

# Nightrider II

## Equatorial Platform

### Operator's Guide



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# INTRODUCTION

The Nightrider Equatorial Platforms represent the finest design for astronomical tracking available at any price. You will find lasting value in the design, construction and reliability of the product. The following information will help you understand the setup, operation and maintenance of the Nightrider II.

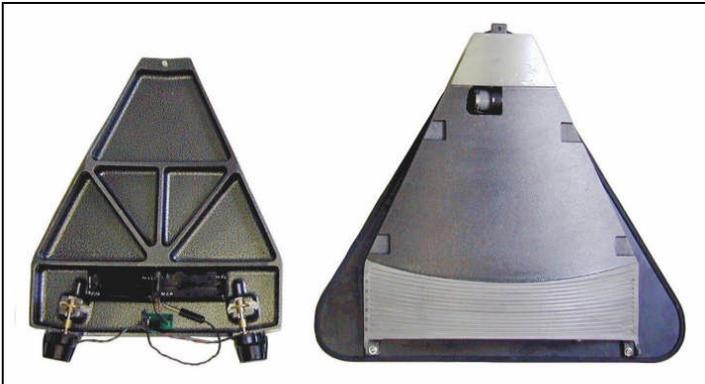
The equatorial platform (also known as an equatorial table) is designed to give a Dobsonian-type scope the ability to track the stars as an equatorially mounted scope.

## Unpacking

The equatorial platform comes in two parts, the top and the base. These parts are kept separate during shipping to prevent scratching and damage. When transporting the platform, we recommend that you use the original box and packaging material to protect your investment.

Before doing anything else, look for any obvious shipping damage and verify that all components are present. Here is a list of what you should find in the box:

- Equatorial Platform Base
- Equatorial Platform Top
- Hand Control with Cable
- Self-adhesive Abrasive Pads (4)
- This Instruction Manual



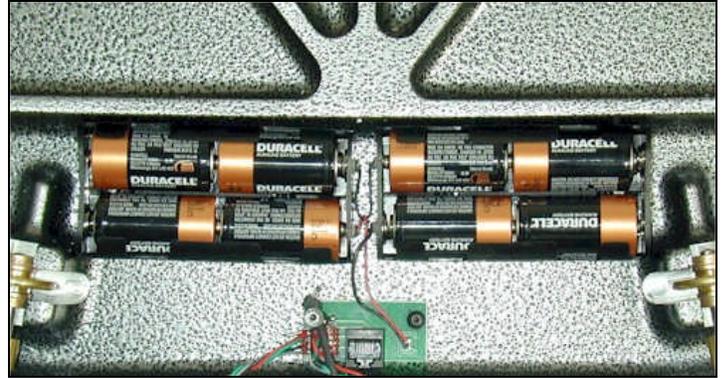
Base (left) and Top (right) of the Nightrider II



Hand Control, Cable and Abrasive Pads

## Battery Installation

Insert 8 fresh alkaline C batteries, with the correct polarity, into the battery holder. The electronics will operate from 9-12 volts DC. The motors will run quietest when operated from a 9V source. Installing C alkaline cells will yield about 40 hours of operation. General-purpose carbon cells are also OK, but expect fewer hours of operation from them.



Battery Compartment in Base

## Powering Up and Down

To turn the unit on, simply connect the hand control cable. One end is inserted into the hand control and the other end into the modular jack in the base of the platform (next to the battery compartment). There is no need to turn a switch on or off. Turning the unit off is accomplished by unplugging one end of the hand control cable.

To connect the declination motor, insert the 1/4" mono plug (coming from the base) into the jack on the platform top.



Declination Plug Inserted Into Declination Jack

## Care and Maintenance

Always keep the unit shaded or covered. The platform is made from Melamine particle board and aluminum. Leaving it exposed to direct sunlight or high humidity can cause the assembly to warp, swell or become too hot.

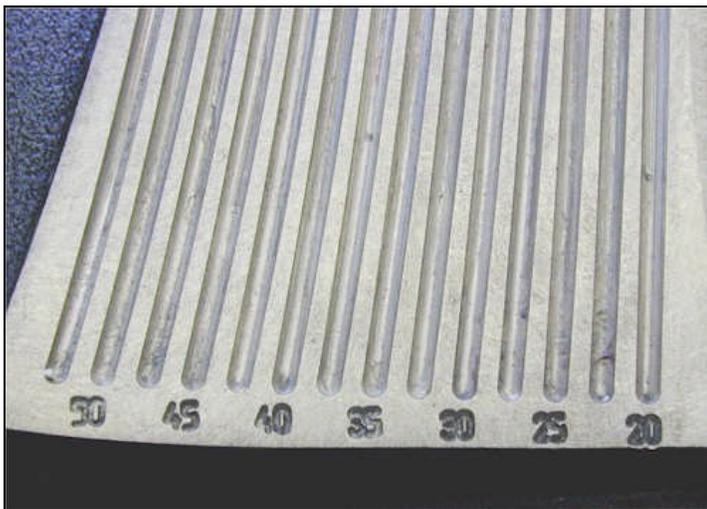
Very little maintenance should be required of your platform. When bring it into a warm house from a very cold observing session, condensation will occur unless you cover the unit with a towel. You are discouraged from letting the unit get wet, although heavy dew should be no problem. The electronics are coated to protect against this type of moisture. Exposure to rain and/or immersion is not recommended. Do not lubricate the drive rollers. Friction is necessary for proper operation.

## OPERATION

It is necessary to position the top of the platform correctly on the bottom portion in order to set the latitude for your location. You can adjust latitude settings from  $\pm 20^\circ$  to  $\pm 52.5^\circ$ .

### Setting the Latitude

Place the top portion of the equatorial table upside down so you can see the bottom aluminum surface with machined grooves. Notice that these grooves are numbered. These numbers represent latitude settings. Place the platform base on the ground where you wish to use is. Find the groove that most closely approximates your latitude. Place the top of the platform onto the base so that the two rollers in the base are placed directly into the selected groove.



Numbered Latitude Grooves

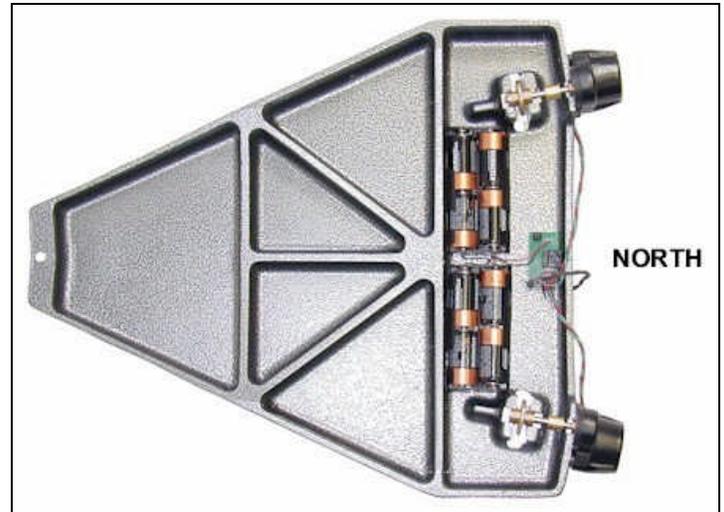
Be sure that both drive rollers are riding in the same groove otherwise you will have an unstable platform with inaccurate tracking.

### Positioning the Platform

Always transport the unit in two pieces. This will prevent side-to-side movements, which could cause minor nicks in the precision assemblies

To use the platform, select a hard, level patch of ground or grass and place the base so the front motors face north, in the direction of Polaris (for use at northern latitudes), or

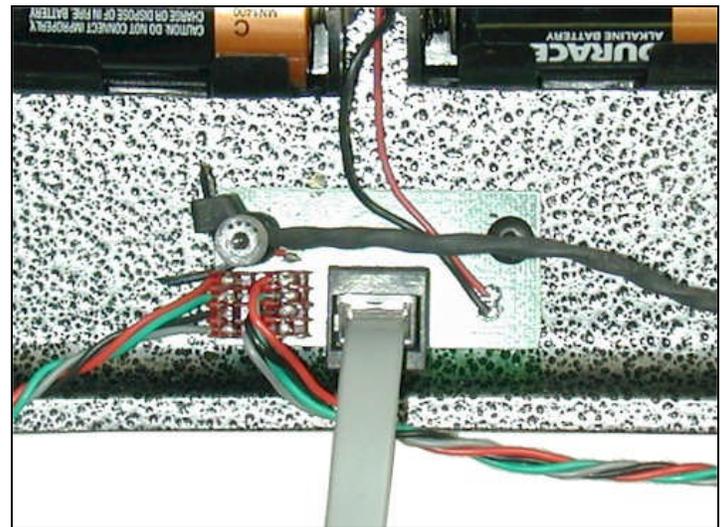
south (for southern latitudes). For visual use, approximate alignment is quite sufficient.



Align the Base with the Motors Facing the Celestial Pole

### Adjusting for Your Hemisphere

The polarity of the stepper motor connections must be reversed to change hemispheres. To do this, simply remove the red connector (for each motor) from the printed circuit board (next to the battery compartment), turn the connector  $180^\circ$  and reconnect it.



Motor (left) and Control (center) Connectors

### Placing a Telescope on the Platform

With the ground board attached, place your telescope's ground board and rocker box on top of the platform so the center rocker box pin is centered between the front drive rollers and the rear Teflon pad of the base. You can experiment with placement of the telescope a bit forward or back for greatest stability. Moving forward increases friction of the drive rollers, but may make the reset operation more difficult. Next, place your optical tube assembly carefully into position. Use smooth, gentle movements to re-position your telescope. Once you are certain of the best position,

you can apply the abrasive pads to the platform to mark the location and keep the scope from sliding on the platform.

To reset the platform, gently push the top half fully towards the west (east in the southern hemisphere) thus moving the scope to the east (west in the southern hemisphere). The platform will then provide about sixty minutes of tracking. You can reset it at any time, but remember, after a reset you will need to re-center your observing object.

## Installation and Removal WARNING

Be certain when installing or removing your scope to first properly align the top and base of the platform to create a level platform surface. Next, place or remove the scope either in pieces or as a unit. Remember, the platform is only held together by gravity, just as your telescope is.

Be careful when you re-point your telescope to avoid knocking the drive rollers out of the correct grooves. This is best accomplished by slow, deliberate movements when pointing the telescope. Always return the platform to a level position when placing or removing your telescope.

## Adjusting the Speed

You can adjust the speed with the hand control. Insert the ends of the hand control cable into the hand control and the base to turn the platform tracking on. Use the following procedures to vary the speeds for tracking or slewing:

- **Forward Slewing** (16x normal tracking speed)  
Press RA+.
- **Reverse Slewing** (16x normal tracking speed in reverse)  
Press RA-.
- **Slowly Increase Tracking Speed**  
First press and hold RA+ then quickly and simultaneously press RA-. Hold down both keys until you reach the desired speed.
- **Slowly Decrease Tracking Speed**  
First press and hold RA- then quickly and simultaneously press RA+. Hold down both keys until you reach the desired speed.

During normal tracking, the LED will flash. During the above procedures for slewing and speed adjustments, the LED will change from flashing to steady.

## Adjusting Declination

To make declination adjustments the declination plug must be inserted into the jack in the top of the equatorial platform.

The declination axis is intended only for minor adjustments. Declination adjustments are made by a simple cam system. Essentially, the motor shaft going into the declination cam is offset from the center of the cam roller. Therefore, pressing and holding one of the declination buttons will cause movement in one direction then back in the other direction

as the cam rotates through 360°. If declination is not moving in the direction that correlates with the buttons, hold the button until you see travel in the opposite direction. Make sure you do not stop at the dead spots at the top or bottom of the cam or movement in either direction will cause declination adjustments in only one direction.

- **Increase Declination**

Press DEC+ (or DEC- depending on cam positioning).

- **Decrease Declination**

Press DEC- (or DEC+ depending on cam positioning).

## TROUBLESHOOTING

If you are having problems getting the platform to function properly, first make sure all three motors and the hand control are plugged in and fresh batteries are installed. Next, refer to the Troubleshooting Guide (below) to find possible causes.

### Troubleshooting Guide

Symptom	Possible Cause(s)
No motion is detected even though the LED is on.	<ul style="list-style-type: none"><li>• Low battery (use alkaline batteries for best performance)  Make sure the LED is flashing. A steady LED indicates high-speed slew mode. Low batteries will not operate the motors in slew mode.</li></ul>
The unit is tracking the wrong direction.	<ul style="list-style-type: none"><li>• The two motors may have different connector polarities. (See the section titled <i>Adjusting for Your Hemisphere</i>, for changing connector polarity.)</li><li>• Make sure that the motor end is facing the celestial pole. (See the section titled <i>Positioning the Platform</i>.)</li><li>• Check the motor connector polarity. (See the section titled <i>Adjusting for Your Hemisphere</i>.)</li></ul>
The unit tracks but the declination motor will not run.	<ul style="list-style-type: none"><li>• Make sure that the declination plug is plugged into the declination jack. (See the section titled <i>Powering Up and Down</i>.)</li></ul>

# APPENDIX A

## Nightrider II Specifications

<b>Platform Size</b>	24" x 24" x 24" (triangle)
<b>Weight Capacity</b>	180 pounds
<b>Scope Capacity</b>	16" aperture
<b>Latitude Range</b>	±20° to 52.5° (usable to 55°)
<b>Platform Height</b>	5½ inches
<b>Construction</b>	Melamine particle board and Aluminum
<b>Total Weight</b>	34 pounds (shipping weight 39 pounds)
<b>Hand Control</b>	Dual axis with forward and reverse slewing, declination adjustment, adjustable tracking speed, built-in chart-illuminator LED
<b>Tracking Time</b>	60 minutes
<b>Power</b>	9-12v DC 100mA, accepts 8 size C batteries
<b>Battery Life</b>	35 to 40 hours (with Alkaline batteries)

## APPENDIX B

### Precision Alignment Using the Star Drift Method

This method requires observing a star under high power, preferably with a center reticule eyepiece. If no such eyepiece is available, you can use the defocused star image very close to the eyepiece field of view to observe any drift. Here is one of many methods:

- Place the platform as close as possible to level and polar aligned. The closer this initial alignment is, the faster you will complete the task. Note the axis of travel during fast/slow slew in the eyepiece. This is the RA direction, which is not terribly important if there is drift. Perpendicular to that axis you will notice the drift that you need to eliminate.
- Pick a star near the celestial equator and in the east. Make sure you are far enough above the horizon to avoid atmospheric distortion (approx. 15°). By raising/lowering the elevation of one end of the platform (not the scope), you should minimize the drift over several minutes.
- Pick a star near the celestial equator and close to the meridian. Reduce the drift by rotating the platform base (not the scope) ever so slightly. Adjust until the error is minimized over several minutes.
- Repeat this sequence until satisfied.

This same method applies to CCD imaging, except you are watching the pixel drift.

For more information on polar alignment, go to our Document Library at [www.jmitelescopes.com](http://www.jmitelescopes.com) and find document number 8, *Polar Alignment is Easy ... Really!*

Good luck with your imaging!

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