

# Photonic Science

## *CoolView FDI – Fast Digital Imager*

The CoolView FDI is a high resolution, cooled, fast imaging camera system that provides 12 or 16-bit high speed images with readout at 20MHz. The camera has three important modes of operation, Fusion, Pipelined and Triggered mode.

In the Fusion mode the camera takes multiple images, which are then processed to produce a 16-bit final image. At the highest quality setting, the Fusion mode image is identical to that produced by a 16-bit slow scan camera.

The camera can be simply switched from standard mode, where preview imaging can give a stream of fast 12-bit images, into fusion mode for highest dynamic range 16-bit imaging.

Pipelined mode gives the camera the ability to take a fast sequence of triggered images, where the time between images is reduced by taking the next image in parallel whilst the previous image is being read out. The Pipelined mode includes a faster pixel clock to reduce the exposure and readout cycle. The camera can be triggered by software or by external hardware trigger. This gives the user easy control of precise timing of image capture and, by using binning, provides 80 frames p/s.

Triggered mode allows the image to be captured when demanded – both hardware and software external triggers are supported and can be used with Fusion mode.

The camera has independent binning in X and Y, which makes the camera additionally suited to spectroscopy applications where binning in Y only greatly increases sensitivity whilst keeping maximum linear resolution. When combined with Fusion mode this gives 16-bit digitisation which allows very faint spectral lines to be observed and accurately compared.

Windowing is also available, and is user selectable in X&Y.

The CoolView FDI provides a flexible digital camera offering high speed imaging coupled with 16-bit slow scan performance.

### ***Features***

- ▶ Peak QE of 65% at 520-550 nm and extended red/near IR spectral response up to 1100nm
- ▶ Fusion driver with 16-bit image digitisation
  - ◆ Actual dynamic range >14-bits (RMS noise in darkness < 3.5 ADU @16-bit / 10MHz digitisation using highest quality setting)
  - ◆ Gives equivalent sensor full well capacity  $\approx$  225,000 e- per pixel
  - ◆ Faster acquisition lower quality setting gives useful dynamic range of >14-bits (but with increased noise at high intensity values > 3,500 ADUs)
- ▶ 1392x1040 pixel resolution at 10MHz. Up to 13 frames per second (900x900 pixel) with fast 20 MHz readout driver (or up to > 80 frames per second with binning)
- ▶ User selectable gain range 10:1 with additional gain boost feature
- ▶ Thermoelectric CCD cooling plus air secondary cooling, with a typical stabilised  $\Delta T$  of >30°C, reduces dark current to allow longer on-chip integration of up to 10+ minutes



# CoolView FDI – Fast Digital Imager

## Technical Specification

- ◆ On chip binning – user selectable: from 1 x 1 to 63 x 63
- ◆ Sub-area readout – user selectable in X and Y
- ◆ Progressive Scan Interline Transfer CCD
- ◆ 1392 (h) x 1040 (v) pixels, 6.45 microns square
- ◆ Integral electronic shutter – user selectable exposure from < 5 microseconds to > 10 minutes (camera, standard software driver from 1 millisecond to > 10 minutes)
- ◆ Dual IEEE 1394 FireWire bi-directional output sockets in camera head housing.
- ◆ CoolView\_FDI camera is FireWire D-CAM compliant (I IDC 1394 based Digital Camera Specification) and image acquisition can be controlled using any fully compliant FireWire D-CAM control software interface.
- ◆ Weight approx.      1.25 kg (camera head)  
   1.4 kg (power supply & camera connecting cable)
- ◆ Dimensions:            Head:                    180mm (l) x 95mm (w) x 68mm (d)  
   Power supply:      245mm (l) x 110mm (w) x 50mm (h)
- ◆ Mains Input voltage                    110–240V ac 50/60 Hz autosensing

## Included Items

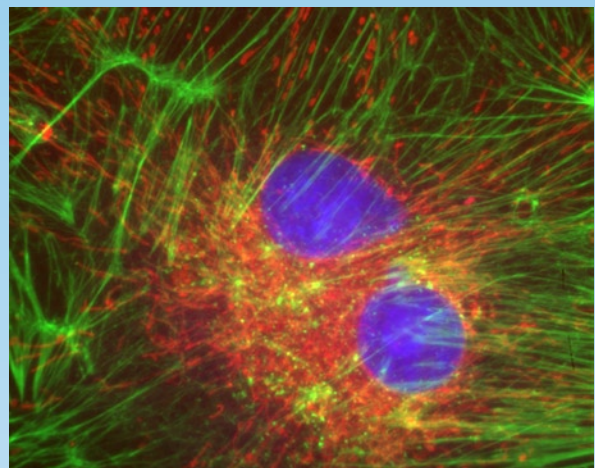
Camera Head with C- mount lens fitting.  
Power supply unit, user manual(s), and flight case  
Drivers for Image Pro Plus range, PSL Image, and LabView  
PSL tested compatible PCI bus IEEE 1394 FireWire interface card  
FireWire interconnecting cable: 4.5 m  
Mains lead for control unit: 1.5m  
Power supply unit to Camera head: 2m

## Software

Drivers, including 16-bit Fusion driver, for PSL Image and Media Cybernetics' Image Pro Plus 4.X (Windows O/S including NT/2000 and XP) – Standard  
The drivers for Media Cybernetics Image Pro Plus 4.X are also suitable for controlling the camera and image acquisition from within any of the other Media Cybernetics software products that use the Image Pro Plus acquisition sub-routines  
Drivers for Labview 5.X (Windows). – Standard  
PSLink library with DLL and sample C++ code for FireWire driver to assist end-user driver development

## PC system minimum recommended specifications

Pentium 4 processor 1GHz or better  
128Mb RAM minimum (256 Mb+ recommended)



Photonic Science Ltd.  
Tel: +44 (0) 1580 881199 Fax: +44 (0) 1580 880910  
Millham, Mountfield, Robertsbridge, East Sussex,  
TN32 5LA, UK.  
<http://www.photonic-science.co.uk>

Photonic Science France  
Tel: +33 476 93 57 20 Fax: +33 476 93 57 22  
ZAC Grenoble Air Parc, 38590 Saint Etienne de Saint Geoirs

[info@photonic-science.co.uk](mailto:info@photonic-science.co.uk)