DATA TRANSLATION

UM-13856-K

DT3155
User's Manual

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Data Translation, Inc.
100 Locke Drive
Marlboro, MA 01752-1192
(508) 481-3700
www.datatranslation.com
Fax: (508) 481-8620
E-mail: info@datx.com

Radio and Television Interference

This equipment has been tested and found to comply with CISPR EN55022 Class A and EN50082-1 (CE) requirements and also with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Changes or modifications to this equipment not expressly approved by Data Translation could void your authority to operate the equipment under Part 15 of the FCC Rules.

Note: This product was FCC-Certified under test conditions that included use of shielded cables and connectors between system components. It is important that you use shielded cables and connectors to reduce the possibility of causing interference to radio, television, and other electronic devices.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Table of Contents

About this Manual

This manual describes the features of the DT3155 frame grabber board and how to use the DT3155 Device Driver with the Frame Grabber SDK™ to write an application program.

Intended Audience

This document is intended for engineers, scientists, technicians, or others responsible for programming and/or using the DT3155 board to perform machine vision and/or image analysis operations. It is assumed that you have some familiarity with imaging principles and that you are familiar with the operating characteristics of your video source.

If you are writing application programs using the device driver and the Frame Grabber SDK, it is also assumed that you are familiar with the Microsoft® Windows® 98, Windows Me (Millennium Edition), Windows 2000, or Windows XP operating system and with the Microsoft C compiler.

What You Should Learn from this Manual

This manual provides detailed information about the features of the DT3155 board and the DT3155 Device Driver to allow you to access the board's capabilities using software. It is organized as follows:

- Chapter 1, "Overview," describes the major features of the board, as well as the supported software and accessories for the board.
- Chapter 2, "Principles of Operation," describes all of the board's features and how to use them in your application.
- Chapter 3, "Supported Device Driver Capabilities," describes the capabilities supported by the DT3155 Device Driver and the initialized control values.

- Chapter 4, "Programming Flowcharts," describes the processes you must follow to program the DT3155 board using the DT-Open Layers™ Frame Grabber SDK.
- Chapter 5, "Troubleshooting," provides information that you can use to resolve problems with the board and the device driver, should they occur.
- Appendix A, "Specifications," lists the specifications of the board.
- Appendix B, "Connector Pin Assignments," shows the pin assignments for the connectors on the board.
- Appendix C, "Modifying the Device Driver," describes how to add, modify, and remove a board from the device driver configuration, and uninstall the device driver, if necessary.
- An index complete this manual.

Conventions Used in this Manual

The following conventions are used in this manual:

- Notes provide useful information that requires special emphasis, cautions provide information to help you avoid losing data or damaging your equipment, and warnings provide information to help you avoid catastrophic damage to yourself or your equipment.
- Items that you select or type are shown in **bold**.
- `Courier font` is used to represent source code.

Related Information

Refer to the following documents for more information on using the DT3155 board:

- *DT3155 Getting Started Manual* (UM-18306), included on the Imaging OMNI CD™ provided with the DT3155 board, describes how to set up, install, and wire signals to the DT3155 board, how to install the DT3155 software, and how to verify the operation of the board with DT-Acquire.
- *Frame Grabber SDK User's Manual* (UM-13442) and online help, included on the Imaging OMNI CD provided with the DT3155 board, describes the Dynamic Linkable Library (DLL) that you can use to write image acquisition application programs.
- *DT-Active Open Layers User's Manual* (UM-17325), available from Data Translation, describes DT-Active Open Layers™, an ActiveX control, which allows you to use Data Translation PCI frame grabber boards within graphical programming environments such as Microsoft® Visual Basic® and Visual C++®.
- *GLOBAL LAB Image/2 User's Manual* (UM-17790) and *GLOBAL LAB Image/2 API Manual* (UM-17792), available from Data Translation, describe how to use GLOBAL LAB® Image/2 and GLOBAL LAB Image/2 Streamline™ to create scientific applications using object-oriented image processing tools.
- *DT Vision Foundry User's Manual* (UM-17755) and *DT Vision Foundry API Manual* (UM-17757), available from Data Translation, describe how to use DT Vision Foundry™ to create machine vision applications using object-oriented image processing tools.
- *PCI Specification:* PCI Local Bus Specification, PCI Special Interest Group, Hillsboro, OR., Revision 2.0, (503) 696-2000.
- Bt254 Monolithic CMOS Triple 8-bit Image Digitizer, Brooktree Corporation, (619) 452-7580.

- SAA7116 Digital Video to PCI Interface, Philips Semiconductors, (800) 234-7381.

Additionally, it may be helpful to read other material in order to gain a better understanding of image processing concepts, algorithms, and their applications. Data Translation's Technical Support Department recommends the following resources for understanding image processing concepts, processing, and coding:

Baxes, Gregory A. *Digital Image Processing, Principles & Applications.* New York: John Wiley & Sons, 1994. Introduction to image processing and hardware/software basics.

Benson, K. Blair, and Donald G. Fink. *HDTV Advanced TV for the 1990's.* New York: McGraw-Hill, 1990. Details high-definition television concepts.

Brooktree Corporation. *Brooktree Applications Handbook - Graphics and Imaging Products.* San Diego: Brooktree Corporation, 1991. Product data book and application examples.

Castleman, K. R. *Digital Image Processing*. Englewood Cliffs, NJ: Prentice-Hall, 1987. Explains major image processing concepts and mathematical concepts involved in digital image manipulation.

Cunningham, John E. *Cable TV*. 2nd ed. Indianapolis: Howard W. Sams & Company, Inc., 1987. Provides the basics of cable television.

Foley, J. D., and A. Van Dam. *Fundamentals of Interactive Computer Graphics*. Addison-Wesley: Reading, MA, 1984. Provides information on geometric functions.

Friedhoff, Richard M., and William Benzon. *The Second Computer Revolution, Visualization.* New York: Harry N. Abrams, Inc., 1989. Covers the history of image processing technology.

Gonzalez, Rafael C., and Paul Wintz. *Digital Image Processing.* Menlo Park, CA: Addison-Wesley, 1987. Explains major image processing concepts and mathematical concepts involved in digital image manipulation, including FFT processing, filtering operations, geometric functions, histograms, and linear equalization.

Held, Gilbert. *Data Compression Techniques and Applications: Hardware and Software Considerations.* 3rd ed. Somerset, NJ: John Wiley & Sons, Inc., 1991. Covers various techniques currently used for data compression; includes programming examples.

Holzmann, Gerard J. *Beyond Photography - The Digital Darkroom.* Englewood Cliffs, NJ: Prentice-Hall, 1988. Introduces and explains image editing; includes programming examples.

Ingram, Dave. *Video Electronics Technology.* Blue Ridge Summit, PA: Tab Books, Inc., 1984. Explains the basic electronics used in video devices.

Kiver, M. S. *Color Television Fundamentals.* New York: McGraw-Hill, 1977. Covers television and video basics.

Lindley, Craig. *Practical Image Processing in C.* Somerset, NJ: John Wiley & Sons, Inc., 1991. Explains basic image processing techniques using C, provides many programming examples, covers TIFF and PICT file formats, and describes how to map images into VGA memory space.

Luther, Arch C. *Digital Video in the PC Environment.* New York: McGraw-Hill, 1991. Explains Digital Video Interactive (DVI) technology.

National Semiconductor Corporation. *Linear Applications Handbook.* Santa Clara, CA: National Semiconductor Corporation, 1986. Explains broadcasting standards and major circuit components of frame grabber boards.

Pratt, William K. *Digital Image Processing.* Somerset, NJ: John Wiley & Sons, Inc., 1991. Detailed text on image processing, including morphological processing, feature extraction, image segmentation, and shape analysis.

Reid, Christopher E. and Thomas B. Passin. *Signal Processing in C.* Somerset, NJ: John Wiley & Sons, Inc.

Rimmer, Steve. *Bit-Mapped Graphics.* Blue Ridge Summit, PA: Tab Books, Inc., 1990. Details digital image file formats and image manipulation after digitizing.

Rimmer, Steve. *Graphical User Interface Programming.* Blue Ridge Summit, PA: Tab Books, Inc., 1992. Covers various techniques currently used for GUI programming; gives insight into how Microsoft Windows was written/implemented along with the design aspects related to windows programming; includes programming examples.

Rosenfeld, Azriel, and Avinash C. Kak. *Digital Picture Processing.* New York: Academic Press, Inc., 1990. Describes image processing techniques and concepts.

Russ, John C. *Computer-Assisted Microscopy,* The Measurement and Analysis of Images. New York: Plenum Press.

Serra, J. *Image Analysis and Mathematical Morphology.* London: Academic Press, Ltd., 1982. Provides information on morphological processing.

Smith, C. Cecil. *Mastering Television Technology.* Richardson, TX: Newman Smith Publishing Company, Inc., 1988. Describes current video technology and concepts.

Tektronix, Inc. *Television Measurements - NTSC Systems.* Beaverton, OR: Tektronix, Inc., 1989. Covers test equipment and broadcasting standards.

Ulichney, Robert. *Digital Halftoning*. Cambridge, MA: The MIT Press, 1987. Describes image manipulation, creation, and analysis in the digital environment.

Watkinson, John. *The Art of Digital Video.* Stoneham, MA: Focal Press, 1990. Provides an in-depth description of digital video fundamentals.

Where to Get Help

Should you run into problems installing or using the DT3155 board, our Technical Support Department is available to provide technical assistance. Refer to Chapter 5 for more information. If you are outside the U.S. or Canada, call your local distributor, whose number is listed in your Data Translation product handbook, or contact the Data Translation web site (www.datatranslation.com).

Overview

Features

The DT3155 is a high-accuracy, programmable, monochrome frame grabber board for the PCI bus. It is suitable for both image analysis and machine vision applications.

The DT3155 accepts video signals in many different monochrome formats and digitizes the image. The board either stores the digitized data to the host computer's system memory or transfers the digitized data to the computer's display controller to display images in real time. The board transfers image data to the host computer using PCI burst transfers.

Key features of the DT3155 board are summarized as follows:

- Operates on the PCI local bus interface;
- Digitizes 8-bit monochrome video from any one of four 60 Hz or 50 Hz video input channels;
- Synchronizes to any of the video inputs;
- Provides digital video synchronization for reduced pixel jitter and good VCR/VTR acquisition;
- Accepts an external trigger with selectable polarity;
- Provides a software-selectable chrominance notch filter for 50 Hz and 60 Hz AC-coupled signals;
- Provides programmable black and white levels;
- Provides a 256 x 8-bit input look-up table (ILUT);
- Provides a 256 x 8-bit passthru look-up table;
- Provides passthru scaling to 1/4 of the frame size; and
- Provides eight TTL-level digital output signals for general-purpose use.

Supported Software

The following software is available for use with the DT3155 board:

- **DT3155 Device Driver** –This software is provided on the Imaging OMNI CD, which is shipped with the board. You *must* install this device driver to use a DT3155 board with any of the supported software packages or utilities. Refer to the *DT3155 Getting Started Manual* for information on installing the device driver.
- **DT-Acquire** –This software is provided on the Imaging OMNI CD, which is shipped with the board. This utility allows you to verify the operation of your board during startup. Refer to the *DT3155 Getting Started Manual* for information on installing and using this utility.
- **32-Bit Frame Grabber SDK** –Use this software package, provided on the Imaging OMNI CD, if you want to develop your own application software for the DT3155 board using the Microsoft C compiler in Windows 98, Windows Me, Windows 2000, or Windows XP.
- **DT-Active Open Layers** –Order this optional software package if you want to use an ActiveX control to access the capabilities of the DT3155 board using Microsoft Visual Basic or Visual C++.
- **GLOBAL LAB Image/2** –Order this optional software package if you want to develop scientific applications using object-oriented image processing tools.
- **DT Vision Foundry** –Order this optional software package if you want to develop machine vision applications using object-oriented image processing tools.

Refer to Data Translation's imaging product catalog for information on additional software packages available for the DT3155 board.

Accessories

The following optional accessories are available for the DT3155 board:

- **EP306** –To connect the DT3155 board to your video input source, you need either an EP306 cable (available from Data Translation) or a user-designed cable.

  The EP306 is a 5-foot cable with a 15-pin, D-shell connector on one end and 14 BNC connectors on the other end. It accommodates all the signals from the J1 connector on the DT3155 board. Refer to Appendix B for connector information.

- **Time Integration Module** –To control exposure time of the Cohu 4910 Series of high-performance monochrome CCD cameras, you can use the Time Integration Module available from Data Translation.

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Principles of Operation

The DT3155 is a programmable, flexible, monochrome frame grabber board for the PCI bus that can perform two-dimensional acquisitions. This chapter describes the features of the DT3155 board from a functional point of view. To aid the discussions in this chapter, refer to the block diagram of the DT3155, shown in Figure 1.

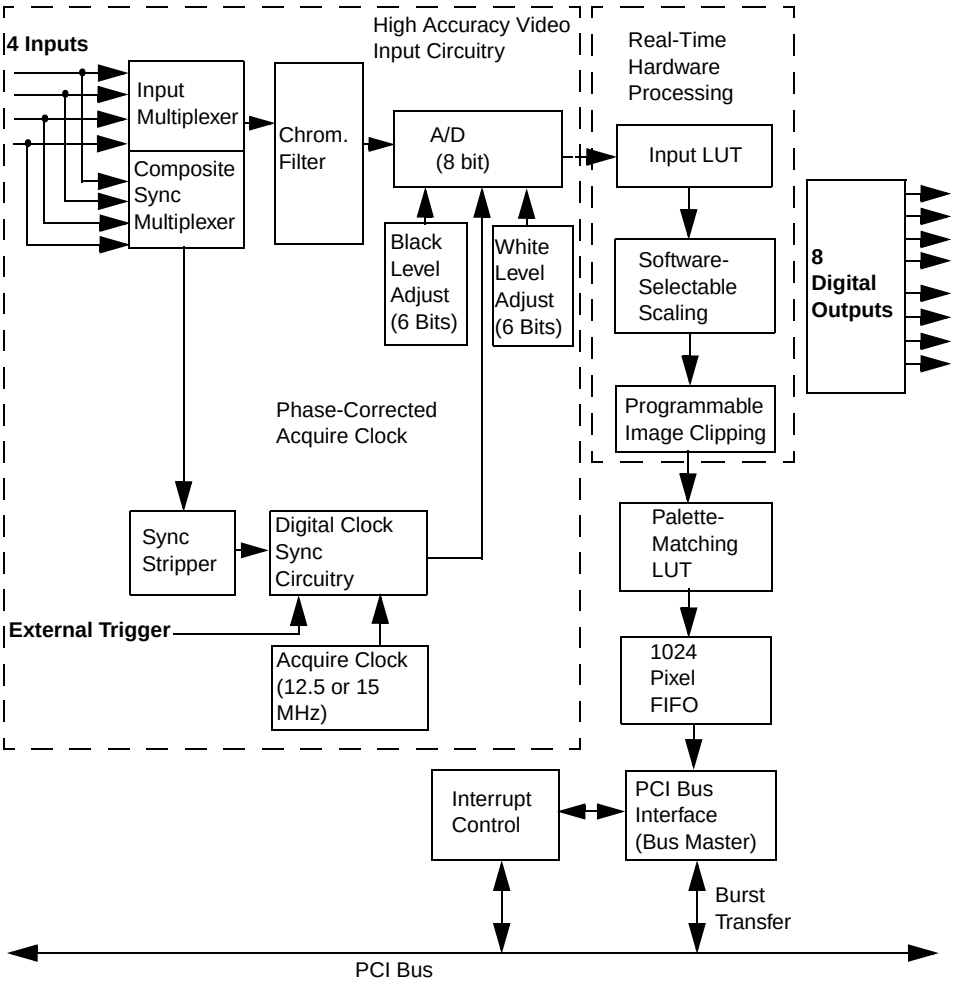


Figure 1: DT3155 Block Diagram

Video Input Signals

This section describes the following aspects of the supported input signals:

- Video formats,
- Video input channels,
- Chrominance notch filter,
- Black and white levels,
- Pixel clock, and
- External trigger.

Video Formats

The DT3155 can acquire monochrome images in the following standard, composite video formats:

- RS-170 –Standard for 60 Hz monochrome video signals. A video frame consists of 525 lines, 480 lines of which are visible.
- CCIR –Standard for 50 Hz monochrome video signals. A video frame consists of 625 lines, 576 lines of which are visible.
- NTSC/RS-330 –Standard for 60 Hz color video signals; color is superimposed over the monochrome RS-170 image. A video frame consists of 525 lines, 480 lines of which are visible.
- PAL –Standard for 50 Hz color video signals; color is superimposed over the monochrome RS-170 image. A video frame consists of 625 lines, 576 lines of which are visible.

Video Input Channels

The DT3155 supports monochrome video input from one of four software-selectable video channels (0 to 3). The channel is software-selectable.

By default, channel 0 is selected.

Chrominance Notch Filter

If the video signal has chrominance information on it, as is the case with the NTSC/RS-330 and PAL video formats, you can use software to apply an AC chrominance notch filter to remove the chrominance information. The chrominance notch filter for 60 Hz is set to 3.58 MHz, while the chrominance filter for 50 Hz is set to 4.43 MHz.

By default, no filter is selected.

Black and White Levels

Black level is defined by DT-Open Layers as the voltage below which all other voltages are digitized to black. Conversely, *white level* is defined as the voltage above which all other voltages are digitized to white. For ease of use, both of these voltages are measured at the camera's output.

The DT3155 supports a minimum black level of −1.275 mV and a maximum black level of 306 mV, in increments of 1.195 mV. By default, the black level is −53.855 mV for 60 Hz and 1.275 mV for 50 Hz.

The DT3155 supports a minimum white level of 351.1 mV and a maximum white level of 1.009 V, in 255 steps of 2.58 mV. By default, the white level is 714.8 mV for 60 Hz and 700 mV for 50 Hz.

After it has been adjusted, the DT3155 board digitizes the video signal between the adjusted minimum full-scale voltage and the white level voltage.

Note: For proper operation, it is recommended that you do not use a white level value below 502 mV. In addition, the difference between the maximum full-scale voltage and the adjusted minimum full-scale voltage (0 V) should not be less than 500 mV.

Pixel Clock

The DT3155 generates a 12.5 MHz pixel clock signal for 60 Hz image formats and a 15 MHz pixel clock signal for 50 Hz image formats.

Using the Digital Clock Sync Circuitry, which has no more than ±5.0 ns jitter, the DT3155 board synchronizes the pixel clock to the first frame of an asynchronous external video source.

External Trigger

The DT3155 frame grabber provides pin 4 (EXT_TRIG_IN) on connector J1 for connecting an external trigger input.

Using an external trigger, you can synchronize an acquisition with an external event. You can enable and invert the external trigger using software. When the external trigger is enabled, image acquisition starts when a low-to-high edge (rising-edge) transition occurs or if the external trigger is inverted, when a high-to-low (falling-edge) transition occurs on pin 4 of connector J1.

Input Look-Up Table

The board's input look-up table (ILUT) allows you to change the value of an incoming pixel. The digital value of each 8-bit pixel passes from the ADC into the 256 x 8-bit ILUT on the board. The ILUT retrieves the output value for that particular pixel and passes the output value to the software scaler. Pixel values range from 0 to 255.

Using software, you can specify the relationship between the pixel input value and the ILUT output value by loading the ILUT with different processing setups. For example, you can pass an image unaltered (the default setting, known as *identity*), or you can perform pixel point operations, such as image multiplication and division, intensity correction, and reverse-video, before passing the image on.

As an example, assume that the ILUT is loaded with the identity pattern. An input value of 0 (black) has an output value of 0 (black). An input value of 1 has an output value of 1. An input value of 2 has an output value of 2, and so on, up to and input value of 255, which has an output value of 255 (white).

As another example, if you load the ILUT with an inverse or negative pattern, an input of 0 (black) has an output value of 255 (white), an input value of 1 has an output value of 254, and so on, up to an input value of 255 (white), which has an output value of 0 (black).

Note: In addition to ILUTs, passthru operations make use of passthru LUTs. For more information about passthru LUTs, refer to page 22.

Sync Signals

This section describes the following aspects of the sync signals:

- Sync signal selection, and
- Sync signal insertion (Sync Sentinel).

Sync Signal Selection

To digitize the incoming video signal, the DT3155 frame grabber requires both horizontal and vertical sync signals. The DT3155 board determines this sync information from the current input channel or from one of the unused composite video input signals on the board. You select the sync source in software.

The sync signal is fed directly into the sync circuitry. The voltage level of the analog sync signal is compared with the sync threshold to determine when the sync is asserted. The sync period is defined as the portion of the sync signal that falls below the sync threshold. The sync is then used to generate the horizontal and vertical timing for the input section of the DT3155 board.

On the DT3155, you can program the sync threshold. Possible threshold limits are 50 mV, 75 mV, 100 mV, and 125 mV (nominal is 125 mV).

Sync Signal Insertion (Sync Sentinel)

The Sync Sentinel circuitry provides sync continuity for the DT3155 board. The Sync Sentinel is especially useful for noisy input sources, such as VCRs, where the DT3155 frame grabber may interpret a noise spike in the video signal as a horizontal or vertical sync, or the board may miss some syncs that are below the threshold.

You can enable or disable the Sync Sentinel through software. By default, the Sync Sentinel is enabled.

When enabled, the Sync Sentinel on the DT3155 provides a fixed window in which a sync can be detected. If a sync (either horizontal or vertical) has not been detected within the window (where one is expected), the Sync Sentinel inserts the appropriate sync. Once the sync is detected, the Sync Sentinel masks any further sync detection until the next window occurs.

If you are switching among multiple channels that are not synchronized with each other or if the sync signals occur at random intervals, you can disable the Sync Sentinel. This allows the DT3155 frame grabber to lock to the sync from the new video signal as soon as it occurs.

Video Area

The total video area is a complete set of horizontal and vertical input lines from which you extract the active video area and the frame within the active video area. The total video area includes all parts of the signal, including nonvisual portions such as horizontal and vertical blanking information. (Blanking information is the data not included in the active video area; it contains sync and other information.)

The total video area is as wide as the total pixels per line (the entire area between two consecutive horizontal sync signals) and as tall as the total lines per field (the entire area between two consecutive vertical sync signals).

You can calculate the total pixels per line as follows:

$$\text{Total pixels per line} = \frac{\text{pixel clock frequency (MHz)}}{\text{horizontal frequency (kHz)}}$$

You can calculate the total lines per field as follows:

$$\text{Total lines per field} = \frac{\text{horizontal frequency (kHz)}}{\text{vertical frequency (Hz)}}$$

Active Video Area

The active video area floats in the total video area. The active video area is defined as that part of the incoming signal that contains valid video data (not blanking or sync information). Therefore, the active video area consists of the visible portion of those lines containing visible pixel data. Its top is set by the first active line, its left side is set by the first active pixel, it is as wide as the active pixel count, and it is as tall as the active line count.

For more information about the horizontal and vertical signals that comprise the total video area and the parameters you can set to specify the active video area, refer to the following sections.

Horizontal Video Signal

Each line of video comprising the total video area contains blanking information and active video. Figure 2 shows the components of a single horizontal line of video.

Note that the frame is an area that you establish within the active video area. For information about the frame, refer to page 16.

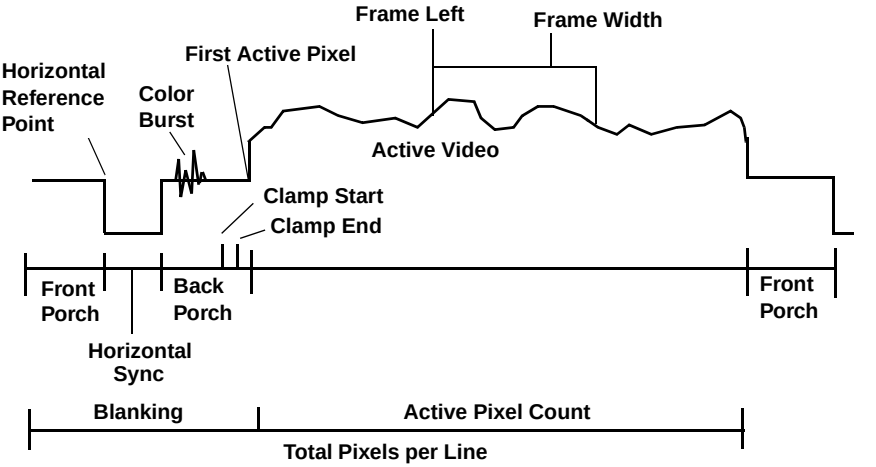


Figure 2: Horizontal Video Signal

A horizontal line of video is identified by the falling edge of the horizontal sync, and a field is composed of a collection of horizontal lines defined by the active line count. Pixel measurements are relative to the horizontal reference point, which is defined as the beginning of the horizontal sync.

The settings for the horizontal video signal are fixed on the DT3155 board.

Vertical Video Signal

Each field of video also contains blanking information and lines of active video. Figure 3 shows the components of a single vertical field of noninterlaced video.

Note that the frame is an area that you establish within the active video area. For information about the frame, refer to page 16.

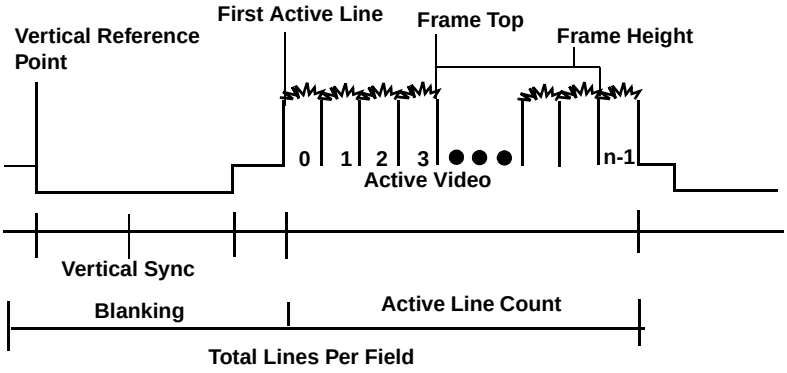


Figure 3: Vertical Video Signal

Line measurements are relative to the vertical reference point, which is defined as the beginning of the vertical sync. Lines themselves are measured in terms of pixels.

The settings for the vertical video signal are fixed on the DT3155 board.

Frame (Region of Interest)

The frame is the portion of the active video area that you want to digitize. For this reason, it is sometimes called the region of interest (ROI).

This section describes the following aspects of frames:

- Frame size,
- Frame type,
- Scaling frames, and
- Frame storage modes.

Frame Size

The top of the frame is the first line of video relative to the active video area; this is fixed at 0 on the DT3155 board. The left side of the frame is the first pixel of video relative to the active video area; this is fixed at 0 on the DT3155 board.

The width of the frame is the number of pixels per line of video; this is fixed at 768 for 50 Hz and 640 for 60 Hz on the DT3155 board. The height of the frame is the number of lines per field; this is fixed at 576 for 50 Hz and 480 for 60 Hz on the DT3155 board.

Figure 4 illustrates these relationships.

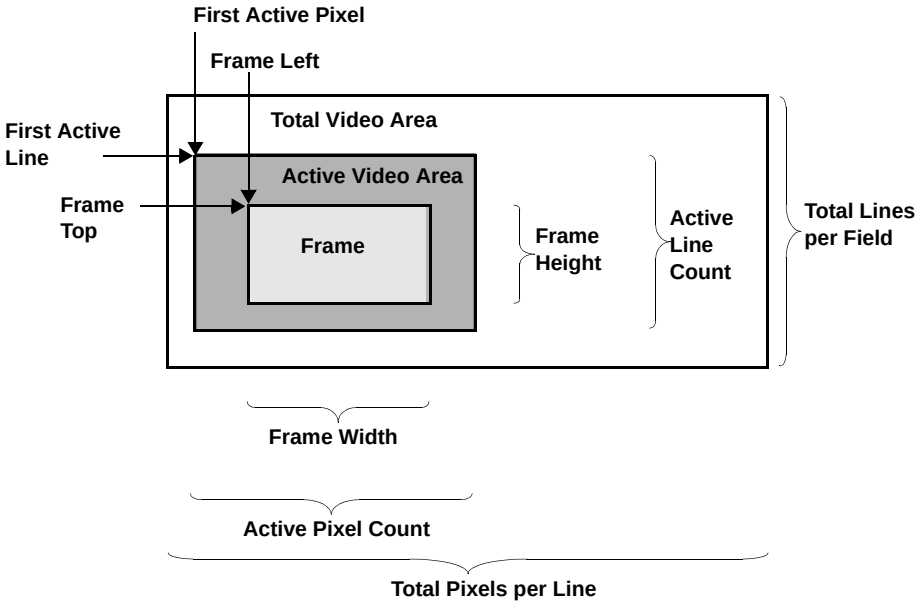


Figure 4: Spatial Relationship of Video Signal

Types of Frames

The DT3155 board can acquire interlaced frames only.

The video signal is defined as two consecutive fields, where the start of each field is identified by the falling edge of the vertical sync. These two fields are acquired to create the complete frame. The even field contains lines 0, 2, 4, and so on; the odd field contains lines 1, 3, 5, and so on.

Using software, you can select one of the following types of frame acquisitions:

- Interlaced frames, starting on the next even field (the default),
- Interlaced frames, starting on the next odd field, or
- Interlaced frames, starting on the next field (odd or even).

Scaling Frames

You cannot reduce or enlarge (scale) the image on the DT3155 board. The scale factor is fixed at 1.

Frame Storage Mode

You can store the frame data for DT3155 board in monochrome mode only, or 8-bits per pixel.

Passthru Operations

In a passthru operation, the DT3155 board continuously captures and displays video data until you stop the operation. Typically, you use passthru to view images (in as close to real time as possible for the configuration and passthru method chosen) for the purpose of focusing or positioning the camera.

In addition to displaying passthru data, you can continuously store the data to user-allocated buffers in host memory, if desired. This operation is called continuous-acquire passthru mode.

This section describes the following aspects of passthru:

- Passthru modes,
- Source origin,
- Passthru scaling,
- Passthru LUT, and
- Overlays.

Passthru Modes

The DT3155 board supports bitmap passthru mode and continuous-acquire passthru mode. This section describes these modes.

Bitmap Passthru Mode

The DT3155 board supports asynchronous bitmap passthru mode. The operation starts but returns control to you immediately, allowing you to perform other operations while data is displayed.

Bitmap passthru mode requires one frame buffer in device memory into which the image is captured.

Once the image is captured, functions in Windows perform bit copies of the image data to display memory. Functions in Windows handle obstructions to the passthru window by automatically clipping the passthru image to the visible client window region. If a window is obstructed in bitmap mode, the passthru continues unabated. When the obstruction is removed, Windows automatically restores the correct underlying image data.

An asynchronous bitmap passthru operation continues until you stop it using software.

Note: No image is saved to memory when passthru is stopped. To save to memory, you must perform an acquisition (see page 23).

Continuous-Acquire Passthru Mode

The DT3155 board supports asynchronous, continuous-acquire passthru mode. Since it is asynchronous, the operation starts but gives control to you immediately, allowing you to perform other operations while data is acquired and/or displayed.

Using software, you can set up the continuous-acquire passthru operation so that data is continuously stored and displayed, or continuously stored but not displayed.

If you want to display data in continuous-acquire passthru mode, functions in Windows perform bit copies of the image data to display memory. These functions also handle obstructions to the passthru window by automatically clipping the passthru image to the visible client window region. Therefore, even if the window is obstructed in bitmap mode, the passthru can continue unabated. Once an obstruction has been removed from the passthru window client area, Windows automatically restores the correct underlying image data.

In continuous-acquire passthru mode, data is stored in a circular buffer in device memory. This mode also has a synchronization mechanism using a WIN32 event object. Using this object, you can synchronize your application with the DT3155 board to process data as it becomes available.

A continuous-acquire passthru operation continues until you stop it using software.

Source Origin

The source origin of an image is the upper left corner of the image. Using software, you can change the source origin of an image to pan and scroll the image during a passthru operation.

The source origin is a pixel position in the image. Values in the horizontal direction range from 0 to 636 for 60 Hz, and 0 to 764 for 50 Hz (in increments of 4). Values in the vertical direction range from 0 to 476 for 60 Hz, and 0 to 572 for 50 Hz (in increments of 4).

When set, the pixel position becomes the upper left corner of the window. The passthru image shifts to the new position.

Passthru Scaling

After the passthru image is transferred to system memory, you can scale the passthru image up to 1/2 of the frame size in either dimension using software. This feature allows a real-time display window that takes less room on the Windows desktop. Images with sharp (single-pixel) vertical or horizontal lines may have missing information when acquired.

For the width, values are 320 or 640 pixels for 60 Hz, and 384 or 768 pixels for 50 Hz. For the height, values are 240 or 480 lines for 60 Hz, and 288 or 576 lines for 50 Hz.

Passthru LUT

It is assumed that the data passed to display memory is 8 bits/pixel. By default, passthru operations load the Windows system palette with 128 grayscale RGB values for display and use the default passthru LUT of 256 monotonically increasing grayscales.

Using software, you can modify the 256-position passthru LUT so that false coloring is used. For each entry in the passthru LUT, the index of the closest matching RGB value in the Windows system palette is used. If an exact match is needed, you can use software to define 15 extra entries in the Windows system palette.

Overlays

If your system provides Direct Draw Interface (DDI) support, you can add overlays to bitmap passthru operations. An overlay is an image that you place on top of the image that was captured using passthru.

You cannot use overlays with direct passthru because they are equivalent to an obstruction and cause passthru to pause.

Acquisition Modes

The DT3155 board can acquire interlaced frames synchronously or asynchronously and store them in system memory.

In a synchronous acquisition, you cannot perform another operation until the synchronous acquisition completes. In an asynchronous acquisition, the operation starts but gives control to you immediately, allowing you to perform other operations while data is acquired.

Using the DT3155, you can acquire single frames to an area in system memory that was either allocated to the DT3155 Device Driver during system startup (called *device memory*) or provided by you (called *host memory*).

An interrupt is generated when an even field or an odd field has been acquired; the PCI bus assigns the interrupt to the DT3155 board automatically when it is installed.

The speed of the PCI bus allows the DT3155 to transfer an unlimited number of consecutive frames across the bus in real time. You can acquire and store consecutive images, up to the capacity of available system memory.

Acting as a PCI bus master, the board sends pixel data over the PCI bus directly using burst transfer rates up to 30 frames/s for 60 Hz image formats and 25 frames/s for 50 Hz image formats. Note that a 16-bit color display adapter is required when performing overlays (DDI).

Digital Output Signals

The DT3155 board provides eight digital output lines on pins 1 to 3 and 9 to 13 on the board's J1 connector.

These digital output signals are simple register-driven, TTL-level signals that you can use for any purpose, such as controlling or actuating external devices. A bit value of 0 identifies a low TTL level; a bit value of 1 identifies a high TTL level.

Use software to write the digital output values.

Supported Device Driver Capabilities

DT3155 Device Driver Capabilities

Because the Frame Grabber SDK is intended to be used with all DT-Open Layers frame grabbers, the DT3155 may not support all of the Frame Grabber SDK capabilities or may support the Frame Grabber SDK capabilities differently from other boards.

To help you determine which capabilities are supported by the DT3155 board, you can use query keys provided by the Frame Grabber SDK. These functions either return information about a specific capability or return the current value of a specific capability.

The tables in this chapter list the capabilities supported by the DT3155 board and the information needed to query the board. The left column of the tables lists the capabilities along with the query key/control used for the listed function. The query's possible returned flags, if any, are indented under the key along with a description. The right column indicates whether the DT3155 board supports the capability or flag or the range of values supported by the capability.

To find the information about a capability more readily, use this information:

For capabilities that apply to ...	Refer to the table starting on ...
All frame grabbers	page 28
Input signals	page 29
Sync signals	page 32
Active video area	page 33
Frames	page 34
Passthru	page 36

For capabilities that apply to ...	Refer to the table starting on ...
Overlay	page 39
Memory	page 40
Acquisition	page 41
Digital I/O	page 43

Note: If your code is intended to be compatible with various Data Translation products, use the query functions to determine that the capability is supported by the installed board, prior to execution.

For more information, refer to the description of the functions in the *Frame Grabber SDK User's Manual* and online help.

Table 1: General Device Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlImgQueryDeviceCaps	
Device Signature OLC_IMG_DC_OL_SIGNATURE	Ox44544F4C
Device ID OLC_IMG_DC_DEVICE_ID	2D
Device Name OLC_IMG_DC_DEVICE_NAME	“DT3155”
Device Type OLC_IMG_DC_OL_DEVICE_TYPE Monochrome Frame Grabber OLC_IMG_DEV_MONO_FRAME_GRABBER Color Frame Grabber OLC_IMG_DEV_COLOR_FRAME_GRABBER	 Yes No
Sections Supported OLC_IMG_DC_SECTIONS Supports Input Operations OLC_FG_SECTION_INPUT Supports Linear Memory Operations OLC_FG_SECTION_LINEAR Supports Camera Control Operations OLC_FG_SECTION_CAMCTL Supports Management of Device Memory OLC_FG_SECTION_MEMORY Supports passthru OLC_FG_SECTION_PASSTHRU Supports DDI OLC_FG_SECTION_DDI	 Yes No No Yes Yes Yes

Table 2: Input Signal Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryInputCaps	
Number of Input Sources OLC_FG_INPUT_SOURCE_COUNT	4
Supports Input Filter Selection OLC_FG_IC_DOES_INPUT_FILTER	Yes
Supports Input Filter Query OLC_FG_IC_DOES_QUERY_INPUT_FILTER	Yes
Supported Filters OLC_FG_IC_INPUT_FILTER_LIMITS AC Coupled, no Input Filter OLC_FG_FILT_AC_NONE AC Coupled, 50 Hz Input Filter OLC_FG_FILT_AC_50 AC Coupled, 60 Hz Input Filter OLC_FG_FILT_AC_60 DC Coupled, no Input Filter OLC_FG_FILT_DC_NONE	 Yes Yes Yes No
Supports Programmable A/D OLC_FG_IC_DOES_PROG_A2D	Yes
Supports Programmable A/D Query OLC_FG_IC_DOES_QUERY_PROG_A2D	Yes
Voltage Range of Black Level, in µV OLC_FG_IC_BLACK_LEVEL_LIMITS	min: -1,275[a] max: +306,000 nominal: 50 Hz: 1,275 60 Hz: 53,855 granularity: 1,195

Table 2: Input Signal Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Voltage Range of White Level, in µV OLC_FG_IC_WHITE_LEVEL_LIMITS	min: 351,100[b,c] max: 1,009,000 nominal: 50 Hz: 700,000 60 Hz: 714,880 granularity: 2,580
Supports Programmable Pixel Clock OLC_FG_IC_DOES_PIXEL_CLOCK	No
Supports Pixel Clock Query OLC_FG_IC_DOES_QUERY_PIXEL_CLOCK	Yes
Range of Internal Input Clock Frequency, in Hz OLC_FG_IC_CLOCK_FREQ_LIMITS	Fixed 50 Hz: 15,000,000 60 Hz: 12,500,000
Clock Sources OLC_FG_IC_CLOCK_SOURCE_LIMITS Supports Internal Clock OLC_FG_CLOCK_INTERNAL Supports External Clock OLC_FG_CLOCK_EXTERNAL	 Yes No
Provides Trigger OLC_FG_IC_DOES_TRIGGER	Yes
Trigger Types OLC_FG_TRIGGER_TYPE_LIMITS Supports Externally Triggered Acquisition OLC_FG_TRIG_EXTERNAL_LINE	 Yes
Multiple Trigger Types OLC_FG_IC_MULT_TRIGGER_TYPE_LIMITS Supports Externally Triggered Acquisition OLC_FG_TRIG_EXTERNAL_LINE	 Yes

Table 2: Input Signal Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Multiple Trigger Modes OLC_FG_IC_MULT_TRIGGER_MODE_LIMITS Trigger Starts Multiple Frame Acquisition OLC_FG_MODE_START Trigger Starts Each Frame Acquisition OLC_FG_MODE_EACH	 Yes Yes
Number of LUTs OLC_FG_ILUT_COUNT	 1
Maximum Index Number Allowed in ILUT OLC_FG_IC_MAX_ILUT_INDEX	 255[d]
Maximum Value Allowed in LUT OLC_FG_ILUT_VALUE	 255

a. If your software supports offset instead of black level, the supported ranges are as follows: minimum offset = -306,000 µV; maximum offset = -1.275 µV; nominal offset (50 Hz) = -1,275 µV; nominal offset (60 Hz) = -53,855 µV; granularity = 1,195 µV.

b. If your software supports reference instead of white level, the supported ranges are as follows: 45,100 µV; maximum reference = 1,007,725 µV; nominal reference (50 Hz) = 698,725 µV; nominal reference (60 Hz) = 661,025 µV; granularity = 2,580 µV.

c. Although the device driver supports a minimum white level of 351,100 µV, for proper operation, it is recommended that you do not use a white level value below 502,000 µV.

d. The maximum number of entries allowed in the ILUT is 255, since the index number is zero-based.

Table 3: Sync Signal Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryInputCaps	
Supports Input Video Selection OLC_FG_IC_DOES_VIDEO_SELECT	No
Supports Input Video Selection Query OLC_FG_IC_DOES_QUERY_VIDEO_SELECT	Yes
Video Types OLC_FG_IC_VIDEO_TYPE_LIMITS Supports Composite Video Source OLC_FG_VID_COMPOSITE Supports Variable Scan Video Source OLC_FG_VID_VARSCAN	 Yes No
Video Sources OLC_FG_IC_CSYNC_SOURCE_LIMITS Composite Sync from Current Input Only OLC_FG_CSYNC_CURRENT_SRC Composite Sync from Any Specified Input OLC_FG_CSYNC_SPECIFIC_SRC Composite Sync from External Sync Line OLC_FG_CSYNC_EXTERNAL_LINE	 No Yes No
Composite Sync Threshold Limits, in mV OLC_FG_IC_CSYNC_THRESH_LIST_LIMITS	 min: 50 max: 125 nominal: 125 count: 4
Composite Sync Threshold List OLC_FG_IC_CSYNC_THRESH_LIST	 50, 75, 100, 125
Supports Sync Sentinel OLC_FG_IC_DOES_SYNC_SENTINEL	 Yes

Table 3: Sync Signal Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Supports Sync Sentinel Query OLC_FG_IC_DOES_QUERY_SYNC_SENTINEL	Yes
Sync Sentinel Types OLC_FG_IC_SYNC_SENTINEL_TYPE_LIMITS Supports Fixed Sync Sentinel OLC_FG_SYNC_SENTINEL_FIXED Supports Variable Sync Sentinel OLC_FG_SYNC_SENTINEL_VARIABLE	 Yes No

Table 4: Active Video Area Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryInputCaps	
Supports Defining of Active Video Area OLC_FG_IC_DOES_ACTIVE_VIDEO	No
Supports Active Video Area Query OLC_FG_IC_DOES_QUERY_ACTIVE_VIDEO	No
Range of Back Porch Start Position OLC_FG_IC_BACK_PORCH_START_LIMITS	N/A
Range of Clamp Start Position OLC_FG_IC_CLAMP_START_LIMITS	N/A
Range of Clamp End Position OLC_FG_IC_CLAMP_END_LIMITS	N/A
Range of Total Pixels Per Line Control OLC_FG_IC_TOTAL_PIX_PER_LINE_LIMITS	N/A
Range of First Active Pixel Position OLC_FG_IC_ACTIVE_PIXEL_LIMITS	N/A
Range of Active Pixels Count OLC_FG_IC_ACTIVE_WIDTH_LIMITS	N/A

Table 4: Active Video Area Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Range of Total Lines per Field Control OLC_FG_IC_TOTAL_LINES_PER_FLD_LIMITS	N/A
Range of First Active Line Position OLC_FG_IC_ACTIVE_LINE_LIMITS	N/A
Range of Active Lines Count OLC_FG_IC_ACTIVE_HEIGHT_LIMITS	N/A

Table 5: Frame Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryInputCaps	
Supports Frame Selection OLC_FG_IC_DOES_FRAME_SELECT	No
Supports Frame Selection Query OLC_FG_IC_DOES_QUERY_FRAME_SELECT	Yes
Range of Frame Top Control OLC_FG_IC_FRAME_TOP_LIMITS	Fixed: 0
Range of Frame Left Control OLC_FG_IC_FRAME_LEFT_LIMITS	Fixed: 0
Range of Frame Height Control OLC_FG_IC_FRAME_HEIGHT_LIMITS	Fixed 50 Hz: 576 60 Hz: 480
Range of Frame Width Control OLC_FG_IC_FRAME_WIDTH_LIMITS	Fixed 50 Hz: 768 60 Hz: 640
Range Between Pixels (Scale factor - horizontal) OLC_FG_IC_FRAME_HINC_LIMITS	1

Table 5: Frame Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Range Between Lines (Scale factor - vertical) OLC_FG_IC_FRAME_VINC_LIMITS	1
Frame Types OLC_FG_IC_FRAME_TYPE_LIMITS Acquire Interlaced Frame Starting on Even Field OLC_FG_FRM_IL_FRAME_EVEN Acquire Interlaced Frame Starting on Odd Field OLC_FG_FRM_IL_FRAME_ODD Acquire Interlaced Frame Starting on Next Field OLC_FG_FRM_IL_FRAME_NEXT Acquire the Even Field OLC_FG_FRM_FIELD_EVEN Acquire the Odd Field OLC_FG_FRM_FIELD_ODD Acquire the Next Field OLC_FG_FRM_FIELD_NEXT Acquire the Next Noninterlaced Frame OLC_FG_FRM_NON_INTERLACED	 Yes Yes Yes No No No No
Maximum Number of Pixels in Frame OLC_FG_IC_MAX_FRAME_SIZE	50 Hz: 442,368 60 Hz: 307,200
Number of Bytes in a Pixel OLC_FG_IC_PIXEL_DEPTH	1

Table 6: Passthru Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryPassthruCaps	
Supports Passthru Section OLC_FG_PC_DOES_PASSTHRU	Yes
Passthru Modes OLC_FG_PC_PASSTHRU_MODE_LIMITS Supports Sync Bitmap OLC_FG_PASSTHRU_SYNC_BITMAP Supports Sync Direct OLC_FG_PASSTHRU_SYNC_DIRECT Supports Async Bitmap OLC_FG_PASSTHRU_ASYNC_BITMAP Supports Async Direct OLC_FG_PASSTHRU_ASYNC_DIRECT Supports Continuous-Acquire OLC_FG_PASSTHRU_ASYNC_BITMAP_EXTENDED	 No No Yes[a,b] No Yes
Source Origin OLC_FG_PC_DOES_SOURCE_ORIGIN Available Range For the X Value of the Source Origin OLC_FG_PC_SRC_ORIGIN_X_LIMITS Available range for the Y value of the source origin OLC_FG_PC_SRC_ORIGIN_Y_LIMITS 	 Yes min: 0 max: 50 Hz: 764 60 Hz: 636 nominal: 0 granularity: 4 min: 0 max: 50 Hz: 572 60 Hz: 476 nominal: 0 granularity: 4

Table 6: Passthru Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Scaling OLC_FG_PC_DOES_SCALING Range of Legal Values for Height OLC_FG_PC_SCALE_HEIGHT_LIMITS	 Yes min: 50 Hz: 288 60 Hz: 240 max: 50 Hz: 576 60 Hz: 480 nominal: 50 Hz: 576 60 Hz: 480 granularity: 50 Hz: 288 60 Hz: 240
Range of Legal Values for Width OLC_FG_PC_SCALE_WIDTH_LIMITS	 min: 50 Hz: 384 60 Hz: 320 max: 50 Hz: 768 60 Hz: 640 nominal: 50 Hz: 768 60 Hz: 640 granularity: 50 Hz: 384 60 Hz: 320

Table 6: Passthru Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
Passthru LUT OLC_FG_PC_DOES_PASSTHRU_LUT Number of Extra Palette Entries OLC_FG_PC_MAX_PALETTE_INDEX Maximum RGB Value for Palette OLC_FG_PC_MAX_PALETTE_VALUE Maximum Index Number in Passthru LUT OLC_FG_PC_MAX_PLUT_INDEX Maximum RGB Value for Passthru LUT OLC_FG_PC_MAX_PLUT_VALUE	 Yes 15 255 255[c] 255
Passthru Snapshot OLC_FG_PC_DOES_PASSTHRU_SNAPSHOT	 Yes

a. This mode is available when the graphics adapter is in 8-bit, 256 color mode. True color (32-bit) is not supported.

b. This mode is available when the graphics adapter is in 16-bit, 65536 color mode, providing that the graphics adapter supports DDI. True color (32-bit) is not supported.

c. The maximum number of entries allowed in the ILUT is 255, since the index number is zero-based.

Table 7: Overlay Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryDDICaps	
Passthru with DDI OLC_FG_DDI_FAST_PASSTHRU	Yes
Overlay support OLC_FG_DDI_OVERLAYS	Yes[a]
Translucent overlay capability OLC_FG_DDI_TRANSLUCENT_OVERLAYS	Yes[a]
Color overlay capability OLC_FG_DDI_COLOR_OVERLAY	Yes[a]
Multiple overlay surface capability OLC_FG_DDI_MULTIPLE_SURFACES	Yes[a]
Color keying (filtering) OLC_FG_DDI_COLOR_KEY_CONTROL	Yes[a]
Add overlay to image OLC_FG_DDI_OVERLAY_ON_FRAME	No
User-managed DDI surface support OLC_FG_DDI_USER_SURFACE_PTR	No
Passthru event synchronization support OLC_FG_DDI_PASSTHRU_SYNC_EVENT	Yes[a]

a. This mode is available when the graphics adapter is in 16-bit, 65536 color mode, providing that the graphics adapter supports DDI. True color (32-bit) is not supported.

Table 8: Memory Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryMemoryCaps	
Memory Types OLC_FG_MC_MEMORY_TYPES Volatile Memory OLC_FG_MEM_VOLATILE Nonvolatile Memory OLC_FG_MEM_NON_VOLATILE	 Yes No
Number of Volatile Buffer Handles OLC_FG_MC_VOL_COUNT	Device memory size divided by maximum number of pixels in frame
Number of Nonvolatile Buffer Handles OLC_FG_MC_NONVOL_COUNT	N/A

Table 9: Acquisition Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryInputCaps	
Acquisition Types OLC_FG_IC_SINGLE_FRAME_OPS -Single Frame to Host (sync) Supports Full Frame Acquisition OLC_FG_ACQ_FRAME	Yes
Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT	No
-Single Frame to Device (sync) Supports Full Frame Acquisition OLC_FG_ACQ_FRAME	Yes
Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT	No
-Single Frame to Host (async) Supports Full Frame Acquisition OLC_FG_ACQ_FRAME	No
Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT	No
-Single Frame to Device (async) Supports Full Frame Acquisition OLC_FG_ACQ_FRAME	Yes
Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT	No

Table 9: Acquisition Capabilities for the DT3155 Device Driver (cont.)

Capability	DT3155 Support
OLC_FG_IC_MULT_FRAME_OPS	
-Multiple Frames to Host (sync)	
Supports Full Frame Acquisition	
OLC_FG_ACQ_FRAME	No
Supports Subframe Acquisition	
OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition	
OLC_FG_ACQ_FRAME_TO_FIT	No
-Multiple Frames to Device (sync)	
Supports Full Frame Acquisition	
OLC_FG_ACQ_FRAME	Yes
Supports Subframe Acquisition	
OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition	
OLC_FG_ACQ_FRAME_TO_FIT	No
-Multiple Frames to Host (async)	
Supports Full Frame Acquisition	
OLC_FG_ACQ_FRAME	No
Supports Subframe Acquisition	
OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition	
OLC_FG_ACQ_FRAME_TO_FIT	No
-Multiple Frames to Device (async)	
Supports Full Frame Acquisition	
OLC_FG_ACQ_FRAME	Yes
Supports Subframe Acquisition	
OLC_FG_ACQ_SUBFRAME	No
Supports Frame-to-Fit Acquisition	
OLC_FG_ACQ_FRAME_TO_FIT	No
Supports Drawing Acquired Frame	
OLC_FG_IC_DOES_DRAW_ACQUIRED_FRAME	Yes

Table 10: Digital I/O Capabilities for the DT3155 Device Driver

Capability	DT3155 Support
OlFgQueryCameraControlCaps	
Number of Digital Output Lines OLC_FG_CC_DIG_OUT_COUNT	8

Initialized Control Values

Table 11 lists the default control values after opening or initializing the DT3155 Device Driver.

Table 11: Default Control Values

Control Name	Value
OLC_FG_CTL_INPUT_FILTER	OLC_FG_FILT_AC_NONE
OLC_FG_CTL_BLACK_LEVEL	50 Hz: 1.275 mV 60 Hz: 53.855 mV
OLC_FG_CTL_WHITE_LEVEL	50 Hz: 700.000 mV 60 Hz: 714.880 mV
OLC_FG_CTL_VIDEO_TYPE	OLC_FG_VID_COMPOSITE
OLC_FG_CTL_CSYNC_SOURCE	OLC_FG_CSYNC_SPECIFIC_SRC
OLC_FG_CTL_CSYNC_THRESH	125 mV
OLC_FG_CTL_SYNC_SENTINEL	TRUE
OLC_FG_CTL_HSYNC_INSERT_POS	10150 (101.5%)
OLC_FG_CTL_HSYNC_SEARCH_POS	9500 (95.0%)
OLC_FG_CTL_VSYNC_INSERT_POS	10150 (101.5%)
OLC_FG_CTL_VSYNC_SEARCH_POS	9000 (90.0%)
OLC_FG_CTL_FRAME_TOP	0
OLC_FG_CTL_FRAME_LEFT	0
OLC_FG_CTL_FRAME_WIDTH	50 Hz: 768 60 Hz: 640
OLC_FG_CTL_FRAME_HEIGHT	50 Hz: 576 60 Hz: 480
OLC_FG_CTL_HOR_FRAME_INC	1
OLC_FG_CTL_VER_FRAME_INC	1
OLC_FG_CTL_CLOCK_FREQ	50 Hz: 15,000,000 Hz 60 Hz: 12,500,000 Hz

Table 11: Default Control Values (cont.)

Control Name	Value
OLC_FG_CTL_CLOCK_SOURCE	OLC_FG_CLOCK_INTERNAL
OLC_FG_CTL_FRAME_TYPE	OLC_FG_FRM_IL_FRAME_EVEN
OLC_FG_CTL_ILUT	0

4

Programming Flowcharts

The following flowcharts show the steps required to perform imaging operations using DT-Open Layers. For illustration purposes, the functions in the Frame Grabber SDK are shown; however, the concepts apply to all DT-Open Layers software.

Note that many steps represent several substeps; if you are unfamiliar with the detailed operations involved with any one step, refer to the indicated page for detailed information. Optional steps appear in shaded boxes.

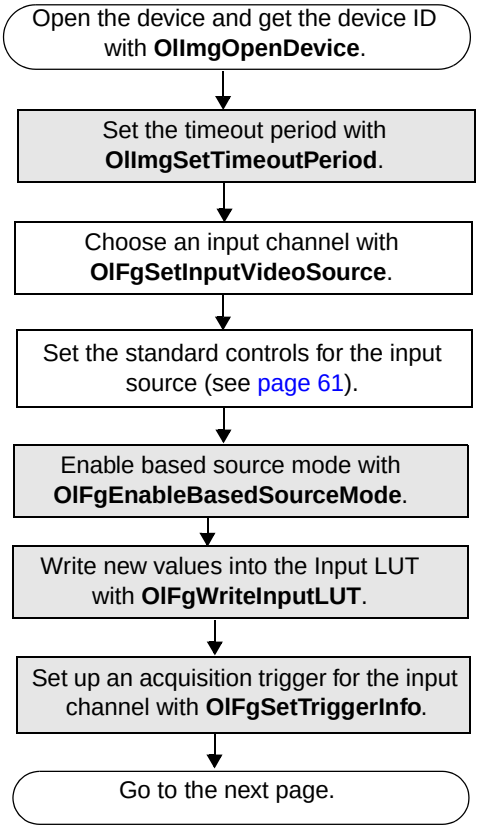
Note: Although the flowcharts do not show error/status checking, it is recommended that you check for error/status messages after calling each function.

The following flowcharts show the steps required to perform imaging operations using DT-Open Layers. For illustration purposes, the functions in the Frame Grabber SDK are shown; however, the concepts apply to all DT-Open Layers software.

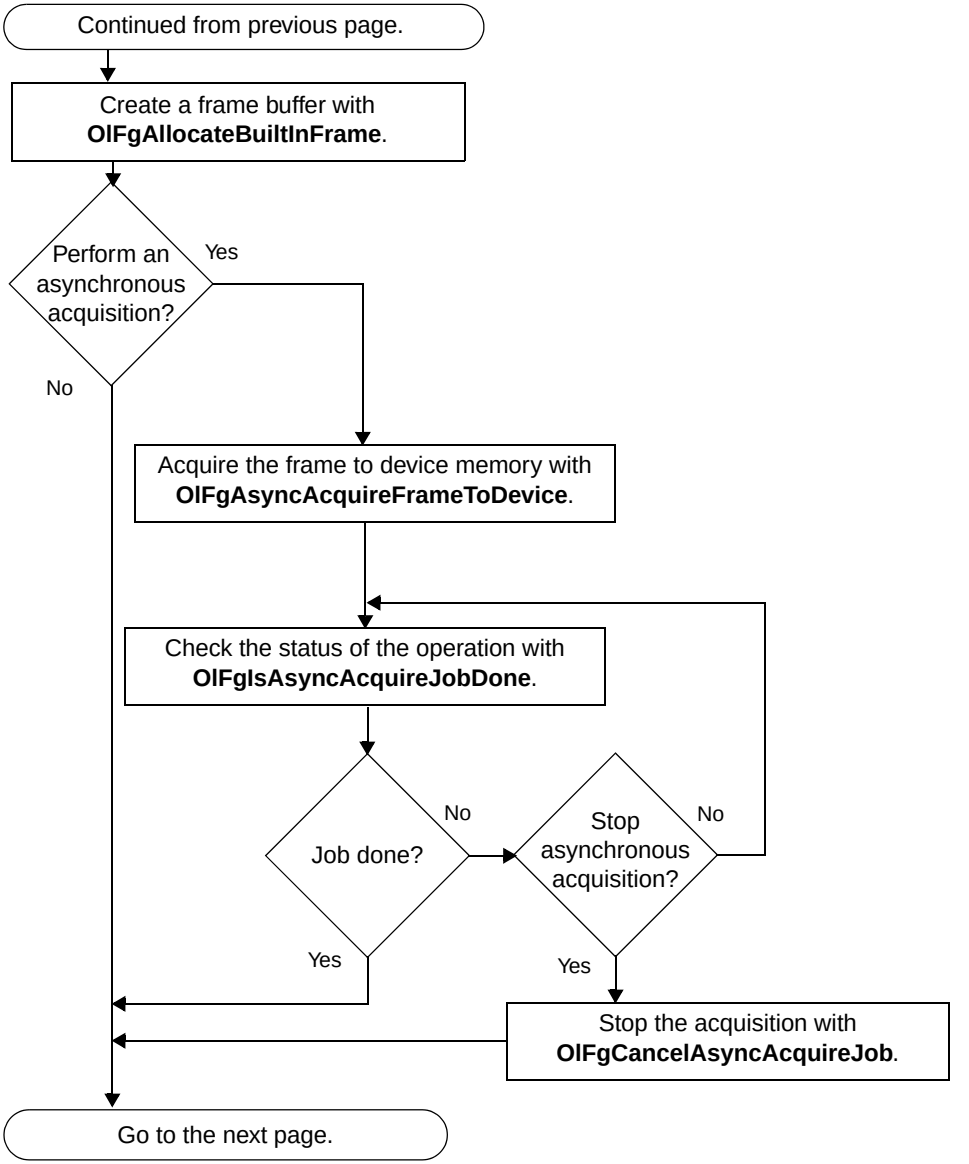
Note that many steps represent several substeps; if you are unfamiliar with the detailed operations involved with any one step, refer to the indicated page for detailed information. Optional steps appear in shaded boxes.

Note: Although the flowcharts do not show error/status checking, it is recommended that you check for error/status messages after calling each function.

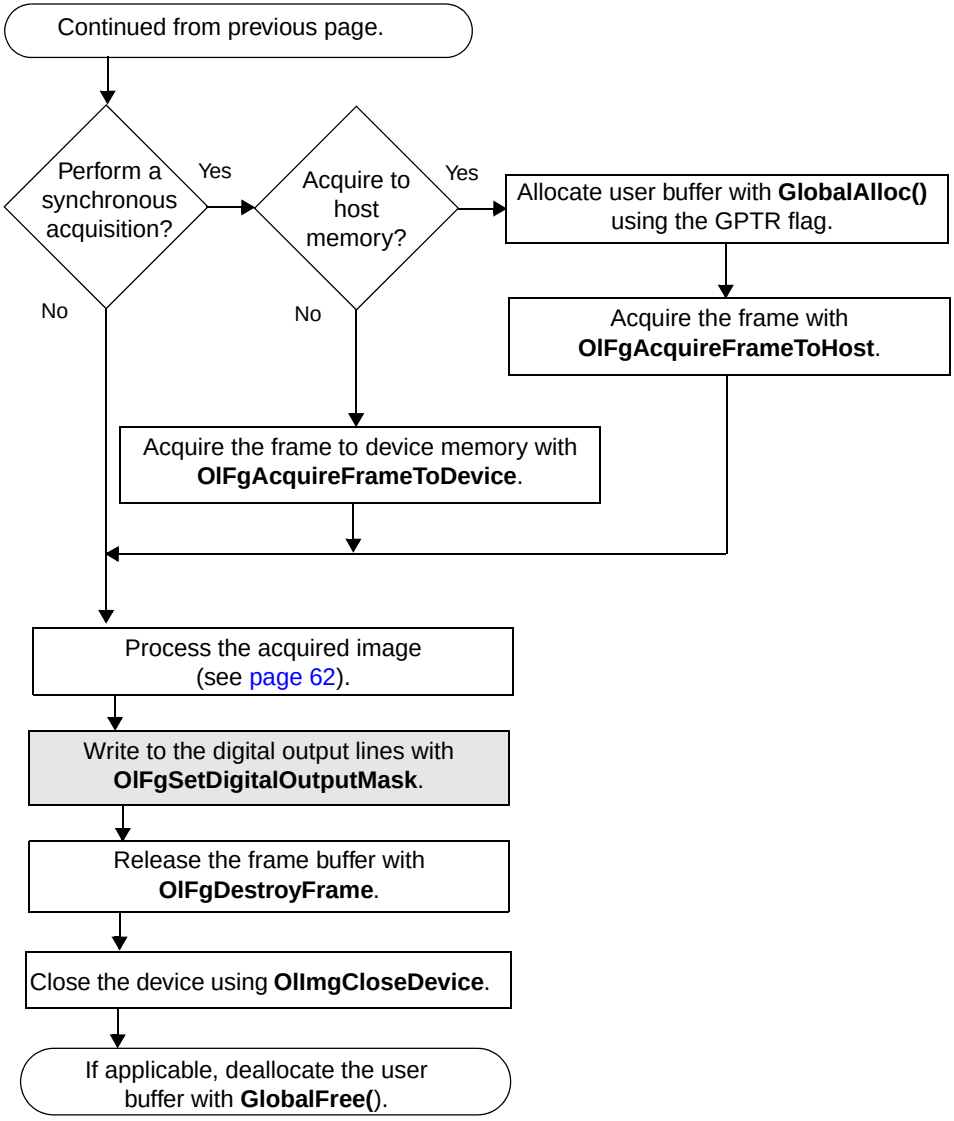
Single-Frame Acquisition



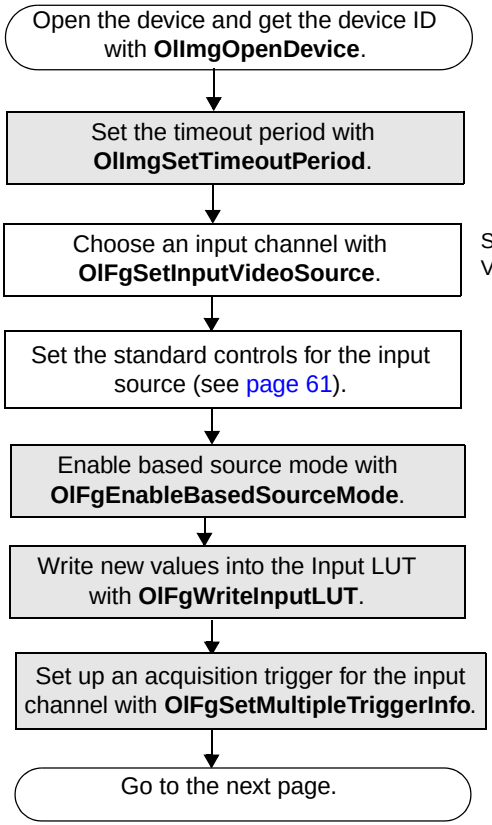
Single-Frame Acquisition (cont.)



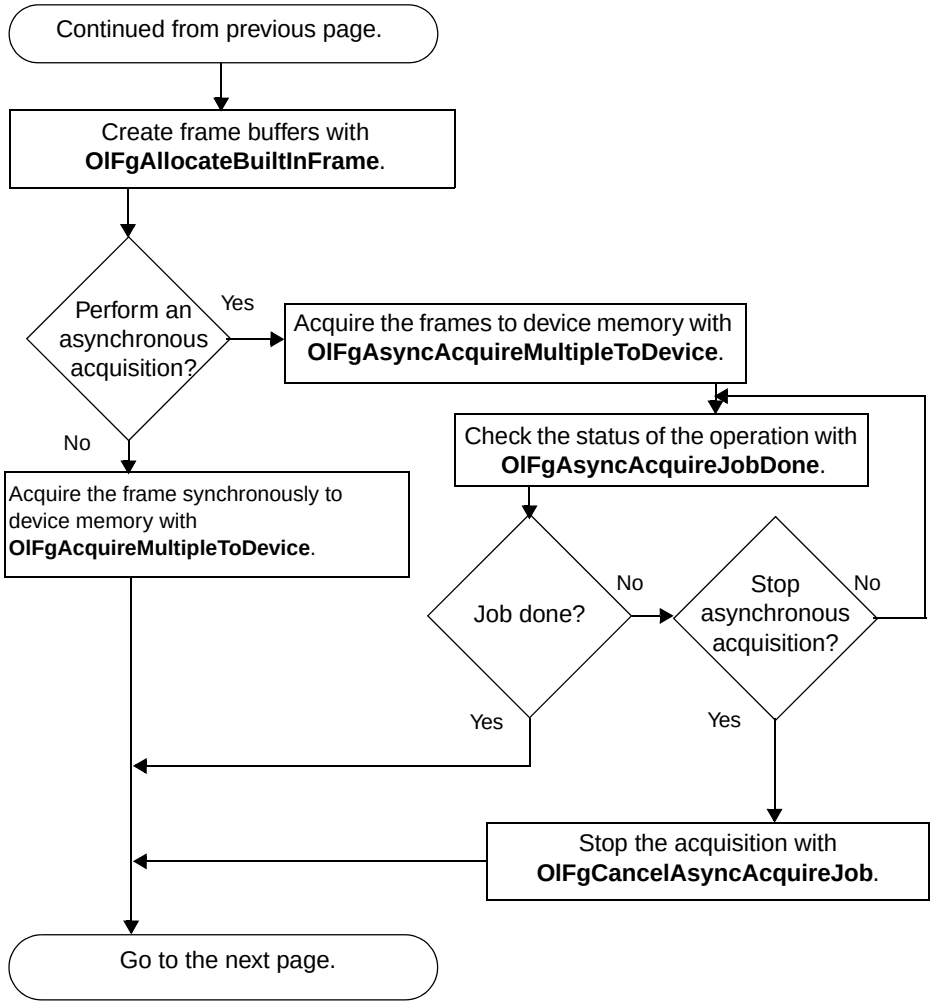
Single-Frame Acquisition (cont.)



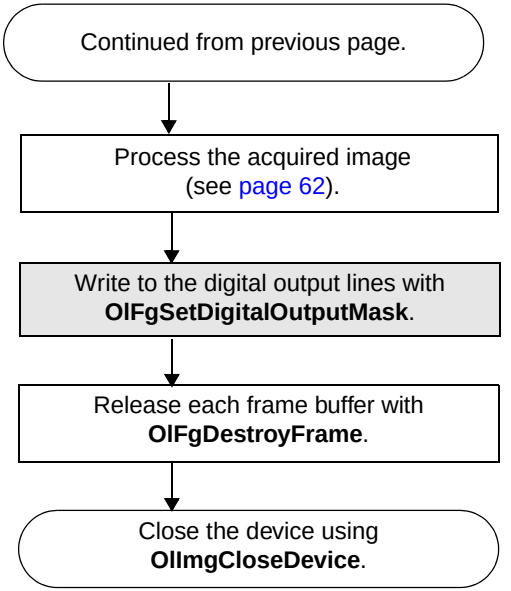
Multiple-Frame Acquisition



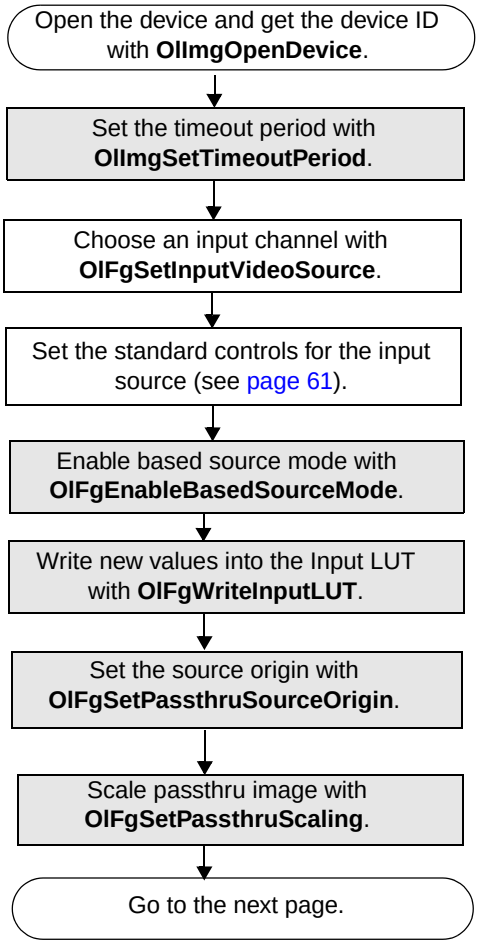
Multiple-Frame Acquisition (cont.)



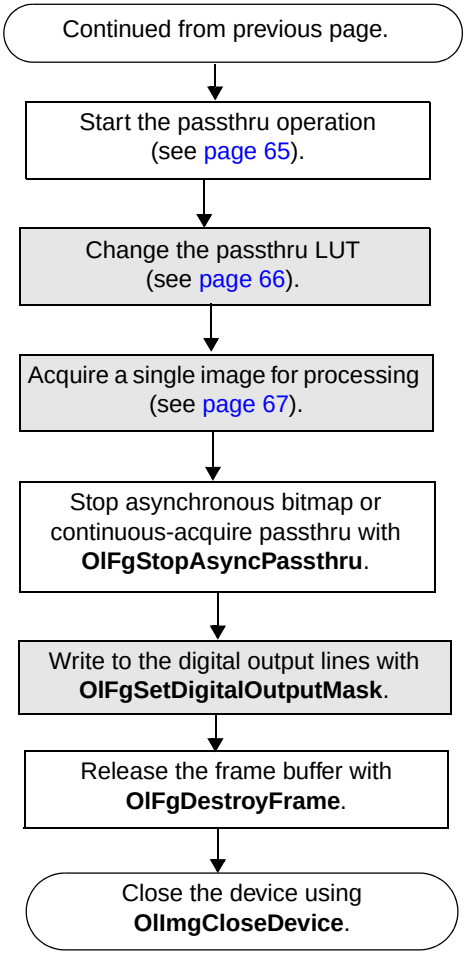
Multiple-Frame Acquisition (cont.)



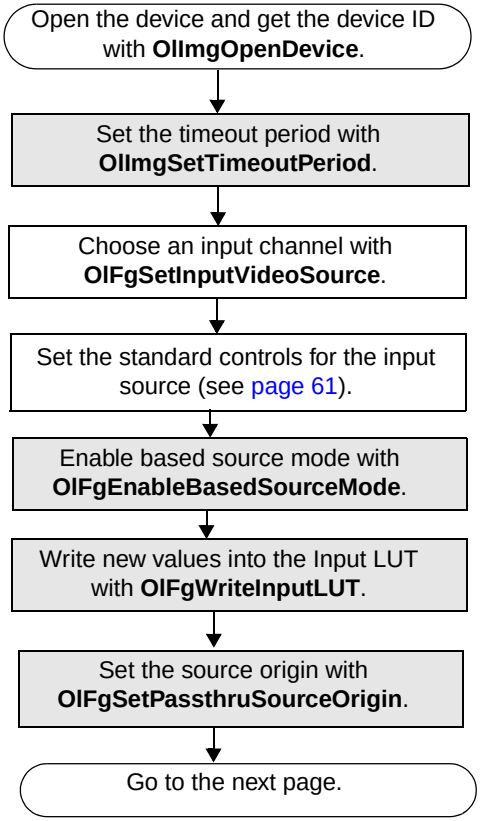
Passthru without Overlays



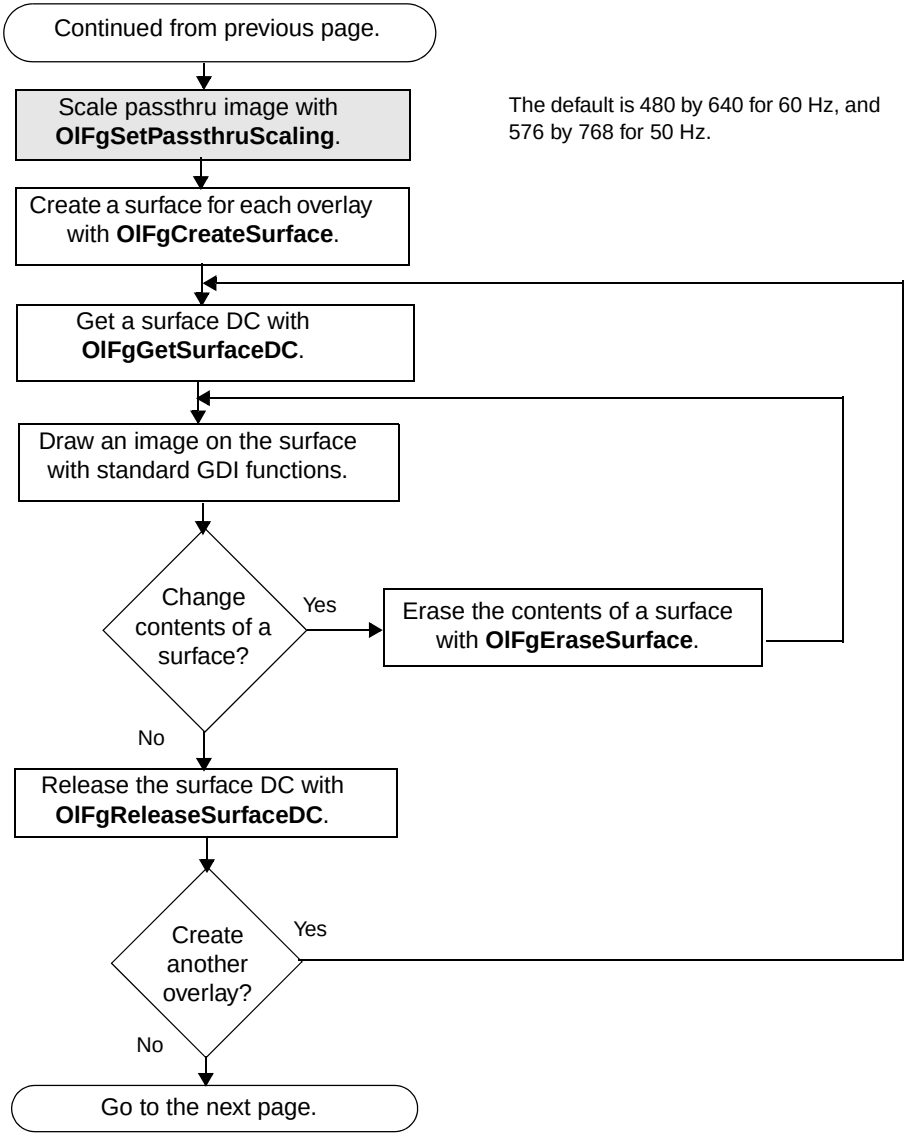
Passthru without Overlays (cont.)



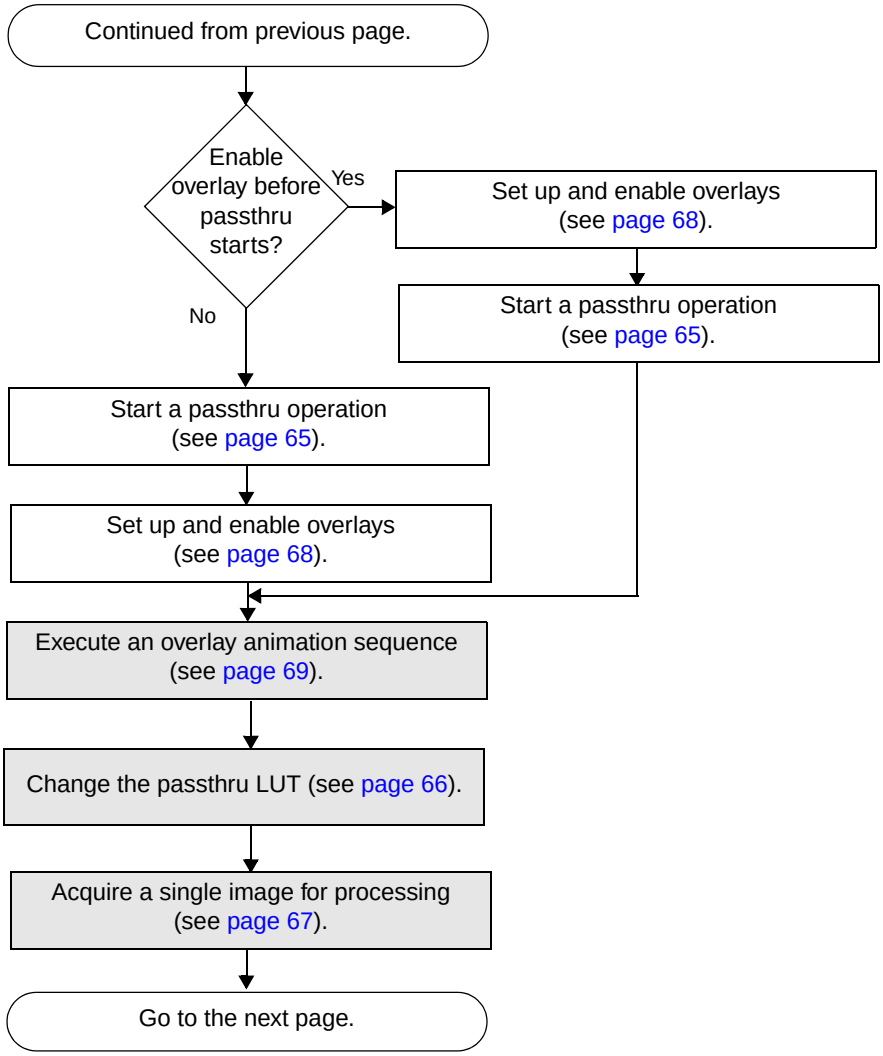
Passthru with Overlays



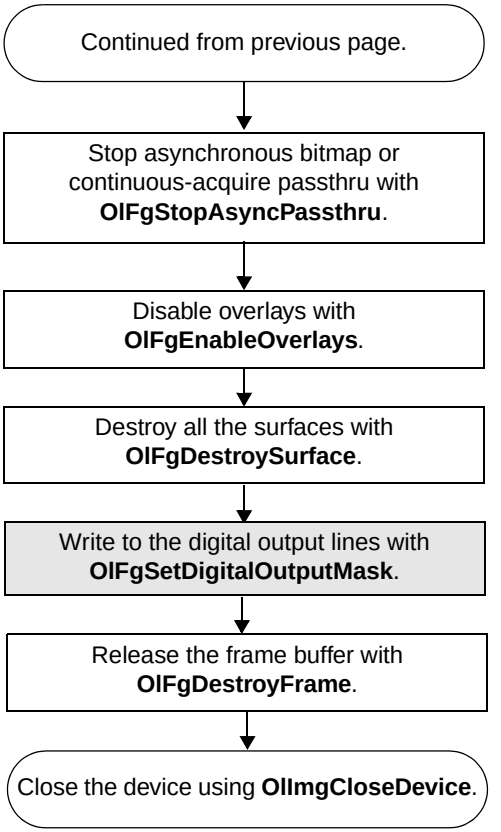
Passthru with Overlays (cont.)



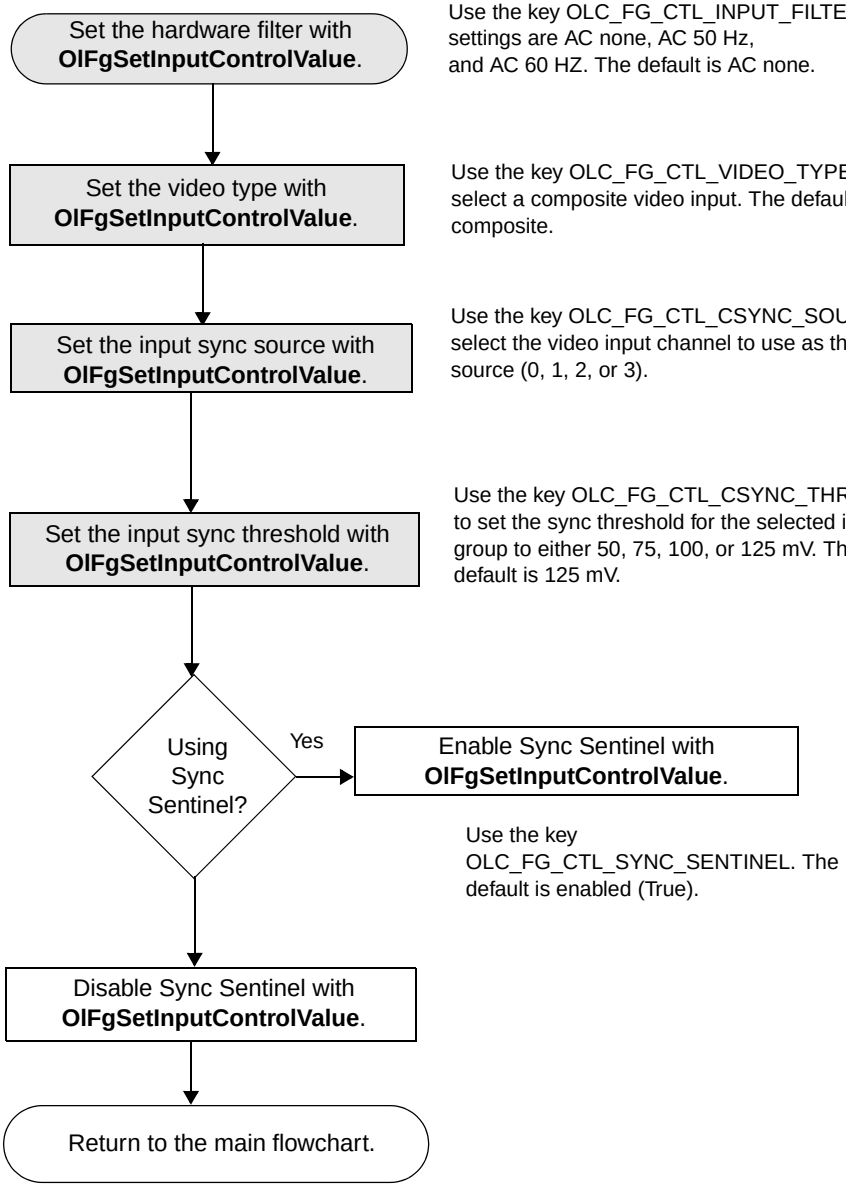
Passthru with Overlays (cont.)



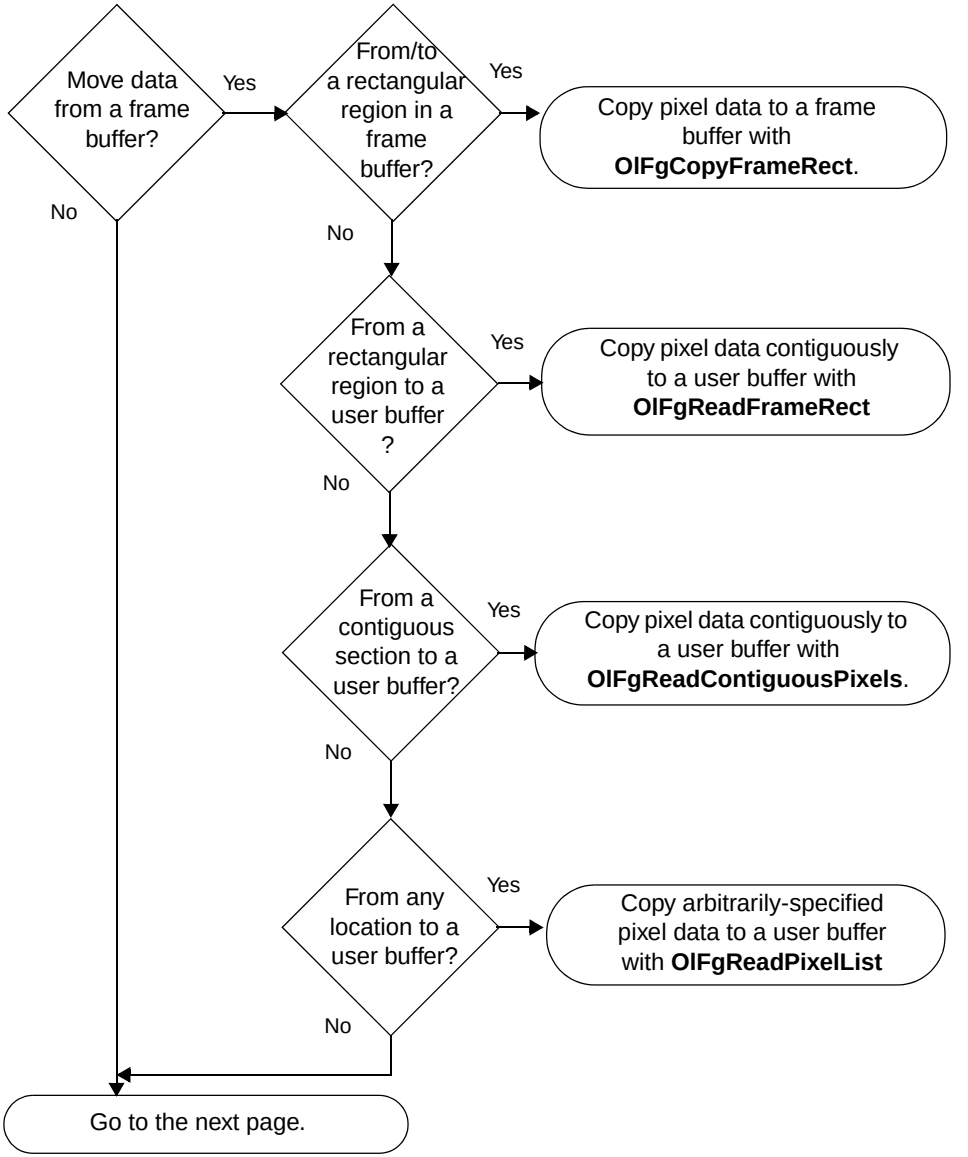
Passthru with Overlays (cont.)



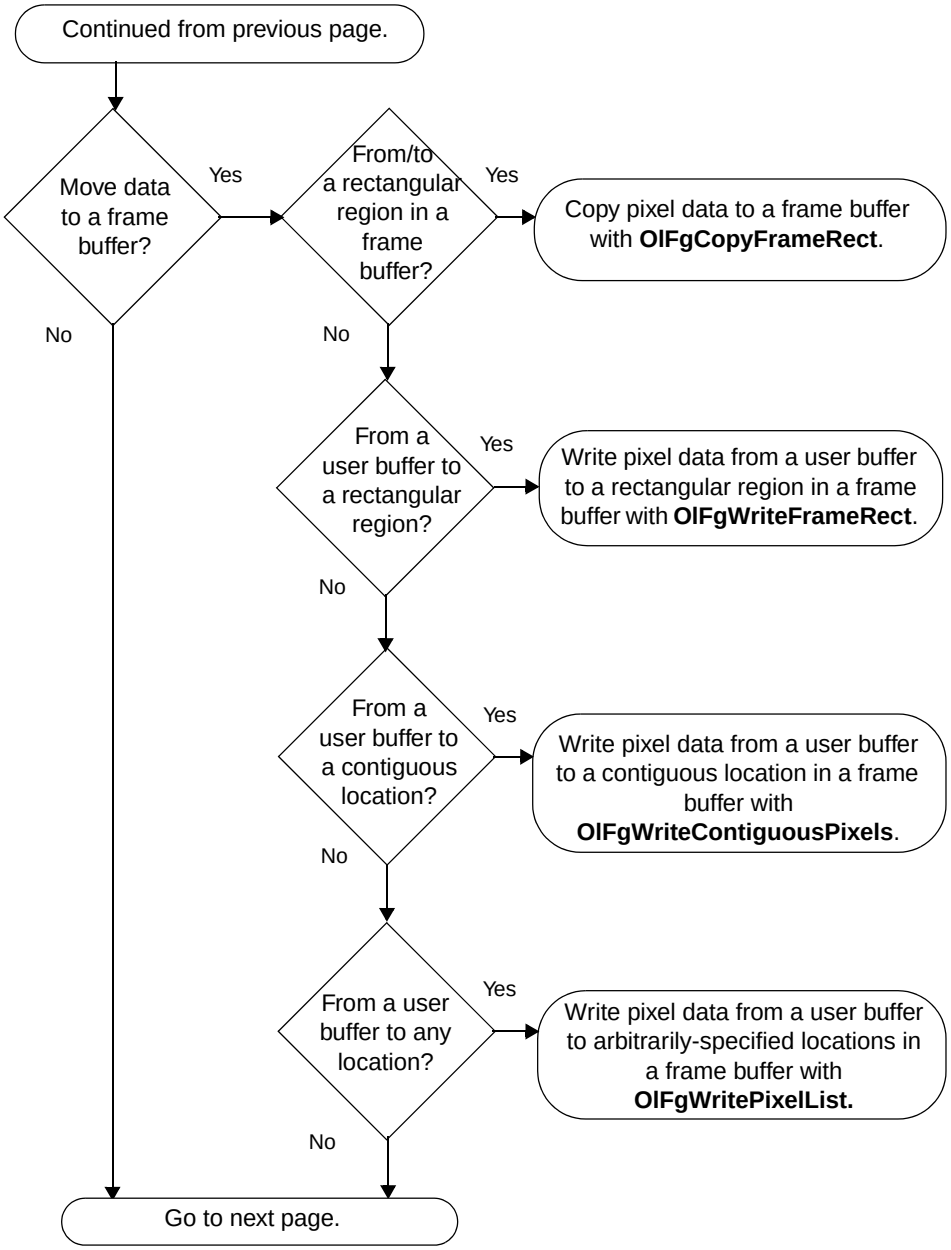
Set the Standard Controls for the Input Source



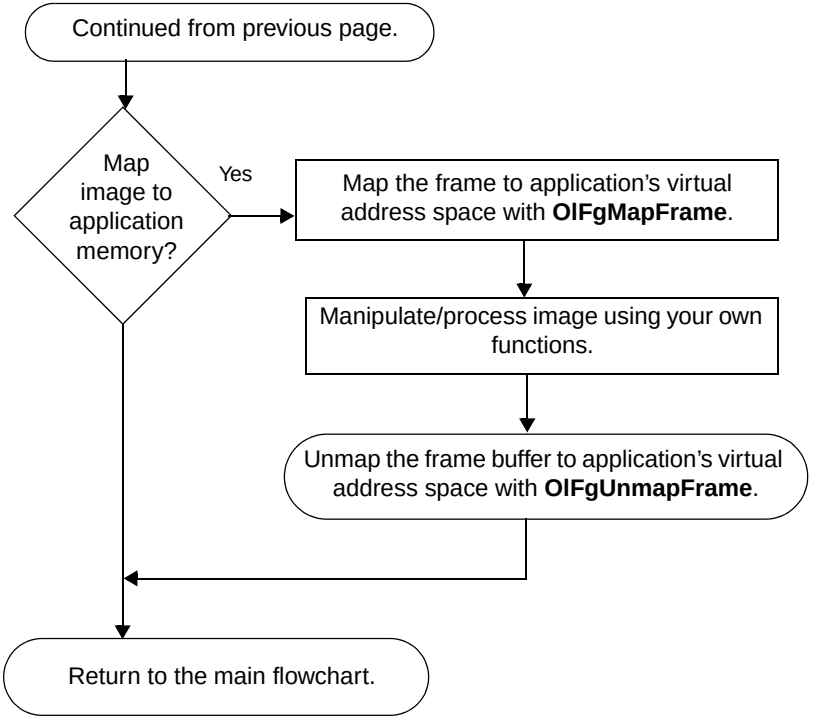
Process the Acquired Image



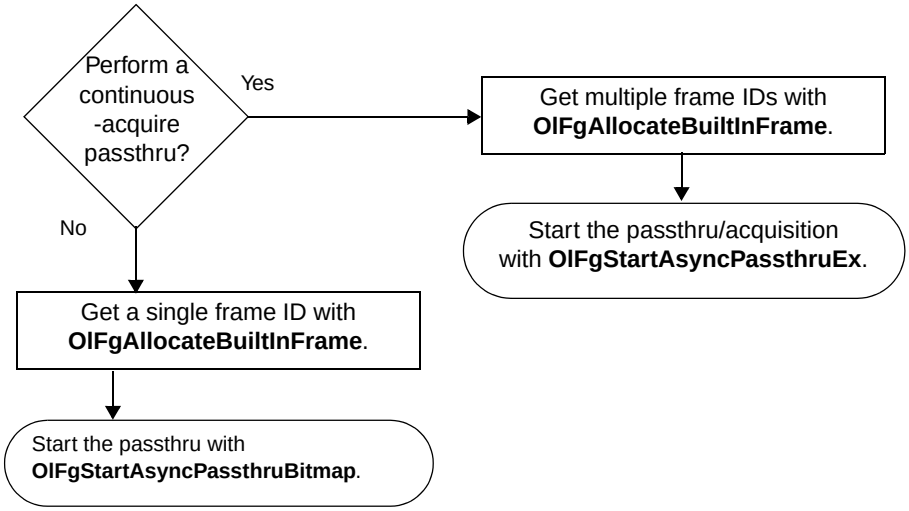
Process the Acquired Image (cont.)



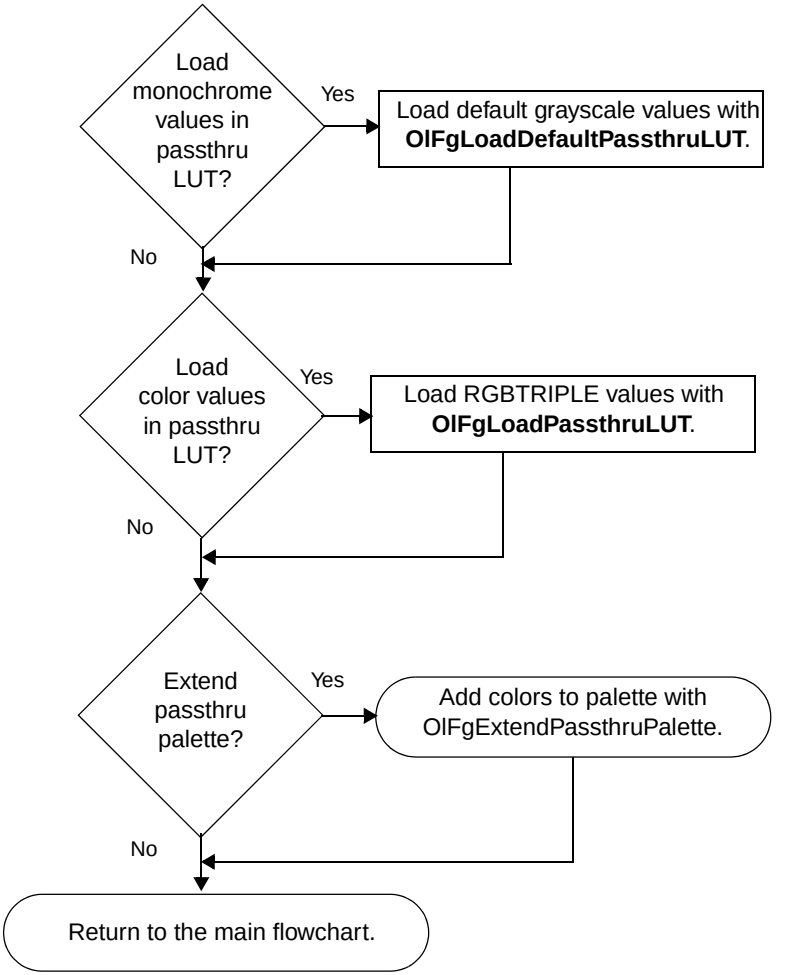
Process the Acquired Image (cont.)



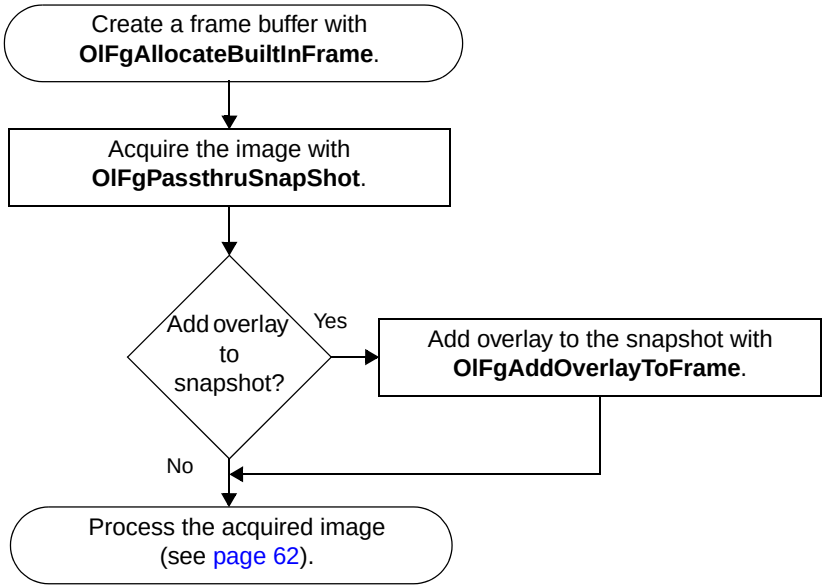
Start the Passthru Operation



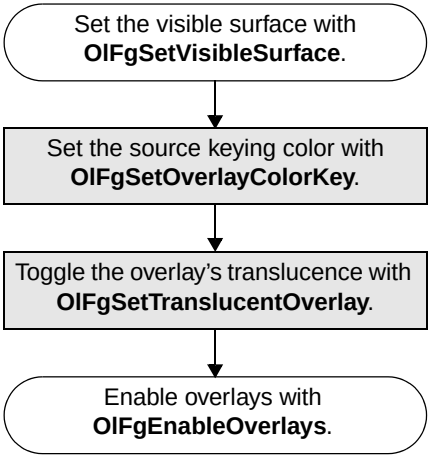
Change the Passthru LUT



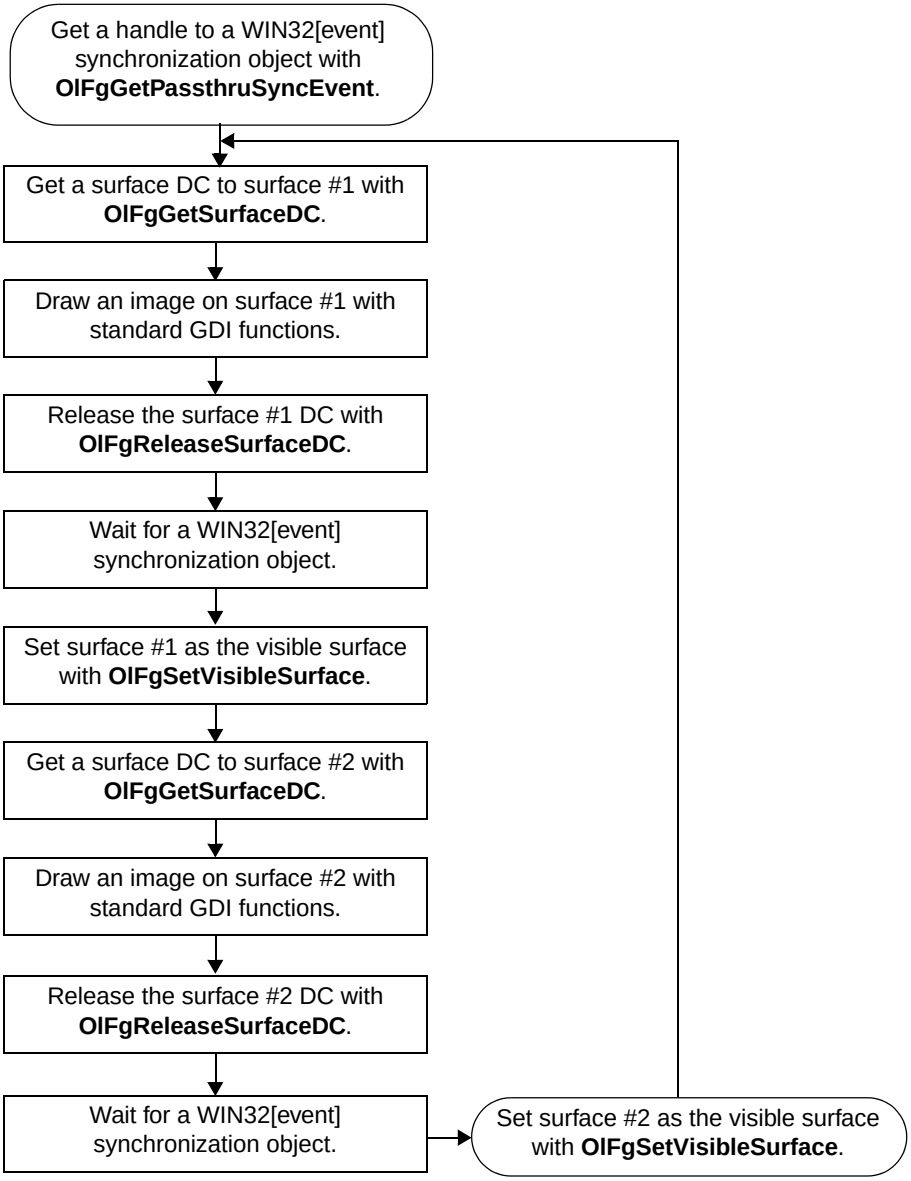
Take a Snapshot



Set up and Enable Overlays



Execute an Overlay Animation Sequence



Troubleshooting

General Checklist

Should you experience problems using the DT3155 board, please follow these steps:

1. Read all the documentation provided for your product. Make sure that you have added any "Read This First" information to your manual and that you have used this information.
2. Check the Imaging OMNI CD for any README files and ensure that you have used the latest installation and configuration information available.
3. Check that your system meets the requirements stated in the *DT3155 Getting Started Manual*.
4. Check that you have installed your hardware properly using the instructions in the *DT3155 Getting Started Manual*.
5. Check that you have installed and configured the device driver properly using the instructions in the *DT3155 Getting Started Manual*.
6. Search the DT Knowledgebase in the Support section of the Data Translation web site (at www.datatranslation.com) for an answer to your problem.

If you still experience problems, try using the information in Table 12 to isolate and solve the problem. If you cannot identify the problem, refer to page 76.

Table 12: Troubleshooting Problems

Symptom	Possible Cause	Possible Solution
Board does not respond.	The board is incorrectly aligned in a PCI expansion slot.	Check that the slot in which your DT3155 board is located is a PCI slot and that the board is correctly seated in the slot; see the instructions in the *DT3155 Getting Started Manual.*
	The interrupt level is unacceptable.	An interrupt conflict exists in your system. The most common interrupt conflict occurs with a PCI device and a device that is plugged into the ISA bus. To resolve this problem, change the interrupt setting (usually by changing a jumper) on the ISA device. An interrupt conflict can also occur if a PCI device was not designed to share interrupts. To resolve this problem, select a different interrupt for each PCI slot in the PCI BIOS. To do this, enter the system BIOS program; this is usually done by pressing the DEL key when rebooting your system. Once in the system BIOS, enter the PCI/PnP BIOS setup, and select a unique interrupt for each PCI slot. The PCI BIOS assigns the interrupt; the device on the PCI bus does not have control over the interrupt assignment. Some network devices do not share interrupts. If you still have an interrupt conflict, try removing the network device, installing the DT3155 board and rebooting the system, then reinserting the network device.
	The board is damaged.	Contact Data Translation for technical support; refer to page 76.

Table 12: Troubleshooting Problems (cont.)

Symptom	Possible Cause	Possible Solution
Intermittent operation.	Loose connections or vibrations exist.	Check your wiring and tighten any loose connections or cushion vibration sources; see the instructions in the *DT3155 Getting Started Manual.*
	Electrical noise exists.	Check your connections; see the instructions in the *DT3155 Getting Started Manual.*
	The board is overheating.	Check environmental and ambient temperature; consult the board's specifications on page 83 of this manual and the documentation provided by your computer manufacturer for more information.
Data appears to be invalid.	Wiring is not connected properly.	Check your wiring and fix any open connections; see the instructions in the *DT3155 Getting Started Manual.*
Computer does not boot.	Board is not seated properly.	Check that the slot in which your DT3155 board is located is a PCI slot, that the board is correctly seated in the slot, and that the board is secured in the slot with a screw; see the instructions in the *DT3155 Getting Started Manual.*
	The power supply of the computer is too small to handle all the system resources.	Check the power requirements of your system resources and, if needed, get a larger power supply; consult the board's specifications on page 83 of this manual.

Table 12: Troubleshooting Problems (cont.)

Symptom	Possible Cause	Possible Solution
System lockup.	Board is not seated properly.	Check that the slot in which your DT3155 board is located is a PCI slot, that the board is correctly seated in the slot, and that the board is secured in the slot with a screw; see the instructions in the *DT3155 Getting Started Manual.*
	Interrupt level is unacceptable.	An interrupt conflict exists in your system. The most common interrupt conflict occurs with a PCI device and a device that is plugged into the ISA bus. To resolve this problem, change the interrupt setting (usually by changing a jumper) on the ISA device. An interrupt conflict can also occur if a PCI device was not designed to share interrupts. To resolve this problem, select a different interrupt for each PCI slot in the PCI BIOS. To do this, enter the system BIOS program; this is usually done by pressing the DEL key when rebooting your system. Once in the system BIOS, enter the PCI/PnP BIOS setup, and select a unique interrupt for each PCI slot. The PCI BIOS assigns the interrupt; the device on the PCI bus does not have control over the interrupt assignment. Some network devices do not share interrupts. If you still have an interrupt conflict, try removing the network device, installing the DT3155 board and rebooting the system, then reinserting the network device.

Service and Support

If you have difficulty using the DT3155 board, Data Translation's Technical Support Department is available to provide prompt technical assistance. Support upgrades, technical information, and software are also available.

All customers can always obtain the support needed. The first 90 days are complimentary, as part of the product's original warranty, to help you get your system running. Customers who call outside of this time frame can either purchase a support contract or pay a nominal fee (charged on a per-incident basis).

For "priority support," purchase a support contract. Support contracts guarantee prompt response and are very affordable; contact your local sales office for details.

Refer to the Data Translation Support Policy located at the end of this manual for a list of services included and excluded in our standard support offering.

Telephone Technical Support

Telephone support is normally reserved for original warranty and support-contract customers. Support requests from non-contract or out-of-warranty customers are processed after requests from original warranty and support-contract customers.

For the most efficient service, please complete the form on page 78 and be at your computer when you call for technical support. This information helps to identify specific system and configuration-related problems and to replicate the problem in house, if necessary.

You can reach the Technical Support Department by calling (508) 481-3700 x1401.

If you are located outside the USA, call your local distributor. The name and telephone number of you nearest distributor are provided in your Data Translation catalog.

If you are leaving a message to request a support call, please include the following information:

- Your name (please include proper spelling),
- Your company or organization (please include proper spelling),
- A phone number,
- An email address where you can be reached,
- The hardware/software product you need help on,
- A summary of the issue or question you have,
- Your contract number, if applicable, and
- Your product serial number or purchase date.

Omitting any of the above information may delay our ability to resolve your issue.

Information Required for Technical Support

Name:_____Phone_____
Contract Number: _____
Address: _____
_____

Data Translation hardware product(s): _____
serial number:_____
configuration: _____
Data Translation device driver - SPO number: _____ _____
_____ version: _____
Data Translation software - SPO number:_____ _____
serial number: _____ version:_____
PC make/model: _____
operating system: _____ version:_____
Windows version: _____
processor: _____ speed:_____
RAM:_____ hard disk space:_____
network/number of users: _____ disk cache:_____
graphics adapter: _____ data bus:_____

I have the following boards and applications installed in my system:_____
_____
_____
I am encountering the following problem(s): _____
_____
_____
_____
and have received the following error messages/codes: _____
_____
_____
I have run the board diagnostics with the following results: _____
_____
You can reproduce the problem by performing these steps:
1. _____
_____
2. _____
_____
3. _____
_____

E-Mail and Fax Support

You can also get technical support by e-mailing or faxing the Technical Support Department:

- **E-mail**: You can reach Technical Support at the following address: tsupport@datx.com

  Ensure that you provide the following minimum information:

  – Your name,

  – Your company or organization,

  – A phone number,

  – An email address where you can be reached,

  – The hardware/software product you need help on,

  – A summary of the issue you are experiencing,

  – Your contract number, if applicable, and

  – Your product serial number or purchase date.

  Omitting any of the above information may delay our ability to resolve your issue.

- **Fax**: Please photocopy and complete the form on page 78, then fax Technical Support at the following number: (508) 481-8620.

Support requests from non-contract and out-of-warranty customers are processed with the same priority as telephone support requests.

World-Wide Web

For the latest tips, software fixes, and other product information, you can always access our World-Wide Web site free of charge at the following address: http://www.datatranslation.com

If Your Board Needs Factory Service

If your board must be returned to Data Translation, perform the following steps:

1. Record the board's serial number, then contact the Customer Service Department at (508) 481-3700 (if you are in the USA) and obtain a Return Material Authorization (RMA).

   If you are located outside the USA, call your local distributor for authorization and shipping instructions. The name and telephone number of your nearest distributor are listed in your Data Translation catalog.

   All return shipments to Data Translation must be marked with the correct RMA number to ensure proper processing.

2. Using the original packing materials, if available, package the board as follows:

   – Wrap the board in an electrically conductive plastic material. Handle with ground protection. A static discharge can destroy components on the board.

   – Place in a secure shipping container.

3. Return the board to the following address, making sure the RMA number is visible on the outside of the box.

   Customer Service Dept.
   Data Translation, Inc.
   100 Locke Drive
   Marlboro, MA 01752-1192

Specifications

The input impedance for the video input signal is 75 Ω

Table 13 lists the electrical specifications for the digital output signals on the DT3155 board.

Table 13: Digital Output Electrical Specifications

Feature	Minimum Specification	Maximum Specification
High-Level Output Current (IOH)	–	2.0 mA
Low-Level Output Current (IOL)	–	20 mA
High-Level Output Voltage (VOH)	2.4 V	–
Low-Level Output Voltage (VOL)	–	0.5 V

Table 14 lists the input electrical specifications for the external trigger signal on the DT3155 board.

Table 14: External Trigger Electrical Specifications

Feature	Minimum Specification	Maximum Specification
Input High Level (V_{IH})	2.0 V	5.0 V
Input Low Level (V_{IL})	-0.3 V	0.8 V
Input Capacitance (C_{IN})	–	6 pF

Table 15 lists the power specifications for the DT3155 board.

Table 15: Power Specifications

Feature	Specification
+5 V	2 A
+12 V	100 mA
-12 V	100 mA

Table 16 lists the physical and environmental specifications for the DT3155 board.

Table 16: Physical and Environmental Specifications

Feature	Specification
Dimensions	6.875 inches L x 4.2 inches H (not including faceplate and connectors)
Weight	5.3 ounces (150 grams)
Operating temperature	0 to 50° C
Storage temperature	-45 to 85° C
Humidity	0 to 90%, noncondensing

Connector Pin Assignments

Video Input Connector J1

Connector J1 is a 15-pin, male, D-shell connector that accepts all the signals brought out by the DT3155 board through the EP306 cable or a user-designed cable. Figure 5 illustrates the pin locations for connector J1.

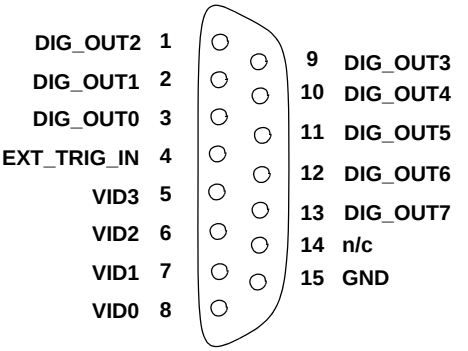


Figure 5: Connector J1

Table 17 lists the J1 pins by signal name, and by the corresponding EP306 BNC connector assignments.

Table 17: J1 Pin Assignments

J1 Pin	EP306 BNC Connector	Signal Name
1	7	DIG_OUT2
2	6	DIG_OUT1
3	5	DIG_OUT0
4	4	EXT_TRIG_IN
5	3	VID3
6	2	VID2
7	1	VID1
8	0	VID0
9	8	DIG_OUT3
10	9	DIG_OUT4
11	10	DIG_OUT5
12	11	DIG_OUT6
13	12	DIG_OUT7
14	13	not connected
15	–	GND

Video Coaxial Connector J2

The video coaxial connector, J2, is a female coaxial connector that connects to the video output jack of your video source using a 75 Ω coaxial cable with a male connector. Figure 6 illustrates connector J2.

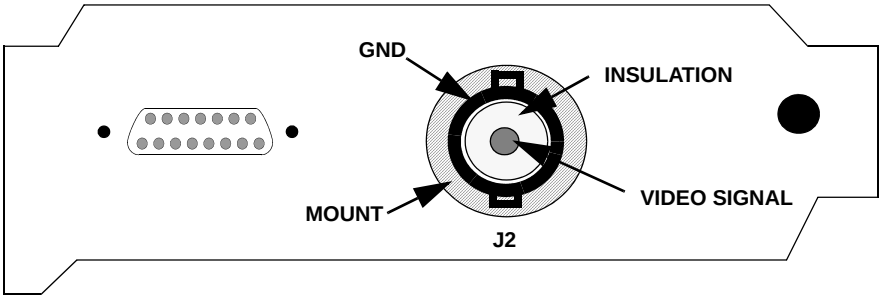


Figure 6: Video Coaxial Connector J2

CAUTION:

The single-use BNC input connector, J2, is shared with the VID0 signal (pin 8) on video input connector J1. Do not attach signals to both connectors; otherwise, the two video sources will be shorted together, which could result in damage to the video sources.

Modifying the Device Driver

Windows 98 and Windows Me Procedures

This section describes the following procedures in Windows 98 and Windows Me:

- Adding a board to the device driver configuration (on this page);
- Modifying the board settings in the device driver configuration (on page 92); and
- Uninstalling the device driver, if necessary (on page 94).

Adding a Board to the Device Driver Configuration

To add a new board to the DT3155 Device Driver configuration after system startup, perform the following steps:

1. If you have not already done so, install the additional board in your computer following the instructions in the *DT3155 Getting Started Manual*, then power up your computer and any attached peripherals.

   Note: On power-up, the PCI bus takes one available interrupt from system resources for the DT3155 board. If any devices are using this interrupt, problems may arise. Verify that no other devices in your system are using the same interrupt that the DT3155 board is using and ensure that PCI interrupts are enabled in your system BIOS.

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2. Start Windows 98 or Windows Me.
   The Found New Hardware dialog box appears.
3. Click **Next**.
4. For Windows Me, click **Specify the location of the device (Advanced)**, then click **Next**.

5. Click **Search for the best driver for your device (Recommended)**, then click **Next.**
6. Click **Specify a location** and uncheck all other options.
7. Insert the Imaging OMNI CD into the CD-ROM drive.
8. Click **Browse**, browse to **x:\DRIVERS\DT3155\WIN98** (where *x* is the letter of your CD-ROM drive), and click **Open**.
9. Click **OK**.
10. Click **Next.**
11. Click **Next.**
    The files are copied.
12. Click **Finish**.
13. Remove the Imaging OMNI CD from the CD-ROM, then click **Yes** to restart the system.
    When the system restarts, the driver configuration dialog box appears.
14. Click **OK**, then click **OK**.
15. Click **Add New** to add a DT3155 board to the configuration.
    The DT3155 Installation dialog box appears for the new board.
16. Enter a board name (alias), which can be any name you choose, then click **Add**. (The board name is used by supported software, such as DT-Acquire and the Frame Grabber SDK.) Only one name (alias) per installed DT3155 board is allowed.
    The DT3155 Configuration dialog box appears.
17. Select **Enable Board** to activate the board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.
18. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.

19. For **Desired Memory Size**, select the amount of contiguous memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The actual amount of memory that the device driver can allocate depends on your system resources. It is recommended that you select only as much memory as you need to leave memory for other devices. Once you enter the desired memory size, the device driver allocates as much memory as possible to match the value you entered; the actual memory size allocated is shown in the **Actual Memory Size** text box when you restart your system.
20. Click **Done**.
    The DT3155 Device Driver Configuration dialog box is redisplayed; you can see the name of the board you just added.
21. Click **Close** to end the DT3155 configuration.
22. If you made any changes to the default settings, click **OK** to confirm that you need to restart Windows before the changes will take effect.
23. Click **OK** to restart Windows.
    For proper operation, it is very important that you restart Windows when prompted.

Modifying a Board in the Device Driver Configuration

To modify a board in the device driver configuration, perform the following steps:

1. Open the Control Panel.
2. For Windows 98, double-click **Multimedia**.
   The Multimedia Properties dialog appears.

   For Windows Me, double-click **Sounds and Multimedia**.
   The Sounds and Multimedia Properties dialog appears.

3. Click the **Devices** tab, then double-click **Media Control Devices**.
4. Double-click **DT3155 Mach Series Frame Grabber**.
   The DT3155 Device Driver Properties dialog box appears.
5. Click **Use this Media Control device**, then click **Settings**.
   The DT3155 Device Driver Configuration dialog box appears.
6. Select the name of the DT3155 board that you want to modify.
7. Click **Modify** to modify the board.
   The DT3155 Configuration dialog box appears.
8. Select **Enable Board** to activate the board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.
9. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.
10. For **Desired Memory Size**, select the amount of contiguous memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The actual amount of memory that the device driver can allocate depends on your system resources. It is recommended that you select only as much memory as you need to leave memory for other devices. Once you enter the desired memory size, the device driver allocates as much memory as possible to match the value you entered; the actual memory size allocated is shown in the **Actual Memory Size** text box when you restart your system.
11. Click **Done**, then click **Close** to end the DT3155 configuration.
12. If you made any changes to the default settings, click **OK** to confirm that you need to restart Windows before the changes take effect.
13. Click **OK** to close the **DT3155 MACH Series Frame Grabber Properties** dialog box, then click **OK** to close the **Multimedia Properties** or **Sounds and Multimedia Properties** dialog box.
14. Close the Control Panel.

15. Restart Windows for your changes to take effect.
For proper operation, it is very important that you restart Windows.

Uninstalling the Device Driver

Generally, you will always require the DT3155 Device Driver. However, if you are no longer using the DT3155 board with the supported software, you can uninstall the DT3155 Device Driver from the system.

To uninstall the device driver, perform the following steps:

1. Click **Start/Programs/Data Translation, Inc/MACHUnLd**.
2. Click **DT3155**.
3. Click **OK**.
The DT3155 device driver is uninstalled.
4. Click **Cancel** to exit from the MACHUnLd utility.

Windows 2000 Procedures

This section describes the following procedures in Windows 2000:

- Adding a board to the device driver configuration (on this page);
- Modifying the board settings in the device driver configuration (on page 97);
- Removing a board from the device driver configuration (on page 98); and
- Uninstalling the device driver, if necessary (on page 99).

Adding a Board to the Device Driver Configuration

To add a board to the DT3155 Device Driver configuration, perform the following steps:

1. If you have not already done so, install the additional board in your computer following the instructions in the *DT3155 Getting Started Manual*, then power up your computer and any attached peripherals.

   Note: On power-up, the PCI bus takes one available interrupt from system resources for the DT3155 board. If any devices are using this interrupt, problems may arise. Verify that no other devices in your system are using the same interrupt that the DT3155 board is using and ensure that PCI interrupts are enabled in your system BIOS.

   ---

2. Start Windows 2000.
   The Found New Hardware dialog box appears.
3. Click **Next**.
4. Click **Search for a suitable driver for my device (recommended)**, then click **Next.**

5. Uncheck all checkboxes, then click **Next**.
6. Click **Disable the device**, then click **Finish**.
7. Open the **Control Panel**.
8. Double-click **Sounds and Multimedia**.
9. Click the **Hardware** tab.
10. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
11. Click the **Properties** tab.
12. Double-click **Multimedia Drivers**.
13. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
14. Click **Settings**.
15. Click **Add New**.
16. Enter a name for the device, then click **Add**.
17. Select **Enable Board** to activate the board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.
18. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.
19. For **Desired Memory Size**, select the amount of contiguous memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The actual amount of memory that the device driver can allocate depends on your system resources. It is recommended that you select only as much memory as you need to leave memory for other devices. Once you enter the desired memory size, the device driver allocates as much memory as possible to match the value you entered; the actual memory size allocated is shown in the **Actual Memory Size** text box when you restart your system.

20. Click **Done**.
    The DT3155 Device Driver Configuration dialog box is redisplayed with the name of the board you just added.
21. Click **Close** to finish.
    A dialog box appears, indicating that you must restart Windows 2000 for the changes to take effect.
22. Click **Restart Now** to restart your system.

Modifying a Board in the Device Driver Configuration

To modify the board settings in the DT3155 Device Driver configuration, perform the following steps:

1. Open the **Control Panel**.
2. Double-click **Sounds and Multimedia**.
3. Click the **Hardware** tab.
4. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
5. Click the **Properties** tab.
6. Double-click **Multimedia Drivers**.
7. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
8. Click **Settings**.
9. Select the name of the board that you want to modify, then click **Modify**.
   Another DT3155 Device Driver Configuration dialog box appears.
10. Select **Enable Board** to activate the board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.

11. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.

12. For **Desired Memory Size**, select the amount of contiguous memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The actual amount of memory that the device driver can allocate depends on your system resources. It is recommended that you select only as much memory as you need to leave memory for other devices. Once you enter the desired memory size, the device driver allocates as much memory as possible to match the value you entered; the actual memory size allocated is shown in the **Actual Memory Size** text box when you restart your system.

13. Click **Done**.
    The DT3155 Device Driver Configuration dialog box reappears with the name of the board you just modified.

14. Click **Close**.

15. Restart your system to cause the new configuration to take effect.

Removing a Board from the Device Driver Configuration

To remove a board from the DT3155 Device Driver configuration, perform the following steps:

1. Open the **Control Panel**.

2. Double-click **Sounds and Multimedia**.

3. Click the **Hardware** tab.

4. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.

5. Click the **Properties** tab.

6. Double-click **Multimedia Drivers**.

7. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
8. Click **Settings**.
9. Select the name of the board that you want to remove, then click **Remove**.
10. Repeat step 9 until all the DT3155 boards you want to remove are removed.
11. Click **Close**.
    The Drivers dialog box appears. The DT3155 Device Driver is still installed in the system, but the board has been removed.
12. Click **OK**.
13. If you want to uninstall the driver at this point, continue with step 5 on page 100. Otherwise, continue with the next step.
14. Click **OK**, then click **OK** to finish.
15. Restart the system for the changes to take effect.

Uninstalling the Device Driver

Note: Ensure that you remove all the DT3155 boards in your system using the preceding section before uninstalling the device driver.

Generally, you will always require the DT3155 Device Driver. However, if you are no longer using the DT3155 board with the supported software, you can uninstall the DT3155 Device Driver from the system by performing the following steps:

1. Open the **Control Panel**.
2. Double-click **Sounds and Multimedia**.
3. Click the **Hardware** tab.

4. Click **DT3155 MACH Series Frame Grabber**, then click **Properties**.
5. Click the **Driver** tab, then click **Uninstall**.
6. Click **OK**.
7. Click **OK**.
8. Restart your system to cause the new configuration to take effect.

Windows XP Procedures

This section describes the following procedures in Windows XP:

- Adding a board to the device driver configuration (on this page);
- Modifying the board settings in the device driver configuration (on page 102);
- Removing a board from the device driver configuration (on page 104); and
- Uninstalling the device driver, if necessary (on page 105).

Adding a Board to the Device Driver Configuration

To add a board to the DT3155 Device Driver configuration, perform the following steps:

1. From the My Computer icon, double-click **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT-Open Layers DT3155 MACH Series Frame Grabber**.
5. Click **Properties**.
6. Double-click **Multimedia Drivers**.
7. Click **Driver**, then click **Properties**.
8. Click **Settings**.
9. Enter a name for the device, then click **Add**.
10. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.

11. For **Memory Size**, select the amount of memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The upper limit depends on your system's resources. The recommended minimum is 1 MB.
12. For **Enable Board**, make sure that a checkmark is next to Enable Board to enable a disabled board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.
13. Click **Done**.
    The DT3155 Device Driver Configuration dialog box is redisplayed with the name of the board you just added.
14. Click **Close** to finish.
    A dialog box appears, indicating that you must restart Windows XP for the changes to take effect.
15. Restart your system to cause the new configuration to take effect.

Modifying a Board in the Device Driver Configuration

To modify the board settings in the DT3155 Device Driver configuration, perform the following steps:

1. From the My Computer icon, double-click **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT-Open Layers DT3155 MACH Series Frame Grabber**.
5. Click **Properties**.
6. Double-click **Multimedia Drivers**.
7. Click **Driver**, then click **Properties**.

8. Click **Settings**.
9. Select the name of the board that you want to modify, then click **Modify**.
   Another DT3155 Device Driver Configuration dialog box appears.
10. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.
11. For **Memory Size**, select the amount of memory (in MB) that you want to allocate in your system to hold the acquired frames. A 60 Hz, 640-by-480 image requires 308 KB per frame; a 50 Hz, 768-by-576 image requires 443 KB per frame. The upper limit depends on your system's resources. The recommended minimum is 1 MB.
12. For **Enable Board**, make sure that a checkmark is next to Enable Board to enable a disabled board. If you want to retain the settings but disable the board (and therefore not use the memory), remove the checkmark next to Enable Board.
13. Click **Done**.
    The DT3155 Device Driver Configuration dialog box reappears with the name of the board you just modified.
14. Click **Close**.
15. Restart your system to cause the new configuration to take effect.

Removing a Board from the Device Driver Configuration

To remove a board from the DT3155 Device Driver configuration, perform the following steps:

1. From the My Computer icon, double-click **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT-Open Layers DT3155 MACH Series Frame Grabber**.
5. Click **Properties**.
6. Double-click **Multimedia Drivers**.
7. Click **Driver**, then click **Properties**.
8. Click **Settings**.
9. Select the name of the board that you want to remove, then click **Remove**.
10. Repeat step 9 until all the DT3155 boards you want to remove are removed.
11. Click **Close**.
    The Drivers dialog box appears. The DT3155 Device Driver is still installed in the system, but the board has been removed.
12. If you want to uninstall the driver at this point, continue with step 5 on page 105. Otherwise, continue with the next step.
13. Click **OK**, then click **OK** to finish.
14. Restart the system for the changes to take effect.

Uninstalling the Device Driver

Note: Ensure that you remove all the DT3155 boards in your system using the preceding section before uninstalling the device driver.

Generally, you will always require the DT3155 Device Driver. However, if you are no longer using the DT3155 board with the supported software, you can uninstall the DT3155 Device Driver from the system by performing the following steps:

1. From the My Computer icon, double-click **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT-Open Layers DT3155 MACH Series Frame Grabber**.
5. Click **Driver**, tnen click **Uninstall**.
6. Click **OK**.
7. Click **OK**.
8. Restart your system to cause the new configuration to take effect.

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Warranty and Service Policy

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RETURN OUTSIDE USA

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Customer Service Department
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100 Locke Drive
Marlboro, MA 01752-1192 USA

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