Camera Physical Description

Aluminum case with C-/CS-mount lens holder (DX-xCS-DX)
Bare-board with C-/CS-mount lens holder (DX-xCS)

The Dragonfly EXPRESS camera is housed in an anodized aluminum case (DX-xxx-KIT and DX-xxx-DSBOX only). The dimensions of this case are 75mm x 65mm x 29mm, not including the optics or the rear GPIO connector. The lens mount can accommodate a standard C- or CS-mount lens.

The large mounting holes on the case are 1/4-20 tapped holes. The smaller mounting holes are M3 tapped holes. The lens set screw hole is 2mm and the set screw requires a 0.035-inch hex driver.

Status Indicator LED

<table>
<thead>
<tr>
<th>LED Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady on</td>
<td>Camera receiving power and successful initialization</td>
</tr>
<tr>
<td>Steady on and very bright</td>
<td>Camera acquiring / transmitting images</td>
</tr>
<tr>
<td>Flashing bright, then brighter</td>
<td>Camera registers being accessed for image acquisition</td>
</tr>
<tr>
<td>Steady flashing on and off</td>
<td>Indicates possible camera problem</td>
</tr>
<tr>
<td>Slow flashing on and off</td>
<td>Indicates possible camera problem</td>
</tr>
</tbody>
</table>

Camera Interface

General Purpose IO (GPIO) Connector

The Dragonfly EXPRESS has a set of four (4) GPIO pins that can be accessed via the Hirose HR10 (12-pin) female circular connector on the back of the case.

| Manufacturer Part Number: | HR10A-10P-12P (male counterpart) |
| Datasheet Part Number:    | HR10A-10R-12SB (female connector) |
|                          | HR10A-10P-12P (male counterpart)  |

GPIO pin configuration (Hirose Connector)

GPIO pin configuration (bare board)

Pins 1 through 4 (GPIO 0 to GPIO3) can be configured as general purpose I/O (external triggering, general input/output, strobe output). Pins 7 and 8 (+3.3V) are powered external circuitry up to a total of 50mA.

Pins 3 and 4 can also be used as an RS-232 serial port; however, a level converter is required to convert the TTL digital logic levels to RS-232 voltage levels. B&B Electronics Part Number 232LPTTL can be used for this conversion.

GPIO Electrical Characteristics

The Dragonfly EXPRESS GPIO pins are TTL 3.3V pins protected by two diodes to +3.3V and GND in parallel. There is also a 10k resistor in series to limit current. When configured as input, the pins can be directly driven from a 3.3V or 5V logic output. For output, each GPIO pin has almost no drive strength (they are high impedance) and needs to be buffered with a transistor or driver to lower its impedance. The pins are protected from both over and under voltage. However, it is recommended that they only be connected to 5V or 3.3V digital logic signals.

WARNING: Users should take every precaution to ensure the correct wiring of the GPIO pins. Incorrect wiring could result in camera damage.

IEEE-1394b Connector

The Dragonfly EXPRESS has a standard 9-pin IEEE-1394b connector that is used for data transmission, camera control and powering the camera. The pin configuration for the socket is illustrated below.

IEEE-1394b pin configuration

Contacting Point Grey Research

General Information:
All general questions can be sent to:
info@ptgrey.com

Sales:
Please direct any sales related questions to:
sales@ptgrey.com

Knowledge Base:
We encourage all customers to search for answers to commonly asked questions in our knowledge base, which can be found at:
http://www.ptgrey.com/support/kb

Technical Support:
To contact technical support please go to our website:
http://www.ptgrey.com/support/contact/

Latest Manuals and Software:
Users can download the latest manuals, software and camera firmware from:
http://www.ptgrey.com/support/downloads

Other inquiries:
All other questions and correspondence can be directed to:
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Dragonfly EXPRESS
IEEE-1394b Digital Camera System

Getting Started Manual

Users can download the latest firmware and documents for their camera at:
http://www.ptgrey.com/support/downloads

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Document printed on November 4, 2004
Precautions and Camera Care

Your PGR IEEE 1394 digital camera module is a precisely manufactured device and should be handled with care. Here are some tips on how to care for the device.

- Avoid electrostatic charging. Please consult the following knowledge base article for more details: http://www.ptgrey.com/support/kb/details.asp?id=42
- Users who have purchased a bare board camera should be sure to take the following additional protective measures:
  - Either handle bare handed or use non-chargeable gloves, clothes or material. Also use conductive shoes.
  - Install a conductive mat on the floor or working table to prevent the generation of static electricity.
- When handling the camera unit, avoid touching the lenses. Fingerprints will affect the quality of the image produced by the device.
- To clean the lenses, use a standard camera lens cleaning kit or a clean dry cotton cloth. Do not apply excessive force.
- To clean the imaging surface of your CCD, follow the steps outlined in the generation of static electricity.
- Our cameras are designed for an office environment or laboratory use. Extended exposure to bright sunlight, rain, dusty environments, etc. may cause problems with the electronics and the optics of the system.
- Avoid excessive shaking, dropping or any kind of mishandling of the device.

Installing Your Camera System

**NOTE:** The driver and SDK must be installed before connecting the camera to your computer; otherwise your computer may not use the correct driver. If this happens, you must manually install the driver. For further instructions, please consult the knowledge base at http://www.ptgrey.com/support/kb.

1. Install the PCI card into an available PCI slot. Installing the 1394b PCI OHCI (Open Host Controller Interface) card is very similar to installing other PCI devices. Upon successful installation, the Windows Device Manager will list an IEEE 1394 Bus host controller.

2. Install the PGR FlyCapture driver and SDK. Software installation can be achieved by either inserting the accompanying CD into your PC or downloading the latest software from http://www.ptgrey.com/support/downloads. Further instructions on installing the FlyCapture software are available in the User Manual contained on the CD.

3. Connect the camera to your computer. With the computer powered on, insert one end of the IEEE-1394 cable (included with the kit) into the camera and the other into the 1394 PCI card.

Camera Features

- **Automatic Synchronization:** Cameras operating on the same bus and running at the same frame rate will automatically synchronize to one another.
- **Upgradable Firmware:** The camera employs a design that allows the firmware to be upgraded in field via the IEEE-1394 interface.
- **Gain and Brightness:** The camera employs a pair of 12-bit A/D converters that allows the user to modify the gain and brightness (black clamp) levels. The gain can be adjusted from -6 to 36dB.
- **Adjustable and Extended Integration Time:** The user has the ability to adjust the sensitivity’s integration time via the IEEE-1394 interface. In addition to supporting the integration times outlined under Camera Specifications, extended shutter times upwards of several seconds are also supported.
- **High Frame Rate:** The Dragonfly EXPRESS is capable of transmitting full frames without compression across the IEEE-1394b bus up to 120fps using standard video modes. In custom image mode, the camera can acquire and transmit images at 200fps (640x480 resolution).
- **General Purpose Input/Output:** The camera has 4 pins that can be used for general-purpose input and output. These GPIO pins can also be configured to behave as an RS-232 serial port.
- **Trigger Modes:** The camera supports a variety of standard external and internal DCAM compliant trigger modes including Trigger Mode 0, Trigger Mode 1 and Trigger Mode 3.
- **Strobe Output:** It is possible to configure the camera to output a triggering signal to an external device that is synchronized and offset with either the start of integration or an external trigger signal.
- **Regions of Interest:** The camera supports DCAM Format 7. This format allows the user to extract partial images at faster frame rates than those possible in full frame modes.

Windows 2000 will automatically recognize the device and prompt you to install the driver- this is usually done automatically. In Windows XP, the Add Hardware Wizard will appear. To properly install the device driver:

- Click Install from a list or specific location and click Next.
- Select Don’t search. I will choose the device to install and click Next.
- Click Have Disk and then browse to the driver folder of your installed software (for example, C:\Program Files\Point Grey Research\PGR FlyCapture\driver), then click OK, then OK.
- Select the camera model (e.g. PGR Dragonfly EXPRESS) then click Next.

The driver installation process will proceed and you will be asked “If you want to install the unsigned driver” - click Continue Anyway then Finish to complete installation. Check Device Manager to verify correct installation.

Test the system. Test the camera using the PGR FlyCap software. For more details see the PGR FlyCapture manual located at Program Files > Point Grey Research > PGR FlyCapture > Documentation.