

Matrox Meteor-II/Camera Link

Camera Interface Application Note

BASLER L104k

March 21, 2006

*Basics about the
camera*

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

*Basics about the
interface modes*

Camera Descriptions

- Effective resolution: up to 2048 pixels/line @ 29.2k line per second.
- Camera Link BASE interface (single/dual tap, 8/10-bit).
- External and internal sync.
- External or internal exposure control.
- 31.25 or 62.5 MHz pixel clock rate.

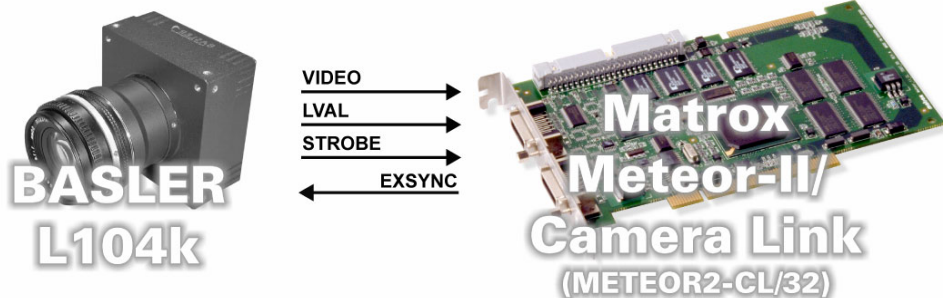
Interface Mode

- Fixed line scan rate (EXSYNC, level-controlled or Free Run mode)
- Variable line scan rate (EXSYNC, level-controlled mode)
- Fixed line scan rate with variable frame size (EXSYNC, level-controlled mode)
- Variable line scan rate with variable frame size (EXSYNC, level-controlled mode)

Camera Interface Briefs

Mode 1: Fixed line scan rate

- 2048 pixels/line.
- Camera Link BASE interface (dual tap, 8-bit).
- DCF configured for 1000 lines per virtual frame.
- Matrox Meteor-II/Camera Link sending periodic EXPOSURE1 (EXSYNC) signal to camera.
- Matrox Meteor-II/Camera Link receiving HSYNC (LVAL), PIXEL CLOCK (STROBE @ 31.25) and video data from camera.
- DCF used: [L104K_2048_8bit2tapFLS.DCF](#)



Matrox Meteor-II/Camera Link

Camera Interface Application Note

BASLER L104k

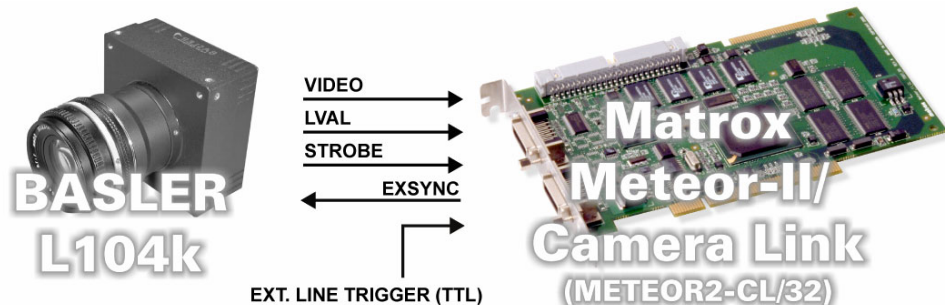
March 21, 2006

*Basics about the
interface modes*

Camera Interface Briefs (continued)

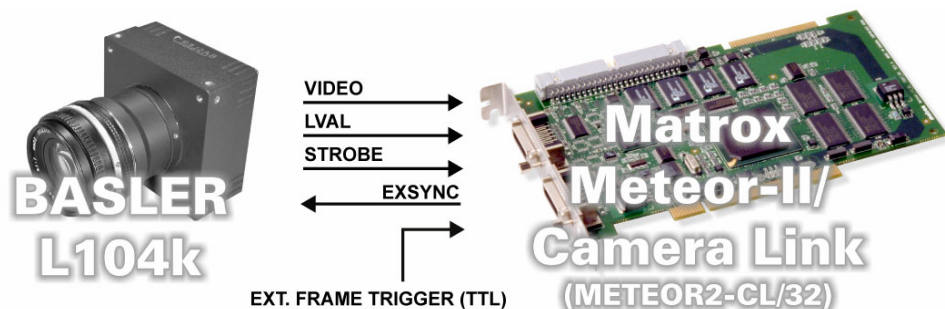
Mode 2: Variable line scan rate

- 2048 pixels/line.
- Camera Link BASE interface (dual tap, 8-bit).
- DCF configured for 1000 lines per virtual frame.
- Matrox Meteor-II/Camera Link receiving external TTL line trigger signal.
- Matrox Meteor-II/Camera Link sending EXPOSURE1 (EXSYNC) signal to camera.
- Matrox Meteor-II/Camera Link receiving HSYNC (LVAL), PIXEL CLOCK (STROBE @ 31.25) and video data from camera.
- DCF used: [L104K_2048_8bit2tapVLS.DCF](#)



Mode 3: Fixed line scan rate with variable frame size

- 2048 pixels/line.
- Camera Link BASE interface (dual tap, 8-bit).
- DCF configured for 1000 lines per virtual frame.
- Matrox Meteor-II/Camera Link receiving external TTL frame (virtual) trigger signal.
- Matrox Meteor-II/Camera Link sending periodic EXPOSURE1 (EXSYNC) signal to camera.
- Matrox Meteor-II/Camera Link receiving HSYNC (LVAL), PIXEL CLOCK (STROBE @ 31.25) and video data from camera.
- DCF used: [L104K_2048_8bit2tapFLSVF.DCF](#)



Matrox Meteor-II/Camera Link

Camera Interface Application Note

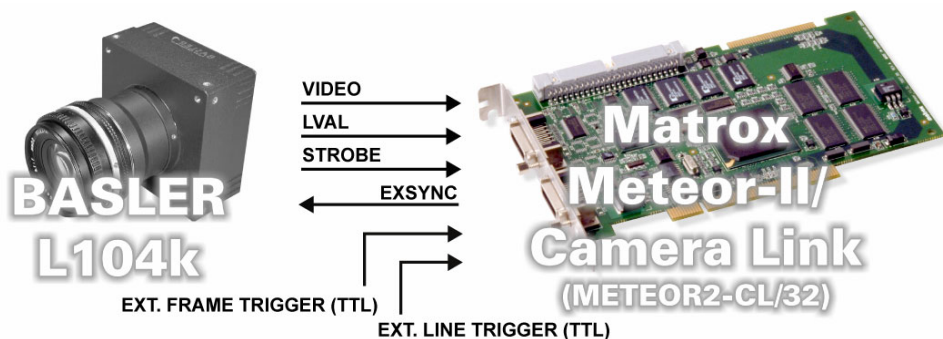
BASLER L104k

March 21, 2006

Camera Interface Briefs (continued)

Mode 4: Variable line scan rate with variable frame size

- 2048 pixels/line.
- Camera Link BASE interface (dual tap, 8-bit).
- DCF configured for 1000 lines per virtual frame.
- Matrox Meteor-II/Camera Link receiving external TTL frame (virtual) and line trigger signals.
- Matrox Meteor-II/Camera Link sending EXPOSURE1 (EXSYNC) signal to camera.
- Matrox Meteor-II/Camera Link receiving HSYNC (LVAL), PIXEL CLOCK (STROBE @ 31.25) and video data from camera.
- DCF used: [L104K_2048_8bit2tapVLSVF.DCF](#)



Specifics about the
interface modes

Camera Interface Details

Mode 1: Fixed line scan rate

- **Line rate:** The frequency of the periodic EXPOSURE1 (EXSYNC) signal determines the camera's line rate. The EXPOSURE1 (EXSYNC) signal period is set in the DCF to **77 μ s** which translates into a **13 kHz** line rate. The maximum line rate for this camera equals **29.2 kHz**.
- **Exposure time:** For **EXSYNC, level-controlled** mode the exposure time is the high level period between the rising and falling edges of the EXPOSURE1 (EXSYNC) signal. The default exposure time for this DCF equals **35 μ s**. Maximum/minimum exposure time per line for this DCF is **1 ms** and **25 ns** respectively. The exposure time can be modified in the DCF using Matrox Intellicam or with the MIL MdigControl() function. Consult the respective manual for more information.

Matrox Meteor-II/Camera Link

Camera Interface Application Note

BASLER L104k

March 21, 2006

*Specifics about the
interface modes*

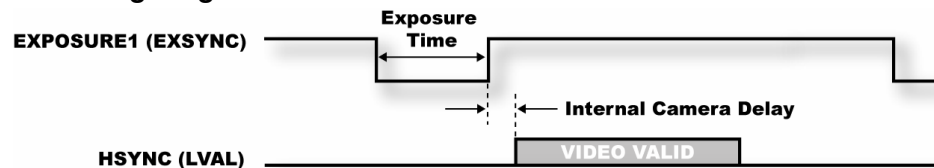
Camera Interface Details (continued)

Mode 1: Fixed line scan rate

- **Camera communication:** Note that this DCF will work with **Free Run** and all EXSYNC modes however **EXSYNC, level-controlled** mode is the recommended one for this DCF. Set the mode using the BASLER Camera Configuration Tool Plus (CCT+). Refer to the camera manual for additional information.

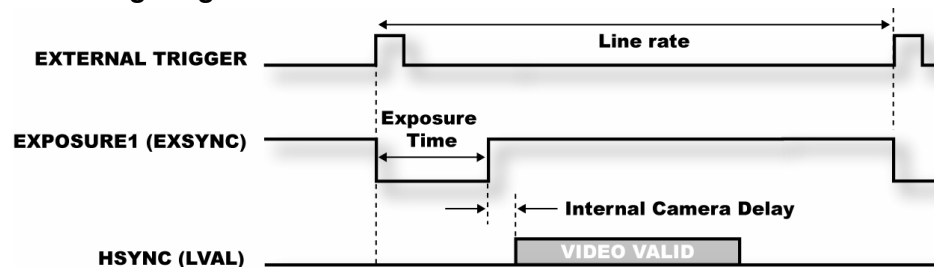
Parameter	Setting
Video Data Output	Mode Dual 8-bits
Exposure Time Control	Mode EXSYNC, Level-controlled

- **Timing diagram:**



Mode 2: Variable line scan rate

- **Line rate:** The line rate is controlled by the frequency of the external TTL line trigger signal. The line trigger signal period must be larger than the total duration of the exposure time (high level duration of the timer), the internal delay of the camera and the line read out (**32.8 μ s**).
- **Exposure time:** Refer to Mode 1: Fixed line scan rate.
- **Camera communication:** Refer to Mode 1: Fixed line scan rate.
- **Timing diagram:**



Matrox Meteor-II/Camera Link

Camera Interface Application Note

BASLER L104k

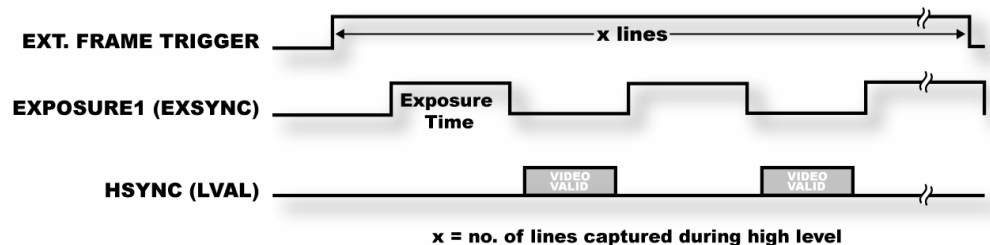
March 21, 2006

Specifics about the
interface modes

Camera Interface Details (continued)

Mode 3: Fixed line scan rate with variable frame size

- **Line/frame rate:** The line rate is fixed and controlled by the period of EXPOSURE1 (EXSYNC) signal. The number of lines per virtual frame (maximum of 1000 for this DCF) is variable and controlled by the frame trigger signal. Matrox Odyssey captures lines during the high level of the frame trigger signal. To modify the maximum amount of lines captured, change the active vertical timing period in the DCF. Capture of the lines will start with the rising edge of the frame trigger signal.
- **Exposure time:** Refer to Mode 1: Fixed line scan rate.
- **Camera communication:** Refer to Mode 1: Fixed line scan rate.
- **Timing diagram:**



Mode 4: Variable line scan rate with variable frame size

- **Line/frame rate:** The line rate is variable and controlled by the external line trigger frequency. The number of lines per virtual frame (maximum of 1000 for this DCF) is variable and controlled by the frame trigger signal. Matrox Odyssey captures lines during the high level of the frame trigger signal. To modify the maximum amount of lines captured, change the active vertical timing period in the DCF. Capture of the lines will start with the rising edge of the frame trigger signal.
- **Exposure time:** Refer to Mode 1: Fixed line scan rate.
- **Camera communication:** Refer to Mode 1: Fixed line scan rate.

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Matrox Meteor-II/Camera Link

Camera Interface Application Note

BASLER L104k

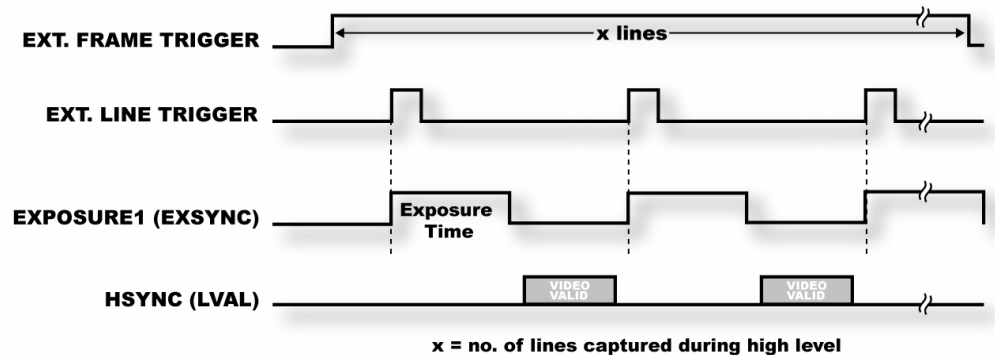
March 21, 2006

*Specifics about the
interface modes*

Camera Interface Details (continued)

Mode 4: Variable line scan rate with variable frame size

▪ Timing diagram:



*Cabling details for the
interface modes*

Cabling Requirements

Mode 1: Fixed line scan rate

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

Mode 2: Variable line scan rate

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

EXTERNAL I/O BRACKET
(9-pin connector)

Pin Name	Pin no.	External Trigger Source
OPTO_AUX_IN0 +	07	← LINE TRIGGER (TTL FORMAT)
OPTO_AUX_IN0 -	02	← LINE TRIGGER (GROUND)

Mode 3: Fixed line scan rate with variable frame size

- **Cable and Connection:** Standard Camera Link.
- **External trigger:** External trigger should be connected to the OPTO TRIG input (pins 4 and 5) of the 9-pin connector on the External I/O adapter bracket:

EXTERNAL I/O BRACKET
(9-pin connector)

Pin name	Pin no.	External Trigger Sources
TTL TRIG	01	← FRAME TRIGGER (TTL FORMAT)
GND	06	← FRAME TRIGGER (GROUND)

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Camera Interface Application Note

BASLER L104k

March 21, 2006

*Cabling details for the
interface modes*

Cabling Requirements

Mode 4: Variable line scan rate with variable frame size

- **Cable and Connection:** Standard Camera Link.
- **External trigger:** External frame and line triggers should be connected to the OPTO TRIG inputs of the 9-pin connector on the External I/O adapter bracket:

EXTERNAL I/O BRACKET (9-pin connector)

Pin name	Pin no.		External Trigger Sources Pin name
TTL TRIG	01	←	FRAME TRIGGER (TTL FORMAT)
GND	06	←	FRAME TRIGGER (GROUND)
OPTO_AUX_IN0 +	07	←	LINE TRIGGER (TTL FORMAT)
OPTO_AUX_IN0 -	02	←	LINE TRIGGER (GROUND)

The DCF(s) mentioned in this application note can be found on our FTP site (<ftp://ftp.matrox.com/pub/imaging/>). 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.

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