

# Multimode Microplate Reader MR 3942 Series



EPC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

**Analytical Technologies Limited**

An ISO 9001 Certified Company

[www.analyticalgroup.net](http://www.analyticalgroup.net)

## MR 3942 And MR 3942S Series Multimode Microplate Reader

The “More-Value-For-Money” Reader - with monochromator technology

MR-3942 the successful multi-technology microplate reader platform has been extended in its modularity, performance and user-friendliness by adding additional reading technologies and a double monochromator for wavelength selection.

- Monochromator Technology
- High-sensitivity Luminescence
- BRET
- UV/VIS Absorbance
- UV/VIS Fluorescence
- UV/VIS FRET
- Time resolved Fluorescence (TRF)
- Time Resolved FRET (TR-FRET / HTRF®)
- Fluorescence Polarization

The MR-3942 is a perfect fit for life sciences research. It has been developed to support a fully modular approach. Any combination of reading technologies and options can be composed maintaining all possibilities of later upgrades.

- Variable Spectral band width up to 5 steps.
- System have a septum injector on top of the sample compartment for addition of reagent.
- Capability of real-time fluorescence measurement while reaction is in progress.

### ►► Versatility And User-Friendliness

**Choice of reagent injectors:** The MR-3942 can be equipped with up to 3 JET injectors with variable volumes. Up to two injectors can be installed in measurement position, e.g. for flash luminescence measurements with highest sensitivity. Additionally, two injectors positions are available in pre-position, making the MR-3942 ready to meet the requirements for multiple assays formats.

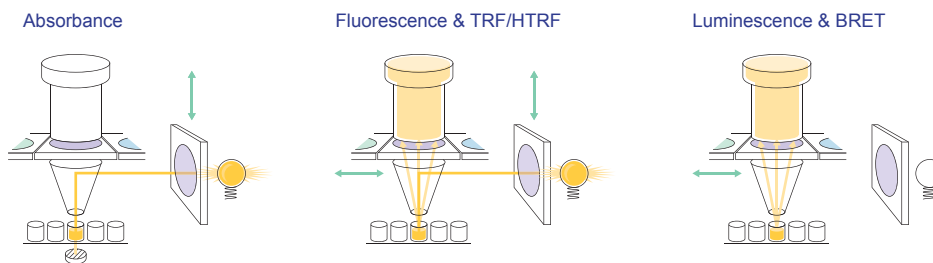
**Ergonomic design and front access:** All operations such as plate loading, filter change and reagent connections are accessible from the front. Reagent vials can be stored in the front of the instrument, providing easy access and visibility. A removable trough can be filled with water or ice to keep reagents cooled. Different reagent tube holders are available to ensure secure handling of valuable reagents.



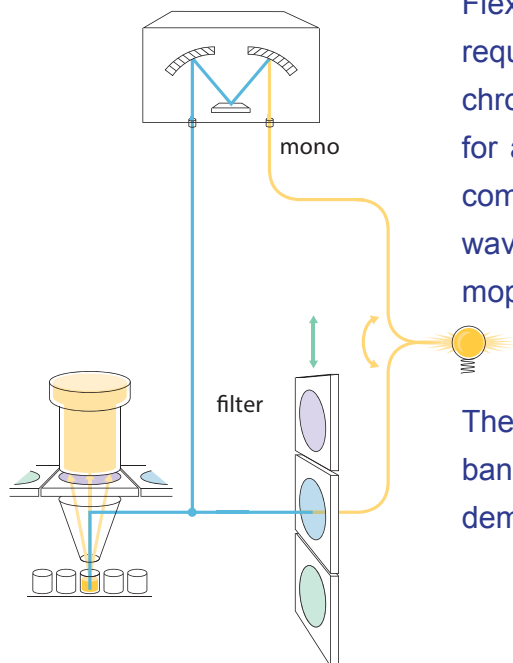
## ►► ONE-4-ALL Optics

The registered optical system ONE-4-ALL combines the stability and user-friendliness of a multimodal optical system with the sensitivity and versatility of dedicated optical devices. The system proves its superior performance for all applications where highest sensitivity, reliability and cross-talk reduction is of key importance. The ONE-4-ALL optical design offers the highest intrinsic security - as the correct device is always inserted and selected - and the highest lifetime - as there are no moving parts.

The established system has been optimized in the new MR-3942 now featuring a high performance Xenon flash lamp as a central light source and additional pathways for monochromator and filter options.



## ►► Monochromator Technology



Flexibility in wavelength selection for any current and future assay requirements is best met by the MR-3942 double-monochromator with high transmission and best blocking properties for absorbance and fluorescence excitation. Use the benefits of complete absorbance and excitation spectral scans to measure wavelength shifts due to e.g. changes in pH or polarity on the chromophore's properties.

The monochromator is equipped with software controlled continuous bandwidth variation to optimize the instrument for the specific demands of different assay requirements.

## ►► Filter Technology



Due to their high transmission characteristics - which can be up to 25-fold that of monochromators - technologies like Time-Resolved Fluorescence (TRF) can be measured more efficiently with filters. In addition filters are available with wide bandwidths making them the ideal choice for fluorophores with wide spectra and for all luminescence based assays requiring the use of filters.

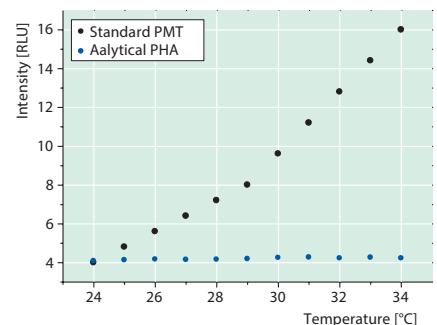
Due to the quick change of filters, tolerant to any wavelength difference, this technology is the ideal device for fast ratiometric measurements common in Fura 2 Calcium monitoring. Up to 40 different excitation and emission filters can be easily mounted on exchangeable filter carriers.

## ►► Detectors

The MR-3942 is equipped with a high-sensitivity UV-extended photodiode for absorbance measurements and a low noise photomultiplier (PMT) for luminescence and fluorescence applications.

**Dual Mode PMT Detector Optimized Detection for Any Assay:** The variety of measurement techniques requires different operation modes of the photomultiplier for optimal performance. The MR-3942 features a novel dual mode detector technology that automatically chooses between single photon counting and analogue operation.

**Noise Free Fluorescence Read-out with Pulse Height Analysis (PHA):** The patent pending pulse-height-analysis detection mode operates almost background-free (dark count rate reduced by factor of 100). Temperature effects are significantly reduced and even at elevated temperatures, often required for cell-based assays, the dark count rate increases only marginally.



When Every Photon Counts: The single photon counting mode is automatically selected for best sensitivity in luminescence, BRET, TRF and TR-FRET/HTRF® studies. A dynamic range spanning 7 orders of magnitude is achieved without the need of any adjustments for maximum convenience and security.

All PMTs are subject to a stringent pre-selection process to guarantee low noise, high detection efficiencies and unmatched stabilities. Optionally available PMTs with an extended wavelength range up to 850nm cover the demands of near-infrared dyes.

## ►► Sensitivity

Low Level Detection. The revolutionary dual-mode detector guarantees the best sensitivity combined with a low and stable background for every measuring mode. In combination with the optimized ONE-4-All optical design this is the major parameter for best performance in a measurement device enabling detection of extremely low amounts of analyte.

- Less than 5 amol Europium (TRF)
- Less than 200 amol Fluorescein (Fluorescence)
- Less than 6 amol ATP (Luminescence)

Save Money and Time. The high sensitivity provides additional benefits, even when detecting the lowest signal levels is not the key to an assay. In these cases the consumption of expensive reagents or valuable cells can be greatly reduced. Similarly, you can significantly reduce the reading time per sample and save valuable total operation time.

## ►► ICE-Software



Wizard Guidance: Instrument Control and Evaluation software has been designed with the requirements of today's researchers in mind: Wizard Guidance guarantees ease of use during protocol, creation, measurement and data export has been achieved with the wizard-guided and clearly structured ICE software package.

Intuitive Dialogues and Displays: starting a measurement, displaying results and exporting data is straight-forward due to clearly structured screen and intuitive dialogs. During routine operation you simply select the required protocol, load the microplate and start the measurement - as easy as this!



Measurement and Operation Modes: Due to the manifold of settings and freely configurable combinations of operation sequences the ICE software package is as flexible as your research is. A protocol file can be well adjusted to the respective needs of an assay:

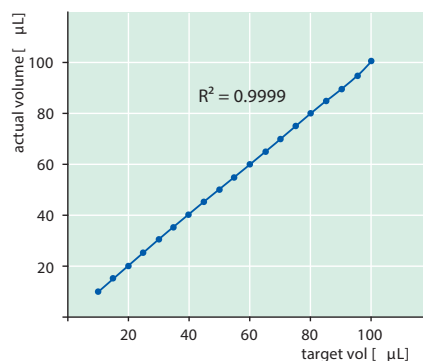
- Single Endpoint
- Multiple Endpoint
- Ratio Endpoint
- Kinetics
- Repeated (long term kinetics)
- Delay
- Scanning
- Spectral Scanning
- Shaking

Report and Export: For documentation and sharing of results data can be exported in CSV- or XLS-file format with multiple selection options, as well as the choice of an individual file-directory per measurement-protocol.

## ►► JET Injectors



Analytical Technologies JET injectors use Teflon bellows for accurate and fast injections even for smallest injections volumes, and guarantee most efficient mixing as well as extreme longevity.



- Accuracy and precision of better than 98% over the entire volume range
- Frictionless operation for extended lifetime
- Cell-friendly materials and negligible shear forces enable injection of cell suspensions, e.g. in Aequorin-based calcium assays
- Sophisticated Prime mode reduces reagent consumption while ensuring homogeneous, gas-free filling

## ►► Quality Control

Aalytical Technologies offers easy-to-use test devices and standardized operational procedures to monitor the proof of functionality and performance of the MR-3942



### Luminescence Test Plate

The solid state test plate for luminescence is the easiest, quickest and most reliable way to periodically check the performance of an instrument. The test plate can be applied to monitor the instrument's

- Efficiency
- Accuracy
- Reproducibility
- Mechanical positioning
- Crosstalk

An annual check-up and calibration of the test plate ensures its consistency.



### Absorbance Test Plate

The absorbance test plate can be used over a wide range of wavelengths from UV to VIS. It can be applied to check the instrument's

- Accuracy
- Reproducibility
- Mechanical positioning

The test plate can be submitted to periodical checks.



### Luminescence Performance Kit

With the QC luminescence performance kit (consisting of two controls and two different detection reagents) the luminescence performance can be checked. It is an alternative to the test plate and an ideal quality control method as both injection and detection system can be monitored. The flash type luminescence reaction provides results within seconds.

## IQ and PQ Services

The test plates as well as the kit are part of the IQ and PQ services available through Berthold Technologies engineers. All reading technologies will be checked during these services with the reagents or means appropriate.



# MR-3942 And MR-3942S

## ►► Technical Specification

	MR 3942	MR 3942S		MR 3942	MR 3942S
Detection Unit	Low-noise photomultiplier tube in single photon counting mode, usable spectral range 380 – 650 nm  Photo diode, spectral range 200 – 1000 nm	Low-noise photomultiplier tube in dual mode, spectral range 200 – 700 nm  Photo diode, spectral range 200 – 1000 nm	Injection Unit	Up to 3 injectors Volume: 10 – 100 µL JET injection technology Accuracy better 2 % (over entire range of volume) Precision better 2 % (over entire range of volume)	
Excitation Source	Halogen lamp, spectral range 340 – 1000 nm	Xenon flash lamp, spectral range 200 – 700 nm with 1500 hrs operation Emission range: 200-800 nm	Temperature Control	+5 °C above RT to 42 °C (option), includes cooled photomultiplier	
Wavelength Selection	High quality interference filters	Double monochromator 3D design  F number 2.7 (high transmission)  Variable bandwidth 1.5 – 20 nm  Increment 1 nm  Blocking 10 <sup>-6</sup>  Stray light 10 <sup>-6</sup>  High quality interference filters	Microplate Formats	6 to 384 well Plate heights 15 ±1 mm and 20 ±1 mm	6 to 1536 well
			Interface	USB	
			PC Operating System	Win XP, Win Vista, Win 7	
			PC Requirements	Pentium Processor, 500 MHz (or better), CD ROM drive, display 1024 x 768 (or better), USB	
			Regulations	CE, UL	
Measurement Technologies	Luminescence BRET, BRET <sup>2</sup> Fluorescence (top) FRET Absorbance Vis	Luminescence BRET, BRET <sup>2</sup> Fluorescence (top) FRET Absorbance UV & Vis Time-Resolved Fluorescence TR-FRET/HTRF® FP (Fluorescence Polarization) Phosphorescence	Power Supply	110 – 240 V, 50/60 Hz, 220 VA External auto-ranging mains adaptor	
			Temperature Range	Storage: 0 – 40 °C Operation: 15 – 35 °C	
			Humidity	10 – 85 % non-condensing	
Performance:			Dimensions (W x D x H)	391 x 470 x 345 mm	400 x 470 x 345 mm
Luminescence	< 6 amol ATP	< 6 amol ATP	Weight	21 kg	22 kg
Fluorescence	< 0.3 fmol Fluorescein	< 0.3 fmol Fluorescein	Optics: Monochromator 1200 grooves/mm Sensitivity: Signal-to-Noise level using the Raman band of water, excitation 350 nm: 4000:1 RMS measuring noise on the Raman peak Wavelength accuracy: ±1.0nm Wavelength reproducibility: +/-0.5nm Resolution: 0.1 nm Wavelength Scanning speed: 20000nm/min		
Absorbance	Accuracy better 2 %, precision better 0.6 %	Accuracy better 2 %, precision better 0.6 %			
TRF	n.a.	< 10 amol Eu			
Dynamic Range	> 6 order of magnitude 0 – 3.5 OD	> 6 order of magnitude 0 – 3.5 OD			
Crosstalk	Low crosstalk due to crosstalk reduction design: 5 x 10 <sup>-6</sup>				
ICE Software					
● Wizard guided operation					
● Single and multiple endpoint					
● Kinetics and Repeated					
● Scanning					
● Ratio calculation					
● Display of kinetic curves incl. zoomed view					



## ►► HPLC Servicing, Validation, Trainings and Preventive Maintenance :

HPLC Servicing	:HPLC Servicing : We have team of service engineers who can attend to any make of HPLC promptly @the most affordable cost.
Trainings	:We also take up preventive Maintenance to reduce downtime of HPLC's Trainings.
AMC's/CMC	:AMC's/CMC :We offer user training both in-House and at customer sites on PLC principles, operations, troubleshooting.
Validations	:Validations :We have protocols for carrying out periodic Validations as per GLP/ GMP/U SFDA norms.
Instruments	:Instruments :We offer instruments / Renting Services Modules like pumps, detector etc. on Rent.



## ►► About Analytical Technologies

Analytical Technologies is synonymous for offering technologies for doing analysis and is the Fastest Growing Global Brand having presence in at least 96 countries across the globe. Analytical Technologies Limited is an ISO :9001 Certified Company engaged in Designing, Manufacturing, Marketing & providing Services for the Analytical, Chromatography, Spectroscopy, Bio Technology, Bio Medical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Centers. Distributors & Channel partners worldwide.

## ►► Our Products & Technologies



## ▶▶ Regulatory compliances



## ▶▶ Corporate Social Responsibility

Analytical Foundation is a Nonprofit Organization (NGO) found for the purpose of:



**Analytical**  
**Foundation**

1. Research & Innovation Scientist's awards / QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personalities for their contributions across various field of Science and Technology and awarding them yearly. To participate for award, send us your details of research / testing / publication at [info@analyticalfoundation.org](mailto:info@analyticalfoundation.org)

2. Improving quality of life by offering YOGA Training courses, Work shops / Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXYFY human minds, souls and body by means of Yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.

## ▶▶ Reach us @



 **Analytical**<sup>®</sup>  
Technologies Limited

HPLC Solutions   MultipleLabs   Analytical Bio-Med   Analytical Distributors   Analytical Foundation (Trust)

**Corporate & Regd. Office:**  
Analytical House, # E67 & E68,  
Ravi Park, Vasna Road, Baroda,  
Gujarat 390 015. INDIA

T: +91 265 2253620  
+91 265 2252839  
+91 265 2252370  
F: +91 265 2254395

E: [info@hplctechnologies.com](mailto:info@hplctechnologies.com)  
[info@multiplelabs.com](mailto:info@multiplelabs.com)  
[info@analyticalgroup.net](mailto:info@analyticalgroup.net)  
[info@analyticalbiomed.com](mailto:info@analyticalbiomed.com)

W: [www.ais-india.com](http://www.ais-india.com)  
[www.analyticalgroup.net](http://www.analyticalgroup.net)  
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