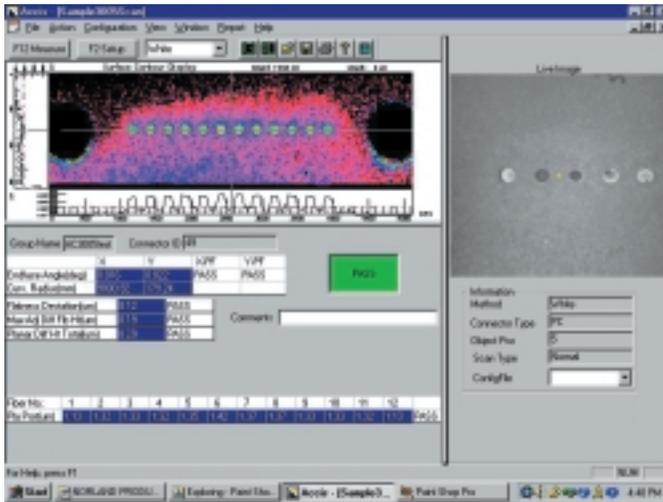


NORLAND PRODUCTS



AC-3005

Automated Non-Contact Interferometer System For Array-Type Fiber Optic Connectors



Measures planar height of up to 24 fibers. Also calculates radius, angle, dome height and maximum differential height. Surface angle calibration speeds measurements by utilizing angular correction factors.

The **Norland AC-3005** is a fully automated, non-contact, interferometric microscope designed specifically for measuring the end face geometry of array-type structures, such as multiple fiber connectors and ferrules. The **AC-3005** incorporates a Michelson interferometric objective lens on an inverted microscope with a built-in camera and a high-speed computer. User-friendly Windows NT with image processing software provide immediate, 3D, topographical information on the surface being inspected.

The **AC-3005** measures the radius of curvature and the angle of the end face along two axes. It automatically calculates planar fiber height and differential planar fiber height on connectors with up to 24 fibers. Utilizing multiple image overlay software, it takes a number of measurements across the surface and stitches them together forming a seamless display of the end face geometry. The variable tilt stage traverses automatically allowing you to quickly gather detailed information on angled as well as flat surfaces. Whether you are establishing a process or are in full-scale production, the **AC-3005** system will provide you with accurate, repeatable results you can depend on. True Angle™ Connector Mounts* are available for MT, MTP, MPO, Fotron, MiniMAC, Mini-MT, MT-RJ and custom ferrules.

The **AC-3005** is a unique system that automatically switches between white light (broad band scanning) interferometry and red light (phase shift) interferometry. This allows the system to accurately map both rough and smooth surfaces. The red light mode allows the system to quickly map smooth surfaces, while the white light mode, using the latest state-of-the-art technology, measures rough surfaces and eliminates ambiguities in step heights. White light provides the "True View" that the red light mode cannot always measure.

Versatile

This is a truly versatile system for analyzing all types of connectors and for measuring planar fiber height to the sub-micron level. The advanced technology of the **AC-3005** can quickly obtain the surface topography of an array-type connector with all its geometric

INDIVIDUAL CONNECTOR TEST REPORT

Client: Telecommunications
Group Name: MCDLabs
Connector ID: 40

Scan Date: 02/28/02
Scan Time: 16:46:50

System: Z4000 MC 3005

X EndFace Ang: 0.295 PASS
Y EndFace Ang: 0.002 PASS
Flatness Dev: 0.186 PASS
Max Diff Fib Ht: 0.184 PASS
Fiber DHT H: 0.200 PASS
Fiber Planar: 0.000 / 0.000 PASS
Core Dip: -0.000 / 0.000 PASS

Scan Parameter	Result	Min	Max	Pass/Fail
X EndFace Ang	0.295	0.200	0.300	PASS
Y EndFace Ang	0.002	0.000	0.050	PASS
Flatness Dev	0.186	0.000	1.000	PASS
Max Diff Fib Ht	0.184	0.000	1.000	PASS
Fiber Planar	0.000 / 0.000	0.000	0.000	PASS
Core Dip	-0.000 / 0.000	-0.000	0.000	PASS

IMAGE INFORMATION

Norland Products Inc.
3648 Foster Dr
Bldg 100
Cupertino, CA 95014
Ph: +1 (650) 949-1000

Fiber No	Fiber Planar Deviation	Fiber Spk Deviation	Fiber Core Dip	Fiber No	Fiber Planar Deviation	Fiber Spk Deviation	Fiber Core Dip
1	1.109	1.612					
2	1.202	1.202					
3	1.240	1.216					
4	1.289	1.189					
5	1.240	1.196					
6	1.419	1.289					
7	1.201	1.217					
8	1.099	1.099					
9	1.202	1.201					
10	1.300	1.300					
11	1.002	1.011					
12	1.021	1.000					

Configurable reporting includes detailed results of the connector mapping process.

characteristics. Detailed results are readily available to monitor the polishing operation. User configurable reporting software makes it possible to produce reports with a wide range of formatting and data display options.

Choose the applicable data, charts and illustrations (including company logo, labels and barcodes) and place them in the layout desired by you or your customer.

Multilevel security allows System Administrators to design Set-Up Screens and set "Pass/Fail" standards while Users can select the appropriate screens for testing. This makes the **AC-3005** as comfortable in the production area as it is in the laboratory.

Easy To Operate

The **AC-3005** is easy to use. Simply insert a connector into the unit, adjust the optics and activate the "Measure" function. On screen graphics and instructions guide you through the connector mapping process.

Results are clearly and attractively displayed on the color monitor. Use either the keyboard or the mouse to activate pull-down menus, shortcut icons, on-line and context-sensitive help. Fast print spooling and multi-processing capabilities allow a hard copy print of the information through a standard inkjet or laser printer, with immediate capability for beginning the next scan.

The unit is designed on an extra-stable, inverted microscope base that provides a large platform at the top allowing integration into a variety of production processes. Flat or angled connectors can be measured without changing mounts using our exclusive variable tilt stage. The variable tilt stage adjusts with continuous variable angles from 0° to 13°, with NIST traceable accuracy to $\pm 0.01^\circ$.

Accurate

The **AC-3005** provides immediate, accurate feedback on the surface being inspected. Surface angle measurements are repeatable and certified to 0.01° . The radius of curvature is accurate to $\pm 5\%$ across the selected region of interest. Planar fiber height and differential fiber height have been shown to be repeatable to ± 20 nanometers.

Norland's True Angle™ Connector Mounts* are equipped

with integral guide pins or holes located on a precision, manufactured aperture plate. This precisely simulates the manner in which the connectors will be mated in a bulkhead or termination.

The optional Norland 0° and 8° NIST traceable standard permits angular accuracy of $\pm 0.01^\circ$ when the variable tilt stage is in the 0° or 8° position. Whether developing or controlling your polishing process, the **AC-3005** is a valuable tool that sets the standard for measuring connector end face geometry.

Features

Norland leads the way in Fiber Optic Interferometry

- Norland 0° and 8° NIST traceable standard permits angular accuracy of $\pm 0.01^\circ$.
- Automatic measurement of: radius of curvature and angle of the end face (vertical and horizontal along two axes), planar fiber height and differential planar fiber height for up to 24 fibers, flatness deviation, core dip values (multimode fibers).
- Autofocus and angle correction features offer higher product throughput without sacrificing accuracy.
- Rugged inverted microscope design for easy leveling and integration into a variety of production processes.
- World class, infinity corrected optics assure superior resolution.
- The variable tilt stage with micrometer control between 0°–13° with NIST traceable accuracy to $\pm 0.01^\circ$.
- Change from red light to white light scan instantaneously with a mouse click.
- Windows NT/2000 software provides full, 32 bit multiprocessing with an easy to use, intuitive feel.
- NT/2000 offers security with network compatible, multilevel password protection.
- Choose measurement data to be displayed in Excel and customize pass/fail standards that follow IEC and TIA Guidelines.
- Obtain roughness measurements both Ra and Rq.

- True Angle™ Connector Mounts* offer extreme accuracy and repeatability with fixed stop plates and pins or guide holes. Edge alignment mounts allow you to view the entire connector end face.
- Mounts for MT, Mini-MT, Fotron, MiniMAC, MPO, MPX, MTP and MT-RJ connectors.
- Widest variety of mounts available from stock inventory (custom mounts also available).

REPRODUCIBILITY AND REPEATABILITY

Measured Parameter	Range	Reproducibility	Repeatability
Planar Fiber Height	±10μ	±0.02μ	±0.01μ
Flatness Deviation	±10μ	±0.03μ	±0.02μ
Differential Height	±10μ	±0.03μ	±0.02μ
Surface Angle (X)	±0.5°	±0.02°	±0.005°
Surface Angle (Y)	±0.5°	±0.02°	±0.005°

Reproducibility based on 100 measurements with re-inserting connector between measurements.

Repeatability based on 100 measurements without disturbing the connector between measurements.

Reproducibility and repeatability are the full differential range of all measurements (max-min) with an AC-3005 on a vibration damping table, after surface angle calibration, using a True Angle™ Connector Mount* and a twelve (12) fiber MT connector.

*Patent Pending

SPECIFICATIONS

Interferometer — Michelson

Light Source	White Light — Tungsten Halogen
Camera	CCTV with 8.8mm x 6.6mm Sensing Area
Image Frame Size	256 x 240 Pixels
Vertical Resolution	11 Angstroms
Magnification	45X
Lateral Resolution	7 microns
Field of View	1600 microns wide

CPU — Pentium IV^f

Speed	1.7 GHz
Hard Disk	15 GB EIDE Drive
Graphics Adapter	Matrox Productiva
Bios	Phoenix 4.0
Operating System	Microsoft Windows NT 4.0
Frame Grabber	Matrox Meteor II
RAM	128MB SD RAM Installed

^fComputer hardware subject to change.



NORLAND PRODUCTS INC.

2540 Route 130, Suite 100, P.O. Box 637, Cranbury, NJ 08512, Tel.(609)395-1966 Fax(609)395-9006

www.norlandproducts.com