



Scientific Cameras

Contents:

Page 1	Introduction
Page 2	Specs of Camera systems - Hi Res V
Page 4	Specs of Camera systems - Electra
Page 6	Specs of Camera systems - Electra Plus
Page 8	Specs of Camera systems - CHROMA
Page 10	Specs of Camera systems - DISCOVERY
Page 12	Specs of Camera systems - iCAM
Page 14	Specs of CCD Chips available and scheme to what Camera they fit.
Page 17	Filter Wheel

Introduction:

NY Photonics offers 6 series of scientific cameras

Hi Res V, Electra, Electra Plus, CHROMA, DISCOVERY and iCAM.

These differ in type of chip that can be integrated, cooling performance, read-out speed, read-out noise, A/D etc. However all are considered high quality scientific grade Camera.

Some of the modules are available in Engineering grade that can save over 50% of the price and even more.

The basic preliminary specifications of each of the series are displayed below and firm specs will be given with the quotation.

In addition to that we list the basic specs of the CCD Chips available and with what camera they fit.

Please feel free to contact us by e-mail or phone to be sure you will get the system that most suits your application, and a quote that includes all the parts you need.

We also offer 6 and 8 positions Filter Wheels, one can easily control with proprietary software, that are designed to be used with high sensitivity cameras like the ones we offer.



HiRes V

DISCOVERY

iCAM

CHROMA

Electra



Scientific Cameras

Specs of Camera systems:

Hi Res V



Picture of the Hi Res V Camera

Readout speed *	Slow scan: up to 100 kpix/s (Dynamic Range > 1:55000) Fast scan: up to 2Mpixel/s (Dynamic Range 1:20000)
Filter wheel (opt.)	External
A/D Converter	Slow scan: 16 bit Fast scan: selectable 12, 14, 16 bit
Max total noise **	5e-/15e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 (or arbitrary)
Mount **	42x0.75 or 50x0.75 input (to be specified on the order)
Backfocus **	17.5/22.5 mm
Interface ***	USB 2
Spectral response	350-1000 nm
Cooling	Double stage Peltier+air stage > 50°C ΔT below ambient Double stage Peltier+liquid stage up to 55°C ΔT below liquid temperature
Shutter	Electromechanical



Scientific Cameras

Exposure time	From 0.01 to 9999 s
CCD temperature control	± 0.1 °C
Settable gains	Slow scan: 1 (as requested by customer) Fast scan: 64
BIAS Control	9 bit
Optical window ****	Fused Silica, 1mm
Head weight	Starting from 2000 g
Dimensions	130x130x162 mm
Auxiliary port	yes

* Selectable by software

** According to sensors

*** On request we can provide the DTA FDL-PCI interface card at a little added cost

**** With double coating. On request, it can mount coating and/or double coating windows with non parallel faces and windows in berillium with X-ray scintillator screen.

The standard system includes:

- Assembled unit in light alloy with threaded 42x0.75 or 50x0.75 input (to be specified on the order);
- USB 2.0 with 3m link cable (optionally, 32-bit FDL-PCI interface with 2.5m PC parallel link cable);
- software for image grab and processing under Windows 2000/XP;
- 230/115V power supply;
- manual, test report and case.

Options

FOL	Serial fiber optic link (fiber: 30 m, ST 62/125 mount). Different lengths on demand
NIK-H	Adapter for Nikon lens
MIN-H	Adapter for 42x1 mm lens
M10	10 m parallel link cable for FDL-PCI
TTC	Adapter from 42x0.75 to C mount
ATE	1/4" mounting post

All the data reported are subject to change without prior warning.



Scientific Cameras

Electra

Pictures of the Electra Camera



Readout speed	420 kpixel/s
A/D Converter	Selectable: 12, 14, 16 bit
Max total noise *	5e-/30e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 (or arbitrary)
Interface	USB 1.1/2.0
Mount (in case of Shutter option)	42x0.75 (C on request)
Spectral response	350-1000 nm
Cooling	Double stage Peltier > 50 °C ΔT
Shutter (optional)	Electromechanical
Exposure time **	From 0.01 to 9999 s
CCD temperature control	±0.1 °C
Settable gains	64
BIAS Control	9 bit
Optical window ***	Fused Silica
Weight	1400 g
Dimensions	160x130x100 mm
Auxiliary port	yes



Scientific Cameras

* According to sensors.

** The minimum exposure time depends on the sensor's type, on the shutter's type and if the user utilize our Power Supply.

***With double coating. On request, it can mount coating and/or double coating windows with non parallel faces and windows in Beryllium with an X-ray scintillator screen.

The standard system includes:

- assembled unit in light alloy with threaded 42x0.75 input;
- 1.8 m USB link cable;
- software for image grab and processing under Windows Me/2000/XP;
- case, manual with test report and 24 months of warranty.

Options

EV- 25	Electromechanical shutter, dia 25 mm	TTC	Adapter from 42x0.75 to C mount
EV- 35	Electromechanical shutter, dia 35 mm	XTE	¼" mounting post
EV- 45	Electromechanical shutter, dia 45 mm	PWS	230/115V Power Supply
NIK- C	Adapter for Nikon lens	BPA	Battery Power Adapter
MIN- C	Adapter for 42x1 mm lens		

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Scientific Cameras

Electra Plus

Readout speed	slow scan: up to 100 kpixel/s fast scan: up to 1 Mpix/s @ 16 bit up to 2 Mpix/s @ 14 bit up to 4 Mpix/s @ 12 bit
A/D Converter	slow scan: 1 (optional) fast scan: Selectable: 12, 14, 16 bit
Max total noise *	5e-/30e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 (or arbitrary)
Interface	USB 2.0 High Speed
Mount (in case of Shutter option)	42x0.75 (C on request)
Spectral response	350-1000 nm
Cooling	Double stage Peltier > 55°C ΔT (EX series) 2 Double stage Peltier > 55°C ΔT (EXH series)
Shutter (optional)	Electromechanical
Exposure time **	From 0.01 to 9999 s
Shutter time base	1 microseconds
CCD temperature control	±0.05 °C
Settable gains	64
BIAS Control	9 bit
Optical window ***	Fused Silica
Weight	1400 g
Dimensions	160x130x100 mm (EX series) 164x141x81 mm (EXH series)
On board memory	256 kbyte
Auxiliary port	yes

* According to sensors.

** The minimum exposure time depends on the sensor's type, on the shutter's type and if the user utilize our Power Supply.

***With double coating. On request, it can mount coating and/or double coating windows with non parallel faces and windows in Beryllium with an X-ray scintillator screen.

The standard system includes:



Scientific Cameras

- assembled unit in light alloy with threaded 42x0.75 input;
- 1.8 m USB link cable;
- software for image grab and processing under Windows Me/2000/XP;
- case, manual with test report and 24 months of warranty.

Options

EV-25	Electromechanical shutter, dia 25 mm	MIN-C	Adapter for 42x1 mm lens
EV-35	Electromechanical shutter, dia 35 mm	TTC	Adapter from 42x0.75 to C mount
EV-45	Electromechanical shutter, dia 45 mm	XTE	¼" mounting post
EV-65	Electromechanical shutter, dia 65 mm	PWS	230/115V Power Supply
EV-90	Electromechanical shutter, dia 90 mm	PWSH	230/115V Power Supply for EXH series
NIK-C	Adapter for Nikon lens	BPA	Battery Power Adapter

* During the time, the USB connexion evolved following some standards until the present USB 2.0.

It exists in three versions, characterized by three different values of data-transfer rate:

Low speed: 1,5 Mbit/s

Full speed: 12 Mbit/s

High speed: 480 Mbit/s

All the data reported are subject to change without prior warning.



Scientific Cameras

CHROMA

Pictures of the CHROMA Camera



Readout speed	Up to 2.2 Mpixel/s
Filter wheel (optional)	8 or 6 positions according to different models
A/D Converter	14 bit
Max total noise (Typ.)	10e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 or arbitrary
Interface	FDL-PCI
Mount *	42x0.75 or C
Spectral response	350-1000
Backfocus	26.8/17.5 mm
Cooling	Single stage Peltier -40°C ΔT
Shutter	Electromechanical
Exposure time	From 0.01 to 9999 s
CCD temperature control	± 0.1 °C
Settable gains	64



Scientific Cameras

BIAS Control	9 bit
Optical window **	Fused silica, 1mm
Weight	1600 g
Dimensions	155x134x62 mm
Auxiliary port	yes

* The C mount panel is a customization of the camera, so involve a little additional cost

** With double coating. On request, it can mount coating and/or double coating windows with non parallel faces and windows in Berillium with X-ray scintillator screen.

The standard system includes:

- assembled unit in light alloy with threaded 42x0.75 input;
- 32 bit FDL-PCI interface;
- 2.5 m PC parallel link cable;
- software for image grab and processing under Windows 95/98/Me/2000/XP with PCI interface (included);
- 230/115V power supply;
- case, manual with test report and 24 months of warranty.

Options

FOL	Serial fiber optic link (fiber: 30 m, ST 62/125 mount). Different lengths on demand
RGB	RGB interference + Blank, dia. 25 mm
WEL	8-position integrated filter wheel (6-position for CX6000), filter: 25mm dia., 4 mm max thickness
NIK-C	Adapter for Nikon lens
MIN-C	Adapter for 42x1 mm lens
PAR	2.5 m standard parallel port link cable
M10	10 m parallel link cable for FDL-PCI
XTE	1/4" mounting post
TTC	Adapter from 42x0.75 to C mount
CPA	Front panel with C mount and backfocus (you can not fit the filter wheel)

All the data reported are subject to change without prior warning.



Scientific Cameras

DISCOVERY

Pictures of the DISCOVERY Camera



Readout speed	Up to 250 Kpixel/s
Filter wheel	External
A/D Converter	Selectable 12, 14, 16 bit
Max total noise (Typ.)*	10e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 or arbitrary
Interface	USB 1.1/2.0
Mount	C
Spectral response	350-1000 nm
Backfocus	17.5 mm
Cooling	Single stage Peltier 35 °C ΔT (standard version) Double stage Peltier 45 °C ΔT (on request)**
Shutter	Electromechanical
Exposure time	From 0.1 to 9999 s
CCD temperature control	± 0.1 °C
Settable gains	64



Scientific Cameras

BIAS Control	9 bit
Optical window	Fused Silica, 1mm
Weight	800 g
Dimensions	dia 118 x 53 mm
Auxiliary port	yes

* According to sensors.

The standard system includes:

- assembled unit in light alloy with threaded C input;
- USB link cable of 1.8 m;
- software for image grab and processing under Windows 95/98/Me/2000/XP;
- 230/115V power supply (optional, not included);
- case, manual with test report and 24 months of warranty.

Options

- NIK-A Adapter for Nikon lens
- MIN-A Adapter for 42x1 mm lens
- TBR Adapter for T mount 42 x 0.75 mm
- DSC-1 Double stage Peltier -50°C DT
- PWR-X Stabilized power supply 230V; 13.8V; 5A
- APW Battery adapter for cars

All the data reported are subject to change without prior warning.



Scientific Cameras

iCAM

Pictures of the iCAM Camera



Readout speed	Up to 12.5 Mpixel/s
Filter wheel	External
A/D Converter	12 bit
Max total noise (Typ.)	15-25 e-
Partial CCD Reading	Programmable
Binning	From 1x1 to 8x8 or arbitrary
Interface	FDL-PCI
Mount	*
Spectral response	350-1000 nm
Backfocus	17.5 mm
Cooling	Single stage Peltier -40°C ΔT
Shutter	Electromechanical
Exposure time	From 0.01 to 9999 s
CCD temperature control	± 0.1 °C
Settable gains	64
BIAS Control	8 bit
Optical window**	Fused silica, 1mm



Scientific Cameras

Weight	1500 g
Dimensions	95x95x250 mm
Auxiliary port	yes

* According to different sensors.

**With double coating. On request, it can mount coating and/or double coating windows with non parallel faces and windows in Beryllium with X-ray scintillator screen.

The standard system includes:

- assembled unit in light alloy with threaded C input;
- 32 bit FDL-PCI interface;
- 2.5 m PC parallel link cable;
- software for image grab and processing under Windows 95/98/Me/XP/2000 with PCI interface (included);
- 230/115V power supply;
- case, manual with test report and 24 months of warranty.

Options

NIK-A Adapter for Nikon lens

MIN-A Adapter for 42x1 mm lens

TTC Adapter from 42x0.75 to C mount

All the data reported are subject to change without prior warning.

NY Photonics declines any responsibility for errors that may occur in the specifications listed above.



Scientific Cameras

CCD Sensor scheme

CCD manufacturer	Kodak	Kodak	Kodak	Kodak	Kodak	Kodak
CCD sensor	KAF-0261E FI	KAF-401LE FI	KAF-402E (ME) FI	KAF-1001E FI	KAF-1301E (LE) FI	KAF-1602E (LE) FI
Camera model	CX3, C3P, C4, DS, EL, HR V	CX3, C3P, C4, DS, EL, HR V, IC	CX3, C3P, C4, DS, EL, HR V, IC	EL, HR V	HR V	CX3, C3P, C4, DS, EL, HR V, IC
CCD format Aspect Ratio	512x512 1:1	768x512 3:2	768x512 3:2	1024x1024 1:1	1280x1024	1536x1024 3:2
Pixel Size (μm^2)	20x20	9x9	9x9	24x24	16x16	9x9
Active area HxV (mm^2)	10.2x10.2	6.9x4.6	6.9x4.6	24.5x24.5	20.48x16.38	13.8x9.2
FWC (ke^-)	500	100	100	500	120	100 (50)
QE% @ 450, 550, 650 nm	35, 55, 58	20, 35, 42	35, 55, 68 (55, 67, 82)	40, 55, 65	40, 55, 63 (20, 32, 28)	40, 50, 60 (20, 35, 42)
QE (%) NIR 1000 nm	7-8	3-4	5-6	4	7-8	5-6
Dark Current max @ -30°C ($\text{e}^-/\text{pixel} \cdot \text{s}$)	0.8	0.03	0.04	1.1	0.18 (0.3)	0.04 (0.03)
Total Sensor Noise ($\text{e}^- \text{rms}$)	22 @ -30 °C	15 @ 25 °C	15 @ 25 °C	22 @ -30 °C	15 @ 25 °C	15 @ 25 °C
Dynamic Range ¹ (dB)	83 (87) ²	70	76	83 (87) ²	77 (74) ²	74 (70) ²
Fill Factor (%)	100	70	100	100	100 (70)	100 (70)

E=Enhanced (ITO) version; FI= front-illuminated; LE= with Antiblooming Protection; ME= with microlens; CE= color version. All parameters are typical.

¹ $20 \text{ LOG}(\text{FWC}/\text{Total Sensor Noise})$

² Two output amplifiers: High Gain Output and Low gain Output (value in brackets)



Scientific Cameras

CCD Sensor scheme

CCD manufacturer	Kodak	Kodak	Kodak	Kodak	Kodak	Kodak
CCD sensor	KAF-1603ME FI	KAF-3200E (ME) FI	KAF-4301E FI	KAF-6302LE FI	KAF-6303E FI	KAF-16801E (LE) FI
Camera model	CX3, C3P, C4, DS, EL, HR V, IC	CX3, C3P, C4, EL, HR V	HR V	CX3, C3P, C4, EL, HR V, IC	CX3, C3P, C4, EL, HR V, IC	HR V
CCD format Aspect Ratio	1536x1024 3:2	2184x1472 3:2	2084x2084 1:1	3072x2034 3:2	3072x2048 3:2	4096x4096 1:1
Pixel Size (μm^2)	9x9	6.8x6.8	24x24	9x9	9x9	9x9
Active area HxV (mm ²)	13.8x9.2	14.85x10.26	50.02x50.02	27.65x18.48	27.65x18.48	36.88x36.88
FWC (ke^-)	100	55	570	50	100	100 (55)
QE% @ 450, 550, 650 nm	50, 67, 75	40, 52, 65 60, 75, 82	40, 55, 65	9, 15, 13	40, 55, 64	40, 52, 65 (20, 28, 33)
QE(%) NIR 1000 nm	5-6	5-6 (7-8)	8-9	5-6	5-6	33 (8)
Dark Current max @ -30 °C ($\text{e}^-/\text{pixel}\cdot\text{s}$)	0.04	0.03	0.3	0.03	0.03	0.04 (0.03)
Total Sensor Noise ($\text{e}^- \text{rms}$)	15 @ 25 °C	7 @ -10 °C	22 @ -30 °C	15 @ 25 °C	15 @ 25 °C	15 @ 25 °C
Dynamic Range ¹ (dB)	74 (70) ²	77	83 (87) ²	76	76	76 (71) ²
Fill Factor (%)	100 (70)	100	100	70	100	100 (70)

E=Enhanced (ITO) version; FI= front-illuminated; LE= with Antiblooming Protection; ME= with microlens; CE= color version. All parameters are typical.

¹ $20 \text{ LOG}(\text{FWC}/\text{Total Sensor Noise})$

² Two output amplifiers: High Gain Output and Low gain Output (value in brackets)



Scientific Cameras

CCD Sensor scheme

CCD manufacturer	E2V	E2V	E2V	E2V	E2V	E2V
CCD ¹ sensor	30-11 B (F)	42-10 B (F)	42-40 B	47-10 B (F)	47-20 B (F) FT	77-00 B (F)
Camera model	EL, HR V	EL, HR V	HR V	EL, HR V	HR V	EL, HR V
CCD format Aspect Ratio	1024x256 4:1	2048x512 4:1	2048x2048 4:1	1024x1024 1:1	1024x1024 1:1	512x512 1:1
Pixel Size (μm ²)	26x26	13.5x13.5	13.5x13.5	13x13	13x13	24x24
Active area HxV (mm ²)	26.6x6.7	27.6x6.9	27.6x27.6	13.3x13.3	13.3x13.3	12.3x12.3
FWC (ke ⁻)	500	100	100	100	100	300
QE% @ 450, 550, 650 nm	82, 81, 76 (21, 43, 45)	84, 82, 76	83, 81, 77	82, 81, 76 (8, 25, 40)	82, 81, 76 (8, 25, 38)	82, 81, 76 (8, 31, 45)
QE(%) NIR 1000 nm	14-15 (10-11)	7-8	14-15	14-15 (9-10)	14-15 (9-10)	14-15 (7-8)
Dark Current max @ -30 °C (e ⁻ / pixel -s)	0.5 (2)	0.5 (0.2)	0.5	0.5 (0.2)	0.5 (0.2)	1.5 (0.4)
Total Sensor Noise (e ⁻ rms)	4 @ -40 °C (4 @ -20 °C)	3 @ -40 °C (2 @ -40 °C)	2 (2) @ -20 °C	2 @ -20 °C	2 @ -20 °C (2 @ -30 °C)	3 @ -20 °C
Dynamic Range ²	83,000:1	33,333:1	33,333:1	50,000:1	50,000:1	100,000:1
Fill Factor (%)	100	100	100	100	100	100

F= front-illuminated; B= back-illuminated; FT= frame transfer. All parameters are typical; for the Back illuminated sensors, they are referred to the broadband coating model (even uncoated, midcoated and UV coated versions are available).

¹ All the sensors operate in Advanced Inverted Mode Operation (AIMO), except CCD 77-00 B(F), that operates in Inverted Mode Operation (IMO)

² Dynamic range is the ratio of readout noise to full well capacity measured at 253 K and 20 kHz readout speed



Scientific Cameras

Filter Wheel

Pictures of the Filter Wheel



RPF6 is a motorized filter wheel, which has six different holders for filters of 1¼". It has been designed to be driven directly from ViSTA, the software that controls the cameras, but it is also supplied with a separated control program for all Windows systems. There are two different connection systems: by means of RS232 or by means of the parallel port.

It is possible to set the rotation speed and a different stop position for each filter. The motor hold current is user adjustable.

This product can be customized, specifying different size, number of filters, input or output adapters.

The typical applications are Photometry, Microscopy and colour sequences.

Specifications

Positioning speed	0.2 s	Number of positions	6 (an 8 position version is also available)
Standard mount	1+1/4"	Speed control	Yes
Serial interface	RS232 4800 Baud	Parallel interface	4 bit input, 1 bit output
Maximum filter thickness	8 mm	Backfocus	30 mm
Power supply	12V 500mA (max)	Dimension	dia 140 mm

The standard system includes:

- assembled unit in light alloy with threaded 31.75 input;
- RS232/Parallel interface;
- 2.5 m PC parallel link cable;

E-mail: sales@NYphotonics.com Site : www.NYPhotoncis.com



Scientific Cameras

- managing software for Windows 95/98/ME/XP/2000;
- 230/115V power supply;
- case, manual with test report and 24 months of warranty.

Options

RGB-6 31.7 mm RGB interference filter kit

NIK-6 Adapter for Nikon lens

MIN-6 Adapter for 42x1 mm lens

ARH-6 Adapter for HiRes

ARI-6 Adapter for DISCOVERY, iCAM

PAR-6 Standard parallel port link cable