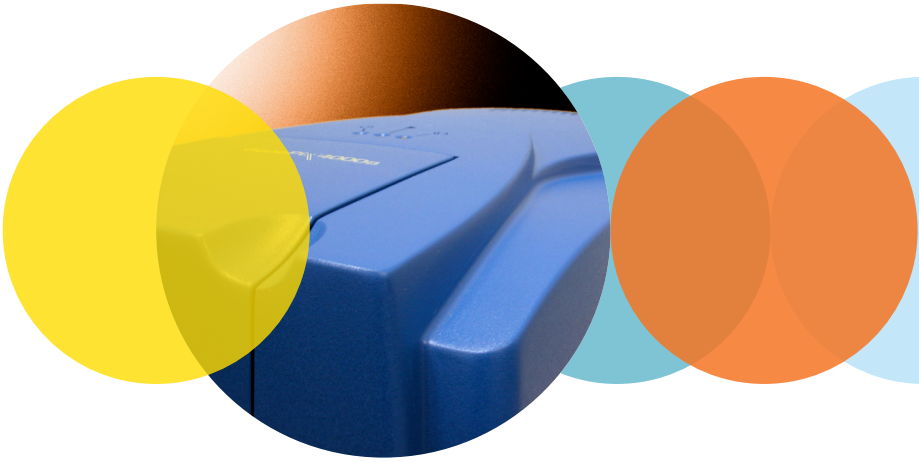

GenePix 4000B Microarray Scanner

Fast, high-quality imaging for two-color microarrays

BENEFITS

- **Simultaneous dual-laser scanning**
- **Rapid image acquisition**
- **Outstanding reproducibility**
- **Automated quality control flagging**
- **Compact, robust, and easy-to-use**
- **Fully-integrated with GenePix Pro Image Analysis Software**

Introduction

The GenePix® 4000B Microarray Scanner is a benchmark for quality, reliability and ease-of-use in microarray scanning technology. Coupled with GenePix® Pro Microarray Image Analysis Software and Acuity® microarray informatics software, the GenePix System sets the highest standards in the acquisition and analysis of data from all types of arrays, including nucleic acids, proteins, tissues, and cells.

Simultaneous dual-laser scanning

Unlike most commercially available array scanners, the GenePix 4000B Scanner acquires data at two wavelengths simultaneously. Simultaneous image acquisition reduces scan times dramatically (6.5 minutes for a full scan at 10 µm resolution in both channels, and much less for smaller scan areas), increasing laboratory efficiency. Apart from superior speed, simultaneous scanning also provides real-time access to ratiometric data for instant assessment of image quality during acquisition. Using this high-performance design ensures precision alignment for accurate ratiometric calculations (Figure 1).

High-resolution acquisition, automated PMT balancing

The GenePix 4000B Scanner acquires data at user-selectable resolutions between 5–100 microns, allowing optimization of image resolution and file size for each experiment. Our exacting design specifications and rigorous factory testing ensure that each GenePix 4000B Scanner resolves features down to 5 µm (Figure 2). In addition, the GenePix 4000B Scanner automatically chooses photomultiplier gain values, for fast and easy optimization of signal intensity and channel balance.

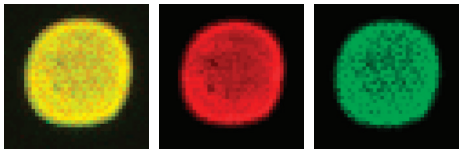

Figure 1. Accurate ratio alignment. The GenePix 4000B Scanner is precision engineered for accurate ratio alignment. Ratio image (far left) and single red and green channel images of a hybridized cDNA arrayed spot scanned on a GenePix 4000B Scanner at 5 µm resolution. Spot diameter = 150 µm.

MOLECULAR DEVICES

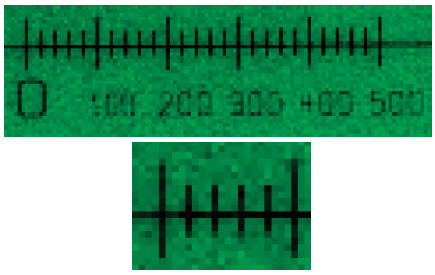

Figure 2. Superior resolution. An image of the resolution standard scanned on the GenePix 4000B Scanner at 5 µm resolution (top), with a detail view of the same scan (bottom). Each short bar is 5 µm wide, separated by 20 µm spacing. Before leaving the factory, each GenePix Scanner is tested for imaging accuracy using a precision resolution test standard.

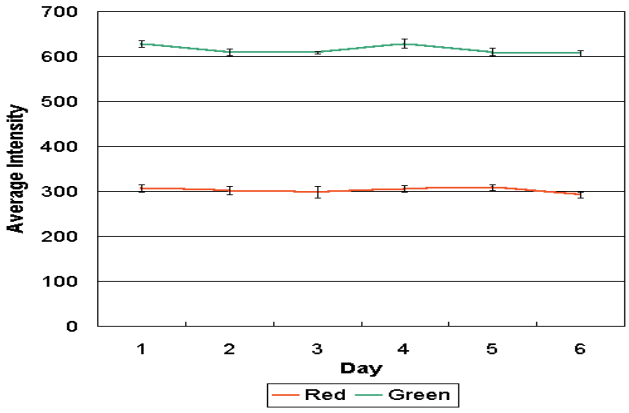

Figure 3. Real-time data handling. The GenePix 4000B Scanner offers proven repeatability, scan after scan. A non-bleaching fluorescent test standard was scanned repeatedly and the average signal was quantified. Signal value variance among all scans was 1.6% in the green channel and 2.1% in the red channel. Error bars cover two SD from the mean of the four measurements at each time point.

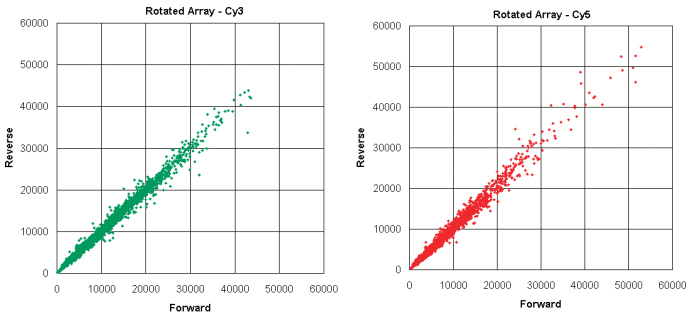

Figure 4. Unparallelled uniformity. Field uniformity ensures that signal calculations are accurate over the entire arrayed area. A hybridized gene expression microarray was scanned on a GenePix 4000B Scanner in the "forward" orientation, then rotated 180° and scanned again in the "reverse" orientation. Each spot was quantified and plotted against the same spot in the opposite orientation. The average percentage difference between forward and reverse scans is 6.4% for the red channel and 4.5% for the green channel.

Expanded sample compatibility

The GenePix 4000B Scanner expands overall sample compatibility, with user-adjustable focus offset and laser power settings. Adjustable focus offset allows proper imaging of slides with either a raised surface, as with membrane-coated glass, or a recessed surface, as in embedded arrays. The ability to adjust laser power provides control in imaging intensely bright samples or limiting laser exposure to unstable samples. To ensure constant signal output at each pixel, laser power is dynamically monitored and small fluctuations, inherent to all lasers, are automatically corrected.

Non-confocal optical design

The non-confocal optics of the GenePix 4000B Scanner are designed specifically for microarray imaging. Other scanners utilize confocal technology for imaging thin sections of a thick sample, as with tissue samples. However, most of the background signal on a microarray slide is produced by nonspecific hybridization, which is in the same plane of focus as the arrayed sample, and not reduced by confocal imaging. In addition, most microarray slides are not held to tight flatness specifications. A confocal imaging system with a very narrow depth of field may actually fluctuate in and out of the optimal plane of focus, as the surface of the slide varies. GenePix Scanners are designed to collect as much light as possible from the array surface, while rejecting stray light from other sources.

Uniformity and repeatability

GenePix Scanners are specified and tested for repeatability (Figure 3) and field uniformity (Figure 4). Our rigorous manufacturing quality control ensures that each GenePix 4000B Scanner produces consistent results, so that reliable data can be compared among all experiments, scan after scan, day after day.

Integrated hardware and software

The GenePix 4000B Microarray Scanner and GenePix Pro Microarray Analysis Software have been designed to work together as a complete integrated platform. The seamless communication between scanner and software ensures unmatched efficiency for data acquisition and analysis, as well as for real-time scanner performance monitoring. Optional Acuity microarray informatics software completes the package, offering database storage, clustering algorithms, advanced statistics and visualizations.

Technical specifications	
Performance specifications	
Sample type	Standard microscope slide (1" x 3", 25 x 75 mm or 26 x 76 mm)
Scan area	Adjustable, 22 x 71.5 mm max.
Excitation	532 nm and 635 nm lasers
Laser power settings	User-selectable 100%, 33% or 10% laser power
Emission filters	Two, optimized for Cy3 and Cy5 or spectrally similar dyes
Detection	Dual photomultipliers (PMTs), automatic and manual gain adjustment
Focus offset	Adjustable between -50 and +200 µm (1 µm increments)
Optics	Non-confocal
Scanning method	Simultaneous, 2-channel
Scan time	6.5 minutes for both channels, 10 µm resolution, full scan area
Pixel resolution	Adjustable from 5–100 µm
Digital resolution	16-bit
Dynamic range	Four orders of magnitude at SNR > 3
Image type	Single- or multi-image TIFF
Barcode reading	Image-based software barcode reader
General specifications	
Dimensions (in.)	13.5 (W) x 8.0 (H) x 17.5 (D)
Dimensions (cm)	34 (W) x 20 (H) x 44 (D)
Weight	45 lbs. (20 kg)
Power source	110/220V universal

Computer requirements available on our web site.

Ordering Information

GenePix 4000B Microarray Scanner

- GenePix 4000B
- GenePix Pro Image Analysis Software
- Acuity Microarray Informatics Software (optional)

Contact Us

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