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Date:	June 27, 2003

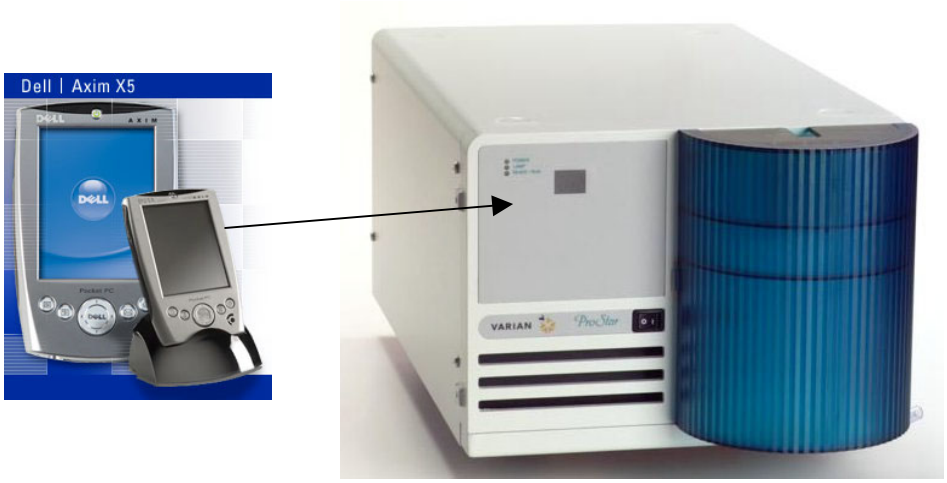
VARIAN

PIB

Product Information Bulletin
INTERNAL VARIAN USE ONLY

Worldwide LC Distribution

Introducing
ProStar 325 Dual Wavelength UV-Vis Detector



Summary

Note: Galaxie has not yet been fully tested with the ProStar 325 and therefore requires special ordering considerations that are detailed in the Ordering Information section of this PIB. We anticipate Galaxie's full functionality with the ProStar 325 very soon. The driver will provide full module control and digital data collection.

1. The ProStar 325 UV-Vis Detector is a completely new product designed and built by Varian Inc., Melbourne.
2. The ProStar 325 has both single and dual (optional) wavelength as well as extended absorbance range (linear up to 70 AU) capabilities.
3. The ProStar 325 can monitor two wavelengths simultaneously either in the ultraviolet range with a deuterium lamp or in the visible range with a quartz halogen lamp.
4. The ProStar 325 has significantly improved signal to noise for all applications, compared to the ProStar 310, 320, 340 and 345.
5. The ProStar 325 has signal to noise specifications equivalent to the best UV-Vis detectors on the market today and is the clear S/N leader in dual wavelength mode.
6. The functions of the ProStar 325 are controlled by Star WorkStation or Galaxie CDS/WS through Ethernet communications.
7. In place of an onboard keypad, detection parameters for the ProStar 325 can be programmed through a handheld PC using infrared technology.
8. Data from the ProStar 325 can be collected via one of the 3 ways below:
   - through an Ethernet communication cable directly to the PC
   - through an analog cable to the Star 800 MIB
   - through an analog cable to the internal pump CIM
9. The ProStar 325 can be upgraded from a single wavelength detector to dual wavelength.

10. The 325 can be upgraded from the ultraviolet range to include the visible range (with the addition of a field upgradeable visible lamp option).

11. Dual wavelength detection coupled with peak ratio calculations in Star WS/Galaxie CDS/WS provide peak purity sensing capabilities.

ProStar 325 Introductory CD and its contents
A summary of what is included on the CD is at the end of this PIB.

Product Overview
See Technical Paper

Performance/Specifications
See **ProStar 325 Specifications** at the end of this PIB or in the ProStar 325 Dual Wavelength UV-Vis Detector data sheet

Competition
See **The Competition** at the end of this document

Product Positioning
Best dual wavelength detector on the market
Lowest dual wavelength noise
Wavelength ratioing with sophisticated peak detection
Operates across the entire wavelength range (190 to 900 nm)
Easy upgrade from single to dual wavelength
Buy dual wavelength now and save $2000

Outstanding analytical detector
Low noise for high sensitivity
Low band spreading flow cells

Outstanding preparative detector
Dual path flow cells for extended range operation
High flow rate operation (up to 10 L/min)
Choice of flow cells for preparative operation
2 programmable analog outputs for operation with fraction collectors or other devices

Single detector for both analytical and preparative applications
Only need to switch flow cells

Easiest detector to operate
Change flow cells or replace lamps from the front of the detector without tools
Full control from Star or Galaxie software
Full set of synchronization signals to work with any manufacturers' system

Manual control and status through a handheld computer (Personal Digital Assistant)
Use general purpose PDA to monitor status of detectors in the lab
Use general purpose PDA with all other applications
Use one PDA with all ProStar detectors in the lab
No need to attach PDA to detector – uses IR communication

Handheld Computer
1. The handheld computer provides method building/instrument control and the ability to monitor the chromatogram in real time.
2. The handheld computer does not provide data handling capabilities like that of Star WS or Galaxie CDS/WS.
3. With the 325 detector being operated in the stand alone mode, stored methods in the handheld computer can be run 1 at a time or a sequence can run 1 method multiple times.

Needs, Features and Benefits

Customer Need: Performance

Feature	Benefit
High performance electronics and optics for lowest noise	Best sensitivity – easy to measure trace amounts
Full dual beam design to minimize drift	Best sensitivity – little baseline wander
Thermostat controlled Internal flow cell	Low band spreading for sharpest peaks and best sensitivity

Customer Need: Productivity

Feature	Benefit
Fully controlled from Star or Galaxie	Can take advantage of all automation features
No changes needed for single or dual wavelength	Can run single or dual channel wavelength methods within the same sequence.
9x1 flow cell can be used for analytical and prep	Can run both analytical and prep runs in automation.

Customer Need: Reliability

Feature	Benefit
Downloadable firmware	Easy to update firmware if needed
Modern reliable design including surface mounted single board system	Highest reliability of parts and manufacturing techniques.

Customer Need: Flexibility

Feature	Benefit
Analytical and prep flow cells for the same detector	One detector for both types of applications
Low back pressure flow cells	High flow rate range for prep applications
Use of handheld computer for status and method download	Can use all of the (Personal Digital Assistant) software on handheld computer
Complete set of synchronization signals and analog outputs	Can work with anyone's HPLC system

Customer Need: Ease of Use/Ease of Learning

Feature	Benefit
Change flow cells and lamps through the front panel	No need to move instruments to change lamps or flow cells
Full control through Ethernet	Simple interconnection (with no distance limit) already built into most computers
Drivers for Star or Galaxie	If you know Varian software, there is no learning curve

Customer Need: Miscellaneous

Feature	Benefit
Built by the same people who build Cary spectrophotometers	Best optical designers on the market.

1. Extended absorbance range saves analysis time by cutting down on the need to dilute concentrated samples
2. Peak ratio capabilities in the Star WS/Galaxie CDS/WS software gives a way to more accurately determine peak purity
3. Front accessible flow cell cartridges allow quick and easy cell changes
4. Semi micro to super preparative flow cells for analytical to preparative detection in one detector saves the customer money
5. Front accessible lamp compartments enable fast lamp replacements to be performed by the user
6. Many software packages available for the handheld computer expand its capabilities to double as a personal digital assistant

Ordering Information

When placing an order for the ProStar 325, please be aware that the unit does not come with a flow cell. The appropriate flow cell must be ordered separately. Flow cells come in a variety of configurations covering semi-micro to preparative flow rates, so make certain to order the correct one for the customer's application. Also, if the 325 is going to be operated in a stand-alone setting, or is not going to be operated using either Star Workstation nor Galaxie CDS/WS, the optional handheld computer will need to be ordered.

Galaxie Orders: Until the Galaxie driver for the ProStar 325 is fully tested, when quoting the ProStar 325 with Galaxie, it should be quoted as follows:

325 Connected to ProStar 210/218

P/N	Description	Price	QTY needed
7891084900	Handheld computer with cradle	$558	1
210186500	325 Sync Interface Board	$100	1
110744100	Shielded Recorder/Integrator/Contact Cable	$30	1
110744200	325 Analog Signal Cable	$75	1

325 Connected to ProStar 220/230/240

P/N	Description	Price	QTY needed
7891084900	Handheld computer with cradle	$558	1
210186500	325 Sync Interface Board	$100	1
110744100	Shielded Recorder/Integrator/Contact Cable	$30	1
110744200	325 Analog Signal Cable	$75	1
393614291	I/O Control Board for ProStar 230/310	$190	
390793701	Star 800 MIB w/2 ADC channels	$1,450	1
390793802	Analog Cable, tinned ends, 3 meter	$50	**1** (single wavelength) or **2** (dual wavelength)
	Barrier strip from a local electronics store		1

The cases above allow the 325 to be operated as a stand-alone detector with data acquisition through analog outputs. The ProStar 325 operates in Star WorkStation much like the ProStar 310.

ProStar 325 UV-Vis Detector

10080100	ProStar 325 UV Single Wavelength Detector	**Includes:** Diagnostic software, handheld pc driver software, manuals, LC Verify. **NOTE:** Flow cell not included, one must be ordered below.	$5,500
10081300	ProStar 325 UV-Vis Single Wavelength Detector	**Includes:** Diagnostic software, handheld pc driver software, manuals, LC Verify. **NOTE:** Flow cell not included, one must be ordered below.	$6,100
10081400	ProStar 325 UV Dual Wavelength Detector	**Includes:** Diagnostic software, handheld pc driver software, manuals, LC Verify. **NOTE:** Flow cell not included, one must be ordered below.	$6,500 (This is an introductory price that will last at least until January 1, 2004!)
10081500	ProStar 325 UV-Vis Dual Wavelength Detector	**Includes:** Diagnostic software, handheld pc driver software, manuals, LC Verify. **NOTE:** Flow cell not included, one must be ordered below.	$7,100 (Introductory Price)

ProStar 325 UV-Vis Detector Parts, Options and Accessories

210182100	Flow Cell (Semi-micro)	4x0 mm, 1.5 µL, 20 mL/min max flow rate		$1,000
210181800	Flow Cell (Analytical)	9x0 mm, 15 µL, 100 mL/min max flow rate		$1,000
210181900	Flow Cell (Preparative)	9x1 mm, 500 mL/min max flow rate		$1,500
210182000	Flow Cell (Super Preparative)	4x0.15 mm, 10 L/min max flow rate		$1,500
110723100	Dual Wavelength Option, Field Upgrade	Field Installed		$3,000
110720100	D2 Lamp (Prealigned)	For wavelengths from 190 nm - 450 nm		$625
110743900	Visible Lamp Option, Field Upgrade	Must be installed by a Varian Service Representative		$1,200
5610136500	Quartz Halogen Lamp (Prealigned)	For wavelengths from 450 nm - 900 nm		$100
210186500	325 Sync Interface Board	Needed when Star WorkStation or Galaxie is not being used. Provides: Auto Zero, Lamp Off, Start In, Start Out, Ready In, Ready Out, Fault In, Fault Out	One cable (P/N 110744100) needed per desired function	$100
110744100	Shielded Recorder/Integrator/Contact Cable		tinned end, 3-wire	$30
210187500	325 Relay Interface Board	Provides: Peak Sense, 4 relays	One cable (01-107441-00) needed per desired function	$100
110744200	325 Analog Signal Cable	Provides dual channel data collection	Needed for fraction collection, external integrator, etc. Needed when Star WorkStation or Galaxie is not being used	$75
7891084900	Handheld computer with cradle	Allows stand alone control of 325 detector. Cradle holds handheld in an upright position and provides an additional battery charging slot.		$558

Communication Accessories

392612922	Ethernet 8-port 10/100BaseT Switch	Autosensing 100 - 240 VAC power supply		$275
392612901	Ethernet Cat. 5 patch cable, 10-foot	For 10/100BaseT Ethernet connection		$15
392612902	Ethernet Cat. 5 patch cable, 20-foot	For 10/100BaseT Ethernet connection		$25

Notes About Ordering

UV versus Vis
The ProStar 325 can handle wavelength settings from 190 nm to 900 nm. However, the customer will get optimum performance with the greatest S/N ratios using the D2 light source in the range from 190 nm up to 350 nm. If the customer will be using the detector in the range from 350 nm up to 900 nm, we recommend that they utilize the quartz halogen light source.

Which flow cell to order?
For dedicated microbore or analytical HPLC applications, it is recommended that the semi micro (P/N 210182100) or analytical flow cell (P/N 210181800) be ordered. Operating at flow rates best suited for these applications with the flow cells previously recommended enables the 325 to meet its given noise specifications. Using the preparative or super preparative flow cells will cause the detector to not meet its noise specifications.

Communications cable ordering
It is recommended to order an Ethernet hub (listed above) when ordering the 325. This is due to the fact that the customer may want their workstation computer to be connected to the company's network while at the same time being connected to the 325 detector. This will save the customer from having to install an additional Ethernet card in their computer. An Ethernet crossover cable is included with the 325 that allows direct connection to the workstation PC, however an Ethernet patch cable (listed above) will need to be ordered to connect the 325 to the Ethernet hub. The Ethernet patch cable can also be purchased from a local computer supply store.

Helpful Hints

- ® To get the best sensitivity, you will need to add the visible lamp if you are going to be working above 350 nm.

- ® If the 325 will be used as a preparative detector, it works exactly the same way that the 320 operates, so an analog cable should be ordered and connect one output to the fraction collector and one to the CIM on the pump. This will display a chromatogram in the Dynamax window.

- ® The handheld computer will only work between 1 and 2 feet away from the 325 and will always disconnect if it is not pointed at the unit.

- ® If the ProStar 325 is connected directly to the PC, it will always start when the rest of the modules start. If the ProStar 325 is connected to a hub or network, network traffic might slow down the start command from being transferred from the PC to the 325. The result will be a variability in retention times for different chromatograms, although all of the peaks should be offset by the same amount. The areas, heights and peak shapes will not be effected. If this is routinely happening, the sync board may need to be added and a contact closure cable from the pump or AutoSampler connected to the start input of the ProStar 325. Nothing further needs to be done in this configuration.

The Competition

Note: Waters' specifications for signal to noise are in a dry cell. The ProStar 325 performs much better (Typical, ±3 x 10-6 AU peak-to-peak at 254 nm) than the Waters detector under these conditions.

cell ength	Flow cell volume and band spreading	Flow cell list prices	Drift Specification	Noise Specification	Test Conditions	Spectral Bandwidth	Linearity Range	Wavelength accuracy	Wavelength precision	Wavelength Range	Source	Time Programmable	Available as single wavelength detector	Number of simultaneous wavelengths	Extended range for prep	GLP features	Special Features	Size (mm) (H x W x D) Weight (kg)	Notes
nm 15 mm	15 uL 1.5 uL	$1000 $1000 $1500 $1500	less than 1 mAU/hr	+/- 5 x 10-6 AU	254 nm, 2 sec response time, 1 mL/min MeOH, 9 mm flow cell	6 nm	analytical 1% to 2 AU; preparative 1% to 20 AU at 265 nm	±1 nm at 260 nm	+/- 0.1 nm	190 - 900	D2 Quartz Iodine	YES	YES	2 plus ratio	Yes	Lamp hour date lamp changed instrument serial number			
	14 uL 1 uL 5 uL	$ 949 $1290 $949	3X10-4 AU/Hr at 254nm	+/- 7.5x10-6 AU	Response time 2 sec 1 mL/min MeOH	6.5 nm typical	5% to 2AU	+/- 1 nm		190 - 600	D2	YES						140 x 345 x 435 11 kg	
	13 uL 8 uL 1.7 uL 0.5 uL	$755 $1785 $1790 $755	2 x 10-3 Au/hr at 254 nm	+/- 10 x 10-6 AU/hr at 254 and 750 nm	Response time 2 sec 1 mL/min MeOH	variable 1, 2, 4, 8, 16 nm		+/- 1 nm											Based on diode array detector
	2.6 uL 10 uL		1x10-4 AU/Hr	<+/-3.5x10-6 AU single wavelength <+/-2.5x10-5 AU dual wavelength	dry cell 254 nm 1 sec TC dry cell 254 / 280 nm 2 sec TC	5 nm	+/-2.5% at 2.5 AU propylparaben, 257	+/- 1 nm'	+/- 0.1 nm	190 - 700	D2	Dual			No				
	8 uL 2.5 uL 8 uL 2.5 uL 8 uL		1x10-4 AU/Hr	<+/-10x10-6 AU (1 sec filter 210 to 280 nm dry cell)	dry cell 254 nm 1 sec TC dry cell 254 / 280 nm 2 sec TC	8 nm	+/-1.5% at 2.5 AU propylparaben, 257	+/- 2 nm	+/- 0.25 nm	190 - 600	D2	No	Yes	1	No			240 x 285 x 545 17.5kg	
			<2x10-4 AU/Hr at 254nm	<+/-1x10-5 AU	at 254 and 546 1.0 sec rise time	6 nm	1% to 2AU			190 - 380	D2	YES							
			<2x10-4 AU/Hr at 254nm	<+/-1x10-5 AU single wavelength <+/-2.5x10-5 dual wavelength	at 254 and 280 1.0 sec rise time	6 nm	1% to 2AU			190 - 800	D2 / W	YES					Dual Wavelength		
n .1 mm	10 uL 0.2 uL 4 uL 4, 2, 1 uL 2.5 uL 3 uL	$540 $1860 ? $1220 ? ?	2x10-4 AU/Hr	+/-3.5x10-6 AU	Unstated	8 nm		+/- 1 nm'	+/- 0.1 nm	190 - 900	D2/W	YES					Scanning GLP Records Dual Wavelength Measurements		
n nm	12 uL 1.6 uL 0.7 uL 0.16 uL	$634 $1221 $1280 $1700	3x10-4 AU/Hr	2.5x10-5 AU	254 nm	9 nm	1% to 2 AU	+/- 1 nm	+/-0.2 nm	190 - 700	D2 / W	YES	Single only	1	No			156x265x435 8.6kg	
as	Same as above	Same as above	3x10-5 AU/Hr	2.5x10-5 AU	254 nm	9 nm	1% to 2 AU	+/- 1 nm	+/-0.2 nm	190 - 700	D2 / W	YES	Dual Only	2	No			156x265x435 8.6kg	

ProStar 325 Specifications

Detector

- Wavelength range: 190 to 900 nm
- Light sources: deuterium for UV and quartz halogen for Vis
- Spectral bandwidth: 6 nm
- Wavelength precision: ±0.1 nm
- Wavelength accuracy: ±1 nm at 260 nm
- Noise, single wavelength: ±5 x 10-6 AU peak-to-peak at 254 nm, 2 sec response time, 1 mL/min MeOH, 9 mm flow cell
- Noise, dual wavelength: ±10 x 10-6 AU peak-to-peak at 254/280 nm, 2 sec response time, 1 mL/min MeOH, 9 mm flow cell
- Noise, dry cell: typically, ±3 x 10-6 AU peak-to-peak at 254 nm, 2 sec response time, 9 mm flow cell
- Drift: less than 1 mAU/hr
- Linearity, with acetone in water: analytical 1% to 2 AU; preparative 1% to 20 AU at 265 nm
- Absorbance range: up to 70 AU with preparative flow cell
- Response time, selectable: 0.05, 0.5, 1, and 2 sec
- Data rate: 20 Hz single channel
- Analog outputs: two with selectable absorbance range of 0.001 to 100 AU full scale at 1V

Flow Cells

- Pathlengths: single and dual, interchangeable
- Single pathlength flow cells: Semi-Micro 4 mm, 1.5 µL; analytical 9 mm, 15 µL
- Dual pathlength flow cells: preparative 9 mm x 1 mm; Super Preparative 4 mm x 0.15 mm
- Maximum flow rate:
  - Semi-Micro flow cell: 20 mL/min
  - Analytical flow cell: 100 mL/min
  - Preparative flow cell: 500 mL/min
  - Super Preparative flow cell: 10 L/min
- Pressure: 1000 psi maximum

Control

- External: Ethernet, IR with handheld
- Contact closure outputs: four time-programmable external event relays, one peak sense relay, three synchronization signals (ready out, start out, and fault out)
- Contact closure inputs: lamp off, autozero, three synchronization signals (ready in, start in, and fault in)
- Software: Star Workstation; Galaxie Workstation; Galaxie Chromatography Data System; handheld computer
- Dual channel ratio calculation: peak detection through Star or Galaxie software

Environment

- Operation: 10 °C to 35 °C; relative humidity from 5% to 95%
- Non-operational storage: –20 °C to 65 °C

Dimensions and Weight

- Size: 8.3 in./21.1 cm (h) x 11.7 in./29.6 cm (w) x 18.7 in./47.7 cm (d)
- Weight: 34.2 lb/15.5 kg

Introductory CD Contents

File	Function
Readme.txt	How to use the CD
Hardware video directory	**Place to keep all of the videos about the hardware**
Disassembly video	How to take the entire module apart
UV Lamp replacement	Demonstrates how to replace the UV lamp
Vis Lamp replacement	Demonstrates how to replace the Vis lamp
Flow cell install	Demonstrates how to install flow cells
Vis option installation	Shows service personnel how to install the visible lamp option
Software video directory	**Place to keep all of the videos about software operation**
Camplayer.exe	Program to play software videos
TSCC.exe	Codec to play Camplayer files
Configuration of Ethernet connections	How to configure the system through Star
System control status	What do the things on system control screen do.
Method editor	How to build a method
Operation of diagnostics	How to run Diagnostics
Operation of LC Verify	How to run LC Verify
Documents	
Operators manual	
Service manual	
Introductory PIB	
Data Sheet	
Competitive comparison	
Technical Details	Paper describing the technical details of the product. Suitable for American Lab
Service Strategy	
Software	
Star Driver	
Handheld computer software	
Diagnostics	
LC Verify	
Miscellaneous	
Pictures	
Run files	Various data files that represent particularly relevant data for sale