



Model 4300

DNA ANALYSIS SYSTEM

TWO-COLOR, NIR DETECTION

TRUE GEL IMAGES

TIME EFFECTIVE ANALYSIS

READY ON DEMAND

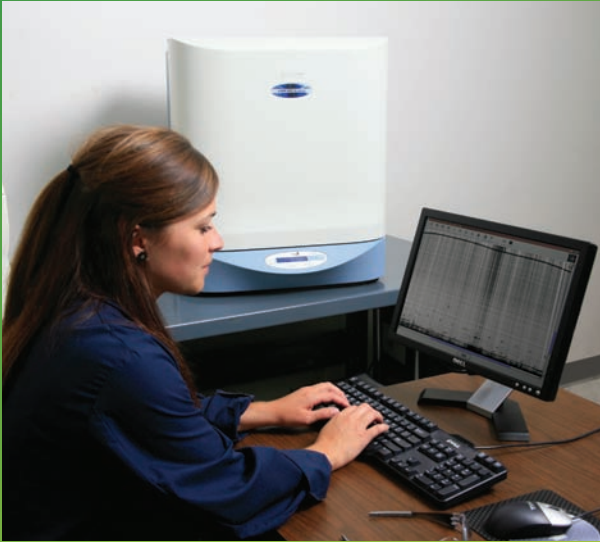
PROVEN RELIABILITY

LI-COR[®]
Biosciences



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Two-Color, NIR Detection

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Time Effective Analysis

Ready On Demand

Proven Reliability

The LI-COR® 4300 System

An Integrated and Comprehensive System

For the professional, student, or faculty researcher, the LI-COR 4300 DNA Analysis System accelerates research and improves the quality of data.

LI-COR first introduced light measuring instruments for plant science research in 1971 and quickly gained a reputation for providing innovative products that are rugged and reliable. As we've grown, we have added to that reputation by expanding into areas such as global climate change, crop science, genetic research, and drug discovery.

In the 1980s, LI-COR focused its research and development expertise on the emerging field of biotechnology. The company collaborated with the University of Nebraska to develop an automated DNA sequencing instrument. The LI-COR DNA Analysis system soon became a standard worldwide for reliability, accuracy, and read lengths. That standard was further recognized when the system played an important role in the worldwide Human Genome Project.

The Standard for Reliability, Refined

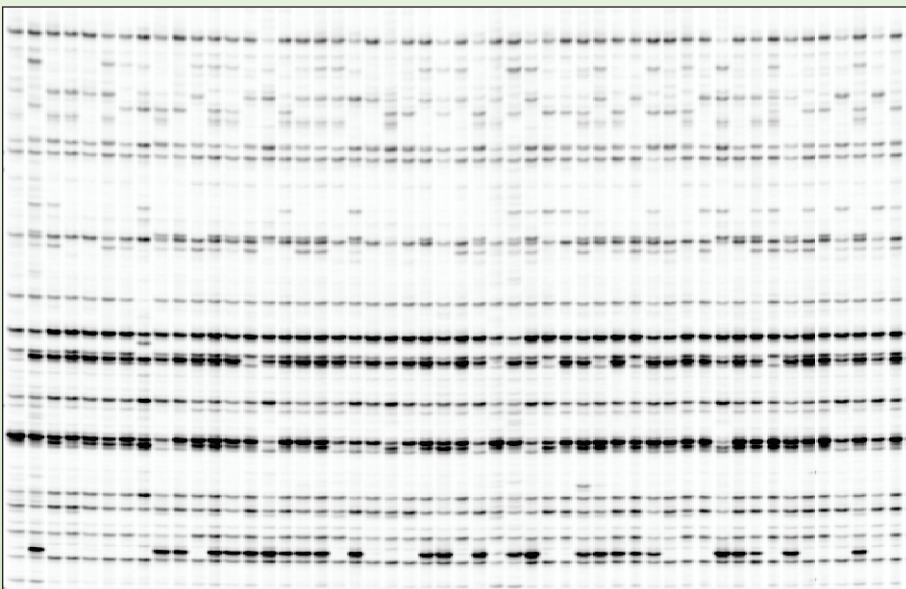
The third generation 4300 DNA Analysis System is based on LI-COR Biosciences' proven and highly sensitive infrared fluorescence detection technology. For more than 20 years, researchers using LI-COR DNA analyzers have relied on LI-COR for data that is noted for its exceptional accuracy. The system adapted and tools were added as genomic research expanded into other areas including microsatellites, AFLP® and TILLING® to meet researchers' demands.

Infrared Advantage: Infrared detection produces high signal-to-noise ratio for increased sensitivity over a wider dynamic range. Low fluorescence background results in dye signals that are bright, clean and strong. In addition, the 4300 DNA Analysis System uses two separate lasers and detectors to eliminate errors from fluorescence overlap.

True Gel Images: LI-COR's autoradiogram-like image format sets the standard as the most easily interpreted, accurate data format for scoring gel images. Autoradiograms are familiar and easier to interpret than intensity peaks because samples are visualized simultaneously.

Reliability: The system is rugged and reliable. Solid-state technology allows for consistent or intermittent use without the need for maintenance.

Time Savings: Automated data analysis using dedicated software makes it easier to get results quickly.



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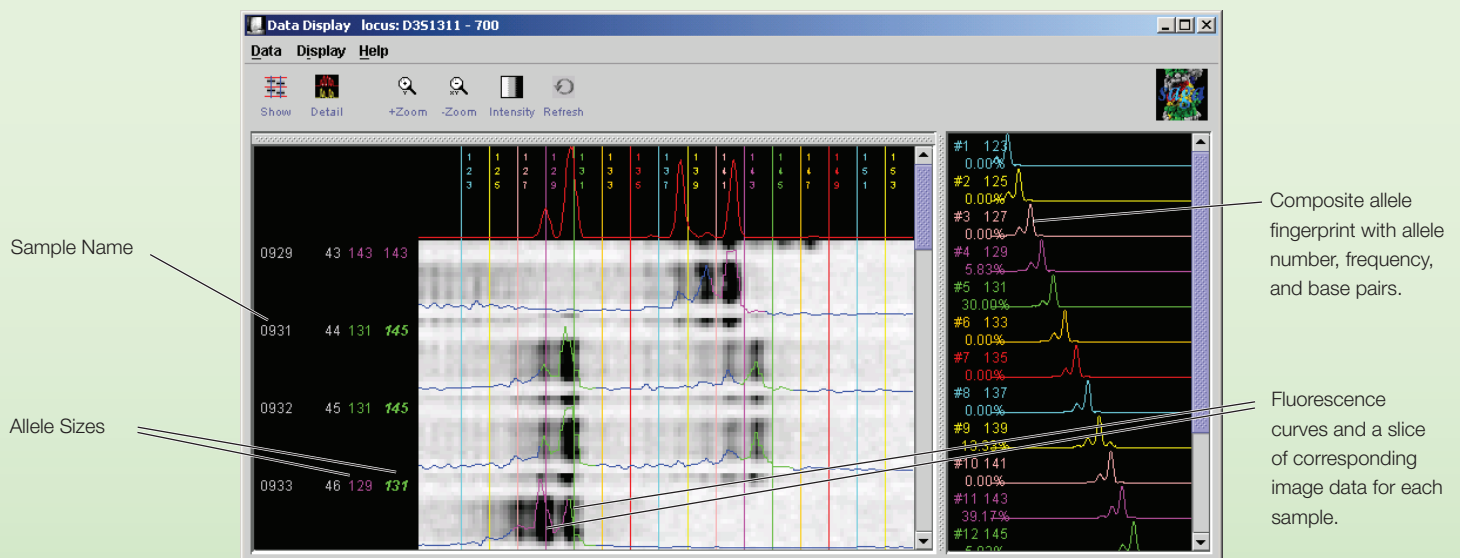
Application Flexibility

- Microsatellites
- AFLP®
- TILLING®
- Ecotilling
- Sequencing

Microsatellites

Microsatellites are repetitive segments of non-coding DNA scattered throughout the genome.

Designed specifically for microsatellite researchers using the 4300 System, SAGA^{GT} microsatellite analysis software offers an intuitive approach to genotyping because its workflow matches a typical microsatellite project. SAGA^{GT} manages all key aspects of the project, i.e. instrument operation, locus data management, and sample analysis. A unique allele fingerprinting method accurately scores alleles, stutter patterns, and heterozygotes that are not well separated. SAGA^{GT} features fast, automated analysis, from lane finding to allele scoring.



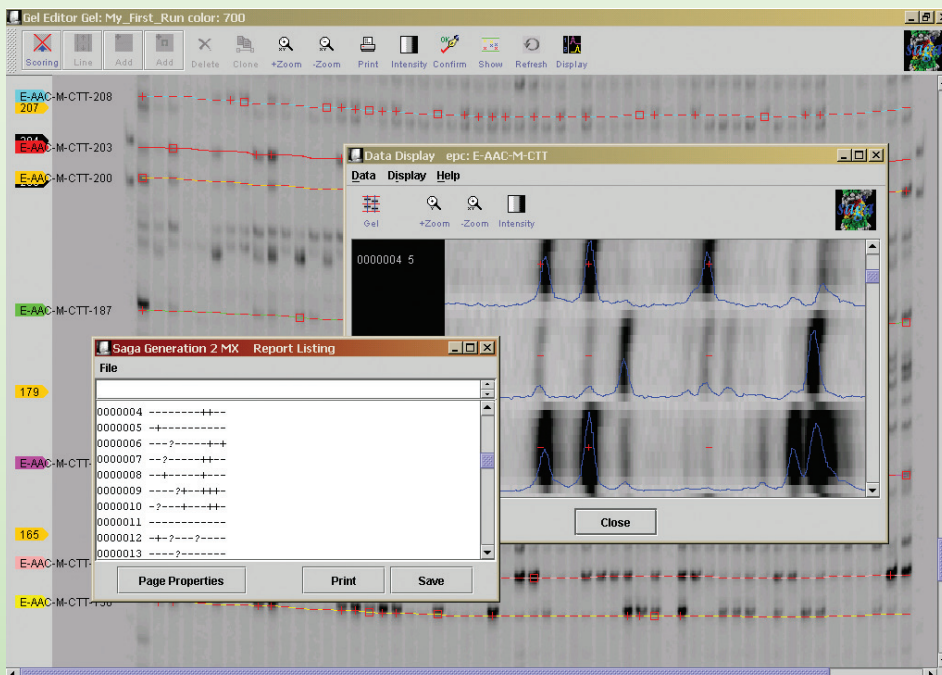
Fluorescence curves and image data are displayed in a horizontal format in the Data Display window. The allele fingerprints are shown in the right pane of the window. With the click of a button, the sample curve and fingerprint curve can be overlaid for direct visual comparison of the degree of match. Alleles are edited by clicking on the appropriate peak and picking an allele designator from a popup menu.

AFLP®

Amplified Fragment Length Polymorphism (AFLP®) is a PCR-based genome survey technique used to identify polymorphic regions in the genome that can be used for genotyping individuals in populations with low genetic variability. The high sensitivity of infrared detection, combined with the proven analysis approach of SAGA^{MX} software, allows for rapid and automatic analysis of AFLP® data. True gel images are accurately scored with SAGA^{MX}, which automates the entire process from electrophoresis through highly accurate band scoring. The scientist has complete control over editing and binning directly on gel images.

For further flexibility with AFLP® research, SAGA^{MX} stores data in a database, providing compatibility with widely used mapping and phylogenetics software. For downstream band extraction,

the AFLP® workflow can be further optimized through integration with the Odyssey® Infrared Imaging System for easy and accurate band extraction.

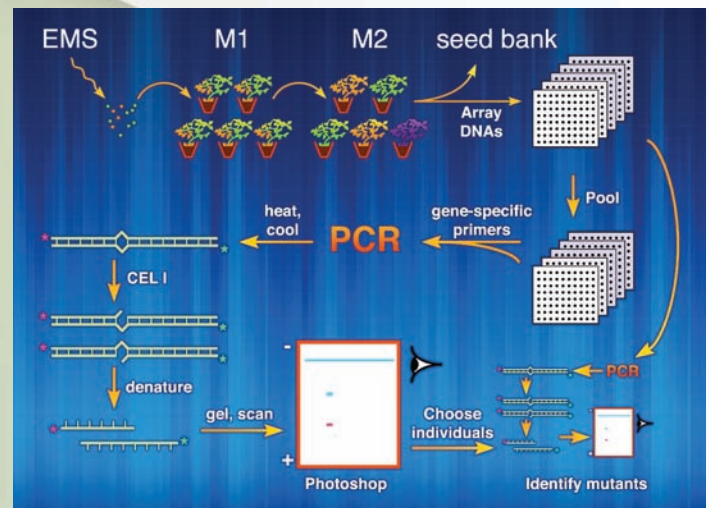


After automatic scoring, you can edit directly on the gel image. Both curve and image data are available for verification. When finished, a variety of standard report formats are available.

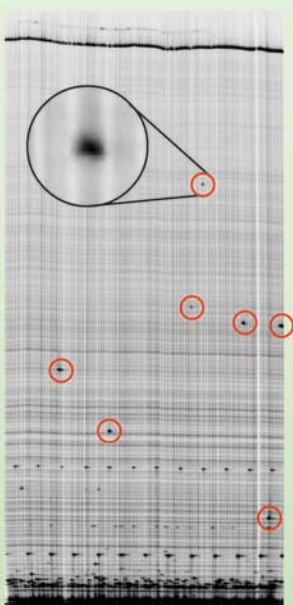
TILLING® & Ecotilling

TILLING is a method that was developed to overcome the limitations of knocking out an entire gene and to expand knowledge of active gene mutations. TILLING uses chemical mutagenesis to yield a traditional allelic series of point mutation for virtually any gene. Ecotilling is a high-throughput, low-cost technique for rapid discovery of polymorphisms in natural populations.

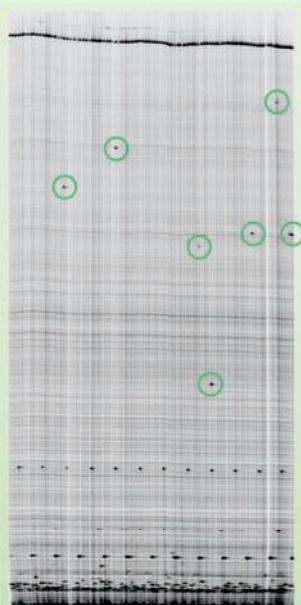
The 4300 System offers inherent advantages for performing TILLING and Ecotilling protocols for rapid discovery of SNPs, small insertions, and deletions and variations in microsatellite repeats. Using two fluorescent dyes (IRDye® 700 and IRDye 800), the system produces good signal-to-noise ratios and detects weak bands without filtering out subtle mutations. The system's wide dynamic range can be critical for resolving both large and small bands and to compensate for signal loss due to exonuclease activity.



IRDye 700 Channel Image



IRDye 800 Channel Image



LI-COR TILLING Images

Even on these highly reduced gel images, bands of mutations are clearly visible (circled red and green). When hetero-duplexes created during PCR are cleaved at base mismatches (see TILLING Workflow), the result is two cleavage fragments labeled with different IRDyes. With two-color imaging, a true mutation has two mutant bands below the wild type band in the same lane. One band is on the IRDye 700 image and the other on the IRDye 800 image. Additionally, the sum of the molecular weights of the mutant bands in a lane must equal the molecular weight of the wild type band in order for the mutation to be confirmed. Using this two-color detection method, the 4300 System virtually eliminates false positive mutation identifications.

Data courtesy of the Arabidopsis TILLING project, Seattle, Washington.

Sequencing

The LI-COR® DNA Analysis System set the standard for accurate, long-read DNA sequencing. Today, the 4300 System continues to offer an affordable solution for both research and classroom environments. Using Simultaneous Bi-directional Sequencing (SBS™) with forward and reverse primers, the LI-COR 4300 System performs two sequencing reactions in one tube, reducing reagent costs and set-up times.

With more than two decades of proven reliability in laboratories around the world, researchers trust the 4300 DNA Analysis System to provide exceptional data. The LI-COR 4300 System stands up to the rugged demands of classroom use and helps students learn the key fundamentals of genomic research.

System Specifications

Laser/Microscope

- Laser Lifetime:** 40,000 - 60,000 hours typical.
- 700 Channel Laser Source:** Solid-state diode laser at 685 nm.
- 800 Channel Laser Source:** Solid-state diode laser at 785 nm.
- Detectors:** Two silicon avalanche photodiodes
- Scanning Speed:** Five selectable scan speeds to optimize image quality.

Electrophoresis Power Supply

- Maximum Output:** 5,000 V, 40 mA, and 120 W.

Operation Specifications

- Operating Conditions:** 15 - 35° C and dew point not greater than 19° C.
- Power Requirements:** Automatic voltage selection at 90-250 VAC and 47-63 Hz. 3 amps at 120 volts; 380 watts maximum.

Dimensions

- 4300S:** 59H x 51W x 47D cm (23" x 20" x 18"). 102 cm (40") wide with door fully open.
- 4300L:** 84H x 51W x 47D cm (33" x 20" x 18"). 102 cm (40") wide with door fully open.

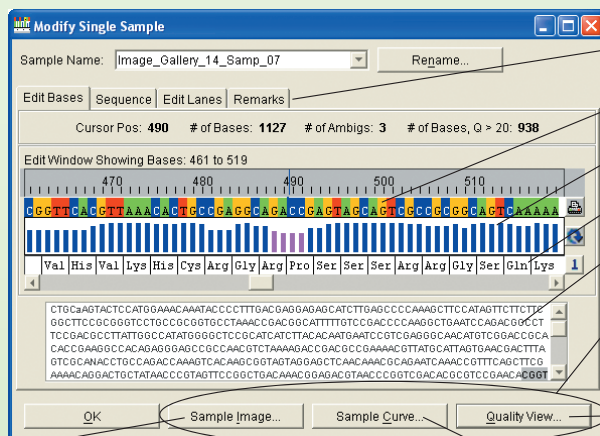
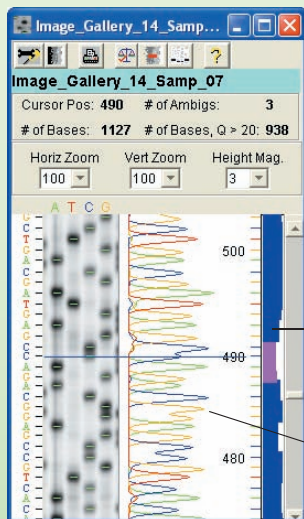
Weight

- 4300S:** 29 kg (64 lb).
- 4300L:** 36.3 kg (80 lb).

Internal Server

- Data Storage Capacity:** 80 GB for data storage and server software.
- Network Protocol:** TCP/IP.
- Network Connection:** RJ-45, 10/100 BaseT.
- Security:** Password protected access.

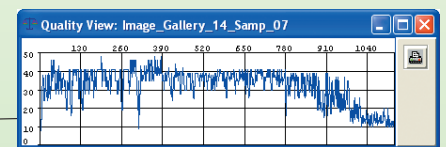
From e-Seq™'s image window (left), data for any sample can be displayed (right) with a single click.



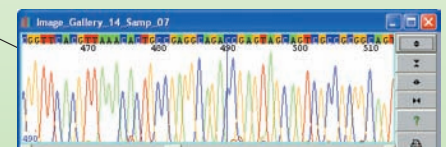
- Tabs to edit, resequence, or extend the sequence.
- Color-coded sequence data.
- Quality bars.
- DNA to protein translation.
- Sequence data.
- Three additional data viewers and editors.

Quality value bars.
 Green > 40; Blue = 30-40; Magenta = 20-30;
 Red = 10-20; Gray < 10
 (numeric values can also be displayed)
 Error probability: 40 = 1 in 10,000; 30 = 1 in 1,000;
 20 = 1 in 100; 10 = 1 in 10.

Image, curve and quality value data are shown side by side for accurate editing. Simple point-and-click editing tools make editing easy.



Quality value overview graph.



Curve viewer and editor.

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Biosciences

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The LI-COR board of directors would like to take this opportunity to return thanks to God for His merciful providence in allowing LI-COR to develop and commercialize products, through the collective effort of dedicated employees, that enable the examination of the wonders of His works.

“Trust in the LORD with all your heart and do not lean on your own understanding. In all your ways acknowledge Him, and He will make your paths straight.”

— Proverbs 3:5,6



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