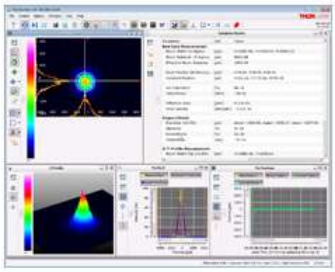
CCD Camera Beam Profiler

- 190 - 350 nm and 350 - 1100 nm Wavelength Ranges Available
- Beam Diameter: 30 µm - 6.6 mm
- For Continuous Wave, Pulsed Beams, and Single Pulses
- M^2 Measurement with Optional Extension Set

Application Idea
Use the BC106N-VIS with the M2MS M2 Extension Set to Create a Complete Beam Quality Measurement System.

BC106N-UV
Filter Wheel with 6 Neutral Density Filters Included

Post and Post Holder Sold Separately



Versatile Software Package

Related Items

Scanning Slit Beam Profilers

M^2 Measurement System

Neutral Density Filters

CCD Cameras

Overview | Specs | ND Filters | User Interface | Pin Diagrams | Software | Shipping List | Feedback

Features

- Full 2D Analysis of Complex Beam Profiles
- For CW or Pulsed Laser Beam and Single Pulse Analysis
- High Resolution: 1360 x 1024 Pixels
- Low Noise: S/N ≥ 62 dB
- 12-Bit CCD Camera
- Large Sensor Area (8.77 mm x 6.6 mm) for Uniformity and Linearity
- Removable, AR-Coated, Wedged Window Protects Sensor from Dust
- User-Calibratable Power Readout
- Auto Exposure from 20 µs to 1 s and Gain Control from 1x to 16x
- Black Level and Ambient Light Compensation
- External Shutter Trigger Input
- Optional M² Extension Kit for Automated M² Analysis (See Below)

Item #	BC106N-UV(/M)	BC106N-VIS(/M)
Wavelength Range	190 - 350 nm[a]	350 - 1100 nm
Power Range	50 fW - 1 W[b]	1 fW - 1 W[c]
Beam Diameter	30 µm - 6.6 mm	
Compatible Light Sources	CW, Pulsed[d]	
Pulse Frequency	1 Hz - 50 kHz (Single Pulse Exposure), Unlimited (Multi-Pulse Exposure)	

a. Design range of Lumigen coating, sensitivity is given throughout 1100 nm but shows increased non-uniformity and noise compared to uncoated BC106N-VIS.
b. @ 200 nm, depending on Beam Diameter & ND Filter. See *Specs* and *ND Filter* tabs for details.
c. @ 550 nm, depending on Beam Diameter & ND Filter. See *Specs* and *ND Filter* tabs for details.
d. Damage threshold data is currently not available for our beam profilers. For use with pulsed lasers, we recommend the following procedure as a guideline for determining a safe upper limit: Set the beam profiler to the maximum integration time (i.e., set the exposure to 1 s). Slowly increase the power until your signal reaches approximately 50% of the intensity as shown in the Profile window of the Beam software package. Multiply this power by a factor of 10. This is the safe upper limit of the mean pulse power for the beam profiler.

Thorlabs' Camera-Based Beam Profilers allow complex mode patterns (like flat top and donut) to be identified while optimizing a laser system. Compared to scanning slit beam profilers, camera beam profilers can capture a more detailed beam profile and provide a true 2D analysis of the beam's power density distribution.

These beam profilers are suited for use with either continuous wave or pulsed sources. Several trigger modes allow flexible capturing of single pulses, including a TTL input for triggered single pulse detection of signals with a repetition rate lower than 50 kHz. In non-trigger mode, pulses with repetition rates above 50 kHz will be seen as a continuous wave source by the beam profiler.

Click to Enlarge
Front View of the BC106N-UV Beam Profiler

Each beam profiler contains a high-quality 12-bit CCD camera with an active sensor size of 8.77 mm x 6.6 mm, a resolution of 1.4 Megapixels, and a 20 µs minimum exposure time. Compared to CMOS profilers, the high-quality CCD camera offers excellent sensitivity and low noise and enhanced global shutter efficiency for improved exposure accuracy and uniformity. The automatic dark level calibration provides very stable dark currents independent of the device settings, eliminating the need to recalibrate the dark level for each user setting.

An integrated filter wheel with 6 high-quality neutral density (ND) filters allows the profiler to be adapted for use with beam intensities from femtowatts to 1 W (see the Specs and ND Filter tabs for details). Each filter housing is internally SM05 (0.535"-40) threaded for easy integration with Thorlabs' lens tube systems and mounts for other optical components such as additional attenuation filters. An 8-32 (M4) tap on the side of the beam profiler housing and 8-32 (M4) and 1/4"-20 (M6) taps on the bottom of the housing allow for two different mounting orientations.

The integrated power meter can be user calibrated and is perfectly suited for simultaneous power and beam shape optimization without the need for an external power meter. A measured mean value of the ambient light intensity is subtracted from the beam profile measurement so as to compensate for ambient light. The automatic exposure and gain control feature adapts the camera settings to the actual beam intensity. The USB 2.0 interface allows up to 10 full frames per second at full resolution. Measurements at higher frame rates can be achieved and transferred with reduced frame sizes.

The BC106N Beam Profilers are shipped with Thorlabs' Beam software package. Features of the software package are listed under the User Interface tab. Thorlabs' Beam software can be downloaded via the links on the Software tab, along with programming reference guides for LabVIEW™, Visual C++, Visual C#, and Visual Basic.

Extension sets are available below to convert these camera beam profilers into a fully-automated M² measurement system. Thorlabs also offers a scanning slit beam profiler, as well as a complete M² analysis systems with the beam profiler included.

CCD Camera Beam Profiler

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Imperial		Price	Available / Ships	
+1			BC106N-UV	CCD Camera Beam Profiler, Ø30 µm - 6.6 mm, 190 - 350 nm	$4,450.00	√	Today
+1			BC106N-VIS	CCD Camera Beam Profiler, Ø30 µm - 6.6 mm, 350 - 1100 nm	$4,200.00	√	Today

+1	Qty	Docs	Part Number - Metric	Price	Available / Ships

+1		BC106N-UV/M	CCD Camera Beam Profiler, Ø30 µm - 6.6 mm, UV, 190 - 350 nm, Metric	$4,450.00	√	Today
+1		BC106N-VIS/M	CCD Camera Beam Profiler, Ø30 µm - 6.6 mm, VIS, 350 - 1100 nm, Metric	$4,200.00	√	Today

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M² Measurement Extension Sets

Zoom

M² Measurement System Compatible with BC106N Camera Profilers
Systems with Mirrors for the 250 - 600 nm or 400 - 2700 nm Range
Mounting Adapters for the BC106 Camera and BP209 Scanning Slit Beam Profilers
Includes an Alignment Laser

These extension sets are designed to convert Thorlabs' Camera or Scanning Slit Beam Profilers into a fully automated, motorized M² measurement system. The M2MS has internal mirrors for wavelengths between 400 - 2700 nm and the M2MS-AL has internal mirrors for wavelengths between 250 - 600 nm. A magnetic mount at the input port allows the included AR-coated lenses (see boxes below) to be easily switched out to optimize the system for your laser source.

The beam profiler and focusing lens remain in a fixed position. For M^2 measurements, the beam path length is varied using a movable retroreflector mounted on a DDSM100/M translation stage, which has a translation range of 200 mm and a maximum velocity of 500 mm/s.

The side of the M² measurement system features an integrated USB 2.0 hub, which has ports for the beam profiler, one other device such as the TSP01 USB temperature and humidity controller, and a mini USB output connection to a PC. The translation stage inside of the system also communicates with the computer through this hub. The system is controlled via the Thorlabs Beam software package, which is also use to control our beam profilers (see the Software tab), which enables accurate measurements of a variety of beam-related parameters.

The housing of the M^2 measurement rests on four feet at the corners created by a 0.5 mm deep relief cut in the base. A set of RDF1 rubber damping feet are included. Five M6 taps allow for the installion of four damping feet with one near each corner or in a configuration using three damping feet.

More information and our complete M² measurement systems can be found here.

Item #	M2MS	M2MS-AL
Wavelength Range	400 - 2700 nm[a]	250 - 600 nm[a]
Beam Profiler Compatibility	BC106, BP209, and BP10x Beam Profilers	
Translation Stage	DDSM100/M	
Travel Range	100 mm	
Velocity (Max)	500 mm/s	
Effective Translation Range	200 mm, -100 mm to 100 mm from Focal Point	
Lens Focal Length	250 mm	
Optical Axis Height	70 mm (Without Additional Feet)	
M² Measurement Range	>1.0 (No Upper Limit)	
Typical M² Accuracy	±5% (Depending on Optics and Alignment)	
Minimum Detectable Divergence Angle	<0.1 mrad	
Applicable Light Sources	CW, Pulsed[a]	
Typical Measurement Time	15 - 30 s (Depending on Beam Shape and Settings)	
General Specifications		
Size	300 mm x 175 mm x 109 mm (Without Beam Profiler)	
Weight	4.2 kg (Without Beam Profiler)	

a. Depending on the beam profiler used with the system.

Lenses Included with M2MS*

Lenses with f = 250 mm Mounted in CXY1QF Quick Release Plate:
LA1461-A (AR Coated for 350 - 700 nm)
LA1461-B (AR Coated for 650 - 1050 nm)
LA1461-C (AR Coated for 1050 - 1700 nm)

Lenses Included with M2MS-AL*

Lenses with f = 250 mm Mounted in CXY1QF Quick Release Plate:
LA4158-UV (AR Coated for 290 - 370 nm)
LA1461-A (AR Coated for 350 - 700 nm)

Other Accessories

Alignment Laser
USB 2.0 to Mini B Cable, 3 m
USB 2.0 to Mini B (Angled), 0.5 m)
15 V, 3.0 A Power Supply
0.05" Hex Key
3 mm Balldriver
4 Rail Clamps
6 M4 Cap Screws

*Additional lenses for shorter UV or longer IR wavelengths and magnetic mounting plates are available separately to allow further customization of your system.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal		Price	Available / Ships
+1			M2MS	M² Measurement System Extension Set, 400 - 2700 nm	$5,610.00	√ Today
+1			M2MS-AL	M² Measurement System Extension Set, 250 - 600 nm	$5,610.00	Lead Time

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Additional Beam Characterization

Optical Spectrum Analyzers	Spectrometers	CCD-Based Shack-Hartmann Wavefront Sensor	CCD / CMOS Cameras
▶Camera Beam Profiler	Fiber Interferometers	Fast CMOS-Based Shack-Hartmann Wavefront Sensor	Liquid Crystal Noise Eater / Laser Stabilizer
Rotating Slit Beam Profiler	Shearing Interferometer	Adaptive Optics Kits	Power and Energy Meters
Complete M² Measurement Systems	Fabry-Perot Interferometer	Ultrafast Temporal Magnifier	Other Detectors

Sales: 1-973-300-3000
Technical Support: 1-973-300-3000