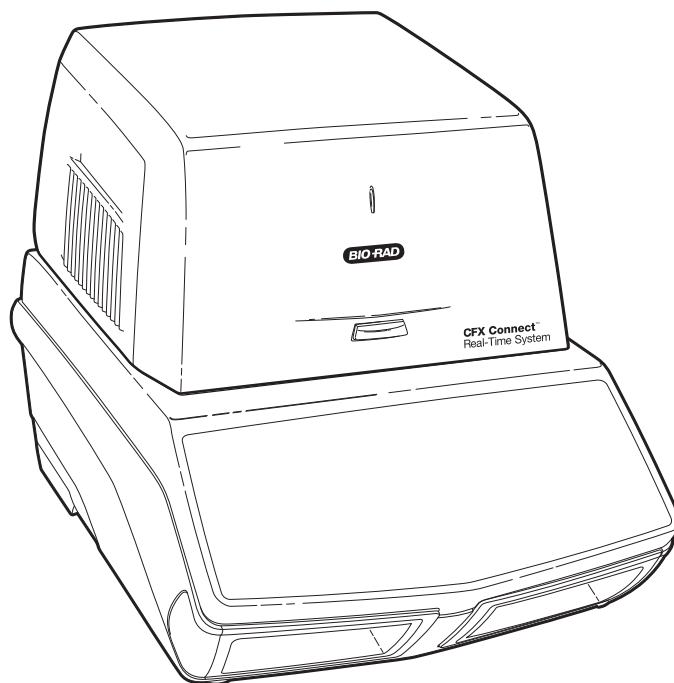

CFX Connect™ Real-Time PCR Detection System

Addendum to CFX96 Touch™ and CFX384 Touch™
Real-Time PCR Detection Systems Instruction Manual

Catalog #185-5200



BIO-RAD

Copyright ©2011 Bio-Rad Laboratories, Inc. Reproduction in any form, either print or electronic, is prohibited without written permission of Bio-Rad Laboratories, Inc.

CAL Fluor is a trademark of Biosearch Technologies, Inc. SYBR® is a trademarks of Invitrogen Corporation. Excel, Microsoft, PowerPoint, Windows, and Windows Vista are trademarks of Microsoft Corporation. FAM, HEX, and VIC are trademarks of Applied Biosystems. qbase^{PLUS} is a trademark of Biogazelle. Bio-Rad Laboratories, Inc. is licensed by Invitrogen Corporation to sell reagents containing SYBR® Green I for use in real-time PCR, for research purposes only.

LICENSE NOTICE TO PURCHASER

Bio-Rad CFX Connect™ real-time thermal cycler is a licensed real-time thermal cycler under Applied Biosystems's United States Patent No. 6,814,934 B1 for use in research, human in vitro diagnostics, and all other fields except veterinary diagnostics.

This CFX Connect detection module, when combined with a CFX Connect thermal cycler for which the applicable real-time thermal cycler royalty fee has been paid, constitutes a real-time thermal cycler licensed under U.S. Patent No. 6,814,934 and corresponding claims in any Canadian counterpart patent thereof owned by Applied Biosystems Corporation, for use solely in research, human in vitro diagnostics, and all applied fields except veterinary in vitro diagnostics. These license rights are effective only if this detection module is combined with a Bio-Rad thermal cycler for which the applicable real-time thermal cycler royalty fee has been paid and not with any other thermal cycler. No rights are conveyed expressly, by implication or estoppel to any patents on real-time methods, including but not limited to 5' nuclease assays, or to any patent claiming a reagent or kit. For further information on purchasing license rights, contact the Director of Licensing at Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California, 94404, USA.

This product is covered by one or more of the following U.S. patents, their foreign counterparts, or their foreign patents pending, owned by Eppendorf AG: U.S. Patent Nos. 6,767, 512 and 7,074,367.

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 Nos. 7,347,977, 6,340,589, and 6,528,302.

Bio-Rad Resources

Table 1 list Bio-Rad resources and how to locate what you need.

Table 1. Bio-Rad resources

Resource	How to Contact
Local Bio-Rad Laboratories representatives	Find local information and contacts on the Bio-Rad website by selecting your country on the home page (www.bio-rad.com). Find the nearest international office listed on the back of this manual.
Technical notes and literature	Go to the Bio-Rad website (www.bio-rad.com). Type a search term in the Search box and select Literature to find links to technical notes, manuals, and other literature.
Technical specialists	Bio-Rad's Technical Support department is staffed with experienced scientists to provide customers with practical and expert solutions. To find local technical support on the phone, contact your nearest Bio-Rad office. For technical support in the United States and Canada, call 800-424-6723 (toll-free phone) and select the technical support option.

Writing Conventions Used in This Manual

This manual uses the writing conventions listed in Table 2.

Table 2. Conventions used in this manual.

Convention	Meaning
NOTE:	Provides important information, including information explained in further detail elsewhere in this manual.
WARNING!	Explains very important information about something that might harm the researcher, damage an instrument, or cause data loss.

For information about safety labels used in this manual and on the CFX Connect system, see Safety and Regulatory Compliance on page iii.




Safety and Regulatory Compliance

For safe operation of the CFX Connect system, we strongly recommend that you follow the safety specifications listed in this section and throughout this manual and in the CFX96 Touch™ and CFX384 Touch™ systems instruction manual.

Safety Warning Labels

Warning labels posted on the instrument and in this manual warn you about sources of injury or harm. Refer to Table 3 to review the meaning of each safety warning label.

Table 3. Meaning of safety warning labels

	CAUTION: Biohazard! This symbol identifies components that may become contaminated with biohazardous material.
	CAUTION: Risk of danger! This symbol identifies components that pose a risk of personal injury or damage to the instrument if improperly handled. Wherever this symbol appears, consult the manual for further information before proceeding.
	CAUTION: Hot surface! This symbol identifies components that pose a risk of personal injury due to excessive heat if improperly handled.

Instrument Safety Warnings

The instrument warning labels shown in Table 4 are displayed on the instrument and refer directly to the safe use of the CFX Connect system.

Table 4. Instrument safety warning labels





Icon	Meaning
	Warning about risk of harm to body or equipment. Operating the CFX Connect real-time PCR detection system before reading this manual can constitute a personal injury hazard. For safe use, do not operate this instrument in any manner unspecified in this manual. Only qualified laboratory personnel trained in the safe use of electrical equipment should operate this instrument. Always handle all components of the system with care and with clean, dry hands.

Table 4. Instrument safety warning labels (continued)

Icon	Meaning
	Warning about handling biohazardous materials. When handling biohazardous samples, adhere to the recommended precautions and guidelines, and comply with any local guidelines specific to your laboratory and location.
	Warning about risk of burning. A thermal cycler generates enough heat to cause serious burns. Wear safety goggles or other eye protection at all times during operation. Always allow the sample block to return to idle temperature before opening the lid and removing samples. Always allow maximum clearance to avoid accidental skin burns.
	Warning about risk of explosion. The sample blocks can become hot enough during the course of normal operation to cause liquids to boil and explode.

Safe Use Specifications and Compliance

Table 5 lists the safe use specifications for the CFX Connect system. Shielded cables (supplied) must be used with this unit to ensure compliance with the Class A FCC limits.

Table 5. Safe use specifications.

Safe Use Requirements		Specifications
Temperature	Indoor use	Ambient temperature of 15 - 31°C. Relative humidity maximum of 80%, noncondensing.
Altitude		Up to 2,000 meters above sea level.

REGULATORY COMPLIANCE

This instrument has been tested and found to be in compliance with all applicable requirements of the following safety and electromagnetic standards:

- IEC 61010-1:2001 (2nd ed.), EN61010-1:2001 (2nd ed). Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General requirements
- IEC 61010-2-010:2005, EN61010-2-010:2003. Safety requirements for electrical equipment for measurement, control, and laboratory use. Part 2-010: Particular requirements for laboratory equipment for the heating of materials
- IEC 61010-2-081:2001+A1, EN61010-2-081:2002+A1. Safety requirements for electrical equipment for measurement, control, and laboratory use. Part 2-081: Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes (includes Amendment 1)
- EN 61326-1:2006 (Class A). Electrical equipment for measurement, control, and laboratory use. EMC requirements, Part 1: General requirements

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Hazards

The CFX Connect real-time PCR detection system is designed to operate safely when used in the manner prescribed by the manufacturer. If the CFX Connect system or any of its associated components are used in a manner not specified by the manufacturer, the inherent protection provided by the instrument may be impaired. Bio-Rad Laboratories, Inc., is not liable for any injury or damage caused by the use of this equipment in any unspecified manner or by modifications to the instrument not performed by Bio-Rad or an authorized agent. Service of the CFX Connect system should be performed only by Bio-Rad personnel.

Biohazards

The CFX Connect system is a laboratory product. However, if biohazardous samples are present, adhere to the following guidelines and comply with any local guidelines specific to your laboratory and location.

GENERAL PRECAUTIONS

- Always wear laboratory gloves, coats, and safety glasses with side shields or goggles
- Keep your hands away from your mouth, nose, and eyes
- Completely protect any cut or abrasion before working with potentially infectious materials
- Wash your hands thoroughly with soap and water after working with any potentially infectious material before leaving the laboratory
- Remove wristwatches and jewelry before working at the bench
- Store all infectious or potentially infectious material in unbreakable leakproof containers
- Before leaving the laboratory, remove protective clothing
- Do not use a gloved hand to write, answer the telephone, turn on a light switch, or touch anything that other people may touch without gloves
- Change gloves frequently. Remove gloves immediately when they are visibly contaminated
- Do not expose materials that cannot be properly decontaminated to potentially infectious material
- Upon completion of the operation involving biohazardous material, decontaminate the work area with an appropriate disinfectant (for example, a 1:10 dilution of household bleach)
- No biohazardous substances are exhausted during normal operations of this instrument

SURFACE DECONTAMINATION

WARNING! To prevent electrical shock, always turn off and unplug the instrument prior to performing decontamination procedures.

The following areas can be cleaned with any hospital-grade bactericide, virucide, or fungicide disinfectant:

- Outer lid and chassis
- Inner reaction block surface and reaction block wells
- Control panel and display

To prepare and apply the disinfectant, refer to the instructions provided by the product manufacturer. Always rinse the reaction block and reaction block wells several times with water after applying a disinfectant. Thoroughly dry the reaction block and reaction block wells after rinsing with water.

WARNING! Do not use abrasive or corrosive detergents or strong alkaline solutions. These agents can scratch surfaces and damage the reaction block, resulting in loss of precise thermal control.

DISPOSAL OF BIOHAZARDOUS MATERIAL

The CFX Connect system contains no potentially hazardous chemical materials. Dispose of the following potentially contaminated materials in accordance with laboratory local, regional, and national regulations:

- Clinical samples
- Reagents
- Used reaction vessels or other consumables that may be contaminated

Chemical Hazards

The CFX Connect system contains no potentially hazardous chemical materials.

Explosive or Flammability Hazards

The CFX Connect system poses no uncommon hazard related to flammability or explosion when used in a proper manner as specified by Bio-Rad Laboratories.

Electrical Hazards

The CFX Connect system poses no uncommon electrical hazard to operators if installed and operated properly without physical modification and connected to a power source of proper specification.

Transport

Before moving or shipping the CFX Connect thermal cycler or CFX Connect optical reaction module, decontamination procedures must be performed. Always move or ship the CFX Connect thermal cycler chassis and CFX Connect optical reaction module in separate containers with the supplied packaging materials to protect the instrument from damage. If appropriate containers cannot be found, contact your local Bio-Rad office.

Storage

The CFX Connect system can be stored under the following conditions:

- Temperature range: -20 to 60°C
- Relative humidity: maximum 80%

Disposal

The CFX Connect real-time PCR detection system contains electrical materials; it should be disposed of as unsorted waste and must be collected separately, according to European Union Directive 2002/96/CE on waste and electronic equipment — WEEE Directive. Before disposal, contact your local Bio-Rad representative for country-specific instructions.

Table of Contents

Bio-Rad Resources	ii
Writing Conventions Used in This Manual	ii
Safety and Regulatory Compliance.	iii
Hazards	v
Table of Contents	vii
Chapter 1. System Installation	1
Unpacking the CFX Connect System	1
System Requirements	1
Setting Up the System	2
Installing CFX Manager Software	2
Chapter 2. CFX Manager™ Software	3
Plates.	3
Chapter 3. Resources	5
Calibration Wizard	5
Checking Firmware and Software Versions Installed	6

NOTE: This addendum manual contains information for the CFX Connect™ real-time PCR detection system. This addendum should be used in conjunction with the CFX96 Touch™ and CFX384 Touch™ systems instruction manual for detailed instructions on instrument operation and data analysis.

1 System Installation

Read this chapter for information about setting up the CFX Connect™ system:

- Unpacking the CFX Connect system (page 1)
- System requirements (page 1)
- Setting up the system (page 2)
- Installing CFX Manager™ software (page 2)

Unpacking the CFX Connect System

Your CFX Connect system shipment includes these components:

- CFX Connect optical reaction module
- CFX Connect thermal cycler chassis
- USB cable
- CFX Manager software installation CD
- CFX Connect system addendum instruction manual
- CFX96 Touch™ and CFX384 Touch™ system instruction manual
- CFX Manager software quick guides for system installation, protocol, plate, data analysis, gene expression analysis, and qbase^{PLUS} software setup
- CFX Manager software video tutorial

Remove all packing materials and store them for future use. If any items are missing or damaged, contact your local Bio-Rad office.

System Requirements

To operate the CFX Connect system, use the following power sources and cables:

- **Input power:** 100 - 240 VAC, 50 - 60 Hz
- **Indoor use:** Ambient temperature of 15 - 31°C. Relative humidity maximum of 80%, noncondensing
- **USB cable:** the system is controlled by a computer via a USB cable. The provided cable from Bio-Rad is sufficiently shielded for use

NOTE: For a full list of the safety and compliance requirements for this instrument, see “Safety and Regulatory Compliance” on page iii

Setting Up the System

Please follow the instructions for **Setting Up the System** from the CFX96 Touch and CFX384 Touch systems instruction manual.

NOTE: The CFX Connect optical module can only be used with the CFX Connect thermal cycler chassis. The CFX Connect system requires a computer and CFX Manager software to operate.

Installing CFX Manager Software

CFX Manager software is run on a personal computer (PC) with Windows XP, Windows Vista, or Windows 7 operating system. The software is required to control the CFX Connect system and to analyze real-time PCR data. Computer system requirements and instructions to install the software can be found in the CFX96 Touch™ and CFX384 Touch™ systems instruction manual.

Recommended Plastic Consumables

The CFX Connect system accepts both low-profile 0.2 ml plates and tubes. Bio-Rad recommends the following consumables for optimal results:

- **MLL-9601.** Low-profile 96-well unskirted plates with clear wells
- **MLL-9651.** Low-profile 96-well unskirted plates with white wells
- **HSP-9601.** Hard-Shell 96-well skirted plates with white shell and clear wells
- **HSP-9655.** Hard-Shell 96-well skirted plates with white shell and white wells
- **TLS-0801.** Low-profile 0.2 ml 8-tube strips without caps, clear wells
- **TLS-0851.** Low-profile 0.2 ml 8-tube strips without caps, white wells
- **TCS-0803.** Optical flat 8-cap strips, for 0.2 ml tubes and plates
- **MSB-1001.** Microseal 'B' adhesive seals, optically clear

Shutting Down the System

To shut down the CFX Connect system, follow these suggestions:

- After a run, click the open lid button on the front of the CFX Connect system to access the samples loaded in the thermal cycler block.
- Remove the samples from the block and click the close lid button to close the lid of the CFX Connect system.

Press the power switch on the back panel of the CFX Connect thermal cycler to power down the system.

2 CFX Manager™ Software

Refer to the chapters listed below of the CFX96 Touch™ and CFX384 Touch™ systems instruction manual for detailed information on the following topics.

- CFX Manager software (Chapter 2)
- Performing runs (Chapter 3)
- Protocols (Chapter 4)
- Data analysis overview (Chapter 7)
- Data analysis windows (Chapter 8)
- Gene expression analysis (Chapter 9)
- Users and preferences (Chapter 10)

Plates

Refer to Chapter 5 of the CFX96 Touch and CFX384 Touch systems instruction manual for detailed information on the following topics.

- Plate editor window
- Plate size and type
- Select fluorophores window
- Well loading controls
- Well groups manager window
- Plate spreadsheet view window

Scan Mode

The CFX Connect™ system excites and detects fluorophores in three channels. The system uses multiple data acquisition scan modes to collect fluorescence data during a run.

Select one of these scan modes in the Plate Editor window toolbar:

- **All Channels.** Includes channels 1 and 2
- **SYBR/FAM only.** Includes only channel 1 and provides a fast scan
- **FRET.** Includes only the FRET channel and provides a fast scan

3 Resources

Refer to Chapter 11 of the CFX96 Touch™ and CFX384 Touch™ systems instruction manual for detailed information on the following topics.

- Automatic software and instrument updates
- LIMS integration
- Instrument maintenance
- Application log
- Troubleshooting
- References

Calibration Wizard

The CFX Connect™ system is factory calibrated for commonly used fluorophores in white-well and clear-well plates (Table 6).

Table 6. Factory calibrated fluorophores and channels.

Fluorophores	Channel
FAM, SYBR® Green I	1
VIC, HEX, TET, CAL Fluor Gold 540	2

The CFX Connect system also includes a channel dedicated to FRET chemistry; this channel does not require calibration for specific dyes.

To calibrate the CFX Connect real-time PCR system for new dyes, please refer to the **Calibration Wizard** section of the CFX96 Touch and CFX384 Touch systems instruction manual.

Checking Firmware and Software Versions Installed

Firmware and software updates for the CFX Connect system and CFX Manager™ software will be available periodically . To confirm that your system is up to date, check the version of firmware and software installed for the CFX Connect system on your computer. Compare these to the latest verisons posted on the Bio-Rad website at www.bio-rad.com/pcr_updates/.

To check for the installed firmware and software versions launch CFX Manager software, then follow the steps below.

For firmware:

1. In the **Detected Instruments** pane window, right-click on your CFX Connect instrument and select **Properties** (Figure 1).

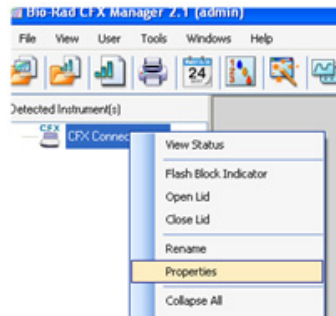


Fig. 1. Navigating in the detected instrument pane window.

2. The **Instrument Properties** window displays the installed firmware version (Figure 2).

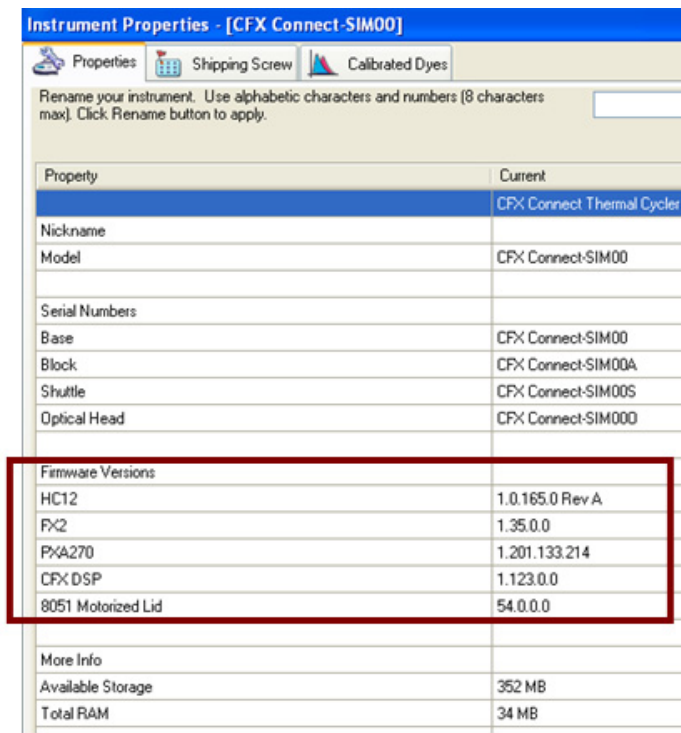


Fig. 2. Installed firmware version displayed in the **Instrument Properties** window.

For software:

1. Select **Help > About** from the main software window (Figure 3).

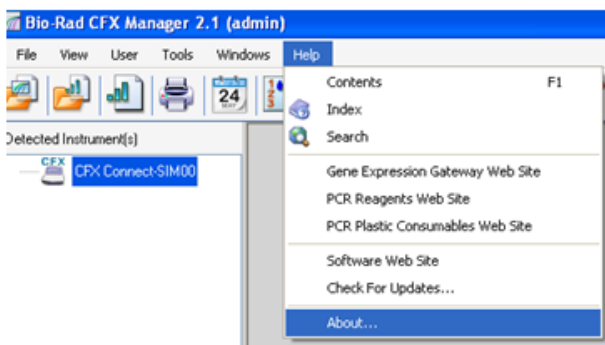


Fig. 3. Navigating in the main window of CFX Manager software.

2. The **About Bio-Rad CFX Manager** window displays the installed software version (Figure 4).

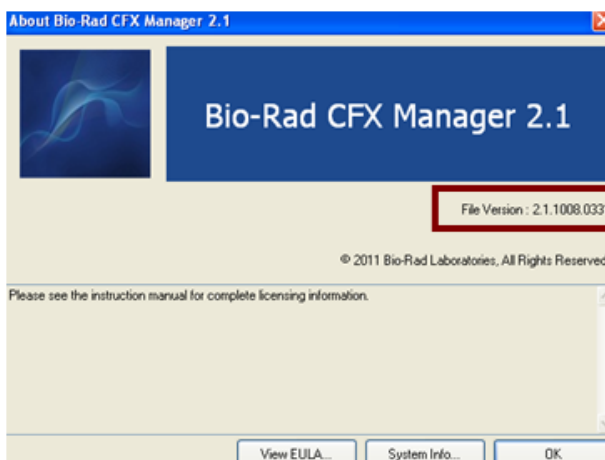


Fig. 4. Installed software version displayed in the **About Bio-Rad CFX Manager** window.

If the firmware and software versions installed on your computer does not match the current versions listed on the website, download and install the updates.



**Bio-Rad
Laboratories, Inc.**

Life Science
Group

Web site www.bio-rad.com **USA** 800 424 6723 **Australia** 61 2 9914 2800 **Austria** 01 877 89 01 **Belgium** 09 385 55 11 **Brazil** 55 31 3689 6600
Canada 905 364 3435 **China** 86 21 6169 8500 **Czech Republic** 420 241 430 532 **Denmark** 44 52 10 00 **Finland** 09 804 22 00
France 01 47 95 69 65 **Germany** 089 31 884 0 **Greece** 30 210 777 4396 **Hong Kong** 852 2789 3300 **Hungary** 36 1 459 6100 **India** 91 124 4029300
Israel 03 963 6050 **Italy** 39 02 216091 **Japan** 03 6361 7000 **Korea** 82 2 3473 4460 **Malaysia** 60 3 2117 5260 **Mexico** 52 555 488 7670
The Netherlands 0318 540666 **New Zealand** 64 9 415 2280 **Norway** 23 38 41 30 **Poland** 48 22 331 99 99 **Portugal** 351 21 472 7700
Russia 7 495 721 14 04 **Singapore** 65 6415 3170 **South Africa** 27 861 246 723 **Spain** 34 91 590 5200 **Sweden** 08 555 12700
Switzerland 061 717 95 55 **Taiwan** 886 2 2578 7189 **Thailand** 66 2 6518311 **United Kingdom** 020 8328 2000