Xi-100 Plus

AMBiOS TECHNOLOGY

Non-Contact Optical Profiler

Non-contact 3D Surface measurement system featuring:

- *Fast, non-destructive, 3-dimensional measurements*
- *Point and shoot operation*
- *High resolution, accuracy, and repeatability on smooth or rough surfaces*
- *Highly affordable*

Focused on Surface Analysis Technology

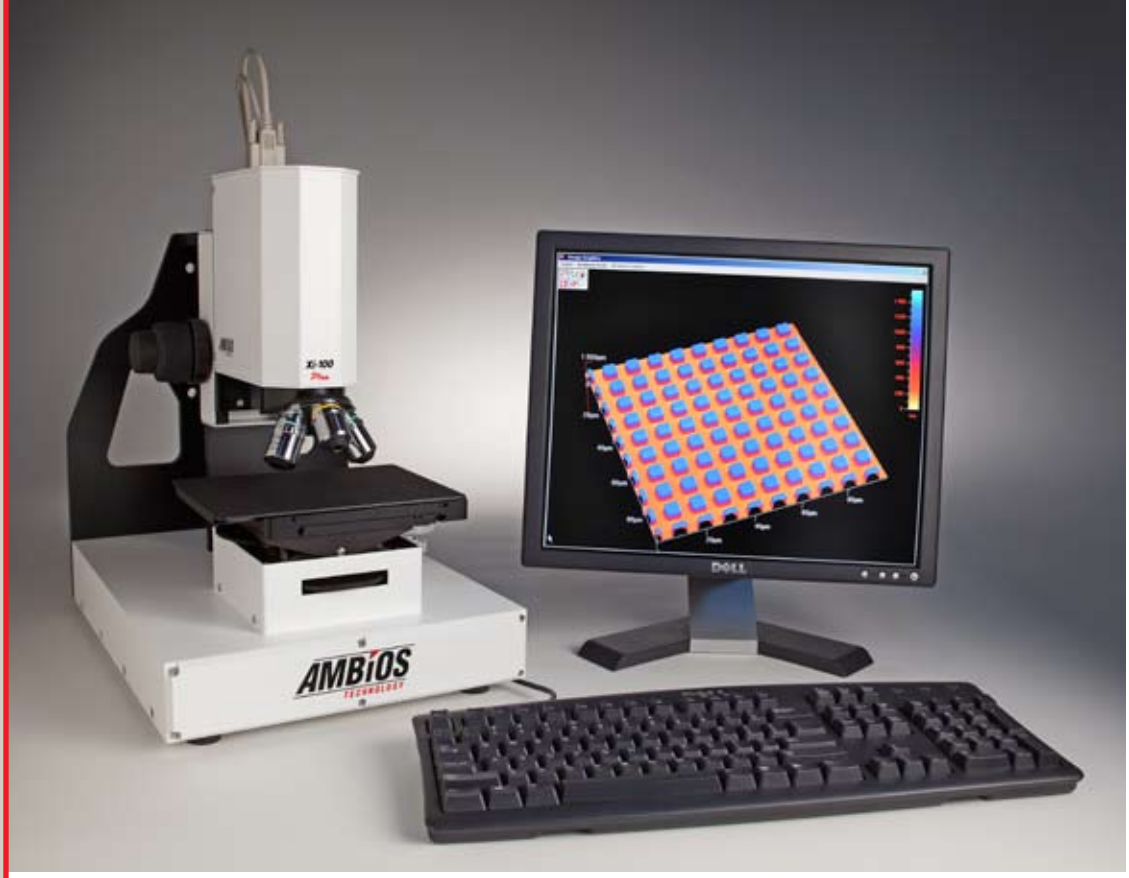
The AMBIOS TECHNOLOGY mission is to provide industrial and academic researchers with affordable, world-class surface-analysis instruments. Our years of experience in virtually every aspect of surface measurement provides us with a unique perspective from which we can evaluate our customers needs and provide appropriate solutions. With our emphasis on surface measurement, we combine various technologies to meet the engineering and research needs of our customers.

Our new Xi-100 Plus Optical Profiler rapidly and quantitatively measures the microscopic 3D topography of surfaces. The Xi-100 Plus complements our XP Series Stylus-type Surface Profilers by combining white light and phase-shifting interferometry for precise, non-destructive surface measurements that are internally and permanently referenced to a standard wavelength of light.

We bring a strong technological emphasis, rigorous attention to quality and superior price/performance value to all the products we offer to meet the critical demands of many surface measurement applications such as:

- Precision machined surfaces
- Optics and fibers
- Ceramics
- Semiconductors
- Film, foil, paper and plastics
- Thin-film magnetic heads and disks
- Polymers and biomaterials
- MEMS devices

Commitment to continued innovation coupled with adherence to our strong corporate values assure our customers of exceptional value, our employees with exciting and challenging work and our stockholders with a fair return on their investment.



Designed for the Researcher

The **Xi-100 *Plus*** is designed for the researcher who is interested in getting fast, repeatable data from an instrument that is not encumbered by unneeded levels of complication. It features the ability to provide precise, high-resolution, non-contact 3D profiles of both smooth and rough surfaces with ease. The only instrument adjustments are sample position and focus. The intuitive Windows user interface allows simple and reproducible program navigation.

Flexible System Performance

- **Angstrom height resolution for superior measurement repeatability**
- **250 micron Z range with optional 10mm motorized range for almost any measurement**
- **Manual 100 x 100mm X-Y stage (programmable with motorized option)**
- **Many objective lenses from which to choose**
- **Solid-state light source and no moving parts in the head (other than the flexure) insure years of reliable operation**
- **Totally rewritten software for image acquisition, rendering and display**
- **Image stitching**
- **Simple point and shoot operation**
- **Operates in scanning white light or phase measuring modes**
- **Substantially improved electronic control with ultra low noise closed loop sensor feedback**
- **High speed digital USB camera provides extremely high speed scanning**

Additional levels of automation can be added to the instrument to provide increased measurement efficiencies. In it's manual configuration the sample navigation is done via a traditional 100 x 100mm microscope stage with manual tip/tilt. This configuration permits a user to simply step up to the instrument and acquire data immediately, which is perfect for laboratory or single measurement purposes. Alternatively, optional motorized X-Y stages and/or a motorized Z stage can be added to provide programmable movements in X & Y and autofocus.

Measurement Principle

In **Texture Mode** the objective lens, which contains the reference arm of the interferometer, is moved vertically over the measurement range of interest (10 microns to 10mm). The optical path difference between the surface and the beam splitter (inside the objective) changes as the objective lens is scanned vertically, thus moving the interference fringes "thru" the surface. The short coherence light source used in the Xi-100 Plus produces temporally confined interference fringes. At each pixel the intensity of the interference fringe is measured as the fringes move thru the surface thus creating a modulated sine wave – otherwise known as a correllogram. The coherence length of the light source determines the modulation envelope or the degree of temporal confinement of the interference fringes. The maximum and minimum of the interference fringes are separated by the wavelength of the light source (550nm) divided by two. With this information, the height as recorded by each pixel can be very precisely determined. Stitching all of the pixels together produces a highly resolved three dimensional representation of the surface. Texture mode is useful for height measurements tens of nanometers to 10 millimeters. Alternatively, **Smooth Mode** uses the very high contrast camera to measure the phase gradient across one or two fringes on the surface. The amplitude of the interference fringe pattern is purely sinusoidal and the phase of this pattern can be measured to very high accuracy. Smooth Mode is useful for height measurements of less than a nanometer to a few microns (on continuous surfaces) or ~lambda/4 (137nm) on discontinuous surfaces.

IMAGE 1

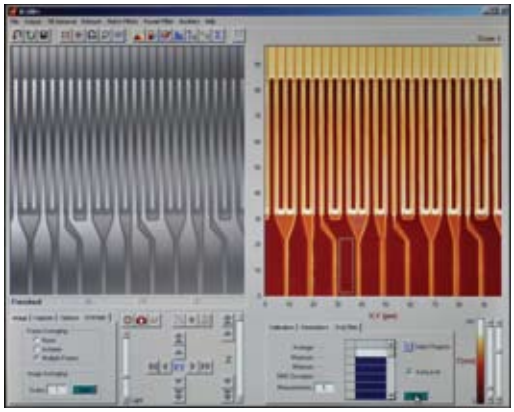


IMAGE 1: Simple instrument configuration with all needed controls on a single page. Simultaneous display of the resultant image and the live video view. Additional advanced features are easily accessible and intuitive.

IMAGE 2 and 3: Nearly infinite image display colors are defined by interactive controls. Controls for 3D displays permit a variety of imaging modes including sunrise, light and slope shading and Z height allows production of stunning visual images suitable for publication.

IMAGE 4 and 5: Incredible resolution showing well resolved ~3nm steps on VLSI Technology, Inc. RQS surface roughness standard. Certified roughness is 14.76 angstroms. Xi-100 Plus measurements show roughness measurement of 14.6 angstroms – average of 30 cross-sections.

IMAGE 3

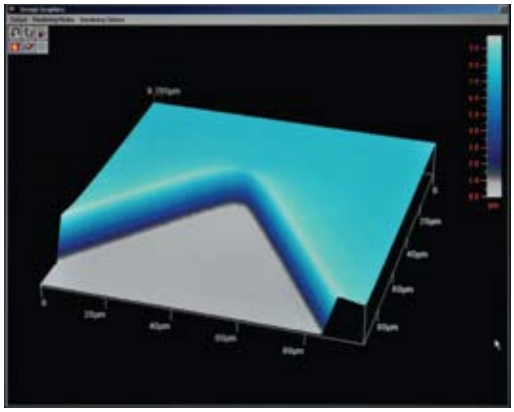


IMAGE 2

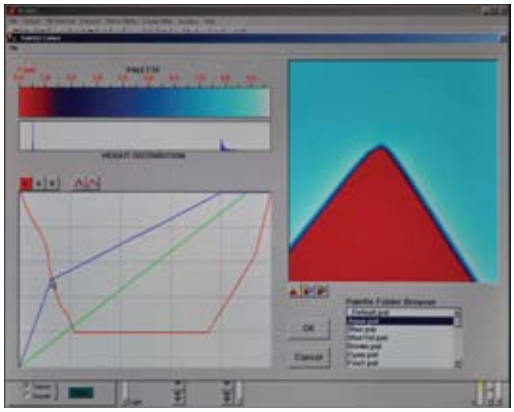


IMAGE 4

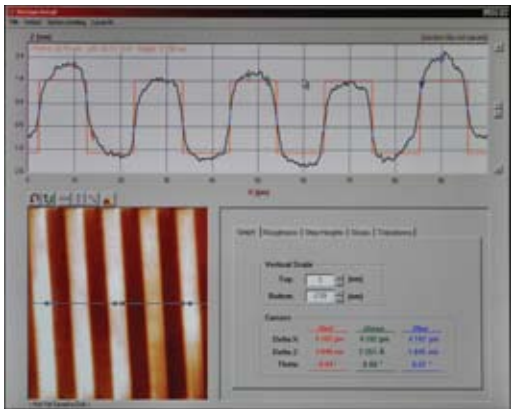
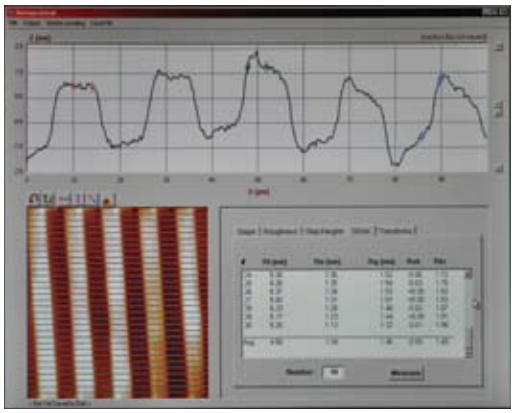


IMAGE 5



Powerful User-Friendly Software

The Xi-100 Plus system software was designed from the ground up with a flexible interface to help you easily and quickly acquire your measurements. It features the Windows® XP operating system and seamlessly integrates into your laboratory and office environment. Once data is obtained with the profiler, you can directly import the results into standard office productivity software. The Xi-100 Plus was designed to operate from day one on the latest Windows operating system.

Data acquisition is little more than focusing on the sample and clicking "image." The easy point-and-click operation allows novice operators to measure their samples and obtain their results in a fraction of the time required by the more complicated systems. After the measurement has been acquired, the results are automatically displayed. Various filters can be set to operate on every data set as it is acquired or only the raw data. This feature allows a process engineer or scientist to identify needed filtering for their sample and apply it automatically. Our standard analysis package provides a host of powerful surface analysis tools, including:

- Surface roughness
- Waviness
- Step height
- Thin film stress
- Geometry algorithms and calculations

The Xi-100 Plus file format is compatible with Ambios Technology's image rendering and analysis program — Q-Port. This important software tool is provided on an infinite site license to all users of the Xi-100 Plus. The program can be installed on any PC from the provided CD-ROM or the Ambios Technology ftp site. Simply run the automatic setup and you're off and rendering. Additionally Xi-100 Plus files are compatible with SPIP from Image metrology and TrueMap from Truegage.

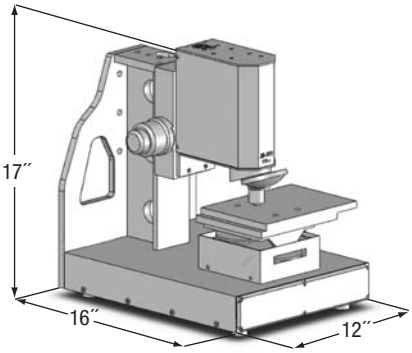
The Ambios Technology Guarantee

We are so sure you will be completely satisfied with our instruments that we offer a 30-day evaluation period prior to payment. If for any reason you decide within 30 days of installation that the instrument does not meet your expectations, we will take it back, no-questions-asked! This gives you enough time to test the instrument under your working conditions and on your samples before you make a final decision.

Go ahead and compare — you won't find a better deal! Many of our standard features are not available or cost thousands of dollars more on competitive models.

Xi-100 Plus with Optional Motorized Stage

Xi-100 Plus Specifications



Vertical Range	250 microns (10.0mm with optional motorized Z stage)
Manual XY Stage Movement	100 x 100mm (optional motorized)
Maximum Scan Speed	7.2µm/sec
Surface Roughness Measurement Resolution	0.1nm (Smooth Mode)
Smallest Resolvable Step	1.0nm (Smooth Mode)[1], 3.0nm (Texture Mode)[2]
Vertical Repeatability	0.1nm (Smooth Mode), 0.5nm or 0.1% of step height which ever is larger (Texture Mode)[3]
Footprint	17″ (h) x 12″ (w) x 16″ (l)
Overall Weight	50 lbs.
Modes	Smooth and Texture
Max Sample Size	400 x 400 x 75mm (with XY stage)
XY Stage Movement	100 x 100mm
Minimum Sample Reflectivity	1% @ 550nm
Vibration Isolation	Complete vibration/acoustic isolation available

[1] Validated on VLSI Standards, Inc. RQS Roughness Standard (S/N 113) - 4.6 Angstrom RMS standard
[2] Validated on VLSI Standards, Inc. RQS Roughness Standard (S/N 113) - 15.2 Angstrom RMS standard
[3] Validated on VLSI Standards, Inc. SHS-440AC Step Height Standard (S/N 1431-001-006C) - 433 Angstrom Step Height Standard. One standard deviation of 40 measurements, 81nm/frame, 10 micron range.

Objective Lenses

Magnification	*2.5x Michelson*	*5x Michelson*	*10x Mirau*	*20x Mirau*	*50x Mirau*
Measurement Area	2.016 x 2.016mm	1.008 x 1.008mm	504 x 504µm	252 x 252µm	101 x 101µm
Sampling Interval	4.0µm	2.0µm	1.0µm	.5µm	.2µm
Optical Resolution	3.7µm	2.15µm	.93µm	.70µm	.51µm
Depth of Focus	49µm	16.2µm	3.0µm	1.7µm	.9µm
Working Distance	10.3mm	9.3mm	7.4mm	4.7mm	3.4mm
Numerical Aperture	0.075	0.13	0.30	0.40	0.55

Computer

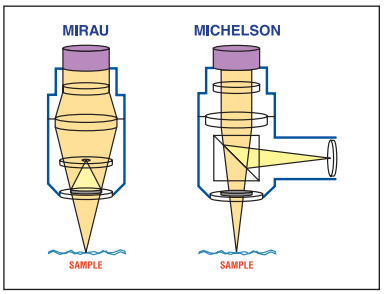
Windows® Intel© Processor with Flat Panel Monitor.

Software

Full featured, multi-tasking data acquisition software operates under Windows and is compatible with standard networking environments, printers and productivity software. Software upgrades are free for the lifetime of the product.

Warranty

One year parts and labor.



The objective in an interference microscope can use co-linear (mirau) or 90° deflected light (Michelson) as the reference.

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