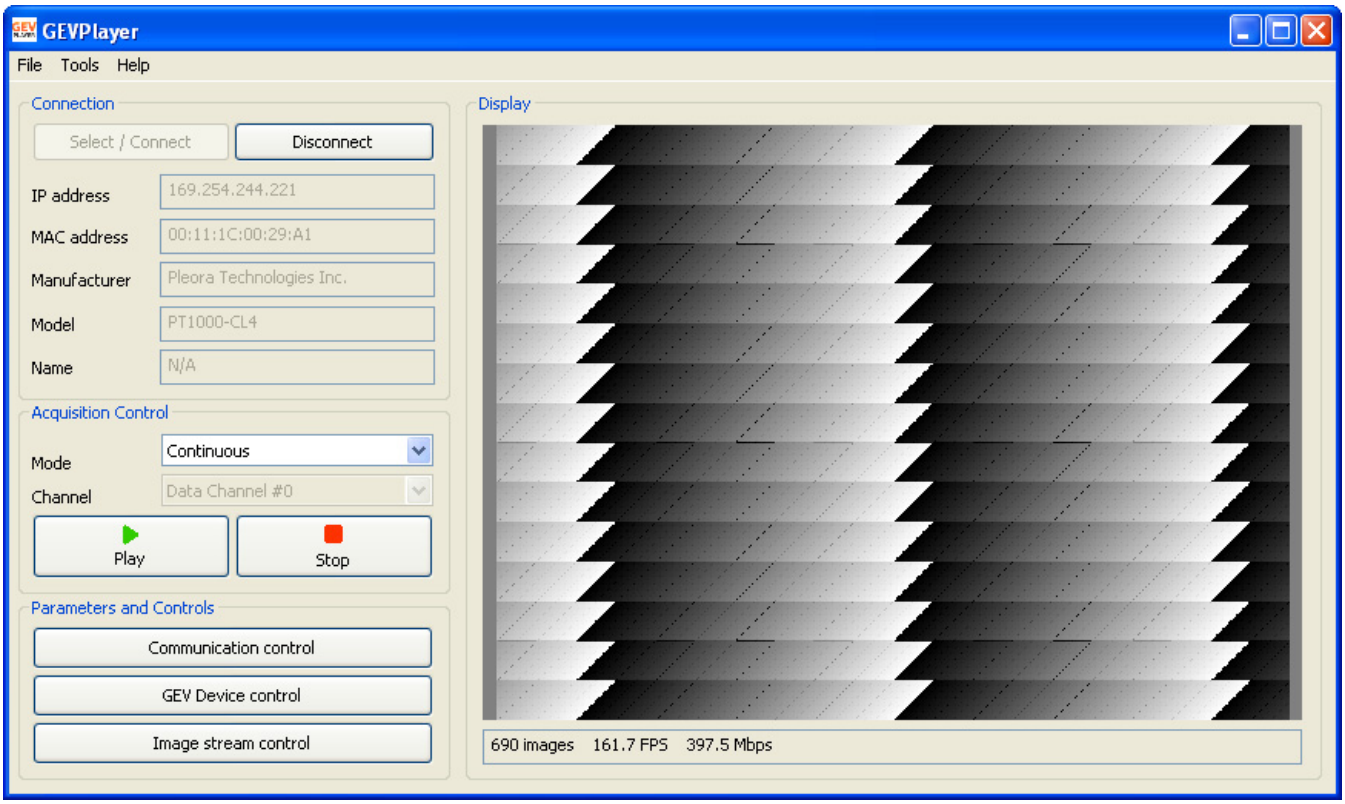
Pleora Technologies

iPORT PureGEV

Quick Start Guide

SIMPLY CONNECT™

Pleora Technologies



GigE Vision made easy

Version 0.2

2/25/08

Contents

Getting started with the iPORT PureGEV Suite

The iPORT PureGEV Suite is a complete set of tools for configuring and controlling your GigE Vision-enabled camera. GEVPlayer is a simple-yet-powerful program that lets you use your IP Engine to capture your first images quickly and easily. Then, as you familiarize yourself with GigE Vision, you can create your own application with the easy-to-use SDK.

The iPORT PureGEV Suite lets you quickly take your GigE Vision device from concept to prototype to finished product!

In this section:

Getting started

To acquire your first images using the iPORT PureGEV Suite:

1. Insert your software CD in your PC and install the following suites:

   eBUS Driver Suite
   iPORT Vision Suite
   iPORT PureGEV Suite
2. Follow the directions in the *eBUS Quick Start Guide* to choose and install the NIC driver that best meets your needs. (The iPORT PureGEV Suite requires an eBUS driver.)
3. Cable your camera, IP Engine, and PC together. See “Cabling your camera to your PC” on page 13.
4. Configure the Windows XP Firewall. See “Configuring the Windows XP Firewall” on page 15.
5. Launch GEVPlayer. See “Launching GEVPlayer” on page 17.
6. Connect to your IP Engine. See “Connecting to your IP Engine” on page 19.
7. Acquire your first images. See “Acquiring images” on page 23.

Going further...

Once you’ve acquired your first images, you can:

- Configure and control your IP Engine further. See “Controlling your IP Engine” on page 25.
- Track the performance of your camera, IP Engine, and PC. See “Tracking performance” on page 29.
- Write your own program! See “Creating your own GigE Vision system” on page 31.

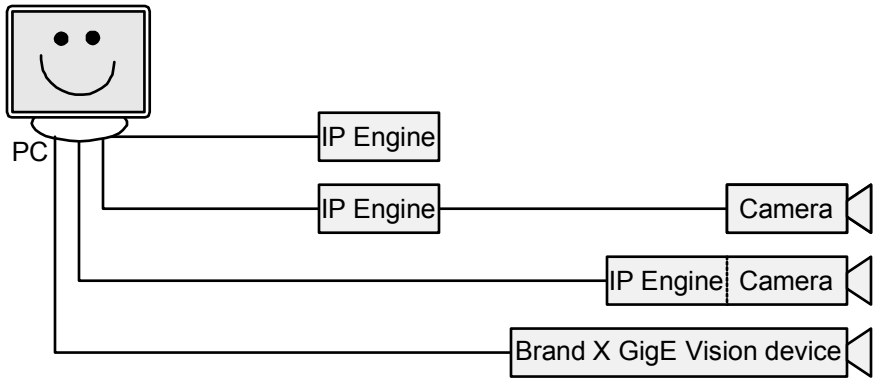
Understanding the iPORT PureGEV Suite

In this section:

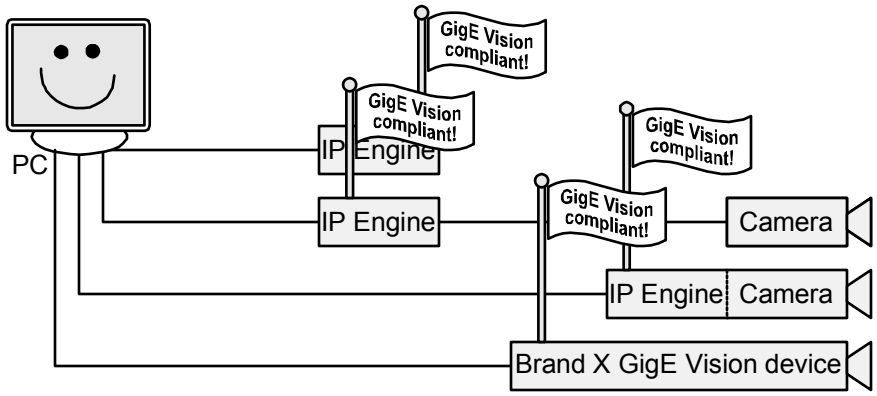
About IP Engines, cameras, and GEV devices

Though the iPORT PureGEV Suite is principally designed to support iPORT IP Engines (with GEV firmware), you can also use it to connect to and control third-party GEV devices. By necessity, the documentation distinguishes the IP Engine and the camera you're (typically) integrating.

However, the form factor of your IP Engine may vary. The form of your IP Engine could be a standalone IP Engine, a standalone IP Engine with a separate cable-connected camera, an IP Engine and camera integrated into a single physical unit, or a third-party GigE Vision compliant camera.

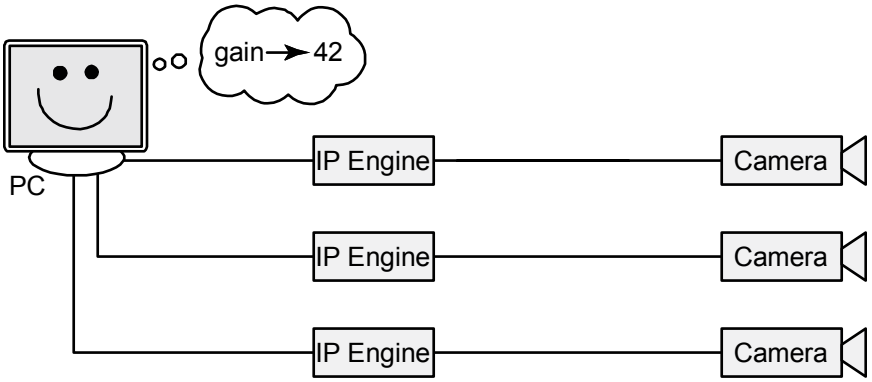


The iPORT PureGEV Suite lets you connect to *any* GigE Vision compliant device, regardless of its form!

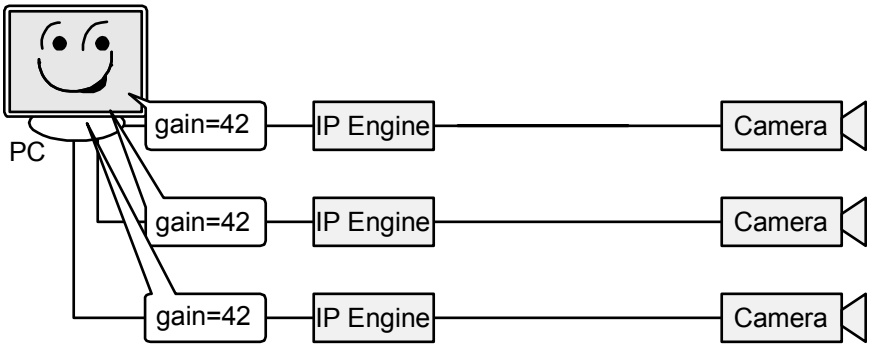


The birth of GigE Vision

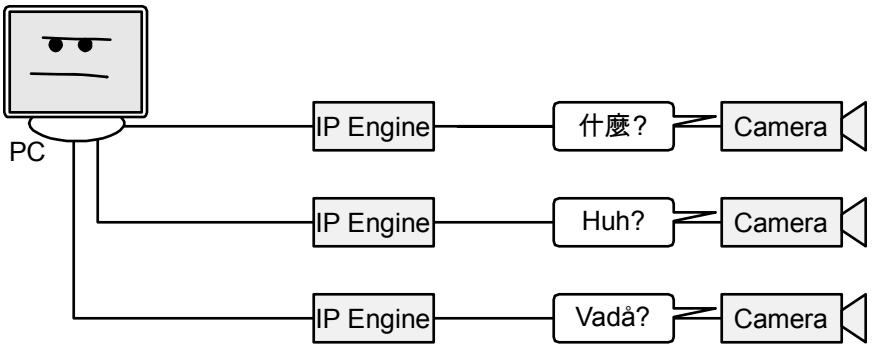
Ideally, knowing how to set a parameter on one camera...



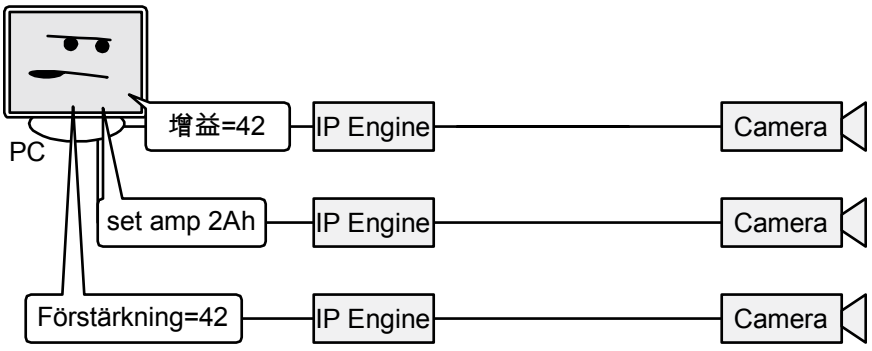
...would let you make the same setting for all cameras.



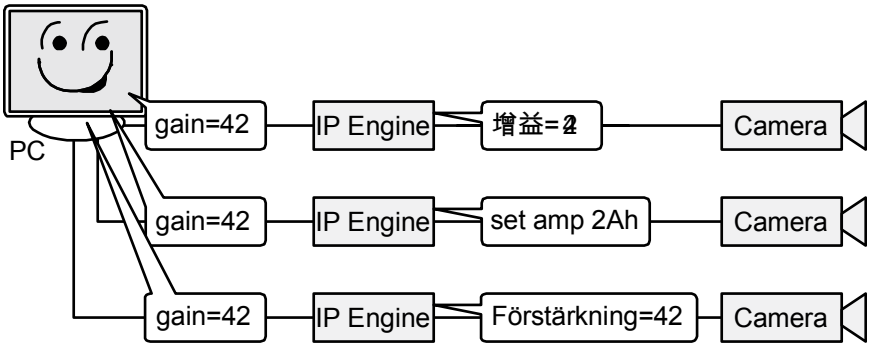
However, cameras have manufacturer-specific or model-specific instruction sets.



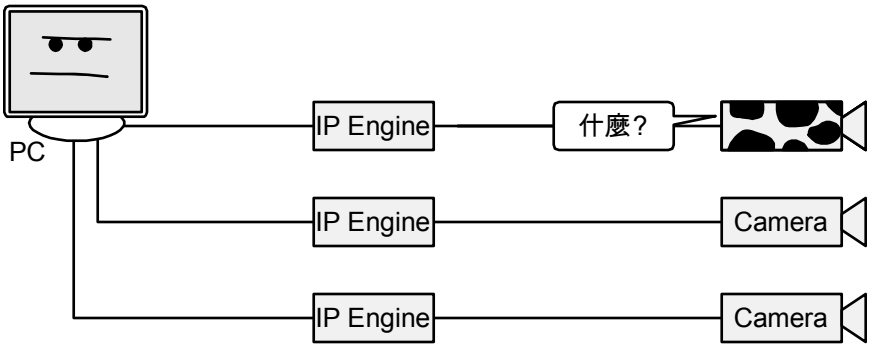
As a result, end users, programmers, or *someone* had to adapt for every camera they used.



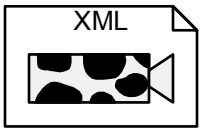
To reduce frustration, Pleora created camera-specific DLLs for as many models as they could (in the iPORT Vision Suite). These DLLs helped provide a more standard interface. Though the process was time-consuming (for Pleora), the DLLs worked well...



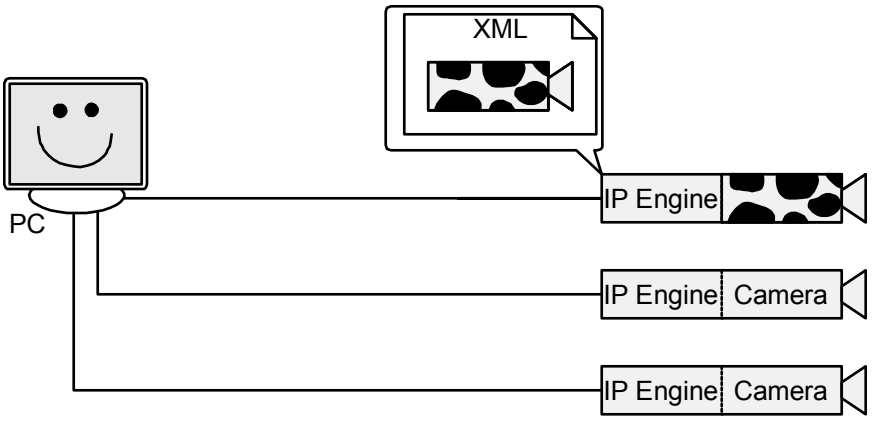
...unless something changed.



Recognizing that the increasing complexity of modern cameras would exacerbate end-user frustration (and that keeping all DLLs up-to-date was impossible), Pleora and a group of companies created the GigE Vision Standard. To be compliant, a GigE Vision device has to provide an XML file that defines its features and how to use them.



Using an iPORT IP Engine and a camera together, you can create a system that behaves as a single, GEV-compliant device. The IP Engine stores the XML file and provides it on request (as well as providing the required GEV interface).



Cabling your camera to your PC

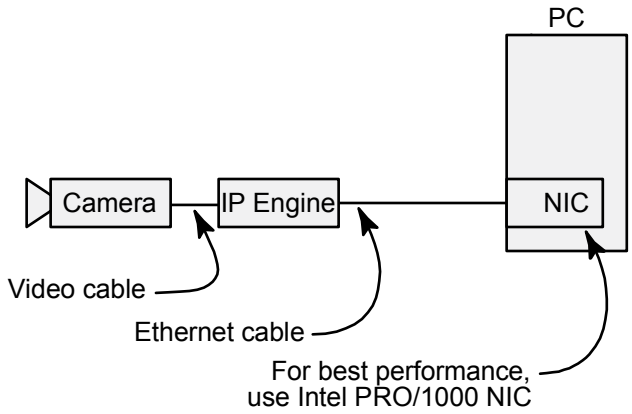
When it comes to cabling, your GigE Vision-enabled iPORT IP Engine gives you a lot of flexibility. However, if you're cabling it for the first time, we recommend that you make a dedicated connection between your IP Engine and PC.

To cable your camera to your PC:

- Cable your system as described in either "Dedicated connection" on page 13 or "Dedicated connection with a second regular NIC" on page 13. Power cables aren't shown.

Dedicated connection

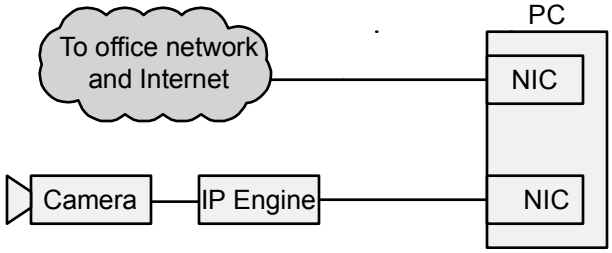
If you require a very high bandwidth connection to your IP Engine but don't require corporate network connectivity, use the configuration below.



This configuration might be used for a standalone machine vision system. For best performance, cable your IP Engine to an Intel PRO/1000 NIC. The Intel PRO/1000 NIC is reliable and lets you use the efficient eBUS Optimal Driver.

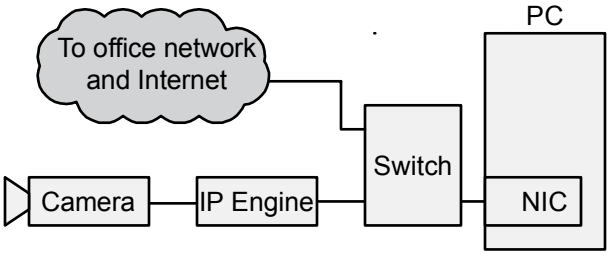
Dedicated connection with a second regular NIC

If you intend to use your NIC as a dedicated connection to your camera, use the configuration below. In this configuration, you have a second NIC for corporate network connectivity.



Switched connection (not recommended for first-time use)

If you intend to use a single NIC for both the connection to your camera and corporate network connectivity, use the configuration below.



If you're setting up your IP Engine for the first time, we advise against using this configuration. Such an arrangement may cause the following problems:

- You may experience data loss, delay, or network slowdowns if the switch employs blocking architecture or insufficient packet forwarding capability.
- You may experience connectivity problems due to a switch that is nonstandard or improperly configured (jumbo frames not enabled).
- Switches that use a spanning tree algorithm often incur a significant delay (several minutes) when establishing a connection between a PC and the IP Engine. We recommend that you turn off spanning tree implementations on the switch (check with your network administrator).

Configuring the Windows XP Firewall

In its default configuration, the Windows XP Firewall may block certain network packets between your IP Engine and GEVPlayer (or your own image-acquisition program).

Follow the directions to ensure Windows XP Firewall works with GEVPlayer (or modify the directions for your own program). Finally, and only if you prefer, you can use the directions to disable the firewall completely.

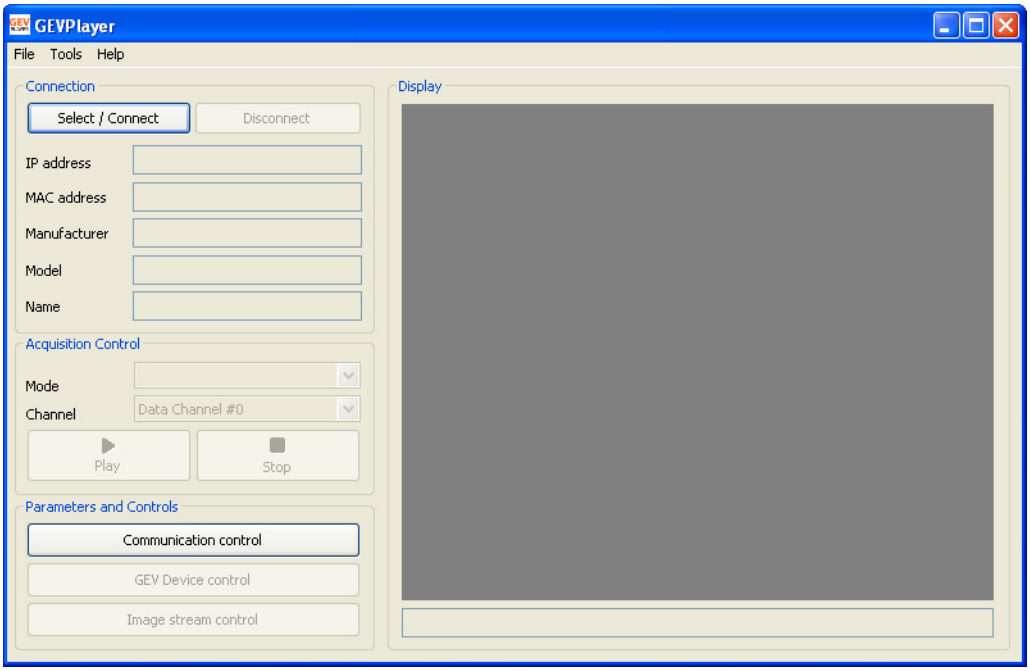
To configure the Windows XP Firewall:

1. From the Windows Start menu, select **Start** > **Control Panel**.
   The Control Panel appears.
2. Open the **Windows Firewall**.
   If the firewall is set to **Off** (such as for closed systems), no further changes are required.
3. On the **General** tab, allow exceptions (*Uncheck* **Don't allow exceptions**).
4. Select the **Exceptions** tab.
5. Click **Add Program**.
   The **Add a Program** dialog appears.
6. Select **GEVPlayer** and click **OK** (the default install location is `C:\Program Files\Pleora Technologies Inc.\iPORT PureGEV Suite\Binaries\GEVPlayer.exe`).
   The **Add a Program** dialog closes and **GEVPlayer** appears in the **Programs and Services** field.
7. Click **OK** to close the **Windows Firewall** dialog.
   The Windows XP Firewall now allows GEVPlayer to send and receive network packets. You can now launch GEVPlayer. See "Launching GEVPlayer" on page 17.

Launching GEVPlayer

To launch GEVPlayer:

- From the Windows Start menu, select **Start** > **All Programs** > **Pleora Technologies Inc** > **iPORT PureGEV Suite** > **GEVPlayer**.
  The main page of GEVPlayer appears. You can now connect to your IP Engine. See “Connecting to your IP Engine” on page 19.

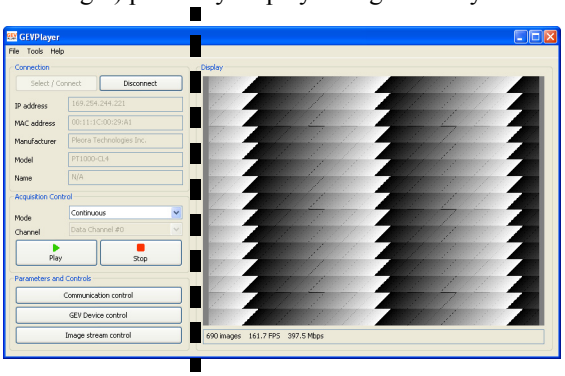


Understanding GEVPlayer

GEVPlayer consists of two parts — the control side and the display side.

The control side (on the left) lets you select and connect to an IP Engine, configure it, and acquire images. The display side (on the right) passively displays images from your IP Engine.

left side - control



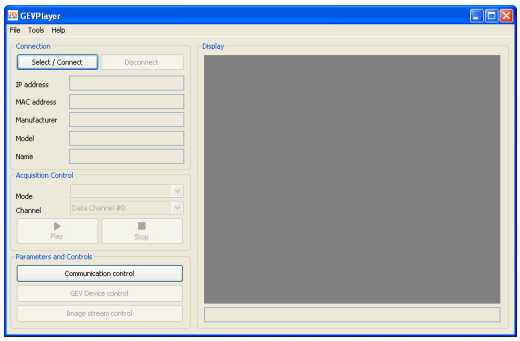
right side - display

18 Launching GEVPlayer

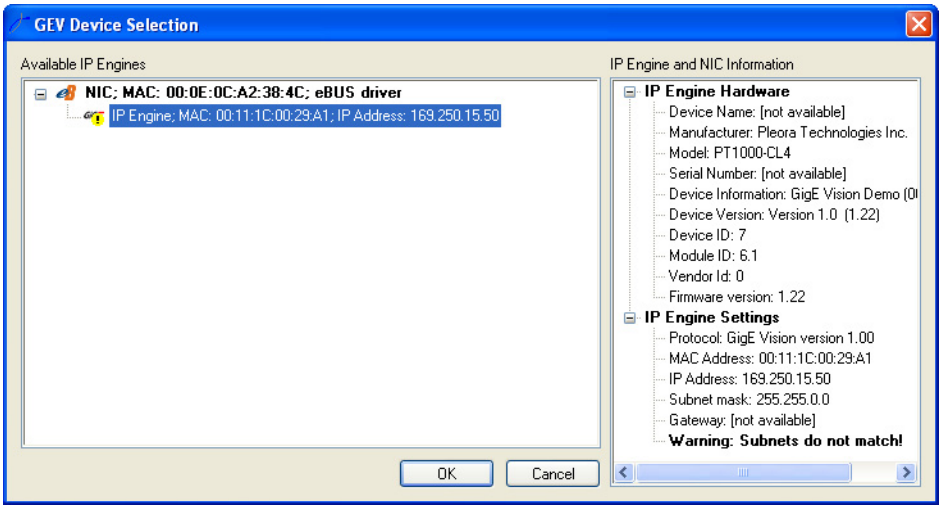
Connecting to your IP Engine

To select and connect to your IP Engine:

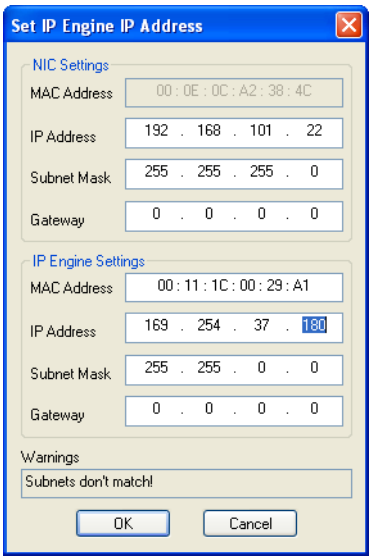
1. Launch GEVPlayer. See “Launching GEVPlayer” on page 17.



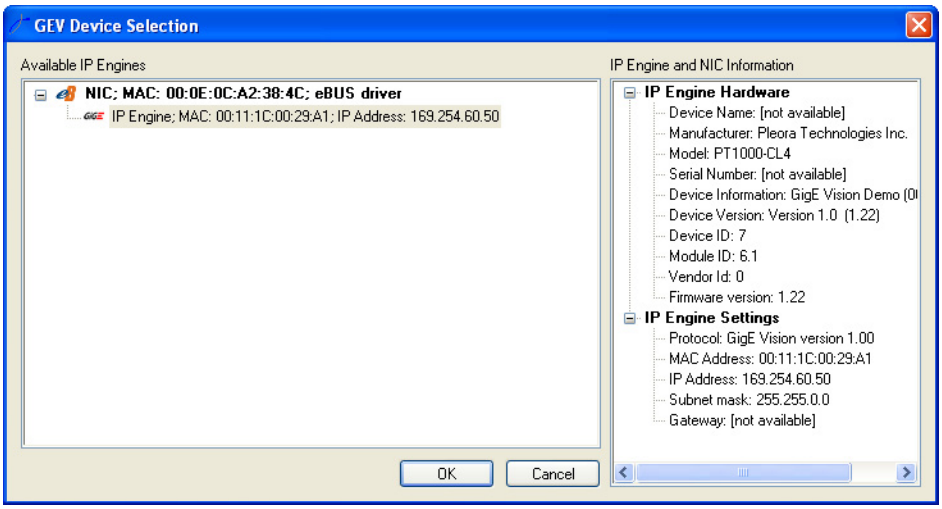
2. In the **Connection** pane, click **Select / Connect**.
   The **GEV Device Selection** dialog appears, listing the IP Engines that each NIC found. NICs connected to a switched network may find multiple IP Engines.
3. In the **Available IP Engines** pane, select your IP Engine.
   GEVPlayer displays information about your selection in the **IP Engine and NIC information** pane.



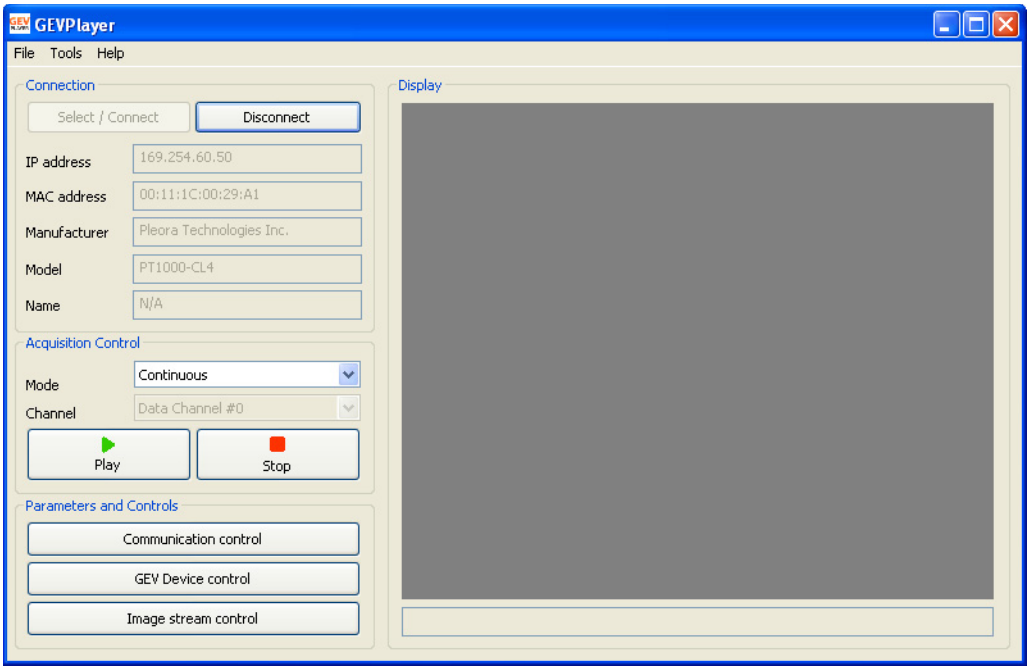
4. Click **OK**.
   The **Set IP Engine IP Address** dialog appears.



5. In the **IP Engine Settings** pane, enter the **IP Address**, **Subnet Mask**, **Gateway**.
6. Click **OK**.
   The **Set IP Engine IP Address** dialog closes.



7. Click **OK**.
   The **GEV Device Selection** dialog closes and GEVPlayer connects to your IP Engine. You can now acquire images. See “Acquiring images” on page 23.



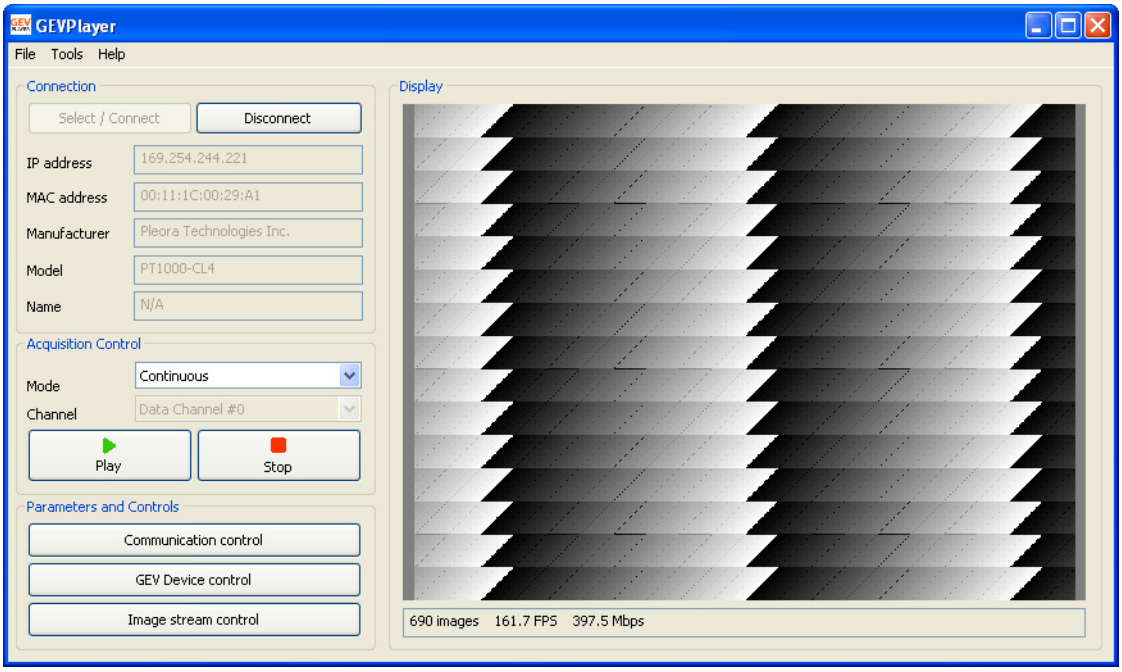
Acquiring images

The **Acquisition Control** pane lets you easily access the features that control how you acquire images.

The GigE Vision Standard requires that your IP Engine start up in a state ready to send images. In fact, you can still acquire images even if you don't have a camera — iPORT IP Engines send a sawtooth-shaped test pattern by default.

To acquire images:

1. Select and connect to your IP Engine. See "Connecting to your IP Engine" on page 19.
2. In the **Acquisition Control** pane, select your preferred **Mode** and **Channel**. For continuous images, select **Continuous** and **Data Channel #0**. For other acquisition modes, see "Understanding acquisition modes" on page 23.
3. In the **Acquisition Control** pane, click **Play**.
   The images appear in the **Display** pane. If you want to control the IP Engine further see "Controlling your IP Engine" on page 25.



Understanding acquisition modes

Your IP Engine lets you acquire images continuously, or frame-by-frame. You can also save images to the IP Engine's onboard memory and retrieve them later. The IP Engine's acquisition modes include:

Continuous
Acquire images continuously.

ContinuousReadout
Acquire images continuously from the IP Engine's onboard memory (until all images in memory have been retrieved).

ContinuousRecording
Save images to the IP Engine's onboard memory until its memory is full.

Multiframe
Acquire a fixed number of images. To configure the number of images, set the IP Engine's **AcquisitionFrameCount** feature.

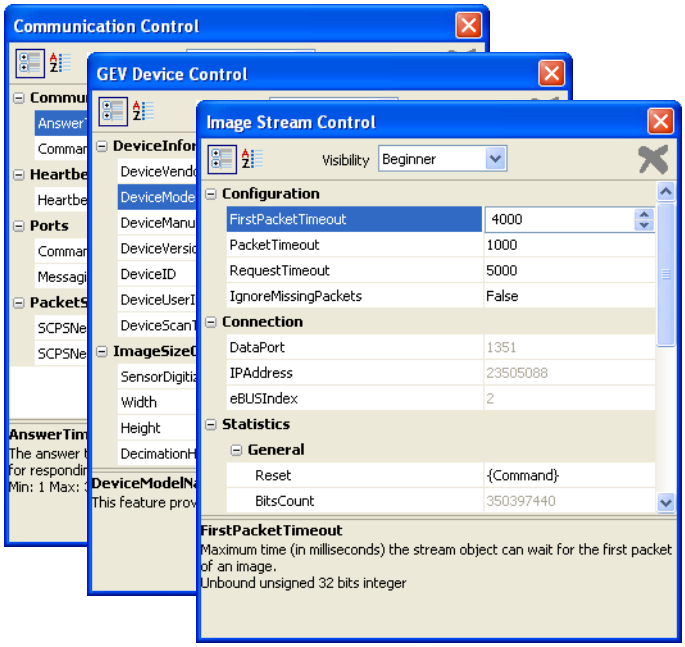
SingleFrame
Acquire a single image.

SingleFrameReadout
Acquire a single image from the IP Engine's onboard memory.

SingleFrameRecording
Save a single image to the IP Engine's onboard memory.

Controlling your IP Engine

GEVPlayer lets you control settings using three functionally identical dialogs.



Control dialogs

Dialog name	Button	Purpose
Communication Control dialog	Communication control	Controls network transport layer settings
GEV Device Control dialog	GEV Device control	Controls settings on the IP Engine and camera
Image Stream Control dialog	Image stream control	Controls image stream settings and provides performance statistics

To access the control dialogs:

- In the **Parameters and Controls** pane, click one of: **GEV Device control**, **Communication control**, or **Image stream control**.
  A control dialog appears.

Understanding the control dialogs

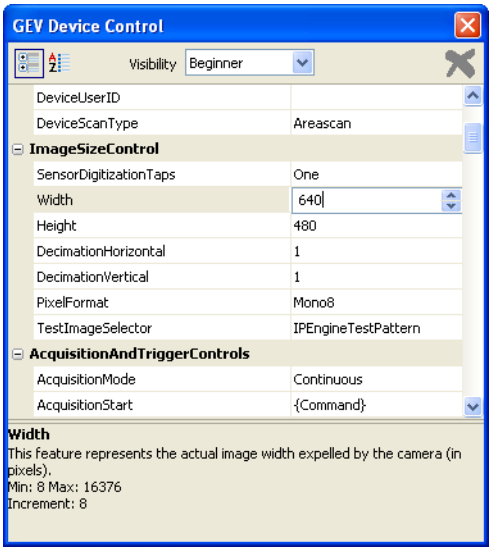
To control the list of features in the left-hand pane:

- Expand and collapse the tree by clicking the + and - icons.
- Find features alphabetically by using the alphabetization button .

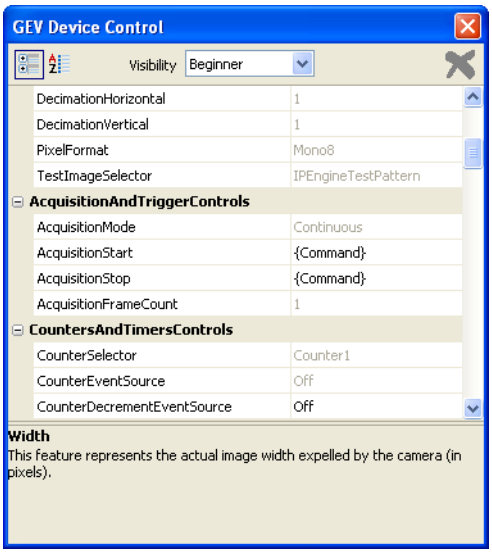
- To show all features, set **Visibility** to **Guru**; to hide complex features, set **Visibility** to **Beginner**.

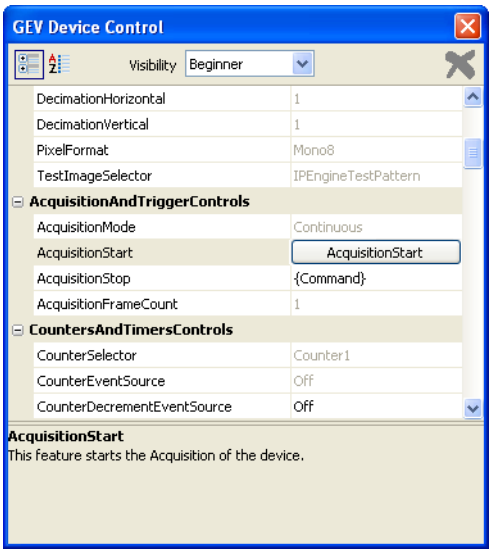
To control features:

1. Select a feature in the left-hand column.
   Information about the feature appears in the bottom pane.
2. If the feature has an editable value, change the value in the edit window. The value is applied when you click somewhere else.



3. If the feature is a command, click it to make the button appear. Click the button to activate the command.





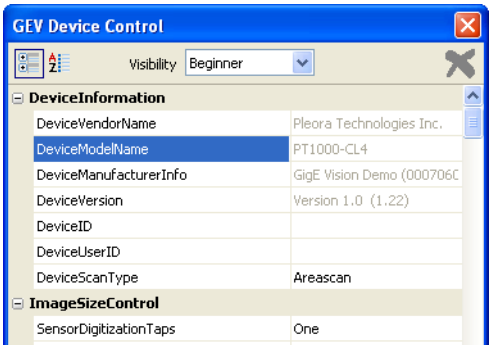
Understanding the controls

All the IP Engine's features are parameter based. By changing the value of a feature, you can directly control how the IP Engine works. In fact, most of the information in GEVPlayer directly correlates to a parameter-based feature in the IP Engine.

Connection pane

Features in the Connection pane

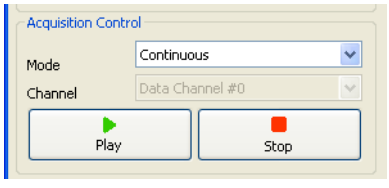
Connection pane shortcut	IP Engine feature
IP address field	**GigEVisionTransportLayer > GevCurrentIPAddress**
MAC address field	**GigEVisionTransportLayer > GevMACAddress**
Manufacturer field	**DeviceInformation > DeviceVendorName**
Model field	**DeviceInformation > DeviceModelName**

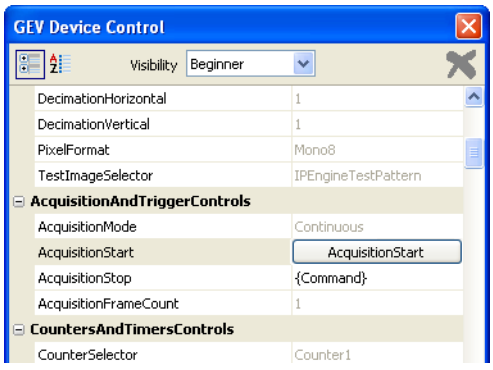


Acquisition Control pane

Features in the Acquisition Control pane

Acquisition Control pane shortcut	IP Engine feature
Mode dropdown	**AcquisitionAndTriggerControls > AcquisitionMode**
Channel dropdown	**GigEVisionTransportLayer > GevStreamChannelSelector**
Play button	**AcquisitionAndTriggerControls > AcquisitionStart**
Stop button	**AcquisitionAndTriggerControls > AcquisitionStop**

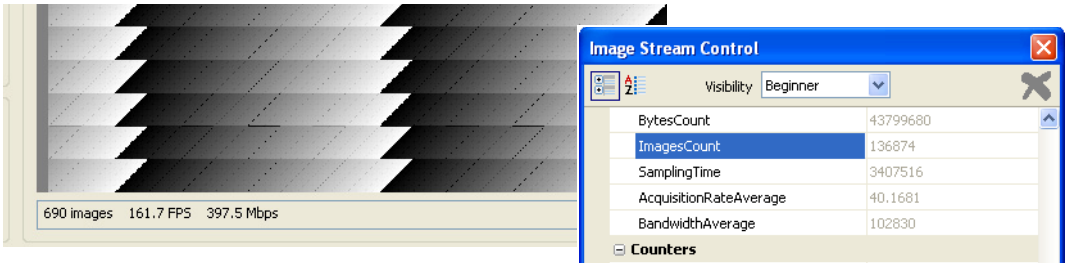




Display pane

Features in the Display pane

Display pane short-cut	Image stream feature
Image count (e.g. *nnn* images)	**Statistics** > **General** > **ImagesCount**
Frame rate (e.g. *xxx* FPS)	**Statistics** > **General** > **AcquisitionRateAverage**
Data rate (e.g. *yyy* Mbps)	**Statistics** > **General** > **BandwidthAverage**

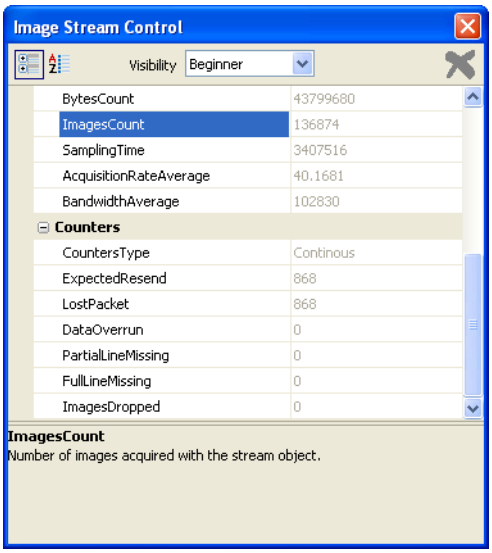


Tracking performance

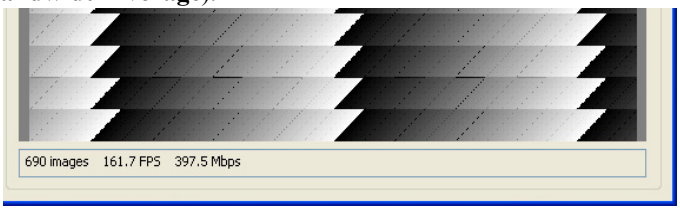
As your IP Engine receives images from your camera and sends them to your PC, it keeps track of image errors (missing lines, etc.), network errors (lost packets, etc.), and other performance-related statistics.

To track performance:

- See a complete list of error counts in the **Image Stream Control** dialog. Performance metrics are grouped in the **Statistics** folder.



- See a summarized list at the bottom of the **Display** pane. The pane shows the total number of images displayed (**ImagesCount**), the instantaneous frame rate (**AcquisitionRateAverage**), and the data rate (**BandwidthAverage**).



Creating your own GigE Vision system

Now that you've successfully connected to your IP Engine and acquired your first images, you're ready to begin developing your own system!

In this section:

Customizing your software

For customizing your software, GEVPlayer is a good place to start — not only is it a complete application, it was designed specifically to be a sample that you can use as a template for your own application!

To customize your software:

1. Configure your IDE (integrated development environment). See the "Creating a new C/C++ project" section in the *iPORT PureGEV C++ SDK Reference Guide*.
2. Copy the GEVPlayer code as a new project. To browse the GEVPlayer code (and all other samples), from the Windows Start menu, select **Start** > **All Programs** > **Pleora Technologies Inc** > **iPORT PureGEV Suite** > **Code Samples**.
3. Use the GEVPlayer code as a template for your own program. You can also use the goal-oriented procedures in the *iPORT PureGEV C++ SDK Reference Guide*.

Customizing your hardware with AutoGEV

The IP Engine's default firmware lets you perform most image-acquisition tasks. However, you can use AutoGEV to customize your hardware.

AutoGEV is software that lets you:

- Hide unneeded features from your customer
- Create your own features
- Define the entire GEV interface
- Instantly generate new firmware (so you can test your results as you go)
- and more!

Using iPORT AutoGEV and your iPORT IP Engine, you can quickly make your existing cameras GigE Vision-compliant so you can get to market quickly.

(Contact your Pleora sales representative for details and pricing for iPORT AutoGEV software.)

To customize your hardware:

- See the *iPORT AutoGEV Software Guide*.

Technical support

For additional help, see the “Technical support” section in the *iPORT Quick Start Guide.*

34 Technical support