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Typhoon Trio and Typhoon Trio+ Imagers

Multicolor fluorescence, filmless autoradiography, and chemiluminescence

Typhoon™ Trio and Typhoon Trio+ Imagers unite proven storage phosphor autoradiography technology with four-color fluorescent labeling techniques for maximum data quality in a single, high-throughput system (Fig 1). For DNA, RNA, and protein samples, users can choose from:

- storage phosphor autoradiography
- direct green (532 nm) excited fluorescence
- direct red (633 nm) excited fluorescence
- direct blue (488 nm) excited fluorescence
- chemiluminescence

When one of the five scanning modes is selected, the appropriate optical components are automatically activated. Typhoon imagers scan mounted and unmounted storage phosphor screens, gels and blots up to 35 x 43 cm as well as microarrays. Typhoon imagers exhibit outstanding linearity and quantitative accuracy, and include ImageQuant™ TL Image Analysis Software.

Typhoon imagers are fully optimized as part of the Ettan™ DIGE system, and seamless integration with DeCyder™ Differential Analysis Software is ensured for all models. Special tray templates that are part of the latest scanner control software and new optional Gel Alignment Guides add higher throughput and ease of handling 2-D gels run on Ettan DALT and SE600.

Typhoon model	Trio	Trio+
Phosphorimaging	●	●
633 nm-excited fluorescence	●	●
532 nm-excited fluorescence	●	●
488 nm-excited fluorescence	●	●
Chemiluminescence	●	●
Microarray		●

Components

- Typhoon scanner with TCP/IP, scan control software for Windows™
- ImageQuant TL Image Analysis Software for Windows User guide
- Microarray slide holder (Typhoon Trio+ model only)

Ettan DIGE components and Typhoon Multislide tray are sold separately.

Detection threshold

Storage phosphor

Storage phosphor screens retain energy from beta particles, X-rays, and gamma rays. The lower limit of detection for a 1-h exposure is less than 2 dpm/mm^2 for ^{14}C (200 µm only). The lower limit of detection for ^{32}P is typically 5–10 times lower than the limit for ^{14}C.

- **488 nm-excited fluorescence**
  100 amol fluorescein end-labeled DNA oligonucleotide in 12% polyacrylamide gel sandwich, 0.4 mm thick.
- **532 nm-excited fluorescence**
  200 amol HEX™, TAMRA™, ROX™, and 400 amol fluorescein end-labelled DNA oligonucleotide in 12% polyacrylamide gel sandwich, 0.4 mm thick.
- **633 nm-excited fluorescence**
  200 amol Cy™5 end-labelled DNA oligonucleotide in 12% polyacrylamide gel sandwich, 0.4 mm thick.

Fig 1. Typhoon Imager is a high performance gel and blot imager that can also image microarrays and 2-D DIGE gels.

Amersham Biosciences

Light measurement

Storage phosphor

Light is emitted from the storage phosphor screen in proportion to the amount of radioactivity in the sample upon laser-induced stimulation. Emitted light is collected and converted to an electrical signal by a photomultiplier. The electrical signal is digitized to permit image display and analysis.

Fluorescence

Upon excitation, light is emitted from a fluorescently-labeled sample in proportion to the amount of labeled compound in the sample. Emitted light is collected and converted to an electrical signal by a photomultiplier. The electrical signal is digitized for image display and analysis.

Chemiluminescence

Emitted light from a chemiluminescent reaction is collected and converted to an electrical signal by a photomultiplier. The electrical signal is digitized for image display and analysis.

Data storage

Data are stored in a square root encoded 16-bit TIFF to provide the digital resolution required to characterize subtle signal intensity differences over the wide dynamic range of the instrument.

Specifications

Spatial resolution

Typhoon TRIO & TRIO+

- Green-excited fluorescence: 8 line pairs/mm @ 25 µm pixel size
- Red-excited fluorescence: 8 line pairs/mm @ 25 µm pixel size
- Blue-excited fluorescence: 8 line pairs/mm @ 25 µm pixel size

Typhoon TRIO+ only

- Green-excited fluorescence: 10 line pairs/mm @ 10 µm pixel size
- Red-excited fluorescence: 10 line pairs/mm @ 10 µm pixel size
- Blue-excited fluorescence: 10 line pairs/mm @ 10 µm pixel size

Emission filters

Filter type	Wavelength range (nm)	Fluorochrome Examples
520 nm-bandpass (520 BP 40)	500–540	Cy2, ECL Plus™, SYBR™Green, fluorescein*
555 nm-bandpass (555 BP 20)	545–565	R6G, HEX
580 nm-bandpass (580 BP 30)	565–595	Cy3, TAMRA
610 nm-bandpass (610 BP 30)	595–625	ROX, ethidium bromide, SYPRO™ Ruby, Deep Purple
670 nm-bandpass (670 BP 30)	655–685	Cy5
526 nm-short-pass (526 SP)	≤526	Fluorescein**, SYBR Green

** With blue excitation*

***With green excitation*

Exposure time

Typically, storage phosphor screen exposure takes 10% of the time for an equivalent exposure to conventional film.

Single or dual-channel scanning time (min)

pixel size (µm)	1000*	500	200	100	50	25	10
20 x 25 cm	1	2	5	9	19	92	-
35 x 43 cm	2	4	10	21	40	167	-
2 x 8 cm (1 slide)	-	-	-	-	-	-	8
2 x 18 cm (2 slides)	-	-	-	-	-	-	16

Four-channel linked scanning time (min)

pixel size (µm)	1000*	500	200	100	50	25	10
20 x 25 cm	3	5	9	19	37	186	-
35 x 43 cm	6	10	21	40	80	335	-
2 x 8 cm (1 slide)	-	-	-	-	-	-	17
2 x 18 cm (2 slides)	-	-	-	-	-	-	32

**Not recommended for quantitative analysis.*

Uniformity
± 5% over entire scan area

Pixel accuracy
± 0.15%

Data format
16-bit (65 536 levels), TIFF (.GEL file extension)

Linearity
Less than 7.5% relative standard deviation for entire dynamic range

Linear dynamic range
Five orders of magnitude (100 000:1)

External interface
10 Base-T Ethernet using the TCP/IP protocol

Software
- Scan control software for Windows
- ImageQuant TL Image Analysis Software for Windows

Red light source
- Type: 10 mW Helium-Neon laser
- Estimated average lifetime: ~10 000 h
- Wavelength: 632.8 nm

Green light source
- Type: 20 mW solid state, doubled frequency SYAG laser
- Estimated average lifetime: ~10 000 h
- Wavelength: 532 nm

Blue light source
- Type: 20 mW solid state laser
- Estimated average lifetime: ~20 000 h
- Wavelength: 488 nm

Application	Storage Phosphor	Direct Fluorescence	Chemi-fluorescence
AFLP	●	●	
Band shift assays	●	●	
Carbohydrate analysis	●	●	
CAT assays	●	●	
Colony hybridization	●		
DNA footprinting	●	●	
DNA quantitation	●	●	●
DNA sequencing	●	●	
DNA typing	●	●	●
Dot blots	●	●	●
Enzyme assays	●	●	●
In-vitro translation assay	●	●	
Kinase assays	●	●	
Library screening	●		●
Macroarrays	●	●	
Microsatelllite mapping	●	●	
Northern blotting	●		●
Plaque lifts	●		●
Primer extension	●	●	
Protein quantitation	●	●	
1-D Protein gels	●	●	
2-D Protein gels	●	●	
RAPD	●	●	
Reportter gene assays	●	●	
Restriction mapping	●	●	
RFLP	●		●
RNA quantitation	●	●	●
Rnase protection	●		
RT-PCR	●	●	
S1 mapping	●		
Slot blots	●	●	●
Southern blotting	●		●
SSCP	●	●	
Short tandem repeat	●	●	
TLC	●	●	
Western blotting	●	●	●
Whole-body autoradiography	●		
VNTR	●	●	●

Other specifications

- **Power requirements:** 115/230 V (auto-switching), 50/60 Hz, < 500 W
- **Weight uncrated:**160 kg (350 lb)
- **Weight crated:** ~180 kg (565 lb)
- **Dimensions:** 48 cm (height) x 118 cm (width) x 78 cm (depth)

Ordering information

Typhoon Trio & ImageQuant TL	63-0055-83
Typhoon Trio, PC Workstation & ImageQuant TL	63-0055-84
Typhoon Trio+ & ImageQuant TL	63-0055-85
Typhoon Trio+, PC Workstation & ImageQuant TL	63-0055-86
560 LP Filter Kit	63-0056-00

Contact your local representative for more information on ordering Typhoon as part of the Ettan DIGE product offering.

shop online www.amershambiosciences.com

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