LabVIEW/IMAQ Vision Driver for MATROX Meteor II frame grabber

Windows 9x/NT/2000/XP version

User manual

September 2003

Version 6.0

Matrox Meteor II Driver

This library contains the LabVIEW / IMAQ Vision driver for Matrox Meteor II frame grabber.

Software requirements for this driver :

- Windows 9x/NT/2000/XP
- MIL-Lite 7.50 or later
- LabVIEW 7 for Windows 9x/NT/2000/XP
- IMAQ Vision 7 for LabVIEW

MIL-Lite 7.50 installation

This Matrox software package contains the low-level drivers and software necessary to drive your Matrox Meteor II framegrabber. You must install this software package first. Refer to the Matrox MIL-Lite installation note for more details. Once the setup of the Matrox Meteor II framegrabber is achieved, you must test your system with the Matrox Intellicam Camera Configuration utility. If your framegrabber does not work properly with the Intellicam stand-alone software, please interrupt the installation at this point and contact your Matrox local technical support.

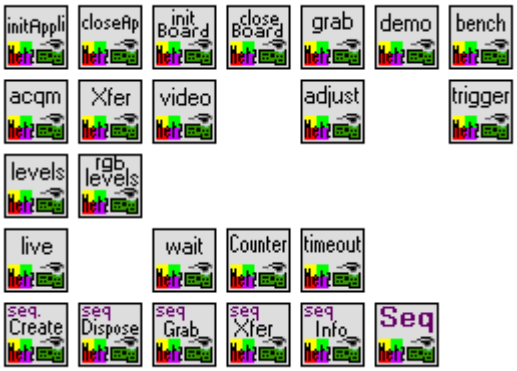
IMAQ Vision driver installation

The setup program of the IMAQ Vision driver for Matrox Meteor II frame grabber asks you for your LabVIEW folder. It adds a library called Meteor2.llb in your <LabVIEW>\user.lib folder. This library appears as a new function sub-menu called Matrox Meteor II.

General overview

The setup program of the IMAQ Vision driver for Matrox Meteor II framegrabber asks you for your LabVIEW folder. It adds a library called Meteor2.llb in your <LabVIEW>\user.lib folder. This library appears as a new function sub-menu called Matrox Meteor II and is located in the User Libraries function palette.

All VIs dedicated to the Matrox Meteor II boards are in the "METEOR2.LLB" library. This library is localized in "\LABVIEW 7.0\USER.LIB". Selecting "User Libraries\Matrox Meteor II" menu, you will see the following icons:



This set of VIs gives access to basic actions to acquire an image:
- Initialize variables and context
- Select a board
- Select a video channel
- Start or stop acquisition
- Transfer an image from the frame grabber memory to an IMAQ Vision image
- Adjust video levels
- Acquire images and image sequences
- Display images in a live window

Transfer rate

Tests made with a Pentium II 233Mhz MMX with 128 MB RAM. The motherboard P6LX-A uses the Intel's Pentium i440LX PCIset. The VGA adaptor is a Matrox Millenium II Powerdesk.
The operating system is Windows NT version 4.00 Service Pack 5.

Remember that standard video signals correspond to the following transfer rates:

Display	OFF	ON
CCIR (8 bits pixel): (768 x 572 x 25)	56 MB/s	15 MB/s
PAL (32 bits color pixel): (768 x 572 x 25)	60.9 MB/s	27.5 MB/s

This means that if your PC has enough memory, you can capture full-sized image sequences at real time speed.

METEOR2 Grab Demo

Demonstration VI. Allows you to test your board. Try it first to verify that your frame grabber is working properly. Inspire from this example to develop the acquisition part of your application.

METEOR2 Benchmark

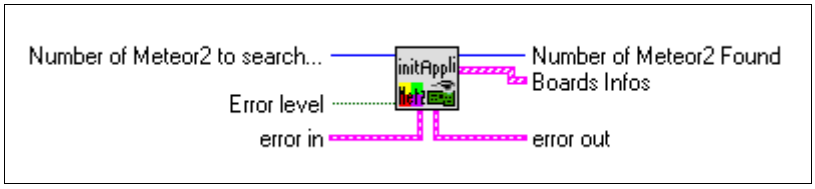
Benchmark VI. Allows you to test your installation and benchmark the transfer rate of the images from the frame grabber to the memory of the host computer.

METEOR2 Sequence Demo

Sequence Demonstration VI. Allows you to grab sequences of images and show the use of the sequence VIs and the Trigger VI.

METEOR2 InitApplication

Initialize the Matrox application. Call this VI before calling METEOR2 InitBoard if you need to know how many and what kind of Meteor2 devices are installed, or if you want to choose the error message mode. At least one call to this VI must be done before calling any other VI in this library.



Number of Meteor 2 to search for is the number of devices you want to be detected.

Error level enables (T) or disables (F) the error message reporting.

error in is a LabVIEW cluster error.

Number of Meteor2 Found is the number of Meteor2 devices detected.

Boards Infos is an array containing a cluster for each Meteor2 device detected whose 2 elements are
- Is Multi-Channel ? is True if the device at this index is a Meteor2 MC.
- Has a JPEG Module ? is True if the device has a JPEG optionnal module.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 CloseApplication

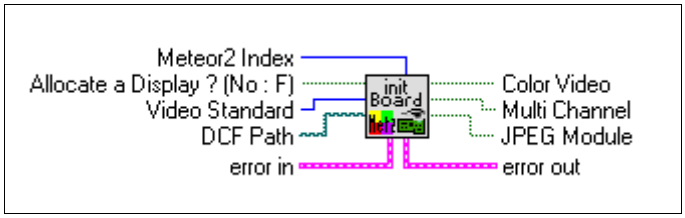
Release the Matrox application and all the Meteor2 devices initialized. This function should be called when the program no longer uses any Meteor2 devices.

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 InitBoard

Initialize the board. At least one call to this VI must be done for each Meteor2 device before calling any other VI in this library, except METEOR2 InitApplication.



Meteor2 Index is the index of the Meteor2 device you want to initialize. You can get the number of Meteor2 devices installed by calling “METEOR2 InitApplication.vi”.

Allocate a Display ? (No : F) (default False) must be set to True if you want to use the live image functionality from this device (See “METEOR2 Live.vi”).

Video Standard is the Video standard you want to grab from, or "DCF File Path" (0) if you pass a pathname in DCF Path.

DCF Path is the pathname of a Digitizer Configuration Format file. This parameter is ignored if Video Standard is not "DCF File Path" (0).

error in is a LabVIEW cluster error.

Color Video returns True if the Video Standard opened is a color Video Standard.

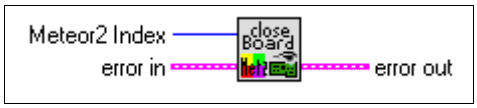
Multi Channel returns True if the device initialized is a Meteor2 MC.

JPEG Module returns True if the device initialized has a JPEG optionnal module.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 CloseBoard

Release the Meteor2 device at index "Meteor2 Index". This function should be called when the program no longer uses the acquisition board.



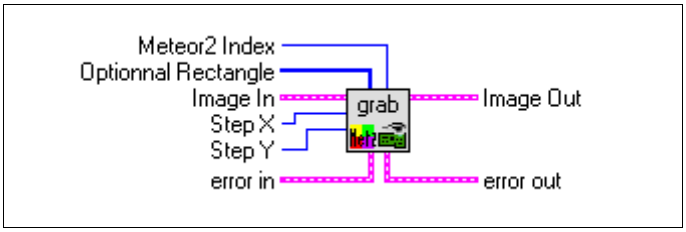
Meteor2 Index is the index of the Meteor2 device you want to release.

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Grab

Acquire an image. A single frame acquisition is done (Snap), and then the captured image is transferred. According to these parameters, the image type can be 8 bits (monochrome) or 32 bits (color).



Meteor2 Index is the index of the Meteor2 device.

Optional Rectangle specifies if only a rectangular portion of the image frame shall be captured. It is defined by an array of 4 elements *[Left, Top, Right, Bottom]*. If not connected or empty, the entire image frame is captured.

Image In is the reference of the image that will receive the pixel data (captured frame).

Step x is a horizontal sampling step or horizontal reduction factor. If set to its default value 1, each column of the image frame is transferred. If set to another value N (<>1), only one column every N columns is transferred.

Step y is a vertical sampling step. If set to its default value 1, each line of the image frame is transferred. If set to another value N (<>1), only one line every N lines is transferred.

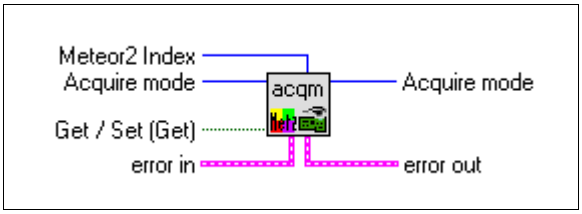
error in is a LabVIEW cluster error.

Image Out is the reference of the image containing the pixel data (captured frame).

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Acquire Mode

Set or return the acquisition mode used by the board.



Meteor2 Index is the index of the Meteor2 device.

Acquire mode : Used only when setting, it's the acquisition mode you want to assign to the board.

- 0 (Freeze): Stop continuous acquisition.
- 1 (Snap): Acquire only one image (default).
- 2 (Grab): Start continuous acquisition. Using this mode, the board acquires all received frames from the video signal. Because the board memory is dual access, it's possible to transfer images during acquisition.

Get / Set (Get) (default False): Select read/write operation.

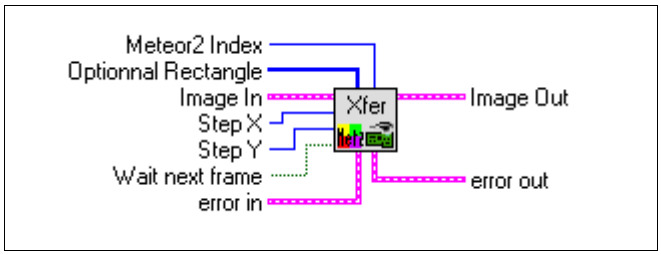
error in is a LabVIEW cluster error.

Acquire mode: Returns the current acquisition mode.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Transfer

Transfers the host memory buffer to the image connected on input. This VI is called by METEOR2 Grab.vi but the difference is that it does not perform a Snap. So a typical use of this function is to start an acquisition using the METEOR2 Acquire Mode.vi and then perform transfers of the acquired images.



Meteor2 Index is the index of the Meteor2 device.

Optional Rectangle specifies if only a rectangular portion of the image frame shall be transferred. It is defined by an array of 4 elements *[Left, Top, Right, Bottom]*. If not connected or empty, the entire image frame is transferred.

Image In is the reference of the image that will receive the pixel data (captured frame).

Step x is a horizontal sampling step or horizontal reduction factor. If set to its default value 1, each column of the image frame is transferred. If set to another value N (<>1), only one column every N columns is transferred.

Step y is a vertical sampling step. If set to its default value 1, each line of the image frame is transferred. If set to another value N (<>1), only one line every N lines is transferred.

Wait next frame (default False) enables to wait (True) (or not : False) the beginning of the next video field.

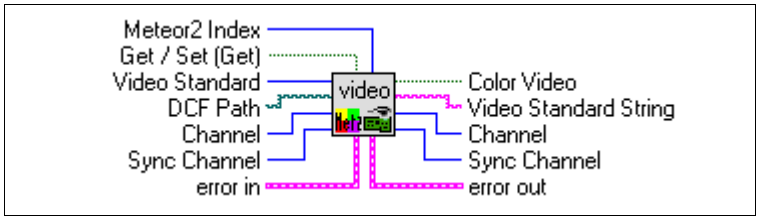
error in is a LabVIEW cluster error.

Image Out is the reference of the image containing the pixel data (captured frame).

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Video Select

Get or set the video standard and channel parameters.



Meteor2 Index is the index of the Meteor2 device.

Get / Set (Get) (default False) specifies if you want to read the current values or set new values.

Video Standard is the video standard you want to grab from, or "DCF File Path" (0) if you pass a pathname in DCF path.

DCF Path is the pathname of a Digital Configuration Format file. This parameter is ignored if Video Standard is not "DCF File Path" (0).

Channel is the video source channel.

Sync Channel is the video synchronization channel.

error in is a LabVIEW cluster error.

Color Video returns True if the Video Standard opened is a color video standard.

Video Standard String returns the name of the video standard currently opened.

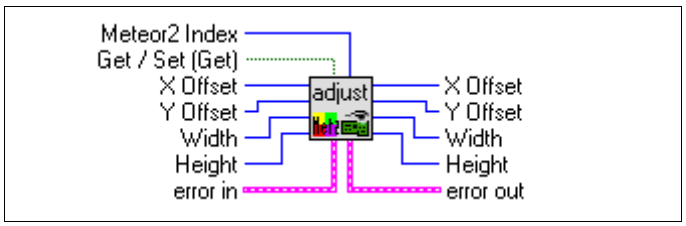
Channel returns the current video source channel.

Sync Channel returns the current video synchronization channel.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Adjust

Get or Set the adjustments of the frame size.
Note: the adjustment is limited by the current frame size. NTSC: 640 * 480 pixels, PAL: 768 * 576 pixels.



Meteor2 Index is the index of the Meteor2 device.

Get / Set (Get) (default False) specifies if you want to read the current values or set new values.

X Offset sets the X Offset of the input-signal capture window.

Y Offset sets the Y Offset of the input-signal capture window.

Width sets the width of the input-signal capture window.

Height sets the height of the input-signal capture window.

error in is a LabVIEW cluster error.

X Offset returns the X Offset of the input-signal capture window.

Y Offset returns the Y Offset of the input-signal capture window.

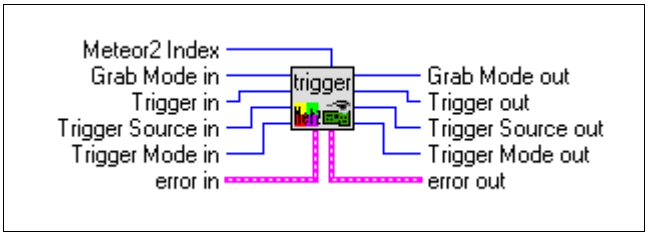
Width returns the width of the input-signal capture window.

Height returns the height of the input-signal capture window.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Trigger

Configures the trigger and the grabbing mode.



Meteor2 Index is the index of the Meteor2 device.

Grab Mode in allows you to configures the grabbing in synchronous or asynchronous mode. In asynchronous mode, the "snap" function of "METEOR2 Acquire Mode.vi" will return before the end of grab.

Trigger in allows you to enable or disable the trigger, or to activate the software triggers.

Trigger Source in allows you to choose the trigger source, or to inactivate its.

Trigger Mode in configures the type of trigger event which should activate the trigger.

error in is a LabVIEW cluster error.

Grab Mode out get the current Grab Mode status if Grab Mode in has been set to "Get Status".

Trigger out get the current Trigger status if Trigger in has been set to "Get Status".

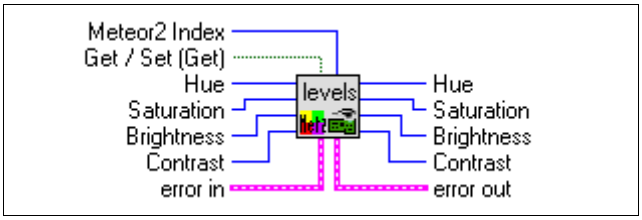
Trigger Source out get the current Trigger Source status if Trigger Source in has been set to "Get Status".

Trigger Mode out get the current Trigger Mode status if Trigger Mode in has been set to "Get Status".

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Video Levels

Get or Set the video levels adjustment. This VI operates when the video acquisition is performed through the Composite or Separate Y/C section of the Matrox Meteor II framegrabber.



Meteor2 Index is the index of the Meteor2 device.

Get / Set (Get) (default False) specifies if you want to read the current values or set new values.

Hue sets the hue level for composite signals.

Saturation sets the saturation level for composite signals.

Brightness sets the brightness level for composite signals.

Contrast sets the contrast level for composite signals.

error in is a LabVIEW cluster error.

Hue returns the digitizer hue level.

Saturation returns the digitizer saturation level.

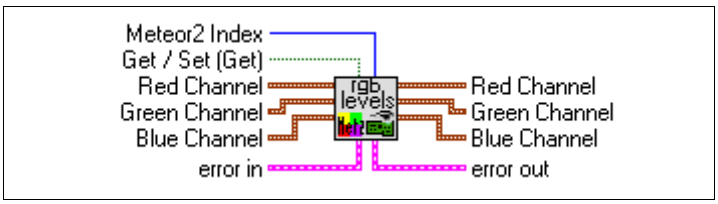
Brightness returns the digitizer brightness level.

Contrast returns the digitizer contrast level.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Video RGB Levels

Get or Set the video levels adjustment for each primary color. This function operates when the acquisition is performed through the RGB section of a Matrox Meteor/RGB.



Meteor2 Index is the index of the Meteor2 device.

Get / Set (Get) (default False) specifies if you want to read the current values or set new values.

Red Channel is a cluster containing:

- **Black Reference** is the signal's digitization black reference level for the red channel.
- **White Reference** is the signal's digitization white reference level for the red channel.

Green Channel is a cluster containing:

- **Black Reference** is the signal's digitization black reference level for the green channel.
- **White Reference** is the signal's digitization white reference level for the green channel.

Blue Channel is a cluster containing:

- **Black Reference** is the signal's digitization black reference level for the blue channel.
- **White Reference** is the signal's digitization white reference level for the blue channel.

error in is a LabVIEW cluster error.

Red Channel is a cluster containing:

- **Black Reference** is the current signal's digitization black reference level for the red channel.
- **White Reference** is the current signal's digitization white reference level for the red channel.

Green Channel is a cluster containing:

- **Black Reference** is the current signal's digitization black reference level for the green channel.
- **White Reference** is the current signal's digitization white reference level for the green channel.

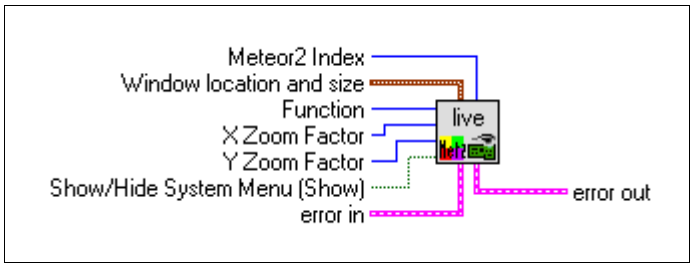
Blue Channel is a cluster containing:

- **Black Reference** is the current signal's digitization black reference level for the blue channel.
- **White Reference** is the current signal's digitization white reference level for the blue channel.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Live

This function enables a live acquisition and display in an external window. This function takes advantage of your video hardware to perform fast display. The best performances are generally obtained with a video board configured in 32-bit mode (True color).



Meteor2 Index is the index of the Meteor2 device.

Window location and size is the cluster that describes the top, left, bottom and right edges of a bounding rectangle for the window, not including the title bar. The minimum width and height for any of these parameters is 90.

Function:

- 0: Start Live Video: starts continuous video acquisition and display in an external window. The next operation after starting the live video acquisition must be a Stop Live Video.
- 1: Stop Live Video: stops the continuous video acquisition.

X Zoom Factor can be positive (zoom in) or negative (zoom out).

Y Zoom Factor can be positive (zoom in) or negative (zoom out).

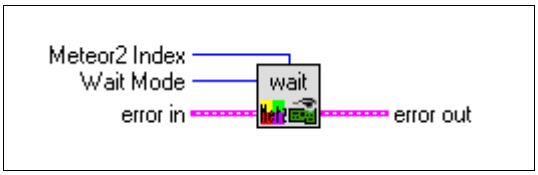
Show/Hide System Menu (Show) show (TRUE) or hide (FALSE) the system menu of the display window.

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Wait

This function allows you to temporarily override an asynchronous grab mode (see METEOR2 Trigger.vi). Using this function allows your application to wait for the grab in progress to end, before continuing. Note : "End of Grab" should not be used when grabbing data in continuous mode.



Meteor2 Index is the index of the Meteor2 device.

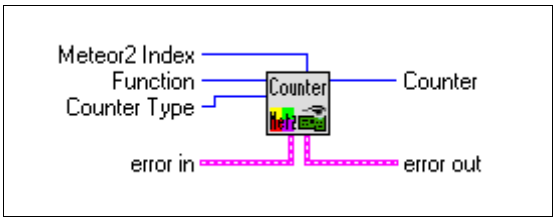
Wait Mode specifies the event to wait for.

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Counter

This function allows you to temporarily override an asynchronous grab mode (see METEOR2 Trigger.vi). Using this function allows your application to wait for the grab in progress to end, before continuing. Note : "End of Grab" should not be used when grabbing data in continuous mode.



Meteor2 Index is the index of the Meteor2 device.

Function is the operation to be performed :

- Get Counter (0) : Get the counter value
- Init Counter Callback (1) : Init a new counter on a specific event. reset the counter to 0.
- Release Counter Callback (2) : Release the counter.

Counter type defines the type of event that will increment the counter.

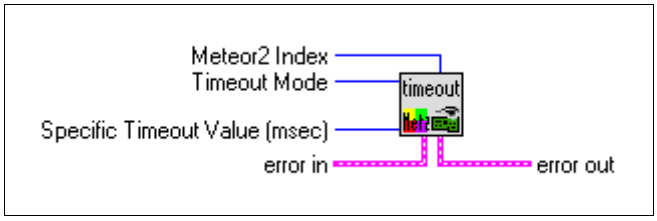
error in is a LabVIEW cluster error.

Counter returns the number of occurences of the event since the counter has been inited.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Timeout

Set the maximum time to wait for end of grab before generating an error.



Meteor2 Index is the index of the Meteor2 device.

Timeout Mode allows you to choose between predefined timeout constants and a user specific value.

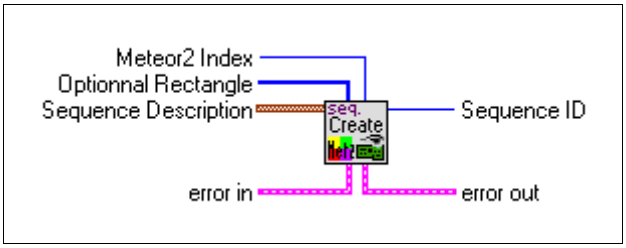
Specific Timeout Value(msec) defines the maximum time to wait when the Timeout Mode is set to 2 (Specific Timeout Value in msec).

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Sequence Create

This function allocates resources for the acquisition of a sequence of images.



Meteor2 Index is the index of the Meteor2 device.

Optional Rectangle specifies if only a rectangular portion of the image frame shall be transferred. It is defined by an array of 4 elements [Left, Top, Right, Bottom]. If not connected or empty, the entire image frame is transferred.

Sequence Description is an array of clusters, each cluster containing the timing definition of a set of images, i.e. a part of the sequence. There must be at least one cluster (one set of images).

- Delay (0): number of frames to wait before acquiring the set of images.
- Nb Images: number of frames to acquire.
- Interval: number of frames between each image of the set (1 means no images are skipped).

error in is a LabVIEW cluster error.

Sequence ID returns the identifier of the sequence. It will be used to identify the sequence for the other "METEOR2 Sequence ..." VIs.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Sequence Dispose

This function disposes the resources allocated for the sequence referenced by Sequence ID.

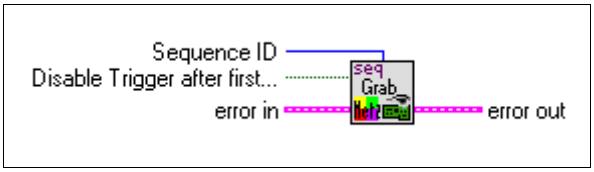
Sequence ID is the ID of the sequence returned by METEOR2 Sequence Create.vi.

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Sequence Grab

Acquire a set of images (sequence) referenced by Sequence ID.



Sequence ID is the ID of the sequence returned by Sequence Create.vi.

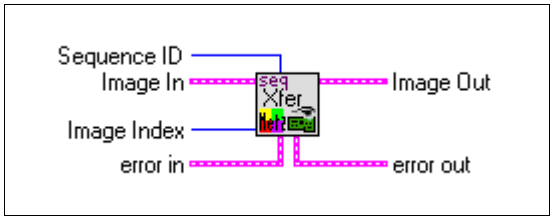
Disable trigger after first image is set to True if you want to trig the first image of the sequence and not the others and is set to False if you want to trig all the images..

error in is a LabVIEW cluster error.

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Sequence Transfer

Transfers the host memory buffer of the image number <Image Index> of the sequence reference by Sequence ID to the image connected on input.



Sequence ID is the ID of the sequence returned by Sequence Create.vi.

Image In is the reference of the image that will receive the pixel data (captured frame).

Image Index is the index (from 0) of the image in the sequence.

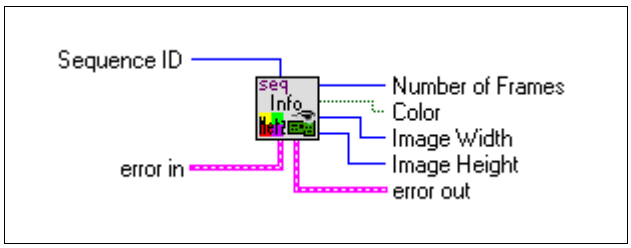
error in is a LabVIEW cluster error.

Image Out is the reference of the image containing the pixel data (captured frame).

error out is a LabVIEW cluster error returning the text of the current error.

METEOR2 Sequence Info

This function returns information about a sequence.



Sequence ID is the ID of the sequence returned by Sequence Create.vi.

error in is a LabVIEW cluster error.

Number of Frames is the number of images of the sequence.

Color is True if the images of the sequence are color images.

Image Width returns is the width of each image of the sequence.

Image Height returns the height of each image of the sequence.

error out is a LabVIEW cluster error returning the text of the current error.

Sub-VIs

METEOR2 Globals.vi - Global Variables shared by all Vis in this library.