

Introduction to the Flea3 FireWire Camera Family

INNOVATION IN IMAGING



POINT GREY

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- Transitioning from the FL2 and FL2G
- What's new with the FL3
- Support for FlyCapture 1.x and FlyCapture 2.x
- Documentation and where to find it
- Part number structure
- Understanding firmware versioning

Introducing the Flea3

- The Flea3 is the next-generation of Flea2 camera
- Adds 2 new Sony CCD sensors
- IEEE 1394b (GigE Vision coming soon!)
- Measures just 29 x 29 x 30 mm
- Opto-isolated GPIO
- Non-volatile flash memory
- 2 year warranty



Transitioning from the FL2 and FL2G

- From Flea2
 - GPIO may have to be re-wired since the Flea3 has opto-isolated GPIO (see following slides)
 - Interface remains 1394b
 - Software may have to be modified to work with IIDC 1.32
 - Download: [Guide to Transitioning from Flea2 to Flea3](#)

- From Flea2G
 - Electrically, the GPIO is the same (opto-isolated)
 - Interface remains 1394b
 - Software may have to be modified to work with IIDC 1.32

What's new with the FL3?

- FireWire and GigE
- New sensors (Sony ICX414 and Sony ICX618)
- GPIO – comparison to FL2 and FL2G
- Flash – 1 MB
- IIDC 1.32 vs. 1.31
- Backwards compatibility
- Improved imaging performance



What's new with the FL3?

FireWire and GigE

- All FL3's have a **locking** connector
- The FL3 with Sony ICX445 sensor (1.3MP) will also be available with a GigE interface
- [Contact sales](#) for availability of FL3-GE-13S2



What's new with the FL3?

New Sensors

- Sony ICX618 (FL3-FW-03S1)
 - 1/4" Optical Size
 - 5.6 x 5.6 mm
 - Available in mono and color
 - Benefits: Low cost, high frame rate (120 fps)
- Sony ICX414 (FL3-FW-03S3)
 - 1/2" Optical Size
 - 9.9 x 9.9 mm
 - Available in mono and color
 - Benefits: Better sensitivity, largest pixel size in the lineup




What's new with the FL3?

GPIO

- GPIO 0 and 1 are opto-isolated
 - GPIO 0 can only be configured as an input
 - GPIO 1 can only be configured as an output
 - Opto-isolated pins use their own ground pin
- GPIO 2 and 3 are non-isolated, bi-directional as before.
 - Must use their own ground pin (not opto-isolated)



Diagram	Pin	Function	Function
	1	IO0	Opto-isolated input (default Trigger in)
	2	IO1	Opto-isolated output
	3	IO2	Input / Output / serial transmit (TX)
	4	IO3	Input / Output / serial 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	+3.3 V	Power external circuitry up to 150mA

What's new with the FL3?

GPIO

- Benefits of opto-isolation
 - Protects the camera from:
 - Noise on the ground pin from external devices.
 - Power or current issues caused by malfunctioning devices attached to the camera.
 - Separate ground pin isolates attached devices from camera
- Transitioning from FL2
 - Depending on how GPIO pins were used, may need rewiring
 - Use a different ground pin
 - Ensure GPIO 0 is an input, GPIO 1 is an output
- Transitioning from FL2G
 - Already has opto-isolated GPIO, so no difference in wiring

What's new with the FL3?

Memory

- 1 MByte of non-volatile flash memory
 - Allows users to save more data using FlyCapture GUI or via the API with block register writes
 - While images can be saved to Flash via the API, this is slow and must be done after the image has been transmitted to the PC.
- Flash memory is different than the on camera **image buffer** (32 MByte), which buffers images on the camera before transmission.

	Data Flash	Image Buffer
Volatility	Non-volatile (persistent)	Volatile (not persistent)
Flea2	0 K	0 K
Flea2G	512 K	32 MB
Flea3	1 MB	32 MB

What's new with the FL3?

IIDC 1.32 vs. IIDC 1.31

- Addition of 12-bit Mono and Raw standard IIDC formats
- More Format 7 (custom image) modes
- 16-bit format little-endian CSR (0x630)



What's new with the FL3?

IIDC 1.32 vs. IIDC 1.31

- Image Buffer CSR (0x634)
 - Can not throw away buffered images without transmitting
 - Other features similar to Point Grey-specific interface
 - Point Grey-specific interface no longer supported.
- IIDC Look Up Table
 - Similar to Point Grey-specific interface, but in a new location
 - Point Grey-specific interface no longer supported.
- All new information is in the new FL3 Technical Reference Manual

What's new with the FL3?

Backwards Compatibility

- Software
 - If using any of the features modified in 1.32 (ie. LUT, image buffer, endianness), software must be updated to reflect changes.
 - Functionality mostly the same, except for image buffer
 - Must transfer all buffered images
- Hardware
 - GPIO – FL2 vs. FL3/FL2G
 - FL3/FL2G GPIO 0 is an opto-isolated input
 - FL3/FL2G GPIO 1 is an opto-isolated output.
 - FL3/FL2G GPIO 2 and 3 are the same, with their own ground
 - GPIO 0 and GPIO 1 must use an opto-isolated ground



What's new with the FL3?

Improved Imaging Performance

- A single pixel clock is used for as many modes as possible, resulting in more consistent imaging across image settings
- For a given video mode, camera performance will not change as a result of different image sizes, frame rates, or pixel formats, except as mentioned in the Technical Reference Manual
- Pixel clocks can still be accessed via the GUI or by querying the Pixel Clock register

Software Support

- Supported in FlyCapture 2.x?
 - All features have been added to the FlyCapture 2.x GUI
 - All features can also be accessed via general register reads and writes
 - GigE will be supported via the FlyCapture 2.x GUI and API
 - FlyCapture 2.x will support 1.31 and 1.32 features
- Supported by FlyCapture 1.x?
 - The FlyCap GUI does not support more than 8 Format_7 modes, or changed features (e.g. LUT, image buffer, endianness)
 - All 1.32 features can still be accessed using the FlyCapture 1.x API using general reads and writes
 - GigE cameras will not be supported in FlyCapture 1.x

New Technical Reference Manual

- Redesigned to be a single point of reference
- Includes all supported control and status registers (C3K s)
- Added information on imaging performance (full well depth, read noise, etc.)
- Enhanced explanations of camera operation e.g. pixel binning, triggering



Where to find the documentation

- Point Grey website:
 - Flea3 Technical Reference manual
 - http://www.ptgrey.com/support/downloads/documents/Flea3_Technical_Reference.pdf
 - Flea3 Getting Started Manual
 - http://www.ptgrey.com/support/downloads/documents/Flea3_Getting_Started.pdf
 - Flea3 Datasheet
 - http://www.ptgrey.com/support/downloads/documents/Flea3_Datasheet.pdf
- Technical Reference manual installed with the SDK as of FlyCapture 2.0.3.13.
 - Found in the Start menu under Documentation
 - Found in the install folder under "doc"
- Technical Application Note
 - Transitioning from the Flea2 to the Flea3
<http://www.ptgrey.com/support/kb/index.asp?a=4&q=344>
Will be updated for transition from Flea2G to Flea3

New Part Number Structure

[Product family] – [Interface] – [Sensor] – [Optics]

FL3	Flea3
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FW	FireWire
GE	Gigabit Ethernet

C	C-mount
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Examples:

- FL3-FW-03S1C-C = Flea3, FireWire, 0.3Mpix, Sony, 1/4", Color, C-mount

Sensor Definition in Part Number

[Resolution]

03	0.3Mpix
08	0.8Mpix
13	1.3Mpix
14	1.4Mpix
20	2Mpix
50	5Mpix

[Manufacturer]

S	Sony
K	Kodak
M	Micron
C	CMOSIS

[Optical size]

1	1/4"
2	1/3"
3	1/2"
4	1/1.8"
5	2/3"
6	1"

[Color or BW]

C	Color
M	Monochrome

Examples:

- 03S1M = 0.3Mpix, Sony, 1/4", Monochrome = ICX618AL
- 50S5C = 5Mpix, Sony, 2/3", Color = ICX625AQ

- Understanding the new firmware versioning scheme

1 . 22 . 3 . 0

Major revision

Indicates a feature release

Minor revision

Indicates a bug fix release

Release Quality

Will always be “3” for “Release”

Branched revision

Indicates a patch release or other branched version

Flea3 Development Accessory Kits

- FireWire
 - Same as the current FL2 / FL2G dev kits
 - [DEVKIT-01-0001](#): Development Accessory Kit with 1394b 64-bit PCI card
 - [DEVKIT-01-0002](#): Development Accessory Kit with FirePRO 1394b PCI Express card
- GigE
 - Development Kit and Accessories TBD



Thank you!

Please provide any feedback to
support@ptgrey.com.

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