

# FlexStation 3 Multi-Mode Microplate Reader

A five-mode microplate reader with integrated fluid transfer

## KEY FEATURES

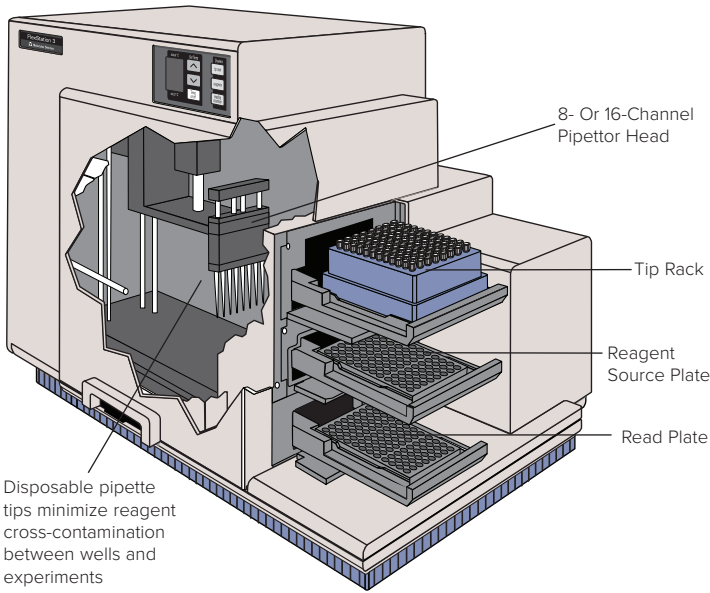
- **Five-mode reader with a wide range of applications**
- **Flexible liquid transfer enables more assay conditions**
- **User-defined pipetting simplifies assay optimization**
- **Instrument and software validation**

## Introduction

Adapting to biochemical- and cell-based application requirements while streamlining assay throughput is a challenge faced by many drug discovery and research laboratories. Multi-detection platforms often provide assay flexibility, however, throughput is often compromised—especially for applications that require integrated fluid transfer, such as calcium mobilization or other fast applications. To address this concern, Molecular Devices offers the FlexStation® 3 Multi-Mode Microplate Reader. The FlexStation 3 reader combines Molecular Devices SpectraMax® M5e Multi-Mode Microplate Reader performance with an integrated 8- or 16-channel pipettor into one compact benchtop reader. This integrated system provides users with a multi-detection platform capable of increasing the liquid handling throughput and flexibility for biochemical- and cell-based kinetic assays.

## Flexible liquid transfer

Using an 8- or 16-channel pipettor, the FlexStation 3 reader offers added assay flexibility over dispenser-based systems by transferring reagents from 96 or 384 distinct wells in a source plate to a read plate, simultaneously. In addition, users can define individual reagents and concentrations to be delivered to each well. The direct transfer capability reduces reagent consumption and allows for more assay conditions to be explored in a single microplate, making the system more amenable to agonist and antagonist assay formats.



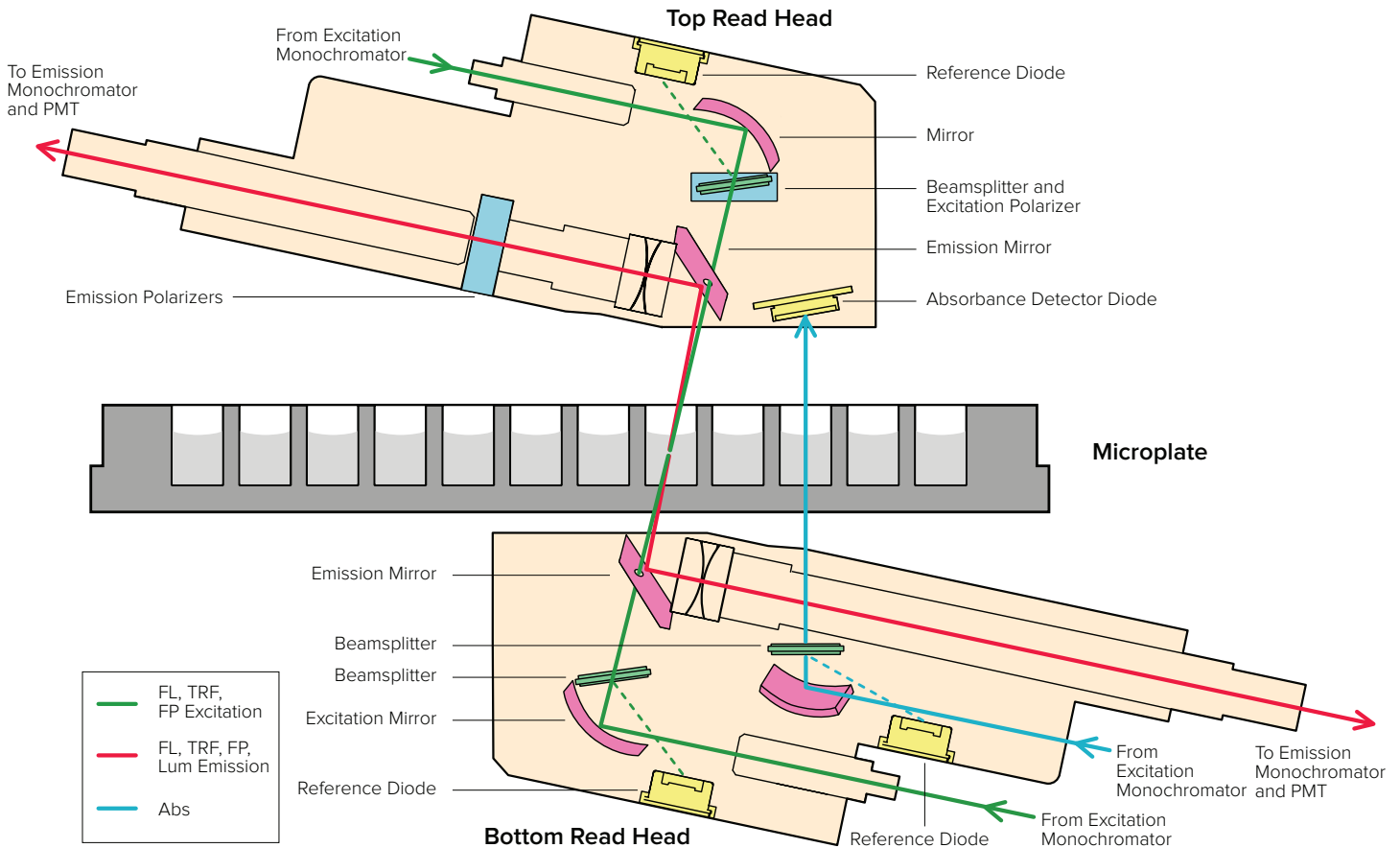
**Integrated 8- or 16-channel pipettor provides liquid transfer flexibility for optimal assay results.**

### Automated pipetting

The FlexStation 3 reader offers automated pipetting using the 8- or 16-channel pipettor to improve assay quality and increase throughput. For instance, liquid transfer for endpoint and slow kinetic assays can be automated to initiate a response at user-defined points of time. Automated pipetting ensures consistent addition time and minimizes pipetting errors, thus providing tighter assay CVs within and between experiments. For fast, kinetic cell-based assays, throughput is increased when a column of wells are pipetted, read, and analyzed simultaneously rather than one well at a time.

### Assay optimization

With the FlexStation 3 reader's pipettors, users can adjust parameters to optimize the assay's robustness. The dispense parameters can be optimized for each reagent addition to accommodate cells with different adherence characteristics, such as adjusting dispense velocity to prevent cell dislodging. The ability for the system to allow for multiple additions enables secondary controls to be added to each well. In addition, trituration (i.e., the mixing of well contents through repeated aspiration and dispensing using the pipettor) can improve the assay in two ways: resuspending compounds that have settled at the bottom of the wells in the source plate, or quickly mixing reagents to promote an even, rapid response with minimal assay variability.



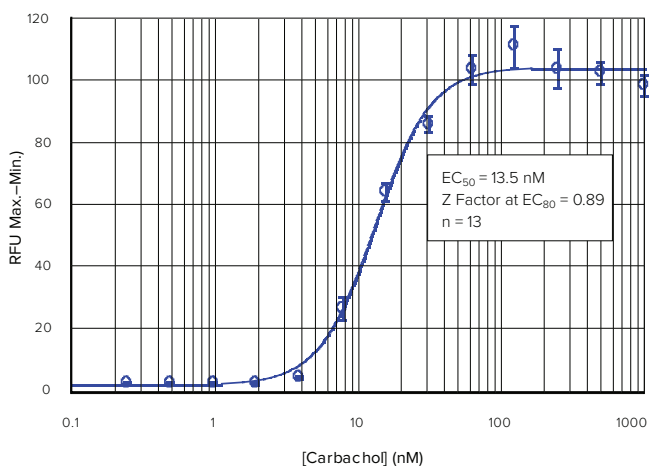
**Five-mode microplate reading with superior optics.**

## Superior optics

The FlexStation 3 reader's optics are designed to easily adapt to changes in assay requirements while maintaining the optimal performance of a single-mode reader. Based on the SpectraMax M5e platform, this five-mode reader addresses multiple application technologies including: absorbance, fluorescence intensity, fluorescence polarization, luminescence and time-resolved fluorescence. Dual monochromators allow users to target the optimal assay excitation and emission wavelengths and eliminate the need to change expensive band pass filters between experiments. Dual PMTs provide flexibility to detect multiple detection modes, while a separate PMT provides additional sensitivity for luminescence applications. Reference diodes automatically adjust to slight fluctuations in excitation intensity to reduce measurement noise. Absorbance applications are enhanced using top-quality UV-grade fibers to provide high light transmission in the lowest wavelengths.



**The SpectraDrop™ Micro-Volume Microplate.** The SpectraDrop Micro-Volume Microplate is a solution that offers the ability to use as little as 2  $\mu$ L samples with 24- or 64-well plates.



**Calcium mobilization in WT3M1 CHO cells.** Calcium mobilization in WT3M1 CHO cells by carbachol, run on the FlexStation 3 reader in 384-well microplate with the FLIPR® Calcium 4 Assay Kit.

## Instrument and software validation

SpectraTest® Absorbance and Fluorescence Validation Packages are available to determine the optical characteristics of the system. The FlexStation 3 reader exclusively offers fluid transfer validation using Molecular Devices patented PathCheck® Feature to quantify the integrated 8- and 16-channel pipettor head performance. These tools can be used in conjunction with SoftMax® Pro Software validation package and IQ/OQ/PQ validation protocols for FDA 21 CFR Part 11 compliance.

## Applications

Superior optics in the FlexStation 3 reader allow homogenous and heterogeneous biochemical- or cell-based microplate assays to be detected through a variety of readouts. When utilizing 8- or 16-channel pipettors, assays are expanded to include fast absorbance, fluorescence, and luminescence applications. Alternatively, automated liquid transfer can be incorporated into numerous endpoint and kinetic applications in five detection modes. Applications include:

- ADME-Tox assays
- Calcium mobilization assays
- cAMP assays using CatchPoint® Assay Kits
- Caspase-3 and protease assays
- DELFIA assays
- DNA/RNA/protein quantitation and purity
- Drug dissolution profiles
- Dual luciferase reporter (DLR) assay
- ELISAs/enzyme kinetics (e.g. Km, Ki, etc.)
- FluoroBlok cell migration assays
- FRET and TR-FRET assays
- Green fluorescent protein
- Intrinsic tryptophan fluorescence
- Kinase assays using IMAP® Assay Kits
- Live/Dead viability/cytotoxicity assays
- Low volume applications
- Membrane permeability assays (PAMPA)
- Membrane potential assays
- PicoGreen/NanoOrange/Bradford assay
- Reporter gene assays

## Robot integration

The FlexStation 3 reader can be integrated with a variety of automation solutions. Our Automation Vendor Partners Program has streamlined the integration of our microplate reader systems with all leading partner robots. The “out-of-the-box” automation solution saves up-front integration time and resources.

## Highly customizable low volume applications

Molecular Devices unique SpectraDrop Micro-Volume Microplate offers the highest throughput solution for low volume measurement available on the market today. Innovative and flexible design features enable accelerated sample preparation time and increased laboratory productivity in DNA, RNA and protein research.

Technical specifications		
General Specifications		
Dimensions (in.)	19 (H) x 23 (W) x 16 (D)	
Dimensions (cm)	49 (H) x 58 (W) x 40 (D)	
Weight	50 lbs. (22.7 kg)	
Power consumption	500 VA	
Power source	90–240 Vac, 3.5 A, 50–60 Hz	
Robotic-compatible	Yes	
General Photometric Performance		
Plate formats	6, 12, 24, 48, 96, 384 wells	
Light source	Xenon flash lamp (1 joule/flash)	
Detectors	2 photomultiplier tubes (PMT)	
Shaker time	0 to 999 seconds	
Temp. control*	2°C above ambient to 45°C	
Temp. uniformity*	±1°C at 37°C set point	
Temp. accuracy*	±1°C for reading chamber	
Flex reading	Abs + fluidics, FI + fluidics, Lum + fluidics	
Endpoint reading	All modes + fluidics	
Kinetic reading	All modes + fluidics	
Spectral scanning	All modes + fluidics	
Well scanning	Abs, FI, TRF, Lum	
Fluidics		
	<b>8-channel</b>	<b>16-channel</b>
Max. volume	200 µL	30 µL
Precision	2% CV @ 50 µL	3% CV @ 10 µL
Precision	8% CV @ 5 µL	5% CV @ 1 µL
Dispense max. rate	208 µL/sec.	52 µL/sec.
Standard Read Times (minutes:seconds)**		
	<b>96 wells</b>	<b>384 wells</b>
Absorbance	0:18	0:49
Fluorescence Intensity	0:17	0:48
Fluorescence Polarization	0:42	2:03
Time-Resolved Fluorescence	0:17	0:48
Luminescence	2:00	7:00
Absorbance Photometric Performance		
Wavelength range	200–1000 nm	
Wavelength selection	Monochromator, tunable in 1.0 nm increments	
Wavelength bandwidth	≤ 4.0 nm	
Wavelength accuracy	±2.0 nm	
Wavelength repeatability	±0.2 nm	
Photometric range	0–4.0 OD	
Photometric resolution	0.001 OD	
Photometric accuracy (microplate)	< ±0.006 OD ±1.0%, 0–2 OD	
Photometric precision	< ±0.003 OD ±1.0%, 0–2 OD	
Stray light	< 0.05% @ 230 nm	

Technical specifications	
Fluorescence Intensity Performance	
Reading capabilities	Top or bottom of a microplate
Wavelength range	250–850 nm
Wavelength selection	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM)	9 nm, 15 nm
Optimized sensitivity	≤ 1 pM fluorescein in 96 wells, ≤ 1.5 pM in 384 wells
Guaranteed sensitivity***	< 5 pM fluorescein in 96 wells or cuvette, < 20 pM in 384 wells
Luminescence Performance	
Reading capabilities	Cuvette or top or bottom of a microplate
Wavelength selection	Choice of simultaneous detection of all wavelengths or selection via monochromator, tunable in 1.0 nm increments
Wavelength range	250–850 nm
Optimized sensitivity	≤ 43 pM ATP in 96 wells
Guaranteed sensitivity***	≤ 75 pM ATP in 96 wells
Dynamic range	> 6 decades
Cross-talk	< 0.3% in white 96- and 384-well microplates
Time-Resolved Fluorescence Performance	
Reading capabilities	Top or bottom of a microplate
Wavelength selection	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM)	9 nm, 15 nm
Precision data collection	1–100 flashes, delay of 0–600 µsec. before read, integration time selectable between 50–1500 µsec.
Optimized sensitivity	≤ 10 fM europium in 96
Guaranteed sensitivity***	≤ 100 fM europium in 96 or 384 wells
HTRF Technology	Certified to Cisbio Bioassays' performance specs
Fluorescence Polarization Performance	
Wavelength range	300–750 nm
Wavelength selection	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM)	9 nm, 15 nm
Optimized Precision	≤ 3.5 mP standard deviation at 1 nM fluorescein in 96 wells
Guaranteed Precision***	< 5 mP standard deviation at 1 nM fluorescein in 96 wells

\* Temperature is regulated in the Read Chamber.

\*\* With three flashes/well in absorbance and fluorescence modes, and 1 sec./well integration in luminescence.

\*\*\* For properly functioning, operated, and maintained equipment.

The PathCheck Sensor is covered under U.S. Patents 5,959,738, 6,188,476, 6,320,662, 6,339,472, 6,404,501, 6,496,260, 6,995,844. FlexStation 3 readers are also covered under U.S. Patents 6,097,025 6,232,608, 6,236,456, 6,313,471, 6,316,774, 6,693,709, 6,825,921, and 7,663,755.

Ordering information	Description	Part number
FlexStation 3 Reader	<ul style="list-style-type: none"> <li>FlexStation 3 Base System</li> <li>SoftMax Pro Software</li> <li>1-year warranty</li> </ul>	FLEX3
Pipettor head kit, 8-channel (96) for FlexStation 3 Reader	<ul style="list-style-type: none"> <li>8-channel pipettor</li> <li>(10) racks of 96-well, FlexStation Pipet Tips (Black)</li> <li>96-well yellow plate</li> </ul>	0200-6182
Pipettor head kit, 16-channel (384) for FlexStation 3 Reader	<ul style="list-style-type: none"> <li>16-channel pipettor</li> <li>(10) racks of 384-well, FLIPR® Tetra Pipet Tips (Clear)</li> <li>384-well yellow plate</li> </ul>	0200-6183

#### Consumables

96-Well, FlexStation Pipet Tips (Black)	<ul style="list-style-type: none"> <li>200 µL capacity</li> <li>(10) racks/box</li> </ul>	9000-0911
96-Well, FlexStation Pipet Tips (Clear)	<ul style="list-style-type: none"> <li>200 µL capacity</li> <li>(10) racks/box</li> </ul>	9000-0912
384-Well, FLIPR Tetra Pipet Tips (Black)*	<ul style="list-style-type: none"> <li>30 µL capacity</li> <li>(50) racks/case</li> </ul>	9000-0764
384-Well, FLIPR Tetra Pipet Tips (Clear)*	<ul style="list-style-type: none"> <li>30 µL capacity</li> <li>(50) racks/case</li> </ul>	9000-0763

\* Inquire regarding partial case purchases.

Ordering information	Description	Part number
<b>Reagents</b>		
FLIPR® Calcium 6 Assay Evaluation Kit	<ul style="list-style-type: none"> <li>Includes 3 vials each of FLIPR Calcium 6 and 6-QF dyes</li> <li>Each vial sufficient for 1 plate (96 or 384-well)</li> </ul>	R8194
FLIPR® Calcium Assay Evaluation Kit	<ul style="list-style-type: none"> <li>Includes 3 vials each of FLIPR Calcium 3, 4, and 5 dyes</li> <li>Each vial sufficient for 1 plate (96 or 384-well)</li> </ul>	R8172
FLIPR® Membrane Potential Assay Evaluation Kit	<ul style="list-style-type: none"> <li>Includes 5 vials each of FLIPR Membrane Potential Blue and Red formats</li> <li>Each vial sufficient for 1 plate (96 or 384-well)</li> </ul>	R8128
IMAP® Fluorescence Polarization Evaluation Kit	<ul style="list-style-type: none"> <li>Includes beads and buffers for 800 data points (384-well)</li> </ul>	R8155
IMAP® TR-FRET Evaluation Kit	<ul style="list-style-type: none"> <li>Includes beads and buffers for 800 data points (384-well)</li> </ul>	R8161
QBT™ Fatty Acid Uptake Assay Explorer Kit	<ul style="list-style-type: none"> <li>Includes 10 vials, each sufficient for 1 plate (96 or 384-well)</li> </ul>	R8132
Neurotransmitter Transporter Uptake Assay Explorer Kit	<ul style="list-style-type: none"> <li>Includes 5 vials, each sufficient for 1 plate (96 or 384-well)</li> </ul>	R8173



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please contact Bio-Strategy for more information or to request a quote

moleculardevices@bio-strategy.com | www.bio-strategy.com

#### Contact Us

Phone: +1-800-635-5577

Web: [www.moleculardevices.com](http://www.moleculardevices.com)

Email: [info@moldev.com](mailto:info@moldev.com)

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