

MegaPlus GigE Vision: Frequently Asked Questions

GigE Vision Basics

1. What is GigE Vision?

GigE Vision is a camera interface standard developed based on gigabit Ethernet communication protocol. It allows maximum data bandwidth of 125MBytes/sec over up to 100 meters of Cat 5e/6 cables.

2. How is GigE Vision interface different from standard Gigabit Ethernet?

“GigE Vision” standard is based on Gigabit Ethernet (GigE) protocol. However it is customized for machine vision applications with a goal to offer more reliable image data transmission and a uniform camera control standard.

3. What is GenICam?

GenICam provides a standard for exposing camera control attributes as part of GigE Vision. The attributes are in a machine readable XML file format. They are generated by camera vendors so that any GigE Vision compliant software can control any GigE Vision compliant camera.

4. What do I need to acquire images from a GigE Vision camera?

- A. GigE Vision compliant camera
- B. PC with Gigabit Ethernet port: Though, it is possible to acquire data from any PC with GigE port, it is highly recommended that you use a dedicated Gigabit Ethernet Network Interface Controller (NIC) card based on Intel Pro 1000 chipset
- C. Cat 5e/6 cable: High quality cables should be used that are explicitly rated for gigabit Ethernet use.
- D. GigE Vision compliant acquisition Software: You will need Vision Acquisition Software that supports GigE Vision standard. These applications, such as NI’s IMAQdx Vision also install required drivers.
- E. Application Programming Interface (API): For custom application development, the acquisition software should also provide required programming interface

5. How does GigE Vision compare with CameraLink and Firewire?

	GigE Vision	CameraLink	Firewire (IEEE 1394a/b)
Bandwidth[†]	Up to 125 MB/sec	Up to 680 MB/sec	Up to 50 – 100 MB/sec
Cable Length (Max^{††})	100m	10m	5m
Frame Grabber	No	Yes	No
Cost	Low	High	Low
Real time data transmission	++	+++	+
CPU load^{†††}	High	Low	High
Availability	+	+++	++

For more information, refer to “Choosing the right interface?” white paper.

6. What are the limitations of GigE Vision interface?

- Bandwidth is limited to 125MBytes/sec compared to ~680MBytes/sec for CameraLink
- Increases CPU load compared to CameraLink with dedicated frame grabber. However, it can be reduced when cameras with on-board processing is used.
- Limited availability compared to CameraLink and

7. What is the maximum bandwidth available under GigE Vision?

125 MBytes/sec (1000 Mbps). However, typical limit is 120 MBytes/sec due to overhead.

8. Can I run multiple cameras through single GigE interface?

Yes. However, the bandwidth will be shared among the cameras.

9. Where can I find more information on GigE Vision interface?

General GigE Vision Information on Advanced Imaging Association (AIA) website

<http://www.machinevisiononline.org/public/articles/articles.cfm?cat=167>

“Acquiring from GigE Vision” white paper from National Instruments

<http://zone.ni.com/devzone/cda/tut/p/id/5651>

MegaPlus and GigE Vision

1. Are all MegaPlus cameras supported under GigE Vision?

Yes.

2. What sensors are supported under GigE Vision?

All interline and full frame sensors used in MegaPlus product line are supported under GigE Vision. For a complete list, visit www.piacton.com/imcam/MegaPlus

3. How does the GigE Vision MegaPlus cameras differ from other GigE Vision cameras on the market?

Though the MegaPlus conforms to the GigE Vision standard, the inherent design of MegaPlus using on-board FPGA lends itself to better utilize the power of GigE Vision.

- On-board defect correction, flat field normalization and RGB Bayer interpolation for reduced CPU load
- Hardware based triggering for time critical applications.
- Full support for binning and other custom features under GigE Vision
- First manufacturer to support both cooled and non-cooled cameras under GigE Vision.

4. What do I need to run MegaPlus cameras via GigE vision interface?

- MegaPlus camera with GigE Vision controller: Make sure that the proper camera configuration file is loaded into the controller. Updated camera configuration files are available at www.piacton.com/imcam/megaplus/
- Gigabit Ethernet port: Though, it is possible to acquire data from any computer with GigE port, it is highly recommended that you use a dedicated Gigabit Ethernet Network Interface Controller (NIC) card based on Intel Pro 1000 chipset.
- Cat 5e/6 cables: High quality cables should be used that are explicitly rated for gigabit Ethernet use.
- Acquisition Software: You will need Vision Acquisition Software that supports GigE Vision standard. These applications, such as NI's IMAQdx Vision also install required drivers.
- Application Programming Interface (API): For custom application development, the acquisition software also provides programming interface

5. Can I run monochrome and color MegaPlus cameras under GigE Vision interface?

Yes.

6. Does MegaPlus support custom camera features such as TEC control under GigE Vision?

Yes.

- 7. Can I use generic gigabit network interface card (NIC) with MegaPlus cameras?**
Yes. However, the performance and operation is guaranteed only with high performance Intel Pro 1000 chipset based NIC cards and GigE Vision software.
- 8. What is the maximum frame rate for various MegaPlus cameras under GigE Vision interface?**
The frame rate limit is set by the available bandwidth of GigE Vision interface, typically limited to 120 MBytes/sec. The frame rate varies depending on the driver used
- 9. Can I run different camera heads using a Single Head Controller (GigE Vision)?**
No. However, multiple controllers can be networked through gigabit Ethernet hub, which in turn is connected to a central PC.
- 10. What are all the data interfaces available with MegaPlus cameras?**
Firewire, CameraLink and GigE Vision
- 11. I already have a MegaPlus camera head that I am using it with Firewire and/or CameraLink. Can I use it with NEW GigE Vision?**
Yes. You need to acquire a new Single Head Controller (GigE Vision) in place of your current controller.
- 12. I would like to operate different types of MegaPlus camera heads using a single head controller (GigE Vision). Can I?**
Yes. You need to update the camera configuration file in the controller to match the camera head connected.
- 13. How can I update firmware on the MegaPlus GigE Vision camera system?**
There are two types of updates that can be applied to the GigE Vision controller.

 - i) GigE Vision camera configuration files can be uploaded to the controller via standard Cat 5e/6 cable connected to “GigE Vision” port
 - ii) Camera Firmware is updated via “Cross-over” Ethernet cable connected to “Diagnostics” port.