

1 Quick Start Tutorial

This tutorial assumes that you will control the telescope and focuser from the computer on the landing and that you will use the Starlight Express color camera with the Maxim DL software.

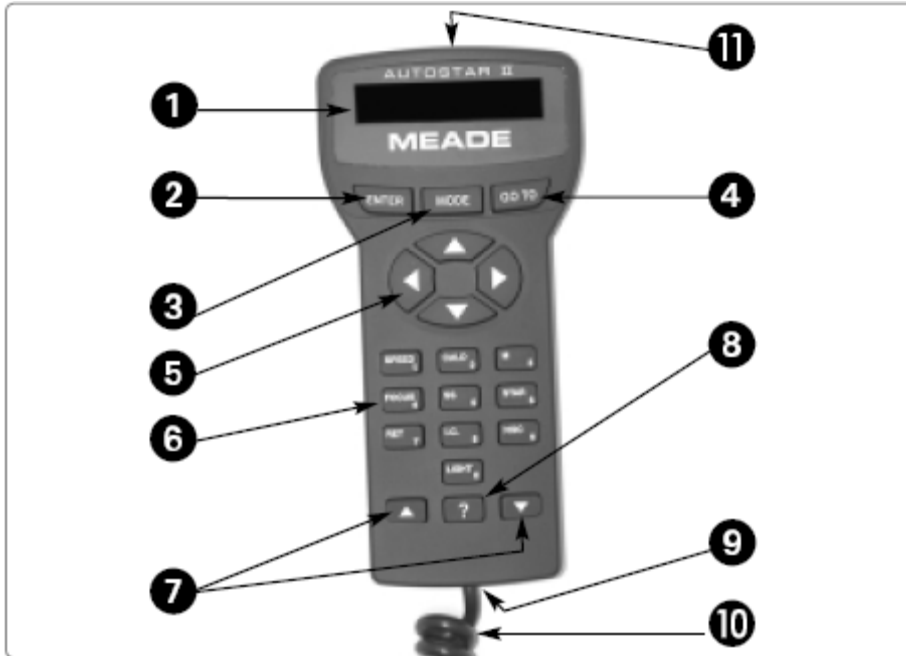
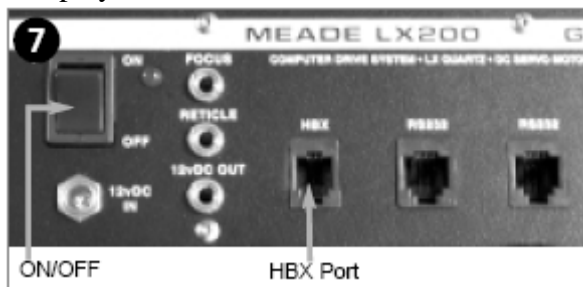


Fig. 2: The Autostar II Handbox.

General Set-Up

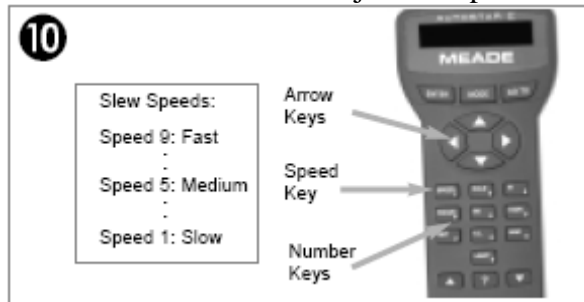
- ✓ Start the computer on the landing
- ✓ Unlock the Dome's turnbuckles
- ✓ Open the Dome
- ✓ Remove the dust covers from the telescope and finder
- ✓ Set up the camera, if necessary and plug it in
- ✓ Turn on the telescope & wait for the "Taking GPS Fix" message to clear from the handbox display



Rough Alignment in the Dome

- ✓ “Select Item Object” should be displayed on the handbox. If not, press mode key
- ✓ Press #6 “Star” key” Press “Enter” for “Named” star
- ✓ Scroll up or down through the list of stars until the star you want appears.
- ✓ Press “Enter”
- ✓ “Calculating” will display and then the star name and set of coordinates will display
- ✓ Press “Go To” key and the telescope should then slew from the parked position to the current position of the star selected
- ✓ If Vega, or the star you selected, is not centered in the cross hairs of the finder scope you may need to manually realign the telescope using the finder scope until it is centered in the crosshairs.

Note: You may need to adjust the speed at which the telescope moves



- ✓ Press and hold the ENTER key for 3 seconds then release it. The handbox will beep and display “ENTER to Sync”. Press ENTER again and the display will show “Synchronized”. The telescope is now aligned.

Connect to the Camera and Focus

NOTE: This section assumes you are using the Harken laptop up min the dome for focusing and alignment.

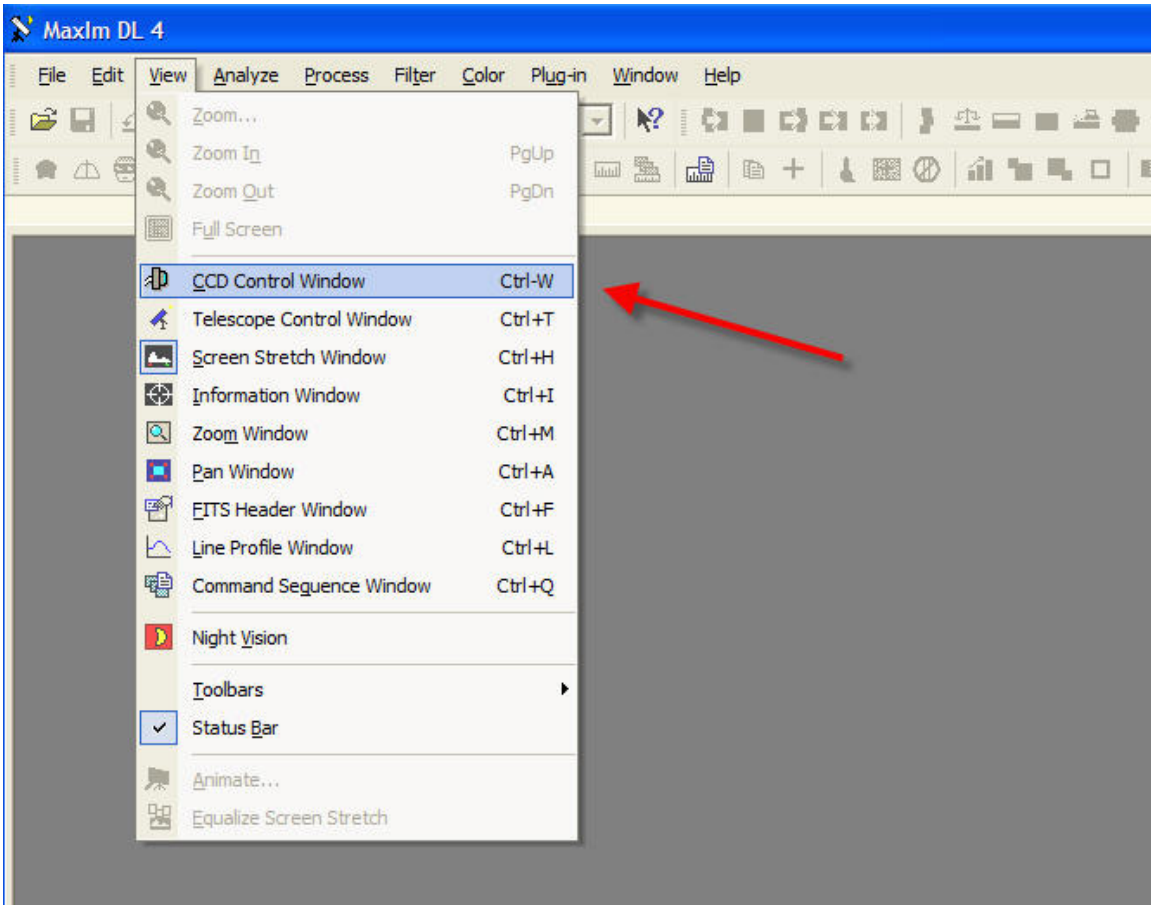
- ✓ Plug in the SXV camera (power brick with the orange plug)
- ✓ Connect the USB cable from the camera to the laptop
- ✓ Select “Maxim DL” icon on desktop



- ✓ Connect to the camera



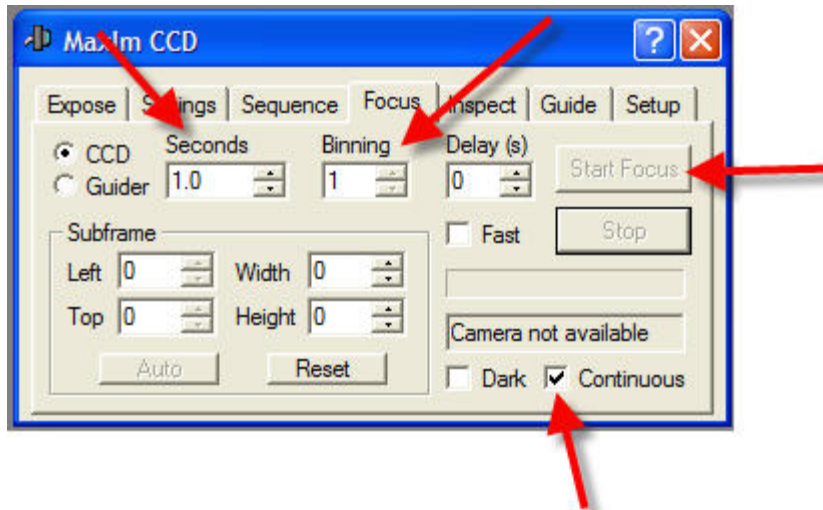
or . . .



✓ Click “Connect”



✓ Click “Focus” Tab



- ✓ Set Binning to 2. This helps focusing with one-shot color cameras.
- ✓ Set Seconds to 1. This is a good general setting for focusing
- ✓ Select “Start Focus”. If the “Continuous” box is checked it will continue to take exposure until “Stop” is pressed.
- ✓ Use Autostar Control to fine tune focus until satisfied with “picture”.
 - This may take some time, but it is a very important step.
 - 1.) Use the Focus tab to monitor a star’s shape Watch histograms to sharpen the peaks as much as possible.

Or

- 2.) Use the Hartmann mask to get a small round star image

Use very short clicks on “Focus In” or “Focus Out” tabs with slower focus speeds to fine tune the image.

- ✓ Carefully align on a named star
- ✓ Close down the laptop
- ✓ Unplug the camera USB cable and reconnect to the powered hub on the floor

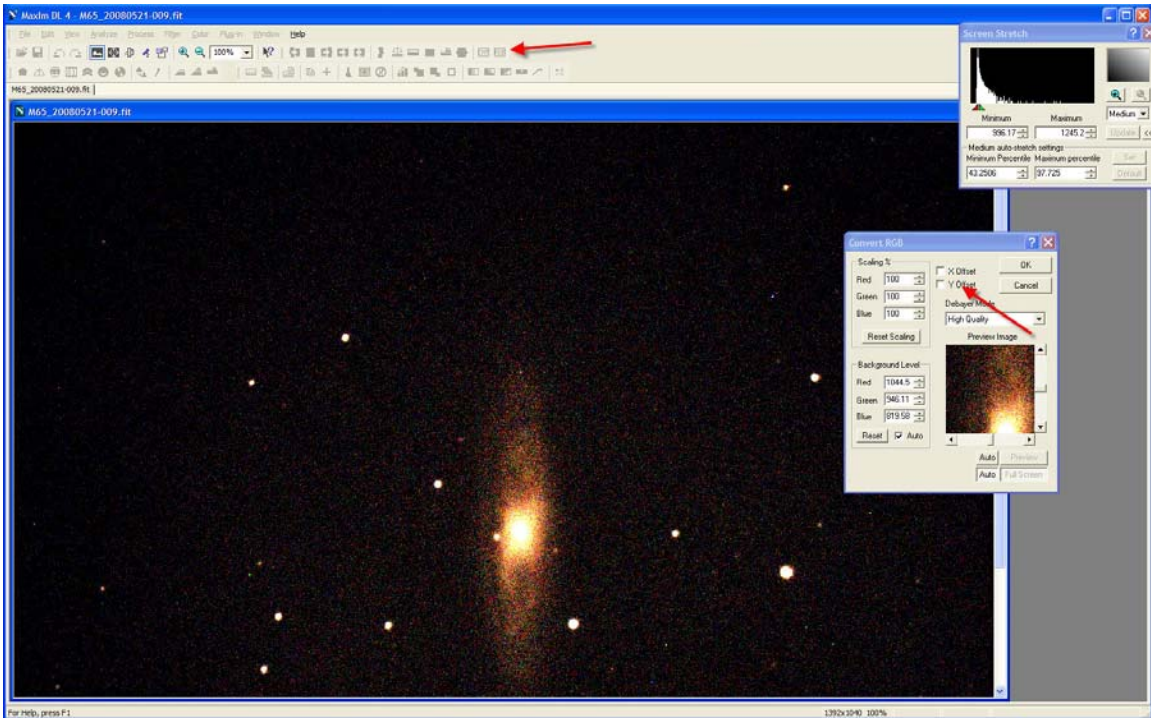
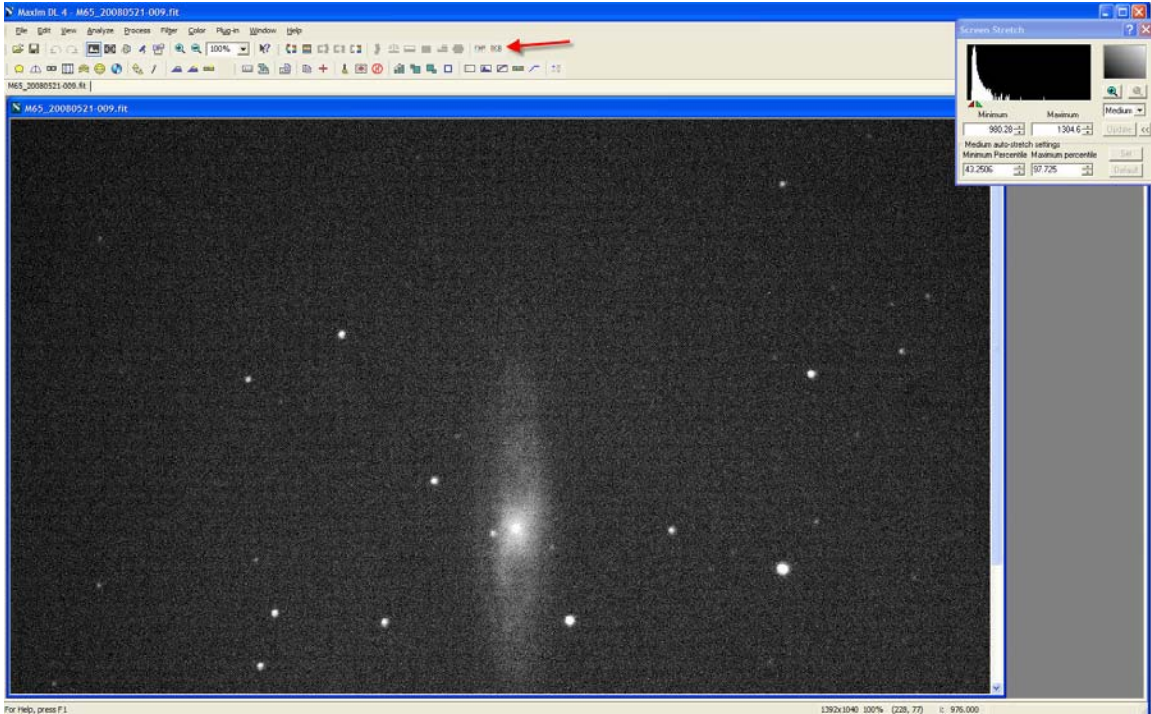
Move to the Computer in the Landing & connect to the telescope

- ✓ Start the Meade Autostar program
- ✓ Click on “Telescope”
- ✓ Select “Protocol”
- ✓ Select “Auto Star Via Comport”
- ✓ Click on “Telescope”
- ✓ Select “Control Panel”
- ✓ Move “Auto Star Telescope Control” box out of the way by clicking and dragging

Connect to the camera

- ✓ Start MaximDL on the computer on the landing (same process as above)
- ✓ Now use Autostar Control to select Object to photograph. Under “Maxim CCD window”, use “Exposures” tab to build a set of exposures.

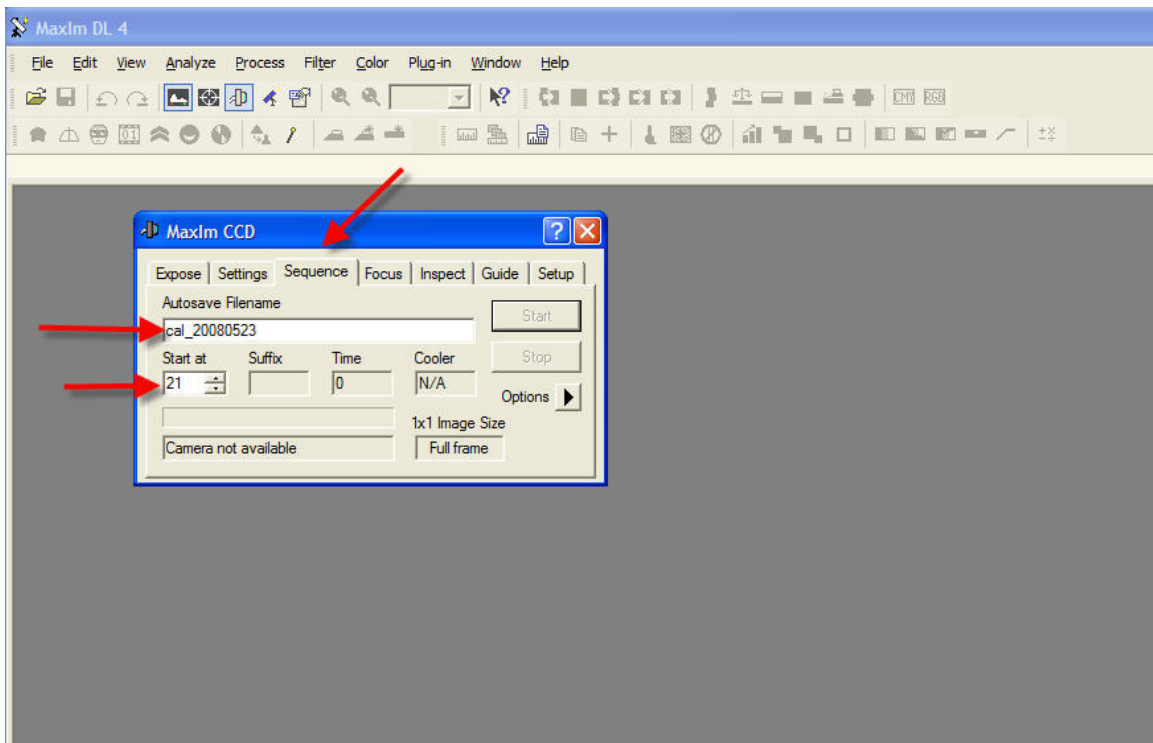
- ✓ To make color photographs, select “Color” menu, then “Convert RGB”. There is also an Icon for this at the far right end of the task bar icons. You may need to adjust the X and Y Offsets if the color looks strange



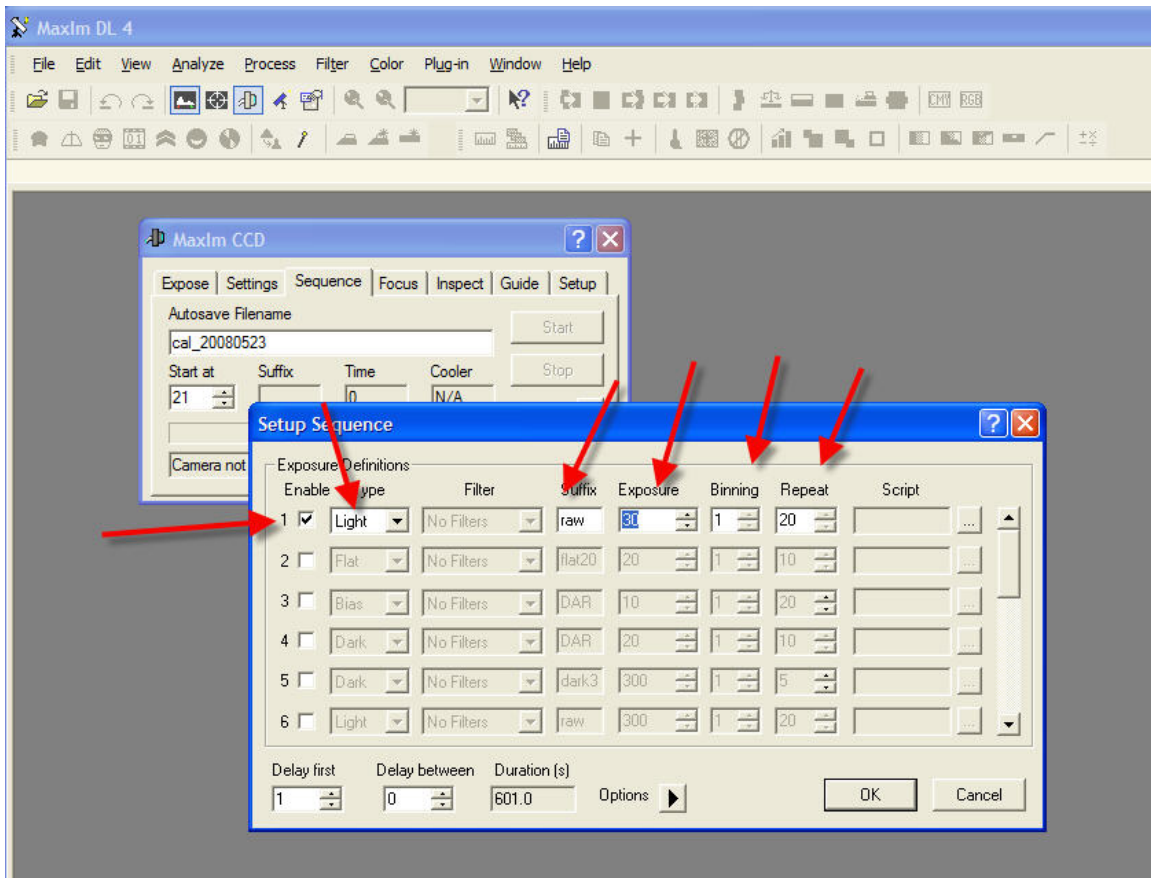
- ✓ To adjust brightness, go to Video menu, and select “Screen Stretch”. Use Shift key while holding mouse button down. Sliding cursor around on screen shows variations in picture “presentation”.
- ✓ Do this until picture looks best “to taste”.
- ✓ To fine tune color, select Color Menu then “Color Balance”. Select “Reset Scaling” and “Reset”
- ✓ Now click on various stars on the picture screen to find an optimum color choice “to your taste”. (Each star “choice” will affect the software algorithm’s choice for color shading of the entire picture)
- ✓ At this Point, can save images, or do sequence;

For Sequence:

- ✓ Use CCD control window with Sequence Tab. Give it a name. To keep things uniform for all club members, we suggest using this format: “Object name_date”. For example, a photo of M42 taken on Feb5th, 2007 would be called “M42_20070205”. You could also “personalize” the photo by adding your initials afterward, i.e.”M42_20070205mp”.



- ✓ Select Options arrow, choose “Setup Sequence”, select “Light”, input #of exposures desired, set Binning of 1, and Repeat count “to taste”.
Note: Sequence of frames will be in Black and White.



When done, convert all images to color:

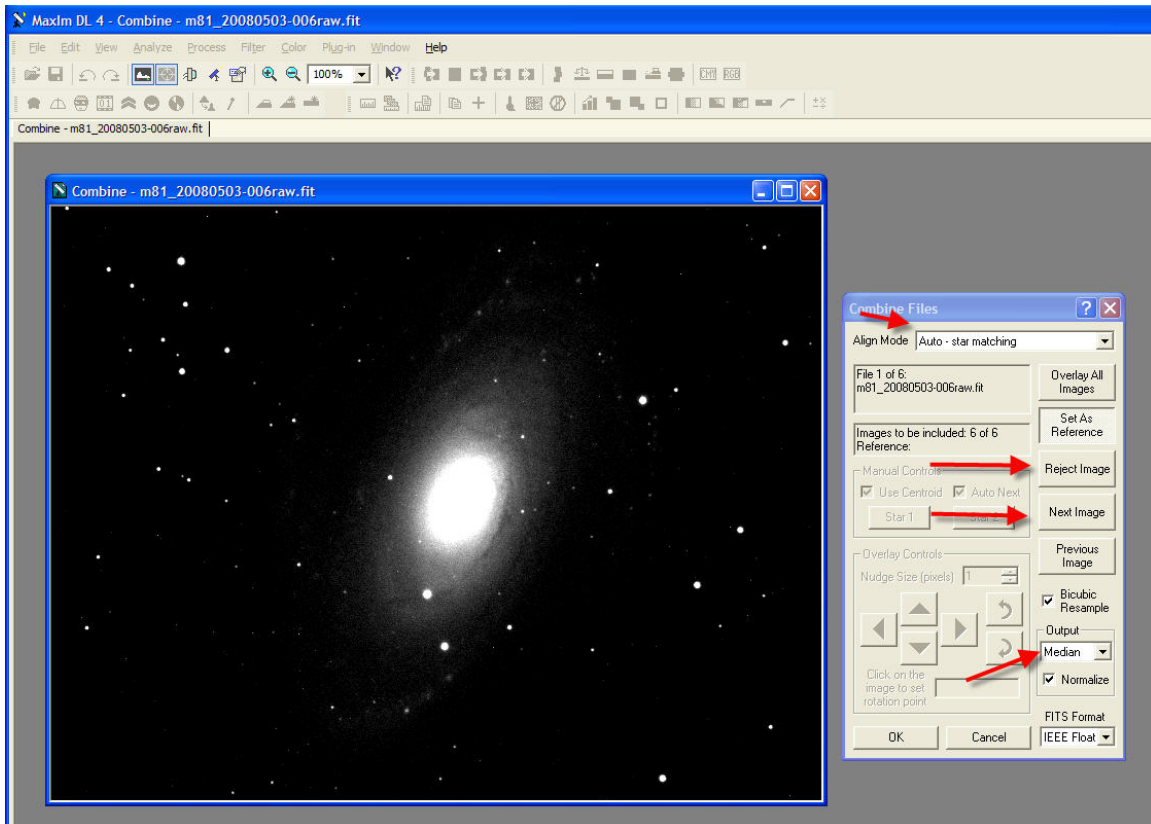
- ✓ Go to Maxim DL window
- ✓ Click VIEW menu then Command Sequence Window,
- ✓ Click on the Red Dot button (this will record a sequence of commands, which we will use to process all the files quickly). Now click the “RGB” icon on the toolbar, then the black “Stop” button.

Do not save changes.

- ✓ Click Files tab, and then select all files desired (use shift key to assist)
- ✓ Click the double arrow symbol to right of Stop button
- ✓ When done close window

Stack the images after they have been converted to color

- ✓ Select File menu, then “Combine Files “
- ✓ Use the file dialog window to select the files to combine, then click “Combine”.
- ✓ Use Next Image tab to scroll through the list; see if any images should be thrown out before combining them. If so, use the right tab for that file. If all files look ok, click “ok”. You now have a composite picture.



- ✓ Play around with the picture (using Shift key and mouse cursor) to find best overall picture presentation.
- ✓ Use File menu, “Save as”, and pick your directory to save it in. Change File Format to Jpeg, and be sure to select Auto Stretch box, then Save.

Shut down Procedure

- ✓ Work station: Close out windows in use then click “Start” tab and select “Shutdown”
- ✓ Also turn off power button on the monitor.
- ✓ Observatory: On Auto star controller use mode button to move up to “Select Object.” Then use scroll to find “Utilities.” Click on “Enter.” Now Scroll to “Park” and click on “Enter.” After it parks turn off power button on the base of the telescope, secure the dome, turn off lights and lock the door.

AUTOSTAR II FEATURES

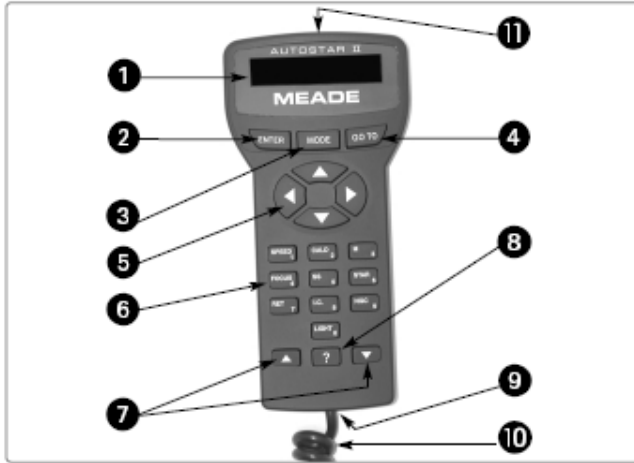


Fig. 2: The Autostar II Handbox.

Tour the Cosmos with Just the Push of a Button

Control of the LX200GPS telescope models is through the operation of the standard Autostar II system. Nearly all functions of the telescope are accomplished with just a few pushes of Autostar II's buttons.

Because the Autostar II system uses flash (rewritable) memory, your system will be able to grow when new features and enhancements become available. Download the latest satellite data, star and object catalogs, tours, serial commands list, and software revisions, directly from the Meade website (www.meade.com). (Requires the optional LX200 Interface Cable. See **OPTIONAL ACCESSORIES**, page 43.)

Some of the major features of the Autostar II system are:

- Automatically move the telescope to any of the more than 145,000 objects stored in the object library, including:

Library	# of Objects
New General Catalog (NGC):	7,840
Index Catalog (IC):	5,386
Messier Catalog (M):	110
Caldwell Catalog:	109
Named Objects:	227
Herschel Catalog:	400
Abell Catalog of Galaxy Clusters:	2,712
Arp Catalog of Irregular Galaxies:	645
Uppsala Galaxy Catalog:	12,940
Morphological Catalog of Galaxies:	12,939
General Catalog of Variable Stars:	28,484
SAO:	17,191
Hipparcos Star Catalog:	17,326

- Take a guided tour of the best celestial objects to view on any given night of the year.
- Control your LX200GPS with your PC using an RS232 interface.
- Align your telescope automatically using GPS (Global Positioning System).
- Access a glossary of astronomical terms.
- Mount the telescope in the "Alt/Az" mode (altitude—azimuth, or vertical—horizontal) for fully automatic tracking of celestial objects.

Want to learn more about downloading the latest updates of Autostar II software from the Meade website? See page 31.

4 Want to learn more about using the GO TO function? See page 20. Want to learn how to perform a spiral search? See page 20.

SPEED 1 Want to learn more about changing slew speeds? See page 17.

FOCUS 4 Want to learn more about the Focus menu? See page 31.

The Autostar II system provides control of virtually every telescope function. The Autostar II handbox has soft-touch keys designed to have a positive feel. The LCD (Liquid Crystal Display) is backlit with red LEDs (Light Emitting Diodes) for easy viewing in the dark. The backlit display, key arrangement, and sequential menu structure make Autostar II extremely user friendly.

- 1 **2-Line LCD Display:** This screen displays Autostar II's menus and information about the telescope.
 - **Top line:** Lists the primary menu.
 - **Bottom line:** Displays other menus that may be chosen, menu options, telescope status, or information about a function that is being performed.
- 2 **ENTER Key:** Press to go to the next menu level or to choose an option in a menu. The ENTER key is similar to the RETURN or ENTER key on a computer. See MOVING THROUGH AUTOSTAR II'S MENU, page 18 and AUTOSTAR II MENU, page 24.
- 3 **MODE Key:** Press to return to the previous menu or data level. The top menu level is "Select Item." The MODE key is similar to the ESCAPE key on a computer.

Note: Pressing MODE repeatedly while in the "Select Item" level moves Autostar II to the topmost screen: "Select Item: Object."

Note: If MODE is pressed and held for two seconds or more, information about the telescope's status displays. When the status displays, press the Scroll keys (7, Fig. 2) to display the following information:

 - Right Ascension and Declination (astronomical) coordinates
 - Altitude (vertical) and Azimuth (horizontal) coordinates
 - Local Time and Local Sidereal Time (LST)
 - Timer and Alarm Status
 - Date
 - Site coordinates
 - Battery status

Press MODE again to return to the previous menu.
- 4 **GO TO Key:** Press to slew (move) the telescope to the coordinates of the currently selected object. While the telescope is slewing, the operation may be aborted at any time by pressing any key except GO TO. Pressing GO TO again resumes the slew to the object. Also, press during the alignment or GO TO procedures to activate a "spiral search."
- 5 **Arrow Keys:** The Arrow keys have several functions. Press an Arrow key to slew the telescope in a specific direction (up, down, left, and right), at any one of nine different speeds. See SLEW SPEEDS, page 17. Use the Up and Down Arrow keys to move the telescope vertically up and down. The Left Arrow key rotates the telescope horizontally counterclockwise, while the Right Arrow key rotates it clockwise (unless reversed for Southern Hemisphere use). Also, use the Arrow keys to scroll through numbers 0 through 9 and the alphabet. The Down Arrow key begins with the letter "A," the Up Arrow key begins with digit "9." Additionally, use the Arrow keys to move the cursor across the display: Use the Right or Left Arrow key (5, Fig. 2) to move the cursor from one number to the next in the display.
- 6 **Number Keys:** Press to input digits 0 to 9. Each Number key also has a specific function, which is printed on each key (these are commonly known as "hot buttons"—see page 31):
 - 1 **SPEED:** Changes the slew speeds. To operate, press Speed and then a Number key (1 is the slowest speed, 9 is highest speed).
 - 2 **CALD (Caldwell):** Press to display the Caldwell catalog on the Autostar II handbox.
 - 3 **M (Messier):** Press to display the Messier catalog library.
 - 4 **FOCUS:** Press to display the Focus Control menu.

RET **7** Want to learn more about the *Reticule* menu? See page 31.

Tip:
When an astronomical term appears in [brackets], press **ENTER** for a definition or more detailed information. Press **MODE** to return to the scrolling Autostar II Help display. If a celestial object's name appears in brackets (and your telescope is aligned), press **ENTER** and then **GO TO** to slew the telescope to the object.

5 SS: Press to display the Solar System library.
6 STAR: Press to display the Star library.
7 RET (Reticle): Press to display the Reticle Control menu.
8 IC: Press to display the Index Catalog library.
9 NGC (New General Catalog): Press to display the NGC catalog library.
0 LIGHT: Press to turn on and off the red utility light on the top of the hand-box.

- 7 Scroll Keys:** Press to access options within a selected menu. The menu is displayed on the first line of the screen. Options in the menu are displayed, one at a time, on the second line. Press the Scroll keys to move through the options. Press and hold a Scroll key to move quickly through the options.

The Scroll keys also control the speed of text scrolling on the Autostar II display. When text is scrolling, press and hold the Up Scroll key for a faster display speed and the Down Scroll key for a slower display speed.

- 8 ? Key:** Press to access the "Help" file. "Help" provides on-screen information on how to accomplish whatever task is currently active.

Press the ? key and then follow the prompts on the display to access details of Autostar II functions in the Help feature. The Help system is essentially an on-screen instruction manual.

If you have a question about an Autostar II operation, e.g., **INITIALIZATION**, **ALIGNMENT**, etc., press the ? key and follow the directions that scroll on the second line. When satisfied with the Help provided, press **MODE** to return to the original screen and continue with the chosen procedure.

- 9 Coil Cord Port:** Plug one end of the Autostar II coil cord (10, Fig. 2) into this port located at the bottom of the Autostar II handbox.

- 10 Coil Cord:** Plug one end of the Autostar II coil cord into the HBX port (13F, Fig. 1) of the computer control panel of the telescope and the other end into the Autostar II coil cord port. See 9 above.

- 11 Utility Light:** Use this built-in red light to illuminate star charts and accessories without disturbing your eye's adaptation to darkness. Press "0" to turn the light on and off.

LX200GPS TIPS

Join an Astronomy Club, Attend a Star Party

One of the best ways to increase your knowledge of astronomy is to join an astronomy club. Check your local newspaper, school, library, or telescope dealer/store to find out if there's a club in your area.

At club meetings, you will meet other astronomy enthusiasts with whom you will be able to share your discoveries. Clubs are an excellent way to learn more about observing the sky, to find out where the best observing sites are, and to compare notes about telescopes, eyepieces, filters, tripods, and so forth.

Often, club members are excellent astrophotographers. Not only will you be able to see examples of their art, but you may even be able to pick up some "tricks of the trade" to try out with your LX200GPS telescope. See page 40 for more information about photography with the LX200GPS.

Many groups also hold regularly scheduled Star Parties at which you can check out and observe with many different telescopes and other pieces of astronomical equipment. Magazines such as *Sky & Telescope* and *Astronomy* print schedules for many popular Star Parties around the United States and Canada.