

Croydon Astronomical Society

Kenley Meade Lx200 User Guide

Guide 1: Manual Operation, Preparing the telescope for use and shutting it down.

Version 5 23rd September 2007 – Instructions changed to reflect use of the GPS facility for time & date, the addition of the Dew Heater and also the changed power supply.

• Introduction

This document is designed to guide you in the use of the CAS Meade telescope at our observatory at Kenley. The instructions below should allow you to use the telescope safely and prevent damage to the telescope.

Parts of the instructions are marked using the caution symbol Δ where it is important that you follow them either for your own safety or to avoid damage to the telescope or accessories.

The parts of the instructions that it is important for you to follow are marked at the start and end by \boxtimes .

This document contains the instructions needed to use the telescope safely. To use all the advanced features of the telescope you should read the parts of the Meade instruction manual listed later in this document. Where reference is made to the Meade Lx200 instruction manual this shown by the symbol \Rightarrow followed by the page number.

Δ Caution: Do not point the telescope at the Sun. Observing the Sun with the telescope will blind you.

You should get a warning on the telescope handset if you attempt to view the Sun but it is possible to turn this off or slew the telescope onto the Sun using the manual slew buttons so do not rely on it. Even if you are not attempting to view the Sun it is possible for the telescope to track across the Sun's position when finding an object which could blind you if you are looking through the telescope or the finder as well as risking damage to the telescope and its accessories. Δ

\boxtimes Due to the risks of accidentally observing the Sun the telescope is not to be used while the Sun is above the horizon without the written permission of the Committee. \boxtimes

Δ Caution: If it starts raining close the dome doors immediately. Any water on the telescope must be dried off before the lens covers and telescope cover are put on. The corrector plate must be dried by using the Dew Heater or the hair dryer – instructions are contained in the section Switching off and putting the telescope away below.

The instructions in this User Guide and the appropriate sections of the Meade Manual will form the basis of the instruction course in using the telescope and also the basis of the competence assessment to assure us that you are able to use the telescope safely.

This user guide covers the use of the telescope from the hand controller; additional guides will cover controlling the telescope remotely from a computer and also the use of the telescope with a CCD camera.

• Telescope Logbook

To ensure that we have a record of who has used the telescope, what they have observed and any problems you may have encountered with the telescope you **must** enter the appropriate information each time you use the telescope. The details to be recorded are:

- * Date & Time you started using the telescope
- * Your name – where several people are using it enter all the names with the name of the person in charge underlined
- * Details of what was observed and any files that have been saved on the computer
- * Details of any problems encounters with the telescope. Any Major problems that may stop the next person using the telescope must be written in red and the telescope engineering team informed.
- * The time you finished using the telescope.

The logbook is located in the control room

- **Meade Lx200 GPS Manual**

Most of the alignment instructions in the Meade Manual refer to aligning the telescope in Alt -Azimuth mode and are not applicable to telescopes mounted on a wedge as the Kenley telescope is. If the telescope has been shut down properly using the 'Park' function as detailed later in this document it should start up already aligned. In the event of the alignment having been lost instructions on aligning the telescope are detailed later in this manual.

- **Preparing the Telescope for use**

The first operation is to open the dome to allow the telescope & building to cool down.

Before you start using the telescope you should check the telescope logbook to see if there are any problems noted that may effect your use of the telescope

The telescope cover should be removed by unfastening the two Velcro strips at the bottom and put out of the way

The eyepiece covers on both the main telescope and the finder should be removed followed by the objective cover on the finder.

Then insert a 26 mm eyepiece into the main telescope (it may already be fitted or else there should be a blanking plug in place)

The front cover on the main telescope should then be removed. It just requires a gentle pull. Don't move the telescope while pulling it off. Place the cover in a corner of the dome so it does not get trod on.

You should then have a look round the telescope for any thing that may be obviously wrong such as moisture or any leads that have been displaced.

The instructions for turning on the telescope continue in the section Turning on the telescope later in this guide.

- **Stopping the telescope in an Emergency**

△ Some accessories such as large eyepieces or cameras fitted to the back of the telescope are too long to pass through the telescope fork mounting. When the scope is slewing in declination automatically watch the scope carefully to ensure that they do not collide with the fork.

It is also possible for the scope to hit the RA rotation limit stop in some circumstances in this case the noise made by the RA drive motor will change to a lower pitch and the telescope will stop moving.

If a collision seems likely or the scope hits the RA limit **stop the slew scope immediately by pressing any key on the keypad except GO TO.**

☺ **Tip: If this does not work or you cannot remember this in the heat of the moment stop the scope by turning the telescope power switch off ① ③ A in Figure 1.**

It is better to have to re-align the scope than it is to repair any damage.

☺ **Tip: Switching of the telescope without parking it may cause the alignment to be lost. So will loss of mains power to the observatory as there is no battery backup. Instructions for recovering the alignment are given in the section Alignment Instructions**

- **Parts of the Telescope & general information**

The following information is based on the Meade Lx200 manual but additional instructions & comments have been added where appropriate. More detailed information on some of the items will be given later in this document and in places you will be referred to the Meade Manual for additional information.

TELESCOPE FEATURES

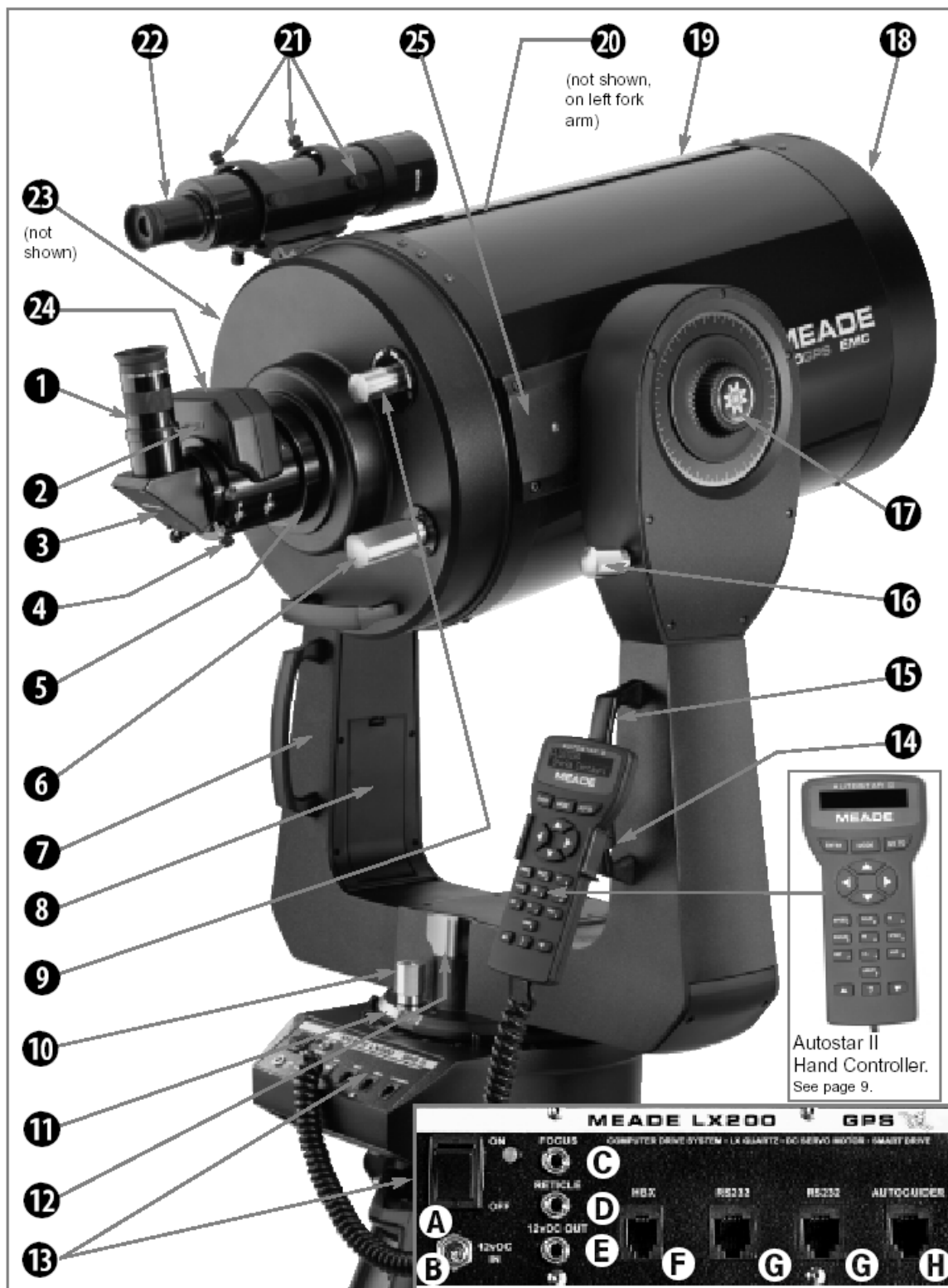


Fig. 1: The LX200GPS Telescope; Computer Control Panel (inset); Autostar II Handbox (inset).

- ① Eyepiece Holder:** This will take either a 2" eyepiece or a 1 ¼" diameter eyepiece with the adaptor that is normally left in place. The eyepiece is secured with the eyepiece thumbscrew (②, Fig. 1)
- ② Eyepiece Thumbscrew:** Holds the eyepiece (①, Fig. 1) in place. Lightly tighten only **△ Caution: over tightening may damage the eyepiece or the thumbscrew** **△ Caution: Ensure you tighten the thumbscrew enough so the eyepiece does not fall out.** ☺ **Tip** When a 1 ¼" eyepiece is being used there is a second thumbscrew to hold the adaptor in place. Ensure you loosen the correct one when changing eyepieces.
- ③ 2" Mirror:** Provides a more comfortable right angle viewing position. A 2" diagonal mirror with an adaptor to take 1.25" eyepieces is normally fitted to the Kenley telescope.
- ④ Diagonal Mirror Thumbscrew:** Tightens the diagonal mirror in place. Tighten to a firm feel only. ☺ **Tip** this allows diagonal to be rotated so the eyepiece is at a convenient position to use. **△ Caution: over tightening may damage the diagonal or the thumbscrew** **△ Caution: Ensure you tighten the thumbscrew enough so the diagonal does not fall out.**
- ⑤ Rear Cell Port:** The microfocuser assembly is mounted onto this port.
- ⑥ Coarse Manual Focus Knob:** Moves the telescopes primary mirror to achieve coarse image focus. To adjust the coarse focus you need to release the primary Mirror Lock ⑨ rotating it in a clockwise direction. ☺ **Tip** When using high magnifications you will find that the image moves a lot in the eyepiece as you focus due to play in the mirror mounting. You should lock the mirror using the mirror lock (⑨) and then focus the telescope using the powered microfocuser.
- ⑦ Fork Arms:** This heavy-duty mount holds the optical tube securely in place.
- ⑧ Battery Compartments:** Do not attempt to fit batteries - the Kenley telescope has its own external power supply.
- ⑨ Primary Mirror Lock:** Rotate this knob clockwise as shown by the unlock arrow to allow the focus to be adjusted manually. After adjusting the focus using the manual focus knob ⑥ rotate the knob in an anti-clockwise direction as shown by the lock arrow. Adjust the tension till you feel some resistance. **△ Caution: Do not over tighten** This action serves to lock in the coarse focus and prevent focus changes due to mirror flop. Use in conjunction with the Zero Image-Shift Microfocuser (see ⑥ and ②④).
- ①⑩ Right Ascension (R.A.) Slow-Motion Control:** **△ Caution do not touch this – use the handset controls to adjust the telescope position** **△ Caution: Do not operate the R.A. Slow Motion Control with the R.A. Lock in the fully locked position, as such operation may result in damage to the internal gear system and also cause you to lose alignment.**
- ①① Right Ascension (R.A.) Setting Circle:** You should not need to use this, as current RA is available from the handset. This should still indicate the correct RA if it does not report this to the Kenley Asset Manager. (You will need to check the setting of this if you have to realign the telescope.)
- ①② Right Ascension (R.A.) Lock:** **△ Caution do not touch this – use the handset controls to move the telescope position otherwise the pre set alignment to the sky will be lost.**
- ①③ Computer Control Panel (see Fig. 1 inset):**
- A. ON/OFF Switch:** Turns the computer control panel and Autostar II ON or OFF. The red power indicator LED next to the switch illuminates when power is supplied to the Autostar II hand box, the microfocuser, and to the telescope's motor drives (the LED can be turned off in the Panel Light menu; (see page 27 of the Meade Manual). **Caution: Using products other than standard Meade accessories may cause damage to the telescope's internal electronics and may void the Meade warranty.**
- B. 12v DC Power Connector:** The external power supply will already be connected to this connector.
- C. Focus Port:** The microfocuser is plugged into this port – you do not need to touch the connection. Control the microfocuser through the Autostar II menus. See **HOT BUTTON MENUS**, page 31 of the Meade Manual, and ②④ below.
- D. Reticule Port:** If you want to use the reticule eyepiece plug the eyepiece into this port. Control the reticule through the Autostar II menus. See **HOT BUTTON MENUS** page 31 of the Meade manual.
- E. 12v DC Output:** Use the 12v DC output to power telescope accessories **△ Caution: The amount of power (current) that can be drawn from this output is very limited. Exceeding this will cause major damage to the telescope. Please consult the telescope engineering team before using this.**
- F. Hand box (HBX) Port:** The Autostar coil cord will already be plugged into this port.

G. RS232 Ports (2): One of these ports is connected to one of the computers in the control room allowing the telescope to be controlled from various astronomy programmes. Leave this connection as found.

H. Autoguider Port: Plug the optional autoguider into this port. See the instruction sheet that came with your autoguider for more information.

1 4 Autostar II Holder: This is attached to the telescope fork (1 5). Holds your hand box in a convenient location. **⚠ Caution:** Ensure the handset is placed in the holder when it is being used – do not allow it to dangle on the end of its cord.

1 5 Fork Handles: Use to lift optical tube assembly or to rotate the telescope when attached to the tripod.

1 6 Declination (Dec.) Slow-Motion Control: **⚠ Caution:** do not touch this – use the handset controls to adjust the telescope position

1 7 Dec. Lock: **⚠ Caution:** do not touch this – use the handset controls to adjust the telescope position otherwise the pre set alignment will be lost.

1 8 Dust Cover: See the instructions for getting the telescope ready to observe and putting it away for instructions on removing and replacing the cover.

1 9 Corrector Plate: **⚠ Caution** both the corrector plate and it's coating are very delicate and if damaged it is not possible to repair or replace it – the telescope will have to be replaced. Do not attempt to wipe any dew or dust off. Instructions on removing Dew from the corrector plate are shown in the section '[Dew Heater](#)' below.

1 9 Optical Tube: The main optical component that gathers the light from distant objects and brings this light to a focus for examination through the eyepiece.

2 0 Declination (Dec.) Setting Circle (on left fork arm): You should not need to use this, as current Dec. is available from the handset. This should still indicate the correct Dec. if it does not report this to the Kenley Asset Manager.

2 1 Finder Scope Collimation Screws: Use these six screws to adjust the alignment of the viewfinder. The viewfinder should already be aligned – do not adjust the collimation screws unless you understand what you are doing.

2 2 8 x 50 mm Finder Scope: A low-power, wide-field finder scope with crosshairs that enables easy centring of objects in the telescope eyepiece. **☺ Tip** The cross hairs in the finder may be at an angle to the horizon. They are aligned so the telescope should move along one set in RA and the other in Dec. If these are not aligned please seek help before rotating the finder.

2 3 GPS Receiver: Receives information transmitted from Global Positioning System satellites. This allows the telescope location, the date & the time to be downloaded from the GPS satellite. This may take a few minutes.

2 4 4-Speed Zero Image-Shift Microfocuser: Allows precise image focus during visual, CCD, and astrophotography applications. Maintains precise image centring on even the smallest CCD chips. Operates at four speeds: Fine to fast using the Arrow keys of the Autostar II hand controller. This is connected to the Focus port (1 3 C Fig. 1). **☺ Tip** Before you set the course focus & lock the mirror you should set the Microfocuser to the mid-position. See the instructions in [Focusing the telescope](#)

2 5 Tube Adapters: Support the telescope tube

Autostar II Handset Parts

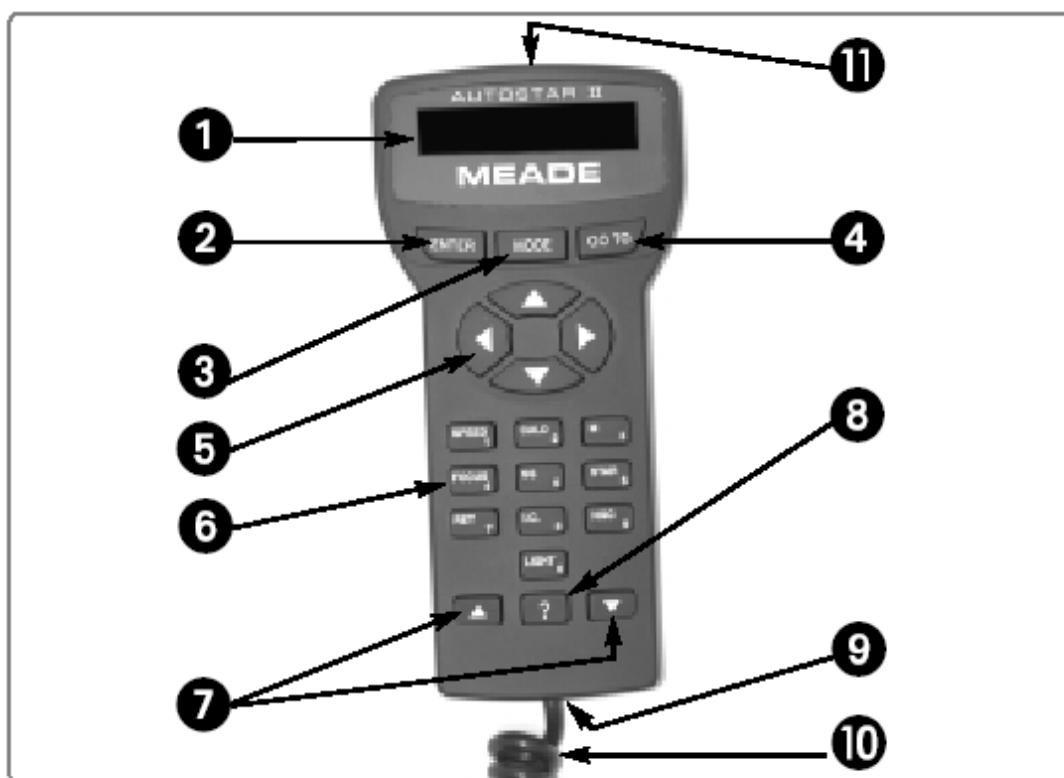


Fig. 2: The Autostar II Handbox.

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 MENUS**, page 18 of the Meade Manual and **AUTOSTAR II MENUS**, page 24 of the Meade Manual.

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.

Tip Be careful how many times you press the Mode button during the alignment procedure – it is quite easy to exit the alignment mode accidentally and to then have to re-start the alignment procedure

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**, see page 17 of the Meade Manual. Use the Up and Down Arrow keys to move the telescope vertically up and down. The Left Arrow key rotates the telescope horizontally counter clockwise, 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 of the Meade Manual):

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 catalogue on the Autostar II hand box.

3 M (Messier): Press to display the Messier catalogue library.

4 FOCUS: Press to display the Focus Control menu.

5 SS: Press to display the Solar System library.

6 STAR: Press to display the Star library.

7 RET (Reticule): Press to display the Reticule Control menu.

8 IC: Press to display the Index Catalogue library.

9 NGC (New General Catalogue): Press to display the NGC catalogue library.

0 LIGHT: Press to turn on and off the red utility light on the top of the hand box.

☺ Tip: To exit these functions press the Mode button, this will take you up one level. For instance if you are aligning the telescope and find the slew speed to high press the '1' (Speed) button – set the required speed and then press 'Mode' to exit the speed setting.

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 onscreen 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: This is used to connect the Autostar II coil cord (**10**, **Fig. 2**) into this port located at the bottom of the Autostar II hand box. This will already be connected.

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

11 Utility Light: Use this built-in red light to illuminate star charts and accessories without disturbing your eyes adaptation to darkness. Use the Hot Key "0" to turn the light on and off.

• Turning on the telescope

The telescope should have been put away using the instructions in the section Switching off and putting the telescope away below. If this has been followed the telescope should remember its alignment and if woken up using the following instructions it should be already aligned to the sky.

The telescope location and time and date are automatically set by the GPS unit in the telescope. when it is powered up.

First you need to prepare the telescope by removing the covers as described in Preparing the Telescope for use above.

To turn the telescope on follow the steps below.

- First switch on the power to the observatory if this has not already been done.
- Next switch on the mains power switch marked 'Telescope Supply' above the computers in the control room.
- Next Turn the White Switch on the wall at the right hand side of the desk marked 'Telescope' on.
- Then go upstairs to the telescope – the red lights on the Dew Heater should be on indicating the

power supply is working

- Then switch the telescope on using the telescope power switch ① ③ A in Figure 1
- The Red LED power indicator should illuminate.
- ☺ **Tip:** If the red LED does not illuminate the Power Supply has probably shut down with the switch on surge. Proceed as follows:
- Turn the telescope power switch ① ③ A in Figure 1 off
- Go down stairs and turn the white telescope power switch at the right of the desk off. Wait 5 seconds and then turn it on again.
- Go back to the telescope, turn the power switch on and the red LED should illuminate.

The Autostar Handset will show 'Initializing'

It will then try to locate the GPS Satellites and download the Location and Time & Date. During this period the handset will show 'Taking GPS Fix' a number of stars will appear across the bottom of the display while it thinks about it. This may take a few minutes.

The display will then show Align and ask you to select the method. Ignore this and press mode twice to return to the main menu.

You are now ready to start observing, if the telescope has been parked correctly following the instructions later in this document you can then use the Object Menu or the Hot Keys to select the item to view and the scope should GOTO to it.

△ Caution: Ensure that the object you select is above the horizon before you press GOTO. If you don't there is a risk that the telescope will drive against the mechanical stops and will at best lose the alignment and at worst the telescope drives may be seriously damaged.

☺ **Tip:** Before you attempt to centre the object you are observing you need to set the slew speed to one of the lower speeds as the telescope starts set to the maximum slew speed.

• Focusing the telescope

The telescope is fitted with a powered microfocuser ⇒67. Due to the limitations of the manual focus mechanism on the telescope it is recommended that you use the powered microfocuser for focusing particularly at high magnifications.

If the instructions for shutting down the telescope have been followed correctly it should be left with the 26 mm eyepiece in place, the microfocuser in the mid position and with the telescope in focus. This ensures that when you are locating the first object that the telescope is in focus.

• Centring the Focuser

The microfocuser has a limited range of in and out movement, to avoid you having to refocus using the manual focus control it is best to set the microfocuser to the middle of its travel before you focus the telescope with the main control. The focuser has around ½" (12 mm) of travel and takes about 32 seconds to move from one end of the travel to another. There is no indication that the focuser has reached the end of its travel – other than looking the only clue is that the note of the motor changes as it strains against the mechanical stop.

Set the focuser to its mid range position as follows:

GOTO a star so you have something to focus on

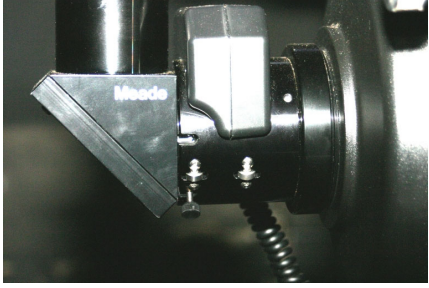
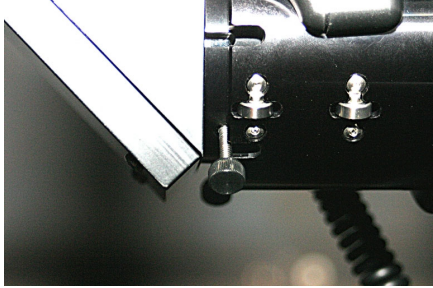

Centre it in the finder & then the main telescope using the slew buttons

Press the focus hot key (Number 4) on the keypad the handset will then enter focus control mode

The display on the handset will show: "Focus Control: Speed: Fast"

Using the up and down scroll buttons ⑦ you can select 4 speeds but leave it on Fast for now

Use the up and down arrow keys ⑤ to move the focuser to its mid point. The adjustment screw should be set so it is just past the start of the U shape slot – about 1 mm is correct. See picture below.

		
<p>Microfocuser at inner limit of travel</p>	<p>Microfocuser at mid point of travel. Note that the screw has just entered the U shaped cut-out in the focuser body.</p>	<p>Microfocuser at outer limit of travel – note the CCD camera was fitted in place of the diagonal</p>

Once you have a star in the main eyepiece use the Course Manual Focus Knob ⑥ to get it into approximate focus and then lock the mirror in position by turning the Primary Mirror Lock ⑨ in an anti-clockwise direction to lock the main mirror. **△ Caution: The lock should only be tightened till slight resistance is felt - Do Not over tighten it.**

• Using the Microfocuser for focusing objects

Focusing for changing eyesight or eyepieces is carried out using the up and down arrow buttons ⑤ on the Handset.

Press the focus key on the keypad (Number 4 key) the handset will then enter focus control mode

The display on the handset will show: "Focus Control: Speed: Fast"

Using the up and down scroll buttons ⑦ you can select 4 speeds you may find it better to select one of the slower speeds to get the best focus. Then press enter to select the speed you require.

☺ Tip Ensure that the handset is in focus mode before you try to use the arrows to focus otherwise the telescope will slew instead and you will lose the object you were observing !

Exit the focus mode by pressing the Mode button twice

• Using the Telescope

Slewing Speed

The 4 Arrow keys are used to manually slew the telescope. The speed of the slew is set by pressing key Number 1 and then pressing one of the keys 1 to 9 to select the slew speed. (1 is the slowest and is normally only used for guiding, 9 is the fastest and is only normally used if moving the telescope through large angles.

The database in the telescope has the location of more than 145 thousand stars and galaxies plus the planets and the Moon programmed in it. Assuming that the telescope is aligned finding an object is just a matter of selecting the item from the handset menu and instructing the telescope to go to that object.

Moving through the AutoStar Menus on the Handset


The majority of the functions of the telescope are controlled through the Menus that are accessible from the handset. The functions are organised in a tree structure that is shown below

Moving through the tree is done using 4 of the Buttons on the Keypad

The Enter Key ② is used to move down a level or when you get to the end of the branch this will activate the option with the exception of going to a selected object. To do this you need to press the GO TO Key ④.

To move up the tree use the Mode Key ③ this is the opposite of the enter key above. **☺ Tip** if you are going through the menus and get to an item you don't want to activate or you get lost press the mode key until you get to the top level 'Select Item'

The two scroll Keys ⑦ are used to access the items at the current level at the tree that you have selected using the Enter & Mode keys as described above.

When you get to an option that requires the entry of digits such as a star number this is done using the numeric keys on the Keypad. Entry of letters is more complicated, when you get to an option where this is required use the up & down arrows  to select the letter of the alphabet, and use the right & left arrow keys to move the cursor to the next position you need to enter a letter in.

The AutoStar menu tree is shown in Appendix 1 that you will have to download separately. This has been shaded in as follows:

△ Caution Do not attempt to change the settings of the items shaded in red on the AutoStar Menu tree shown on the Appendix 1 without the permission of the Telescope Engineering Team.


The Yellow Items are those that you will be need to be familiar with to use the telescope

△ Caution Do not attempt to use the Blue items without further instruction – these are to do with re-aligning the telescope from the beginning – you should not normally need to use these.

Those items that are not shaded are not important for the day-to-day operation of the telescope and can be investigated at your leisure. Information on the use of these can be found in the Meade Manual

• Refining the alignment of the telescope during use

During use it may become apparent that the object that you GO TO is not in the centre of the field. It is possible to refine the alignment of the telescope to the current object by centring the object in the main telescope eyepiece and then holding down the 'Enter' button for 2 seconds till 'Enter to Sync' is displayed. Then press Enter. This then realigns the scope to this object that should improve the alignment accuracy on other objects.

 **Tip** Do this on a star rather than a diffuse object or a planet. The part of the diffuse object that you Sync on may not be the location programmed into the telescope. Also the planet position calculated by the telescope is only an approximation and the moon is far too big to sync on.

• Spiral Search

If the object you are looking for is not visible in the eyepiece after you have used the GO TO function to find it is possible to get the scope to carry out a spiral search from the current position until the object is visible in the eyepiece. To do this wait till the scope has stopped slewing and then press the GO TO button while looking through the eyepiece. The telescope will then begin a spiral search from the current position. When the object appears in the eyepiece press the MODE button to stop the spiral search and the centre the object in the eyepiece with the arrow keys.

• Dew Heater

All Schmitt – Cassegrain telescope are prone to the glass corrector plate becoming covered in dew as the temperature of the telescope falls.

△ Caution do not attempt to wipe the dew off – the coating on the corrector plate is very delicate and if damaged will require the telescope to be replaced.

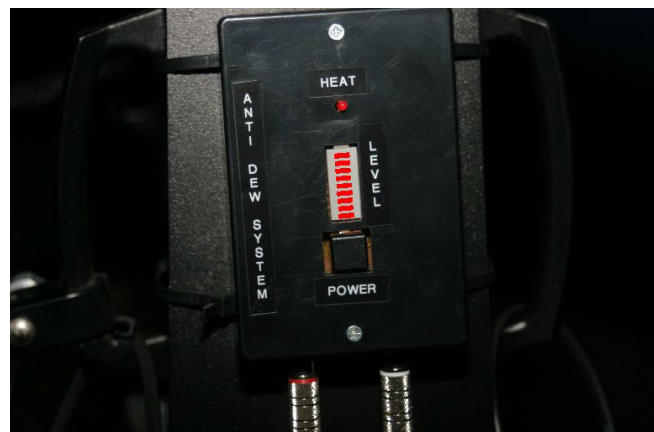
To prevent Dew forming on the corrector plate the telescope is fitted with a Dew Heater Mounted on at the front of the telescope. This is switched on and the heating level controlled by a box mounted the side of the forks.

The power to the Dew Heater is turned on when the telescope power supply is switched on. The number of red LEDs in the column show how high the power is – non-illuminated = no heating and nine illuminated equals full power. The red 'Heat' LED shows that power is being provided to the heater strip. This will flash at the lower settings and will remain illuminated all the time at full power.

To increase the power to the Dew Heater press the 'Power' Button. Each press will increase the power by one bar on the display. Pressing the 'Power' button when it is on full power switched the Dew Heater off.

The Dew Heater Power should be set to the minimum level consistent with stopping dew formation as excess heat will reduce the optical performance of the telescope.

 **Tip** The best way to see if the telescope has dew on the corrector is to examine it with a red torch – but



make sure no one is looking through the telescope or imaging when you look !

- **Switching off and putting the telescope away**

It is important that the following instructions are followed to ensure that the next user does not have to realign the telescope before he starts observing. If you lose the alignment and are unable to reset it please put a note to this effect in the telescope logbook and inform the observatory manager and the astronomer.

The sequence to be followed is:

Fit the 26 mm Eyepiece in the telescope.

Set the Microfocuser to the mid position (see section Focusing the telescope)

Focus the telescope on a star & lightly lock the mirror

Park the telescope by using the function on the handset – Utilities – Park Scope – then press Enter. The scope should go to its Park position – pointing due South with the tube approximately level

☺ **Tip** The 'Park Scope' option is the last item on the menu so it is easier to press the up arrow key once rather than scroll down all the options.

Then turn the telescope power switch off.

Check the front corrector plate for dew, if it is damp it should be dried by turning the dew heater up to maximum and leaving it for 10 to 15 minutes. If this does not work dry the moisture of using the hair dryer. **△ Caution** heat it very gently all over – concentrating the heat in one area may crack the corrector plate – it is not replaceable !

Fit the front cover, the two eyepiece caps & the cover to the front of the finder.

If there is any other moisture on the telescope dry this off with the hair dryer as well

Put on the green cover and fasten the two Velcro straps at the base

Turn off the power in the control room

- **Recovering from a failed Park Command**

If the telescope fails to park correctly you will then have to switch the telescope on again using the procedure in Turning on the telescope

Then locate an object and re-sync the scope to it as described in Refining the alignment of the telescope during use

Then Park the telescope again using the procedure above. – It should then park correctly

☺ **Tip** If you accidentally press a key after instructing the telescope to 'Park' it will stop where it is and go into its parked status. The only option is to turn the power off and then follow the instructions on the two lines above.

- **Re-aligning the telescope if the alignment has been lost**

The telescope should be aligned to the sky when it is switched on, provided that the scope has been parked properly when it was last switched off. As noted above switching off the power either deliberately or accidentally before parking the scope will cause the telescope alignment to be lost. The following instructions are included to allow you to realign the telescope if required.

Do not attempt to follow the alignment information in the Meade manual as the majority of this refers to telescopes on an Alt-Az mount and not on a wedge like the Kenley Telescope. The Meade instructions for aligning the telescope on a wedge also contain details of aligning the wedge. The wedge on the Kenley Telescope has been correctly aligned so that the telescope axis points at the North Pole so these are not required.

△ Caution: do not attempt to adjust any of the controls on the wedge or the manual controls on the Declination or RA axis of the telescope. You do not need to use these to align the telescope to the sky.

- **Alignment Instructions**

In most cases it is possible to recover the alignment if it has been lost by following the instructions below.

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△ Caution: it is possible for accessories on the back of the telescope to hit the base of the forks during this procedure or for the telescope to reach its mechanical stops. In either case the telescope must be stopped immediately. Preferably by stopping the slew by pressing any key but the GO TO key. For more information on stopping the telescope see Stopping the telescope in an Emergency

Park the telescope using the procedure in

- If the telescope parks with the tube away from the normal park position or stops displaying the message ' park position outside lower limit do the following
- Turn off the power
- Wait for a short period and switch it on again
- Re-start the scope using the procedure in Turning on the telescope
- Move the telescope to the park position using the hand controls. The tube should be level and pointing due South – Due south can be checked by ensuring the RA scale reads zero
- Park the telescope

Re-start the scope using the procedure in Turning on the telescope

Then use the GO TO function to slew to a STAR that is between 30 and 60 degrees above the Horizon.

The telescope will then start slewing – if it looks as though the back end or worse still the front end of the telescope may attempt to go through the fork or if the RA drive motor sounds as it is straining and the telescope stops moving in RA then stop the slew immediately by pressing any button on the hand control except GO TO.

Attempting to slew to the star can result in one of three things happening

1: The telescope will GO TO the star selected – all you need to do is to centre the star in the main telescope using the hand controls and then refine the alignment by following the instructions in Refining the alignment of the telescope during use.

2: If the slew stops but the telescope does not point at the Star. Move the telescope to the Star manually using the hand control and centre the star in the main telescope and then refine the alignment by following the instructions in Refining the alignment of the telescope during use.

3: If you have to stop the telescope slewing by using the hand control / turning the power off due to the danger of collision or the telescope meets its RA stops the telescope will need re-aligning. This is not covered in this guide and you should call the telescope engineering team.

• **Additional information in the Meade Manual**

You should read the following section of the Meade manual for more information on the features of the Meade Lx200 GPS.

Pages 22 to 36 give more detailed information on using the Autostar II however this needs to be read in conjunction with the notes above on which functions you should not use.

• **Updates to this guide**

This guide will be updated to correct any errors, to include additional information that may be useful to you or when we discover new things about how the telescope works. Please ensure you have a copy of the latest version. There should be a printed copy of the latest version in the telescope folder at Kenley. The latest versions will also be published on the CAS web site and a copy put on the computer at Kenley. Announcements of updates will be published on Altair_B.