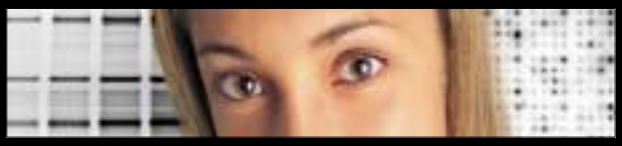
FUJIFILM
I&I – Imaging & Information

Science Imaging Systems

Very Wide Array

Fluorescent/Radioisotope



Science Imaging

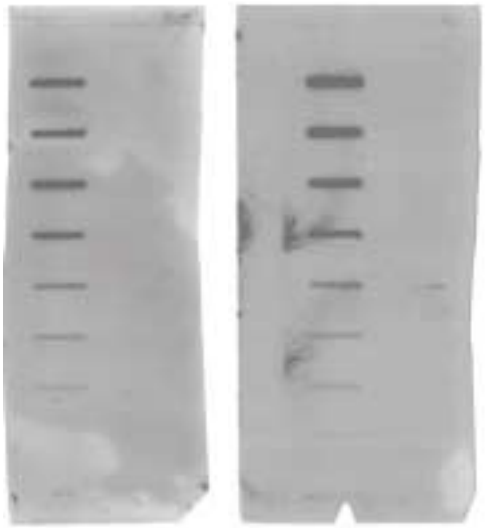
System

FLA-3000

Our FLA-3000, with its wide format Imaging Plate, gives you the power to do more. Now you can quickly perform gene expression profiling using commercially available cDNA membranes up to 22 x 22cm in size. How quickly? A complete 23 x 40cm Imaging Plate can be scanned in six minutes.

The power of multi-format detection

And the FLA-3000 allows you to configure it to process samples labeled with either radioisotopes or fluorescent dyes – all within a single research tool. Its combination of two solidstate Second Harmonic Generation lasers (blue: 473nm, green: 532nm) and a He-Ne laser (red: 633nm) makes the FLA-3000 truly unique. For example, it is the only system that can not only efficiently detect and discriminate between Cy3™ and Cy5,™ but also between Cy2™ and Cy5™ labeled samples. Plus, the FLA-3000 continues to push the boundaries of performance for a multifunctional scanner in speed, throughput, sensitivity and resolution. All that, and a 23cm wide-format Imaging Plate.



Cy3™ and Cy5™ fluorescent dyes processed on a single sample

Human IgG protein was directly labeled with Cy3™ and Cy5,™ and respective diluted protein on the membrane was excited by either SHG-532 laser or He-Ne laser.

22 x 22cm cDNA macroarray radioisotope image

Image courtesy of Norio Komatsu, M.D., Ph.D., Jichi Medical School and Masao Seto, M.D., Ph.D., Aichi Cancer Center Research Institute. cDNA membrane (Genome Systems, Inc.) hybridized with ^{32}P-labeled probe and exposed for 70 hours to a BAS-MS 2340 Imaging Plate. (FLA-3000 settings: 50µm pixel, S4000 and L5)

The FLA-3000 with HeNe, SHG 473 and SHG 532 lasers for the ultimate in imaging applications.

Fluorescence and radioisotopic detection in a single system.

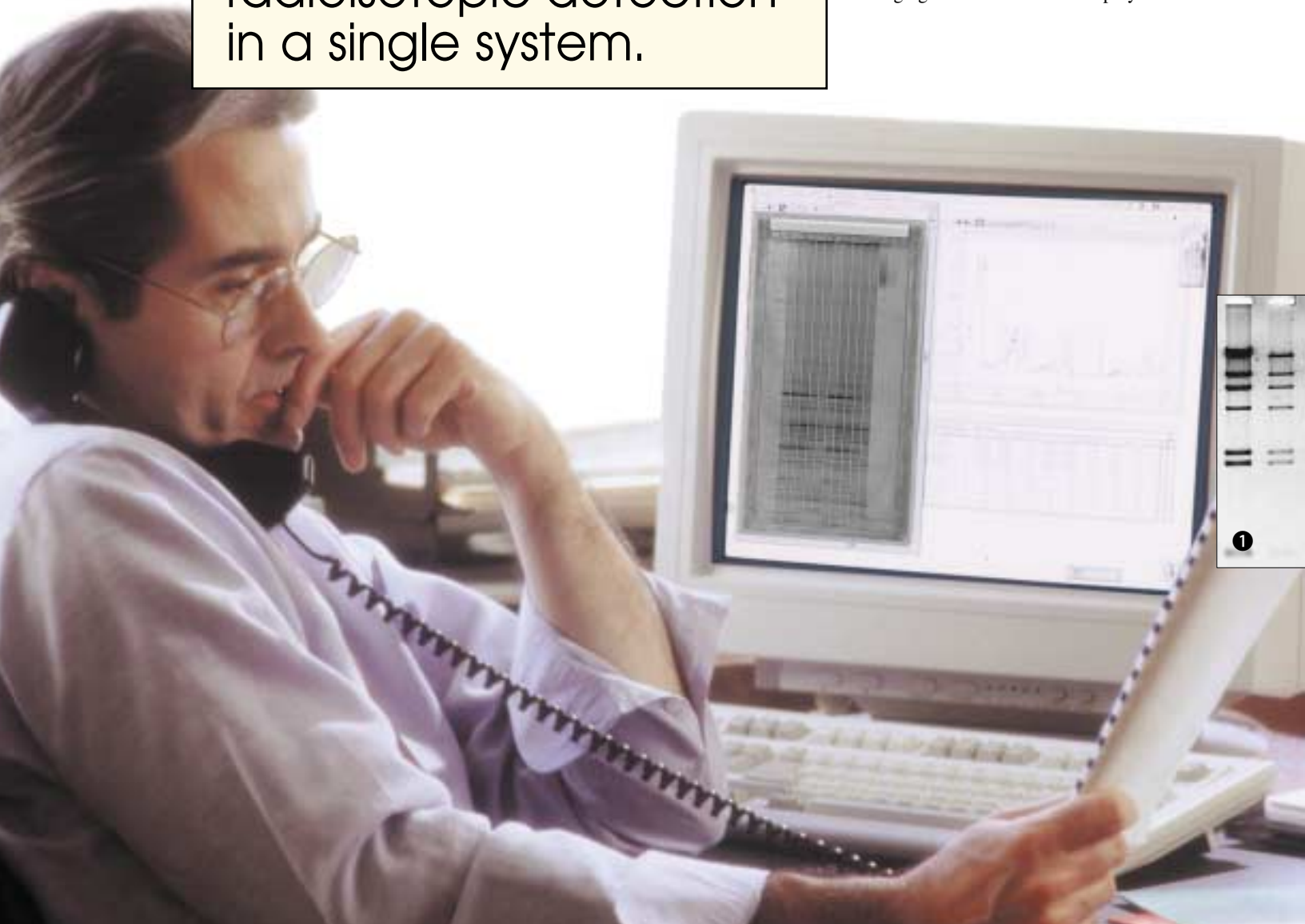
Capturing images of samples labeled with fluorescent dyes has never been easier. At the heart of our FLA-3000 lies an exclusive, patented Second Harmonic Generation (SHG) laser assembly. Its SHG532nm green laser allows for numerous applications to satisfy even the most demanding laboratories. For instance, the use of RITC, SYPRO® Red, HNPP and Cy3™ is now a practical reality. The FLA-3000 also gives you speed. Images of 50µm, 100µm or 200µm pixel size, to a maximum size of 23 x 40cm, can be obtained in six minutes. Smaller areas, of course, take even less time to scan.

The FLA-3000 can also be configured with just the SHG473nm laser and a He-Ne (633nm) laser, making it ideal for SYBR® Green I and SYBR® Green II, ethidium bromide, FITC, Phycoerythrin and Cy5,™ not to mention alkaline phosphatase substrates such as AttoPhos™ and DDAO-phosphate.

Capturing radioisotopic images with proven, patented technology.

Fujifilm had more than fifteen years of experience with phosphor Imaging Plate (IP) technology for medical radiography before they expanded its use to bioresearch. And the FLA-3000 makes good use of this development. The Imaging Plate in the FLA-3000 is approximately 100 times more sensitive to emitted radiation than conventional X-ray film. It reduces sample exposure times by as much as 90% and the amount of radioisotope needed for detection by as much as 90%. What's more, Imaging Plates are easy to use. They are reusable. They do not require a dark room or chemicals, and they can be exposed at room temperature.

Imaging Plates have a flexible polyester base



coated with highly dispersed barium fluorohalide phosphor crystals (BaF(Br,I):Eu^{2+}). When a radioactively labeled sample is exposed to an IP, the energy from the sample is transferred to the phosphor crystals and stored as trapped electrons. In short, the electrons become trapped to form 'F-centers' in the BaF(Br,I) matrix and Eu^{2+} ions trap holes. These F-centers have an absorption band at about 600nm. So scanning the exposed IP with the He-Ne (633nm) laser releases the trapped electrons to the conduction band. The trapped electrons recombine with the holes trapped by Eu^{2+} and photons at about 400nm are released. This process is known as photo-stimulated luminescence. The blue light emitted is collected to produce the digitized image.

This Imaging Plate technology makes the FLA-3000 a fast and accurate means for quantitative analysis of all alpha, beta, and gamma-emitting isotopes (including tritium). With the BAS-ND type IP, neutron ray detection is also possible. The FLA-3000 is ideal for a broad spectrum of applications, from gene array analysis to drug metabolism.

Collecting images from radioactively-labeled samples is as easy as generating images from fluorescent-labeled samples.

Three lasers mean more applications.

The FLA-3000 performs a wide array of imaging applications, from fluorescence to radioisotope (IP method). It's ideal for SYBR® Green I and II, SYPRO® Orange, SYPRO® Ruby, ethidium bromide, FITC, Phycoerythrin and Cy5.™ It's fast. You get six-minute scanning at even the highest resolution for areas as large as 23 x 40cm. Our patented SHG laser is the only laser technology that efficiently detects and discriminates not only between Cy3™ and Cy5,™ but also Cy2™ and Cy5™ labeled samples. And light emitted from our SHG laser is coherent, which means it's not dispersed when you use thick gels. So, unlike with other light sources, you get good image quality even with thick gels.

Speed, image quality, flexibility and extraordinary capabilities make the FLA-3000 a remarkable research tool, with much of the credit going to the revolutionary SHG Laser. The laser diode assembly in the FLA-3000 uses our newly developed, periodically poled $MgO/LiNbO_3$ (PPMGLN) crystal as a wavelength transformer. Inside the crystal, the direction of the dipole is periodically inverted. Hundreds of inverted regions, with a width of approximately 2.5µm, are aligned within the 1mm thick crystal. The wave-

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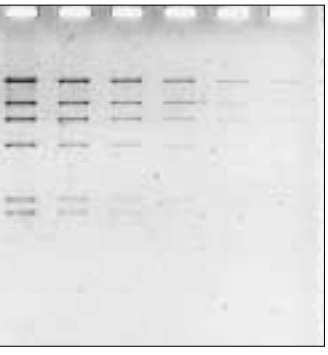
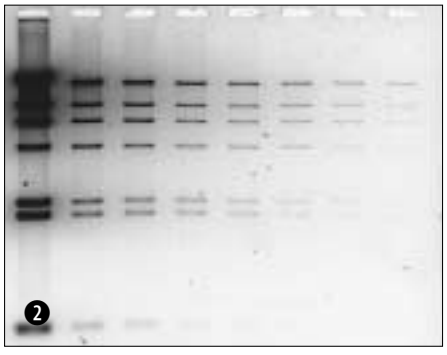
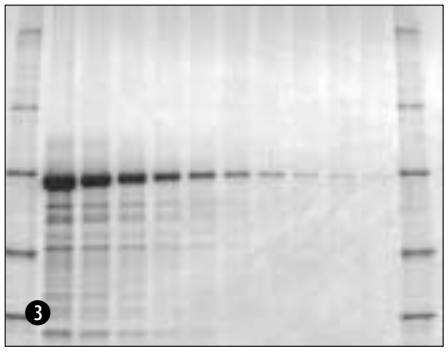
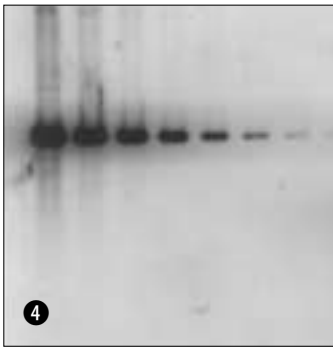








Data Images, left to right:

On monitor: SYBR® Green I-stained Differential Display. Sample: Mouse Testis. Courtesy of Dr. Yasuyuki Kurihara, Yokohama National University.

1. EtBr-stained DNA agarose gel. Sample: λ DNA/Hind III. Applied Amount: Iµg/100ng/50ng/20ng/10ng/5ng/2ng/1ng

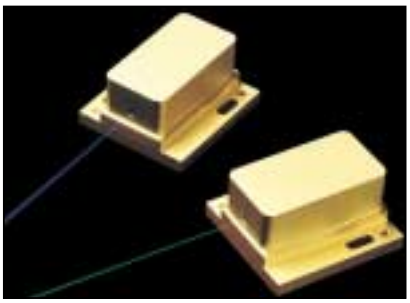
2. SYBR® Green I-stained DNA agarose gel. Sample: λ DNA/Hind III. Applied Amount: Iµg/100ng/50ng/20ng/10ng/5ng/2ng/1ng

3. SYPRO® Orange-stained protein SDS-PAGE. Sample: Bovine Serum Albumin. Applied Amount: MW Marker/Iµg/500ng/200ng/100ng/50ng/20ng/10ng/5ng/2ng/1ng/MW Marker

length of the secondary light beam is then freely controlled by varying the width of the poled regions. The use of this new crystal along with other SHG technology led to the world's first blue, solid-state laser diode.

A Configuration for Your Laboratory

The FLA-3000 is available in various configurations, so you select the system that best meets the demands of your laboratory today. Tomorrow, if your research or application needs change, you can add additional capabilities.



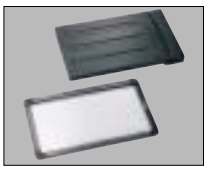
The combination of two solid-state Second Harmonic Generation lasers (blue:473nm, green: 532nm) and a He-Ne laser (red: 633nm) makes the FLA-3000 truly unique.

New BAS-MS Imaging Plate

With its high sensitivity and high water resistance, our newly developed photo stimulable phosphor Imaging Plate gives you a higher level of performance. In fact, there's no sensitivity deterioration on severe water resistance tests.

The wider detection area of this high water resistant Imaging Plate in combination with ArrayGauge software (Windows®) makes the FLA-3000 ideal for macroarray analysis.

The BAS-MS Imaging Plate also has a soft ferrite backing layer, so you can use it with all the scanners in the BAS series.



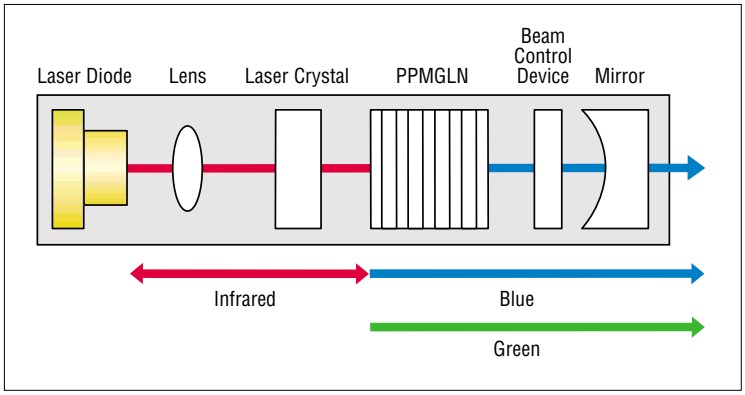
How to capture fluorescent images:

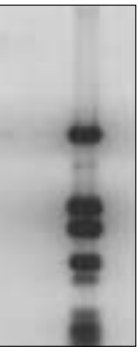
1. Put the sample on the FLUOR-Stage.

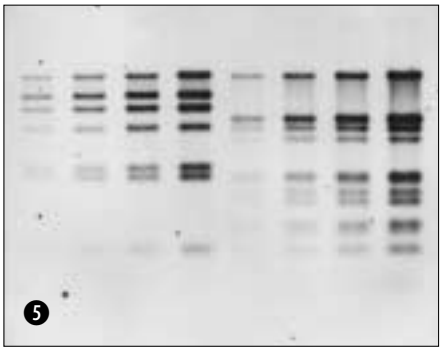
2. Open the cover and place the FLUOR-Stage on the loading unit.

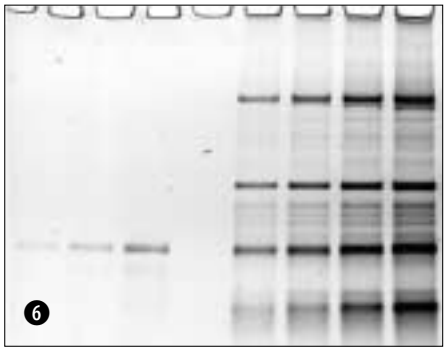
3. Select desired operating parameters and initiate scan.

4. When scanning is complete, a digitized image is displayed on the computer for analysis.









4. Chemifluorescence Southern blotting. Detected with AttoPhos™ as alkaline phosphatase substrate. Sample: pBR328/ Bam HI. Applied amount: 100pg/30pg/10pg/3pg/1pg/300fg/100fg/30fg/10fg/MW Marker

5. Chemifluorescence Southern blotting. Detection with DDAO-phosphate (1,3-dichloro-9, 9-dimethylacridin-2-one-7-yl). Sample: Left four lanes: λ DNA/Hind III. Right four lanes: λ DNA/Eco RI+Hind III. Applied amount: Left four lanes; 10ng/20ng/50ng/100ng, Right four lanes; 10ng/20ng/50ng/100ng

6. FITC (Fluorescein isothiocyanate): Conventional SDS-PAGE of protein. Sample: Monoclonal antibody labeled with FITC and MW marker labeled with FITC. Method: SDS-PAGE

7. SYPRO® Orange-stained 2D protein electrophoresis. Sample: Yeast. Courtesy of Dr. Yoshihiro Yamamoto, Kyoto Municipal Institute of Industrial Research.

Specifications and Applications

Specifications

Scanner	
Excitation Lasers	473nm (SHG) 532nm (SHG) 633nm (He-Ne)
Detectable Nuclides	^{14}C, ^{32}P, ^{33}P, ^{35}S, ^{125}I, ^{3}H, and others
Fluorescence	Cy2;™ ECF, ECL Plus;™ FITC, Fluorescein, SYBR® Green I, SYBR® Green II, SYBR® Gold, SYPRO® Ruby, SYPRO® Orange, Vistra Green;™ Alexa 532, Cy3;™ Ethidium Bromide, Rhodamine B, SYPRO® Red, Texas Red;® Cy5;™ DDAO-Phosphate
Chemifluorescence	AttoPhos;™ AttoPhos Plus;™ ECL Plus;™ HNPP, DDAO-phosphate, etc.
Scanning Area	23 x 40cm (max.) (scanning area is to be designated)
Pixel Size	50µm/100µm/200µm (selectable)
Gradation	65, 536 or 256 (selectable)
Dynamic Range	5 orders of magnitude
Sensitivity for RI Detection	S 4,000
Sensitivity for Fluor. Detection	F 1, 10, 100, 1000 (selectable)
Scanning Time	ca. 6 min. (50µm, 23 x 40cm)
Software for Scanning	ImageReader (MacOS/Windows®)

Image Analysis	
Computer Hardware	Macintosh™/IBM Compatible (selectable)
Operating System	MacOS/Windows®95, Windows®98, Windows® NT
Main Memory	128MB or More
HDD	4GB or More
17-inch Color Monitor	
3.5-inch MO Disk, 640MB Type (128/230/540MB compatible)	
Laser Beam Printer	
Software for Image Analysis	Science Lab (MacOS/Windows®)

Environment	
Power Supply	AC100V±10%, AC120V±10%, AC240V±10%
Frequency	50/60Hz
Operating Environment	15˚C - 30˚C, 30%~70% Humidity (avoid condensation)
Power Consumption	About 1.1kVA

Options	
High-Quality Pictrography 3000/4000	
Macroarray Analysis Software	ArrayGauge (Windows®)
High-Sensitivity, Water Resistance IP	BAS-MS 2325/2340/2025/2040
IP Cassette	BAS Cassette 2325, 2025, 2040
Imaging Plates	BAS-SR 2025/2040, BAS-TR 2025/2040, and BAS-ND 2025/2040
IP Eraser	

Accessories

FLUOR-Stage
For capturing fluorescent or chemifluorescent images. 23x40cm.

IP Stage
For capturing radioisotopic images. Exposed IP attaches to the magnetic stage using a soft-ferrite backed surface. 23x40cm.

Multi-Stage
For detecting fluorescence in 20 x 40cm glass plate for DD method or in microtiter plates. 23 x 40cm.

IP Cassette 2340
Used when IP is exposed to RI-labeled sample. Available in: 23x25cm, 23x40cm, 20x25cm, 20x40cm.

Imaging Plates
Available types: BAS-MS 2325, BAS-MS 2340, BAS-MS 2025, BAS-MS 2040.

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