

Matrox Helios eCL/XCL

Camera Interface Application Note

IMPERX IPX-4M15-LC

November 7, 2006

Basics about the
camera

Camera Descriptions

- Effective resolution: $2048 \times 2048 \times 12\text{-bit}$ @ 15 fps*.
- Camera Link BASE interface (Dual tap).
- Progressive scan.
- Bayer color filter (12-bit).
- Internal sync.
- External or internal exposure control.
- 40 MHz pixel clock rate.

Interface Mode

- Continuous
- Pseudo-continuous (CC integration mode)
- Asynchronous reset (CC integration mode)

Camera Interface Briefs

Mode 1: Continuous

- $2048 \times 2048 \times 12\text{-bit}$ @ 15 fps*.
- Camera Link BASE interface (Dual tap).
- Progressive scan.
- Bayer Color Filter.
- Matrox Helios eCL/XCL receiving LVAL, FVAL, PCLK and video from camera.
- DCF used: [IPX4M15LC_2048x2048_12bitCon.DCF](#)



Mode 2: Pseudo-Continuous

- $2048 \times 2048 \times 12\text{-bit}$.
- Camera Link BASE interface (Dual tap).
- Progressive scan.
- Bayer Color Filter.
- Matrox Helios eCL/XCL sending TIMER1 OUT (CC1) signal to camera to initiate and control the exposure.
- Matrox Helios eCL/XCL receiving LVAL, FVAL, PCLK and video from camera.
- DCF used: [IPX4M15LC_2048x2048_12bitPcont.DCF](#)

Mode of operations as
per Matrox Imaging (in
parentheses as per
camera manufacturer)

Basics about the
interface modes

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Camera Interface Application Note

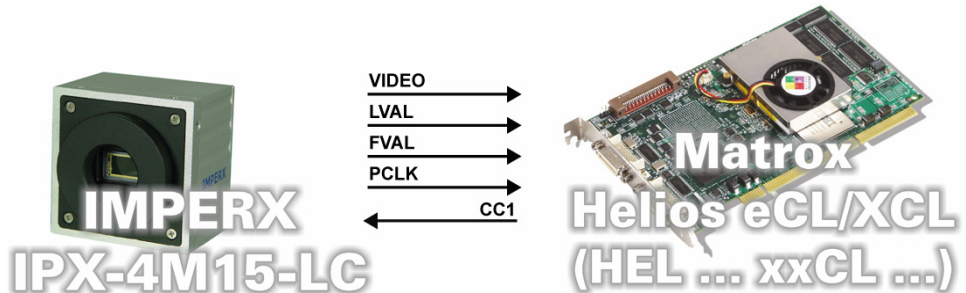
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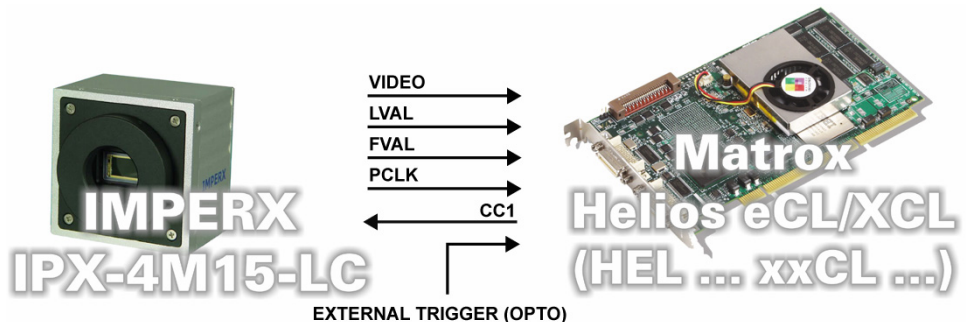
Camera Interface Briefs (cont.)

Mode 2: Pseudo-Continuous



Mode 3: Asynchronous reset

- 2048 × 2048 × 12-bit.
- Camera Link BASE interface (Dual tap).
- Progressive scan.
- Bayer Color Filter.
- Matrox Helios eCL/XCL receiving external trigger signal.
- Matrox Helios eCL/XCL sending TIMER1 OUT (CC1) signal to camera to initiate and control the exposure.
- Matrox Helios eCL/XCL receiving LVAL, FVAL, PCLK and video from camera.
- DCF used: [IPX4M15LC_2048x2048_12bitAsync.DCF](#)



Specifics about
the interface modes

Camera Interface Details

Mode 1: Continuous

- **Frame Rate:** Matrox Helios eCL/XCL receives the continuous video from the camera at 15 frames per second. *Note that it is not possible to grab the full 12-bits at 15 fps, and it will be necessary to grab only 8-bits to display or grab to host (without display) for the full 12-bits at 15 FPS.
- **Exposure time:** Exposure time is set using the **Set Shutter Time (sst)** command in Windows HyperTerminal. Refer to the camera manual for commands description and usage.

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Specifics about
the interface modes

Camera Interface Details (cont.)

Mode 1: Continuous

- **Bayer Color Filter:** Color information is generated by a Bayer color mosaic filter mounted on the sensor. RGB information can only be obtained through software-based conversion. Following each frame capture it will be necessary to make a call to your MIL/MIL-Lite program in order to reconstruct the proper color image. This will require processing time by the host computer, which may reduce the effective acquisition rate. For more information, contact your local Sales representative or Matrox Imaging Technical Support.
- **Camera Configuration:** The camera mode is set as follows using Windows HyperTerminal. Refer to the camera manual for commands description and usage.

Command	Description
sst n	Set Shutter Time
sbd 12	Set Bit Depth
str OFF	Set Trigger Mode

Mode 2: Pseudo-Continuous

- **Frame rate:** The frame rate is determined by the frequency of the TIMER1 OUT (CC1) signal.
- **Exposure time:** The width (rising edge to falling edge) of the TIMER1 OUT (CC1) signal is the exposure time, which can be modified in the DCF using Matrox Intellicam or with the MIL MdigControl() function. Consult the respective manual for more information.
- **Bayer Color Filter:** Refer to *Mode 1: Continuous*.
- **Camera Configuration:** The camera mode is set as follows using Windows HyperTerminal. Refer to the camera manual for commands description and usage.

Command	Description
sci ON	Set CC Integration
sbd 12	Set Bit Depth
str CC S	Set Trigger Mode

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Specifics about the
interface modes

Camera Interface Details (cont.)

Mode 3: Asynchronous Reset

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** Same as in Mode 2: Pseudo-continuous.
- **Bayer Color Filter:** Refer to *Mode 1: Continuous*.
- **Camera Configuration:** Same as in Mode 2: Pseudo-continuous.

Cabling Requirements

Modes 1 and 2: Continuous, Pseudo-continuous

- **Cable and Connection:** Standard Camera Link cable.

Mode 3: Asynchronous reset

- **Cable and Connection:** Standard Camera Link.
- **External trigger:** External trigger should be connected to the OPTO TRIG input of the 9-pin connector (pins 7 and 2) on the Expanded I/O adapter bracket.

EXPANDED I/O BRACKET (9-pin connector)

				External Trigger Source	
OPTOTRIG +	07	←	LINE SIGNAL	--	
OPTOTRIG -	02	←	LINE GROUND	--	

Cabling details for the
interface modes

The DCFs mentioned in this application note are also attached (embedded) to this PDF file – use the Adobe Reader's View File Attachment to access the DCF files. The information furnished by Matrox Electronics System, Ltd. is believed to be accurate and reliable. Please verify all interface connections with camera documentation or manual. Contact your local sales representative or Matrox Sales office or Matrox Imaging Applications at 514-822-6061 for assistance. © Matrox Electronic Systems Ltd, 2006-2011.

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