

# Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

## Overview

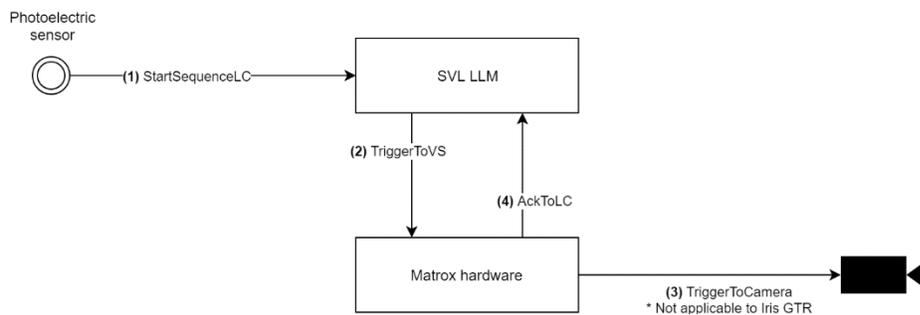
This application note describes how to interface a [Smart Vision Lights \(SVL\) LED Light Manager \(LLM\)](#) to a Matrox Iris GTR smart camera, Matrox 4Sight GpM/EV6 vision controller and Matrox Indio card henceforth referred to as Matrox hardware unless stated otherwise.

## Initial trigger source

The LLM requires an initial trigger to start an illumination sequence. This initial trigger can come directly from a photoelectric or equivalent sensor (Figure 1).

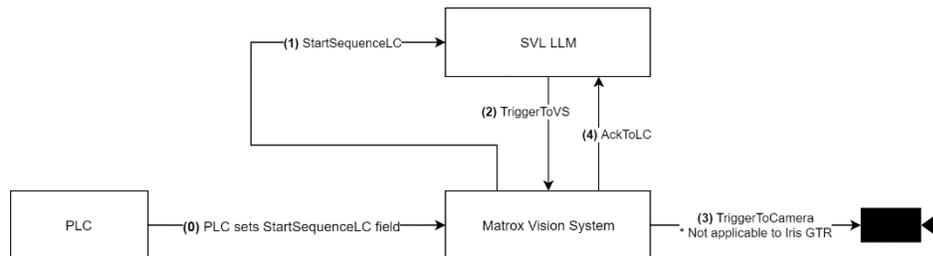
 **Note that the LLM's input mode must be set to NPN to work with Matrox hardware.**

Figure 1 - Initial trigger from a photoelectric or equivalent sensor.



The initial trigger can also come from an automation controller or PLC. In this case, the vision system will have to detect a change to the appropriate PLC field (over the network link using the CC-Link IE Field Basic, EtherNet/IP or PROFINET protocols). Once the PLC field change is detected, the Matrox hardware will need to be instructed to set one of its discrete outputs to trigger the LLM (Figure 2).

Figure 2 – Initial trigger from a PLC via Matrox hardware.



Note that the Matrox Design Assistant PhotometricStereo example projects already have the necessary fields and events defined for working with a PLC. One simply needs to enable either the CC-Link IE Field Basic, EtherNet/IP or PROFINET protocols to use any of the example projects with a PLC. A trigger pulse will be sent to the LLM over the specified discrete output when the StartSequenceLC field changes from 0 to 1.

# Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

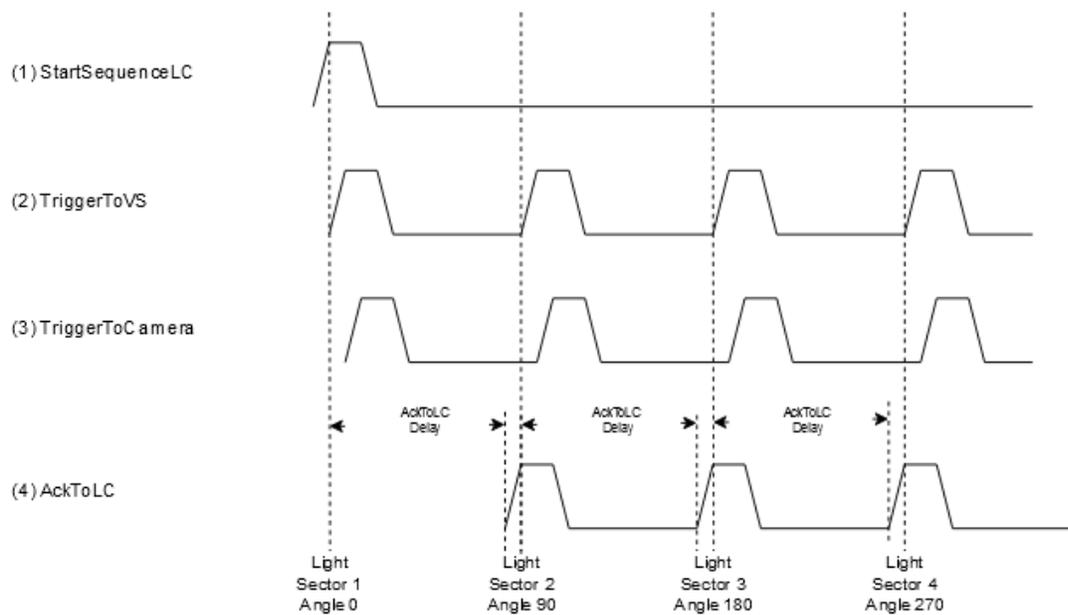
## Timing diagram

Figure 3 illustrates the signal timing sequence between a LLM, Matrox hardware and a third-party camera, when relevant. In addition, the timing sequence is described as follows:

1. A signal is sent to the LLM to initiate the illumination sequence.
2. The LLM turns on the next illumination sector and then sends a trigger to the vision system to capture an image.
3. A trigger signal is sent to the camera to capture an image. Note: This signal is not needed when using a Matrox smart camera.
4. Once the image capture is completed, the vision system sends a signal to the LLM to turn on the next illumination sector.

Steps 2 to 4 are repeated for all the selected illumination sectors.

Figure 3 - Signal timing diagram.



**The above timing diagram is achieved using a LLM with firmware version 1.66 and DIP switch 5 set to the On position**

## Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

The delay before signaling AckToLC needs to take into account the image capture time:

- The camera's exposure delay
- The camera's exposure time
- The camera's image readout time, which is often 1 over the camera's maximum frame rate

This delay can be calculated as follows:

$$AckToLC\ Delay \cong Exposure\ Delay + Exposure\ Time + Image\ Readout\ Time$$

Note that Matrox Design Assistant PhotometricStereo example projects implement this delay within the Matrox hardware's discrete I/O interface.

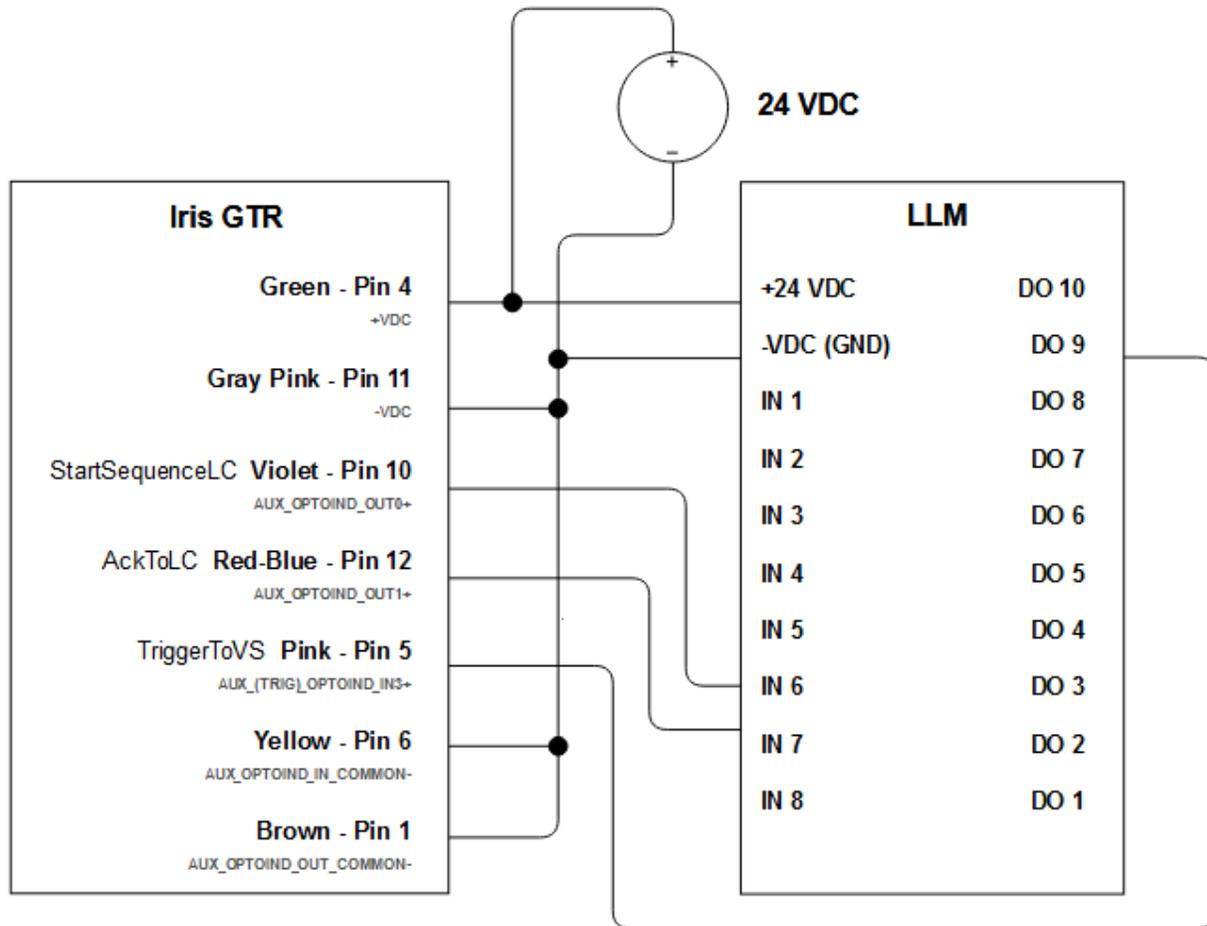
 **The LLM needs to be set for just four (4) sequences with each quadrant turned on in turn (i.e., Sequence 1: Q1 on, Q2-Q4 off; ...; Sequence 4: Q1-Q3 off, Q4 on) to work with the Matrox Design Assistant PhotometricStereo example projects.**

# Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

## Wiring diagrams

The following figures illustrate how to wire the various discrete trigger signals between the Matrox hardware, LLM and third-party camera, when relevant. Figure 4 does so for the Matrox Iris GTR smart camera, Figure 5 for the Matrox 4Sight GpM/EV6 vision controller and Figure 6 for the Matrox Indio card.

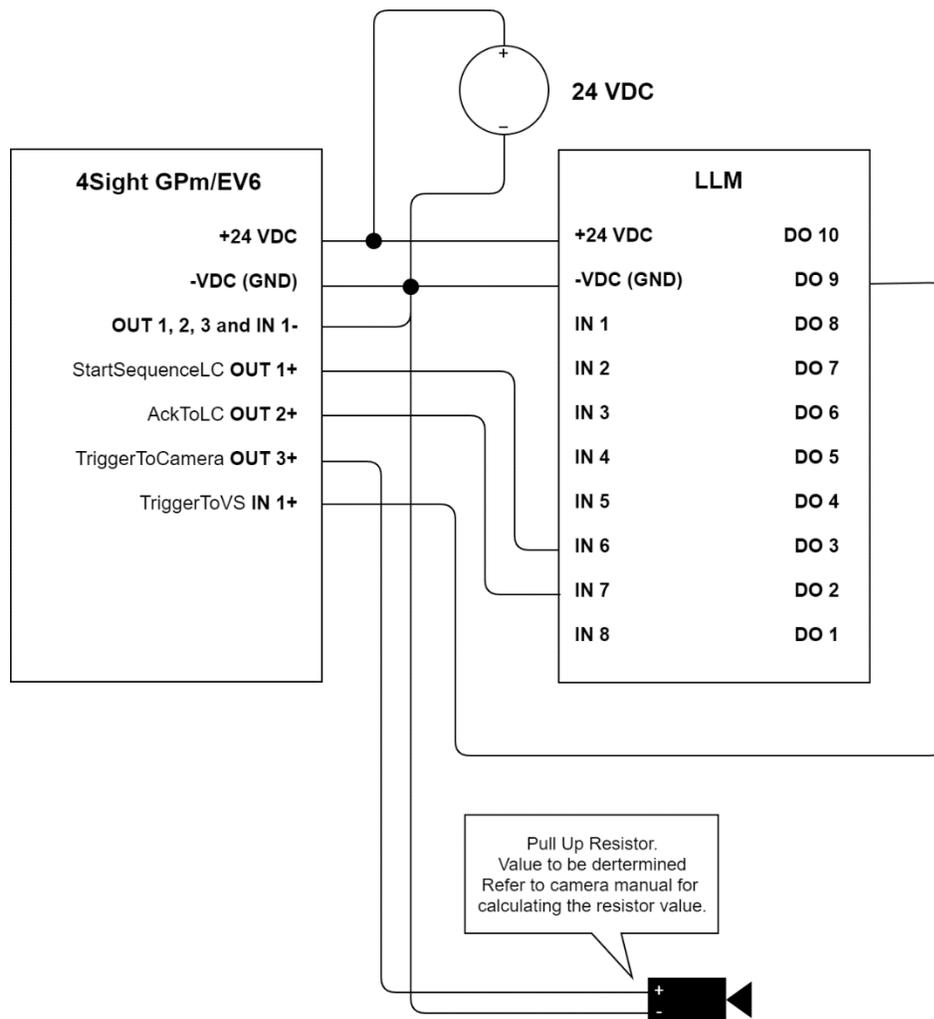
Figure 4 - Wiring between Iris GTR and LLM.



**Note:** The color coding described is for the open end of the GTR-CBL-PWR/3 cable, available either individually or as part of an Iris GTR starter kit (P/N:GTR-STARTER-KIT or GTR5000-STR-KIT)

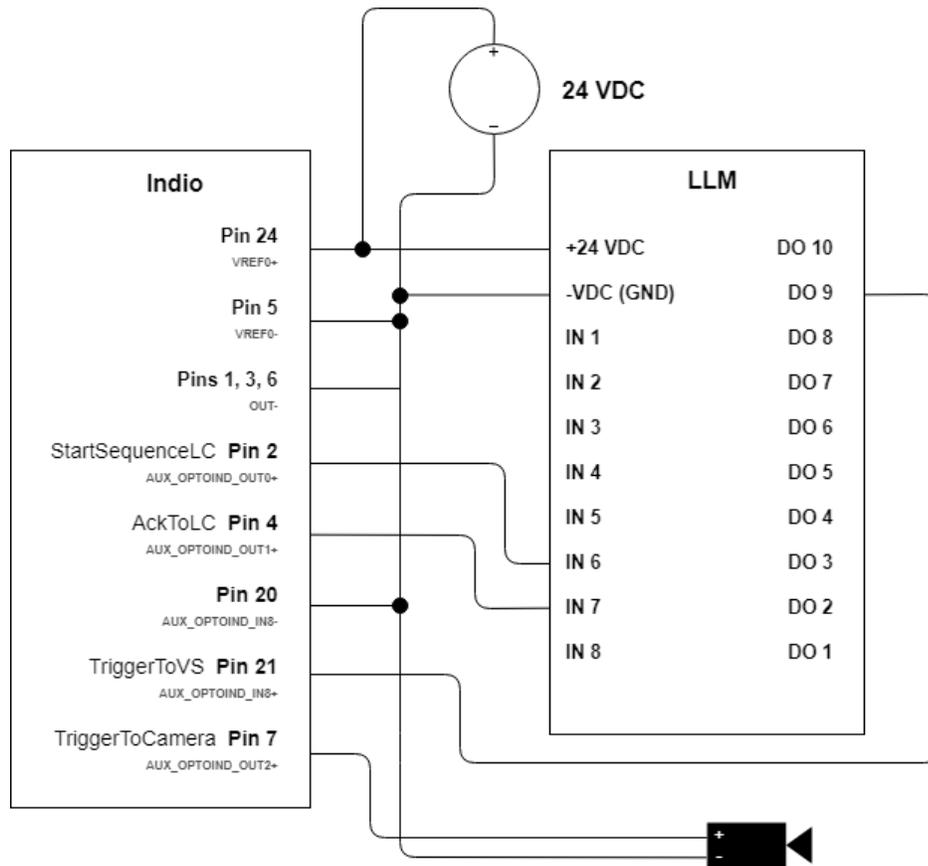
# Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

Figure 5 - Wiring between 4Sight GpM/EV6, LLM and third-party camera.



# Interfacing Matrox hardware to a Smart Vision Lights LED Light Manager

Figure 6 - Wiring between Indio, LLM and third-party camera.



**NOTES:**

The Indio's on-board pullup circuitry for both inputs and outputs is assumed to be instantiated by way of the appropriate jumpers. Refer to the Indio's Installation and Hardware Reference manual for more information.

The TriggerToCamera polarity is to be set to falling edge because of Indio's on-board pullup circuitry.