



CFX96 Touch™ Real-Time PCR Detection System



Advancing qPCR Together

The CFX96 Touch real-time PCR detection system builds on the power and flexibility of the C1000 Touch™ thermal cycler to create an exceptional real-time PCR system. Its unsurpassed thermal cycler performance plus innovative optical design produce accurate, reliable data. The powerful, yet intuitive software accelerates every step of your real-time PCR research, shortening the time between getting started and obtaining great results.

With the CFX96 Touch system you can:

- **Get great results right away** — quick installation and factory-calibrated optics let you set up the system in seconds
- **Fit experiments into your schedule** — fast thermal cycling produces results in <30 min
- **Save research time** — thermal gradient feature lets you optimize reactions in a single experiment
- **Minimize sample and reagent usage** — perform up to 5-target multiplexing and use low sample volumes
- **Rely on performance** — innovative technology with long-lasting LEDs and solid-state components provides maximum reliability and optimal quantitative results
- **Analyze results when and where you want** — receive email notification with an attached data file when a run is finished
- **Configure the system to fit your laboratory needs** — run without a computer, run up to 4 instruments from 1 computer, or integrate with the CFX automation system for higher throughput

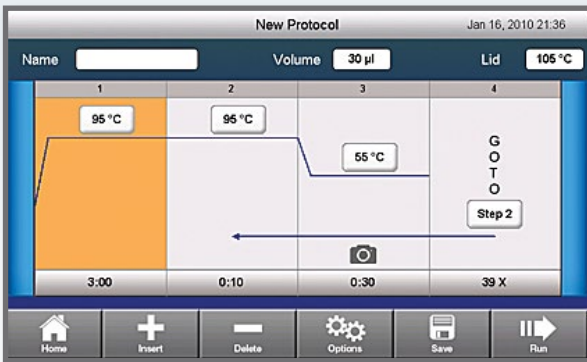
qPCR That Stands Alone

Real-time PCR runs can be performed in stand-alone mode without the CFX96 Touch system being attached to a computer. Easily set up runs using the intuitive touch screen. The amplification data traces can be viewed on the touch screen while a run is in progress

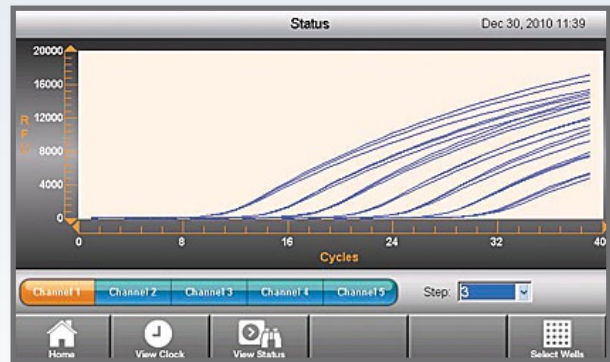
so you can quickly decide your next experimental step even before your run has finished. When a run is complete, export the data using a USB flash drive, or directly email the data from the C1000 Touch chassis. The CFX96 Touch system truly stands alone.



Easily start runs using the intuitive touch screen.



Quickly customize run parameters.

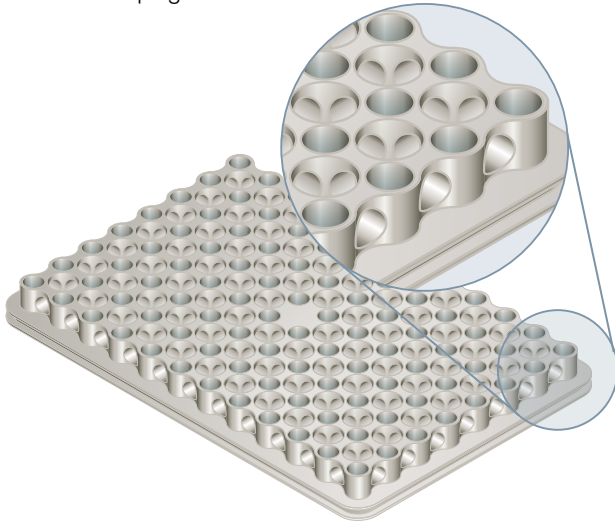


Monitor run progress in real time by viewing the amplification traces on the LCD display.

Fast Thermal Cycling

Superior Uniformity

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 CFX96 Touch system uses six independently controlled thermal electric modules (TEs), the heating and cooling elements of the thermal cycler, to maintain tight temperature uniformity at all points during a run — even while ramping.

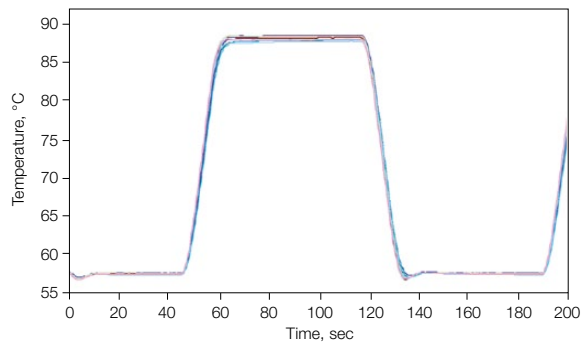


The patented* reduced-mass sample block heats and cools more quickly than standard blocks, so average ramp rates are increased and overall run times are reduced.

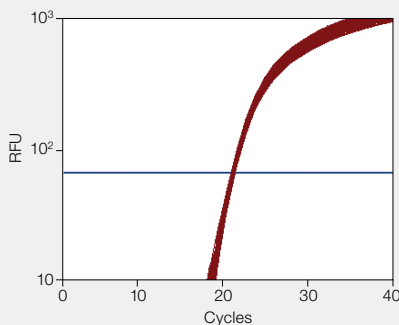
* U.S. patent 7,632,464.

Rapid Arrival at Target Temperature

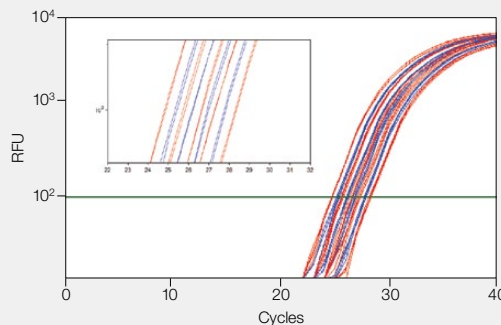
A key component of overall protocol run time is the time required to reach target temperature, which is determined by the average ramp rate and the time needed for the sample block to reach thermal uniformity. Maximum ramp rate is less important because it can fluctuate significantly during the ramp. The CFX96 Touch system produces high average ramp rates and tight uniformity during ramping to yield fast time to target temperature and faster protocol run times. Run times can be dramatically shortened — to less than 30 min — while still producing accurate quantitative results. Now you can tailor your runs around your schedule instead of tailoring your schedule around your runs.



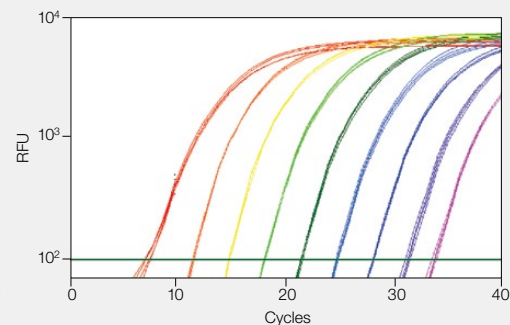
Superior uniformity with rapid arrival at target temperature. 1000-series thermal cyclers exhibit high average ramp rates, rapid settling time, and tight thermal uniformity throughout the ramp. This graph shows the temperature measured by probes in 15 wells across a sample block. The traces are nearly indistinguishable due to the tight uniformity. Note the consistent high average ramp rate throughout heating and cooling.



Excellent uniformity. IL-1 β plasmid template diluted to 10^5 copies/reaction amplified in the presence of a FAM-labeled detection probe with iQTM supermix. Graph shows 96 replicates of 10 μ l reactions. Average quantification cycle (Cq) = 19.81 ± 0.10 . RFU, relative fluorescence units.



Exceptional reproducibility can be achieved with SsoFastTM 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%, $r = 0.996$. Inset is a magnified view showing robust discrimination and reproducible amplification. RFU, relative fluorescence units.



The unique fusion polymerase in SsoFast EvaGreen supermix delivers extreme speed and generates exceptional qPCR results in less than 30 min. Tenfold serial dilutions of 10 ng–100 ag cDNA from human spleen were used in each 20 μ l reaction to detect 18S rRNA. 18S rRNA efficiency = 101.8%, $r = 0.997$. Total qPCR run time = 29 min. RFU, relative fluorescence units.

Innovative Optical Design

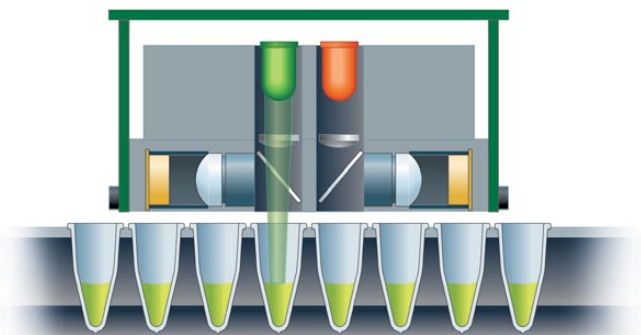
The CFX96 Touch system's solid-state optical technology provides sensitive detection for precise quantification and target discrimination. Scanning just above the sample plate, the optics shuttle individually illuminates and detects fluorescence from each well with high sensitivity and no cross talk. The optical system automatically collects data from all wells during data acquisition, so you can enter or edit well information on your own schedule.

Five-Target Multiplexing

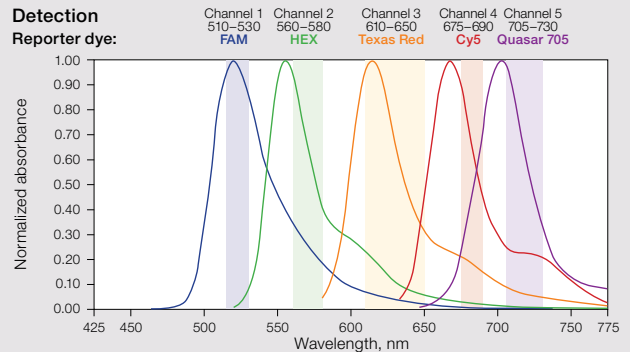
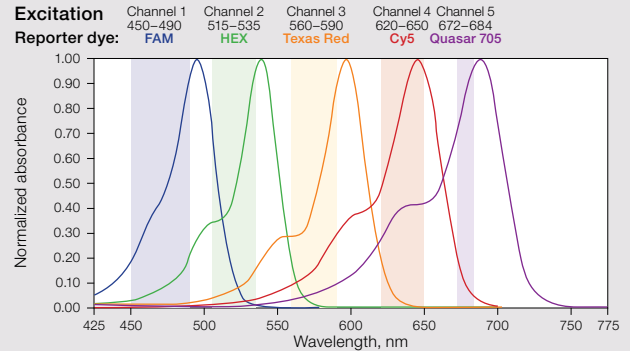
The CFX96 Touch system can discriminate up to five targets in a single reaction well. The optical filter sets are designed to maximize fluorescence detection for specific dyes in specific channels. At every position and with every scan, the optics shuttle is reproducibly centered above each well, so 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.

Multiple Data Acquisition Modes

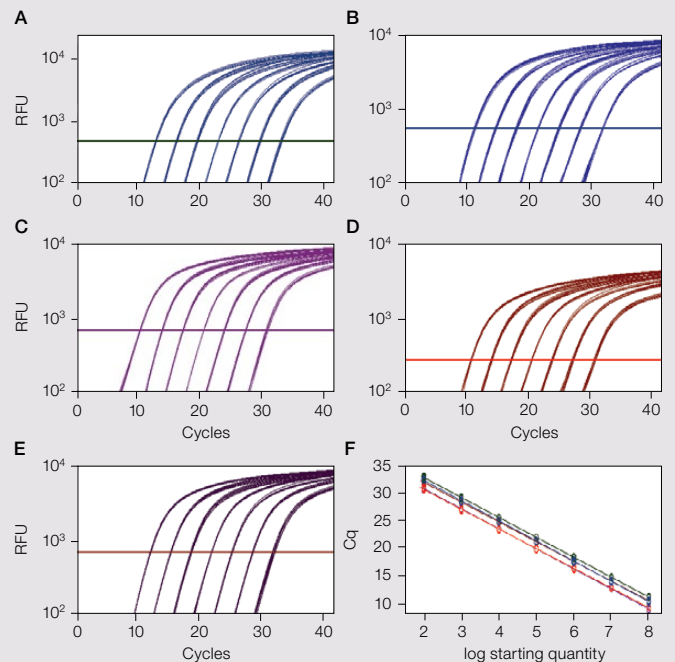
The CFX96 Touch system can acquire data using several modes. Choose to acquire data for SYBR® Green I, EvaGreen, and single-color FAM protocols using the fast scan mode, or choose to acquire data from all channels when performing multiplex protocols. The CFX96 Touch system's optics shuttle includes one channel with an LED-filter photodiode combination designated for single-color fluorescence resonance energy transfer (FRET) experiments, further expanding your experimental options.



As the CFX96 Touch optics shuttle travels across the plate, light is focused directly into the center of each sample well. Side view of the optics shuttle shows the green LED firing over a well.



Discrete excitation and detection wavelengths for the CFX96 Touch system enable thorough data discrimination.



Confidently analyze data from a broad range of sample concentrations even when multiplexing five targets. A-E, fluorescence data from a series of tenfold dilutions of plasmid DNA (10^8 - 10^2 copies) amplified using reporter dyes to monitor five targets: ■, FAM/actin; ■, HEX/GAPDH; ■, Texas Red/cyclophilin; ■, Cy5/tubulin; ■, Quasar 705/IL-1 β ; F, standard curves generated from data in A-E, reaction efficiencies range from 97 to 103%. Cq, quantification cycle; 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 of 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

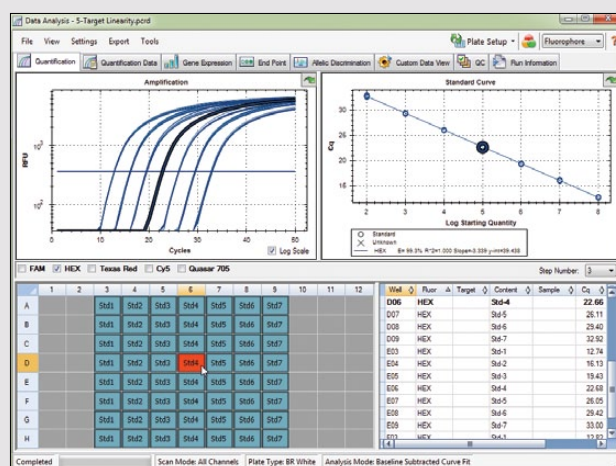
Precision Melt Analysis™ Software

Precision Melt Analysis software imports and analyzes data files generated by the CFX96 Touch, 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 SNPs, identifying insertions/deletions or other unknown mutations, and determining the percentage of methylated DNA in unknown samples.

qbase^{PLUS} Software

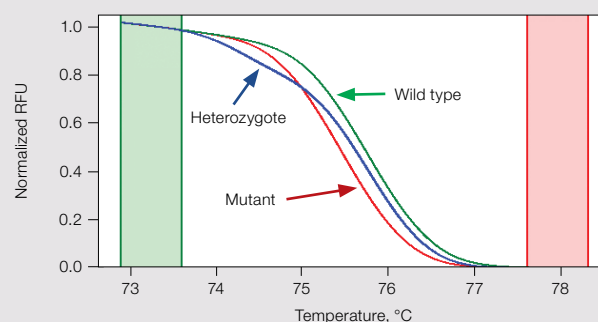
qbase^{PLUS} software is a powerful tool that imports and analyzes data generated by the CFX96 Touch or CFX384 Touch real-time PCR detection system. This platform-independent software package is available for major computer operating systems such as Microsoft Windows, Macintosh, and Linux.

CFX Manager Software



Easily identify specific samples using the multipane data highlighting feature.

Precision Melt Analysis Software



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.

Key features of qbase^{PLUS} 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

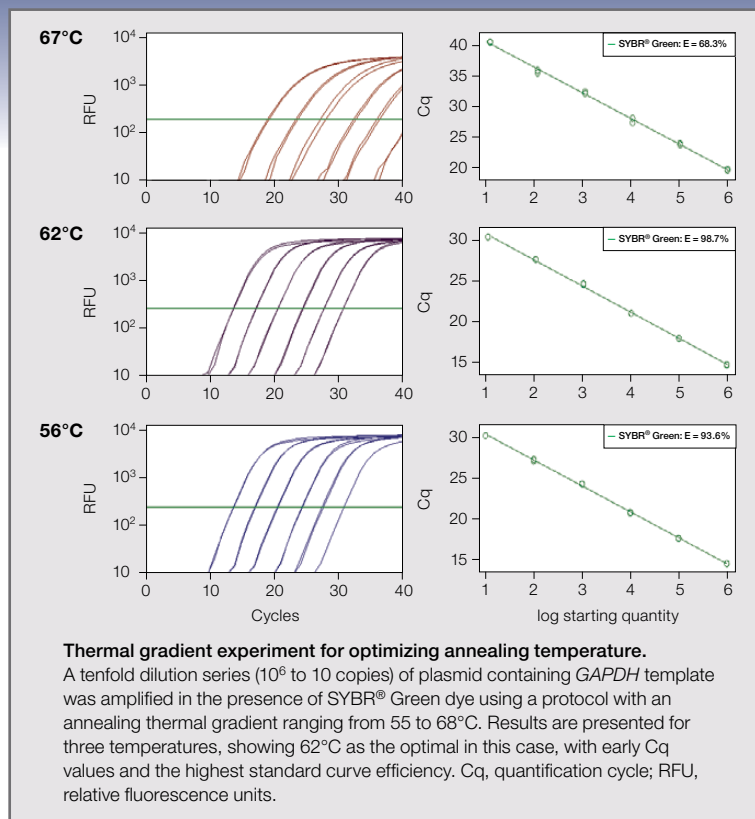
Efficient Optimization

Thermal Gradient

Determining the optimal temperature for primer annealing is crucial for efficient and specific amplification of product. With the CFX96 Touch system's thermal gradient feature, you can determine the optimal temperature for primer annealing 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. The thermal cycler provides exceptional temperature uniformity and reproducibility within each gradient zone, and the temperatures can easily be programmed and viewed onscreen in the software, so you can quickly identify the optimal incubation temperature.



CFX Automation System



Thermal gradient experiment for optimizing annealing temperature.

A tenfold dilution series (10⁶ to 10 copies) of plasmid containing *GAPDH* template was amplified in the presence of SYBR[®] Green dye using a protocol with an annealing thermal gradient ranging from 55 to 68°C. Results are presented for three temperatures, showing 62°C as the optimal in this case, with early Cq values and the highest standard curve efficiency. Cq, quantification cycle; RFU, relative fluorescence units.

Expanding Your Throughput

The flexibility of the 1000-series thermal cycling platform allows you to adjust your setup as your needs change. CFX Manager software can independently run up to four instruments. Maximize laboratory throughput by integrating one CFX96 Touch system with a CFX automation system for hands-free loading and unloading of up to fifteen 96-well plates.

Bio-Rad's PCR instruments, reagents, plastics, and software are powerful building blocks for your genomic research, providing the flexibility and reliability you need to accelerate discovery.

Reagents That Provide Optimal Performance

Bio-Rad reagents demonstrate best-of-class performance over a wide dynamic range of input RNA, cDNA, and genomic DNA. The broad mix of reverse transcription kits and supermixes for qPCR delivers maximum sensitivity and consistent results every time.

Don't Worry About Your Consumables

Bio-Rad's plastic consumables have been validated to deliver reliable, reproducible results, leaving you less to worry about.



Specifications

Thermal Cycler

Chassis	C1000 Touch
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	6 filtered LEDs
Detection	6 filtered photodiodes
Range of excitation/emission wavelengths	450–730 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 XP, Windows 7
Memory	Minimum 1 GB
Multiplex analysis	Up to 5 targets per well
Data analysis modes	PCR quantification with standard curve Melt curve analysis Gene expression analysis by relative quantity (ΔC_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 μ l (10–25 μ 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")
Weight	21 kg (47 lb)

Ordering Information

Catalog #	Description
184-1100	C1000 Touch Thermal Cycler Chassis , includes USB flash drive, power cord; does not include reaction module
184-5096	CFX96™ Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase ^{PLUS} software, communication cable, reagents, consumables
184-5097	CFX96 Optical Reaction Module , for use with C1000 Touch thermal cycler chassis, includes CFX Manager software, license for qbase ^{PLUS} software, communication cable
185-5196	CFX96 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase ^{PLUS} software, communication cable, reagents, consumables
185-5195	CFX96 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Manager software, license for qbase ^{PLUS} software, communication cable
184-5001	CFX Manager Software, Security Edition , includes 1 user license, installation CD, HASP HL key
184-5025	Precision Melt Analysis Software , includes 2 user licenses, installation CD, 2 HASP HL keys, melt calibration kit
184-5072	CFX Automation System , includes robotic plate handler, base tray, bar code scanner, CFX automation control software CD
170-8840	iScript™ Reverse Transcription Supermix for RT-qPCR , 25 x 20 μ l reactions, includes 100 μ l 5x iScript RT supermix and iScript RT supermix no-RT control
170-8842	iScript Advanced cDNA Synthesis Kit for RT-qPCR , 50 x 20 μ l reactions, includes 200 μ l 5x iScript advanced reaction mix, 50 μ l iScript advanced reverse transcriptase
172-5260	SsoAdvanced™ SYBR® Green Supermix , 2 ml (2 x 1 ml), 200 x 20 μ l reactions, 2x real-time PCR mix, contains dNTPs, Sso7d fusion polymerase, MgCl ₂ , SYBR® Green I, stabilizers
172-5230	SsoFast Probes Supermix , 2 ml (2 x 1 ml), 200 x 20 μ l reactions, 2x real-time PCR mix, contains dNTPs, Sso7d fusion polymerase, MgCl ₂ , stabilizers

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Notice regarding Bio-Rad thermal cyclers and real-time systems:
Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser's own internal research and development and for use in human in vitro diagnostics and all other applied fields under U.S. Patent Number 5,475,610 (Claims 1, 44, 158, 160–163, and 167 only), or corresponding claims in its non-U.S. counterpart, owned by Applied Biosystems. No right is conveyed expressly, by implication, or by estoppel under any other patent claim, such as claims to apparatus, reagents, kits, or methods such as 5' nuclease methods. 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.

Bio-Rad's real-time thermal cyclers are licensed real-time thermal cyclers under Applied's U.S. Patent Number 6,814,934 B1 for use in research, human in vitro diagnostics, and all other fields except veterinary diagnostics.

Bio-Rad's thermal cyclers and 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.

Practice of the patented 5' Nuclease Process requires a license from Applied Biosystems. The purchase of these products 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 when used with the separate purchase of Licensed Probe. No other patent rights are conveyed expressly, by implication, or by estoppel. Further information on purchasing licenses may be obtained from the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.



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