western blotting



iBright FL1000

Introducing iBright CL1000 and FL1000 Imaging Systems



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Stunningly easy western blot imaging—from start to finish

Modern life science research is moving at a rapid pace. What has remained constant, however, is the importance of the simple western blot as a foundational research technique. Western blotting is often the compass that guides the start of a research project—clear results can pave a path to move a project forward.

The team of scientists at Thermo Fisher Scientific spent thousands of hours designing and refining the imaging experience of our new Invitrogen[™] iBright[™] CL1000 and FL1000 Imaging Systems. These high-performance instruments enhance the western blotting experience through advanced automated features and an interface that is easy to use for researchers of all experience levels. Be empowered to take on your research challenges and discover western blot imaging designed to work for you.

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Optimal results with minimal hands-on time

Intuitive interface and automated features



Load and go

Insert samples using our motorized, automatically opening drawer, and select from four imaging modes (fluorescent blot, chemiluminescent blot, protein gel, or nucleic acid gel).

Feel right at home

The experience begins with our capacitive LCD touch screen, which responds to inputs like other popular touch screen devices do.





Streamlined interface and workflows

The interface has a simple, logical layout of functions and features. Workflows are similar between imaging modes,

for a smooth imaging experience regardless of sample type, so researchers of all experience levels can quickly become experienced at imaging with minimal training.



Protein gel mode

Nucleic acid gel mode

Hassle-free sample alignment, focus, and zoom

Rather than having to open the sample drawer and repeatedly reposition your sample to achieve proper alignment, iBright Imaging Systems automatically determine the sample position and can rotate samples left or right up to 10° on a mechanically rotating sample stage. Mechanical rotation eliminates the need to digitally rotate the sample and preserves the integrity of the data, as digital rotation can lead to data alterations.



The iBright Imaging Systems automatically determine if the sample requires zoom in order to maximally utilize the field of view. If imaging a single blot, the camera will move toward the sample (up to 2x zoom). This puts the camera physically closer to the sample, which further maximizes sensitivity, as the light travels a shorter distance to the camera sensor. The iBright Imaging Systems automatically adjust focus for each level of zoom, producing crystal-clear images.



Figure 1. Digital rotation vs. mechanical rotation. (A) Pixels rotate with digital rotation, so bands appear jagged. With mechanical rotation, the sample itself rotates, so bands remain smooth in appearance as the pixels remain aligned. **(B)** Graphic depicting iBright Imaging System stage before and after rotation.

Figure 2. Zoom function. (A) At 1x zoom, the field of view is 22.5 cm (W) x 18.0 cm (H). Four full-sized mini blots or gels can be accommodated. (B) The blot outlined in A, when repositioned in the center of the field of view, at 2x zoom.

Analysis in a fraction of the time

iBright Imaging Systems feature automatic on-board data analysis, which allows for instantaneous lane and band identification and molecular weight marker overlay, greatly simplifying and streamlining basic post-image



data analysis. Quantitation and densitometry analysis can be performed directly on the instruments. Up to 4 mini blots or gels can be analyzed simultaneously, greatly increasing throughput.



Figure 3. On-board auto-analysis. Automatic lane and band identification on (A) a single mini blot and (B) 4 mini blots. These blots were imaged in chemiluminescent blot mode.



Push-button optimized exposure

Smart Exposure technology and powerful camera

Capture crystal-clear images

Smart Exposure[™] technology rapidly determines optimal exposure time, which helps minimize the potential for over- or underexposed images, and the need to repeat exposures to get the desired signal. Combining



Smart Exposure technology with a sensitive 9.1 megapixel (MP) cooled CCD camera, iBright Imaging Systems provide powerful imaging potential, helping to enable the detection of subtle differences in protein expression.



Figure 4. Detect subtle protein modifications using iBright Imaging Systems. HeLa cells were stimulated with staurosporine to induce protein cleavage, or with IFN-a to induce protein phosphorylation. Equal amounts of lysates were run on Invitrogen[®] Novex[®] Tris-glycine gels, transferred, and probed with antibodies against PARP, phospho-STAT3, or STAT3. Blots were then probed with relevant HRP-conjugated secondary antibodies, developed with Thermo Scientific[®] SuperSignal[®] West Dura chemiluminescent substrate, and visualized on the iBright FL1000 Imaging System with 2 min exposure (PARP), 3 min exposure (phospho-STAT3), and 52 sec exposure (STAT3).



Figure 5. iBright Imaging Systems feature a powerful 9.1 MP camera for greater sensitivity compared to instruments with a lower-resolution camera. Two-fold serial dilutions of HeLa cell lysate (starting at 80 μg/lane) were loaded and run on Novex Tris-glycine gels, transferred, and probed with antibodies against DDX3 or Ku80 proteins. Blots were then probed with relevant HRP-conjugated secondary antibodies, developed with Thermo Scientific[™] SuperSignal[™] West Pico PLUS chemiluminescent substrate and visualized on the iBright FL1000 Imaging System and another imaging device with a lower-quality, 4.1 MP camera—each with 10 sec exposures.



Figure 6. Comparison of detection sensitivity and dynamic range for film and the iBright FL1000 Imaging System. (A) A luminometer reference plate emitting light at varying fixed intensities and specific wavelength (540 nm) was used to expose film or to acquire an image on the iBright FL1000 Imaging System for 10 seconds. More luminometer spots are visible on the image from the iBright instrument, indicating higher sensitivity compared to film. (B) One-minute exposures to the same luminometer plate, with graphical analysis. Image analysis reveals the better signal linearity and dynamic range of signals acquired using the iBright FL1000 Imaging System compared to film.

A clear path to multiple imaging applications

Epi-LED illumination and imaging modes

Big field of view, small footprint

The iBright Imaging Systems feature a light path design that helps enable a large functional viewing area in a relatively small instrument footprint.



Visible mode image



Fluorescent mode (imaging the same blots)

Figure 7. Large field of view. The large field of view (22.5 x 18.0 cm) enables capture of up to 4 mini blots or gels.

Long-life epi-LED illumination

The iBright FL1000 Imaging System uses a simple combination of two high-quality long-life epi-LEDs for fluorescence imaging applications. One broad-spectrum white LED is used as the light source for RGB fluorescence and far-red fluorescence. The other LED is optimized for near-IR fluorescence. Light from these sources passes through our excitation and emission filters to enable many reagent options for protein gel, nucleic acid gel, and blot imaging applications.

Excitation channel	Filter range (nm)	Emission channel	Filter range (nm)	Example compatible fluorophores
EX1	455–485	EM1	510-555	Alexa Fluor Plus 488, Alexa Fluor 488
EX2	515–545	EM2	565–615	Alexa Fluor Plus 555, Alexa Fluor 546
EX3	610–635	EM3	675–720	Alexa Fluor Plus 647, Alexa Fluor 594
EX4	655–680	EM4	725–750	Alexa Fluor Plus 680, Alexa Fluor 680
EX5	745–765	EM5	810-850	Alexa Fluor Plus 800, Alexa Fluor 790

Table 1. iBright FL1000 Imaging System filter set.

Table 2. Imaging modes.

Imaging capability	What kind of signal can be captured?
Protein gel	Colorimetric staining of gels (e.g., Coomassie, silver) and membranes (e.g., Ponceau S, Thermo Scientific [™] MemCode [™] stain)
Nucleic acid gel	Ethidium bromide and Invitrogen [™] SYBR [™] dye staining
Chemiluminescent blot	Chemiluminescence using all popular HRP and AP substrates (e.g., Thermo Scientific [™] SuperSignal [™] and Invitrogen [™] WesternBreeze [™] substrates)
Fluorescent blot*	Fluorescence with popular RGB (visible range) and near-IR fluorophores (e.g., Invitrogen [™] Alexa Fluor [™] and Alexa Fluor [™] Plus, Thermo Scientific [™] DyLight [™] dyes)

* FL1000 model only

Table 3. Examples of reagents that can be detected using the iBright Imaging Systems.

Reagent	FL1000	CL1000	Reagent	FL1000	CL1000
Chemiluminescent detection reagents for blo	ots		Visible fluorophores		
SuperSignal West Pico PLUS	٠	•	Alexa Fluor 488, Alexa Fluor Plus 488	•	
SuperSignal West Dura	٠	•	Alexa Fluor 546	•	
SuperSignal West Femto	٠	•	Alexa Fluor 555, Alexa Fluor Plus 555	•	
Pierce ECL Plus	•	•	Alexa Fluor 568	•	
Pierce ECL	•	•	Alexa Fluor 594	•	
WesternBreeze	•	•	Alexa Fluor 633	•	
Colorimetric detection reagents for blots			DyLight 488	•	
1-Step Ultra TMB Blotting Solution	•	•	DyLight 550	•	
1-Step NBT/BCIP	•	•	DyLight 633	•	
Protein gel stains			WesternDot 585	•	
Coomassie stains	٠	•	WesternDot 625	•	
Silver stains	٠	•	NIR fluorophores		
SYPRO Ruby	•	•	Alexa Fluor 647, Alexa Fluor Plus 647	•	
SYPRO Orange	•	•	Alexa Fluor 660	•	
SYPRO Tangerine	•	•	Alexa Fluor 680, Alexa Fluor Plus 680	•	
SYPRO Red	•	•	Alexa Fluor 790	•	
Coomassie Fluor Orange	٠	•	Alexa Fluor Plus 800	•	
Nucleic acid dyes/stains			DyLight 650	•	
Ethidium bromide	•	•	DyLight 680	•	
SYBR Green I	•	•	DyLight 800	•	
SYBR Green II	•	•	WesternDot 655	•	
SYBR Safe	•	•	WesternDot 800	•	
SYBR Gold	•	•			

Accelerate your research

When using fluorescent reagents in combination with our filter sets, up to 4-color fluorescence western blot multiplexing is possible, expanding the potential to study multiple proteins in a single blot. Obtain more meaningful and representative comparisons to enhance your experiments. Smart Exposure technology further improves acquisition of multiplex fluorescence western blot data, because exposure times are optimized for each fluorescence channel separately.



4-color fluorescence blot, individual channels (left and right panels), and pseudocolored composite (center panel)

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3-color fluorescence blot

4-color fluorescence blots

2-color fluorescence blots

Figure 8. Multiplexed fluorescence western blots. (A) Four color fluorescence blot, with images from individual channels displayed in grayscale, and pseudocolored composite image. (B) Left to right: 3-color fluorescence blot, 4-color, high-throughput image with 4 mini blots, and 2-color fluorescence, high-throughput image with 4 mini blots.

Streamlined image analysis

iBright Analysis Software

Big performance in a simple package

Invitrogen[™] iBright[™] Analysis Software expands upon the on-board analysis features of the iBright Imaging Systems, with in-depth image adjustment and data analysis capabilities. iBright Analysis Software was designed to complete the overall intuitive imaging experience.



Figure 9. iBright Analysis Software - a complete data analysis suite.

Software workspace	Function	Features
lmage gallery	Explore and organize your images	View, store, sort, search, select, import, export, and create reports
Image adjust	Fine-tune and refine your images for presentations	Rotate, straighten, flip, zoom, crop, invert, adjust contrast and gamma levels, apply false colors
Image analysis	Gain a deeper understanding of the data	Auto-analysis (automatically detect lanes and bands), manual analysis (user-defined), quantitation (relative or absolute), and normalization using loading controls



iBright Analysis Software: image gallery mode







iBright Analysis Software: image analysis mode

Figure 10. iBright Analysis Software interface. (A) image gallery mode, (B) image adjust mode, (C) image analysis mode.

Go green Green LED transilluminator

Cloud connectivity helps increase productivity

iBright Analysis Software is built on the Thermo Fisher Cloud web-based platform, and is part of the Thermo Fisher Connect suite. Data can be exported directly from iBright Imaging Systems and securely stored in Thermo Fisher Cloud. As the iBright Analysis Software is web-based, you can access, review, analyze, and share your data wherever an internet connection is available. Furthermore, with Thermo Fisher Connect you can determine instrument status, firmware edition, and usage history, providing an extra degree of control over the monitoring of your investment.



Keep your data secured

Thermo Fisher Connect is powered by Thermo Fisher Cloud which uses powerful security standards that include high levels of encryption and network firewalls, so your data remain secure. Thermo Fisher Cloud also provides data backup and recovery so that even in emergencies, your data remain secure.



For further details about the Thermo Fisher Cloud platform and data security, go to **thermofisher.com/cloudsecurity**

The iBright Imaging Systems utilize a transilluminator based on green LEDs. Our green LED transilluminator effectively excites popular DNA dyes such as ethidium bromide and SYBR Green dyes, and offers many additional benefits.

No harmful UV rays

While UV light effectively excites many fluorescent dyes and stains, UV light is a health hazard. Furthermore, prolonged exposure to UV light can damage DNA samples and may compromise the integrity of samples to be used for downstream applications, such as subcloning.

No mercury waste

UV transilluminator bulbs contain mercury, a hazardous substance, and therefore require special care for handling and disposal.



LED bulbs have a substantially longer real-time life than UV bulbs, which can add up to considerable cost savings over the lifetime of the instrument.



Service and support when you need an expert

SmartStart and on-site service plans

Comprehensive instrument warrantv

Our factory-trained and certified field service

engineers (FSEs) are focused on delivering the highest-quality workmanship. During the warranty period, qualifying repairs as well as engineer time and travel are covered.

Get up and running quickly

Every iBright CL1000 and FL1000 Imaging System includes a 1-day on-site

SmartStart orientation to get you up and running quickly in your lab. The orientation includes:

- Basic setup
- Cloud enablement and connectivity
- Printer networking
- Review of starter reagents
- Software use

- Instrument operation
 - Instrument maintenance

Global support

When you partner with Thermo Fisher Scientific, you get the support you need to help keep your research running. More than 1,300 global sales, service, and technical support specialists are available to assist you in person by phone or online.

Service plans

You may elect additional instrument coverage to carry through your warranty period. Service plans provide comprehensive post-warranty support to help you maintain productivity, maximize the value of your investment, and optimize performance with professional consulting services. The benefits include:

• Prioritized response based on your business demands

- · Reliability via scheduled preventive maintenance
- Predictable operating costs because parts, labor, and engineer travel are included

Refer to Table 4 for more details.

How to reach us

To find your local support or technical support team, go to thermofisher.com/contactus

For product FAQs, protocols, training courses, and webinars, go to thermofisher.com/technicalresources

Table 4. Service plans at a glance.	On-site service plans		
	AB Maintenance Plus	AB Assurance	AB Complete
On-site response time	Target 2 business days*	Guaranteed 2 business days*	Guaranteed next business day*
Scheduled on-site planned maintenance (PM)	•	٠	۰
Remote instrument diagnostics	٠	٠	•
Parts, labor, and travel for repair	10% discount optional add-on in selected regions	•	•
Priority access to remote service engineer		٠	•
Requalification post-PM and critical repairs			۰
Troubleshooting by field application scientist			•

Response times vary by region.





Systems to fit your work

Compare iBright Imaging System models

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Table 5. Specifications for			
iBright Imaging Systems.	where	where	
	CL1000	FL1000	
Applications			
Chemiluminescence western blots	Ye	es	
Protein gels	Ye	es	
DNA gels	Ye	es	
Multiplex western blots	No	Yes	
RGB fluorescence western blots	No	Yes	
Near-IR western blots	No	Yes	
Camera			
Detector	Cooled 16-bit CCD		
Lens	25 mm, f/0.95		
Resolution	9.1 megapixels		
Field of view	22.5 x 18.0 cm		
Binning modes	1 x 1, 2 x 2, 3 x 3, 4 x 4, 5 x 5, 6 x 6, 8 x 8		
System interface			
Touch screen display	12.1 inch, capacitive touch screen		
Computer	Internal		
Storage and connectivity			
Integrated hard drive	64 GB (additional 10 GB of expandable cloud storage included)		
USB	Yes		
Network	Yes		
Image file format	Proprietary image format (G2I), TIFF, JPG, PNG, PDF		
System hardware			
Excitation source	Green LED transillumination	Epi-LEDs, green LED transillumination	
Filter wheel	2 filter positions, motorized	7 filter positions, motorized	
Shipping			
Dimensions (L x W x H)	68 x 38	x 60 cm	
Weight	50 kg (110 lbs)		

Ordering information

Product	Cat. No.
iBright FL1000 system	
iBright FL1000 Imaging System	A32752
AB Assurance Plan	ZG11SCIBRIGHTFL
AB Complete Plan	ZG21SCIBRIGHTFL
AB Maintenance Plan Plus	ZG51SCIBRIGHTFL
Qualification add-on	ZGQUSCIBRIGHTFL
iBright CL1000 system	
iBright CL1000 Imaging System	A32749
AB Assurance Plan	ZG11SCIBRIGHTCL
AB Complete Plan	ZG21SCIBRIGHTCL
AB Maintenance Plan Plus	ZG51SCIBRIGHTCL
Qualification add-on	ZGQUSCIBRIGHTCL

Recommended products

Thermo Scientific[™] SuperSignal[™] West Pico PLUS Chemiluminescent Substrate

Excellent sensitivity (low picogram to high femtogram), intensity, and signal duration (up to 24 hours) compared to other ECL substrates in its class. Compatible with different membranes, blocking reagents, and a wide range of antibody dilutions, making it an ideal choice for most western blotting applications.

Invitrogen[™] iBright[™] Prestained Protein Ladder

Contains twelve recombinant proteins, ten (11 to 250 kDa) that are bluestained and fluorescently labeled for direct and near-IR fluorescence visualization and protein sizing, and two proteins (30 kDa and 80 kDa) that are unstained and contain IgG-binding sites for primary and secondary antibodies used for chemiluminescent and fluorescent detection of target proteins.

Invitrogen[™] Alexa Fluor[™] Plus secondary antibodies

Make your low-abundance target proteins visible, spend less time optimizing, and make every one of your precious samples count. New Alexa Fluor Plus secondary antibodies are designed to provide higher sensitivity and signal-to-noise in fluorescent western blotting and cell imaging.







Request a demo at thermofisher.com/ibright

