Cognex MVS-8000 Series

Getting Started

CVL 6.5
August 2007

Contents

Contents

CVL 6.5 Notes

This document describes release 6.5 of the Cognex Vision Library (CVL) software. CVL 6.5 supports a new hardware platform, the PCI Express MVS-8600e; a new operating system, Windows Vista; several new acquisition capabilities; and a number of new color vision tools.

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.

Note All of the features added in CVL version 6.5 are described in this document, *Getting Started*, and in the *CVL User's Guide*, *CVL Vision Tools Guide*, and *CVL Class Reference*.

About This Release

CVL 6.5 introduces the following new or improved features.

1. Support for the Windows Vista operating system
2. Authenticode signed device drivers for all Cognex hardware supported on Windows Vista
3. Support for the new MVS-8600e CameraLink frame grabber, which provides the following capabilities:
   - PCI express bus support
   - Medium-config camera support
   - Per-channel lookup tables
   - Improved encoder support (start-on-count, ignore backward encoder movement, selectable encoder count resolution)
4. 1394 bus reset notification. Your application can now get notification when the FireWire bus is reset due to devices being added or removed, cabling problems, or other events that affect the bus.
5. Color vision tools:
   - Color Segmenter tool providing color based segmentation using automatically selected soft thresholds
   - Color Match tool to classify colors based on color space distance
   - Composite Color Match tool to match color samples based on multi-pixel image analysis

Documentation Supplied With This Release

The changes included in CVL 6.5 affected information in chapters of the *CVL User's Guide, Vision Tools Guide* and *CVL Class Reference.* All of these documents have been updated for this release.

The *MVS-8600 Hardware Manual* has been updated to describe both the PCI MVS-8600 and the PCI Express MVS-8600e frame grabbers. This manual, and all other Cognex hardware documentation, is included with the release in PDF format.

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 CD-ROM. To access the online documentation, from the Windows Start menu, select **Programs** -> **Cognex Documentation and Tutorial**.

Table 1 lists the online documentation specific to this CVL 6.5 release.

Document	Format	Contains
Getting Started (this manual)	PDF	New features, system requirements, supported hardware, and software installation information
CVL 6.5 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 6.5 Supported Cameras	HTML	Cameras and video formats supported in this release.
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 1. Documentation specific to CVL 6.5

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-8100C/CPCI Hardware Manual* *MVS-8100D and CDC Cameras Hardware Manual* *MVS-8100L Hardware Manual* *MVS-8100M Hardware Manual* *MVS-8120 Hardware Manual* *MVS-8500 Hardware Manual* *MVS-8600/8600e Hardware Manual* *FIreWire Cameras (IEEE 1394 DCAM) User's Guide*	PDF	Electrical, mechanical, installation, and configuration information for Cognex MVS-8000 series hardware and FireWire cameras.

Table 1. Documentation specific to CVL 6.5

Note You can receive hard copy documentation only for the hardware you have ordered.

Supported Cameras and Video Formats

The list of supported cameras and video formats is found in the release-specific *Supported Cameras* table, as described in *Table 1 on page 7*.

Installing Adobe Acrobat

Most CVL documentation is delivered in Adobe Acrobat format on the CVL installation CD-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 CD-ROM.
2. Follow the on-screen prompts.

Single File Sample Code Installed with This Release

CVL ships with sample code in two forms:

- Small example applications, complete with their own Visual C++ project file.

- Single file code samples designed to be plugged into the example framework provided by *%VISION_ROOT%\sample\cvl\cvlmain.cpp*. For instructions on using these sample files, see *Using the Single Code File Samples* in chapter 1 of the *CVL User's Guide*.

The sample code files are installed in *%VISION_ROOT%\sample\cvl*. Table 2 lists each single file sample code installed with this release of CVL and the topics each one illustrates.

Sample Code File	Description
acq8100d.cpp	Shows how to enumerate multiple cameras attached to an MVS-8100D frame grabber and list its supported video formats.
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
acq8600leinescan.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. Replaces the **acq1**, **acq2**, **acq3**, **acq4**, **acq5**, and **acqcvm4** samples shipped with CVL 6.0 and earlier.
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.
acusymbl.cpp	Shows how to use the 2D symbol classes.

Table 2. CVL single file code samples for this release

Sample Code File	Description
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.
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.
caliper.cpp	Shows how to use the Caliper tool.

Table 2. CVL single file code samples for this release

Sample Code File	Description
cdb.cpp	Shows how to use the image database.
circfit.cpp	Shows how to use the Circle Finder tool to find a circle.
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\cvl\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 Cognex generic 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).

Table 2. CVL single file code samples for this release

Sample Code File	Description
diag.cpp	Shows how to use the diagnostic recording classes with CNLSearch.
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**.
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.
gausmpl.cpp	Shows how to use the Gaussian Sampling tool.
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.
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.
pdf417.cpp	Shows how to use the PDF417 OCR tool.
pelbuf.cpp	Shows how to work with images (pel buffers).

Table 2. CVL single file code samples for this release

Sample Code File	Description
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.
pmalign1.cpp	Shows how to use the PatMax/Align tool.
pmalign2.cpp	Shows how to use the PatMax/Align tool with synthetic training.
pmalign3.cpp	Shows how to use interactive mouse-manipulable shapes to define a model for PatMax.
pmalign4.cpp	Shows how to import synthetic models from DXF-format CAD files for use with PatMax.
pmalign5.cpp	Shows how to use CVL shapes code to draw a synthetic model for use with PatMax.
pmalignf.cpp	Demonstrates outside region threshold PatMax, with full scene usage
pmalignh.cpp	Shows how to use High Sensitivity PatMax
pmaligno.cpp	Demonstrates outside region threshold PatMax
pmismpl.cpp	Shows how to use the PatInspect tool to train a pattern and do image difference calculations.
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.

Table 2. CVL single file code samples for this release

Sample Code File	Description
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 2. CVL single file code samples for this release

Supported Hardware

This section describes the Cognex hardware configurations that CVL 6.5 supports.

Cognex Frame Grabbers

CVL 6.5 supports the following Cognex frame grabbers:

- MVS-8100C
- MVS-8100D
- MVS-8100L
- MVS-8100M
- MVS-8100M+
- MVS-8102
- MVS-8120 with CVM1, CVM4, CVM6, CVM9, or CVM11
- MVS-8501
- MVS-8504
- MVS-8601
- MVS-8602
- MVS-8601e
- MVS-8602e
- FireWire (IEEE 1394 DCAM) Cameras as listed in the *CVL 6.5 Supported Cameras* table

Multiple CPU Systems and Multi-core processors

CVL 6.5 supports multi-CPU systems and multi-core processors for all supported operating systems and hardware configurations. (See *Operating System Requirements* on page 20).

Dual-Board Configurations

CVL 6.5 supports the dual-board combinations marked in Table 3 for all supported operating systems.

	8100M	8100M+	8100L	8100C	8100D	8120/CVM1	8120CVM/4	8120/CVM6	8120/CVM9	8120/CVM11	8501	8504	FireWire	8601	8602	8601e	8602e
8100M	Y	Y	Y	Y	Y	Y	N	N	N	Y	N	N	N	N	N	N	N
8100M+		Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
8100L			Y	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
8100C				Y	N	Y[1]	N	N	N	N	N	N	N	N	N	N	N
8100D					Y	N	N	N	N	N	N	N	N	N	N	N	N
8120/CVM1						Y	N	Y	Y	Y	N	N	N	N	N	N	N
8120/CVM4							Y	N	N	N	N	N	N	N	N	N	N
8120/CVM6								Y	N	N	N	N	N	N	N	N	N
8120/CVM9									Y	N	N	N	N	N	N	N	N
8120/CVM11										N	N	N	N	N	N	N	N
8501											Y	Y	Y	Y	Y	Y	Y
8504												Y	Y	Y	Y	Y	Y
FireWire													Y	Y	Y	Y	Y
8601														Y	Y	Y	Y
8602															Y	Y	Y
8601e																Y	Y
8602e																	Y

[1] Simultaneous use of an MVS-8120/CVM1 and MVS-8100C may be problematic on certain Gateway Pentium II systems. If you encounter problems using this configuration, contact Cognex Technical Support.

Table 3. Dual-board frame grabber combinations supported

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:

- The motherboard's chipset must be compliant with the PCI specification, version 2.1 or later. Motherboards manufactured after 1997, that support Pentium/MMX or later processors, are known to be compliant.

Note The PCI 2.3 specification establishes the removal of support for 5 volt PCI cards. The MVS-8100, MVS-8100M, MVS-8100M+, MVS-8100C, MVS-8100C/CPCI, and MVS-8100L are 5 volt-only cards and are not compatible with PCI 2.3-compliant motherboards.

- The processor must be an Intel Pentium III, Pentium 4, or Xeon, or an AMD K6-III or Athlon. Intel-compatible processors not in this list may work, but have not been tested by Cognex.
- The minimum supported processor speed is 500 MHz (1 GHz for Windows Vista).
- The host PC must run a Windows operating system that supports the Cognex frame grabber you will use, as described under *Operating System Requirements* on page 20.
- To install the CVL software, the host PC must have a CD-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 7.0 or later for Windows 2000, and DirectX 8.1 or later for Windows XP.

- Video card recommendations are discussed in *Video Card Requirements* on page 19.

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 4 on page 19.
- 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 2000 and XP default 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.

  For more information, see the following articles from Microsoft's knowledge base:

  - The first article discusses how to tell if bus-mastering is already enabled for Windows 2000:
    http://support.microsoft.com/support/kb/articles/Q247/4/26.ASP
  - The second article says that UltraDMA disks (ATA/33 and above) are not supported until Windows NT 4.0 Service Pack 4 or later:
    http://support.microsoft.com/support/kb/articles/Q164/3/78.ASP
- By default, Windows 2000, and XP allow 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 4 on page 19, 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 17. If your application requires extensive use of live display for multiple cameras, or uses overlay graphics, more video memory is strongly recommended.

Table 4 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.

Table 4. Video card general recommendations

Video Card Feature	Recommendations
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.
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 4. Video card general recommendations

Operating System Requirements

CVL 6.5 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 2000 SP4 and Windows 2000J SP4
- Windows 2000 Server and Windows 2003 Server
  (for quad cpu support)
- Windows XP SP2 and Windows XP-J SP2
  (32-bit editions only for Home and Professional)
- Windows XP SP2
  (32-bit edition only for Home and Professional with Intel hardware DEP support)
- Windows XP Embedded, 32-bit edition
- Windows Vista
  (32-bit editions only for Home Basic, Home Premium, Business, and Ultimate)

CVL 6.5 does not support any 64-bit Windows operating system, and it does not support any version of Windows NT, Windows 95, Windows 98, or Windows ME.

For Windows 2000 and Windows XP operating systems, CVL 6.5 supports the version of DirectX packaged with the OS/SP versions mentioned above, up to and including DirectX version 9.0c. Cognex will not redistribute DirectX version 9.0c if it is not already present on the host PC.

For Windows Vista, CVL 6.5 supports the version of DirectX packaged with the OS/SP versions mentioned above, up to and including DirectX version 10. Cognex will not redistribute DirectX version 10 if it is not already present on the host PC.

CVL 6.5 supports PCs with hardware enabled DEP using Intel chipsets.

Locale Support

CVL 6.5 was tested with the following locales:

- US English
- German
- Japanese

Windows XP Embedded Components

This section lists the major Windows XP Embedded components needed to support CVL application with MVS-8000 series hardware. An exact list of XP Embedded subsystems cannot be predicted, since it is dependent on the requirements of your hardware platform and CVL application. For example:

- If your application uses serial I/O, you would need to include the Communications Port component.
- To provide end-users of your XP Embedded platform the ability to install from a CD-ROM, include the CD-ROM Drive and CDFS components.

The Windows XP Embedded components generally required by CVL are as follows:

- C Run-time Library
- Class Installers
- CodePage support
- Core Networking
- Fonts
- GUI Based Format Common Libraries
- I/O Error Log Messages
- Keyboard
- PnP (Kernel-mode)
- PnP (User-mode)
- Programmable interrupt controller
- TCP/IP Networking

- Device Manager
- DirectDraw
- DirectDrawEx
- Disk drive
- FAT or NTFS
- Microsoft Visual C++ Run Time
- Networking
- Numeric data processor
- PCI bus
- Plug and Play Software Device Enumerator
- User Locale
- Win32 APIs
- Windows Sockets
- Windows subsystem

Service Pack Requirements

CVL 6.5 has been tested against the service pack or release levels of the Microsoft products shown in Table 5. 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.

Product	Service Pack or Release Level Supported
Microsoft Dev Studio 6.0 MASM 6.14	Service Pack 6 Unicode versions of the MFC libraries may be required to run some CVL samples in the default mode, as described in the next section.
Visual Studio .NET 2003 v7.1 MASM 7.1	Service Pack 1
.NET Framework 1.1	Service Pack 1
Visual Studio 2005 v8.0 MASM 8.0	Service Pack 1 SP1 Update for Windows Vista supported on WIndows Vista
.NET Framework 2.0	No service pack

Table 5. Service pack release levels supported by CVL 6.5

Notes

Since CVL 6.5 is an unmanaged SDK it only supports applications built with MSVC 2003 and MSVC 2005 in unmanaged applications. CVL 6.5 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 6.5 software. For information about installing hardware, refer to the hardware manual for your Cognex frame grabber or adapter.

Coexistence with VisionPro

VisionPro is a complete vision application development environment provided by Cognex. CVL 6.5 can coexist with VisionPro 4.4 and later versions on the same host PC. You can install and uninstall either product separately without interfering with the other installation. Vision tools are licensed for each product separately.

Device Drivers

CVL and VisionPro use the same device drivers which are installed by *Cognex Drivers 2.4*, a separate installer program you run. After installing either CVL or VisionPro, the installer displays 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.

Note If you are upgrading an existing CVL or VisionPro installation and you are using an MVS-8600 or any Cognex dongle (security key), you must uninstall the existing drivers and install *Cognex Drivers 2.4*. Cognex recommends that all users install the Cognex Drivers supplied with the software release they are installing.

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 17.
- When installing CVL under Windows 2000, Windows XP, or Windows Vista, 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 and Cognex Drivers before installing the current version. You uninstall the software using **Add/Remove Programs** (**Programs and Features** on Windows Vista) in the Windows Control Panel, as described further in *Uninstalling CVL Software* on page 27 and *Uninstalling Cognex Drivers* on page 32.

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 2.4* package. The Cognex Drivers package also installs all of the driver files required by all supported dongle types.

See *Installing Device Drivers* on page 29 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 6.5 Software

This section describes how to install CVL 6.5 software.

Note Make sure the **PnP** option in the BIOS setup is set to **No**.

1. Power on the PC and start Windows 2000, Windows XP, or Windows Vista.
2. If while starting, Windows detects new hardware (your frame grabber or adapter) it displays a **Files Needed** dialog. Click **Cancel** to skip this dialog. Do not use this method to install the MVS-8000 drivers.
3. Insert your release CD-ROM and follow the on-screen instructions.

Notes

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.

4. Follow the on-screen prompts through the **Preparing**..., **Welcome**... and **License Agreement** screens.
5. 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++ 6.0, MSVS C++ .NET 2003 or MSVS C++ 2005 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.

6. 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.
7. The **Installing Cognex CVL 6.5** screen displays while the software is being installed.
8. 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. (See *Device Drivers* on page 24 and *Installing Device Drivers* on page 29). Uncheck the box if you do not wish to install the drivers. Click **Finish** to proceed.

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

Uninstalling CVL Software

To uninstall CVL use Windows **Control Panel->Add or Remove Programs** (**Programs and Features** on Windows Vista). 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.

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 Device Drivers Silently* on page 32.

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 26. These features are summarized in the table below.

Command line argument	Defaults	Screen dialog names
devvc60	✓	Visual Studio C++ 6.0 Development Files
devvc71	✓	Visual Studio C++ .NET 2003 Development Files
devvc80	✓	Visual Studio C++ 2005 Development Files
docsw	✓	CVL Developer Manuals
dochw	✓	Acquisition Hardware Manuals
sample	✓	Sample Code
dplvc60a		Visual Studio C++ 6.0 ANSI[1]
dplvc60u		Visual Studio C++ 6.0 UNICODE[1]
dplvc71a		Visual Studio C++ .NET 2003 ANSI[1]
dplvc71u		Visual Studio C++ .NET 2003 UNICODE[1]
dplvc80a		Visual Studio C++ 2005 ANSI[1]
dplvc80u		Visual Studio C++ 2005 UNICODE[1]

Note 1: Deployment-only files

Table 6. CVL installation Features

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

```
setup /s /v"/qn ADDLOCAL=dplvc80a,dplvc80u
                    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 6 on page 28. 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 6 also.

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 6.5 Silently

To uninstall CVL 6.5 silently run the following command from a DOS command line prompt.

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

Installing Device Drivers

This section describes using *Cognex Drivers 2.4*, to install device drivers for CVL 6.5 and VisionPro 4.4. CVL. After installing either CVL or VisionPro 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 Cognex Drivers Installer

The final dialog screen of the CVL 6.5 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 2.4* installer which installs device drivers.

When you run *Cognex Drivers 2.4*, 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 2000, Windows XP, or Windows Vista 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 one of the following:

   - Select **Complete** to install all device drivers except the MVS-8102 device driver. The list of device drivers installed by default is shown below:.

MVS-8100 Driver	MVS-8501/8504 Driver
MVS-8100D Driver	MVS-8601/8602/8601e/8602e Driver
MVS-8100L Driver	IEEE 1394 DCAM FireWire Driver
MVS-8120 Driver	Dongle (Security Key) Driver
	Sentinel Dongle (Security Key) Driver

     Click on **Next** to accept the defaults.

   - Select **Custom** to choose only the specific drivers you wish to install.

     Choosing **Custom** and **Next** leads to the **Custom Setup** dialog where you can browse through the displayed list and choose the drivers you wish to install. Note that an **X** next to a driver indicates it will NOT be installed. Also note that the MVS-8102 is not selected, by default.

     The default install path for the driver files is C:\Program Files\Cognex\Common. To change the path, click the **Change**… button on the right. The driver files install into the fixed directory *Drivers* below the "Install to:" path.

     Click **Next** to install the drivers you have selected. If you have chosen to install the Dongle (Security Key) Driver, when you click **Next** the installer displays a dialog describing the Cognex Reminder Service and allows you to choose whether or not to install the service. For a description of this service see *Cognex Reminder Service* below.

4. The **Ready to Install the Program** dialog gives you a chance to review your selection of the drivers that will be installed. Click **Back** to review or change your selections, or click **Install** to install the device drivers.

5. The **Installing Cognex Drivers 2.4** screen displays while the drivers are being installed.

Note The Windows XP SP2 operating system IEEE 1394 FireWire bus drivers, as shipped by Microsoft, block full speed operation of the IEEE 1394b adapter. The Cognex drivers installer provides you with a solution which is to downgrade the Windows XP SP2 IEEE 1394 bus driver files to the Windows XP SP1 versions. If you are:

- installing onto a Windows XP SP2 system,

- and have an IEEE 1394b adapter installed,

- and are installing the Cognex IEEE 1394 DCAM FireWire Driver

then the device driver installer will detect this condition and display a dialog box asking if you want to downgrade the Windows XP SP2 IEEE 1394 bus driver files. We recommend that you click *Downgrade* so that your IEEE 1394b DCAM FireWire camera will operate at full speed.

6. 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. You can disable the service with the following steps, which apply to Windows 2000 and XP:

1. In the Windows Control Panel, open **Administrative Tools**.
2. In the **Administrative Tools** control panel, open **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 **Services** window.

Installing Cognex Drivers Manually

If you did not launch the drivers installer after installing CVL 6.5, 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* folder on your CVL release CD-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 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/Remove Programs** (**Programs and Features** on Windows Vista) dialog, selecting **Cognex Drivers 2.4**, and clicking 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.

Modify allows you to add or remove drivers from the current driver set. This is most often used to add a driver when installing a new frame grabber or adapter. If you have already installed an IEEE 1394b adapter you may be prompted to downgrade the Windows bus driver. Click on *Downgrade* if this happens. (For more information see the note on page 30).

Remove will uninstall all of the Cognex drivers.

Notes

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

Uninstalling Cognex Drivers

To uninstall device drivers use Windows **Control Panel->Add or Remove Programs** (**Programs and Features** on Windows Vista). 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 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 2.4* 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 30.

The Cognex Drivers 2.4 installer can install any or all of ten 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-8100 Driver
_8100D	MVS-8100D Driver
_8100L	MVS-8100L Driver
_8102	MVS-8102 Driver
_8120	MVS-8120 Driver
_8504	MVS-8501/8504 Driver
_8600	MVS-8601/8602/8601e/8602e Driver
_dcam	IEEE 1394 DCAM FireWire Driver
_hasp	Dongle (Security Key) Driver
_sentinel	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* folder on the CVL release CD-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 MVS-8100 and MVS-8100D drivers:

```
setup /s /v" /qn ADDLOCAL=_8100,_8100D
          INSTALLDIR=\"C:\Program Files\Cognex\Common\" "
```

Note When you install device drivers silently, if you are:

- installing onto a Windows XP SP2 system,
- and have an IEEE 1394b adapter installed,

- and are installing the Cognex IEEE 1394 DCAM FireWire Driver

then the device driver installer will automatically (and silently) downgrade the Windows XP SP2 IEEE 1394 bus driver to the SP1 version. See the note on page 30.

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 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.

Note on Installing Windows Drivers

You should be aware of the following point regarding the installation of device drivers under Windows 2000, Windows XP, or Windows Vista: It is valid to install a newer version of a driver for an older product. The Windows PnP manager always attempts to install the latest driver. To determine the latest driver, the PnP manager compares the version information stored in the cached *<driver>.inf* file and the one you are attempting to install. If it finds that the cached version is newer, it will install that version.

Modifying an Existing CVL Installation

The CVL 6.5 installation program offers the ability to modify or repair an existing CVL 6.5 installation, or to remove the entire CVL 6.5 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 6.5 software.

Device Driver Backward Compatibility

Device drivers supplied with CVL 6.5 are backward compatible with the versions listed in Table 7. Backward compatibility in this sense implies that the specified older CVL version will continue to operate when using the newer driver from this release.

Cognex Frame Grabber	Earliest CVL Version with Compatible Driver
MVS-8100L/D/M/M+ MVS-8120	CVL 6.0
MVS-8501 MVS-8504	CVL 6.1
MVS-8102	CVL 6.2
MVS-8601 MVS-8602 MVS-8601e MVS-8602e Dongles	CVL 6.5 (this release)

Table 7. Device driver compatibility

Note The earliest CVL version for all platforms on Windows Vista is CVL 6.5 (this release).

MVS-8500 Compatibility Issues

This section describes compatibility issues that affect the use of the MVS-8500.

Contrast and Brightness Settings on MVS-8500

Contrast and brightness settings are made in CVL with functions of the **ccContrastBrightnessProp** class. The same settings used on other Cognex frame grabbers will have different effects on the MVS-8500 series. This is because the MVS-8500 series uses a different analog-to-digital converter chip, the TI THS8083A, than previous frame grabbers.

Cognex recommends that you experiment with contrast and brightness settings if you are porting a vision processing application from another Cognex frame grabber to the MVS-8501 or MVS-8504.

Software Addresses with Cable 300-0406

Cognex cable 300-0406 is intended for connecting a Sony DXC-390 color camera plus one monochrome analog camera to the MVS-8504.

When using this cable, the R, G, and B cable branches connecting to the color camera consume camera positions 0, 1, and 2. This means that the monochrome camera connected to the fourth cable branch has a software address of 3. Use this address in your CVL code to control the monochrome camera when using cable 300-0406.

Strobe Polarity Reversed When Using TTL-Only Cable Option

For two of the three parallel I/O cable options for the MVS-8500, the strobe lines are opto-isolated. However, when you use the TTL pass-through cable option (cable 300-0390 and the TTL connection module, 800-5818-1), the four strobe lines have reversed polarity, compared to the same lines when opto-isolated.

Thus, when using strobes on the all-opto (300-0389) or half and half (300-0399) cable options, the information about **ccStrobeProp::strobeHigh()** in the *CVL Class Reference* is accurate as written:

```
void strobeHigh(bool polarity);
```
When *polarity* is true, the active pulse is set to high. If false, sets the active pulse to low.

However, when using strobes on the TTL pass-through cable option, 300-0390, the polarity information is reversed:

```
void strobeHigh(bool polarity);
```
When *polarity* is true, the active pulse is set to low. If false, sets the active pulse to high.

MVS-8100L Compatibility Issues

This section describes compatibility issues that affect the use of the MVS-8100L.

Converting Applications to the MVS-8100L

CVL 5.5.1 and later support the MVS-8100L frame grabber. If you are porting an MVS-8100, MVS-8100M, MVS-8100M+, or MVS-8100C application to the MVS-8100L, keep the following points in mind:

- Do not use the special MVS-8100 pel pool (**ccVp8100PelRootPool** objects) with the MVS-8100L. Other generic pel pools will work on the MVS-8100L. See also the *Optimizing MVS-8100 Acquisition Performance* section of the *Acquiring Images* chapter of the *CVL User's Guide*.
- The **cc8BitInputLutProp::inputLut()** functions in the acquisition properties class used with other frame grabbers are not implemented for the MVS-8100L. Therefore, the associated default pixel acquisition range of 15 through 240 cannot be used. The default pixel acquisition range for the MVS-8100L is 0 through 255.
- Running **ccDisplay::startLiveDisplay()** on 8-bit desktops will show colors because the default acquisition range is 0 through 255. To prevent the display of colors, do not use **ccDisplay::startLiveDisplay()** but instead write your own live display loop. In that loop, when calling **ccDisplay::image()**, set the *displayRaw* argument to false. This will map all pixel values to the range 10 through 240 and eliminate the colors. See the *Clipping and Color Maps* section of the *Displaying Images* chapter of the *CVL User's Guide* for a description of the *displayRaw* argument.

  See the *Live Display Using One FIFO on an MVS-8120* section of the same chapter for an example of how to write a live display loop. To prevent the display of colors on 8-bit desktops, change the line:

  ```
  console->image(remote_img);
  ```

  to:

  ```
  console->image(remote_img, false);
  ```

- Brightness and contrast values differ between other frame grabbers and the MVS-8100L. For information on reproducing other frame grabber contrast and brightness values on the MVS-8100L, contact Cognex Technical Support. You may also need to adjust your lighting and aperture settings to achieve the same results with the MVS-8100L as with other frame grabbers.

Improving Image Quality on the MVS-8100L

CVL 5.5.3 had a number of problems that affected the quality of images acquired from MVS-8100L frame grabbers, including the following:

- Dark pixels in the leftmost column of images captured from RS-170 cameras
- Dark pixels in the next to last right most column of images captured from some CCIR cameras

- For most cameras, loss of dynamic range caused by an incorrect default ADC reference voltage setting
- CCIR image brightness 10 grey levels higher than expected

Changes to the MVS-8100L image acquisition code introduced in CVL 6.0 fixed the first three of these problems. The changes involved adjusting the digitizer offset and pixel aspect ratio to fix the dark pixel column problems, and changing the default ADC reference voltage setting to fix the loss of dynamic range problem.

Note To fix the CCIR image brightness problem, adjust the brightness property in your CVL application code to reduce the grey level.

The new settings will cause images captured using CVL 6.0 and later to be slightly different from those captured using CVL 5.5.3. To retain exact backward compatibility with CVL 5.5.3, use the **cc8100l::ADCReferenceVoltage()** function, passing **cc8100l::defaultADCReferenceVoltage**, which specifies the CVL 5.5.3 default value, as an argument. This function will always cause the MVS-8100L acquisition to revert to CVL 5.5.3 settings, with any value argument. Always call the **cc8100l::ADCReferenceVoltage()** function before creating an acquisition FIFO. You need to call this function only once in your application, after getting a handle to the **cc8100l** or **ccBoard** object, whichever your application uses.

You can use the **cc8100l::ADCReferenceVoltage()** function either with a **cc8100l** object directly (see scenario 1, below), or with generic **ccBoard** or **ccFrameGrabber** objects (see scenario 2, below):

Scenario 1: If your application uses a **cc8100l** object (for example, named *fg8100l*) directly, add the following code when *fg8100l* is a pointer:

```
fg8100l->ADCReferenceVoltage(
  cc8100l::defaultADCReferenceVoltage);
```

Add the following code when *fg8100l* is a reference:

```
fg8100l.ADCReferenceVoltage(
  cc8100l::defaultADCReferenceVoltage);
```

Scenario 2: If your application uses a generic **ccBoard** or **ccFrameGrabber** object (for example, named *myBoard*), add the following code when *myBoard* is a pointer:

```
cc8100l *fg8100l = dynamic_cast<cc8100l*>(myBoard);
if(fg8100l)
  fg8100l->ADCReferenceVoltage(
    cc8100l::defaultADCReferenceVoltage);
```

Add the following code when *myBoard* is a reference:

```
cc8100l* fg8100l = dynamic_cast<cc8100l*>(&myBoard);
if(fg8100l)
  fg8100l->ADCReferenceVoltage(
    cc8100l::defaultADCReferenceVoltage);
```

For the second scenario, you must also explicitly include the header file *ch_cvl/vp8100l.h* to have the MVS-8100L reference voltage function and default value definitions required for compilation.

Basler L203 Compatibility Notes

CVL 6.5 supports the use of the Basler L203 line scan camera on the MVS-8120 with CVM11. The L203's line width is up to 4096 pixels wide, and can scan up to 8192 lines, for a maximum image size of 4096 x 8192 pixels. The L203's pixel clock operates at 40 MHz in single-tap mode.

Note Support for the L203 requires a minimum of 128 megabytes of frame buffer RAM installed on the MVS-8120. Contact your Cognex Sales Engineer for information on upgrading your existing MVS-8120 boards to the higher RAM requirements, or for buying new boards that meet those requirements.

Set up the L203 with the Basler-provided Classic Camera Configuration Tool, using the same procedure described for the L103 camera on pages 78-79 of the CVL 6.5 edition of the *MVS-8120 Hardware Manual*.

To use the L203 with CVL, specify the following video format in your image acquisition code:

```
"Basler L203 4096x4096"
```

The minimum and maximum exposures enforced by CVL are 51 and 205 microseconds, respectively. Any value set outside this range is silently clipped.

Caution *The Basler L203 requires a 24 V power supply, whereas the L103-2K (supported in this and previous releases) requires a 12 V power supply. The two power supplies are* not *interchangeable; do not mix the two power supplies. Be especially vigilant because both cameras use the same power input connector.*

Larger Pel Pool Size Recommended

Whenever your application acquires images 15 MB or larger, such as those produced using the Basler L203 camera, Cognex recommends that you increase the size of the MVS-8120 pel pool size to 32 MB or more. Refer to the description of **cc8120::sizePelPool()** in the *CVL Class Reference* for information on changing the pel pool size.

Balancing Gain and Offset

Images of low-contrast scenes acquired using the Basler L203 camera may exhibit slight grey-level variations between adjacent columns of pixels. You can reduce this variation by balancing the gain and offset values for the two camera channels.

You cannot use CVL to examine or change the gain and offset values for the Basler L203 camera. Instead, you must use the serial interface implemented by the camera. For information on how to do this, refer to the *Basler L200 Series User's Manual*.

FireWire Compatibility Issues

This section describes compatibility issues that affect the use of FireWire cameras.

Do Not Call ccAcqFifo::isPrepared()

Calling **ccAcqFifo::isPrepared()** on an acquisition FIFO associated with an IEEE 1394 DCAM camera always returns false. You can call **ccAcqFifo::prepare()** to ensure that an acquisition FIFO is ready for use; refer to the *CVL User's Guide* for more information on **ccAcqFifo::prepare()**.

Note In future releases of CVL, **ccAcqFifo::isPrepared()** will be deprecated for all platforms.

Generic DCAM Format Exposure Control

If you use one of the generic IEEE 1394 DCAM video formats and your camera does not support absolute exposure control, you cannot set the exposure time by supplying an exposure value in seconds to **ccExposureProp::exposure()**.

Instead, you must set the value of **exposure()** to the register value that produces the desired exposure time for the specific camera that you are using. You can obtain this information from your camera's documentation.

Note All AVT and Basler IEEE 1394 DCAM cameras supported by CVL do not support absolute exposure control when using a generic DCAM video format. However, if you use the camera-specific format ("**AVT F046B 780x582 IEEE1394 (mono, 53fps, shutter-hw-triggermode0) CCF**") you can set the exposure time by supplying a value in seconds to **exposure()**.

Camera Response to Over-Triggering Varies

Different IEEE 1394 DCAM cameras have different responses when subjected to a trigger rate in excess of the maximum camera frame rate. For example:

- The AVT F046B will store image data in its internal buffer for short bursts of over-rate triggers. If overtriggering continues, the internal buffer is overwritten, resulting in image corruption.
- The Basler A102f camera ignores triggers when overtriggered, resulting in lost images.

Slow Camera Initialization on Windows 2000

Whenever you create an acquisition FIFO that refers to a Basler A102f camera on a Windows 2000 system, the required initialization may take as long as 16 seconds. If you are using this combination of camera and operating system, you should make sure that you create your acquisition FIFO at a time when this delay does not cause problems.

Image Acquisition Issues

Do Not Disconnect Cameras While Acquiring

Cameras should never be disconnected or unplugged from a frame grabber, or from an IEEE 1394 port, while CVL image acquisition is underway. This is especially a problem in external PLL mode, where the frame grabber is deriving its pixel clock from the video signal.