

Image Acquisition Toolbox Release Notes

The “Image Acquisition Toolbox 1.6 Release Notes” on page 1-1 describe enhancements and bug fixes included in the latest version of the Image Acquisition Toolbox. The following topics are discussed in these Release Notes.

- “New Features” on page 1-2
- “Major Bug Fixes” on page 1-5
- “Known Software and Documentation Problems” on page 1-7

The Image Acquisition Toolbox Release Notes also provide information about recent versions of the product, in case you are upgrading from an earlier version.

- “Image Acquisition Toolbox 1.5 Release Notes” on page 2-1
- “Image Acquisition Toolbox 1.1 Release Notes” on page 3-1
- “Image Acquisition Toolbox 1.0 Release Notes” on page 4-1

Printing the Release Notes

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New Features

Version 1.6 of the Image Acquisition Toolbox includes the following new features, added since Version 1.5.

- “New Image Acquisition Blockset” on page 1-2
- “DCAM Adaptor Now Supports Absolute Values” on page 1-3
- “Performance Enhancements” on page 1-4

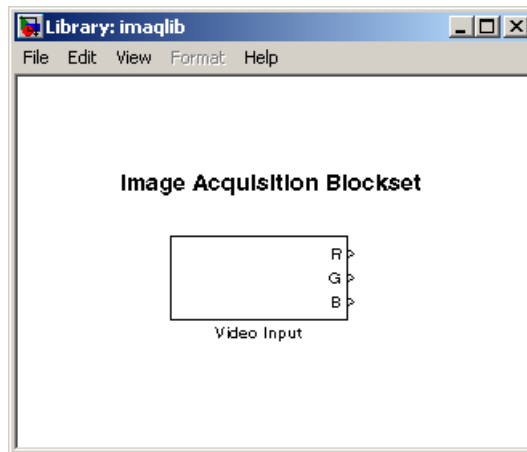
New Image Acquisition Blockset

The Image Acquisition Toolbox now includes a Simulink blockset, called the Image Acquisition Blockset. The blockset contains one block: the Video Input block. You can use this block to bring live video data into a simulation. (For information about some limitations of the blockset, see “Image Acquisition Blockset” on page 1-12.)

To open the Image Acquisition Blockset library, enter

```
imaqlib
```

at the MATLAB prompt. MATLAB displays the contents of the blockset in a separate window.



DCAM Adaptor Now Supports Absolute Values

The DCAM adaptor now supports properties that let you specify the value of a property as an absolute value, if the device supports that capability for a particular feature.

As defined by the IIDC DCAM specification, the values specified for properties can be interpreted as either relative or absolute. Relative values only have meaning in relation to a device-specific reference point. For example, if you set the shutter speed property to 4000, this value might be interpreted as 4000 seconds for one device, but 4000 milliseconds for another device. Previously, the DCAM adaptor device-specific properties only supported relative values.

To provide more precise control, the IIDC DCAM specification also defines absolute values, where the units are specified as part of the definition. For example, the DCAM specification defines the units for shutter speed property as seconds. So, if you specify a value of 0.10032 for this property, any DCAM device that supports absolute values would interpret the value as 100.32 milliseconds. To find out the units used with a feature that supports absolute values, see Appendix B of the IIDC 1394-based DCAM specification or check the documentation that came with your device.

New Properties

To support both absolute and relative values, the DCAM adaptor now provides additional device-specific properties. If a device supports absolute values for a particular feature, the DCAM adaptor creates a property, using the same feature name as the relative property but with the word “Absolute” appended to it. For example, if a device supports both relative and absolute values for shutter speed, the DCAM adaptor creates properties named Shutter and ShutterAbsolute.

When it creates an absolute value property, the DCAM adaptor also creates a property to control the type of value the device uses. This property has the same name as the feature with the word “Control” appended to it. For example, if the DCAM adaptor created the ShutterAbsolute property, it also creates a ShutterControl property.

If you set either the relative or absolute properties, the corresponding mode property is set to 'manual'. For example, if you set the ShutterAbsolute property, the value of the ShutterMode property changes to 'manual'. Setting the control property has no effect on the mode property.

Performance Enhancements

Because of a number of enhancements to the way that the toolbox handles video frames, you might notice increased performance in the following areas:

Note The actual performance improvement achieved depends on factors such as video format, resolution, and CPU speed.

- Faster acquisition with the `getdata`, `peekdata`, and `getsnapshot` functions.
- Previewing should consume less CPU overhead.
- Frame handling during acquisition should be faster.

Major Bug Fixes

This release includes the following major bug fix.

- For long acquisitions, the metadata information reported from `getdata` was sometimes incorrect. This included reporting the wrong values for the `AbsTime` and `FrameNumber` fields of the `getdata` metadata structure. This has been fixed.

Upgrading from a Previous Release

The following are some changes from previous releases.

- The `FieldStart` property for the Coreco PC-Vision device has been removed. To specify which field the device uses as the first field for an interlaced video signal, use the `StartingField` property.
- The way the toolbox determines the default value of device-specific properties for Matrox devices has changed. In some cases, the initial value of the property at object creation time (and the default value returned by the `propinfo` function) might be different than what was returned in previous releases. To ensure that properties that are important to your application have the value you expect, you should explicitly set them. Do not depend on the default value.

Known Software and Documentation Problems

This section describes some known software problems with this release of the Image Acquisition Toolbox.

- “General Issues”
- “Generic Windows Image Acquisition Devices” on page 1-8
- “Matrox Devices” on page 1-10
- “Data Translation Devices” on page 1-11
- “Image Acquisition Blockset” on page 1-12

General Issues

- The preview window might distort displayed images when running MATLAB on a computer with an 8-bit display. Note, however, that the quality of the data logged is not affected.
- Warning messages indicating that the toolbox was unable to allocate memory can be displayed multiple times under the following scenario.
 - a Preview window is opened.
 - b The `imaqmem` function is used to limit memory to a very small amount.
 - c Hardware trigger executes, initiating an acquisition.

To prevent this problem, close the preview window.

- You might encounter a problem logging data to an AVI file. For example, the value of the `DiskLoggerFrameCount` property might remain at 0 (zero). To remedy this problem, try changing the value of the AVI file object's `Compression` property to `'none'`.

Generic Windows Image Acquisition Devices

- You cannot create multiple video input objects for the same device when the device is active. The toolbox issues an error.

For example,

```
vid = videoinput('winvideo', 1);
preview(vid)
newvid = videoinput('winvideo', 1, 'RGB24_160x120');
??? Cannot access information on the image acquisition device. One
or more arguments are invalid. Make sure no other objects or
applications are accessing the same device.
```

If you close the preview window you can create the object.

```
closepreview(vid)
newvid = videoinput('winvideo', 1, 'RGB24_160x120');
preview(newvid)
```

- There are known issues with the USB Creative WebCam drivers that can lead to crashes and computer reboots. It is recommended that users only install one of these devices per system.
- Some device drivers, most commonly Video for Windows (VFW) drivers, might request a device to be selected via a dialog box. By choosing a device from the dialog box, you can associate an image acquisition object with an installed device.

TV Tuner Devices

The following list covers known issues with TV Tuner Devices (devices with an AnalogVideoFormat video source property).

- Video input objects associated with a TV tuner card like the ATI Rage Theater Video Capture card may be created with an invalid analog format selected. To correct this, modify the value of the AnalogVideoFormat property on the currently selected video source object. (Use the getselectedsource function to retrieve the currently selected video source object.)
- Some TV tuner cards might not honor the value of the FrameGrabInterval property. The ATI TV Wonder VE card is known to have this problem.

- While accessing a TV tuner card, a blue screen crash can occur if the preview window is repeatedly opened and closed.
- Some TV tuner cards may not be able to access video formats such as YVU9 or YV12. Although the `imqhwinfo` function might report these formats as supported, attempts to acquire from them can fail. The ATI TV Wonder VE card is known to have this problem.
- Previewing is known to max out the CPU, making MATLAB unresponsive. It is recommended that users use a low resolution to reduce the CPU load.

Matrox Devices

- Matrox's MIL or MIL-Lite library is required and must be installed before using the toolbox.
- The Gencout program, which is related to the Genesis board, will start when you first try to use the toolbox. This causes MATLAB to lose focus. To work around this behavior, uninstall the Genesis Native Library. Gencout is not used by the Image Acquisition Toolbox, but it is installed by default by the installation program for the Genesis drivers.
- It is recommended that MIL's nonpaged reserved memory be greater than the size of four incoming images. You can change this value using Matrox's MIL Configuration utility, provided with MIL.
 - For standard RS170 and CCIR monochrome formats, at least 2 MB of nonpaged memory is recommended.
 - For standard NTSC and PAL color formats, at least 8MB is recommended.
- Two- and four-band images are not supported. Dual-channel video, however, is supported via a DCF file if the resulting image is a single band.
- UARTs are not supported.
- If the device supports exposure timers, they are exposed as video source object properties using the prefix “Timer”. These properties are implemented using the manual bypass exposure model as described in the *Matrox MIL Users Guide*. Do not set these parameters while the object is previewing or running, to avoid invalid combinations of parameters while the object is accessing the device.
- User digital inputs are not currently supported. User digital output values are exposed as video source object properties using the prefix “UserOutputBit”.

Data Translation Devices

- You should update device drivers to Imaging Omni CD 2.2 drivers. These drivers are available from the support page at datatranslation.com.
- Data Translation drivers allow for the reservation of nonpaged, nonvolatile memory. Set this value as follows:

Devices	Reserved Memory Recommendations
3120, 313x, and 3152	<p>Nonpaged reserved memory must be greater than the size of four incoming images. Recommended values are</p> <ul style="list-style-type: none"> • For standard RS170 and CCIR monochrome formats, at least 2 MB of non-paged memory • For standard NTSC and PAL color formats, at least 8 MB <p>You can change this value in the DT driver properties; see the Data Translation <i>User's Guide</i> for your hardware for more information.</p>
3152-LS, 3153, 3154, 3155, 3157	<p>Nonpaged reserved memory must be greater than the size of the total number of frames provided by the hardware for a whole trigger. Use this equation to determine the size of the total number of frames:</p> $\text{total} = \text{FramesPerTrigger} * \text{FrameGrabInterval}$ <p>where <code>FramesPerTrigger</code> and <code>FrameGrabInterval</code> are properties of the video input object. Refer to the Image Acquisition Toolbox documentation for more information on these properties.</p>

- Line scan mode for the 3152-LS is not supported.
- For the 3152-LS, 3153, 3154, 3155, and 3157 devices in immediate trigger mode, the last image frame of a trigger and the first image frame of the next trigger might not be adjacent frames in the incoming video; that is, one or more frames might be dropped between triggers.
- The 3152 might require certain color depths from your video card in order to fully function. To determine if the proper color depth is selected, start

DTAcquire (provided with your hardware) and verify that both 'Passthru' and 'Single Frame Acquire' function properly. If 'Passthru' fails, try using a different color depth, e.g., 24-bit truecolor instead of 32-bit truecolor.

Image Acquisition Blockset

The following are known issues with the Image Acquisition Blockset.

- Invalid devices in **Device name** menu — When you first open the Video Input block mask, MATLAB searches your computer and lists all of the available devices in the **Device name** menu in the Block Parameters dialog box. If you disconnect or change the cameras connected to the computer while MATLAB is running, the mask will not reflect these hardware changes. The menu will continue to list the devices initially found when the mask was first opened. The only way to update this list is to restart MATLAB; using the Image Acquisition Toolbox function `imaqreset` has no effect.
- No support for DV camcorders — The Image Acquisition Blockset does not support DV camcorders at this time. Attempting to access the Image Acquisition Blockset while a DV camcorder is connected to your system will cause MATLAB to hang. This will be addressed in a future release.
- Invalid formats in **Input video format** menu — The list of formats displayed in the **Input video format** menu in the Block Parameters dialog box is derived from the first device listed in the mask. If you change the selected device, the list of formats in this menu is not updated. Thus, the menu can contain formats that are not supported by the specified device. In a future release, the block will update the list of formats in the **Input video format** menu when the device changes.
- Duplicate entries in **Input video format** menu — The **Input video format** menu in the Block Parameters dialog box can contain duplicate entries. This will be corrected in a future release.
- Support only for RGB24 formats — The Video Input block only supports RGB24 formats. Other video formats, such as RGB8 and Y422, cause an error when the model is run. This will be corrected in a future release.
- No preview or configuration capabilities — The Video Input block does not support a preview window nor does it provide access to device configuration parameters. To configure a device or see a preview of the acquired data, you must use utility programs supplied with the device, or third-party

applications, such as Microsoft's AMCAP .EXE utility. The AMCAP .EXE utility is included with the Image Acquisition Toolbox in the `toolbox\imaq\imaq` directory. Any device configuration performed using a third-party application will affect the device in the Simulink model.

Note Make sure to close whatever third-party application you use for previewing or configuration before running your Simulink model.

Image Acquisition Toolbox

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New Features

The Image Acquisition Toolbox 1.5 includes the following new features, added since Version 1.1.

Additional Hardware Support

The Image Acquisition Toolbox provides support for specific image acquisition devices by providing adaptors that enable a connection between MATLAB and devices. The toolbox supports devices from specific hardware vendors, such as Matrox or Data Translation, or for general categories of devices, such as consumer-level video devices that support a connection via DirectX or Video for Windows drivers.

This release provides support for the following additional vendors and device categories.

- Coreco Imaging, Inc. image acquisition devices, including the PC2-Vision, the PCVision, the PCVisionplus, the PC-RGB and the PC-DIG.
- Matrox CronosPlus
- Digital cameras that comply with the IIDC 1394-based Digital Camera (DCAM) Specification

New Utility Functions

The toolbox includes the following new utility functions.

- `isrunning` — Determines if a video input object is running
- `islogging` — Determines if a video input object is logging
- `obj2mfile` — Saves a video input object by creating an M-file containing the commands necessary to recreate the object

Changes to Existing Functions

The toolbox includes the following enhancements to existing functions and properties.

- You can now specify the color space of the returned image data by setting the value of the `ReturnedColorSpace` property.
- The `imaqmem` function can now retrieve specific fields by fieldname.

-
- `flushdata` now accepts an array of video input objects
 - The `wait` function can now wait until an object stops running or logging. Previously, this function only waited until an object stopped running.

Major Bug Fixes

The Image Acquisition Toolbox 1.5 includes several important bug fixes made since Version 1.1. This section describes the particularly important Version 1.5 bug fixes.

If you are viewing these Release Notes in PDF form, please refer to the HTML form of the Release Notes, using either the Help browser or the MathWorks Web site and use the link provided.

Limitations from Previous Versions Lifted

The following are limitations that existed in previous versions of the toolbox that are no longer issues.

- Matrox acquisition devices that support image scaling now scale images correctly for any selected video source object. Previously, the toolbox only honored the `XScaleFactor` and `YScaleFactor` properties of the first video source object.
- DV devices, such as camcorders, were limited to the default 'dvsd' format provided by the device. Additional formats are now available for these devices.
- DV devices, such as camcorders, no longer experience a short lag between the preview window display, and what is actually captured by the device.

Known Software and Documentation Problems

This section also describes some known software problems with this release of the Image Acquisition Toolbox.

- General issues
- Issues with generic Windows image acquisition devices
- Issues with Matrox image acquisition devices
- Issues with Data Translation acquisition devices

General Issues

- The preview window might distort displayed images when running MATLAB on a computer with an 8-bit display. Note, however, that the quality of the data logged is not affected.
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Generic Windows Image Acquisition Devices

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around this behavior, uninstall the Genesis Native Library. Gencout is not used by the Image Acquisition Toolbox, but it is installed by default by the installation program for the Genesis drivers.

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Data Translation Devices

- Device drivers should be updated to Imaging Omni CD 2.2 drivers. These drivers are available from the support page at datatranslation.com.

- Data Translation drivers allow for the reservation of non-paged, non-volatile memory. This value should be set as follows:

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3152-LS, 3153, 3154, 3155, 3157	<p>Non-paged, reserved memory must be greater than the size of the total number of frames provided by the hardware for a whole trigger. Use this equation to determine the size of the total number of frames:</p> $\text{total} = \text{FramesPerTrigger} * \text{FrameGrabInterval}$ <p>where <code>FramesPerTrigger</code> and <code>FrameGrabInterval</code> are properties of the video input object. Refer to the Image Acquisition Toolbox documentation for more information on these properties.</p>

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- The 3152 may require certain color depths from your video card in order to fully function. To determine if the proper color depth is selected, start `DTAcquire` provided with your hardware and verify that both `'Passthru'` and `'Single Frame Acquire'` function properly. If `'Passthru'` fails, try using a different color depth, e.g., 24-bit truecolor instead of 32-bit truecolor.

Image Acquisition Toolbox

1.1 Release Notes

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Enhancements

The Image Acquisition Toolbox, Version 1.1, includes the following enhancements.

- Region-of-Interest (ROI) configurations using the `ROIPosition` property are now supported for all hardware devices.
- A troubleshooting utility is now included in the `MATLABROOT/toolbox/imaq/imaq` directory called `AMCap.exe`. This utility can be used to verify that Windows video devices are working properly.
- Enhanced memory management is now provided to optimize image frame storage efficiency.
- A warning is issued when accessing Windows video hardware using an incorrect DirectX version.

Major Bug Fixes

The Image Acquisition Toolbox 1.1 includes several bug fixes made since Version 1.0. This section describes the particularly important Version 1.1 bug fixes.

- A memory leak associated with running peekdata has been fixed.
- The toolbox now stops acquisition hardware when you use Ctrl-C to interrupt the getsnapshot function.
- When using Matrox DCF camera files, the toolbox now configures all video source objects according to the camera file settings.
- A MATLAB segmentation fault that occurred when using old versions of the Matrox MIL library has been fixed. The toolbox now displays a message instead.
- A segmentation fault associated with accessing the Data Translation 3157 frame grabber has been fixed.

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Introduction to the Image Acquisition Toolbox

The Image Acquisition Toolbox 1.0 is a new product from The MathWorks that enables you to connect to an image acquisition device from within a MATLAB session. Based on MATLAB object technology, the Image Acquisition Toolbox provides functions for creating objects that represent the connection to the device.

For example, the following command creates an object `vid` associated with a Matrox frame grabber. (Use the `imaqhwinfo` function to retrieve the object constructor syntax for the device installed on your system.)

```
vid = videoinput('matrox');
```

Using the properties of the `vid` object, you can control various aspects of the connection to the device.

For more information about the capabilities of the Image Acquisition Toolbox, refer to the documentation.

Software and Hardware Requirements

The toolbox requires the device drivers for the installed image acquisition hardware. For the most up-to-date list of supported hardware, go to the Image Acquisition Toolbox product page (www.mathworks.com/product/imaq).