DATA TRANSLATION

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DT-Active Frame Grabber Controls Getting Started Manual

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Table of Contents

About this Manual 5
Intended Audience. 5
What You Should Learn from this Manual. 5
Organization of this Manual. 6
Conventions Used in this Manual 6
Related Information 7
Where to Get Help 7

Chapter 1: Introduction 9
What is a DT-Active Frame Grabber Control? 10
Overview of Tasks 12
Adding the Control to Your Project 13
Visual Basic 6.0 13
Visual C++ 6.0 14
Visual Studio .NET Project. 15
Using the Example Programs 17
Using the Online Help 18
Removing the Software 19

Chapter 2: Summary of Properties, Methods, and Events 21
General Imaging 22
Input Source 24
Active Video Area 25
Region of Interest 26
Line-Scan Operations. 27
Overlay. 27
Trigger 28
Camera Control Output. 28

Sync Output 29
Expose/Reset Output Pulse 30
Integrate Output Pulse 31
Strobe Output Pulse 31
Acquisition 32
Digital I/O 34

Chapter 3: Programming Flowcharts 35

Chapter 4: Product Support 57

Chapter 5: Glossary 59

Index 69

About this Manual

This manual describes how to install, set up, and use the DT-Active Frame Grabber™ controls to develop application programs for Data Translation® MACH II Series frame grabber boards.

Intended Audience

This manual is intended for engineers, scientists, technicians, or others responsible for developing imaging or machine vision application programs using Microsoft® Visual Basic® or Microsoft Visual C++®.

It is assumed that you are a proficient programmer, that you are experienced programming in the Windows 2000 or Windows XP operating environment on the IBM® PC or compatible computer platform, that you have familiarity with imaging or machine vision principles, and that you have clearly defined your requirements.

What You Should Learn from this Manual

This manual summarizes the properties, methods, and events provided by DT-Active Frame Grabber controls and describes how to use the properties, methods, and events to develop an imaging or machine vision program. Using this manual, you should be able to successfully get started writing an application program.

This manual is intended to be used with the online help for the DT-Active Frame Grabber control that you are using. The online help contains all of the specific reference information for each of the properties, methods, and events.

Organization of this Manual

This manual is organized as follows:

- Chapter 1, "Introduction," describes how to add a DT-Active Frame Grabber control to your project, how to use the example programs and online help, and how to remove the software.
- Chapter 2, "Summary of Properties, Methods, and Events," summarizes the properties, methods, and events provided with the DT-Active Frame Grabber controls.
- Chapter 3, "Programming Flowcharts," provides programming flowcharts for using the properties, methods, and events provided with the DT-Active Frame Grabber controls.
- Chapter 4, "Product Support," describes how to get help if you have trouble using a DT-Active Frame Grabber control.

A glossary and an index complete this document.

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**. Property, method, and event names are also shown in bold.
- When navigating the screens, an instruction such as **Configure | Board** means to select "Board" from the drop-down menu under "Configure."

Related Information

Refer to the following documentation for more information on using the DT-Active Frame Grabber controls:

- Online help for the DT-Active Frame Grabber control that you are using. The online help contains all of the specific reference information for each of the properties, methods, and events provided by the DT-Active Frame Grabber control. Refer to page 18 for information on how to open the help file.
- Device-specific documentation. Data Translation devices are shipped with a getting started manual and a user's manual. The getting started manual describes how to install the device, how to install the device driver for the device, and how to get started using the device. The user's manual describes the features, specifications, and connector pin assignments of the device, and the property values supported by the device.

Refer to the following documentation for programming information:

- The Microsoft documentation for your operating system.
- The online help for your programming environment.

Where to Get Help

Should you run into problems installing or using a DT-Active Frame Grabber control, the Technical Support Department is available to provide technical assistance. Refer to Chapter 4, "Product Support," for information on how to contact the Technical Support Department. 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).

1

Introduction

What is a DT-Active Frame Grabber Control? 10
Overview of Tasks 12
Adding the Control to Your Project 13
Using the Example Programs 17
Using the Online Help 18
Removing the Software 19

What is a DT-Active Frame Grabber Control?

A DT-Active Frame Grabber control is an ActiveX® control that allows you to develop imaging and machine vision application programs in Visual Basic and Visual C++. You use a DT-Active Frame Grabber control as you would use any other ActiveX or OLE custom control in your Windows application.

Each DT-Active Frame Grabber control provides the following features:

- **Properties, methods, and/or events –** Each DT-Active Frame Grabber control has unique properties, methods, and events, described as follows:
  - Properties represent the variables that allow you to configure the operation. Properties are accessible through the Properties window and through the control's custom Property Pages. Some properties are read-only and provide information about your operation.
  - Methods are tools that you can use in your code to provide run-time control of operations. Some methods are accessible through the control's custom Property Pages.
  - Events are actions that cause code to be executed when an event occurs.
- **Multiple-device support –** DT-Active Frame Grabber controls are hardware-independent. You can add support for new devices, without altering or recompiling code at the application level, by adding a new device driver. You install the device driver separately (in the Windows environment); refer to the getting started manual for your device for more information on installing device drivers.

Note that at the present time, the DT-Active Monochrome Frame Grabber control supports the DT3162 frame grabber board and the DT-Active Camera Link Frame Grabber control supports the DT3145 frame grabber board.

Note: The list of supported devices is constantly expanding. Refer to the Data Translation web site (www.datatranslation.com) for information on the devices and device drivers available for use with DT-Active Frame Grabber controls.

Overview of Tasks

The following is an overview of the tasks required to install and use a DT-Active Frame Grabber control:

1. Make sure that the DT-Active Frame Grabber control has been installed. Typically, you install the appropriate DT-Active Frame Grabber control when you install the device driver for your imaging device. Refer to your device-specific documentation for installation instructions.
2. Add the DT-Active Frame Grabber control to your project. For more information, refer to the next section.
3. Create your application program. For more information, refer to your programming language documentation.

If you have problems installing or using a DT-Active Frame Grabber control, refer to page 18 for information on accessing the online help, or refer to Chapter 4, "Product Support," for information on contacting Data Translation's Technical Support Department.

Adding the Control to Your Project

The following sections describe how to add a DT-Active Frame Grabber control to a Visual Basic 6.0 project, Visual C++ 6.0 project, or a Visual Studio .NET project.

Visual Basic 6.0

To add a DT-Active Frame Grabber control to a Visual Basic 6.0 project, perform the following steps:

1. Select **Project | Components**.
   The Components dialog box appears.
2. Click the **Controls** tab.
3. Select the appropriate DT-Active Frame Grabber control(s), then click **OK**.

When the DT-Active Frame Grabber control is loaded, the appropriate icon, shown below, appears in the toolbox.

DT-Active Frame Grabber Control	Icon
Monochrome	
Camera Link	

Visual C++ 6.0

To add a DT-Active Frame Grabber control to a Visual C++ 6.0 project, perform the following steps:

1. Start Microsoft Visual C++ 6.0.
2. Create a new MFC project using the appropriate application wizard. Make sure that you add support for ActiveX controls.
3. Select **Project | Add to Project | Components and Controls**.
   The Component and Controls Gallery dialog box appears.
4. Double-click the **Registered ActiveX Controls** folder.
5. Select the appropriate DT-Active Frame Grabber control, then click **Insert**.
   The program prompts you to insert the component and to confirm the creation of a wrapper class for accessing the control through Visual C++.
6. If you intend to use DT-Active Frame Grabber control events, use the Class Wizard to add the event handlers.

Note: Several DT-Active Frame Grabber control methods use enumerated variables. To ensure that these enumerated variables are recognized in Visual C++, make sure that you add the following line to the beginning of your application program:

```
#import "x:\Path\Control.DLL" no_namespace
```

where *x:\Path* is the complete path to the location of the appropriate .DLL file on your system, and *Control* indicates the specific DT-Active Frame Grabber control you are using. For example, if you are using the DT-Active Monochrome Frame Grabber control under Windows 2000, you might use the following line:

```
#import "c:\WINNT\system32\DTFGCTLS.DLL" no_namespace
```

Visual Studio .NET Project

To add a DT-Active Frame Grabber control to a Visual Studio .NET project, perform the following steps:

1. Launch Microsoft Visual Studio .NET 2003.
2. Create a new project by selecting **File** -> **New** -> **Project**.
3. Select the **Project Type** (Visual Basic, Visual C++, and so on), and then select **Template – Windows Application**.
4. Enter the **Name** and **Location** of the project, and then click **OK**.
5. Select **View** -> **Toolbox**.
6. Right-click the **Components** (or **General**) tab in the Toolbox window, and then select **Add/Remove Items**.
7. Select the **COM Components** tab.
8. Select the appropriate DT-Active Frame Grabber control(s), and then click **OK**.
   The appropriate icon, shown below, appears in the toolbox-components area.

DT-Active Frame Grabber Control	Icon
Monochrome	
Camera Link	

9. From the **Components** tab in the **Toolbox** window, select the appropriate DT-Active Frame Grabber control(s), and then drag-and-drop them onto your project's form.
   The selected DT Controls now appear on your form.

10. Double-click the workspace on the project's form to start programming.

The following example code shows how to open a DT3162 frame grabber board, acquire an image, and draw the image to the control:

```
Private Sub Form1_Load(ByVal sender As
   System.Object, ByVal e As System.EventArgs)
   Handles MyBase.Load
   'Open device during form load.
   AxDTAFGMON1.OpenDevice(("DT3162-1"))
End Sub

Private Sub Button1_Click(ByVal sender As
   System.Object, ByVal e As System.EventArgs)
   Handles Button1.Click
   'ACQUIRE button
   'Allocate and acquire image frame. Then draw the
   'image to the control and a PictureBox.
   Call AxDTAFGMON1.AcquireMem(PictureBox1.
     Handle.ToInt32, 1,
     DTFGCTLSLib.AcquireModeEnum.SinglePassSync)
   Call AxDTAFGMON1.AcquireMem(0, 1,
     DTFGCTLSLib.AcquireModeEnum.SinglePassSync)
End Sub

Private Sub Button2_Click(ByVal sender As
   System.Object, ByVal e As System.EventArgs)
   Handles Button2.Click
   'EXIT button
   End
End Sub
```

Using the Example Programs

Two simple example programs are shipped with each DT-Active Frame Grabber control (one for Visual Basic and one for Visual C++). The example programs allow you to open a device and acquire image data to an internal memory buffer. You can modify the example programs to suit your particular needs and then compile the code in your particular development environment.

In addition, the DT-Acquire utility programs are provided on the Imaging OMNI CD that ships with your Data Translation device. Use DT-Acquire2 to familiarize yourself with the basic features of the DT-Active Monochrome Frame Grabber control; use DT-AcquireCL to familiarize yourself with the basic features of the DT-Active Camera Link Frame Grabber control. For more information about a DT-Acquire utility program, refer to the getting started manual for your device.

Note: Additional example programs will be provided on the Data Translation web site (www.datatranslation.com) as they become available.

To open the example program in Visual Basic or Visual C++, perform the following steps:

1. Open Visual Basic or Visual C++.
2. For Visual Basic, select **Programs | Data Translation, Inc** from the Windows Start menu, select the name of your imaging device, and then select **VB Example Project**.

   For Visual C++, select **Programs | Data Translation, Inc** from the Windows Start menu, select the name of your imaging device, and then select **C++ Example Project**.
3. Compile the program, then run it.

Using the Online Help

This manual is intended to be used with the online help for the DT-Active Frame Grabber control that you are using. The online help contains all of the specific reference information for each of the properties, methods, and events.

To open the online help, click **Programs | Data Translation, Inc** from the Windows Start menu, select the name of your imaging device, and then select the online help for the DT-Active Frame Grabber control that you are using. To access context-sensitive help while using the DT-Active Frame Grabber control property pages, either highlight a property in the Properties window and then press **F1** or click the Help button in one of the tabs in the property pages. The help topic associated with that property / tab appears.

Removing the Software

If you are having problems with a DT-Active Frame Grabber control, you may want to remove the control and then reinstall it. To remove a DT-Active Frame Grabber control, exit your programming environment, then click **Settings | Control Panel** from the Start menu. Double-click **Add/Remove Programs**. Select the name of your imaging device, and then click **Add/Remove**. All applicable files and file settings are removed.

2

Summary of Properties, Methods, and Events

General Imaging 22
Input Source 24
Active Video Area 25
Region of Interest 26
Line-Scan Operations 27
Overlay 27
Trigger 28
Camera Control Output 28
Sync Output 29
Expose / Reset Output Pulse 30
Integrate Output Pulse 31
Strobe Output Pulse 31
Acquisition 32
Digital I / O 34

This chapter provides a summary of the properties, methods, and events used in the DT-Active Monochrome Frame Grabber control and the DT-Active Camera Link Frame Grabber control. For more detailed information, refer to the online help for the control. Refer to page 18 for information on opening the online help.

Note: The properties described in this chapter are appropriate for Visual Basic only. If you are using Visual C++, use the associated Visual C++ methods instead. For example, to set and / or return the pixel clock source, use the Visual C++ **SetPixelClockSource** and **GetPixelClockSource** methods instead of the Visual Basic **PixelClockSource** property. For more information about Visual C++ methods, refer to the DT-Active Frame Grabber control online help.

General Imaging

Property/Method Name	Description	Control
OpenDevice method	Opens a device.	Monochrome Camera Link
CloseDevice method	Closes the device previously opened using the **OpenDevice** method.	Monochrome Camera Link
ActiveDevice property	Closes any open device and opens the device with the specified name; returns the name of the currently open device.	Monochrome Camera Link
GetDeviceName method	Returns the name of the device associated with a device ID.	Monochrome Camera Link
DeviceCount property	Returns the number of available devices.	Monochrome Camera Link
DeviceType property	Returns the type of the active device.	Monochrome Camera Link

General Imaging (cont.)

Property/Method Name	Description	Control
DeviceBusy property	Returns the state of the active device.	Monochrome Camera Link
DrawXOrigin property	Sets and returns the element in the buffer that represents the x-position of the first pixel to draw in the destination window (x-origin).	Camera Link
DrawYOrigin property	Sets and returns the element in the buffer that represents the y-position of the first pixel to draw in the destination window (y-origin).	Camera Link
StatusMessage property	Returns the status message corresponding to the current device status code.	Monochrome Camera Link
Timeout property	Sets and returns the timeout period used by the software.	Monochrome Camera Link
DisplayMode property	Sets and returns the way that you want to display images when setting up your application (DDI or GDI).	Camera Link
LoadConfigFile method	Opens a device configuration file and applies its settings to the current instance of the control.	Monochrome Camera Link
SaveConfigFile method	Saves the current device configuration to a device configuration file.	Monochrome Camera Link
ShowPropPages method	Displays one or more of the property pages.	Camera Link

Input Source

Property/Method Name	Description	Control
PixelClockSource property	Sets and returns the pixel clock source.	Monochrome
Calibrate method	Automatically adjusts the quality of the images.	Monochrome
Contrast property	Sets and returns the contrast level for the incoming video.	Monochrome
Brightness property	Sets and returns the brightness level for the incoming video.	Monochrome
HSyncInPolarity property	Sets and returns the polarity of the horizontal (line) sync of an incoming variable-scan video signal.	Monochrome
VSyncInPolarity property	Sets and returns the polarity of the vertical (field) sync of an incoming variable-scan video signal.	Monochrome
SyncInSource property	Sets and returns the source of the incoming sync signal.	Monochrome
LineFrequency property	Sets and returns the frequency of an incoming horizontal video line.	Monochrome
VideoInputSource property	Sets and returns the video input source used for acquisitions.	Monochrome
DataFormat property	Sets and returns the data format used.	Camera Link
ActiveLUT property	Sets and returns the look-up table (LUT) that you want to use.	Monochrome Camera Link
LoadLUTFromArray method	Loads a look-up table (LUT) with data from an array.	Monochrome Camera Link
LoadLUTFromFile method	Loads a look-up table (LUT) with data from a file.	Monochrome Camera Link

Input Source (cont.)

Property/Method Name	Description	Control
SaveLUTToArray method	Saves a look-up table (LUT) with data to an array.	Camera Link
SaveLUTToFile method	Saves a look-up table (LUT) with data to a file.	Camera Link

Active Video Area

Property Name	Description	Control
TotalPixelsPerLine property	Sets and returns the total number of pixels in a single horizontal line of video (the number of pixels that are not black).	Monochrome
TotalLinesPerFrame property	Sets and returns the total number of lines in a frame of video.	Monochrome
FirstActivePixel property	Sets and returns the position of the beginning of the active video signal on the line.	Monochrome
FirstActiveLine property	Sets and returns the position of the beginning of the active video signal within the field.	Monochrome
ActivePixelCount property	Sets and returns the number of pixels per line in the active video area (Monochrome) or the number of pixels per line supported by your camera (Camera Link).	Monochrome Camera Link

Active Video Area (cont.)

Property Name	Description	Control
ActiveLineCount property	Sets and returns the number of lines per frame in the active video area (Monochrome) or the number of active lines supported by your camera (Camera Link).	Monochrome Camera Link
ClampStart property	Sets and returns the clamp start position.	Monochrome
ClampEnd property	Sets and returns the clamp end position.	Monochrome

Region of Interest

Property Name	Description	Control
ROIHeight property[a]	Sets and returns the number of lines in the ROI that you want to save/acquire.	Monochrome Camera Link
ROILeft property[a]	Sets and returns the position of the first pixel of the ROI that you want to save/acquire.	Monochrome Camera Link
ROITop property[a]	Sets and returns the position of the first line of the ROI that you want to save/acquire.	Monochrome Camera Link
ROIWidth property[a]	Sets and returns the number of pixels in each line of the ROI that you want to save/acquire.	Monochrome Camera Link

a. For the DT-Active Frame Grabber Camera Link control, this property is used for area-scan operations only.

Line-Scan Operations

Property Name	Description	Control
LineScanLeft property	Sets and returns the position of the first pixel of the line(s) that you want to acquire.	Camera Link
LineScanWidth property	Sets and returns the number of pixels in the line(s) that you want to acquire.	Camera Link
LineScanFrameHeight property	Sets and returns the number of lines that you want to acquire.	Camera Link
LineScanFrameTrigger Enabled property	Enables and disables the use of the frame trigger.	Camera Link
LineScanFrameTrigger Transition property	Sets and returns the transition type for digital input line 0 when it is used as a frame trigger.	Camera Link

Overlay

Property/Method/Event Name	Description	Control
OverlayEnabled property	Enables and disables the use of overlays.	Monochrome Camera Link
OverlayBitmapFile property	Sets and returns the complete path to an overlay bitmap file.	Monochrome Camera Link
OverlayColorKey property	Sets and returns the color key for an overlay bitmap file.	Monochrome Camera Link

Overlay (cont.)

Property/Method/Event Name	Description	Control
OnUpdateOverlay event	Generated by the control whenever a frame/ROI is acquired; returns the DTOverlay object that holds the overlay information.[a]	Monochrome Camera Link

a. For more information about DTOverlay objects, refer to the online help for your control.

Trigger

Property Name	Description	Control
TriggerType property	For area-scan mode, sets and returns the type of the ROI trigger. For line-scan mode, sets and returns the type of the line trigger.	Monochrome Camera Link
TriggerTransition property	Sets and returns the transition type for an external trigger.	Monochrome Camera Link

Camera Control Output

Property Name	Description	Control
TimeGranularity property	Sets and returns the time granularity used by the camera control output signals (in microseconds).	Camera Link
CameraControlOutput1 property	Sets and returns the output signal assigned to camera control output line 1.	Camera Link

Camera Control Output (cont.)

Property Name	Description	Control
CameraControlOutput2 property	Sets and returns the output signal assigned to camera control output line 2.	Camera Link
CameraControlOutput3 property	Sets and returns the output signal assigned to camera control output line 3.	Camera Link
CameraControlOutput4 property	Sets and returns the output signal assigned to camera control output line 4.	Camera Link

Sync Output

Property Name	Description	Control
SyncOutEnabled property	Enables and disables the outgoing sync signal.	Monochrome
HSyncOutPulseWidth property	Sets and returns the width of the outgoing horizontal sync pulse.	Monochrome
VSyncOutPulseWidth property	Sets and returns the width of the outgoing vertical sync pulse.	Monochrome
LineFrequency property	Sets and returns the frequency of an outgoing horizontal video line.	Monochrome
SyncOutPolarity property	Sets and returns the polarity of the outgoing sync pulses.	Monochrome

Expose/Reset Output Pulse

Property Name	Description	Control
ExposeEnabled property	Enables and disables the expose/reset output pulse.[a]	Monochrome Camera Link
ExposePolarity property	Sets and returns the polarity of the expose/reset output pulse.[a]	Monochrome Camera Link
ExposeStartLine property	Sets and returns the start position of the expose/reset output pulse.[a]	Monochrome
ExposeStopLine property	Sets and returns the stop position of the expose/reset output pulse.[a]	Monochrome
VSyncDelay property	Sets and returns the number of lines between the end of the expose/reset output pulse and the beginning of the outgoing vertical sync.[a]	Monochrome
ExposeDelay property	Sets and returns the time delay between the trigger event and the beginning of the expose output pulse.[a, b]	Camera Link
ExposePulseWidth property	Sets and returns the time that the expose output pulse is in its active state (determined by the polarity).[a, b]	Camera Link

a. Applicable to asynchronous reset cameras only.

b. Multipled by the **TimeGranularity** to determine the value.

Integrate Output Pulse

Property Name	Description	Control
IntegrateEnabled property	Enables and disables the integrate output pulse.[a]	Camera Link
IntegratePolarity property	Sets and returns the polarity of the integrate output pulse.[a]	Camera Link
IntegratePulseWidth property	Sets and returns the time that the integrate output pulse is in its active state (determined by the polarity).[a, b]	Camera Link
IntegrateDelay property	Sets and returns the time delay between the trigger event and the beginning of the integrate output pulse.[a, b]	Camera Link

a. Applicable to line-scan cameras.
b. Multipled by the **TimeGranularity** to determine the value.

Strobe Output Pulse

Property Name	Description	Control
StrobeEnabled property	Enables and disables the strobe output pulse.	Monochrome Camera Link
StrobePolarity property	Sets and returns the polarity of the strobe output pulse.	Monochrome Camera Link
StrobeStartLine property	Sets and returns the start position of the strobe output pulse.	Monochrome
StrobeStopLine property	Sets and returns the stop position of the strobe output pulse.	Monochrome

Strobe Output Pulse (cont.)

Property Name	Description	Control
StrobePulseWidth property	Sets and returns the time that the strobe output pulse is in its active state (determined by the polarity).[a]	Camera Link
StrobeDelay property	Sets and returns the time delay between the trigger event and the beginning of the strobe output pulse.[a]	Camera Link

a. Multipled by the **TimeGranularity** to determine the value.

Acquisition

Property/Method/Event Name	Description	Control
AcquireType property	Sets and returns the type of acquisition that you want to perform.	Monochrome Camera Link
AcquireMem method	Acquires one or more frames/ROIs (in area-scan mode) or lines/frames (in line-scan mode) to internal memory buffers, displaying the data in a window, if desired.	Monochrome Camera Link
StopAcquire method	Stops the current acquisition.	Monochrome Camera Link
GetBuffer method	Returns the DTBuffer object associated with a buffer ID.[a]	Monochrome Camera Link
GetBufferCount method	Returns the number of available DTBuffer objects.[a]	Monochrome Camera Link
OnAcquireComplete event	Generated by the control when the acquisition is complete.	Monochrome Camera Link

Acquisition (cont.)

Property/Method/Event Name	Description	Control
OnFrameComplete event	Generated by the control whenever a buffer of data is acquired; returns the DTBuffer object that holds the most recently acquired frame/ROI.[a]	Monochrome Camera Link
OnFramesComplete event	Generated by the control whenever a number of buffers of data is acquired; returns the DTEnumBuffers object that holds the most recently acquired buffers.[b]	Camera Link
OnAsyncError event	Generated by the control whenever an error occurs during an asynchronous acquisition; returns the DTErrorInfo object that holds the error information.[c]	Monochrome Camera Link

a. For more information about DTBuffer objects, refer to the online help for your control.
b. For more information about DTEnumBuffers objects, refer to the online help for your control.
c. For more information about DTErrorInfo objects, refer to the online help for your control.

Digital I/O

Property/Method/Event Name	Description	Control
InputLineCount property	Returns the number of digital input lines supported by the device.	Monochrome Camera Link
OutputLineCount property	Returns the number of digital output lines supported by the device.	Monochrome Camera Link
ReadDigitalInputPattern method	Returns the state (high or low) of all the digital input lines.	Monochrome Camera Link
WriteDigitalOutputPattern method	Sets the state (high or low) of all the digital output lines.	Monochrome Camera Link
InputLineEventMask property	Sets and returns a bit mask, indicating the digital input lines that you want to use to generate state-change events.	Monochrome Camera Link
OnInputBitsChanged event	Generated by the control whenever a digital input bit that has been configured to generate a state-change event changes state.	Monochrome Camera Link

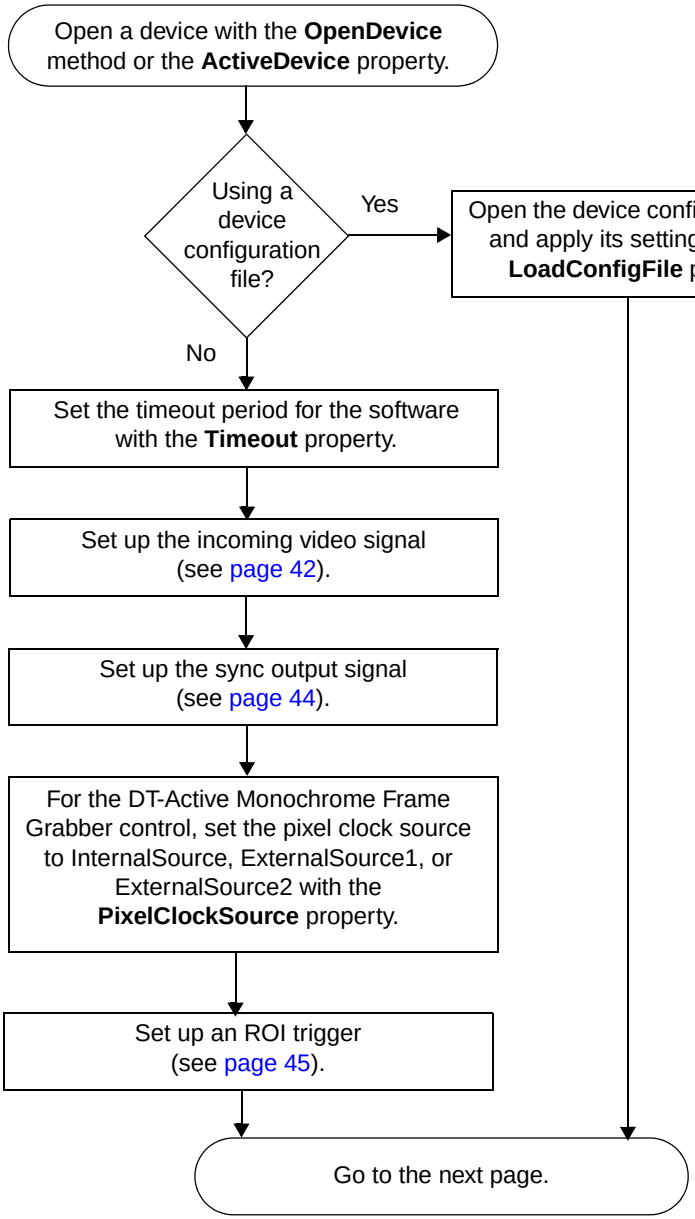
3

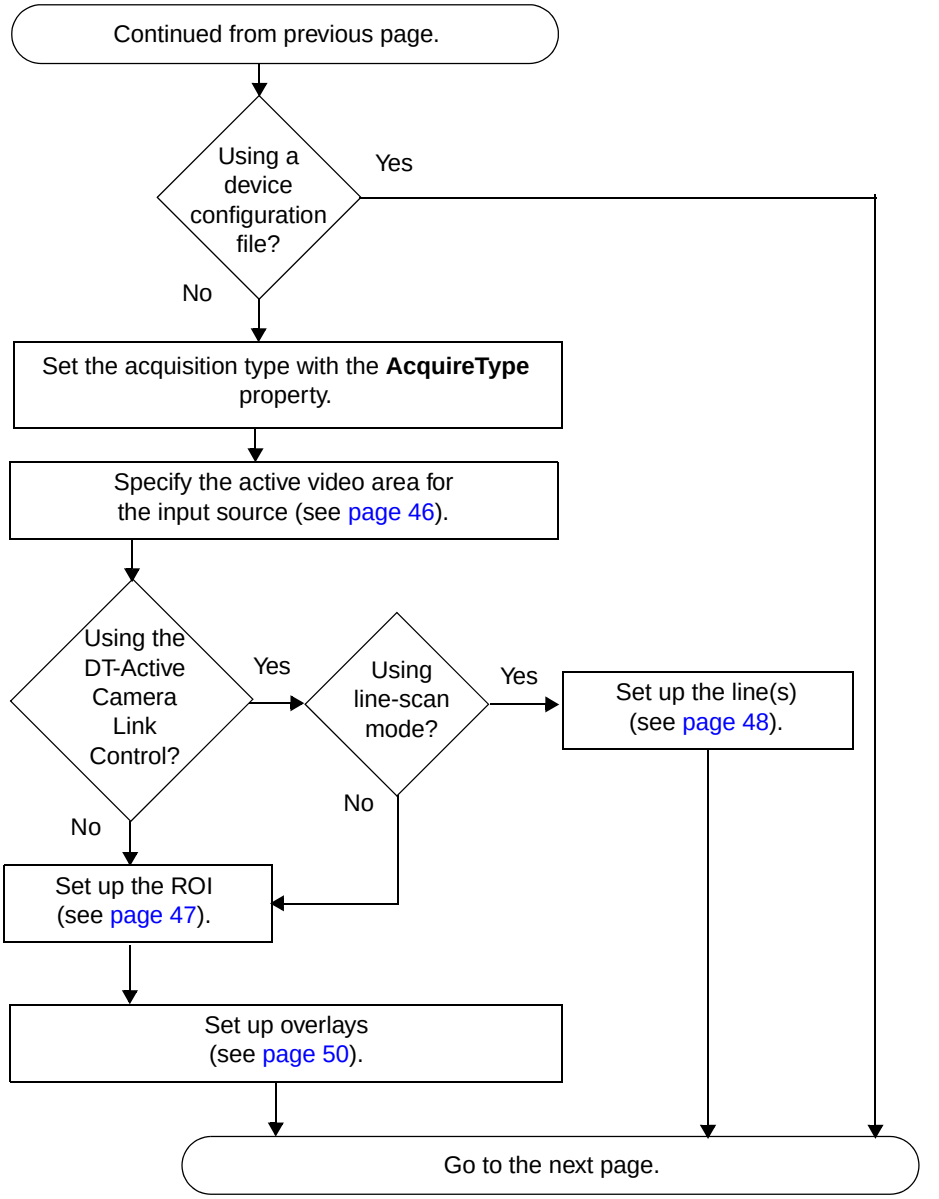
Programming Flowcharts

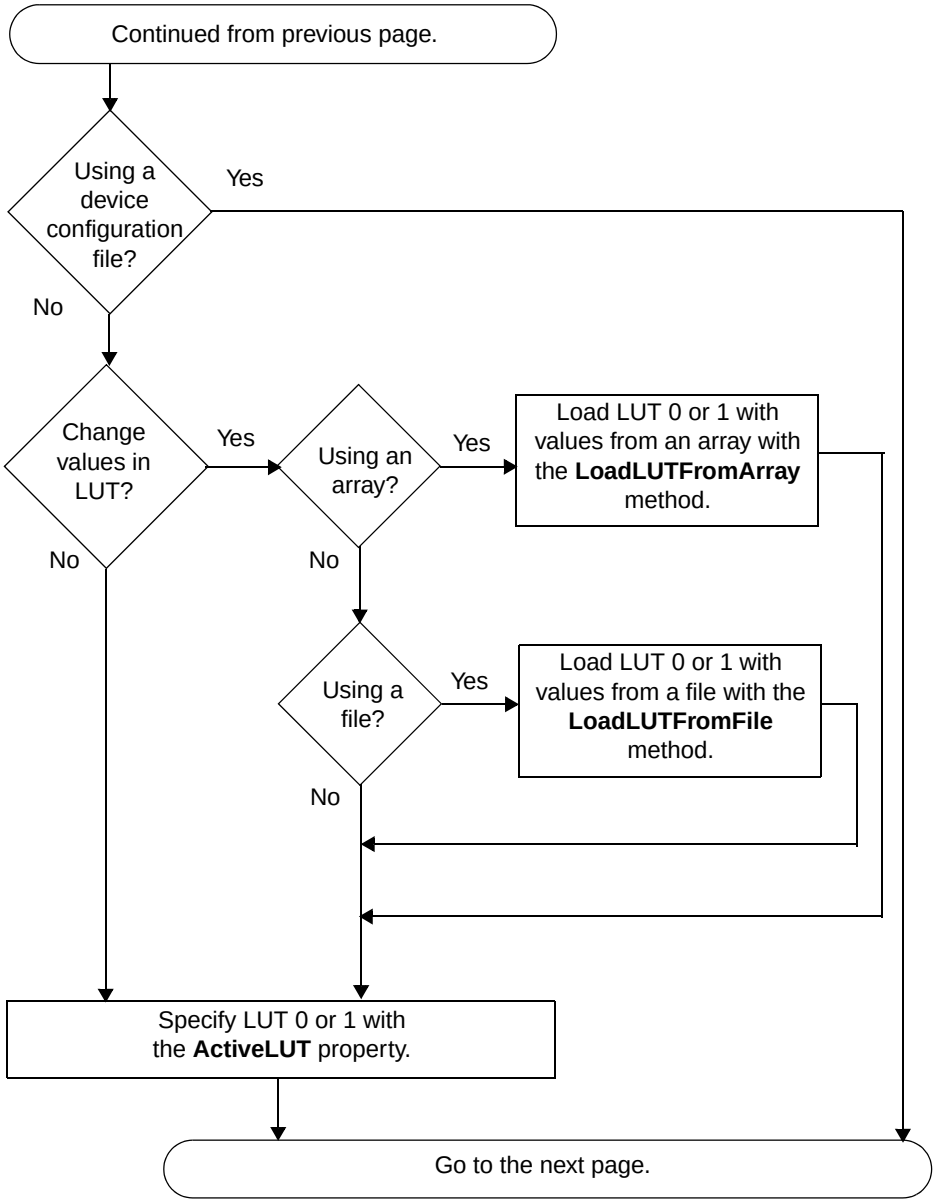
This chapter provides a series of flowcharts showing an overview of the steps required to perform each of the operations supported by the DT-Active Frame Grabber controls. Although the flowcharts do not show error / status checking, it is recommended that you check for error / status messages after using each property, method, or event.

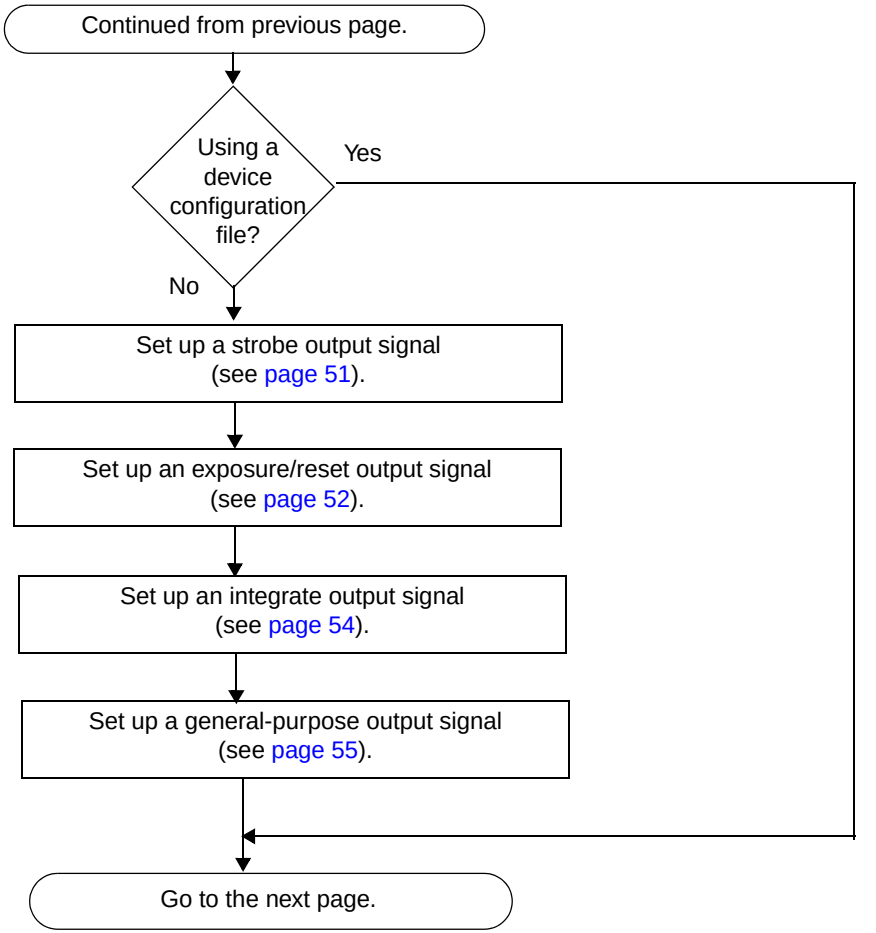
Notes: The properties described in this chapter are appropriate for Visual Basic only. If you are using Visual C++, use the associated Visual C++ methods instead. For example, to set and / or return the pixel clock source, use the Visual C++ **SetPixelClockSource** and **GetPixelClockSource** methods instead of the Visual Basic **PixelClockSource** property. For more information about Visual C++ methods, refer to the online help for your control.

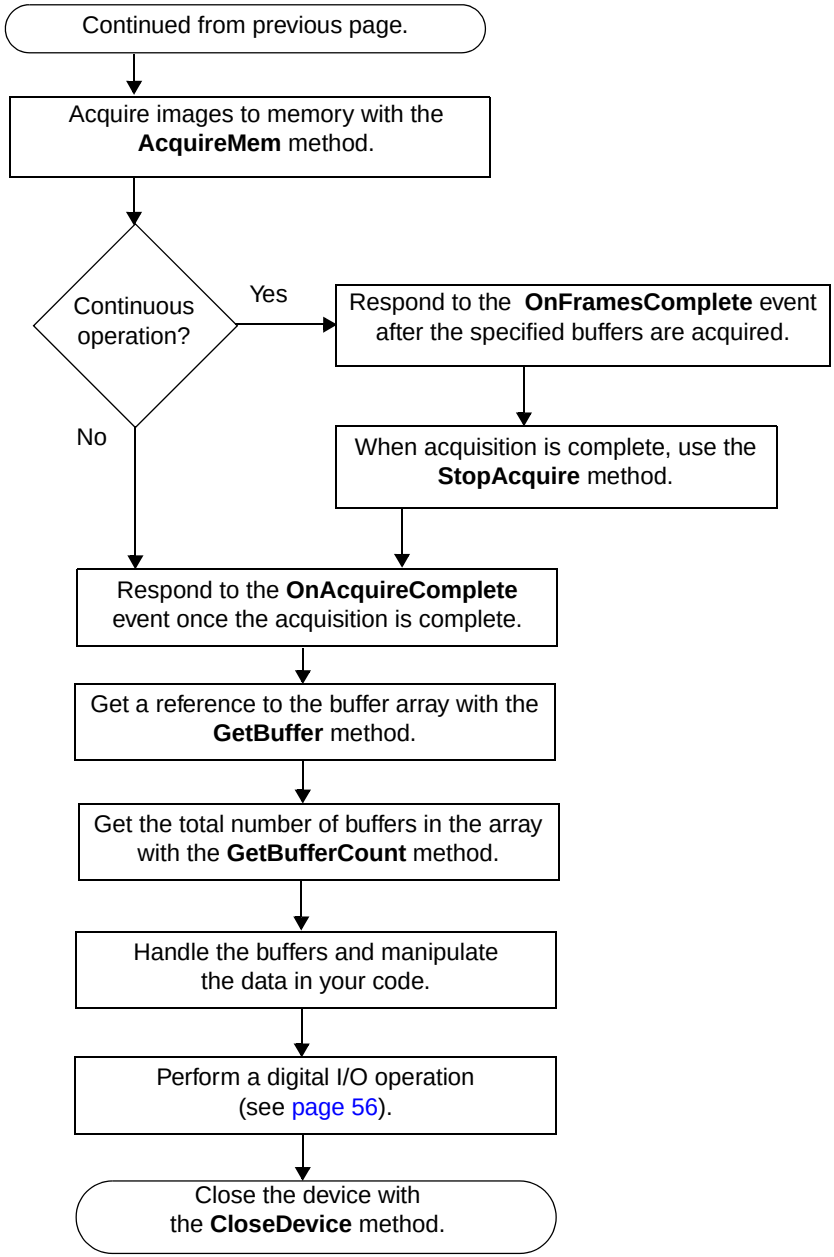
Some of the steps may not be required for the device / control that you are using. For example, if you are using a DT3145 frame grabber board with the DT-Active Camera Link Frame Grabber control, you do not set the pixel clock source. For more information about the steps that are required for your device / control. refer to the user's manual for your device.


Open a device with the **OpenDevice** method or the **ActiveDevice** property.
Using a device configuration file?
Yes
Open the device configuration file and apply its settings with the **LoadConfigFile** property.
No
Set the timeout period for the software with the **Timeout** property.
Set up the incoming video signal (see page 42).
Set up the sync output signal (see page 44).
For the DT-Active Monochrome Frame Grabber control, set the pixel clock source to InternalSource, ExternalSource1, or ExternalSource2 with the **PixelClockSource** property.
Set up an ROI trigger (see page 45).
Go to the next page.

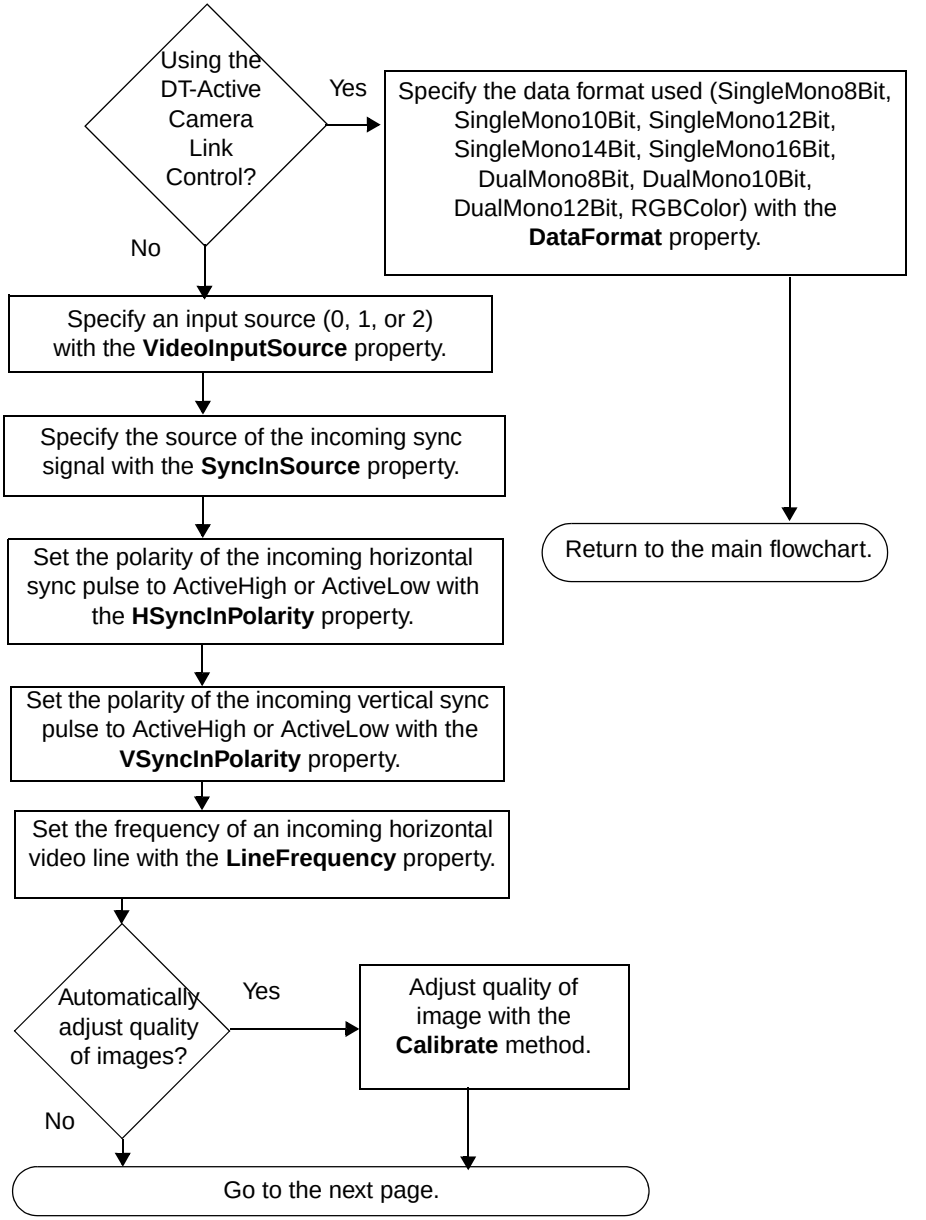

Continued from previous page.
Using a device configuration file?
Yes
No
Set the acquisition type with the **AcquireType** property.
Specify the active video area for the input source (see page 46).
Using the DT-Active Camera Link Control?
Yes
Using line-scan mode?
Yes
Set up the line(s) (see page 48).
No
No
Set up the ROI (see page 47).
Set up overlays (see page 50).
Go to the next page.


Continued from previous page.
Using a device configuration file?
Yes
No
Change values in LUT?
Yes
No
Using an array?
Yes
No
Load LUT 0 or 1 with values from an array with the **LoadLUTFromArray** method.
Using a file?
Yes
No
Load LUT 0 or 1 with values from a file with the **LoadLUTFromFile** method.
Specify LUT 0 or 1 with the **ActiveLUT** property.
Go to the next page.

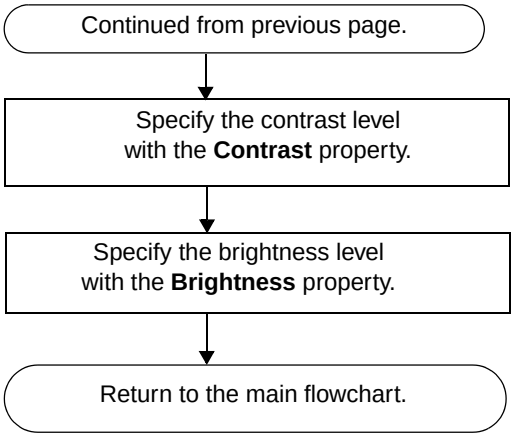

Continued from previous page.
Using a device configuration file?
Yes
No
Set up a strobe output signal (see page 51).
Set up an exposure/reset output signal (see page 52).
Set up an integrate output signal (see page 54).
Set up a general-purpose output signal (see page 55).
Go to the next page.


Continued from previous page.
Acquire images to memory with the **AcquireMem** method.
Continuous operation?
Yes
No
Respond to the **OnFramesComplete** event after the specified buffers are acquired.
When acquisition is complete, use the **StopAcquire** method.
Respond to the **OnAcquireComplete** event once the acquisition is complete.
Get a reference to the buffer array with the **GetBuffer** method.
Get the total number of buffers in the array with the **GetBufferCount** method.
Handle the buffers and manipulate the data in your code.
Perform a digital I/O operation (see page 56).
Close the device with the **CloseDevice** method.

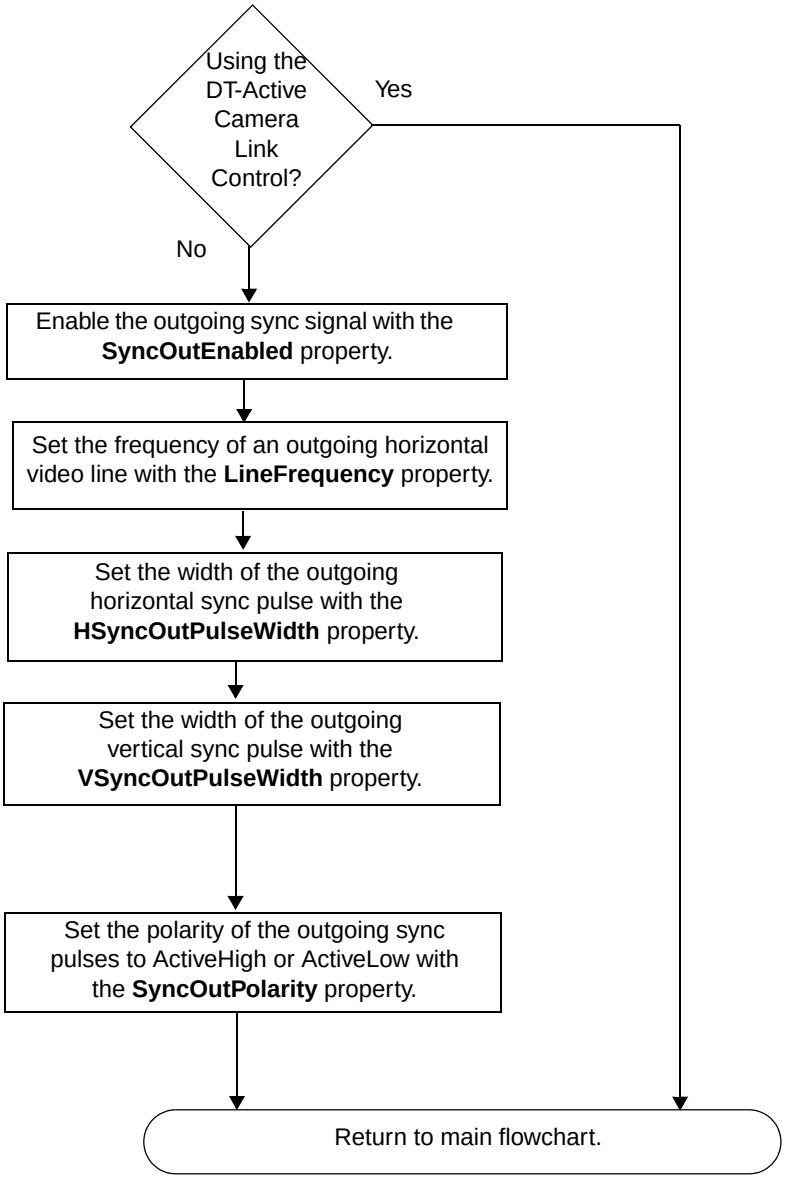
Set up the Incoming Video Signal



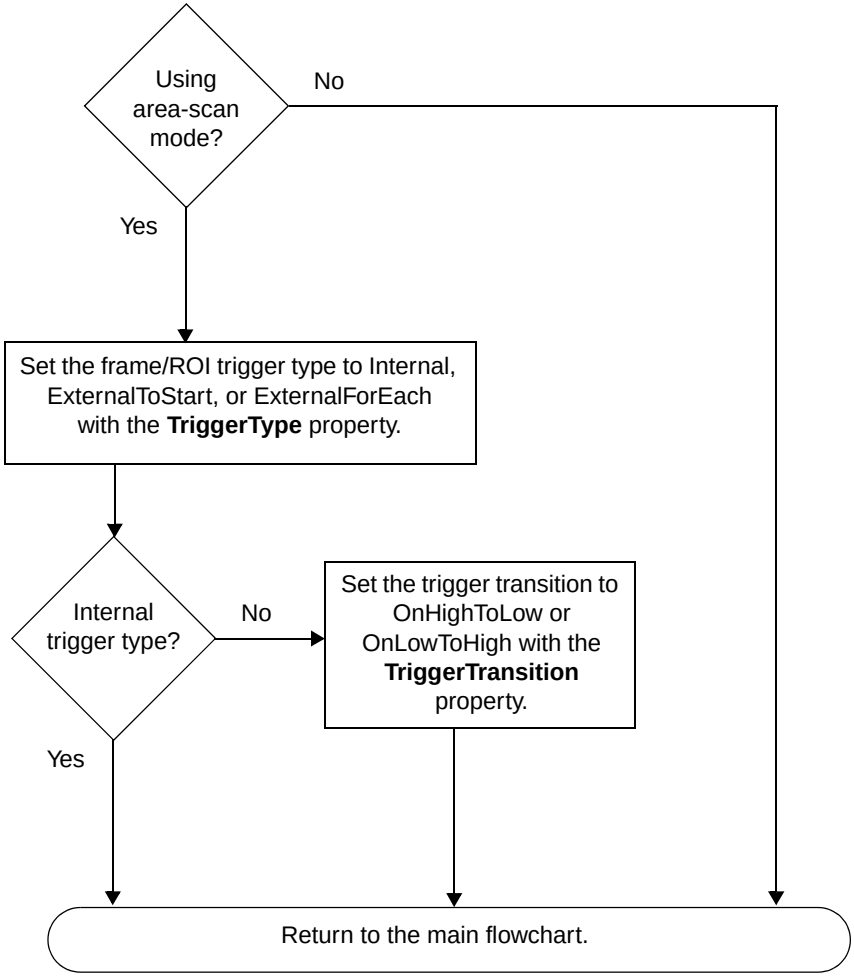
Set up the Incoming Video Signal (cont.)



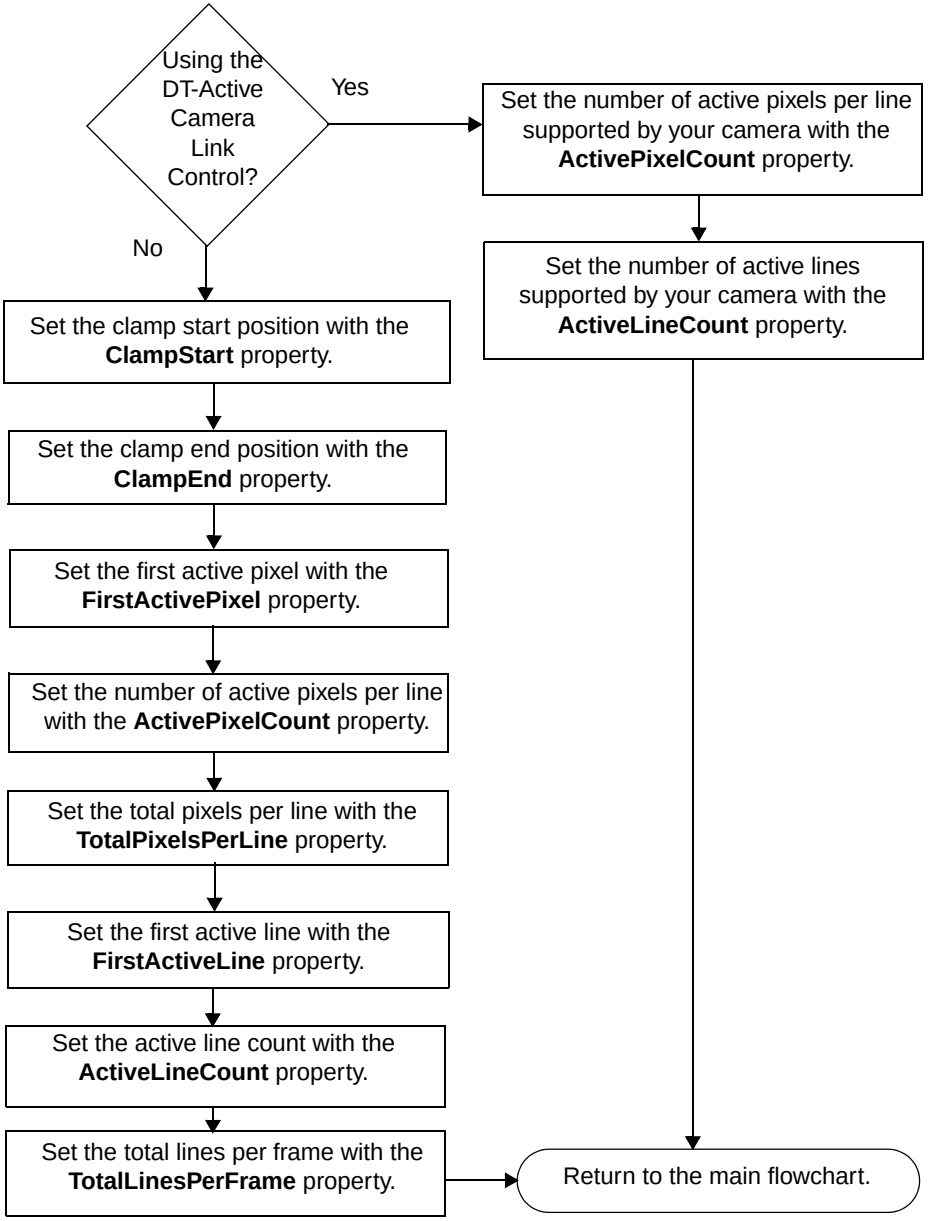
Set up the Sync Output Signal



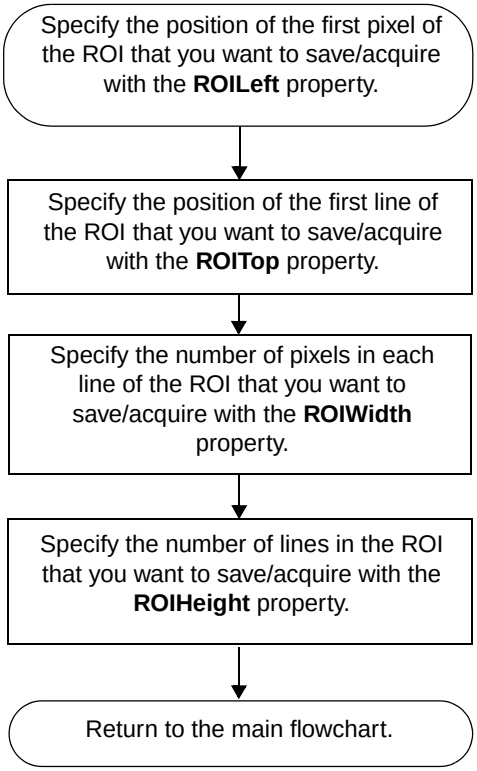
Set up the Acquisition Trigger



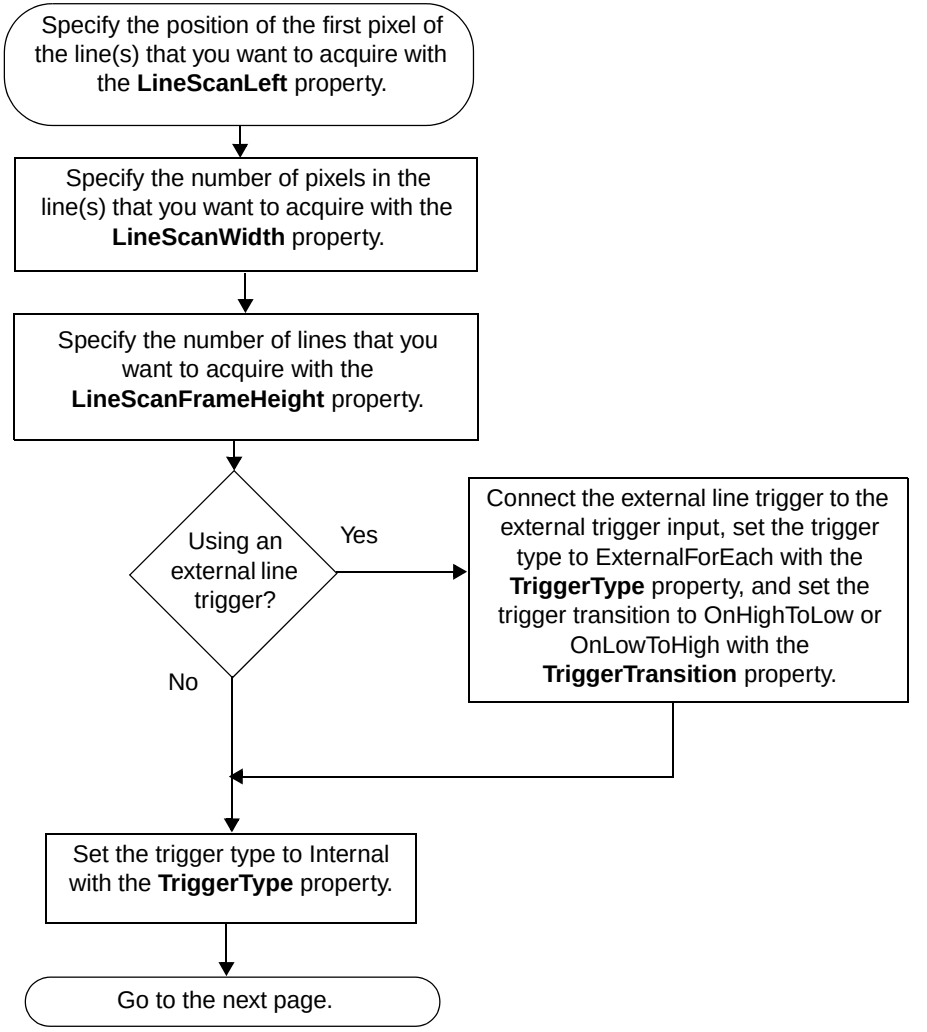
Specify the Active Video Area



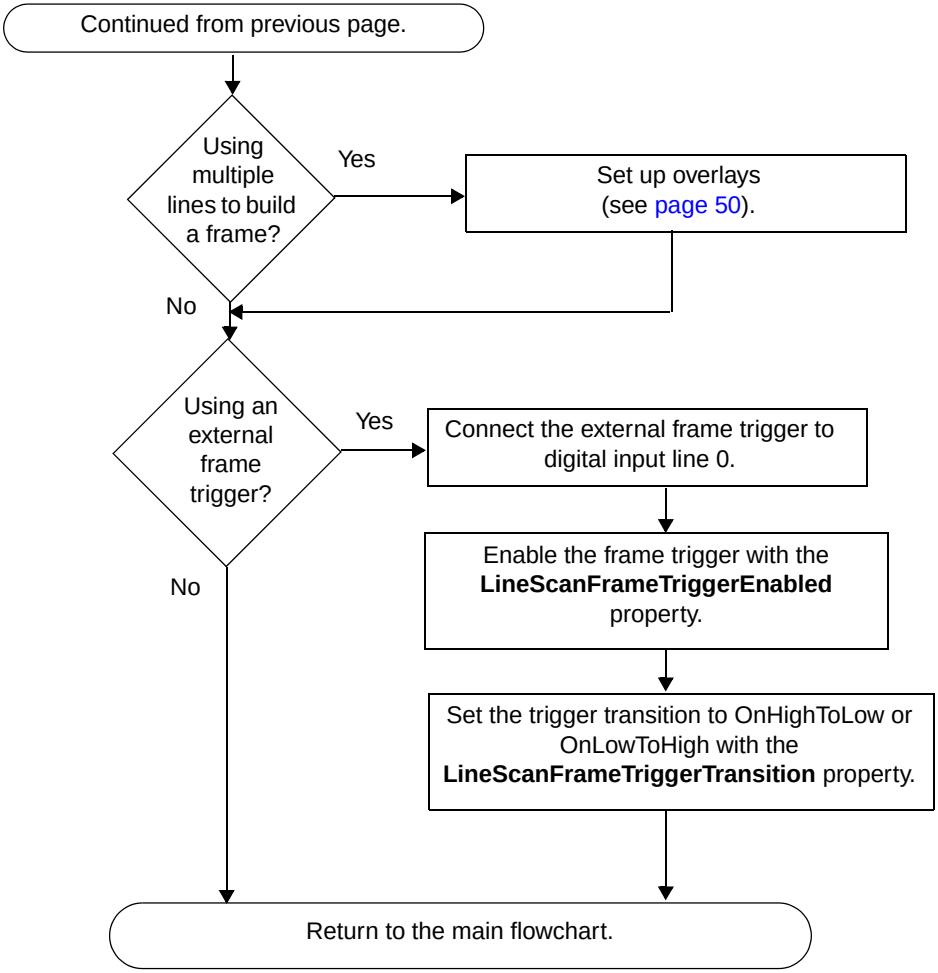
Set up the ROI



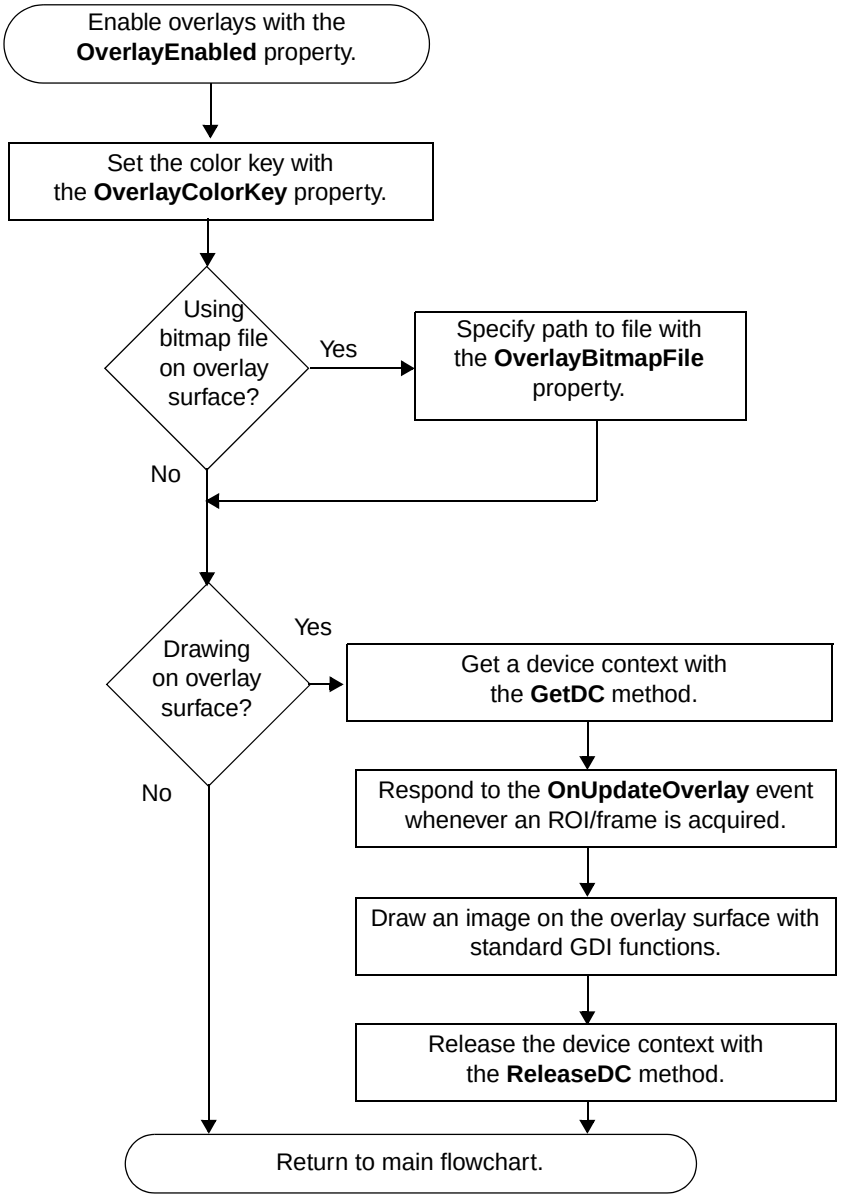
Set up the Line(s) for a Line-Scan Operation



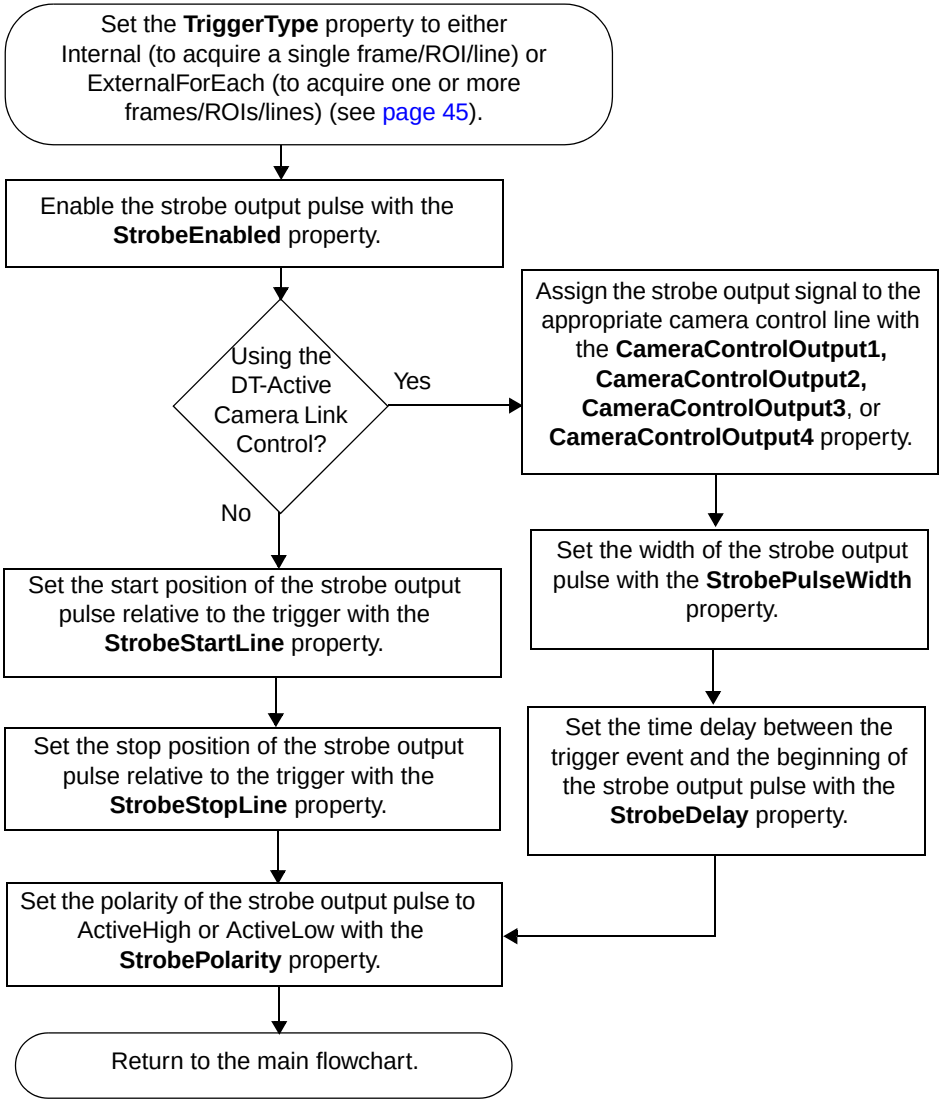
Set up the Line(s) for a Line-Scan Operation (cont.)



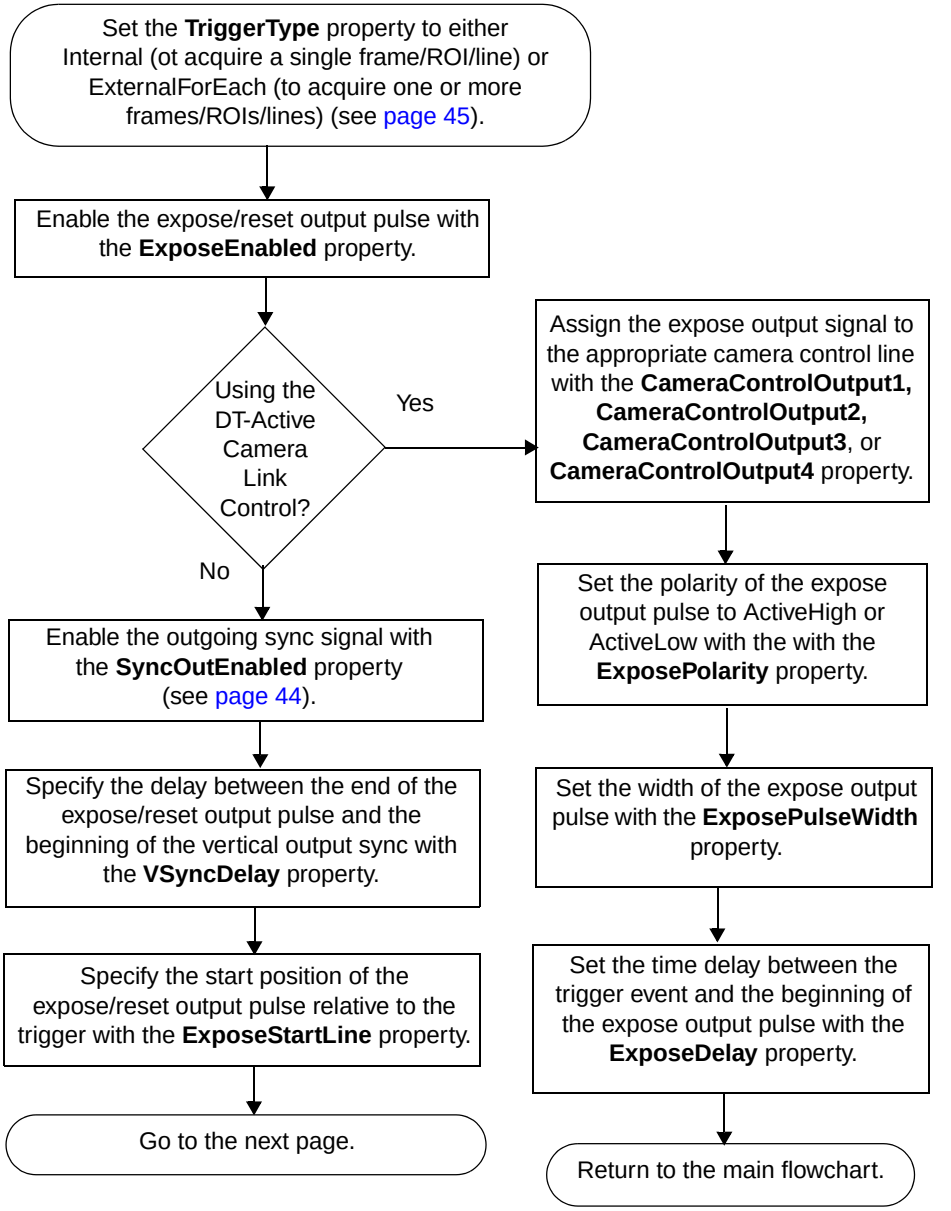
Set up Overlays



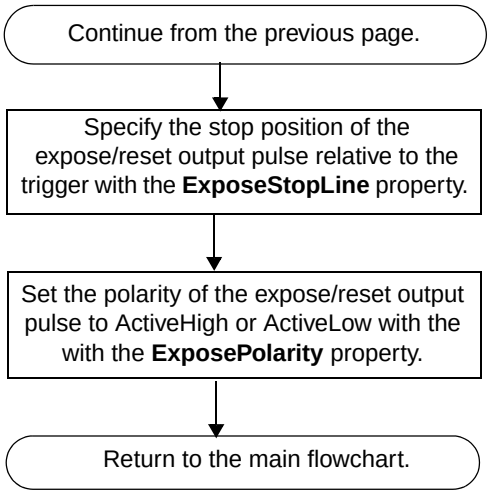
Set up a Strobe Output Signal



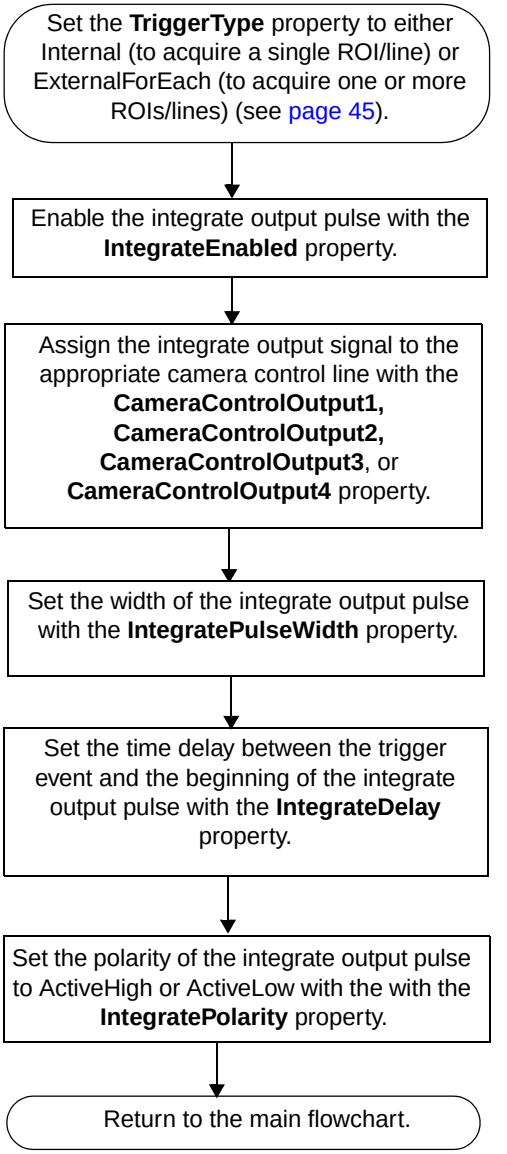
Set up an Expose/Reset Output Signal



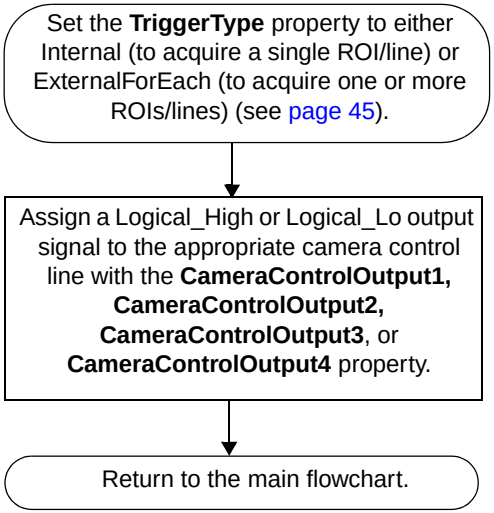
Set up an Exposure/Reset Output Signal (cont.)



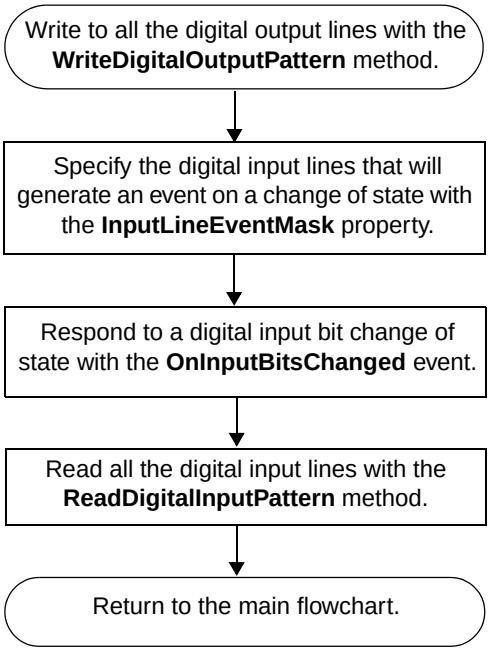
Set up an Integrate Output Signal



Set up a General-Purpose Output Signal



Perform a Digital I/O Operation



4

Product Support

Should you experience problems using a DT-Active Frame Grabber control, perform the following steps:

1. Read all the appropriate sections of this manual. 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 a README file. If present, read this file for the latest installation and configuration information.
3. Make sure that you have installed the device driver, DT-Active Frame Grabber control, and other software for your device properly. For information, refer to the getting started manual for your device.
4. Make sure that you have installed your device properly. For information, refer to the getting started manual for your device.

If you are still having problems, Data Translation's Technical Support Department is available to provide technical assistance. To request technical support, go to our web site at http://www.datatranslation.com and click on the Support link.

When requesting technical support, be prepared to provide the following information:

- Your product serial number
- The hardware/software product you need help on
- The version of the CD you are using
- Your contract number, if applicable

If you are located outside the USA, contact your local distributor; see our web site (www.datatranslation.com) for the name and telephone number of your nearest distributor.

Glossary

Active Line Count

For the DT3162 frame grabber board, a line of data in the active video area (the part of the incoming signal containing valid data). The first active line defines the top of the active video area.

For the DT3162 frame grabber board, the number of lines of data supported by your camera. Refer to your camera documentation for more information. The height of the ROI that you want to acquire must be less than or equal to the Active Line Count.

Active Video Area

The part of the incoming video signal that contains valid video data (no blanking or sync information). It is the visible portion of the incoming video signal.

Each line of video in the active video area contains horizontal sync information, blanking information, and active video. Pixel measurements are relative to the horizontal reference point, which is defined as the beginning of the horizontal sync. In the horizontal video signal, blanking occurs during the horizontal sync and image border periods, which are defined by the front porch (before the horizontal sync) and back porch (after the horizontal sync).

Each field of video in the active video area contains vertical sync information, blanking information, and lines of active video. Line measurements are relative to the vertical reference point, which is defined as the beginning of the vertical sync.

See also total video area.

Asynchronous

An asynchronous function returns control to the caller before the operation completes.

Brightness Level
A value that you can use to move the entire grayscale range up and down, making the digitized video lighter or darker.

Buffer
A location in internal memory that is intended to hold one acquired ROI, one acquired line, or one acquired frame of multiple lines.

Channel
The analog-to-digital converter on the device through which the video signal passes. If your device supports multiple channels, you can receive multiple video signals at the same time (one on each channel). See also video input source.

Clamp Period
A period when the device adjusts the input voltage from the camera by shifting the input signal to 0 V. The active video area following the blanking period is then referenced to that shift. You can specify the start of the clamp period and the end of the clamp period.

Composite Signal
A signal in which the video and synchronization signals are combined in a single signal.

Contrast Level
A value that you can use to emphasize the differences between light and dark. By adjusting the contrast level, you can stretch or contract the range of the incoming video.

DDI
DirectDraw Interface. One of the display modes that determines the way that you want to display images when setting up your application. Typically, you will use DDI mode; it is faster and requires less system memory. See also GDI.

Device
A frame grabber board, such as the DT3162, DT3145, or other hardware used to acquire images.

Device Context

Referred to as a DC. A DC is a Windows Graphical Device Interface (GDI) object. Refer to your Windows documentation for more information.

Expose/Reset Pulse

A digital output pulse generated by some devices to control the resetting or the exposure time of an asynchronous reset camera. The exposure time is the amount of time that the shutter is open. You can specify the polarity of the pulse (high-going or low-going), the time delay from a trigger event to the start of the exposure, and the length of time the shutter is open. The expose output signal is typically used in area-scan mode. Note that for the expose / reset pulse to work as programmed, you must adjust the physical settings on your camera appropriately.

For the DT3162 frame grabber board, the expose / reset pulse is connected to your camera through a Camera Interface Module (CIM). For the DT3145 frame grabber board, the expose output pulse is connected to your camera through the camera link connector.

External Trigger

A trigger that is connected to the device through a dedicated external line.

Field

The collection of horizontal lines between two consecutive vertical sync signals. For interlaced images, two fields (odd and even) make up a single frame.

Frame

For the DT3162 frame grabber board, a collection of video data. An interlaced frame consists of an odd field and an even field, where one field is drawn in the first pass and the other field is drawn in the next pass. A noninterlaced frame (progressive scan) consists of the complete frame, where all lines are drawn in a single pass.

For the DT3145 frame grabber board, the definition of a frame depends on whether you are using area-scan mode or line-scan mode. In area-scan mode, a frame is the portion of the video that is defined by the Frame_Valid and Line_Valid signals; the portion of the frame that you want to acquire is determined by the **ROILeft**, **ROIWidth**, **ROITop**, and **ROIHeight** properties. In line-scan mode, a frame is a series of lines acquired into a single buffer. You can use these frames built from multiple lines in frame-based software packages, such as DT Vision Foundry and GLOBAL LAB Image/2.

Frame Trigger

A trigger that allows you to control the acquisition of frames in line-scan mode. On the DT3145 frame grabber board, the frame trigger input is provided through digital input line 0 (pin 1 of connector J2). You can access this signal using the STP15 screw terminal panel. The frame trigger must have a minimum pulse width of 10 µs.

GDI

Graphics Display Interface. One of the display modes that determines the way that you want to display images when setting up your application. If you receive an error when acquiring very large ROIs/lines/frames (typically, larger than 2K x 2K), you can try reducing the size of the ROI/line/frame, increasing the memory in your graphics card, updating the driver for your graphics card, or changing the display mode to GDI. See also DDI.

Identity LUT

A look-up table in which the pixel data is passed through the LUT unchanged. For example, for 8-bit data, a pixel input value of 255 has an output value of 255.

Integrate Pulse

A digital output pulse generated by some devices to control the exposure time of a line-scan camera. The integrate time is the amount of time that the shutter is open. You can specify the polarity of the pulse (high-going or low-going), the time delay from a trigger event to the start of the integrate pulse, and the length of time the shutter is open. The integrate output signal is typically used in line-scan mode. Note that for the integrate pulse to work as programmed, you must adjust the physical settings on your camera appropriately.

For the DT3145 frame grabber board, the integrate pulse is connected to your camera through the camera link connector.

Interlaced Frame

A frame in which two consecutive fields of the video signal are acquired to create a complete frame. The odd field contains lines 1, 3, 5, and so on, of the video signal. The even field contains lines 2, 4, 6, and so on, of the video signal. One field is drawn in the first pass and the other field is drawn in the next pass.

Inverse LUT

A look-up table in which the image is reversed. For example, for 8-bit data, a pixel input value of 255 has an output value of 0.

Line

For the DT3162 frame grabber board, the area between two consecutive horizontal sync signals.

For the DT3145 frame grabber board, the portion of the video that is defined by the Line_Valid signal. In line-scan mode, the portion of the line that you want to acquire is determined by the **LineScanWidth** and **LineScanLeft** properties. In area-scan mode, the portion of the line that you want to acquire is determined by the **ROIWidth** and **ROILeft** properties.

Look-up Table

A hardware feature of the device that you can use to change the value of an incoming pixel or affect the displayed image. When the LUT receives an input pixel value, it modifies this value according to the corresponding value in the LUT. Also called a LUT.

The DT3162 and DT3145 frame grabber boards have two built-in hardware look-up tables numbered 0 and 1. By default, LUT 0 is loaded with an "identity" table and LUT 1 is loaded with an "inverse" table. The "identity" table maps the data through unchanged. The "inverse" table inverts the image (black becomes white and white becomes black).

The DT3162 video circuitry generates 10-bit data values (0 to 1023). The board uses the look-up table to convert these 10-bit values to corresponding 8-bit values (0 to 255) that are sent to the PC. The DT3162 look-up table has 1024 entries corresponding to all possible 10-bit input values. Each of these entries contains a number between 0 and 255, which is the 8-bit output value that is generated for the corresponding input value.

On the DT3145 frame grabber board, it is recommended that you use the LUTs shipped with the board and the LUTs provided with your camera.

LUT

A look-up table.

Noninterlaced Frame

A frame in which all lines (the complete frame) are acquired in a single pass. A noninterlaced frame is also referred to as a progressive scan.

Overlay

A means by which you can place or overlay an image on top of the frames in your image. The overlay is always an additional (and therefore removable) part of the frame. Anything that is drawn in the color key that you specify is invisible (transparent); anything that is drawn in any other color key is opaque.

Progressive Scan

A frame in which all lines (the complete frame) are acquired in a single pass. A progressive scan is also referred to as a noninterlaced frame.

ROI

Region of interest. An ROI is applicable in area-scan mode only.

For the DT3162 frame grabber board, an ROI is the portion of the acquired frame that you want to store in a buffer for processing. The top of the ROI is the first line of video relative to the active video area. The left side of the ROI is the first pixel of video relative to the active video area. The width of the ROI is the number of pixels per line of video. The height of the ROI is the number of lines per frame.

For the DT3145 frame grabber board, an ROI is the portion of the video that you want to acquire. The top of the ROI is the first line of video, the left side of the ROI is the first pixel of video, the width of the ROI is the number of pixels per line of video, and the height of the ROI is the number of lines of video.

Source

For the DT3162 frame grabber board, the input line on the device through which the video signal is received. See also channel.

For the DT3162 frame grabber board, the Camera Link camera.

You can receive a video signal from only one source at a time.

Strobe Pulse

A digital output pulse generated by some devices to control an attached strobe light. You can specify the polarity of the pulse (high-going or low-going), the time delay from a trigger event to the start of the pulse, and the width of the pulse.

Synchronous

A synchronous function returns control to the caller after the operation completes.

Timeout Period

The length of time that the device driver waits from the software call that starts an acquisition to the acquisition of the first ROI, line, or frame of multiple lines. If an ROI/line/frame is not acquired within this time period, the device driver generates a timeout error and terminates the operation. Note that the timeout period always starts with a software call, even if an external trigger is used.

Total Video Area

The video image area is composed of pixels and lines of video. The total video area is the complete set of horizontal and vertical input lines from which you extract the active video area and the region of interest (ROI) within the active video area that you want to acquire. 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 frame.

Variable-Scan Signal

A signal whose components, such as pixel clock, back porch start, first active pixel, and total lines per field, vary depending on your camera.

Video Input Source

For the DT3162 frame grabber board, the input line on the device through which the video signal is received. See also channel.

For the DT3162 frame grabber board, the Camera Link camera.

You can receive a video signal from only one source at a time.

Index

A

AcquireMem method 32, 41
AcquireType property 32, 38
acquisition properties, methods, and events 32
active video area properties 25
ActiveDevice property 22, 37
ActiveLineCount property 26, 46
ActiveLUT property 24, 39
ActivePixelCount property 25, 46
ActiveX control, *see* DT-Active Frame Grabber control
adding a DT-Active Frame Grabber control to a project 13

B

boards, *see* devices
Brightness property 24, 43

C

Calibrate method 24, 42
camera control output properties 28
CameraControlOutput1 property 28, 29, 51, 52, 54, 55
CameraControlOutput2 property 51, 52, 54, 55
CameraControlOutput3 property 29, 51, 52, 54, 55
CameraControlOutput4 property 29, 51, 52, 54, 55
ClampEnd property 26, 46
ClampStart property 26, 46
CloseDevice method 22, 41
Contrast property 24, 43
conventions used 6
custom control, *see* DT-Active Frame Grabber control

D

DataFormat method 24
DataFormat property 42
DeviceBusy property 23
DeviceCount property 22
devices
  determining the type 22
  returning the name 22
  supported 11
DeviceType property 22
digital I/O properties 34
DisplayMode property 23
DrawXOrigin property 23
DrawYOrigin property 23
DT-Active Frame Grabber control 10
  adding to a project 13
  example program 17

E

error/status messages 36
events
  acquisition 32
  defined 10
  overlay 27

example program 17
expose output pulse properties 30
ExposeDelay property 30, 52
ExposeEnabled property 30, 52
ExposePolarity property 30, 52, 53
ExposePulseWidth property 30, 52
ExposeStartLine property 30, 52
ExposeStopLine property 30, 53

F

FirstActiveLine property 25, 46
FirstActivePixel property 25, 46
frame grabber boards, *see* devices

G

general imaging properties and methods 22
GetBuffer method 32, 41
GetBufferCount method 32, 41
GetDC method 50
GetDeviceName method 22

H

help
online 18
HSyncInPolarity property 24, 42
HSyncOutPulseWidth property 29, 44

I

imaging properties and methods 22
input properties and methods 24
InputLineCount property 34
InputLineEventMask property 34, 56
installing the software 12
integrate pulse properties 31
IntegrateDelay property 31, 54
IntegrateEnabled property 31, 54
IntegratePolarity property 31, 54
IntegratePulseWidth property 31, 54

L

LineFrequency property 24, 29, 42, 44
line-scan properties 27
LineScanFrameHeight property 27, 48
LineScanFrameTriggerEnabled property 27, 49
LineScanFrameTriggerTransition property 27, 49
LineScanLeft property 27, 48
LineScanWidth property 27, 48
LoadConfigFile method 23
LoadConfigFile property 37
LoadLUTFromArray method 24, 39
LoadLUTFromFile method 24, 39

M

methods
acquisition 32
defined 10
general imaging 22
input 24
line-scan 27

O

OLE control, *see* DT-Active Frame Grabber control
OnAcquireComplete event 32, 41

OnAsyncError event 33
OnFrameComplete event 33
OnFramesComplete event 33, 41
OnInputBitsChanged event 34, 56
online help 18
OnUpdateOverlay event 28, 50
OpenDevice method 22, 37
OutputLineCount property 34
overlay properties and events 27
OverlayBitmapFile property 27, 50
OverlayColorKey property 27, 50
OverlayEnabled property 27, 50

P

PixelClockSource property 24, 37
project, adding a control 13
properties
  acquisition 32
  active video area 25
  camera control output 28
  defined 10
  digital I/O 34
  expose output pulse 30
  general imaging 22
  input 24
  integrate pulse 31
  line-scan 27
  overlay 27
  ROI 26
  strobe output pulse 31
  sync output 29
  triggers 28

R

ReadDigitalInputPattern method 34, 56
region of interest properties 26
related documents 7
ReleaseDC method 50
removing the software 19
ROI properties 26
ROIHeight property 26, 47
ROILeft property 26, 47
ROITop property 26, 47
ROIWidth property 26, 47

S

SaveConfigFile method 23
SaveLUTToArray method 25
SaveLUTToFile method 25
service and support procedure 58
ShowPropPages method 23
software
  installing 12
  removing 19
status codes 36
StatusMessage property 23
StopAcquire method 32, 41
strobe output pulse properties 31
StrobeDelay property 32, 51
StrobeEnabled property 31, 51
StrobePolarity property 31, 51
StrobePulseWidth property 32, 51
StrobeStartLine property 31, 51
StrobeStopLine property 31, 51
sync output properties 29
SyncInSource property 24, 42
SyncOutEnabled property 29, 44
SyncOutPolarity property 29, 44

T

technical support 58
TimeGranularity property 28
Timeout property 23, 37
TotalLinesPerFrame property 25, 46
TotalPixelsPerLine property 25, 46
trigger properties 28
TriggerTransition property 28, 45, 48
TriggerType property 28, 45, 48
troubleshooting checklist 58

V

VideoInputSource property 24, 42
Visual Basic 6.0, adding a control 13
Visual C++ 6.0, adding a control 14
Visual Studio .NET, adding a control 15
VSyncDelay property 30, 52
VSyncInPolarity property 24, 42
VSyncOutPulseWidth property 29, 44

W

WriteDigitalOutputPattern method 34, 56