



The NexStar HC telescope is a precision scientific instrument that will allow you to enjoy viewing numerous objects in the night sky — planets, nebulae, star clusters, galaxies and more. Equipped with high speed motors and hand control, the NexStar HC allows you to remotely move your telescope to desired objects quickly and accurately. At a touch of a button, you can slew your telescope across the sky in a matter of second and track objects remotely as the Earth rotates beneath them. The NexStar HC is fully upgradeable and can be equipped with the optional NexStar Hand Control with a database of over 4,000 objects (see the Optional Accessories section of this manual).

Powering the NexStar

The NexStar HC can be powered by the supplied battery pack or an optional 12v AC adapter. The power pack requires 8 user supplied AA size alkaline batteries. To power the NexStar, insert the batteries into the battery pack and plug the round post into the 12v outlet located on the side of the fork arm. Once the battery pack is plugged in, the NexStar will power on and one of the slew rate indicator lights will light up.

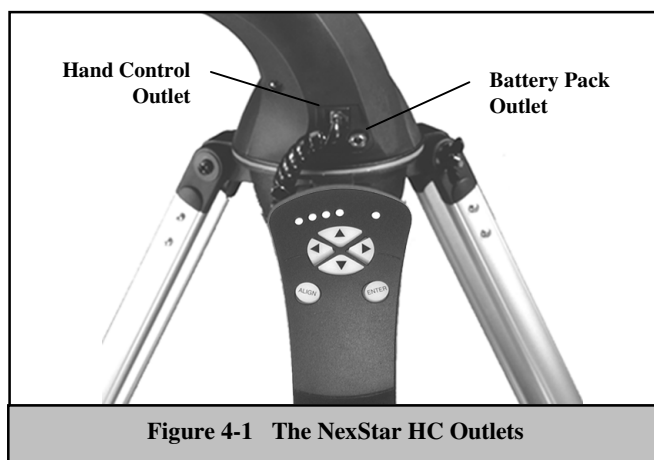


Figure 4-1 The NexStar HC Outlets

The Hand Control

The NexStar HC has a removable hand control that gives the user quick access to all the motion controls the NexStar HC offers. Below is a brief description of the individual components of the NexStar HC hand controller:

1. **Star Key Activation Light:** Indicates that the **Star** button has been pressed and the utility functions on the hand control are active.
2. **Direction Buttons:** Allows complete control of the NexStar in any direction. Use the direction keys to move the telescope from object to object or for centering objects in the eyepiece.
3. **Rate:** Instantly changes the rate of speed of the motors when the direction buttons are pressed. Press this button repeatedly to cycle through the speeds of the motors.
4. **Star Key:** Gives the user access to the utility functions of the hand control, such as changing the direction of the arrow keys and backlash compensation.
5. **Hand Control Slew Rate Indicator Lights:** Displays the speed at which the telescope will move when each direction button is pressed.

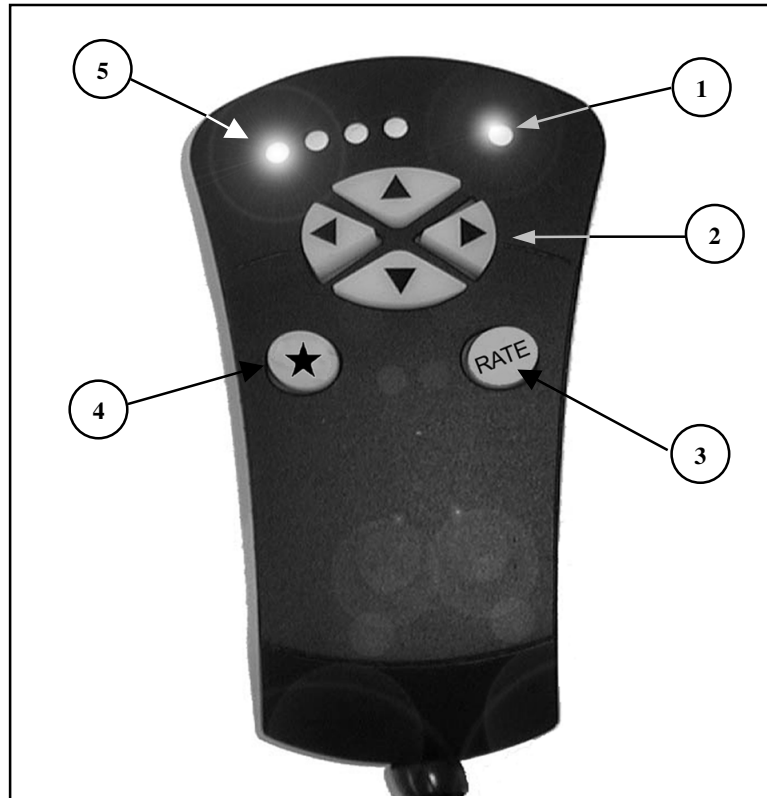


Figure 4-2
The NexStar HC Hand Control

Attaching the Hand Control

The NexStar HC hand control has a phone jack type connector at the end of its cord. Plug the phone jack connector into the outlet at the base of the telescope's fork arm. Push the connector into the outlet until it clicks into place and put the hand control into its holder on the tripod as described previously in the Assembly section of the manual.

Rate Button

Pressing the RATE key (3) allows you to instantly change the speed rate of the motors from high speed slew rate to precise centering rate or two speeds in between. Each rate corresponds to one of the indicator LED lights (5) on the hand control. From left to right, the corresponding speeds are as follows:

<i>Rate</i>	
1	For fine centering of objects in the eyepiece
2	For scanning around for objects in the eyepiece
3	For centering bright stars in the Star Pointer
4	For slewing around the sky from object to object

The hand control has a "double button" feature that allows you to instantly speed up the motors without having to choose a speed rate. To use this feature, simply press the arrow button that corresponds to the direction that you want to move the telescope. While holding that button down, press the opposite directional button. This will increase the slew rate to approximately 1.5° per second (equal to the third rate on the hand control). This feature will only function if the telescope is currently set at a speed rate of 1 or 2.

Utility Features

The NexStar HC hand control comes with a *Star* function key that allows you to change certain parameters of the hand controls functions, such as the directional logic of the arrow keys, backlash compensation of the motor gears and azimuth tracking.

Direction Buttons: When looking at a star through an eyepiece or star diagonal, the direction that the star moves when the Up and Down arrow buttons are pressed will be reversed from when the same object is being centered in the Star Pointer Finderscope. For example, when a star is being centered in the telescope's eyepiece, it may appear to move upward when the down arrow button is pressed (and visa-versa) even though the telescope tube is actually moving downward. This is why it is convenient to be able to change the arrow button direction when switching from using the Star Pointer to the eyepiece. To reverse the direction of the Up and Down arrow buttons:

1. Press the **STAR** key on the hand control. The activation light (1) on the hand control will light up to indicate that the button has been pressed. When the button has been pressed, the four direction buttons (2) will be non-operational until the button is pressed again.
2. Press the **RATE** button on the hand control.
3. Press the **STAR** key on the hand control to activate the direction buttons.

Anti-backlash – All mechanical gears have a certain amount of backlash or "play" between the gears. This play is evident by how long it takes for a star to move in the eyepiece when the hand control arrow buttons are pressed (especially when changing directions). The NexStar's anti-backlash feature allows the user to compensate for backlash by having the hand control quickly rewinding the motors just enough to eliminate the play between gears. The amount of compensation needed depends on the slewing rate selected; the slower the slewing rate the longer it will take for the star to appear to move in the eyepiece. To change the backlash compensation:

1. Press the **STAR** key on the hand control.
2. Use the Right and Left arrow keys to speed up or slow down the initial speed of the azimuth motors when the arrow buttons are pressed. For example, if it takes a star too long to move in the eyepiece when the hand control arrow buttons are pressed, then press the Right arrow button to speed up the initial motor speed. The buttons can be pressed repeatedly to increase the initial motor speed even more.
3. Use the UP and Down arrow keys to speed up or slow down the initial speed of the altitude motors when the arrow buttons are pressed.
4. Press the **STAR** key on the hand control again to activate the direction buttons again.

RS-232 Connection

The NexStar HC has an RS-232 port on the back of the hand control, allowing it to be controlled using the *GuideStar* telescope control software. Linking the NexStar to a computer requires the use of a RS-232 cable (included in the HC models of the NexStar, and an optional accessory for the GT models). The *GuideStar* software gives you all the "Go To" features of the NexStar GT hand control including a 4,000 object database, *AutoAlign* based on date and location, and helpful information for hundreds of objects.

To interface the NexStar with your computer, follow these steps:

1. Connect the phone jack end of the RS-232 cable to the port in the back of the hand control and the 9-pin connector to the back of your computer.
2. Install the *GuideStar* CD-ROM onto your computer and follow the on-screen instructions.
3. Plug in power to the NexStar and start the *GuideStar* program.
4. From the Setup Screen you can test communication by clicking on the Test Port button after selecting a Comm port (see Fig 4-3). If you receive a communication error message, select a different Comm port and click Test Port until communication is successful.
5. Once communication is established, update the following information on the Setup Screen:

- Telescope Model – Select your telescope model from the drop-down list.
- Location – Click the Change Location button to choose the city closest to your location.
- Time – The software will use the current time setting from your computer, however you must indicate your time zone and whether Daylight Savings is in effect.

6. Click the Save button to save these parameters.

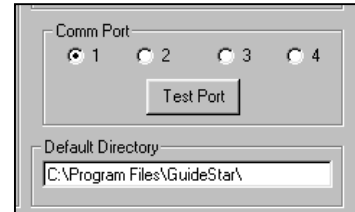


Fig 4-3 – Testing Communication

Press the Align button to begin the alignment procedure. Follow the on-screen instructions for aligning the NexStar on two stars in the sky. For information on using many of the *GuideStar* features, refer to the *AutoAlign* instructions in the NexStar GT section of your manual. The *GuideStar* software also has help buttons to explain many of the commonly used fields.