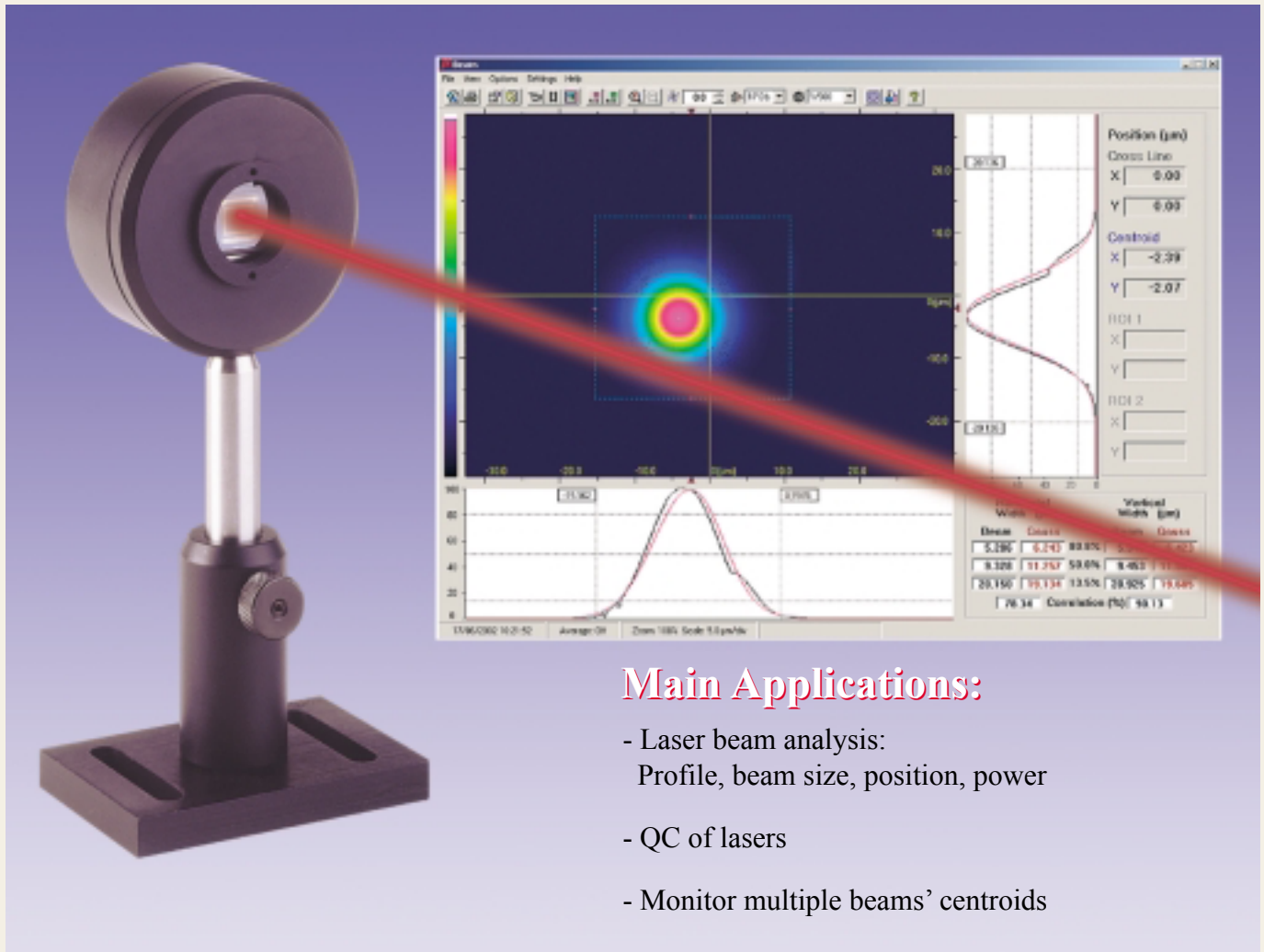


BeamOn *CCD Beam Profiler*



Main Applications:

- Laser beam analysis:
Profile, beam size, position, power
- QC of lasers
- Monitor multiple beams' centroids

Expanding your profiling capabilities

- **Patented technology:** Wide dynamic range enabled by double sampling technology
- **Versatile:** A complete test station, measures both CW and pulsed beams
- **Flexible:** A wide spectral response from deep UV (190nm), VIS and up to 1550nm
- **Portable:** Based on a USB 2.0 attachment for notebooks, or on a PCI card
- **Easy to use:** user-friendly software, on-line help routine

Main Software Features

- Real time beam size and gaussian fit
- 2D/3D plots of beam in real time
- Software controlled electronic shutter & gain
- Video with playback, snapshot files
- Data exporting to another computer via RS232
- Data logging with detailed statistics
- ActiveX package to control software from your application
- Automatic Pass/Fail analysis report



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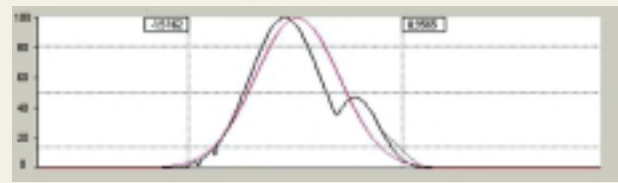
System Presentations

BeamOn provides an extensive range of graphical presentations and analysis of laser beam parameters.

Beam Profiles and Width

Two types of profiles are being displayed;
Sum Profiles-Displays the two orthogonal profiles, one along the vertical axis and one along the horizontal axis. Each profile is composed of a summation of rows and columns at a beam cross-section.

Line Profiles-Displays the beam contour along a line parallel to the vertical and horizontal axes. These two orthogonal lines are designated as a cross hair cursor on the image plane and can be moved along the working area.



Horizontal Profile

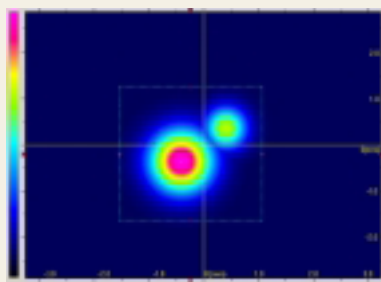
Horizontal Width (µm)			Vertical Width (µm)		
Beam	Gauss		Beam	Gauss	
528.8	624.3	88.8%	594.6	642.3	
932.8	1125.7	58.8%	946.3	1158.1	
2815.3	1813.4	13.6%	2952.5	1968.5	
78.34			Correlation (%) 99.13		

Results

Beam widths are digitally displayed for any three user selected clip levels.

A Gaussian fit profile can be overlaid on profiles in real time, while the correlation and fit values are displayed digitally. A Top Hat profile presentation and fit is also available.

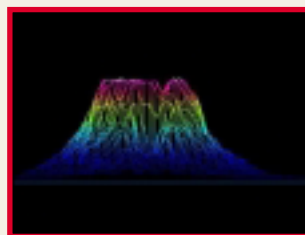
2D and 3D Intensity Plots



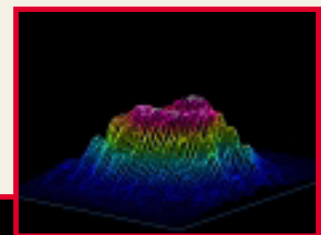
Beam Intensity Pallet

The Projection function provides either a 2D or a 3D plot of the beam intensity profile. A zooming feature enables magnification of the displayed image. It is possible to control the 3D plot wire density. For a weak beam image, even at max shutter and gain settings. Use the beam intensity pallet to optimize color display.

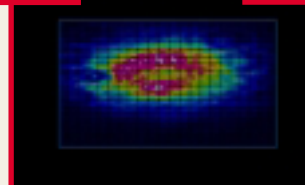
The 3D plot can be rotated along the beam optical axis, as well as be flipped. This feature enables the user to view the image from various angles around the beam.



3D Plot - side view



3D Plot - top view



2D Plot

Power Measurement

The beam power is displayed as a digital readout at the status bar. A power calibration function allows the user enter a “base” power value. In subsequent captured images the summed intensity of all pixels will be proportional to this value.



System Analysis

BeamOn provides an extensive range of laser beam parameters calculation and analysis.

Beam Position

The beam centroid is continuously monitored relative to the center of CCD head. Three Regions of Interest (ROI) can be defined by the user, thus enabling the user to monitor up to 3 beams' centroids simultaneously.

Detailed Statistics

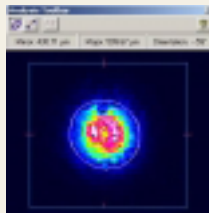
The information in Statistics screen is updated in real time and is useful for analyzing beam characteristics. It lists the information in a table format and shows the actual measurement values, as well as the MIN (minimal measurement), MAX (the maximal measurement), AVER (the averaged value), and STD (the standard deviation) of several parameters which are crucial for beam analysis:

- Centroid (H / V profiles)
- Beam Peak (H / V Profiles)
- Beam width at 3 clip levels (H / V Profiles)
- Correlation to Gaussian profile (H / V Profiles)
- Power (mW)

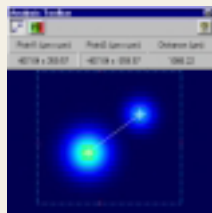
Parameter	Current	MIN	MAX	AVER	STD
Centroid (mm)					
Horizontal	486.43	486.43	486.43	486.43	0.000
Vertical	117.98	117.98	117.98	117.98	0.000
Beam Peak (mm)					
Horizontal	486.43	486.43	486.43	486.43	0.000
Vertical	117.98	117.98	117.98	117.98	0.000
Beam Width (mm)					
Horizontal	118.88	118.88	118.88	118.88	0.000
Vertical	118.88	118.88	118.88	118.88	0.000
Correlation					
Horizontal	0.999	0.999	0.999	0.999	0.000
Vertical	0.999	0.999	0.999	0.999	0.000
Power (mW)					
Current	0.000	0.000	0.000	0.000	0.000

Statistics

Analysis and QA Testing



Elipse estimation



Distance measurement

Test Name	Unit	Value	Pass/Fail
Beam Width (Horizontal)	mm	118.88	Pass
Beam Width (Vertical)	mm	118.88	Pass
Beam Peak (Horizontal)	mm	486.43	Pass
Beam Peak (Vertical)	mm	117.98	Pass
Beam Centroid (Horizontal)	mm	486.43	Pass
Beam Centroid (Vertical)	mm	117.98	Pass
Beam Correlation (Horizontal)		0.999	Pass
Beam Correlation (Vertical)		0.999	Pass
Beam Power (mW)	mW	0.000	Pass

Test

The software enables a best fit to an ellipse as well as direct distance measurement.

The **Elipse function** calculates the best-fit ellipsoid for the examined beam. The major and minor axes of the fit ellipse are calculated as well as the orientation of the major axes of the fit.

The **Distance measurement function** calculates the distance between any two points on the beam image, the points are being selected by the user.

The **Test routine** allows the user to test a laser beam based on user-defined Pass/Fail criteria. The test results are calculated for any one of the beam calculated parameters.

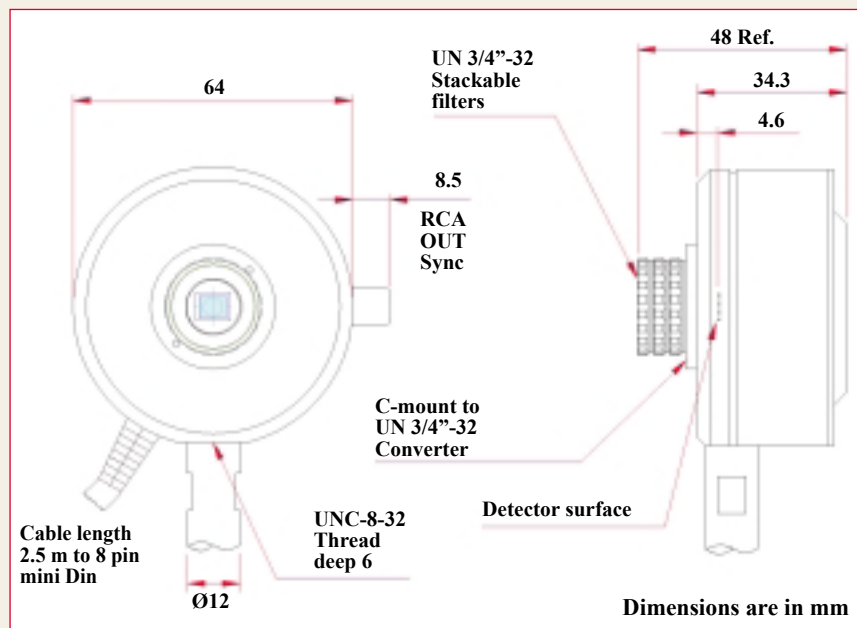
More Software Features

- Data logging to a Text file (up to 99 hours)
- Average
- Zooming
- Printing of text and images
- User set threshold levels
- Full on line Help routine
- Live Snapshot files replay for complete analysis of results
- Capture up to 12 still images
- Setup for different camera types (for PCI version)
- Multiple PCI boards operation (Windows 2000/XP)
- Full session recordings for off-line analysis (Mpeg)
- Customer set Pass/Fail criteria
- Tile images in matrix format
- Direct link to Duma's website for support



Specifications

CCD Head Drawing:



CCD Head Specifications

Camera type:	Monochrome interline transfer CCD •” format
Pixel size:	8.6μm(H)X8.3μm(V)
Sensor active area:	6.47mmX4.83mm
Weight:	295 gr. with cable
Sync out:	RCA female jack, 4.5V square wave TTL output
Power consumption:	5V, 0.9Watts
Accessories included:	3XNG 1.6mm thick Schott colored filters in housing about 240:1 (wavelength dependent), cap, mounting post



General Specifications

PC interface:	1/3 size P&P PCI card or USB2.0 Attachment
RS232:	Data out
Operating temp:	-10°C to 50°C
Storage temp:	-40°C - 60°C
CE compliance	



Ordering Information

The system comes with a camera, a post, a set of 3XNG Schott colored filters (NG4, NG9, NG10) in housing, a PCI card or a USB2.0 Attachment, software on CD disk, carrying case and user manual. Select PC interface when ordering.

	spectral range
BeamOn-VIS (PCI or USB2):	350-1100nm
BeamOn-UV (PCI or USB2):	190-1100nm
BeamOn-IR1310 (PCI or USB2):	350-1310nm
BeamOn-IR1550 (PCI or USB2):	350-1100nm Plus 1550nm ±50nm
NG Filter:	1.6mm thick Schott colored filter in mount, select type:4/9/10
BeamOn-Sampler:	Attachment for high power lasers attenuation (up to 20W)



Host Computer Requirements

Pentium III (IV, 1GHz for USB2.0 ver), 128MB RAM, 10MB Free HDD, 16 MB 16 bit color VGA card, resolution 1024X768, CD ROM any type, 1 free 1/3 size PCI slot (or 1 free High Speed USB2.0 port), OS Win2000/XP (also Win98/Me for PCI ver).



System Performance with Software

System Response

VIS 350-1100nm	(*) Model IR1550 is based on the standard CCD for VIS which is coated with a conversion coating, enabling capture of signals at the 1550nm range +/-50nm.
UV 190-1100nm	
IR1310 350-1310nm	
IR1550 350-1100nm and 1550nm	

Max frame rate:	25Hz
Image resolution:	640X480
Shutter speed:	1/50 to 1/10000 sec, 8 steps
Gain control:	6dB to 30dB, 8 steps
Null:	In CW mode Null function is available to automatically subtract background
Optical dynamic range:	up to 1X10 ¹¹ using all filters and software controlled electronic shutter and gain
Damage threshold:	50W/cm ² with filters
Sensitivity:	~5nW/cm ² at 633 nm (models VIS, UV) ~15μW/mm ² at 1310 nm (model IR 1310) ~50μW/mm ² at 1550 nm (model IR 1550)
Saturation:	~1mW/cm ² , no filters (models VIS, UV) ~5mW/cm ² no filters (model IR 1550)

Operation with pulsed lasers:	Ability to capture and replay images from slowly pulsing lasers (1-100Hz) while filtering out frames with no laser pulse. Provision for displaying single shot pulses.
Triggering:	In pulsed mode set threshold by slide bar to display frames with captured pulses
Max frequency for single pulse display:	10KHz



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