

DiscTrack Plus™

The new standard for optical disc measurement accuracy takes AFM data beyond image and click measurements to a fully integrated, automated solution with unparalleled productivity.

With DiscTrack Plus you can:

- Quickly measure pit and groove geometry on all kinds of optical discs.
- Precisely measure individual and mean track pitch.
- Link production variables to pit geometry and pit geometry to electrical output.

With this powerful new tool you can:

- Identify weak links in your production process chain.
- Reduce development cycle time.
- Reduce cost while speeding up analysis and lowering frustration.
- Correct playability problems.

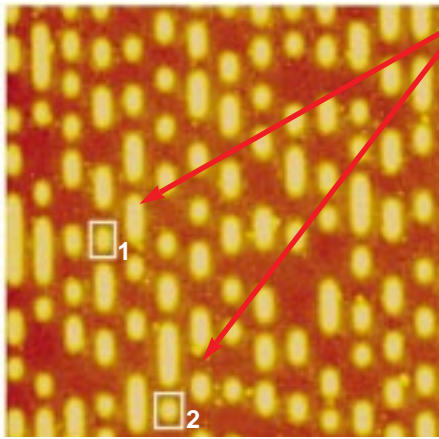
“We use DiscTrack Plus with a great deal of satisfaction. DiscTrack Plus is now considered the standard measurement for track pitch variation in our company.”

Mark van der Kerkhof
ODME, The Netherlands

Too much data, too little time?

Now you can obtain accurate measurements of hundreds of features in only one or two minutes. With just a few clicks of the mouse it is possible to know the length, width, height and sidewall/endwall angles of every feature in an AFM scan. Even a single image yields a comprehensive analysis and more images can be analyzed, if desired.

Statistical summaries are generated in an Excel-compatible format for engineering and quality reports. In addition, each individual feature is listed and uniquely specified. Individual measurements and mean values are checked against predefined bounds set by the user, with out of spec values highlighted.



Can you tell these two DVD bumps apart?

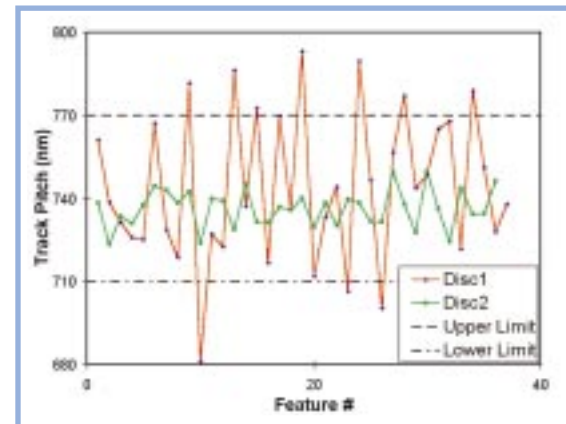
DiscTrack Plus can.

It measures hundreds of features automatically to identify subtle differences. This is important because changes in the production process vary pit size, shape, and placement, characteristics that affect the playability of CDs and DVDs. DiscTrack Plus allows you to isolate and quantify the effects of key variables, giving you the tools you need to tune your process fast and accurately.

Bump	1	2
Width	337.0	352.2
Length	447.3	423.1
Height	94.5	104.5
	(All dimensions in nm)	

You can build your process on our precision. In our patented procedure, DiscTrack Plus uses measurements of the calibration reference, a holographic grating, to correct the measurements made on the test specimen (your disc). In an experiment using one grating as the calibration reference and a second, independently fabricated grating as the test specimen, results showed that individual pitch measurements were accurate to better than 1 nm, with precision that corresponds to .04 pixel (1 standard deviation) in the original AFM image.

A practical example:



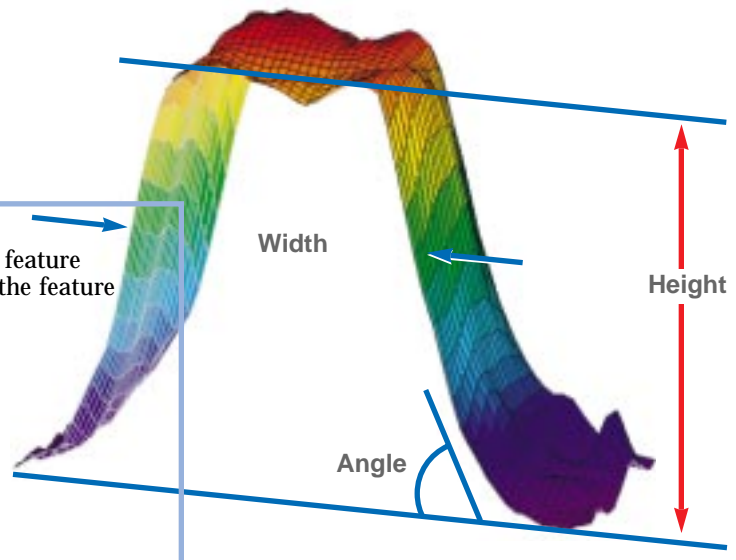
Charles Rogers of Cinram Incorporated investigated track pitch variation in order to determine whether to purchase a particular laser beam recorder for mastering DVDs—a multimillion-dollar decision. DiscTrack Plus demonstrated that clear differences existed between the models inspected.

“DiscTrack Plus provides an unbiased verification of track pitch and track pitch variation. We have shipped over 1 million DVDs worldwide without a single customer return.”
Dom DallaVerde
 WAMO, Pennsylvania, USA

Optimize your process and produce higher quality discs at lower cost.

DiscTrack Plus measures sixteen different ways:

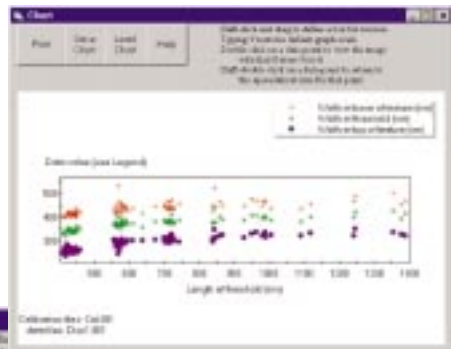
- Track pitch**
- Width:**
 - Base
 - Threshold with full smoothing
 - Threshold with reduced smoothing
 - Top
- Length:**
 - Base
 - Threshold with full smoothing
 - Threshold with reduced smoothing
 - Top
- Height:**
 - Measured across feature
 - Measured along the feature
- Angles:**
 - Left side
 - Right side
 - Front end
 - Back end
- Jitter**



1

File Name	Track Pitch	Width at Lower Bound (mic)	Threshold (mic)	Width at Upper Bound (mic)	Jitter
113	5	406.03	406.69	300.14	
114	5	405.43	394.01	307.14	
115	4	471.39	406.34	332.44	
116	4	458.39	383.48	322.01	
117	4	423.66	395.58	330.14	
118	4	404.93	325.01		
119	4	409.93	327.42		
120	4	397.57	326		
121	5	400.95	327.99		
122	5	411			
123	5	406.4	404.05		
124	5	396			
125	5	421.93	360.12		
126	5	440.88	370.55		
127	5	450.19	381.14		
128	5	453.84	385.26		
129	5	396.26	351.53		
130	5	416.58	357.27		

2



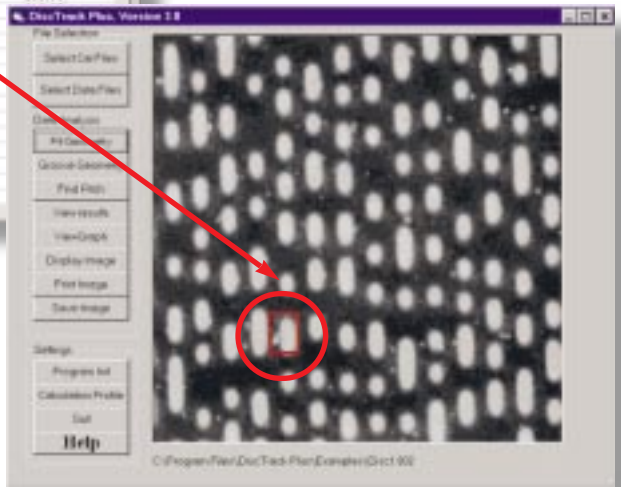
Sophisticated tools simplify your analysis.

1 Out of spec measurements are highlighted: Bold black for high, underlined bold red for low.

2 Graphing results is easy. Determine the effects of one parameter on another. With DiscTrack Plus's flexible analysis package you can quickly hunt down critical parameters and recognize their effects.

3 Our unique FeatureFinder™, a sophisticated tool for data inspection, lets you instantly find the defects that cause measurements to be out of specification. With a double click on a graph point the software displays the image with the feature highlighted, revealing exactly what is causing the anomaly.

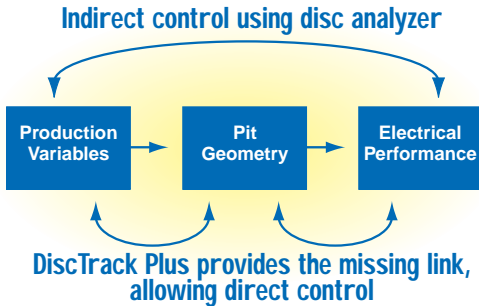
3



Extract critical information you need to keep your process on line.

Disc analyzers tell you there is a problem.

DiscTrack Plus helps you do something about it.



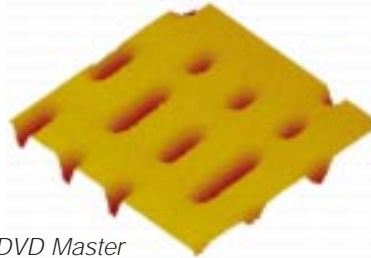
Pit geometry is the hidden variable. Disc analyzers provide electrical playback measurements, but they cannot provide a geometric measure of each individual feature. Atomic Force Microscopes (AFMs) can provide that measure. In the past the time required to make each measurement limited the analysis to a handful of features at a time. DiscTrack Plus analyzes the images produced by your AFM and, with its automated feature location and measurement system, unleashes it.

When pit geometry is measured precisely for statistically significant numbers of features, it becomes clear which production variables determine specific characteristics. You can systematically study the effects of feature geometry on various electrical signals. Process windows and tolerances can be established.

When disc analyzers report a problem, DiscTrack Plus will help you do something about it.

Use DiscTrack Plus at key stages in the mastering and replication process.

DiscTrack Plus works with stampers, masters and replicas, for both pitted and continuous groove media. For grooves, DiscTrack Plus easily provides measurements at multiple locations along each track.



DVD Master



Grooved Master

System requirements

AFM

DiscTrack Plus works with images from your existing AFM. It is compatible with the Digital Instruments NanoScope® Dimension™ or MultiMode™ and other major brands.

CALIBRATION SPECIMENS

Select from our 4 high precision, holographic ridge and grid patterns with pitch values of 300 or 700 nm.

PC

Pentium computer running Windows® 95/98/NT4
16 Mb of RAM
20 Mb free hard disk space
SVGA or better graphics
(min 800 X 600 pixels with 256 colors)
Parallel port, 25-pin.

RECOMMENDED

Microsoft® Excel 7.0 or other spreadsheet software which can read Excel 5/7 format files.

Advanced Surface Microscopy, Inc. has provided Atomic Force/Scanning Probe Microscopy services to industry since 1990. The DiscTrack™ track pitch measurement system has been featured in One to One magazine.

DiscTrack™ and DiscTrack Plus™ include technology protected by US Patents #5,644,512 and 5,825,670. DiscTrack™, DiscTrack Plus™, and FeatureFinder™ are trademarks of Advanced Surface Microscopy, Inc. NanoScope is a registered trademark and Dimension and MultiMode are trademarks of Digital Instruments, Inc.



Advanced Surface Microscopy, Inc.

6009 Knyghton Road
Indianapolis, IN 46220-4955, U.S.A.
Phone: (317) 251-1364
Toll free: (800) 374-8557
Fax: (317) 254-8690

e-mail: info@asmicro.com
web: <http://www.asmicro.com>
See our Web site for additional and updated information.

Ask about our demo software.

Expose and control hidden variables.

© 1999, Advanced Surface Microscopy, Inc.