

# Typhoon

Multi-colour fluorescence, filmless autoradiography, and chemiluminescence

The Typhoon™ 8600 Variable Mode Imager unites proven storage phosphor autoradiography technology with four-colour fluorescent labelling techniques for maximum data quality in a single, high-throughput system. For DNA, RNA, and protein samples, users can choose from:

- storage phosphor autoradiography
- direct green excited fluorescence
- direct red excited fluorescence
- chemiluminescence

When one of the four scanning modes is selected, the appropriate optical components are automatically activated. Typhoon scans mounted and unmounted storage phosphor screens, plus gels and blots up to 35 × 43 cm. Typhoon exhibits outstanding linearity and quantitative accuracy, and includes ImageQuant™ image analysis software for Windows NT™ or Macintosh™.

## Components

- Typhoon scanner with TCP/IP, scan control software for Windows NT or Macintosh
- ImageQuant image analysis software for Windows NT or Macintosh
- One unmounted 20 x 25 cm storage phosphor screen and exposure cassette
- One ImageEraser for erasure of screens
- User's guide

## Detection threshold

### Storage Phosphor

Storage phosphor screens retain energy from beta particles, X-rays and gamma rays. The lower limit of detection for a one-hour exposure is less than 2 dpm/mm<sup>2</sup> for <sup>14</sup>C (200 μ and 100 μ only). The lower limit of detection for <sup>32</sup>P is typically five to ten times lower than the limit for <sup>14</sup>C.

### 532 nm Ex Fluorescence

- 200 amole HEX, TAMRA, & ROX end-labelled DNA primer in 12% polyacrylamide gel sandwich, 0.4 mm thick.
- 400 amole FAM end-labelled DNA primer in 12% polyacrylamide gel sandwich, 0.4 mm thick.

### 633 nm Ex Fluorescence

- 200 amole Cy™5 end-labelled DNA primer in 12% polyacrylamide gel sandwich, 0.4 mm thick.

## Specifications

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

**Pixel size:** 200, 100, and 50 microns, selectable. The scanning laser beam is approximately 20 μm in diameter.

### Single- or dual-channel scanning time

Pixel size	200 μ	100 μ	50 μ
20 x 25 cm	5 min.	9 min.	19 min.
35 x 43 cm	10 min.	21 min.	40 min.

### Four-channel linked scanning time

Pixel size	200 μ	100 μ	50 μ
20 x 25 cm	9 min.	19 min.	37 min.
35 x 43 cm	21 min.	40 min.	80 min.

### Spatial resolution

- Storage phosphor autoradiography: 2 line pairs/mm
- Green excited fluorescence: 5 line pairs/mm
- Red excited fluorescence: 5 line pairs/mm

**Uniformity:** ± 5% over entire scan area

**Pixel accuracy:** ± 0.15%

**Data format:** 16-bit (65 536 levels), TIFF

**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 NT or Macintosh
- ImageQuant image analysis software for Windows NT or Macintosh

### Red light source

- Type: 10 mW Helium-Neon laser
- Estimated average lifetime: ~ 10 000 hours (approximately five years of normal operation)
- Wavelength: 632.8 nanometers

## Green light source

**Type:** 20 mW solid state, doubled frequency SYAG laser

**Estimated average lifetime:** ~10 000 hours (approximately five years of normal operation)

**Wavelength:** 532 nanometers

## Emission filters

Emission filter type	Range	Fluorochromes
555 nm bandpass (555 DF 20)	545 nm–565 nm	R6G, HEX
580 nm bandpass (580 DF 30)	565 nm–595 nm	TAMRA, Cy3
610 nm bandpass (610 DF 30)	595 nm–625 nm	ROX, EtBr
670 nm bandpass (670 DF 30)	655 nm–685 nm	Cy5
526 nm short-pass	526 nm or below	Fluorescein
560 nm long-pass	560 nm or above	TRITC

## 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. Data are stored in a 16-bit file format to provide the digital resolution required to characterize subtle signal intensity differences over the wide dynamic range of the instrument.

### Fluorescence

Upon excitation, light is emitted from a fluorescence-labelled sample in proportion to the amount of labelled 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. Data are stored in a 16-bit file format to provide the digital resolution required to characterize subtle signal intensity differences over the wide dynamic range of the instrument.

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## 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 are stored in a 16-bit file format to provide the digital resolution required to characterize subtle signal intensity differences over the wide dynamic range of the instrument.

## Power requirements

### Typhoon

- 115/230 V (auto-switching)
- 50/60 Hz, < 500 Watts

### ImageEraser

- 115/230 V (switchable)
- 50/60 Hz, < 150 Watts

## Weight

**Uncrated:** 160 kg (350 lbs.)

**Crated:** ~ 180 kg (565 lbs.)

## Dimensions

**Typhoon:** 48 cm (height) x 118 cm (width) x 78 cm (depth)

**ImageEraser:** 63.5 cm (height) x 42 cm (width) x 32 cm (depth)



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