

AlphaScreen

TRF

Fluorescence Polarization

AlphaScreen

Dual Luminescence

TRF  
Luminescence

Absorbance  
HTRF

FRET  
Fluorescence

AlphaScreen

FRET  
Fluorescence  
Polarization

Luminescence

BRET<sup>2</sup>  
Absorbance

Absorbance  
Fluorescence  
Polarization

Absorbance  
Dual  
Luminescence

Dual  
Luminescence

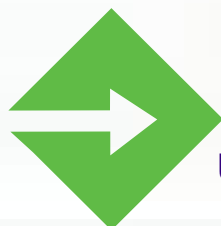
BRET<sup>2</sup>  
TRF

Luminescence

Fluorescence



Any Assay, Any Format,  
Any Method of Detection...  
One Instrument..



**Fusion**  
Universal Microplate Analyzer

# Any Assay, Any Format, Any Method of Detection...

## Any Method of Detection...

### The Complete Solution to Keep You Ahead of Changing Technology...Fusion

If your research takes you from solution to cell based assays, in 6- to 1536-well formats, using virtually any non-isotopic method of detection, the Fusion™ Universal Microplate Analyzer is the only instrument that can meet your ever changing needs. From basic research to assay development to high throughput screening, Fusion is the first multi-detection platform that you configure to fulfill both your research requirements and budget.

#### ■ Any Assay

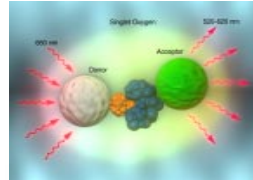
Whether your research involves cell based assays, solution based assays, enzyme assays, reporter gene assays, immunoassays, binding studies, or molecular biology, the Fusion Universal Microplate Analyzer can run your assays.

#### ■ Any Format

The Fusion system can handle microplates from 6-wells up to 1536-wells.

#### ■ Any Method of Detection

There are up to 11 detection modes in one system. No other multi-detection instrument can provide the versatility for your research that Fusion offers.



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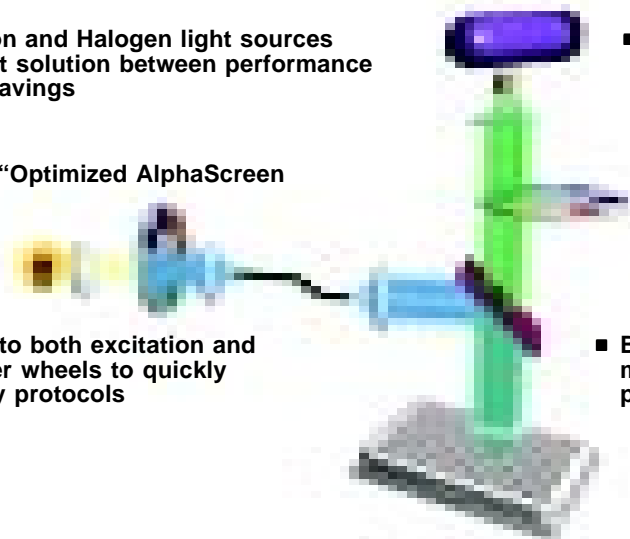
# Fusion

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# One Instrument...

## Fusion Optics

- Combined Xenon and Halogen light sources provide the best solution between performance and user cost savings
- Laser diode for “Optimized AlphaScreen performance”
- Easy access to both excitation and emission filter wheels to quickly change assay protocols
- Direct optics eliminates light loss associated with fiber-optics based systems
- Auto-Z plate height adjustment eliminates manual system optimization
- Better sensitivity allows miniaturization for higher productivity



With the power of the Fusion Universal Microplate Analyzer, you only need one instrument to perform all of these methods of detection

- **AlphaScreen™**  
(Amplified Luminescent Proximity Homogeneous Assay) technology creating a powerful assay miniaturization tool.
- **TRF**  
(Time-Resolved Fluorescence) chemistry including HTRF® (Homogeneous Time-Resolved Fluorescence), Europium cryptates, Europium chelates, Terbium, Samarium, and Dysprosium.
- **Fluorescence**  
Modes include FRET (Fluorescence Resonance Energy Transfer), top reading fluorescence intensity for solution based assays and bottom reading fluorescence intensity for cell based assays.
- **Luminescence**  
Modes include glow luminescence, enhanced flash luminescence, and dual reporter gene assays, including BRET™ (Bioluminescence Resonance Energy Transfer).
- **Absorbance**  
Readings from UV (for 230/260/280 nm readings) through the visible spectrum are supported.
- **FP**  
(Fluorescence Polarization) assays with optics optimized to cover the whole visible spectrum.

# Any Assay, Any Format, Any Method of Detection...

## Any Format...

### If Your Research Needs Change, You Don't Need New Technology, Simply Add to the Technology You Already Have...Fusion

Fusion can be configured to meet your research needs and budget. Fusion is a modular platform design. If your research only requires basic methods of detection such as fluorescence and absorbance, then the Fusion Basic System will address your requirements, without overpaying for features and options that you don't require. Additionally, if your research needs to grow, many of the modular Fusion performance options can be upgraded on an existing system. Options such as 40 plate stackers, 1536-well plate reading, TRF, FP, UV capabilities and AlphaScreen are options available on most of the base instrument platforms. Let Packard and Fusion help you advance your research to the next level.

The following models are just some of the popular configurations that address assay detection and throughput needs from basic research through assay development and high throughput screening.



#### ■ Fusion Basic System

For basic research needs including both Top and Bottom Reading Fluorescence, Luminescence and Absorbance with the ability to read up to a 384-well plate format.

#### ■ Fusion Basic with TRF

The TRF option provides the ability to read both TRF and HTRF homogenous time resolved fluorescence chemistries as well as UV capabilities for assays such as 260/280nm absorbance ratios.



#### ■ Fusion Basic with TRF and FP

Adding FP provides the capabilities to perform virtually any fluorescence based assay.

#### ■ Fusion Alpha

AlphaScreen chemistry provides the ultimate in sensitivity and miniaturization for screening and assay development. The Alpha option enables Fusion to be the only multi-detection system optimized to perform AlphaScreen assays.

#### ■ Fusion Alpha with TRF and FP

With more methods of detection than any available multi-detection system, this model truly performs... *Any Assay, in Any Format, in Any method of Detection on One Instrument.*



#### ■ Integrated Workstations with the MultiPROBE® II, Gripper™ Integration Platform and PlateTrak™ Systems

With the OCX interface software, Fusion can be directly controlled by one of Packard's Liquid Handling systems to form an integrated workstation for true walk-away convenience. This OCX interface can also be used by other sample processing and liquid handling systems to control the Fusion system.

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# Fusion

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# One Instrument...

## Configuration Guide

Regardless of your budget... you'll never have to choose between price and performance again. When choosing a Fusion model that fits your research needs, you don't have to worry about performance. Fusion offers the same performance in all methods of detection, regardless of the configuration you purchase. This is due to the high performance direct-optics system incorporated into all Fusion systems.

The Fusion Universal Microplate Analyzer comes in six models: Fusion, Fusion  $\alpha$ , Fusion  $\alpha$ -FP, Fusion HT, Fusion  $\alpha$ HT and Fusion  $\alpha$ -FP HT. Each system can be configured to meet your specific research needs and budget.

Feature/Mode	Fusion	Fusion $\alpha$	Fusion $\alpha$ -FP	Fusion HT	Fusion $\alpha$ HT	Fusion $\alpha$ -FP HT	Notes
Read Modes Available	7	8	11	9	10	11	
AlphaScreen	N/A	S	S	N/A	S	S	
Absorbance (340 – 700 nm)	S	S	S	S	S	S	
Absorbance (230 – 340 nm)	O	O	O	S	S	S	1
Luminescence (dual, glow, and enhanced flash)	S	S	S	S	S	S	
Top and Bottom Fluorescence Intensity	S	S	S	S	S	S	
FRET	S	S	S	S	S	S	
TRF & HTRF	O	O	O	S	S	S	1
Fluorescence Polarization	O	O	S	O	O	S	
Red Shifted PMT	O	O	O	O	O	O	1
Flash Xenon Light Source	O	O	O	S	S	S	1
Quartz Tungsten Halogen Light Source	S	S	S	S	S	S	
HTRF Filter Set (337nm, 620nm, 665nm)	O	O	O	S	S	S	1
Fluorescein Filter Set (485nm, 530nm)	S	S	S	S	S	S	
8 Position Excitation Filter Wheel	S	S	S	S	S	S	
6 Position Emission Filter Wheel	S	S	S	S	S	S	
2 Optical Channels	S	S	S	S	S	S	
Auto-Z Automatic Plate Height Adjustment	S	S	S	S	S	S	
Orbital and Linear Plate Shaking	S	S	S	S	S	S	
6-, 12-, 24-, 48-, 96-, and 384-well Compatibility	S	S	S	S	S	S	
1536-well Compatibility	O	O	O	S	S	S	
Temperature Control	O	O	O	S	S	S	
40 Plate Stackers	O	O	O	S	S	S	
Bar Code Reader	O	O	O	S	S	S	
Built-in Database	S	S	S	S	S	S	
Kinetics and Curve Fitting Data Reduction Software	O	O	O	O	O	O	
Robotics Control Software	O	O	O	N/A	N/A	N/A	2

S = Standard

O = Optional

N/A = Not Available

Notes and Read Modes:

1. These features are not available individually. They are combined in the TRF Detection Module options.
2. Please consult your local Packard representative for information regarding the use of the Robotics Control Software with stackers.

# Any Assay, Any Format, Any Method of Detection...

## Any Assay...

## Any Application is Possible with the Performance...

### Performs All of Your Routine Research Experiments

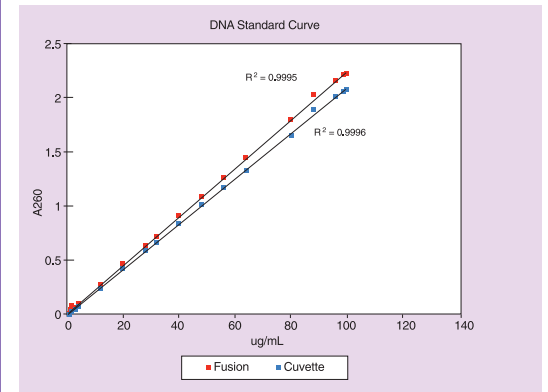
From basic research to assay development and HTS, Fusion offers the flexibility to perform all of your current and future assays, in any method of detection, all on one versatile system.

Basic research for molecular biology requires a system that can perform many of the routine assays that take your experiments to the next level of investigation. From simple absorbance based 260/280nm DNA purity analysis to fluorescence labeled DNA quantitation experiments, Fusion is the basic research tool that will provide fast, reliable answers to further your research.

#### UV Absorbance (A260) of DNA Standard Solutions Using Fusion

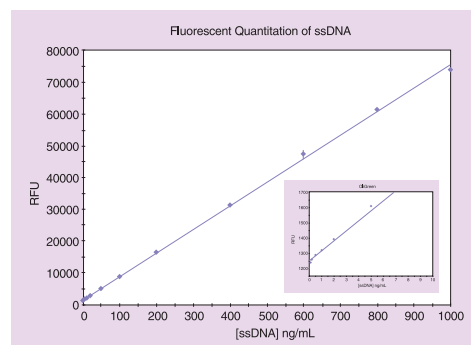
Using the UV Absorbance option on Fusion allows for rapid, non-destructive quantitation and purity analysis of DNA in UV-compatible microplates. The graph shows the excellent correlation of Fusion with a standard cuvette based spectrophotometer, as well as the linearity and sensitivity obtained with a DNA standard curve.

#### Absorbance



#### DNA Purity Analysis

#### Fluorescence



#### DNA Quantitation

#### Quantitation of Nucleic Acids on Fusion

Nucleic acids may be detected and quantitated on the Fusion by direct measurement of UV absorbance at 260/280 nm, or by detection of fluorescent nucleic acid dyes. Fluorescent quantitation is highly sensitive (< 1ng/mL ssDNA) and linear over four orders of magnitude. The graph shows the standard curve of ssDNA at concentrations from 1 ug/mL to 100 pg/mL in a 96-well plate using OliGreen® (Molecular Probes Cat.# O-7582). Excellent linearity was obtained using 0.5 sec/well read times. Inset shows an enlargement of the lowest standards.

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# Fusion

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# One Instrument...

## and Versatility of...Fusion

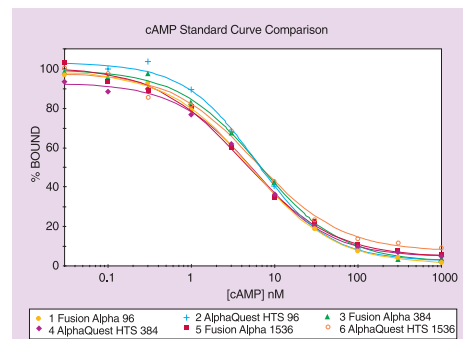
### Develop New Assays for HTS

Assay Development for HTS requires a system which offers flexibility in plate formats along with a system which can perform any required method of detection in a variety of plate formats and sample volumes. Fusion meets these requirements along with consistent performance in all methods of detection.

#### ■ cAMP Detection on Fusion- $\alpha$ Using AlphaScreen

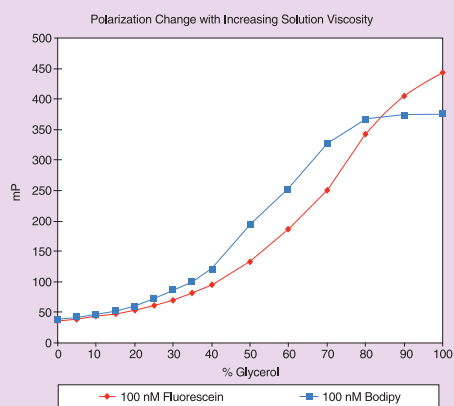
AlphaScreen is a highly sensitive and easily miniaturized homogeneous assay technology for HTS. cAMP standard curves generated in 96-, 384- and 1536-well formats were measured using Fusion- $\alpha$  and AlphaQuest HTS instruments. Curves were overlaid using Fusion Data Analysis software to show the excellent correlation between a versatile assay development platform (Fusion- $\alpha$ ) and a dedicated high throughput instrument (AlphaQuest HTS). The Fusion can also be integrated into a robotic environment using an OCX interface, making the transition to screening without requiring additional assay optimization.

### AlphaScreen



cAMP

### Fluorescence Polarization



Dynamic Range

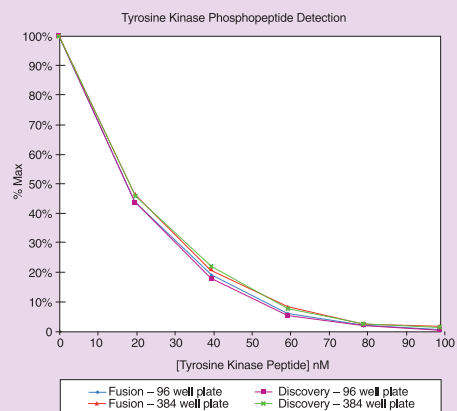
#### ■ Fluorescence Polarization

The use of fluorescence polarization for kinase, protease, enzyme activity, and receptor binding assays has continued to expand with particular interest in new red-shifted fluorophores. The associated curves illustrate the large dynamic range of the fluorescence polarization detection optics.

#### ■ Tyrosine Kinase Phosphopeptide Detection Using TRF

Time-resolved fluorescence detection of long-lived fluorophores provides excellent sensitivity, by eliminating background fluorescence from assay and media components. Fusion offers single and dual wavelength TRF, with user-selectable delay and measurement parameters, to detect all common lanthanide-based reagents, including HTRF. The graph shows the correlation of results from Fusion to those of a dedicated HTRF instrument (Discovery<sup>®</sup>) for quantitation of low levels of phosphorylated peptide in a homogeneous tyrosine kinase assay format.

### Time-Resolved Fluorescence



Tyrosine Kinase

# Any Assay, Any Format, Any Method of Detection...

## One Instrument...

### Easy-to-Use Software with Intuitive Functionality,

Many software packages cram so much flexibility and performance into one program, so that the intuitive nature of the software is lost. Even setting up a simple assay becomes a difficult task. Fusion software combined the simplicity of the user interface and consolidated many of the redundant user set-up procedures. The result, a very easy-to-use package that contains all of the necessary functionality to appeal to all users.

#### Point, click and read, a user-friendly interface and instrument control software with features that matter

- With the ability to set-up parameters for both single and dual wavelengths for end point, ratiometric and kinetic assays.
- Thumb-nail viewer provides the ability to see the "working area" when using higher density plate formats.
- Never lose data again. Fusion software includes a built-in database for automatic data storage.
- Reduce the learning curve in your lab. With so many read modes in a single instrument, users only need to learn one software package to read virtually any assay.
- Simple transfer of programs from one Fusion system to another allows assays to be developed in one lab and brought to another.

#### And if you need on board data reduction and curve fitting, Fusion Data Analysis Software provides the same ease-of-use

- Automatic transfer of assay data from Fusion Instrument Control to Data Analysis Software.
- Provides all the calculations you require such as CVs, mean, SD, blank subtractions, concentrations of standards and unknowns, as well as added features for ratio calculations for Packard chemistries such as BRET<sup>2</sup> and HTRF.
- Select from any of the nine curve fit options including linear regression, 2- and 4-parameter, point-to-point, log-logit, log-log, and cubic spline.
- Flexible output of data in graphical and tabular format that you configure to meet your reporting needs.

#### OCX Interface Software for Workflow Integration

If your throughput needs require that Fusion is integrated to a plate handling robotic or liquid handling system, Fusion's Robotic Control Software is your answer for fast and easy integration to ANY system.

- Powerful OCX interface allows integration of Fusion with robots and other plate handling systems.
- Flexible design allows the Fusion software to be loaded on the same Windows NT<sup>®</sup> computer as the robotics control or to be loaded on a remote computer with a link to the system control computer.
- Interface protocols already available for Packard's MultiPROBE II Gripper Integration Platform and PlateTrak systems.

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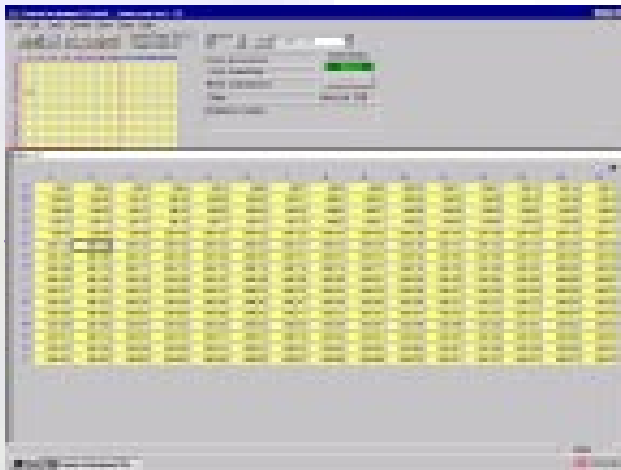
Fusion

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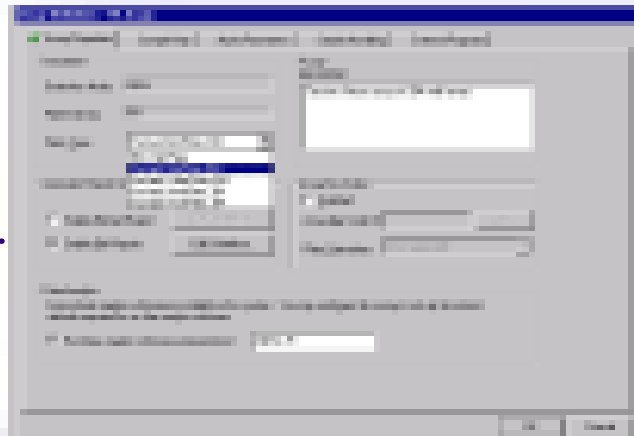


# One Instrument...

## From Instrument Control Through Final Data Analysis...Fusion

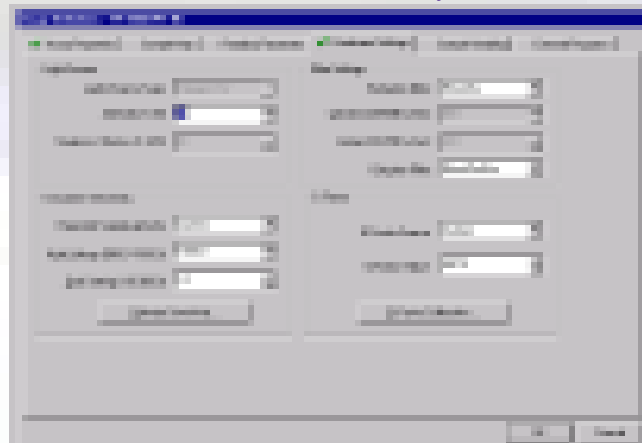


Sample map with "thumb-nail" display to view the working area.

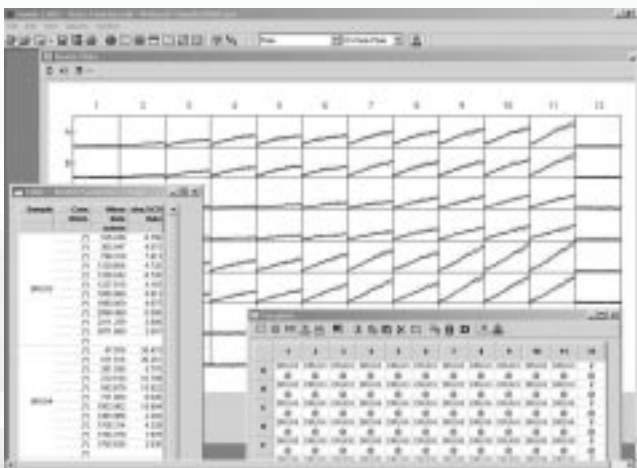


Select a plate type and assay definition and you're ready to start your experiment.

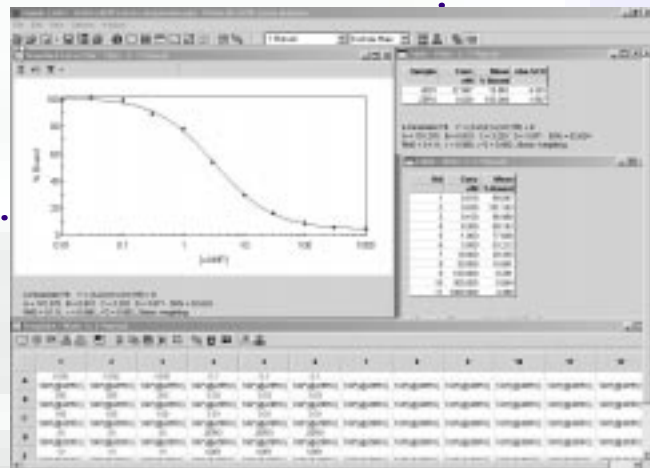
Easy-to-use, intuitive software from sample layout to data analysis



Configure system for optimum performance.



Real-time graphical display for kinetic assays.



Data analysis curve fitting and calculations.

# Any Assay, Any Format, Any Method of Detection...

## Your Only Instrument...

### Assay Performance with No Compromises... Fusion

#### No Compromises

Multi-detection plate reading instrumentation has always been synonymous with "compromised performance." It was thought impossible to provide the maximum flexibility of a multi-detection platform and still provide the same sensitivity possible in a dedicated detection system. At Packard, the challenge to deliver industry benchmarked performance, in all methods of detection, culminated in the design success of the Fusion Universal Microplate Analyzer.

#### Optimum Performance, Minimum Optimization

Many of today's versatile plate reading systems provide powerful performance, but require a time consuming assay optimization process from the user. Fusion eliminates these process problems and accelerates your research with such features as:

- Reads virtually any microplate format up to 1536-wells and any method of detection for unsurpassed performance versatility.
- Automatically switches from charge integration to photon counting depending on the method of detection, ensuring Fusion is optimized for your specific assay.
- Automatic adjustment of the optics height in relation to the microplate wells minimizes "trial-and-error" experimentation.
- Optical elements designed for each specific method of detection are automatically selected by Fusion for optimal assay performance.
- Excitation light source selection between Halogen and Xenon sources improves specific assay performance and saves you money on replacement costs.
- Modular design allows upgrading of your system as your assay and performance needs increase.

#### Key Performance Parameters

Fluorescence Intensity
Fluorescence Polarization
Time Resolved Fluorescence
Luminescence
Absorbance

Compared to Fusion provided

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<sup>1</sup>U.S. patent #5,618,682

<sup>2</sup>Under license to U.S. patent #5,650,289; 5,283,179; 5,641,641; and 5,814,471

HTRF<sup>®</sup> is based on the CIS bio International proprietary TRACE<sup>™</sup> technology. Packard holds the exclusive license for this technology in the life science market. HTRF products are manufactured under one or more of the following patents: EP180492, EP321353, EP539477, EP539435, EP569496, EP076695

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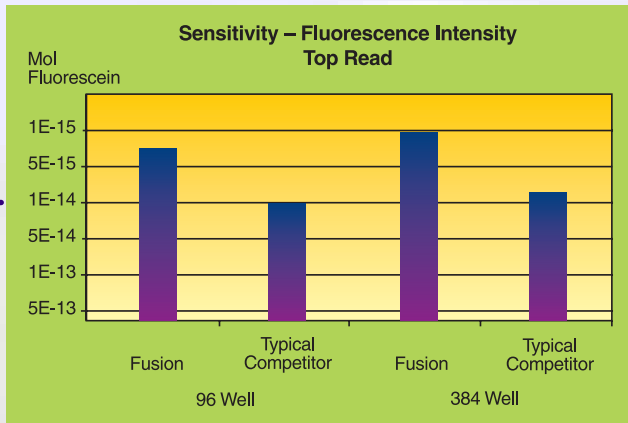
OliGreen<sup>®</sup> is a registered trademark of Molecular Probes.

# Fusion

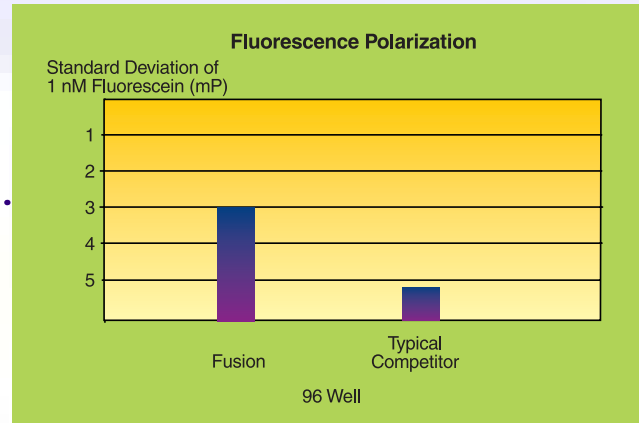
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# One Instrument...

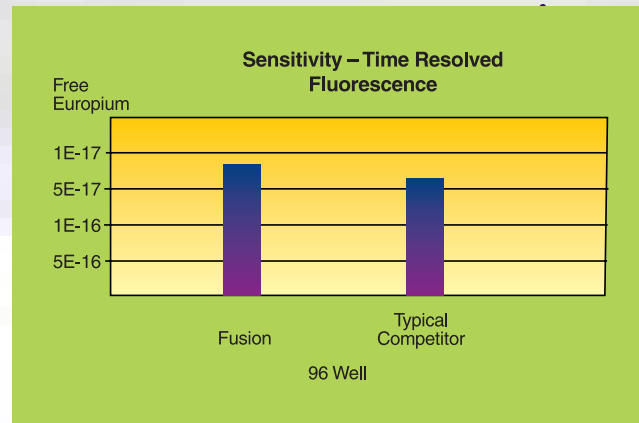
## Industry Leading Fluorescence Performance



## Industry Leading Fluorescence Polarization Performance



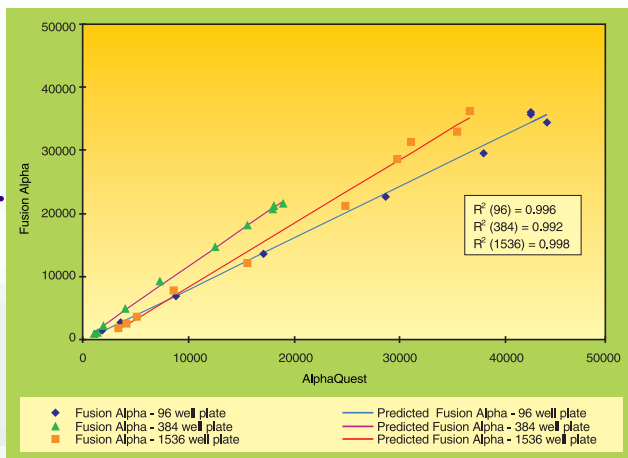
## Industry Leading Time-Resolved Fluorescence Performance



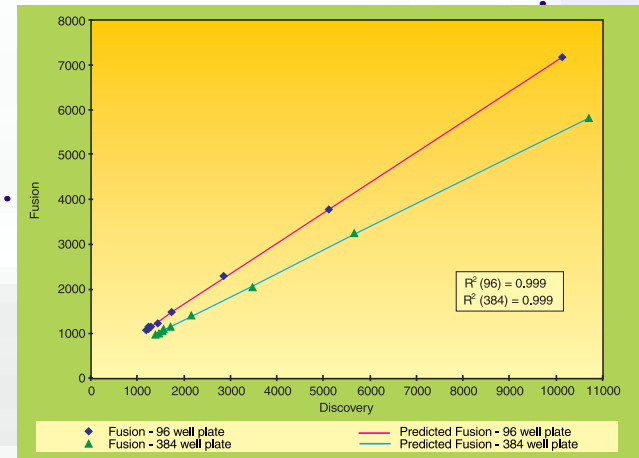
Sensitivity	<5 fmol of fluorescein
Standard deviation of 1nM solution of fluorescein	< 3mP in 96-well format < 5mP in 384-well format < 15mP in 1536-well format
Sensitivity	<20 attomol of free Europium in 96- and 384-well format
Sensitivity	<10 attomol of luciferase in 96- and 384-well format
Dynamic Range @ 405nm	0 to >2.5A

to other multi-detection and dedicated readers, provides the best overall performance for all of your assays.

## AlphaScreen Performance Equal to AlphaQuest™



## HTRF Performance Equal to Discovery





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