

## Welcome to the Celestron PWI Software Startup Guide

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### Introduction

The first version of Celestron PWI allows you to align your CGX Mount and go to celestial objects from your PC. In addition to having a graphical interface with the Sky Viewer to control your mount, the key advantage to this software is the PointXP mount modelling, which allows you to add multiple points to the alignment for better pointing accuracy.

PWI was co-developed by PlaneWave Instruments and Celestron. Please check the CGX Support Page for updates to the software.

### System Requirements

To use this software with your CGX Mount, you will need:

- A PC with Windows 7, 8, or 10 equipped with USB 2.0.
- A USB 2.0 cable (standard type A to type B connector)



- Internet connectivity for automatic driver installation, extended object database, and location detection
- Only 10MB of hard disk space and 64MB of memory is required
- Screen resolution of 1024 x 768 or higher is recommended
- CGX or CGX-L mount and telescope setup with power to the mount.
- The CGX Mount should be polar aligned\* prior to using the PWI software

\* The CGX Mount should be at least roughly polar aligned before beginning the alignment in PWI. PWI can account for some polar alignment error in its pointing model, however, good tracking (especially for astrophotography) still relies on good polar alignment. Use the AllStar Polar Alignment feature in the included NexStar+ hand control, or use the optional Polar Axis Finder Scope for the CGX, available from Celestron.

### Installing the Software

1. Open the Setup\_PWI exe file and follow the prompts to complete installation.
2. Open Celestron PWI.

*Windows may prompt you with a security warning when opening the EXE file. PWI is safe and has been developed by PlaneWave Instruments and Celestron. If prompted with a security warning, please select "Run Anyways" to continue the installation.*

**Note to Windows 7 and 8 users:** PWI version 1.0 is not yet digitally signed. You may need to temporarily disable driver signage requirements in your system to proceed with installation. For assistance, please refer to this link: <https://www.raymond.cc/blog/loading-unsigned-drivers-in-windows-7-and-vista-64-bit-x64/>

## PWI Overview

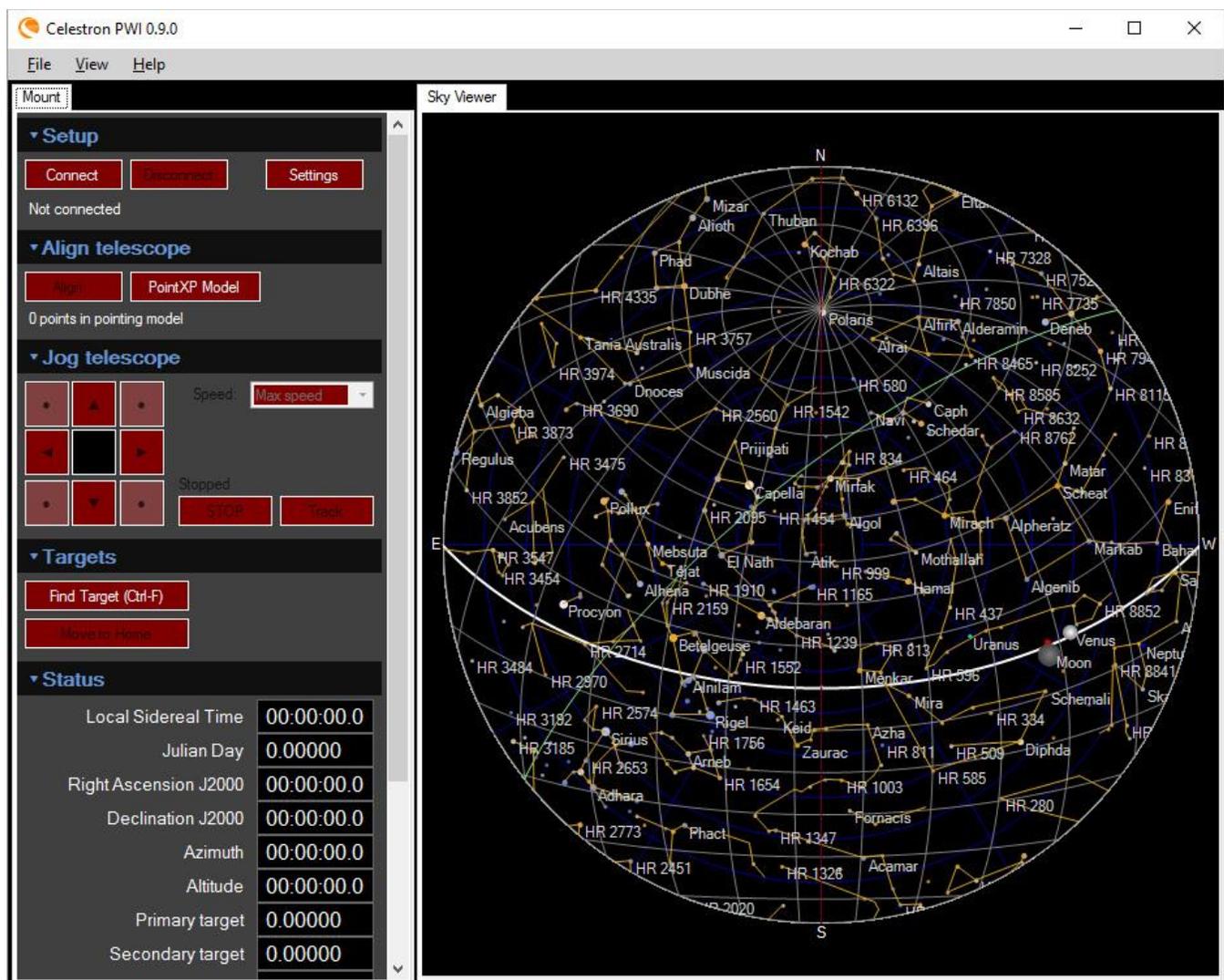
The PWI window is divided into the “Mount” and “Sky Viewer” screens.

The “Mount” screen controls the telescope:

- Mount Connection Settings
- Connects/Disconnects from CGX
- Align telescope
- Find named objects, Messier and NGC objects
- Jog telescope with the arrow keys.
- Change the slew speed
- Status display: location information, and telescope position information

The “Sky Viewer” screen displays a virtual sky:

- Bright named stars
- Constellation asterisms
- Bright solar system objects
- R.A.-Dec gridlines and Alt-Az gridlines
- Zenith, meridian, celestial equator, and galactic plane



## Sky Viewer

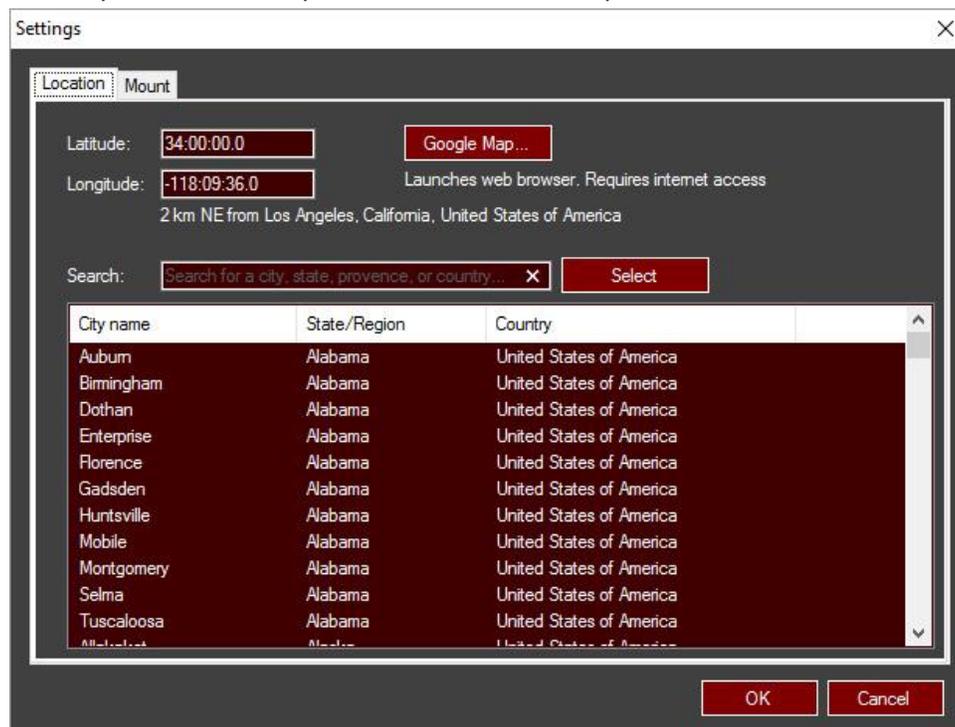
You can resize the Sky Viewer by resizing the window on your screen. The largest view is with the window expanded to full screen. You cannot zoom in/out within the Sky Viewer.

Any object that is visible on the Sky Viewer can be selected by clicking on it. Objects here are filtered to bright named stars and solar system objects. To find a deep sky target, such as Messier 8, click “Find Target” and enter the Messier or NGC object catalog number or name. Read more in “Finding Objects” later in this setup guide.

When the telescope is aligned, green crosshairs indicate the position of the telescope. Yellow crosshairs indicate the selected position in the sky.

### Setting Location

Click “Settings” in the Setup menu, then select your location. You can search by city, or click “Detect Location”. You may have to enable your web browser to use your location.



### Connecting To Your Mount

1. Plug the USB cable from your PC to the USB port on the CGX mount.
2. Click “Settings” in the Setup menu, then click the Mount tab.
3. Power on the CGX mount and select the COM Port that appears in the detected COM ports (if this is the first time plugging the mount into the PC, please wait a moment while the USB Serial driver is automatically installed).



## Aligning the Telescope

Prerequisite: The CGX Mount should be at least roughly polar aligned before beginning the alignment in PWI. PWI can account for some polar alignment error in its pointing model, however, good tracking (especially for astrophotography) still relies on good polar alignment. We recommend polar aligning your CGX mount prior to using PWI. Use the AllStar Polar Alignment feature in the included NexStar+ hand control, or use the optional Polar Axis Finder Scope for the CGX, available from Celestron.

### 1. Click “Connect” under Setup section of the Mount tab.



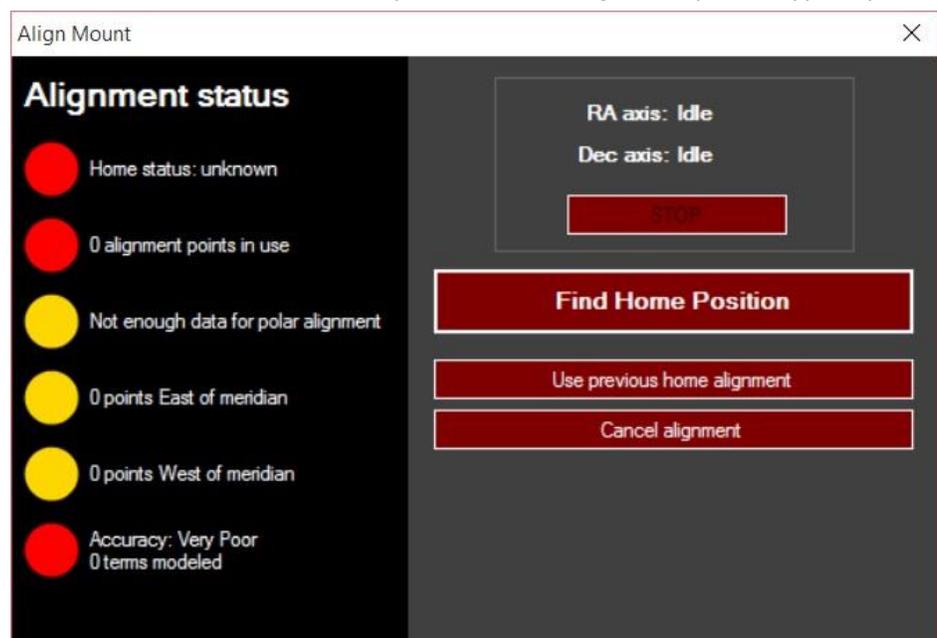
Date, time, and location info is provided by your PC. If necessary, you can change the location or time to customize your observing site.

### 2. Click “Begin alignment”.

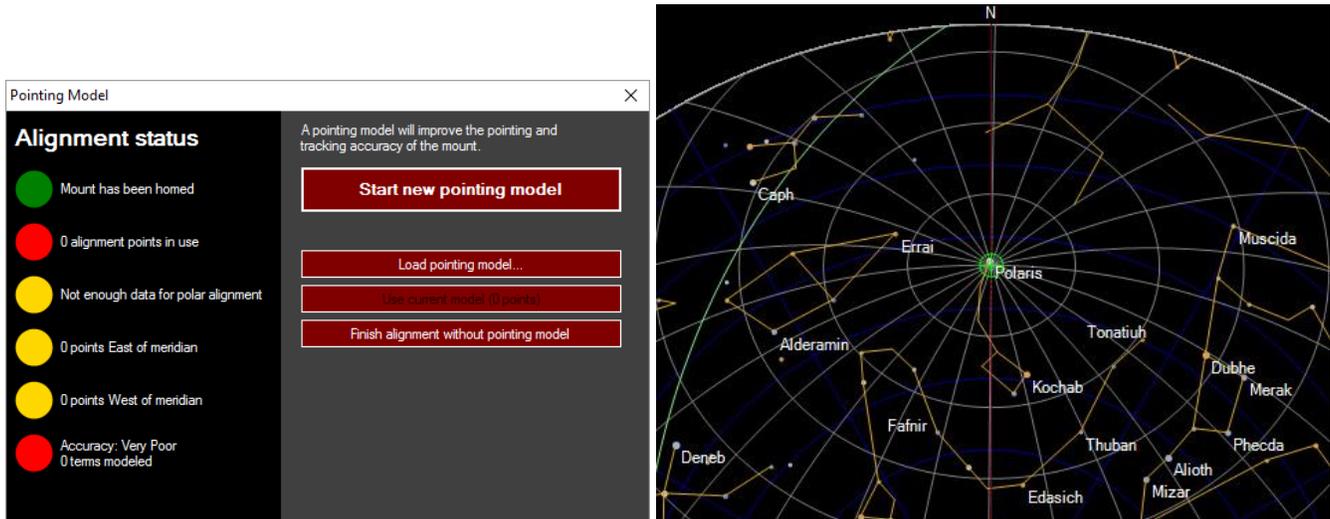
The **Alignment Status Window** will appear. The alignment status indicates how far along your alignment is. For a minimal alignment, the software must at least establish the home position and 1 alignment point. Typically, when all fields are green, your alignment is good. In PWI, you can always add additional alignment points to further improve the pointing accuracy.

### 3. Click “Find Home Position” and wait for the CGX to find its home sensor position.

Once the CGX has reached the home position, the first alignment status indicator will turn green, and you will see green crosshairs appear over



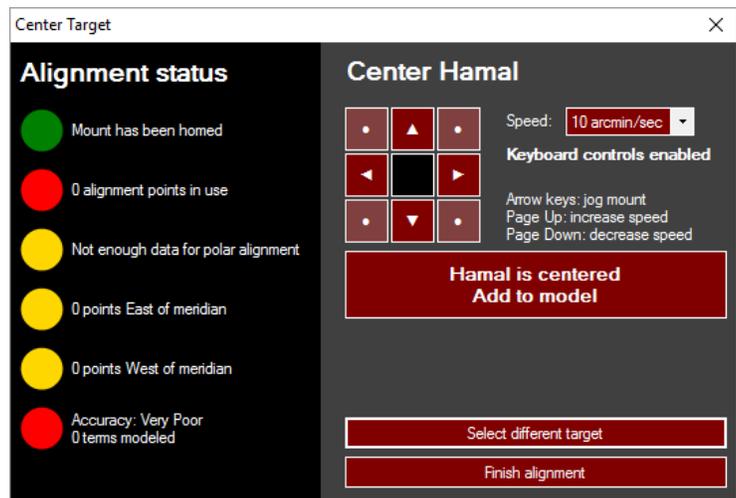
the north celestial pole in the Sky Viewer. The default starting position assumes you are polar aligned. As a reminder, you should at least be roughly polar aligned to proceed with alignment in PWI. But the software can still compensate for several degrees of misalignment.



4. Click “Start new pointing model”, then select a star in the Sky Viewer and click “Go to target”. Or, you can choose from the Suggested Targets pulldown menu, which is broken up into the brightest objects in each quadrant of the sky. The telescope will slew to the area of that star and the Center Target screen will appear.

Keep in mind the Sky Viewer assumes an unobstructed sky. Choose a star that is suitable for your observing location.

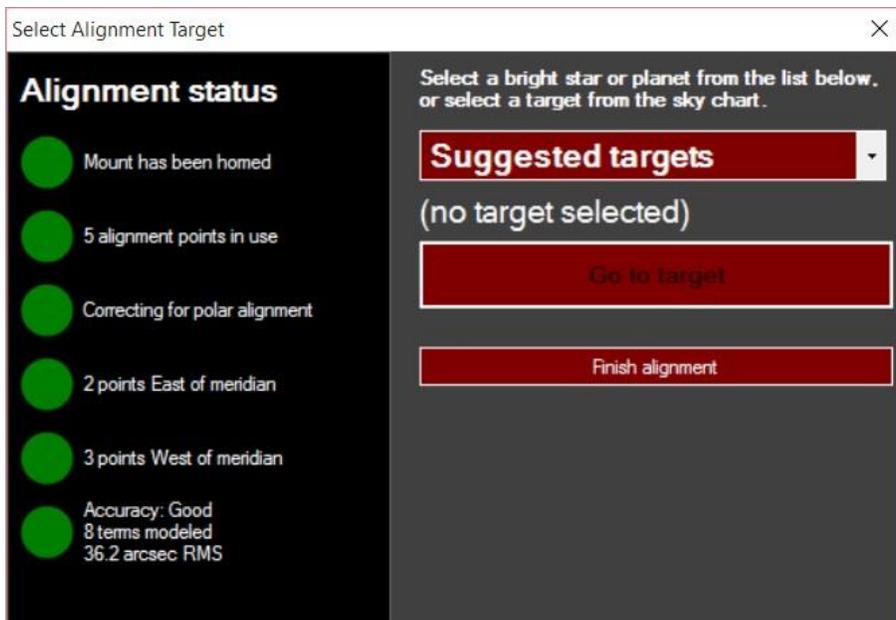
5. Center the star in your eyepiece or camera using the arrow keys on the Center Target screen (or use the arrow keys on your keyboard!) and click “star is centered. Add to model”.



After one alignment star your CGX is minimally aligned. We recommend aligning to at least 4 stars for better go-to accuracy, or ideally until all fields in the Alignment Status Window turn green.

6. Select another star in the Sky Viewer or Suggested Targets and click “Go to target”. Center the star and add it to the model. Repeat this until you have at least 3 to 4 alignment points, and note the Alignment Status indicators turning green.

Align on at least two or more stars from each side of the meridian to achieve a good all-green alignment status. You can use fewer or greater alignment points depending on the level of pointing accuracy you want.

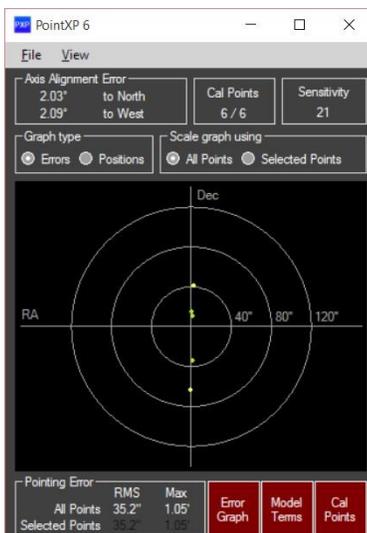


7. Click “Finish alignment” once you have added the sufficient number of stars.

You may add additional alignment points at any time to the model for improved pointing accuracy. Simply repeat step 6 as desired.

### Point XP Model

During the alignment process, the Alignment Status Window displays the current alignment status, including number of alignment points, quality of alignment, and the calculated RMS pointing error of the alignment model (when enough points are in the model to calculate this). The more points you accurately center and add to the model, the more accurate the pointing will be overall. There is some error in the centering accuracy of each star, as well as natural limitations to how accurate the system can point, but to an extent, more points are better.



Click the PointXP Model to review the details of your alignment at any time.

### Determining Polar Alignment Accuracy from PointXP

Once you have a good pointing model, you can review your polar alignment error in PointXP. Look at your “Axis Alignment Error” to determine the quality of your polar alignment. If the reading is  $2^{\circ}$  to the West, and  $2^{\circ}$  North, then you would need to move your mount’s azimuth adjuster  $2^{\circ}$  westward, and your latitude knob  $2^{\circ}$  northward. If you adjust the latitude or azimuth of your mount, you will have to perform a new pointing model.

### Saving a Pointing Model / Saving Your Alignment

Once your alignment is completed, you may save it by going to File → Save Pointing Model. You can do the same from the PointXP window.

### Loading a Pointing Model / Loading Your Alignment

Provided you have not physically moved your mount or unlocked the clutch, you can load an alignment to restore your telescope's pointing after shutting the mount off. Simply go to File → Load Pointing Model to restore your alignment.

### Restoring Your Alignment After Unlocking the R.A. or Dec Clutches

If you unlock the CGX's R.A. and Dec clutches and move the mount, your alignment will be lost, but you can restore it simply by clicking "return to home". As long as you don't physically relocate the mount, you can conveniently restore your alignment this way.

### Removing an Align Point from the PointXP Model

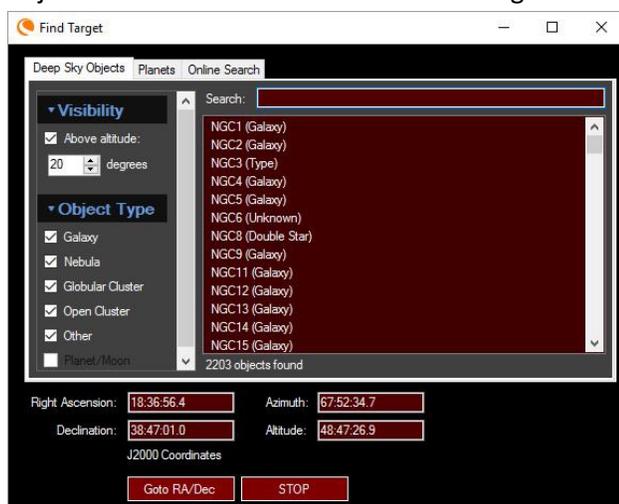
If you want to remove an alignment point from your model click PointXP → Cal Points, then select the point from the spreadsheet and click "Delete Selected". This can be useful if you have added a bad point to an otherwise good model.

### Basic telescope controls

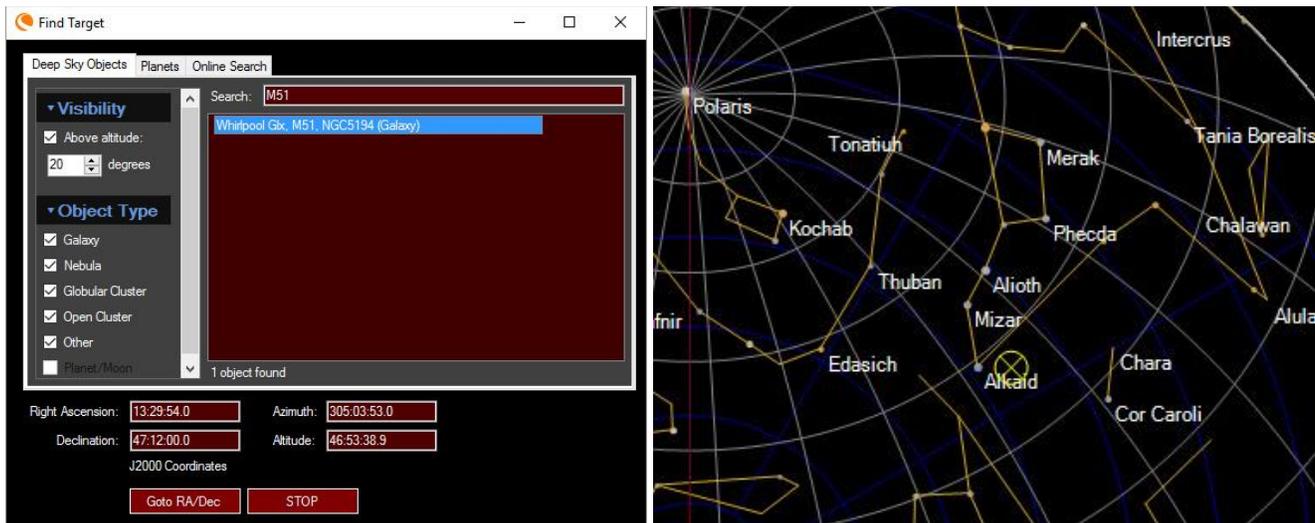
The "Jog telescope" allows you to manually slew the CGX at a specified speed. 4 degrees per second is the default fastest rate, and slower speeds can be selected from the pulldown menu to center objects in your eyepiece or camera. You can also use the arrow keys on your keyboard to jog the telescope at the selected slew speed.

### Finding Objects

Objects in PWI are automatically filtered for your time, observing location and altitude limit above the horizon. The default altitude limit is 20 degrees, which you can change to your preference in the Find Target window. Beyond bright named stars and solar system objects, you can access the more extensive database of deep sky objects within the Messier and NGC catalogs.



1. Click “Find Target” in the Target’s section of the Mount tab.
2. Enter the object name by M or NGC catalog number, such as M42, or NGC, then click on the object generated in the search list. Yellow crosshairs will appear in the Sky Viewer to indicate its position in the sky.



3. Click “Goto RA/Dec” and the CGX will slew to your selected target.

R.A. and Dec or Alt and Az coordinates can be entered manually as degrees:minutes:seconds.tenths of seconds, such as 13:29:54.0. Simply highlight the coordinate fields with your mouse and enter the coordinates.

For an even larger object database and extends into IC, PCG, UGC and more, select the online search tab and enter the object name or catalog number and click “Search”.

### Disconnecting

Alignments are saved and can be restored when disconnecting and reconnecting to the CGX mount. Click “Disconnect” to disconnect from the CGX mount. As long as you do not physically move the mount or unlock the R.A. and Dec clutches, you can resume the existing alignment once you reconnect. No “Hibernate” setting is necessary. If the mount is setup in an observatory, you may park the mount in any desired position simply by slewing to that position, then disconnecting in PWI.

### New Features and Improvements are Under Development

Stay tuned on Celestron’s website for updates to PWI which will add features and other improvements.