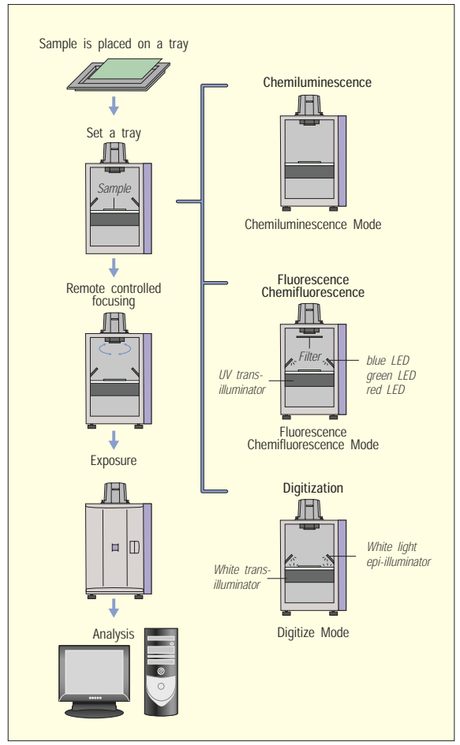
Specifications and Applications

Image Capturing Unit (Camera Head and Controller)	
CCD chip Number of pixels Pixel size	Fujifilm Super CCD Area Type chip 3.2M pixels 10.75 x 10.75µm
Cooling	Two-stage thermoelectric module with air circulation
Cooling temperature	-30°C (when room is below 28°C)
Focusing	Power focusing; remote and preset control
Exposure time	1/100 second to 30 hrs (2 hrs to 30 hrs to be set manually)
Dynamic range	Four orders of magnitude
Gradation	16 bits (65,536)
Image size	12.6MB Max.; 49.2KB Min.
Maximum sample size	25 x 25cm (wide angle lens); 14 x 21cm (Fujinon VRF43LMD lens)
Binning	1 x 2, 2 x 4, 4 x 8, and 8 x 16 pixels
Interface	USB1.1
Software	
Image capture	Fujifilm Image Reader (Mac™ and Windows®)
Image analysis	Fujifilm Image Gauge (Mac™); Fujifilm MultiGauge (Windows®)
Dimensions and Weights	
Camera head	180 (W) x 170 (H) x 250mm (D) 3.4kg
Dark Box IV	510 (W) x 730 (H) x 480mm (D) 49.0kg
Analyzing Unit	
Operating system	Windows® XP or Mac™ OS 9 & X
Applicable Reagents and/or Samples	
Chemiluminescence	CDP-Star®, ECL™, ECL Plus™, SuperSignal, ImmunoStar, CSPD®
Fluorescence	EtBr (W/UV light), SYBR® Green I & II, SYPRO® Orange, GFP, DY-458XL (blue LED)
	Pro-Q™ Diamond, Cy™3, RFP, DY-520XL (green LED), Alexa Fluor 633, Cy™5, DY-647 (red LED)
Chemifluorescence	*AttoPhos™
Digitization	CBB-stained gel, Silver stained gel (Transilluminator) NBT/BCIP-stained membrane. MW marker (Epi-illuminator)
Intelligent Dark Box IV	
EPI-illuminator for fluorescence	blue LED (470nm), green LED (520nm), red LED (630nm)
EPI-illuminator for digitization	White-light source
Transilluminator - for digitization of stained gels and autoradiographic films	White LED
UV transilluminator**	UV-light source (312nm)
Filter turret	Five positions
Printers	
Pictrography 3500	

Lens		Lens	
High-sensitivity lens (FUJINON VRF43LMD)		Wide-view lens	
F-number	0.85	F-number	2.0
Focal length	43mm	Focal length	24mm
Focus	Remote power focusing	Focus	Manual
Mount	Bayonet	Mount	Adapter to Nikon F mount

**No license is granted for use of AttoPhos™ to detect nucleic acid on a nylon membrane.*
***No license is granted for pre-labeling gel electrophoresis method with the UV transilluminator.*

The binning mode of the LAS-3000 allows researchers to select from four binning settings to enhance both imaging sensitivity and image resolution.



The image analysis process captures images in three modes: chemiluminescence, fluorescence/chemifluorescence and digitization.

FUJIFILM
I&I–Imaging & Information

Life Science

TÜV PRODUCT SERVICE Quality system certified to ISO 9001

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Specifications and system configuration subject to change for improvement without notice. All other product names mentioned herein are the trademarks of their respective owners.

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FUJIFILM
I&I–Imaging & Information

Life Science

Super CCD

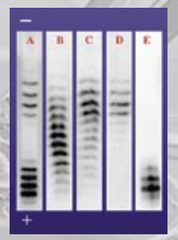
Remote Controlled

Science Imaging System

LAS-3000

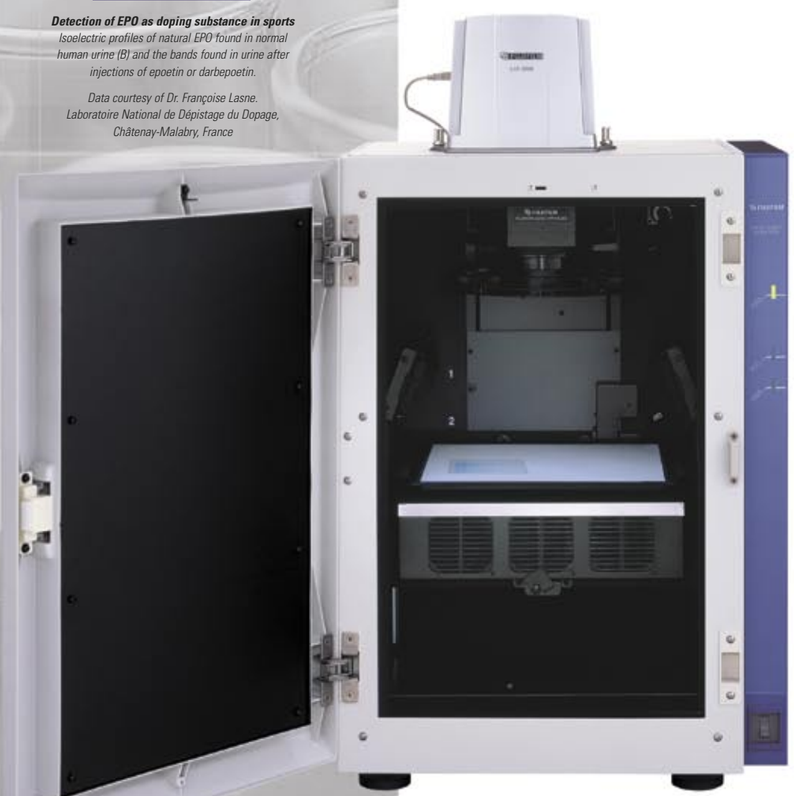
LUMINESCENT IMAGE ANALYZER (LAS) FOR APPLICATIONS REQUIRING HIGH SENSITIVITY AND A WIDE RANGE OF FLUORESCENT CAPABILITIES

GFP expression in tobacco leaf



Detection of EPO as doping substance in sports
Isoelectric profiles of natural EPO found in normal human urine (B) and the bands found in urine after injections of epoetin or darbepoetin.

Data courtesy of Dr. Françoise Lasne. Laboratoire National de Dépistage du Dopage, Châtenay-Malabry, France



The LAS-3000 imaging system combines Fujifilm's high-sensitivity Super CCD camera technology with the added versatility of white, blue, green and red EPI illuminators. The Super CCD imaging chip, binning mode and specially designed camera lens allow researchers to capture faint-light luminescent images with unprecedented sensitivity and resolution. Multicolor illuminator options enlarge application area in fluorescent imaging.

More sensitivity for chemiluminescent detection

Western blotting, Southern blotting and Northern blotting detection by chemiluminescence is a widely accepted method. The use of a cooled CCD camera system enables the generation of a digital image and quantitative analysis of the image's signal strength.

Several state-of-the-art technologies were incorporated to make the LAS-3000 system as sensitive as the conventional film method:

- The newly designed F0.85 high-sensitivity Fujinon lens gathers as much light as possible onto the CCD.
- The CCD is a 3.2M-pixel Super CCD having large octagonal-shaped CCD pixels 10.75 x 10.75µm in size.
- The CCD is cooled to -30°C by peltier when the environment is below 28°C.
- Pixel binning in the LAS-3000 electronically increases the pixel area to increase sensitivity. The binning mode includes four binning levels: 1 x 2 (Standard), 2 x 4 (High), 4 x 8 (Super) and 8 x 16 (Ultra). In the Ultra mode, the exposure time is nearly 60 times faster than Standard. An image smoothing function increases the pixels to make the image size the same as the Standard.
- Long exposure times are required to capture images of extremely low-light samples. The low-noise design of the LAS-3000 system includes default settings for a two-hour exposure and a 15-hour exposure in addition to manual settings for exposures as long as 30 hours.
- A non-parallax (NP) tray is used to eliminate the parallax effect when imaging chemiluminescence in the 96-well plate. Up to two plates can be placed.

More versatility for fluorescent detection

More and more fluorescent dyes are introduced into the biochemistry and molecular biology fields for staining proteins and nucleic acids in gels, membranes and well plates. Expression analysis using green fluorescent protein (GFP) and red fluorescent protein (RFP) can be detected by blue excitation or green excitation respectively.

The LAS-3000 includes multiple LED options for various fluorescence applications, including blue LED (470nm), green LED (520nm) and red LED (630nm) for epi-illumination and a UV (312nm) light source for DIA-illumination.

The five-position filter turret holds 77mm filters, such as Y515 (general purpose for blue LED excitation), 510DF10 (GFP, etc.), 575DF20 (RFP, Cy™3, Pro-Q™Diamond, etc.), R670 (Cy™5, ALEXA Fluor® 633, etc.) and 605DF40 (EtBr, etc.).

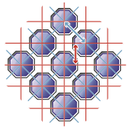
Digitizing functions

Capturing images as we see them is called digitizing. For CBB-stained gel or silver-stained gel, use of the white LED DIA-illuminator at iris f2.8 without any filter is recommended. For digitizing the molecular weight standard on blotted membrane, white light epi-illuminator, which is located in the center part of the blue, green and red LED epi-illuminator unit, is used.

Easy-to-use operation

Samples are placed on the appropriate tray and placed in the intelligent dark box. After closing the door, all the functions are controlled remotely from the Image Reader software. The software automatically recognizes the type of illuminator installed or changed during operation.

Users are able to control the LAS-3000 with the Image Reader software in either the user-friendly Lite mode or the more advanced Pro mode. The modes are selected with the click of a mouse.



Super CCD *- By rotating pixels 45 degrees to form an interwoven layout, the Super CCD's pixel pitch in the horizontal and vertical directions is narrower than in the diagonal direction, achieving higher horizontal and vertical resolution.*

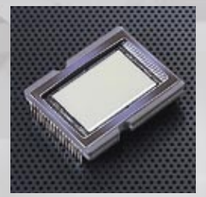
Quantitative image analysis function

The 16-bit signal accumulated on each CCD pixel is processed through an A/D converter to form a digital image. The image data obtained at the closed shutter condition is the dark frame. The image data of an even, flat sample is the flat frame. To analyze the image data, the dark frame and flat frame data are subtracted from the original image. This correction function is included in the Image Reader software. MultiGauge software for Windows® and ImageGauge software for Mac™ are the standard image analysis software included in the ScienceLab software provided by Fujifilm.

NP Tray

The five filter options available for the LAS-3000.

LED units



Fujifilm Super CCD Area Type imaging chip

FUJINON lens VRF43LMD and five-position filter turret

Applications

Fluorescence/Chemifluorescence

Blue:	SYBR® Green I & II SYPRO® Ruby SYPRO® Tangerine FAM™ ECFP DY-458XL	SYBR® Gold SYPRO® Orange FITC EGFP AttoPhos™
Green:	SYPRO® Red TAMRA™ HEX™ Alexa Fluor® 546 Pro-Q™ Diamond BODIPY®576/589 R-phycoerythrin HNPP DY-547	Cy™3 ROX™ Alexa Fluor® 532 Deep Purple Rhodamine Red™ NED™ RFP DY-520XL
Red:	Alexa Fluor® 633 Alexa Fluor® 647 BODIPY®650/665 TOTO®-3 DY-647	Alexa Fluor® 635 Cy™5 DiD DDAO phosphate
UV:	Ethidium Bromide	SYPRO® Rose
White:	Silver stained NBT / BCIP	CBB X-ray film

Chemiluminecence

ECL™	ECL Plus™
ECL Advance™	Lumi-Light Plus
Super Signal®	CDP-Star™
CSPD®	Renaissance™
Bright-Star™	

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