SPECIFICATION SHEET

BioMark™ HD System

- Time savings—perform 9,216 reactions in as little as 30 minutes
- Cost savings—do more experiments at 10x less cost per data point
- Flexibility—use commercially available assays and DNA binding dyes

The BioMark HD System sets a new standard for high-throughput real-time PCR, end-point PCR, and digital PCR, with benefits that are impossible to reproduce using many other conventional PCR systems. Integrated Fluidic Circuit (IFC) technology both prepares and performs thousands of reactions in nanoliter volumes, saving time, money, and reducing pipetting steps by 95%. The BioMark HD System, together with IFCs and the IFC Controller for loading samples and assays, streamlines workflows for applications demanding sensitivity and dynamic range at an extremely high throughput, such as single cell analysis.

HIGH-THROUGHPUT DETECTION

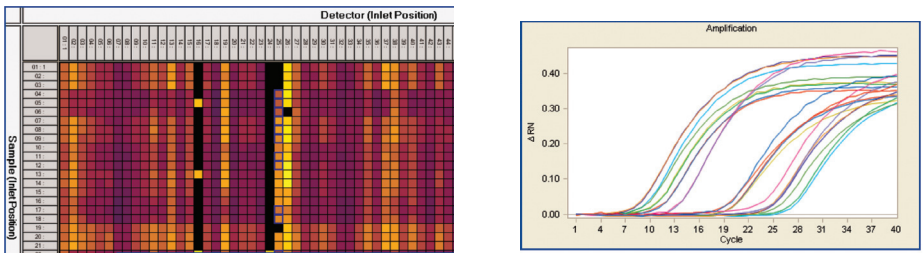
The system integrates thermal cycling and detection of PCR assays for all Dynamic Array™ IFCs and Digital Array™ IFCs. It acquires data for each reaction chamber on the IFC simultaneously and can operate in either real-time or end-point detection mode for gene expression or for genotyping experiments, respectively.

ASSAYS

The BioMark HD System offers an open and flexible platform accommodating reagents and chemistries of choice. Also, the entire system, from the footprint of the IFCs to the architecture of analysis and database software, adheres to industry standards and ensures integration with established workflows.

ANALYSIS SOFTWARE

The BioMark HD System is bundled with data collection and data analysis software. Real-Time PCR Analysis Software displays the analyzed data in multiple formats, including color-coded maps of every reaction chamber on the IFC, amplification curves, and numeric tables. Results may be easily managed, annotated, and archived.



Real-Time PCR Analysis Software generates the heat map and amplification plot.

GENE EXPRESSION ASSAYS

DELTAgene™ Assays for mid-plex gene expression studies provide robust, high quality real-time PCR gene expression assays. The assays enable users to take full advantage of the BioMark HD System with minimal experimental setup time using validated protocols that provide quality results. See Figure 2.

- Amplicons designed to cross an intron whenever possible to avoid genomic DNA amplification
- Designed to any RefSeq including human, mouse, rat, microbe, and plant (minimum of 48 assays per order)
- Single-cell gene expression protocols available
- Turnaround time is three weeks for bioinformatically tested assays and six weeks for wet-lab tested assays
- Custom panels/pathways designed upon request

GENOTYPING ASSAYS

SNPtype™ Assays provide a high-throughput, low-cost single nucleotide polymorphism (SNP) genotyping solution which enables rapid assay design and polymorphism screening. The assays are based on allele-specific PCR SNP detection chemistry and combine the advantages of minimum experimental setup time and flexible assay choice with the reliability of Dynamic Array IFCs. See Figure 1.

- Designed to target species with available sequence information
- Three to four week design and turnaround time with customer-provided sequences (minimum of 24 assays per order)
- Access to loci-specific primer sequences assures reproducibility
- Compatible with Specific Target Amplification (STA) protocol for improving results from samples of low quality and/or concentration, or from species with large genome sizes (>human); necessary STA primers provided

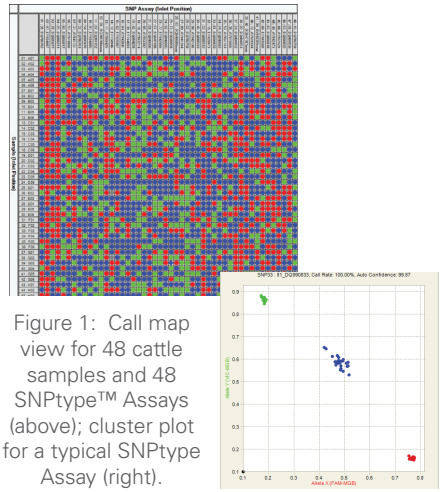
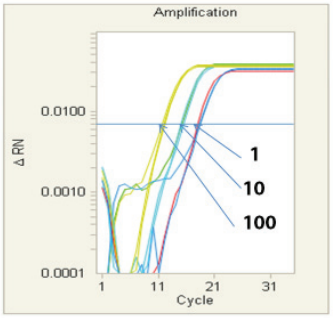


Figure 1: Call map view for 48 cattle samples and 48 SNPtype™ Assays (above); cluster plot for a typical SNPtype Assay (right).

C_q difference between 1, 10, and 100 cells easily distinguished



Single T_m Peak

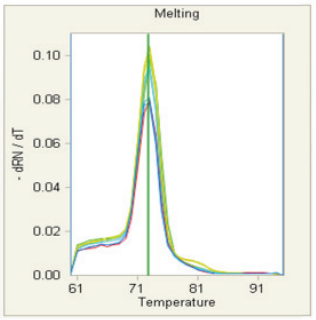


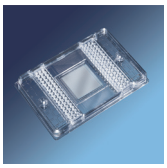
Figure 2: 1, 10, and 100 cells, custom EvaGreen® Assay Linearity Data (triplicates shown)

The BioMark HD System is compatible with multiple system components to meet a variety of application and sample throughput needs.

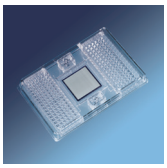
IFC CONTROLLER COMPATIBILITY

PARAMETER	IFC Controller MX 	IFC Controller HX 	IFC Controller RX 
Gene Expression	48.48 Dynamic Array IFC	96.96 Dynamic Array IFC	—
SNP Genotyping	48.48 Dynamic Array IFC	96.96 Dynamic Array IFC	192.24 Dynamic Array IFC
Digital PCR	12.765 Digital Array IFC 48.770 Digital Array IFC	—	—
Experiment tracking	Barcode		
Gas pressure	Internal compressor		
Interface	USB and Ethernet		
IFC Controller MX, HX or RX software	Touchscreen interface for operating and tracking		
Dimensions (approx.)	19 x 9.5 x 13 inches; 48.5 x 24 x 33 cm		

IFCs FOR GENE EXPRESSION



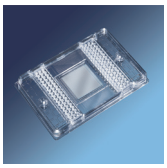
48.48 Dynamic Array IFC



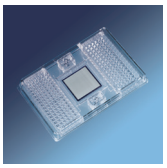
96.96 Dynamic Array IFC

PARAMETER		
Quantitative resolution	2-fold difference in starting copy with 99.7% confidence and 6-log of dynamic range	
Inlet spacing on input frame	4.5 mm pitch	
Dimensions	SBS compatible (128 mm x 85 mm x 14 mm)	
Liquid transfer steps	96	192
Assay inlets	48	96
Sample inlets	48	96
Reaction chambers	2,304	9,216
Reaction volume	9 nL	6.7 nL
Instrument compatibility	BioMark HD System, IFC Controller MX	BioMark HD System, IFC Controller HX

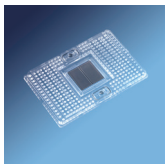
IFCs FOR GENOTYPING



48.48 Dynamic Array IFC



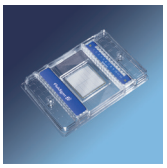
96.96 Dynamic Array IFC



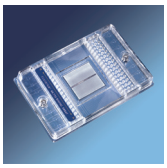
192.24 Dynamic Array IFC

PARAMETER			
Assay transfer rate	98.00%	98.00%	98.00%
Call rate	99.00%	99.00%	99.00% or greater
Call accuracy	99.75%	99.75%	99.75% or greater
Dimensions	SBS compatible (128 mm x 85 mm x 14 mm)		
Inlet spacing on input frame	4.5 mm pitch		
Liquid transfer steps	96	192	216
Assay inlets	48	96	24
Sample inlets	48	96	192
Reaction chambers	2,304	9,216	4,608
Instrument compatibility	EP1™ Reader, IFC Controller MX, FC1™ Cycler, BioMark HD System	EP1 Reader, IFC Controller HX, FC1 Cycler, BioMark HD System	EP1 Reader, IFC Controller RX, FC1 Cycler, BioMark HD System

IFCs FOR DIGITAL PCR



12.765 Digital Array IFC



48.770 Digital Array IFC

PARAMETER		
Detection sensitivity	Single copy (if copy is present in the reaction chamber)	
Dimensions	SBS compatible (128 mm x 85 mm x 14 mm)	
Inlet spacing on input frame	4.5 mm pitch	
Minimum input volume/sample	8 µL (12 samples per array)	4 µL (48 samples per array)
Liquid transfer steps	12	48
Sample inlets	12	48
Reactions per sample	765	770
Total reaction chambers	9,180	36,960
Individual reaction volume	6 nL	0.85 nL
Total reaction volume/sample	4.6 µL (per sample)	0.65 µL (per sample)
Instrument compatibility	BioMark HD System, EP1 Reader, IFC Controller MX	

SYSTEM COMPONENTS

Excitation filters (center-width, in nm)	485-20, 530-20, 580-25 (two empty positions)
Emission filters (center-width, in nm)	525-25, 570-30, 645-75 (two empty positions)
Thermal control	4 °C – 99 °C range Heating (65 °C – 90 °C) > 2 °C/sec Cooling (90 °C – 65 °C) > 1 °C/sec
Software	Fluidigm Real-Time PCR Analysis Software Fluidigm Genotyping Analysis Software Fluidigm Digital PCR Analysis Software Fluidigm Data Collection Software

SOFTWARE SPECIFICATIONS

The BioMark software suite was designed to offer a simple and intuitive user interface while continuing to offer all key data analysis features required by today's scientists. To simplify and expedite data analysis, the software suite includes key features:

Heat Maps

Chip layout maps have color-coded reactions to identify C_t or delta C_t trends or SNP genotyping calls.

Sample and Assay Mapping

Sample and assay information can be pasted directly from Microsoft® Excel and imported from a database of a previously saved template.

Quality Scores

Quality scoring allows quick and efficient sorting through PCR curves and cluster calls to identify and exclude those that do not meet criteria.

FOR RESEARCH USE ONLY.

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