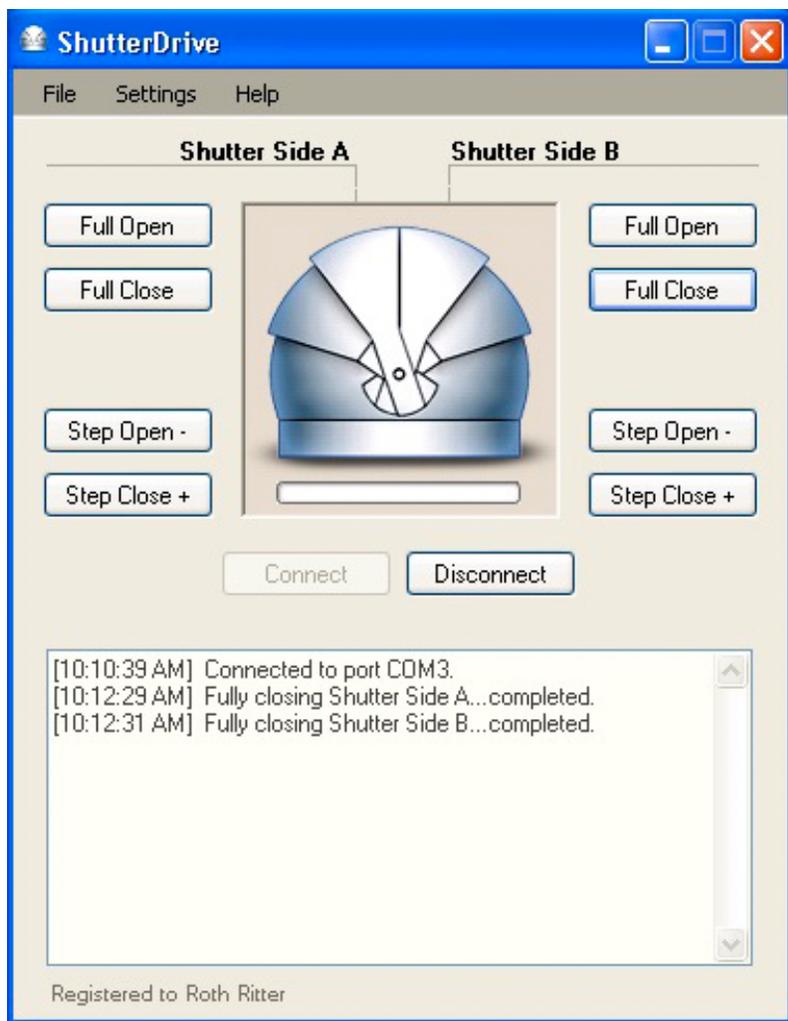


ShutterDrive User's Guide

ShutterDrive is a straight forward, stand-alone application that can control the opening and closing tasks of your motorized clamshell observatory. Although these systems do mechanically work well, the standard method for remotely activating them involves holding down keys in a terminal window to raise and lower the shutters which is cumbersome.



ShutterDrive is a better solution which lets you easily take control of your dome with more precision and convenience. * At a minimum, please read the sections in RED below!

This application was designed to be very quick and simple to use. The illustration and titling in the top window are to emphasize that the controls are divided into two halves like the dome itself (**Shutter Side A** and **Shutter Side B**). These are editable, custom labels for your particular dome orientation. The documentation shipped with the motor control system cautions against operating both sides simultaneously for risk of possibly blowing a fuse in the control box. This utility makes it impossible to inadvertently operate the two motor drives at the same time. For those using a clamshell dome in a way that prevents ingress from outside, blowing a fuse can be an ordeal.

CONFIGURATION

Before ShutterDrive can operate, you must set the appropriate COM port. Select **Port Settings** found under the **Settings** menu. Choose the port that is connected to your dome and click the **OK** button. Optionally check the **Auto-connect** box if you would like ShutterDrive to automatically connect to the COM port you have selected at the time you launch the software. After you have chosen the port, you can then click the **Connect** button to open the com port. Assuming you have selected the correct COM port, all of the buttons should now be able to control your dome.

Shutter side labels are editable to customize the ShutterDrive display reference according to your particular dome orientation.

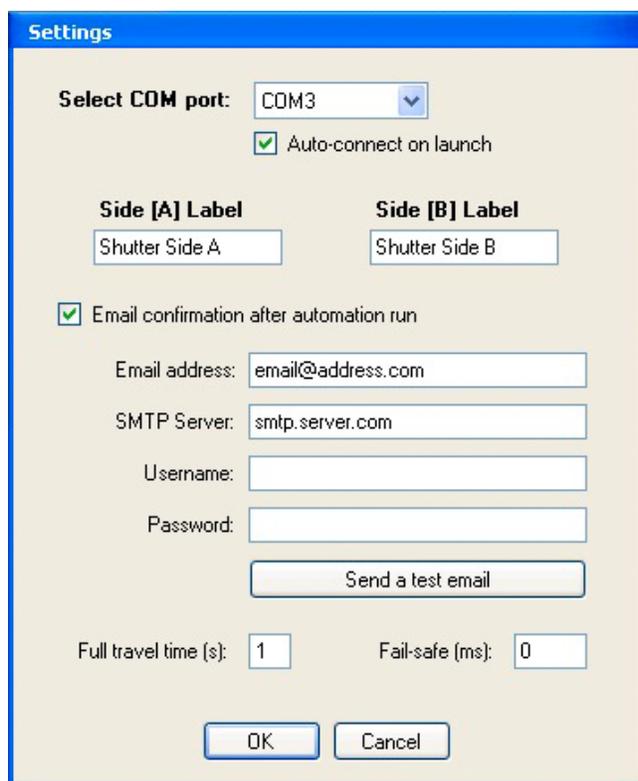
ShutterDrive User's Guide

Email confirmation is an option which is only used when you run ShutterDrive from either of the automatic full open or full close scripts (see the quick-launch automation below). When the fields are correctly filled in and check box activated, ShutterDrive will send an automated email to the specified address verifying successful dome automation and the time it occurred.

Full travel time / Fail-safe

YOU MUST SET THESE VALUES FOR YOUR DOME to have a safety measure if your limit switches fail and to use ShutterDrive!

These two settings are the **MOST important parameters** next to setting the COM port. Their purpose is to provide as accurately as possible a safeguard against damage to your dome in the event one of your limit switches fails during a full open or full close command issued by ShutterDrive. The more accurately you set these values the safer your dome will be during a hardware failure. **For safety reasons, the default values of 1 second for travel time and 0 for fail-safe are purposely set to trigger a fail state until you properly set them for your dome.** They are easy to figure and only have to be done once (please read the following easy set up procedure).



They are easy to figure and only have to be done once (please read the following easy set up procedure).

NOTE: The step open/close buttons are not protected by this safety feature because there is currently no way to know precisely what partial position the the shutters are in except for fully open or closed. Therefore, it is recommended that you use the full open/close buttons to reach those positions instead of getting there by repeatedly by pressing the step buttons.

The **full travel time** box represents the time in seconds it takes for one side of your dome to reach the fully open state from the closed position (or vice versa). To set this value for your dome, make sure your dome is fully closed and press the [Full Open] button for one of the sides and record the time it takes the shutter to reach the fully open position from the moment you press the button. Enter the number of seconds in the input box.

Next, the **fail-safe value** needs to be set. This is extra time that will be added to your previous time measurement (the time it took your dome to fully open one side) and is entered in milliseconds. This value is the determining factor used when ShutterDrive checks to see if the total time (total travel time + fail-safe time) has expired and triggers a failure. Using milliseconds will allow you to fine tune the delay as needed. Ideally, if you have timed the exact duration it takes for full travel, then adding a fail-safe of 500 milliseconds (half a second) is generally a good setting. Certainly feel free to home in using trial and error to get these settings as close as possible where false failures are avoided, but close enough to flag an error state as quickly as possible beyond that point.

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USER INTERFACE

Full Open / Full Close

These buttons will completely open or close the side of the dome you choose. When the message box reports that side (**A**) or side (**B**) is fully open or closed, you can be assured that this message was received by the internal limit switches inside the dome.

Step Open - / Step Close +

These buttons will open or close the side of the dome you choose, in stepped increments. The amount of these increments is the smallest that the RS-232 control system will allow. For example, if you are used to holding down the 'a' or 'A' key in a terminal window to control your dome, then these buttons would be the equivalent of typing a single letter rather than holding down the key.

If you need to have one or both sides partially raised, then these buttons are handy in allowing you to determine how many increments (or presses) of each button is required to position the shutters at a specific height, starting either from the open or closed position. One may find it useful to have one side partially raised in order to block out an incoming light source or wind current.

Quick-launch automation

In order to make ShutterDrive more flexible, an additional two shortcuts are installed in the application Start menu called **Full_Close** and **Full_Open**. When launched, they will automatically run a full open or close script by passing a command line parameter to ShutterDrive. The dome moves one side at a time, first (**A**) then (**B**), from the position the shutter is currently in whether fully open, closed, or anywhere in between.

Uses for automation include manual simplicity in quickly opening/closing the entire dome or being launched from other automation applications to streamline these tasks without human intervention.

CCDAutopilot should point to the .bat files "auto_open" and "auto_close" installed in:
Programs > ShutterDrive > CCDAP

ACP users should point to the shortcut files "auto_open" and "auto_close" installed in:
Programs > ShutterDrive > ACP

All of the automated methods outlined above assume the correct COM port has initially been set and control is working properly.

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Thank you for using ShutterDrive!