

Gemini Hub Help File

Table of contents

Gemini Help	3
Setup	6
About	7
License	9
Quick Start	10
Software Installation	11
Connecting To Your Gemini	16
Completing The Configuration	21
Temperature Coefficients	24
Configuring Software	27
Webpage Ethernet	28
Webpage Wi-Fi	30
Direct Serial Connection	36
Uninstalling Software	38
Operation	40
Gemini Commander	41
Focus Presets And Offsets	46
Sky PA Offsets	52
Accessories	53
Gemini Hand Control	54
FAQ & Troubleshooting	57
Hub Connection Issues	58
Configuring USB Converters	60
HTML Help Viewer Display Issues	63
Updating Firmware	64
Updating Gemini Commander	66
Contacting Optec Technical Support	68
Accessing The Event Logger	69
Reference	73
System Requirements	74
Hardware	76
Command List	77
Error List	78
Additional Resources	80
Optec Website	81
Optec User Group	81
Optec Software Downloads	81
Optec Support	81
ASCOM Website	81



Welcome to the Optec Gemini Help

This help document is organized into the following chapters:

[Setup](#)

- ▶ [About](#)
- ▶ [License](#)
- ▶ [Quick Start](#)
 - ▶ [Software Installation](#)
 - ▶ [Connecting To Your Gemini](#)
 - ▶ [Completing The Configuration](#)
 - ▶ [Temperature Coefficients](#)
- ▶ [Configuring Software](#)
 - ▶ [Webpage Ethernet Connection](#)
 - ▶ [Webpage Wi-Fi Connection](#)
 - ▶ [Direct Serial Connection](#)
- ▶ [Uninstalling Software](#)

[Operation](#)

- ▶ [Gemini Commander](#)
 - ▶ [Focus Presets And Offsets](#)
 - ▶ [Sky PA Offsets](#)
- ▶ [Accessories](#)
 - ▶ [Gemini Hand Control](#)

[FAQ & Troubleshooting](#)




- ▶ [Hub Connection Issues](#)
 - ▶ [Configuring USB Converters](#)
- ▶ [HTML Help Viewer Display Issues](#)
- ▶ [Updating Firmware](#)
- ▶ [Updating Gemini Commander](#)
- ▶ [Contacting Optec Technical Support](#)
 - ▶ [Accessing The Event Logger](#)

[Reference](#)

- ▶ [System Requirements](#)
- ▶ [Hardware](#)
- ▶ [Command List](#)
- ▶ [Error List](#)

[Additional Resources](#)

Revisions to this Help document

- | | | |
|---|-----------------------|------------------------------------|
|  | Rev 1.00 - 2015/05/07 | initial release. |
|  | Rev 1.01 - 2015/11/03 | Minor updates |
|  | Rev 1.02 - 2016/02/09 | Updated to software version 1.0.3. |



Chapter 1: Gemini Hub Setup

- ▶ [About](#) - Capabilities of the Gemini hub
- ▶ [License](#) - The End-User License Agreement for the Gemini Commander software and Gemini control website
- ▶ [Quick Start](#) - A digital copy of the paper Quick-Start Guide that is included with the purchase of every Gemini focuser hub
 - ▶ [Software Installation](#) - How to install Gemini Commander on your system
 - ▶ [Connecting To Your Gemini](#) - How to connect your hub to your computer using Gemini Commander
 - ▶ [Completing The Configuration](#) - How to complete the Gemini Commander configuration process for your hub
 - ▶ [Temperature Coefficients](#) - How to use Gemini Commander to automatically calculate and store temperature compensation coefficients.
- ▶ [Configuring Software](#) - How to configure software on your computer to control the Gemini
 - ▶ [Webpage Ethernet Connection](#) - Configuring browser-based control with an Ethernet connection
 - ▶ [Webpage Wi-Fi Connection](#) - Configuring browser-based control with a Wi-Fi connection
 - ▶ [Direct Serial Connection](#) - Configuring direct serial control with a serial terminal application
- ▶ [Uninstalling Software](#) - How to remove Gemini Commander from your system

About



Section 1.1 - About The Gemini

What Is Gemini?

The Gemini is a Focusing Rotator in a single compact package. The focuser has a full half inch (12.7 mm) of travel. The rotator has a full three hundred and sixty degrees of rotation. The whole package fits in a 2.75 inch (seventy mm) package when the focuser is fully extended. Both the Focuser and the Rotator are controlled from the same hub.

The Ever-Reliable Serial Port

Everyone knows that the serial port is almost extinct, right? In truth, the serial port is still the most reliable standard communications protocol available and is used in several industries and applications, including observatory control. The RS-232 serial protocol is simple to implement, capable of communication over great distances and very reliable when used properly. To allow the hobbyist to easily write software for control of the focuser and for firmware upgrades, the Gemini system includes an RS-232 interface as standard.

Using Optec's Serial-USB communications cable, users can easily connect the Gemini controller to any modern PC even when no DB-9 serial port is available. The Serial-USB cable includes an RJ-12 plug on the controller end and terminates in a USB converter on the PC end. The original TCF-S focuser has enjoyed overwhelming success with these new communications cables. Additionally, with the Serial-USB cable the 5 meter distance limitation of USB 2.0 is negated. The Gemini controller includes a single 6-ft.long Serial-USB cable, but much longer cables, up to 50 meters in length, are available from Optec.

Wired Ethernet Connectivity

Gemini also supports Ethernet connections, allowing for large distances and easy remote control.

Optional WiFi Connectivity

With the explosion of mobile devices capable of direct network communications, the Gemini system includes easy mobile access through iPhones, Android OS devices, and any other device with an Internet browser. With the purchase of the optional WiFi control board, connectivity to a Gemini is a snap. Now observers, astrophotographers, and astronomy enthusiasts can completely eliminate the hassle of computer control cables by connecting to the Gemini over a wireless network. Focusing can be accomplished without ever touching your telescope eliminating vibrations and thermal effects.

ASCOM Compatibility

The Gemini software package includes an ASCOM-compatible driver for both the Focuser and the Rotator. Therefore, the Gemini hub is usable with any ASCOM-compliant software. Acting

as an ASCOM Local Server, the Gemini requires ASCOM Platform 6.1 or higher for use.

Please Note: This manual documents only the Gemini focuser hub and control software. Refer to the ASCOM Standards website (www.ascom-standards.org) for platform downloads and documentation.

License



Section 1.2 - Gemini Software Warranty

By installing and/or using **Gemini Control** software, you agree to Optec's license and warranty terms below.

GEMINI COMMANDER, GEMINI CONTROL WEBSITE, AND THESE INFORMATIONAL MATERIALS ARE PROVIDED "AS-IS": NEITHER OPTEC, INC., ITS AUTHORS, NOR ITS SUPPLIERS MAKES ANY WARRANTY, EXPRESS OR IMPLIED WITH RESPECT TO THE CONTENT OF THESE MATERIALS OR THE ACCURACY OF THE GEMINI COMMANDER/CONTROL WEBSITE PRODUCTS, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. BECAUSE SOME STATES / JURISDICTIONS DO NOT ALLOW EXCLUSIONS OF IMPLIED WARRANTIES, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

IN NO EVENT SHALL OPTEC, INC., THE AUTHOR, OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR INABILITY TO USE THESE PRODUCTS, EVEN IF OPTEC, INC., HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

Quick Start



Section 1.3 - Gemini Quick-Start Guide

If you are now the proud owner of a new Gemini Focusing Rotator, congratulations! You are on the cutting edge of Astronomical technology!

We invite you to use this quick-start guide to get a fast introduction to the installation, connection, and configuration process that you will need to go through to get your Gemini up and running. However, we also suggest that you read the full Gemini Technical Manual in order to gain a more complete understanding of the advanced features and multiple connection methods that will help you to get the most out of your Gemini.

- ▶ [Software Installation](#) - How to install Gemini Commander on your system
- ▶ [Connecting To Your Gemini](#) - How to connect your focuser hub to your computer using Gemini Commander
- ▶ [Temperature Coefficients](#) - How to use Gemini Commander to automatically calculate and store temperature compensation coefficients
- ▶ [Completing The Configuration](#) - How to complete the Gemini Commander configuration process for your focuser hub

Software Installation



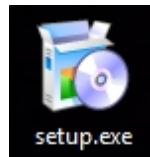
Section 1.3.1 - Gemini Commander Installation Instructions

NOTICE: Make sure that you have connected the hub's focuser port to the Gemini's focuser port and the hub's rotator port to the Gemini's rotator port. Although it is difficult to damage the Gemini by switching the lines it is best to avoid this problem.

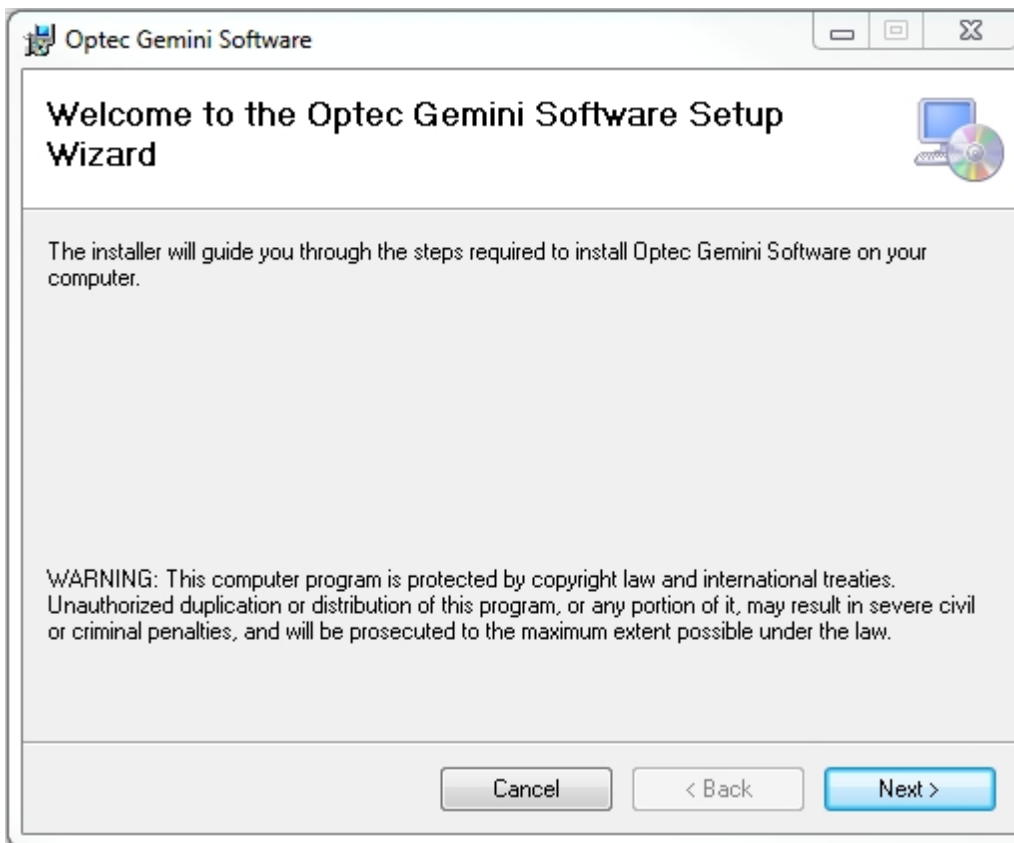
Installing Gemini Commander

To install the Gemini Commander control software and ASCOM Gemini drivers, please follow these steps:

- ▶ Review the [System Requirements](#) to verify that your system is capable of running Gemini Commander. If you are reading this document on a Windows machine it is almost certain that your computer far exceeds the minimum requirements.
- ▶ Obtain the latest version of Gemini Commander installer from the [Downloads](#) page on the Optec website. If you do not have an Internet connection, the release version of Gemini Commander is available on the CD included with the hub. You can also download the program on another computer and transfer the installer to your control computer.



- ▶ Double-click the installer file to run it.



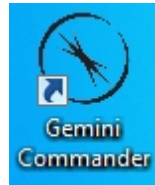
- ▶ Follow the instructions in the installer to complete the installation.

Congratulations! Your Gemini Commander software is installed and ready for configuring with your focuser system.

Opening Gemini Commander

For first-time use, Gemini Commander will open when the installation is finished unless you specified otherwise.

For later use, you can open Gemini Commander by picking one of the following options:

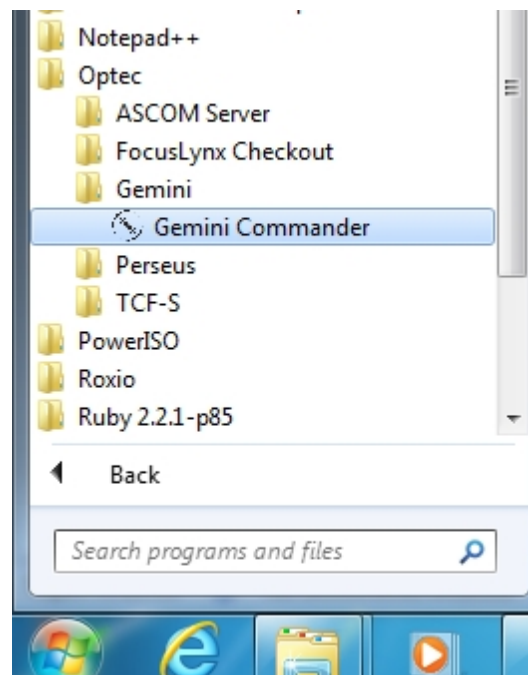


- ▶ Double-click the shortcut for **Gemini Commander** that the installer creates on your **Desktop**.

-OR-

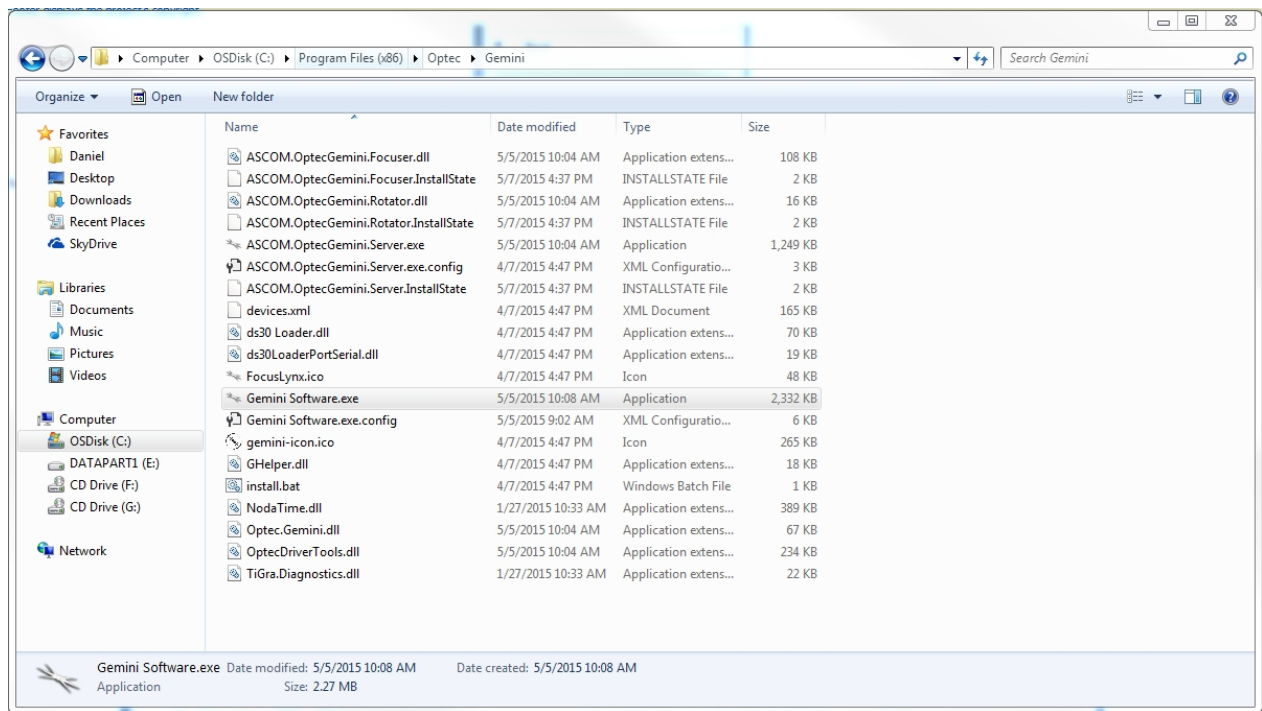
- ▶ If you are using Windows Vista or Windows 7, go to the **Start** menu, then search for **Gemini Commander** in the search bar.

-OR-



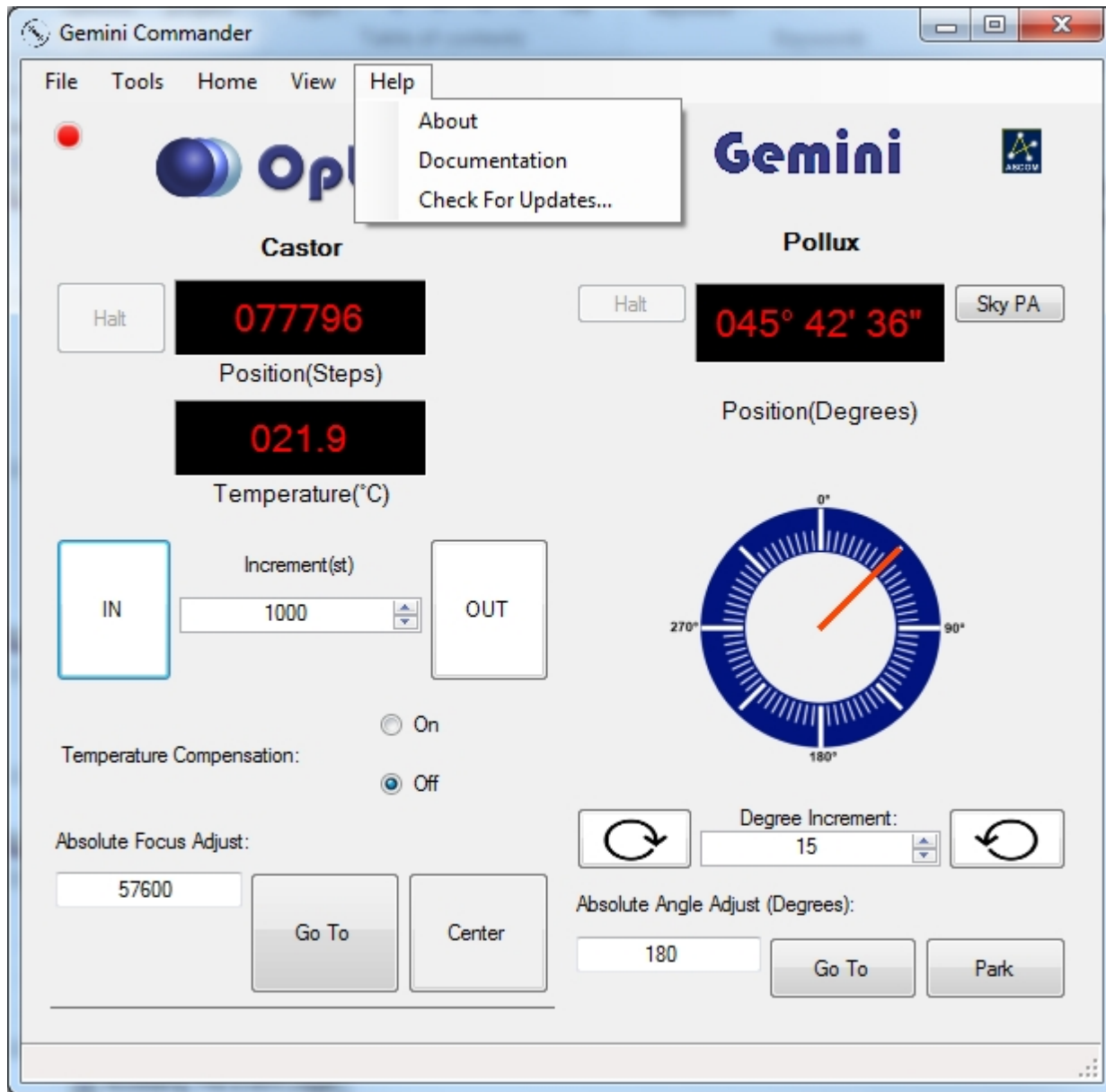
- ▶ Go to the **Start** menu, and choose All programs. Click the **Optec** folder, click the **Gemini** folder, and click the **Gemini Commander** shortcut that appears.

-OR-



- ▶ Go to **My Computer**, then follow the file path you specified during installation to find the **Gemini Commander.exe** file, which will open the program. The default installation path for Windows XP and 32-bit versions of Windows Vista and Windows 7 is **C:\Program Files\Gemini Commander**. The default installation path for 64-bit versions of Windows Vista and Windows 7 is **C:\Program Files (x86)\Gemini Commander**.

Getting Help



If you encounter any problems during connection, configuration, or operation, please contact Optec Technical Support by telephone or [email](#).

Connecting To Your Gemini



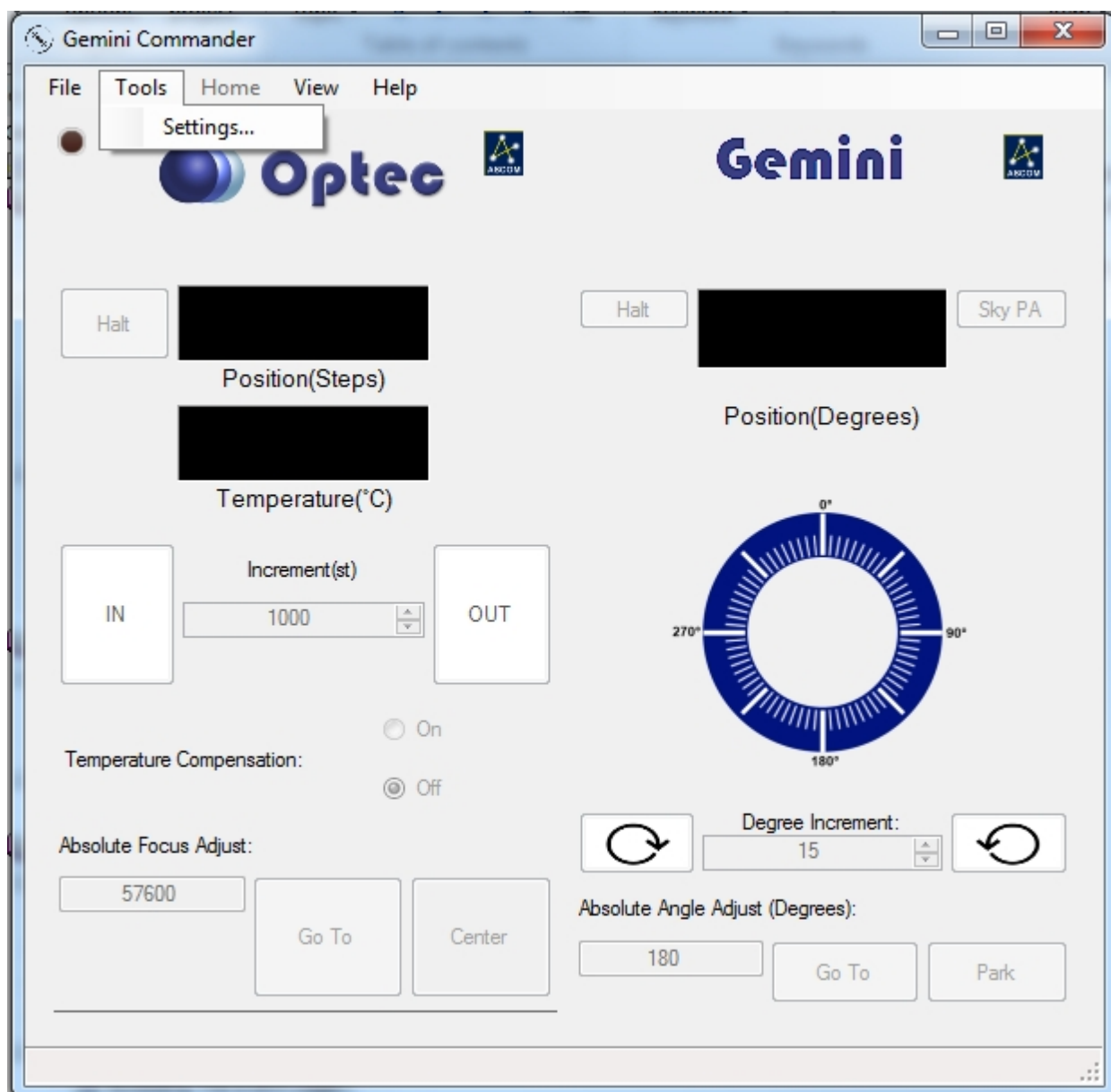
Section 1.3.2 - Connecting To Your Gemini

NOTICE: Make sure that you have connected the hub's focuser port to the Gemini's focuser port and the hub's rotator port to the Gemini's rotator port. Although it is difficult to damage the Gemini by switching the lines it is best to avoid this problem.

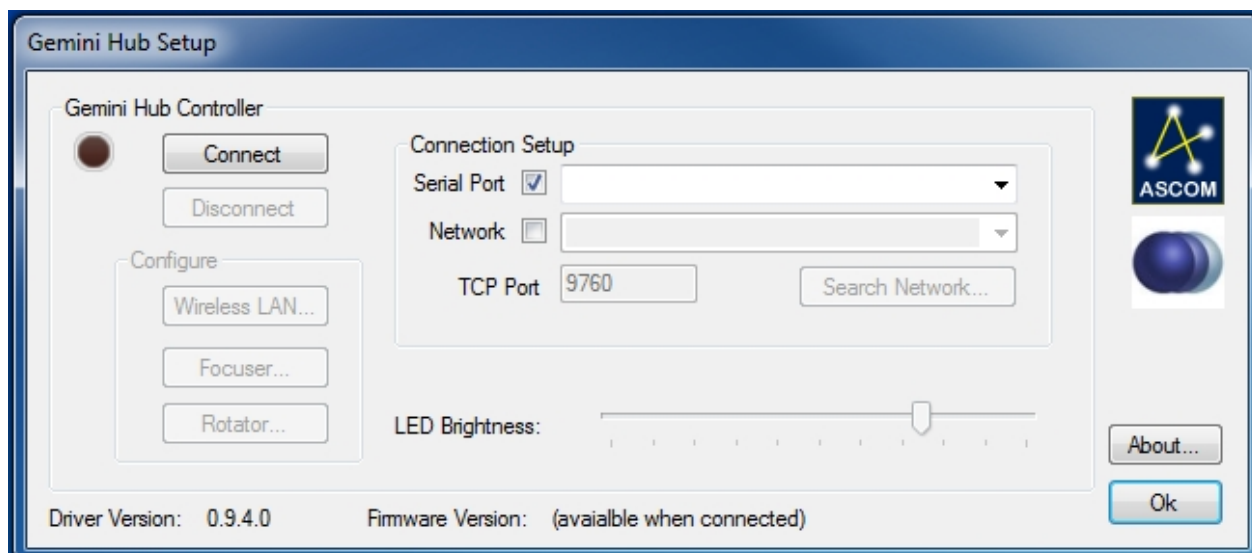
Once you have installed your Gemini Commander software, the next step is to connect your hub to your computer. These instructions will help you connect over an **RS-232 Serial** connection using the Serial-USB cable included with the Gemini controller hub. For instructions on connecting and configuring over other types of connections, please consult the [Configuring Software](#) section of the Gemini manual.

To establish a serial connection using Gemini Commander:

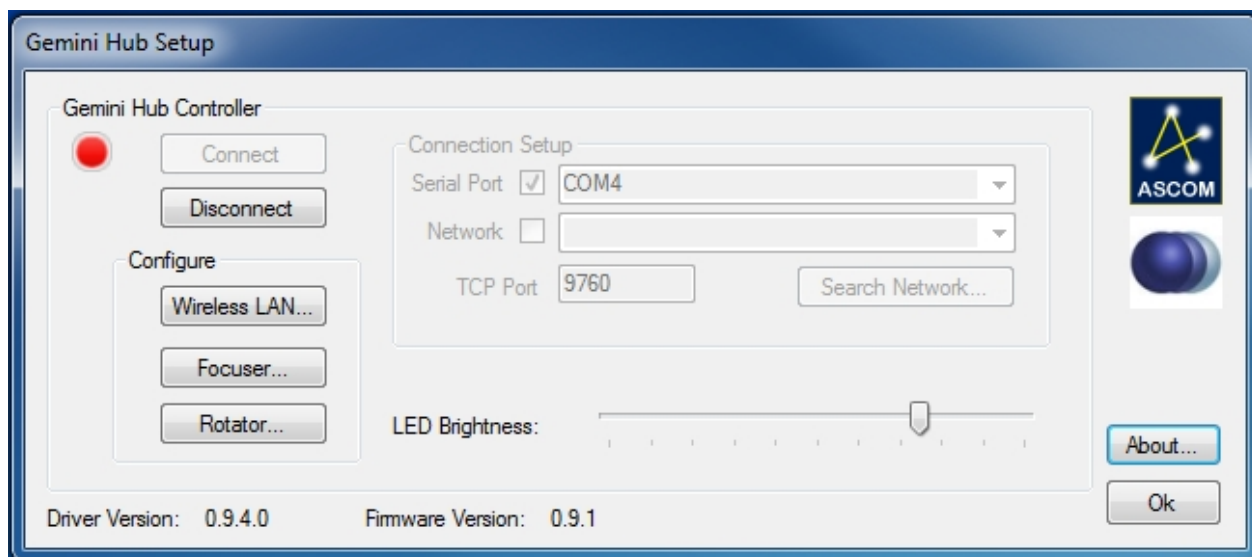
- ▶ **Plug In Your Gemini Hub** - Plug the universal 12VDC power supply into a wall outlet using a locally compatible power cord. Insert the 2.5mm x 5.5mm plug into the 12VDC power port on the Gemini control hub and move the slide switch up to turn on the Gemini hub. The LED power indicator will light after a few seconds to indicate the boot sequence was successful.
- ▶ **Connect the Serial-USB Cable** - For serial communication, connect the RJ12 plug into the Gemini socket labeled "Serial" and connect the USB-A plug into an open USB port on the PC computer.



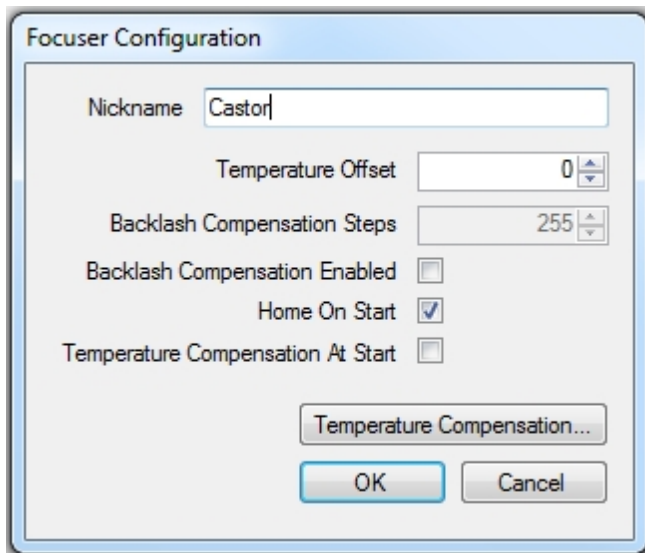
- ▶ **Go To The Setup Screen** - Open Gemini Commander and go to the **Tools** menu. Choose the **Settings** option. The setup screen will open, note that this screen is a separate client. The Setup Screen will appear in the upper left screen - If not initially visible, check the task bar for the second Gemini instance. If you wish to leave the setup screen at any time without changing any settings, click the **OK** button at the bottom of the window.



- ▶ **Connect To The Hub** - For serial communication, select the **Serial** option in the **Connection Setup** section and use the **Com Port** drop-down to select the appropriate communications port. This drop-down list will display only active serial ports so the virtual com port (VCP) assigned to the Serial-USB cable should be easy to identify. Next click the **Connect** button. If the LED indicator next to the **Connect** button does not light or if you receive an error, try selecting a different serial port in the **Com Port** drop-down list. If you encounter persistent problems determining which COM port to use, contact Optec Technical Support for assistance. You will see the Firmware version update when the connection is established. If you wish to connect via the Ethernet or WiFi check the network box and click search network. After several seconds you should be able to select the Gemini's IP address from the drop down box.

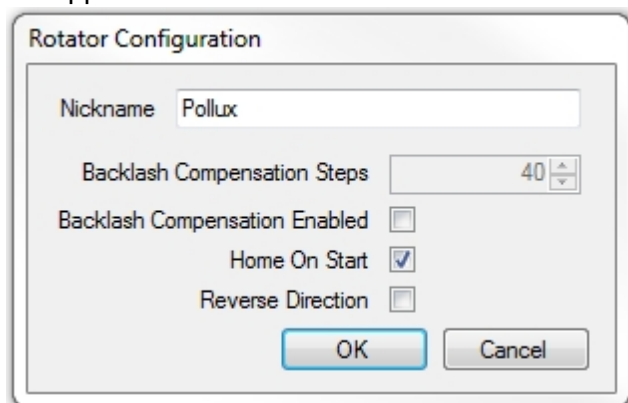


- ▶ **Adjust LED Brightness** - if you find the focuser hub's power indication LED adversely affects your night vision, you may adjust its brightness with the **LED Brightness** slider. The range of brightness varies from left to right, starting with no light at all and moving to full brightness. You have to be connected to adjust the LED brightness.
- ▶ **Configure the Focuser** - In the Configure box click on Focuser. You should see this menu appear:



This will allow you to adjust many of the focuser's features. Several features are factory defaults and can not be adjusted.

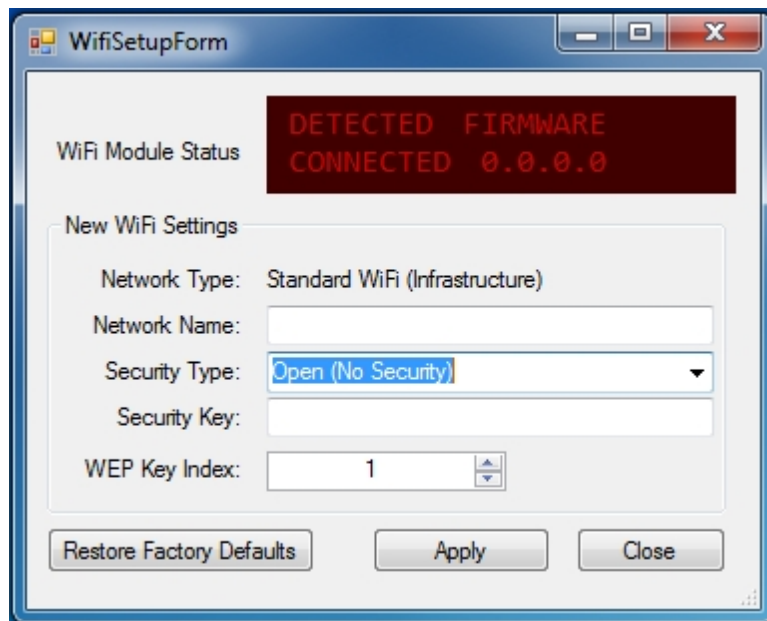
- ▶ **Configure the Rotator** - In the Configure box click on Focuser. You should see this menu appear:



This will allow you to adjust many of the rotators features. Several features are factory defaults and can not be adjusted.

- ▶ **Connect To The Hub Via WIFI** - Connect your computer to the **GeminiConfig** WiFi network that is auto-generated by the hub. In Gemini Commander, verify that the **Connection Setup** selection is set to *WiFi* and the **IP Address** setting has been auto-filled (if it has not, then click the **Refresh IP's** button to try again, then click the **Connect** button. If the IP address that is auto-filled is incorrect, contact Optec for support.

-OR-



- ▶ **Connect To The Hub Manually** - Connect to the hub via serial or Ethernet, then click the **Wireless Lan** button. Current WiFi configuration information will be displayed. If at any time, you wish to restore the hub's WiFi settings to default, click the **Restore** button.
 - ▶ **Enter A New Configuration** - Enter a **network name**, **security type**, security key (if necessary), and WEP Key Index (if necessary) that matches the Wi-Fi network to which you want to connect.
 - ▶ **Confirm Your Changes** - Click the **Apply New Settings** button to connect to the new network. Allow one to two minutes for the hub to reconnect. A message will be displayed to confirm your changes. Click the **Close** button to exit this window.
 - ▶ **Connect To The Hub** - Connect your computer to the Wi-Fi network that you entered information for above. Verify that the **Connection Setup** selection is set to **WiFi** and the **IP Address** setting has been auto-filled (if it has not, then click the **Refresh IP's** button to try again, then click the **Connect** button. If the IP address that is auto-filled is incorrect, contact Optec for support.

- ▶ **Confirm Connection** - The red LED simulation should turn on, indicating that the connection has been established.

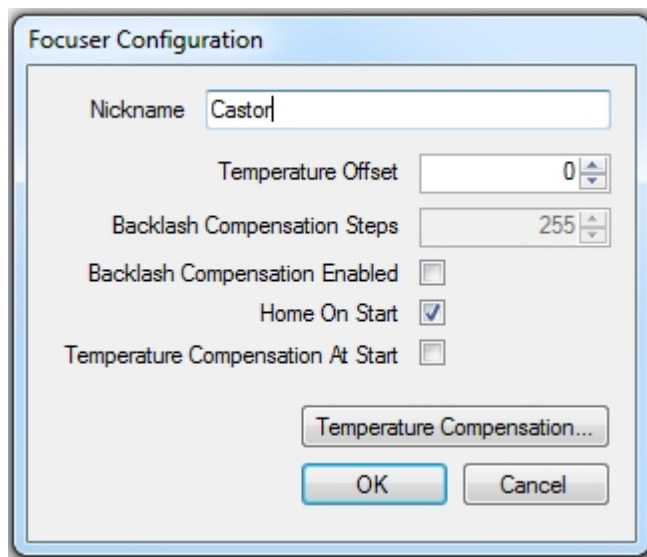
Completing The Configuration



Section 1.3.3 - Completing A Serial Configuration

Having successfully installed the Gemini software and connected to your hub, you can now use the following instructions to complete a serial configuration. Alternatively, you may use any of the other connectivity options detailed in the [Configuring Software](#) section of the Gemini manual.



To complete a **serial configuration for the focuser**:



- ▶ **Set Nickname** - You may set the nickname by entering any description into the **Nickname** text box.
- ▶ **Immediate Temperature Compensation** - If you want to begin temperature compensation immediately upon opening Gemini Commander, check the **Temperature Compensation At Start** checkbox.
- ▶ **Enable Backlash Compensation** - If your focuser has a noticeable amount of backlash, check the **Backlash Compensation Enabled** checkbox to enable compensation.
- ▶ **Set Backlash Steps** - Enter a number of steps into the **Backlash Comp. Steps** text box to adjust to the level of backlash compensation your focuser requires. You may set the number of steps to a maximum of 9999 steps in the OUT direction only.
- ▶ **Confirm Your Configuration** - When you are finished, click the **Ok** button to save your changes and return to the main Gemini Commander window.

Gemini Commander

File Tools Home View Help

Optec  **Gemini** 

Castor

Halt 077796
Position(Steps)

021.5
Temperature(°C)


IN Increment(st) 1000 OUT

Temperature Compensation: On Off

Absolute Focus Adjust: 57600 Go To Center

Pollux

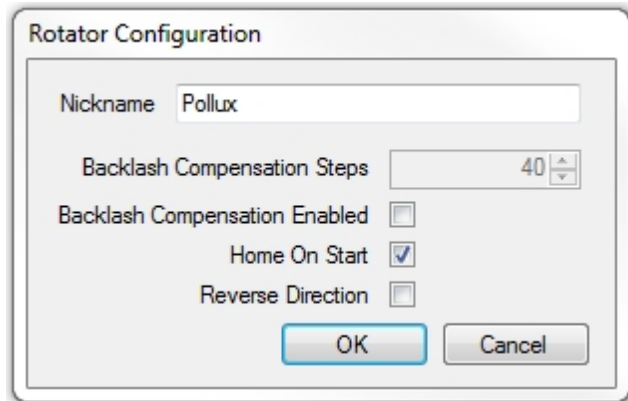
Halt 045° 42' 36" Sky PA
Position(Degrees)



↻ Degree Increment: 15 ↻

Absolute Angle Adjust (Degrees): 180 Go To Park

To complete a **configuration for the rotator**:

A screenshot of a 'Rotator Configuration' dialog box. It features a title bar with the text 'Rotator Configuration'. Inside the dialog, there is a text input field labeled 'Nickname' containing the text 'Pollux'. Below this is a numeric spinner control labeled 'Backlash Compensation Steps' with the value '40'. There are three checkboxes: 'Backlash Compensation Enabled' (unchecked), 'Home On Start' (checked), and 'Reverse Direction' (unchecked). At the bottom of the dialog are two buttons: 'OK' and 'Cancel'.

- ▶ **Set Nickname** - You may set the nickname by entering any description into the **Nickname** text box.
- ▶ **Enable Backlash Compensation** - If your focuser has a noticeable amount of backlash, check the **Backlash Compensation Enabled** check-box to enable compensation.
- ▶ **Set Backlash Steps** - Enter a number of steps into the **Backlash Comp. Steps** text box to adjust to the level of backlash compensation your rotator requires. You may set the number of steps to a maximum of 9999 steps in the OUT direction only.
- ▶ **Confirm Your Configuration** - When you are finished, click the **Ok** button to save your changes and return to the main Gemini Commander window.

Congratulations! Your hub and focuser are now ready to use! You may use the current configuration to connect or disconnect from a focuser by clicking the **Connect** or **Disconnect** buttons in the *Setup Window*, the **Connect** or **Disconnect** buttons in the **File** menu of the main window, or by clicking the LED above each focuser information display in the main window.

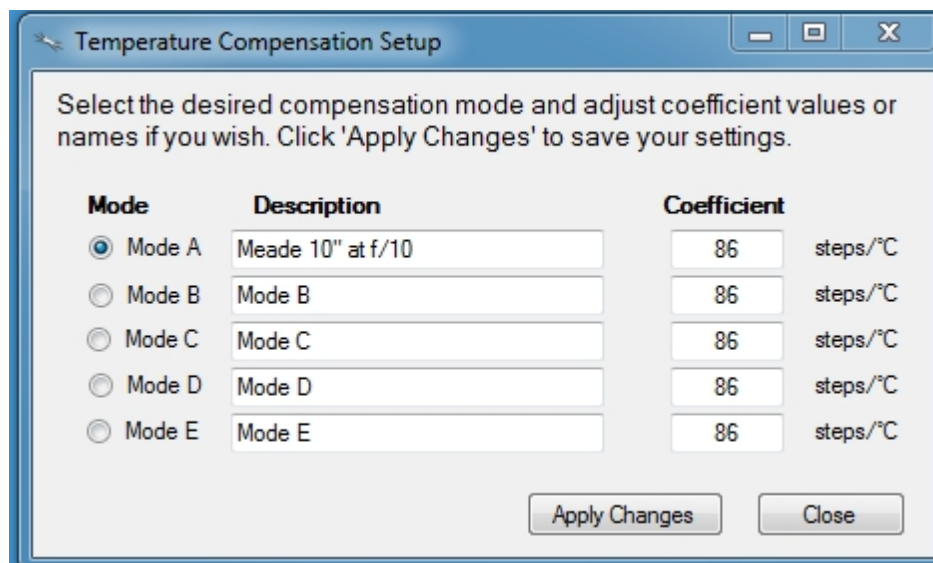
Temperature Coefficients



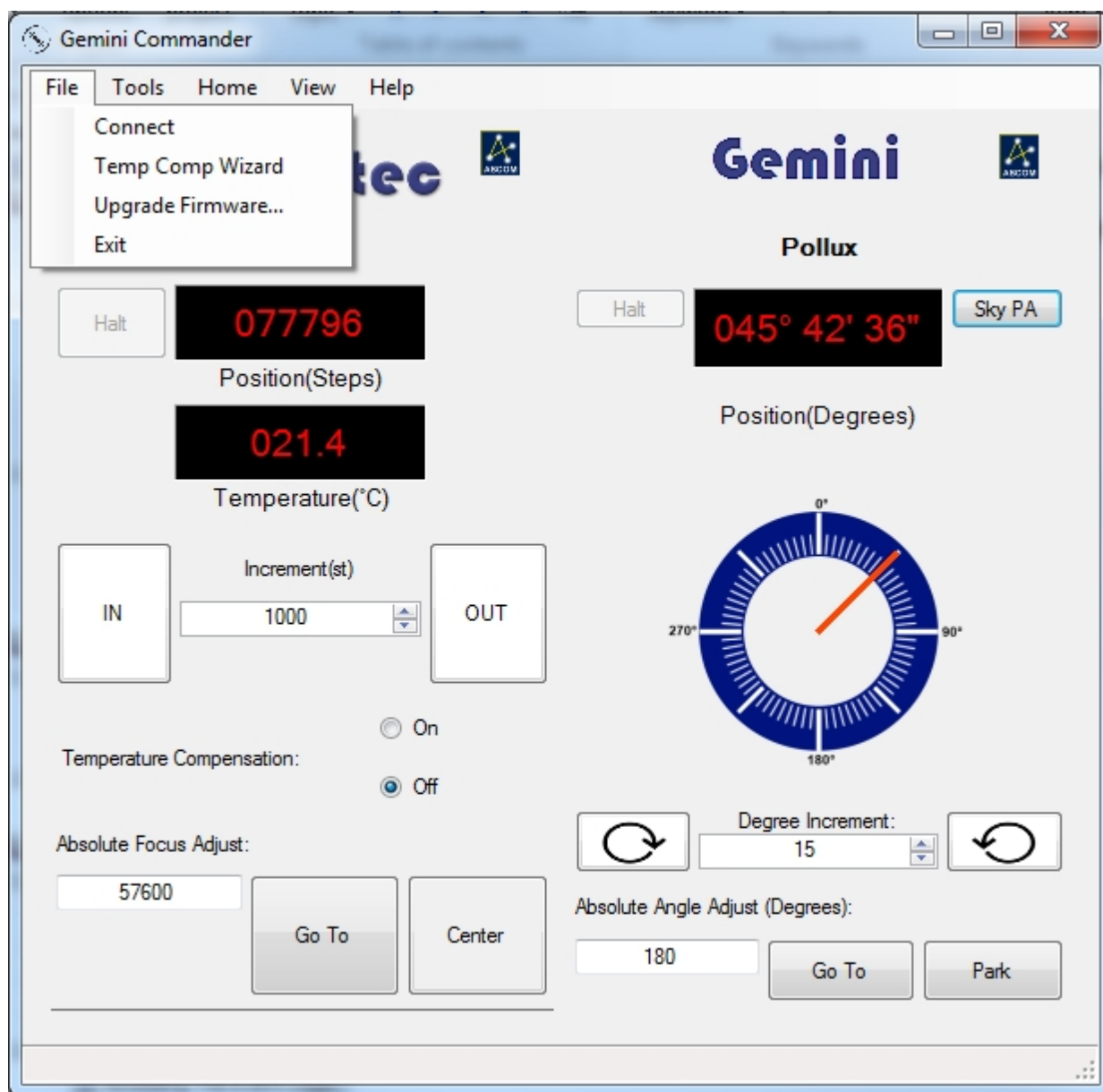
Section 1.3.4 - Configuring Temperature Coefficients

While it is possible to manually calculate and configure the temperature coefficients for your temperature compensating focuser, there is also a handy setup wizard available in the Gemini Commander control program that will assist you in setting up your temperature coefficients.

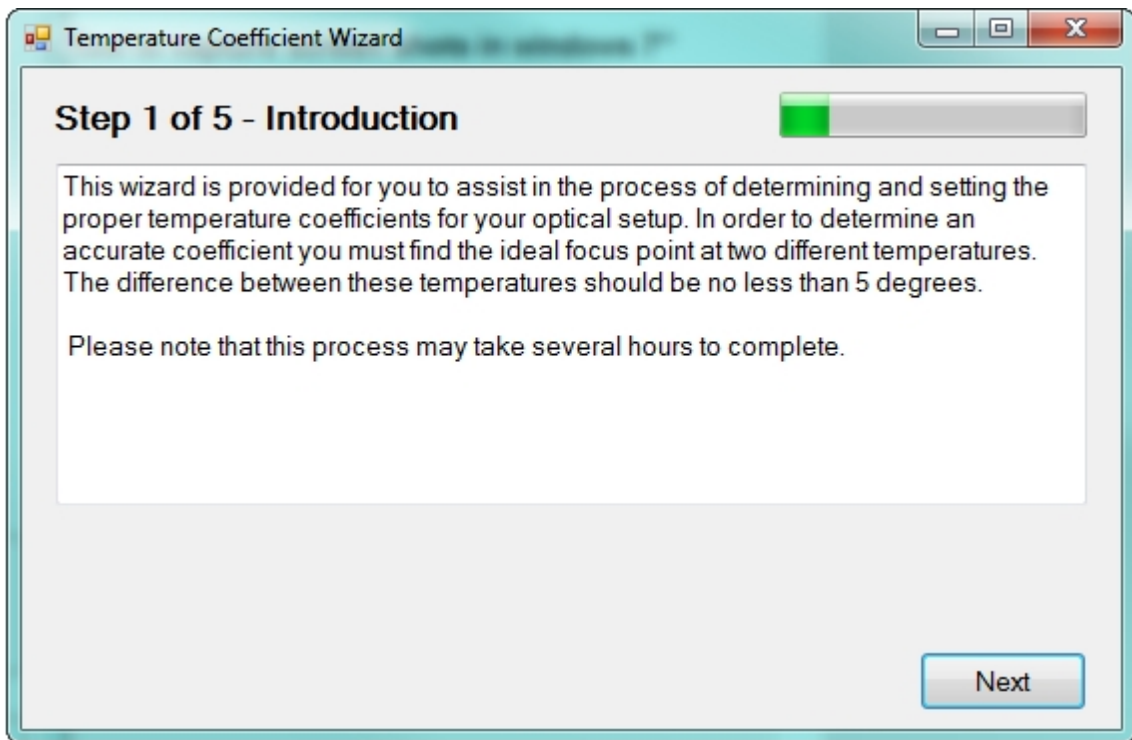
- ▶ **Connect To Your Hub** - Connect to the focuser hub in Gemini Commander via the method described in the [Connecting To Your](#) Gemini portion of this Quick-Start Guide.
- ▶ **Plug In Your Focuser And Temperature Probe** - Ensure that both the focuser and its temperature probe are properly connected. In the **Settings** dialog box you may click **Focuser** button and then the **Temperature Compensation** button to make changes. Accept the default temperature coefficients or change the **Description** and **Coefficient** if you already know your system's unique temperature coefficient, then **Apply Changes**.



- ▶ Select the active **Mode** to be used when turning ON temperature compensation in the Gemini Commander main window or when using other ASCOM applications.
- ▶ Alternatively, you may choose to run the **Temperature Compensation Wizard** to determine your optical system's unique temperature coefficient.



- ▶ **Open The Temperature Compensation Wizard** - Open Gemini Commander and go to the **File** menu and select the **Temp. Comp. Wizard** option.



- ▶ **Complete The Temperature Compensation Wizard** - Follow the directions provided by the wizard to calculate and save a temperature compensation coefficient as the compensation mode of your choice.
- ▶ **Enable Temperature Compensation** - When you return to the main Commander window, make sure to enable temperature compensation by selecting **On** in the **Temperature Compensation** section of the main window.

Configuring Software



Section 1.4 - Configuration Of The Gemini Focusing Rotator

The Gemini hub accepts three different forms of computer communication protocols and connections: RS-232 for Serial-USB, Wired Cat 5 Ethernet, and WiFi wireless Ethernet (using the optional WiFi Add-in Board). Consequently, there are a variety of ways to configure the Gemini Commander software for use with a computer. Each method works equally well for controlling the hub, so the best choice is very much dependent upon the user's preference and observatory local network configuration.

Configuring A Connection Using Gemini Commander

Gemini Commander is an easy-to-use, all-in-one program for controlling your Gemini through the hub. It can handle connections of all three types. Instructions for connecting with each type of connection are given below:

- ▶ [Connecting to your Gemini](#)

Configuring A Connection Using The Gemini Control Website

Another option for controlling the Gemini is to use the web-page that is automatically generated by the Gemini on-board web server. This web-page is accessible whenever a Gemini hub is connected to a computer by Ethernet or WiFi. As Gemini Commander is only compatible with Windows systems, using the web-page is a much better option for Mac and Linux users. Additionally, once the web-page is configured, owners of smart-phones may access this web-page to, in essence, turn their phone into a hand controller! Instructions for connecting with either connection option are given in detail below:

- ▶ [Web-page Ethernet Connection](#)
- ▶ [Web-page WiFi Connection](#)

Configuring A Direct Serial Connection Using A Serial Terminal Application

In addition to the options described above, commands may be sent to control the Gemini by using the **Optec Terminal Application** or another a serial terminal application to directly send commands to the hub over a serial connection. Instructions for connecting to the hub via a serial terminal application are given in detail here:

- ▶ [Direct Serial Connection](#)



Section 1.4.1 - How To Configure A Web-Based Ethernet Connection

NOTICE: Make sure that you have connected the hub's focuser port to the Gemini's focuser port and the hub's rotator port to the Gemini's rotator port. Although it is difficult to damage the Gemini by switching the lines it is best to avoid this problem.

As an alternative to the Gemini Commander control software, the Gemini hub can be controlled via a web-page. This web-page can be accessed and configured through either an Ethernet connection or via [WiFi](#). To access and configure the web-page, follow these simple steps:

- ▶ **Power Up And Connect The Gemini** - Ensure that the 12VDC power adapter is plugged into both the Gemini and a power outlet, then flip the switch on the side of the focuser hub to turn it on. A red LED should turn on to confirm that the focuser hub is now running. Ensure that there is a valid Ethernet connection between the computer and the hub.



- ▶ **Go To The Web-page** - Accessing the web-page works slightly differently depending on

whether you are using a Windows machine or not.

- ▶ **Windows** - Using any of the supported browsers listed in the [System Requirements](#), access the control website at [gemini/focuser1.htm](#).
- ▶ **Non-Windows** - First, find the **IP address** of your Gemini. You can find this by checking the homepage of your router. The command line command **arp -a** will list all IP addresses that your computer knows about on your network. If you are unsure which IP belongs to your Gemini disconnect the Gemini, rerun the command then reconnect it. Now, access the control website with any supported browsers by going to **[IP Address Here]/focuser1.htm**.

Congratulations! You are now ready to use the control website to control your Gemini.

Webpage Wi-Fi



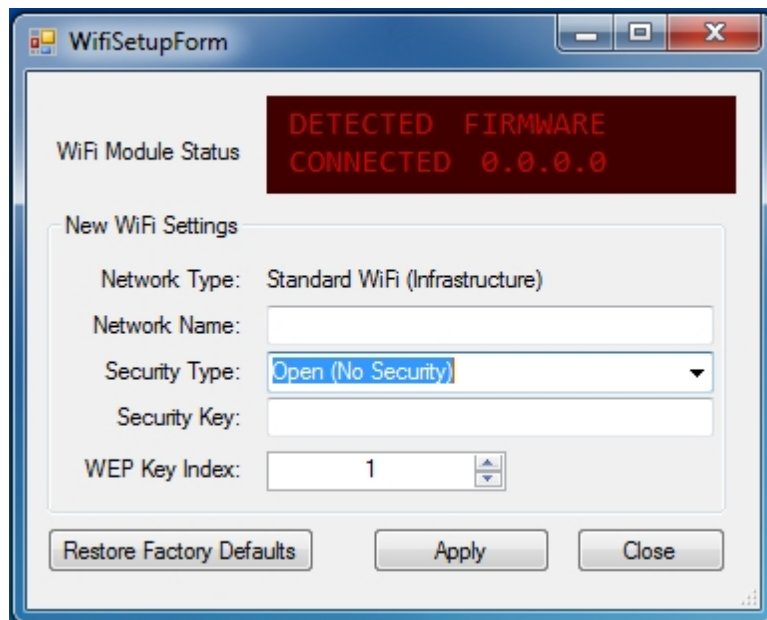
Section 1.4.2 - How To Configure A Web-Based WiFi Connection

Note: To connect to the Gemini via WiFi, purchase of the WiFi Daughter Board is a necessity! If you have not purchased this board, you **must** use another method to connect to the Gemini! Additionally, your computer **must** be able to connect to WiFi networks!

As an alternative to the Gemini Commander control software, the Gemini hub can be controlled via a web-page. This web-page can be accessed and configured through either an [Ethernet Connection](#) or via WiFi. To access and configure the web-page, follow these simple steps:

- ▶ **Power Up The Gemini** - Ensure that the 12VDC power adapter is plugged into both the Gemini and a power outlet, then flip the switch on the side of the focuser hub to turn it on. A red LED should turn on to confirm that the hub is now running.

Note: There are several methods that can be used to connect to the board via WiFi. Please pick ONE of the following options:



- ▶ **If The Hub Is Already Connected By Any Method In Gemini Commander** - You may use the **WiFi Setup** window in Gemini Commander to switch the hub to a wireless connection method. More details on this procedure can be found on the [Gemini Commander WiFi](#) page.

-OR-

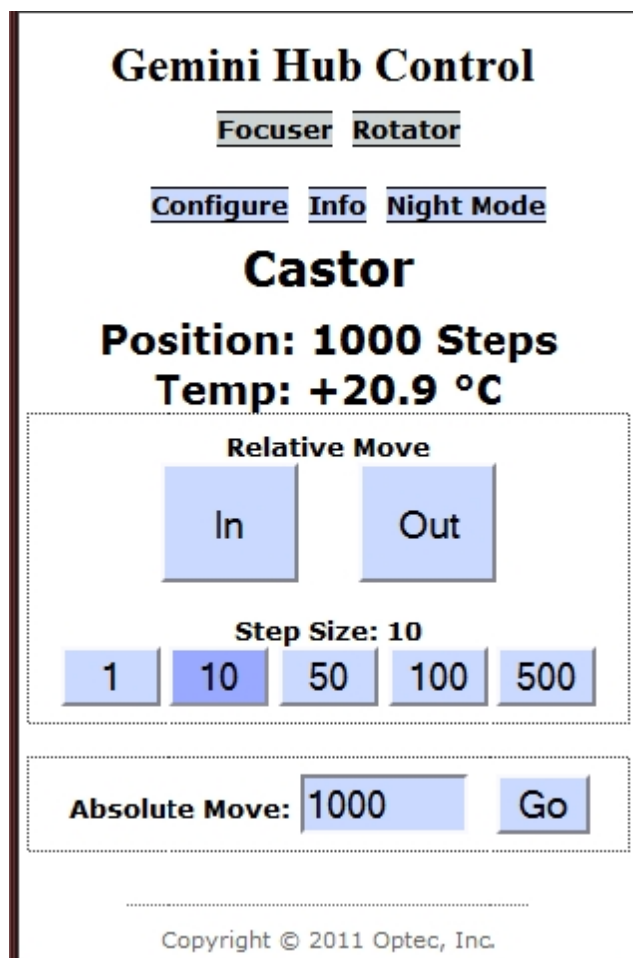
- ▶ **If The Hub Is Already Connected Via Direct Serial Connection** - You may use the WiFi

information commands found in the [Command List](#) to switch the hub to a wireless connection method.

- ▶ **Set The Basics** - At minimum, you will need to set the **name** and **security type** of your network.
- ▶ **Provide Security Information** - If your network is not an open network, you will also need to provide a **pass-phrase**.
- ▶ **Provide A WEP Index** - If your network uses WEP security, you will also have to provide a **WEP Key Index**.
- ▶ **Confirm Network Settings** - When you have set all of this information, use the **Push Settings** command to tell the hub to switch to the wireless connection.

-OR-

- ▶ **If The Hub Is Unconnected** - When the Gemini is started, it will begin to generate its own WiFi network that will allow you to connect to the web-page.
- ▶ **Connect To The Setup Network** - This setup network will be called *GeminiConfig*, and you should connect your computer to it now. Note that the control website is the only site that can be accessed on this network.



- ▶ **Go To The Web-page** - Now you will be able to access the control website at [Gemini/focuser1.htm](#)

- ▶ **Begin Focusing or Swap To Your Own Network** - If you just want to have quick access to your device, you are all set! However, if you want to be connected on a secure network and/or have access to other web-pages, you can use this setup network to swap your connection to any wireless network in the area.

Note: The following instructions are only necessary if you want to switch to a new WiFi network.

- ▶ **Go To The Configuration Page** - Once on the control website, click the **Configure** link to go to the WiFi configuration page.



- ▶ **Find Your Network** - Click the **Scan For Wireless Networks** button to search the area for all available networks and click the one to which you wish to connect. The focuser hub will begin connecting. You will be prompted for a security key if necessary. The web-page will then change to one that gives instructions on finalizing your connection.

Gemini Hub Control

[Focuser](#) [Rotator](#)
[Configure](#) [Info](#) [Night Mode](#)

Reconnection In Progress

A connection to another network is now underway! Please allow a few minutes for the connection process to finish, then connect your computer or mobile device to the new network ("PRIVATE") and return to one of the other webpages to regain access to this website.

This is the network you were on:

SSID: "FocusLynxConfig"
WLAN type: adhoc (IBSS)

This is the network that you will be going to:

SSID: "PRIVATE"
WLAN type: infrastructure (BSS)

Copyright © 2011 Optec, Inc.

-OR-

Gemini Hub Control

[Focuser](#) [Rotator](#)
[Configure](#) [Info](#) [Night Mode](#)

Scan for Wireless Networks

Other Network...

Adhoc

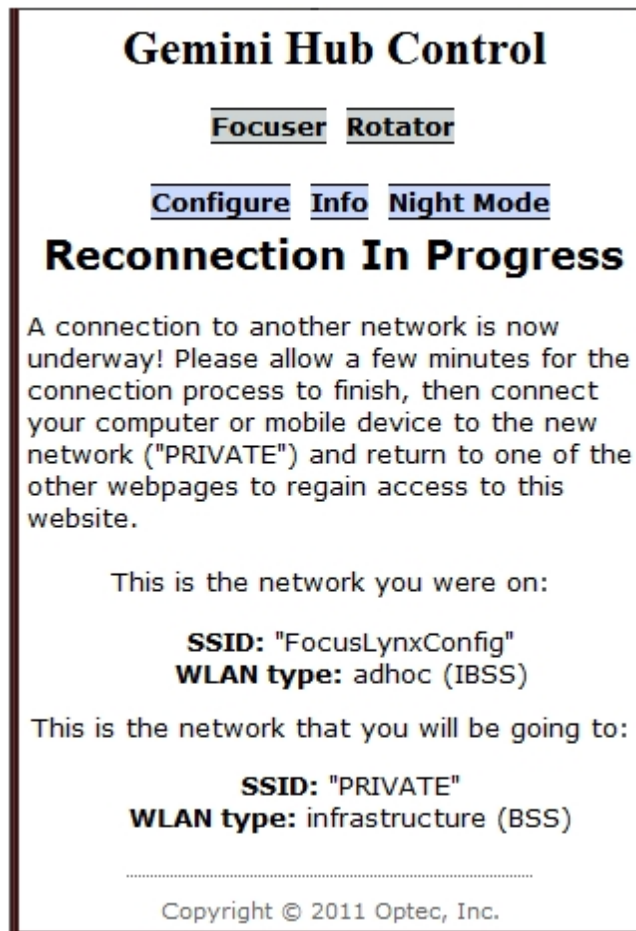
Infrastructure

Network Name

None

Join

- ▶ **Specify Your Network** - Click the *Other Network...* button to enter information about the network you want to connect to.
 - ▶ **Input Network Settings** - You will need to input the **network type**, **name**, and **security type**.
 - ▶ **Submit Your Settings** - When you are finished, click the *Join* button to swap to the new network. You will be prompted for a security key if necessary. The webpage will then change to one that gives instructions on finalizing your connection.



- ▶ **Go To The Web-page** - Accessing the web-page works slightly differently depending on whether you are using a Windows machine or not.
 - ▶ **Windows** - Using any of the supported browsers listed in the [System Requirements](#), access the control website at [gemini/focuser1.htm](#).
 - ▶ **Non-Windows** - First, find the **IP address** of your Gemini. You can find this by checking the homepage of your router. The command line command **arp -a** will list all ips that your computer knows about on your network. If you are unsure which ip belongs to your Gemini disconnect the Gemini, rerun the command then reconnect it. Now, access the control website with any supported browsers by going to **[IP Address Here]/focuser1.htm**.

Congratulations! Your focuser hub is now configured to work over the WiFi connection of your choice! This ability is not limited to regular computers. The control website has been designed to accommodate **Android** and **iPhone** smart phones, so accessing the web-page with these

devices is now possible!

Direct Serial Connection



Section 1.4.3 - How To Configure A Direct Serial Command Connection

- ▶ **Install A Serial Terminal Application** - In order to send direct serial commands, you need a serial terminal application to send them. The **Optec Terminal Application** is available for free download on the Optec website and requires no installation. Other similar applications such as HyperTerminal are available for free download on the Internet. The following instructions assume that you are using the Optec application, but the configuration for other applications should work in a similar fashion.
- ▶ **Configure Serial Connection Settings** - To connect to the Gemini with the Optec Terminal Application, ensure that the following configuration options are set correctly:

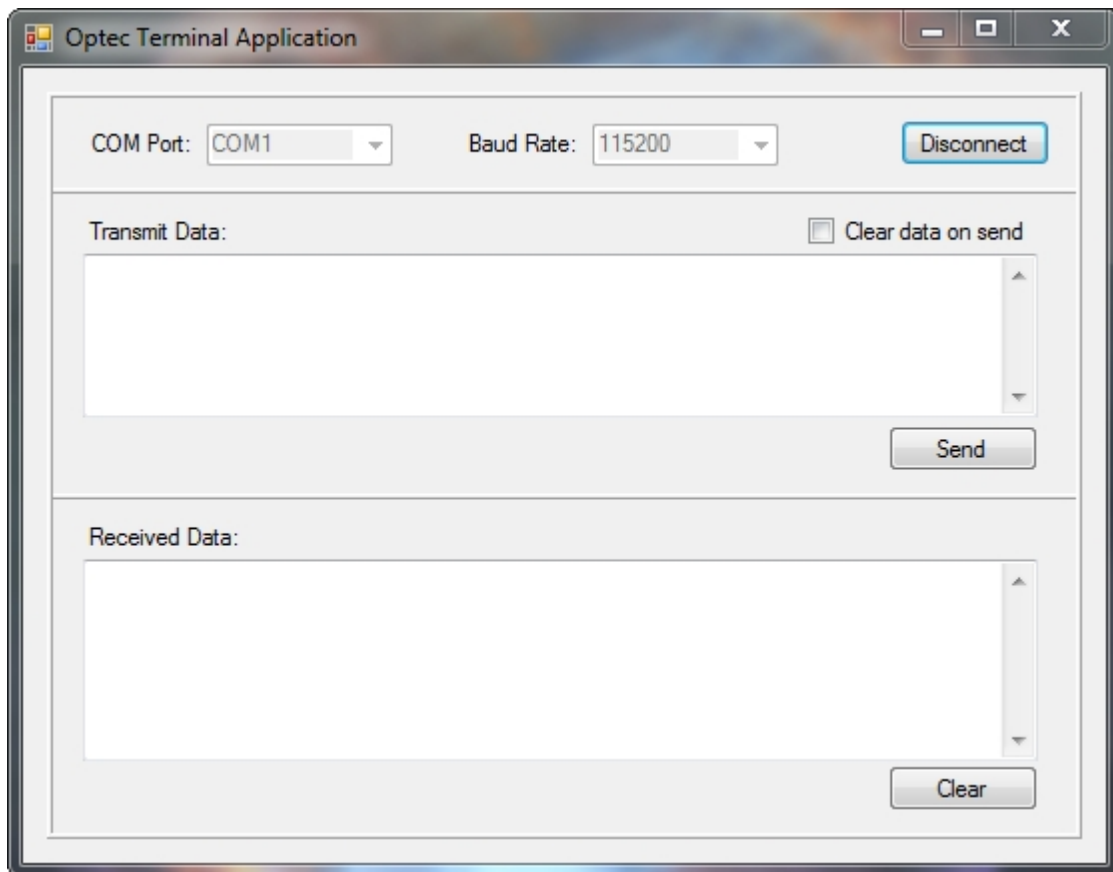
Port Number: Variable
Baud Rate: 115200

For other serial terminal applications, you may also have to specify these options:

Parity: None
Byte Size: 8
Stop Bits: 1

The port number of your focuser hub is determined by which serial port on your computer the hub is connected to. If you are not sure which COM port your focuser hub is plugged into, guessing and checking among the available options should work, as there will be very few COM ports on any given computer. If you encounter persistent problems determining which COM port to use, contact Optec for assistance.

- ▶ **Power Up And Connect Your Gemini** - Before the next step, ensure that the 12VDC power adapter is plugged into both the Gemini and a power outlet, then flip the switch on the side of the hub to turn it on. A red LED should turn on to confirm that the focuser hub is now running. Also ensure that your Gemini focuser hub is connected via RS-232 serial cable to your computer.



- ▶ **Open Connection** - Click the **Connect** button to open a connection to the device. When the connection is open, the same button will be labeled **Disconnect** and will disconnect you from the focuser hub when clicked.

Congratulations! Your hub is ready to receive focuser commands directly from your terminal application!

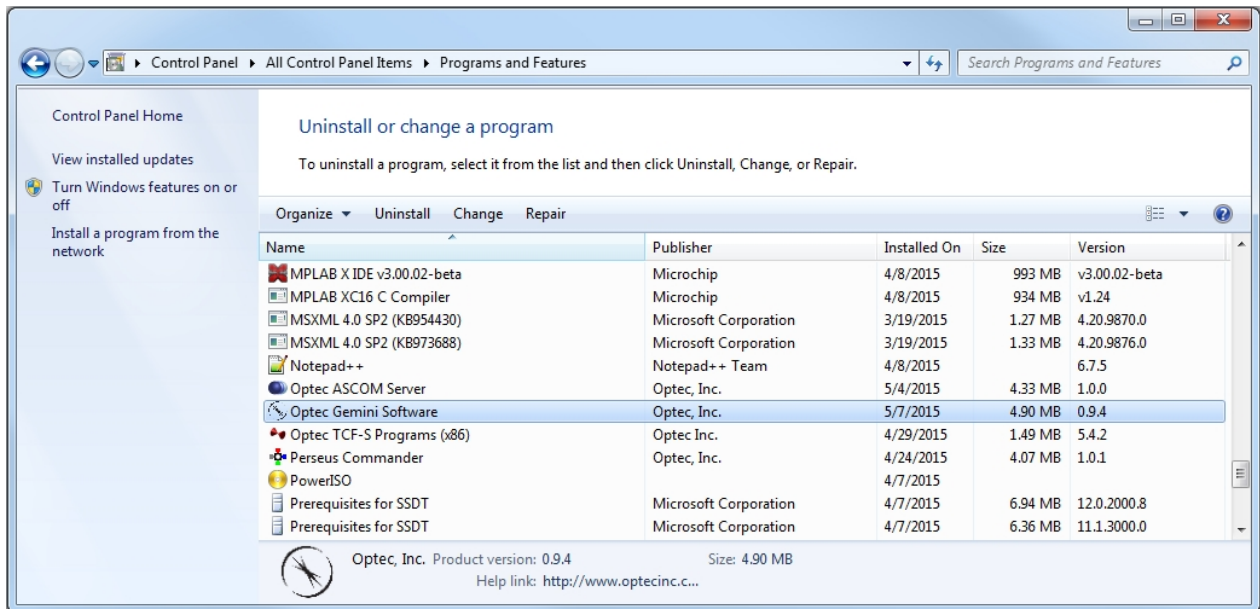
Uninstalling Software



Section 1.5 - Gemini Commander Uninstallation Instructions

To uninstall the Gemini Commander control software, please follow these steps:

- ▶ Go to the **Start** menu, and click **Control Panel**.
- ▶ Within the control panel, if you are running Windows 7 or Vista, click the **Uninstall** option to choose a program to uninstall. If you are running Windows XP, click **Add/Remove Programs** to choose a program to uninstall.



- ▶ Scroll through the list of programs to find **Gemini Software**. If you are running Windows 7 or Vista, click **Uninstall** to open the uninstaller. If you are running Windows XP, click **Change/Remove** to open the uninstaller.
- ▶ Follow the prompts provided to uninstall Gemini Commander.

When the uninstaller has finished, Gemini Commander and the Gemini software drivers will have been removed from your computer.



Chapter 2: Operation Of Gemini Focusing Rotators

- ▶ [Gemini Commander](#) - Operating the Gemini Commander software
 - ▶ [Focus Presets And Offsets](#) - How to add and remove focus offsets and presets
 - ▶ [Sky PA Offsets](#) - How to use the Sky PA Offset function
- ▶ [Accessories](#) - Operating a focuser with Optec accessory items
 - ▶ [Gemini Hand Control](#) - Operating a focuser with the Gemini hand controller

Gemini Commander

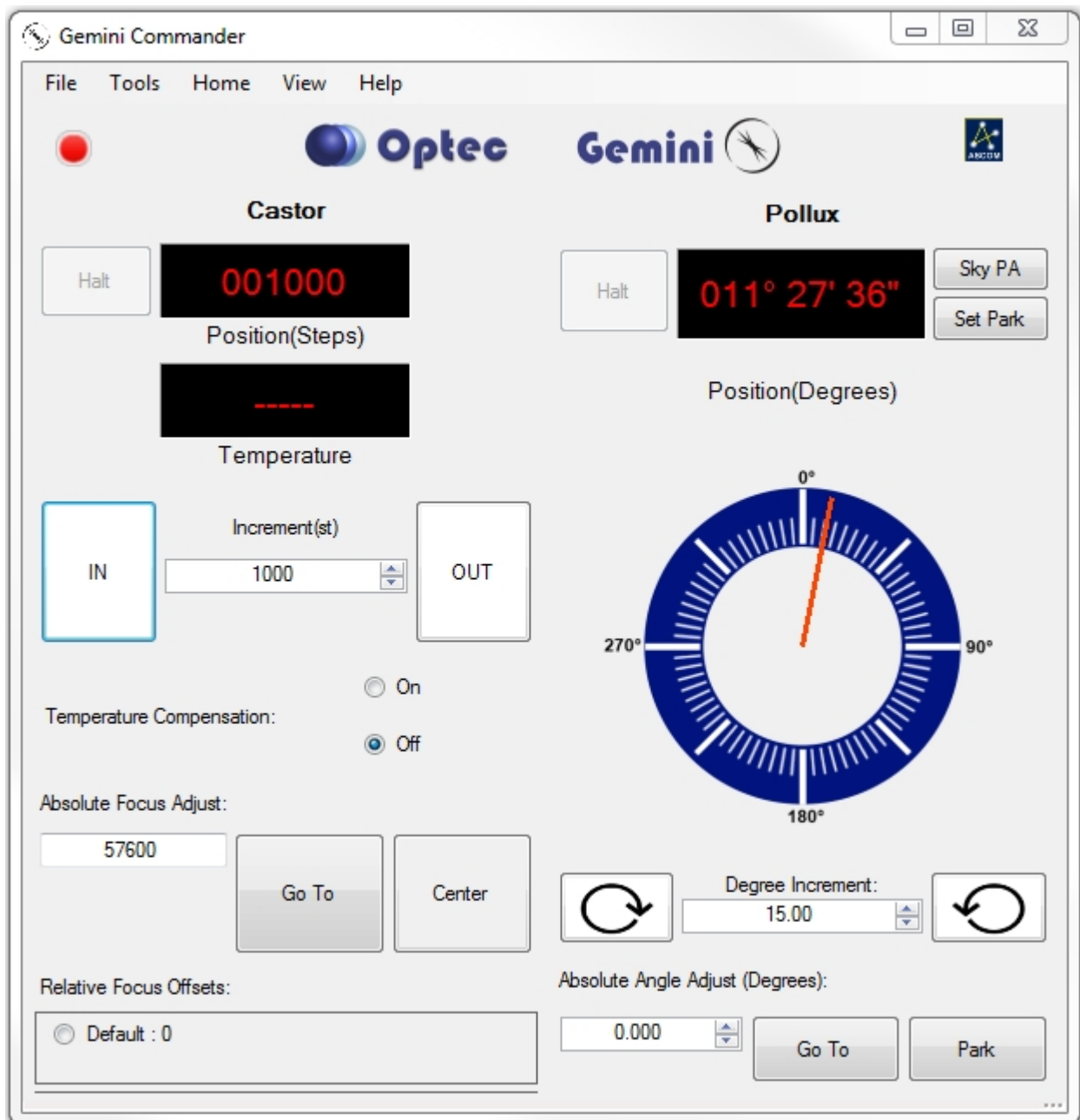


Section 2.1 - Operating Gemini Commander

The Gemini Commander control software is the easiest and most user-friendly method for controlling a Gemini focuser hub with a Windows computer. Once you have [installed](#) Gemini Commander and [configured](#) it for connection with a Gemini, you can use the following instructions to control your Gemini:

Controlling Your Hub

- ▶ **Plug In Your Gemini** - Ensure that there is a valid connection between your Gemini hub and one of the two ports on the Gemini. Make sure that you plug the Focuser into the Focuser port and the Rotator into the Rotator port.



- ▶ **Relative Move** - The *In* and *Out* and the **Arrow** buttons found below the position display on the main Commander window can be used to move the focuser in the direction specified. With each click, the focuser or rotator will move by the number of steps or degrees displayed in the **Increment** text box.
- ▶ **Adjust Increment** - To adjust the amount by which the Relative Move buttons moves a device, enter a number (or use the up and down arrows) into the **Increment** text box that is located between the buttons.
- ▶ **Absolute Move** - To move the focuser to a specific location, use the **Absolute Focus Adjust** or **Absolute Angle Adjust** text box located below the temperature compensation toggle. Enter a number of steps into the text box, then click the **Go To** button to start moving. The number of steps must be between zero and the maximum number of steps for your device (you can find this in your focuser's documentation).
- ▶ **Clicking on the Rotator Graphic** will also cause an absolute move for the rotator.

Note: With both relative and absolute moves, if you try to move beyond the physical limits of the device the program will stop you from doing so to prevent you from damaging the System.

- ▶ **Centering** - To move the focuser to the exact center of its travel, click the **Center** button. The focuser will automatically begin moving.
- ▶ **Halting** - To stop the device once it has begun moving, click the **Halt** button that is immediately to the left of the position and temperature displays.
- ▶ **Temperature Compensation** - You can use the **Temperature Compensation** buttons located below the Relative Move buttons to turn temperature compensation on or off. Unless you specify otherwise during focuser configuring, temperature compensation will be off by default.
- ▶ **Homing** - To Home a device select the device under the Home menu.
- ▶ **Absolute Angle Adjust** - Moves the rotator to the target angle.
- ▶ **Park** - Move the Gemini to the position defined by the **Set Park** button.

Changing Display Units

You can adjust the units of the position and temperature display for the simply by clicking the respective quantity's display.



11660.76
Position(Microns)

Position units can be switched between **steps**, **microns** and **millimeters**.

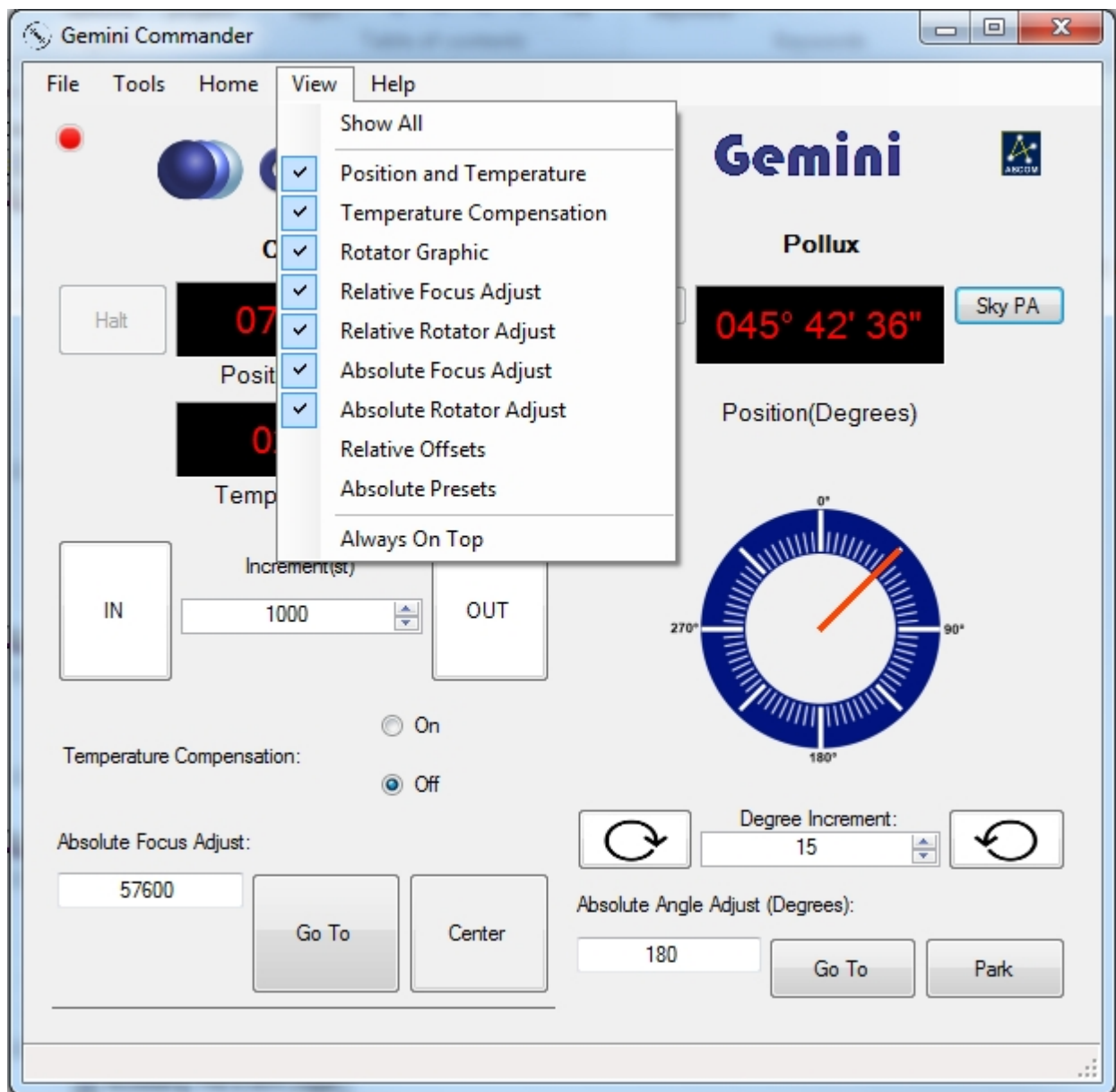


297.0
Temperature(K)

You can also switch the rotator from Degrees Minutes Seconds to decimal degrees.

Temperature units can be cycled between **Celsius**, **Fahrenheit**, and **Kelvin**.



Adjusting The Display



Using the **View** menu on the main Commander page, you can select what information is visible to you. You can click on each item to toggle its display on or off, and use the **Show All** selection to return to the default setting of showing all possible items.

The image shows a composite of two screenshots. On the left is the Optec website homepage, featuring a navigation menu, a welcome message, and several product announcements. On the right is the Gemini Commander software interface, which displays various telescope control parameters and a graphical representation of the telescope's field of view.

Website Content:

- Site Menu:**
 - Company
 - Catalog
 - Ordering
 - Support
 - Downloads
 - Resources
 - Dealers
 - Price List
 - Special Deals
- Welcome To Optec's Home On The Web**
"Helping Astronomers Measure The Stars Since 1979"
 Optec is a design and manufacturing firm specializing in electro-optical products used in astronomy, atmospheric science and microscopy. We are located in the town of Lowell, Michigan near the banks of the Grand River. Our company is small but we utilize state-of-the-art equipment and techniques in the design and manufacture of our products. Our reputation for high quality and well designed products is very well established.
- Products Available Now:**
 - #19630 Pyxis LE Camera Field Rotator**

 The NEW Optec Pyxis LE is a low-profile, lightweight, and very Camera field Rotator with standard mechanical interfaces for ease-of-connectivity. Based on a design from the Acorn Hollow Observatory, the Pyxis LE is the thinnest camera field rotator available today!
 Click here to learn more.
 Now available from stock. Call Optec today to order!
 - #19235 Keller EZ-Saddle**

 The latest component of the Libra dovetail system, Optec's new Keller EZ-Saddle makes mounting large telescopes quick and easy. Designed by Alan Keller of PlaneWave Instruments, the EZ-Saddle provides a smart mounting platform for any size telescope but was especially designed for OTA's such as the PlaneWave Instrument 12.5" CDK. Featuring plenty of mounting options and bolt package kits for the Paramount Versaplate and AstroPhysics SB1522 plate, the EZ-Saddle offers a standard Losmandy plate receiver saddle.
- News and Announcements:**
 - Optec is Purchasing Alnitak!**
 We are happy to announce that Optec, Inc. has acquired the Alnitak Astronomy brand! Effective July 1, 2011, Optec will own, manufacture, and distribute all Alnitak electro-mechanical flat fielding devices.
 - AP 2.7 Extension Sets Now Available.**
 New spacer and extension tube sets for the Acorn Pyxis AP2.7 and Deep Sky Instruments 680 3.5 thread. Spot are now available.
 - TOP-5 mounts for the AstroTech AT6RC, AT8RC, AT10RC, and AT15RC**
 We now have an M8x1mm threaded mount

Gemini Commander Software Interface:

- Header:** Optec Gemini
- Left Panel:**
 - Lactor:** 00000.1
 - Temperature:** 10.0
 - Humidity:** 65%
 - Pressure:** 1013
 - Wind Speed:** 0.0
 - Wind Dir:** 0.0
 - Seeing:** 0.5
 - Focus Error:** 0.0
- Right Panel:**
 - Polux:** 011° 07' 00"
 - Field of View:** 1.0
 - Field of View (degrees):** 1.0
 - Field of View (arcmin):** 60.0
 - Field of View (arcsec):** 3600.0
 - Field of View (degrees):** 1.0
 - Field of View (arcmin):** 60.0
 - Field of View (arcsec):** 3600.0
 - Field of View (degrees):** 1.0
 - Field of View (arcmin):** 60.0
 - Field of View (arcsec):** 3600.0
- Center:** A circular graphical representation of the telescope's field of view, showing the current pointing direction and the location of the star Polux.
- Bottom Panel:**
 - Mount:** GEM
 - Mode:** GEM
 - Tracking:** ON
 - Rate:** 1.0
 - Rate (degrees):** 1.0
 - Rate (arcmin):** 60.0
 - Rate (arcsec):** 3600.0
 - Rate (degrees):** 1.0
 - Rate (arcmin):** 60.0
 - Rate (arcsec):** 3600.0

The **Always On Top** option will place the Gemini Commander window on top of all other program windows you may have open, no matter which window is selected, so you can always see your controls.

Your view preferences will be saved, so you can close Gemini Commander and have the same view settings applied the next time the program is opened.



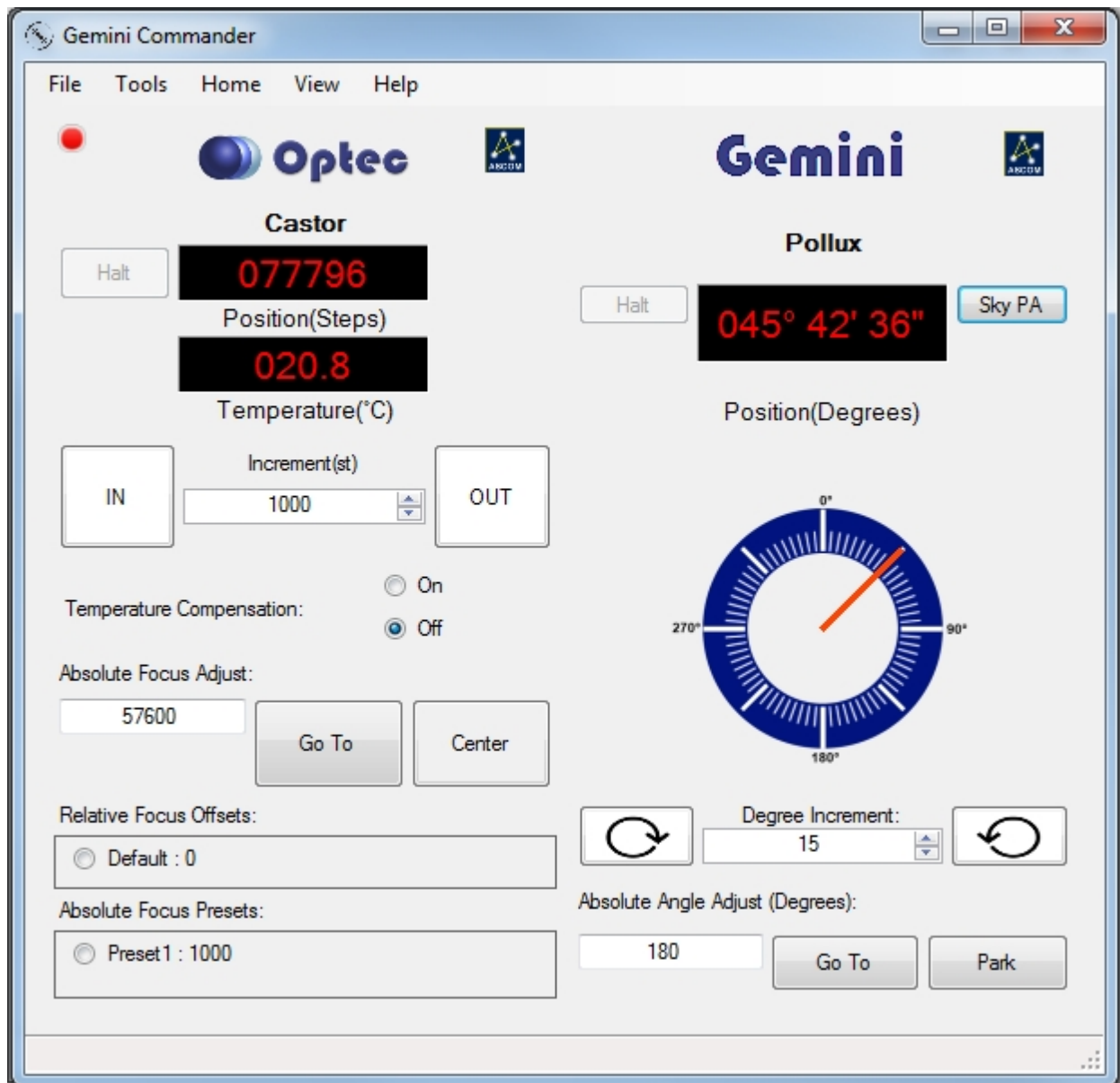
Section 2.1.1 - Setting/Removing Focus Presets And Offsets

Enabling Absolute Focus Presets and Relative Focus Offsets

Gemini Commander provides the option to establish **Relative Focus Offsets** and **Absolute Focus Presets** to allow the user to have saved absolute positions and saved offset movements, typically used with filter offsets. By default, neither Relative Focus Offsets nor Absolute Focus Presets are enabled. To enable and work with Offsets/Presets you must enable the window panel under the **View** menu by clicking **Relative Focus Offsets** and/or **Absolute Focus Presets**. A check-mark will appear next to the option and the window panel will be revealed. Some re-sizing of the Gemini Commander main form may be required.

Description of Absolute Focus Presets

The purpose of the **Absolute Focus Presets** is to allow Absolute Focus Adjustments that are used frequently to be saved as a shortcut. For example, if the user has a preferred Park position for the focuser a preset can be saved. At the end of each evening's run, a simple click of the radio button next to the Absolute Focus Preset named PARK will drive the focuser to the stored position.



Description of Relative Focus Offsets

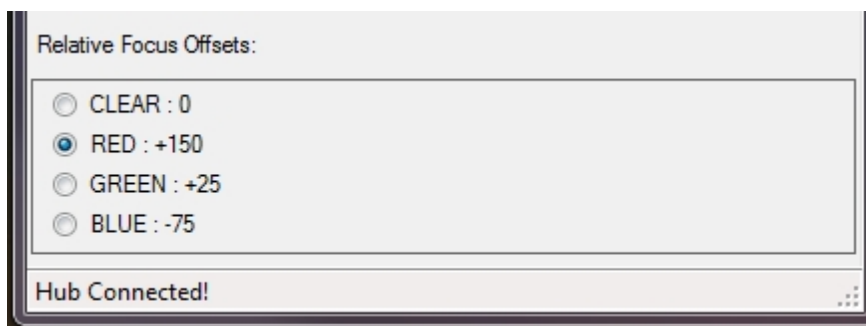
Unlike Absolute Focus Presets, **Relative Focus Offset** are not nearly as intuitive and can present seemingly confusing behavior. **Relative Focus Offsets** were included at the request of several customers to allow filter focus offsets to be performed directly from **Gemini Commander**. Most image acquisition software applications such as Maxim D/L, TheSky X, and many others provide similar functionality. Review your acquisition software's description of "Filter Focus Offsets" for a detailed description of the process. In short, due to chromatic aberrations in telescopes and refractive shifts due to different thickness filters, the best focus for each color filter may lie at different focal planes. A focuser can easily compensate for this filter focal shift if the step position changes have been characterized and defined in advance. However, duplication of filter focus offsets between software packages is not recommended. Choose one software package to perform the offsets and stick with it exclusively.

That being said, here is a description of the **Relative Focus Offsets** feature provided in Gemini Commander as applied to Filter Focus Offsets. The screen shot below shows an example of preconfigured Relative Focus Offsets for the TCF-Lynx focusers and an arbitrary optical system.

Assume the CLEAR filter focus position is our baseline and has an Offset of 0 steps. The RED filter has an Offset of +150 steps from Clear. The GREEN filter has an Offset of +25 steps from Clear, and the BLUE filter has an Offset of -75 steps from Clear. All moves are relative to the CLEAR focus position.

Assume we start at Position 3500 and click the RED offset. The focuser moves to 3500 plus 150 or 3650, as shown. Clicking the GREEN offset will move to 3525 (3500 plus 25) and clicking the BLUE offset will move to 3425 (3500 minus 75). These moves are relative to our original starting point and NOT the current position. This procedure is straight-forward until we introduce additional moves.

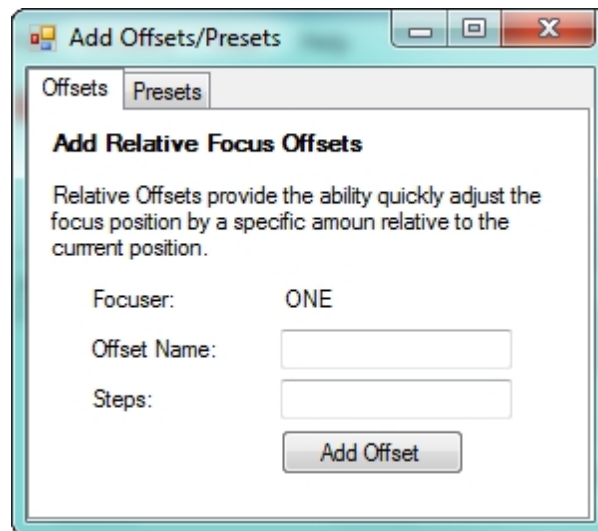
If we make a Relative move from any of these positions of, say 250 steps, then the new baseline will be 3500 plus 250, or 3750 steps. All offsets will now be based upon this new baseline - the CLEAR filter in our example below. In this example, clicking the CLEAR offset will move immediately to 3750, the RED offset will move to 3750 plus 150, or 3900. Similarly, clicking the GREEN offset will move to 3750 plus 25, or 3775, and clicking the BLUE offset will move to 3750 minus 75, or 3675.



Turning on **Temperature Compensation** at this point will move the focuser in accordance with the TC, or temperature coefficient, and all moves will be with respect to the baseline, or CLEAR filter position in our example. Again, this can be confusing to watch and understand but if you think about it in terms of the baseline position it will make sense. Contact [Optec Technical Support](#) for clarification or additional explanation.

Setting Offsets

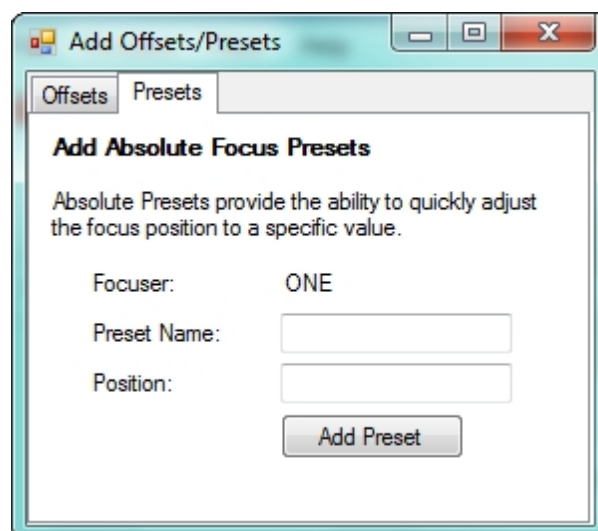
The purpose of the focus offset is to accommodate customers who are using the Gemini in conjunction with one or more filter wheels. When changing from one filter to another, a focus change is often required because the optical system does not always focus all wavelengths at the same focal plane. A small offset can be entered for each filter used.



- ▶ **Open The Add Offsets/Presets Window** - On the Gemini Commander main window, right-click anywhere within the **Relative Focus Offsets** list at the bottom of the window. Select the **Add Offset(s)** option. You may add as many offsets as you like from the same window.
- ▶ **Add A Name** - Give the offset a name by filling in the **Offset Name** text box.
- ▶ **Add A Step Number** - Specify the number of steps associated with the offset by filling in the **Steps** text box. For **Offsets** a positive **Steps:** value will move the focuser Out while a negative **Steps:** value will move the focuser In.
- ▶ **Save Your Offset** - Click the **Add Offset** button to add your offset. The offset should appear in the **Relative Focus Offsets** list on the Commander main window.

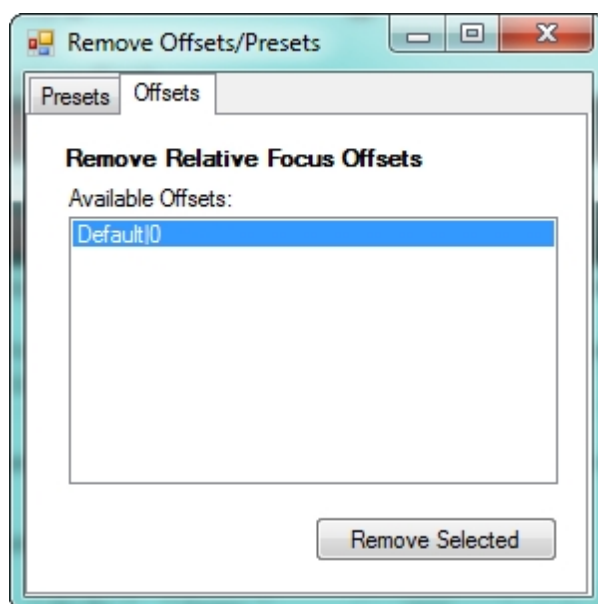
Setting Presets

The purpose of these presets is to provide the user the ability to quickly change focus to a specific stored position. For example, if you know that your optical system focuses somewhere near 1000 steps, you may want to create an absolute focus preset at 1000. With such a preset, you may be able to shorten the time of a focusing routine by quickly moving close to your focus point before beginning the routine.



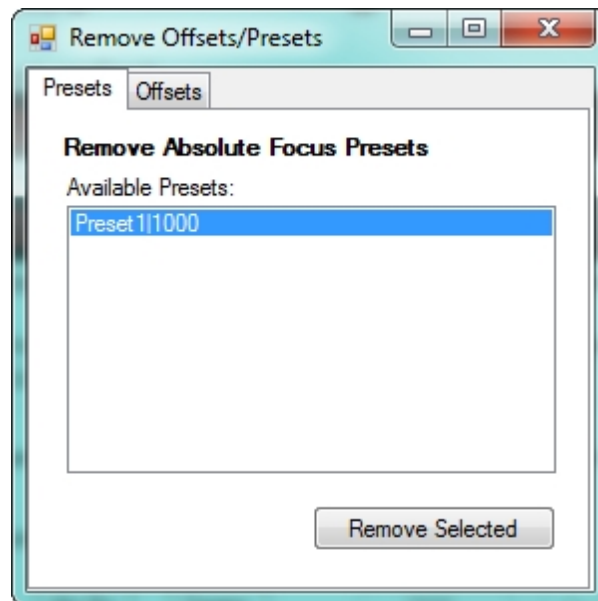
- ▶ **Open The Add Offsets/Presets Window** - On the Gemini Commander main window, right-click anywhere within the **Absolute Focus Presets** list at the bottom of the window. Select the **Add Preset(s)** option. You may add as many presets as you like from this window.
- ▶ **Add A Name** - Give the preset a name by filling in the **Preset Name** text box.
- ▶ **Add A Step Number** - Specify the absolute position associated with the preset by filling in the **Position** text box.
- ▶ **Save Your Preset** - Click the **Add Preset** button to add your preset. The preset should appear in the **Absolute Focus Presets** list on the Commander main window.

Removing Offsets



- ▶ **Open The Remove Offsets/Presets Window** - On the Gemini Commander main window, right-click anywhere within the **Relative Focus Offsets** list at the bottom of the window. Select the **Remove Offset(s)** option.
- ▶ **Select The Offsets** - Select the offset you wish to remove by clicking on it in the **Available Offsets** list. Use **Ctrl+Click** to select multiple offsets from the list.
- ▶ **Remove The Offsets** - Remove the selected offsets by clicking the **Remove Selected** button.

Removing Presets



- ▶ **Open The Remove Offsets/Presets Window** - On the Gemini Commander main window, right-click anywhere within the **Absolute Focus Presets** list at the bottom of the window. Select the **Remove Preset(s)** option.
- ▶ **Select The Presets** - Select the preset you wish to remove by clicking on it in the **Available Presets** list. Use **Ctrl+Click** to select multiple presets from the list.
- ▶ **Remove The Presets** - Remove the selected presets by clicking the **Remove Selected** button.

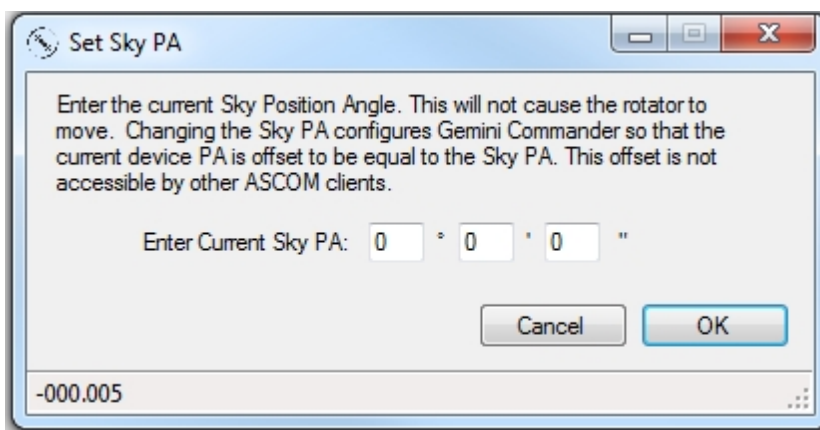
Sky PA Offsets



Section 2.1.2 - Sky PA Offsets

Changing the Sky PA Offset

- ▶ **Sky Position Angle** - The **Sky PA** display box indicates the rotator's current Sky Position Angle. The Sky PA can be changed by clicking the **Set Current Sky PA...** button. This will open a dialog that will let you enter a new Sky PA. When you are finished, click **Ok**. To match the **Sky PA** to the actual Sky Position Angle take an image and perform a plate-solve. With a successful solve the Position Angle (sometimes referred to as Roll Angle) will be displayed in the solution and can be entered into the Set Sky PA dialog box. (see example screen below). To change the Sky PA Offset click on the **Set Sky PA** button and enter the actual Sky PA and click OK.



This will map the instrumental PA to The Sky PA. The offset (as of software version 1.0.2) is stored at the driver level and is sent to all ASCOM clients, allowing the sky PA to be set once for all connected clients.

This offset is sent to all connected clients. This means that you can adjust the Sky PA here and keep all clients in sync.

Accessories



Section 2.4 - Gemini Accessories

In addition to control with a computer or smartphone, the Gemini can be controlled via a Hand Controller.

- ▶ [Gemini Hand Control](#)

Gemini Hand Control



Section 2.4.1 - Using The Gemini Hand Control

The Gemini Hand Control is optionally available to allow control of the Gemini controller while at the telescope. The Hand Control provides a digital read-out and IN and OUT focus functionality. A MODE button is also provided to switch between the Focuser and the Rotator. Pressing the MODE button will toggle between a splash screen with the hand control firmware version number, Focuser, Rotator, and the Home screen. The home mode allows you to rehome the focuser or the rotator.

The Hand Control should be connected to the Hand Controller port of the Gemini control box using either the short or long 4-pin coiled cable included with the package. Most any telephone handset cable will work but a ferrite core choke may be required for longer cables if the "Waiting for Data" error appears and persists.



The Hand Control can be plugged in or disconnected anytime without concern about damaging either the Gemini control box or the Hand Control. Using a serial protocol, the PIC in the Hand Control communicates with the main PIC in the Gemini box receiving position updates and sending new position requests. All position changes are instantly communicated to the control PC so that each display system is simultaneously updated with the current focuser position.



Chapter 3: Gemini FAQ & Troubleshooting

Please consult the topics in this chapter for answers to some of the most frequently asked questions about the Gemini focuser hub, as well as technical assistance and solutions to common problems you may experience with the Gemini.

- ▶ [Hub Connection Issues](#) - How to solve issues that may arise while trying to maintain a connection to your Gemini focuser hub
 - ▶ [Configuring USB Converters](#) - How to configure and troubleshoot your USB-to-Serial Converter
- ▶ [HTML Help Viewer Display Issues](#) - How to ensure that you can use the in-program Gemini Commander help file.
- ▶ [Updating Firmware](#) - How to update the software that runs on your focuser hub.
- ▶ [Updating Gemini Commander](#) - How to update the computer software that controls the focuser hub.

If your problem is not solved within this help file, please contact Optec directly and we will be happy to assist you.

- ▶ [Contacting Optec Technical Support](#) - How to ensure when contacting Optec for support that your problem is resolved as quickly as possible.
 - ▶ [Accessing The Event Logger](#) - How to configure, retrieve, and view Gemini Commander event logs.

Hub Connection Issues



Section 3.1 - Gemini Hub Connection Issues

If you experience issues getting connected or staying connected to your Gemini focuser hub, the following techniques may assist you in solving your connection problems:

- ▶ **Check Your Physical Connections** - The first step to diagnose any connection problem is to *check all connections*.
 - ▶ Ensure that the 12VDC power adapter included with your Gemini is plugged into both a wall outlet and the hub and that the hub is turned on.
 - ▶ If you are attempting to connect via serial or ethernet, ensure that the connection cable is properly plugged into both the hub and your computer.
 - ▶ If you are attempting to connect via Wi-Fi, ensure that your computer has a strong connection to the wireless network. Also note that unless you have purchased the **Wi-Fi Daughter Board** upgrade, you will not be able to connect via Wi-Fi.
- ▶ **Check Your Connection Settings** - Once all physical connections have been verified, the next most likely issue is with the connection configurations in your control software.
 - ▶ If you are attempting to connect via serial cable, ensure that your software is set to connect using the same port number that the focuser hub is plugged into. This port number is dependent on the specific serial plug that your cable is using. Also, if you are using a program other than Gemini Commander, ensure that the baud rate is set to **115200**.
 - ▶ If you are attempting to connect via ethernet cable or Wi-Fi, ensure that you are connecting to the correct IP Address. Waiting a few minutes since your last connection attempt and clicking the **Refresh IPs** button on the *Setup* dialog of Gemini Commander should solve this problem.
 - ▶ Additionally, if you are attempting to connect via Wi-Fi, ensure that you are connected to the same network that the Gemini hub is configured for. If you have not specifically defined another network for the hub to connect to, the network you must use is called **GeminiConfig**.
 - ▶ If you are using a USB-to-Serial Port Converter, ensure that it is configured correctly by following the instructions in the [Configuring USB Converters](#) section of this manual.
- ▶ **Try Another Connection Method** - If all else fails and you find yourself unable to connect to your hub using your preferred method, we suggest attempting to use one of the many other methods (serial instead of ethernet, webpage Wi-Fi instead of Gemini Commander Wi-Fi, etc.) described in the [Configuring Software](#) section of this manual to connect to your focuser. *Whether trying a new method works or not, you will have gained valuable*

knowledge. If you succeed in maintaining a connection with another method, then you know the source of your problem. If not, you know that the cause of this problem is not specific to a connection method and is more likely systemic in nature.

If your problem is not resolved by following these steps, then it is highly recommend that you [Contact Optec](#) directly for assistance.



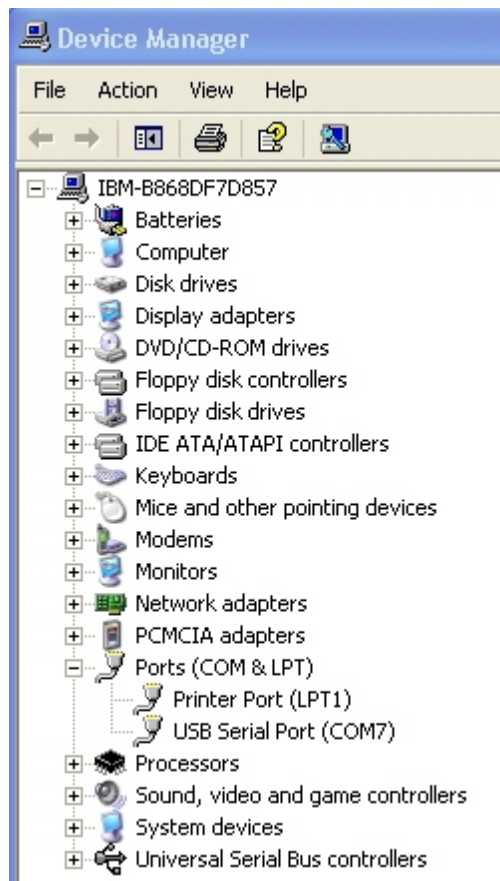
Section 3.1.1 - Configuring USB-To-Serial Converters

The Gemini package includes a special **USB/Serial Cable** designed by Optec to work with nearly all Optec serial devices. The device used in the cable is based on the FTDI chipset. Most current operating systems include native drivers for these USB-to-serial converter devices. Windows 7 and higher will automatically load the proper device driver upon initial use. The very latest drivers for Windows and Mac are available directly from the Optec and FTDI websites.

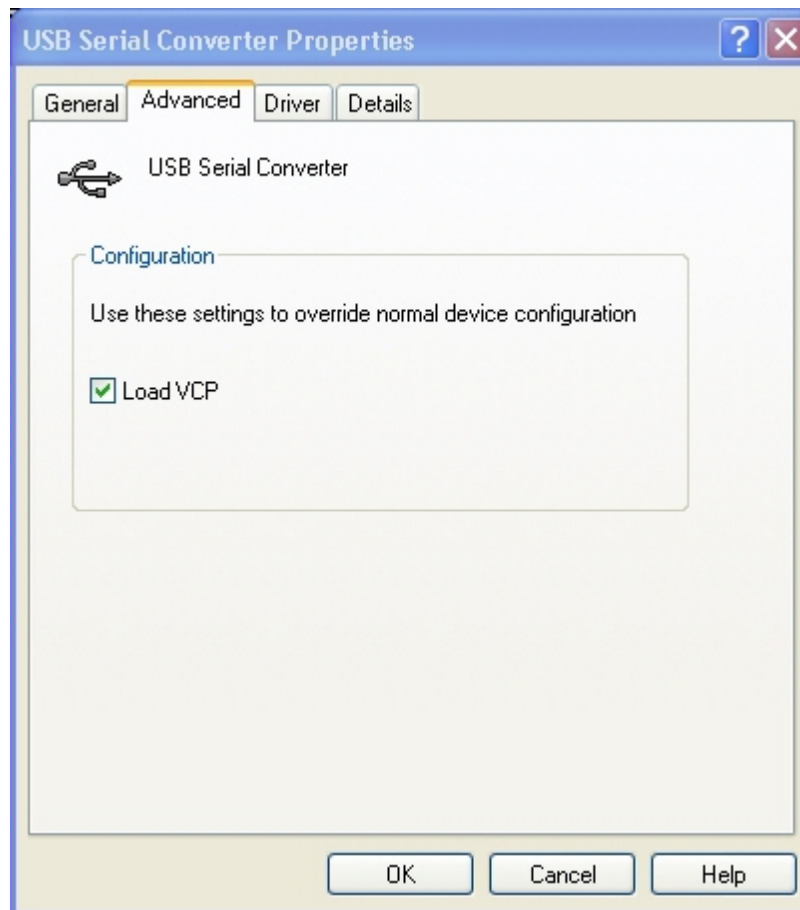
Generally, the **Gemini Commander** software will list only valid and available COM ports in the Connection Setup section of the Focuser Setup dialog boxes. However, if you are unsure which COM port has been assigned to your USB/Serial cable or USB-to-Serial converter, you may need to check the Device Manager in Windows. The instructions for Windows XP below provide the easiest way to install the converter drivers and configure the USB-to-Serial port converter when using an older operating system. Windows 7 and newer operating systems do not generally require the steps below, but will quickly locate and load the proper device driver when plugging the **USB/Serial Cable** into a USB port.

To display the Device Manager in Windows, click **Control Panel** on the **Start** menu, or right-click on the **My Computer** icon and select **Manage**. Select **Device Manager** under **System Tools**.

- ▶ **Remove Old Drivers** - Before plugging your new converter into your computer, make sure that any existing old drivers for the FTDI chips set have been removed. Do this by going to the Add/Remove Programs in the Control Panel and find any listing of *FTDI drivers* and remove it. If you have any older USB-to-Serial Converters using the FTDI chip set, you can remove them now.
- ▶ **Download And Install New Drivers** - From the Optec Install disk or from the [Optec Downloads](#) page, at download and run the FTDI driver executable setup program. This setup program is compatible with Windows XP, Vista, and 7. You will not see any message if the program loads successfully.
- ▶ **Plug In Your Converter** - After running the setup program, you can now plug in one of your FTDI chip set USB-to-Serial converters.
- ▶ **Open Device Manager** - To find the COM number that was selected for each USB-to-Serial converter, go to your Device Manager by clicking the **Control Panel** option on the **Start** menu, and selecting **Hardware and Sound**, followed by **Devices and Printers -> Device Manager**.



- ▶ **Find The Converter Port** - Browse the list of devices to see the COM port number listed under **Ports (COM & LPT)**. In the diagram above, the USB-to-Serial Converter is using port COM7. You can then plug your other converters in one at a time to see which COM numbers have been selected for those.
- ▶ **Additional Modification May Be Necessary** - If you purchased your converter from Optec before July 2007, you may have to modify an additional setting. If you do not see the COM port number in the Device Manager screen as above, but do see messages that indicated that the USB-to-Serial converter is installed and ready, then right-click the **USB Serial Port** device and select **Properties**.

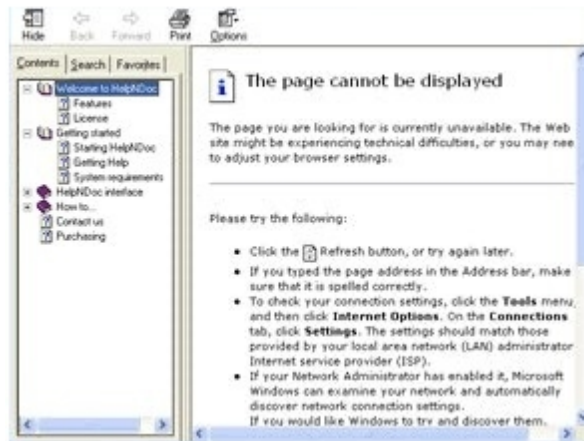


- ▶ **Check The Checkbox** - Select the **Advanced** tab in the properties window and check the **Load VCP** box. Unplug the USB-to-Serial converter and then plug it back in. You should see the COM port number appear under Ports. This will affect all converters connected to the computer.

HTML Help Viewer Display Issues



Section 3.2 - HTML Help Viewer Display Issues



If the Help Viewer used by Gemini Commander to view this help file displays an error message saying either : "*This action has been canceled*" or "*The page cannot be displayed*", thus forcing you to view this help file via the Optec website, the following solution may help you resolve the issue:

- ▶ **Make A Local Copy** - This help viewer will only work when opened from your computer's local drive(s) (i.e. the C:\ Drive as opposed to a network path or mapped network drive). Find the Gemini.chm file in your Gemini Commander installation and open it from a local drive.

If this does not work, your best solution is to simply continue using the Web-based help file that, since you are reading this article, you are presumably already using.

Updating Firmware



Section 3.3 - Updating Firmware

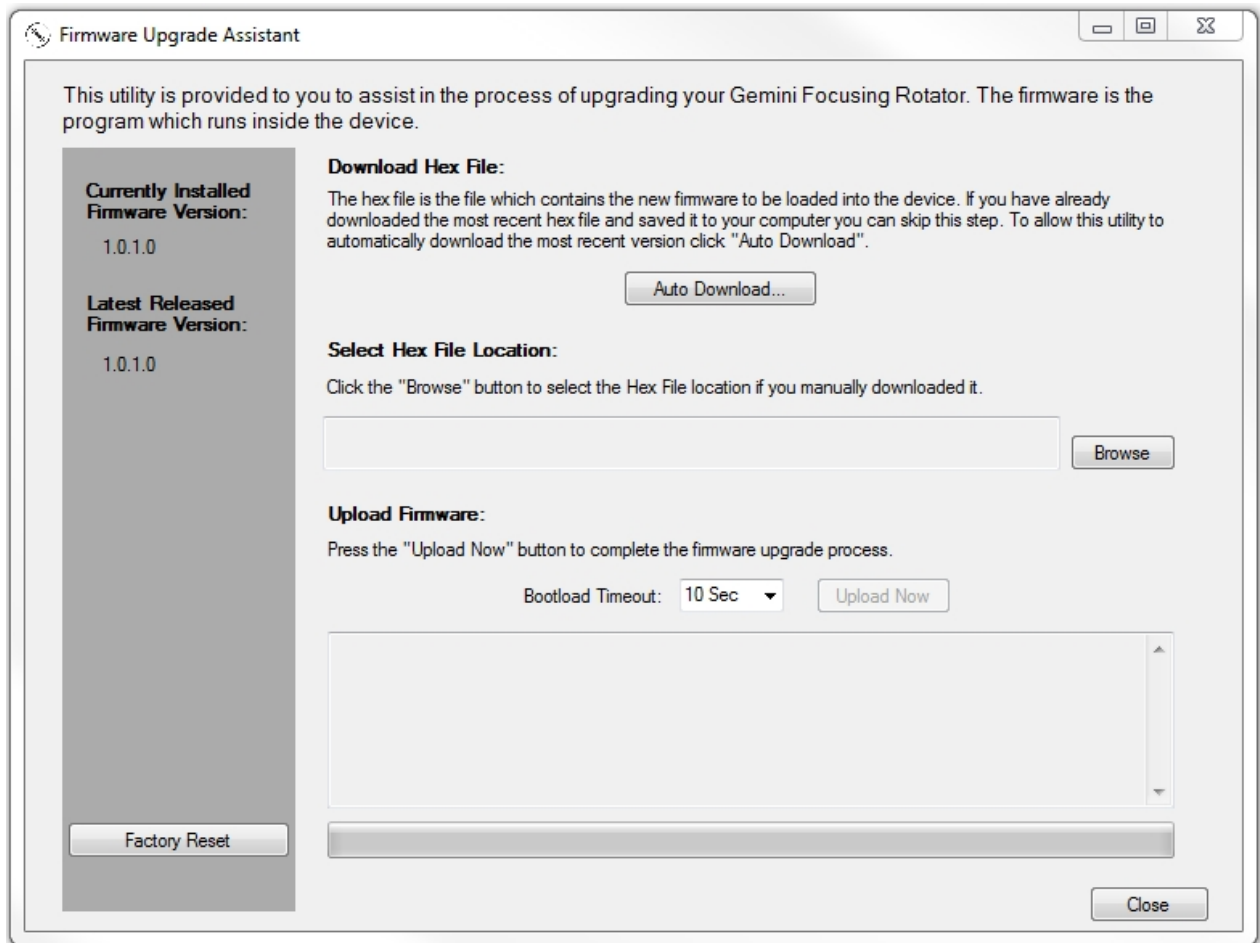
Firmware, as differentiated from software, is the set of programs loaded directly onto the Gemini focuser hub's internal microprocessor in order to enable the hub to perform all of the functions that it needs to perform.

In the past, upgrading most focusers, cameras, or other instruments with new firmware would necessitate the expense and inconvenience of shipping the device back to the manufacturer and waiting several days for it to be returned. However, the Gemini eliminates this hassle by allowing you to upgrade your firmware directly through the Gemini Commander control software.

WARNING! If you have recently updated your Gemini focuser hub firmware, we highly recommend updating your software as well to ensure that your Gemini works properly.

To upgrade your firmware:

- ▶ **Connect Your Hub** - Ensure that your Gemini focuser hub is connected via an **RS-232 Serial** connection.
- ▶ **Open The Firmware Upgrade Wizard** - In Gemini Commander, go to the **File** menu and select the **Upgrade Firmware** option.



- ▶ **Check For A New Version** - Using the **Current Firmware Version** and **New Firmware Version** displays, determine if there is a newer firmware version available for download. If not, click the **Close** button to return to the main Gemini Commander window
- ▶ **Download New Firmware** - If a newer firmware version is available, you may download it in one of two ways:
 - ▶ **Auto-Download New Firmware** - Click the **Auto Download** button to automatically download and save your new firmware. In this case, the **Hex File Location** will be automatically filled in.

-OR-

 - ▶ **Manually Download New Firmware** - You may manually download the newest firmware version from the Optec website. In this case, you must also manually select the **Hex File Location** (the location of your download).
- ▶ **Upload Your Firmware** - Once your firmware is downloaded, click the **Upload Now** button to upload the new firmware to your focuser hub.
- ▶ **Factory Reset** - The factory reset button will reset the Gemini's internal settings to their factory defaults.
- ▶ **Return To The Main Window** - When you are finished uploading, click the **Close** button to return to the main Gemini Commander window.

Updating Gemini Commander

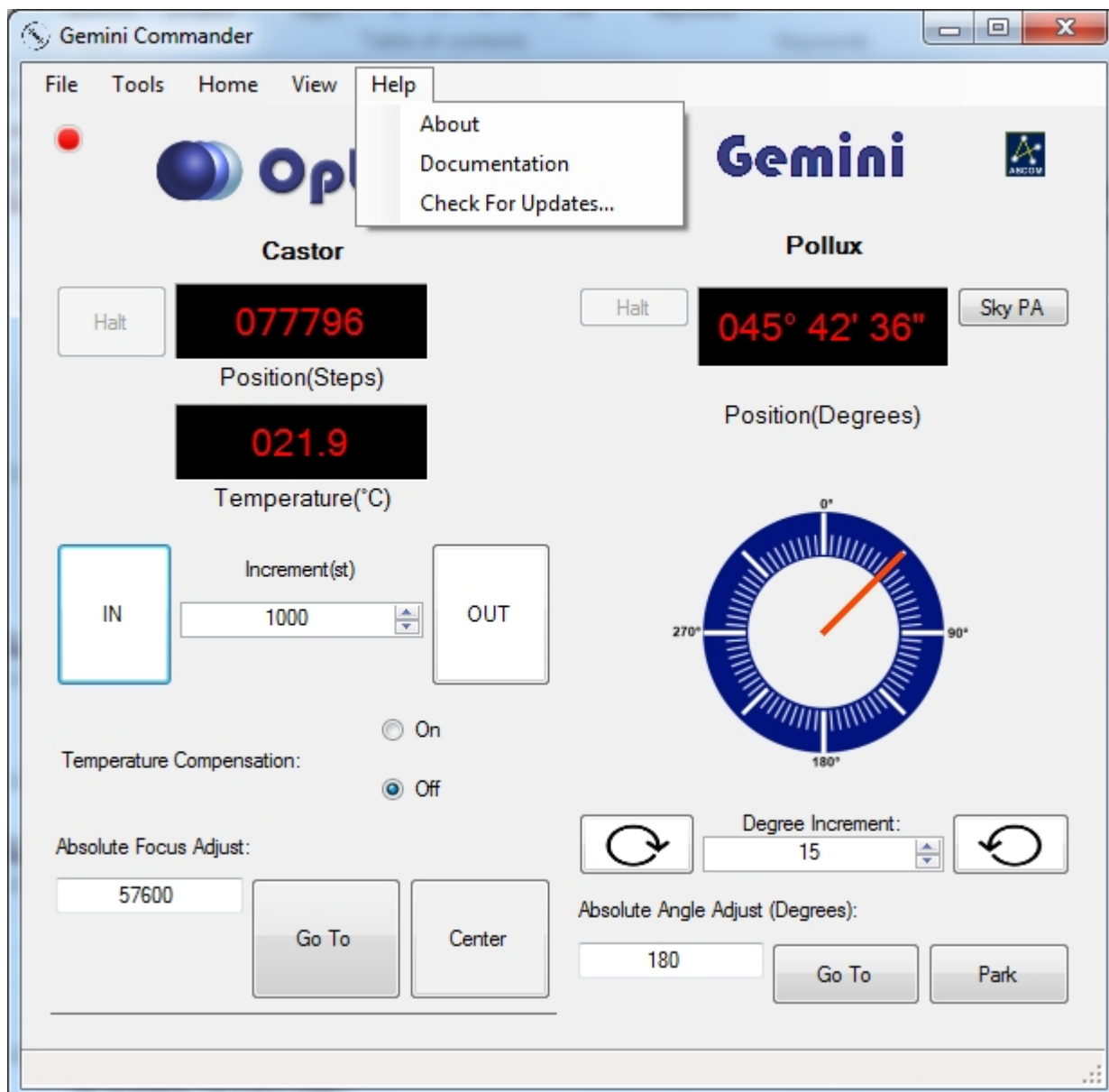


Section 3.4 - Updating Gemini Software

In order to ensure the best possible experience with your Gemini, you should do your best to keep your Gemini Commander software up to date. To do this, you can either:

- ▶ **Go To The Optec Website** - We will always make the latest version of Gemini Commander and its associated drivers available for download on our [Downloads](#) page.

-OR-



- ▶ **Check For Updates** - Within Gemini Commander, access the **Help** menu and click the **Check For Updates** option to determine if you need updates. If there is a newer version of the Gemini software package available, you may choose to download and install it or not.

Contacting Optec Technical Support



Section 3.5 - Contacting Optec Technical Support

If you encounter any problems, errors, or questions about using the Gemini focuser hub that are not addressed by this owner's manual, the recommended next step is to contact [Optec Technical Support](#) for assistance.

However, providing certain resources when contacting Optec will greatly increase the speed and completeness with which your problem is solved. When using email, these resources should be included in text or spreadsheet files attached to the email. When contacting Optec by phone, simply have the documents available for ready access, as our technical support team may need you to refer to them. The resources you will need are as follows:

- ▶ **Description of Your Problem** - Naturally, to solve a problem, Optec tech support must know what the symptoms of the problem are.
- ▶ **How The Problem Occurs** - If there is a specific procedure required for the problem to appear, make a note of the steps for doing so.
- ▶ **Text Of Your Error** - If your problem is related to an error message received in Gemini Commander, you should retrieve a verbatim copy of the error message.
- ▶ **Error Logs** - If your problem is related to Gemini Commander, you should retrieve your Error Logs as directed in the [Accessing The Event Logger](#) section of the manual.
- ▶ **Hub Firmware Version** - The firmware version number can be found by opening the *Firmware Upgrade Assistant* in Gemini Commander.

Accessing The Event Logger



Section 3.5.1 - Accessing And Configuring The Gemini Commander Event Logger

While using Gemini Commander, if the program encounters any sort of problem, it will notify you with an error message describing the problem. If this problem is consistently preventing you from using the program the way you need to use it, we highly recommend contacting [Optec Technical Support](#) for assistance.

Gemini Commander has been programmed with the capability to log every major event that occurs during normal program operations, as well as the full details of every error that is capable of occurring.

When preparing to contact Optec for support, having your Gemini Commander error log at the ready and, if possible, sending that log to Optec can greatly increase our ability to solve your problem quickly and completely.

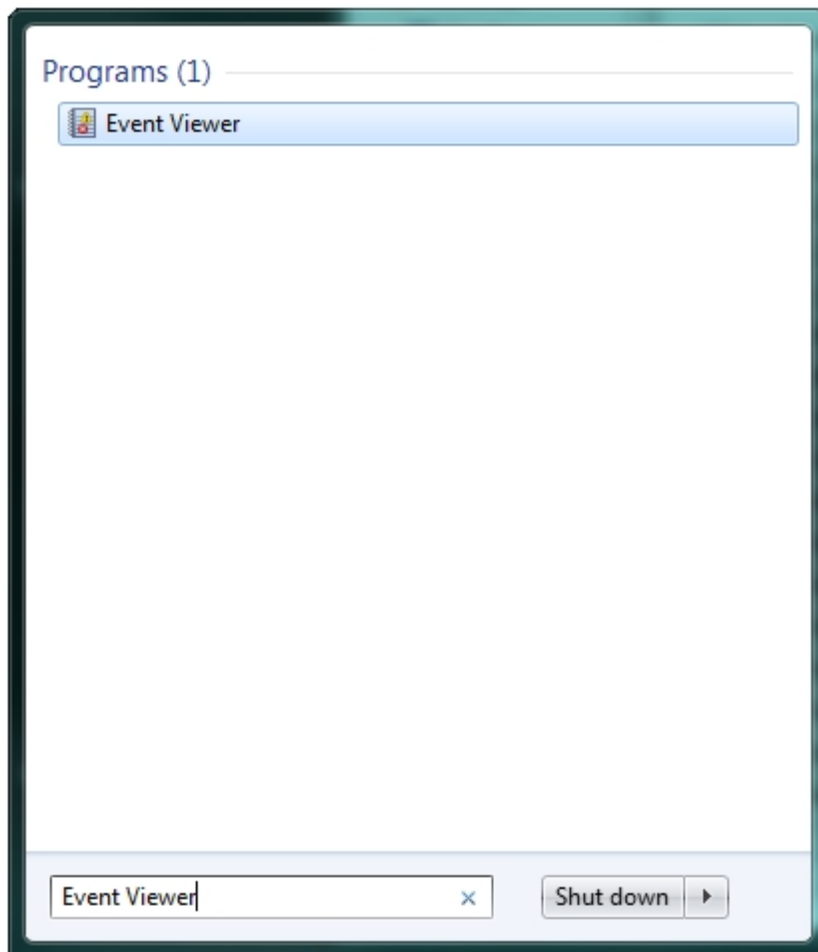
If you are contacting Optec for support, we also recommend following the other guidelines outlined in the [Contacting Optec Technical Support](#) section of this manual.

Configuring Event Logging

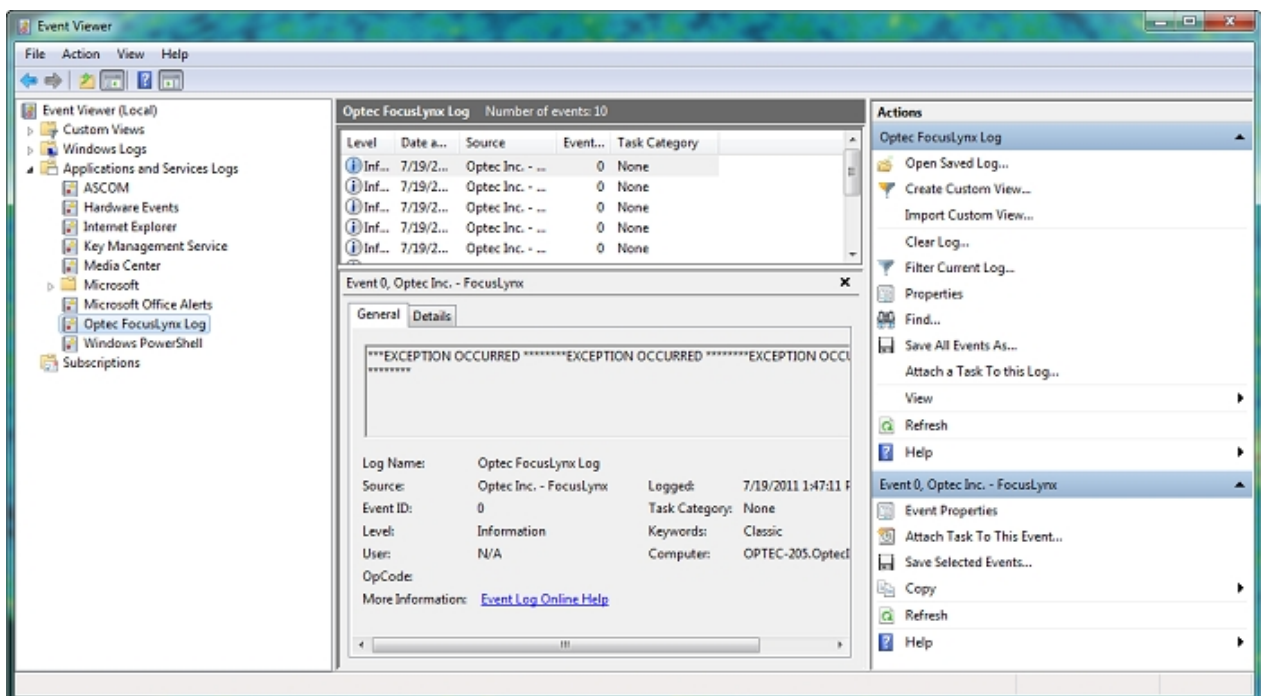
Accessing Event Logs

Events logged by the event logger are stored in the Windows **Event Viewer** utility.

To access Gemini event logs in the event viewer:



- ▶ **Open Event Viewer** - Windows Vista and 7 users can find the Event Viewer can be found by searching in the **Start** menu for *Event Viewer*. Windows XP users must go to



- ▶ **Open Application Logs** - On the left side of the viewer, a listing of all classes of events can

be found. Click the **Applications And Services Logs** folder to open it.

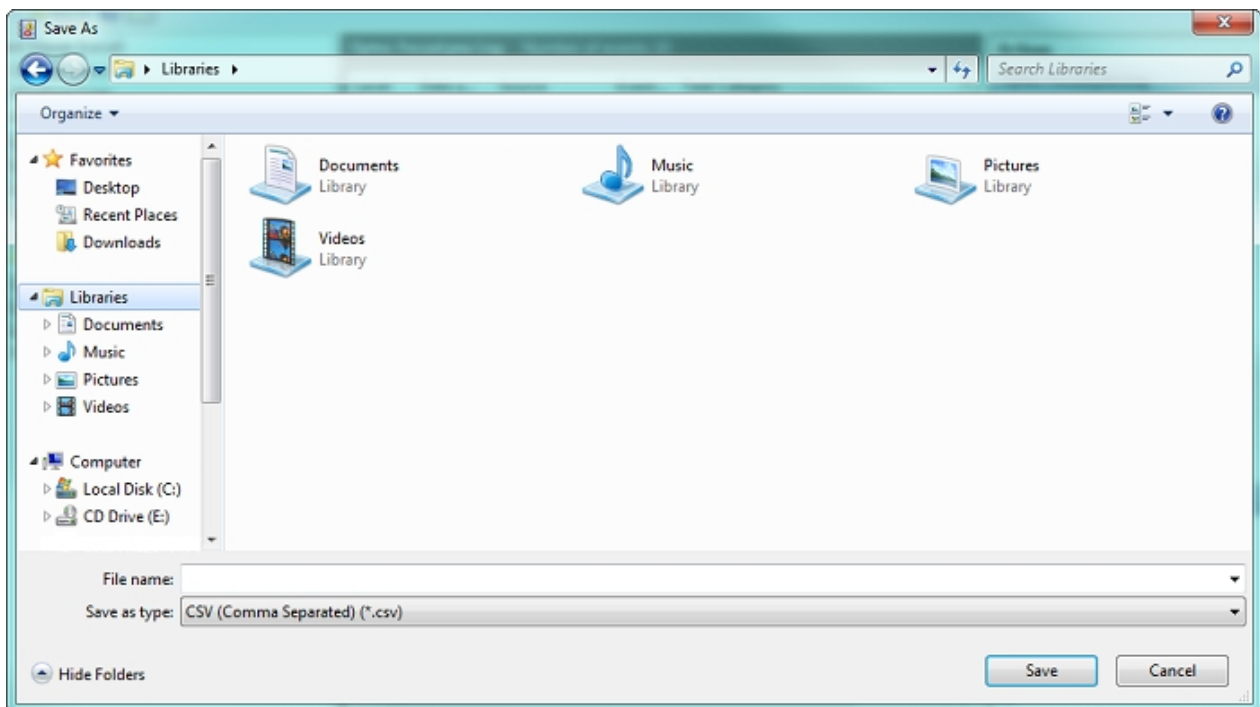
- ▶ **Find Gemini Logs** - In this folder, the Gemini Commander event log can be found under the title **Optec Gemini Log**. Click on this log to open it.
- ▶ **View Events** - Now, the full list of Gemini Commander events is viewable in the center portion of the Event Viewer window. By default, the events are organized chronologically from newest to oldest.

Saving Event Logs

- ▶ **Open The Event Viewer** - Follow the previously described steps to open your Windows Event Viewer and access the Gemini event log.

 Save All Events As...

- ▶ **Save Events** - Click the **Save All Events As...** button on the right side of the Event Viewer to open a *Save As* dialog.



- ▶ **Save Events As A CSV** - Using the **Save As Type** drop-down selection, choose the **.csv** file extension. Choose a location to save the event log, and click **Save** to save it.



Chapter 4: Gemini Reference

- ▶ [System Requirements](#) - Required software and hardware for use of Gemini Commander and the Gemini control website.
- ▶ [Hardware](#) - Physical characteristics the Gemini focuser hub.
- ▶ [Command List](#) - Listing of commands usable to directly communicate with the Gemini via a serial connection.
- ▶ [Error List](#) - Listing of errors that may be returned during direct serial communication.

System Requirements



Section 4.1 - System Requirements

Gemini Commander

In order to use the Gemini Commander control software, you will need the following software installed on your system:

- Windows XP, Vista, Windows 7, Windows 8/8.1 or Windows 10
- ASCOM Platform 6.1 SP1 or later
- Microsoft .NET Framework 3.5 or later

Gemini Commander is a very lightweight program, so if your computer meets the minimum system requirements for the software listed above, you should have no problem using Gemini Commander.

Gemini Commander requires less than **5 MB** of hard drive space.

If you are unsure of whether you have the correct .NET Framework and/or ASCOM Platform installed, simply run the installer for Gemini Commander. The installer will automatically search your system for the required components and provide a link where you can download any that are missing.

Control Website

To run the web page-based controls for the Gemini hub, all you need is an updated version of one of the following supported browsers and a wireless or wired Ethernet connection to the hub.

The Gemini control website is supported on the following browsers:

- Internet Explorer
- Mozilla Firefox
- Google Chrome
- Safari (in both Mac OS X and iOS)
- Opera
- Android Browser
- iPhone Browser

Power Connection

The Gemini focuser hub requires 12VDC to function properly. A suitable power supply is provided with every controller purchase. Please contact Optec, Inc in the event that you require a replacement power supply. Using non Optec power supplies may cause damage to you unit.

Data Connections

There are three options for establishing the data communication link between your PC and the Gemini hub: standard RS-232 serial, wired Ethernet, and wireless Ethernet via Wi-Fi (requires purchase of the Wi-Fi optional board). See the [Hardware](#) reference for details.

Hardware



Section 4.2 - Gemini Hardware

The Gemini hardware is simply designed and straightforward to use. The Gemini Hub box has reserved one end exclusively for **control** connections and the opposite end reserved entirely for **device** connections.

Dimensions

- ▶ 5.01 x 3.21 x 1.05 inches
- ▶ 12.73 x 8.15 x 2.67 cm

Device Connections

- ▶ **Focuser** - Allows connection with a *CAT-5E* Ethernet cable.
- ▶ **Rotator** - Allows connection with a *CAT-5E* Ethernet cable.

Control Connections

- ▶ **12VDC** - Power connection for the Gemini. Connect your included 12VDC power adapter here.
- ▶ **Network** - Allows connection with a standard *CAT-5E* Ethernet cable (not included) to a computer. This allows [Gemini Commander](#) or [Webpage](#) control.
- ▶ **Hand Control** - Allows connection via RS-232 serial cable to the soon-to-be-released [Gemini Hand Controller](#), allowing portable hand-held control.
- ▶ **Serial** - Allows connection via RS-232 serial cable to a computer. This allows [Gemini Commander](#) or [Direct Command](#) control.

Microprocessors

- ▶ **Main Board** - Microchip PIC24HJ128GP 204-I/PT
- ▶ **Wi-Fi Daughter Board** - Microchip PIC24HJ128GP 202-I/SP

Command List



Section 4.4 - Command List

- See the documentation on the Optec Website.

Error List



Section 4.5 - Error List

- See the documentation on the Optec Website.

Additional Resources



Chapter 5: Additional Resources

There are many resources on the Internet to help you use the Gemini focuser hub. We recommend visiting the [Optec website](#) first.

If you are unable to connect to the Internet, or you have any other questions at all, please feel free to contact Optec Support by telephone at:

- ▶ Optec Support: 616-897-9351

