Technical Application Note TAN2008012

Ladybug JPEG image quality and buffer size settings
Revised November 19, 2008

1.1.   Subject

Technical Application Note (TAN2008012): Ladybug JPEG image quality and buffer size settings

1.2.   Applicable Product(s)

- **Ladybug2 and Ladybug3 Spherical Vision cameras**

1.3.   Application Note Description

The purpose of this Technical Application Note is to explain how to use the Custom Settings dialog in the LadybugCapPro demo program to manage JPEG image quality and frame rate.

1.4.   Overview

When balancing JPEG image quality and frame rate on Ladybug cameras, there are two primary factors to consider:

- Compression Control—This is the rate at which the Ladybug compression engine works. A higher compression rate produces higher-quality JPEG images. In turn, higher-quality images result in larger amounts of data that must be transmitted to the PC.
- Image Buffer Size—This is the size of the frame buffer on the PC (controlled by the camera driver) that receives images from the camera. A larger buffer size means higher-quality data can be processed. However, processing more data may come at the expense of frame rate.

You can use the Custom Settings dialog in the LadybugCapPro demo program to adjust compression control and buffer size, effectively balancing the quality of JPEG images that are transmitted from a Ladybug camera with the frame rate of these transmissions. There are two primary mechanisms for achieving this balance: auto and manual.

*'Frame rate' in the context of this article refers to Maximum Transmitted Frame Rate, which controls the rate at which images are transmitted from the camera to the PC. Unless the **Set Frame Rate** control is clicked, this setting is not the same as the Frame Rate setting of the camera register, which controls the rate at which the camera grabs images. This rate is controlled in the General Settings dialog.*

1.5.   Using the JPEG Quality-Auto Setting

The easiest way to balance JPEG image quality with frame rate is to check the **Auto** checkbox beside the JPEG Quality slider. When you do this, the Ladybug camera adjusts the quality of JPEG compression to the maximum allowed by the **Image Buffer Size** setting. Checking **Auto** ensures that the compression rate continually adjusts so that it never exceeds the amount of data allowed by the image buffer size. This process is portrayed in Figure 1.
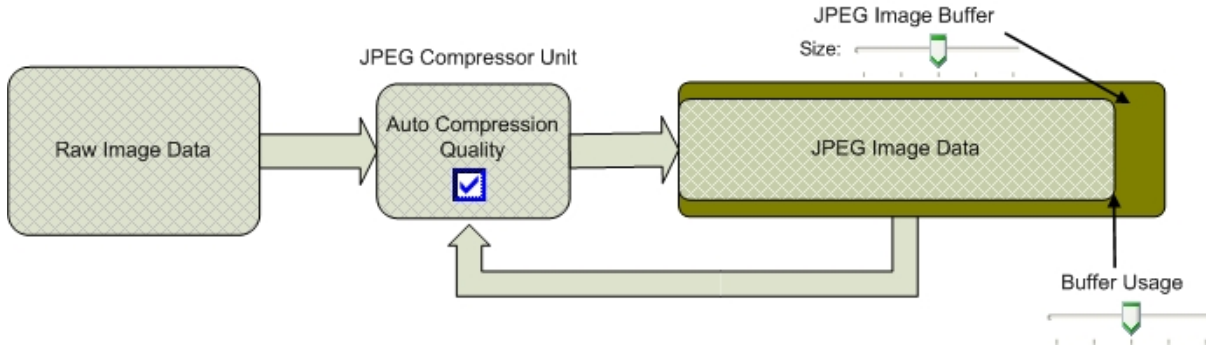

Figure 1: JPEG Quality-Auto Compression Process

The compression engine receives raw image data and converts it to JPEG format. The quality of the compression adjusts automatically depending on the image buffer size.

Note also that when JPEG Quality-Auto is enabled, you can adjust the **Auto Buffer Usage** setting. This control specifies the percentage of the image buffer size that is actually used for JPEG compressed image data. Specifying a value less than the maximum allows for room in the image buffer to accommodate extra image data, depending on scene variations from frame to frame. Increasing this value may result in an increase in the JPEG Quality setting. We suggest a setting that results in a JPEG Quality value that is not too high—between 80% and 95%. For more information, see 1.7 General Recommendations. When JPEG Quality-Auto is not enabled, the percentage of the image buffer that is used is undetermined and cannot be controlled.

1.6.   Adjusting JPEG Quality Manually

When JPEG Quality-Auto is not enabled, you can adjust the **JPEG Quality** value manually. When you use this approach, there is no feedback mechanism to adjust compression quality according to image buffer size. This is illustrated in Figure 2.
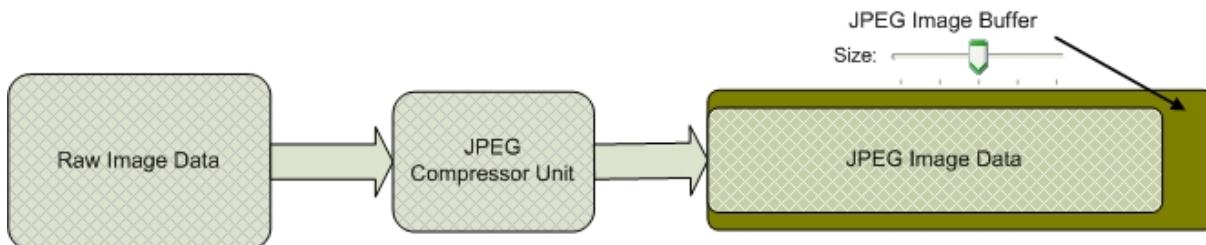

Figure 2: JPEG Quality-Manual Compression Process

Without the feedback mechanism in place, the **JPEG Quality** setting may be too high for your image size, frame rate or packet size settings. When this is the case, you may get unexpected results from your camera, including dropped frames and 'Buffer too small' errors displayed on the LadybugCapPro status bar. Depending on your requirements, you can address this issue by increasing the image buffer size, lowering the frame rate, or lowering image quality.

1.7.   General Recommendations

Whether you adjust JPEG quality automatically or manually, we recommend following these general guidelines:

- Maximize frame rate by setting **Packet Size** to the maximum allowed by the bus. The default setting is a maximum of 4096 bytes on a 1394a bus and 9792 bytes on a 1394b bus.
- We recommend a **JPEG Quality** setting between 80% and 95%. The visual improvement at higher than 95% is negligible compared to the increased amount of data generated.

For more information about working in the Custom Settings dialog of the LadybugCapPro demo program, refer to the 'Custom Settings' topic in the Ladybug SDK Help.

1.8.   Related Knowledge Base Articles

Article	Title	Address
33	Different Color Processing Algorithms	http://www.ptgrey.com/support/kb/index.asp?a=4&q=33
149	PGR FlyCapture SDK color processing algorithm performance	http://www.ptgrey.com/support/kb/index.asp?a=4&q=149
182	Why is the frame rate displayed in the demo program different from the requested frame rate?	http://www.ptgrey.com/support/kb/index.asp?a=4&q=182
222	How does changing the compression level affect the quality of Ladybug2 images?	http://www.ptgrey.com/support/kb/index.asp?a=4&q=222

1.9.   Additional Downloads and Support

Access more Technical Application Notes on the web at www.ptgrey.com/support/downloads.

Point Grey Research Inc. endeavors to provide the highest level of technical support possible to our customers. Most support resources can be accessed through the Product Support section of our website: www.ptgrey.com/support.

Creating a Customer Login Account

The first step in accessing our technical support resources is to obtain a Customer Login Account. This requires a valid name, e-mail address, and camera serial number. To apply for a Customer Login Account go to www.ptgrey.com/support/downloads/.

Knowledge Base

Our on-line knowledge base at www.ptgrey.com/support/kb/ contains answers to some of the most common support questions. It is constantly updated, expanded, and refined to ensure that our customers have access to the latest information.

Product Downloads

Customers with a Customer Login Account can access the latest software and firmware for their cameras from our downloads site at www.ptgrey.com/support/downloads. We encourage our customers to keep their software and firmware up-to-date by downloading and installing the latest versions.

Contacting Technical Support

Before contacting Technical Support, have you:

1. *Read the product documentation and user manual?*
2. *Searched the Knowledge Base?*
3. *Downloaded and installed the latest version of software and/or firmware?*

If you have done all the above and still can't find an answer to your question, contact our Technical Support team at www.ptgrey.com/support/contact/.

Revised 19-Nov-08   4