DATA TRANSLATION

UM-15478-H

DT3153
User's Manual

Eighth Edition
August, 2002

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 DT3153 frame grabber board and how to use the DT3153 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 DT3153 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 DT3153 board and the DT3153 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 DT3153 Device Driver and the initialized control values.

- Chapter 4, "Programming Flowcharts," describes the processes you must follow to program the DT3153 board using the DT-Open Layers™ Frame Grabber SDK and Color SDK Extensions.
- 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 DT3153 board:

- *DT3153 Getting Started Manual* (UM-18304), included on the Imaging OMNI CD™ provided with the DT3153 board, describes how to set up, install, and wire signals to the DT3153 board, how to install the DT3153 Device Driver, and how to verify the operation of the board.
- *Frame Grabber SDK User's Manual* (UM-13442) and online help, included on the Imaging OMNI CD provided with the DT3153 board, describe 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 DT3153 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 DT3153 is a high-accuracy, low-cost, color frame grabber board for the PCI bus. It is suitable for both color image analysis and machine vision applications.

The DT3153 board digitizes the video signal, and 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 32-bit images in real-time. The board transfers image data to the host computer using PCI burst transfers.

Key features of the DT3153 board are summarized as follows:

- Operates as a PCI bus master;
- Digitizes up to three composite (CVBS) video inputs using NTSC/RS-170 or PAL video formats, or one S-video (YUV) input using the Y/C video format;
- Acquires a single frame or multiple frames synchronously or asynchronously;
- Stores images in either 32-bit color format (RGB) or 16-bit color format (YUV or RGB16);
- Supports programmable region-of-interest (ROI);
- Provides real-time, interpolated scaling to any size;
- Provides Sync Master mode which, when enabled, outputs three sync signals for driving camera timing;
- Provides programmable control of the color settings of the board, including brightness, contrast, saturation, and hue;
- Accepts an external trigger with selectable polarity; and
- Provides four general-purpose, TTL-level digital I/O lines.

Supported Software

The following software is available for use with the DT3153 board:

- **DT3153 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 DT3153 board with any of the supported software packages or utilities. Refer to the *DT3153 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 *DT3153 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 DT3153 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 DT3153 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 DT3153 board.

Accessories

To connect the DT3153 board to your video input source, you need either a 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 DT3153 board. Refer to Appendix B for connector pin assignments.

2

Principles of Operation

This chapter describes the features of the DT3153 board from a functional point of view. To aid the discussions in this chapter, refer to the block diagram of the DT3153, shown in Figure 1.

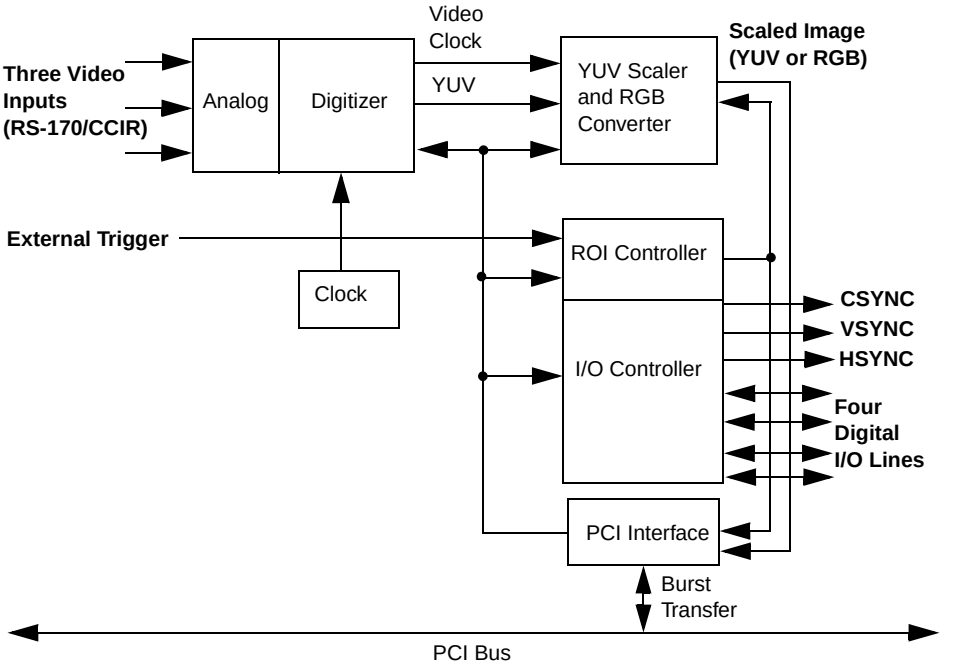


Figure 1: DT3153 Block Diagram

Video Input Signals

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

- Signal types,
- Video formats,
- Video input channels,
- Color controls,
- Pixel clock, and
- External trigger.

Signal Types

The DT3153 can acquire images from the following signal types:

- **Composite (CVBS**) –The Color Video Broadcast Standard, where a single composite video signal contains both luminance and chrominance information. The signal passes through high- and low-pass filters on the board to separate the chrominance and luminance signals. The decoded signals are represented as 8-bit data.
- **S-Video** –A digital representation of the CVBS signal. It contains both luminance information and chrominance information. The filters on the board are bypassed. S-video signals are generally "cleaner," since the high- and low-pass filters can sacrifice signal integrity.

Video Formats

The following video formats are supported for composite inputs:

- NTSC/RS-170 –Standard for 60 Hz video signals. In this format, the video input is a single analog signal. A video frame is displayed as 640 x 480 lines.
- PAL –Standard for 50 Hz video signals. In this format, the video input is a single analog signal. A video frame is displayed as 768 x 576 lines.

The Y/C format is supported for S-video inputs. In this format, the video input is provided as two separate analog signals. The Y signal contains luminance information (the gray scale portion of the color image). The C signal contains chrominance information (the color portion of the image). For 60 Hz, a video frame is displayed as 640 x 480 lines. For 50 Hz, a video frame is displayed as 768 x 576 lines.

Videos Input Channels

The DT3153 provides three video input channels that you can use as follows:

- Three composite video inputs, connected to channels VID0_IN, VID1_IN, or VID2_IN; or
- One S-video input and two composite video inputs. For the S-video input, connect the Y signal to channel VID1_IN; connect the C signal to the CHROM_IN channel. You can then connect composite video inputs, if desired, to the two unused video input channels.

Through software, the video multiplexer on the board determines which channel or channels are digitized. By default, channel 0 (VID0_IN) is selected.

Color Controls

Using software, you can adjust the following color settings of the DT3153 board:

- **Brightness** –The value associated with a pixel representing its gray value. Values range from 0 to 255; the nominal value is 163.
- **Contrast** –The overall range of the monochrome signal of an image. For example, a high contrast image has a large range between black and white values; a low contrast image has a small range between black and white values. Values range from 0 to 511; the nominal value is 233.
- **V-Saturation** –The purity of the blue and green primary colors in an image. For example, if a particular pixel has a value of 0 for green, but a value of 256 for blue, then the pixel is said to be saturated in blue. Values range from 0 to 511; the nominal value is 235.
- **U-Saturation** –The purity of the green and red primary colors in an image. For example, if a particular pixel has a value of 0 for green, but a value of 256 for red, then the pixel is said to be saturated in red. Values range from 0 to 511; the nominal value is 165.
- **Hue** –The intensity or shade of the color. Values range from 0 to 255; the nominal value is 128.

Pixel Clock

The DT3153 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. Pixels are available to the DT3153 frame grabber board in increments of *PixelPeriod*, which is equal to 1 /clock frequency.

With no more than ±6 ns jitter, the DT3153 board synchronizes the pixel clock to the first frame of an asynchronous external video source.

External Trigger

The DT3153 frame grabber provides pin 1 (EXT_TRIG) on connector J1 for connecting an external trigger input. Using an external trigger, you can synchronize frame acquisitions with external events.

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 1 of connector J1.

Sync Signals

This section describes the following aspects of sync signals:

- Sync signal selection, and
- Sync Master mode.

Sync Signal Selection

To digitize the incoming video signal, the DT3153 frame grabber requires both horizontal and vertical sync signals. The DT3153 board determines this sync information from the video input signal being digitized.

Sync Master Mode

On the DT3153, you can enable or disable Sync Master mode. In Sync Master mode, the DT3153 board generates the following sync signals:

- A horizontal sync signal (HSYNC_OUT), output on pin 9 of connector J1.
- A vertical sync signal (VSYNC_OUT), output on pin 10 of connector J1.
- A composite sync signal (CSYNC_OUT), output on pin 11 of connector J1.

These signals comply with the NTSC (60 Hz) or PAL (50 Hz) format and can be used to drive one or more cameras, if desired.

The video signal from the camera is digitized as usual, using the syncs generated by the board as the sync basis. This process is called *gen-locking*. Gen-locking allows you to synchronize signals when switching among channels.

By default, Sync Master mode is enabled on the DT3153.

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 15.

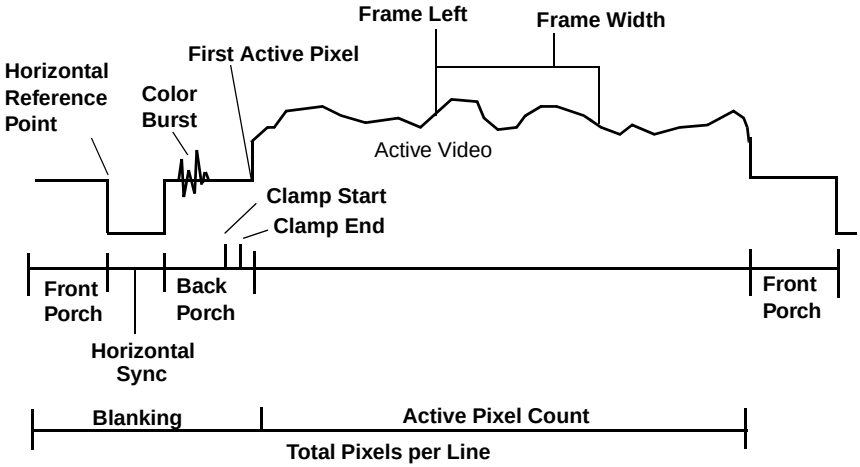


Figure 2: Horizontal Video Signal

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 DT3153 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 15.

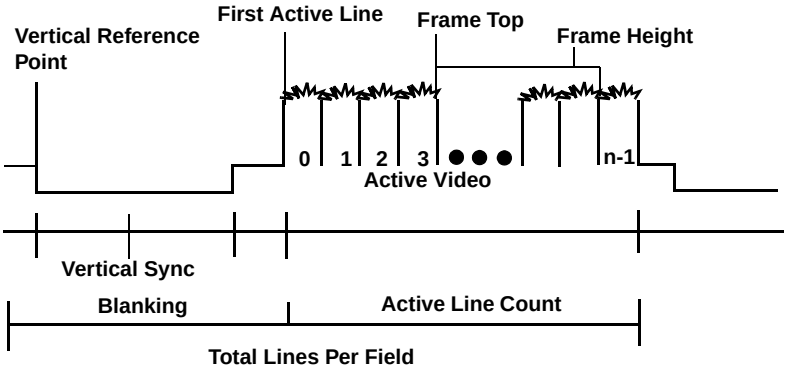


Figure 3: Vertical Video Signal

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 DT3153 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. The left side of the frame is the first pixel of video relative to the active video area. The width of the frame is the number of pixels per line of video. The height of the frame is the number of lines per field.

Table 1 shows the settings you can program on the DT3153 board to define the frame. Figure 4 illustrates these relationships.

Table 1: Frame Settings for the DT3153 Board

Setting	Description	Range	Nominal Values
Frame Left	The first pixel in the region of interest, relative to the first active pixel, to digitize.	50 Hz: 0 to 767[a] 60 Hz: 0 to 636[a]	0
Frame Width	The number of pixels per line of video to digitize.	50 Hz: 4 to 768[b] 60 Hz: 4 to 640[b]	50 Hz: 768 60 Hz: 640
Frame Top	The first line of the region of interest, relative to the first active line, to digitize.	50 Hz: 0 to 575 60 Hz: 0 to 479	0
Frame Height	The number of lines per frame of video to digitize.	50 Hz: 1 to 576 60 Hz: 1 to 480	50 Hz: 576 60 Hz: 480

a. Granularity is 1.
b. Granularity is 4.

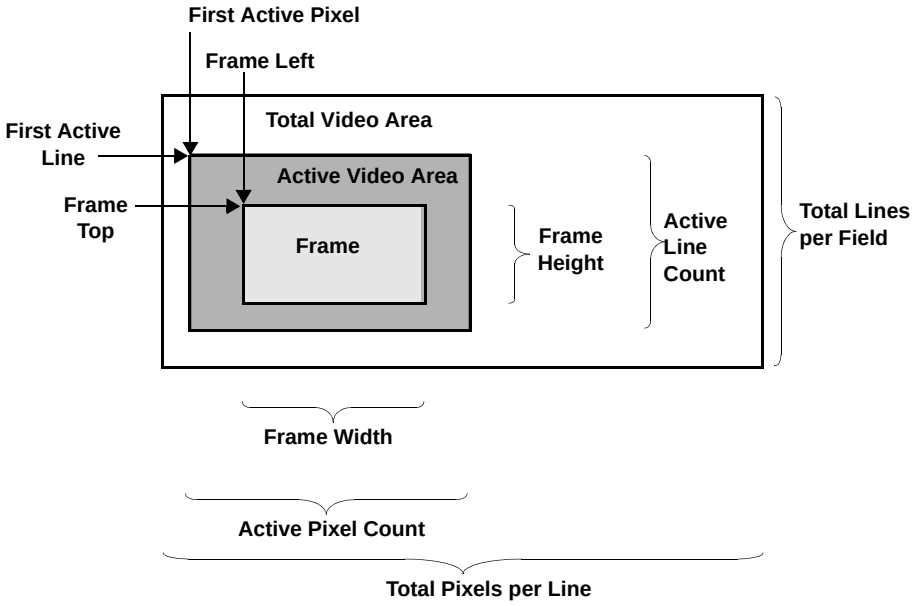


Figure 4: Spatial Relationship of Video Signal

Types of Frames

The DT3153 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

The DT3153 can perform simultaneous, interpolated, arbitrary scaling in real-time. This feature is useful if you want to reduce the size of an image.

Using software, you provide the scale factor for the horizontal and vertical directions. The scale factor is the ratio of the target values (the total number of pixels or lines in the resulting scaled image) to the source values (the total number of pixels or lines in the image to scale) in each direction.

The minimum scale factor is 1; the maximum scale factor is 100 (nominal is 100).

Frame Storage Mode

You can store the data in one of the following formats:

- YUV (16-bits per pixel), as shown in Figure 5;
- RGB16 (16-bits per pixel), as shown in Figure 6; and
- RGB (32-bits per pixel), as shown in Figure 7.

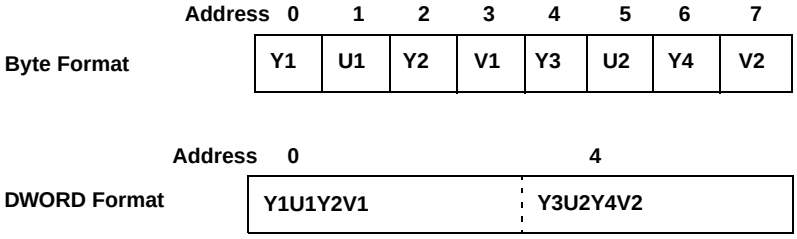


Figure 5: YUV Mode (16-Bit Data Format)

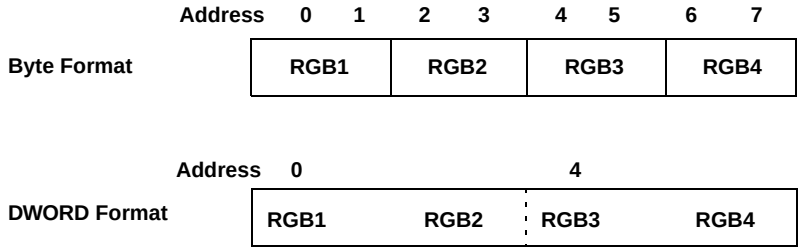


Figure 6: RGB16 (16-Bit) Color Data Format

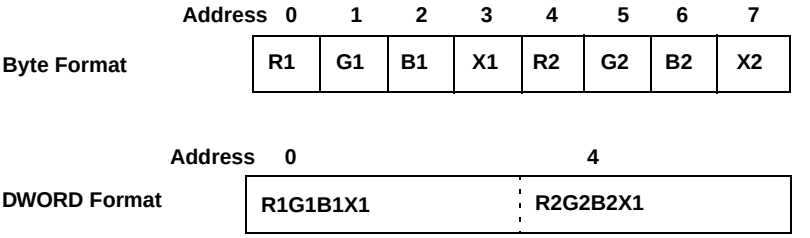


Figure 7: RGB 32-Bit Color Data Format

Passthru

The DT3153 board can continuously capture and display video data; this operation is called *passthru*. The goal of passthru is to allow you 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 a passthru operation, the image is captured, converted to a bitmap, and transferred to the display memory of the video board. Image data in display memory is continuously overwritten and is not stored.

This section describes the following aspects of passthru:

- Bitmap passthru mode,
- Source origin,
- Passthru scaling, and
- Overlays.

Bitmap Passthru Mode

The DT3153 board supports both synchronous and asynchronous bitmap passthru mode. In a synchronous passthru operation, you cannot perform another operation until the synchronous passthru operation is stopped. In an asynchronous passthru operation, the operation starts but gives control to you immediately, allowing you to perform other operations while data is displayed.

Bitmap passthru mode requires a frame in device memory into which the image is first captured. Once it is captured, Windows functions perform bit copies of the image data to display memory. Windows functions 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, 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.

A bitmap passthru operation continues until you stop it. You can stop an asynchronous bitmap passthru operation using software. To stop a synchronous bitmap passthru operation, click the mouse or press a key.

Note: No image data is saved to nonvolatile system memory when a passthru operation is stopped. To save an image, you must perform an acquisition (see page 24).

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 new source origin is a pixel position somewhere in the image. Values for the horizontal direction, range from 0 (the default) to 636 for 60 Hz or 764 for 50 Hz. Values for the vertical direction, range from 0 (the default) to 479 for 60 Hz or 575 for 50 Hz.

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

Passthru Scaling

Using software, the DT3153 board can scale the passthru image to the height and width that most closely match the requested size. Unlike hardware scaling (see page 18), where the hardware scales the image before the image is transferred to system memory, passthru scaling is done in software after the image is transferred to system memory.

Values for the width range from 4 to 640 pixels (the default) for 60 Hz image formats or from 4 to 768 pixels (the default) for 50 Hz image formats (in increments of 4). Values for the height range from 1 to 480 lines (the default) for 60 Hz image formats or 1 to 576 lines (the default) for 50 Hz image formats (in increments of 1).

Overlays

Using software, you can add overlays to the display when capturing images. Overlays are a means by which you can place an image on top of another image that was captured using passthru.

Note: Overlays require Direct Draw Interface (DDI) support.

Acquisition Modes

The DT3153 board can acquire interlaced frames either 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 DT3153, you can acquire a single full frame or multiple full frames. Single frames are stored in an area in system memory that was either allocated to the DT3153 Device Driver during system startup (called *device memory*) or provided by you (called *host memory*). Multiple frames are stored only in device memory.

Each buffer in memory must be large enough to hold the acquired frame. The amount of memory required depends on the video format (50 Hz or 60 Hz) and the storage image format (RGB or YUV) used. The required memory size must be equal to or greater than frame height multiplied by frame width multiplied by pixel depth for each video format and storage image format.

Table 2 lists the maximum memory size required for each image format and image type supported.

Table 2: Required Memory

Video Format	Storage Image Format	Maximum Memory Required (Bytes)
60 Hz	RGB	1,228,800
	YUV or RGB16	614,400
50 Hz	RGB	1,769,472
	YUV or RGB16	884,736

WARNING!

If you are acquiring to host memory and change either the image format or the image type, you must ensure that the buffer is large enough to hold the acquired data. Failure to do so results in invalid frame messages when you acquire the image.

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

The speed of the PCI bus allows the DT3153 to transfer an unlimited number of consecutive frames across the bus in real time. You can acquire consecutive images, up to the capacity of available system RAM.

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, when used with a 16-bit or 32-bit color display adapter board that supports DDI.

Digital I/O Signals

The DT3153 board provides four digital I/O lines (pins 2, 3, 4, and 12) on connector J1. These digital lines are simple register-driven, TTL-level inputs and outputs 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.

You can configure, write to, and read from the digital I/O lines using software.

Supported Device Driver Capabilities

DT3153 Device Driver Capabilities

Because the Frame Grabber SDK is intended to be used with all DT-Open Layers frame grabbers, the DT3153 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 DT3153 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 DT3153 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 DT3153 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 30
Input signals	page 32
Sync signals	page 35
Active video area	page 37
Frames	page 38
Passthru	page 41

For capabilities that apply to ...	Refer to the table starting on ...
Overlay	page 43
Memory	page 44
Acquisition	page 45
Digital I/O	page 47

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 3: General Device Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlImgQueryDeviceCaps	
Device Signature OLC_IMG_DC_OL_SIGNATURE	Ox44544F4C
Device ID OLC_IMG_DC_DEVICE_ID	0x2C
Device Name OLC_IMG_DC_DEVICE_NAME	“DT3153”
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	 No Yes
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 3: General Device Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
DtColorQueryInterface	
Color SDK Capabilities	
OLT_QUERY_COLOR_INTERFACE	
Supports Signal Type	
COLOR_INTERFACE_SIGNAL_TYPE	True
Supports Storage Mode	
COLOR_INTERFACE_STORAGE_MODE	True
Supports Image Parameter	
COLOR_INTERFACE_IMAGE_PARAMETER	True
Supports Hardware Scaling	
COLOR_INTERFACE_HARDWARE_SCALING	True
Supports Digital I/O	
COLOR_INTERFACE_DIGITAL_IO	True
Supports Draw Acquired Frame	
COLOR_INTERFACE_DRAW_ACQUIRED_FRAME	True
Supports Sync Master Mode	
COLOR_INTERFACE_SYNC_MASTER_MODE	True

Table 4: Input Signal Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlFgQueryInputCaps	
Number of Input Sources OLC_FG_IC_INPUT_SOURCE_COUNT	3
Supports Input Filter Selection OLC_FG_IC_DOES_INPUT_FILTER	No
Supports Input Filter Query OLC_FG_IC_DOES_QUERY_INPUT_FILTER	No
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	N/A
Supports Programmable A/D OLC_FG_IC_DOES_PROG_A2D	No
Supports Programmable A/D Query OLC_FG_IC_DOES_QUERY_PROG_A2D	No
Voltage Range of Black Level, in µV OLC_FG_IC_BLACK_LEVEL_LIMITS	N/A
Voltage Range of White Level, in µV OLC_FG_IC_WHITE_LEVEL_LIMITS	N/A
Supports Programmable Pixel Clock OLC_FG_IC_DOES_PIXEL_CLOCK	No
Supports Pixel Clock Query OLC_FG_IC_DOES_QUERY_PIXEL_CLOCK	Yes

Table 4: Input Signal Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
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
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_IC_ILUT_COUNT	0
Maximum Index Number Allowed in each ILUT OLC_FG_IC_MAX_ILUT_INDEX	N/A
Maximum Value Allowed in each ILUT OLC_FG_IC_MAX_ILUT_VALUE	N/A

Table 4: Input Signal Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
DtColorSignalType	
Signal Type in the Color SDK Extensions OLT_SIGNAL_TYPE Supports Monochrome Signal Type OLC_MONO_SIGNAL Supports Y/C Signal Type (Luminance/Chrominance) OLC_YC_SIGNAL Support Composite Signal Type OLC_COMPOSITE_SIGNAL Supports RGB Signal OLC_RGB_SIGNAL	 No Yes Yes No
DtColorImageParameters Image Parameters in the Color SDK Extensions OLT_COLOR_PARAMETER Brightness Values OLC_SET_BRIGHTNESS Contrast Values OLC_SET_CONTRAST V-Saturation Values OLC_SET_V_SAT U-Saturation Values OLC_SET_U_SAT 	 min: 0 max: 255 nominal: 163 granularity: 1 min: 0 max: 511 nominal: 233 granularity: 1 min: 0 max: 511 nominal: 235 granularity: 1 min: 0 max: 511 nominal: 165 granularity: 1

Table 4: Input Signal Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
Image Parameters in the Color SDK Extensions (cont.)	
Hue Values	
OLC_SET_HUE	min: 0 max: 255 nominal: 128 granularity: 1
Red Level Values	
OLC_SET_RED_LEVEL	N/A
Green Level Values	
OLC_SET_GREEN_LEVEL	N/A
Blue Level Values	
OLC_SET_BLUE_LEVEL	N/A

Table 5: Sync Signal Capabilities for the DT3153 Device Driver

Capability	DT3153 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

Table 5: Sync Signal Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
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	 Yes No No
Composite Sync Threshold Limits, in mV OLC_FG_IC_CSYNC_THRESH_LIST_LIMITS	N/A
Composite Sync Threshold List OLC_FG_IC_CSYNC_THRESH_LIST	N/A
Supports Sync Sentinel OLC_FG_IC_DOES_SYNC_SENTINEL	No
Supports Sync Sentinel Query OLC_FG_IC_DOES_QUERY_SYNC_SENTINEL	No
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	 No No
DtColorSyncMasterMode	
Sync Master in Color SDK Extensions OLT_SYNC_MASTER_PARAMETER Enable Sync Master Mode OLC_SYNC_MASTER_ENABLE	 Yes

Table 6: Active Video Area Capabilities for the DT3153 Device Driver

Capability	DT3153 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
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 7: Frame Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlFgQueryInputCaps	
Supports Frame Selection OLC_FG_IC_DOES_FRAME_SELECT	Yes
Supports Frame Selection Query OLC_FG_IC_DOES_QUERY_FRAME_SELECT	Yes
Range of Frame Top Control OLC_FG_IC_FRAME_TOP_LIMITS	min: 0 max: 50 Hz: 575 60 Hz: 479 nominal: 0 granularity: 1
Range of Frame Left Control OLC_FG_IC_FRAME_LEFT_LIMITS	min: 0 max: 50 Hz: 767 60 Hz: 636 nominal: 0 granularity: 1
Range of Frame Height Control OLC_FG_IC_FRAME_HEIGHT_LIMITS	min: 1 max: 50 Hz: 576 60 Hz: 480 nominal: 50 Hz: 576 60 Hz: 480 granularity: 1

Table 7: Frame Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
Range of Frame Width Control OLC_FG_IC_FRAME_WIDTH_LIMITS	min: 4 max: 50 Hz: 768 60 Hz: 640 nominal: 50 Hz: 768 60 Hz: 640 granularity: 4
Range Between Pixels (Scale Factor - Horizontal) OLC_FG_IC_FRAME_HINC_LIMITS	min: 1 max: 16 nominal: 1 granularity: 1
Range Between Lines (Scale Factor - Vertical) OLC_FG_IC_FRAME_VINC_LIMITS	min: 1 max: 16 nominal: 1 granularity: 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

Table 7: Frame Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
Maximum Number of Pixels in Frame OLC_FG_IC_MAX_FRAME_SIZE	 50 Hz: 442368 60 Hz: 307200
Number of Bytes in a Pixel OLC_FG_IC_PIXEL_DEPTH	 2 or 4[a]
DtColorHardwareScaling	
Hardware Scaling in Color SDK Extensions OLT_SCALE_PARAM Horizontal scale factor (percentage) hscale Vertical scale factor (percentage) vscale	 min: 1 max: 100 nominal: 100 granularity: 1 min: 1 max: 100 nominal: 100 granularity: 1
DtColorStorageMode	
Storage Mode in the Color SDK Extensions OLT_IMAGE_MODE Supports Monochrome Mode OLC_IMAGE_MONO Supports YUV Mode OLC_IMAGE_YUV Supports RGB OLC_IMAGE_RGB Supports RGB16 OLC_IMAGE_RGB_16	 No Yes Yes Yes

a. YUV and 16-bit RGB formats use two bytes per pixel; 32-bit RGB format uses four bytes per pixel.

Table 8: Passthru Capabilities for the DT3153 Device Driver

Capability	DT3153 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 Async Bitmap OLC_FG_PASSTHRU_ASYNC_BITMAP Supports Sync Direct OLC_FG_PASSTHRU_SYNC_DIRECT Supports Async Direct OLC_FG_PASSTHRU_ASYNC_DIRECT Supports Continuous-Acquire OLC_FG_PASSTHRU_ASYNC_BITMAP_EXTENDED	 Yes Yes No No No
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[a] min: 0 max: 50 Hz: 764 60 Hz: 636 nominal: 0 granularity: 4 min: 0 max: 50 Hz: 575 60 Hz: 479 nominal: 0 granularity: 1

Table 8: Passthru Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
Passthru Scaling OLC_FG_PC_DOES_SCALING Range of Legal Values for Height OLC_FG_PC_SCALE_HEIGHT_LIMITS Range of Legal Values for Width OLC_FG_PC_SCALE_WIDTH_LIMITS	Yes min: 1 max: 50 Hz: 576 60 Hz: 480 nominal: 50 Hz: 576 60 Hz: 480 granularity: 1 min: 4 max: 50 Hz: 768 60 Hz: 640 nominal: 50 Hz: 768 60 Hz: 640 granularity: 4
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	 No N/A N/A N/A N/A
Passthru snapshot OLC_FG_PC_DOES_PASSTHRU_SNAPSHOT	 Yes

a. This is supported if your computer has a DDI graphics adapter.

Table 9: Overlay Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlFgQueryDDICaps	
Passthru with DDI OLC_FG_DDI_FAST_PASSTHRU	Yes
Overlay support OLC_FG_DDI_OVERLAYS	Yes
Translucent overlay capability OLC_FG_DDI_TRANSLUCENT_OVERLAYS	Yes
Color overlay capability OLC_FG_DDI_COLOR_OVERLAY	Yes
Multiple overlay surface capability OLC_FG_DDI_MULTIPLE_SURFACES	Yes
Color keying (filtering) OLC_FG_DDI_COLOR_KEY_CONTROL	Yes
Add overlay to image OLC_FG_DDI_OVERLAY_ON_FRAME	Yes
User-managed DDI surface support OLC_FG_DDI_USER_SURFACE_PTR	No
Passthru event synchronization support OLC_FG_DDI_PASSTHRU_SYNC_EVENT	Yes

Table 10: Memory Capabilities for the DT3153 Device Driver

Capability	DT3153 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 11: Acquisition Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlFgQueryInputCaps	
Acquisition Types OLC_FG_IC_SINGLE_FRAME_OPS *-Single Frame to Host* Supports Full Frame Acquisition OLC_FG_ACQ_FRAME Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT *-Single Frame to Device* Supports Full Frame Acquisition OLC_FG_ACQ_FRAME Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT *-Single Frame to Host (async)* Supports Full Frame Acquisition OLC_FG_ACQ_FRAME Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT -Single Frame to Device (async) Supports Full Frame Acquisition OLC_FG_ACQ_FRAME Supports Subframe Acquisition OLC_FG_ACQ_SUBFRAME Supports Frame-to-Fit Acquisition OLC_FG_ACQ_FRAME_TO_FIT	 Yes No No Yes No No Yes No No Yes No No

Table 11: Acquisition Capabilities for the DT3153 Device Driver (cont.)

Capability	DT3153 Support
Acquisition Types (cont.)	
OLC_FG_IC_MULT_FRAME_OPS	
-Multiple Frames to Host	
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	
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 12: Digital I/O Capabilities for the DT3153 Device Driver

Capability	DT3153 Support
OlFgQueryCameraControlCaps	
Number of Digital Output Lines OLC_FG_CC_DIG_OUT_COUNT	4[a]
DtColorDigitalIOControl	
Number of Digital Input/Output Lines	4[a]

a. The DT3153 supports for digital I/O lines, each of which can be configured for input or output. Use the **DtColorDigitalIOControl** function to determine the configuration of the digital I/O lines, return the value of the digital input lines, or sets the values of the digital output lines.

Initialized Control Values

Table 13 lists the default control values after opening or initializing the DT3153 Device Driver.

Table 13: Default Control Values

Control Name	Value
OLC_FG_CTL_INPUT_FILTER	N/A
OLC_FG_CTL_BLACK_LEVEL	N/A
OLC_FG_CTL_WHITE_LEVEL	N/A
OLC_FG_CTL_VIDEO_TYPE	OLC_FG_VID_COMPOSITE
OLC_FG_CTL_CSYNC_SOURCE	OLC_FG_CSYNC_CURRENT_SRC
OLC_FG_CTL_CSYNC_THRESH	N/A
OLC_FG_CTL_SYNC_SENTINEL	TRUE
OLC_FG_CTL_HSYNC_INSERT_POS	N/A
OLC_FG_CTL_HSYNC_SEARCH_POS	N/A
OLC_FG_CTL_VSYNC_INSERT_POS	N/A
OLC_FG_CTL_VSYNC_SEARCH_POS	N/A
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 60 Hz: 12,500,000
OLC_FG_CTL_CLOCK_SOURCE	OLC_FG_CLOCK_INTERNAL
OLC_FG_CTL_FRAME_TYPE	OLC_FG_FRM_IL_FRAME_EVEN

Table 13: Default Control Values (cont.)

Control Name	Value
OLC_FG_CTL_ILUT	N/A
DtColorSignalType	OLC_COMPOSITE_SIGNAL
DtColorStorageMode	OLC_IMAGE_RGB
DtColorImageParameters Brightness Contrast V Saturation U Saturation Hue Red Level Green Level Blue Level	 163 256 180 254 128 N/A N/A N/A
DtColorHardwareScaling Horizontal scale factor Vertical scale factor	 100 100
DtColorDigitalIOControl Digital I/O Configuration	 0 (all inputs)
DtColorSyncMasterMode Enable/Disable	 0 (disabled)

4

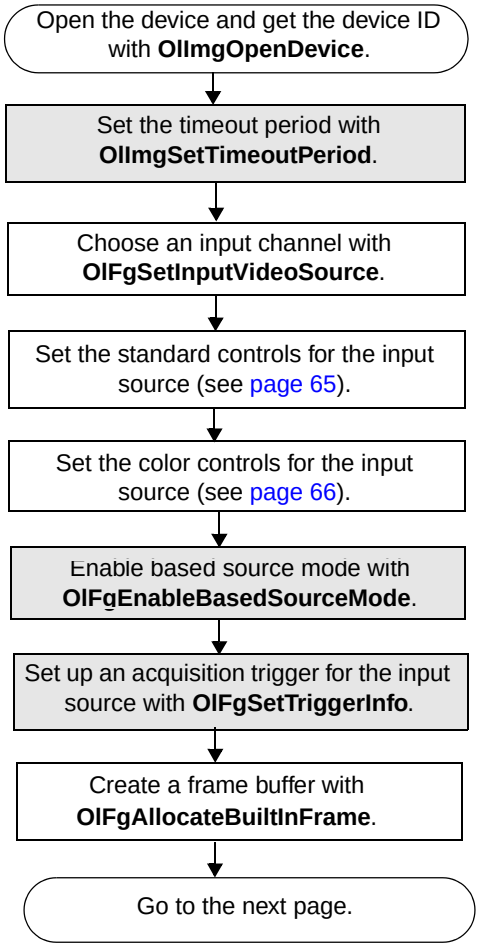
Programming Flowcharts

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.

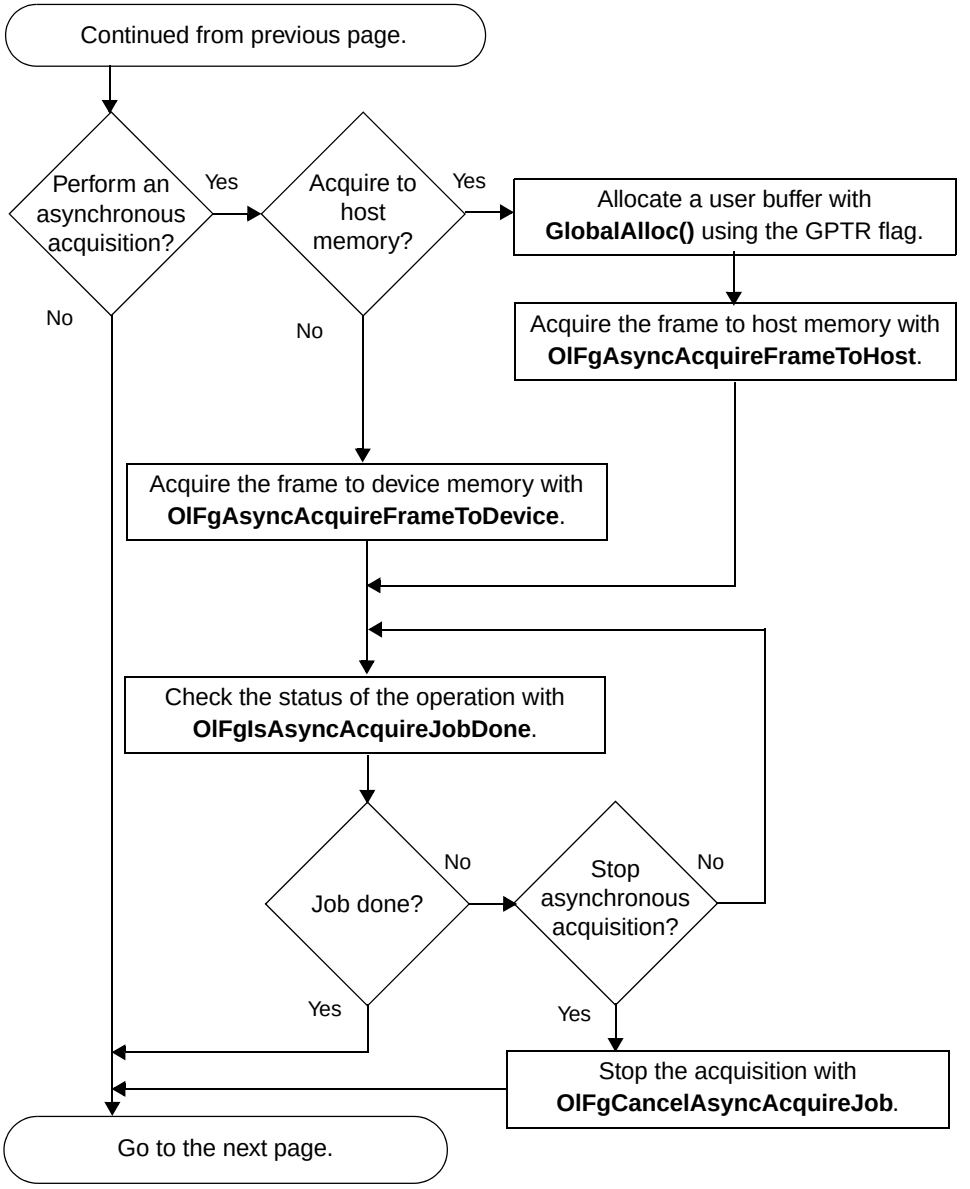
Note that many steps represent several substeps; if you are unfamiliar with the detailed operations involved with any one step, refer to the indicated page for detailed information. Optional steps appear in shaded boxes.

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

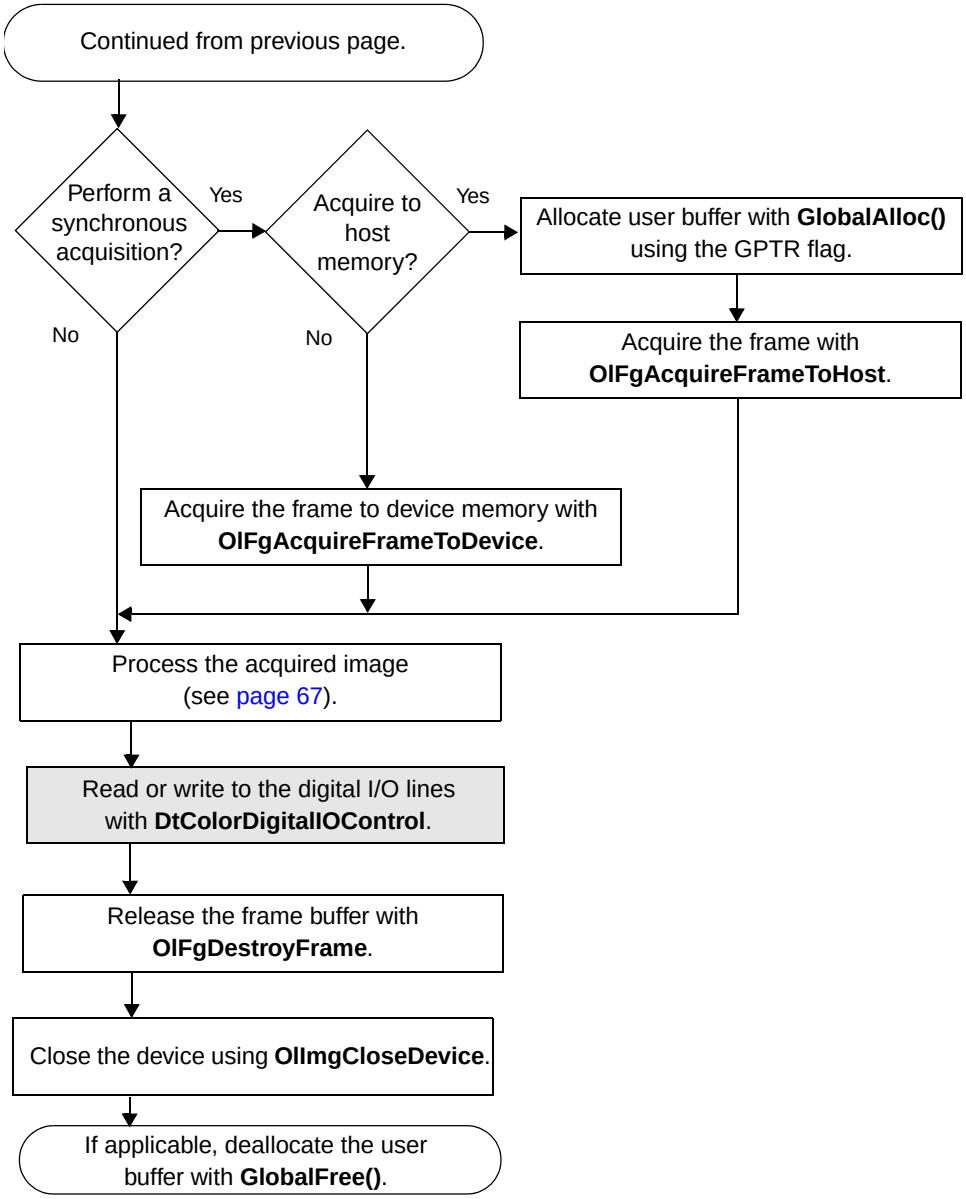
Single-Frame Acquisition



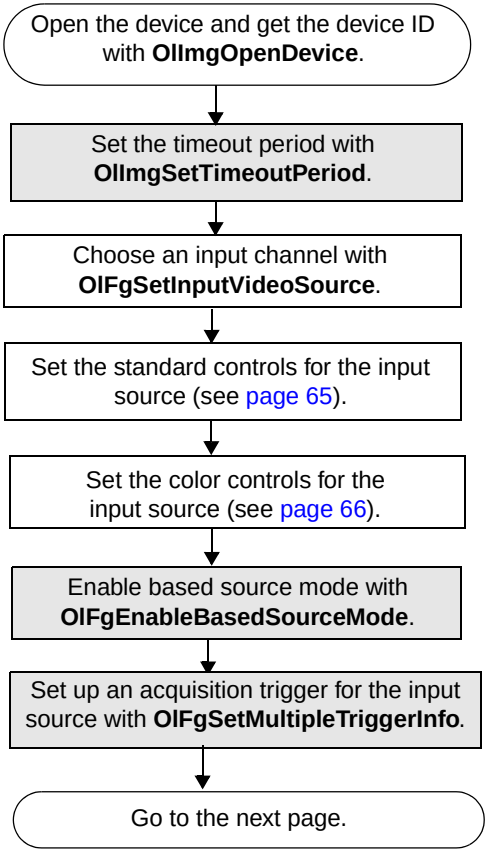
Single-Frame Acquisition (cont.)



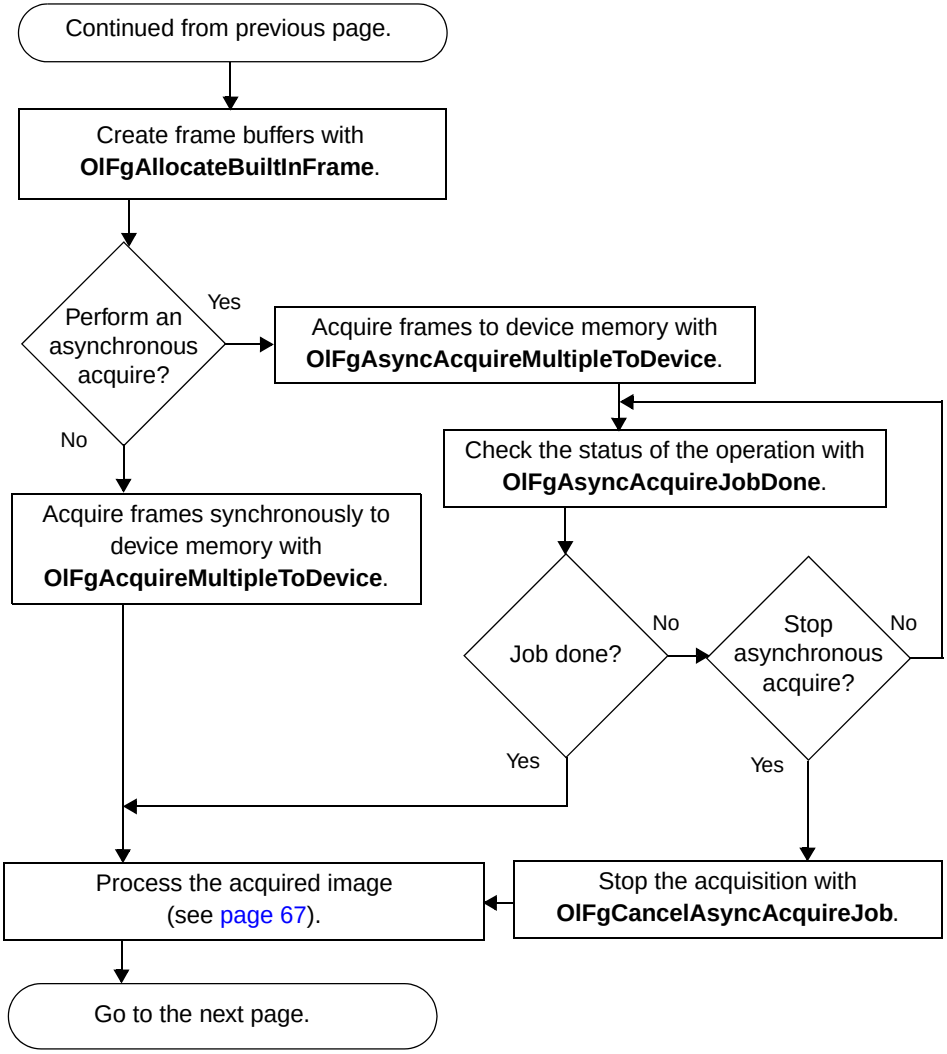
Single-Frame Acquisition (cont.)



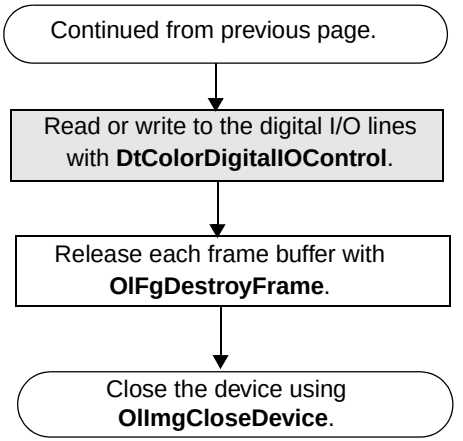
Multiple-Frame Acquisition



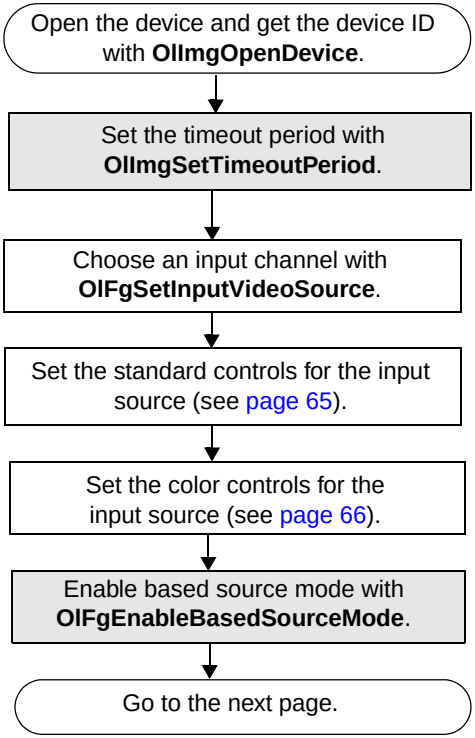
Multiple-Frame Acquisition (cont.)



Multiple-Frame Acquisition (cont.)

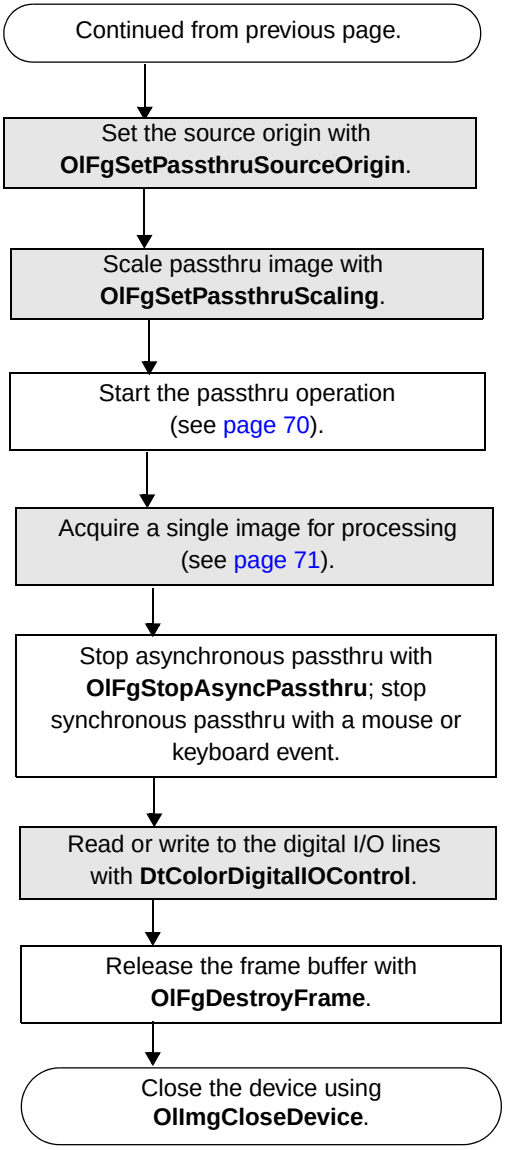


Passthru without Overlays



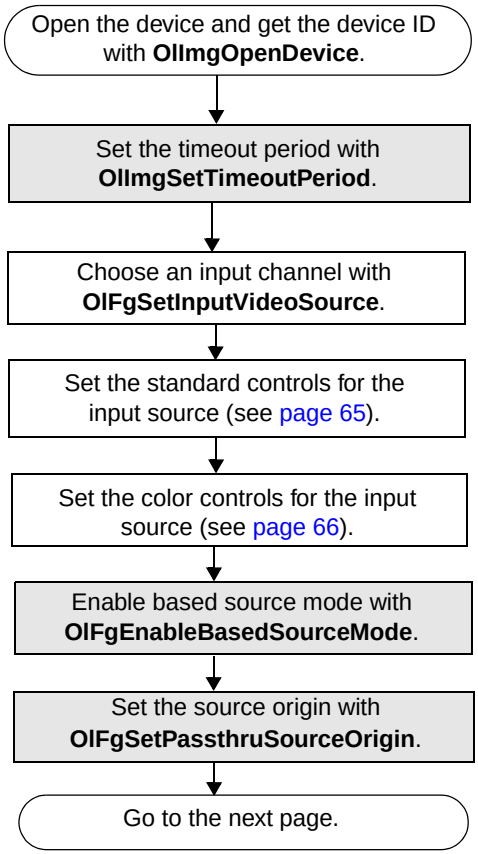
Select input channel 0, 1, or 2. The default value is 0.

Passthru without Overlays (cont.)



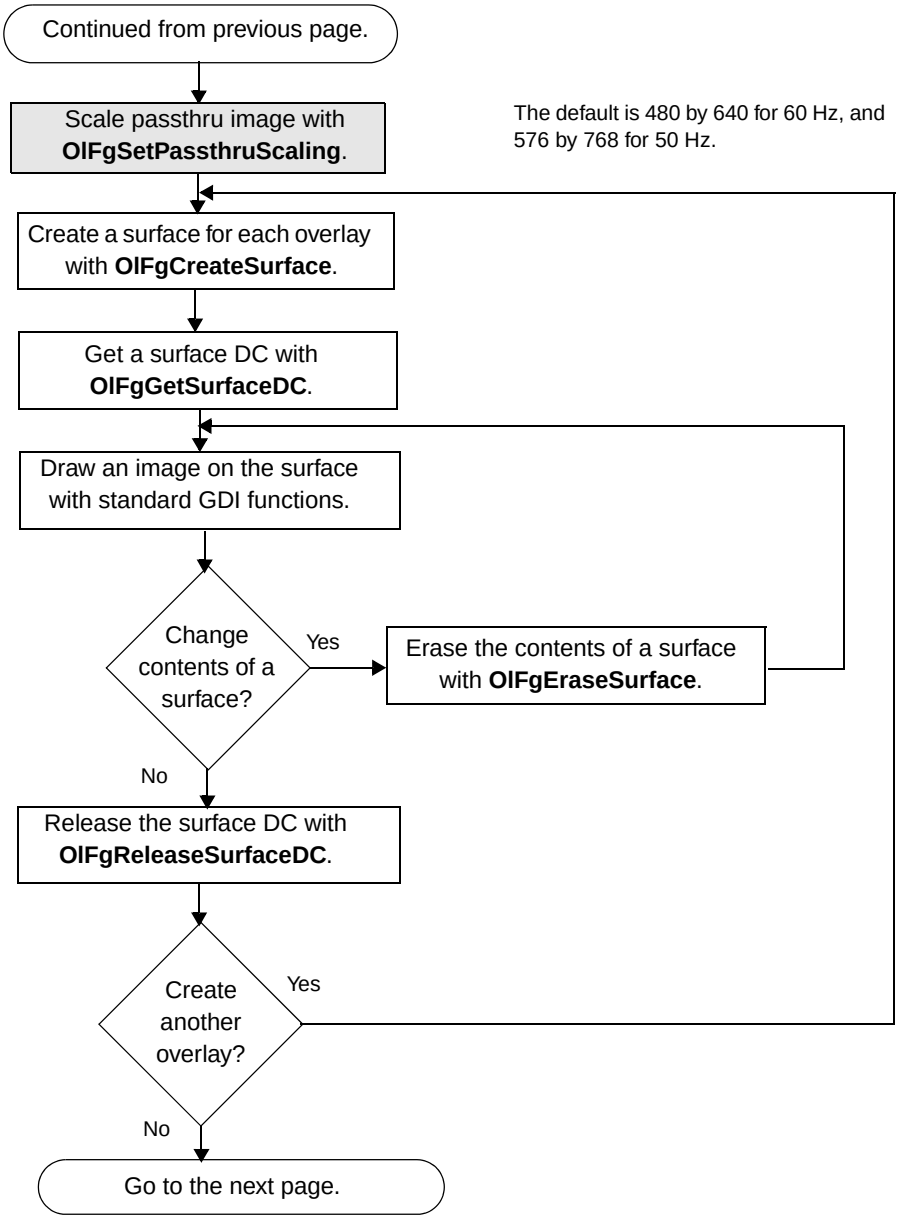
The default is 480 by 640 for 60 Hz and 576 by 768 for 50 Hz.

Passthru with Overlays

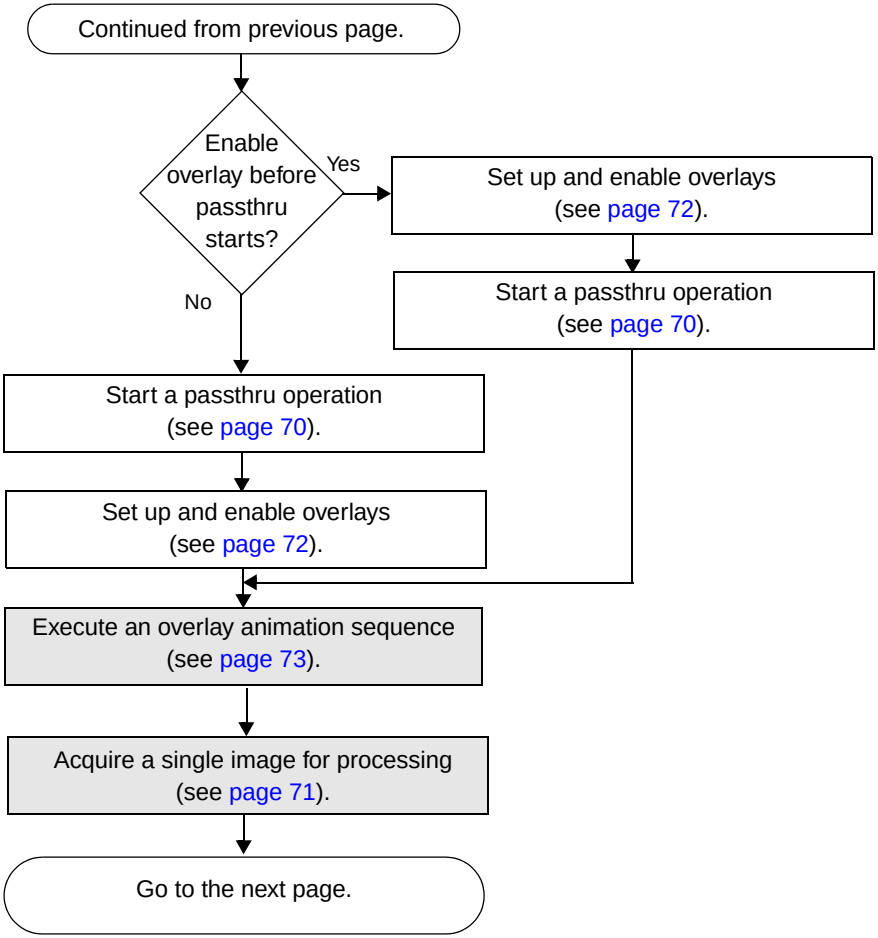


Select input channel 0, 1, or 2. The default value is 0.

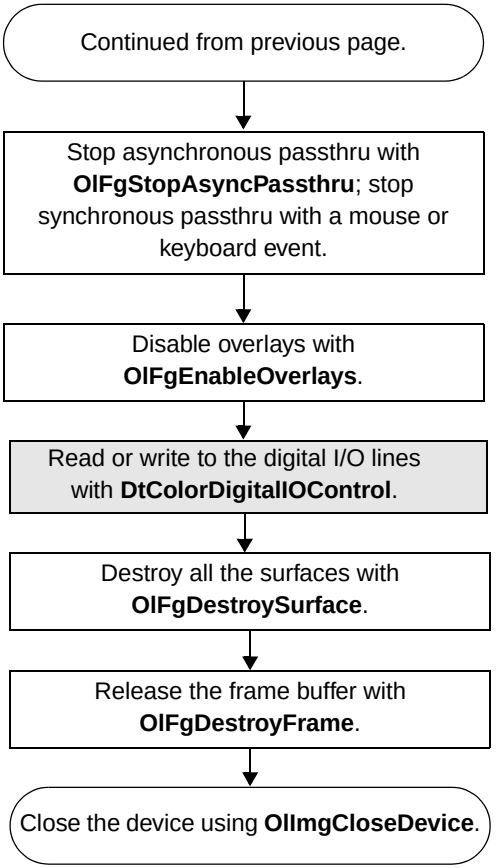
Passthru with Overlays (cont.)



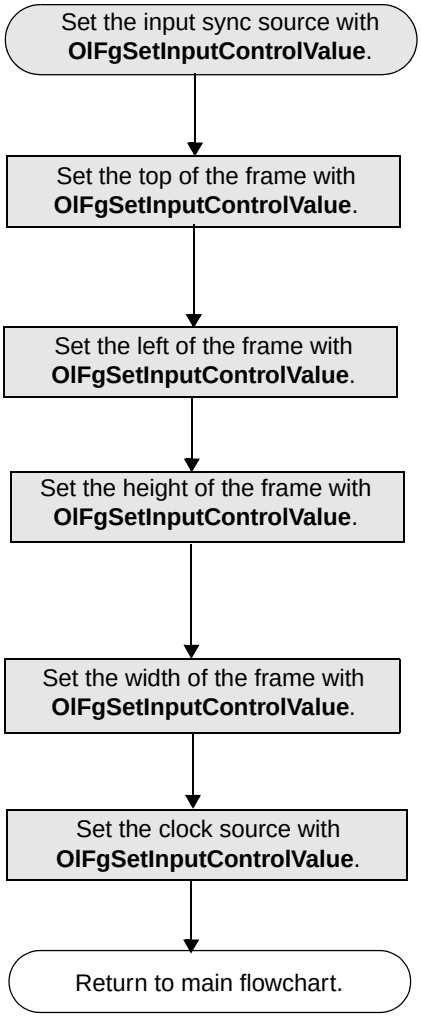
Passthru with Overlays (cont.)



Passthru with Overlays (cont.)



Set the Standard Controls for the Input Channel



Use the key OLC_FG_CTL_VIDEO_TYPE to select a composite sync source and OLC_FG_CTL_CSYNC_SOURCE to select the composite sync on the current channel only.

Use the key OLC_FG_CTL_FRAME_TOP to set the first line of video, relative to the active video area, to digitize for the selected input channel. The default is 0.

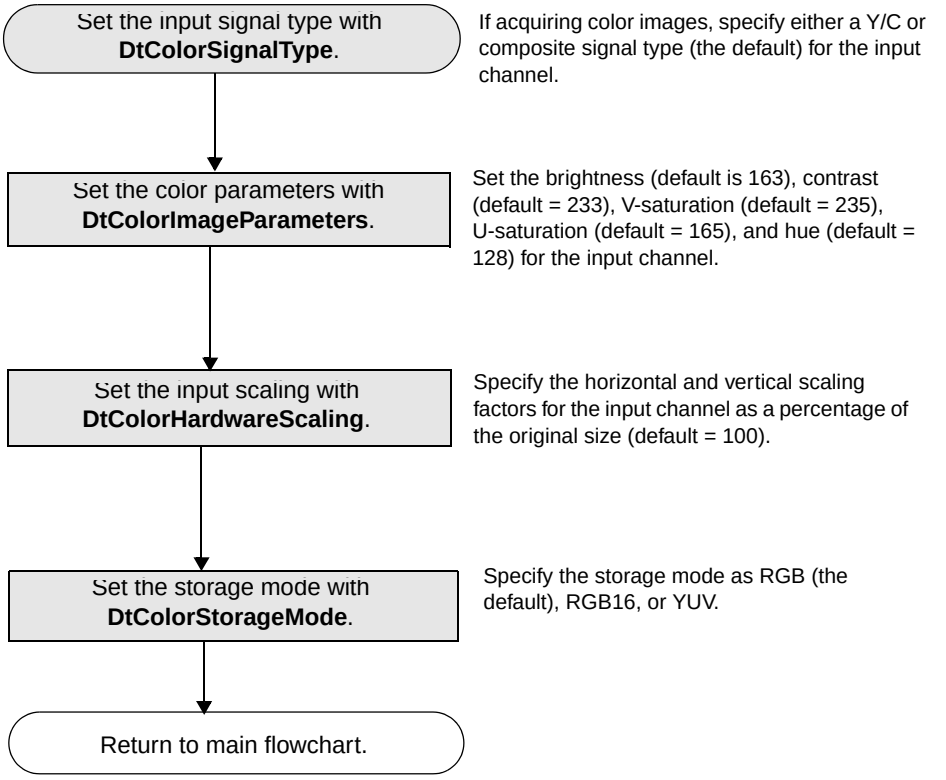
Use the key OLC_FG_CTL_FRAME_LEFT to set the first pixel of video, relative to the active video area, to digitize for the selected input channel. The default is 0.

Use the key OLC_FG_CTL_FRAME_HEIGHT to set the number of lines per field of video to digitize for the selected input channel.The default is 576 for 50 Hz, and 480 for 60 Hz.

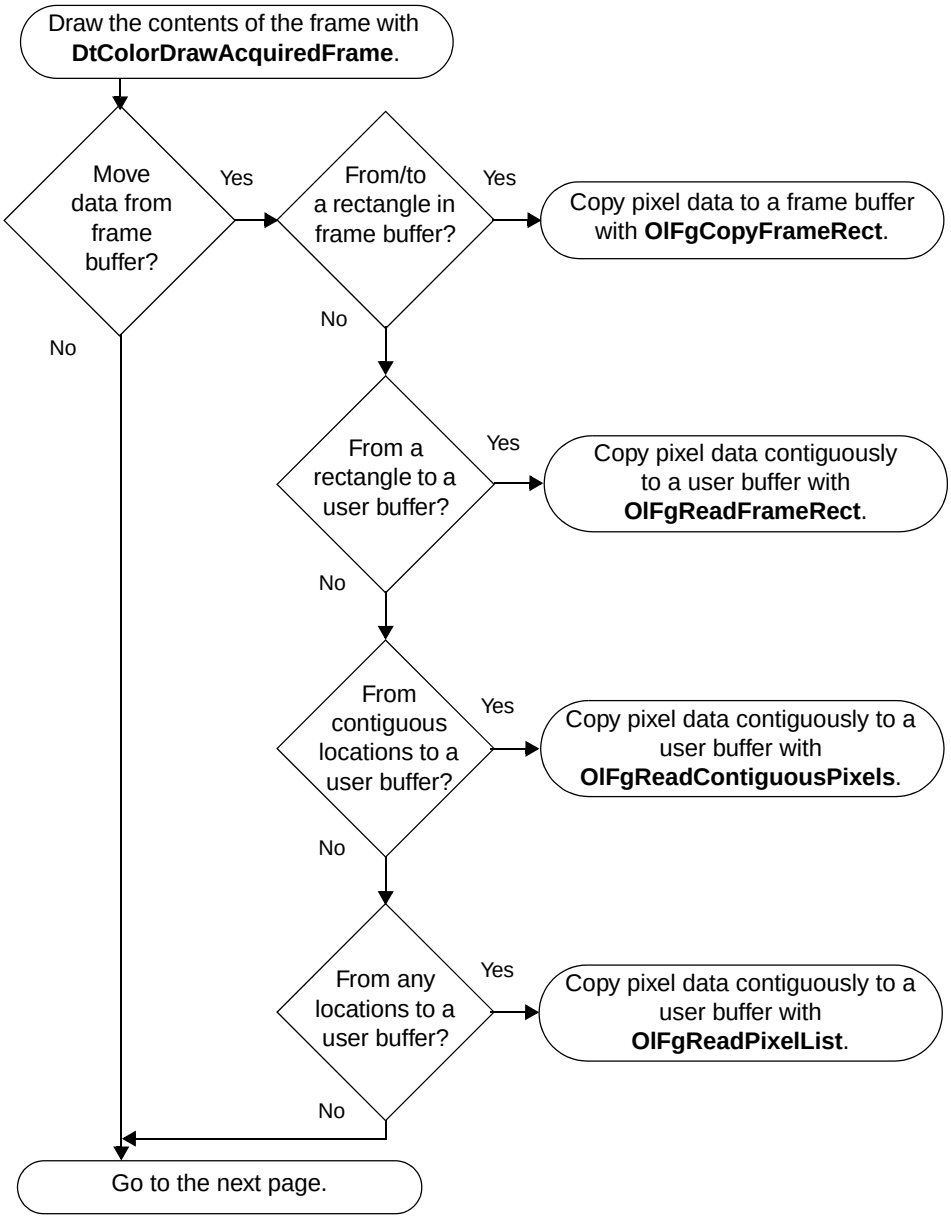
Use the key OLC_FG_CTL_FRAME_WIDTH to set the number of pixels per line of video to digitize for the selected input channel. The default is 786 for 50 Hz, and 640 for 60 Hz.

Use the key OLC_FG_CTL_CLOCK_SOURCE to set the pixel clock to internal.

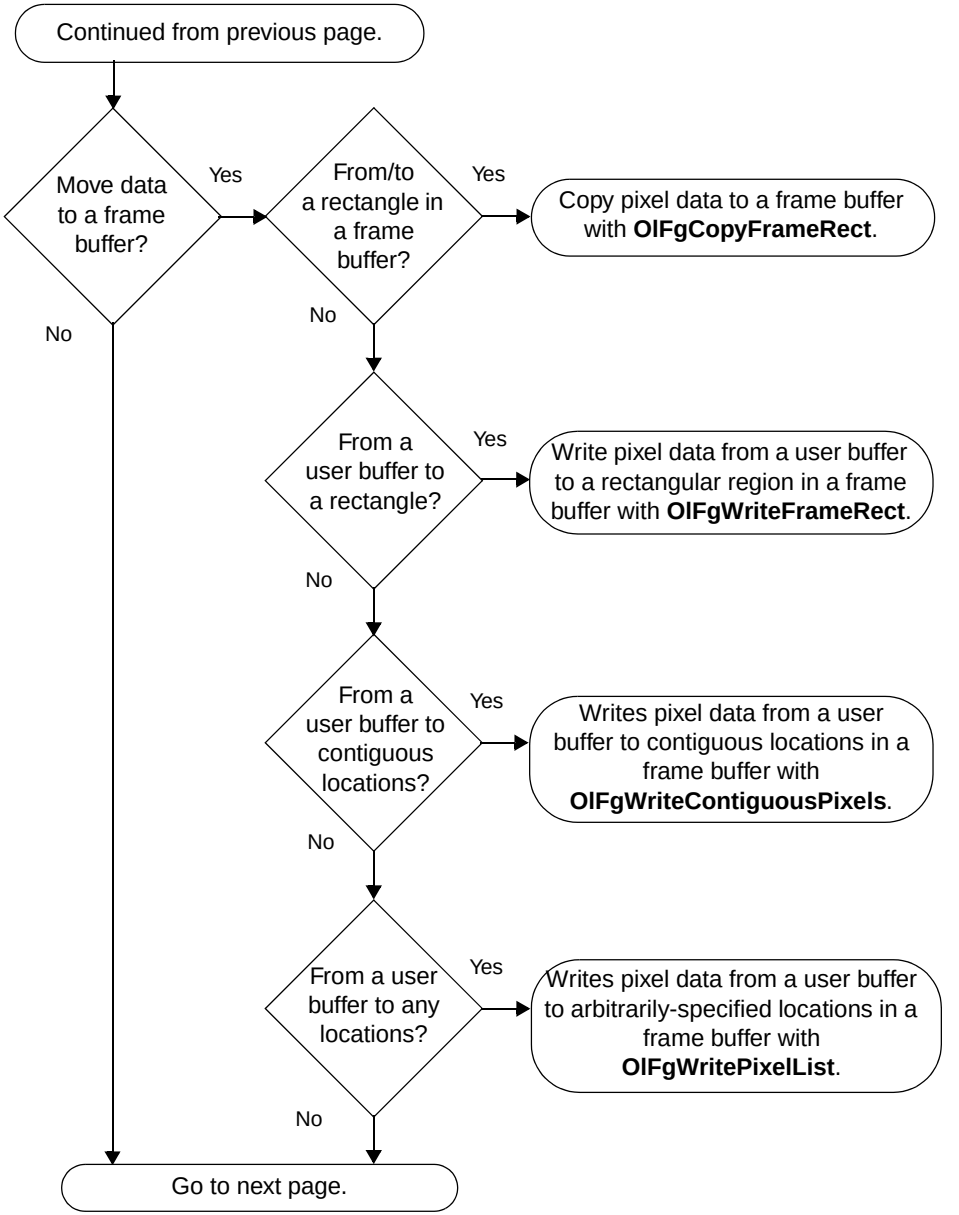
Set the Color Controls for the Input Channel



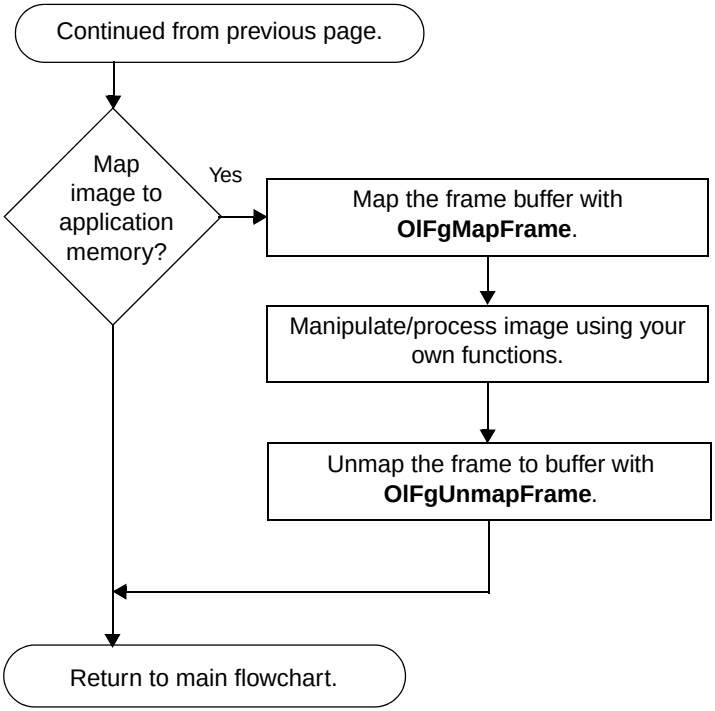
Process the Acquired Image



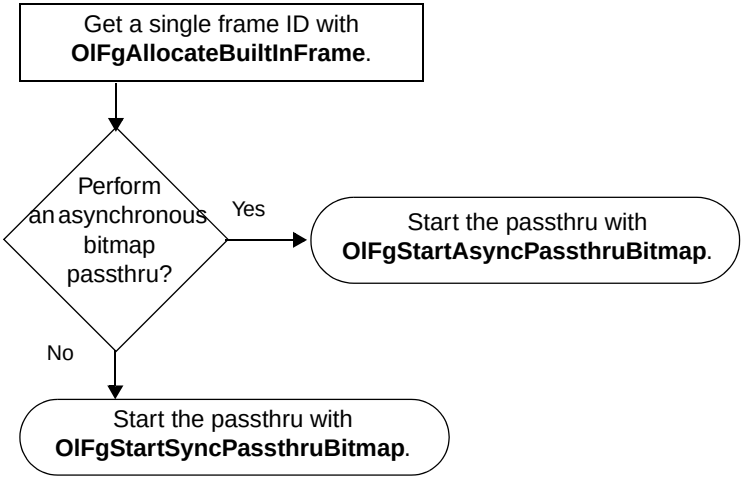
Process the Acquired Image (cont.)



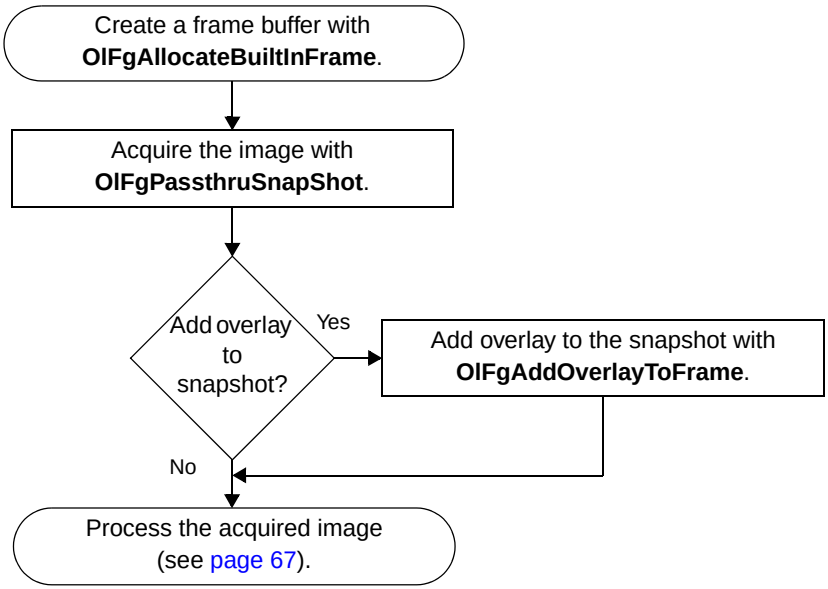
Process the Acquired Image (cont.)



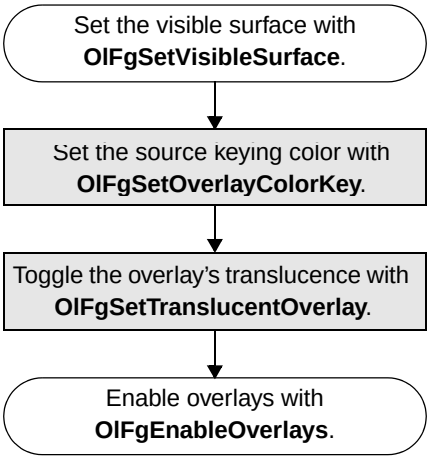
Start the Passthru Operation



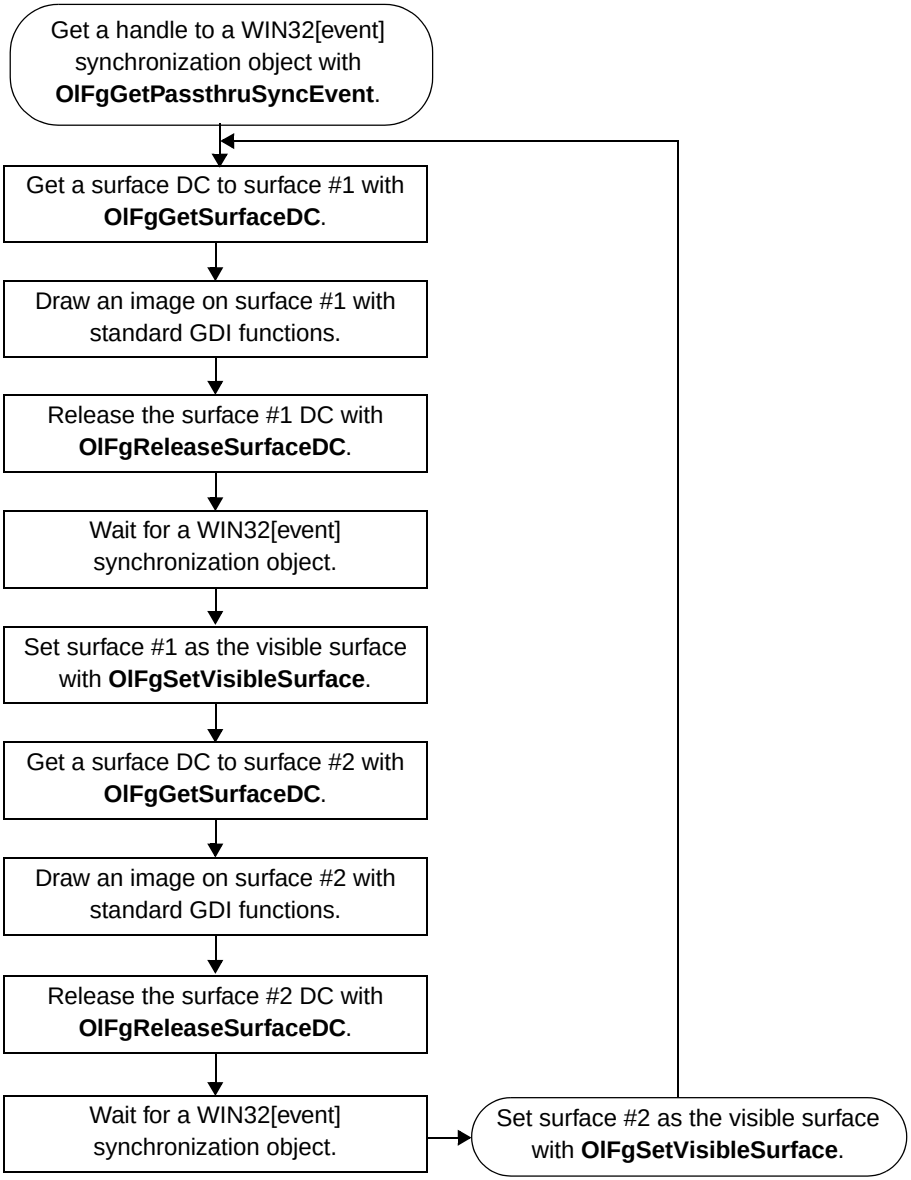
Take a Snapshot



Set up and Enable Overlays



Execute an Overlay Animation Sequence



Troubleshooting

General Checklist

Should you experience problems using the DT3153 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 *DT3153 Getting Started Manual*.
4. Check that you have installed your hardware properly using the instructions in the *DT3153 Getting Started Manual*.
5. Check that you have installed and configured the device driver properly using the instructions in the *DT3153 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 14 to isolate and solve the problem. If you cannot identify the problem, refer to page 80.

Table 14: 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 DT3153 board is located is a PCI slot and that the board is correctly seated in the slot; see the instructions in the *DT3153 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 DT3153 board and rebooting the system, then reinserting the network device.
	The board is damaged.	Contact Data Translation for technical support; refer to page 80.

Table 14: 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 *DT3153 Getting Started Manual.*
	Electrical noise exists.	Check your connections; see the instructions in the *DT3153 Getting Started Manual.*
	The board is overheating.	Check environmental and ambient temperature; consult the board's specifications on page 87 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 *DT3153 Getting Started Manual.*
Computer does not boot.	Board is not seated properly.	Check that the slot in which your DT3153 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 *DT3153 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 87 of this manual.

Table 14: Troubleshooting Problems (cont.)

Symptom	Possible Cause	Possible Solution
System lockup.	Board is not seated properly.	Check that the slot in which your DT3153 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 *DT3153 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 DT3153 board and rebooting the system, then reinserting the network device.

Service and Support

If you have difficulty using the DT3153 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 82 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 82, 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

Table 15 lists the electrical specifications for the digital output signals on the DT3153 board.

Table 15: 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 16 lists the input electrical specifications for the external trigger signal on the DT3153 board.

Table 16: Digital Input 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

A

Table 17 lists the power, physical, and environmental specifications.

Table 17: Power, Physical, and Environmental Specifications

Feature	Specification
Power consumption	5 V @ 2 A ±12 V@ 100 mA
Operating temperature	0° C to 50° C (32° F to 122° F)
Storage temperature	-25° C to 70° C (-13° F to 158° F)
Humidity	0 to 90%, noncondensing
Dimensions	6.875 inches (length) x 4.2 inches (height)
Weight	5.3 ounces (150 grams)

Connector Pin Assignments

Video Input Connector J1

Connector J1 is a 15-pin, male, D-shell connector that brings out all the signals from the board. You can access all the signals using the EP306 cable or a user-designed cable. Figure 8 illustrates the pin locations for connector J1.

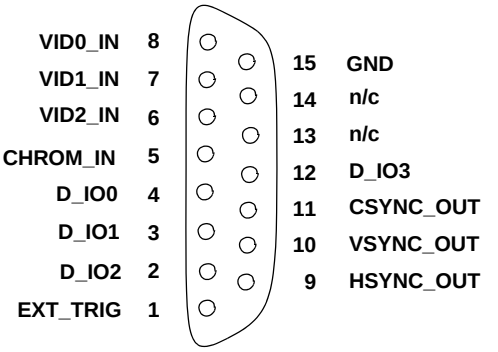


Figure 8: Video Input Connector - J1

Table 18 lists the pins of connector J1 by signal name, and by the corresponding EP306 BNC connector assignments.

Table 18: J1 Pin Assignments

J1 Pin	EP306 BNC Connector	Signal Name
1	7	EXT_TRIG
2	6	D_IO2
3	5	D_IO1
4	4	D_IO0
5	3	CHROM_IN
6	2	VID2_IN
7	1	VID1_IN
8	0	VID0_IN
9	8	HSYNC_OUT
10	9	VSYNC_OUT
11	10	CSYNC_OUT
12	11	D_IO3
13	12	not connected
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 OUT jack using a 75 Ω coaxial cable with a male connector. Use this connector only if you are using a single composite input signal. Figure 9 illustrates connector J2.

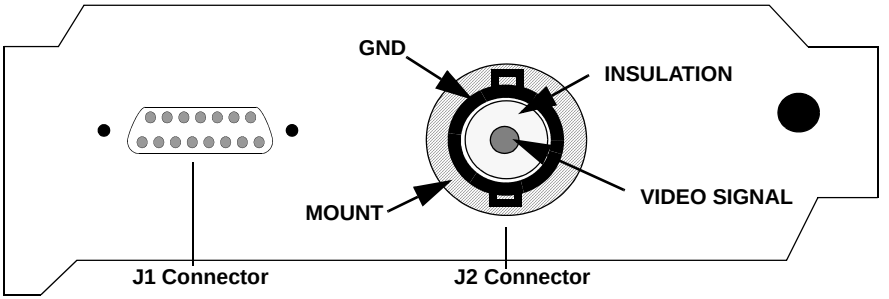


Figure 9: Video Coaxial Connector J2

CAUTION:

The single-use BNC input connector, J2, is shared with the VID0_IN 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 96); and
- Uninstalling the device driver, if necessary (on page 98).

Adding a Board to the Device Driver Configuration

To add a new board to the DT3153 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 *DT3153 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 DT3153 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 DT3153 board is using and ensure that PCI interrupts are enabled in your system BIOS.

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\DT3153\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 DT3153 board to the configuration.
    The DT3153 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 DT3153 board is allowed.
    The DT3153 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 1.2 MB per frame; a 50 Hz, 768-by-576 image requires 1.7 MB 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 DT3153 Device Driver Configuration dialog box is redisplayed; you can see the name of the board you just added.

21. Click **Close** to end the DT3153 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 **DT3153 Mach Series Frame Grabber**.
   The DT3153 Device Driver Properties dialog box appears.
5. Click **Use this Media Control device**, then click **Settings**.
   The DT3153 Device Driver Configuration dialog box appears.
6. Select the name of the DT3153 board that you want to modify.
7. Click **Modify** to modify the board.
   The DT3153 Configuration dialog box appears.
8. For **Enable Board**, ensure that a checkmark is next to Enable Board to activate the board. If you want to retain the settings but disable the board, 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 1.2 MB per frame; a 50 Hz, 768-by-576 image requires 1.7 MB 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 DT3153 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 **DT3153 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 DT3153 Device Driver. However, if you are no longer using the DT3153 board with the supported software, you can uninstall the DT3153 Device Driver from the system.

To uninstall the device driver, perform the following steps:

1. Click **Start/Programs/Data Translation, Inc/MACHUnLd**.
2. Click **DT3153**.
3. Click **OK**.
The DT3153 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 101);
- Removing a board from the device driver configuration (on page 102); and
- Uninstalling the device driver, if necessary (on page 103).

Adding a Board to the Device Driver Configuration

To add a board to the DT3153 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 *DT3153 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 DT3153 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 DT3153 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 **DT3153 MACH Series Frame Grabber**, then click **Properties**.
11. Click the **Properties** tab.
12. Double-click **Multimedia Drivers**.
13. Click **DT3153 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 1.2 MB per frame; a 50 Hz, 768-by-576 image requires 1.7 MB 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 DT3153 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 DT3153 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 **DT3153 MACH Series Frame Grabber**, then click **Properties**.
5. Click the **Properties** tab.
6. Double-click **Multimedia Drivers**.
7. Click **DT3153 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 DT3153 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 1.2 MB per frame; a 50 Hz, 768-by-576 image requires 1.7 MB 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 DT3153 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 DT3153 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 **DT3153 MACH Series Frame Grabber**, then click **Properties**.

5. Click the **Properties** tab.

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

7. Click **DT3153 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 DT3153 boards you want to remove are removed.
11. Click **Close**.
    The Drivers dialog box appears. The DT3153 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 104. 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 DT3153 boards in your system using the preceding section before uninstalling the device driver.

Generally, you will always require the DT3153 Device Driver. However, if you are no longer using the DT3153 board with the supported software, you can uninstall the DT3153 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 **DT3153 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 107);
- Removing a board from the device driver configuration (onpage 109); and
- Uninstalling the device driver, if necessary (on page 110).

Adding a Board to the Device Driver Configuration

To add a board to the DT3153 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 *DT3153 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 DT3153 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 DT3153 board is using and ensure that PCI interrupts are enabled in your system BIOS.

2. Start Windows XP.
   The Found New Hardware dialog box appears.
3. Click **Next**.
4. Click **Install from a list or specific location (advanced)**, then click **Next.**

5. Uncheck all checkboxes, then click **Next**.
6. Click **Finish**.
   The Technial Support page appears.
7. Click **Cancel**.
8. Open the Control Panel.
9. Double-click **Sounds and Audio Devices**.
10. Click Hardware.
11. Double-click **DT-Open Layers DT3153 MACH Series Frame Grabber**.
12. Click **Properties**.
13. Double-click **Multimedia Drivers**.
14. Click **DT3153 MACH Series Frame Grabber**, then click **Properties**.
15. Click **Settings**.
16. Click **Add New** to add a DT3153 board to the configuration.
    The DT3153 Installation dialog box appears for the new board.
17. Enter any unique name (or alias) for the DT3153 board, then click **Add**. Only one alias per installed board is allowed.
    The DT3153 Configuration dialog box appears.
18. 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.
19. Select the **Video Format** as either 50 Hz or 60 Hz.
20. 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 1.2 MB per frame; a 50 Hz, 768-by-576 image requires 1.7 MB 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.

21. Click **Done**.
The DT3153 Configuration dialog box is redisplayed; you can see the name of the board you just added.

22. Click **Close** to finish.
A dialog box appears, indicating that you must restart Windows XP for the changes to take effect.

23. Remove the Imaging OMNI CD from the CD-ROM, then click **Restart Now** to restart the system.

Modifying a Board in the Device Driver Configuration

To modify the board settings in the DT3153 Device Driver configuration, perform the following steps:

1. Open the **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT3153 MACH Series Frame Grabber**.
5. Click **Properties**.
6. Click the **Properties** tab.
7. Double-click **Multimedia Drivers**.
8. Click **DT3153 MACH Series Frame Grabber**, then click **Properties**.
9. Click **Settings**.

10. Select the name of the board that you want to modify, then click **Modify**.
    Another DT3153 Device Driver Configuration dialog box appears.
11. 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.
12. For **Video Format**, indicate the video format of your video input source: 50 or 60 Hz.
13. 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.
14. Click **Done**.
    The DT3153 Device Driver Configuration dialog box reappears with the name of the board you just modified.
15. Click **Close**.
16. 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 DT3153 Device Driver configuration, perform the following steps:

1. Open the **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click **Hardware**.
4. Double-click **DT-Open Layers DT3153 MACH Series Frame Grabber**.
5. Click **Properties**.
6. Click the **Properties** tab.
7. Double-click **Multimedia Drivers**.
8. Click **DT3153 MACH Series Frame Grabber**, then click **Properties**.
9. Click **Settings**.
10. Select the name of the board that you want to remove, then click **Remove**.
11. Repeat step 10 until all the DT3153 boards you want to remove are removed.
12. Click **Close**.
    The Drivers dialog box appears. The DT3153 Device Driver is still installed in the system, but the board has been removed.
13. If you want to uninstall the driver at this point, continue with step 5 on page 110. 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 DT3153 boards in your system using the preceding section before uninstalling the device driver.

Generally, you will always require the DT3153 Device Driver. However, if you are no longer using the DT3153 board with the supported software, you can uninstall the DT3153 Device Driver from the system by performing the following steps:

1. Open the **Control Panel**.
2. Double-click **Sounds and Audio Devices**.
3. Click the **Hardware** tab.
4. Double-click **DT-Open Layers DT3153 MACH Series Frame Grabber**.
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.

Index

D

E

F

G

H

I

J

L

M

N

O

P

R

S

T

U

V

W

Y

Warranty and Service Policy

WARRANTY

Data Translation, for the effective period of the warranty set out below, warrants that its standard hardware products and software media will be free from defects in materials and workmanship under normal use and service. Data Translation's obligation under this warranty shall not arise until the Buyer returns the defective product, freight prepaid, to Data Translation's facility or another specified location. The only responsibility of Data Translation under this warranty is, at its option, to replace or repair, free of charge, any defective component part of such products.

EFFECTIVE PERIOD OF WARRANTY

All boards, modules, systems, and software media are warranted for one year from date of invoice. Products repaired or replaced within this warranty period maintain their original warranty. Products repaired or replaced outside the warranty period are warranted for 30 days from invoiced date of return.

RETURN OUTSIDE USA

Contact the local sales representative or factory for authorization and shipping instructions.

LIMITATIONS ON WARRANTY

The warranty set forth above does not extend to and shall not apply to

1. Products which have been repaired or altered by other than Data Translation personnel, unless Buyer has properly altered or repaired the products in accordance with procedures previously approved in writing by Data Translation.
2. Products which have been subject to misuse, neglect, accident, or improper installation.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, ORAL OR WRITTEN, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH DATA TRANSLATION SPECIFICALLY DISCLAIMS. DATA TRANSLATION, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER LIABILITY IN CONNECTION WITH THE SALES, INSTALLATION, OR USE OF ITS PRODUCTS. DATA TRANSLATION, INC. SHALL HAVE NO LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND ARISING OUT OF THE SALE, INSTALLATION, OR USE OF ITS PRODUCTS.

CUSTOMER SERVICE POLICY

a. Data Translation, Inc. will repair or replace, at its option, any faulty item within ten days after receipt of said part regardless of its warranty status.

b. A Quick Turnaround Plan is available to expedite servicing. Contact the Data Translation Customer Service Department for details.

c. If a product should fail during the warranty period, it will be repaired free of charge. For out-of-warranty repairs, the customer will be invoiced for repair charges.

RETURN/REPAIR PROCEDURES

Upon determining that repair services are required, or to return a product to Data Translation, contact the Data Translation Customer Service Department at (508) 481-3700, extension 394 to obtain a Return Material Authorization (RMA) number. Have the following information ready when you call: complete product model number, product serial number, name, address, and telephone number of person returning product; and any special repair instructions.

Carefully package the product in anti-static packaging, making sure the RMA number appears on the outside of the package. Ship prepaid to:

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

On completion of required service, an invoice is issued stating charges, when applicable, and the work that has been completed.

Data Translation Support Policy

Data Tr**an**slation, Inc. (Data Translation) offers support upon the following terms and conditions at prices published by Data Translation from time to time. Current price information is available from Data Translation, or its authorized distributor. If Licensee elects to obtain support services from Data Translation, Licensee must complete the Support Order Form attached hereto and submit to Data Translation the completed form, along with Licensee's purchase order for support. Support will only be provided for all (not less than all) Licensed Processors (as defined in the Data Translation Software License Agreement).

1. DEFINITIONS.

Capitalized terms used herein and not otherwise defined shall have the meanings assigned thereto in the applicable Data Translation Software License Agreement (the Agreement). The following terms have the meanings set forth below:
Enhanced Release means a new release of any Product that contains new features and may contain corrections to previously identified errors. Enhanced Releases are designated in the tenths digit of the release designation (e.g., 1.2 is an Enhanced Release from 1.1.x).

Maintenance Release means a new release of any Product that contains corrections to previously identified errors. Maintenance Releases are designated in the hundredths digit of the release designation (e.g., 1.2.2 is a Maintenance Release from 1.2.1).

Major Release means a new version of any Product that involves major feature changes. Major Releases are designated in the ones digit of the release designation (e.g., 2.0, 3.0, etc., are Major Releases).

2. DATA TRANSLATION'S OBLIGATIONS.

Subject to the terms of the Agreement, and this Support Policy, Data Translation will provide the following support services (Support Services) for the Products comprising the Software, as they may be used with the Licensed Processors:

(a) problem reporting, tracing and monitoring by internet electronic mail; (b) telephone support for problem determination, verification and resolution (or instruction as to work-around, as applicable) on a call-back basis during Data Translation's normal weekday business hours of 8:30 a.m. to 5 p.m. Eastern Time, excluding holidays; (c) one (1) copy of each Maintenance Release for the Products comprising the Software; (d) commercially reasonable efforts to diagnose and resolve defects and errors in the Software and Documentation; and (e) furnishing of the maintenance and technical support described above, for the current release and the immediately previous Enhanced Release of the Software. Support Services will be delivered in English. Enhanced Releases and Major Releases can be purchased by Licensee at a discount of twenty five percent (25%) off the then-current list prices for such releases.

3. EXCLUSIONS.

Support Services do not include: (a) the provision of or support for Products other than those identified in the Agreement as to which the applicable license and support fees shall have been paid, including without limitation, compilers, debuggers, linkers or other third party software or hardware tools or components used in conjunction with any Product; (b) services required as a result of neglect, misuse, accident, relocation or improper operation of any Product or component thereof, or the failure to maintain proper operating and environmental conditions; (c) support for processors other than Licensed Processors or for Products modified by or on behalf of Licensee; (d) repair or restoration of any Software arising from or caused by any casualty, act of God, riot, war, failure or interruption of any electrical power, air conditioning, telephone or communication line or any other like cause.

It is Licensee's responsibility to have adequate knowledge and proficiency with the use of the compilers and various software languages and

operating systems used with the Products, and this Support Policy does not cover training of, or detailed direction on the correct use of these compilers, operating systems, or components thereof. On-site assistance shall not be provided hereunder, but may be available on a per call basis at Data Translation's then current rates (Specialized Application Support Charges) for labor, travel time, transportation, subsistence and materials during normal business hours, excluding holidays observed by Data Translation. The troubleshooting of faulty Licensee programming logic may also be subject to Specialized Application Support Charges and is not covered under this Support Policy. Direct authoring or development of customized application code is not provided hereunder but may be available on a per call basis upon payment of Specialized Application Support Charges.

4. LICENSEE'S OBLIGATIONS.

Licensee agrees: (a) that the Designated Contact persons identified on the Support Order Form (or such other replacement individuals as Licensee may designate in writing to Data Translation) shall be the sole contacts for the coordination and receipt of the Support Services set forth in Section 2 of this Support Policy; (b) to maintain for the term of the support, an internet address for electronic mail communications with Data Translation; (c) to provide reasonable supporting data (including written descriptions of problems, as requested by Data Translation) and to aid in the identification of reported problems; (d) to install and treat all software releases delivered under this Support Policy as Software in accordance with the terms of the Agreement; and (e) to maintain the Agreement in force and effect.

5. TERM AND TERMINATION.

5.1 Term. For each Product comprising the Software, Support Services will begin on the later of the date the Software warranty granted in the Agreement expires or the date of Licensee's election to obtain Support Services and will apply to such Product for an initial term of one (1) year, unless an alternative commencement date is identified in the Support Order Form. The initial term will automatically be extended for additional terms of one (1) year unless Support Services are terminated at the expiration of the initial term or any additional term, by either party upon thirty (30) days prior written notice to the other party.

5.2 Default. If Licensee is in default of its obligations under the Agreement (except for Licensee's obligation to maintain valid licenses for the Software, in which case termination is immediate) and such default continues for thirty (30) days following receipt of written notice from Data Translation, Data Translation may, in addition to any other remedies it may have, terminate the Support Services.

6. CHARGES, TAXES AND PAYMENTS.

6.1 Payment. The Support Fee in respect of the initial term, and, as adjusted pursuant to Section 5.2 in respect of additional terms, is payable in full prior to the commencement of the initial term or any additional term, as applicable.

6.2 Changes From Term to Term. The Support Fee and the terms and conditions of this Support Policy may be subject to change effective at the end of the initial term or any additional term by giving Licensee at least sixty (60) days prior written notice.

6.3 Taxes. The charges specified in this Support Policy are exclusive of taxes. Licensee will pay, or reimburse Data Translation, for all taxes imposed on Licensee or Data Translation arising out of this Support Policy except for any income tax imposed on Data Translation by a governmental entity. Such charges shall be grossed-up for any withholding tax imposed on Data Translation by a foreign governmental entity.

6.4 Additional Charges. Licensee agrees that Data Translation or its authorized distributor will have the right to charge in accordance with Data Translation's then-current policies for any services resulting from

Data Translation Support Policy

(a) Licensee's modification of the Software, (b) Licensee's failure to utilize the then-current release, or the immediately previous Enhanced Release, of the Software, (c) Licensee's failure to maintain Data Translation Support Services throughout the term of the Agreement, (d) problems, errors or inquiries relating to computer hardware or software other than the Software, or (e) problems, errors or inquiries resulting from the misuse or damage or of the Software or from the combination of the Software with other programming or equipment to the extent such combination has not been authorized by Data Translation. Pursuant to Section 2.4 of the Agreement, the Support Fee will also be adjusted in accordance with Data Translation's then current fee schedule as additional Licensed Processors are added. Support Fees do not include travel and living expenses or expenses for installation, training, file conversion costs, optional products and services, directories, shipping charges or the cost of any recommended hardware, third party software, or third party software maintenance fees or operating system upgrade.

7. WARRANTY LIMITATION.

EXCEPT AS EXPRESSLY STATED IN THIS SUPPORT POLICY, THERE ARE NO EXPRESS OR IMPLIED WARRANTIES WITH RESPECT TO THE SUPPORT SERVICES PROVIDED HEREUNDER (INCLUDING THE FIXING OF ERRORS THAT MAY BE CONTAINED IN THE APPLICABLE DATA TRANSLATION SOFTWARE), INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES AND REMEDIES SET FORTH IN THIS SUPPORT POLICY ARE EXCLUSIVE, AND ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED.

8. GENERAL PROVISIONS.

Upon the election by Licensee to obtain Support Services, the terms of this Support Policy shall be governed by and are made a part of the Agreement.