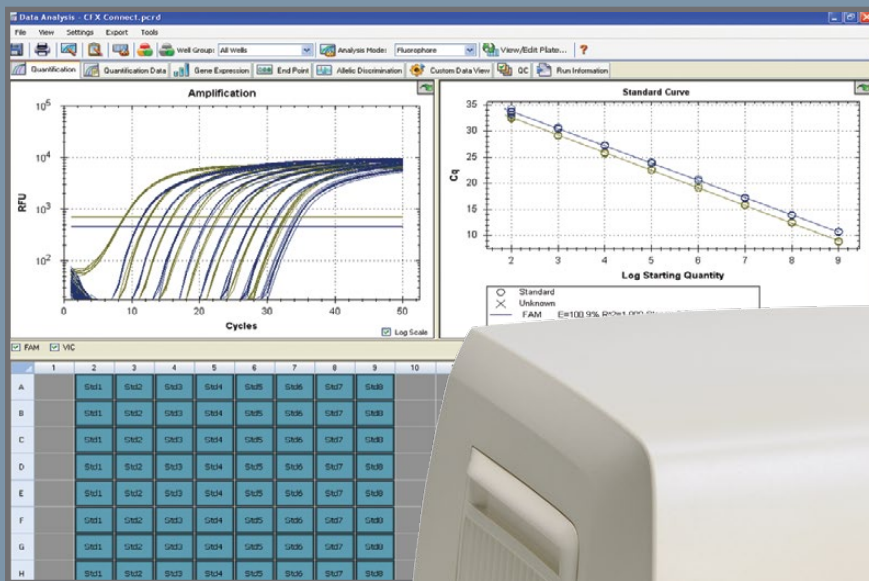




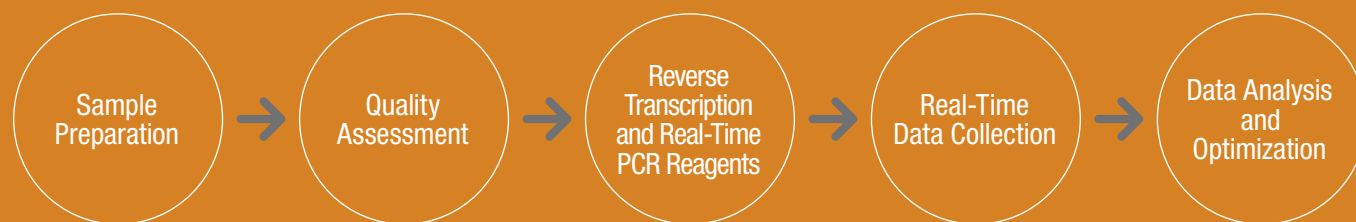
# CFX Connect™ Real-Time PCR Detection System



# ADVANCING qPCR TOGETHER



The CFX Connect Real-Time PCR Detection System offers two-target analysis, excellent thermal cycler specifications, and the same reliable performance as the CFX96 Touch™ System. The system incorporates innovative optical technologies with powerful software to provide maximal reliability and efficiency for all your real-time PCR needs.



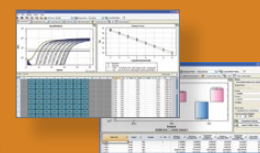
- SingleShot™ Cell Lysis RT-qPCR Kits
- Aurum™ Total RNA Mini Kit
- Aurum Total RNA 96 Kit
- Aurum Total RNA Fatty and Fibrous Tissue Kit

- Experion™ Automated Electrophoresis System

- iScript™ Reverse Transcription Kits
- SsoAdvanced™ Universal Supermixes
- iTaq™ Universal Supermixes
- iTaq Universal One-Step Kits
- PrimePCR™ Assays and Panels

- CFX384 Touch™ Real-Time PCR Detection System
- CFX96 Touch Real-Time PCR Detection System
- CFX96 Touch Deep Well Real-Time PCR Detection System
- CFX Connect Real-Time PCR Detection System

- CFX Manager™ Software
- Precision Melt Analysis™ Software
- qbase+ Software



Visit [bio-rad.com/amplification1](http://bio-rad.com/amplification1) for more information.

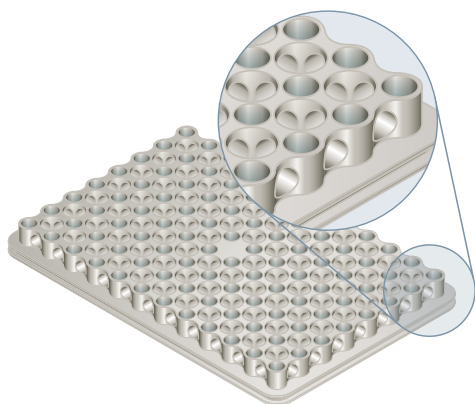
## Have Confidence in Your Entire Genomics Workflow

Bio-Rad offers a complete suite of research tools for your experiments that utilize real-time PCR detection. Generating accurate, reproducible results is reliant on each preceding step in the workflow as documented in the minimum information for publication of quantitative real-time PCR experiments (MIQE) guidelines (Bustin et al. 2009). Appropriate selection of methods and analyses results in robust, repeatable data and conclusions. Bio-Rad's suite of genomics research tools can help you achieve this goal.

# FAST THERMAL CYCLING

## Superior Uniformity

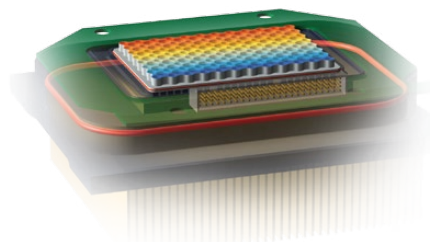
The 96-well block of the CFX Connect System offers excellent thermal performance and uniformity across the entire block. Precision of the temperature steps is critical for the rate and efficiency of PCR. To obtain reliable, consistent results, all sample wells must maintain proper temperature throughout each incubation step. The CFX Connect System achieves precision by using six independently controlled thermal electric modules, the heating and cooling elements of the thermal cycler, to maintain tight temperature uniformity at all points during a run — even while ramping. A high average ramp rate allows the system to rapidly reach its target temperature, thus shortening run time with an unsurpassed 10 sec settling time.



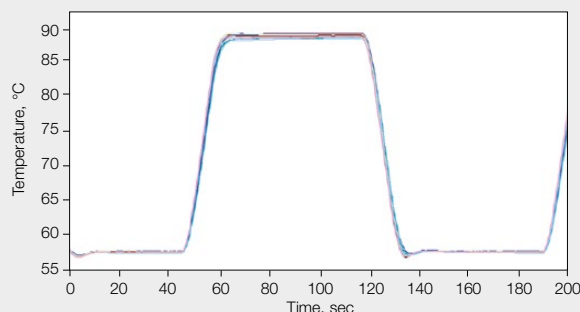
The patented\* reduced-mass sample block heats and cools more quickly than standard blocks, so average ramp rates are increased and overall run times are reduced.

## Efficient Optimization

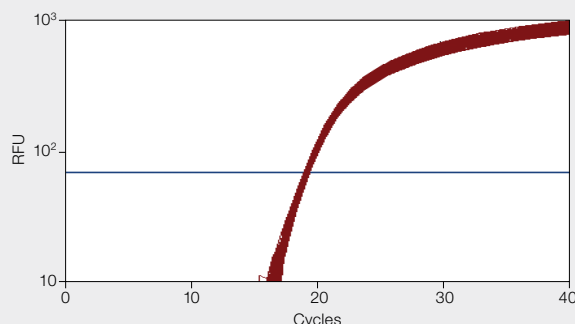
Determining the optimal temperature for primer annealing is crucial for efficient and specific target amplification. The thermal gradient feature of the CFX Connect System quickly assists with optimizing your assay in a single experiment, minimizing the use of precious samples and reagents and saving valuable research time. At any step in a protocol, you can program a temperature gradient of up to 24°C across the reaction block with exceptional temperature uniformity and reproducibility within each gradient zone.



\* U.S. patent 7,632,464.

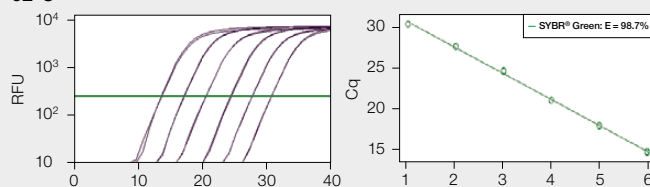


**Rapid arrival at target temperature and superior uniformity for reproducible results.** The CFX Connect System exhibits high average ramp rates, rapid settling time, and tight thermal uniformity throughout the ramp. This graph shows the temperature measured by probes in 15 wells across a sample block. The traces are nearly indistinguishable due to the tight uniformity. Note the consistent high average ramp rate throughout heating and cooling.

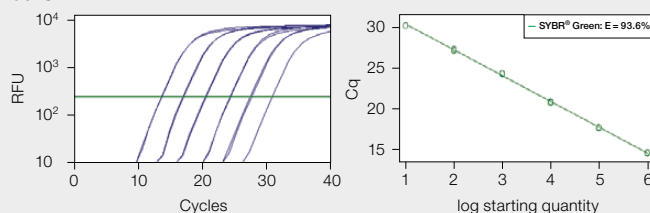


**Excellent uniformity.** *IL-1 $\beta$*  plasmid template diluted to  $10^5$  copies/reaction amplified in the presence of a FAM-labeled detection probe with iQ Supermix. Graph shows 96 replicates of 10  $\mu$ l reactions. Average quantification cycle (Cq) =  $19.81 \pm 0.10$ . RFU, relative fluorescence units.

### 62°C



### 56°C



**Thermal gradient experiment for optimizing annealing temperature.** A tenfold dilution series ( $10^6$  to 10 copies) of plasmid containing *GAPDH* template was amplified in the presence of SYBR® Green using a protocol with an annealing thermal gradient ranging from 55 to 68°C. Results are presented for two temperatures, showing 62°C as the optimal in this case. Cq, quantification cycle; RFU, relative fluorescence units.

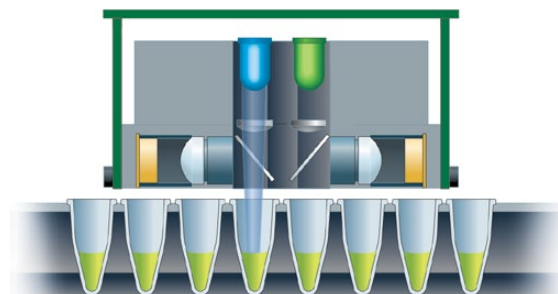
# PRECISE DETECTION

CFX Connect  
REAL-TIME PCR  
DETECTION SYSTEM

The solid-state optical technology of the CFX Connect System enables precise excitation and detection of fluorophores. Scanning just above the sample plate, the optics shuttle, containing light-emitting diodes (LEDs) and photodiodes, individually illuminates and detects fluorescence from each well with high sensitivity and no cross talk. The optical system automatically collects data from all wells during data acquisition, so you can enter or edit well information on your own schedule.

## Multiple Data Acquisition Modes

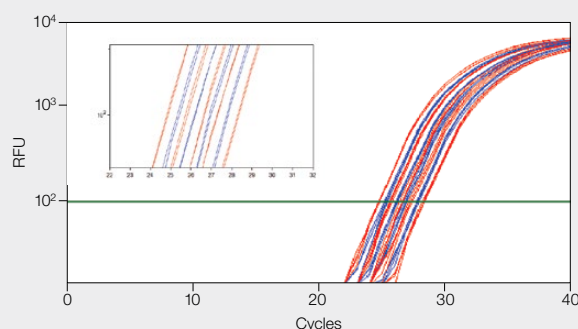
The CFX Connect System can acquire data using several modes. Fast scan mode acquires data for SYBR® Green I, EvaGreen, and single-color FAM protocols while all channel mode acquires data for duplex experiments. The CFX Connect System includes one channel with an LED-filter photodiode combination designated for single-color fluorescence resonance energy transfer (FRET) experiments, further expanding your experimental options.



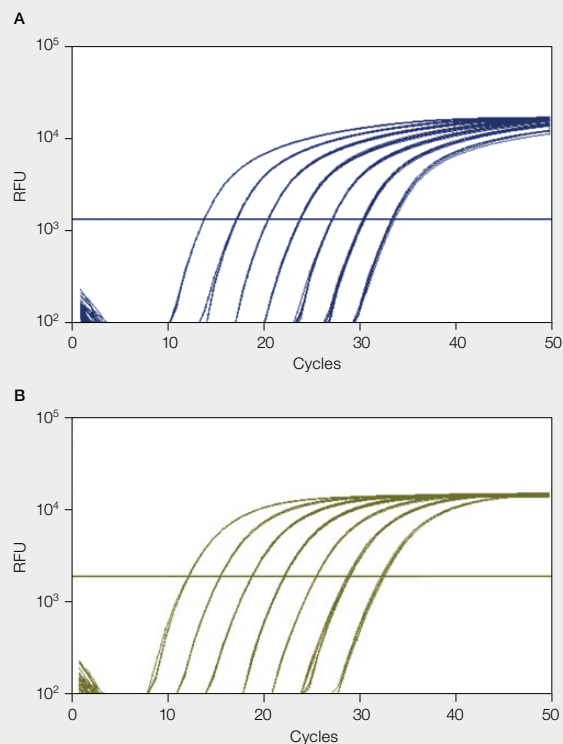
As the optics shuttle of the CFX Connect System travels across the plate, light is focused directly into the center of each sample well. Side view of the optics shuttle shows the blue LED firing over a well.

# ACCURATE TWO-TARGET MULTIPLEXING

The optical design of the CFX Connect System provides flexibility in fluorophore selection. The optical filter sets are designed to maximize fluorescence detection for specific dyes in specific channels. At every position and with every scan, the optics shuttle is reproducibly centered above each well, so the light path is always fixed and optimal, and there is no need to sacrifice data collection in one of the channels to normalize to a passive reference.



**Exceptional reproducibility can be achieved with SsoFast™ EvaGreen Supermix.** Efficient discrimination and reliable quantification can be obtained from 1.33-fold serial dilutions of input template. The *CBP* gene was amplified from varying amounts of human genomic DNA (5 ng–511 pg). From left to right: (■) 5 ng, 2.83 ng, 1.60 ng, 903 pg, and 511 pg; (■) 3.76 ng, 2.13 ng, 1.20 ng, and 679 pg. *CBP* efficiency = 96.5%,  $R^2 = 0.996$ . Inset is a magnified view showing robust discrimination and reproducible amplification. RFU, relative fluorescence units.



**Excellent linearity of duplex detection. A–B,** fluorescence data from a series of tenfold dilutions of plasmid DNA ( $10^8$ – $10^2$  copies) amplified using reporter dyes to monitor two targets: ■, FAM/cyclophilin; ■, VIC/*IL-1β*. RFU, relative fluorescence units.



# POWERFUL SOFTWARE

## CFX Manager Software

CFX Manager Software accommodates individual user needs and different types of experiments with intuitive navigation and customizable settings.

With CFX Manager Software you can:

- **Get started quickly** — use intuitive navigation, a new Startup Wizard, and a streamlined interface
- **Stay organized** — reserve multiple instruments using the Scheduler and rapidly set up reactions with the Master Mix Calculator
- **Analyze results when and where you want** — receive email notification with an attached data file when a run is finished
- **Make decisions about your data faster** — visualize all your run's data easily with Custom Data View
- **Extract more meaningful information from your run** — analyze data using bar chart, clustergram, scatter plot, volcano plot, or heat map analysis employing multiple reference genes and individual reaction efficiencies
- **Export only the data you want** — specify what to export and the preferred format with Custom Data Export
- **Run on multiple operating systems** — compatible with Windows 7 and Windows 8

## Precision Melt Analysis Software

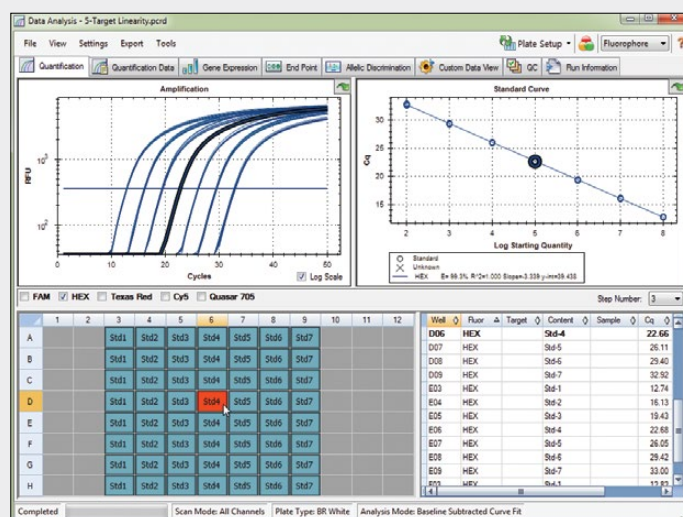
Precision Melt Analysis Software imports and analyzes data files generated by the CFX96 Touch, CFX96 Touch Deep Well, CFX Connect, or CFX384 Touch Real-Time PCR Detection System to genotype samples based on their DNA thermal denaturation properties. The software can be used for a variety of applications, including scanning for new gene variants, screening DNA samples for single nucleotide polymorphisms (SNPs), identifying insertions/deletions or other unknown mutations, and determining the percentage of methylated DNA in unknown samples.

## qbase+ Software

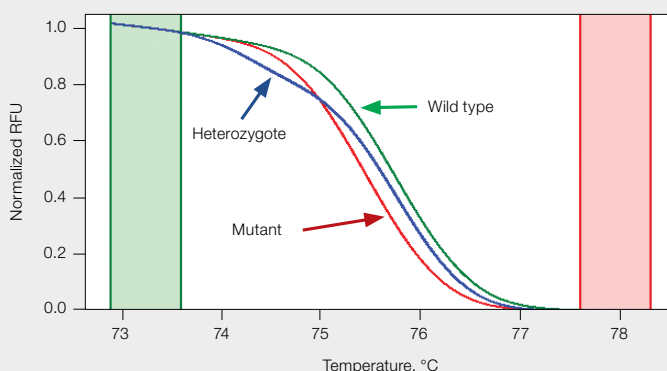
qbase+ Software is a powerful tool that imports and analyzes data generated by the CFX96 Touch, CFX96 Touch Deep Well, CFX Connect, or CFX384 Touch System. This platform-independent software package is available for major computer operating systems such as Microsoft Windows, Macintosh, and Linux.

Key features of qbase+ Software:

- **Reliable validation** — based on proven solutions for quality control, normalization, and inter-run calibration
- **Efficient data analysis** — import and consolidate information from multiple runs and multiple instruments to quickly analyze your complete data set, and use a guided statistical wizard to determine significance
- **Streamlined publication submission** — export an RDML file containing annotations, such as sample and assay information, to conform to the MIQE guidelines



Easily identify specific samples using the multipane data highlighting feature.



**Quickly and accurately genotype samples using Precision Melt Analysis Software.** Discrimination of human factor V coagulation SNP genotypes (C to T substitution) using SsoFast EvaGreen Supermix. Data from homozygous wild type (■), mutant (■), and heterozygote (■) samples are shown on a normalized melt curve plot. RFU, relative fluorescence units.

# A COMPLETE SYSTEM

CFX Connect  
REAL-TIME PCR  
DETECTION SYSTEM

Bio-Rad offers optimized reagents and plastic consumables for all your quantitative PCR (qPCR) experiments. Obtain high-quality, contaminant-free RNA rapidly and efficiently with Aurum Total RNA Kits. Choose from a broad mix of reverse transcription qPCR (RT-qPCR) kits, supermixes, and plastic consumables to produce maximum sensitivity and consistent results every time.

## RNA Isolation and Cell Lysis Kits

- Aurum Total RNA Kits are designed and formulated to assist in the isolation of highly pure and intact RNA from various starting materials
- SingleShot Cell Lysis RT-qPCR Kits provide a complete and fast solution for generation of lysates from cell cultures
  - Lysates are optimized for downstream one- or two-step qPCR reactions and do not require an RNA purification step
  - Kits are available in SYBR® Green or probe chemistries

## Reverse Transcription Reagents

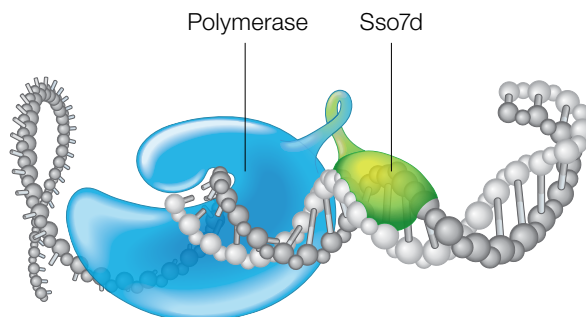
- Fast and efficient cDNA synthesis from 7.5 µg to 100 fg of total RNA
- High sensitivity enables single-copy detection utilizing an RNase H+ Moloney murine leukemia virus (MMLV) reverse transcriptase and advanced formulation
- Unbiased 3' to 5' cDNA synthesis using an optimal blend of oligo(dT) and random primers
- Potent RNase A inhibitors protect RNA during setup and reverse transcription

## Real-Time qPCR Reagents

- Patented\* Sso7d fusion enzyme delivers superior data from GC- and AT-rich targets, challenging samples with known inhibitors, and target regions with high secondary structure
- Antibody-mediated hot-start polymerases enable instant activation and higher specificity
- Universal passive reference dyes enable use on all real-time PCR systems
- Broad range of thermal cycling conditions
- Flexible one-step and two-step RT-qPCR reagents

## PrimePCR Assays and Panels

- Expertly designed and wet-lab validated for proven performance; each assay for the human, mouse, and rat genomes was experimentally tested for optimal efficiency, specificity, sensitivity, and linear dynamic range
- Available as individual assays, predesigned pathway and disease panels, and custom plates
- Wide selection of reference gene and control assays to assess the key experimental factors that may impact your real-time PCR results
- Integrated with CFX Manager Software for a fast, streamlined approach, from data generation to data analysis



**Bio-Rad's SsoAdvanced Universal Supermixes utilize patented\* Sso7d fusion protein technology to provide enhanced processivity, speed, and tolerance to PCR inhibitors.** SsoAdvanced™ Universal SYBR® Green Supermix delivers enhanced fluorescence compared to SYBR® Green alone. SsoAdvanced Universal Probes Supermix enables robust detection of two different gene targets under standard or fast cycling conditions.

## PCR Plastic Consumables

- Precisely manufactured for optimal fit and cycling performance
- Produced in Class 10,000 or 100,000 cleanroom environment
- Certified to be free of DNase, RNase, and human genomic DNA
- Extremely uniform wells reduce well-to-well variability in real-time PCR
- Warp-free Hard-Shell® Plates are designed for optimum performance with automation

\* U.S. patents 6,627,424; 7,541,170; and 7,560,260.



**Bio-Rad's broad selection of vessels and sealers for PCR and real-time PCR.**



## Specifications

### Thermal Cycler

Chassis	CFX Connect
Maximum ramp rate	5°C/sec
Average ramp rate	3.3°C/sec
Heating and cooling method	Peltier
Lid	Heats up to 105°C
Temperature	
Range	0–100°C
Accuracy	±0.2°C of programmed target at 90°C
Uniformity	±0.4°C well-to-well within 10 sec of arrival at 90°C
Gradient	
Operational range	30–100°C
Programmable span	1–24°C

### Optical Detection

Excitation	3 filtered LEDs
Detection	3 filtered photodiodes
Range of excitation/emission wavelengths	450–580 nm
Sensitivity	Detects 1 copy of target sequence in human genomic DNA
Dynamic range	10 orders of magnitude
Scan time	
All channels	12 sec
Single channel fast scan	3 sec

### CFX Manager Software

Operating systems	Windows 7, Windows 8
Memory	Minimum 1 GB
Multiplex analysis	Up to 2 targets per well
Data analysis modes	PCR quantification with standard curve Melt curve analysis Gene expression analysis by relative quantity ( $\Delta C_q$ ) or normalized expression ( $\Delta\Delta C_q$ ) with multiple reference genes and individual reaction efficiencies Data analysis options include bar chart, clustergram, scatter plot, volcano plot, and heat map Multiple file gene expression analysis for comparison of an unlimited number of $C_q$ values Allelic discrimination End-point analysis
Data export	Save, copy, and print all graphs and spreadsheets from right-click menu Export specified data in multiple formats Copy and paste into Microsoft Excel, Word, or PowerPoint file Customizable reports containing run settings, data graphs, and spreadsheets can be directly printed or saved as PDFs

### System

Licensed for real-time PCR	Yes
Sample capacity	96 wells
Sample size	1–50 $\mu$ l (10–25 $\mu$ l recommended)
Communications	USB 2.0
Electrical approvals	IEC, CE
Dimensions (W x D x H)	33 x 46 x 36 cm (13 x 18 x 14 in.)
Weight	21 kg (47 lb)

## Ordering Information

Catalog #	Description
185-5200	<b>CFX Connect Real-Time PCR Detection System</b> , includes CFX Connect Thermal Cycler Chassis, CFX Connect Optical Reaction Module, CFX Manager Software, license for qbase+ Software, communication cable, reagents, consumables
185-5201	<b>CFX Connect Real-Time PCR Detection System</b> , includes CFX Connect Thermal Cycler Chassis, CFX Connect Optical Reaction Module, CFX Manager Software, license for qbase+ Software, communication cable
184-5025	<b>Precision Melt Analysis Software</b> , includes 2 user licenses, installation CD, 2 HASP HL keys, melt calibration kit
181-4000	<b>PX1™ PCR Plate Sealer</b> , includes heat sealing instrument
181-4030	<b>Optically Clear Heat Seal</b> , for use with PX1 PCR Plate Sealer, 100
MSB-1001	<b>Microseal® 'B' Adhesive Seals</b> , optically clear, 100
HSP-9655	<b>Hard-Shell Low-Profile 96-Well Skirted PCR Plates</b> , white well, white shell, 50
HSP-9955	<b>Hard-Shell Low-Profile 96-Well Skirted PCR Plates</b> , white well, white shell, barcoded, 50
170-8840	<b>iScript Reverse Transcription Supermix for RT-qPCR</b> , 25 x 20 $\mu$ l reactions, includes 100 $\mu$ l 5x iScript RT Supermix, iScript RT Supermix No-RT Control
172-5037	<b>iScript Advanced cDNA Synthesis Kit for RT-qPCR</b> , 25 x 20 $\mu$ l reactions, includes 100 $\mu$ l 5x iScript Advanced Reaction Mix, 25 $\mu$ l iScript Advanced Reverse Transcriptase
172-5848	<b>iQ Multiplex Powermix</b> , 50 x 50 $\mu$ l reactions, 2x mix contains dNTPs, 11 mM $MgCl_2$ , iTaq DNA Polymerase, stabilizers
172-5270	<b>SsoAdvanced™ Universal SYBR® Green Supermix</b> , 2 ml (2 x 1 ml vials), 200 x 20 $\mu$ l reactions, 2x qPCR mix, contains Sso7d fusion polymerase, ROX Normalization Dyes
172-5280	<b>SsoAdvanced Universal Probes Supermix</b> , 2 ml (2 x 1 ml vials), 200 x 20 $\mu$ l reactions, 2x qPCR mix, contains Sso7d fusion polymerase, ROX Normalization Dyes
172-5160	<b>SsoAdvanced PreAmp Supermix</b> , 1.25 ml (1 x 1.25 ml vial), 50 x 50 $\mu$ l reactions
172-5085	<b>SingleShot™ SYBR® Green One-Step Kit</b> , 100 x 50 $\mu$ l reactions

Visit [bio-rad.com/web/CFXConnectMore](http://bio-rad.com/web/CFXConnectMore) for more information.

Bustin SA et al. (2009). The MIQE guidelines: minimum information for publication of quantitative real-time PCR experiments. *Clin Chem* 55, 611–622.

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Bio-Rad's real-time thermal cyclers are covered by one or more of the following U.S. patents or their foreign counterparts owned by Eppendorf AG: U.S. Patent Numbers 6,767,512 and 7,074,367.

Purchase of iTaq DNA Polymerase includes an immunity from suit under patents specified in the product insert to use only the amount purchased for the purchaser's own internal research. No other patent rights are conveyed expressly, by implication, or by estoppel. Further information on purchasing licenses may be obtained by contacting the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

The use of iQ, iTaq, SsoAdvanced, and SsoFast Supermixes is covered by one or more of the following U.S. patents and corresponding patent claims outside the U.S.: 5,804,375; 5,538,848; 5,723,591; 5,876,930; 5,994,056; 6,030,787; 6,171,785; and 6,258,569. The purchase of these products includes a limited, non-transferable immunity from suit under the foregoing patent claims for using only this amount of product for the purchaser's own internal research. No right under any other patent claim and no right to perform commercial services of any kind, including without limitation reporting the results of purchaser's activities for a fee or other commercial consideration, are conveyed expressly, by implication, or by estoppel. These products are for research use only. Diagnostic uses under Roche patents require a separate license from Roche. Further information on purchasing licenses may be obtained from the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

Hard-Shell Plates are covered by one or more of the following U.S. patents or their foreign counterparts owned by Eppendorf AG: U.S. Patent Numbers 7,347,977; 6,340,589; and 6,528,302.



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Laboratories, Inc.**

Life Science  
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**France** 01 47 95 69 65 **Germany** 089 31 884 0 **Greece** 30 210 9532 220 **Hong Kong** 852 2789 3300 **Hungary** 36 1 459 6100 **India** 91 124 4029300  
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