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QuickFind:

PHOTON Inc.
Precision Beam Profiling

6878 Santa Teresa Blvd.
San Jose, CA 95119-1205
1.800.374.6866
Tel: 408.226.1000
Fax: 408.226.1025

BeamScan®

For Characterizing Pulsed and CW Light Sources.



Features

- Measures beam width, divergence, collimation, astigmatism, pointing, M^2, relative power
- Easy to align and use (convenient operation)
- Direct measures of focused beam (no optics required)
- True real-time beam profiles
- Data export capability (through ASCII files, ActiveX, Software Development Kit)

Photon was the first to produce a real time slit-based instrument to measure beam widths. Ease of use and accuracy are primary reasons BeamScan is so widely accepted worldwide. Photon was also the first to use two slits to obtain orthogonal beam widths with one mechanical motion. This method makes the task of measuring orthogonal laser beam widths faster and easier. The scanning-slit method is also preferred to both the pinhole scan and the knife-edge scans, since it is much easier to use than a pinhole scan, and provides greater detail than a knife edge scan. The slit is a natural attenuator allowing only a fraction of the laser power onto the detector. The slit produces the profile directly without differentiation and without mathematical filtering. Compared with the pinhole scan, the scanning slit is extremely easy to align, and produces a larger signal-to-noise ratio.

BeamScan Operation
In this method, a narrow slit is scanned through the beam. A photo detector collects the transmitted light. The photocurrent is proportional to the irradiance with distance and is the irradiance profile. The peak is 100% and the tail 0%. The definition of Beam Size is the spatial width at the 13.5% clip level (1/e2).

The main components of the scan head are a rotating drum with an air slit and a stationary large-area detector, nested between the drum and motor to collect light transmitted by the air slit. The moving slit passes through the beam and exposes the detector. The transmitted photons cause current to flow from the detector to a load resistor across a preamplifier. The voltage from the amplifier while scanning is proportional to the irradiance profile. Using the drum radius and the rotation frequency, time measures are converted to distance or space. The measurement plane is the plane of the scan slit.

The scan head contains a motor mount, a small DC motor, encoder, and slit apertures mounted on a drum that spins. The motor is specified with high precision bearings to assure good position measures and long life. (The DC motor is so quiet that we are often asked what kind of array detector we use.) The instrument master counter is a phase locked loop (PLL) circuit where the smallest data gathering increment is 0.14 mm. The PLL assures long term accuracy of the measures even if the speed of the motor varies after years of operation. A rotation mount illustrated below allows scan head rotation about the entrance aperture, thus providing an easy way of orienting the direction of scan through the beam.

Why do you need a BeamScan?

BeamScan Scan Head Models

BeamScan Controller Models

BeamScan Specifications

Scanhead Mechanical Dimensions

Operating Space Charts

BeamScan Brochure - PDF File (2.9 Mb)

Dual Axis Beam Sampling using BeamScan
Revolutionizing slit measurements, Photon introduced the first commercial dual axis slit scanner, allowing BeamScan to measure orthogonal beam positions to the micron level. Two precision slits are mounted at right angles to one another and + 45 degrees to the direction of scan of the drum. The second slit is at 90 degrees to the first slit and 45 degrees to the drum motion, and measures the wide profile of the elliptic spot. This simple invention allows sampling two orthogonal cross-sectional irradiance profiles with one mechanical motion. Photon precisely controls the drum radius of each slit to microns, which is beneficial for shallow depth-of-focus beam waists.

Scan Slit Explained. - PDF File (700 Kb)

PDF files require Adobe Acrobat Reader software, available free from Adobe Systems.

BeamScan Systems
BeamScan is available as a meter with a beam size display or as an analyzer with greater analysis and display of profile data. The meter versions are preferred when a quick beam width answer is required such as an on-line adjustment of an optic in the factory or field. Analyzers measure beam position, Gaussian fit, ellipticity, optionally relative power and more. Beam Size Meter Applications

- Adjust a lens to a laser diode to form a specific spot size
- Tune a laser
- Functional test of a lens
- Collimate a source
- Position a focused beam

Beam Analysis Systems
Photon software provides capabilities for extensive analysis of profile data. The Beam Analysis System offers greater detailed measures such as Gaussian fits, M2 measurement Wizard, laser beam position to a few microns, relative beam power, parameter measurements over time, ellipticity, and more. Results can be saved for user analysis and/or printed, captured and pasted into other programs. Data can be gathered or transferred through Active X Automation to another program.

Beam Analysis System Applications

- Engineering and research development experiments
- Extensive documentation in manufacturing
- Time variation studies
- Adjust fringe contrast of an interferometer
- All prior above applications

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BeamScan® Scan Head Models:

Dual Axis: XY, XYS, XYGE, XYGET, XYPrec, XYGEPrec, XYLA, XYLAGE, XYFIR, XYLAFIR, XYM, XYGEM

Operating Space Charts:

XY 1.8µm/10 Hz - PDF File
XYS 5µm/10 Hz - PDF File
XYGE 1.8µm/10 Hz - PDF File
XYGET 5µm/10 Hz - PDF File

Pyro XYFIR 25µm 10Hz - PDF File
Pyro XYFIR 5µm 5Hz - PDF File

Photon manufactures BeamScan with silicon, germanium and pyroelectric scan head detectors, with a variety of slit sizes and scan rates. To find the best BeamScan scan head for your specific application, view our chart showing available scan heads and their specifications.

Model XYM and XYGEM - The XYM and the XYGEM are compact designs for the XY and XYGE dual axis BeamScan scan heads. This design was in response to customers' need for a small scan head for use in applications that have limited space or access. This new scan head model measures approximately 2" in lengthwhich provides an easy fit along virtually any optical path.

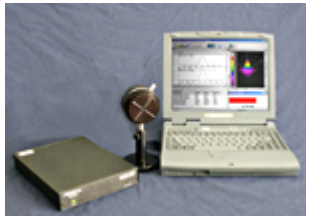


Single Axis: CP, GP

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BeamScan® Controller Models:

Model 3088 - Photon's new 3088 controller is now the standard configuration for BeamScan systems. The 3088-1 allows the BeamScan to be used with a standard PCI bus computer (standard desk-top) and the 3088-3 is used with a laptop computer equipped with a standard PC-Card (PCMCIA) interface slot. For more information, get the BeamScan Controllers data sheet or contact Photon for information and quotation.



Model 3180 - The 3180 is a commercially available desktop computer configured to operate with Photon equipment and installed with the appropriate Photon Instrument analysis software.



Models 1180/1280 - BeamScan Controller Electronics Module. Beam size display meter with BNC connector for analog profiles. Use Model 1280 with dual-axis scan heads, and Model 1180 for single-axis scan heads.



Specifications:

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- Used for wavelengths: 190nm - 20µm
- Beam size measured: 4µm - 19mm @1/e^2
- Maximum beam power measured: 200mW
- Unit-to-unit repeatability: ±2%
- Update rate: Up to 10Hz
- Minimum sampling resolution: 0.14
- Working distance: 1.12mm

Available Software:

- Windows 2000 Professional/XP Professional — Contact Photon for availability of earlier software versions.

Minimum Requirements:

- A processor equal to or better than 586-133MHz (Pentium)
- Microsoft Windows 2000 Professional or XP Professional Operating System
- At least 32MB of RAM, preferably more
- Hard disk drive with at least 50MB of available space
- SVGA or better
- 256 color graphics card with accelerator
- 3.5" floppy disk drive
- CD-ROM drive
- Microsoft compatible pointing device

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