



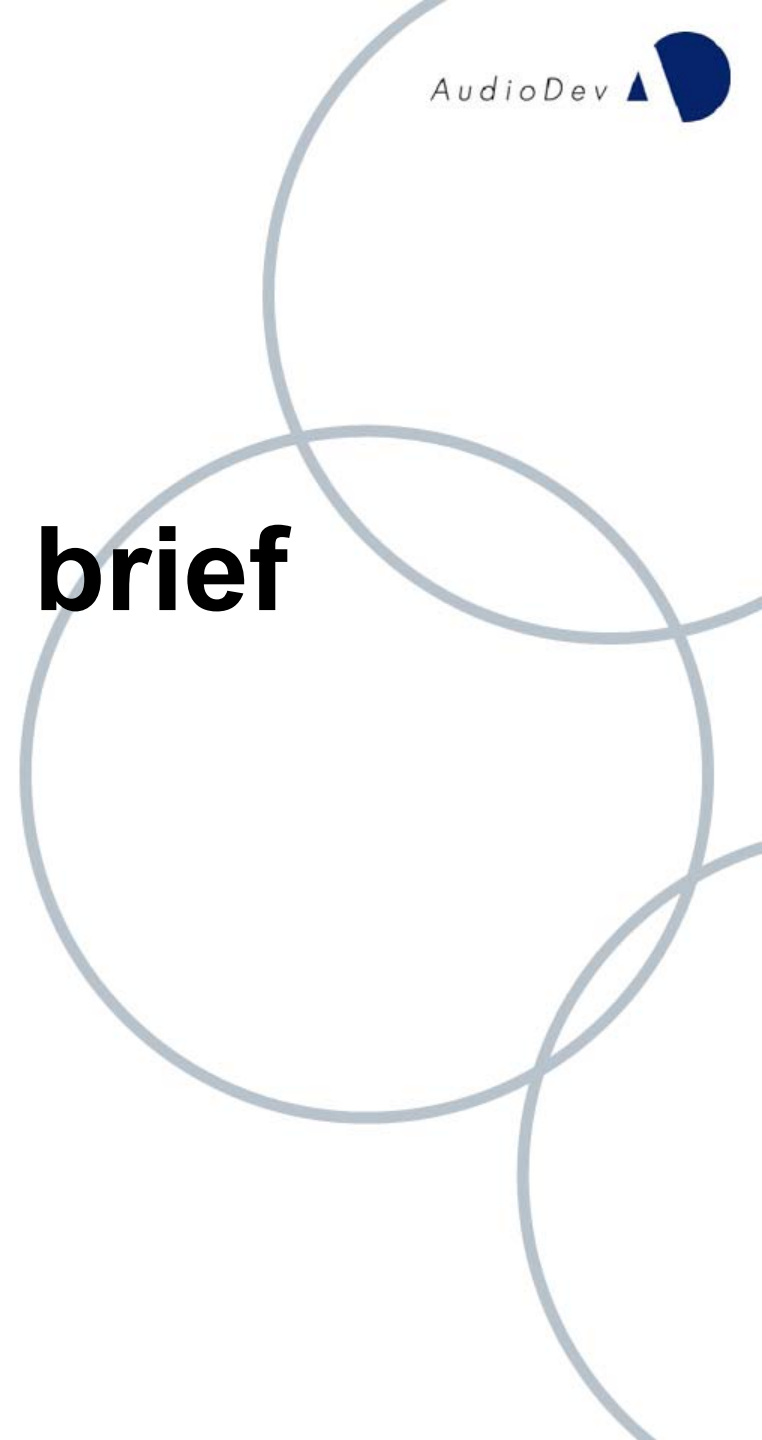
Track Sweep

-a quick and reliable tool for production control-

Marianne Sernevi
VP International Sales & Marketing

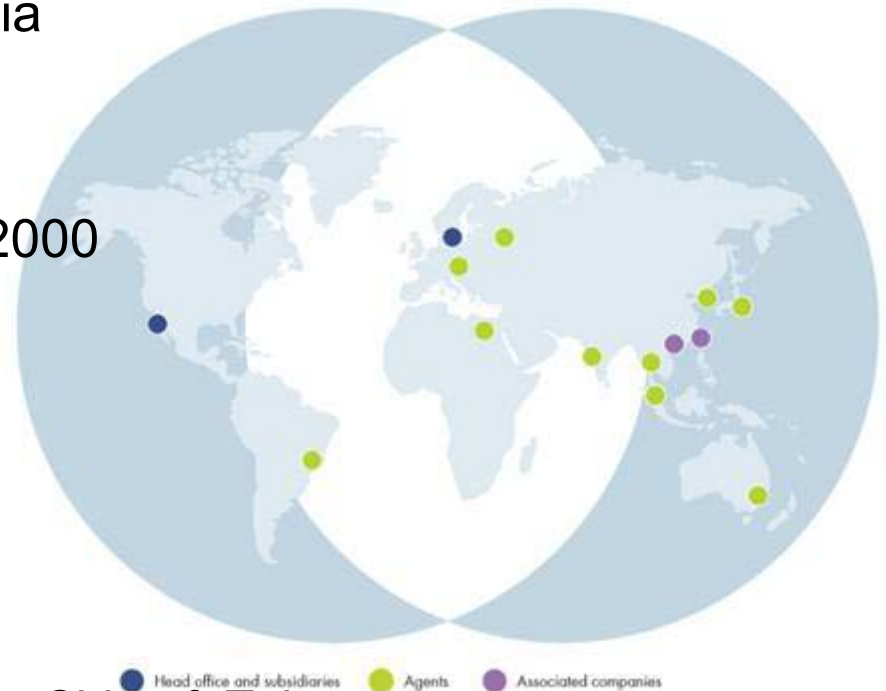


AudioDev in brief





An Introduction to AudioDev

- A world leading manufacturer of test equipment for all optical media such as DVD and BD.
- Company founded 1987, IPO in 2000
 - 75+ employees
 - HQ in Sweden
- Worldwide presence
 - Subsidiary in USA
 - Associated company in Hong Kong, China & Taiwan
 - Agents worldwide



Our products

APPLICATIONS FOR AUDIODEV PRODUCTS

	 Recordable media	 Premastered media
High precision testing	CATS products for CD-R/RW DVD-R/RW BD-R/RE HD DVD-R/RW	CATS products for CD, DVD BD-ROM HD DVD-ROM
Production control	Go! products for DVD-R/RW	n.a.

Services - We are with you along the way

- Customer Support
 - ▶ Worldwide service network
 - ▶ Preventive maintenance
 - ▶ Support plans
 - ▶ Remote support
 - ▶ System installation
- Training
 - ▶ Technical training
 - ▶ User training
 - ▶ Training classes held worldwide
- TestCenter
 - ▶ Independent testing
 - ▶ Worldwide presence



AudioDev 2006, Well-equipped to meet the future

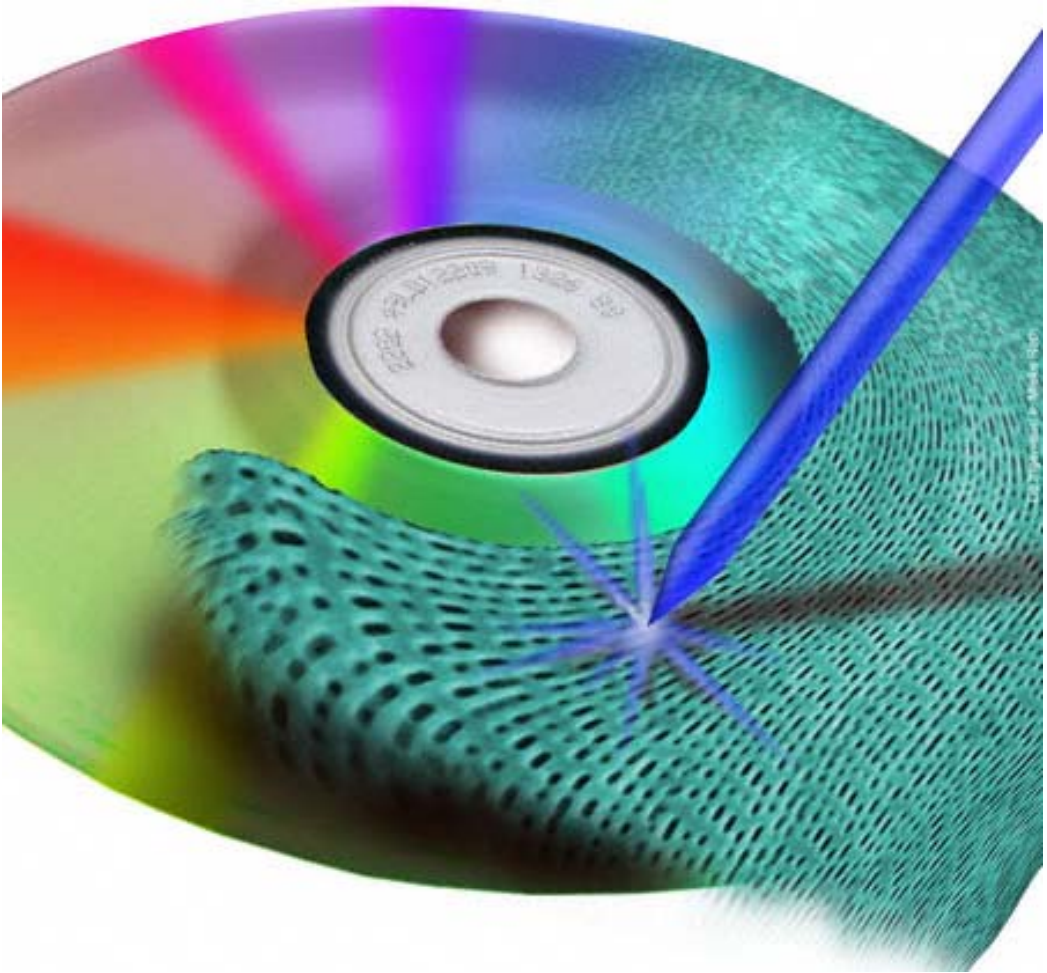
- Establish CATS BD and HD DVD testers
- Continue to develop our service offer
- Address and adapt to the changing conditions of our customers and the industry as a whole.
- AudioDev's aim is to exploit its strong financial position to acquire companies that offer technological or marketing synergies.



Track Sweep

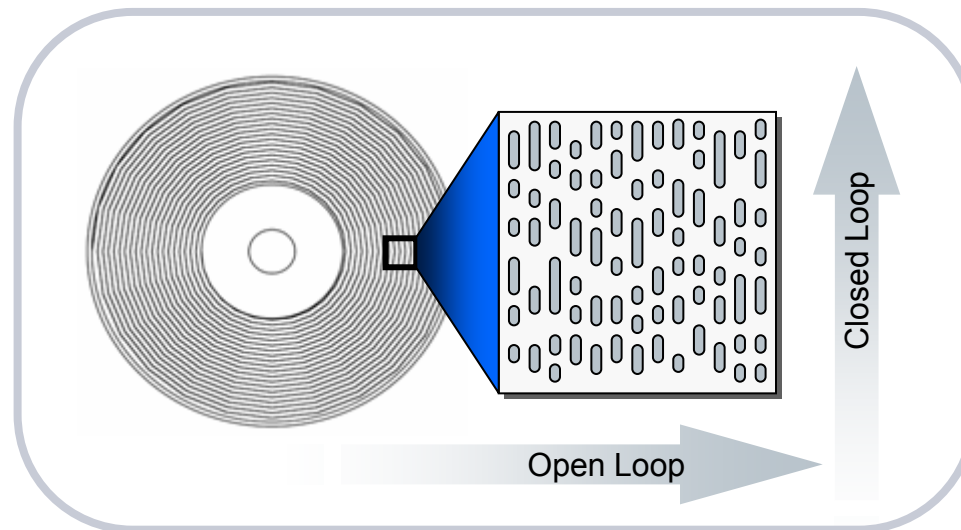


Blue laser growth- demands



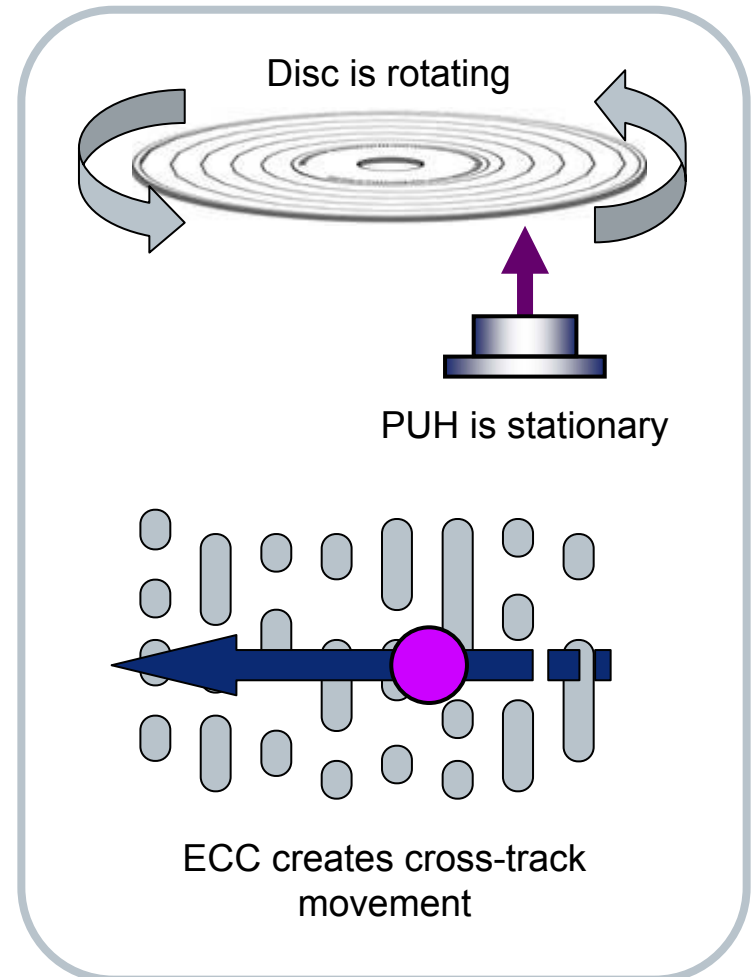
Open Loop vs. Closed Loop measurements

- Parameter definition require different test types:
 - ▶ Closed Loop - The read spot goes along the track
 - ▶ Open Loop- The read spot goes across the tracks



Open Loop – how does it work?

- Traditional Open Loop based on disc ECC
 - ▶ Offset between track spiral and disc centre
- Measurement sequence:
 - ▶ Disc is rotated
 - ▶ PUH is stationary and focusing (not tracking)
 - ▶ ECC create cross-track movement
- The number of tracks passed and cross-track speed based on disc ECC



Push-Pull in the specification

$$PP_{\text{norm}} = \left(\frac{l_1(t) - l_2(t)}{l_1(t) + l_2(t)} \right)_{\text{peak-peak}} \equiv \frac{(l_1 - l_2)_{\text{at } t_2}}{(l_1 + l_2)_{\text{at } t_2}} - \frac{(l_1 - l_2)_{\text{at } t_1}}{(l_1 + l_2)_{\text{at } t_1}}$$

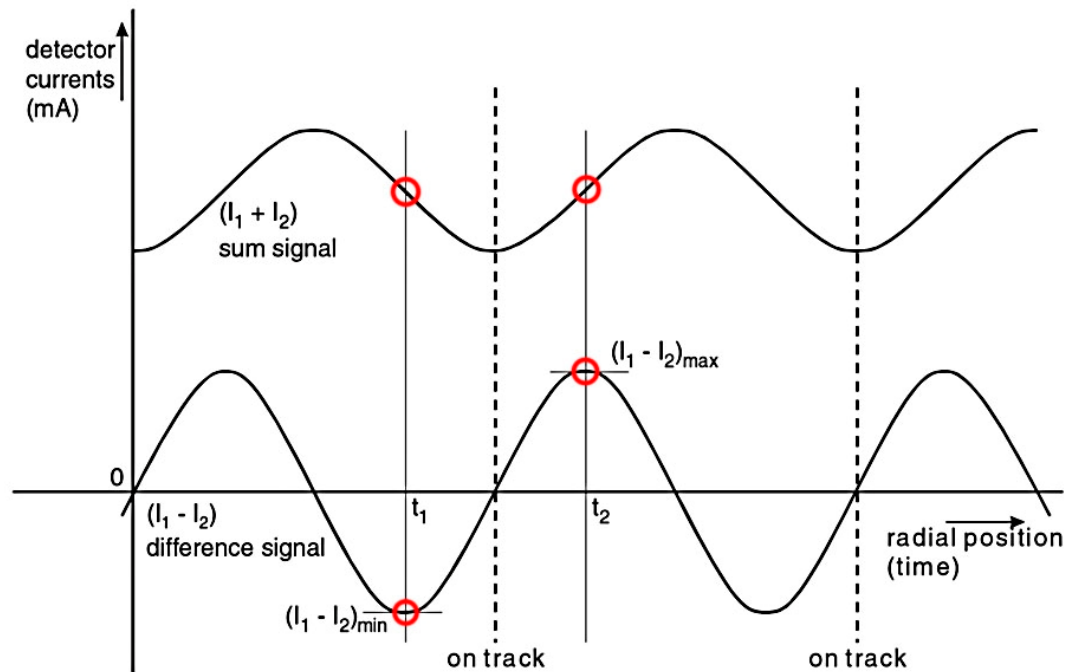


Figure 7-1 Definition of Push-pull signals

Push pull in the specification

Real RPP signals

$$PP_{\text{norm}} = \left(\frac{I_1(t) - I_2(t)}{I_1(t) + I_2(t)} \right)_{\text{peak-peak}} = \frac{(I_1 - I_2)_{\text{at } t_2} - (I_1 - I_2)_{\text{at } t_1}}{(I_1 + I_2)_{\text{at } t_2} - (I_1 + I_2)_{\text{at } t_1}}$$

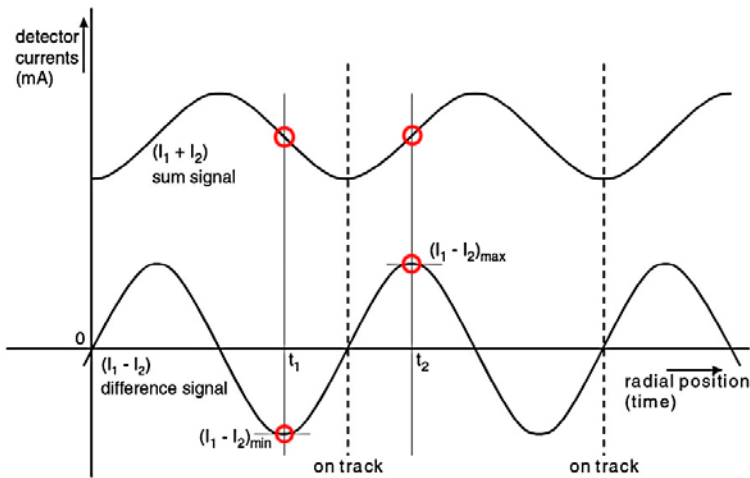
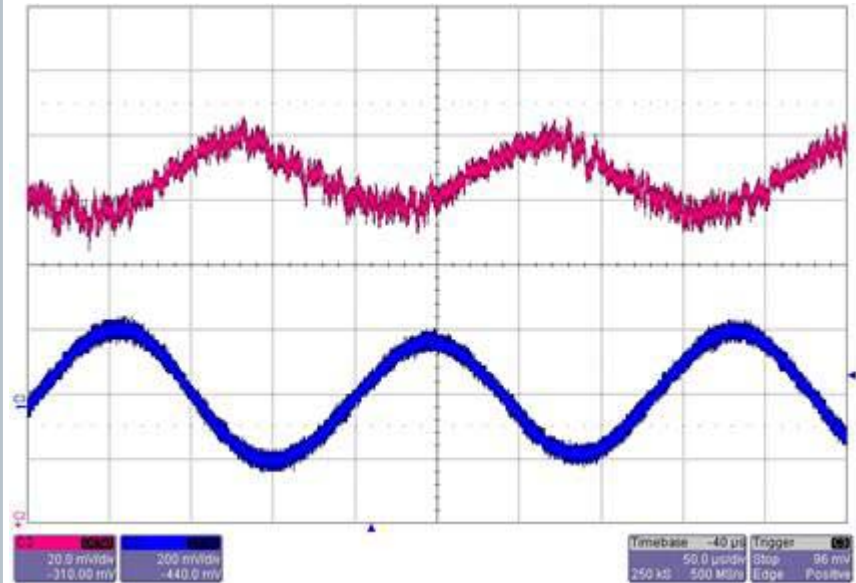


Figure 7-1 Definition of Push-pull signals

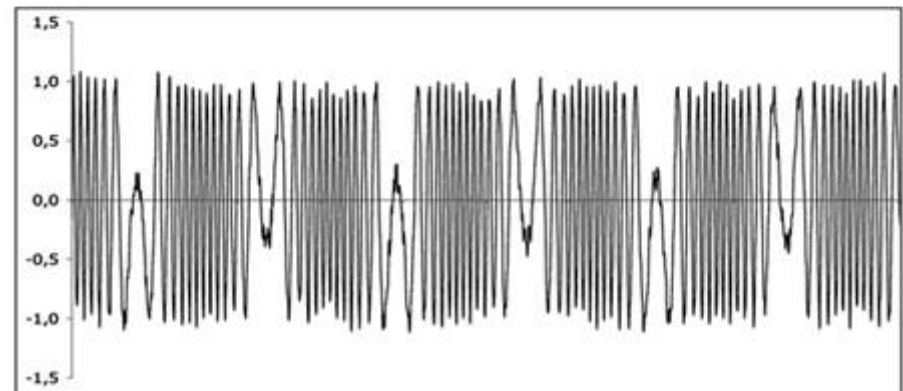
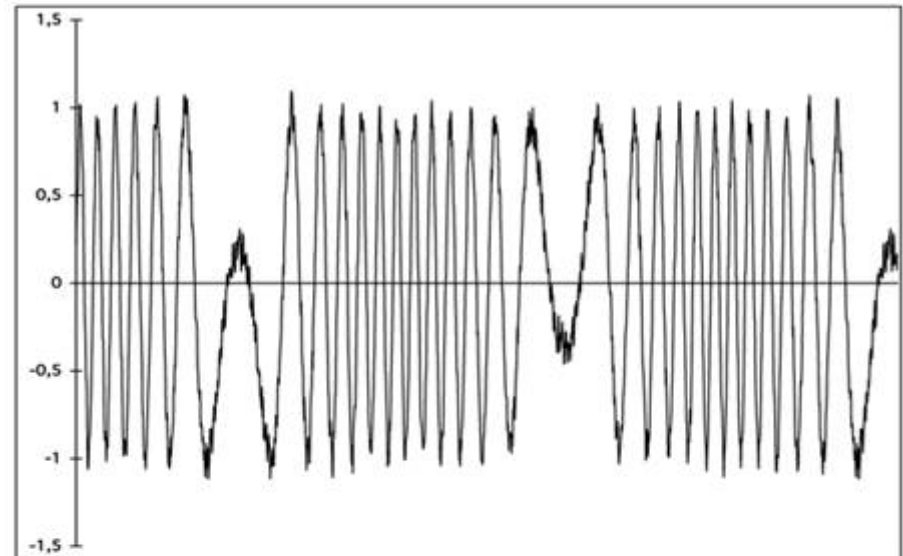
Push pull in the specification



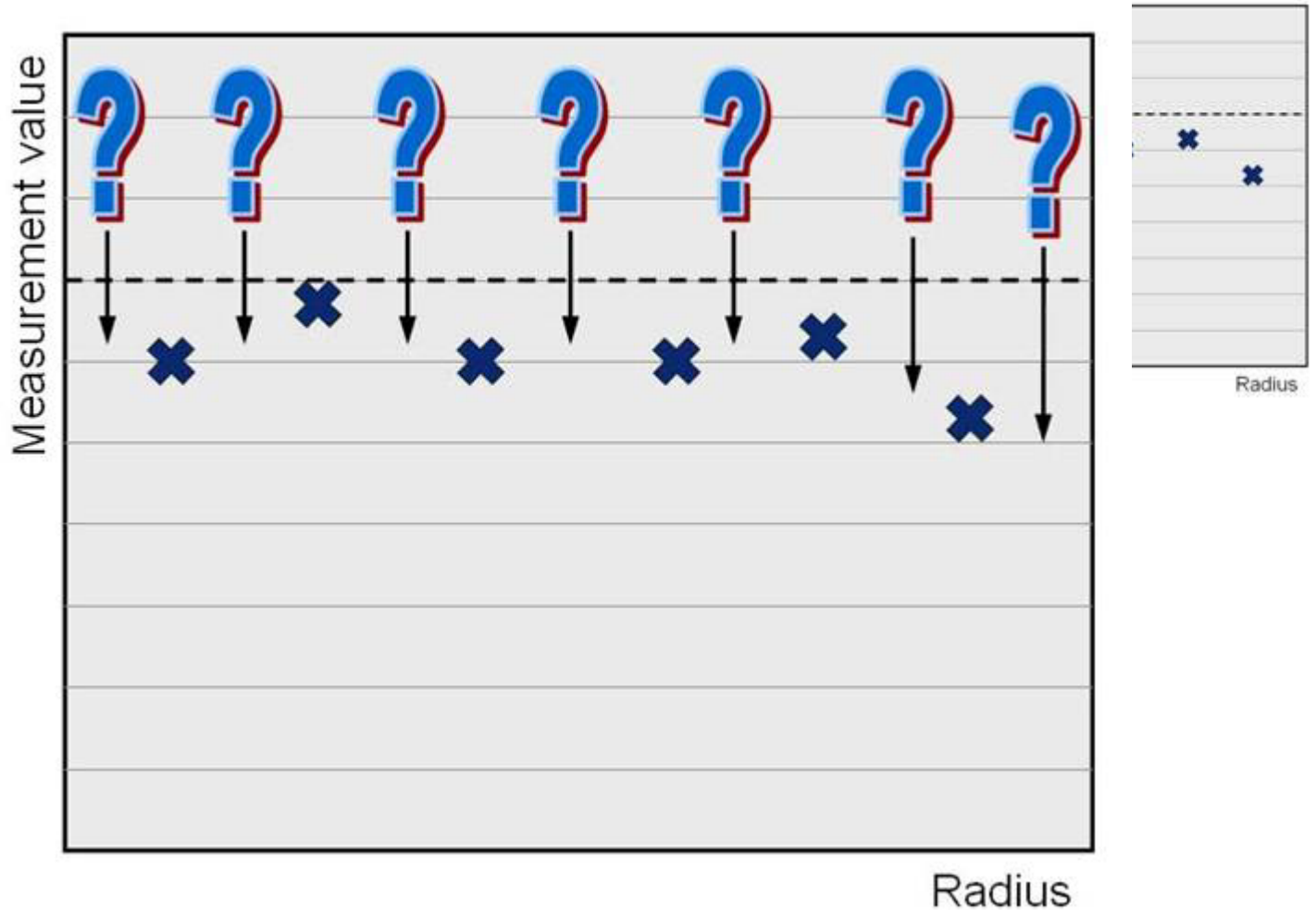
Oscilloscope screen-shot

RPP use

- RPP - Radial Push Pull
 - ▶ Signal used by the drive for tracking purposes
 - ▶ Push Pull is affected by pit depth and recording layer properties
 - ▶ Cross-track movement necessary to get amplitude
 - ▶ Certain areas have no track crossings



RPP at a closer look



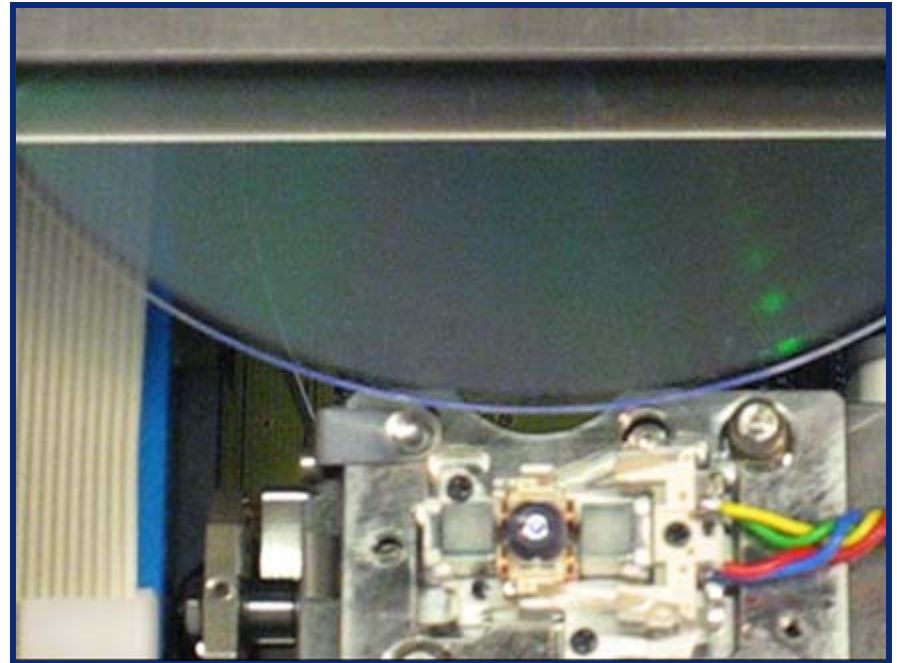
Open Loop problems

- Incomplete measurement
- Low ECC- hard to measure
- Time-consuming



So how can we do better?

- Track Sweep
 - ▶ Completeness
 - ▶ Continuous
 - ▶ Covering full surface
 - ▶ Moving pick-up to eliminates ECC-problem
 - ▶ 110 000 tracks (BD)
 - ▶ Quick (20 sec. acquisition).



Starting self-calibration...

Calibration finished

Starting Sweep at radius 22mm

...data acquisition 33000 tracks...

...data acquisition 66000 tracks...

Sweep finished at radius 58mm

Accuracy

$$PP_{\text{norm}} = \left(\frac{l_1(t) - l_2(t)}{l_1(t) + l_2(t)} \right)_{\text{peak-peak}} \equiv \frac{(l_1 - l_2)_{\text{at } t_2}}{(l_1 + l_2)_{\text{at } t_2}} - \frac{(l_1 - l_2)_{\text{at } t_1}}{(l_1 + l_2)_{\text{at } t_1}}$$

The specified calculation is used in Track Sweep

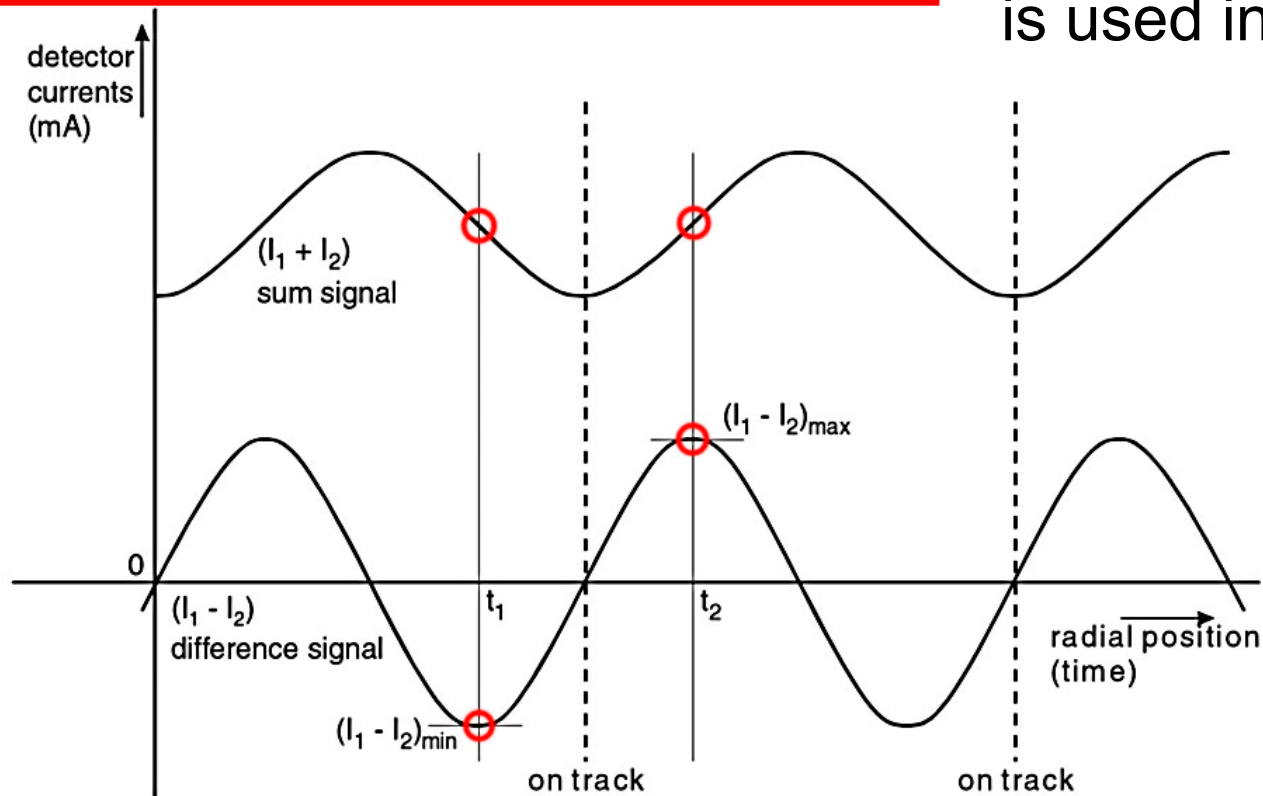
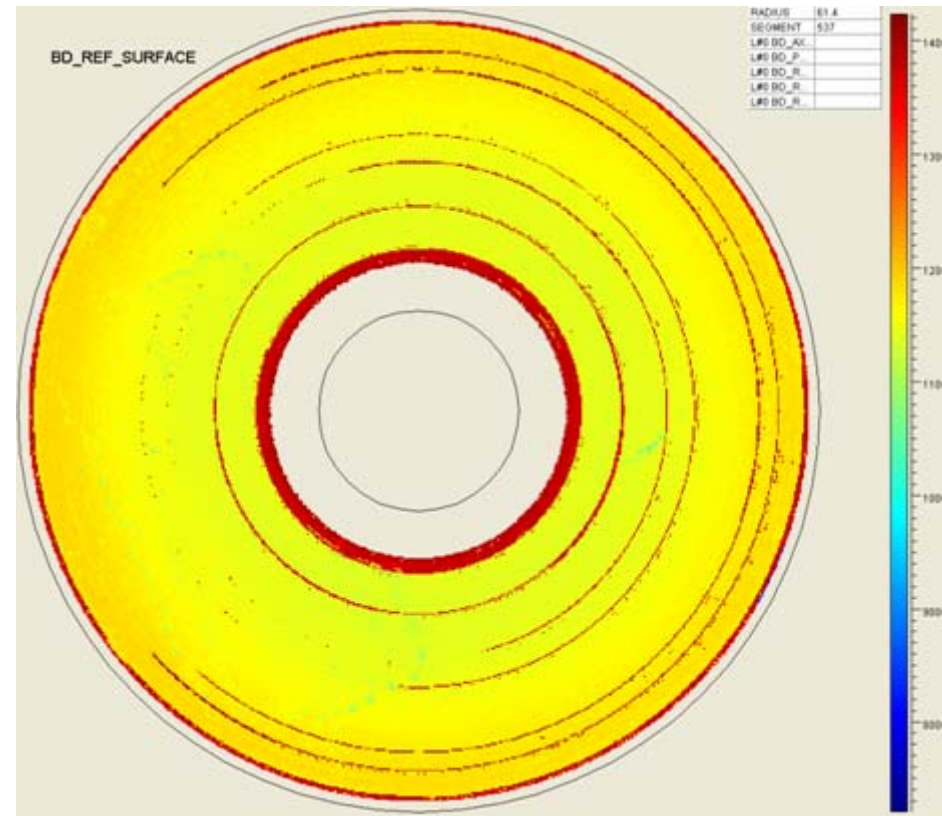


Figure 7-1 Definition of Push-pull signals

Completeness

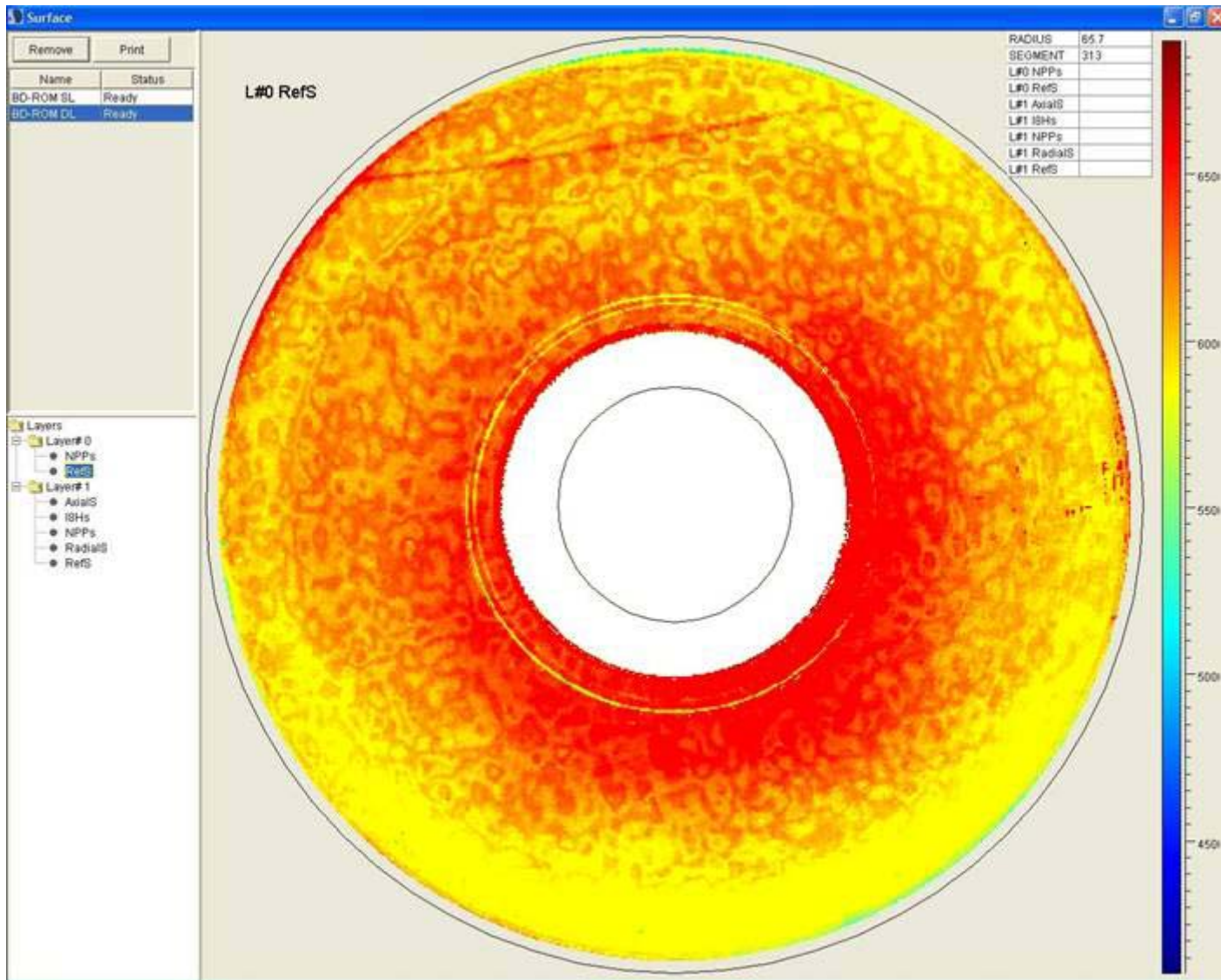
- A complete Surface Presentation is generated after:
 - ▶ 20 seconds data acquisition
 - ▶ 40 seconds data processing



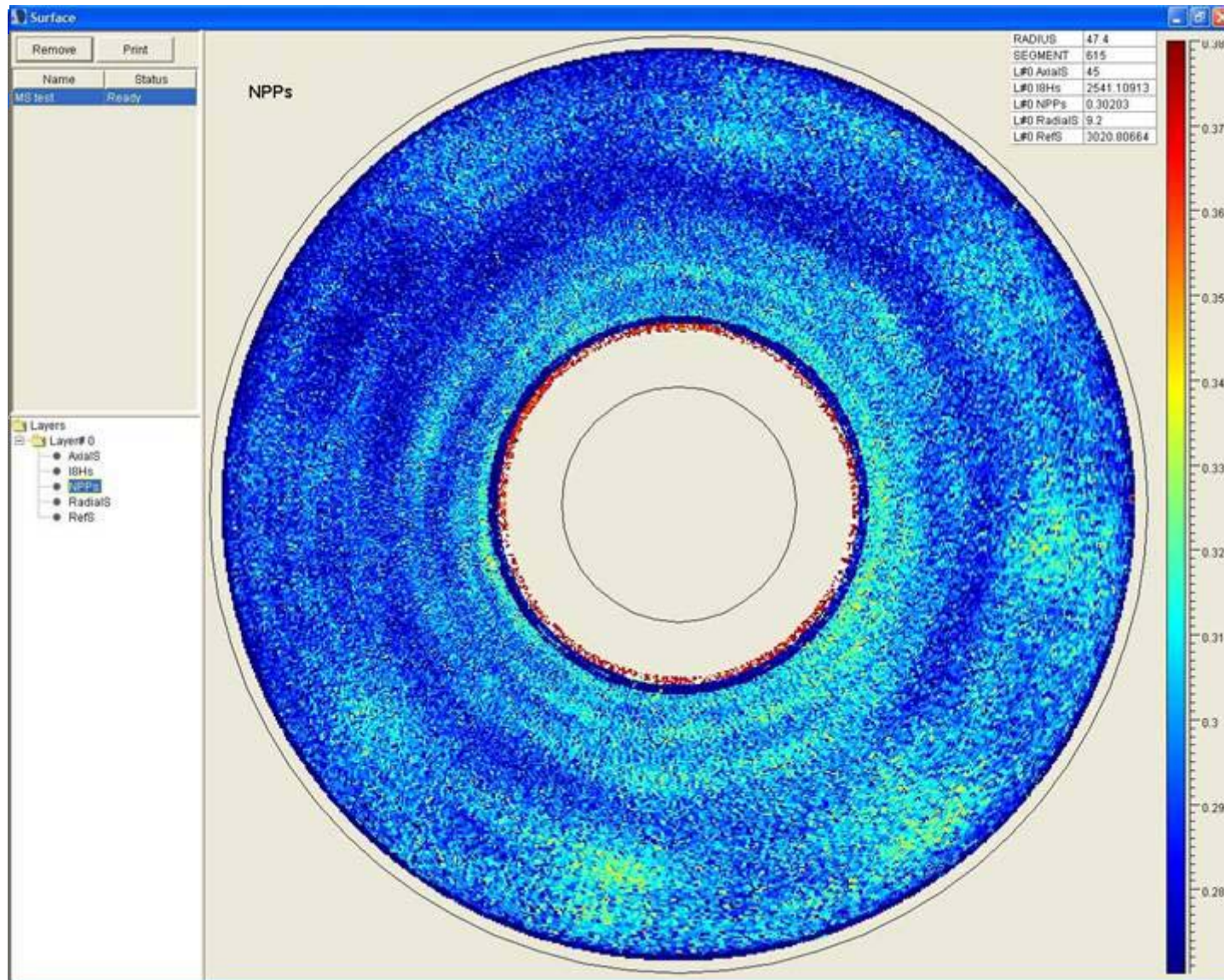
Quick answer



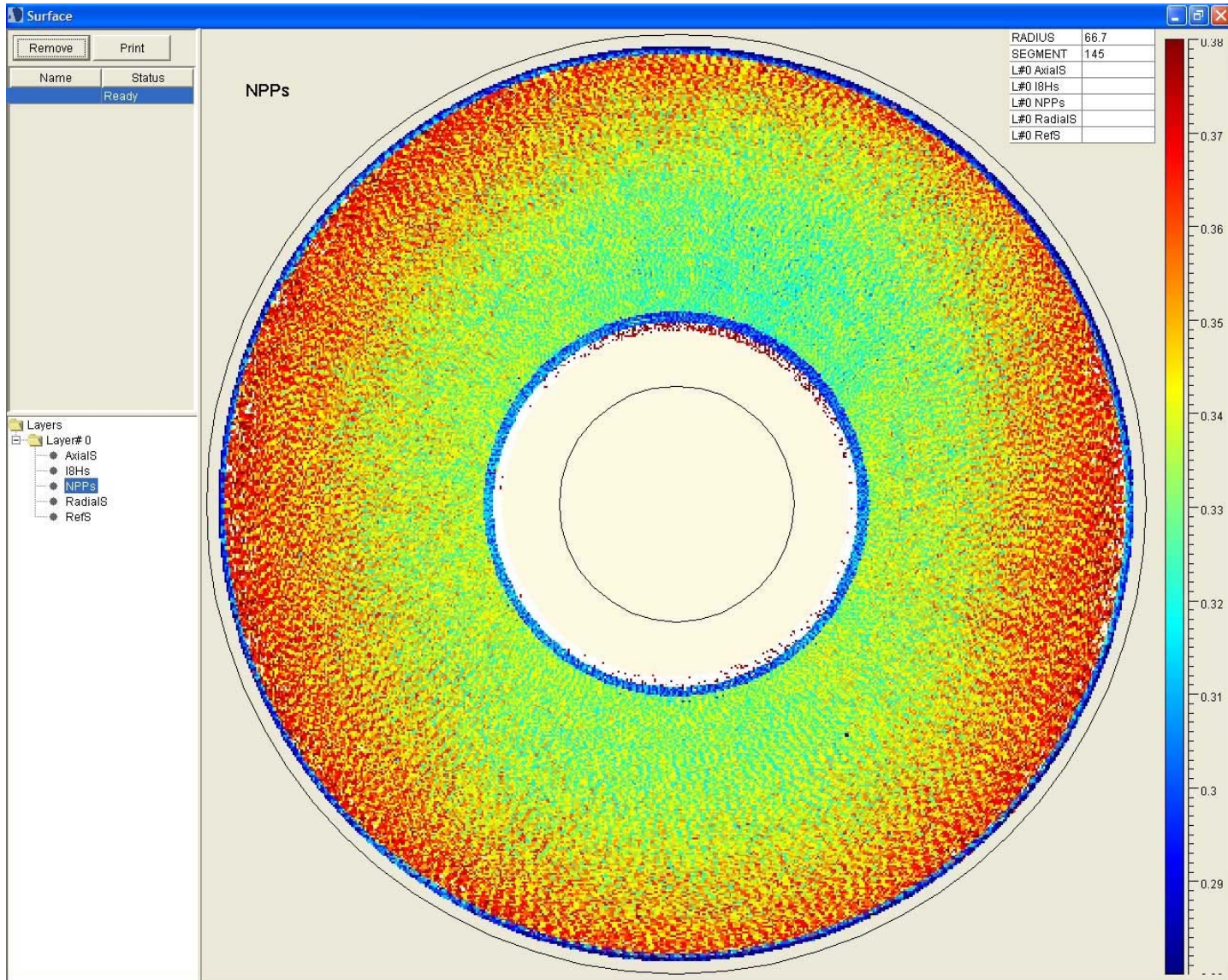
Quick answer



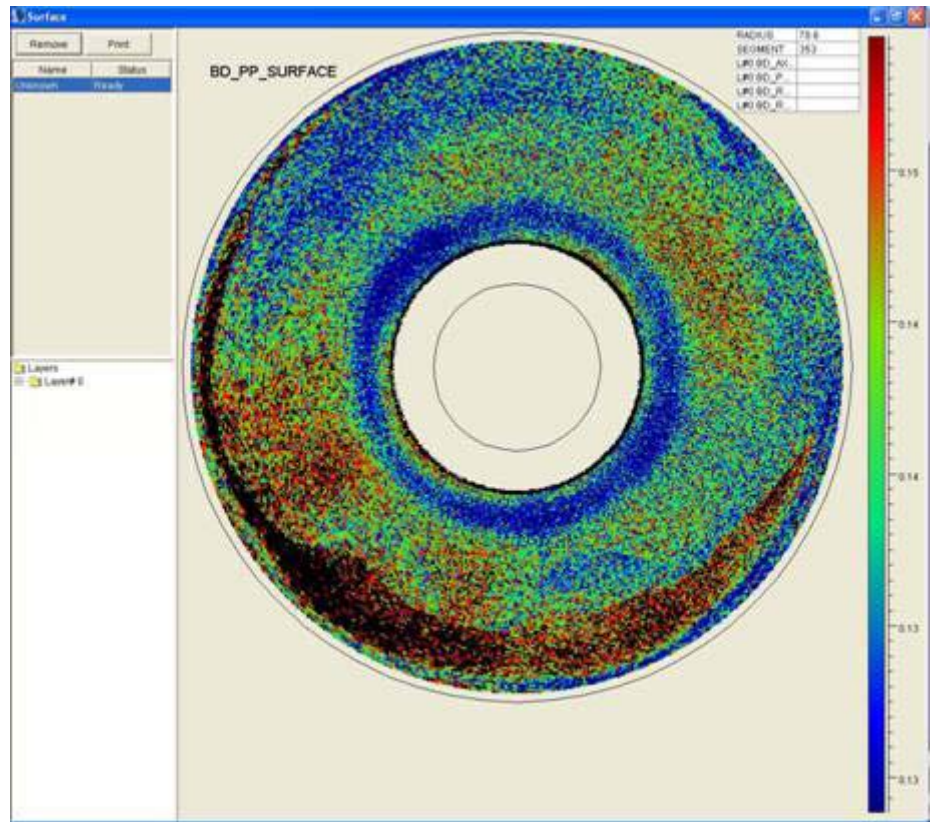
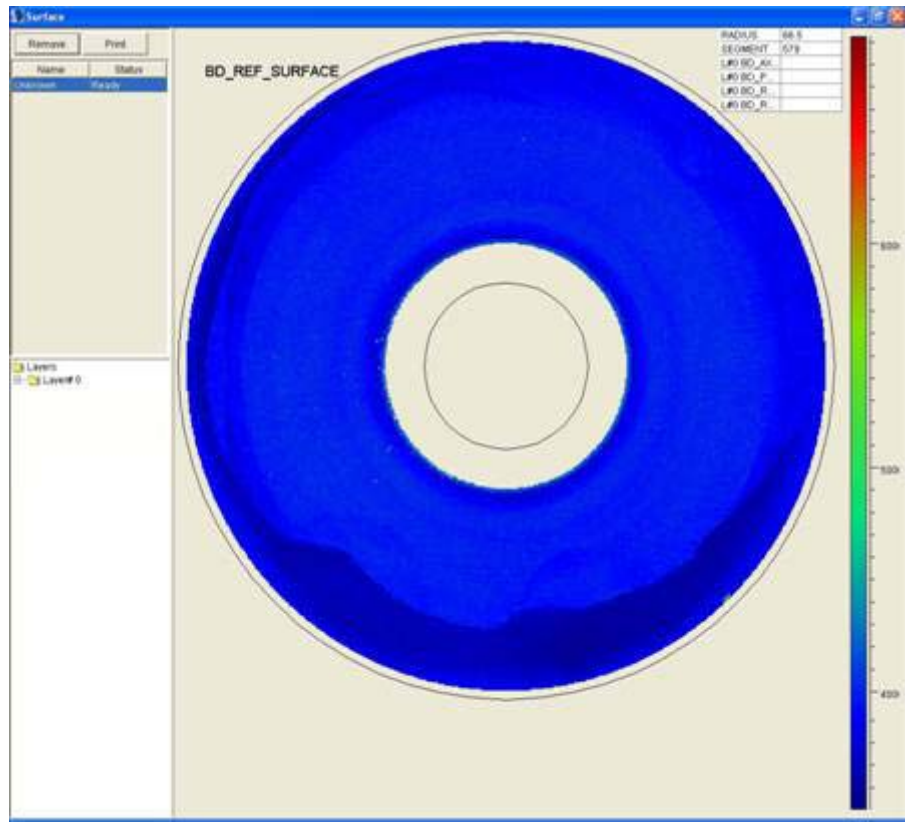
Quick answer



Quick answer



Quick answer



How does Track Sweep handle ECC?



Keep adequate sweep-speed to outrun ECC cross-track speed.

Benefits

- Quick process response
 - ▶ Groove properties
 - ▶ Metallizing
 - ▶ Dye-coating
 - ▶ Local defects
- Completeness
- Accuracy



How and when can I get Track Sweep ?

- Track Sweep is a feature in the CATS range of blue laser analyzers.
 - ▶ B100 BD PRO
 - ▶ B600 BDR PRO
 - ▶ H100 HD DVD PRO
 - ▶ H600 HD DVDR PRO





Thank you for your attention