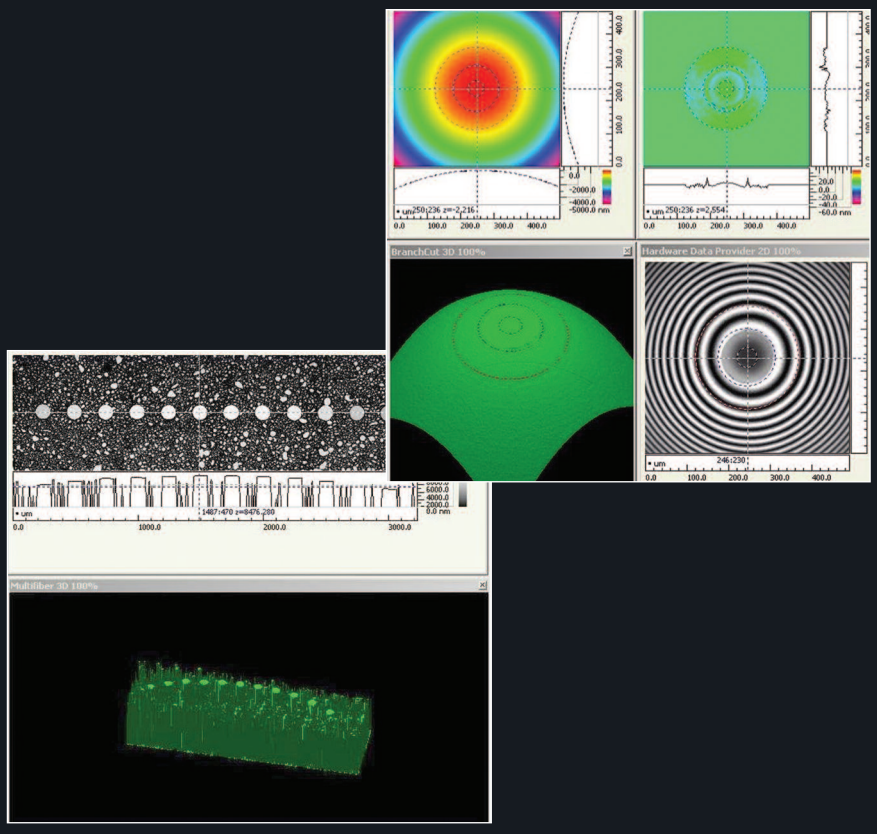
Norland TotalSCAN™ for Total Control

INTERFEROMETRIC SYSTEMS FOR CONNECTOR END FACE MEASUREMENT



NORLAND PRODUCTS INC.

Precision & Simplicity

Norland Products provides fiber optics manufacturers with the industry's most accurate, versatile, and easy to use line of automated non-contact interferometer systems for measuring connector end face geometry. Our advanced designs, precision optics, and intuitive software are accepted worldwide as the standard by which all others are judged. Norland Interferometric Systems support both production and R&D with the ability to measure standard as well as custom connectors. The instantaneous feedback from our systems provides critical information to give total control of the polishing process.

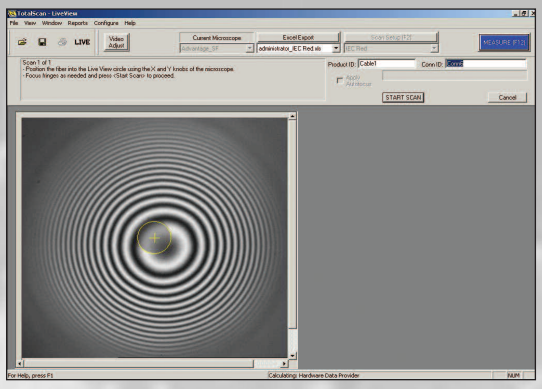
At the center of all of our systems is our innovative TotalSCAN™ software. TotalSCAN™ delivers a wealth of tools to simply, rapidly, and accurately collect and measure data. Extensive export and reporting options are also provided. No other software package offers users as many automated features, easy configurability, and precise calibration standards.

Our family of automated interferometer systems includes the AC-3000, ideally suited for measuring single fiber connectors, the AC-3005 for measuring multifiber connectors, and the Norland Advantage System which can measure both.

We invite you to challenge Norland against any system available today and see how our unrivaled precision and convenience will make your job easier.

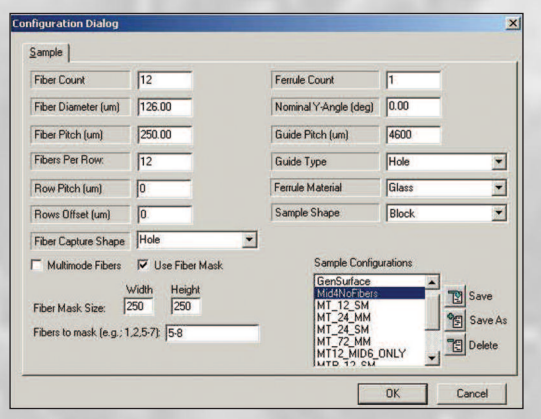
TotalSCAN™ for Total Control

Our TotalSCAN™ software is the key to the outstanding performance of each Norland Interferometer system. TotalSCAN™ provides a host of features that allow users to exercise a superior level of control and repeatable precision.



Ease of Use

Only one user interface needs to be learned for controlling all Norland Interferometer Systems. Also, setup and operation is simplified with on-screen instructions, industry-standard scan configurations, and automatic report printing.



High Speed

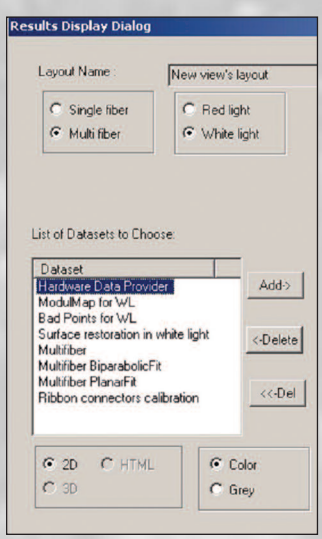
MT ferrules with up to 72 fibers can be evaluated in under 60 seconds with the AC-3005, the industry leader for multifiber connectors.

Autofocus

Focus and fringe are adjusted automatically for optimum measurements.

Versatility

- Measure both multifiber and single fiber connectors
- Configure measurement for custom connector designs
- Create customized screen views and reports

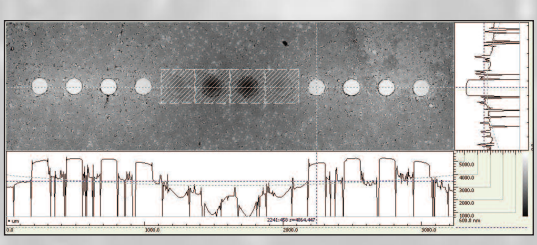


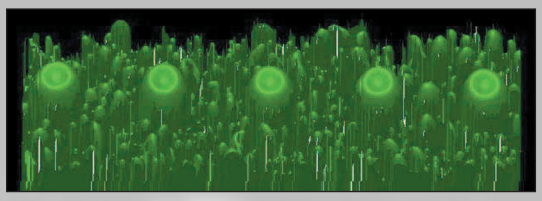
Multiple Scanning Modes

Effortlessly change between Phase-Shifting Interferometry (PSI) for smooth surfaces and Vertical-Scanning Interferometry (VSI) for rough surfaces or step heights to measure all connector surfaces.

Fiber Masking

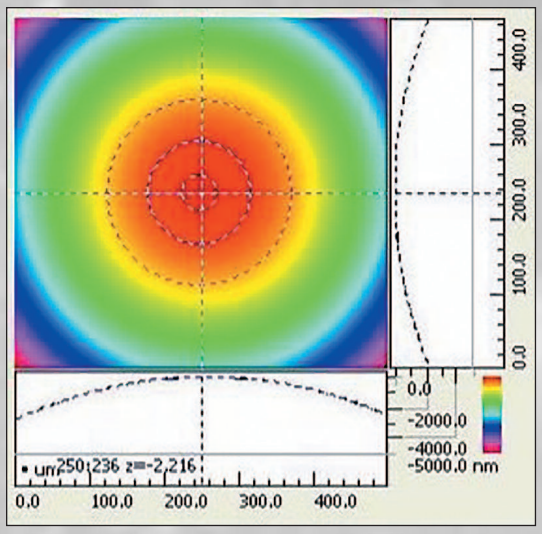
Evaluation of alternative connector designs can be achieved by masking out areas not pertinent to the measurement results.





Fully Adustable Graphical Views

2D and 3D graphics with extensive viewing controls provide a superior level of surface detail for perfecting polishing processes as well as for incoming inspection.



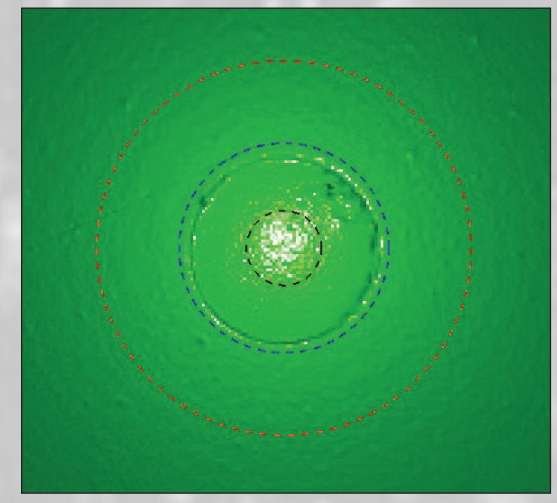
Maximum Configurability

TotalSCAN™ lets the user configure Test Rules, Samples, Reports, Results Display and User Levels with the touch of a few buttons.

Support for Wide Range of Users

TotalSCAN™ offers hierarchical user levels - each of which assigns more rights to operate additional features within the program:

- **Operator**—easily select and run preconfigured measurements and data reporting.
- **Administrator**—define new connector configurations and calibration controls.
- **Developer**—work with special tools and configurations.

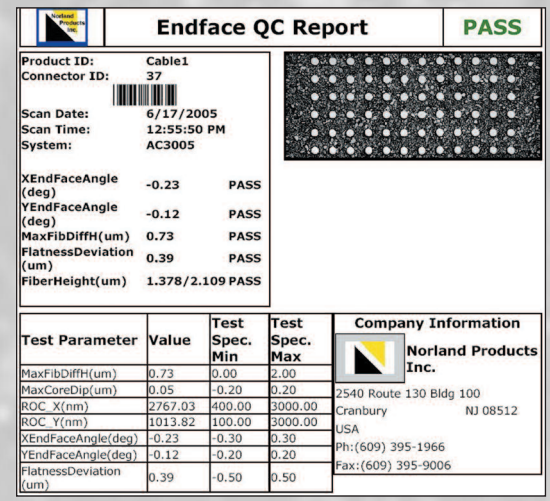


Convenient Exporting

Measurement results (both graphical and quantitative) are stored to a Microsoft Access® database and can be printed out or exported to a spreadsheet or ASCII text file for use in a full quality control regimen.

Multiple Operating Systems Compatibility

TotalSCAN™ works with Windows 2000® Professional or Windows XP® Professional.



Endface QC Report — **PASS**

Product ID:	Cable1
Connector ID:	37
Scan Date:	6/17/2005
Scan Time:	12:55:50 PM
System:	AC3005

XEndFaceAngle (deg)	-0.23	PASS
YEndFaceAngle (deg)	-0.12	PASS
MaxFibDiffH(um)	0.73	PASS
FlatnessDeviation (um)	0.39	PASS
FiberHeight(um)	1.378/2.109	PASS

Test Parameter	Value	Test Spec. Min	Test Spec. Max
MaxFibDiffH(um)	0.73	0.00	2.00
MaxCoreDip(um)	0.05	-0.20	0.20
ROC_X(nm)	2767.03	400.00	3000.00
ROC_Y(nm)	1013.82	100.00	3000.00
XEndFaceAngle(deg)	-0.23	-0.30	0.30
YEndFaceAngle(deg)	-0.12	-0.20	0.20
FlatnessDeviation (um)	0.39	-0.50	0.50

Company Information

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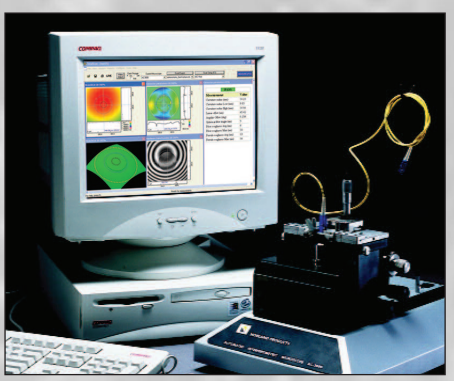
NIST Traceable Calibration Standards

NIST-traceable calibration standards eliminate guesswork and ensure that the system is performing accurately. Norland is the only manufacturer to offer these tools for Stage Tilt, Fiber Height, Radius of Curvature, Magnification Calibration and Apex Offset.

Brilliant Solutions

TotalSCAN™ software is available with three interferometer platforms. Each includes world class infinity-corrected optics and powerful computer capabilities.



The AC-3000 System – Specifically designed to measure the key parameters of PC polished connectors, the AC-3000 measures the radius of curvature, offset of polish, and undercut or protrusion on FC, ST®, SC, LC, and MU type connectors. In addition, the system can measure APC, flat polished connectors, bare ferrules, cleaved or polished fibers, and sections of multifiber connectors. Our precision Locking V-Groove Mounts use our patented integral leaf spring design that offers the most robust method for repeatably holding standard connectors. The feedback from the AC-3000 provides the user with optimum control of the production process by quickly showing any variation in the polish quality.

Designed for users needing extreme accuracy, the AC-3000 is capable of determining true fiber height to within 2 nm, and radius of curvature and offset of polish to within 0.2 mm and 2.0 microns, respectively.

The AC-3005 System—Designed specifically for measuring the end face geometry of array-type structures, such as multiple fiber connectors and ferrules, the AC-3005 measures the radius of curvature and the angle of the end face along two axes. It automatically calculates individual and differential planar fiber height on connectors with up to 72 fibers. The variable tilt stage traverses automatically to quickly gather detailed information on angled as well as flat surfaces. True Angle Connector Mounts™ are available for MT, MTP, MPO, MT-RJ and custom ferrules.

The AC-3005 provides repeatable angle measurements, certified to 0.01°, and radius of curvature measurements accurate to within 10% across the selected region of interest. Fiber height measurements and differential fiber height have been shown to be repeatable to within 40 nanometers.

The Advantage System—Designed to provide the functions of the AC-3000 and AC-3005 in a single system, the Advantage utilizes a high resolution interferometer to measure the end face of multifiber connectors and fiber arrays as well as single fiber, PC/APC connectors. This provides extra versatility for anyone who needs to measure a wide variety of connectors.

Every Norland Interferometric System saves time and money by providing the ultimate in quality assurance for your high performance connectors. Whether it is incoming inspection, R&D, or quality control of the polishing process, the combination of precision, convenience, and versatility make Norland the ideal choice for all your interferometric needs.

SYSTEM SPECIFICATIONS

DIMENSION (Inches)	LENGTH	WIDTH	HEIGHT
Interferometer	17.0	11.0	8.3
Monitor	17.0	17.0	17.0
Computer	17.5	17.0	5.25
INTERFEROMETER			
	AC-3000	AC-3005	Advantage
Light Source	White Light - Tungsten Halogen		
Camera	CCTV w/8.8mm x 6.6mm Sensing Area		
Image Frame Size	512 x 480 pixels		
Vertical Resolution	1.1nm		
Lateral Resolution	0.97µm	3.12µm	1.95µm
Magnification	175X	55X	90X
Field of View	500µm^2	1600µm^2	1000µm^2
COMPUTER - Pentium III*			
Speed	2.8 GHz*		
Hard Disk	80.0 GB EIDE Drive*		
Graphics Adapter	Matrox Productiva		
Bios	Phoenix 4.0*		
Operating System	Microsoft Windows 2000 or XP		
Frame Grabber	Matrox Meteor II		
RAM	512 MB SD RAM Installed*		

*Subject to change due to improving technology

MEASUREMENT SPECIFICATIONS

		MEASURED PARAMETER	**RANGE**		**REPEATABILITY**	**REPRODUCIBILITY**
AC-3000	SINGLE	Radius of Curvature	3-∞	mm	0.10 %	0.20 %
		Apex Offset	0-500	µm	0.20 µm	1.0 µm
		Spherical Fiber Height	± 10	nm	1.00 nm	2.0 nm
AC-3005	MULTI	Planar Fiber Height	± 15	µm	0.020 µm	0.040 µm
		Endface Angle	± 0.5	°	0.010 °	0.040 °
		Flatness Deviation	± 15	µm	0.040 µm	0.060 µm
		Differential Height	± 15	µm	0.040 µm	0.060 µm
ADVANTAGE	SINGLE	Radius of Curvature	3-∞	mm	0.20 %	0.40 %
		Apex Offset	0-500	µm	1.0 µm	3.0 µm
		Spherical Fiber Height	± 10	nm	2.0 nm	4.0 nm
	MULTI	Planar Fiber Height	± 15	µm	0.020 µm	0.040 µm
		Endface Angle	± 0.5	°	0.008 °	0.040 °
		Flatness Deviation	± 15	µm	0.040 µm	0.060 µm
		Differential Height	± 15	µm	0.030 µm	0.050 µm

Repeatability based on 100 consecutive undisturbed measurements.

Reproducibility based on 100 measurements with connector reinsertion between each.

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