

PF-Link

Fiber optical link for PixelFly* cameras Version 1.0

User's guide

Overview

PixelFly cameras are computer controlled high-quality digital devices consisting of a compact camera head and a controlling PCI bus computer card, available in standard or compact PCI format. These two parts communicate via a bi-directional high-speed digital link operated over a CAT 5 SFTP (Shielded Twisted Pair) cable. Although this cable is physically identical to a modern computer network cable, its electrical interface is completely different from that, and the camera cannot be directly connected to a computer network.

The high-speed electrical signals between the camera head and the PCI card limit the length of the STP cable to about 15m and require a ground connection between the camera and the computer. In many applications the camera is operated in a dangerous or electrically noisy environment where the computer need to be located at a larger distance or electrically isolated from the camera head. The PF-Link kit is the solution to these requirements, it provides a ground independent optical fiber connection between the camera head and the PCI card. It also provides power to the camera which is done through the SFTP cable in a standard PixelFly camera setup.

Features

- Hardware level interface, no software changes are required
- Suitable for both 32 MHz and 40 MHz cameras
- Standard 50 or 62.5 micron Duplex SC fiber cable
- Camera head to computer distance up to 700 m
- Class 1 FDA and IEC laser safety compliant
- Ground independent camera head operation
- Single 9V DC power input to camera interface, can be operated from battery as well
- Universal 100-240 V power adaptors
- 0-40 °C temperature range

Kit contents

The PF-Link kit consists of the following components:

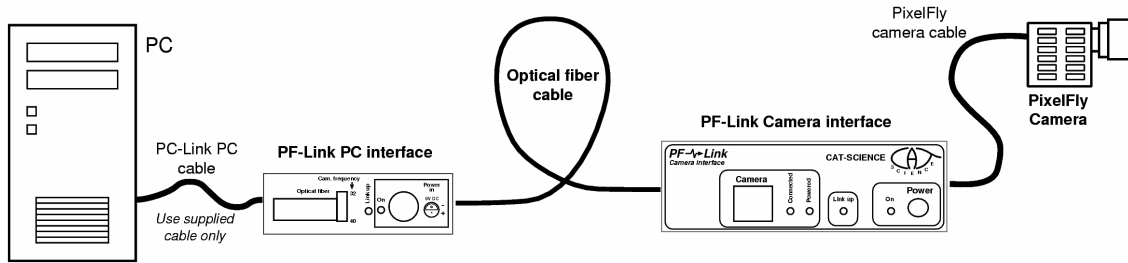
- PF-Link PC interface
- Power supply for PC interface (input: 100-240V AC, output: 5V min. 1 A)
- PF-Link camera interface
- Power supply for camera interface (input: 100-240V AC, output: 9V min. 2 A)
- PC adapter cable (CAT 5 STP)
- User's guide

The optical fiber communication cable is not part of the kit, it should be ordered separately, by specifying the required length.

*PixelFly digital cameras are a product of PCO AG. For more information see www.pco.de

System setup

To set up your PixelFly camera system with the PF-Link kit connect the components as shown in the Figure below.



First identify the PF-Link components. The smaller black box is the PC interface, the larger white box is the camera interface. Identify the power supplies to these two units. They are different, but to avoid any problem their connectors are not interchangeable. Prepare the PF-Link PC STP cable supplied with the kit.

Set up the two interfaces to match your camera operating frequency. Older VGA cameras and SVGA cameras operate at 32 MHz, QE versions and all new cameras operate at 40 MHz. In case of doubt consult PCO. Setting up wrong frequency cannot damage the camera, simply the interfaces will not work. Locate the frequency switches next to the fiber cable connectors and set them on both units to the correct frequency.

Start setting up the fiber link by disconnecting the camera head from the PCI card. Connect the PF-Link PC interface to the PCI card using the 1m STP cable in the PF-Link kit. ***Always use the cable supplied in the kit, its length is essential for correct operation.*** Using a longer cable is possible, please consult CAT-SCIENCE for the exact length needed. Connect the power supply of the PC interface and power it from the mains outlet. The interface power connector is a self-latching type, it can be removed by simply pulling the connector. After powering the mains adaptor the red power LED should be lit.

Connect the camera head to the PF-Link camera interface using the STP cable of your camera. The length of the cable can be arbitrary up to about 5m, similarly to the standard camera set-up. Connect the power supply of the camera interface and power it from the mains outlet. The two power adaptors provide ground independent operation between the camera and the computer, but if the camera head is expected to experience a high ground level potential the use of an isolation transformer is required.

Connect the two PF-Link interfaces with the optical cable. Handle the optical cable carefully, do not bend the over sharp edges.

With the above steps the system is connected. Now switch on the power on the camera interface box. If everything is correctly set up all 4 LEDs on the front panel should be lit and at the same time the “Link up” LED on the PC interface should be lit as well. See section “Troubleshooting” if any of the LEDs remain dark. If the LEDs are lit you can try operating your camera through the fiber link.

When the camera is not used the camera interface can be switched off, which cuts the power to the camera as well. The PC interface does not have a power switch, it can be left on continuously or can be switched from the PC mains outlet.

Switches, connectors and indicators

This section contains usage and reference technical information about all switches, indicators and connectors in the PF-Link kit.

PC interface:

- The *power connector* is a two-pin shielded self-latching “half-moon” socket from LEMO type LEMO EPL-0S-302-HLN. The type number of the mating plug is FFA-0S-302-

CLAC37. The polarity is shown on the box, shield is connected to the negative power pin. The required power input is 5V, maximum 700 mA. The power supply ripple should be less than 100 mV. A higher voltage power supply can be used as well, but it will cause some excessive heating of the unit.

- The *optical cable receptacle* type is duplex SC. The laser emission is indicated on the top label of the box.
- The *frequency switch* is located next to the optical fibre connector. It is used to select the base communication frequency of the camera, 32 or 40 MHz. Older camera versions use 32 MHz, while all new PixelFly cameras use 40 MHz. Selecting the wrong frequency will not cause any harm, but the unit will not detect data transmission.
- The *PC cable receptacle* is a standard STP one.
- The *red “power” LED* indicates that the electronics of the interface receives power.
- The *green “link up” LED* is lit when the PC interface detects data transmission from the camera interface. This enables data transmission to the PC and communication from the PC interface to the camera interface.

Camera interface:

- The *power connector* is a two-pin shielded self-latching socket from LEMO type EPG-0B-302-HLN. The type number of the mating plug is LEMO FGG-0B-302-CLAD35. The polarity is shown on the box, shield is connected to the negative power pin. The required power input is 9V, maximum 2 A. The power supply ripple should be less than 100 mV. Please consult CAT-SCIENCE if you intend to use another input voltage or battery. The power supply module of the camera adapter is replacable, and different types (e.g. battery with automatic charging, inductorless power supply) are planned in the future.
- The *optical cable receptacle* type is duplex SC. The laser emission is indicated on the top label of the box.
- The *frequency switch* is located next to the optical fibre connector. Its role is identical to the frequency switch on the PC interface, they should always be set to the same frequency.
- The *PC cable receptacle* is a standard STP one.
- The power switch switches the input 9V power for the unit.
- The *red “power” LED* indicates that the electronics of the interface receives power. The camera receives power from the interface box as well, if the power LED is lit it receives the basic power inputs, which will cause the camera to start data transmission. Other power inputs to the camera are activated by the PC when the yellow “Camera Powered” LED is lit.
- The *green “camera connected” LED* indicates that data transmission from the camera is detected. This should always happen when a camera is connected, the correct frequency is selected and the power switch is on. The camera interface starts data transmission to the PC interface only if communication from the camera is detected.
- The *yellow “camera powered” LED* shows that the PC switched on additional powers for the camera. The camera will operate only if it is powered.
- The *green “link up” LED* is lit when the camera interface detects data transmission from the PC interface. The PC interface will transmit only when it detects data transmission from the camera, therefore this LED will be lit only if a camera is connected.

Troubleshooting

The following table shows how problems can be identified from the status of the indicators. A • shows a lit LED, ◦ indicates a dark LED, x means any status.

<i>Indicator</i>							<i>Problem/Action</i>
<i>PC</i>		<i>Camera</i>					
<i>Power</i>	<i>Link up</i>	<i>Power</i>	<i>Link up</i>	<i>C. connected</i>	<i>C. powered</i>		
○	X	○	X	X	X	Problem: Any of the power indicator LEDs is dark. Action: Check the power LEDs on the power supplies, mains connections and power connections on the interface boxes.	
●	X	●	X	○	X	Problem: The “camera connected” LED does not come on. Action: Check the camera cable and the camera frequency setting on the camera interface.	
●	○	●	○	●	○	Problem: The camera interface detects the camera, but the PC interface does not detect data transmission. Action: Check the optical fibre cable and the frequency setting on the PC interface.	
●	●	●	○	●	○	Problem: The PC interface detects transmission, but the camera interface does not detect transmission from the PC interface. Action: This means that the transmission works from the camera to the PC interface, but not in the reverse way. This can happen only if one fibre of the duplex cable (or connector) is bad or the PF-Link electronics is broken.	
●	●	●	●	●	○	Problem: All communications are OK, but the camera is not powered. These power inputs to the camera are activated by the PC, therefore this indicates some PC related problem. Action: Check the STP cable connecting the PC interface and the PC and check whether the PC is up. The camera power is handled by the PCI card hardware, therefore the operating system need not be running. If the problem remains, try to connect the camera directly to the PC.	
●	●	●	●	●	●	Problem: All LEDs are up, but the camera is not found by the software. This means that the camera basically works, but it is not recognised by the software. Action: This indicates a camera problem. Connect the camera directly to the PC and check that it works. Check that you are using the 3m PC interface STP cable supplied to the PF-Link kit. Other cable lengths might make cause timing problems in the communication.	

If your problem remains please consult CAT-SCIENCE at sales@catscience.kfkipark.hu or check out our webpage at www.catscience.kfkipark.hu.

Additional data acquisition products from CAT-SCIENCE.

CrossControl	Cross-platform and cross-language communication package to support control and data acquisition from high-level languages (IDL, Matlab) in a heterogeneous (Windows, Unix) network
CAMTIMER	A computer controlled 4 channel timer and time measuring unit to correctly set and measure camera and other measurement timing.
CAMTESTER	Camera test image of 50 LEDs. Can be used to calibrate camera exposure time and length from images. Data processing program available in IDL and Matlab.

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