

Technical Support

Technical Bulletin

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Product:	CVL, Rev: ALL VISIONPRO	
Title: Introduction of MVS-8510 Frame Grabbers		

PURPOSE

The purpose of this document is to describe what steps users must take to use the new MVS-8510 frame grabbers with their existing applications. Also discussed in this document are the differences and similarities between the MVS-8500 frame grabbers (MVS-8501, MVS-8504, MVS-8500Le and MVS-8504e) and the new re-designed MVS-8510 frame grabbers (MVS-8511, MVS-8514, MVS-8511e and MVS-8514e). For a complete discussion of the MVS-8510 features and capabilities the user should refer to the *MVS-8500 Series Hardware Manual*, dated September 2011 or later.

TECHNICAL DETAILS

The analog-to-digital converter (ADC) used on the MVS-8500 frame grabbers (MVS-8501, MVS-8504, MVS-8500Le, MVS-8504e) is end of life. To continue to offer Cognex customers an analog frame grabber, the MVS-8500 was re-designed to incorporate a new analog-to-digital converter. The new analog frame grabbers are called the MVS-8510 series.

The new MVS-8510 frame grabbers are listed below:

Current board	Replacement board	Description of Replacement Board
MVS-8501	MVS-8511	4:1 multiplexed, monochrome, PCI
MVS-8504	MVS-8514	4 independent channels, color, PCI
MVS-8500Le	MVS-8511e	4:1 multiplexed, monochrome, PCI Express
MVS-8504e	MVS-8514e	4 independent channels, color, PCI Express

The new MVS-8510 frame grabbers were designed to be as similar as possible to the existing MVS-8500 frame grabbers. The expectation is that most users will not have to modify their application code to use the new frame grabbers.

The camera connector (DB-26 female connector) and parallel I/O connector (MDR20 female connector) located on the faceplate of the MVS-8500 and MVS-8510 are identical. This means that all existing cables will work with the MVS-8510 frame grabbers. In addition, all the cameras supported on the MVS-8500 series of frame grabbers are supported by the MVS-8510 series of frame grabbers with one exception: the MVS-8510 frame grabbers do not support dual-tap cameras. No new CCFs are required for the MVS-8510.

The external power connector used on the MVS-8510 series frame grabbers is a standard 4-pin Molex connector. This is the same connector used on the MVS-8500Le and the MVS-8504e. The MVS-8501 and MVS-8504 use the 3-pin header Berg connector so this connector is different from the MVS-8510.

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The MVS-8511 and MVS-8514 have a universal PCI interface, compatible with 5 V and 3.3 V systems. The MVS-8511 supports standard 33 MHz operation when placed in any PCI or PCI-X slot. The MVS-8511 does not support 66 MHz operation. The MVS-8514 supports both 33 MHz and 66 MHz operation. The MVS-8514 supports 66 MHz operation under the following conditions:

- The PC's motherboard and chipset must support 66 MHz PCI or PCI-X operation
- The MVS-8514 must be installed in a PCI or PCI-X slot that supports 66 MHz operation
- No 33 MHz PCI cards can be installed on the same 66 MHz PCI or PCI-X bus segment

The MVS-8514 operates as a standard 33 MHz PCI card:

- If placed in a standard 33 MHz PCI slot
- If placed in a 66 MHz PCI or PCI-X slot, but one of the conditions above is not met

The MVS-8511e and MVS-8514e have an x1 bus and can be placed in any x1, x4, x8, or x16 PCI Express slot.

The power usage of the MVS-8510 PCI series boards is shown below:

Voltage	Source	MVS-8511	MVS-8514
+3.3 V	PCI Bus	0.5 A	0.5 A
+5 V	PCI Bus	1.3 A	1.3 A
+12 V	External power connector	Camera only	Camera only

The maximum power consumption for the MVS-8511 and MVS-8514 is approximately 8.0 watts.

The power usage of the MVS-8510 PCI Express series boards is shown below:

Voltage	Source	MVS-8511e	MVS-8514e
+3.3 V	PCIe Bus	2.0 A	2.0 A
+12 V	PCIe Bus	0.30 A	0.30 A
+5 V	External power connector	0.20 A	0.20 A
+12 V	External power connector	Camera only	Camera only

The maximum power consumption for the MVS-8511e and MVS-8514e is approximately 11.0 watts.

Appendix A provides a comparison of the features of the MVS-8500 series of frame grabbers and the MVS-8510 series of frame grabbers.

Software Considerations

The MVS-8511, MVS-8514, MVS-8511e, and MVS-8514e analog frame grabbers require a software patch to work with the following software packages:

- CVL general, CR, and PR releases from CVL 6.3 through CVL 7.0.
- CVL patch releases 6.2CR17, 6.2CR17PR1, 6.2CR24, 6.2CR24PR1, 6.2CR28, 6.2CR29, 6.2CR29PR1, 6.2CR30, 6.2CR31, 6.2CR31PR1, 6.2CR32, and 6.2CR36
- VisionPro general, CR, and PR releases from VisionPro 4.0.1 through VisionPro 7.1.

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These frame grabbers do not require a patch when used with

- CVL 7.1 or newer
- CVL 6.6CR17
- VisionPro 7.2 or newer

The MVS-8511, MVS-8514, MVS-8511e, and MVS-8514e frame grabbers cannot be used with software versions other than those listed above. The software patch supports the following 32-bit operating systems: Windows 2000, Windows XP and Windows 7.

Patch Instructions

You can download the required software patch here:

http://www.cognex.com/tech_supp/8510_Support_Software/8510SupportSoftware.zip

To install the patch, save the *8510SupportSoftware.zip* file to your PC, expand it, and run the enclosed installer (setup.exe). The zip file includes an updated *MVS-8500 Series Hardware Manual* that documents the MVS-8511, MVS-8514, MVS-8511e, and MVS-8514e analog frame grabbers.

The software patch will work with the both the MVS-8500 and MVS-8510 series of frame grabbers. The software includes new versions of the *cognv8500r.dll*, *cognv8500d.dll* and *fg8500.sys* files. Users do not need to re-compile their applications to use the software patch.

Software Compatibility

In general, a user's application written to work with the MVS-8500 series frame grabbers will work with the MVS-8510 series frame grabbers without any modifications.

For both the CVL and VisionPro software frameworks, you use exactly the same programming statements regardless of the specific MVS-8500 series frame grabber model.

- For CVL, you instantiate an instance of the **cc8501**, **cc8504**, or **cc8500l** class.
- For VisionPro, you use the **CogFrameGrabber8501**, **CogFrameGrabber8504**, or **CogFrameGrabber8500L** class.

Users who are migrating from the 8500Le to the MVS-8510 must change their application code to use the MVS-8510 frame grabbers.

- For CVL, you instantiate an instance of the **cc8501** or **cc8504** class. You can no longer use the **cc8500l** class.
- For VisionPro, you use the **CogFrameGrabber8501s.Item** and **CogFrameGrabber8501s.Count** instead of **CogFrameGrabber8500Ls.Item** and **CogFrameGrabber8500Ls.Count**

To determine which MVS-8500 series model is installed, call the **name()** method on the object. The returned value will be one of the following:

- **Cognex 8501**
- **Cognex 8504**
- **Cognex 8511**
- **Cognex 8514**

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- Cognex 8504e
- Cognex 8511e
- Cognex 8514e
- Cognex 8500Le

Contrast and Brightness Settings on MVS-8500 Series Frame Grabbers

Contrast and brightness settings are made in CVL with functions of the **ccContrastBrightnessProp** class. Within the commonly used range of 0.05 to 0.95 for contrast and 0.20 to 0.80 for brightness settings, the grey level values in acquired images will vary slightly depending on which MVS-8500 board you were using.

- At the same contrast and brightness settings, the MVS-8511, MVS-8511e, MVS-8514, and MVS-8514e frame grabbers produce grey level values that may be up to 10 grey levels higher or 6 grey levels lower than the pixel values produced by the MVS-8501 and MVS-8504 frame grabbers using the same input signal. The median difference in grey values across the full range of inputs is approximately 0.
- At the same contrast and brightness settings, the MVS-8511, MVS-8511e, MVS-8514, and MVS-8514e frame grabbers produce grey level values that may be up to 4 grey levels higher or 12 grey levels lower than the pixel values produced by the MVS-8500Le and MVS-8504e frame grabbers using the same input signal. The median difference in grey values across the full range of inputs is approximately -2 (the values produced by the newer frame grabbers are lower).

You may be able to minimize the grey value differences for a particular range of input values by adjusting the brightness and contrast settings.

Internal Drive RGB Color Cameras

If you are using an Internal drive RGB color camera (3-channel master/slave/slave with the frame grabber supplying drive signals to the camera) and one monochrome camera on an MVS-8514 or MVS-8514e, you may observe a behavior difference from the MVS-8504 and MVS-8504e. On the MVS-8510, in order to initialize the frame grabber for use with the 3-channel RGB camera, a reset of the clock generator is required. The clock generator also provides the clock for the 4th channel. Therefore, if the 4th channel is actively acquiring images, then the initialization of the RGB camera will fail until the acquisition on the 4th channel is stopped. You must ensure there is no active acquisition on the 4th channel, then initialize the frame grabber for use with the RGB camera, and then re-start acquisition on the 4th channel.

This behavior does NOT apply when the frame grabber locks to sync signals from an RGB color camera.

Board Ordering

If you are using multiple MVS-8500 series frame grabbers in a single PC, replacing one or more existing MVS-8501, MVS-8500Le, MVS-8504, or MVS-8504e frame grabbers with a new MVS-8511, MVS-8501e, MVS-8514, or MVS-8514e frame grabber may cause your application code to return frame grabber instances in a different order. This issue is discussed in the MVS-8500 Series Hardware Manual in the software compatibility section.

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Appendix A – Comparison of MVS-8500 series model features

Feature	PCI Bus		PCI Express Bus		
	MVS-8501 MVS-8511	MVS-8504 MVS-8514	MVS-8500Le	MVS-8511e	MVS-8504e MVS-8514e
Bus interface	PCI Universal 32/64-bit, 33/66 MHz		PCI Express, x1		
Bus interface options	33 MHz operation in both 32-bit (short) PCI slots and 64-bit (long) PCI and PCI-X slots.	66 MHz operation in 64-bit (long) PCI slots or PCI-X slots. 33 MHz operation in standard 32-bit (short) PCI slots.	Any PCIe slot		
Cameras connected at same time	1 to 4		1 or 2	1 to 4	1 to 4
Asynchronous image acquisitions	1	1 to 4	1	1	1 to 4
Onboard video multiplexer	Yes	No	Yes	Yes	No
Onboard video timing generators	1	4	1	1	4
Onboard analog-to-digital converters	1	4	1	1	4
Maximum recommended pixel clock	40 MHz (MVS-8501/8504) 50 MHz (MVS-8511/8514)		50 MHz		
Onboard SDRAM for FIFO buffer	8 MB	16 MB	8 MB	8 MB	16 MB
Supports master-slave image acquisition	No	Yes	No	No	Yes
Supports RGB color cameras	No	Yes	No	No	Yes

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Feature	PCI Bus		PCI Express Bus		
	MVS-8501 MVS-8511	MVS-8504 MVS-8514	MVS-8500Le	MVS-8511e	MVS-8504e MVS-8514e
Number of bi-directional parallel I/O lines	16	16	8	16	16
Parallel I/O lines configurable as hardware trigger lines	1	4	1	1	4
Parallel I/O lines configurable as hardware strobe lines	1	4	1	1	4
Syncs to camera's HD/VD output	Camera 1 only	All 4 cameras	2 cameras, but switching delay	4 cameras, but switching delay	All 4 cameras
Syncs to camera's composite video	All 4 cameras, but switching delay	All 4 cameras	2 cameras, but switching delay	4 cameras, but switching delay	All 4 cameras