoguide”** menu. Set the exposure time to 3 seconds and make sure the **“Show Autoguider”** box is checked. Now click **“Take Image”** to take an image. When the image first appears, it may be hidden behind the image from the main CCD image. If so, move the autoguider image to one side so that you can see it even with a main image open.



Most times the autoguider is calibrated, so once you have a reasonably bright star in the autoguider image, you are ready to start guiding. However, the following instructions are included in case you ever have to calibrate the autoguider.

Move the telescope until the image shows the brightest star close to the center. Now click the **“Calibrate”** button and click **“Calibrate”** on the window that appears.



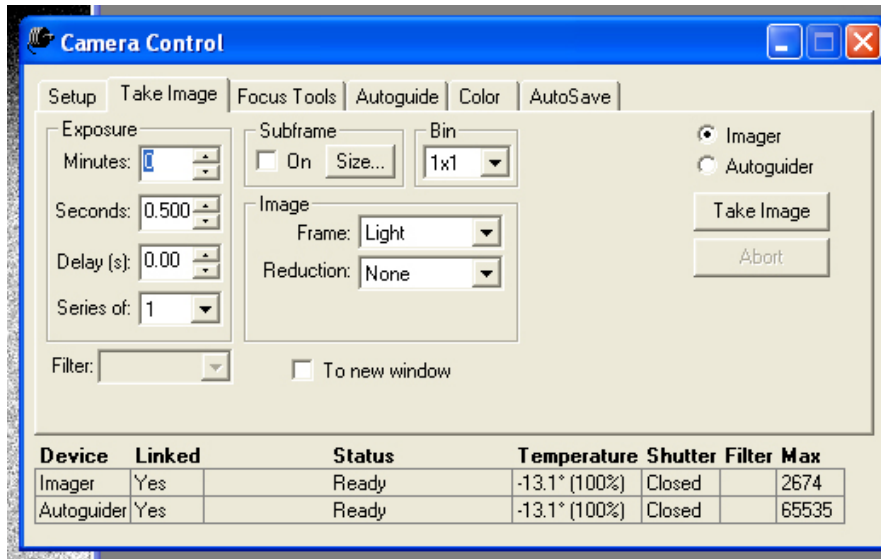
The computer will now take a series of short exposures, moving the telescope a small amount between each image to calculate how much the telescope moves in each direction. Once it is completed, a **“Calibration successful”** message will appear. 😊😊😊

## Taking Images:

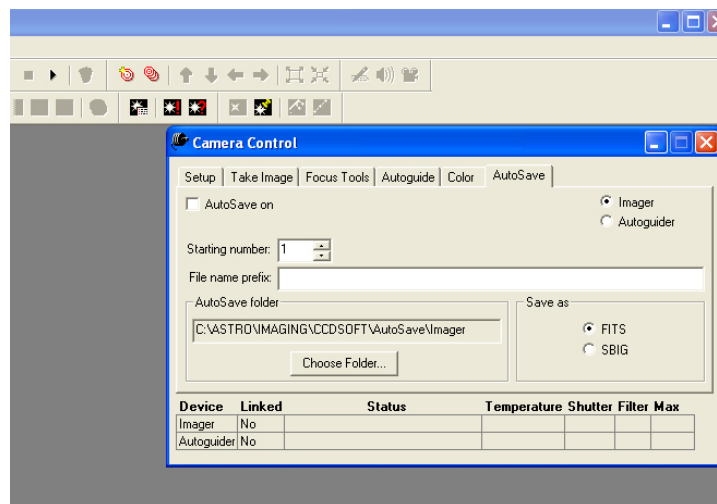
Check **“The Sky”** again to make sure that your target is still in the field of the main CCD. If it is, then click on the brightest star in the Autoguider image and then click on the **“Autoguide”** button. Now the computer will keep the telescope accurately tracking the stars. (Or at least.... ***it should!!!!***)

Now click on the **“Take Image”** tab to get to the imaging window. Set the exposure time you want. The exact exposure length will depend on the brightness of the object you are imaging. An exposure that is too long will result in bright stars displaying ugly blooming streaks. Even without any bright stars, do not expose each image for more than 3 - 5 minutes, otherwise the background light pollution will fog the image. Also **MAKE SURE** that you have the binning set to 1x1. The **“Sub-frame”** box **MUST** be **UNCHECKED**, the **“Image Frame”** should read **“Light”**, and **“Reduction”** is set to **“None”**. Now set the number of images you want to take of that object using the **“Series of”** box.





Now go to the **“AutoSave”** menu and check the **“AutoSave On”** box. In the **“File name prefix”** window, enter the name you want to call the images, and then set the starting number. (usually 1 if you are taking your first images of the object) In the **“Choose Folder”** window, set the folder to which you will save the images.



Now you can go back to the **“Take Image”** menu and click the **“Take Image”** button. CCDSoft will now start taking the images.

Once you have finished taking your images of your target, go to the **“Autoguide”** menu and click the **“Abort”** button to stop the autoguider. You can then move to another target if there is enough time, or start packing down the telescope if you are finished for the night.

Once you have obtained all of your images, including calibration frames, go to the **“Setup”** and click **“Disconnect”**. You can now close **“CCDSOFT”**. Make a copy of your images onto your memory stick.



## Important CCDSoft Menus

### Camera Control Window:

#### Setup Menu:

- “Connect”:  
This will connect/disconnect the CCD from the computer.
- “Temperature”:  
This sets the operating temperature of the CCD. It should be about 30°C below air temperature. As a guide, it should be set between -10°C and -35°C, depending on how warm/cold the night is.
- “File Defaults”:  
Here you can enter any information you want to be stored in the image header. In general you should enter your name(s), the location, and the telescope information. Apart from your names, this information should already be entered.

#### Take Image Menu:

- “Exposure”:  
This will set the length of the exposure, any delay in opening the shutter and the number of exposures to be taken.
- “Subframe”:  
Unless you are taking planetary images, leave this box unchecked.
- “Binning”:  
When initially finding an object or centering set this to 2x2. Set it to 1x1 when taking actual images to be saved.
- “Image”:  
This will let you take either images of the sky (Light) or dark frames (Dark). “Reduction” should be “None”.
- “Take Image”:  
This will take the image as specified.

#### Focus Tools Menu:

- “Exposure”:  
This will set the length of the exposure and any delay in opening the shutter.
- “Subframe”:  
Once you have chosen which star(s) you will use to focus on, use the mouse to draw a box around the star(s). A check will then appear in the “subframe” box.
- “Continuous”:  
This box should be unchecked unless you are actually trying to focus the telescope.
- “Clear Graph”:  
This will clear the graph appearing in the window. Click this if you change binning, exposure, or stars.

“Take Image”:  
This will take the image as specified.

### **Autoguide Menu:**

“Exposure”:  
This will set the length of the exposure. Generally, 5 seconds is sufficient.

“Show Autoguider”:  
This box must be checked.

“Take Image”:  
This will take the image as specified. It is used to find a suitable guidestar, which is selected by clicking on the star you wish to use to guide the telescope.

“Calibrate”:  
This will start the calibration procedure. It should be done at the beginning of the observing session.

“Autoguide”:  
This will start the autoguiding.

### **Color Menu:**

“Edit L”:  
This is used to set the details of the luminance image. Likewise with the other “Edit” buttons for the other colors.

“Series of”:  
This specifies how many sets of images that you specified using the “Edit” buttons will be taken.

“Take Color”:  
This starts the CCD taking the number of series you specified.

### **AutoSave Menu:**

“AutoSave On”:  
This box **MUST** be checked when you are ready to take actual images. It should be unchecked when centering an object or taking images for focusing. ***It is very easy to forget to check this box when you start imaging. Failure to do so will result in the loss of all your images!!!!***

“Starting Number”:  
This specifies what number will be given to the first image in a series.

“AutoSave Folder”:  
This is the name of the directory where your images will be saved. Use the “Choose Folder” button to set this.