

# Spectrophotometer Overview

now the only  
difficult thing about  
spectrophotometry  
is how to say it



# Who We Are

**Harvard Bioscience, Inc.** is a global leader in the manufacture and distribution of scientific instruments used to advance life science research at pharmaceutical and biotechnology companies, universities and government laboratories worldwide. We have over 110 years of experience with 20 wholly owned subsidiaries. Our corporate headquarters is located in Holliston, Massachusetts USA and a Center of Excellence for finance, sales, service and training in Cambourne, United Kingdom.



**Biochrom**, located in Cambourne, United Kingdom and Holliston, Massachusetts offers a full range of spectrophotometers, microplate readers / washers and Amino Acid analyzers for a wide range of applications in the clinical, life-science, educational and industrial markets. Biochrom is a leading global manufacturer with more than 40 years of experience of designing and manufacturing the highest quality scientific instruments including the renowned Ultrospec, Novaspec, NanoVue and SimpliNano brands of spectrophotometers. Our instruments are trusted by scientists, doctors and technicians in hospitals and laboratories worldwide. Biochrom also has long standing relationships as a valued OEM partner to many of the worlds' largest and most exciting scientific instrumentation companies.

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# Introduction

UV-Visible spectrophotometers are a ubiquitous tool in the life sciences because of the wide range of molecules that can be detected and analyzed using this technique. Like many other everyday items, it's easy to forget how long you have had your spectrophotometer and you might not think about its performance or capabilities until you need to replace it. Questions to consider include:

- What applications are routinely run in your laboratory? Could this change in the near future?
- What range of sample volumes do you need to measure? If this varies, look for options for different cuvette sizes and adaptors.
- Do you want to measure multiple samples at the same time? If so, consider options for multiple cell holders.
- What level of sensitivity do you need? For low concentration samples, a wider bandwidth (3 to 5 nm) will give more consistent results than a narrow (1 nm) bandwidth instrument.
- How many users will there be and what level of experience will they have? Pre-programmed methods and password control of your own methods can be useful features.
- How will data be recorded, output or stored?

This guide is an introduction to the range of spectrophotometers available from Biochrom, including instruments for low sample volumes and features such as the SD card option.

Whether you are performing simple colorimetric assays or conducting the most stringent research, there is an instrument from our range to meet your needs.

## ***Low sample volumes and ease of use***

NanoVue™ Plus Spectrophotometer offers convenience and speed using a novel drop and measure sample plate for accurate and reliable quantitation of nucleic acid and protein samples. The ability to pipette samples of 0.5 to 5 µl directly onto the sample plate eliminates the need for cuvettes or other sample devices. The SimpliNano Spectrophotometer is another option for basic DNA/RNA measurements and protein concentrations at 280 nm.

## ***Routine applications***

Biochrom offers a number of spectrophotometers for widely used applications such as DNA and RNA quantitation, protein concentration determination, and cell density measurements. This includes Ultrospec™ 10, a battery-operated, portable, cell density meter; Novaspec III+ and Pro for protein determination and/or enzyme kinetics; and GeneQuant™ 100 and 1300 instruments for a wide range of applications.

## ***Additional features***

For more advanced features, Ultrospec 2100 offers temperature control and cell changer options, whilst the Ultrospec 8000 and 9000 are high performance, dual beam instruments, for precision measurements that are compatible with Pharmacopoeia guidelines.

# Spectrophotometer Selection Guide

Model	Main features	DNA/RNA quantitation	PCR/sequencing/hybridization Primer quantitation and design	Protein determination (Bradford, Biuret, BCA etc)	Cell culture OD <sub>600</sub>	Enzyme activity kinetics at 340 nm	Fluorescent probe quantitation, cDNA probes for microarrays, PCR probes	Pharma method development
Ultrospec 9000	High performance double-beam, variable bandwidth UV-Visible spectrophotometer. Wavelength range 190 to 1100 nm. Pharmacopeia compliant. Optional Life Science and CFR Datrys software upgrades available.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ultrospec 8000	High performance double-beam, 1 nm bandwidth UV-Visible spectrophotometer. Wavelength range 190 to 1100 nm. Pharmacopeia compliant. Optional Life Science and CFR Datrys software upgrades available.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ultrospec 7000	High performance double-beam, 2 nm bandwidth UV-Visible spectrophotometer. Wavelength range 190 to 1100 nm. Optional Life Science and CFR Datrys software upgrades available.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ultrospec 2100 <i>pro</i>	3 nm bandwidth instrument, wavelength range 190 to 900 nm with 8-position cell changer and options for temperature control.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SimpliNano	Simple to use microvolume spectrophotometer for basic laboratories measuring nucleic acid and protein.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NanoVue Plus	Novel sample mechanism, eliminates need for cuvettes and facilitates low-volume measurements (0.5 to 5 µl).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
GeneQuant 1300	As GeneQuant 100, with built-in enzyme kinetics, and CyDye™ applications plus Bluetooth™ data output options, 190 to 1100 nm spectrophotometer.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
GeneQuant 100	190 to 110nm, 5 nm bandwidth instrument with built in applications for nucleic acids, proteins and cell density.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Novaspec III <sup>+</sup>	7 nm bandwidth visible spectrophotometer, 325 to 1100 nm for single wavelength measurements of absorbance, % transmission, concentration and has the option to perform simple kinetics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Novaspec Pro	Similar to the Novaspec III <sup>+</sup> , with stored protein methods, multi-wavelength scanning, and quantitation with calibration curves.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ultrospec 10	Battery-powered, portable cell density meter.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key:  Recommended     Suitable     Not suitable



## High performance method development

Ultrospec 9000/9000PC is a double-beam UV-Visible spectrophotometer for operation in high specification laboratories. The instrument is Pharmacopoeia compliant and is also compatible with CFR part 11 requirements via the optional Datrys software. Method development is supported through variable bandwidth capability and custom calculation facilities.

### Key features

- Double-beam, variable bandwidth optics—high performance for difficult samples
- Pharmacopoeia compliant
- 21 CFR part 11 support through Datrys CFR (optional)
- Custom calculation facility for method development using Datrys software
- Equation Editor software allowing custom calculations to be applied to measured data
- Color touchscreen (stand-alone instrument)—simpler operation
- Software for wavelength scanning, fixed wavelength, standard curves, kinetics and pre-stored life science methods as standard
- Multi-user analytical instrument with secure login to protect methods
- USB memory stick data/method storage and USB PC connection—export data the way you want



Ultrospec 9000 with PC-control option

- Stand-alone or PC-controlled versions available
- Both instrument versions are supplied with Datrys Standard, and can be upgraded to Datrys Life Science or Datrys CFR
- Stand-alone version also includes Print Via Computer (PVC)
- Wide range of accessories and options available including cell changers, thermostating, sipper, built-in printer, Bluetooth and Datrys software options

### Ordering information

Product	Code no.
Ultrospec 9000 UV-Visible Spectrophotometer	29003616
Ultrospec 9000PC UV-Visible Spectrophotometer	29003617
Ultrospec 9000 UV-Visible Spectrophotometer with Bluetooth accessory	29003619



## High performance analytics

Ultrospec 8000/8000PC is a double-beam UV-Visible spectrophotometer designed to meet the requirements of critical analysis and users in Pharmacopoeia research environments. Secure user login and method control, plus a 1 nm bandwidth enables Pharmacopoeia compliance. 21 CFR part 11 support can be achieved with the optional Datrys CFR software.



Ultrospec 8000 stand-alone instrument

### Key features

- Double-beam instrument, with a 1 nm bandwidth
- Pharmacopoeia compliant
- 21 CFR part 11 support through Datrys CFR (optional)
- Color touchscreen (stand-alone instrument)—simple operation
- Software for wavelength scanning, fixed wavelength, standard curves, kinetics and pre-stored life science methods as standard
- Equation Editor software allowing custom calculations to be applied to measured data
- Multi-user analytical instrument with secure login to protect methods
- USB memory stick data/method storage and USB PC connection—export data the way you want
- Stand-alone or PC-controlled versions available
- Both instrument versions are supplied with Datrys Standard. Can be upgraded to Datrys Life Science or Datrys CFR
- Stand-alone version also includes Print Via Computer (PVC)
- Wide range of accessories and options available including cell changers, thermostating, sipper, built-in printer, Bluetooth and Datrys software options

### Ordering information

Product	Code no.
Ultrospec 8000 UV-Visible Spectrophotometer	29003610
Ultrospec 8000PC UV-Visible Spectrophotometer	29003611
Ultrospec 8000 UV-Visible Spectrophotometer with Bluetooth accessory	29003613





# High performance multiple applications

Ultrospec 7000/7000PC is a multiple application, double-beam, UV-Visible spectrophotometer developed to meet the day-to-day needs of the busy laboratory. Engineered for robust, lower cost operation with minimal maintenance requirements, yet providing simple, touchscreen operation, multiple-user profiles and a choice of data export methods. A range of software upgrade and accessory options are available to meet your needs in the future.



Ultrospec 7000 with PC-control option



Ultrospec 7000 stand-alone instrument

## Key features

- Double-beam instrument with a 2 nm bandwidth
- High energy Xenon lamp minimizes annual running costs
- Color touchscreen (stand-alone instrument)—simple operation
- Software for wavelength scanning, fixed wavelength, standard curves, kinetics and pre-stored life science methods as standard
- Equation Editor software allowing custom calculations to be applied to measured data
- Multi-user analytical instrument with secure login to protect methods
- USB memory stick data/method storage and USB PC connection—export data the way you want
- Stand-alone or PC-controlled versions available
- PC version is supplied with Datrys Standard
- Stand-alone version includes Print Via Computer (PVC) only—can be upgraded with Datrys software options including Life Science and CFR
- Wide range of accessories and options available including cell changers, thermostating, sipper, built-in printer, Bluetooth and Datrys software options.

## Ordering information

Product	Code no.
Ultrospec 7000 UV-Visible Spectrophotometer	29003605
Ultrospec 7000PC UV-Visible Spectrophotometer	29003606
Ultrospec 7000 UV-Visible Spectrophotometer with Bluetooth accessory	29003608



# Accessories

The large sample compartment of the Ultrospec instruments can be configured with quick change accessories including film holders, automatic 8 cell changer, peltier thermocirculator, and automatic sipper. Other automatic accessories include a thermostatted 5 cell changer, test tube holder, variable pathlength cell holder and a water thermostatted single cell holder.

## Film Holder

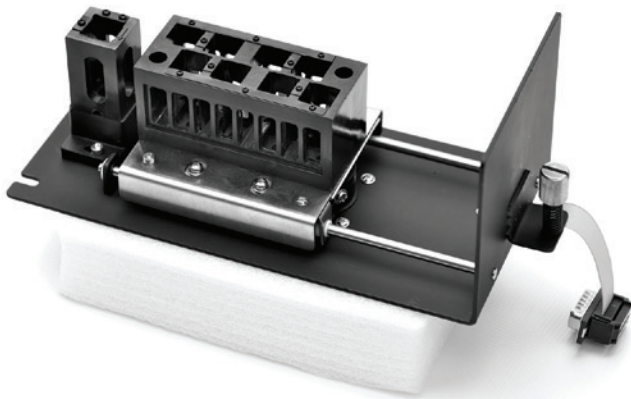
- Holds films from 1 mm to 10 mm thickness
- Holds films up to 160 mm wide and 70 mm high
- Fits to standard sample compartment baseplate and can be changed in seconds
- Holder installed in sample position only



### Ordering information

Product	Code no.
Film holder for Ultrospec 7000/8000/9000	80-7100-12

## Automatic 8-Cell Changer



- Fully automatic operation
- Fully controlled by software, parameters stored within application methods

### Ordering information

Product	Code no.
Automatic 8-Cell Changer for Ultrospec 7000/8000/9000	80-7100-08

## Ultrospec 7000, 8000, and 9000 accessories (continued)

# Accessories

## Peltier Thermocirculator

- Range 20°C to 60°C
- Temperature accuracy of  $\pm 0.1^\circ\text{C}$
- User friendly interface and digital display
- Display current and set temperatures
- Sealed unit

### Ordering information

Product	Code no.
Peltier Thermocirculator (requires suitable thermostatted cell holder or cell changer, see pages 9 & 10)	80-7100-50



## Automatic Sipper System

- Automatic aspiration
- User defined air gap and sip volume
- Waste or return option
- Local or PC controlled
- Ability to calibrate sipped volume
- Choice of tubing kits

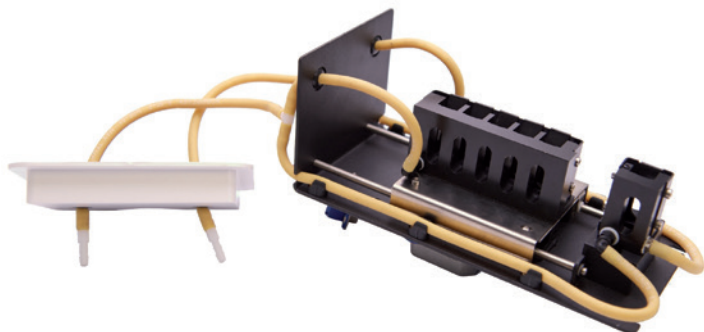
### Ordering information

Product	Code no.
Sipper for Ultrospec 7000/8000/9000 Requires Tubing kit (80-7100-37 or 80-7100-38) & suitable flowcell	80-7100-36
Standard tubing kit for Ultrospec 7000/8000/9000 sipper Includes 6 Marprene pump head tubes, PTFE tubing and silicon connection tubing	80-7100-37
Acid Resistant Tubing kit for Ultrospec 7000/8000/9000 sipper Includes 6 Viton pump head tubes, PTFE tubing and silicon connection tubing	80-7100-38
80 $\mu\text{l}$ Quartz Flowcell for sipper 10 mm pathlength with screw connectors and tubing	80-7100-40



# Accessories

## Thermostatted 5-Cell Changer



The 5-position thermostatted cell changer is designed to speed up analysis by allowing users to automatically measure samples that are at a controlled temperature. With a cell changer connected, the software will allow the user to perform parallel kinetics measurements on either stand-alone or PC-controlled instruments.

The water tubing is connected to an external fluid circulator.

- Fully automatic operation
- Fully controlled by software, parameters stored within application methods
- Fits to standard sample compartment baseplate, can be changed in seconds
- Fast operation

### Ordering information

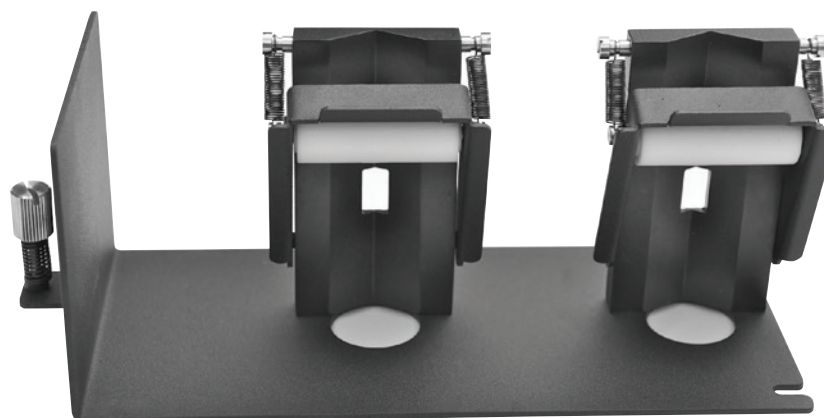
Product	Code no.
Thermostatted Cell Changer for Ultrospec 7000/8000/9000	80-7100-09

## Test Tube Holder

Designed to hold test tubes from 10 mm to 24 mm diameter and up to 160 mm tall.

This accessory replaces the standard single cell holder. The installation is easily performed by the operator with only one thumb screw to remove at the front of the cell compartment.

- 10 to 24 mm tubes diameters
- Up to 160 mm tube height
- Fits to standard sample compartment baseplate and can be changed in seconds



Product	Code no.
Test Tube Holder for Ultrospec 7000/8000/9000	80-7100-11

# Accessories

## Variable Pathlength Cell Holder

The variable pathlength cell holder is designed to hold 1 mm, 2 mm, 5 mm, 10 mm, 20 mm, 50 mm and 100 mm pathlength cells. To accommodate different pathlengths, the clips should be moved to secure the cell at the required pathlength.

- Variable pathlength of 1 mm, 2 mm, 5 mm, 10 mm, 20 mm, 50 mm and 100 mm
- Only 1 thumb screw
- Supplied with spacers for short pathlength cells



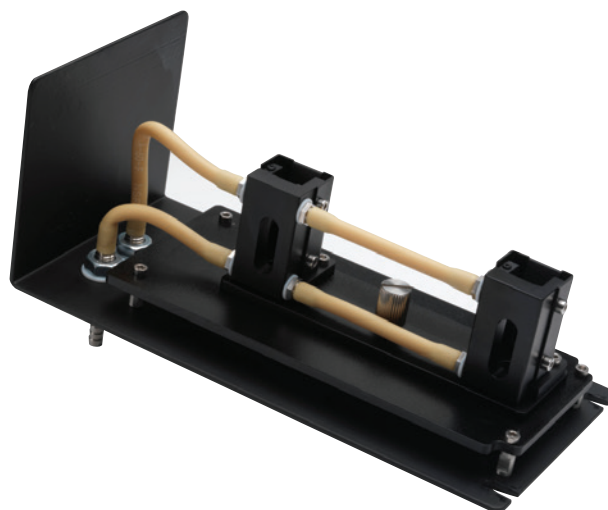
### Ordering information

Product	Code no.
Variable Pathlength Cell Holder for Ultrospec 7000/8000/9000	80-7100-05

## Water Thermostatted Single Cell Holder

The water thermostatted cell holder is designed to work with water circulators to achieve constant temperatures in the range of 5 to 80°C. The accessory is connected so that the water flows into the bottom of the cell holder and flows out through the top of the cell holder.

- Only 1 thumb screw at front of sample compartment
- 10 mm pathlength



### Ordering information

Product	Code no.
Water Thermostatted Single Cell Holder for Ultrospec 7000/8000/9000	80-7100-03

## Ultrospec 2100 pro spectrophotometer

# Options for enzyme kinetics

Ultrospec 2100 *pro* is a simple-to-use instrument for nucleic acid measurements and enzyme kinetics. It provides stored methods for nucleic acid quantitation and a standard curve method for protein determination, in addition to measuring absorbance and concentration. An 8-position sample changer is supplied as standard. Accessories such as a temperature control unit option are also available. The stand alone instrument can be upgraded for more sophisticated applications, as well as data storage with Datrys Life Science or CFR software and a PC.

- Preset methods for DNA, RNA, oligonucleotide quantitation, and purity check
- Combines basic measurement modes with graphical modes: wavelength scan, absorbance changes with time, reaction rate determinations, and standard curves can be displayed and printed
- Store up to 18 user-defined methods
- Includes serial and parallel outputs as standard (outputs to a range of printers)
- GLP self-test diagnostics



6-position Peltier heated cell changer



Ultrospec 2100 *pro*

### Spreadsheet interface software

Scans of absorbance/wavelength may be converted to a more conventional graph by using the spreadsheet interface software to export results directly to Microsoft™ Excel™. The results can then be formatted or manipulated as appropriate.

### Ordering information

Product	Code no.
Ultrospec 2100 <i>pro</i>	80-2112-21

#### Accessories

Spreadsheet interface software (Requires serial interface cable - sold separately)	80-2110-73
RS232C Serial Interface Cable	80-2105-97
4-position cell changer (10 – 50 mm pathlength)	80-2106-01
6-position Peltier heated cell changer, 10 mm pathlength (requires Temperature Control Unit, see 80-2105-49)	80-2106-04
8-position water heated cell changer, 10 mm pathlength (requires circulation bath)	80-2109-70
Sipper, complete with UV quartz cell and all tubing (requires single cell holder 80-2106-05 or 80-2106-13)	80-2112-15
Temperature Control Unit	80-2105-49

For a complete list of accessories, including cells and cell holders, please visit [www.biochromspectros.com](http://www.biochromspectros.com).



## SimpliNano™ spectrophotometer

# Micro-volumes made easy

SimpliNano is an easy-to-use, low-maintenance microvolume spectrophotometer designed for basic laboratory analysis of low volumes of nucleic acid and protein samples.

### SimpliNano offers the following benefits:

- Simple sample handling: Built-in sample port with one fixed pathlength means that samples can be added and removed without the need for time-consuming pathlength calibration. SimpliNano contains no moving parts, which contributes to excellent instrument reproducibility and low maintenance.
- Low sample volumes: Reduce sample loss and eliminate the need for dilution by using low volumes of 1 to 5 µl for sample measurement. The sample can either be recovered or simply wiped away after measurement.
- Built-in life science methods: Measures nucleic acid concentrations at 260 nm, protein concentrations at 280 nm, and provides 230/260 and 260/280 ratios for determining sample purity. Wavescan plots from 220 nm to 330 nm can be achieved for nucleic acids and from 250 nm to 350 nm for protein. The methods include options for background correction at 320 nm and 340 nm.



SimpliNano

- Flexible instrument control: Use as either a standalone instrument using its large, built-in screen for quick measurements or operate from a PC with optional Datrys software.
- Choice of data output: Output to any suitable PC via a USB cable, to an optional integrated printer, or to a USB stick.

### Ordering information

Product	Code no.
SimpliNano	29061711
SimpliNano with Printer	29061712



## NanoVue Plus spectrophotometer

# Micro-volumes made easy

NanoVue Plus spectrophotometer is an easy-to-use instrument designed for reliable measurement of nucleic acid or protein samples.

- Eliminate the need for cuvettes, capillaries or other sample devices—just drop and read
- Conserve precious samples by assaying low volumes of 0.5 to 5  $\mu$ l. Samples can also be simply recovered with a pipette if required
- PC control option using Datrys software upgrade
- Predefined methods for nucleic acid and protein quantitation (including Bradford and Lowry)
- Intuitive software includes automatic self-calibration on startup
- Choice of data output options including USB cable, Bluetooth connectivity, integrated printer option and SD card option
- CyDye software with intuitive drop down lists for most common fluors and full CyDye range



NanoVue Plus spectrophotometer showing drop, measure, and read capability. Pipette samples directly onto the novel sample plate for measurement. The sample plate can then be easily and quickly wiped clean for the next sample measurement.

### Ordering information

Product	Code no.
NanoVue Plus	
NanoVue Plus	28956057
NanoVue Plus with integrated printer	28956058
NanoVue Plus with Bluetooth connectivity	28956020
NanoVue Plus with SD card option	28943212

Product	Code no.
Accessories	
Pathlength calibration kit	80-2140-09
Replacement sample plate kit	28956958
Spare printer paper 20 rolls	28918226
Printer accessory	28918227
Lower sample plate kit	28956959
SD card accessory	28943214
Bluetooth accessory	28918225

## GeneQuant 1300 and 100 spectrophotometers

# Compact, convenient and flexible

GeneQuant 1300 spectrophotometer is a compact instrument pre-programmed with a range of methods for the quantitation of proteins, nucleic acids, and bacterial cell cultures. Absorbance and concentration measurements can be made at any wavelength, providing flexibility for future applications.

- Built-in applications for cell density, nucleic acids, proteins, and enzyme kinetics
- New PC control option using Datrys software upgrade
- cDNA application software for measuring incorporation of Cy<sup>TM</sup> 3 and Cy<sup>TM</sup> 5, or other dyes into purified microarray hybridization probes and PCR products
- Wavelength range of 190 to 1100 nm, with wavelength scan from 200 to 900 nm performed in less than 5 seconds with zoom facility, peak identification, and on-peak confirmation
- Visual inspection of a nucleic acid scan can identify the presence of impurities especially useful with RNA samples
- Optional integrated printer
- USB cable and Print Via Computer software supplied as standard
- Bluetooth accessory (optional)
- Three-year lamp warranty
- The GeneQuant 100 is also available, with built in applications for nucleic acids, proteins and cell density measurements



GeneQuant 1300 can be used with a wide variety of cuvettes or capillaries for sample volumes from 3 µl to 2 ml.

### Ordering information

Product	Code no.
<b>GeneQuant 1300</b>	
GeneQuant 1300 Classic	28918213
GeneQuant 1300 with printer	28918214
GeneQuant 1300 with Bluetooth	28918215
Bluetooth accessory	28918225
Spare printer paper 20 rolls	28918226
Printer accessory	28918227

### GeneQuant 100

GeneQuant 100 Classic	28918204
GeneQuant 100 Classic with Printer	28918205
Spare printer paper 20 rolls	28918226
Printer accessory	28918227
PVC Software for GeneQuant 100	28923188
Capillary cell holder	80-2120-19
Spare capillaries for cell holder	80-2104-67

## Novaspec Pro and Novaspec III<sup>+</sup> spectrophotometers

# Basic enzyme kinetics

### Novaspec Pro

A robust and rugged instrument for general laboratory use, it includes stored methods for protein quantitation and enzyme kinetics, plus the basic modes of absorbance, transmittance, OD<sub>600</sub>, and concentration.

- Multi-wavelength measurements, wavelength scanning, quantitation with calibration curves
- Stored protein methods for Bradford, BCA, Biuret, and Lowry
- Bacterial cell culture measurement at OD<sub>600</sub>
- Save data on a USB memory stick and analyze results later
- Graphical display of wavelength scans, kinetic assays (including slope calculation for rate/activity studies) and standard curves
- Increase your measurement flexibility with an optional test tube cell holder that is spring loaded and fits 10 mm to 18 mm diameter test tubes. A heated cell holder is available for experiments needed at 37°C
- Up to 90 stored methods



Test tube cell holder



Novaspec III<sup>+</sup> and Pro include removable cell holders for easy cleaning. The PVC (Print via Computer) software supplied allows downloading to PC.

### Novaspec III<sup>+</sup>

A light-weight instrument used for measuring absorbance, % transmission, concentration, and rate. It is easy to use—just select wavelength, set reference and measure sample—making it the instrument of choice for teaching laboratories.

- Large display with easy-to-read characters
- Absorbance, % transmission, concentration, factor, and rate
- Ability to measure two wavelengths simultaneously for kinetics assays
- Self test on startup
- Save data on a USB memory stick and analyze results later
- Increase your measurement flexibility with an optional test tube cell holder that is spring loaded and fits 10 mm to 18 mm diameter test tubes. A heated cell holder is available for experiments needed at 37°C.

### Ordering information

Product	Code no.
Novaspec Pro	80-2120-50
Novaspec III <sup>+</sup>	80-2120-40
Test Tube Cell Holder	80-3007-12
Heated Cell Holder	80-3007-13

## Ultrospec 10 Cell Density Meter

# Portable cell density meter

A small, portable, and dedicated cell density ( $OD_{600}$ ) measurement instrument. The Ultrospec 10 measures the density of cells (*E. coli*, other bacteria, and yeast<sup>†</sup>) in suspension at 600 nm. This battery-powered, hand-held device can be easily used in incubation cabinets, under anaerobic conditions and in other areas of the laboratory where cells are cultured. Spillages are easily wiped from the smooth surface, and the cell compartment area can be sterilized.

Rechargeable batteries provide nearly one month of cord-free use.

- Battery operated for use in cell culture facilities
- Easy to use, easy to clean, easy to sterilize
- Download results to a PC or printer for convenient data storage and retrieval



### Ordering information

Product	Code no.
Ultrospec 10 Cell Density Meter	80-2116-30

<sup>†</sup> Not recommended for use with mammalian cell lines

### Technical specifications

Technical Specification	Ultrospec 10
Wavelength Range	600nm
Wavelength Accuracy (+/-)	<±0.05A at 1A
Wavelength Reproducibility (+/-)	±0.02A at 1A
Lamp Source	LED
Beam	Single Beam
Bandwidth	40 nm
Photometric Range	-0.3 to 1.99A
Photometric Accuracy	± 0.02A at 1A
Photometric Reproducibility	0.02A at 1A in 10mm cuvette
Stray Light	<1%T
Cell Compatibility	Test tube * (10, 12, 16mm)
Cell Holder	Single Cell

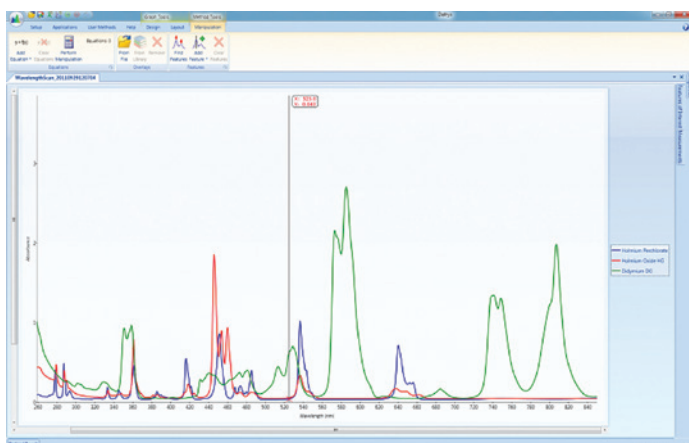
Technical Specification	Ultrospec 10
Memory	99 readings
Printer	Serial* ( External via Export)
Data Output	Print*, Store*, Export to PC*
Display	LCD
Export / Data Storage	Serial Cable
Languages	English
Power Requirement	110-220V, 50/60Hz, 20VA (internal rechargeable NiMH battery)
Weight	0.6 Kg (1.2lb)
Dimensions (WxDxH)	15 x 18 x 6cm (5.9 x 7.1 x 2.4 inches)
Regulatory	CE
Warranty	1 Year

\*Optional Accessory

## Datrys System control software

# PC control software

For many users, having an external PC to control their spectrophotometer and manipulate data, gives them the ultimate in flexibility and control. Whether looking for small differences in multiple spectral overlays or carrying out post-run manipulations on large numbers of samples, Datrys software has the flexibility to work in the way you want.



Datrys software wavelength scan.

Datrys software is supplied in different modules to meet the application requirements of different customer groups and offers a simple upgrade path should your requirements change.

Choose:

- Datrys Lite for Quick Read and Quick Scan only
- Datrys for all routine measurements
- Datrys Life Science for nucleic acids, proteins and cell density measurements
- Datrys CFR to support 21 CFR part 11 compatibility

Offering the familiar look and feel of Microsoft<sup>®</sup> Office 2007, Datrys software is compatible with Windows<sup>®</sup> XP, Windows<sup>®</sup> Vista, Windows 7, and Windows<sup>®</sup> 8, 8.1, 10 operating systems. Data export options include Microsoft Word<sup>®</sup> and Excel plus Adobe<sup>®</sup> PDF formats.

Modules	Datrys Lite	Datrys	Datrys Life Science	Datrys CFR
Quick Read and QuickScan	•	•	•	•
Wavelength Scanning, Kinetics, Quantitative Calibration Curves		•	•	•
Validation	•	•	•	•
Method Developer		•	•	•
Life Science Methods			•	•
Accessory Control		•	•	•

## Ordering information

Product	Code no.
Datrys	29003621
Datrys Lite <sup>†</sup>	29003622
Datrys Life Science	29003623

Product	Code no.
Datrys CFR	29003624
Datrys Life Science Upgrade <sup>†</sup>	29003625
Datrys CFR Upgrade <sup>‡</sup>	29003626

<sup>†</sup> GeneQuant 100/1300, SimpliNano, NanoVue, Ultrospec 2100 *pro*, Ultrospec 7000 upgrade for instruments without Datrys standard installed.

<sup>‡</sup> For users who own Datrys standard software.



# Datrys System control software

Software modules	Stand-alone instrument software	Datrys Lite	Datrys	Datrys Life Science	Datrys CFR
Single Wavelength Measurement	Fixed wavelength, Abs/%T, Concentration (factor)		Single or multiple wavelength measurements in absorbance, % transmission or concentration including full instrument control, batch processing of sample data and calculations on collected data		
Wavelength Scanning	Sample overlays, automatic feature detection and post run data manipulation		Sample overlays, automatic feature detection and post run data manipulation, spectral scans and spectral arithmetic manipulations		
Concentration Standard Curve	Quantitation using calibration curves with multiple standards and a choice of curve fits		Generation of calibration curves including full instrument and accessory control, choice of line fit, QC limit testing and statistical analysis of sample data		
Kinetics	Serial (or parallel measurements with the optional cell changer) including sample overlays and post run data manipulation		Absorbance versus time measurements on single or multiple cells (with optional cell changer), multiple sample overlays, batch processing of sample data and post run sample calculations and manipulations		
Validation	Software module that allows users to enter and store full details of their Certified Reference Materials (CRMs) and schedule tests to be carried out at defined intervals to meet their Standard Operating Procedures. Users are prompted to insert the specified CRM at the scheduled time and the system automatically checks the performance against the instrument specification.				
Life Science Methods	DNA, RNA & Oligo concentration and purity measurement with optional wavelength scanning. CyDye DNA quantitation. T <sub>m</sub> calculation. Protein concentration by direct UV measurement or Bradford, Biuret, Lowry or BCA colorimetric methods			DNA, RNA and Oligo concentration & purity measurement Protein quantitation via direct UV methods or BCA, Biuret, Bradford, Lowry and Colloidal Gold methods Cell Density measurement Fluorescent dye methods	
Custom Method Development	Equation Editor allows the set up of stored methods that can include calculations based on measured sample data e.g., absorbance ratio and difference.		The Method Developer module allows custom methods to be set up in all applications. These can include sample prompts containing information such as method SOP timings and the ability to lock individual method parameters		
21 CFR Part 11 Compatibility					Ability to set up different users as part of defined groups. Audit trail. Electronic signature.



## Software and qualifications packages

### Print Via Computer (PVC) software

Print Via Computer software runs under Windows® 2000, Windows® XP, Windows® Vista, Windows® 7, Windows® 8, 8.1, 10 and enables transfer of data into a PC environment using a USB cable, Bluetooth, or SD card.

Data can be printed, saved or exported in a variety of formats (including Microsoft Excel) either manually or automatically.

PVC is capable of supporting several instruments simultaneously, and is compatible with GeneQuant 100 and 1300, NanoVue Plus, SimpliNano, Novaspec III+ and Pro, and Ultrospec 7000, 8000 and 9000 stand alone units.

### Summary of software by instrument

Instrument	Standard Software	Optional Packages
Ultrospec 7000PC	Datrys Standard	Datrys Life Science or CFR Upgrade version
Ultrospec 8000PC	Datrys Standard	Datrys Life Science or CFR Upgrade version
Ultrospec 9000PC	Datrys Standard	Datrys Life Science or CFR Upgrade version
Ultrospec 7000 (Stand alone)	PVC only	Datrys Lite, CFR, Standard, Life Science Full versions
Ultrospec 8000 (Stand alone)	PVC & Datrys Standard	Datrys Life Science or CFR Upgrade version
Ultrospec 9000 (Stand alone)	PVC & Datrys Standard	Datrys Life Science or CFR Upgrade version

Instrument	Standard Software	Optional Packages
Ultrospec 2100 pro	None	Datrys Lite, CFR, Standard, Life Science Full versions
GeneQuant 100	None	PVC, Datrys Lite, CFR, Standard, Life Science Full versions
GeneQuant 1300	PVC	Datrys Lite, CFR, Standard, Life Science Full versions
NanoVue Plus	PVC	Datrys Lite, CFR, Standard, Life Science Full versions
Novaspec III* / Pro	PVC	None
Ultrospec 10	None	None

## Ultrospec 7000, 8000, and 9000 technical specifications

Technical Specification	Ultrospec 7000PC	Ultrospec 7000	Ultrospec 8000PC	Ultrospec 8000	Ultrospec 9000PC	Ultrospec 9000
Wavelength Range	190-1100 nm					
Wavelength Accuracy (+/-)	0.5 nm		0.3 nm		0.3 nm (1 nm bandwidth)	
Wavelength Reproducibility (+/-)	0.1 nm					
Lamp Source	Xenon (PTR)		Deuterium/Tungsten			
Beam	Double Beam Monochromator					
Beam height	15mm					
Bandwidth	2 nm		1 nm		Variable (0.5 nm, 1 nm, 2 nm, 4 nm)	
Detector	Dual Solid State Silicon photodiode					
Photometric Range	-4.000A to 4.000A					
Stray Light	< 0.050%T at 220nm (NaI), < 0.050%T at 340 nm (NaNO <sub>2</sub> )		<0.025%T at 220 nm (NaI), <0.025%T at 340 nm (NaNO <sub>2</sub> ), <1%T at 198nm & 200nm (KCl)			
Zero Stability	± 0.001A/hr at 500nm		± 0.0003A/hr at 500nm in precision mode			
Photometric Accuracy	± 0.002A at 0.5A, ± 0.004A at 1A, ± 0.006A at 2A at 440 nm, 456 nm, 546.1 nm, 590 nm, 635 nm ± 0.005A using 60 mg/L K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>		± 0.002A at 0.5A, ± 0.004A at 1A, ± 0.006A at 2A at 440 nm, 456 nm, 546.1 nm, 590 nm, 635 nm ± 0.005A using 60 mg/L K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>		± 0.002A at 1A (at 1 nm bandwidth)	
Photometric Reproducibility	±0.002A at 1A					
Scan Speed	Up to 2400 nm/min					
Spectral Scanning	Yes (up to 1100 nm)					
Cell Holder	Dual (sample and reference)					
Method Storage	Unlimited	Up to 90 on-board, unlimited via USB	Unlimited	Up to 90 on-board, unlimited via USB	Unlimited	Up to 90 on-board, unlimited via USB
Regulatory Compliance	21 CFR part 11*, IQ/OQ*		Pharmacopoeia, IQ/OQ*, 21CFR part 11*		Pharmacopoeia, IQ/OQ*, 21CFR part 11*	
Export/Data Storage	Via USB cable to PC	Internal Memory, USB Memory Stick, Bluetooth*, USB cable to PC, Printer*	Via USB cable to PC	Internal Memory, USB Memory Stick, Bluetooth*, USB cable to PC, Printer*	Via USB cable to PC	Internal Memory, USB Memory Stick, Bluetooth*, USB cable to PC, Printer*
Data Interface	USB					
Languages	English	English, French, Spanish, German, simplified Chinese	English	English, French, Spanish, German, simplified Chinese	English	English, French, Spanish, German, simplified Chinese
Power Requirement	100-240V AC, 50/60Hz, 150VA					
Weight	18 kg (40 lbs)					
Dimensions (WxDxH)	54 x 46 x 32cm (21.3 x 18.1 x 12.6 inches)					
Regulatory	CE					
Warranty	Instrument: 2 years, Xenon lamp: 3 years					

\*Optional Accessory

## Ultrospec 2100 pro technical specifications

Technical Specification	Ultrospec 2100 pro
Wavelength Range	190 - 900
Wavelength Accuracy (+/-)	± 1 nm
Wavelength Reproducibility (+/-)	± 0.5 nm
Lamp Source	Xenon lamp
Beam	Split beam
Beam Height	15 mm
Bandwidth	< 3 nm
Detector	Dual silicon photodiode
Photometric Range	-3.0 - 3.0A, 0.1 to 200% T
Stray Light	< 0.05% T at 220 nm (NaI), < 0.05% T at 340 nm (NaNO <sub>2</sub> )
Photometric Linearity	up to 3A
Photometric Accuracy	± 0.5 % or ± 0.003 A to 3.000 A at 546 nm
Photometric Reproducibility	0.5% of absorbance value to 3.000 A at 546 nm

Technical Specification	Ultrospec 2100 pro
Scan Speed	3000 nm/minute
Cell Holder	Standard 8 cell changer
Sample Compartment Size	21 x 14 x 8 cm
Data Output	Print*, Export to PC*, PC Control*
Regulatory Compliance	21 CFR Part 11*
Memory	up to 18 methods
Export/Date Storage	Analogue, RS232, printer
Data Interface	9 Pin Serial and Centronics Parallel
Power Requirement	100-240 VAC, 50/60 Hz, 80VA
Languages	English, German, French, Spanish, Italian
Dimensions (WxDxH)	51 x 35 x 16 cm (20 x 13.8 x 6.3 inches)
Weight	13 kg (29 lbs)
Regulatory	CE
Warranty	Instrument: 1 year, Xenon lamp: 3 years

\*Optional Accessory

## SimpliNano™ and NanoVue Plus Spectrophotometer technical specifications

Technical Specification	SimpliNano	NanoVue Plus
Minimum volume	1 µl	0.2 mm pathlength as low as 0.5 µl, for auto or 0.5 mm, use 2 µl
Pathlength	0.5 mm	0.2 mm or 0.5 mm
Wavelength Range	190-1100 nm	200-1100 nm
Wavelength Accuracy (+/-)	± 2 nm	± 2 nm across, ± 1 nm from 240 to 340 nm
Wavelength Reproducibility (+/-)	± 1 nm	± 0.5 nm
Lamp Source	Pulsed Xenon lamp	
Photometric Range	-0.3 to 2.500A, 0 to 100%T	0 to 125 A (10 mm pathlength equivalence)
Analysis	DNA, RNA, Oligo, Absorbance/Concentration, Protein A280	Nucleic Acids (Theory, DNA, RNA, Oligo, Tm, CyDye), Protein (theory, Protein UV, protein A280, BCA, Brad- ford, Lowry, Biuret), Single wavelength, Concentration, Wavescan, Kinetics, Standard curve, Multiple wave- length, Absorbance ratio
Method Storage	Up to 9 onboard	up to 81 onboard
Printer	Built in Printer*	
Data Output	via PC with USB cable, USB memory stick	via PC with USB cable, SD card*, Bluetooth*
Languages	English, French, German, Spanish, Italian, simplified Chinese, Japanese	
Power Requirement	18Vdc from a 90-250V, 50/60Hz, Max 30VA mains power pack	
Weight	4.5 kg (10 lbs)	
Dimensions (WxDxH)	26 x 39 x 13 cm (10 x 15 x 5 inches)	
Regulatory	CE	
Warranty	Instrument: 1 year, Xenon lamp: 3 years	

\*Optional Accessory

## GeneQuant 1300 and 100 technical specifications

Technical Specification	GeneQuant 100	GeneQuant 1300
Wavelength Range	190 - 900 nm	
Wavelength Accuracy (+/-)	2 nm	
Wavelength Reproducibility (+/-)	1 nm	
Lamp Source	Xenon	
Beam	Split beam	
Beam height	15 mm	
Bandwidth	5 mm	
Detector	1024 CCD array	
Photometric Range	-0.300 to 2.500A, 0 to 199%T	
Stray Light	0.5%T at 220 & 340 nm	
Photometric Accuracy	±0.003A at 0-0.5A at 546 nm	
Photometric Reproducibility	0.002A at 0 - 0.5A at 546 nm	
Spectral Scanning	Yes (220-320 nm)	<2 sec
Cell Compatibility	Cuvette 10 mm, Microcell*, Ultra Microcell*	
Cell Holder	Single Cell	
Applications	DNA, RNA, Oligo, Absorbance/Concentration, OD600, Protein Determination (Protein UV, BCA, Bradford, Lowry, Biuret)	DNA, RNA, Oligo, Absorbance/Concentration/%T, OD600, Protein Determination (Protein UV, BCA, Bradford, Lowry, Biuret), Tm Calculation, CyDye, Single wavelength, Wavescan, Simple kinetics, Standard curve, Multiple wavelength, Absorbance ratio
Data Output	Print*, Export to PC*	Print*, Export to PC
Memory	2Gb	up to 90 user-defined methods with optional password protection
Data Interface	USB	
Power Requirement	100-240 VAC ±10%, 50/60Hz, 50VA	
Languages	English	
Dimensions (WxDxH)	10 x 26 x 39 cm (4 x 10 x 15.3 inches)	
Weight	4.5kg (10lbs)	
Regulatory	CE	
Warranty	Instrument: 1 year, Xenon lamp: 3 years	

\*Optional Accessory

## Novaspec Pro and Novaspec III<sup>+</sup> technical specifications

Technical Specification	Novaspec III <sup>+</sup>	Novaspec Pro
Wavelength Range	325 - 1100 nm	
Wavelength Accuracy (+/-)	± 2 nm	
Wavelength Reproducibility (+/-)	± 1 nm	
Lamp Source	Pulsed Tungsten Halogen	
Beam	Single Beam	
Bandwidth	<7 nm	
Detector	CMOS array	
Photometric Range	-0.300 to 2.500A, 0.3 to 199%T	
Stray Light	<1%T at 340 nm	
Photometric linearity	± 2.0 % or ± 0.010A to 1.000A at 546 nm, whichever is the greater	
Noise	± 0.002A near 0A and ± 0.020A near 2A at 600 nm	
Photometric Reproducibility	< 0.002 A at 0A and 500 nm	
Applications	Fixed Wavelength, Absorbance, %T, Concentration (factor and single standard), Kinetics	Fixed Wavelength, Absorbance, %T, Concentration (factor and single standard), Kinetics, Standard Curve, Wavelength scanning, Multi-wavelength, Absorbance Ratio, Life Science Methods
Cell Compatibility	Cuvette 10mm, Test tube adaptor*	
Cell Holder	Single Cell	
Method Storage	72 with PIN number protection	90 with PIN number protection
Printer	via PC with PVC	
Export/ Data Storage	PC via USB Cable (PVC Software), USB memory stick	
Data Interface	USB	
Power Requirement	90-265V AC, 50/60Hz, 15VA	
Languages	English, H&S manuals in French, German, Italian and Spanish	
Dimensions (WxDxH)	32.5 x 22.5 x 13.3 cm (13 x 8.8 x 5 inches)	
Weight	1.6 kg (3.5 lbs)	
Regulatory	CE	
Warranty	1 Year	

\*Optional Accessory

# Molecular Separation and Analysis

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