Beeline™ 2.0 Software

A flexible solution to reduce array data size and facilitate analysis of large-array experiments.

Highlights

- **Flexible Filtering Options**
  Reduce size of large array data sets with automated or manual filtering options
- **Integrated Quality Controls**
  Monitor performance of controls with customizable charts
- **Accessible Reporting**
  Generate text file reports in various formats
- **Seamless Integration with GenomeStudio® Software**
  Create and export projects for deep analysis

Introduction

The content, capacity, and complexity of Infinium® whole-genome genotyping BeadChips continue to grow dramatically, leading to substantial increases in the size of experimental array data sets. Such large data sets present a significant challenge for researchers to analyze array data, calculate sample statistics, and visually interrogate clusters. Beeline Software offers a direct path to data analysis for large array experiments (Figure 1).

Beeline Software enables automated sample statistics and allele calling, offers flexible filtering options to reduce data size, and generates charts for data visualization and reports in various formats. Data filtered in Beeline Software can be imported directly into GenomeStudio Software for interactive analysis. Incorporating Beeline Software into large array data set analysis increases efficiency in obtaining meaningful answers.

Flexible Data Filtering Capabilities

Beeline Software offers flexible filtering capabilities to reduce experimental array data size. Researchers can choose between automated or manual filtering of data based on samples, loci, or both. Automated filtering is based on thresholds whereby Beeline Software automatically eliminates any poorly performing loci based on a user-defined metric (Figure 2). Users can combine automated and manual filtering by first applying a threshold to a data set. Then users can override the threshold manually to select individual samples and/or loci to be included or excluded from the data set, regardless of performance.

Integrated Quality Controls

Illumina array-based assays contain internal sample-dependent and sample-independent controls, giving researchers confidence that they are producing high-quality data. Beeline Software integrates various quality control (QC) metrics for on-demand monitoring

Figure 1: Beeline 2.0 Software—Beeline Software augments analysis of array data generated on the iScan System by reducing total experimental data set size with filtering and reporting capabilities before visual analysis with GenomeStudio Software.

via charts for visualization of performance (Figure 3). Users can select from a list of available chart templates or customize them to suit specific needs:

- Controls: Staining Red or Green
- Controls: Extension Red or Green
- Controls: Target Removal Red or Green
- Controls: Hybridization Red or Green
- Controls: Stringency Red or Green
- Controls: Non-Specific Binding Red or Green
- Controls: No-Polymorphic Red or Green
- Controls: Restoration Red or Green

Accessible Reporting

Beeline Software generates text file reports containing metrics of interest, including various loci statistics and allele calls for all samples. These reports can be used outside of Beeline Software for further processing and analysis using third-party tools and scripts.

- DNA Report: Creates a list of filtered samples in the current project.
- Summary Report: Provides a high-level overview of the current project, including number of samples, number of loci, and date.
- Locus Summary Report: Creates a list of filtered loci in the current project.
- Locus × DNA Report: Provides calls and DNA sample information in a single report.
- Final Report: Provides allele calls at each locus for all samples.

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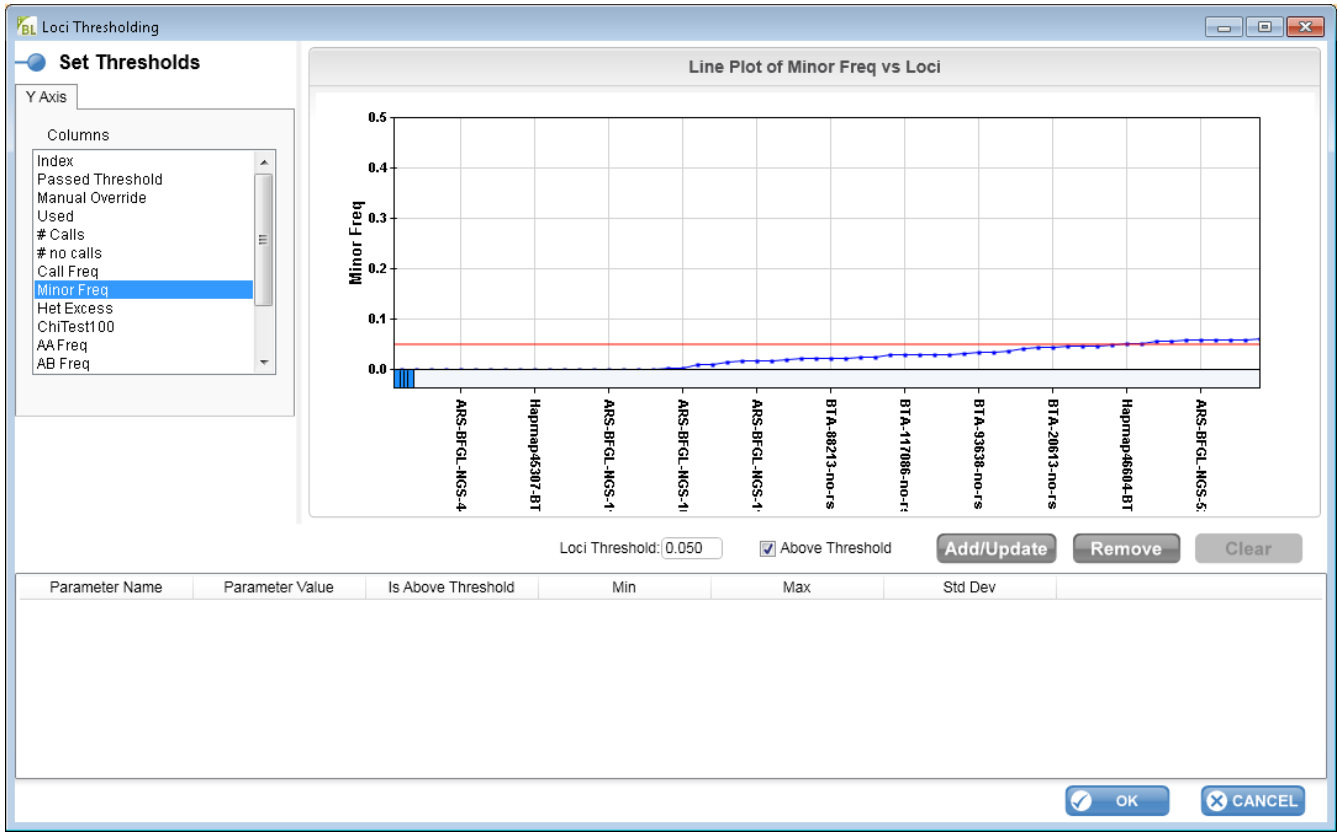

Figure 2: Automated Filtering—Users define a threshold (red line) for a particular metric (Columns list on left). Beeline Software automatically filters and eliminates any samples or loci (pictured) that do not meet the threshold from further downstream analysis.

Beeline Software also generates charts for visualizing data. Users can select charts from a list of available templates that include Call Rate vs Index and p10 GC vs Index, or customize them to suit experimental needs.

Integration with GenomeStudio Software

Beeline Software can create projects with subsets of array data for export into GenomeStudio Software for deep analysis. GenomeStudio Software features performance-optimized tools and a user-friendly graphical interface that enable genotyping of diploid and polyploid organisms with customizable data visualization.

Table 1: Minimum Beeline Software System Requirements

Parameter	Requirement
Processor	64-bit
Memory Size	8 GB or more
Hard Drive	100 GB or larger
Video Display	1280 × 1024
Operating System (OS)	Windows 7 or higher
Specific OS Requirements	Microsoft .NET Framework 3.5 or later
Network Connection	1 GbE or faster
Other Required Software	iScan® Control Software 3.2 or later GenomeStudio 2.0 Software

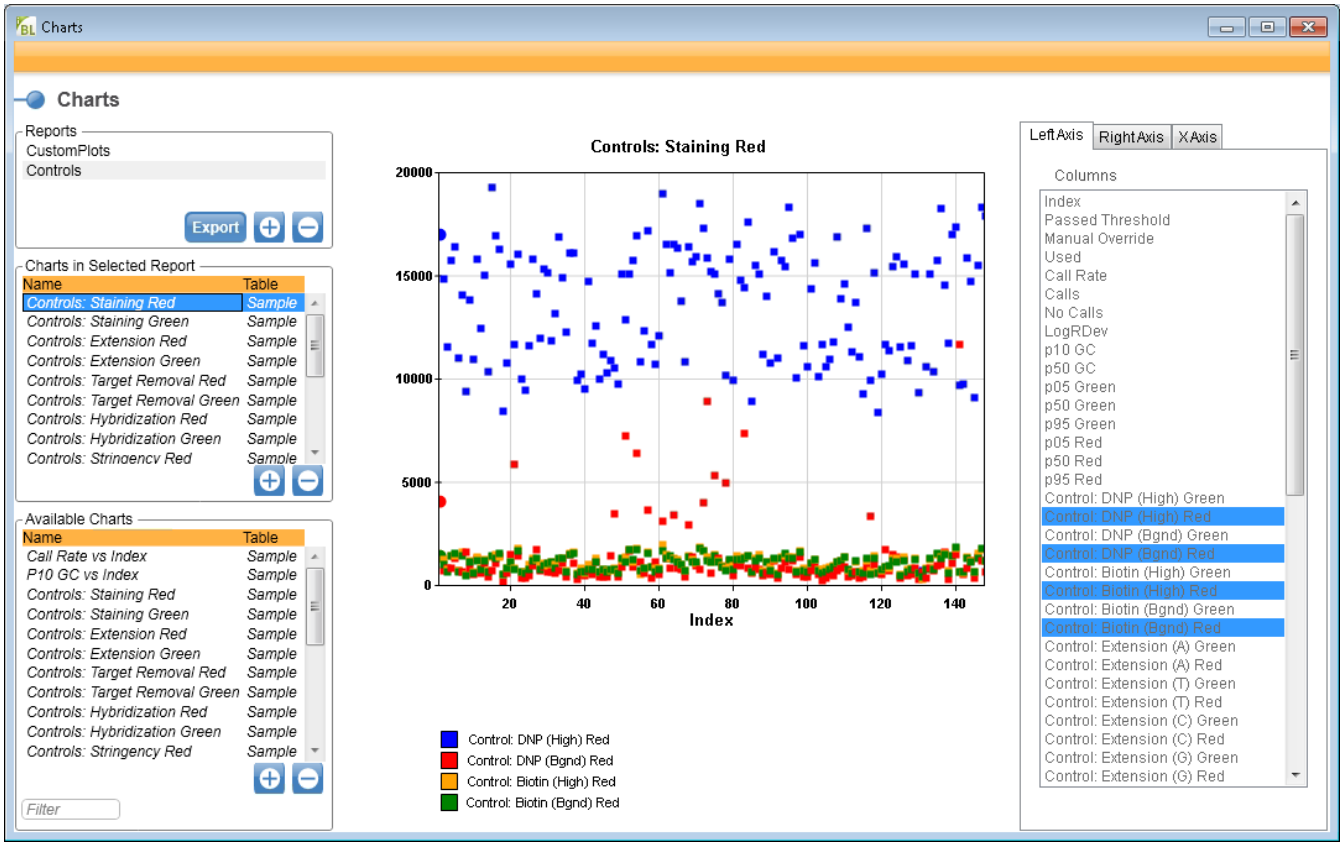

Figure 3: Quality Control Visualization—Beeline Software generates various charts for visualization of QC performance. Charts can be saved in PDF format for viewing outside of the software.

Summary

Beeline Software is a valuable component of data analysis workflows for large array data sets. The software improves efficiency with filtering capabilities that reduce the overall data volume for large experiments, making analysis more manageable. Integrated QC metrics can be visualized with customizable charts and reports, providing confidence in the data being generated. Beeline Software facilitates analysis for large array experiments with options for exporting filtered data directly into GenomeStudio Software.

Ordering Information

Beeline Software is available at no charge and can be downloaded from the Beeline Software Support Page on the Illumina website.

Learn More

To learn more about Beeline 2.0 Software, visit www.illumina.com/techniques/microarrays/array-data-analysis-experimental-design/beeline.html.

To learn more about GenomeStudio 2.0 Data Analysis Software, visit www.illumina.com/techniques/microarrays/array-data-analysis-experimental-design/genomestudio.html.

To learn more about analysis workflows for array data, read the Microarray Data Analysis Workflows Technical Note. www.illumina.com/content/dam/illumina-marketing/documents/products/technotes/technote_array_analysis_workflows.pdf

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