Molecular Devices

GenePix 4300A & 4400A Microarray Scanners

HIGH-RESOLUTION, HIGH-QUALITY IMAGING WITH 4-LASER EXCITATION

- HIGH-RESOLUTION IMAGING
- ULTIMATE SAMPLE COMPATIBILITY
- HOUSES UP TO FOUR LASERS
- 16-POSITION EMISSION FILTER WHEEL
- FULLY-INTEGRATED WITH GENEPIX PRO IMAGE ANALYSIS SOFTWARE

The GenePix® 4300A and GenePix 4400A Scanners from Molecular Devices offer maximum imaging quality with optimal resolution in highly configurable platforms. Configurations include 5 µm or 2.5 µm per-pixel maximum scanning resolution, choices of up to four lasers for excitation, and sixteen emission-wavelength filters. These options allow the systems to detect a wide variety of fluorophores. Coupled with GenePix Pro Microarray Image Analysis Software and Acuity® Microarray Informatics Software, the GenePix Systems provide powerful, flexible, and easy-to-use solutions for the acquisition and analysis of data from all types of arrays, including nucleic acids, proteins, tissues, and cells.

HIGH-RESOLUTION ACQUISITION, AUTOMATED PMT BALANCING

The GenePix 4400A Scanner acquires data at user-selectable resolutions between 2.5 and 100 µm per pixel, allowing the optimization of image resolution and file size for each experiment. The 5 µm resolution of the 4300A system can be upgraded to the higher resolution 4400A system as research requirements increase. Additionally, both systems are capable of automatically choosing photomultiplier gain value, for fast and easy optimization of signal intensity and channel balance.

OUTSTANDING FLUOROPHORE FLEXIBILITY

Up to four internal lasers can be installed in the 4300A and 4400A scanners, enabling compatibility with a wide range of fluorophores. Easy-to-access, sixteen-position filter wheels allow users to add additional emission filters as desired, enhancing the flexibility of the systems. (See Figure 1.) Laser upgrades may be added at any time.

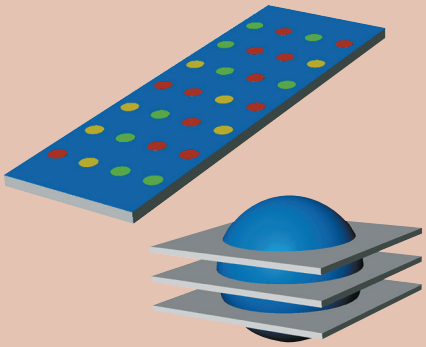
EXPANDED SAMPLE COMPATIBILITY

In addition to fluorophore flexibility, the GenePix 4300A and 4400A Scanners expand overall sample compatibility with user-adjustable focus offset and laser power settings. Adjustable focus offset allows optimal imaging of slides with either a raised surface, as with membrane-coated glass, or a recessed surface, as with embedded arrays. The ability to adjust laser power in 1% increments provides fine 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. In addition, all GenePix Systems image the array surface directly, enabling the use of a variety of microarray substrates, even non-transparent ones.

Flexible Filters (Figure 1)

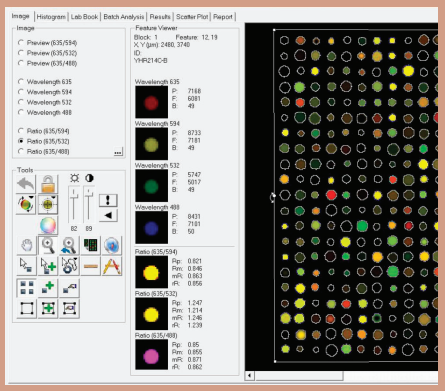
The GenePix 4300A and 4400A Scanners house 16-position, user-accessible emission filter wheels. Standard emission filters are included with the purchase of each laser. Additional filters are available for purchase.

Non-Confocal Optics (Figure 2)



The GenePix Scanners' optical paths are designed specifically for microarrays. Confocal optics do not benefit microarray imaging because the primary source of background is in the same plane of focus as the sample (left). Confocal imaging is primarily beneficial for rejecting out-of-plane background when scanning a thick sample (right).

Integrated Software (Figure 3)



All GenePix Microarray Scanners are closely integrated with GenePix Pro Software, which is used both for scanner control and image analysis.

NON-CONFOCAL OPTICAL DESIGN

The non-confocal optics of the 4300A and 4400A scanners are designed specifically for microarray imaging. Confocal technology was originally developed for imaging thin sections of a thick sample for subsequent 3-D reconstruction as with tissue samples. (See Figure 2.) However, most of the background signal on a microarray slide is produced by non-specific 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 planarity 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. All GenePix scanners are designed to collect as much light as possible from the array surface, while rejecting stray light from other sources.

UNPARALLELED SIGNAL-TO-NOISE PERFORMANCE

The 4300A and 4400A scanners combine industry-leading low-noise digitization technology with ultra-sensitive photomultiplier (PMT) detectors for five- to ten-times higher signal-to-noise ratios than white-light CCD systems.

INTEGRATED HARDWARE AND SOFTWARE

The entire family of GenePix Scanners are designed to work together with GenePix Pro Microarray Analysis Software as a complete integrated platform. (See Figure 3.) 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 slides (1" x 3" or 25 x 75 mm)
Scan area:	Adjustable, 22 x 72 mm max.
Excitation:	Up to 4 lasers (all internal); 488 nm, 532 nm, 594 nm, 635 nm
Laser settings:	User-selectable, from 5–100% (1% increments)
Emission filters:	16-position user-accessible filter wheel
Detection:	1 photomultiplier (PMT), automatic and manual gain adjustment settings
Focus offset:	Adjustable between -50 and +200 µm (1 µm increments)
Optics:	Non-confocal
Scanning method:	Sequential
Scan time:	4 minutes per channel, 10 µm resolution, full scan area
Pixel resolution:	4300A—Adjustable from 5–100 µm 4400A—Adjustable from 2.5–100 µm
Image digitization:	16-bit
Dynamic range:	Four orders of magnitude at SNR > 3
Image type:	Single- or multi-image TIFF
Barcode reading:	Integrated hardware barcode reader; all common 1D and 2D barcodes

General Specifications

Dimensions (in.):	16.9 (W) x 13.4 (H) x 25.6 (D)
Dimensions (cm):	43 (W) x 34 (H) x 65 (D)
Power supply:	110/220V universal
Weight:	103 lbs. (47 kg)

Computer requirements available on our web site at http://www.moleculardevices.com/pages/software/gn_genepix_pro.html

ORDERING INFORMATION

GenePix 4300A or GenePix 4400A Microarray Scanners include:

- GenePix scanner
- GenePix Pro image analysis software (one license)
- Acuity microarray informatics software (optional)

SALES OFFICES

- Australia +61-3-9896-4700
- Brazil +55-11-3616-6607
- North America +1-800-635-5577
- Germany +49-89/96-05-88-0
- UK +44-118-944-8000

Check our web site for a current listing of our worldwide distributors.
www.moleculardevices.com

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