

Cognex MVS-8000 Series

Getting Started

CVL 7.0
February 2011

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CVL

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■ Contents

CVL 7.0 Notes

- This document describes release 7.0 of the Cognex Vision Library (CVL).

This document contains the following sections:

- About This Release provides an overview of the features of the current release.
- Supported Hardware describes the Cognex hardware supported by this release.
- System Information describes system requirements for this release.
- Installation Information describes how to install and uninstall the software.
- Compatibility Notes describes compatibility issues related to the use of this software release and Cognex hardware.

About This Release

This section provides an overview of CVL 7.0.

New Features in This Release

CVL 7.0 is a general availability release. It includes the new features listed in this section.

Note Some of the features listed in this section were first released in earlier CVL customer releases; the first release supporting each feature is shown in parentheses after the feature name.

High-Accuracy Mode for RSI Search and Image Registration (6.8 CR11)

CVL 6.8 CR11 introduces a new high-accuracy mode for computing sub-pixel model locations with the RSI Search tool and the Image Registration tool. The new mode provides more accurate sub-pixel location results with no performance penalty.

Support for Microsoft Windows 7 32-bit and 64-bit Editions (6.8 CR3)

CVL 6.8 CR3 introduces support for the Microsoft Windows 7 operating system. For additional information about Microsoft Windows 7 support, see the section Compatibility Notes on page 50.

Enhancements for the MVS-8602e Frame Grabber (7.0 CR1)

The following enhancements have been made to the MVS-8602e Frame Grabber:

- Support for 64-bit operating systems.
- Upgraded firmware (from rev. 3.52 to 3.56).
- Support for greater than 8-bit acquired monochrome image depth values (that is, the values of 10, 12, 14, and 16 bits per pixel are supported).

Notes

MVS-8601 and MVS-8602 do not support the use of greater than 8-bit acquired monochrome image depth values (that is, they cannot create Acq FIFO using greater than 8-bit monochrome image depth values).

Support for Large Images (6.7 CR3)

In CVL 6.7 CR3, the image processing, image analysis, and vision tools listed in Table 1 support the use of images without any upper limit to their size (the only limit is the amount of the available physical memory). In versions of CVL prior to 6.7 CR3, certain tools did not work properly when used with certain large image sizes. All of these limitations have been removed, subject to the changes described in the section Large Image Compatibility Issues on page 50.

Image Processing Tools	Image Analysis and Vision Tools
• Affine Transform Tool • Image Stitching Tool • Convolution Tool • Edge Tool (including hysteresis thresholding) • Pixel mapping • Image Arithmetic Tools: • Pel Clear • Pel Copy • Pel Equal • Pel Expand • Pel Flip (horizontal) • Pel Set • Pel Subtract • Pel Transpose • Image Filter Tools: • Maximum • Minimum • MinMax • Median (3x3 kernel only) • Spatial Averaging • Sampling	• PatMax • Calibration (grid of dots only) • Caliper • Blob • Histogram (including WGV thresholding tool)

Table 1. Tools with large image support

3D-Locate Calibration Wizard (6.7 CR1PR2)

CVL 7.0 includes an easy to use program that lets you perform 3D calibration on from one to four cameras. To start the calibration wizard, select

Cognex->CVL->Utilities->Calibration Wizard from the Windows **Start** menu.

The calibration wizard lets you acquire multiple calibration plate viewsets and compute a 3D calibration based on those viewsets. You can save an archive containing the calibration that you can load from inside your 3D-Locate application. The calibration wizard also lets you validate an existing calibration.

If you are using a Cognex-supplied calibration plate with a machine-readable 2D symbol (Data Matrix code) that indicates the plate pitch, the Calibration wizard can locate and decode the symbol and then automatically set the grid pitch based on the symbol.

To use this functionality, the symbol must be visible within the camera's field of view. To set the grid pitch automatically, click the **Read Grid Pitch from Cal Plate** button in the **Setup** tab of the wizard.

Cognex 3D-Locate 3D Machine Vision Software (6.7 CR1) and 3D Sample Code (6.7 CR1PR1)

CVL 7.0 includes support for Cognex 3D-Locate 3D machine vision software. 3D-Locate provides the following 3D machine vision capabilities:

- Highly accurate 3D camera calibration for single and multiple camera systems.
- Hand-eye calibration for both hand-mounted and fixed cameras.
- 3D triangulation, fitting, and pose estimation for single and multiple cameras.
- 3D framework support including shapes, graphics, and transformations.

3D-Locate is described in detail in two manuals provided with this release:

- The 3D-Locate Developer's Guide describes the underlying 3D machine vision technology and shows how to use it.
- The 3D-Locate Class Reference provides reference pages for all of the 3D-Locate programming interface.

PNG File Support (6.6 CR14)

CVL 7.0 includes support for the Portable Network Graphics (PNG) file format. PNG is a lossless image compression format.

OCVMax Availability

CVL 7.0 fully supports the OCVMax tool.

The OCVMax tool is described in detail in two manuals provided with this release:

- The OCVMax Tool chapter of the CVL Vision Tools Guide provides an overview of the tool and information on how to use the tool.
- The CVL Class Reference provides reference pages for the OCVMax programming interface.

3D Pose Functionality

The CDB pose functionality encodes a 3D rigid pose as a string which can be inserted into the comment field of a CDB record. This functionality also provides decoding functionality for extracting the 3D rigid pose from a CDB record.

3D pose computation functions have been added for CVL 7.0 to the 3D-Locate Class Reference. See the %VISION_ROOT%\defs\ch_c3d\cdbpose.h file for more information.

Camera Link Serial Communication Utility Support for 64-bit Operating Systems (7.0 CR1)

The Camera Link Serial Communication Utility runs on 64-bit operating systems.

Support for Disconnection Recovery and Bus Configuration Change Event for FireWire Cameras (7.0 CR1)

This release allows limited removal and reconnection of IEEE 1394 (FireWire) cameras as your vision application executes. Be aware, however, that changing camera topology, such as moving a camera to a different port on your IEEE 1394 adapter, can cause unexpected behavior.

In addition, this release allows your CVL application to detect an IEEE 1394 bus configuration changed event without needing to stop and restart. Depending on the nature of the bus event, your vision application may not be able to acquire images until you correct the problem. For example, if a FireWire camera was disconnected, then reconnecting the camera will generate another bus event and should resume image acquisition capabilities.

See the FireWire Cameras (IEEE 1394 DCAM) User's Guide for details.

Support for the Maximum Data Matrix Size of 144x144 Using the Symbol Tool (6.7 CR2)

The Symbol Tool supports the maximum data matrix size of 144x144.

Partial Match Mode Availability for PatFlex (6.8 CR12)

The partial match mode is available for the PatFlex algorithm.

Support for Telecentric Lens Calibration, Telecentric Lens Affine Transform, and Lens Distortion Correction (6.8 CR10)

The calibration tools included with CVL 7.0 support a telecentric lens distortion model. This allows you to use telecentric lenses in both 2D and 3D vision applications. This release also includes support for computing image affine transformations between telecentric cameras. See the files %VISION_ROOT%\defs\ch_cv\ccalib.h, %VISION_ROOT%\defs\ch_cog\ccalibtl.h, and %VISION_ROOT%\defs\ch_c3d\telaff.h for more information on this functionality.

CVL 7.0 includes support for generating resampled images that remove the effect of optical distortion, as long as the image is acquired from a calibrated camera. See the file %VISION_ROOT%\defs\ch_c3d\imgcrrct.h file for more information on this functionality.

Support for Line Scan Distortion Correction (6.8 CR1)

CVL 7.0 supports nonlinear distortion correction for line scan cameras without the need to use a calibration plate.

Documentation Supplied With This Release

The documentation included with this release is available online once you install CVL, and can also be found in the Doc directory of the CVL installation DVD-ROM. To access the online documentation, from the Windows Start menu, select **Programs -> Cognex -> CVL -> Documentation**.

Table 2 lists the online documentation supplied with CVL 7.0 release.

Document	Format	Contains
Getting Started (this manual)	PDF	New features, system requirements, supported hardware, and software installation information
CVL 7.0 Release Notes	HTML	Lists fixed bugs, open bugs, and known limitations. The version supplied on the CVL installation CD is current as of the release date of the product. Check the Online Support area of www.cognex.com for the most current information.
CVL User's Guide	PDF	Overview of CVL programming, working with the sample code, acquiring and displaying images and graphics, and an introduction to vision tools and concepts.
CVL Vision Tools Guide	PDF	Descriptions of how each vision tool works; describes algorithms, parameters, and results.
CVL Class Reference	PDF	Class-by-class reference manual for the CVL C++ class library.
PC Vision Wiring Guide	PDF	Illustrated guide showing how to wire common I/O configurations.
PC Configuration Guide	PDF	Summary document listing PC system requirements and recommendations.

Table 2. CVL 7.0 Documentation

Document	Format	Contains
The following hardware manuals are accessible from the Cognex MVS-8000 Hardware Manuals submenu of the Cognex Documentation and Tutorial menu:		
MVS-8100C Hardware Manual MVS-8100L Hardware Manual MVS-8100M Hardware Manual MVS-8500 Hardware Manual MVS-8600/8600e Hardware Manual FireWire Cameras (IEEE 1394 DCAM) User's Guide GigE Vision Cameras User's Guide	PDF	Electrical, mechanical, installation, and configuration information for Cognex MVS-8000 series hardware and FireWire and GigE Vision cameras.

Table 2. CVL 7.0 Documentation

Installing Adobe Acrobat

Most CVL documentation is delivered in Adobe Acrobat format on the CVL installation DVD-ROM. If you have not already installed the Adobe Acrobat Reader software, you can install it as follows:

1. Double click the **ar<ver>enu.exe** icon in the Acrobat folder on the CVL installation DVD-ROM.
2. Follow the on-screen prompts.

Sample Code Installed with This Release

CVL 7.0 is shipped with four sets of sample code. Each set of code is described briefly here, and in more detail in the section Programming Examples in chapter 1 of the CVL User's Guide.

Single-File Sample Code Examples

Each of the single-file sample code examples, which are listed in Table 3, shows how to use a specific CVL tool or how to perform a specific function. These sample code files are installed in %VISION_ROOT%\sample\cvl.

To use one of these examples, you add it to the framework provided by %VISION_ROOT%\sample\cvl\cvlmain.cpp. For detailed instructions on using these sample files, see Using the Single Code File Samples in chapter 1 of the CVL User's Guide.

Sample Code File	Description
acq8600.cpp	Shows how to acquire images using the MVS-8600 frame grabber and a Camera Link area scan camera
acq8600linescan.cpp	Shows how to acquire continuous line scan images using the MVS-8600 frame grabber and a Camera Link line scan camera
acq8600elinescan.cpp	Shows how to use two MVS-8600e-specific line scan acquisition features: starting acquisition at a specific encoder count and specifying encoder count resolution.
acqbasic.cpp	Shows the textbook way to perform image acquisition in CVL.
acq_custom.cpp	Shows how to examine and modify custom properties implemented by GigE Vision cameras and Cognex Imaging Devices.
acubar.cpp	Shows how to use the barcode classes.
acuread.cpp	Shows how to use the OCR class ccAcuRead .
acureadud.cpp	Shows how to use user-defined fonts with the OCR class ccAcuRead .
acusymb2.cpp	Shows how to use of the 2D Symbology tools for decoding QR Code symbols encoding Shift JIS characters.
acusymb1.cpp	Shows how to use the 2D symbol classes.
afftrans.cpp	Shows how to create a synthetic image and transforms an affine rectangular region of it into a separate destination image.
archive.cpp	Shows how to write a persistent class.

Table 3. CVL single file code samples for this release

■ CVL 7.0 Notes

Sample Code File	Description
atslenh.cpp	Demonstrates enhanced functionality of the Auto-select tool: query mode, masking, and overlap constraints
atslsmpl.cpp	Shows how to use the Auto-select tool.
blend.cpp	Demonstrates the blending of two images during live display.
blob.cpp	Shows how to use the Blob tool.
bndtrckr.cpp	Shows how to use the Boundary Tracker tool in its major modes and how to read the results.
boards.cpp	Displays the Cognex frame grabber or vision processor boards installed on your system and their capabilities
boundaryinspector1.cpp	Demonstrates the Boundary Inspection Tool with a global tolerance.
boundaryinspector2.cpp	Demonstrates the Boundary Inspection Tool with a local shape tolerance.
boundaryinspector3.cpp	Demonstrates the Boundary Inspection Tool with statistically learned boundary tolerances.
boundaryinspector4.cpp	Demonstrates the Boundary Inspection Tool with shape masking, shape clipping, and featurelet filtering.
boundaryinspector5.cpp	Demonstrates the local contour comparison mode of the Boundary Inspection Tool
calib.cpp	Shows how to use the cc2XformLinear/cc2XformPoly Calibration tool.
calib2.cpp	Shows how to use the cc2XformCalib2 Calibration tool.
calibls.cpp	Shows how to use the Line Scan Calibration tool.
caliper.cpp	Shows how to use the Caliper tool.
cdb.cpp	Shows how to use the image database.
circfit.cpp	Shows how to use the Circle Finder tool to find a circle.

Table 3. CVL single file code samples for this release

Sample Code File	Description
clipsket.cpp	Demonstrates rectangular region clipping of displayed images.
clssfier.cpp	Shows how to classify numbers in one of the four quadrants and initialize the scoring functions.
cnlsrch.cpp	Show how to use CNLSearch.
colmtchc.cpp	Show how to use the Composite Color Match tool.
colmtchs.cpp	Shows how to use the Color Match tool.
colsegm.cpp	Shows how to use the Color Segmenter tool.
constrea.cpp	Shows how to use console streams including cogOut, the Cognex standard output stream
convolve.cpp	Shows how to use the Discrete Convolution tool.
cvlmain.cpp	Main program for most sample projects. Use this file when building host-based projects, except enhanced acquisition samples in %VISION_ROOT%\sample\cv\acquire.
dcambasic.cpp	Shows how to perform IEEE 1394 DCAM image acquisition using a generic format.
dcamcolor.cpp	Demonstrates how to acquire from an IEEE 1394 DCAM color camera using a color DCAM video format. The sample also shows how to perform white balance adjustments using functions provided in the ch_cog/dcamutil.h header.
dcamlive.cpp	Demonstrates how to display a live image from an IEEE 1394 DCAM camera using the startLiveDisplay() method.
dcamroi.cpp	Shows how to perform IEEE 1394 DCAM image acquisition using a Format 7 format and how to adjust the acquired region of interest (ROI).
diag.cpp	Shows how to use the diagnostic recording classes with CNLSearch.

Table 3. CVL single file code samples for this release

Sample Code File	Description
disp.cpp	Shows how to use ccDisplayConsole windows to draw graphics in an MFC application. See Using the Display Classes in the Displaying Images chapter for more information on ccDisplayConsole .
dispprop.cpp	Shows how to use the ccGraphicsProps class.
disppump.cpp	Shows how to create a Windows message handler thread for a ccDisplayConsole .
dxc390_8504.cpp	Shows how to acquire color images from a 3-tap color camera (Sony DXC-390) using the MVS-8504.
edge.cpp	Shows how to use the Edge tool.
edgefilt.cpp	Demonstrates edgelet chain filtering.
except.cpp	Shows how to use CVL exceptions.
featureletfilter.cpp	Shows how to use the Featurelet Filtering tool.
featurelt.cpp	Shows how to use featurelets and featurelet chains.
fit.cpp	Shows how to use the Fitting tool.
flxunwrp.cpp	Shows how to use the results of a PatFlex tool to unwarp an image.
gausmpl.cpp	Shows how to use the Gaussian Sampling tool.
gige_basler_as.cpp gige_jai.cpp gige_prosilica.cpp	Shows how to access camera-specific features of several GigE Vision cameras.
gige_basler_ls.cpp	Shows how to configure a Basler GigE line scan camera.
gige_timestamp.cpp	Shows how to use the timestamp function of GigE Vision cameras.
gmrph.cpp	Shows how to use the Grey-scale Morphology tools.
handle.cpp	Shows how to use the Cognex handle classes.
histo.cpp	Shows how to use the Histogram tool.

Table 3. CVL single file code samples for this release

Sample Code File	Description
idtool.cpp	Shows how to use the ID tool.
lablproj.cpp	Shows how to use the Label Projection tool.
linefit.cpp	Shows how to use the Line-fitting tools.
matrix.cpp	Shows how to work with the matrix classes.
ocv1.cpp	Shows how to use the OCV tool.
ocvmax.cpp	Shows how to use the OCVMax tool.
pdf417.cpp	Shows how to use the PDF417 OCR tool.
pelbuf.cpp	Shows how to work with images (pel buffers).
pelfunc.cpp	Shows how to use pixel processing functions (pelfuncs).
pelrect.cpp	Shows how to use the rectangle classes.
persist.cpp	Shows how to write a complex-persistent class.
pio.cpp	Shows how to use parallel I/O.
palign1.cpp	Shows how to use the PatMax/Align tool.
palign2.cpp	Shows how to use the PatMax/Align tool with synthetic training.
palign3.cpp	Shows how to use interactive mouse-manipulable shapes to define a model for PatMax.
palign4.cpp	Shows how to import synthetic models from DXF-format CAD files for use with PatMax.
palign5.cpp	Shows how to use CVL shapes code to draw a synthetic model for use with PatMax.
palignf.cpp	Demonstrates outside region threshold PatMax, with full scene usage
palignh.cpp	Shows how to use High Sensitivity PatMax
paligno.cpp	Demonstrates outside region threshold PatMax

Table 3. CVL single file code samples for this release

■ CVL 7.0 Notes

Sample Code File	Description
pmismpl.cpp	Shows how to use the PatInspect tool to train a pattern and do image difference calculations.
png.cpp	Demonstrates reading a PNG file.
polar.cpp	Demonstrates polar transformations.
prealign.cpp	Shows how to use the Wafer Pre-Align tool
ptmatch.cpp	Shows how to use the Point Matcher tool to train and match sets of 2-dimensional points.
rgbplane.cpp	Shows how to extract separate red, green, and blue images from a single color image, and create a grey-scale image from a color image. Requires a color-capable frame grabber and color camera.
rsi.cpp	Shows how to use the RSI Search tool.
rsltgrph.cpp	Shows how to use the result graphic classes with CNLSearch.
sanglef.cpp	Shows how to use the Scene Angle Finder tool.
serialio.cpp	Demonstrates the CVL interface for serial I/O.
thresh.cpp	Shows how to use the Threshold tool.
timer.cpp	Shows how to use timers.
units.cpp	Shows how to use units classes to convert between degrees and radians.
userbuf.cpp	Shows how to display the contents of a user-defined block of data in a pel buffer.
userstor.cpp	Shows how to persist the contents of a user-defined block of data to a file.
vector.cpp	Shows how to use the vector classes.
version.cpp	Shows how to retrieve CVL product version information.
xform.cpp	Shows how to use the transformation object classes.

Table 3. CVL single file code samples for this release

Acquisition Sample Projects

The CVL sample code includes five Visual Studio projects that build stand-alone CVL applications that acquire images. The sample projects show how to

- Acquire images from an externally triggered camera
- Acquire RGB images from a color camera
- Manage IEEE-1394 bandwidth use by multiple FireWire cameras
- Perform master-slave acquisition using multiple analog cameras
- Create a live-display loop application

These sample programs are found in the %VISION_ROOT%\sample\cv\acquire directory. For detailed instructions on using these sample files, see Image Acquisition Sample Projects in chapter 1 of the CVL User's Guide.

Display Sample Projects

The CVL sample code includes three Visual Studio projects that build stand-alone CVL applications that display images. The sample projects show how to

- Perform live display of both color and grey-scale images.
- Use the display console to display images and vision tool results.
- Use the Win32 display code to display images in an MFC application.

These sample programs are found in the %VISION_ROOT%\sample\cv\display directory. For detailed instructions on using these sample files, see the section Display Sample Projects in chapter 1 of the CVL User's Guide.

3D-Locate Sample Projects

The CVL sample code includes two Visual Studio projects, one for Visual Studio 2005 and one for Visual Studio 2009, that build an application that demonstrates 3D-Locate. The sample projects show how to

- Use viewsets to perform 3D camera calibration.
- Use a set of images and poses to perform hand-eye calibration.
- Use triangulation and pose estimation to solve 3D applications.

These sample programs are found in the %VISION_ROOT%\sample\cv\3d directory. For additional instructions on using these sample files, see the 3D-Locate Developer's Guide.

3D-Locate Sample Application

The CVL sample code for 3D-Locate includes a fully functional sample application that shows how to use 3D-Locate and PatMax to determine the pose of objects in 3D space.

The sample application can be found in

%VISION_ROOT%\sample\cv\c3d\apps\fixedmulticam. For information on the sample application, see the file

%VISION_ROOT%\sample\cv\c3d\apps\fixedmulticam/fixedmultipcamera3dlocate.doc.

Supported Hardware

This section describes the Cognex hardware configurations that CVL 7.0 supports.

Image Acquisition Devices

CVL 7.0 supports the following image acquisition devices:

- Cognex MVS-8100L (32-bit OS only)
- Cognex MVS-8100M (32-bit OS only)
- Cognex MVS-8501 (32-bit OS only)
- Cognex MVS-8504 (32-bit OS only)
- Cognex MVS-8500Le (32-bit OS only)
- Cognex MVS-8504e (32-bit OS only)
- Cognex MVS-8601 (32-bit OS only; under 64-bit OS, the driver will install but the use of the board is blocked by the software)
- Cognex MVS-8602 (32-bit OS only; under 64-bit OS, the driver will install but the use of the board is blocked by the software)
- Cognex MVS-8602e (32-bit; 64-bit OS for board firmware versions 3.56 or later, the use of the board is blocked by the software for other board firmware versions)
- FireWire (IEEE 1394 DCAM) Cameras as listed in the Supported Cameras table for this release (32-bit OS only)
- GigE Vision Cameras as listed in the Supported Cameras table for this release (32-bit and 64-bit OS)
- Third-party Imaging Devices that conform to the Imaging Device Interface, described in Chapter 3 of the CVL User's Guide. The Acquisition Integration Kit (AIK) for third-party image acquisition supports 32-bit and 64-bit OS.

In addition to frame grabber-based security, CVL 7.0 supports the use of a Cognex-supplied dongle (security key) for licensing, as described in the section Using a Dongle on page 37. CVL 7.0 also supports the use of software licensing, as described in the section Using Software Licensing on page 33.

Multiple CPU Systems and Multi-core processors

CVL 7.0 supports multi-CPU systems and multi-core processors for all supported operating systems and hardware configurations. (See Operating System Requirements on page 30).

Dual-Board Configurations

CVL 7.0 supports the dual-board combinations marked in Table 4 for 32-bit operating systems.

	8100C	8100M	8100L	8501	8504	8500Le	8504e	FireWire	GigE Vision	8601	8602	8602e	Imaging Device
8100C	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8100M		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8100L			Y	Y	Y	N	N	Y	Y	N	N	N	N
8501				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8504					Y	Y	Y	Y	Y	Y	Y	Y	Y
8500Le						Y	Y	Y	Y	Y	Y	Y	Y
8504e							Y	Y	Y	Y	Y	Y	Y
FireWire								Y	Y	Y	Y	Y	Y
GigE Vision									Y	Y	Y	Y	Y
8601										Y	Y	Y	Y
8602											Y	Y	Y
8602e												Y	Y
Imaging Device													Y

Table 4. Dual-board frame grabber combinations supported (32-bit OS)

CVL 7.0 supports the dual-board combinations marked in Table 5 for 64-bit operating systems.

	GigE Vision	Imaging Device	8602e
GigE Vision	Y	Y	Y
Imaging Device		Y	Y
8602e			Y

Table 5. Dual-board frame grabber combinations supported (64-bit OS)

System Information

This section describes system level information, such as the operating system, service pack levels, hardware platforms, and video card required to run CVL software.

System Requirements

To install and use CVL, the host PC must meet the following minimum requirements:

- If you are using a Cognex frame grabber, the PC must be equipped with the expansion slots and ports listed in the PC Configuration Guide and shown in the following table

Frame Grabber	Supported Expansion Slots	Recommended
8601 / 8602	PCI (3.3 or 5 volts; 32 or 64-bit) PCI-X (3.3 or 5 volts; 32 or 64-bit)	PCI or PCI-X slot 64-bit / 66 MHz or higher.
8100L / 8100M	PCI (5 volts only; 32 or 64-bit)	PCI 5 volts; 32-bit
8501	PCI (3.3 or 5 volts; 32 or 64-bit) PCI-X (3.3 or 5 volts; 32 or 64-bit)	PCI or PCI-X slot 33 MHz or higher.
8504	PCI (3.3 or 5 volts; 32 or 64-bit) PCI-X (3.3 or 5 volts; 32 or 64-bit)	PCI or PCI-X slot 66 MHz or higher.
8504e / 8500Le	PCIe x1, x4, x8, x16	PCIe x1
8602e	PCIe x4, x8, x16	PCIe x4

- If you are using a direct-connect camera, the PC must be equipped with an appropriate port (Gigabit-Ethernet for GigE Vision, IEEE-1394 for FireWire).
- The host must have a 1 GHz or faster Intel Pentium (or compatible) CPU with MMX/SSE2 instruction set support. See the PC Configuration Guide for additional recommendations.
- The host PC must run a Windows operating system listed in the section Operating System Requirements on page 30.
- To install the CVL software, the host PC must have a DVD-ROM drive, or access to one over a network.

- The PC must have a PCI, AGP, or PCI Express video card.
 - The minimum supported video card memory configuration is 8 megabytes, which provides limited functionality.
 - PCI-based video cards are strongly discouraged, and are not supported at all for use with the MVS-8100L frame grabber.
 - A standalone video card that plugs into a motherboard slot is strongly preferred over a chip-based video system integrated with the motherboard.
 - An AGP or PCI Express x16 standalone video card with at least 16 megabytes of memory is strongly recommended as the practical minimum configuration with acceptable performance.
 - The video card's device driver must support DirectX 8.1 or later for Windows XP.
 - Video card recommendations are discussed in Video Card Requirements on page 28.

To use CVL at its maximum potential, the host PC should meet the following additional requirements:

- The host system should have more RAM than is specified for the version of Windows in use. The amount required is application dependent. Generally, the host system should have enough RAM that your CVL application does not need to page to disk.
- The Windows desktop must be in 8-, 16-, or 32-bit color mode. The desktop must be in 16- or 32-bit mode to display color images.
- Video card memory requirements depend on several factors, including the number of cameras in use, the number of live display windows open, the desktop color depth selected, and whether overlay graphics are used. More video memory than 16 megabytes may be required to assure maximum performance for some frame grabbers and configurations, as discussed in Table 6 on page 29.
- To use CVL manipulable graphics, the host PC must have a mouse or other pointing device supported by your Windows version.
- Set the PC's BIOS to support a non plug-and-play operating system.
- The system should use bus-mastered DMA disk drivers, as opposed to PIO drivers for IDE (ATA) hard disks. Bus-mastered drivers improve system performance, because the CPU is less heavily used during disk I/O. Windows XP defaults to auto detection and use DMA mode if the disk device supports it. Check with your motherboard vendor to determine if it provides bus-mastered IDE drivers. Bus-mastered DMA disk drivers are required when using the MVS-8100L.

- By default, Windows XP allows the kernel and some device drivers to be paged from memory. If your PC has 64 MB of RAM or more, you can disable the paging of the kernel and drivers, which keeps them in memory for faster access. To do this, use your registry editor of choice and navigate to HKLM/SYSTEM/CurrentControlSet/Control/Session Manager/Memory Management. In this folder, the key DisablePagingExecutive controls kernel paging behavior and is set to 0 (false) by default. To disallow kernel and driver paging, set this key's value to 1 (true). Once changed, the setting does not take effect until after you reboot the computer. Always back up your registry before making edits.

Video Card Requirements

Note

Cognex provides video card recommendations in this section as a guideline. If your video card meets all of the requirements described in Table 6 on page 29, you may still experience less than optimal performance depending on the video card manufacturer, the video card driver installed, and the PC hardware in use.

The minimum requirements for video cards used with this CVL release are listed in System Requirements on page 26. If your application requires extensive use of live display for multiple cameras, or uses overlay graphics, more video memory is strongly recommended.

Table 6 provides general recommendations for video card capabilities.

Video Card Feature	Recommendations
PCI video cards	Adequate when using 8-bit acquisition FIFOs and 8-bit desktop depth when maximum acquisition frame rate is not required. Not supported with MVS-8100L. Results in high CPU usage during live video and increased likelihood of acquiring corrupted images, which would also be flagged as corrupted. Because PCI-type video cards cause more bus traffic to occur when performing live display of images, the CPU usage will be higher with a PCI video card than with an AGP video card. This is true for all frame grabbers.
AGP video cards	Cognex strongly recommends 2X cards or faster. AGP video cards that support the AGP Fast Write feature may show reduced CPU usage during live display. Check with the video card manufacturer to determine whether your card and its driver support this feature.
PCI Express video cards	Cognex supports x16 PCI Express video cards.
8 MB of video memory	Adequate when using 8-bit acquisition FIFOs and 8-bit desktop depth.
16 MB of video memory	- Recommended when using 16- or 32-bit desktop depths. - Required when using the overlay layer with 8-bit acquisition FIFOs and 8-bit desktop depth, or 16-bit acquisition FIFOs and 16-bit desktop depth.

Table 6. Video card general recommendations

Video Card Feature	Recommendations
32 MB of video memory	• Recommended when using 32-bit desktop depth. • Required when using the overlay plane with 32-bit acquisition FIFOs and 32-bit desktop depth (if supported by your hardware).
64 MB of video memory	• Recommended when using 32-bit desktop depth, large desktop width x height resolutions, or displaying live images from multiple cameras with large video formats. • Recommended when using the overlay layer with 8-, 16-, or 32-bit acquisition FIFOs and 32-bit desktop depth in a multicamera configuration and/or with multiple display windows.

Table 6. Video card general recommendations

Operating System Requirements

CVL 7.0 requires one of the Microsoft operating systems listed below to be installed on the host system. Cognex supports the US English and Japanese localized editions of the following Windows variants:

- Windows XP SP3 and Windows XP-J SP3
(32-bit editions of Home and Professional)
- Windows 7
(32-bit editions for Premium, Professional, and Ultimate)
- Windows 7
(64-bit editions for Premium, Professional, and Ultimate)

DirectX Support

For all supported operating systems, CVL 7.0 supports the version of DirectX associated with that operating system (DirectX 9.0c for Windows XP and DirectX 11.0 for Windows 7).

DEP Support

CVL 7.0 supports PCs with hardware enabled DEP using Intel chipsets.

Locale Support

CVL 7.0 was tested on all supported operating systems (listed in the section Operating System Requirements on page 30) with the following locales:

- US English
- Japanese

Development Environment Requirements

CVL 7.0 has been tested against the service pack or release levels of the Microsoft development environment products shown in Table 7. Later service packs or release levels may work, but have not been tested and are not supported by Cognex for use with this version of the software.

Development Environment	Framework	Compiler Version	Service Pack Requirement
Visual Studio 2005	.NET 2.0	Visual C++ v8.0	Service Pack 1 with July 2009 ATL Security Update Installed
Visual Studio 2008	.NET 3.0	Visual C++ v9.0	Service Pack 1 with July 2009 ATL Security Update Installed
Visual Studio 2010	.NET 4.0	Visual C++ v10.0	None

¹ Unicode versions of the MFC libraries may be required to run some CVL samples in the default mode, as described in the next section.

Table 7. Development environment, framework, and operating system service pack release levels supported by CVL 7.0

Notes+

Since CVL 7.0 is an unmanaged SDK, it only supports applications built with MSVC 2005, MSVC 2008, or MSVC 2010 in unmanaged applications. CVL 7.0 does not support applications built with managed .NET (using the /clr compiler switch); also known as mixed mode.

Visual C++ Unicode Requirements

The sample code provided with CVL (in %VISION_ROOT\sample\cvl) has four build modes: Win32 Debug, Win32 DebugUnicode, Win32 Release, and Win32 ReleaseUnicode. Some sample projects, such as ConsDisplay, are installed with Win32 ReleaseUnicode as the default build mode. To be able to build these sample projects in their default mode, Microsoft Visual C++ must be installed with support for Unicode character sets.

If Unicode support is not present, you can build the samples in one of the non-Unicode modes (Win32 Debug or Win32 Release). To change build modes, select either of the non-Unicode modes from the combo box in Visual C++'s Build toolbar.

Installation Information

This section describes the procedures and limitations for installing CVL 7.0 software. For information about installing hardware, refer to the hardware manual for your Cognex frame grabber or adapter.

Before You Install

Please take a moment to familiarize yourself with the information in this section before installing CVL.

- Verify that the system on which you are installing CVL software meets all hardware and software requirements described in System Information on page 26.
- When installing CVL, you must have Administrator privileges for the system.
- Set the **Plug and Play** (PnP) option in the PC's BIOS setup menus to **No** for all Windows platforms.
- Fully uninstall any earlier version of CVL, the Cognex Drivers, and the Cognex Software Licensing Center (CSLC) before installing the current version. You uninstall the software using the **Add or Remove Programs** control panel (Windows XP) or **Programs and Features** control panel (Windows 7), as described further in Uninstalling CVL Software on page 39 and Uninstalling the 32-bit Cognex Drivers on page 44.

Using Software Licensing

If your application uses a FireWire or GigE Vision camera or another method to acquire images that doesn't require a frame grabber, you can use the Cognex Software Licensing Service to enable license bits on your PC without installing any hardware or security devices.

Software Licensing Overview

Software licensing uses special software to enable and disable Cognex security bits on an individual PC. You configure and use software licensing by running the Cognex Software Licensing Center (CSLC), a program supplied with CVL that runs on your PC. Using an Activation ID that Cognex supplies to you after you purchase your CVL product, you use the CSLC to install the license on one or more PCs. The CSLC automatically contacts Cognex to verify the Activation ID that you enter, and once verified, it sets the security bits that correspond to the tools that you have purchased, allowing you to use these features within your application.

■ CVL 7.0 Notes

The CSLC normally contacts Cognex over an internet connection, but if your PC does not have an internet connection you can use the CSLC in offline mode. In offline mode, the CSLC generates a transaction file that you upload to a Cognex web site from a different, internet-connected PC. Cognex processes the transaction file and lets you download a response file which you then supply to the CSLC to complete the license installation. Figure 1 summarizes how you install a software license.

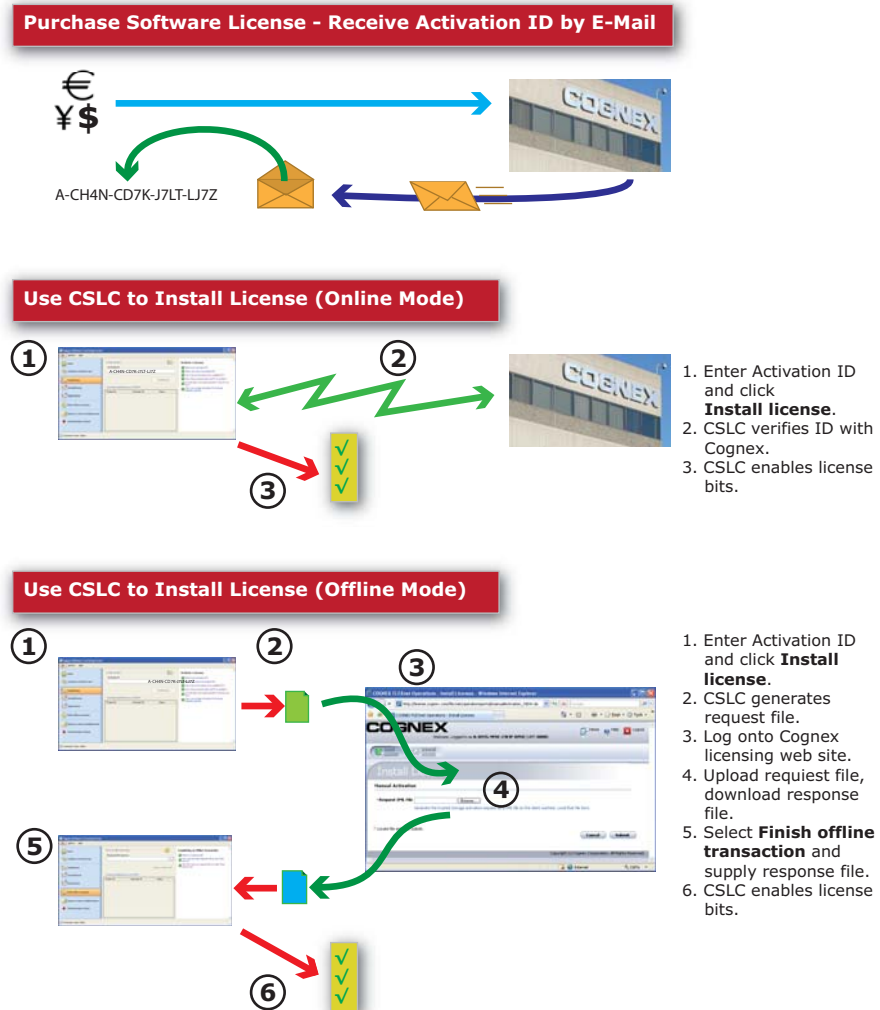


Figure 1. Software licensing overview

Installing a Software License

Start by locating your Activation ID. You should have received this ID (a coded sequence of characters) by e-mail when you purchased CVL. If you cannot locate your Activation ID, contact Cognex at **product_services@cognex.com**.

Next start the Cognex Software Licensing Center (CSLC) by selecting Cognex->CVL->Cognex Software Licensing Center from the Start menu.

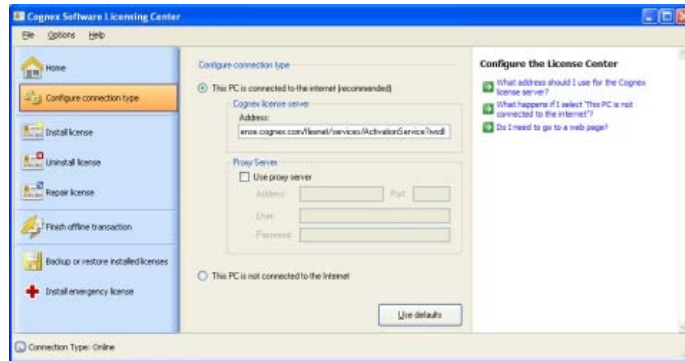


Figure 2. CSLC main screen

Note The CSLC provides on-line user assistance for each action on the right side of the CSLC window. For additional information on software licenses, refer to this embedded on-line information.

If your PC is connected to the internet, simply click on the Install license step, enter the Activation ID, and click Install license. If your PC is not connected to the internet, click on Configure connection type and select This PC is not connected to the internet before you enter the Activation ID. The CSLC will prompt you to save a transaction file, which you upload at the Cognex licensing web site (<http://license.cognex.com/flexnet/operationsportal/logon.do>). After uploading the transaction file, download the response file, restart the CSLC, click on the Finish offline transaction step, and supply the response file.

After you complete the installation process, the Currently installed licenses list should show the license, and running Cogtool.exe should show the correct bits enabled.

Note A single Activation ID may be used to install licenses on multiple PCs, as long as the same product configuration is being installed on each PC. When you purchase a software license from Cognex, you will receive a single Activation ID for each product type that you buy. As you install licenses on individual PCs, the CSLC tracks the number of installations made with the Activation ID.

Managing Software License

The CSLC makes it easy to manage software license on your PC. Table 8 describes some of the things that you can do with the CSLC.

Task	Notes
Moving a License to a new PC	You can move a license from one PC to another by first uninstalling the license from the source PC by clicking on the Uninstall license step, then installing the license on the new PC.
Repairing a Broken License	If you make changes to the PC's configuration, such as adding memory, swapping expansion cards, or adding a disk drive, the Cognex Software Licensing Service may invalidate the license on that PC. You can repair a broken license using the CSLC by clicking on the Repair license step. Note: License repairs can only be performed as offline tasks. You can temporarily enable a software license by installing an emergency license using the CSLC (click on the Install emergency license step). Emergency licenses are valid for 3 days, and a limited number of emergency licenses are available for each PC. Installing an emergency license allows you to keep your system running while you are processing the offline license repair transaction. You can prevent broken licenses by uninstalling the license before making the PC configuration changes, then reinstalling it after the changes are complete.
Replacing System Disks	If you need to replace your PCs system disk because it has failed, you can simply restore the disk image using any backup software and the license on the restored disk should be valid, as long as the following are true: •The backup image was created on the same PC that you are restoring •The backup image was created after the license was installed •You have not made any other configuration changes to the PC since the backup was created If you wish to use a single disk image ("cookie") to restore multiple PCs, then you must use the CSLC to create individual license backup files for each licensed PC. You do this using You do this using the Backup or restore installed licenses step.

Table 8. Managing software licenses

Using a Dongle

A dongle (sometimes called a security key) is a hardware device that you attach to your PC's parallel port or USB port. A CVL-based application can then verify the licensing of CVL vision tools by checking the licensing data programmed into the dongle, as an alternative to checking the security information in a Cognex frame grabber.

Time-limited dongles expire after a set period of time programmed into the dongle. CVL provides APIs that enable a reminder service to warn you of an impending expiration date and allow you to extend the expiration date.

Dongle security is managed by the Cognex Security Service, a Windows service that is automatically installed when you install the Cognex Drivers package. The Cognex Drivers package also installs all of the driver files required by all supported dongle types.

See Installing 32-bit Device Drivers on page 42 for information on installing and uninstalling the dongle drivers and the Cognex Security Service.

Extension of Time-Limited Dongles

Time-limited dongles are programmed to expire after a specified time limit, usually one year. The expiration date of a time-limited dongle can be extended, without returning it to Cognex. Contact Cognex Technical Support if you need a dongle's expiration date extended.

To extend a dongle's expiration date, you must give Technical Support the serial number and upgrade code programmed into your dongle. You can display the serial number and upgrade code with the Cogtool utility. In a DOS command prompt window, type the following command:

```
cogtool --print | more
```

The dongle responds with information like the following:

```
Board 0 - Cognex Security Key v3
Serial Number: nnnnnnnn
Upgrade Code: TR5
State: Active
Time Remaining: 363 days 0 hours
Battery: ok
Host Tools Enabled:
...
```

Supply the serial number and upgrade code from the second and third lines to Cognex Technical Support. They can then provide instructions on extending the expiration date of your dongle.

Installing CVL 7.0 Software

This section describes how to install CVL 7.0 software.

Notes

One installation DVD-ROMs is provided for both 32-bit operating systems and 64-bit operating systems.

If the installer detects an older installed CVL version it displays a message instructing you to uninstall CVL before attempting this installation. Remove the existing version of CVL and try again.

If the installer detects that the CVL version you are now installing is already installed, the InstallShield Wizard displays a screen with the choices **Modify**, **Repair** and **Remove**. Follow the on-screen instructions.

1. Insert your release DVD-ROM and follow the on-screen instructions.
2. Follow the on-screen prompts through the **Preparing...**, **Welcome...** and **License Agreement** screens.
3. On the **Setup Type** screen, select one of the following:
 - Select **Complete** to install all files required to develop CVL applications with the supported Microsoft Visual C++ versions, all Cognex online documentation and CVL sample code.
 - Select **Custom** to choose MSVS C++ .NET 2005, MSVS C++ 2008, or MSVS C++ 2010 as your CVL development environment, and whether to include or exclude Cognex online documentation, CVL sample code and CVL deployment-only files.

Choosing Custom leads to the **Custom Setup** dialog where you can choose the features you wish to install. Browse through the displayed tree and choose the features you wish to install. Note that an **X** next to a feature indicates it will NOT be installed.
4. The **Ready to Install the Program** dialog gives you a chance to review what will be installed. Click **Back** to review or change your selections, or click **Install** to install CVL.
5. The **Installing Cognex CVL 7.0** screen displays while the software is being installed.
6. When the installation is complete the **InstallShield Wizard Complete** screen appears. By default, the box in this screen is checked to launch the Cognex driver installer and the Cognex Software Licensing Center (CSLC). (See Installing 32-bit Device Drivers on page 42 and Installing the Cognex Software Licensing Center (CSLC) Silently on page 49). Uncheck the box(es) if you do not wish to install the drivers or the CSLC. Click **Finish** to proceed.

There is no need to reboot your PC after installing CVL.

Uninstalling CVL Software

To uninstall CVL use the **Add or Remove Programs** control panel (Windows XP) or **Programs and Features** control panel (Windows 7). Find the CVL version to remove in the program list and click on it to highlight and expand it. Click on **Remove** to uninstall it. You must uninstall the Cognex Drivers and Cognex Software Licensing Center separately.

Installing CVL Silently

It is possible to install CVL unattended, without the need for operator intervention to click on screen dialog buttons. This is known as silent operation. Note that when you install CVL silently, if you wish to also install Cognex device drivers silently a separate operation is required. For information on installing Cognex device drivers silently, see [Installing 32-bit Device Drivers Silently](#) on page 44.

■ CVL 7.0 Notes

The CVL silent install is run from a DOS prompt command line. Arguments you include on the command line name CVL features you wish to install. These are the same features you see in the screen dialog of an interactive Custom install. See **Setup Type** on page 38. These features are summarized in Table 9 (for the 32-bit installer) and Table 10 on page 41 (for the 64-bit installer).

Command line argument	Defaults	Screen dialog names
gigecfg	✓	GigE Vision Configuration Tool
devvc80	✓	Visual Studio C++ 2005 Development Files
devvc90	✓	Visual Studio C++ 2008 Development Files
devvc100	✓	Visual Studio C++ 2010 Development Files
docsw	✓	CVL Developer Manuals
dochw	✓	Acquisition Hardware Manuals
sample	✓	Sample Code
dplvc80a		Visual Studio C++ 2005 ANSI ¹
dplvc80u		Visual Studio C++ 2005 UNICODE ¹
dplvc90a		Visual Studio C++ 2008 ANSI ¹
dplvc90u		Visual Studio C++ 2008 UNICODE ¹
dplvc100a		Visual Studio C++ 2010 ANSI ¹
dplvc100u		Visual Studio C++ 2010 UNICODE ¹

Note 1: Deployment-only files

Table 9. CVL installation Features (32-bit installer)

Command line argument	Defaults	Screen dialog names
gigecfg	✓	GigE Vision Configuration Tool
dev80x64	✓	Visual Studio C++ 2005 x64 Development Files
dev90x64	✓	Visual Studio C++ 2008 x64 Development Files
dev100x64	✓	Visual Studio C++ 2010 x64 Development Files
docsw	✓	CVL Developer Manuals
dochw	✓	Acquisition Hardware Manuals
sample	✓	Sample Code
dpl80a64		Visual Studio C++ 2005 x64 ANSI ¹
dpl80u64		Visual Studio C++ 2005 x64 UNICODE ¹
dpl90a64		Visual Studio C++ 2008 x64 ANSI ¹
dpl90u64		Visual Studio C++ 2008 x64 UNICODE ¹
dpl100a64		Visual Studio C++ 2010 x64 ANSI ¹
dpl100u64		Visual Studio C++ 2010 x64 UNICODE ¹

Note 1: Deployment-only files

Table 10. CVL installation Features (64-bit installer)

To run a silent install, execute setup.exe located in the root directory of your CVL release DVD-ROM. For example:

```
setup /s /v"/qn ADDLOCAL=dpl80a64,dpl80u64
      INSTALLDIR="c:\Program Files\Cognex\CVL\""
```

This command installs CVL into the `c:\Program Files\Cognex\CVL` directory. You can install it in another directory if you wish by changing the Path in the above command line.

Following **ADDLOCAL=** is a comma-separated list (with no spaces) of the features you wish to install. These must be names from the left-hand column of Table 9 (32-bit) and Table 10 (64-bit). If you omit **ADDLOCAL=** the installer installs the defaults which are the same as the defaults used in the interactive installation when you choose a **Complete** install. These defaults are shown in Table 9 and Table 10.

To install all features, use **ADDLOCAL=ALL**.

Note that the path you specify following **INSTALLDIR** must be enclosed with quotes if there are any spaces in the path name.

Uninstalling CVL 7.0 Silently

To uninstall CVL 7.0 silently run the following command from a DOS command line prompt.

```
setup/s /v"/qn REMOVE=ALL"
```

Installing 32-bit Device Drivers

This section describes installing the 32-bit Cognex Drivers 4.1 package for CVL 7.0. After installing CVL the installer dialog gives you the option to run the drivers installer. If you install both VisionPro and CVL on the same PC you need run the drivers installer only once. Note that on PCs with both CVL and VisionPro installed, you should not uninstall the drivers unless you are uninstalling both CVL and VisionPro.

Running the 32-bit Cognex Drivers Installer

The final dialog screen of the CVL 7.0 install includes a check box labeled **Launch Cognex Driver Installer** which is checked by default. The recommended procedure is to leave the box checked which will then automatically start the Cognex Drivers installer which installs device drivers.

When you run the Cognex Drivers installer, follow these steps:

1. The **Welcome** screen displays. Click **Next**, click **I accept...**, and **Next** again to display the **Setup Type** screen.
2. If while starting, Windows XP detects new hardware (your frame grabber or adapter) it displays the **Files Needed** dialog. Click **Cancel** to skip this dialog. Do not use this method to install the drivers.
3. On the **Setup Type** screen, select **Complete** to install the security device drivers.
4. The **Installing Cognex Drivers** screen displays while the drivers are being installed.
5. When the installation is complete the **InstallShield Wizard Complete** screen appears. Click **Finish** to proceed.

There is no need to reboot your PC after installing device drivers.

Cognex Reminder Service

The Reminder Service's only function is to display a warning dialog when it detects a time-limited dongle with an upcoming expiration date. Warning dialogs are displayed when the development dongle has 30 days remaining, and again when there are 10 and 5 days remaining, and warns that the dongle has expired after 0 days remain.

To disable the Cognex Reminder Service, follow these steps:

1. Right click on **My Computer** (Windows XP) or **Computer** (Windows 7) in the Windows **Start** menu and select **Manage...**
2. Expand the **Services and Applications** item in the **Computer Management** window and click on **Services**.
3. Locate and select the entry for **Cognex Reminder Service** in the right-hand pane.
4. Right-click and select **Properties** from the pop-up menu.
5. In the **General** tab of the **Properties** window, set the **Startup Type** to **Disabled**.
6. Click **OK** and close the **Computer Management** window.

Installing the 32-bit Cognex Drivers Manually

If you did not launch the drivers installer after installing CVL 7.0, or if you later add hardware such as an IEEE 1394b adapter, you will need to run the driver installer manually. To do this, double click on the file setup.exe in the drivers subfolder of the setup32bit folder on your CVL release DVD-ROM.

Running the Cognex Drivers installer will cause one of the following to happen:

1. If an older set of drivers is installed a display asks you to uninstall them. Uninstall the drivers and try again. (Also, see Uninstalling the 32-bit Cognex Drivers below).
2. If the installer detects that the driver version you are now installing is already installed, the InstallShield Wizard displays a screen with the choices **Modify**, **Repair** and **Remove**. Follow the on-screen instructions. Also, see the following paragraphs for more about these options.

If you know that the drivers are currently installed and you wish to only make some driver changes or reinstall drivers, you do not need to uninstall the drivers. In this case go to the **Add or Remove Programs** control panel (Windows XP) or **Programs and Features** control panel (Windows 7), select **Cognex Drivers**, and click on **Change**. The installer starts and leads to a screen with the choices **Modify**, **Repair** and **Remove**. **Repair** causes the previously installed driver set to be reinstalled. This is most often used if you suspect a driver problem and want to reinstall the drivers. The Repair option proceeds with no intervention since there are no choices to make.

Remove will uninstall all of the Cognex drivers.

Notes

The installer may require you to insert your release DVD-ROM if it needs files that are not stored on your hard drive. You will be prompted to do so if necessary.

Uninstalling the 32-bit Cognex Drivers

To uninstall device drivers use the **Add or Remove Programs** control panel (Windows XP) or **Programs and Features** control panel (Windows 7). Find Cognex Drivers in the program list and click on it to highlight and expand it. Click on **Remove** to cause the device drivers to be uninstalled. The installer will then ask you to reboot, which is required.

Installing 32-bit Device Drivers Silently

It is possible to install device drivers unattended, without the need for operator intervention to click on screen dialog buttons. This is known as silent operation. You initiate a silent install from a DOS prompt command.

The silent Cognex Drivers installer runs from a DOS prompt command line. Arguments you include on the command line name device drivers you wish to install. These are the same drivers you see in the screen dialog of an interactive Custom install. See **Setup Type** on page 42.

The Cognex Drivers installer can install any or all of nine drivers. Each driver has an internal name that you must use in the command line when installing silently. These drivers are listed in the following table.

Command line argument ¹	Screen dialog names
_8100	MVS-8100M/C/M+ Driver
_8100D	MVS-8100D Driver
_8100L	MVS-8100L Driver
_8102	MVS-8102 Driver
_8504	MVS-8500/8500e Driver
_8600	MVS-8600 Driver
_dcam	IEEE 1394 DCAM FireWire Driver
_gige	Cognex GigE Vision Interface
_hasp	Dongle (Security Key) Driver

Command line argument ¹	Screen dialog names
<code>_sentinel</code>	Sentinel Dongle (Security Key) Driver

Note 1: Command line arguments are case sensitive.

To install the drivers silently, run the file `setup.exe` from the `drivers` subfolder of the `setup32bit` subfolder on the CVL release DVD-ROM. The `ADDLOCAL` command line option lets you specify the specific drivers to install. Specify `ADDLOCAL=ALL` to install all drivers.

```
setup /s /v" /qn ADDLOCAL= driver,driver,driver
                        INSTALLDIR=directory "
```

Note that the path you specify following `INSTALLDIR` must be enclosed with quotes if there are any spaces in the path name.

The following is an example, installing the HASP dongle driver:

```
setup /s /v" /qn ADDLOCAL=_hasp
                        INSTALLDIR="C:\Program Files\Cognex\Common\" "
```

Controlling the Cognex Reminder Service During Silent Install

If you install the Cognex Dongle driver, the Cognex Reminder Service installs and starts during silent installation. To prevent it from installing and starting, add the following setting to the command line: `SETREMINDERSERVICE=""`. For example:

```
setup /s /v" /qn ADDLOCAL=_hasp
                        INSTALLDIR="C:\Program Files\Cognex\Common\"
                        SETREMINDERSERVICE="" "
```

Uninstalling the 32-bit Device Drivers Silently

Use the following DOS command to uninstall silently all Cognex frame grabber drivers:

```
setup/s /v"/qn REMOVE=ALL"
```

Note Be aware that on completion this command automatically reboots your PC.

Installing 64-bit Device Drivers

This section describes installing the 64-bit Cognex Drivers 4.1 package for CVL 7.0. The only 64-bit operating systems CVL 7.0 supports are the 64-bit editions of Windows 7; therefore, the instructions described in this section are for these operating systems. After installing CVL, the installer dialog gives you the option to run the drivers installer. If you install both VisionPro and CVL on the same PC you need run the drivers installer only once. Note that on PCs with both CVL and VisionPro installed, you should not uninstall the drivers unless you are uninstalling both CVL and VisionPro.

Running the 64-bit Cognex Drivers Installer

The final dialog screen of the CVL 7.0 install includes a check box labeled **Launch Cognex Driver Installer** which is checked by default. The recommended procedure is to leave the box checked which will then automatically start the Cognex Drivers installer which installs device drivers.

When you run the Cognex Drivers installer, follow these steps:

1. The **Welcome** screen displays. Click **Next**, click **I accept...**, and **Next** again to display the **Setup Type** screen.
2. On the **Setup Type** screen, select **Complete** to install the security device drivers.
3. The **Installing Cognex Drivers** screen displays while the drivers are being installed.
4. When the installation is complete the **InstallShield Wizard Complete** screen appears. Click **Finish** to proceed.

There is no need to reboot your PC after installing device drivers.

Cognex Reminder Service

The Reminder Service's only function is to display a warning dialog when it detects a time-limited dongle with an upcoming expiration date. Warning dialogs are displayed when the development dongle has 30 days remaining, and again when there are 10 and 5 days remaining, and warns that the dongle has expired after 0 days remain.

To disable the Cognex Reminder Service, follow these steps:

1. Right click on **Computer** in the Windows **Start** menu and select **Manage...**
2. Expand the **Services and Applications** item in the **Computer Management** window and click on **Services**.
3. Locate and select the entry for **Cognex Reminder Service** in the right-hand pane.
4. Right-click and select **Properties** from the pop-up menu.
5. In the **General** tab of the **Properties** window, set the **Startup Type** to **Disabled**.

6. Click **OK** and close the **Computer Management** window.

Installing the 64-bit Cognex Drivers Manually

If you did not launch the drivers installer after installing CVL 7.0, or if you later add hardware such as an IEEE 1394b adapter, you will need to run the driver installer manually. To do this, double click on the file setup.exe in the drivers subfolder of the setup64bit folder on your CVL release DVD-ROM.

Running the Cognex Drivers installer will cause one of the following to happen:

1. If an older set of drivers is installed a display asks you to uninstall them. Uninstall the drivers and try again. (Also, see Uninstalling the 32-bit Cognex Drivers below).
2. If the installer detects that the driver version you are now installing is already installed, the InstallShield Wizard displays a screen with the choices **Modify**, **Repair** and **Remove**. Follow the on-screen instructions. Also, see the following paragraphs for more about these options.

If you know that the drivers are currently installed and you wish to only make some driver changes or reinstall drivers, you do not need to uninstall the drivers. In this case go to the **Programs and Features** control panel, select **Cognex Drivers**, and click on **Change**. The installer starts and leads to a screen with the choices **Modify**, **Repair** and **Remove**. **Repair** causes the previously installed driver set to be reinstalled. This is most often used if you suspect a driver problem and want to reinstall the drivers. The Repair option proceeds with no intervention since there are no choices to make.

Remove will uninstall all of the Cognex drivers.

Notes

The installer may require you to insert your release DVD-ROM if it needs files that are not stored on your hard drive. You will be prompted to do so if necessary.

Uninstalling the 64-bit Cognex Drivers

To uninstall device drivers use the **Programs and Features** control panel. Find Cognex Drivers in the program list and click on it to highlight and expand it. Click on **Remove** to cause the device drivers to be uninstalled. The installer will then ask you to reboot, which is required.

Installing 64-bit Device Drivers Silently

It is possible to install device drivers unattended, without the need for operator intervention to click on screen dialog buttons. This is known as silent operation. You initiate a silent install from a DOS prompt command.

The silent Cognex Drivers installer runs from a DOS prompt command line. Arguments you include on the command line name device drivers you wish to install. These are the same drivers you see in the screen dialog of an interactive Custom install. See **Setup Type** on page 46.

The Cognex Drivers installer can install any or all of four drivers. Each driver has an internal name that you must use in the command line when installing silently. These drivers are listed in the following table.

Command line argument ¹	Screen dialog names
<code>_8504</code>	MVS-8500/8500e Driver
<code>_8600</code>	MVS-8600 Driver
<code>_gige</code>	Cognex GigE Interface for Cameras
<code>_hasp</code>	Dongle (security key) Driver
<code>_sentinel</code>	Sentinel Dongle (security key) Driver

Note 1: Command line arguments are case sensitive.

To install the drivers silently, run the file `setup.exe` from the drivers subfolder of the `setup64bit` folder on the CVL release DVD-ROM. The `ADDLOCAL` command line option lets you specify the specific drivers to install. Specify `ADDLOCAL=ALL` to install all drivers.

```
setup /s /v" /qn ADDLOCAL= driver,driver,driver
                        INSTALLDIR=directory "
```

Note that the path you specify following `INSTALLDIR` must be enclosed with quotes if there are any spaces in the path name.

The following is an example, installing the HASP dongle driver:

```
setup /s /v" /qn ADDLOCAL=_hasp
                        INSTALLDIR="C:\Program Files\Cognex\Common\" "
```

Controlling the Cognex Reminder Service During Silent Install

If you install the Cognex Dongle driver, the Cognex Reminder Service installs and starts during silent installation. To prevent it from installing and starting, add the following setting to the command line: `SETREMINDERSERVICE=""`. For example:

```
setup /s /v" /qn ADDLOCAL=_hasp  
INSTALLDIR="C:\Program Files\Cognex\Common\  
SETREMINDERSERVICE="" " "
```

Uninstalling the 64-bit Device Drivers Silently

Use the following DOS command to uninstall silently all Cognex frame grabber drivers:

```
setup/s /v"/qn REMOVE=ALL"
```

Note Be aware that on completion this command automatically reboots your PC.

Installing the Cognex Software Licensing Center (CSLC) Silently

You can silently install the Cognex Software Licensing Center (CSLC) by running the following command from the \cslc directory on the distribution DVD-ROM:

```
msiexec /i "Cognex Software Licensing Center.msi" /q
```

Note The command must appear on a single line.

Modifying an Existing CVL Installation

The CVL 7.0 installation program offers the ability to modify or repair an existing CVL 7.0 installation, or to remove the entire CVL 7.0 installation.

If you start the CVL setup program with CVL software already installed, the Welcome screen offers the following options:

- Select **Modify** to add or remove individual CVL features. The Modify option offers you the same choices as the Custom installation option during a first-time CVL installation.
- Select **Repair** to reinstall all CVL features installed by the previous setup.
- Select **Remove** to remove the entire CVL installation.

Compatibility Notes

This section describes compatibility issues related to the use of Cognex hardware and CVL 7.0 software.

64-bit Operating System Compatibility Issues

The AcuRead tool is not supported on 64-bit operating systems.

Microsoft Windows 7 Compatibility Issues

This section describes compatibility issues related to Microsoft Windows 7.

Legacy IEEE-1394 Driver Recommended

For IEEE-1394 (FireWire) cameras, Cognex recommends the use of the Legacy driver supplied with Windows 7, not the default driver. Using the default driver may cause acquisition failures, particularly if your application uses manual triggers and frequently enables or disables triggering.

To enable the legacy driver, follow these steps:

1. Open the **System** Control Panel and click on **Device Manager**.
2. Select your 1394 device from within the **IEEE 1394 Bus Host Controllers** node.
3. Right-click on the selected device and pick **Update Driver Software...**
4. Click **Browse my computer for driver software**.
5. Click **Let me pick from a list of device drivers on my computer**.
6. Select **1394 OHCI Compliant Host Controller (Legacy)**, then click **Next**

Note The Legacy driver only supports 1394(a) bandwidth (400 mbps).

Large Image Compatibility Issues

This section describes compatibility issues related to support for large images.

Affine Sampling Tool Interface Changed

In CVL 6.7 CR1 and earlier releases, the members used to specify the number of samples in the X- and Y-direction for the affine sampling tool

(**ccAffineSamplingParams::xNumSamples** and **ccAffineSamplingParams::yNumSamples**) were of type **c_Int16**.

In order to support sampling large images, in releases starting with CVL 6.7 CR3, the number of samples is stored using a **c_Int32** value.

The setter functions in **ccAffineSamplingParams** are simply changed to take a **c_Int32** value; this does not cause incompatibility with existing code because the C++ compiler promotes the 16-bit value to a 32-bit value. The getter functions, however, cannot be changed without becoming incompatible with existing code. CVL 6.7 CR3 added two new members to **ccAffineSamplingParams**:

- **ccAffineSamplingParams::xNumSamples32()** returns the number of samples in the X-direction.
- **ccAffineSamplingParams::yNumSamples32()** returns the number of samples in the Y-direction.

The existing getter functions that return 16-bit values are deprecated, and they will now throw an error if the number of samples is greater than or equal to 32768.

Not all Affine Sampling Modes Supported for Large Images

Only the following sampling modes are supported by the Affine Sampling Tool for input or output images with more than 32768 pixels in either the X- or Y-dimension:

- **ccAffineSamplingParams::eNone**
- **ccAffineSamplingParams::eBilinearAccurate**

The remaining modes (**eBilinearApprox**, **eHighPrecision**, and **eBilinear**) are not supported; if you specify one of the unsupported modes and either the input or output image has an X- or Y-dimension greater than 32768, the tool will throw an error.

Edge Tool Interface Changed to Support Large Images

CVL 6.7 CR1 and earlier releases, the Edge tool stored the whole-pixel locations of sub-pixel edges (edgelets) using 16-bit values. This meant that any edgelet that had whole pixel positions outside the range -32768 to +32767 could not be represented.

Starting with CVL 6.7 CR3, the Edge tool allows you to specify the storage method for edgelets.

- If you request `ccEdgeletDefs::eRequestContiguous`, the edgelets will be stored in a single contiguous block. If no edgelet has a whole-pixel location with an image X- or Y-coordinate outside the range -32768 through +32767, the edgelets are stored in a vector of **ccEdgelet** and accessed through **ccEdgeletSet::edges()**. If any edgelet has a whole pixel location with an image X- or Y-coordinate that is outside the range outside the range -32768 through +32767, the edgelets are stored in a vector of **ccEdgelet2** and accessed through **ccEdgeletSet::edges2()** or through the **ccEdgeletIterator** or **ccEdgeletIterator_const** classes obtained by calling **ccEdgeletSet::begin()**.
- If you request `ccEdgeletDefs::eRequestEdges2`, the edgelets are stored in a vector of **ccEdgelet2** and accessed through **ccEdgeletSet::edges2()** or through the **ccEdgeletIterator** or **ccEdgeletIterator_const** classes obtained by calling **ccEdgeletSet::begin()**.
- If you request `ccEdgeletDefs::eRequestEdgesAndOffsets`, the edgelets are stored in one or more separate blocks of memory, where each block contains an array of **ccEdgelet** objects and a pair of 32-bit offset specifiers. Edgelets are accessed using the **ccEdgeletIterator** or **ccEdgeletIterator_const** classes. You obtain one of these objects by calling **ccEdgeletSet::begin()**.

Multiple blocks are only used when at least one edgelet has a whole pixel location with an image X- or Y-coordinate that is outside the range outside the range -32768 through +32767. If only a single block is created, you can use both **ccEdgeletSet::edges()** and the **ccEdgeletIterator()** methods for accessing the set's edgelets.

Because the **ccEdgeletIterator** or **ccEdgeletIterator_const** classes obtained by calling **ccEdgeletSet::begin()** can be used to access edgelets regardless of the storage method, Cognex recommends that you use this interface.

CDB Files Created by Certain CVL and VisionPro Versions are Invalid

Any CDB or IDB files created using the IDBEdit program supplied with CVL 6.8 CR1, CVL 6.8 CR2, or VisionPro 6.0 are unreadable by the IDBEdit program supplied with earlier versions of CVL and VisionPro.

The IDBEdit program supplied with CVL 7.0 (and with VisionPro 6.1 or 6.2) can be used to repair invalid CDB or IDB files. Simply open the affected file using the newer IDBEdit program, then select **File->Save As...** and save it under a different name. The newly saved file is readable by all versions of IDBEdit.

CDB Files with Large Images are Not Compatible with Earlier CVL Releases

If you use a CVL application built with CVL 6.8 CR3 to save an image that is larger than 32768 pixels in either the X- or Y-dimension, attempts to load that image into a CVL application built using an CVL releases 6.7 CR1 and earlier will produce a 1x1 pixel image.

Development Environment Compatibility Issues

This section describes compatibility issues related to supported development environments.

CVL Libraries Built with Visual Studio 2005/2008 SP1 ATL Security Update

In July 2009, Microsoft released a pair of security updates for the ATL (Active Template Library) provided with Visual Studio 2005 SP1 and Visual Studio 2008 SP1. CVL 7.0 can be built using the updated versions of Visual Studio 2005 and 2008. Any application that you build using CVL 7.0 requires that the updated run-time files associated with the updates be present at application run time.

CVL 7.0 ships with the release-mode versions of these run-time files, which are installed for both development and deployment installations of CVL, but Microsoft does not allow Cognex to redistribute the Debug-mode versions of these files.

If you need to debug a CVL 7.0 application, you must install the Visual Studio 2005 SP1 Security Update (if you are using Visual Studio 2005) or the Visual Studio 2008 SP1 Security Update (if you are using Visual Studio 2008).

You can download the updates for both Visual Studio 2005 and 2008 here:

- <http://www.microsoft.com/technet/security/bulletin/MS09-035.mspx>

For more information, see these locations:

- <http://support.microsoft.com/kb/971090/> (Visual Studio 2005)
- <http://support.microsoft.com/kb/971092/> (Visual Studio 2008)

Edge and Blob Tools with Visual Studio 2008 on Multi-Core Systems

Under specific conditions, the Blob tool and the Edge tool may exhibit performance degradation when used in applications built with Visual Studio 2008. This problem also affects applications that use the CVL graphics list container class (**ccGraphicsList**).

Performance degradation, when compared with the same application built with Visual Studio 2005, is seen when **all** of the following conditions are true:

- The application is built using Visual Studio 2008.
- The application uses multiple threads.
- The application is running on a PC with multiple physical cores (multiple CPUs, a single multi-core CPU, or multiple multi-core CPUs).
- One of the affected tools (Edge, Blob, or graphic lists) is running simultaneously on multiple threads.

The problem may also occur when your application runs a combination of the affected tools on multiple threads (Blob on one thread, graphics lists on another thread, for example).

The performance degradation is strongly influenced by the number of cores in the system. For systems with only two physical cores, the performance impact may be minimal. For an eight-core system, the performance impact may be significant.

To avoid this issue, build your application using Visual Studio 2005. Alternatively, if you must use Visual Studio 2008, make sure that the affected tools do not run on multiple threads.

Device Driver Backward Compatibility

Device drivers supplied with CVL 7.0 are backward compatible with the versions listed in Table 11. Backward compatibility in this sense implies that the specified older CVL version will continue to operate when using the newer driver from this release.

Frame Grabber, Dongle, or Camera	Earliest CVL Version Compatible with 7.0 Driver (Windows XP)	Earliest CVL Version Compatible with 7.0 Driver (Windows 7)
MVS-8100L/M	CVL 6.0	CVL 6.8 CR3
MVS-8100D	CVL 6.0	CVL 7.0
MVS-8501 MVS-8504	CVL 6.6	CVL 6.8 CR3
MVS-8601 MVS-8602	CVL 7.0 CR1	CVL 7.0 CR1

Table 11. Device driver compatibility

Frame Grabber, Dongle, or Camera	Earliest CVL Version Compatible with 7.0 Driver (Windows XP)	Earliest CVL Version Compatible with 7.0 Driver (Windows 7)
MVS-8602e	CVL 7.0 CR1	CVL 7.0 CR1
MVS-8500Le MVS-8504e	CVL 6.6	CVL 6.8 CR3
IEEE-1394 DCAM	CVL 6.4 CR2	CVL 6.8 CR3
GigE Vision Performance Drivers	CVL 6.6	CVL 6.8 CR3
Dongles	CVL 6.5	CVL 6.8 CR3

Table 11. Device driver compatibility

■ CVL 7.0 Notes
