



Microarray analysis

SwiftArrayStudio Microarray Analyzer

Microarrays enable researchers to analyze genetic variations and gene expression on a large scale. DNA microarrays have been an integral contributor in basic biology, applied genetics, and medical research laboratories. Their versatility and efficiency make microarrays a cornerstone technology for innovation across multiple disciplines, driving progress and enhancing our ability to understand the genomic influence on health and disease.

Although the typical workflow of a microarray analysis is not complicated, it can take up to 5 days to acquire data. As the number of samples analyzed with microarrays increases, innovations that accelerate the workflow are needed. Such innovations can allow researchers to obtain data faster and keep pace with the larger sample loads required for modern genomic analyses.

Thermo Fisher Scientific continues to be an innovator of genetic analysis tools. To address the growing demands for speed in high-throughput microarray analyses, we developed the Applied Biosystems™ SwiftArrayStudio™ Microarray Analyzer. This microarray analysis solution includes a target preparation workflow that can be completed in a single day and an instrument that automates array processing, including hybridization, washing, and scanning.

Usability and efficiency

Many of the key features of the SwiftArrayStudio Microarray Analyzer advance usability and efficiency. These features make setting up, using, and maintaining the system easy.

- Components required to run array plates are contained within a single unit. No additional light source or computer workstation is required.
- The SwiftArrayStudio Microarray Analyzer provides automated array processing. All on-instrument steps are facilitated by newly developed reagents that are stable at room temperature.
- Newly designed universal wash trays reduce the number of different consumable components required to process an array plate.
- Runs are set up and monitored using a novel, touchscreen-driven graphical user interface.
- The instrument is networkable, allowing setup and remote monitoring of runs.
- Up to 6,144 samples can be run in a 5-day work week with automated array processing.

Reliability

The SwiftArrayStudio Microarray Analyzer has been designed as a robust and reliable platform that supports laboratory uptime. In addition to helping keep the data flowing, this reliability minimizes the need for service visits.

- An integrated peristaltic pump is used to move liquid through the system.
- A novel auto-teach capability for the plate gripper system substantially reduces positioning calibration errors.
- An internal multiwavelength LED light source, designed to last for the lifetime of the instrument, has been integrated into the system. This eliminates the need for periodic replacement of the light source.
- On-platform placement of four 1 L ergonomic wash bottles with simple snap-in mounting reduces the amount of fluid tubing required to run the instrument.

Speed

The SwiftArrayStudio Microarray Analyzer has incorporated internal features that improve the rate at which array plates are processed. These changes increase the speed at which data can be collected from samples.

- Improved autofocus algorithms during scanning enable faster calculation of the optimal plane for faster image acquisition.
- The LED light source eliminates filter switching between wavelengths, further increasing the speed at which images are acquired.
- A single plate can be processed without manual intervention in ~21 hours.
- The average optical scan time for a 96-array plate is ~105 minutes; the average scan time per sample is ~1.09 minutes.
- The average optical scan time for a 384-array plate is 95 minutes; the average scan time per sample is ~15 seconds.
- With the “Load later” option, the instrument can process up to 4 plates in 28 hours, up to 16 plates per week.

Flexibility

Thermo Fisher Scientific offers a growing portfolio of catalog and custom microarrays that are compatible with the SwiftArrayStudio Microarray Analyzer. The instrument is designed to run a variety of arrays that are compatible with the Applied Biosystems™ Axiom™ SwiftArray™ Assay, enabling flexibility while supporting future array content. Arrays include:

- Applied Biosystems™ Axiom™ PangenomePro™ and PangenomePro™ Plus array plates
- Applied Biosystems™ Axiom™ PharmacoPro™ array plates
- Applied Biosystems™ Axiom™ agrigenomics array plates
- Custom arrays developed through the Applied Biosystems™ Axiom™ myDesign™ program, including 24-, 96-, and 384-array, as well as 96 mini-array options

Support

The SwiftArrayStudio Microarray Analyzer was designed to be easy to use, and easy to service when needed. Its design leverages the Thermo Fisher Scientific global service and support network—helping you get back to your research faster.

- Service and maintenance are simplified by making extensive use of modular field-replaceable units (FRUs).
- When connected to a network, a novel on-instrument Smart Help function enables remote troubleshooting, log file transfer, and support team engagement.
- Software packages automate calibration and system testing, eliminating manual tuning and potential operator biases from field service engineers (FSEs) during preventative maintenance.
- The Thermo Fisher™ Connect Platform allows users to rapidly contact our service and support teams. The Smart Help feature in the software allows users to open service tickets directly from the instrument's interface, attaching error and event logs to support prompt and accurate assistance.

Applications

Microarrays continue to be important tools for the acquisition of large amounts of genomic information. The SwiftArrayStudio Microarray Analyzer supports a variety of applications that depend on these data, including:

- Population genomics
- Genome-wide association studies (GWAS) in health and disease
- Agricultural genotyping to improve breeding
- Pharmacogenomics
- Polygenic risk scores (PRSs) and predictive genomics

Instrument specifications

Attribute	Specifications
Dimensions (W x H x D)	Instrument: 54.5 x 25.0 x 26.9 in. (138.5 x 63.6 x 68.4 cm) External waste bottle: 6 x 10 x 8 in. (15.2 x 25.4 x 20.3)
Weight	375 lb (170.1 kg)
Temperature range	15°C–30°C (59°F–85°F)
Humidity range	20%–80% relative humidity, noncondensing
Pollution degree	Pollution Degree 2: Install the instrument in an environment that normally only has nonconductive pollutants. Typical environments are laboratories, sales areas, and commercial settings.
Operating altitude	Located between sea level and 6,500 ft. (2,000 m) above sea level
Electrical supply	100–240 VAC
Current	12 A (maximum)
Main supply voltage fluctuations	±10% VAC
Illumination	LED light source
Pixelation	4.1 megapixels
Scan time, 96-array plate	105 minutes
Scan time, 384-array plate	95 minutes

Instrument throughput utilizing automated array processing

Configuration	Scan time, entire plate	Scan time per sample	Max. number of samples per week
96-array plate	105 minutes	65.6 seconds	1,536
384-array plate	95 minutes	14.8 seconds	6,144

* Assumes a 5-day work week.

Learn more at thermofisher.com/swiftarraystudio

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