

The Concept

Berthold Detection Systems introduces the second generation microplate luminometer. Our experience with hundreds of installations worldwide inspired many new and improved features for the benefit of researchers and lab technicians working with bioluminescence and chemiluminescence applications.



The Concept

The New MPL2 Microplate Luminometer is a very compact, easy to use and ultrasensitive microplate luminometer. It incorporates all important functions necessary to perform glow luminescence measurements. Due to the concentration on the few critical functionalities and the ability to manufacture in high quantities, the product can be made available to customers for a very attractive price.



Black and white microplates from various manufacturers are suitable for luminescence measurement in the MPL2 luminometer. Photography courtesy of Nunc A/S Denmark.

The Detection System

The heart of the instrument is a newly developed, very compact photon counter, combining the latest low noise photomultipliers and state-of-the-art, very fast electronic circuitry. They are the basis for an excellent sensitivity and a very high linear range. Due to the excellent stability, no cumbersome internal calibration is required. The extremely high time resolution guarantees excellent linearity which is not achievable otherwise, for example when electronic gain adjustments need to be done.

The Optical System

The light transmission from the microplate into the detector is critical in order to obtain highest sensitivity and lowest light crosstalk from adjacent sample wells. This was solved by combining high precision optomechanical assemblies, treated with special light absorbing surface with an optimized mirror system to allow maximum light collection and eliminating virtually any straylight.

The Sample Transport System

All commercially available microplates can be measured on the MPL2 Microplate Luminometer. The microplate sample carrier will correct any variances of outer dimensions with its effective plate alignment mechanism. The microplate wells are presented to the detector sequentially: two stepper motors perform the sample positioning quickly and reliably, with an optical feedback providing additional position verification in both dimensions.

User Interface

The MPL2 Microplate Luminometer is operated by a standard Personal Computer System. Several software packages are available for operation of the instrument. The standard software package supplied with the instrument is **"Simplicity"**, running under Windows platform.

Applications

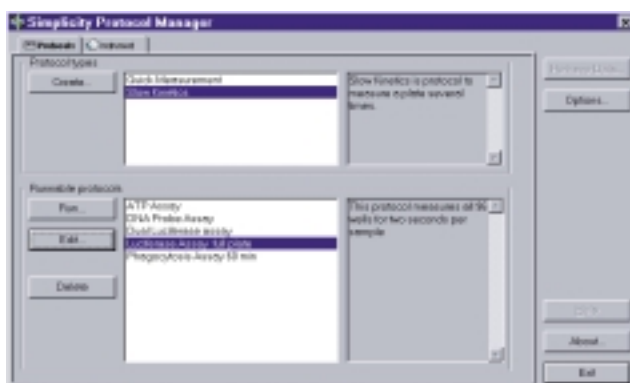
All luminescent „Glow“ applications can be performed on this instrument. These include, but are not limited to:

- Reporter Gene Assays
- PCR Quantification
- Immunoassays
- ATP Assays
- DNA Probe Assays
- Phagocyte Function Assays

The PC Software "Simplicity"

The Platform of the PC Software

The PC program runs on Microsoft® Windows® platform. All suitable Windows® features are utilized. The software relies on an open system architecture: The basic module for standard measurements meets most basic needs. Additionally available are the protocol types Fast Kinetics and Slow Kinetics, with more to follow.



Basic module **Protocol Manager**: The upper field shows available protocol types for individual generation of executable measurement protocols, the lower field includes user-defined ready-to-use protocols.

The Program Structure

The PC program is structured in the form of protocols, allowing automation of all steps from defining measurement parameters to reporting of final results. They describe the way samples are measured and their data is processed and reported. The architecture of the program allows future additions of new protocol types.

Following the structure of the protocol types, the users define their own individual protocols and store them for immediate use and/or later availability.

The measurement results are available as both tables and graphs (where applicable), both on screen and as printouts on every Windows® compatible printer. They may be saved and exported as text files. Direct transfer into Microsoft® Excel

by one mouseclick only is also possible. The "Advanced Excel Functionality" provides automation of pre-defined evaluation steps by Excel.

Basic Module

Every MPL2 Microplate Luminometer includes the basic version **Protocol Manager** and the standard function **Raw Data**. The protocol is always ready to measure. The data is presented as a spreadsheet and may be saved and reported as printout. The "Excel" button provides transfer to Microsoft® Excel with a single mouseclick. Any combination of wells: all, columns, rows, individual, rectangles, can be selected with the mouse for measurement. The measuring time can be set from 0.1 s upwards. The results are reported as RLU/s.

Additional Modules

Several additional modules can be added to the basic version, depending on the type of luminescence experiment:

Fast Kinetics

Measurement of the time course of a luminescent reaction. Data table and graph. Additional functions: Smoothing, averaging of selectable samples, logarithmic scale, autoscale or selectable scale.

Measurement window:
The wells can be selected randomly for measurement.

Slow Kinetics

This protocol is used for the measurement of several samples in parallel. It is applicable for kinetics lasting several minutes and longer. The measurement of a microplate is repeated continuously. The software will rearrange the individual data points to data tables and graphical displays, as described in Fast Kinetics.

Convenient Result Output

Every module offers comprehensive result output options:

- data table
- graphical display with autoscale or selectable scale
- icons for different display arrangements
- printout of data table and/or graphs
- Excel transfer by mouseclick
- saving of data
- retrieving previously measured data.

Instrument hardware and microprocessor

Sample format:	96-well microplate, opaque in solid or strip format
Detector:	Photomultiplier Tube with Bialkali Cathode, effective spectral sensitivity range 300 – 650 nm
Sensitivity:	Better than 1000 molecules of luciferase in a reporter gene assay. ATP detection limits set only by reagent quality (the instrument has several orders or magnitude sensitivity reserve for future reagent improvements).
Crosstalk:	Less than 3×10^{-5} (spillover from adjacent well)
Dynamic range:	6 decades
Hardware:	Micro-controller for control of all basic instrument functions.
Measuring time:	0.1 s – 100 s per well
Scan pattern:	Random selectable single well, access by mouseclick
Interfaces:	Serial interface (RS-232) for PC
Dimensions:	Instrument: W 400 mm, D 490 mm, H 139 mm Transport Package: W 500 mm, D 610 mm, H 260 mm
Weight:	19.2 kg including packing
Power:	230 V 50 Hz; 115 V 60 Hz
Power consumption:	35 VA
Storage temperature:	0 °C – 40 °C
Operating temperature:	10 °C – 35 °C
Humidity:	10% – 80% (non condensing)

Regulatory: CE, UL, CUL

PC Software

Platform/Required hardware:	IBM compatible PC, one available serial port. Screen resolution: 640 x 480. Colors: min.16. Operating system: Windows® 95, Windows® 98, Windows® NT 4.0
Additional software (optional):	Microsoft® Excel.
Standard configuration:	Protocol Manager, Raw Data.
Additionally available:	Fast Kinetics, Slow Kinetics Please inquire for more protocols.
Windows® features provided:	Full OLE support, fully resizable grids, non-contiguous areas selectable, multiple document interface, resizable, zoomable graphs, status bars, draggable tool bars, etc.

Developed under IEEE standards to ensure best software quality.



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