

# Applied Biosystems StepOne™ and StepOnePlus™ Real-Time PCR Systems

Remarkably Simple Systems. Simply Remarkable Results.



## Total Confidence

- Data stored both on the instrument and computer for extra safety
- Fast system with plug and play assays and fast reagents for maximum time savings
- Ultra-compact footprint fits most laboratory settings
- LCD touchscreen and USB drive with the option of PC-free instrument operation
- Remote monitoring and email notification with run file attached for immediate access to results—even remotely

## Software Highlights

- Intuitive, flexible software with plate set up wizard that guides new users through their real-time PCR experiments
- Powerful Gene Expression Study Package with advanced features for complex studies
- Customizable graphs and plots
- Export to JPEG, Excel® and PowerPoint®
- Optional software package offers the ability to conduct high resolution melt (HRM) experiments

## StepOne™ and StepOnePlus™ Systems

### StepOne™ System

48 wells for lower throughput  
3 colors for basic applications research

Easily upgradeable to the StepOnePlus™ System

### StepOnePlus™ System

96 wells for higher throughput  
4 colors for more flexibility

VeriFlex™ Blocks technology for thermal cycling flexibility

The Applied Biosystems StepOne™ and StepOnePlus™ Real-Time PCR Systems are remarkably powerful real-time PCR instruments designed with a user-friendly interface. Flexible and easy to use, these systems can be set up and operated with total confidence, even by researchers who have little or no previous real-time PCR experience. Highly affordable, these new low- to medium-throughput systems are suitable for every level of experience. The easy to use software with its optional wizards guides researchers through all aspects of sample processing, including sample and reaction setup, thermal cycling, and fluorescent detection. The StepOne™ and StepOnePlus™ Systems even assist users in selecting and ordering real-time PCR reagents online.

**Table 1. Features at a Glance.**

	StepOne System	StepOnePlus System
Throughput/Wells	48	96
FAM™/SYBR® Green dyes	✓	✓
VIC®/JOE™ dyes	✓	✓
ROX™ dyes	✓	✓
NED/TAMRA™ dyes		✓
Veriflex™ Blocks		✓
Plug and play applications	✓	✓

### StepOne™ Software Designed for New and Advanced Users

Instrument software for the Applied Biosystems StepOne™ and StepOnePlus™ Real-Time PCR Systems provides instrument control, data collection, and data analysis. This user-friendly and intuitive software package includes the following features:

- Experimental Design Wizards to help you design and set up experiments
- Advanced setup for expert users who require more flexibility for more complex applications, such as multiplexing
- QuickStart setup so runs can begin immediately and plate information entered later
- Remote real-time monitoring for observing the run from a remote PC
- Email notifications with data file attached, providing immediate access to results
- Exports data to PowerPoint®, Excel®, or .jpeg files
- Troubleshooting flags to help diagnose and solve problematic experiments
- Multiple Plots view for simultaneous data assessment from four perspectives

Primer Express® Software v3.0 is also included with the systems. This software offers simple primer and probe design for real-time PCR applications.

### Powerful Gene Expression Study Package

Import an unlimited number of Comparative C<sub>t</sub> (Relative Quantitation) plates to one study:

- View data by biological replicate group or technical replicate group
- Normalize to multiple endogenous controls
- Enter known efficiencies to adjust RQ values for each target
- View amplification plot, multi-component plot and QC summary within the study to easily identify and eliminate outliers
- Preview the effect of modified analysis settings before permanently applying them to results

### HRM Just Got A Lot Easier

Optional High Resolution Melt Software v3.0 offers the ability to conduct high resolution melt experiments on the StepOne™ and StepOnePlus™ Systems:

- Accurately distinguish control and variant genotypes with a new clustering algorithm
- Input expected number of clusters for difficult-to-detect SNPs
- Run separate analysis of multiple assays run on a single plate
- Copy and paste directly from Excel® software
- Easily view well information and plate layout in the Plate View
- Saves analysis settings for future experiments—software automatically applies default/saved settings upon opening an experiment file

### As Flexible as Possible with PC-Free and Networkable Operation

The StepOne™ and StepOnePlus™ Systems can be installed in five distinct configurations:

1. PC controlled
2. PC free
3. Networked
4. PC controlled connected to LAN
5. PC controlled with network instrument

Connection to an ethernet network enables remote monitoring, downloading and uploading of experimental files and data.

StepOne™ and StepOnePlus™ Systems are available for purchase with either a laptop or tower computer. Systems without computers are also available. The instruments can be operated even without a PC—a QuickStart feature initiates experimental runs from the instruments touchscreen.

### Convenient Online Ordering

For convenient ordering of real-time PCR master mixes and consumable plasticware, an experimental material list is accessible through the Design Wizard in the system software. It links directly to the Applied Biosystems Store (optional).

**Table 2. Demonstrated Performance Specifications.**

Dynamic Range	9 logs of linear dynamic range
Sensitivity	A single-reporter TaqMan® Assay can detect 10 copies of RNaseP in a 30 µL reaction volume
Precision	Using the TaqMan® RNaseP Instrument Verification Plate, the system can distinguish between 5,000 and 10,000 template copies of RNaseP with up to 99.7% confidence
Run Time	Fast: <40 min/40-cycle PCR reactions, using the TaqMan® RNaseP Verification Test Plate Standard: <2 hours/40 cycle PCR reactions

**Fluorescence Detection**

Fluorophore detection chemistries include FAM™, VIC®/JOE™ and ROX™ dye-labeled TaqMan® MGB probe-based assays. With the StepOnePlus™ System, TAMRA™ dye can also be utilized. The fluorophore detection chemistries offer outstanding specificity and sensitivity for real-time quantitation, gene expression assays, genotyping assays, and multiplex reactions. The systems also accommodate SYBR® Green I dye assay chemistry, an economical alternative for target identification, initial screening assays, or for studies that require only a few reactions.

All sample wells in these systems are illuminated with a high powered blue LED excitation light that is designed to last for up to ten years of continuous use, virtually eliminating the need for replacement. Fluorescence emission is detected through filters on a photodiode. The emission filters are optimized for use with FAM™/SYBR® Green I, VIC®/JOE™, and ROX™ fluorescent dyes.

**Experiment Ready on Day One**

Prior to shipping, each system is calibrated for optical and thermal accuracy. During the installation setup, which requires <4 hours, the RNaseP Instrument Verification Test Plate confirms performance specifications to help ensure data fidelity.

**Innovative VeriFlex™ Blocks**

The 96-well StepOnePlus™ System features VeriFlex™ technology, which brings six independently controllable peltier blocks together for precise temperature control and enhanced PCR functionality. VeriFlex™ blocks deliver flexibility for those who have the need to optimize their assays or who have probes and primers that are optimized at different annealing temperatures. The VeriFlex™ blocks can run with six different annealing temperatures in the same run.

**StepOnePlus Real-Time PCR System Upgrade Kit**

To accommodate your changing real-time PCR needs, Applied Biosystems offers for sale the StepOnePlus™ Real-Time PCR System Upgrade Kit. The upgrade converts a StepOne™ System into a StepOnePlus™ System by upgrading the 48-well block to a 96-well VeriFlex™ Block and expanding the dye flexibility to four colors. The color of the bar above the block is also updated to indicate that the instrument is now a StepOnePlus™ System. Just send in your existing StepOne™ System and you'll receive a StepOnePlus™ loaner instrument until your upgraded system arrives in your lab.

**Service and Warranty**

Purchase of the StepOne™ or StepOnePlus™ Real-Time PCR System includes a limited warranty\* on parts and labor. Applied Biosystems provides worldwide technical support and service. Depot repair services are available for both systems through Applied Biosystems.

**Validated Solution**

IQ/OQ - A certified Applied Biosystems Service Engineer will assist with the Installation Qualification (IQ/OQ) process as part of the overall system validation. According to your change control and maintenance requirements, they can re-Qualify (OQ/IPV) to the same specifications; verifying consistent performance over time. These services are available for a separate fee.

\*Warranty length varies by region.

**Table 3. Instrument Specifications.**

	StepOne™ System	StepOnePlus™ System
Thermal cycling system	Peltier-based system	Peltier-based system
Block format	48-well block	96-well block
Supported volumes	10–30 µL	10–30 µL
Supported consumables	<ul style="list-style-type: none"> <li>• 48-well (0.1 mL) plates with optical adhesive covers</li> <li>• 48-well (0.1 mL) plates with optical flat caps</li> <li>• 8-tube (0.1 mL) strips with optical flat caps</li> <li>• Individual (0.1 mL) tubes with optical flat caps</li> </ul>	<ul style="list-style-type: none"> <li>• 96-well (0.1 mL) plates with optical adhesive covers</li> <li>• 96-well (0.1 mL) plates with optical flat caps</li> <li>• 8-tube (0.1 mL) strips with optical flat caps</li> <li>• Individual (0.1 mL) tubes with optical flat caps</li> </ul>
Sample ramp rate	Fast mode: +/- 2.2°C/sec Standard mode: +/- 1.6°C/sec	Fast mode: +/- 2.2°C/sec Standard mode: +/- 1.6°C/sec
Peak block ramp rate	4.6°C/sec	4.6°C/sec
VeriFlex™ Blocks	N/A	25°C (5°C zone-to-zone)
Temperature range	4°C–100°C	4°C–100°C
Temperature accuracy	±0.25°C (35°C to 95°C) of setpoint/display temperature, measured 3 minutes after clock start	±0.25°C (35°C to 95°C) of setpoint/display temperature, measured 3 minutes after clock start
Temperature uniformity	±0.50°C, measured 30 seconds after clock start over the temperature range of 35°C to 95°C	±0.50°C, measured 30 seconds after clock start over the temperature range of 35°C to 95°C
Melt curve resolution	As small as 0.1°C	As small as 0.1°C
Optical system	LED, emission filters, photodiode	LED, emission filters, photodiode
Calibrated dyes at installation	FAM™, SYBR® Green I, VIC®, JOE™, ROX™ dyes	FAM™, SYBR® Green I, VIC®, JOE™, NED, TAMRA, ROX™ dyes
Passive reference dyes	ROX™ dye	ROX™ dye
Data collection	Data collected in all filters for all wells regardless of plate setup. Plate setup may be modified after run completes	Data collected in all filters for all wells regardless of plate setup. Plate setup may be modified after run completes
Quantitative PCR Run Time	Fast: <40 minutes Standard: <2 hours	Fast: <40 minutes Standard: <2 hours
Touchscreen	LCD/6.5 in. VGA (640 x 480)/32K colors	LCD/6.5 in. VGA (640 x 480)/32K colors
Instrument dimensions	Width: 24.6 cm (9.7 in) Depth: 48.5 cm (19.1 in) Height: 51.2 cm (20.4 in) Weight: 23.6 kg (52 lbs)	Width: 24.6 cm (9.7 in) Depth: 48.5 cm (19.1 in) Height: 51.2 cm (20.4 in) Weight: 24 kg (53 lbs)
Software Specifications	Applications—Comparative C <sub>t</sub> , Standard Curve, Relative Standard Curve, Genotyping Presence/Absence, Melt Curve Analysis, high-resolution melt (HRM) analysis (additional software package required) Dye Discrimination—Multicomponenting algorithm Multiplate Data Comparison—Compare an unlimited number of plates of gene expression assays Multiplex Capability—Multiplex up to five targets per well PC Compatible	

## Full Range of Plug and Play Applications

Entire experiments can be planned and executed in the StepOne™ Software. Assays and reagents specifically tailored for many types of research can be ordered from Applied Biosystems through the StepOne™ Software. The software then creates color-coded plate layout schemes for easy pipetting. Finally, the software is pre-populated with run protocols from many applications.

### TaqMan® Assays

Applied Biosystems offers the most comprehensive set of inventoried TaqMan® Gene Expression and SNP Genotyping Assays available. More than 700,000 Gene Expression Assays and over 4.5 million pre-designed human, and 10,000 pre-designed mouse SNP Genotyping Assays are available at your fingertips (Table 4). Alternatively, you can submit your target DNA sequence from any organism, and we'll custom-build an assay for you. Applied Biosystems also offers TaqMan® MicroRNA Assays to quantify miRNA with the sensitivity and specificity of TaqMan® assay chemistry. For more information on Gene Expression Assays, visit [www.allgenes.com](http://www.allgenes.com); for information on SNP Genotyping Assays, visit [www.allsnps.com](http://www.allsnps.com).

### TaqMan® Gene Expression and Genotyping Master Mixes

Tailored for quantitative real-time PCR experiments, the TaqMan® Gene Expression and Genotyping Master Mixes are specially formulated for exceptional sensitivity and reproducibility for both routine and challenging quantitative applications. Each mix has been extensively validated for use on the StepOne™ and StepOnePlus™ Systems, as well as all other Applied Biosystems real-time PCR platforms.

### Reagents and Disposables

A complete line of reagents, including TaqMan® Fast Universal PCR Master Mix, TaqMan® Universal PCR Master Mix, Fast SYBR® Green Master Mix, Power SYBR® Green PCR Master Mix, and disposables, including 48- and 96-well plates, is available for use with the StepOne™ and StepOnePlus™ Real-Time PCR Systems. These products can easily be added to a shopping list for future reference or for ordering through the "Materials List" link in the experimental Design Wizard.

### Real-Time PCR Applications

Both systems support many real-time quantitative PCR applications, including gene expression analysis, using relative standard curve and comparative  $C_t$  [ $\Delta\Delta C_t$ ] for relative quantitation, standard curve for absolute quantitation.

In addition, the systems enable qualitative, post-PCR detection of nucleic acids for allelic discrimination (SNP genotyping) assays and presence/absence (plus/minus) assays that use internal positive controls. New applications include melt curve analysis as an independent application, real-time PCR amplification using the allelic discrimination (SNP genotyping) application, and high-resolution melt (HRM) analysis (additional software package required).

### Applications

The StepOne™ Systems support any real-time PCR application. Predesigned or custom assays are available for the following applications:

- Gene Expression Profiling
- SNP Genotyping
- MicroRNA Expression
- Translocation Analysis
- Viral Load Analysis
- Gene Detection

For information about existing Gene Expression, MicroRNA, and Translocation Analysis Assays, please visit [www.allgenes.com](http://www.allgenes.com).

SNP Genotyping Assay information can be found at [www.allsnps.com](http://www.allsnps.com).

**Table 3. Instrument Specifications.**

TaqMan® Assays Selection Guide	Application		
	Gene Expression*	SNP Genotyping†	MicroRNA††
TaqMan® Pre-designed Assays (Inventoried and Made-to-Order)	Yes	Yes	Yes
Custom TaqMan® Assays	Yes	Yes	No
Species	Number of Inventoried and Made-to-Order Assays		
Human	> 2,024,000	> 4,000,000	> 300
Mouse	> 179,000	> 10,000	> 240
Rat	> 128,000	§	> 180
<i>Drosophila melanogaster</i>	> 38,000	§	> 50
<i>Arabidopsis thaliana</i>	> 95,000	§	> 40
<i>Caenorhabditis elegans</i>	> 90,000	§	> 60
Canine	> 6,000	§	N/A
Rhesus macaque	> 70	§	N/A

\* Includes mRNA, gene copy number, and mitochondrial assays  
† Includes HapMap and drug metabolism genotyping assays  
†† Gene expression only  
§ Custom TaqMan® Assays are available for any SNP, transcript, and genome

**ORDERING INFORMATION**

Description	P/N
StepOne™ Real-Time PCR System	4376357
StepOne™ Real-Time PCR System with Laptop Computer	4376373
StepOne™ Real-Time PCR System with Tower Computer	4376374
StepOnePlus™ Real-Time PCR System	4376600
StepOnePlus™ Real-Time PCR System with Laptop Computer	4376598
StepOnePlus™ Real-Time PCR System with Tower Computer	4376599
StepOnePlus™ Real-Time PCR System Upgrade Kit*	4379216
High Resolution Melt Software v 3.0, 1 license	4461357
High Resolution Melt Software v 3.0, 10 licenses	4461456

\*For users of the StepOne™ Real-Time PCR System.

Life Technologies offers a breadth of products DNA | RNA | protein | cell culture | instruments

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