

Agilent's DNA Microarray Scanner With SureScan High-Resolution Technology

See More Than Ever

Microarray scanners play a pivotal role in the microarray processing workflow and can profoundly affect the quality and reliability of microarray data. Agilent is taking microarray scanning to new heights with a scanner that offers high resolution combined with seamless data analysis and extended dynamic range, without sacrificing sensitivity. Agilent's improved microarray scanner produces high-quality data for future generation arrays while still permitting the scanning of legacy arrays. These improvements lay the foundation for the next generation of microarray-based applications where increased coverage of the genome is a necessity.

Agilent's New Microarray Scanner

Agilent's new DNA Microarray Scanner with SureScan High-Resolution Technology enables automated high-speed scanning and is able to produce high-quality data from both legacy and upcoming arrays. The scanner is equipped with new optics, electronics, and software. With an extended dynamic range (XDR) of up to 20 times greater than other leading scanners, and fast high-resolution scanning of up to 2 micron in under 20 minutes, the Agilent DNA Microarray Scanner provides state-of-the-art technology for microarray applications.

Agilent's high-resolution microarray scanner is part of an improved microarray platform that provides greater transcript definition and chromosomal definition, as well as

expression measurements that more accurately reflect the range of gene activity in biological systems. Agilent's system produces accurate relative quantitation of signal levels over a range of more than six orders of magnitude, far exceeding the capabilities of other systems. This enhances data quality across a broad range of applications such as gene expression, miRNA profiling, array CGH, ChIP, and methylation assays.

Features and Benefits

Superior resolution

The new Agilent DNA Microarray Scanner extends the minimum scan resolution down to 2 micron, offering researchers a range of resolutions from 10 micron to 2 micron. This change allows more pixels to be acquired per



microarray feature, generating a quality image. By providing this level of resolution, the new Agilent scanner enables superior data analysis and results.

Faster scanning, great sensitivity

The new Agilent DNA Microarray Scanner performs fast scans while preserving sensitivity. Simultaneous two-color scanning at 2 micron resolution takes less than 20 minutes per slide, while providing superior detection of low-abundance and weakly expressed genes.

Low-level detection resulting from optimized precision optics, broad dynamic range, and minimal spectral cross-talk permits researchers to detect weak features and achieve rapid, accurate, and dependable results.

Extended dynamic range

Improved XDR technology offers up to 20 times greater dynamic range than other leading scanners. It prevents saturation of bright features or loss of weaker features. The resulting data considerably extend the number of features that can be identified as statistically significant. Agilent has

improved XDR scanning by increasing the dynamic range of a single scan from 16-bit to 20-bit, thereby realizing a similar dynamic range as with XDR scanning using only a single scan. This is not only faster, it represents a 12-fold increase in dynamic range.

XDR scanning can still be performed using an initial scan at 100% gain to capture low-signal data and a second identical scan at reduced gain (~10%) to capture high-signal data. The twin scans are processed as individual scans and then combined to create additional dynamic range.

Figure 1. The image on the left shows a region of a 30 micron feature array scanned at 5µm. The image on the right shows the same region of the array scanned at 2µm on the new high-resolution Agilent scanner. Note the improvement in the image quality.

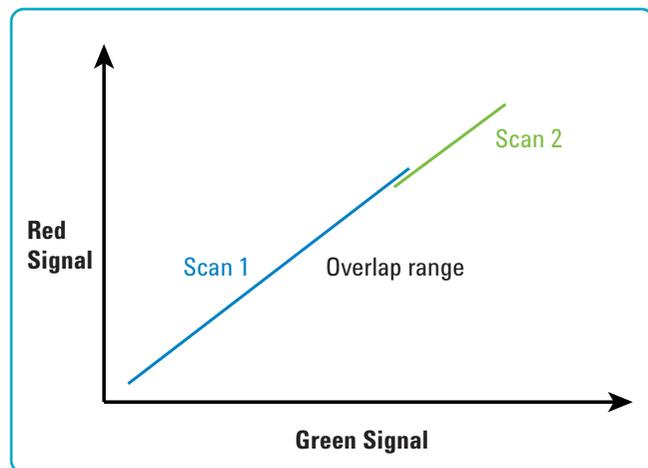
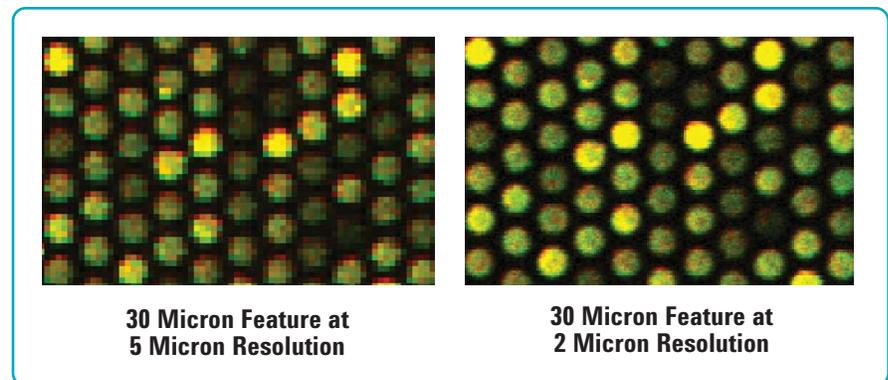


Figure 2a. A dual scan with recombined data is valuable for high dynamic range assays.

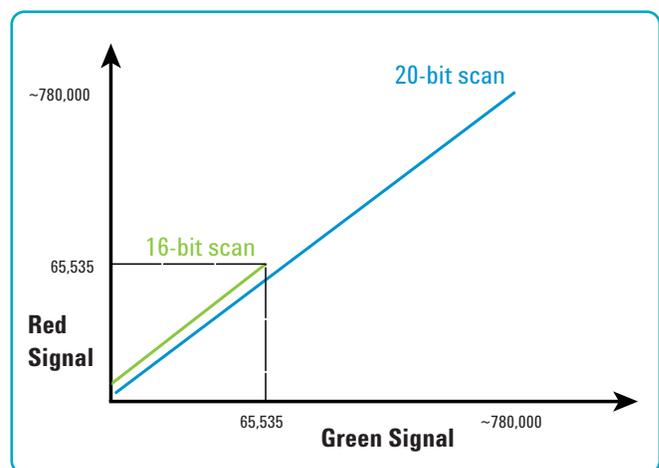


Figure 2b. The new single 20-bit scan with no need to recombine data saves time while providing high dynamic range.

Industry-first dynamic autofocus

Subtle variations in glass slide curvature, thickness, or other aberrations can cause problems with microarray scanner laser focusing. Most scanners focus and calibrate on a few discrete areas of a microarray slide, which may not correct for all potential aberrations, resulting in reduced scanning efficiency and sensitivity.

Agilent combats this problem with its industry-first Dynamic Autofocus feature. This unique capability increases scanning sensitivity by continual adjustment of the focal plane up to over 1 million times during the scanning process. This corrects for common glass aberrations and gradients as well as any potential slide movement within the scanner. The result is "on the spot" focus every time for more sensitive and precise microarray data.

Energy-efficient laser control

The laser-saver feature allows you to program your laser to turn on and off according to a given lab's workflow needs, thereby increasing the laser's lifespan while reducing instrument maintenance.

Powerful Image Analysis and QC Tools

Agilent's Feature Extraction software generates reliable, high-quality image analysis results. It can automatically process images in a seamless workflow while providing advanced statistical analysis. It finds and places microarray grids, rejects outlier pixels, accurately determines feature intensities and ratios, flags outlier features, and calculates statistical confidences. A variety of QC tools allow researchers to verify the reliability of their data and monitor multiple

analyses. Two licenses of Agilent's Feature Extraction software are included with every Agilent scanner purchase.

Summary

The Agilent DNA Microarray Scanner provides an integrated platform complete with PC, barcode reader, and image analysis software. Its superior resolution, sensitivity, and extended dynamic range make it the best choice for researchers requiring state-of-the-art results.

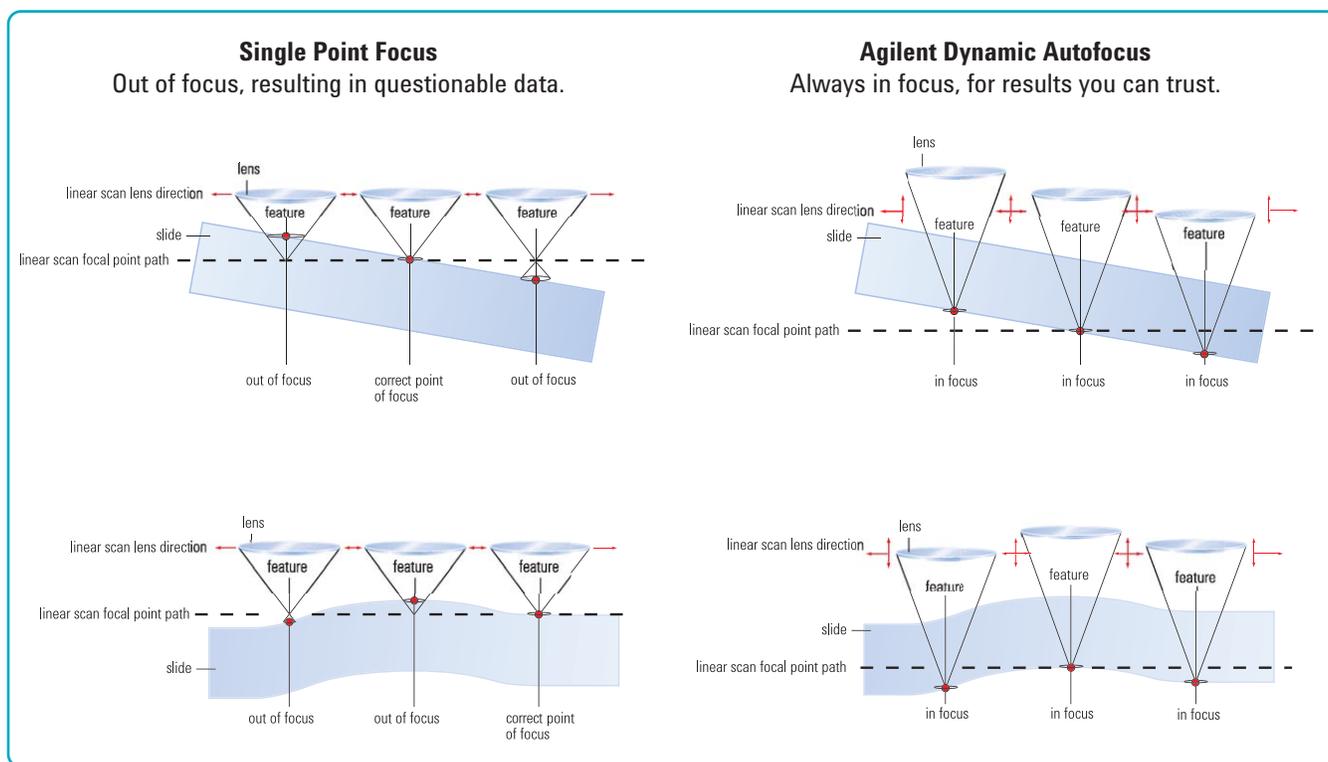


Figure 3. Agilent's Dynamic Autofocus continually adjusts the scanner's focus to ensure that features remain in focus at all times.

Specifications

Product	DNA Microarray Scanner with SureScan High-Resolution Technology Model G2565CA
Pixel Resolution	2, 3, 5, or 10 microns
Dynamic Range	10 ⁴ (16-bit data format) 10 ⁶ (20-bit data format) 10 ⁶ (with XDR scanning)
Dynamic AutoFocus	Features remain in focus at all times due to continual scanner adjustment
Scan Time	2-color simultaneous data acquisition in ~15 minutes per for 3 micron scans and ~20 minutes for 2 micron scans (scan region of 61mm x 21.6mm)
Autoloader	48-slide carousel allows for hands-off operation
Integrated Barcode Reader	Reads Code 128 (A,B,C), Code 39, Code 93, and CODABAR
Compatible Dyes	Cyanine 3 and Cyanine 5, and Alexa 647, 555, and 660
Laser Information	1 - SHG-YAG laser, 532nm 1 - Helium-Neon laser, 633nm Power: 20 mW at 532 nm and 23 mW at 633 nm both controlled to 13 mW
Scan Window Maximum	21.6mm x 71mm
PMT Adjustment	Allows adjustment of signal levels from 100% (default) to 1%
Detection Limit	0.05 chromophores per square micron
Pixel Placement Error	1 pixel @ 5 micron resolution
Uniformity	5% CV global non-uniformity; average local non-uniformity is typically 1% based on 100 micron area
Glass Specifications Supported	1" x 3" (25mm x 75mm) glass slide Width: 24.95mm to 26.1mm Length: 74.8mm to 76.45mm Thickness: 0.9mm to 1.1mm Non-mirrored slides of low intrinsic fluorescence

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