

## 3D Optical Profiler



### 3D OPTICAL PROFILER MODEL 7503

Chroma 7503 uses the technology of white light interference to measure and analyze the surface profile of micro-nano structures with sophisticated scanning system and innovative algorithms. It can work with color or monochrome camera as required for 2D and microscope measurements.

The latest modular design of Chroma 7503 has flexible configurations that can comply with diversified test applications. When equipped with electric nose gear, maximum 5 types of lens can be mounted and switched directly for use without changing manually. In addition, the equipped electrical adjustment mobile platform is able to adjust and position the sample automatically. The large scanning range of vertical and horizontal axis is applicable for various auto measurements. Nondestructive and rapid surface texture measurement as well as analysis can be done on the sample without any preprocessing that is most suitable for R&D, production, process improvement and academic research.

The height resolution of Chroma 7503 is up to 0.1 nm and it can achieve 100mm when Z vertical axis is used to measure the scanning stroke. Also the horizontal axis is able to reach sub-micro resolution with scanning range up to 150 × 150mm when a PC is used to control the mobile platform as demand. The fast calibration procedure and algorithm theory enables the system calibration result to be traced to NIST standard. Combined with several innovative, robust and reliable algorithms, Chroma 7503 has the quality of high precision and large scale measurement.

The configured auto scanning platform is able to find the best focus position via the automated vertical axis mobile platform with rapid autofocus algorithm. Moreover, the tilt adjustment platform is able to level the unit under test within a few seconds without complex operations.

The commercial white light interference analyzers frequently use the centroid algorithm to calculate the surface height. Since the light diffraction causes incorrect height calculation of some positions and

results wrong profiling data, Chroma 7503 applies the most advanced 3D Profiler Master software along with the interference signal process algorithm of Chroma to analyze the spectrum of white light interference and prevent the boundary error problem. The system has dark point process function to filter out and correct the data that is incapable of creating interference to reduce the error in measurement. Since the dark point process runs while the data is retrieving, the dark point filter function can be executed effectively; meanwhile the correction is made by referencing the surrounding data that makes the measurement more robust and reliable.

STA (Surface Texture Analysis) Master software analyzes and corrects the data of surface texture, also provides complete profiles in icon. It has more than 150 lines or surfaces profiling parameters including roughness, ripple, flatness, apex and valley. The high pass filter, low pass filter, fast Fourier transformation and cusp removal space filter tools allow the user to filter out the high/low/ bandpass signals. The software has polynomial fitting, region growth, the entire surface and multiple area leveling tools that can be used for data processing and analysis flexibly.

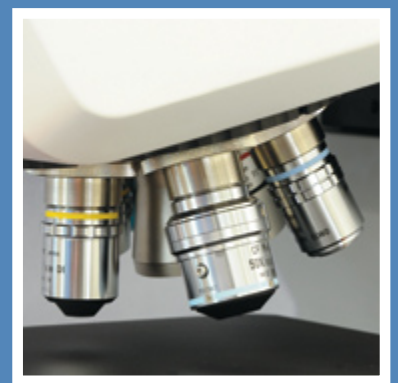
In many hi-tech industries such as semiconductor, flat panel display, fiber communication, MEMS, biomedical and electronic packaging, the accuracy of micro structure surface texture determines the performance and function of the product, thus it needs to be monitored for quality during manufacturing. Chroma 7503 has many surface measurement parameters such as section height, included angle, area, dimension, roughness, ripple, film thickness and flatness that can meet the requirements of the industries and R&D units.

Chroma 7503 has 2D and 3D measurements with fast switch of ratio and large area map interlinking function that can cope with various applications' needs. Furthermore, the flexible modular design allows customization for practical use to gain the balance between price and performance. Chroma 7503 is the best choice for improving efficiency and saving cost.

### MODEL 7503

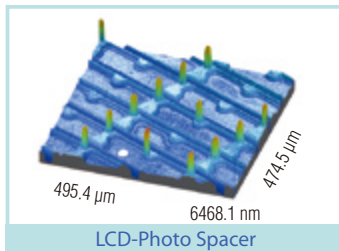
#### Key Features :

- Up to 0.1 nm height resolution for measurement
- Use white light interference measurement technique to do nondestructive and rapid surface texture measurement and analysis
- Modularized design to select parts based on test demands or budget concerns
- Work with color or monochrome camera to do 2D measurement and enable the measuring microscope function
- Equipped with electric nose gear to mount various lens for switch programmatically
- LED or halogen light source for selection
- Measurement range 150 mm x150 mm
- Integrate low magnification lens (5X & 2.5X ratio) for large area 3D measurement
- Provide various surface measurement parameters, such as sectional difference, included angle, area, dimension, roughness, waviness, film thickness and flatness
- Equipped with dark point and boundary error correction algorithms
- Friendly user interface with simple graphical control system and 3D graphics display
- Exchangeable file format to save and read various 3D profile file formats
- Powerful STA (Surface Texture Analysis) Master software providing more than 150 lines and surfaces profiling parameters
- Automated rapid self calibration to ensure the system's measurement capability
- Provide Chinese/English user interface for switch
- Provide measurement script for auto test

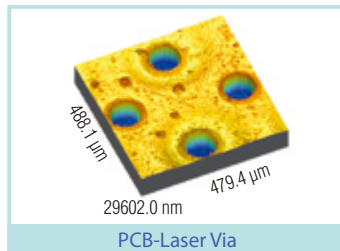


**Chroma**

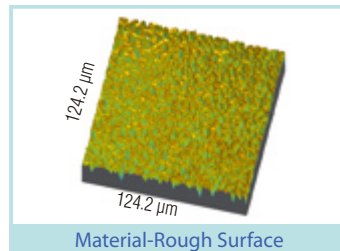
## APPLICATIONS



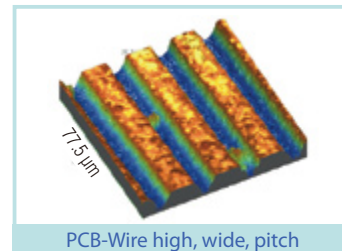
LCD-Photo Spacer



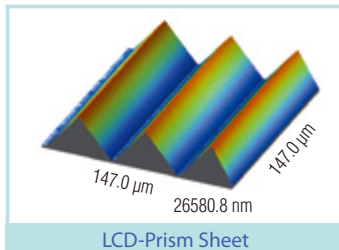
PCB-Laser Via



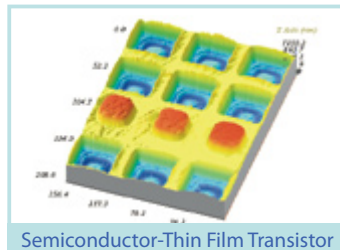
Material-Rough Surface



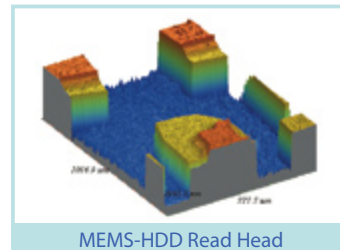
PCB-Wire high, wide, pitch



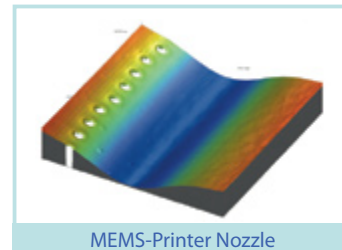
LCD-Prism Sheet



Semiconductor-Thin Film Transistor



MEMS-HDD Read Head



MEMS-Printer Nozzle

## SPECIFICATION

Model		7503	
Measurement		Noncontact 3D & 2D measurements	
Imaging System (CCD video camera)		640 × 480 pixels (mono), 640 × 480 pixels (color) Optional 1000 × 1000 pixels (mono), 1000 × 1000 pixels (color) <sup>*1</sup>	
Interference Objective Lens		2.5X <sup>*2</sup> , 5X, 10X, 20X, 50X, 100X	
Conventional objective Lens		5X, 10X, 20X, 50X, 100X	
Supported Tube Lens Ratio		0.45X, 0.5X, 1.0X	
Nose Gear		Electric rotary 5 holes : Optional None, Manual rotary 5 holes	
Light Source		White light LED : Optional Halogen	
Measurement Mode <sup>*3</sup>		PSI, VSI	
XY Mobile Platform	Stroke	150 mm	
	Resolution	2 μm (auto version)	
	Load Capacity	≤ 1.1 Kg (without carrying tray)	
	Control Mode	Auto	
Level Measurement Range		150 x 150 mm	
Z axis	Stroke	150 mm (Electrical platform)	
	Resolution	< 0.5 μm (Electrical platform)	
Level Adjustment Platform		Manual 2 axis, ± 6°	
PZT Scan	Stroke	100 μm	
	Accuracy	≤ 1.5% <sup>*4</sup>	
Vertical Direction	(Step Height)	PSI ≤ 5.0% <sup>*5</sup>	
	Repeatability (Step Height)	VSI ≤ 0.14% <sup>*4</sup>	
	(Step Height)	PSI ≤ 1.7% <sup>*5</sup>	
	Scan speed	PZT 12 μm / sec	
Operating System		Microsoft Windows <sup>®</sup> XP, Window <sup>®</sup> 7 32-bit	
Operating Environment		Noise : ≤ 60db : Vibration : VC-C or above	
Input Voltage Range		AC 100~240V, 50/60 Hz, 50VA	
Operating Temperature/ Humidity		15~35°C (47°F to 67°F) : less than 75% relative humidity (non condensing)	
Dimension (H x W x D)		950 x 770 x 600 mm	
Weight		Approx. 110 Kg <sup>*6</sup>	

Notes \*1 : Only support 1.0X tube lens ratio. \*2 : 2.5X objective lens have special working distance with other objective lens. \*3 : VSI - Vertical Scanning Interferometry; PSI - Phase Shift Interference. \*4 : Measured with 8.0 μm standard step height \*5 : Measured with 46nm standard step height \*6 : The actual weight varies with selected option.

\*All specifications are subject to change without notice.

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## ORDERING INFORMATION

**7503** : 3D Optical Profiler

**Imaging System** : 640 x 480 pixels (mono), 640 x 480 pixels (color), 1000 x 1000 pixels (mono), 1000 x 1000 pixels (color)

**Interference Objective Lens** : 2.5X<sup>\*2</sup>, 5X, 10X, 20X, 50X, 100X

**Conventional Objective Lens** : 5X, 10X, 20X, 50X, 100X

**Tube Lens** : 0.45X, 0.5X, 1.0X

**Nose Gear** : None, Manual rotary 5 holes, Electric rotary 5 holes

**Light Source** : White light LED, Halogen

**Anti-vibration Table**

**Software** : STA Master

Developed and Manufactured by :

**CHROMA ATE INC.**

致茂電子股份有限公司

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