

Imaging



Gel Doc™ XR+ Imager

**Effortless and Accurate
Gel Imaging and Analysis**



Fast, Automated, Reproducible Imaging for Perfect Images Every Time

For more than two decades, the Molecular Imager® systems from Bio-Rad have been widely recognized and trusted high-quality imaging instruments. Whether you perform routine imaging of PCR products or protein purifications, the Gel Doc XR+ imaging system will meet your needs. Designed for ease of use and an ability to support a wide array of applications, it is a perfect fit for individual laboratories, multiuser core facilities, or research on infectious diseases such as avian flu and H1N1 flu. Quality standards of engineering and manufacturing make the system adaptable to academic or biopharmaceutical laboratories. Thousands of researchers over the years have published Gel Doc XR+ system images in dozens of journals and established a record of reliability and excellence for the system.

The Gel Doc XR+ system enables quick and easy visualization, documentation, and analysis of nucleic acid and protein gels, blots, and macroarrays with a few clicks of the mouse. It is a flexible and easy to use system that supports fluorescence and colorimetric detection methods. The large imaging area accommodates a broad range of gel sizes, from large handcast polyacrylamide gels to small ReadyAgarose™ gels. The Gel Doc XR+ system is the ideal accompaniment to your PCR and electrophoresis systems, enabling image analysis and documentation of restriction digests, amplified nucleic acids, and genetic fingerprinting.

What the Gel Doc XR+ System Can Do for You:

Automated workflow from image to results

- Makes your gel imaging and analysis quick and effortless
- Eliminates the need for training
- Allows any user to repeat the same workflow in exactly the same way

Automated image capture

- Produces beautiful pictures of your gels
- Delivers quantitative analysis of your protein and DNA samples

Automated image optimization

- Delivers image data that is always optimized and reproducible without imaging artifacts

Automated image analysis

- Produces reports with data organized the way you want
- Minimizes time from lab work to presentations



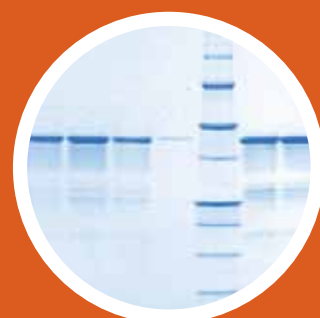


Gel Doc XR+ System Applications

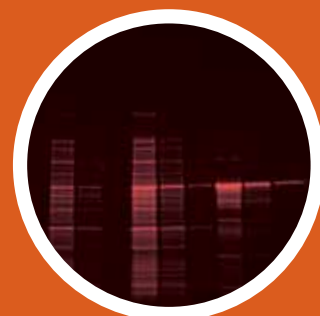
Nucleic Acid Electrophoresis	Protein Gel Electrophoresis	Blotting
Ethidium bromide	Coomassie Blue	Colorimetric
SYBR® Green	Copper stain	Qdots 525
SYBR® Safe	Zinc stain	Qdots 565
SYBR® Gold	Flamingo™ fluorescent gel stain	Qdots 625
GelGreen	Oriole™ stain	Cy2
GelRed	Silver stain	Alexa Fluor 488
Fast Blast™ DNA stain	Coomassie Fluor Orange	DyLight 488
	SYPRO Ruby	Fluorescein
	Krypton	



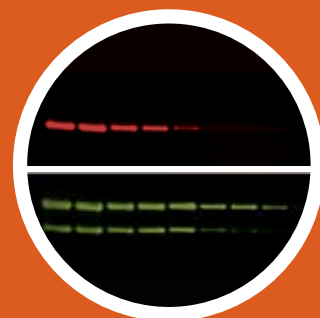
SYBR® Safe stain



Coomassie Brilliant Blue R-250 stain



Oriole™ stain



Qdot blot

Gel Doc XR+ System Is Powered with Image Lab™ Software



Fast Results from a Completely Automated Workflow

The Gel Doc XR+ system is controlled by Image Lab software to automatically and reproducibly generate gel images. Image Lab software is fast, taking you from gel to printed results in seconds. Your results are visible with a single click of the mouse.

Image Lab software eliminates the guesswork in imaging. You won't have to perform tedious repetitive steps to find the right focus setting. You won't have to guess which exposure times will best visualize the bands of interest. Image calculations and corrections are done automatically for your application. Whether you are working with protein gels, nucleic acid gels, or your own customized imaging application, the Gel Doc XR+ system will select the proper settings for optimum detection conditions of the stain or label.

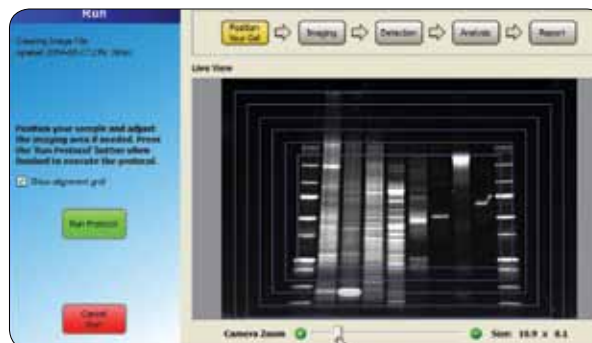
You also won't need to set aside time for training new users; the system and the software are easy to use and work together from setup to finish. Imaging and image analysis can become the simplest work in the laboratory.

Simple and Reproducible Image Capture

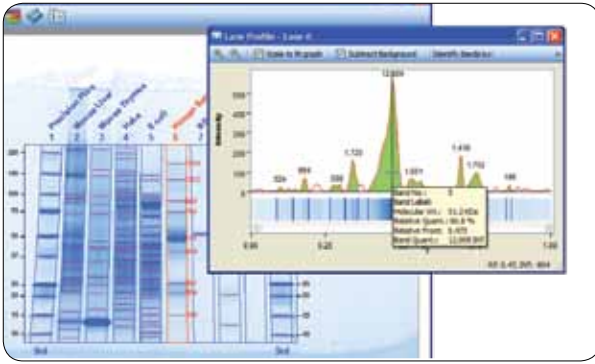
Place your gel on the Gel Doc imager's sample tray and run your protocol — your work is done in just one step. Design and save protocols for the imaging steps in your experiments and Image Lab software will run the protocols exactly the same way every time. The protocol feature negates variability in results due to different people operating the imaging system. When a new project is related to an existing one, you can reuse the previously created protocol by revising its parameters and renaming it. Image Lab software lets you devote your valuable time to research and discovery instead of to wondering if you used your imaging system properly.



Automated workflow for any application.



The image stays focused at any zoom point.



Lane profiles depict band intensity and represent quantities of sample components separated in a gel.

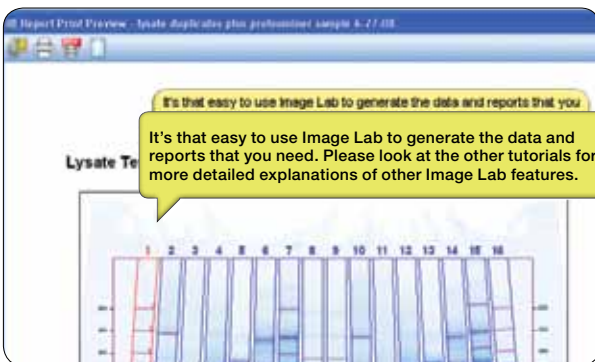
Results and Reports

In addition to printing a picture of your gel for your records, Image Lab software creates and prints reports of your experimental data. Any part of the report can be copied into popular document processing applications such as Adobe Acrobat and Microsoft Word, PowerPoint, or Excel files. To include a 3-D view of your gel, copy it using the Snapshot tool, and paste it into your presentation slide. High quality, good-looking reports are easy to produce with the combined power of the Gel Doc XR+ system and Image Lab software.

When an analysis parameter is changed, the results tables are updated instantly to reflect the new data.

Tutorials

With Image Lab software, you don't need previous imaging experience to produce optimal gel images. Detailed tutorials are accessible via the toolbar and start-up page to acquaint you with all of the Image Lab software capabilities.



Tutorials for novice users.

Sophisticated Software

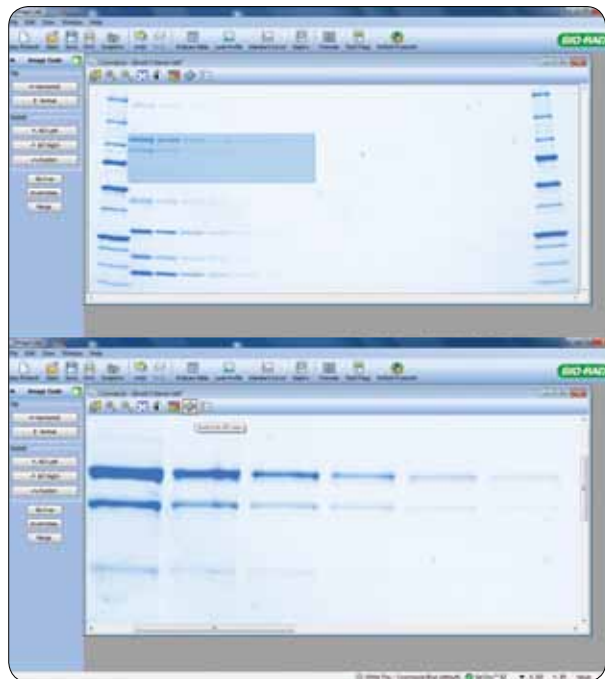
Automated workflows — the entire workflow (image capture, results, report) is recorded in a protocol file. Protocols can be edited, resaved, reused, and shared among multiple users. Allows 100% repeatability of the workflow and ensures optimized image data and analysis specific to the selected application.

Auto focus — Image Lab software's proprietary algorithms calibrate the system at setup for an automatic focused image at any zoom level. Eliminates user error and the need for manual camera adjustments to obtain an image, leading to higher image quality.

Auto camera aperture control — you do not have to focus or adjust aperture setting. Only adjust the zoom to position sample. Allows you to quickly image across different applications with different aperture setting requirements.

Flat fielding — flat fielding calibrations are performed for each application automatically. Delivers image data that is always optimized and reproducible without imaging artifacts for superior image uniformity and quantification.

Increased image resolution — decreases pixelation when images are cropped or zoomed. Yields smooth, clean images at any zoom level.

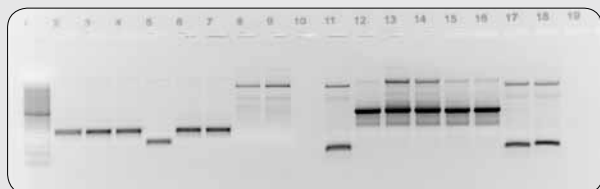


Images can be zoomed in without losing resolution.

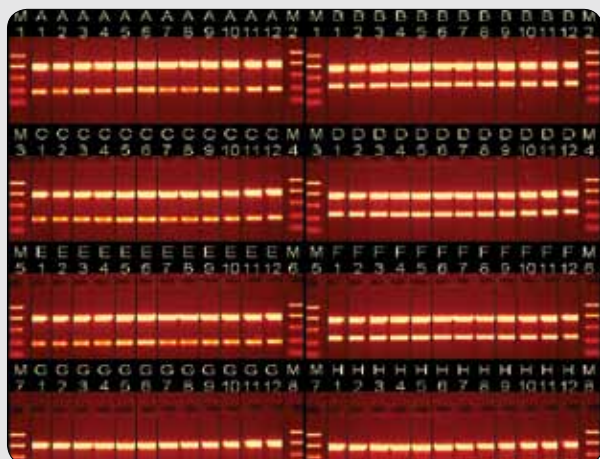
Greater export functionality — no need to export images to another program such as Photoshop image editing software to change the dpi before importing for publication. You can now define your desired resolution within Image Lab software.

Molecular Biology Applications

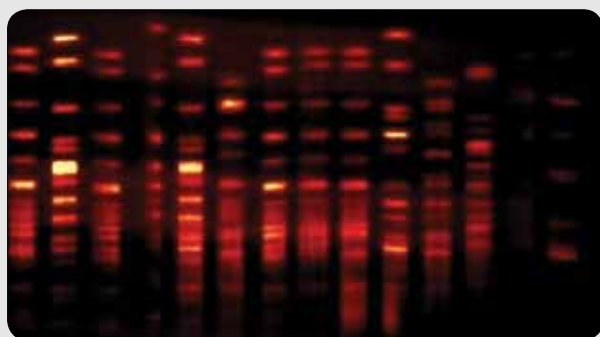
The Gel Doc XR+ system can be used in multiple workflows. Gel electrophoresis remains an important tool for quantitative analysis of complex protein and nucleic acid samples. Applications include nucleic acid isolation or amplification for molecular cloning techniques, nucleic acid quality evaluation prior to quantitative PCR, gene silencing, gene modulation, and gene expression. DNA gel electrophoresis is also used for fine separations of nucleic acid fragments or entire plasmids for analysis, cloning, transfection, environmental testing, and quality assurance testing. Gel Doc XR+ systems are suitable for laboratories engaged in RNAi analysis, molecular diagnostics, epigenetics, pharmacogenomics, and forensic testing of genomic DNA.



E. coli colony screening by PCR.



ReadyAgarose 96 Plus gel stained with EtBr.

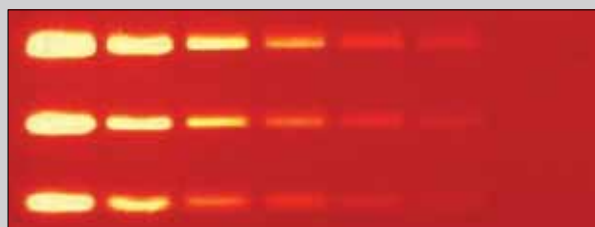
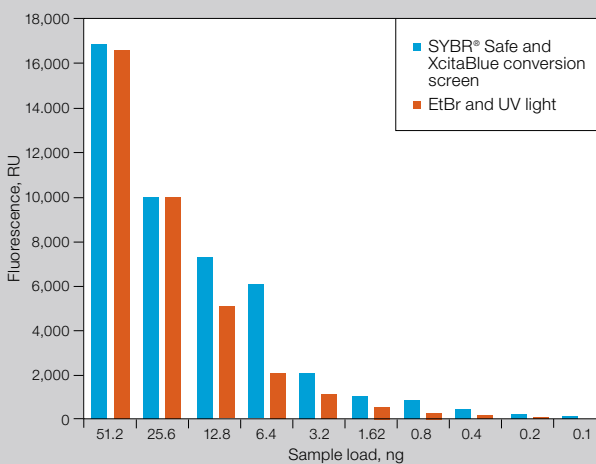


PFGE gel stained with EtBr.

Safe DNA Imaging

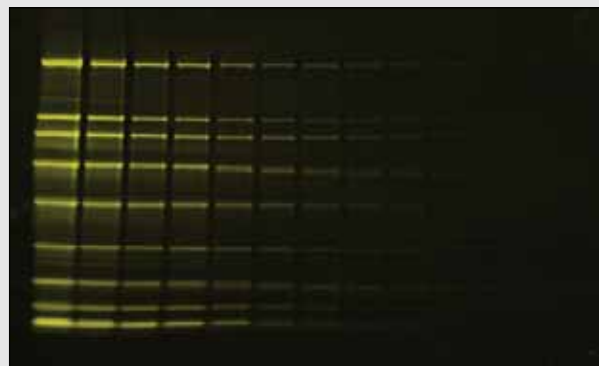
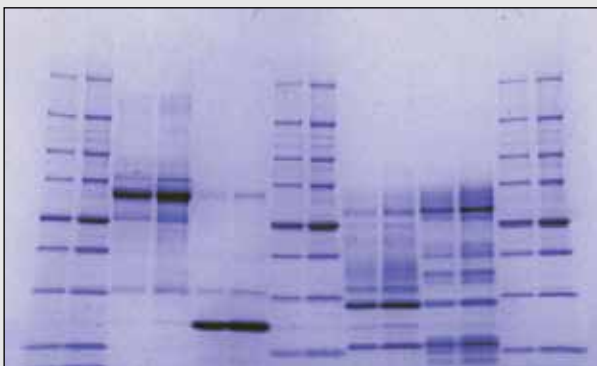
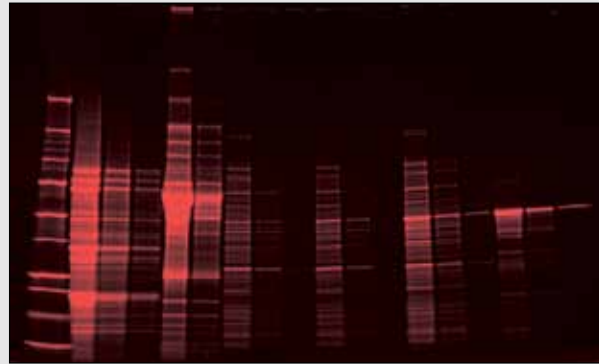
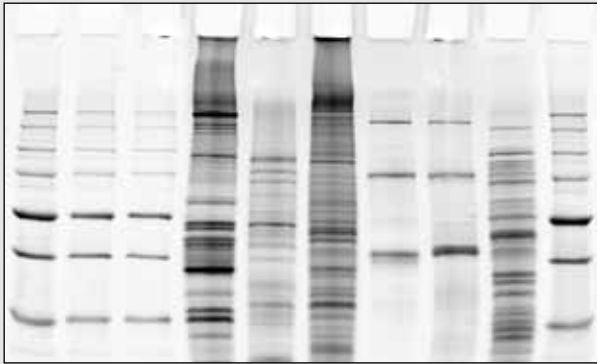
Acquire images of DNA electrophoresis samples without exposing samples or users to harmful UV radiation by adding the XcitaBlue™ conversion screen to your Gel Doc XR+ system. The screen enables detection of DNA with SYBR® Safe stain and other blue light-excitatable fluorescent stains such as GelGreen and SYBR® Green. Images and analyzed data produced by Gel Doc XR+ systems are often incorporated into sample preparation and sample quantitation workflows.

Ethidium Bromide vs. SYBR® Safe DNA Stain Detection



Alternative to UV illumination to better preserve DNA samples.

Top, serial dilutions of EtBr-stained precision molecular mass ruler (Bio-Rad Laboratories, Inc.) on agarose gel imaged with UV light; **bottom**, serially diluted precision molecular mass ruler stained with SYBR® Safe stain on agarose gel imaged with XcitaBlue conversion screen. There is no loss in sensitivity when a combination of SYBR® Safe nucleic acid fluorescent stain and less harmful blue excitation is used instead of UV-excitatable EtBr. The image of the gel stained with SYBR® Safe stain was taken using the XcitaBlue conversion screen and a filter for SYBR® Safe stain and GFP. Less harmful detection methods preserve samples better and more efficiently for downstream uses such as cloning.

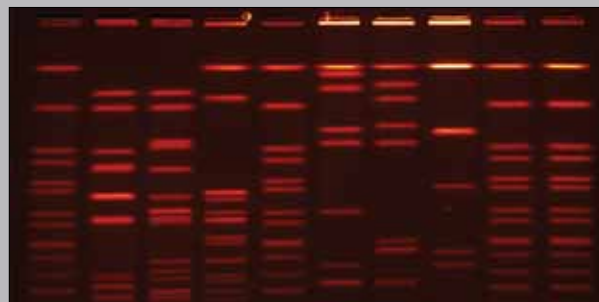


Protein gels stained with silver stain (top) and Coomassie Blue stain (bottom). Documentation of protein gels for lab notebooks or sample analysis, including protein purity and concentration assessment for differential protein expression studies or to monitor gene modulation products, is supported by the array of analysis tools in the Gel Doc XR+ system. The gel stained with silver stain shows salmon muscle, soybean, and rat brain extracts, protein mixtures, and *E. coli* extracts compared with Precision Plus Protein™ Unstained standards.

Protein gels fluorescence-stained with Oriole stain (top) and Flamingo fluorescent gel stain (bottom). Achieve higher levels of sensitivity with fluorescent stains to differentiate proteins with low expression. Resolve closely spaced spots or bands for protein profiling, quantitation, and characterization.

Capturing Gene Typing Results

Gel Doc XR+ systems are the imagers of choice for pulsed field gel electrophoresis (PFGE). Gel Doc XR+ system images generated from CHEF Mapper® XA systems for PFGE have been used often by PulseNet International (a global network of health and food regulatory agency laboratories coordinated by the Centers for Disease Control and Prevention) for strain typing and molecular epidemiology studies. Image data and analysis of PFGE gels have contributed to new findings in cancer research, food safety, public health, quality control, and genome mapping.



Images produced by the Gel Doc XR+ system have contributed to new findings in many fields. This gel shows a strain of *Salmonella* identified in a food safety experiment.

Specifications

Automation Capabilities

Workflow automated selection	Application driven; user selected or recalled by a protocol
Workflow automated execution	Controlled by a protocol via application specific setup for image area, illumination source, filter, analysis, and reporting
Workflow reproducibility	100% repeatability via recallable protocols; from image capture to quantitative analysis and reports
Autofocus (patent pending)	Precalibrated focus for any zoom setting or sample height
Image flat fielding*	Dynamic; precalibrated and optimized for every application
Autoexposure	2 user-defined modes (intense or faint bands)

Hardware Specifications

Maximum sample size (L x W)	28 x 36 cm
Maximum image area (L x W)	19.4 x 26 cm
Excitation source	Trans-UV and epi-white are standard (302 nm included, with 254 and 365 nm available as options); optional trans-white, self-powered or conversion screen; optional XcitaBlue** UV/blue conversion screen
Illumination control	3 modes (trans-UV, trans-white, epi-white)
Detector	CCD
Image resolution	4 megapixels
Pixel size (H x V)	4.65 x 4.65 μ m
Filter holder	3 positions (2 for filters, 1 without filter)
Emission filters	1 included (standard), 3 optional
Dynamic range	>3.0 orders of magnitude
Pixel density (gray levels)	4,096
Instrument size (L x W x H)	36 x 60 x 96 cm
Instrument weight	32 kg

Operating Ranges

Operating voltage	110/115/230 V AC nominal
Operating temperature	10–28°C (21°C recommended)
Operating humidity	<70% noncondensing

* U.S. patent 5,951,838.

** Use the optional XcitaBlue kit if performing SYBR® Safe DNA applications; the UV to blue conversion screen allows visualization of DNA samples while protecting user and sample from UV radiation damage.

Ordering Information

Catalog #	Description
170-8195	Molecular Imager® Gel Doc™ XR+ System with Image Lab Software, PC or Mac, includes darkroom, UV transilluminator, epi-white illumination, camera, cables, Image Lab software

Accessories

170-7950	White Light Transilluminator
170-8001	White Light Conversion Screen
170-8182	XcitaBlue Conversion Screen, includes view goggles; blue conversion screen for viewing SYBR® Green, SYBR® Safe, GFP, Flamingo, and other fluorescent gel stains
170-8183	XcitaBlue Conversion Screen and Filter, includes view goggles and SYBR® Safe filter (170-8075, 560DF50); blue conversion screen for viewing SYBR® Green, SYBR® Safe, and other fluorescent gel stains
170-8074	Filter 520DF30 62 mm, for SYBR® Green/GFP/SYBR® Gold/fluorescein
170-8075	Filter 560DF50 62 mm, for SYBR® Safe/Cy3/rhodamine
170-8076	Filter 630BP30 62 mm, for SYPRO Ruby/Texas Red
170-8077	Filter 480BP70 62 mm, for Hoechst/coumarin
170-8098	254 nm UV Lamps, pkg of 6
170-6887	365 nm UV Lamps, pkg of 6
170-8097	Standard 302 nm UV Lamps, pkg of 6
170-8089	Mitsubishi Thermal Printer
170-7581	Mitsubishi Thermal Printer Paper, 4 rolls
170-8184	Gel Alignment Templates, pkg of 3

Software

170-9690*	Image Lab Software, PC or Mac, for automated image capture, optimization, and 1-D data analysis
170-8199	Image Lab Upgrade for Gel Doc XR+ System, includes Image Lab software, focus calibration target, flat fielding disk, installation guide, and user manual

* Included with the imaging system.

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Practice of the polymerase chain reaction (PCR) may require a license.

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