

**FUJIFILM**

Life  Science

Meeting the

wide spectrum of



imaging needs

for the life sciences

FLA-5100

FLUORESCENCE • DIGITIZATION • RADIOISOTOPE • CHEMILUMINESCENCE



# THE FLA-5100 FLUORESCENT IMAGE ANALYZER UNLEASHES THE POWER OF PROTEOMICS RESEARCH

The future of science imaging continues to unfold with Fujifilm's next-generation FLA-5100 imaging system. Optimized for proteomics research using the fluorescence and digitizing methods, the FLA-5100 represents Fujifilm's latest imaging technology developed for use by the biomedical research community.

## Innovative multi-tasking capability

The FLA-5100 includes four imaging solutions in a single system. While optimized for fluorescence, the system also excels at radioisotope (RI) detection using the IP method. Additional imaging methodologies include digitization using fluorescence board and chemiluminescence detection by the direct detection method.

## Versatile

The FLA-5100 takes imaging versatility to a new level with a large 40 x 46cm sampling area, imaging pixel size as low as 10 $\mu$ m and modular add-ons for key imaging components. The FLA-5100 is ideal for fluorescence detection of 2D gel by SYPRO<sup>®</sup> Ruby stain, fluorescence detection of CBB by 670nm laser, and digitization of CBB-stained or silver-stained samples.

## Modular

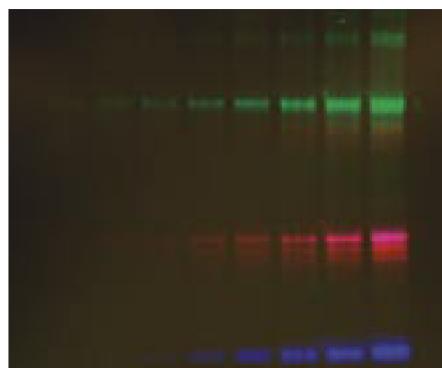
Component modules offer a unique opportunity to expand the system's capabilities and performance as new research methodologies evolve. The system includes a red laser (635nm) as standard and green (532nm), blue (473nm) and near infrared (670nm) as optional internal lasers. Additional options include a second photomultiplier tube (PMT) and an optional optical filter to accommodate concurrent or dual fluorescence detection.



## Fluorescent imaging

(Fluor Stage or Multi Stage)

Up to four excitation lasers are used to create images of fluorescent-labeled or fluorescent-stained samples. The Fluor Stage accommodates wet gels or membranes on its glass platen. The Multi Stage accommodates a 20 x 40cm glass plate with gel or a 96-well plate using the titer plate plug-in. Multiple-stained samples can be imaged either by dual fluorescence detection when equipped with the optional PMT2 or sequential detection.



Fluorescence detection of *CyTM2*, *CyTM3* and *CyTM5* superimposed by Multi Gauge software.  
Sample: 1D PAGE of *CyTM2* conjugated Carbonic anhydrase, *CyTM3* conjugated BSA and *CyTM5* conjugated lysozyme  
FLA-5100: Ex: 473nm, Filter: LPB, Ex: 632nm, Filter: LPG, Ex: 635nm, Filter: LPR, PMT: 400HV, Pixel size: 200 $\mu$ m.  
The images were obtained sequentially by the 1-laser-1-image-cyclic mode and composed by Multi Gauge software.

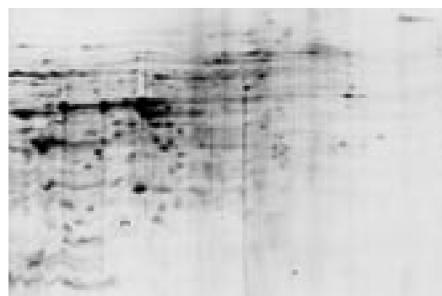


Fluorescence detection of SYPRO® Ruby-stained 2D gel  
Sample: Sake yeast  
FLA-5100: Ex: 473nm, Filter: LPB, PMT: 500HV, Pixel size: 50 $\mu$ m.  
Stain: SYPRO® Ruby

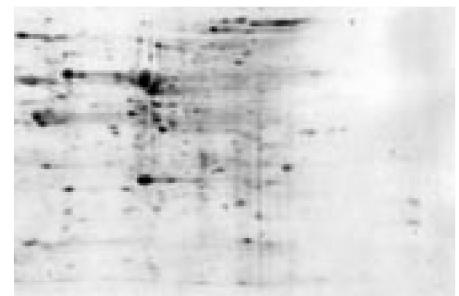
## Digitization

(Fluor Stage)

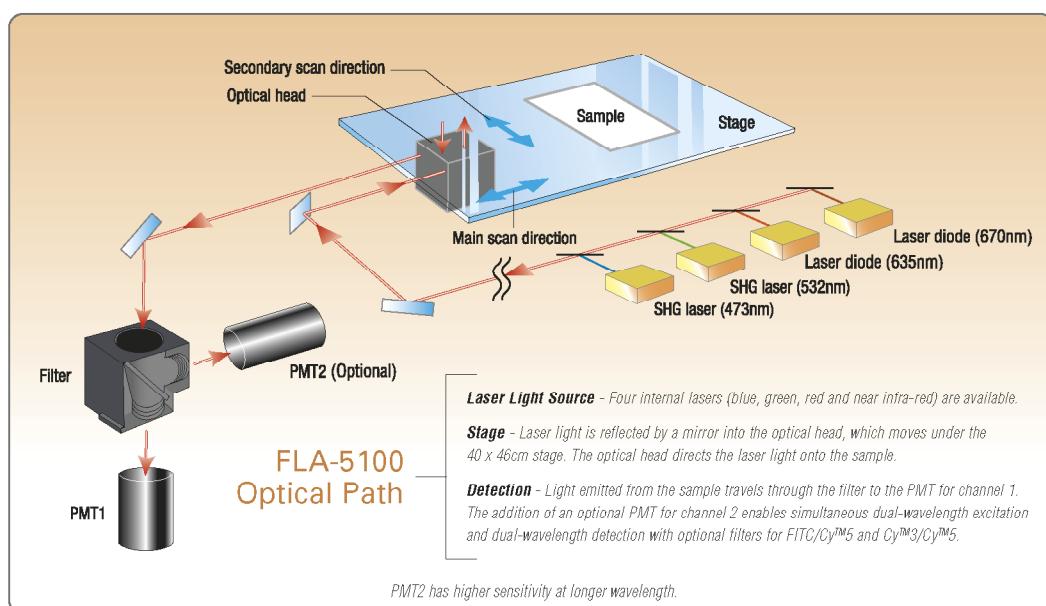
The digitization function is used for silver-stained or CBB-stained gel imaging. A specialized fluorescent board is placed over the stained gel on a Fluor Stage. Using the green SHG 532nm laser at the PMT 250HV setting, the stained part of the gel decreases the excitation and the fluorescence according to the density of the stain. Fujifilm's Image Reader software automatically reverses the negative image to create an easy-to-read positive image.



Fluorescence detection of CBB-stained 2D gel  
Sample: Sake yeast  
FLA-5100: Ex: 670nm, Filter: LPFR, PMT: 600HV, Pixel size: 100 $\mu$ m.  
Stain: CBB



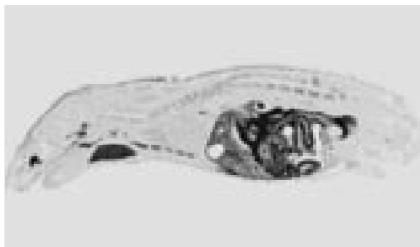
Digitization of CBB-stained 2D gel  
Sample: Sake yeast  
FLA-5100: Ex: 532nm, Filter: LPG, PMT: 250HV, Pixel size: 100 $\mu$ m  
Stain: CBB



## Radioisotope (RI) imaging

### (IP Stage)

Depending on the sampling requirement, the system will accommodate a single BAS-MS3543 IP or two concurrent BAS-2025/2040/2325/2340 IPs. The IP Stage consists of a magnetic plate which holds an IP with a soft ferrite layer.



Whole body autoradiography of a rat  
Sample:  $^{14}\text{C}$ -labeled drug-injected rat  
FLA-5100: IP-S mode, Pixel size: 50 $\mu\text{m}$ .  
IP: BAS-MS type

## Chemiluminescent imaging

### (Fluor Stage or Multi Stage)

The optical scanning head directly detects chemiluminescence. When the pixel size is set to 200 microns, a 5 x 10cm sample can be scanned in about two minutes.



Rat brain autoradiography by BAS-TR plate  
Sample:  $^{3}\text{H}$ -labeled receptor assay  
FLA-5100: IP-S mode, Pixel size: 25 $\mu\text{m}$ .  
IP: BAS-TR type

## APPLICATION SOFTWARE

Fujifilm provides fast, easy-to-use software to simplify highly complex image capture, analysis and reporting functions.

### Image Reader software

Image Reader for image capture (Mac<sup>TM</sup> and Windows<sup>®</sup>)

### Science Lab software

- Image Gauge for image analysis (Mac<sup>TM</sup>)
- L Process for image processing (Mac<sup>TM</sup>)
- Multi Gauge for image analysis and processing (Windows<sup>®</sup>)

### Multi Gauge software

Multi Gauge is the new standard image analysis and processing software for the FLA-5100 system. Multi Gauge includes the capability to capture multi-channel images which can be pseudo-colored for differentiation and overlapped, or viewed in parallel, for detailed analysis. Available modes include: Quantity (density measurement), Profile (1D electrophoresis), Plate

(96-well, 384-well and custom-well) and Distance (distance and angle). Image processing functions include filtering, compose, arithmetic and others.

### Colony software

Colony counting software was newly developed by Fujifilm.

### 2D software

Fujifilm does not provide 2D software. Please use commercially available 2D software. Various 2D software applications are now available which have the capability to open the Fujifilm file formats (.img and .inf) used by the BAS, FLA and LAS imaging systems.



Image overlapping by Multi Gauge.

## ADVANCED IMAGING FEATURES

### Multiple lasers

Up to four built-in internal lasers accommodate a wide range of fluorescence and methodologies utilizing fluorescent reagents such as SYBR® Green, Cy™3, Cy™5, SYPRO® Ruby as listed on the last page. The lasers include the SHG 473nm (blue), SHG 532nm (green) and LD 635nm (red). The optional fourth laser is an LD 670nm (near infra-red).

### Large scanning area

A large 40 x 46cm selectable scanning area is suitable for wide range of applications, including 2D gel analysis, sequencing gel analysis and others.

### 10-micron pixel size

Pixel size is user-selectable from 10, 25, 50, 100 or 200-micron pixels depending on specific methodology requirements.

### Multi-format detection

The versatility of multi-format detection in a single system greatly expands the researcher's range of sampling methodologies.

**Fluorescence detection by laser scanning:** Repetitive scanning of a sample with different lasers and filters is controlled by Image Reader software. The addition of an optional second photomultiplier tube (PMT) and filter allows the simultaneous detection of two different fluorescent dyes by two different exciting lasers in a single scan.

**Radioisotope by IP method:** IP-S (standard mode for RI detection) generates logarithmic converted values in PSL units. IP-V (variable mode) can change the high voltage of the photomultiplier tube (PMT), which enables X-ray diffraction study, non-destructive testing and other IP detection studies.

**Digitization function by Epi-illumination with fluorescent board:** Applicable for transparent gels with silver stain, CBB stain, NBT stain and others.

**Chemiluminescence by direct detection:** Chemiluminescence can be detected.

### Stages

The Fluor Stage, Multi Stage and IP Stage allow multiple detection opportunities, which include agarose gel, polyacrylamide gel, membrane, radioisotopic images and others.

**Fluor Stage:** The Fluor Stage includes a 40 x 46cm glass platen with an optional gel stopper and is used for fluorescent detection, digitization and chemiluminescent detection. Concurrent detection of dual fluorescence is possible with the addition of an optional PMT2.

**Multi Stage:** The Multi Stage is used for detecting fluorescence in a 20 x 40cm glass plate or in a microtiter plate with the optional microtiter plate holder (TP plug-in).

**IP Stage:** To capture radioisotopic images the magnetic IP Stage holds the IP with a soft ferrite backing layer of any size up to 40 x 46cm in total area.

### Easy to maintain

**Removable stages:** The IP, Fluor and Multi Stages are easily removed and inserted into the top of the imaging unit for convenient detection of samples. Since the Fluor Stage is also waterproof, it can be easily cleaned with water following contamination by a sample.

**Removable filter cartridges:** The filter cartridges are removable and easily changed to accommodate specific detection methodologies.



Fluor Stage is watertight and washable



Multi Stage with TP plug-in



IP Stage for phosphor imaging plate with 40 x 46cm scanning area

# Specifications and Applications

## Operating System

Windows® NT/2000/XP and Mac®OS

## Nuclides

<sup>3</sup>H, <sup>14</sup>C, <sup>32</sup>P, <sup>33</sup>P, <sup>35</sup>S, <sup>125</sup>I, Neutron, etc.

## Representative Fluorescent Dyes

473nm Laser:	SYPRO® Orange, SYPRO® Ruby, SYBR® Green I, FITC
532nm Laser:	Cy™3, Rhodamine, SYPRO® Red
635nm Laser:	Cy™5
670nm Laser:	Alexa Fluor® 680, CBB

## Dynamic Range

Five orders of magnitude.

## Pixel Size

User choice of 10, 25, 50, 100, 200 micron.

## Filters

Four filters may be placed on a single filter tray and may be easily changed.

Available filters are indicated below in *Accessories*.

## Dimensions

900 (W) x 840 (D) x 400 (H) mm

## Weight

ca. 110 kg

## Fluorescent reagents corresponding to excitation wavelengths

473nm			
Reagent name	Ex.(nm)	Em.(nm)	Filter
SYBR® Green I	494	521	LPB
SYBR® Green II	492	513	LPB
SYBR® Gold	495	537	LPB
SYPRO® Orange	472	570	LPB
SYPRO® Ruby	450	610	LPB, LPG
SYPRO® Tangerine	490	640	LPB
FITC	494	520	LPB, BPB1, DBR1
FAM™	490	520	LPB, BPB1, DBR1
Alexa Fluor® 488	495	519	LPB
AttoPhos™	482	560	LPB
DY-485XL	485	560	LPG, BPB1, DBR1

532nm			
Reagent name	Ex.(nm)	Em.(nm)	Filter
EtBr	518	605	LPG
SYPRO® Red	547	631	LPG
RTIC	554	577	LPG
Cy™3	550	570	LPG, BPG1, DGR1
TAMRA™	542	568	LPG
ROX™	535	567	LPG
HEX™	535	553	LPG
Alexa Fluor® 532	532	554	LPG
Alexa Fluor® 546	556	573	LPG
HNPP	550	562	I PG
DY-520XL	520	664	LPG, LPR
DY-547	557	574	LPG, BPG1, DGR1
Deep Purple	528	594	LPG
Pro-Q® Diamond	555	580	LPG, BPG1, DGR1

635nm			
Reagent name	Ex.(nm)	Em.(nm)	Filter
Cy™5	649	670	LPR, DBR1, DGR1
Alexa Fluor® 633	632	647	LPR, DBR1, DGR1
DDAO Phosphate	634	665	LPR, DBR1, DGR1
DY-647	652	673	LPR, DBR1, DGR1

670nm			
Reagent name	Ex.(nm)	Em.(nm)	Filter
DY-675	674	699	LPFR (for PMT2)
DY-676	674	699	LPFR (for PMT2)
Alexa Fluor® 680	679	702	I PFR (for PMT2)

Standard filters: LPB (Y510), LPG (0575), LPR (R665)  
Optional filters: BPB1 (530DF20), BPG1 (570DF20), DBR1 (530DF20, R665), DGR1 (570DF20, R665), LPFR (R705)

## Accessories



**FLUOR Stage**  
(with optional gel stopper)

A glass plate of 40 x 46cm can be used for fluorescence detection, digitizing function and Cherniulin fluorescence detection.

### IP Stage

A magnetic stage holds the IP with a soft ferrite layer of any size up to 40 x 46cm.

### MULTI Stage

(with optional microtiter plate holder, which can hold up to six microtiter plates)  
Large size polyacrylamide gel plate can be measured with the glass.

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



**Filter Tray**  
**Filters**  
B390 for IP detection  
Y510 for blue laser  
0575 for green laser  
R665 for red laser  
R705 for 670nm laser (for PMT2)  
530DF20 for FITC  
570DF20 for Cy™3  
530DF20/R665 set for FITC/Cy™5  
570DF20/R665 set for Cy™3/Cy™5



**IP Eraser 3**  
(applicable up to 40 x 46cm size)

Additional PMT (PMT2) (option) for concurrent detection of dual fluorescence



**Imaging Plate**  
BAS-MS 3543



**IP Cassette BAS 4043**  
Available Imaging Plates (IPs) include:  
1 x (3543 MS IP),  
2 x (2040, 2025, MS, SR, ND, TR IP).

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Fuji Photo Film Co., Ltd. 26-30, Nishiazabu 2-Chome, Minato-ku, Tokyo 106-8620, Japan, Tel: +81-3-3406-2201, Fax: +81-3-3406-2158 • <http://lifescience.fujifilm.com> • E-mail: sginfo@tokyo.fujifilm.co.jp



**raytek Scientific Ltd.**, 26 Norton Park View, Sheffield, S8 8GS, U.K.

Tel: +44-114-2749575, Fax: +44-114-2749919 E-mail: [lifescience@raytek.co.uk](mailto:lifescience@raytek.co.uk)

**IE Distributor**



**Brennan & Company**, 61 Birch Avenue, Stillorgan Industrial Park, Stillorgan, Co Dublin , Ireland

Tel: +353-1-295-2501, Fax: +353-1-295-2333 E-mail: [mburgess@brennanco.ie](mailto:mburgess@brennanco.ie)

