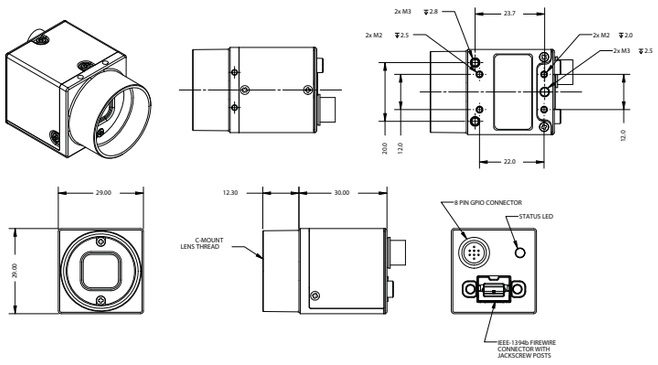
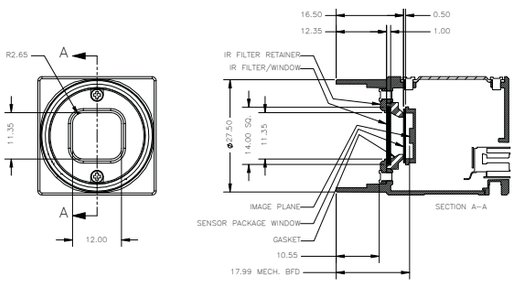
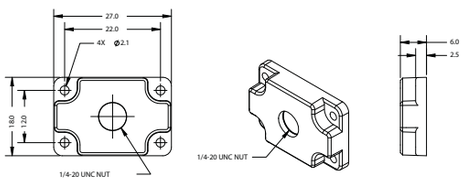
## TECHNICAL DRAWINGS




NOTE:
1. CAMERA USES IR FILTER WITH COLOUR SENSORS, AND A CLEAR WINDOW WITH MONOCHROME SENSORS.
2. THE REFRACTIVE INDEX OF THE IR FILTER/WINDOW, AND THE SENSOR PACKAGE WINDOW IS 1.5.
3. THIS IS A C-MOUNT CAMERA. CS-MOUNT LENSES CAN NOT BE USED WITH THIS CAMERA
4. THE MECHANICAL BACK FLANGE DISTANCE (MECH. BFD) IS GREATER THAN THE NOMINAL 17.526MM C-MOUNT BFD DUE TO THE FILTER AND WINDOW(S) BETWEEN THE LENS AND THE IMAGE PLANE.




# Getting Started

## Flea®3 IEEE-1394b Digital Camera

The following items are included with your Flea 3 Development Accessory Kit

- ACC-01-2005 4.5m, 9-pin to 9-pin locking IEEE-1394b cable
- ACC-01-2007 4.5m, 6-pin to 9-pin locking IEEE-1394a to 1394b
- ACC-01-10001 IEEE-1394b OHCI PCI Host Adapter 3-port 800Mb/s card
  OR
  FWB-PCIE-01: FirePRO low profile single bus IEEE-1394b PCI Express card
- ACC-01-3000 1m GPIO wiring harness with Hirose HR25 8-pin male connector
- PGR FlyCapture SDK (C/C++ API and device drivers) CD


FireWire

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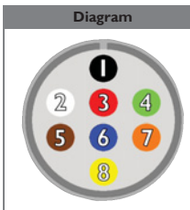
## STATUS LED

| | |
|---|---|
| **Off** | Not receiving power |
| **Steady on** | Receiving power and successful camera initialization |
| **Steady on and very bright** | Acquiring / transmitting images |
| **Flashing bright, then brighter** | Camera registers being accessed (no image acquisition) |
| **Steady flashing on and off** | Indicates possible camera problem |
| **Slow flashing on and off** | Indicates possible camera problem |

## GPIO

| Diagram | Pin | Function | Description |
|---|---|---|---|
|  | 1 | IO0 | Opto-isolated Input (default Trigger in) |
| | 2 | IO1 | Opto-isoloated Output |
| | 3 | IO2 | Input / Output / RS232 Transmit (TX) |
| | 4 | IO3 | Input / Output / RS232 Receive (RX) |
| | 5 | GND | Ground for bi-directional IO, $V_{EXT}$, +3.3 V pins |
| | 6 | GND | Ground for opto-isolated IO pins |
| | 7 | $V_{EXT}$ | Allows the camera to be powered externally |
| | 8 | +3.3V | Power external circuitry up to a total of 150mA |
| To configure the GPIO pins, consult section 3.4 "General Purpose Input / Output" of the Flea3 Technical Reference Manual | | | |



## SPECIFICATIONS

| | FL3-FW-03S1 | FL3-FW-03S2 | FL3-FW-03S3 | FL3-FW-08S2 | FL3-FW-13S2 | FL3-FW-14S3 | FL3-FW-20S4 | FL3-FW-50S5 |
|---|---|---|---|---|---|---|---|---|
| **Image Sensor Type** | Sony progressive scan interline transfer CCD's with square pixels and global shutter, monochrome or color | | | | | | | |
| **Image Sensor Model** | ICX618 1/4" | ICX424 1/3" | ICX414 1/2" | ICX204 1/3" | ICX445 1/3" | ICX267 1/2" | ICX274 1/1.8" | ICX655 2/3" |
| **Maximum Resolution / Max Frame Rate** | 648x488 at 120 FPS | 648x488 at 80 FPS | 648x488 at 76 FPS | 1032x776 at 30 FPS | 1288x966 at 30 FPS | 1392x1032 at 15 FPS | 1624x1224 at 15 FPS | 2448x2048 at 9 FPS |
| **Pixel Size** | 5.6µm x 5.6µm | 7.4 x 7.4µm | 9.9 x 9.9µm | 4.65 x 4.65 µm | 3.75 x 3.75 µm | 4.65 x 4.65 µm | 4.4 x 4.4 µm | 3.45 x 3.45 µm |
| **Analog-to-Digital Converter** | Analog Devices 12-bit analog-to-digital converter | | | | | | | |
| **Video Data Output** | 8, 12, 16 and 24-bit digital data (see Supported Data Formats) | | | | | | | |
| **Image Data Formats** | Y8, Y16, Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, Raw8, Raw12, Raw16 (color models) | | | | | | | |
| **Digital Interface / Transfer Rates** | Bilingual 9-pin IEEE-1394b for camera control, video data transmission, and power Transfer Rates: 100, 200, 400, 800 Mbit/s | | | | | | | |
| **Partial Image Modes** | pixel binning and region of interest modes via Format_7 | | | | | | | |
| **Interfaces** | 9-pin IEEE-1394b for camera control and video data transmission, 4 general-purpose digital input/output (GPIO) pins. | | | | | | | |
| **General Purpose I/O Ports** | 8-pin Hirose HR25 GPIO connector opto-isolated pins for trigger, pwm and strobe, bi-directional pins for trigger, strobe, pwm or serial port | | | | | | | |
| **Gain Control** | automatic / manual / one-push gain modes, programmable via software, 0dB to 24dB in 0.04dB increments | | | | | | | |
| **Synchronization** | via external trigger, software trigger (on same bus only), or free-running | | | | | | | |
| **External Trigger Modes** | DCAM v1.32 Trigger Modes 0, 1, 3, 4, 5, 14, and 15 | | | | | | | |
| **Power Requirements** | Voltage: 8-30V. Power: less than 2.5W | | | | | | | |
| **Mass/ Dimensions (L x W x H)** | 58 grams (without optics), 29mm x 29mm x 30mm (excluding lens holder, without optics) | | | | | | | |
| **Memory Storage** | 32MB frame buffer, 1 MB non-volatile user data flash; 2 user configuration sets | | | | | | | |
| **Shutter** | Automatic/Manual/One-Push/Extended Shutter modes, 0.03 ms to 25 seconds | | | | | | | |
| **Lens Mount** | C-mount | | | | | | | |
| **Emissions Compliance** | Complies with CE rules and Part 15 Class A of FCC Rules | | | | | | | |
| **Operating/Storage Temperature** | 0° to 45°C, -30° to 60°C | | | | | | | |
| **Camera Specification** | IIDC 1394-based Digital Camera Specification v1.32 | | | | | | | |

# 1 Installation

## 1. Recommended System Configuration

| OS | CPU | RAM | VIDEO | PORTS |
|---|---|---|---|---|
| Vista SP1, Win7, Linux Ubuntu 8.04 | 2.0GHz or equivalent | 2 GB | AGP 128mb | IEEE-1394b |

- Windows XP Service Pack 1
- 512MB of RAM
- Intel Pentium 4 2.0GHz or compatible processor
- AGP video card with 128MB video memory
- 64-bit PCI or PCI-X slot (32-bit slot required)
- PCI-Express slot
- 1394b PCI card or 1394b PCI-Express card (available in dev kit)

## 2. Electrostatic Precautions and Camera Care

- Users who have purchased a bare board camera should:
  - This product is not intended for use in residential environments.
  - 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.

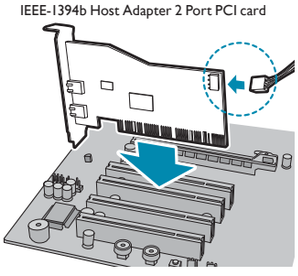
- When handling the camera unit, avoid touching the lenses. To clean the lenses, use a standard camera lens cleaning kit or a clean dry cotton cloth. Do not apply excessive force.
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

- To clean the imaging surface of your CCD, follow the steps outlined in www.ptgrey.com/support/kb/index.asp?a=4&q=66.
- 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 mishandling of the device.

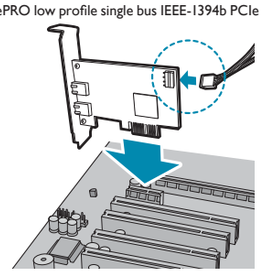
## 3. Install the IEEE-1394b PCI or PCIe card

- Turn computer off and place the IEEE-1394b PCI card in an open PCI slot or place the IEEE-1394b PCI-Express card in an open PCI-Express slot.

IEEE-1394b Host Adapter 2 Port PCI card

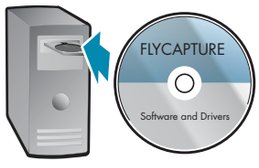


FirePRO low profile single bus IEEE-1394b PCIe card



- Connect the 4-pin connector on the card to the PC power supply.
- Turn the computer back on and log into Windows.
- In most cases, the Windows IEEE-1394 drivers will be automatically installed for the card, with no user input required. However, in some cases the **Found New Hardware Wizard** will appear. Follow the prompts given by the Wizard to install the card.
- Open Windows Device Manager by going to the **Control Panel > System > Hardware tab > Device Manager.** Ensure the PCI card is properly installed as an **IEEE 1394 Bus host controller.**

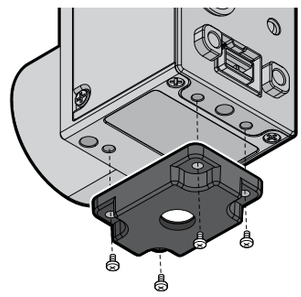
## 4. Install the FlyCapture® Software and Drivers




- Insert the FlyCapture software CD-ROM. If the Installation Wizard does not automatically run, browse to your CD-ROM directory and run the **setup.exe** file.
- Follow the installation instructions to install the software.

**IMPORTANT NOTE for Windows XP Users**
A dialog will appear prompting you to install the **FirePRO** driver. We strongly recommend doing this in order to take full advantage of 1394b 800Mb/s speeds. See this Knowledge Base article for further information: www.ptgrey.com/support/kb/index.asp?a=4&q=171

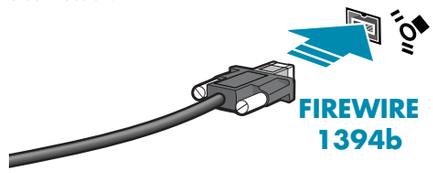
## 5. Installing the Tripod Mounting Bracket (optional)



- The ASA and ISO-compliant tripod mounting bracket for the Flea3 attaches to the camera using the included M2x5 screws.

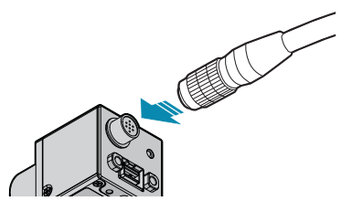
## 6. Connect the 1394b PCI Card and Cable to the camera

- Plug the 4.5 meter, 9-pin to 9-pin, IEEE-1394b cable into the 1394b PCI card and the Flea3 1394b connector; the cable jack screws can be used for a secure connection.




**NOTE:** The camera relies on the 9-pin 1394b cable to provide power. If using an interface card other than that provided, ensure that adequate power is provided. The Flea2 has a standard 9-pin IEEE-1394b connector that is used for data transmission, camera control and powering the camera. The maximum 1394b cable length between any 1394 node (e.g. camera to PCI card) is 4.5m, as specified by the IEEE-1394 standard

## 7. Install the GPIO Cable (optional)



**General Purpose I/O Connector**
The Flea3 has a Hirose HR25 8-pin general purpose input/output (GPIO) female connector on the back of the case (P/N: HR25-7TR-8SA). The FL2-DEVKIT includes a one (1) meter long wiring harness equipped with a male connector (P/N: HR25-7TP-8P, Digikey P/N: HR702-ND). Wires are color coded or labelled according to the table below to indicate functionality.

| Diagram | Pin | Function | Description |
|---|---|---|---|
|  | 1 | IO0 | Opto-isolated Input (default Trigger in) |
| | 2 | IO1 | Opto-isoloated Output |
| | 3 | IO2 | Input / Output / RS232 Transmit (TX) |
| | 4 | IO3 | Input / Output / RS232 Receive (RX) |
| | 5 | GND | Ground for bi-directional IO, $V_{EXT}$, +3.3 V pins |
| | 6 | GND | Ground for opto-isolated IO pins |
| | 7 | $V_{EXT}$ | Allows the camera to be powered externally |
| | 8 | +3.3V | Power external circuitry up to a total of 150mA |
| To configure the GPIO pins, consult section 3.4 "General Purpose Input / Output" of the Flea3 Technical Reference Manual | | | |



## 8. Confirm Successful Installation

- Check the Device Manager to confi rm that installation was successful (PGRCAM driver install only). Go to the **Start menu**, select **Run** and enter "**devmgmt.msc**".
- To test the camera's image acquisition capabilities, run the FlyCap demo program.

# 2 Troubleshooting

The FlyCapture® User Guide and other technical references can be found in the **Programs > Point Grey Research > PGR FlyCapture > Documentation** directory. Our on-line Knowledge Base (www.ptgrey.com/support/kb/) also addresses the following problems:

- Article 21: Troublesome hardware configurations
- Article 88: Vertical bleeding or smearing from a saturated portion of an image
- Article 91: PGR camera not recognized by system and not listed in Device Manager
- Article 93: My laptop's IEEE-1394 port or PCMCIA card doesn't supply power to my camera
- Article 145: Image discontinuities or horizontal tearing of images when displayed on monitor
- Article 171: Performance of 1394 devices may decrease after installing Windows XP SP2
- Article 188: Image data acquired by my camera is corrupt and displayed images are broken
- Article 189: Image capture freezes after a period of successful image capture.

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