

7900HT

Applied Biosystems 7900HT Fast Real-Time PCR System

The complete solution for real-time PCR



A real asset to any disease research program.



Applied Biosystems 7900HT Fast Real-Time PCR System, shown here with Automation Accessory, is engineered from the ground up to support high-throughput applications such as gene expression quantitation and SNP genotyping. Fast PCR options provide quicker PCR results in standard 96-well format (run time: ~35 minutes) or 384-well format (<55 minutes).

- Choose your level of automation
- Fast, scanning-based detection
- A high-performance platform for high-throughput discovery

The Applied Biosystems 7900HT Fast Real-Time PCR System is the only real-time quantitative PCR system that combines 384-well plate compatibility with fully automated robotic loading—and offers optional Fast real-time PCR capability. Acknowledged as the gold standard in real-time PCR, the 7900HT system combined with TaqMan® Assays enables you to achieve unprecedented throughput and flexibility, allowing you to pursue projects beyond the scope of previous real-time instruments. With powerful, researcher-friendly software, a 384-well TaqMan® Array, and Applied Biosystems convenient assay products, it's easy for labs of all sizes to realize the full potential of this powerful research tool.

Real results—with the Applied Biosystems 7900HT System and TaqMan® Arrays.



TaqMan® Array. Streamlines reaction setup time, eliminates the need for liquid handling robotics, and provides standardization when screening selected panels of genes.

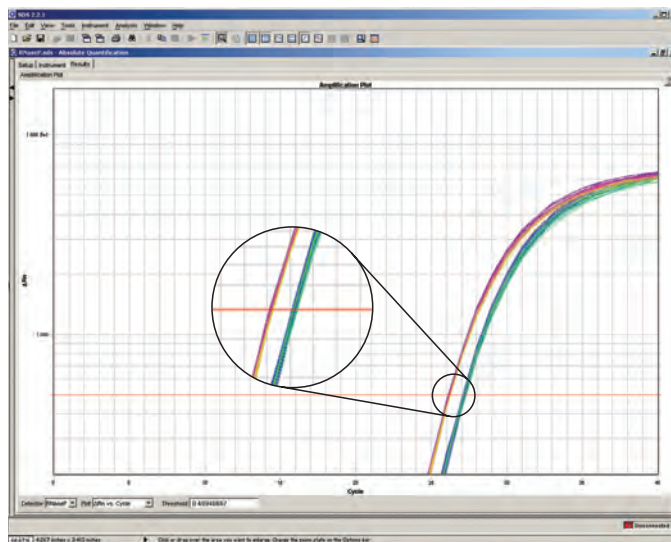
A High Performance Platform For High Throughput Discovery

- **User-interchangeable block formats** deliver exactly the throughput and features you need—in a system that can expand and adapt to meet your future requirements
- **Two Fast PCR options** give you real-time PCR results in both the standard 96-well format (run time: ~35 minutes) or 384-well format (<55 minutes)
- **Optional Enterprise Edition Software** makes it easy for your whole organization to make the most of the system's advanced features and high-throughput capabilities while providing assistance with 21CFR Part 11 requirements
- **Choice of assay chemistries** lets you pursue a broad range of applications—with or without the use of probes
- **Hands-free plate-loading and unloading** provides true walkaway automation allowing you to amplify your lab's productivity

Fast, Scanning-based Detection

The 7900HT system accommodates higher density plates without compromising speed, resolution, or robust performance.

A laser scans and excites the fluorescent dyes in each of the wells; a spectrograph and charge-coupled device (CCD) camera spectrally resolve and collect the fluorescence emission from each sample.



Real-time reproducibility. Amplification of the RNase P gene from human genomic DNA. Samples were run in replicates of 144 using the fluorogenic 5' nuclease assay. The system can distinguish between two samples containing 5,000 and 10,000 template copies with a confidence level of 99.7%.

Real flexibility—to match your research requirements.

The Applied Biosystems 7900HT Fast Real-Time PCR System gives you the flexibility you need to meet any real-time PCR need. Interchangeable block formats let you easily adapt for different applications. You can also take advantage of a wide range of powerful automation capabilities.

The 7900HT system is a versatile research tool that can accommodate any real-time PCR need. User-interchangeable thermal cycling block formats let you select the format that's right for your project. You can choose from the industry-standard 96- and 384-well formats, as well as a novel 384-well TaqMan® Array and a new Fast 96-well block that reduces run times from 2 hours to about 35 minutes, and a new Fast 384-well block that completes each run in less than 55 minutes. An automation option also allows you to meet increasing throughput demands.



Flexible formats. Easily interchangeable block formats include a new Fast PCR option, standard 384-well and 96-well detection, and the TaqMan® Array.



Automation Accessory.

Choose Your Level of Automation

The optional, integrated Automation Accessory provides maximum throughput. Up to eighty-four 384-well plates can be loaded at a single time for unattended operation; a bar code reader allows you to insert or substitute plates into the sample queue at any time.

Powerful software makes short work of system setup and data analysis—and the fully-automated Enterprise Edition integrates seamlessly into your company-wide high throughput discovery operations.



Comprehensive Application Support

The 7900HT system supports many real-time PCR applications. Pre-designed or custom assays exist for the following applications:

- Gene Expression
- SNP Genotyping
- Pathogen Detection
- Viral Load Analysis
- miRNA Quantitation

For more information about existing Gene Expression Assays, please visit www.allgenes.com.

SNP Genotyping Assay information can be found at www.allsnps.com.

Real power—to deliver world-class performance and results.

Advanced analysis capabilities and a full feature set make high-throughput gene expression and SNP genotyping research accessible to labs of all sizes.

Your Choice of Quantitation Methods

The 7900HT system gives you a choice of quantitation methods for gene expression. The absolute quantitation method determines target quantity directly from a standard curve. Relative quantitation eliminates the need for a standard curve by calculating quantitation values of an unknown sample relative to a calibration sample. Either way, the software completely automates data analysis, and can automatically set the optimal baseline for each well, as well as the optimal threshold for each primer and probe set (TaqMan® Assays) or assay-specific primer set (SYBR® Green Dye).

Absolute Quantitation

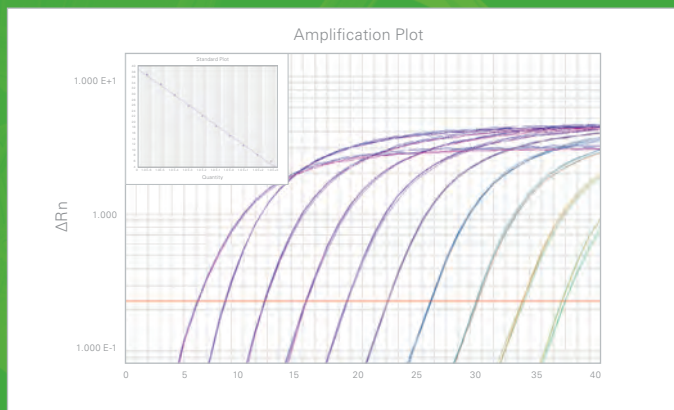
To quantitate the amount of target in unknown samples, the 7900HT system measures the sample's C_T^* and uses a standard curve to determine starting copy number. To prepare the standard curve, the 7900HT system software first calculates C_T values from dilutions of samples with known starting copy number. The software then plots the

log of the starting copy number against the measured C_T value. The relationship between C_T and starting copy number is linear over at least five orders of magnitude.

Relative Quantitation

Relative quantitation is ideal for gene expression studies. Instead of using a standard curve, expression levels are calculated relative to a calibration sample—saving you time and money. An endogenous control is used to normalize the sample amount. This method, coupled with the ability of the 7900HT system to quantitate both the target and endogenous control in a multiplex reaction, enables highly cost-effective, high-throughput gene expression studies. The relative quantitation (RQ) study, which comes standard with the 7900HT system, allows simultaneous analysis of up to ten plates of data.

** C_T , or threshold cycle, is the PCR cycle at which a statistically significant increase in reporter fluorescence can be detected above the background.*



Absolute quantitation using the Fast 96-well block: 9-log linearity. Amplification of the Human Eukaryotic 18S rRNA target in ten-fold dilutions from 500 nanograms to 0.5 femtograms illustrating 9 logs of linear dynamic range. The amplification plot shows the log of the change in fluorescence plotted vs. cycle number. The insert provides a standard curve showing C_T values plotted vs. the log of the quantity.



Relative quantitation study: 1X analysis with 10X results. Using the relative quantitation method, data analysis is completely automated, and you can view amplification plots from up to 10 plates or cards in a single analysis session with no further downstream processing needed.

RQ Manager

The 7900HT system eliminates data analysis bottlenecks with the innovative RQ Manager, which allows the simultaneous analysis of a substantial number of plates. This novel software tool analyzes all RQ studies, provides a plate-centric view, table settings, and plate/study-level flags and filtering capability. The software displays filtered data as a plot and exports the file, making RQ Manager easy to use and a valuable resource for all gene expression applications.

For easy, automated troubleshooting and quality control, RQ Manager also includes flags and filtering capability that can be configured for absolute/relative quantitation, allelic discrimination, and analysis failure. Flags are specific to the type of analysis—average quantitation (AQ), relative quantitation (RQ), or allelic discrimination (AD).

Intuitive, Flexible Software

Fast, accurate data analysis is crucial for all research applications, and the Sequence Detection System v2.3 software, standard on all instruments, provides everything that today's high-throughput gene expression laboratories require. This intuitive, easy-to-use software provides numerous innovations that facilitate your research and give you confidence in your results. These include:

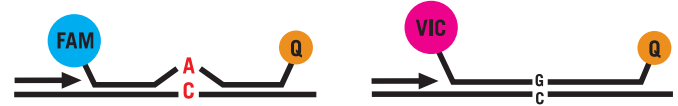
- a plate wizard that lets you choose assay and plate setup preferences
- plus/minus assay capability with internal positive controls
- real-time monitoring with automatic display of amplification plot (for one or all detectors), run progress, cycle information and run/batch statistics
- a data continuity feature for transferring data from the 7700 to the 7900HT system
- a flags and filters feature for increased quality control, problem notification, filtering and troubleshooting

To make data analysis as easy as possible, comprehensive "Getting Started" guides are available to help you with all four real-time PCR techniques: AQ, RQ, AD and plus/minus assays.

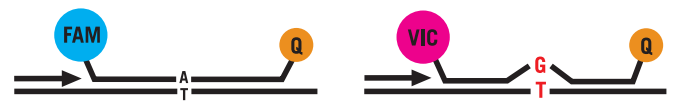
A Complete System for SNP Genotyping

In addition to real-time quantitation, the 7900HT system includes software for large-scale screening of known SNPs. In a two-allele system, TaqMan® probes for each allele are multiplexed in a single tube. End-point fluorescence is measured by the 7900HT system, and experimental results are rapidly generated by the integrated data analysis software.

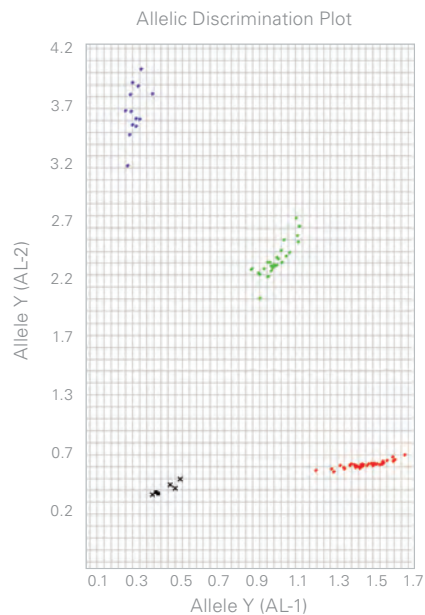
Allele 1



Allele 2



Allelic discrimination chemistry. Allelic discrimination assay design strategy using the fluorogenic 5' nuclease assay and TaqMan® MGB probes. Fluorescent signals from the FAM™ and VIC® dye-labeled probes are only generated in the presence of the complementary target sequence.



Real productivity—to get you more data, quicker.

Walkaway operation, user-friendly system operation and sophisticated, automated workflows help you generate large volumes of data—and quickly turn all that data into answers.

High Performance Extends to Data Analysis

The 7900HT system extends high-throughput performance beyond sample analysis by streamlining operation and making results easy to interpret. The intuitive user interface simplifies setup and allows you to quickly analyze sample data and visualize your results for fast, effective decision-making.

Fully Automated Enterprise Option

In addition to the Standard Edition Software included with the 7900HT system, you can also choose to upgrade to the optional Enterprise Edition. The Enterprise Edition Software further facilitates high-throughput automated workflows, allowing you to realize the full power of the 7900HT system. The Enterprise Edition also enables robust, scalable and secure data management via the included Oracle® database.

Support for 21 CFR Part 11 Requirements

Enterprise Edition Software includes a suite of features to assist you with 21 CFR Part 11 requirements: data integrity, security, auditing functions, electronic signatures and electronic recordkeeping. In addition to minimizing vulnerability to signature fraud and report misfiling, these electronic procedures reduce compliance bottlenecks, and help increase the flow of vital information throughout your organization.

Application-specific Analysis Software

Two new analysis packages are available for use with the Enterprise Edition Software: RQ Manager (gene expression) and SNP Manager (SNP genotyping). By letting you analyze the data from hundreds (RQ Manager) to thousands (SNP Manager) of plates as a single study, these powerful software applications facilitate high-throughput data analysis. They reduce your hands-on analysis time and simplify your data analysis workflow.

HRM Analysis

High Resolution Melting (HRM) analysis, an alternative to dHPLC for pre-sequencing screening of new gene mutations, is also available for the 7900HT System. The software has an easy, intuitive workflow that:

- Unlike other plate-based HRM systems, does not require temperature shifting, allowing you to easily distinguish between homozygous mutants and wildtype variants
- Shortens analysis time by auto-calling genotypes and automatically omitting the 'no template' controls
- Minimizes subjective analysis by automatically grouping unknown variant clusters
- Allows easy data review with customizable multi-plot views, expandable windows and one-click color assignment to highlight curves of interest
- Facilitates data presentation with the option to export data and graphs directly to PowerPoint or as JPEG files
- Ability to analyze multiple targets (assays) on one plate

For more information on the HRM software for the 7900HT system, please visit info.appliedbiosystems.com/hrm.

Automated Enterprise Edition workflow.

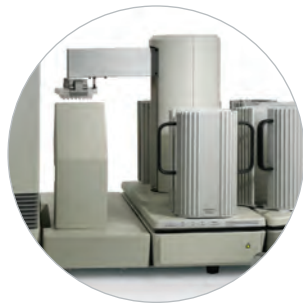
When you use the Enterprise Edition Software, all plate documents are loaded into the database; automation runs proceed without further intervention as bar codes on the plates are read by the system.

When the run is complete, raw data and primary analysis results are automatically saved to the database and are then available for further analysis using SNP or RQ Manager Software.



Step 1

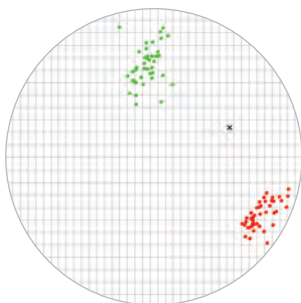
Store plate documents in the SDS Software v2.3 database.



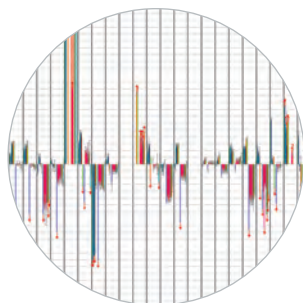
Step 2

Begin automation run. Software will then automatically:

- Retrieve plate setup information for plates loaded on the Automation Accessory
- Analyze the file following each individual run
- Populate the database with the raw data and experimental results



SNP Manager Software



RQ Manager Software

Step 3

View results from multiple plate documents in RQ Manager or SNP Manager Software.

SNP Manager Software: A new analysis application for SNP genotyping, SNP Manager allows up to thousands of plates to be auto-called in a single analysis, using the same automated allelic-calling algorithm as the Standard Edition Software. Easy-to-use and easy-to-learn, the high-throughput package has been verified with 5,000 x 384-well plates (384 markers)—1.92 million genotypes.

RQ Manager Software: Developed to meet the data demands of high-throughput gene expression studies, RQ Manager automates data analysis when using the comparative C_T method. It allows data from up to hundreds of plates/cards to be analyzed in a single session, using the same automatic baseline and threshold algorithms (Auto C_T) as SDS Standard Edition Software. Easy-to-learn and easy-to-use, application performance has been verified with up to 200 x 384-well plates—153,600 data points.

Real convenience—with pre-designed assays and your choice of chemistries.

Convenient, pre-designed TaqMan® Assays let you focus on your results rather than assay development.



Reliable reagents. In addition to TaqMan® Assays for gene expression and SNP genotyping, Applied Biosystems also offers a complete selection of application-proven reagents and consumables—all optimized for use with the 7900HT system.

Accomplish More

Applied Biosystems biologically informative genomic assays are moving genetic discovery to the next level by making the world's largest collection of genomic assays available to any researcher. Based on today's most comprehensive library of public and private sequence data, these affordable SNP and gene expression probe and primer sets eliminate the time required to design "home-brew" assays, and can significantly increase your throughput.

Simplify Your Workflow, Increase Your Confidence

Alternate analysis techniques require numerous steps and manual intervention. By contrast, the 5' nuclease assay chemistry calls for already-familiar tools and requires no complicated sample preparation.

Simply pipette genomic DNA or cDNA, TaqMan® Gene Expression or SNP Genotyping Master Mix or TaqMan® Fast Universal PCR Master Mix for fast cycling, and your assay probe and primer mix into microplate wells for real-time cycling or end-point analysis on the 7900HT system.

The Whole Genome: at Your Service and Ready-to-Use

Applied Biosystems TaqMan® Assays are high-quality, biologically informative assays that use public and Celera genomic information to design optimal probe and primer sets based on our 5' nuclease chemistry. All TaqMan Assays are delivered in a single-tube format, are designed to run under universal thermal cycling conditions, and don't require additional optimization.

Gene Expression and Genotyping Assays

We offer over 700,000 TaqMan® Gene Expression Assays for quantitative gene expression studies on human, mouse, rat, *Arabidopsis*, *Drosophila*, *C. elegans*, Rhesus macaque, and canine genes (visit www.allgenes.com for more details). Or, choose from over 4.5 million TaqMan® SNP Genotyping Assays—the world's largest collection of biologically informative, validated, pre-designed genotyping assays (visit www.allsnps.com for more details).

Design Your Own

If you prefer to design your own probe and primers, our Custom TaqMan Assays are the best solution. Simply submit your sequence using our secure and confidential online ordering system, and we'll deliver your gene expression or genotyping assay for any species or organism.

Versatile chemistries for multiple applications.

The 7900HT system provides flexible dye detection. It is optimized for TaqMan® probe-based and SYBR® Green I Dye assay chemistries; however, this system also provides the features and capabilities to accommodate a wide range of other real-time chemistries.

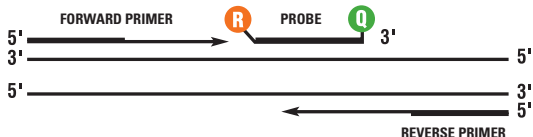
TaqMan probe-based assay chemistry provides outstanding specificity and sensitivity, and the ability to multiplex reactions for real-time quantitation and single nucleotide polymorphism (SNP) genotyping assays. The SYBR Green I Dye assay chemistry, while not as specific, provides an economical alternative for target identification (screening assays), or when only a small number of reactions are required for a given assay.

Simplified Assay Development—or no Assay Development at All

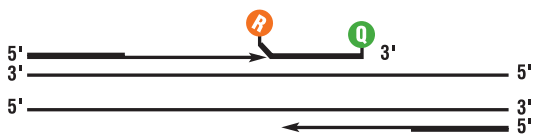
Both TaqMan probe-based and SYBR Green I Dye assay chemistries are supported by a comprehensive range of reagents and proven protocols that allow you to rapidly develop robust assays and eliminate assay optimization. But if you really want to save time, you can move your research ahead even faster with Applied Biosystems TaqMan Assays. Either way, universal thermal cycling conditions allow you to combine multiple assays in a single real-time run for unmatched flexibility.

TAQMAN® PROBE-BASED ASSAY CHEMISTRY

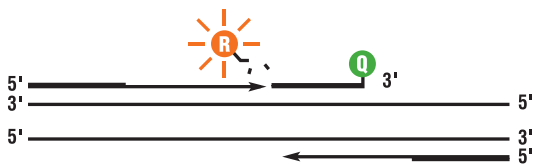
1. **Polymerization:** A fluorescent reporter (R) dye and a quencher (Q) are attached to the 5' and 3' ends of a TaqMan® probe, respectively.



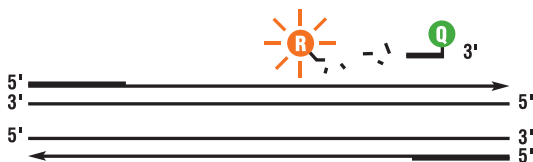
2. **Strand displacement:** When the probe is intact, the reporter dye emission is quenched.



3. **Cleavage:** During each extension cycle, the DNA polymerase cleaves the reporter dye from the probe.



4. **Polymerization completed:** Once separated from the quencher, the reporter dye emits its characteristic fluorescence.



SYBR® GREEN I DYE ASSAY CHEMISTRY

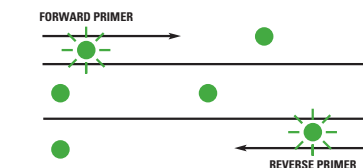
1. **Reaction setup:** The SYBR® Green I Dye fluoresces when bound to double-stranded DNA.



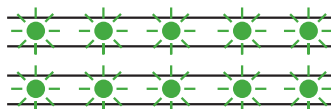
2. **Denaturation:** When the DNA is denatured, the SYBR® Green I Dye is released and the fluorescence is drastically reduced.



3. **Polymerization:** During extension, primers anneal and PCR product is generated.



4. **Polymerization completed:** When polymerization is complete, SYBR® Green I Dye binds to the double-stranded product, resulting in a net increase in fluorescence detected by the 7900HT system.



Real system solutions—that include software, reagents, support, and instrumentation.

Whatever your organization's path of genetic discovery, we are committed to helping you achieve your research goals faster and more efficiently. Our mission is to deliver complete product solutions that make your gene expression studies or SNP scoring efforts more productive and easy. Everything works together—instruments, software, chemistries, and ready-to-use assays—to provide the consistent, reliable results you need to advance your research to the next level.

Along with instrumentation, software and consumables, the 7900HT system solution includes:

- Comprehensive training
- Application and assay development support
- Worldwide technical service

Discover how the 7900HT Fast Real-Time PCR System can make a real difference in your discovery program

For more information about the Applied Biosystems 7900HT Fast Real-Time PCR System—or about any of our full line of integrated products for gene expression or SNP genotyping—contact your Applied Biosystems representative or visit www.appliedbiosystems.com

For Research Use Only. Not for use in diagnostic procedures.

NOTICE TO PURCHASER

The Applied Biosystems 7900HT Fast Real-Time PCR system is a real-time thermal cycler covered by US patent claims in their non-US counterparts, owned by Life Technologies Corporation. 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.

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