Technical Application Note TAN2006008

Streaming raw video data to disk from multiple 1394 cameras
Revised January 5, 2007

1.1. Subject

Technical Application Note (TAN2006008): Streaming raw video data to disk from multiple 1394 cameras

1.2. Applicable Product(s)

- *Flea*
- *Flea2*

1.3. Application Note Description

The purpose of this Technical Application Note is to document a configuration that was used to store raw video data streams from multiple cameras to hard disk on a single machine. The configuration employs standard off the shelf components and 1024x768 Flea2 cameras.

1.4. System Configuration

Parameter	Configuration
Hardware	
Motherboard	Asus M2N-E
Video card	2MB VRAM PCI card
Hard drive	4 Maxtor 250GB 7200rpm SATA2 drives configured in a non-redundant, RAID0 array using the volume striping option available with the Microsoft Disk Management Tools.
1394 card	SIIG FireWire 800 3-port PCI Express
Cameras	5 Flea2 1024x768
Software	
SDK	FlyCapture 1.6rc15
Driver	PGR1394b-PRO
Capture	Modified version of MultipleCameraEx
Synchronization	via Multisync software

1.5. Additional Details

1.5.1. Capture software

The standard MultipleCameraEx example from the FlyCapture SDK was modified to provide the functionality required to perform the benchmark testing. The primary modification involved adding functionality that wrote all of the incoming raw image data to disk.

Disk writing was optimized by:

- Making use of the following Microsoft Windows API calls:
  - `GetDiskFreeSpace`
  - `CreateFile`
  - `WriteFile`
- Making all writes sector aligned. In this case, no padding was done as the image size (1024x768) was a whole number multiple of the 512byte sector size.
- Writing all of the data from a single camera to a single file as opposed to having a single file for every image. Maintaining a relatively small number of files helps reduce the overhead associated with maintaining the file system.
- When using color cameras, only storing the raw bayer data as opposed to the larger color processed images.

1.5.2. Video card

All of the PCI Express slots on the board were occupied with PCIe 1394 cards. The only slot available for a video card was a much slower PCI slot. As a result of this lack of bandwidth visual output from the software was kept to a minimum in order to avoid a number of performance issues.

1.5.3. Multiple cameras on a single bus

At the time that this article was written, most 1394b host adapter cards suffered from an issue which prevented more than two 1394b nodes (1 camera + host adapter) to reside on the same bus. This issue is discussed in Knowledge Base Article 244 at www.ptgrey.com/support/kb/. In order for configurations involving more than a single 1394b camera on the same bus to be successful, users will have to insure that their 1394b card employs the TI TSB81BA3D physical layer. This will not be an issue for configurations involving a single camera on any given bus or for configurations involving 1394a cameras.

1.6.   Successful Configurations

The following two tables illustrate successful configurations that attempted to maximize throughput to disk – they should not be considered an exhaustive list; many other lower data rate configurations will also work.

1.6.1.   3 Buses, 5 Cameras

Parameter	Value
1394 cards	3
Number of Cameras	5
Camera Resolution	1024x768
Frame Rate	30Hz
Data rate	~112MB/sec
Out of sync frames	0

1.6.2.   4 Buses, 4 Cameras

Parameter	Value
1394 cards	4
Number of Cameras	4
Camera Resolution	1024x768
Frame Rate	30Hz
Data rate	~90MB/sec
Out of sync frames	0

1.7. 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/.