

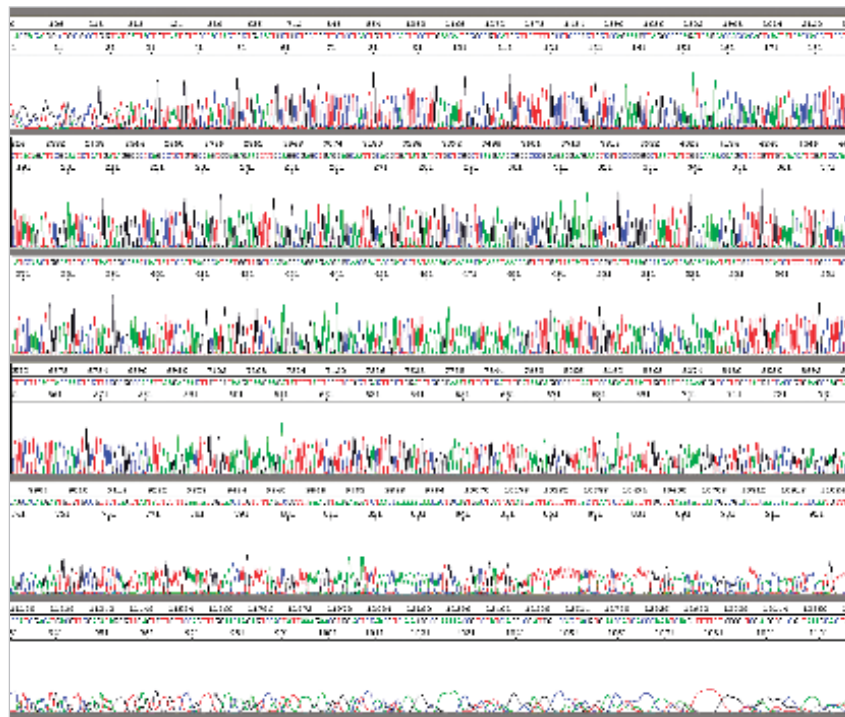
# Accurate Long-Read DNA Sequencing on the Applied Biosystems 3130 Series Genetic Analyzers with the 80 cm Capillary Array

Achieving accurate read lengths of 1,000 base pairs (bp) or longer in a single sequencing reaction is valuable for investigators in many areas of research. Such lengths-of-read (LOR\*) can now be achieved more rapidly and easily on the new Applied Biosystems 3130 and 3130*xl* Genetic Analyzers, using the 80 cm capillary array and the 3130 POP-7™ polymer.

## Long-Reads and the 3130 Series Genetic Analyzers

The 3130 Series Systems are fully automated, high-performance, fluorescence-based capillary electrophoresis systems that can analyze multiple samples simultaneously. Using the 3130 POP-7 Polymer as the separation medium with the 80 cm capillary array, the 16-capillary 3130*xl* system, and the 4-capillary 3130 system can automatically sequence samples with an average LOR greater than 950 bp in a run time of 2 hours and 50 minutes (Figure 1). Furthermore, the 3130*xl* can efficiently sequence up to eight runs (128 samples) in a 24-hour period in this configuration, generating high-quality data in excess of 121,600 bp with minimal hands-on time.

\*Sequencing Analysis Software v5.2 provides a metric LOR, defined as the usable range of high-quality or high-accuracy bases, determined by Quality Values (QV) generated by the KB™ Basecaller v1.2. The LOR is determined using a sliding window of 20 bases, which have an average QV greater than 20.



**Figure 1.** The above electropherogram from a 3130*xl* Genetic Analyzer is an example of a typical long-read sequence obtained from a BigDye® Terminator Sequencing Standard v3.1. An LOR of 1,090 bp was achieved for this sample using the 3130 POP-7™ Polymer. Total run time: 2 hours, 50 minutes.

## Full Automation Maximizes Productivity to Reduce Costs

Long-read sequencing on the Applied Biosystems 3130 Series Systems is fully automated from the moment you place a 96- or 384-well sample plate on the instrument and the run is started. The instrument provides continuous, unattended operation for every phase of the process, including polymer-loading by means of the Automated Polymer Delivery System, sample injection, separation, detection, and data analysis. Enhanced automation maximizes laboratory productivity while reducing costs.

## Optimal Signal Detection, Accurate Results for Long Read Sequencing

The high-performance, laser-based optical detection system of the Applied Biosystems 3130 Series Systems simultaneously illuminates all capillaries, and maximizes the signal received per sample to ensure accurate results. Long read sequencing on the 3130 Series Systems speeds and simplifies applications where sensitive and accurate results in excess of 1,000 bp are desired, including:

- Cross-genome comparison
- *De novo* sequencing
- Resequencing

- SNP Discovery
- Mutation detection
- Genome-finishing and contig-building
- Construct validation
- Large-template sequencing (BACs, cosmids, large-insert plasmids)
- Serial analysis of gene expression (SAGE)

### System Flexibility

The flexibility of the system allows you to switch easily between capillary lengths and, therefore, applications as investigational needs change in the dynamic research environment. A major advantage of the 3130 Series Systems is the ability to perform both sequencing and fragment analysis applications without having to change the polymer type. You can simply replace the 80 cm array with a 36 cm or a 50 cm array while continuing to use the same 3130 POP-7™ Polymer.

Another advantage is the efficient Automated Polymer Delivery System which eliminates regular, manual clean-up. Furthermore, the 3130 POP-7™ Polymer, coupled with the new detection cell heater, provides better thermal control for faster runs and longer read lengths (Table 1). The integration of these components improves functionality and maintains the flexibility of the instrument.

### System Compatibility with a Variety of Sequencing Chemistries

It is possible to achieve high-quality sequencing data on the Applied Biosystems 3130 Series Systems with any of the following chemistries:

- ABI PRISM® BigDye® Terminator v1.1 and v3.1 chemistry
- ABI PRISM® BigDye® Primer Cycle Sequencing Ready Reaction Kit, -21 M13/M13 Rev
- ABI PRISM® dRhodamine Terminator chemistry

**Table 1. Sequencing Throughput/Array Length on the 3130 and 3130xl Genetic Analyzers**

Array Length	Polymer	Run time	Analyzer Throughput/24 hr		KB™ Basecaller Q20 LOR†
			3130	3130xl	
80 cm	3130 POP-7™	170 min	32 samples	128 samples	950 bp
80 cm	POP-4™	210 min	24 samples	96 samples	700 bp

†98.5% basecalling accuracy, less than 2% N's

### Ordering Information

Description	P/N
3130xl and 3100 Capillary Array (80 cm)	4319899
3130 and 3100-Avant Capillary Array (80 cm)	4333465
3130 POP-7™ Polymer	4352759
Hi-Di™ Formamide	4311320
10X Genetic Analyzer Buffer with EDTA	402824
BigDye® Terminator v3.1 Matrix Standard	4336974
BigDye® Terminator v3.1 Sequencing Standard	4336935
BigDye® Terminator v3.1 Cycle Sequencing Ready Reaction Kit	1,000 rxn 4337456



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### Headquarters

850 Lincoln Centre Drive  
Foster City, CA 94404 USA  
Phone: 650.638.5800  
Toll Free: 800.345.5224  
Fax: 650.638.5884

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Printed in the USA, 11/04, P+s,  
Publication 106AP16-01

