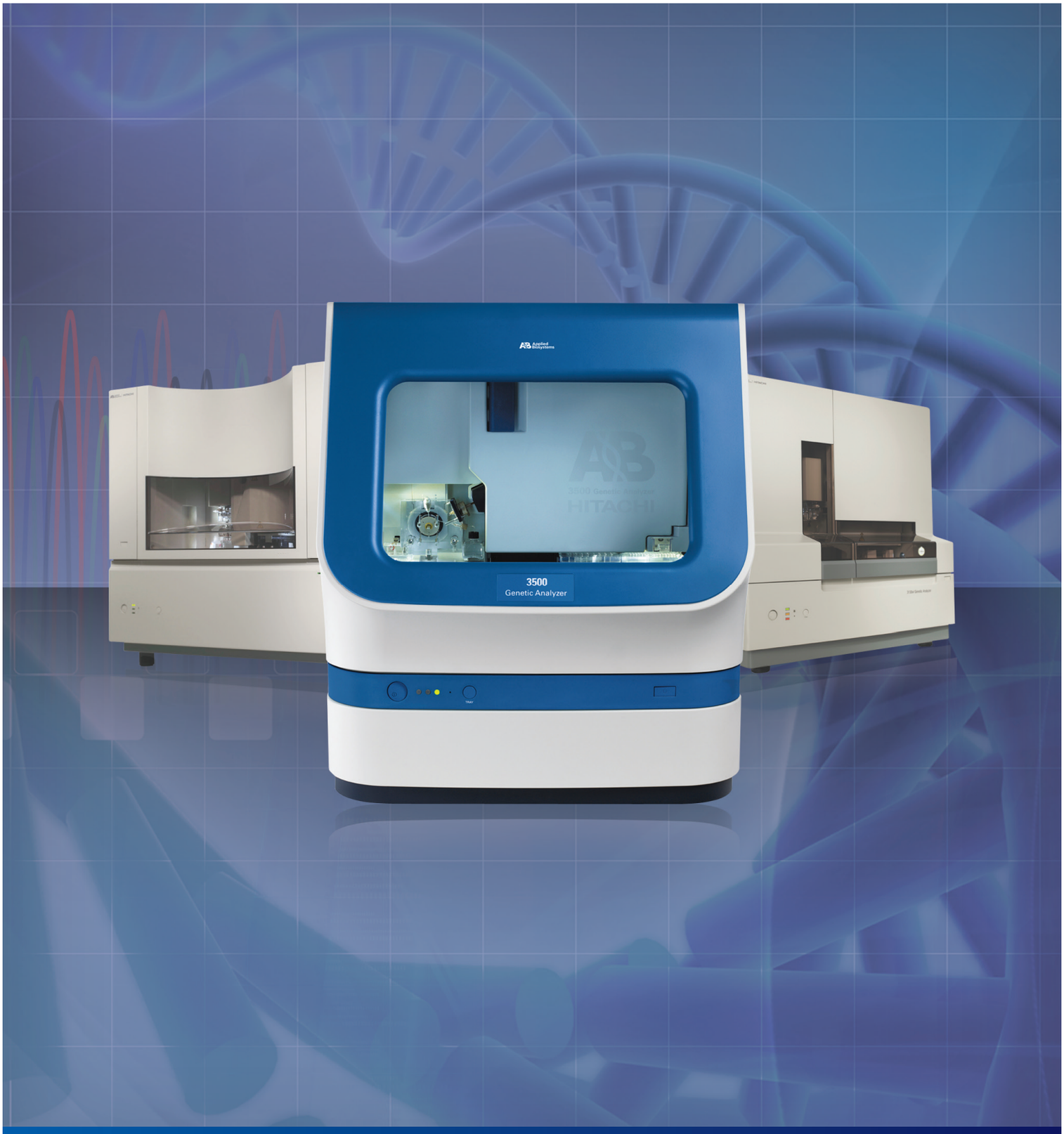


Applied Biosystems®

Applied Biosystems® Genetic Analyzers

Gold-standard technologies for Sanger sequencing and fragment analysis applications

life technologies™

Sequence with confidence

Today, DNA sequencing is a fundamental tool in basic, applied and clinical research. Whether checking the integrity of a clone or the identity of a forensic sample, data quality is paramount to getting the right answer to your sequencing questions.

Capillary electrophoresis is the gold standard for Sanger (DNA) sequencing and fragment analysis. Its utility is proven through decades of results and over 20,000 publications, including the first human genome and the discovery of genes implicated in diseases like cystic fibrosis. In addition to multiple Sanger sequencing–based applications, capillary electrophoresis is used in fragment sizing and quantification-based applications. Applied Biosystems® Genetic Analysis Systems continue to offer proven high-quality instrumentation, reagents, consumables, analysis software, and world-class technical support to respond to the unlimited potential of scientific discovery.

From the simplicity of the single capillary 310 system, to the high capacity of the 3500 and 3730 Series Genetic Analyzers, our suite of instruments offers you more flexibility, performance, and reliability.

Sanger sequencing and fragment analysis applications

Numerous applications are addressed with high reliability and efficiency using Sanger sequencing techniques. Each of our genetic analyzers is optimized for a suite of Sanger sequencing applications, including ***de novo*** sequencing and resequencing.

- *De novo* sequencing
- Resequencing
- Mutation detection
- Mitochondrial sequencing

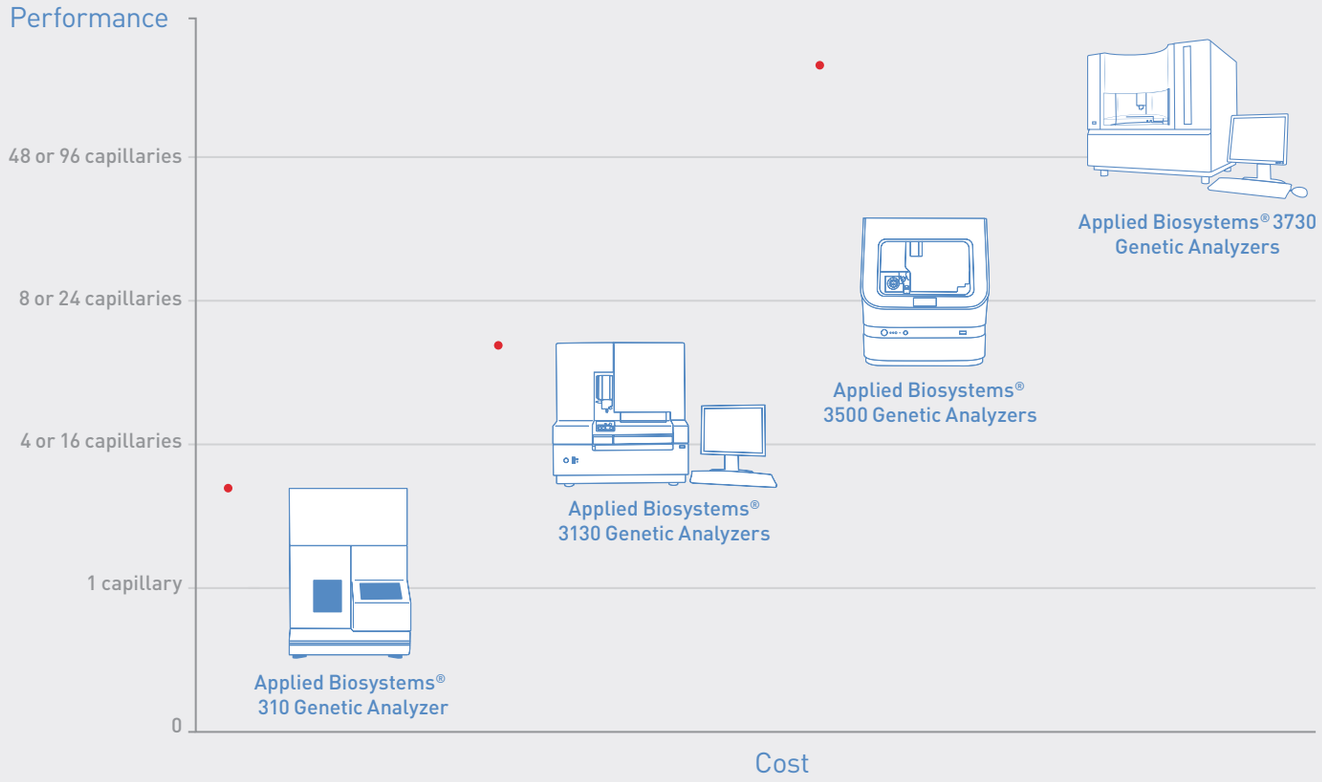
In addition to performing sequencing by capillary electrophoresis, Applied Biosystems® genetic analyzers deliver high-quality data for a variety of DNA analysis applications based on the sizing and/or intensity of fluorescently labeled DNA fragments. Collectively, these applications are referred to as fragment analysis.

- General sizing of PCR products
- SNP genotyping analysis
- Genome fingerprinting
- Relative fluorescent quantification

For more information, visit **lifetechnologies.com/ceapplications**

Find the right instrument for your application and throughput needs

	310	3130/3130*xl*	3500/3500xL	3730/3730*xl*
	This single capillary instrument is ideal for low-throughput labs and basic applications.	Available as an upgrade to an existing 3100 or as a factory refurbished unit, the 3130 is great for labs looking to expand their capacity.	Designed to support the demanding performance needs of validated and process-controlled environments.	Ideal for high-throughput labs with 48-hour hands-free automation, integrated plate stacker, and lowest cost per sample.



● Available refurbished

Figure 1. Comparison of performance, throughput and cost of Applied Biosystems® Genetic Analyzers.

Table 1. Features and specifications of Applied Biosystems® Genetic Analyzers

	310	3130/3130*xl*	3500/3500xL	3730/3730*xl*
Number of capillaries	1	4 (3130), 16 (3130*xl*)	8 (3500), 24 (3500xL)	48 (3730), 96 (3730*xl*)
Number of dyes	5	5	6	5
Capillary array length (cm)	47, 61	22, 36, 50, 80	36*, 50	36, 50
RFID	No	No	Yes	No
Polymer type	POP™ CAP, POP-4™, POP-6™	POP™CAP, POP-4™, POP-6™, POP-7™	POP-4™, POP-6™, POP-7™	POP™ CAP, POP-6™ , POP-7™
Sample capacity	1–96 sample tubes	2 sample plates (96- or 384-well)	2 sample plates (96- or 384-well)	16 sample plates (96- or 384-well)
Hands-free automation	24 hours	24 hours	24 hours	48 hours
Integrated plate stacker	No	No	No	Yes
Availability**	New or refurbished	Upgrade or refurbished	New	New or refurbished

*36 cm capillary array is only used for HID applications on POP-4™.
**Availability of refurbished instruments varies throughout the year, please contact your sales rep for details.

3500 and 3500xL Genetic Analyzers

Designed to support the demanding performance needs of validated and process-controlled environments while retaining unsurpassed application versatility. The 3500 Series Genetic Analyzers are optimized for validating NGS discoveries and performing translational research.

Benefits	Description
Scalable design	8-capillary system that can easily be upgraded to a 24-capillary system, allowing the system to grow with your lab
Fits in any lab	Solid-state laser utilizes a standard power supply and requires no heat-removal ducting
Data review in real-time	Powerful, integrated data collection and primary analysis software provides real-time assessment of data quality
Consumables tracking	Radio frequency identification (RFID) technology tracks key consumables data and records administrative information
Advanced multiplexing	DNA fragment analysis with up to six unique dyes
Simple and powerful	One array and one polymer are used for most applications

3730 and 3730*xl* Genetic Analyzers

The 3730 Genetic Analyzer Series offers 48-hour hands-free automation, integrated plate stacker, astounding throughput and lowest cost per sample operation, making these instruments ideal for high-throughput labs.

Benefits	Description
Long read lengths	Long read lengths allow you to get more accurate sequence data from fewer runs
Economical operation	Advanced optical system and compatibility with the latest polymers offer higher-quality data at a lower cost per sample
Maximum productivity	Integrated plate stacker and continuous, 48-hour hands-free automation offer productivity gains and minimizes the chances for human error
Supports many applications	Supports a diverse range of genetic analysis projects. Compatible with proprietary Applied Biosystems® reagents and software including *de novo* sequencing and resequencing (mutational profiling), as well as microsatellite analysis, MLPA, LOH, MLST, AFLP, and SNP validation or screening

3130 and 3130*xl* Genetic Analyzers

Available as an upgrade to an existing 3100 or as a factory refurbished unit, the 3130 Genetic Analyzer Series is great for labs looking to expand their capacity for basic sequencing and fragment analysis techniques while maintaining a tight budget.

Benefits	Description
Fully automated	Continuous, unattended 24-hour operation with fully automated polymer delivery, sample injections, separation, detection, and data analysis has higher throughput than the 310 with 4 or 16 capilaries and can still be fully automated
Dependable performance	Long-term reliability with extremely low maintenance requirements
Simple and powerful	One polymer and one array for both sequencing and fragment analysis applications
Multiple configurations	Multiple array and polymer configurations allow application-specific flexibility
Upgrading possibilities	Simple hardware upgrades are available to maintain optimum system performance

310 Genetic Analyzer

Our most affordable genetic analyzer offers a single capillary for low-throughput labs and a variety of basic applications such as confirmation analysis and BAC fingerprinting.

Benefits	Description
Application flexibility	Perform comparative sequencing, linkage analysis, STR analysis, SNP detection, discovery and validation, mutation detection, and many other applications
Automated operation	Continuous 24-hour hands-free automation allows you to maximize the data output from your lab
Multicolor analysis	Detect five dyes simultaneously to increase throughput
Automated workflow	Load your samples, set up the data collection software and click to minimize hands-on time and costs

Factory refurbished genetic analyzers

If you're ready to increase your sequencing and fragment analysis capabilities, or if you're starting a new laboratory and are operating on a tight budget, you can get the most for your money with a factory-refurbished Applied Biosystems® Genetic Analyzer.

We offer refurbished 3130, 3730, and 310 genetic analyzers. Whether you need a single-capillary system for a few reactions a day or a multi-capillary system for a few thousand reactions, we have the right instrument for you.

Our expertly refurbished systems are certified at our instrument manufacturer, Hitachi, and come with the same software and warranties as new instruments. Our certified team of engineers takes each refurbished instrument through a rigorous validation program before it is given an official quality refurbishment label.

To receive an official quality refurbishment label, each system must pass strict guidelines that include:

- Replacement of all critical components, including the laser
- Realignment and calibration
- Testing and verification to meet original manufacturer's specifications
- Performance validation and calibration of firmware, electrical voltage, optical system, oven temperature, auto sampler, pump, switches and lights
- Installation of latest data collection and analysis software
- New computer with most current operating system
- Comprehensive 1-year limited warranty with priority service and support

life CERTIFIED
REFURBISHED INSTRUMENT

For more information regarding our refurbished instruments, please visit **lifetechnologies.com/ce** or contact your local sales representative.

POP™ Polymers

POP™ polymers are separation matrices for the Applied Biosystems® Genetic Analyzers used to dynamically coat the capillary wall to control electro-osmotic flow. Their defined quality and uniform consistency eliminate guesswork and help to ensure reproducibility. POP™ polymers are specifically formulated to separate DNA fragments of a known size range at a desired resolution and run time. They are conveniently offered in an easy to use pouch (3500 series only) or bottle format. Each polymer is optimized for specific applications (Table 2).

All POP™ polymers are:

- Pre-formulated and supplied in ready-to-use bottles (3130 and 3730 instruments) or pouches (3500 series) to help save time and enable consistency
- Equipped with radio frequency identification (RFID) labels to easily track important information such as part/lot number, samples remaining and expiry dates (for 3500 & 3500xL analyzers)
- Versatile for use in sequencing and fragment analysis applications
- Capillaries are replenishable with POP™ Polymers, allowing them to be used multiple times

Table 2. Compatibility of POP™ polymers with Applied Biosystems® Genetic Analyzers.

Polymer	310	3130/3130*xl*	3500/3500xL	3730/3730*xl*
POP™ CAP	x	x	N/A	x
POP-4™	x	x	x	N/A
POP-6™	x	x	x	x
POP-7™	N/A	x	x	x

Sequencing kits and reagents

Applied Biosystems® Sanger sequencing kits provides superior solutions for all applications and templates.

BigDye® Terminator Sequencing Chemistry

The BigDye® Terminator Cycle Sequencing Kits provide the required reagent components for the sequencing reaction in a pre-mixed format. You need only provide your template and the template-specific PCR primer pair.

BigDye® terminators utilize single energy transfer molecules, which include an energy donor and acceptor dye connected by a highly efficient energy transfer linker. Each of the four dyes is attached to its corresponding ddNTP, thereby requiring only one reaction tube per sample. DNA template, unlabeled primer, and a ready-to-use reaction mix containing buffer, dNTPs, fluorescently labeled ddNTPs, and polymerase are added to the reaction tube. Fluorescent fragments are generated by incorporation of dye-labeled ddNTPs via 3-step thermal cycling. Each different ddNTP will carry a different color of dye at their 3' end (Figure 2).

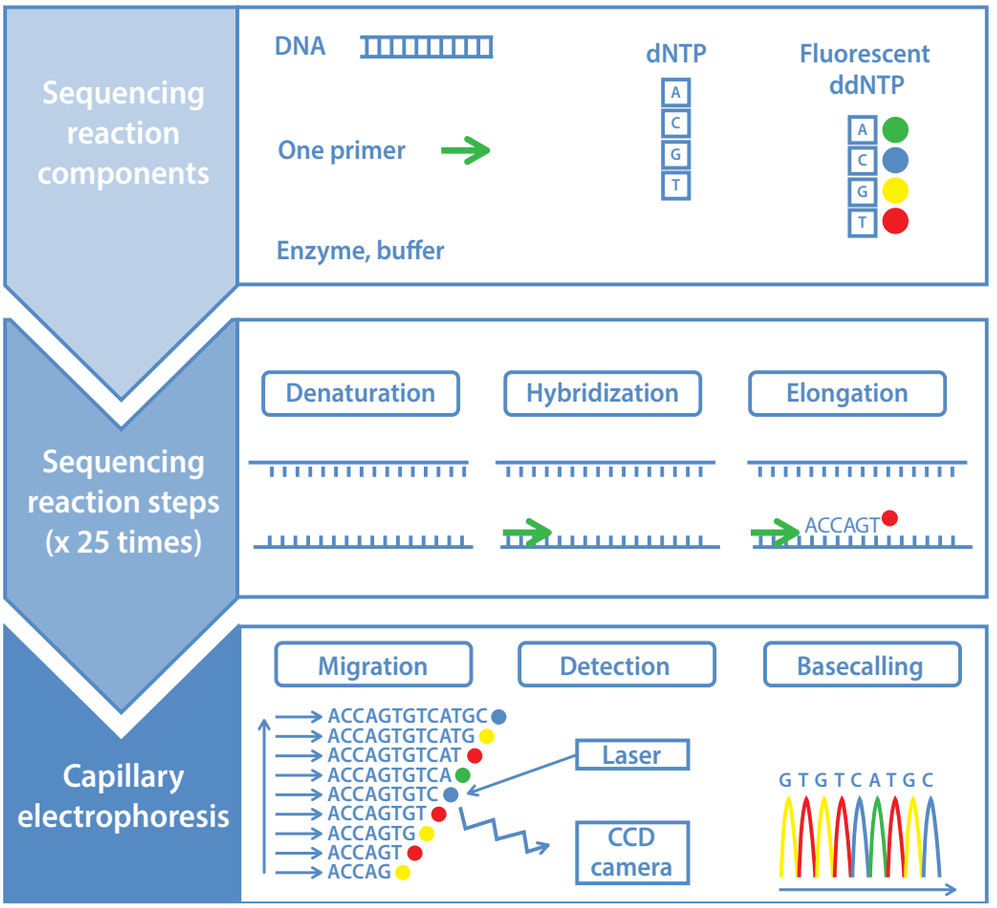


Figure 2. Sanger sequencing workflow using dye terminator technology.

BigDye® Direct Cycle Sequencing Chemistry

The BigDye® Direct Cycle Sequencing Kit, the newest addition to the BigDye® product family, is a complete kit for your PCR and sequencing needs. This innovative, time-saving kit combines the PCR purification and cycle sequencing steps, enabling a streamlined protocol and shorter time to results. Furthermore, the entire process takes place in one tube or well—no sample transfer is needed, minimizing the chance for sample mix-up errors.

In addition to the BigDye® Direct Cycle Sequencing Kit, Life Technologies offers BigDye® Terminator v3.1 and BigDye® Terminator v1.1. See Table 3 below for the recommended BigDye® Kits for each sequencing application.

Table 3. Compatibility of BigDye® Cycle Sequencing Kits for various sequencing applications.

Sequencing application	BigDye® Direct	BigDye® Terminator v3.1	BigDye® Terminator v1.1
All types of sequencing	O	O	O
High resolution close to the sequencing primer	O (if using POP-7™)	NR	O (if using POP-6™)
Universal tail primer other than M13 primer	NR	S	S
Long read (>650 bp)	S	O	S
Mixed base (heterozygote) with ratio 10/50 to 50/50	O	S	O
GC-rich, GT-rich, difficult template†	S	S	S

O - Optimal
S - Satisfactory
NR - Not Recommended

† BigDye® Direct, BigDye® Terminator V3.1, and BigDye® Terminator V1.1 will provide good sequence quality for the majority of these templates. In some cases, the dGTP BigDye® terminators have been specially designed for these difficult templates and will provide better results.

Fragment analysis kits and reagents

GeneScan™ Size Standards

GeneScan™ Size Standards are fluorescently labeled DNA fragments required for performing fragment analysis applications on Applied Biosystems® capillary electrophoresis platforms. Each standard contains fragments of known sizes that will be used by the data analysis software to generate a calibration curve, which is then used to determine the size of unknown fragments in a sample. GeneScan™ Size Standards generate reliable and reproducible size calls, and are available with either ROX™ fluorophore or the proprietary LIZ® dye. The LIZ® dye–labeled standards offer higher throughput and help reduce project costs by enabling an increase in the number of markers that can be multiplexed in a single sample.

SNaPshot® Multiplex System to screen and confirm SNPs

The SNaPshot® Multiplex Kit is the perfect tool for SNP screening and validation. The kit offers a one-tube single-base extension/termination reagent to label DNA fragments.

The SNaPshot® Multiplex System allows you to:

- Interrogate multiple SNPs regardless of chromosome position
- Separate SNP loci that differ by a single base pair
- Perform single sample genotyping without using cluster-based data analysis
- Conserve your amplified template without sacrificing robust interrogation
- Perform SNP screening and validation on any Applied Biosystems® capillary electrophoresis instrument

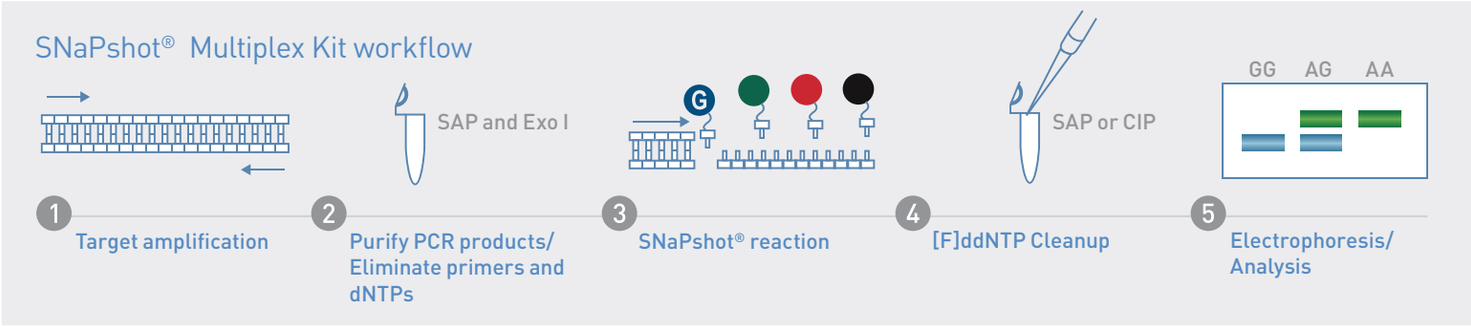


Figure 3. Step-by-step workflow for the SNaPshot® Multiplex Kit.

Analysis software

Applied Biosystems® offers primary and secondary analysis software for sequencing and fragment analysis applications, as well as data viewing tools for sequencing.

Table 4. Sequence and fragment analysis software for Applied Biosystems® Genetic Analyzers.

Software	Description	Main features
Sequencing analysis software		
Sequencing Analysis Software with KB™ Basecaller	Enables you to basecall, trim, display, edit, and print electrophoregrams generated by your genetic analyzer.	Longer read lengths and improved 5′ accuracy Low signal to noise Basecalling quality values Enables accurate mixed basecalls
Sequence Scanner Software	Designed to review and quickly evaluate the sequence reactions of multiple runs and generate quality reports.	Review traces in thumbnails and sort by trace quality Effective quality metrics Simultaneously view raw and analyzed data Results at a glance with Plate Report view
SeqScape® Software	Provides reference based analysis of sequencing reactions for mutation detection and analysis, SNP discovery and validation, and sequence confirmation.	Obtain quality values for each base pair, consensus sequence and mutation Automatically process raw data and generate reports Pre-configured templates Custom data views
Variant Reporter® Software	Reference based and non-reference based analysis of sequencing reactions for mutation detection and analysis, SNP discovery and validation, and sequence confirmation.	Handles over 10 times more sample files than competing software products Accelerate data review Simple and intuitive Robust data filtering with effective quality metrics
Fragment analysis software		
Peak Scanner™ Software	Performs DNA fragment analysis, separates a mixture of DNA fragments according to their sizes, provides a profile of the separation, and precisely calculates the sizes of the fragments. View, edit, analyze, print, and export fragment analysis data with ease.	Use a workflow panel to guide you through analysis Quickly analyze samples with the default sizing methods Analyze large fragments (up to 1200 bp) View raw and analyzed data simultaneously
GeneMapper® Software	Flexible genotyping software that enables DNA sizing and quality allele calls. This software specializes in multi- application functionality, including amplified fragment length polymorphism (AFLP), loss of heterozygosity (LOH), microsatellite, and SNP genotyping analysis.	Security and audit features to help users meet 21 CFR Part 11 requirements Process Quality Values (PQVs) for automated evaluation Remote auto-analysis and command line operation Multi-user, client-server deployment

Table 5. Performance specifications and sequencing reagents for Applied Biosystems® Genetic Analyzers.

	310	3130/3130*xl*	3500/3500xL	3730/3730*xl*
Sequencing				
Sequencing read length (bp)	up to 600	up to 950	up to 850	up to 900
Minimum run time	38 minutes	35 minutes	30 minutes	20 minutes
Maximum sequencing throughput (bases pair reads/day)	15 k	78 k (3130), 315 k (3130*xl*)	138 k (3500), 414 k (3500xL)	1.3 M (3130), 2.6 M (3130*xl*)
Sequencing reagents	BigDye® Terminator v1.1 BigDye® Terminator v3.1	BigDye® Direct BigDye® Terminator v1.1 BigDye® Terminator v3.1	BigDye® Direct BigDye® Terminator v1.1 BigDye® Terminator v3.1	BigDye® Direct BigDye® Terminator v1.1 BigDye® Terminator v3.1
Fragment analysis				
Minimum run time	30 minutes	20 minutes	30 minutes	20 minutes
Fragment throughput (bp)	up to 920	up to 3 k (3130), 12 k (3130*xl*)	up to 5 k (3500), 16 k (3500xL)	up to 10 k (3730), 21 k (3730*xl*)
Fragment analysis reagents	SNaPshot® Multiplex Kit GeneScan™ Size Standards	SNaPshot® Multiplex Kit GeneScan™ Size Standards	SNaPshot® Multiplex Kit GeneScan™ Size Standards	SNaPshot® Multiplex Kit GeneScan™ Size Standards

For more information about the applications listed above, please scan this barcode or visit
lifetechnologies.com/ceanalysissoftware

Support at every step of your experiment

Instruments & Services Portal

Award-winning*, free, online tool that enables faster response to requests for service or service quotes, and instant sharing of key instrument and service information with your colleagues.

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Whether you need help with a current order, placing a new order, or finding more information about product availability, please contact your local customer support team.

Technical support and training

If you have questions about product selection or use, assay or experiment design, data analysis or troubleshooting, contact our team of technical support scientists or utilize our comprehensive portfolio of online product and application support tools.

How to reach us

To find your local customer support or technical support team, go to **lifetechnologies.com/contactus**
For product FAQs, protocols, tranining courses, and webinars, go to **lifetechnologies.com/technicalresources**

*2012 Oracle Fusion Middleware Innovation Award Instruments & Services Portal not available in all regions

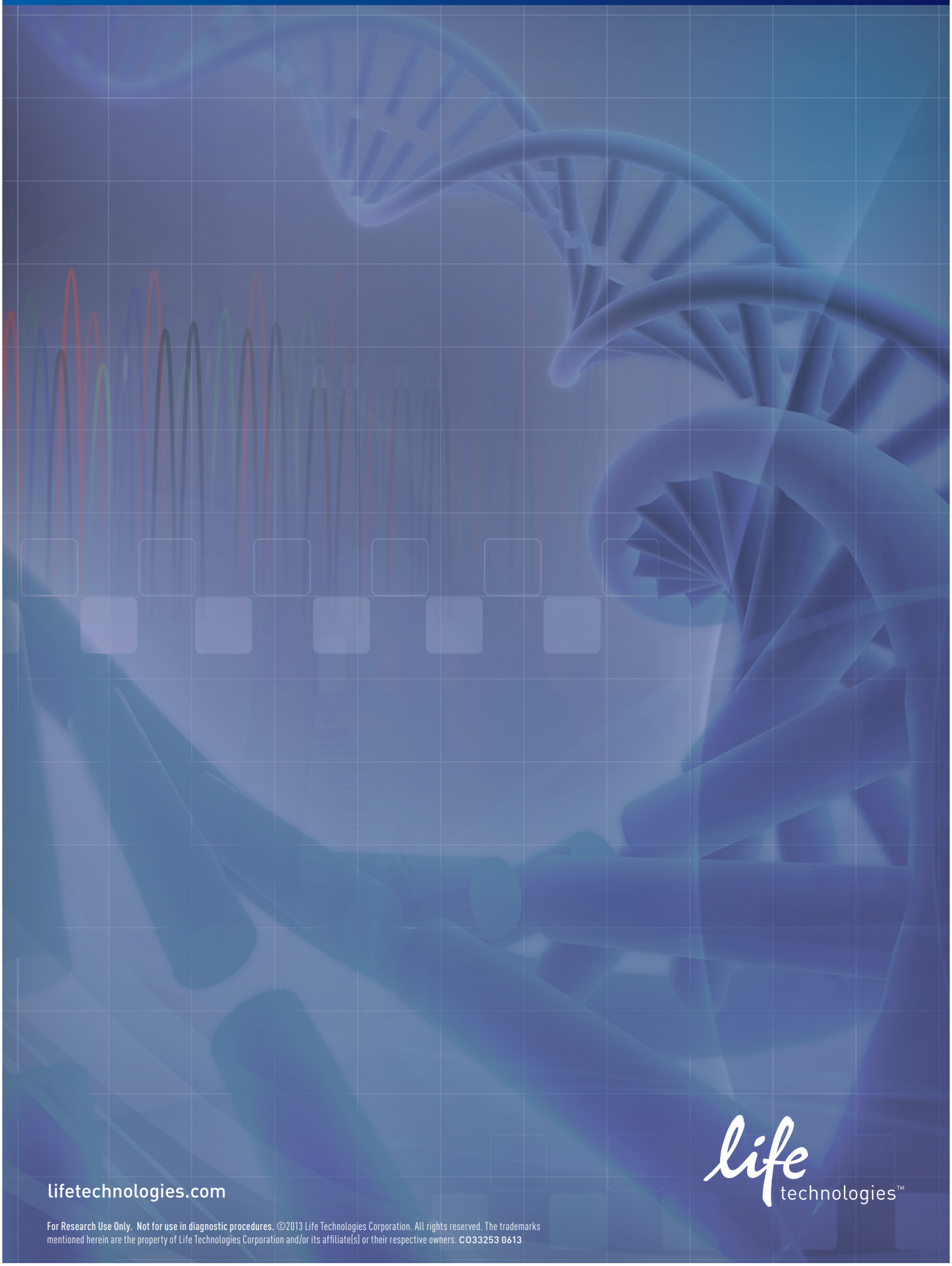
Service for genetic analyzers

Applied Biosystems® service plans

Table 6. Comparison of service plans for Applied Biosystems® Genetic Analyzers.

Service packages at a glance	AB Complete	AB Assurance	AB Maintenance
Planned maintenance	✓	✓	✓
Application technical support	✓	✓	✓
Instrument operating software updates	✓	✓	✓
Phone and email access to instrument technical support (TAC)	✓	✓	
On-site service—Labor	✓	✓	
On-site service—Parts	✓	✓	
On-site service—Travel	✓	✓	
Remote instrument monitoring diagnostics	✓		
On-site application consulting	✓		
Qualification service	✓		
On-site response time	Guaranteed next business day*	Guaranteed 2 business days*	Priority 2 business days

For more information on our warranty and service plans, scan this barcode, visit **lifetechnologies.com/instrumentservices** or contact your local sales representative.



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