



NOCTURN SDI720p GUI user Guide



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Introduction

The NOCTURN SDI720p core is a rugged low light imaging core that features high-definition resolution, high sensitivity and high dynamic range with low power consumption. Powered by Photonis’ 1 inch optical format 1280×1024 pixels Lynx CMOS sensor, the NOCTURN provides real-time imaging capabilities (from daylight to one quarter moon scene illumination) in the visible and near infrared spectrum in either monochrome or color. Its small size, weight and power (SWaP) make this core module ideal for integration into mobile and hand-held surveillance systems.

With its 9.7µm×9.7µm pixel pitch and 4e- median read noise, the NOCTURN provides unsurpassed signal to noise at low light with video rates up to 60 frames per second. Leveraging Photonis expertise in night vision imaging, the NOCTURN electronics incorporates a multitude of functions to enhance the low light level performance. This camera features automatic gain control (AGC), automatic exposure control (AEC), non-uniformity correction (NUC) and advanced image enhancement, allowing the NOCTURN to provide continuous situational awareness without compromising mobility and SWaP.

This document provides detailed information on the list of command and controls available on the camera. Please contact Photonis technical support for details not covered in this document.

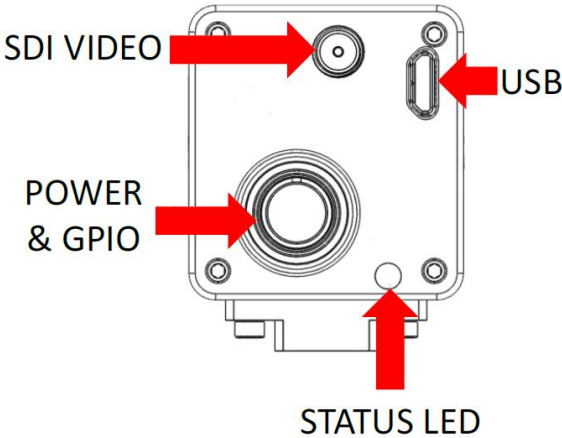
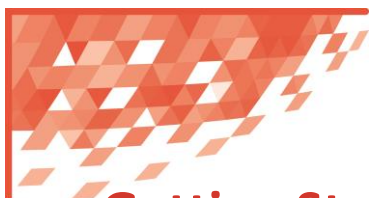


Figure 1: Back view of the NOCTURN SDI720p camera



Getting Started

USB Driver Installation (WINDOWS)

Description	Image				
<p>Before proceeding with the initial power-up of the Camera, be sure the USB driver (if applicable), provided on the Silicon Labs website, is installed on the PC if the communication through the USB port is allowed on your camera. Download the latest CP210x USB to UART Bridge VCP drivers from the Silicon Labs website:</p> <p>http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx</p> <p>Unzip the downloaded driver file: CP210x_VCP_Windows.Zip</p> <p>Double click the installer (please note that you need administrator privilege to install the drivers):</p> <ul style="list-style-type: none"> • CP210xVCPInstaller_x64 (for 64b OS systems) • CP210xVCPInstaller_x86 (for 32b OS systems) <p>On the installer Welcome screen click the Next button.</p>					
<p>On the License Agreement screen, select “I accept this agreement” and then click the Next Button.</p>					
<p>Wait for the installation to complete. Once it is finish you will see the following screen. Just click Finish to complete the installation.</p>	<table border="1"> <thead> <tr> <th>Driver Name</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>✓ Silicon Laboratorie...</td> <td>Ready to use</td> </tr> </tbody> </table> <p>At the bottom, there are buttons for '< Back', 'Finish', and 'Cancel'.</p>	Driver Name	Status	✓ Silicon Laboratorie...	Ready to use
Driver Name	Status				
✓ Silicon Laboratorie...	Ready to use				

GUI Installation

Please extract and copy the NOCTURN_GUI_SDI720p files on your computer. To start the GUI, run the “Nocturn_GUI.exe” file in the main folder

Initial Camera Power up

- Connect the SMA connector to an SDI compliant video display.
- The NOCTURN SDI720p can be powered either via the USB interface from a personal computer (must be able to provide 500mA over the USB port) or through the external circular connector. For the latter, the voltage input must be within a range of +5.0 to +12 VDC.



Camera Controls

The NOCTURN SDI720p is controlled by a serial communication protocol. This communication can be done only through the GUI provided with the camera.

STARTING SEQUENCE

- Connect the camera to the USB port of the computer to set up communication with the GUI.
- Launch the evaluation GUI
- Determine the camera COM port by looking in Windows device manager. The NOCTURN COM port number can be seen under the “Ports (COM & LPT)” and will be labeled “Silicon Labs CP210x USB to UART Bridge (COM XX)”.
- Make sure that the “Baud Rate” control is set to 115200 and click the “COM port” indicator. The indicator should turn red, and the status of the camera should be “Connected” (on the upper right corner of the GUI). Connection may take at least 10 seconds.

SETTINGS

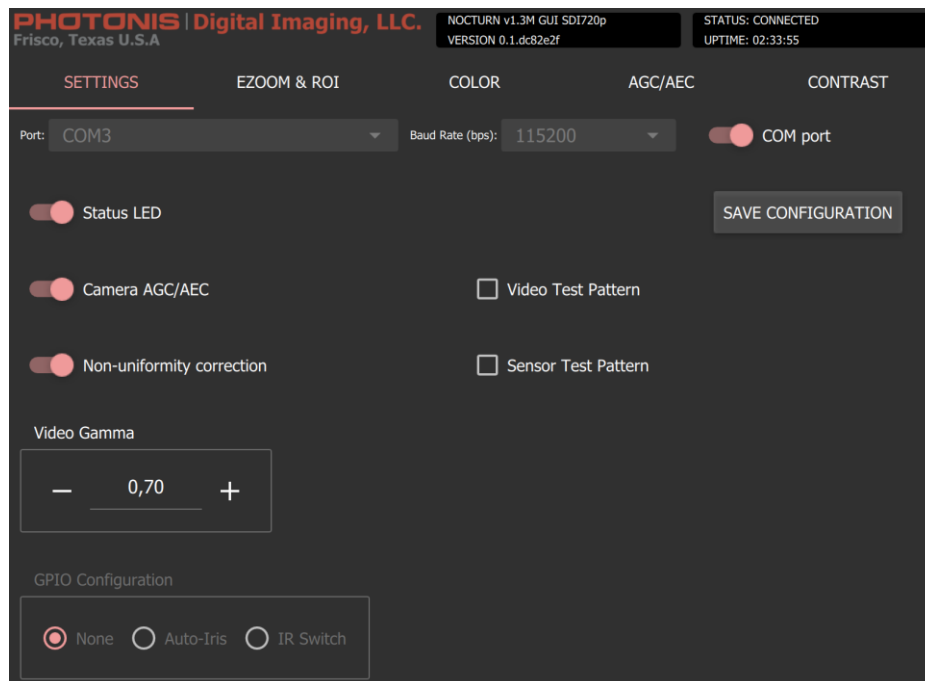


Figure 2: Main Settings

- **Communication Port** : COM port used to communicate with the NOCTURN SDI720p camera.
- **Baud Rate** : Communication baud rate that camera is set to. By default this should be set to 115200.
- **Save Configuration** : Saves current state of the camera as power on default.
- **Status LED** : turn on/off the status LED at the backside of the camera
- **AEC/AGC** : turn on/off the Auto Gain Control (AGC) of the camera
- **Non Uniformity Correction** : Enables and disables the camera non uniformity correction tables
- **Video Gamma** : Adjusts the Gamma on the video output channel.
- **GPIO configuration** : NA. Set to “None”
- **Video test pattern** : display the video test pattern of the camera
- **Sensor test pattern** : display the sensor test pattern of the camera
- **Save configuration** : saves current state of the camera as power on default



EZOOM & ROI

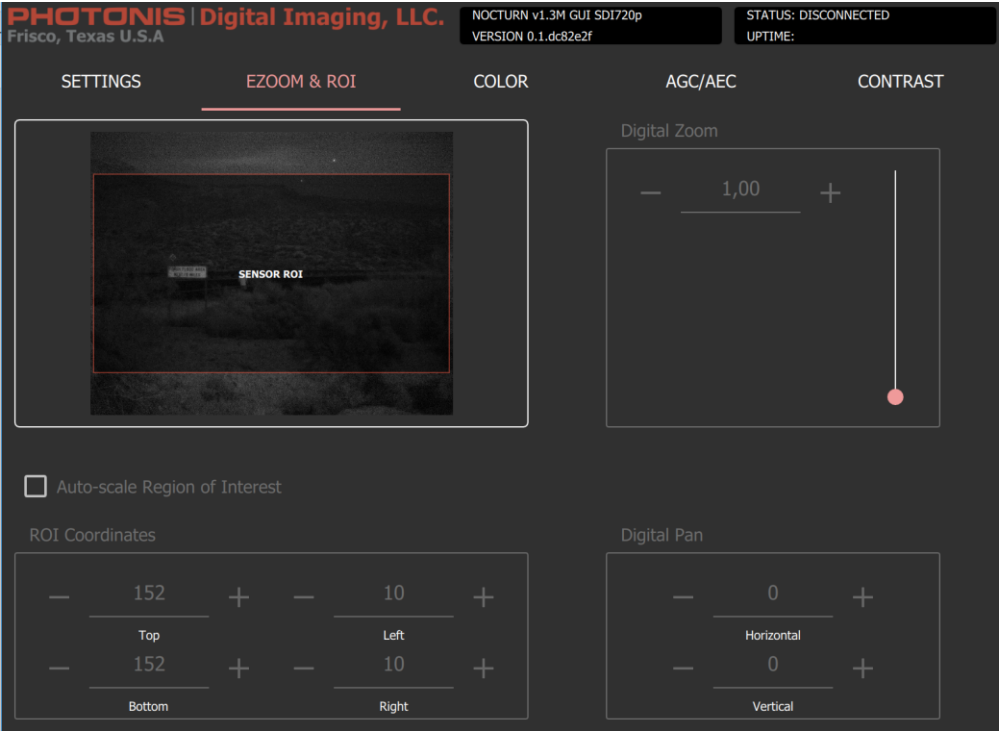


Figure 3: Region Of Interest and zoom set up

- **ROI** : Selects the region of interest (ROI) utilized to calculate the histogram for the AGC and the contrast enhancement

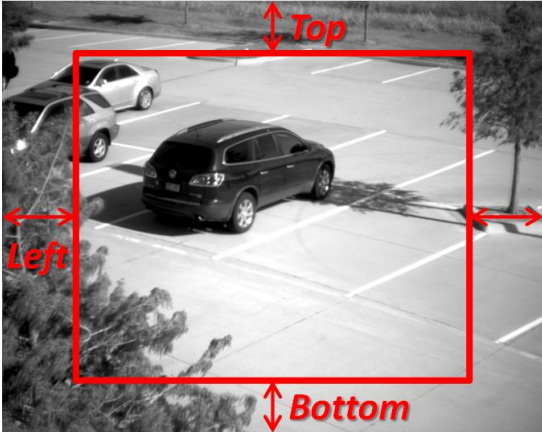


Figure 4: ROI Definition

- **Digital Zoom** : Enables the user to adjust the camera digital zoom up to 4x.
- **Pan Horizontal** : Enables the user to pan the image on the X or horizontal axis when in zoom mode
- **Pan Vertical** : Enables the user to pan the image on the Y or vertical axis when in zoom mode



COLOR

These options applies only for the color camera

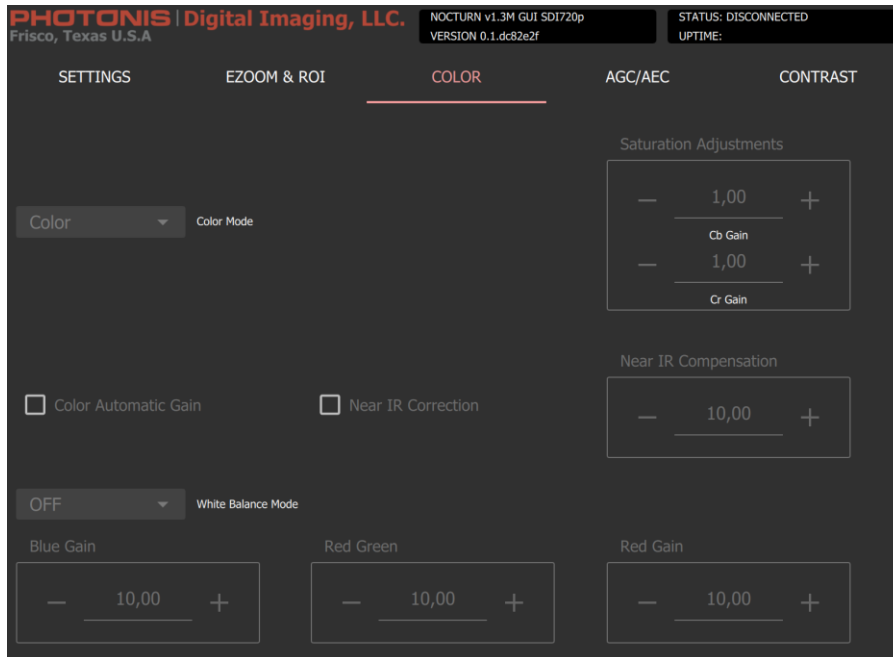


Figure 5: Color options

- **Color mode** : allow to switch between mono and color imagery, or automatically switches between monochrome and color depending on the light level.
- **Color Automatic gain** : enables the auto adjustment of the color gain to maintain pre-selected color balance with light level.
- **Near IR Correction** : NA
- **Near IR Compensation** : NA
- **White balance mode** : switch the white balance settings from “Auto” to “Manual”
- **Color gains** : Change Blue, Red and Green Gain manually when white Balance is in “Manual” mode and “Color Automatic Gain” is disabled
- **Saturation adjustment** : Adjust the Cb and the Cr Gain for the color.



AGC/AEC

The AGC should be turned off in order to change parameters (on “Settings” page)

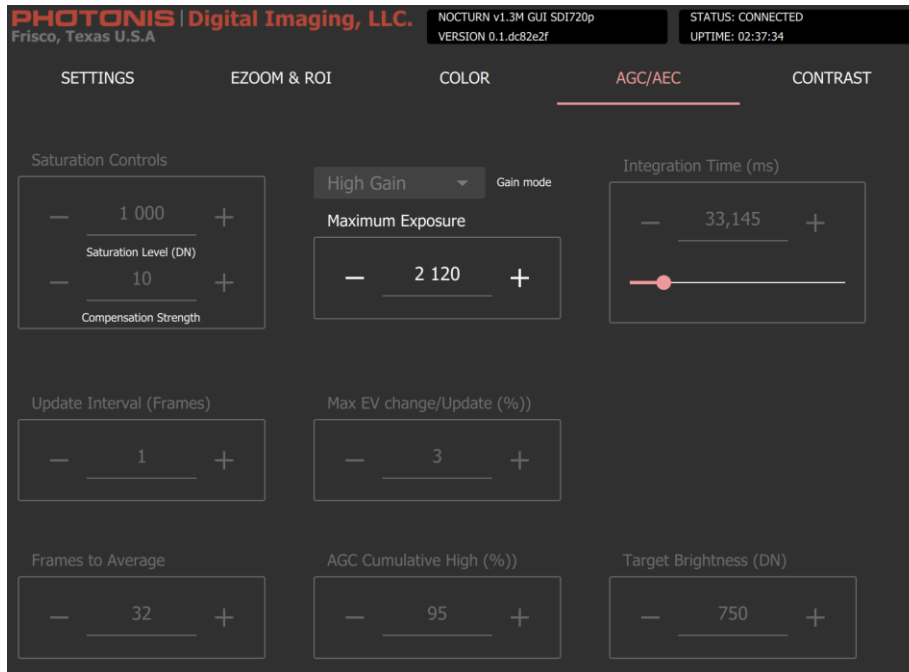


Figure 6: AGC/AEC

- **Saturation Control** : Sets the digital value at which a pixel is considered saturated.
- **Update Interval** : Determines how often the AGC settings are updated based on the number of time a new image histogram is calculated
- **Frames to Average** : Number of frames averaged to compute AGC statistics and update both the exposure and gain settings of the sensor.
- **Max EV change update** : Maximum percentage change in exposure value allowed between AGC updates
- **AGC Cumulative High** : Represents the upper and lower limit used in the cumulative histogram to recalculate the AGC exposure and gain values
- **Target Brightness** : Target value for the “AGC Cumulative High” max percentage used to calculate sensor exposure and gain settings when the “Cumulative Histogram” max percentage value is either below the “Min. Brightness” or above the “Max Brightness” values.
- **Gain mode**: Allows the user to switch between “Low Gain” (corresponds to a sensor analog gain setting of 1.2x) and “High Gain” (sensor analog gain setting of 6x).
- **Maximum Exposure** : Maximum integration time value (in number of lines) used by the AGC to recalculate new exposure setting in the high gain mode (used in low light level). This setting allows minimum frame rate set up. A value of 1066 corresponds to 60fps, 2132 to 30fps, 4264 to 15fps, ...
- **Integration time** : define integration time of the sensor in ms when AGC is off



CONTRAST

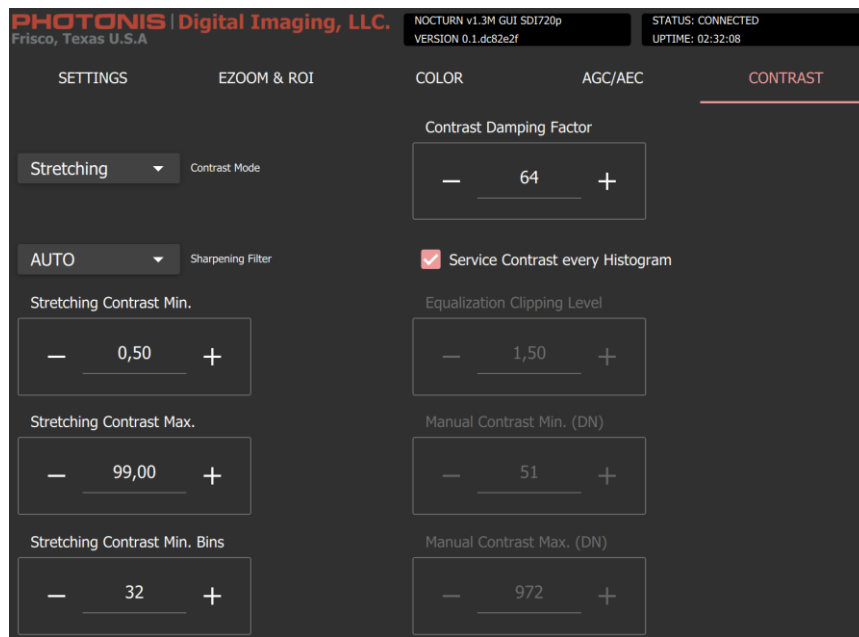


Figure 7: Contrast

Contrast Mode

- NONE : Disables contrast enhancement.
- STRETCHING : Stretches the contrast such that the 0 value of the digital output corresponds to the lower limit of the cumulative histogram bin number and the 1023 value of the digital output corresponds to the upper limit of the cumulative histogram bin number.
- EQUALIZATION : Performs standard histogram equalization.
- CLIP EQUALIZATION : Variant of adaptive histogram equalization in which the contrast amplification is limited, so as to reduce the problem of noise amplification. The amplification is limited by clipping the histogram at a predefined value (clipping level) before computing the cumulative distribution function.
- FIXED

Sharpening filter : Enables or disables sharp filter

Stretching Contrast Min. Bins : Represents the minimum number of bins to use in the histogram stretching

Equalization Clipping level : Histogram clipping equalization level in pixel percentage