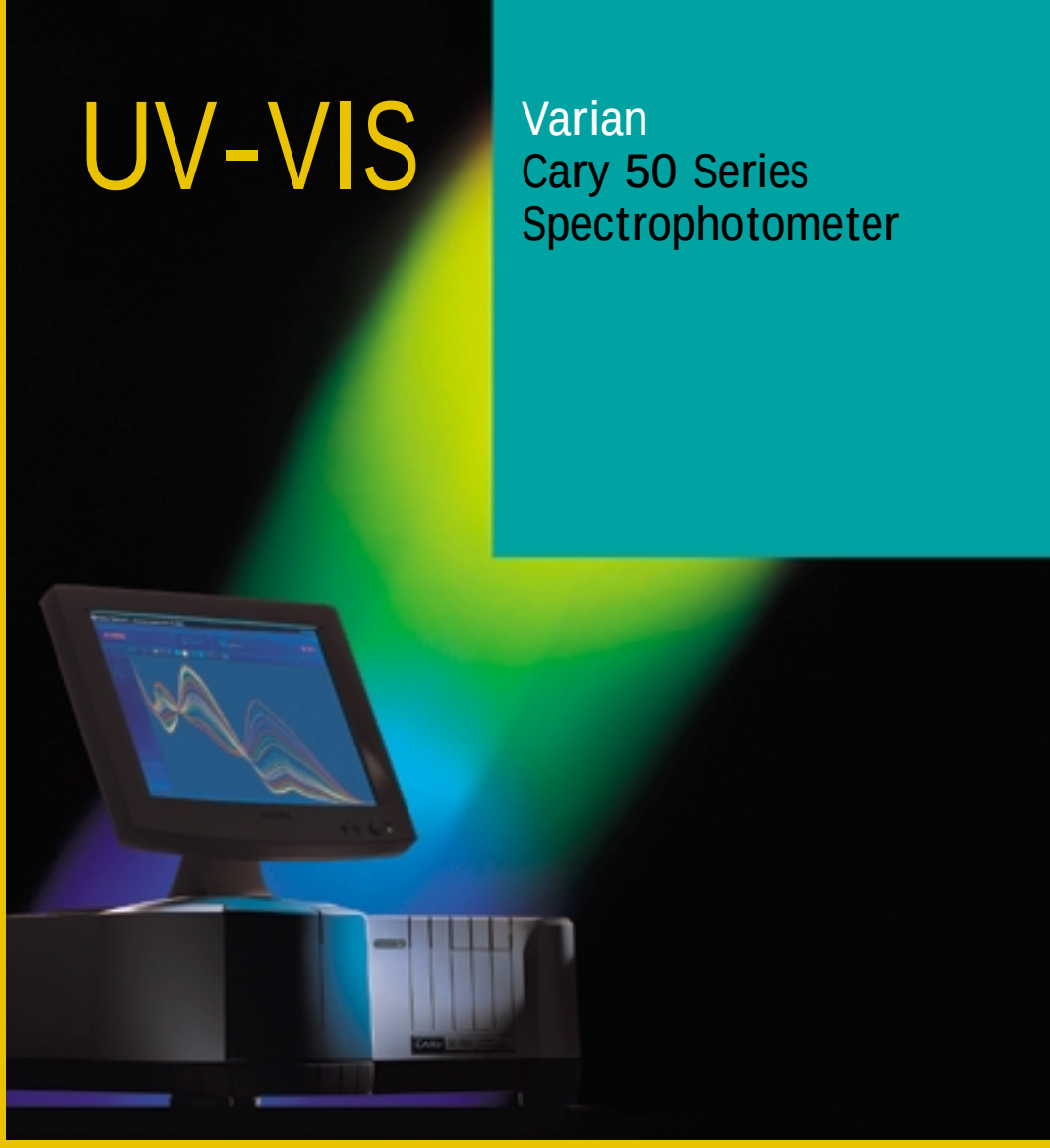
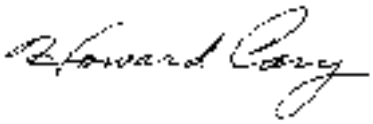
UV-VIS

Varian
Cary 50 Series
Spectrophotometer



VARIAN

> “For investigators who on occasion must push a spectrophotometer to the very limits of its performance capability to obtain the information they need, and yet have to have an instrument which is adaptable to many different applications”



Howard Cary
The Cary Philosophy 1947

Fifty years of experience, starting with the Cary 11, serial number 2, circa 1947.

Applied Physics Corporation (known later as Cary instruments) was founded in January, 1946, by Howard Cary, William W. Miller, George W. Downs, and Russell E. Vaniman. Howard Cary made important contributions to analytical instrumentation in the mid 1930s and early 1940s. He founded Cary instruments just after leaving his position as vice-president in charge of development with Beckman Instruments, where he had been for 11 years.

In April 1947 Applied Physics Corporation delivered the first commercial recording UV-Vis spectrophotometer, a Cary 11, to Mellon Institute in Pittsburgh, USA.

At that time Applied Physics Corp had only 12 employees. In 1954 the Cary family grew to include the Cary 14.

By that time the Cary name had become synonymous with high performance and reliability.

In 1966 Cary merged into Varian and in 1972 the Cary operation moved from Monrovia to Varian’s main facilities in Palo Alto, California. In 1982 the Cary operation was moved to the Varian Techtron facility in Melbourne, Australia. During the mid to late 1980s the Melbourne based factory was very busy researching and developing a whole new generation of Cary instruments.

Using the best optical and performance characteristics of the past Cary instruments and the latest technology in electronics and software the Cary 1, 3, 4 and 5 were created. On the 50th anniversary of the first Cary a whole new series of Cary instruments, the Cary 50, Cary 100, Cary 300, Cary 400 and Cary 500 were born. In 1999, the Cary range was extended to include the Cary Eclipse fluorescence spectrophotometer, offering the excellent specifications and modern software that has become the Cary standard.

Cary 11 UV-Vis	Cary 14 UV-Vis-NIR	Cary 15 UV-Vis	Cary 16 UV-Vis	Cary 17 UV-Vis-NIR	Cary 118 UV-Vis
1947	1954	1961	1964	1970	1972

You're not just buying a Cary, you're buying a relationship

If you need help with your Cary instrument, there are many options and sources of information available to you, including:

• Servicing and support
You can call your Varian office and get over-the-phone support or request an on-site service call. Varian's Tele-diagnostics option connects you to our worldwide network of support personnel for online assistance. This remote diagnosis service minimizes on-site calls and reduces downtime.

• Join our user group
All Cary users can subscribe to our free email forum, which keeps you up to date with the latest product and application information. You can also exchange questions and experiences with Varian support staff and other Cary users.

• www.varianinc.com
Varian's web site www.varianinc.com is another part of our on-going commitment to customer support.
To go directly to the UV-Vis-NIR section, visit http://www.varianinc.com/osi/uv/.
You can access application notes, download free ADL programs, find out about the latest product developments or email us if you have a question. Use our online Parts and Supplies catalog to identify any consumables you need.
If you're not connected to the Internet then you can receive the parts and supplies catalog on CD ROM.

Cary 50
This innovative instrument represents the budget end of the Cary line.

Cary 100*
A low to mid-priced instrument, the Cary 100 is suitable for routine and research laboratory work.

Cary 300*
Represents a cost effective, research-grade instrument for laboratories doing analyses of biological or highly absorbing samples.

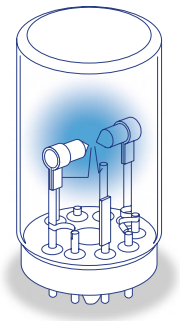
Cary 400*
This research-grade instrument represents the top-of-the-line UV-Vis spectrophotometer. (Optional deep UV version also available.)

Cary 500*
Extends the capabilities of the Cary 400 up to 3300 nm. If you want an instrument that will measure any sample then the Cary 500 is the best choice.

Cary Eclipse*
This Fluorescence spectrophotometer compliments the Cary UV-Vis range by offering the first truly new mid-range fluorescence instrument in more than 10 years.

* Refer to separate brochures for details

	Cary 17D UV-Vis-NIR	Cary 219 UV-Vis	Cary 2400 UV-Vis-NIR	Cary 1 & 3 UV-Vis	Cary 4 UV-Vis Cary 5 UV-Vis-NIR	Cary 50 Series Cary 100-500 Series	Cary Eclipse Series
	1975	1977	1987	1989	1990	1997	1999

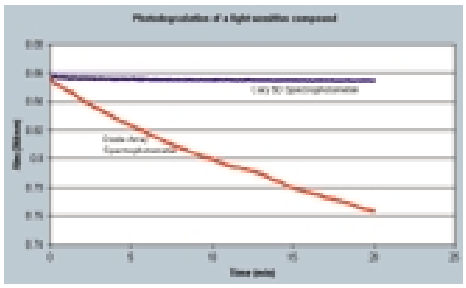


As fast as a diode array, but better performance

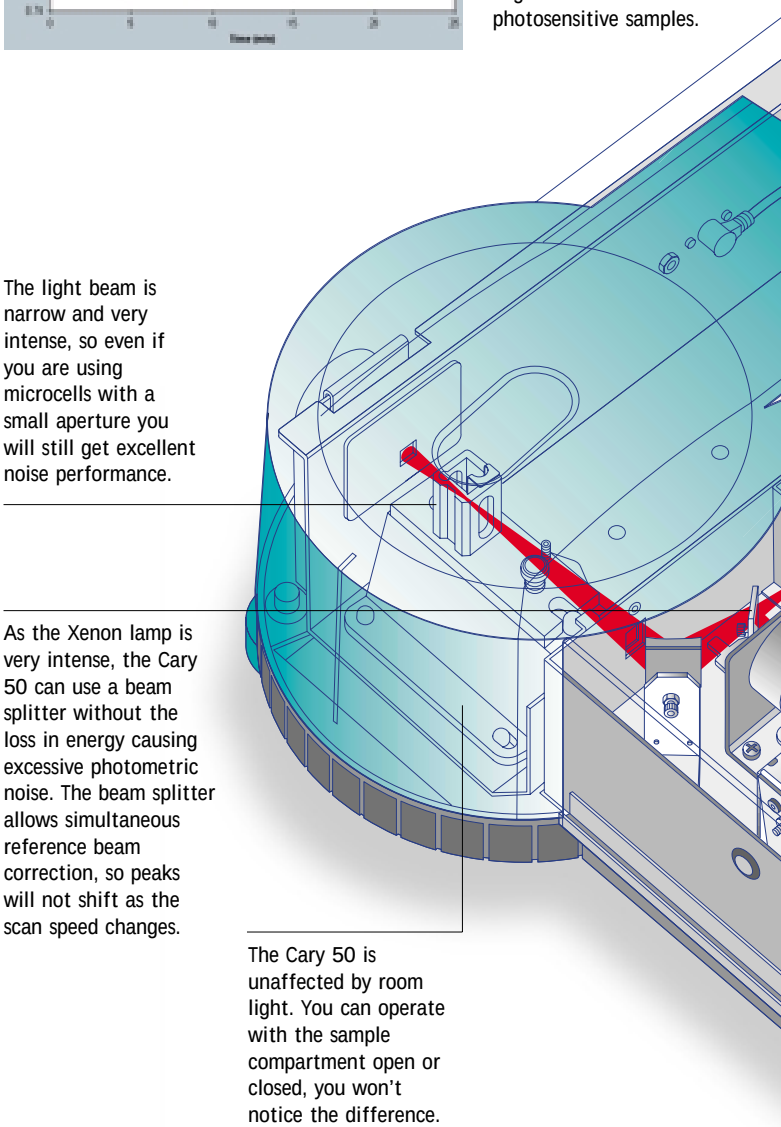
By incorporating a Xenon flash lamp, the Cary 50* offers many advantages over traditional UV-Vis spectrophotometers:

- The maximum scan rate is 24 000 nm per minute. That means you can scan the whole wavelength range of 190-1100 nm in less than 3 seconds.
- With a data collection rate of an impressive 80 points per second you'll have all the information you need about your kinetics assay.
- The Cary 50 can measure samples up to 3 Abs so you won't have to dilute as often.
- The Xenon lamp has a very long lifetime—3 x 109 flashes actually. This means that even if you measure continuously, 7 days a week, the lamp will last at least a year. If you use the instrument less frequently you may never need to change it. That makes the Cary 50 very cheap to run.
- The Cary 50's super-concentrated beam makes it ideal for fibre optic work. The coupling efficiency and light throughput are both excellent. The room-light immunity of the Cary 50 also means shielding of a fibre optic probe is unnecessary.

* Patent pending



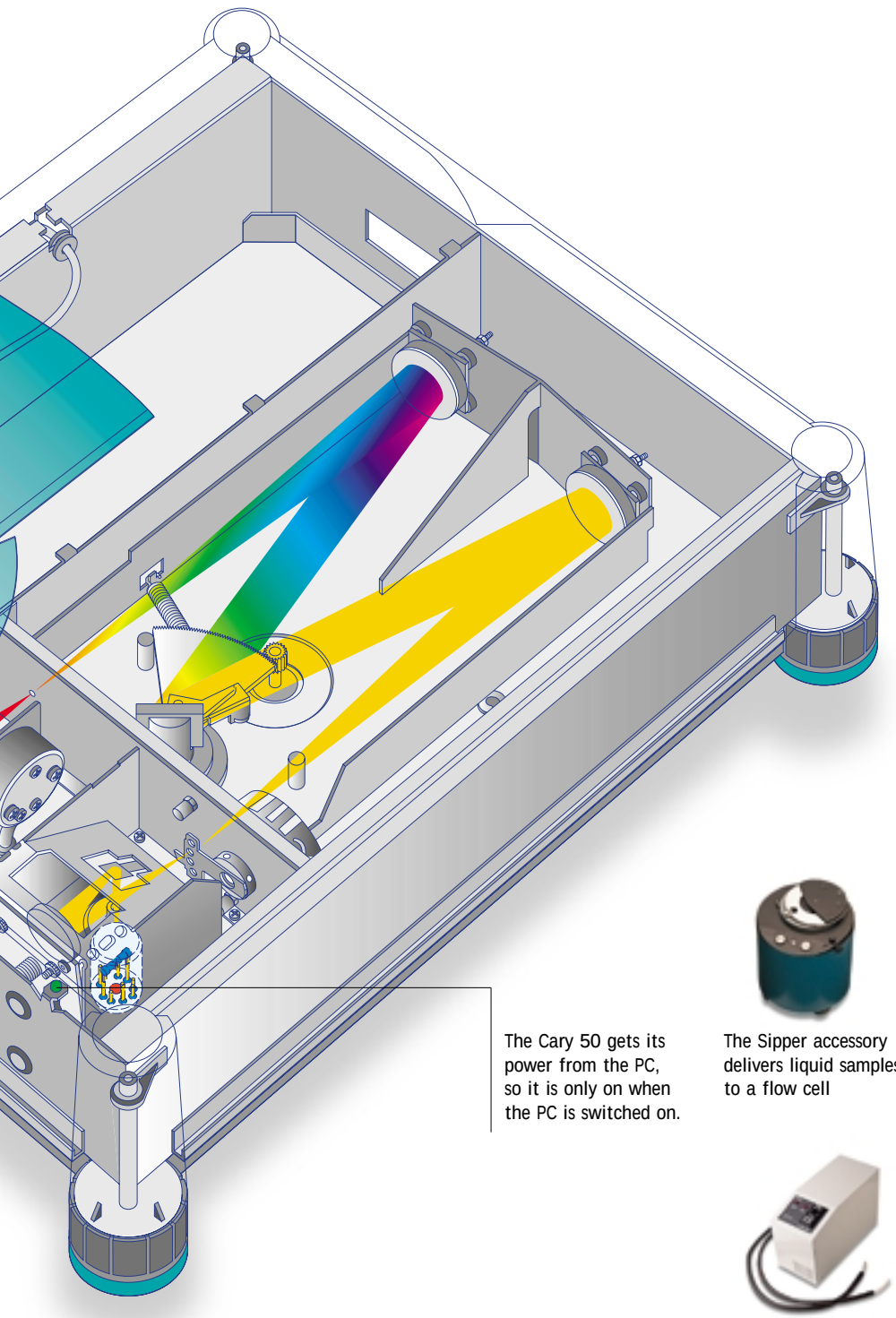
The Xenon lamp flashes only when acquiring a data point, unlike a diode array which exposes the sample to the whole wavelength range with each reading, causing degradation of photosensitive samples.



The light beam is narrow and very intense, so even if you are using microcells with a small aperture you will still get excellent noise performance.

As the Xenon lamp is very intense, the Cary 50 can use a beam splitter without the loss in energy causing excessive photometric noise. The beam splitter allows simultaneous reference beam correction, so peaks will not shift as the scan speed changes.

The Cary 50 is unaffected by room light. You can operate with the sample compartment open or closed, you won't notice the difference. So, if your sample won't quite fit in the sample compartment, it's OK, you can leave the lid off. If you want to keep dust, dirt and room light out of the sample compartment, then you can use the lid.



The Cary 50 gets its power from the PC, so it is only on when the PC is switched on.

The Fibre Optics dip probe is a trouble-free alternative to a conventional sipper

A range of fibre optic probes are available for Abs, %T and %R measurements

The single cell peltier accessory is used for precise temperature control

The Temperature Probe accessory measures the temperature inside the cuvette

The Multicell holder houses up to 18 cells and can be connected to a water bath

Fixed angle relative Specular Reflectance Accessories are available in 12.5°, 30°, 45°, 60°

The Sipper accessory delivers liquid samples to a flow cell

The solid sample holders cater for a range of sample types

The Rapid Mix accessory is ideal for stopped flow kinetics measurements

The PCB-150 water bath connects to any of the water-thermostatted cell holders

A range of cell holders caters for most cell types

The Fibre Optic Coupler allows you to connect a fibre optic probe to suit your application

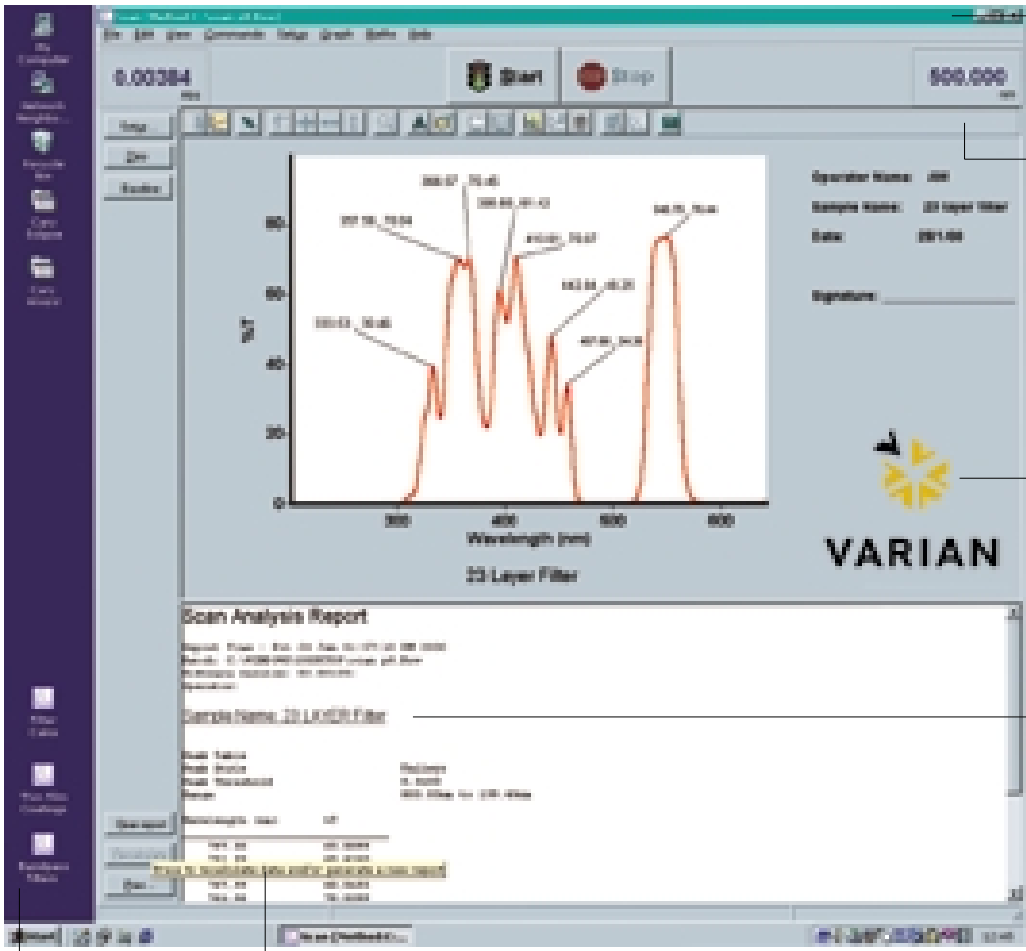
Cary Win UV software—just what you asked for

The Cary WinUV software's modular design means that you are only buying the functionality that you need. If your use of the spectrophotometer changes in the future you can simply upgrade to meet your new requirements.

Of course, the Cary Win UV software takes advantage of Windows® 32-bit functionality such as multitasking and file association, for example you can drag and drop a data file onto a Cary application and it will be immediately loaded.

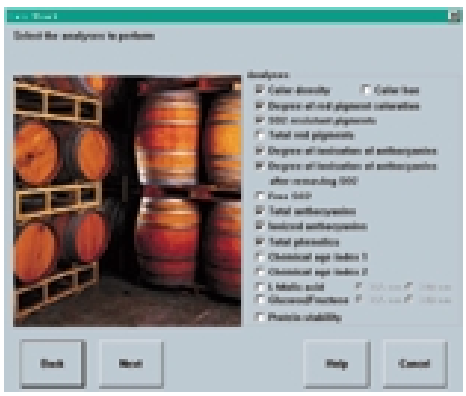
Cary packages are available for the common UV-Vis-NIR applications. These packages bundle appropriate software modules with an instrument to suit each application.

The three general use packages are Scan, Conc and Bio. Packages are also available for Tablet Dissolution, Color Analysis and Ultra-Violet Protection and the list is continually growing. Of course, you can then add any of the Cary accessories that you need.



Auto load icons
Just click on the appropriate icon and the application and the correct method will load, ready for you to measure samples.

Hint text
Having trouble figuring out what a particular button or control does? Just hold the mouse pointer over the object until the hint text pops up with an explanation.



The Cary WinUV comes with the inbuilt Applications Development Language (ADL), a computer language which can be used to automate your laboratory's measurements.

You can download a range of customized ADL programs (such as the Wine Wizard ADL shown above) from Varian's website or develop your own.

Single window operation
All controls can be accessed from this window, making operation quick and easy.

Graphics tool bar
The Cary software features a toolbar to give you quick access to the most common graphics operations such as zooming, adding text and changing the axes ranges.

Customized reports
Reports can include your company logo or any bitmap you like. You can even use the Print Preview function to check your report before printing.

Batch files
You can store all method and report parameters, calculations and graphical displays, and the actual data in one file. This saves time as you simply recall one file instead of several.

Scanning—any way you want

The Cary Scan package consists of the following software modules:

- Scanning software with Maths module
- Simple Reads module
- Advanced Reads module
- Instrument Validate module
- GLP module for file security
- Applications Development Language (ADL)

Making measurements simple

All you want to do is to find the absorbance of a sample at a single wavelength? It should be easy. With the Cary WinUV software, it is:

1. Double click on the Simple Reads icon on the desktop.
2. Click on the Setup button, set the wavelength.
3. Press the Zero button.
4. Press the Read button.

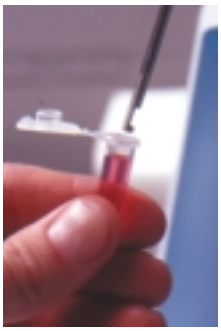
Fast data collection

The use of the Xenon flash lamp in the Cary 50 allows scan speeds up to 24000 nm per minute to be attained. This means that if you typically measure a wavelength range of 300 nm, you can complete the scan in less than 1 second. Imagine the productivity improvements you will see in your lab!

Lid on or lid off

The Xenon lamp in the Cary 50 also means that you can scan samples with the sample compartment open, just like a diode array instrument. So if you have samples that will not quite fit in the sample compartment you can leave it open without affecting your measurement.

Cary 50 Bio—a new standard for routine measurements



The microprobe can measure sample volumes as low as 120 µL.

Why is a Cary so good for Life Science measurements?

The Cary Bio package consists of the following software modules:

- Simple Reads module
- Concentration module with built-in Protein concentration methods
- Scanning module
- Kinetics module
- Enzyme Kinetics module
- Scanning Kinetics module
- RNA/DNA Estimation module
- Instrument Validate module
- GLP module for file security
- Applications Development Language (ADL)

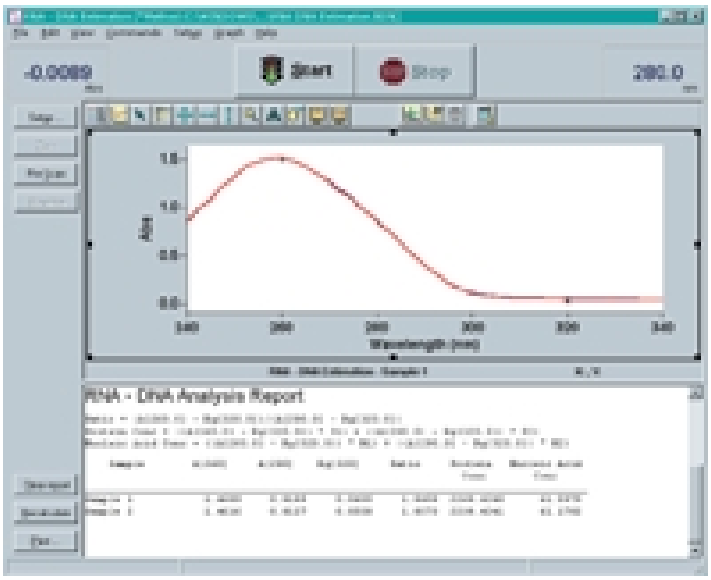
These packages are ideal for the multi-user, multi-discipline Life Science laboratories.

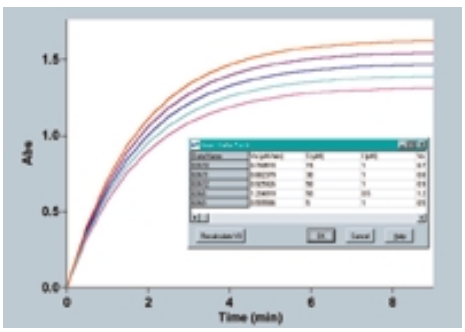
Focussing on data quality

The light beam in the Cary 50 sample compartment is very narrowly focussed and extremely intense. This design ensures that approximately 80% of the beam passes through the small aperture of a 40 µL microcell. With this much energy available, your data will be smooth and much more precise.

Data security guaranteed

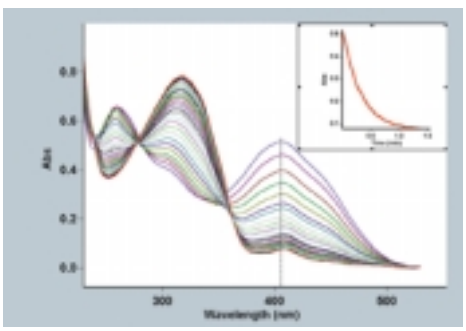
Some spectrophotometers only store data at the end of a run, so if the power fails during the analysis you have to start again. The Cary software stores data as it is acquired, so even if someone accidentally pulls the power plug, you'll still have the data up to that point.



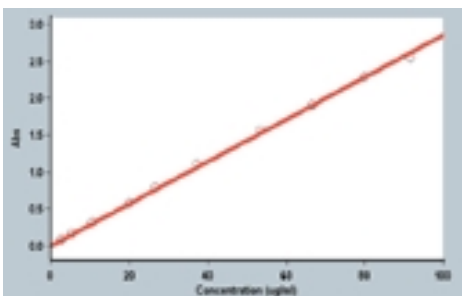


The RNA/DNA module offers pre-programmed parameters for routine analyses such as protein and nucleic acid estimation. (Top.)

Enter substrate and inhibitor concentrations into a User Data Form for Vo determinations. (Left.)



The Cary 50's extremely fast scan speed means that you can repetitively scan your kinetics sample many times during the reaction. Shown are 30 scans collected over 1 minute. The insert shows the kinetics curve at 410 nm.



This calibration graph of Bovine Serum Albumen demonstrates the excellent linearity of the Cary 50 with microprobe. This allows samples up to at least 1.5 Abs to be measured accurately.

Cary 50 Bio—the master of kinetics analysis

What functionality does Cary offer for kinetics measurements?

Part of the Cary Bio package is the Kinetics application. This application is ideal for determining the rates of reactions and enzyme activity.

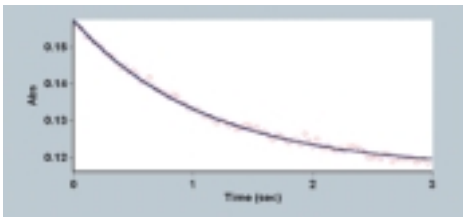
Can I vary the data collection rate?

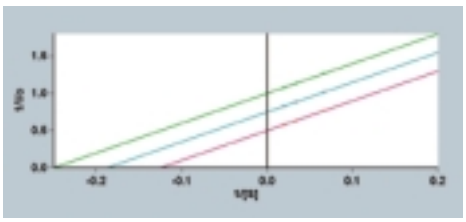
If you have a reaction which starts off very fast and then slows you may want to collect data at different rates over the course of the reaction—fast at the start (up to 80 data points per second) and then slower during the later part of the reaction. To do this, simply specify multiple data collection rates for different time segments of the assay.

The Kinetics software also caters for long, slow reactions and is capable of collecting data for up to 8000 minutes without the restriction of a limited number of data points in a file.

Need an extension?

If you decide during an assay that you need to change the end time, you can extend the length of the assay without stopping the measurement. By using the Pause function prior to opening the sample compartment lid to add reagents, and using the Continue function once the lid is closed, you can also prevent spikes in your data.





The Rapid Mix accessory allows you to automatically start an analysis in less than 1/10th of a second after the two components are mixed. (Top.)

You can collect your kinetics data and perform enzyme kinetics calculations all in the same application. The following plots are available: Lineweaver-Burk, Eadie-Hofstee, Hanes-Woolf, Eadie-Scatchard, V0 vs [S], Dixon 1/V0 vs [I]. (Bottom.)

Cary 50 Conc—quantitative analysis made easy

What about concentration measurements?

The Cary Conc package contains the following software:

- Simple Reads module
- Advanced Reads module
- Concentration module
- Scanning module with Maths mode
- Instrument Validate module
- GLP module for file security
- Applications Development Language (ADL)

The system is ideal for Quality control laboratories and those who perform quantitative measurements, with a requirement for the occasional wavelength scan.

Up to 30 standards

Catering for up to 30 standards and up to 5 replicates (multiple readings on the same aliquot) you have maximum flexibility in terms of the level of precision you want in your results. Another option is to perform averaging on multiple aliquots of each standard and sample. The built-in weight and volume correction will give you the final result without your chemists having to perform additional calculations.

Fibre optic concentration measurements

The Fibre optic dip probe enables you to dip a measuring probe into any vessel and initiate the reading from the built-in switch in the probe. By rinsing between samples the carryover is non-existent and sample throughput is increased considerably. Also, you don't have to waste time transferring samples to an instrument cuvette.

It can provide faster analysis times than is possible with typical sipper systems as there is no time taken for the sample to be pumped into a flowcell, and none of the waiting time for the cell contents to equilibrate. Over 180 samples with 3 replicates can be measured in an hour.

By taking the light to the sample instead of the sample to the instrument, all of the solution pumping problems inherent in some flowcell systems are gone. This means no more bubbles in the flowcell which block the light beam and destroy your measurement. It also means no more tubing leaks and degradation.

The Fibre Optic Dip probe makes concentration measurements quick and error-free.

Varian offers a recertification service which certifies that your instrument is working correctly. The Varian engineer is equipped with a large kit of certified standard materials and other tools.

What about testing the performance of a Cary instrument?

The Cary 50 is equipped with a range of tools to make instrument testing easy. Supplied with each package is the Instrument Validate application. This software automates the testing of the instrument hardware*.

GLP Compliance and Validation

The Cary software is Good Laboratory Practise (GLP) compliant*. If you need to validate your Cary system, Validation documentation is available for Cary instruments, software and accessories. Varian, Inc. service organizations around the world support validation of our instruments in a number of ways, including training programs, support agreements, hotlines, Telediagnostics, service contracts and certification. An overview of the Validation documentation and services Varian, Inc. provides is available from your local Varian, Inc. office.

Can I get my Instrument recertified?

At installation your instrument will be checked against specifications. As part of your ongoing validation program you may want to have your instrument recertified, to ensure that it is still meeting those specifications. Varian offers a recertification service which involves an on-site visit from a Varian Engineer who is equipped with various traceable standards and other test equipment. This means that you don't have to purchase and maintain expensive standard materials and if the instrument needs adjustment, the engineer will fix it for you.

The Cary 50 contains very few components, therefore little can go wrong.

Safety

It is Varian's policy to manufacture safe products and to meet all legal requirements governing the design, manufacture and sale of safe products. As with all similar products, some or all of the following hazards may be present: magnetic and radio frequency radiation, UV and visible light and electricity. Each product is designed to protect operators from potential hazards. Varian supplies instructions which describe the correct procedures for the operation and maintenance of each product.

Cary spectrophotometers are designed to measure the absorption of, the reflection off and the transmission through materials.

CE The Cary Series is certified to comply with the requirements of the EMC and LV directives of the European Union.

* For details refer to the separate Specifications brochure.

VARIAN

Varian is committed to a process of continuous improvement which demands that we understand and then meet or exceed the needs and expectations of our customers—both inside and outside the company—in everything we do.

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Venezuela
Tel (58) 41 257 608

Other countries
Australia
Tel (61) 3 9560 7133
Fax (61) 3 9560 7950

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