

# Funding Support for the Eco™ Real-Time PCR System



March 11, 2013

Dear Researcher,

Thank you for your interest in the Eco Real-Time PCR system. This one-of-a-kind instrument is designed to make qPCR experiments accessible to everyone, enabling quicker advancement of your research efforts.

To help you in your grant request, we have put together this funding support package. In this introductory letter, you will find a brief overview of the unique offerings of the Eco system. The following documents provide you with more detailed information regarding the Eco system's features and benefits, technology, and instrument specifications. In short, you will learn how the revolutionary Eco Real-Time PCR system produces high-performance qPCR results in an affordable manner.

**Precise Temperature Control**

An innovative proprietary thermal system with above industry standard temperature control and thermal uniformity enables the Eco system to perform all qPCR applications, including resource-intensive High Resolution Melt (HRM) analysis.

**Superior Optical Systems Enables Four-Assay Multiplexing**

With two sets of 48 high-power fixed LEDs, four detection filters, and a CCD camera, the Eco system is the only affordable Real-Time PCR instrument capable of simultaneously multiplexing up to four assays in one reaction. The instrument supports all commonly used qPCR chemistries and is provided factory-calibrated for DNA binding dyes, as well as FAM, HEX, ROX, Cy5, and Q670 fluorescent dyes.

**Simplified Setup, Run, and Analysis**

A plug-and-play instrument; intuitive, user-friendly software; and technical support from expert Illumina scientists and online documentation, make the Eco system the easiest qPCR platforms to master.

We look forward to working with you and helping you apply Eco Real-Time PCR system applications to your current and future projects. To learn more, please visit [www.illumina.com/ecoqpcr](http://www.illumina.com/ecoqpcr).

Sincerely,  
The Eco Real-Time PCR System Support Team

## Executive Overview

### Introduction

Real-Time PCR technology is used worldwide for a growing number of well-characterized applications in research, clinical diagnostics, and applied market segments. These market segments are highly competitive with a limited number of vendors providing expensive, and relatively poorly differentiated, instruments. Customers make instrument purchase decisions based primarily upon price, performance, ease of use, and flexibility.

As with mainframes in the computer industry, early real-time PCR instruments were large, expensive, and shared by many users. Today's instrument systems are somewhat smaller and less expensive, but still do not meet requirements for individual research purchase and use. In fact, ten or more researchers routinely share access to the majority of real-time instruments. The average instrument price today is \$40–50K.

This document is Illumina's proposal to offer a low-cost, easy-to-use real-time PCR system for individual researchers that will meet and surpass the performance of expensive industry-standard real-time PCR instruments. In particular, the Eco system will offer more accurate results for real-time applications due to superior optics precise thermal uniformity across all samples.

The Eco system's optimal uniformity enables high-value applications such as High Resolution Melt (HRM), a key differentiator compared to existing instruments that cannot provide the uniformity that supports HRM or require extensive and expensive upgrades to do so.

### Eco Real-Time PCR System Technology Background

The Eco Real-Time PCR system was developed through collaborations between the labs of Nobel Laureate David Baltimore, Ph.D. and Axel Scherer, Ph.D. at Caltech for research and clinical applications. The product showcases Illumina's philosophy of providing research solutions that combine innovative technologies and design, an experienced management team, and, most importantly, direct feedback from researchers. The Eco system is the first high-performance Real-Time PCR instrument designed for individual researcher access and use. The Eco Real-Time PCR system offers:

- High performance due to better thermal uniformity than current systems
- Low price that allows individual researcher to purchase
- Support of all Real-Time PCR applications, including HRM and multiplexing
- Compact bench-top size
- Easy-to-use, intuitive software for setup, run, and analysis

## Sole-Source Justification

The Eco Real-Time PCR system is a compact, affordable qPCR instrument that makes qPCR applications accessible to individual researchers. The instrument consists of a proprietary thermal system that provides the most precise temperature control across all samples during a qPCR run for increased data quality; sensitive optics that offers four-dye multiplexing and a completely open chemistry platform, enabling use with any qPCR chemistry; and a 48-well loading platform that supports the throughput required by most researchers. Additional components include a notebook pre-loaded with intuitive software for easy setup, run, and analysis of qPCR experiments, a sample loading dock, and consumables.

Description	Features
<b>Instrument Specifications</b>	
Performance	<ul style="list-style-type: none"> <li>• Sensitivity down to 1 copy</li> <li>• Dynamic range &gt; 9 logs linear range</li> <li>• Discriminates between 5,000 and 10,000 template copies with 99%+ confidence</li> </ul>
Dimensions	<ul style="list-style-type: none"> <li>• Closed; WxDxH: 13.6 in x 12.2 in x 12.6 in</li> <li>• Open; WxDxH: 13.6 in x 12.2 in x 14.5 in</li> <li>• Weight: 13.6 kg (30 lbs)</li> </ul>
Electrical	<ul style="list-style-type: none"> <li>• Voltage: 120–240 VAC = 10%</li> <li>• Frequency: 50/60 Hz = 1%</li> <li>• Nominal current draw: 8A</li> <li>• Peak power: 500W; typical power is 180W</li> </ul>
<b>Thermal System</b>	
Components	<ul style="list-style-type: none"> <li>• Proprietary hollow silver block with Peltier-based system</li> <li>• 48-well block</li> </ul>
Temperature Uniformity	<ul style="list-style-type: none"> <li>• Accuracy specification of <math>\pm 0.1^{\circ}\text{C}</math> across the block</li> <li>• Actual thermal uniformity is <math>&lt; 0.05^{\circ}\text{C}</math> across the block</li> </ul>
Temperature Range	<ul style="list-style-type: none"> <li>• 35–100°C</li> </ul>
Average Ramp Rate	<ul style="list-style-type: none"> <li>• 5.5°C / second</li> </ul>
Sample Plates	<ul style="list-style-type: none"> <li>• 48-well plate format</li> <li>• Sealed with optically clear tape</li> </ul>
Sample Volume	<ul style="list-style-type: none"> <li>• Optimized for 20<math>\mu\text{l}</math> reaction volume</li> <li>• Supports 5–20<math>\mu\text{l}</math> reaction volumes</li> </ul>
Reaction Times	<ul style="list-style-type: none"> <li>• 40-cycle PCR in less than 40 minutes using standard Real-Time PCR chemistries</li> <li>• HRM analysis in as little as 4 minutes for melting curve read-only</li> </ul>
<b>Optical System</b>	
Components	<ul style="list-style-type: none"> <li>• Dual fixed solid-state LED excitation systems (452–486 nm and 542–582 nm)</li> <li>• Four emission filters (505–545 nm, 562–596 nm, 604–644 nm, and 665–705 nm)</li> <li>• CCD camera</li> </ul>

PCR Chemistry	<ul style="list-style-type: none"> <li>• Open platform supports all available Real-Time PCR chemistries</li> <li>• Factory-calibrated for SYBR Green, ROX, FAM, HEX, VIC, Cy5</li> <li>• No additional calibration required for fluorescent dyes within the wavelength ranges compatible with the Eco filters</li> <li>• Use of ROX is supported; optional</li> </ul>
Data Collection	<ul style="list-style-type: none"> <li>• Automatic collection in all four filters for all wells, regardless of plate setup</li> <li>• Real-time monitoring of amplification in all four channels</li> <li>• Melt curve analysis supports continuous data acquisition in a single filter to provide increased data point collection and reduced run times</li> </ul>
<b>Software</b>	
Licenses	<ul style="list-style-type: none"> <li>• Included with Eco system</li> <li>• Upgrades available via the internet</li> </ul>
PCR Applications	<ul style="list-style-type: none"> <li>• Gene expression</li> <li>• Genotyping</li> <li>• High Resolution Melt</li> </ul>
Data Analysis Supported	<ul style="list-style-type: none"> <li>• Absolute quantification using a standard curve</li> <li>• Relative quantification using the <math>\Delta\Delta Cq</math> method with support for multiple reference genes and PCR efficiency correction</li> <li>• Allelic discrimination assays</li> <li>• High Resolution Melt curve analysis</li> </ul>
Interface	<ul style="list-style-type: none"> <li>• Intuitive, icon-driven user interface for easy plate layout and thermal profile editing</li> <li>• Smart default cycling profiles provided for most common applications</li> </ul>
Data Format	<ul style="list-style-type: none"> <li>• Easily exported to Excel, CSV, PDF, and PPT</li> <li>• Export graphs as .jpeg or .bmp files</li> </ul>
Availability	<ul style="list-style-type: none"> <li>• Pre-installed on a notebook computer that communicates with the Eco instrument through an Ethernet connection</li> <li>• Pre-loaded on a USB flash drive, along with protocols and application notes, for transferring data and files and installation on your desktop computer</li> </ul>
<b>Sample Loading Dock Station</b>	
Components	<ul style="list-style-type: none"> <li>• Illuminated platform for simplified loading of samples into the custom Eco 48-well plate</li> <li>• Two plate adapters for use in standard centrifuge plate holders</li> <li>• Angle-adjustable foot ensures comfort when pipetting</li> </ul>

## Ordering Information

**Eco Real-Time PCR system components:**

- Eco Real-Time PCR instrument
- Notebook pre-installed with Eco software
- Eco loading dock
- USB drive pre-loaded with Eco software
- Ethernet and power cables
- 10 Eco plates
- 40 Eco adhesive seals
- 1 Eco evaluation plate (qPCR plate pre-loaded with template and primers in a dry-down format)
- User guide and reference sheets
- 12-month service contract, parts and labor

**Catalog numbers**

Product	Quantity	Catalog No.
Eco Real-Time PCR System	1 unit	EC-101-1001
Eco loading dock	1 unit	EC-200-1001
Eco plates	40 plates	EC-200-1002
Eco adhesive seals	40 seals	EC-200-1003

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