



SightLine

APPLICATIONS

EAN-Lens Focus Control

PN: EAN-Lens-Focus-Control

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The following notifications are used throughout the document to help identify important safety and setup information to the user:

 **CAUTION:** Alerts to a potential hazard that may result in personal injury, or an unsafe practice that causes damage to the equipment if not avoided.

 **IMPORTANT:** Identifies crucial information that is important to setup and configuration procedures.

 *Used to emphasize points or reminds the user of something. Supplementary information that aids in the use or understanding of the equipment or subject that is not critical to system use.*



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1 Overview

This document describes how to configure SightLine video processing boards for controlling motorized lenses. The Panel Plus application is used to configure the SLA-hardware communications to the connected lens. No other additional serial port configuration is needed. Once configured, the lens can be zoomed in and out manually, or the auto-focus feature can be used to drive the lens.

Before starting this procedure, the SLA-hardware should be connected to one of the supported motorized lenses through a serial port or directly through a SightLine camera adapter board.

This process is also helpful as a reference for creating customized lens controller software. To help with this process see the [Focus Metrics](#) section for more information.

1.1 Associated Documents

[EAN-Startup Guide 1500-OEM](#): Describes steps for connecting, configuring, and testing the 1500-OEM video processing board on the 1500-AB accessory board.

[EAN-Startup Guide 3000-OEM](#): Describes steps for connecting, configuring, and testing the 3000-OEM video processing board.

[EAN-Ethernet and Serial Communication](#): Describes passthrough options and testing examples for SLA-hardware.

[EAN-Hitachi-Block-1500-OEM](#): Setup and configuration information for the Hitachi block cameras.

[EAN-Sony-Block-1500-OEM](#): Setup and configuration information for the Sony block cameras.

[EAN-Sony-Block-3000-OEM](#): Setup and configuration information for the Sony block cameras.

[Interface Command and Control \(IDD\)](#): Describes the native communications protocol used by the SightLine Applications product line. The IDD is also available as a local download on the [Software Download](#) page.

Panel Plus User Guide: Provides descriptions of all the settings in the Panel Plus application. (Located in the Panel Plus application in the *Help* menu.)

1.2 SightLine Software Requirements

ⓘ IMPORTANT: The Panel Plus software version should match the firmware version running on the board.

1.3 Application Bit Requirements

The functions described in this EAN require Application Bits (app bits) purchased from SightLine. App bits reside on the hardware unit and are enabled with a license file provided by SightLine at initial unit purchase or during a license upgrade process. License files use a hardware ID that is applicable to a specific hardware serial number. For questions and upgrade support contact [SightLine Sales](#).

Table 1: Application Bits Requirement Table

Function	Minimum Software Version	Required Application Bit(s)
Focus Telemetry	2.21.xx	Focus Telemetry. 0x1000




2 Serial Port Summary

The 1500-OEM assumes the following configuration:

- Serial Port 0 (J3) SightLine Command and Control for configuring the SLA-hardware
- Serial Port 1 (J4) Lens Command and Control (Set to *Port Not Used*)
- Serial Port 2 (J4) Camera command and Control (Set to *Port Not Used*)

The 3000-OEM assumes the following configuration:

- Serial Port 0 (J1) SightLine Command and Control for configuring the SLA-hardware
- Serial Port 2 (J3) VIN0 Camera command and Control (Set to *Port Not Used*)
- Serial Port 3 (J4) VIN1 Camera command and Control (Set to *Port Not Used*)

 *Serial ports used for lens and camera control should be configured as Port Not Used through the Serial Port Settings Dialog in Panel Plus (main menu » Configure » Serial Ports). Command passthrough will not be available and should not be configured. Doing so can cause inconsistent communication with the lens.*

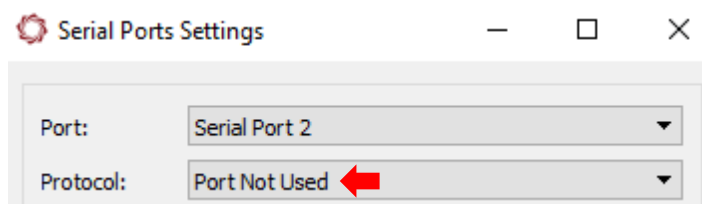


Figure 1: Port Not Used

3 Supported Lens Types and Serial Ports

The SightLine software integrates command and control for a set of known lenses or cameras with integrated lens. This assumes that the lens is connected to a known serial port (e.g., Tamron SC001 is connected to Serial Port 1 on SLA-1500). This serial port will automatically be configured to the correct baud rate.

Table 2: Supported Lens Types and Serial Ports

Device	SLA-1500 Serial Port	SLA-3000 Serial Port
Tamron IR Lens (SC001*)	1	NA
VISCA (Sony Block compatible)	2	2 or 3
Hitachi (DI-SC120R compatible)	2	2 or 3

*The Tamron SC001 lens must initially be configured with the Tamron FZ Drive GUI to default to 115.2 kBaud.




4 Configure Lens

This process can be used for both the 1500-OEM and the 3000-OEM.

4.1 SightLine Lens Control and Serial Passthrough

Presently lens control and serial passthrough features are mutually exclusive and should be used independently of each other.

 *There is an option to set Protocol to Port Not Used for ports being configured for lens control, see [Serial Port Summary](#) above.*

4.2 Connect to Target Hardware

The process outlined below assumes that all hardware is correctly and safely connected. See the associated startup EANs for additional connection information.

1. Apply power to SLA hardware.
2. Start Panel Plus on the host PC.
3. From the *Connect* tab, click the *Refresh List* button to get a list of boards on the network.
4. Use the dropdown menu and click on the appropriate board to select it.
5. Click the *Disconnected (click to connect)* button. Once the connection is successful, the button changes to *Connected*.

 *See the troubleshooting section for recommendations on correcting connection issues.*

5 Select Lens Type and Serial Port Number

1. Click on the *Lens* tab.
2. Set the *Lens Type*.
3. Set the *Serial Port Num* based on the Serial Port Summary in section 2.

Lens Type: Port Num Set to "Port Not Used"

4. From the Panel Plus main menu, go to *Parameters » Save to board*.
5. Go to *Reset » Board*. After resetting the board, the SLA hardware will initialize the Serial Port for lens communication.

 *Additional controls on this tab should now be available to control the lens.*



6 Focus Control

Far (focus further away)

Near (focus closer in)

Position (drive to a known location)

Curr (current encoder position)

Speed (focus change speed)

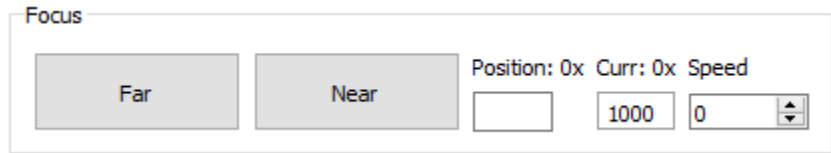


Figure 2: Focus Control

7 Auto Focus Control

AutoFocus Region (0% to 100%)

AutoFocus Method (Seek search near current focus. Scan far to near. Look for a peak starting at far focus.)

Rate Adjust (Denotes how fast the focus moves when seeking - 0 to 255.)

Change Pct (Ignores focus metric changes below set value while seeking.)

AutoFocus (Click to run the auto focus feature.)

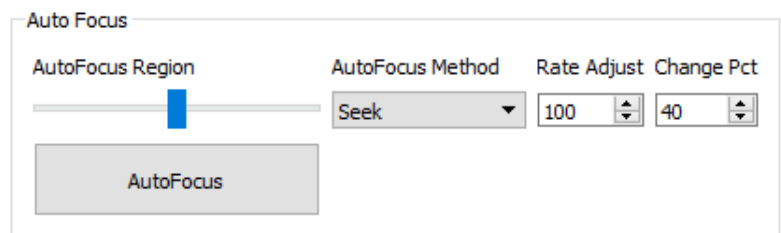


Figure 3: Auto Focus Control

8 Zoom Control

Narrow (Zooms in)

Wide (Zooms out)

Track Focus (Stops when focus metric reaches peak threshold.)

Zoom Position (Drives lens to a specific encoder position.)

Curr: (Current position of lens encoder.)

Zoom Speed (Denotes the rate at which the lens encoder moves.)

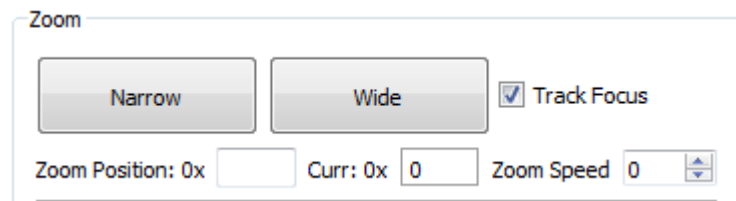
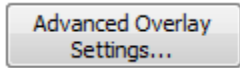


Figure 3: Zoom Control

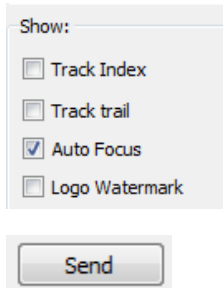


9 Working with Focus Metrics

1. Click on the *Overlays* tab.
2. Click *Advance Overlay Settings*.



3. Click the *Auto Focus* checkbox and click *Send*.



Region Size: Percent of the screen to use to calculate the focus metrics.

AF Metric: Actual focus (AF) metric returned by the Hardware

Mov Avg: Moving (Mov) Average (Avg) is a running average calculated by Panel Plus to provide simple statistics during lens movement.

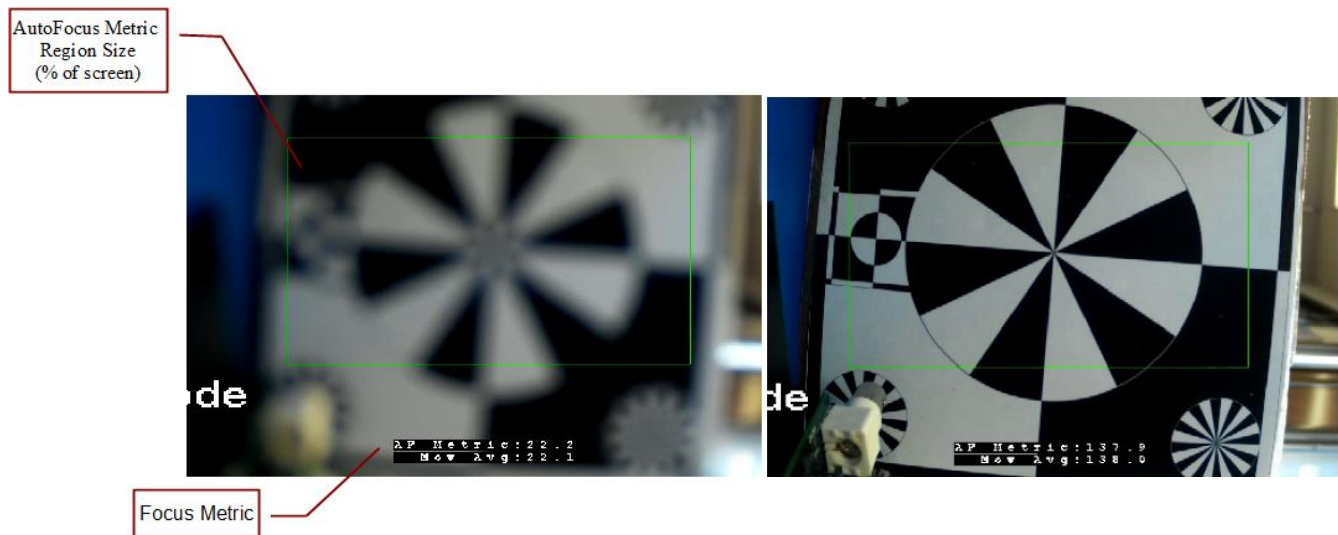
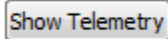


Figure 4: Focus Metrics

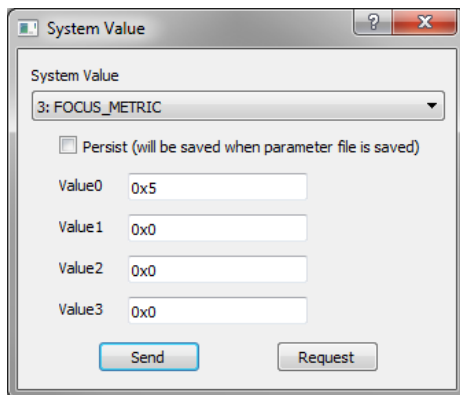


To enable receiving the focus metric telemetry:

1. Click on the *Tracking* tab.
2. Click *Show Telemetry*.



3. Click the *Auto Focus Metrics* checkbox.
4. Change the Focus Metric using *Configure » System Value*.
5. Change *Value0* to 3 = *Variance of Laplacian*, 4 = *Variance of Sobel*, 5 = *Variance of Brenner*. See the next section for more information.



10 Focus Metrics

SightLine can report statistics for creating a custom camera lens control driver. The focus metric reported is based on one of three calculations done over the full image or a specified image sub-region.

1. The Variance of the Laplacian filtered image (3). A good description is located on the [pyimagesearch](#) page. This filter looks for transition edges. It can have less of a peak than the other two measures, especially for noisy sensors such as an uncooled LWIR.
2. The Variance of the Sobel filtered image (4). This filter looks for vertical and horizontal edges.
3. The Variance of the Brenner filtered image (5, default) This filter also looks for vertical and horizontal edges but is somewhat more sensitive to diagonal edges and may be somewhat more sensitive to noise. This is the default and recommended focus metric.

Searching for the best focus generally requires some combination of sweeping to avoid finding a local maximum and gradient searching. SightLine protocol messages used include the following:

- Focus Stats (0x55)
- Set Lens Params (0x6E) & Current Lens Params (0x6F)
- Set Overlay Mode (0x06) - Show auto focus metric and ROI
- Set Coordinate Reporting Mode (0x0B) - Report Focus Stats (0x55) focus measurement
- Set Lens Mode (0x6C) & Current Lens Status (0x6D)
- Set System Value (0x55) - Set the Focus Metric.



11 Questions and Additional Support

For questions and additional support, please contact [Technical Support](#). Additional support documentation and Engineering Application Notes (EANs) can be found on the Support pages of the SightLine Applications [website](#).