May 2003 CAP TODAY / **35**

Laboratory automation systems & workcells

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Part 1 of 11	Abbott Laboratories Diagnostics Division Darin Leigh darin.leigh@abbott.com 100 Abbott Park Rd. Abbott Park, IL 60064-3500 972-518-7031 www.abbottdiagnostics.com	Al Scientific Pty. Ltd. Stephen Pronk stephen.pronk@aiscientific.com 91 Landsborough Ave., Scarborough 4020 Australia 617 3897 3888 www.aiscientific.com
Name of system/First year installed	FE 500/2000 (See also Tecan listing, page XX)	Pathfinder/1998
Automation products that are available Process control software/Transportation systems Auto. centrifugation/Auto. input or accessioning Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliquoting Instrument (analyzer) interfaces/Auto. recapping System architecture of staff dedicated to clinical automation system for budget dedicated to R&D for clin. auto. technology Company's primary product category	yes/yes yes/yes yes/yes/in development in development/yes no/in development open system 50% 15% lab automation systems	yes/no no/no yes/yes/yes no/yes no/yes open system n/a — laboratory automation systems
Information systems technology for your automation system Database/Operating system/Server/User interface	Sybase SQL Anywhere/Windows NT/—/dynamic download, host query	Paradox, Microsoft SQL server/Windows 95, 98, 2000, NT4/Windows 2000 Server, NT4 Workstation/Borland C++, Borland Delphi
Software features/functionality • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports	n/a/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a/n/a	LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/—/LAS SW feature
Evaluates validity and releasability of results from automated analyzers Specimen tracking/Priority processing/Random-access specimen movement Supports accession No. redundancy (duplicate specimen ID) Supports specimen carrier and level identification Unique bar-code number per container required Specimen routing/Multistop routing (one tube to multiple workstations) Specimen scheduling/Instrument scheduling Routes test to workstation/Automatic reflex, repeat, dilutions	n/a LAS SW feature/LAS SW feature LAS SW feature n/a n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/n/a	LIS requirement LAS SW feature/LAS SW feature LAS SW feature LAS SW feature LAS SW feature n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/—
Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards		LAS SW feature/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Misys, SCC, Cerner, Citation, McKesson, Triple G, Molis/ASTM	Kestral, MelbPath, Triple G, Apollo, Bayer/ASTM, HL7
No. of live sites installed in N. America/Outside N. America	34/32	—/—
Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions	yes conveyor/—/— —	no
Types of containers device can accommodate Modular hardware/Installed options/Device functions independent of track	16x100, 13x100, 16x75, 13x75 —/—/—	Ξ
Required utilities/Required maintenance Carrier type/Scalable system	compressed air, electricity/— single specimen container per carrier/—	=
Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/—/300 @ 10-min spin time 16x100, 13x100, 16x75, 13x75 — yes —/—/500	no yes Mk2/yes/150-500
Types of containers device can accommodate Automated decapping available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard yes —/—/500	16x100, 13x100, 16x75, 13x75 yes Mk2/—/>150-500
Types of containers device can accommodate Automated sorting available	16x100, 13x100, 16x75, 13x75 yes	16x100, 13x100, 16x75, 13x75, 12x75, 16x108 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	—/—/500 16x100, 13x100, 16x75, 13x75, any manufacturer's rack	Mk2/—/>500 tubes 16x100, 13x100, 16x75, 13x75, 12x75, 16x108
Specimen integrity monitor available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	in development yes	<u>no</u>
Types of containers device can accommodate Automated aliquoting available	level sensing & clot detection yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	—/—/— 13x75 prepackaged secondary tubes yes/yes/yes	Mk2/—/150-500 16x100, 13x100, 16x75, 13x75, aliquot can be 12x75 or 16x100 yes/yes
Instrument (analyzer) interfaces		•
Rules-based instrument interface control subsystem Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface	<u>-</u>	no no
Hematology/Chemistry/Coagulation Immunoassay/Urinalysis	- <i>I</i> - <i>I</i> -	_/_/_ _/_
Instruments to which your system/product is interfaced	contact vendor	n/a, interfaces LIS only
Other robotic products/components to which system, product is linked	_	_
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate	in development — —	yes Mk2/yes/150-500 16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate	in development — —	no
Refrigeration available Longitudinal ungrade pathway or plan to protect users' investments.	- contact worder	samples placed in storage racks can be refrigerated—manual removal & storage
Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	contact vendor 6 weeks/Tecan-based service and support/24/7 no/—	2 weeks/Al Scientific/24/7 no/no
List price Individual list prices for components	\$450k	-
Process control software/Transportation systems Auto. centrifugation/Auto. input, accessioning	-	_
Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting	-	Ξ
Instrument (analyzer) interfaces/Automated recapping	_	_
Distinguishing features	flexibility, footprint, completely configurable	 camera-based specimen container recognition delivers capped or uncapped daughter tubes in two sizes large automated sorting table accepts up to 30 destinations
* Ave. throughput in specimen containers per hr per device		

 $\label{thm:constraint} \textbf{Tabulation does not represent an endorsement by the College of American Pathologists}$

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Pai	t 2 of 11	A&T Corp. Akira Igarashi igarashi@alice.aandt.co.jp 1799 Old Bayshore Hwy., Ste. 168	Bayer Diagnostics Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave.,
Ple	ase see accompanying article on page 33	Burlingame, CA 94010-1319 650-346-6543 www.aandt.co.jp	Tarrytown, NY 10591 914-333-6123 bayerdiag.com and labnews.com
Nan	ne of system/First year installed	Clinilog/1993	Advia LabCell/1998
• Pr • Ar • Ar • Sr • In Sys % 0	omation products that are available ocess control software/Transportation systems uto. centrifugation/Auto. input or accessioning uto. decapping/Auto. sorting/Auto. storage and retrieval oecimen integrity monitor/Auto. aliquoting strument (analyzer) interfaces/Auto. recapping tem architecture f staff dedicated to clinical automation system f budget dedicated to R&D for clin. auto. technology upany's primary product category	yes/yes yes/yes yes/yes yes/yes no/yes yes/no open system 10% 10% laboratory automation systems	yes/yes yes/yes yes/yes (storage & mapping) no/available 2003 yes/no open system — laboratory solutions
	rmation systems technology for your automation system tabase/Operating system/Server/User interface	SQL/Windows NT/Windows NT	SQL & Progress/Windows NT/Windows NT/Bayer-user interface (proprietary)
P: SI	ware features/functionality ntient demographics & insurance data/Rules-based architecture apports data retrieval/Internet connectivity nline real-time help system/QC/Stats & management reports raluates validity and releasability of results from automated analyzers secimen tracking/Priority processing/Random-access specimen movement apports accession No. redundancy (duplicate specimen ID) apports specimen carrier and level identification apports specimen carrier and level identification apports processing/Multistop routing (one tube to multiple workstations) apports test to workstation/Automatic reflex, repeat, dilutions apports multiple hardware config./Supports other proprietary transport. hardware apports multiple hardware config./Supports proposed NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature LAS SW feature LAS SW feature LAS SW feature/LAS SW feature	LIS requirement/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature via error management LAS SW feature LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/— LAS SW feature (database mgmt)/—
LIS	interfaces that are live/How LISs are interfaced with auto. sys.	A&T, Triple G, Techni Data/ASTM, HL7	SCL 2000, Misys, Labzis II, LMX, NetLab, Telepath-iSoft, OSI/HL7, ASTM
Trai • Ve • Si • Ty • M	of live sites installed in N. America/outside N. America isportation systems available rsion/conforms to NCCLS Standards Auto 1-5/Ave. throughput* ipports automatic rerouting for reflex/repeat/dilutions pes of containers device can accommodate odular hardware/Installed options/Device functions independent of track iquired utilities/Required maintenance irrier type/Scalable system	0/60 yes 2.0-3.0/yes/360 yes 16x100, 13x100, 16x75, 13x75 yes/floor & subfloor mounted/yes electricity/quarterly single, multiple specimen container per carrier/yes	1/9 yes —/no/2,000 yes 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) yes/floor mounted/yes compressed air, electricity/weekly, monthly, quarterly, annually single specimen container per carrier/yes
• Ve • Ty • Fc Auth • Ve • Ty Auth • Ve • Ty Spe • Ve • Ty Auth • Ve • Ty Auth • Ve • Ty Auth • Ve • Ty	omated centrifugation available rsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate r multi-unit centrifuges, each cent. operates independently for rate and time omated input/accessioning available rsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate omated decapping available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate omated sorting available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate cimen integrity monitor available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate omated aliquoting available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate omated aliquoting available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate omated aliquoting available rrsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate stem inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/yes/200 16x100, 13x100, 16x75, 13x75 yes yes —/yes/360 16x100, 13x100, 16x75, 13x75 yes —/yes/350 16x100, 13x100, 16x75, 13x75 yes —/yes/250 16x100, 13x100, 16x75, 13x75 no — yes —/yes/250 16x100, 13x100, 16x75, 13x75 no — yes —/yes/250 16x100, 13x100, 16x75, 13x75 yes —/yes/yes/yes	yes —/—/240 11.5—16.2 mm (diam) & 75—100 mm (ht.) yes yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5—16.2 mm (diam.) & 75—100 mm (ht.) yes —/—/240 11.5—16.2 mm (diam) & 75—100 mm (ht.); cap, plug, screw top yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5—16.2 mm (diam.) & 75—100 mm (ht.) within each instrument — — — in development — —
• Ri • Pi Phy • He	rument (analyzer) interfaces iles-based instrument interface control subsystem ocess control of instrument via control subsystem sical/hardware (instrument/specimen) interface ematology/Chemistry/Coagulation imunoassay/Urinalysis	yes yes robotic arm interface/ptof-reference sampling & robo. arm interface/ ptof-reference sampling & robo. arm interface ptof-reference sampling & robo. arm interface/ptof-reference sampling & robo. arm interface	yes no (high level only) robotic arm interface/ptof-reference sampling/robotic arm interface ptof-reference sampling & robotic arm interface (both avail.)/ ptof-reference sampling
Inst	ruments to which your system/product is interfaced	Hitachi 747, 7600; Toshiba 200 FR, Dax; Bayer Advia 1650, Centaur;	Bayer: Advia 120, 1650, 2400, & Centaur; Clinitek Atlas, Immuno1,
Oth	er robotic products/components to which system, product is linked	Coulter Gen-S; Abbott Aeroset i2000; Tosoh Al21; A&T 502X —	Stago STA-R none
• Ve	omated recapper available rsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate	<u>no</u>	no
• Ve	omated storage and retrieval available rsion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* pes of containers device can accommodate frigeration available gitudinal upgrade pathway or plan to protect users' investments	yes —/yes/360 16x100, 13x100, 16x75, 13x75 no scalable modular automation can be designed from front-end automation or workcell until fully integrated TLA format; step wise construction possible	software tracking retrieval no can contain as few as two interfaced modules/instruments & can be expanded to include up to 16 interfaced modules; instruments open system allows for instrument exchanges
	time to install sys./Who provides service and support/Hours support is available site biomedical engineer required/User group meets regularly	1 week/A&T or designated service engineer/depends on contract no/no	1 month/Bayer Diagnostics/24/7 no/yes
Indi • Pı • Aı • Aı • Sı	price vidual list prices for components ocess control software/Transportation systems tto. centrifugation/Auto. input accessioning tto. decapping/Auto. sorting/Auto. storage & retrieval tecimen integrity monitor/Automated aliquoting strument (analyzer) interfaces/Automated recapping	depends on system configuration -///////-	varies by configuration —/— —/— —/— —/— —/— —/—
	inguishing features e. throughput in specimen containers per hr per device	open modular automation high-speed single tube transportation has unique two-way option flexible layout—from workcell/front end until fully integrated LAS	a menu of modules from which to design an individual solution customizable and reconfigurable as needs change allows customer to plan and manage around their changing needs single LIS connection for system and instruments
A	от иновадирах игоробиной общаниего рег ин рег исулсе		Single Lie semicouon lei system anu mattuments

	*	
	Bayer Diagnostics	Beckman Coulter
Part 3 of 11	Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591	Ronald Berman rberman@beckman.com 200 S. Kraemer Blvd., Brea, CA 92821
Please see accompanying article on page 33	914-333-6123 bayerdiag.com and labnews.com	714-993-8817 www.beckmancoulter.com
Name of system/First year installed	Advia WorkCell (chemistry & immunoassay instruments)/2000	Power Processor/1994
Automation products that are available		
Process control software/Transportation systems Auto-contributation/Auto-input or accessioning	yes/yes	yes/yes
Auto. centrifugation/Auto. input or accessioning Auto. decapping/Auto. sorting/Auto. storage and retrieval	no/yes no/yes/yes (storage & mapping)	yes/yes yes/yes
Specimen integrity monitor/Auto. aliquoting	no/no	yes (available in analyzer)/yes
Instrument (analyzer) interfaces/Auto. recapping System architecture	yes/no closed system	yes/yes open system
% of staff dedicated to clinical automation system	—	5%
% of budget dedicated to R&D for clin. auto. technology	-	7%
Company's primary product category Information systems technology for your automation system	laboratory solutions	lab automation systems and instruments
Database/Operating system/Server/User interface	SQL & Progress/Windows NT/Windows NT/Bayer-user interface (proprietary)	SQL/Windows NT/—/GUI
Software features/functionality Patient demographics & insurance data/Rules-based architecture	LIS requirement/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature
Supports data retrieval/Internet connectivity	LAS SW feature/n/a	LAS SW feature/n/a
Online real-time help system/QC/Stats & management reports Evaluates validity and releasability of results from automated analyzers	LAS SW feature/LAS SW feature LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature
Specimen tracking/Priority processing/Random-access specimen movement	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
Supports accession No. redundancy (duplicate specimen ID)	via error management	LAS SW feature
Supports specimen carrier and level identification Unique bar-code number per container required	LAS SW feature LAS SW feature	n/a LAS SW feature, LIS requirement
Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling	LAS SW feature/LAS SW feature (load balancing)	LAS SW feature/LAS SW feature
Routes test to workstation/Automatic reflex, repeat, dilutions Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/LAS SW feature LAS SW feature/—	LAS SW feature/LAS SW feature LAS SW feature/n/a
Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature (database mgmt)/—	LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner PathLab & Citation, Ness, Safir-Wilnor, FlexLab, LMX, Per Se, Meditech, VA System, SCC Soft, Misys, PGP/ASTM, HL7	ADAC, Cerner, Meditech, Misys, SCC, SMS, Antrim, McKesson, Per Se Technology/direct, worklist consol. download or listen on analyzer line
No. of live sites installed in N. America/Outside N. America	21/13	140/70
Transportation systems available	yes	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions	—/no/2,000	n/a/n/a/900
Types of containers device can accommodate	yes 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	yes 16x100, 13x100, 16x75, 13x75
Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor/yes
Required utilities/Required maintenance Carrier type/Scalable system	compressed air, electricity/weekly, monthly, quarterly, annually single specimen container per carrier/yes	compressed air, electricity/monthly single specimen container per carrier/yes
Automated centrifugation available	no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	n/a/n/a/300
Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time		16x100, 13x100, 16x75, 13x75 yes
Automated input/accessioning available	yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/no/600	n/a/n/a/900
Types of containers device can accommodate Automated decapping available	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) no	16x100, 13x100, 16x75, 13x75 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	n/a/n/a/600
Types of containers device can accommodate Automated sorting available	yes	16x100, 13x100, 16x75, 13x75 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/no/600	n/a/n/a/500
Types of containers device can accommodate Specimen integrity monitor available	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) within each instrument	16x100, 13x100, 16x75, 13x75
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	yes —
Types of containers device can accommodate	_	_
Automated aliquoting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	<u>no</u>	yes n/a/n/a/450
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75
System inspects samples for bar code/Reports clots/Reports QNS specimens	_	yes/yes
Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem	yes	yes
Process control of instrument via control subsystem	no (high level only)	yes
Physical/hardware (instrument/specimen) interface	n/a/nt of vafavance commissed—	depends on manufacturer of and
Hematology/Chemistry/Coagulation Immunoassay/Urinalysis	n/a/ptof-reference sampling/n/a ptof-reference sampling/n/a	depends on manufacturer of analyzer depends on manufacturer of analyzer
Instruments to which your system/product is interfaced	Bayer: Advia 1650, 2400, & Centaur	Abbott: AxSym, Architect, Aeroset; Bayer: Centaur, Atlas; Beckman
		Coulter: Synchron LX20, Gen-S, STKS, LH; J&J: Vitros; Roche: Modular, 747, 917; Stago Coag Analyzer
Other robotic products/components to which system, product is linked	none	CRS Arms, RoboCart
Automated recapper available	no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_	n/a/n/a/500 16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available	software tracking retrieval	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	n/a/n/a/300
Types of containers device can accommodate Refrigeration available	no	16x100, 13x100, 16x75, 13x75 yes
Longitudinal upgrade pathway or plan to protect users' investments	future chemistry & immunochem systems from Bayer will be able to con-	all systems may be upgraded (SW & HW) due to modular design
	nect to the track and can be exchanged; designed so it can be upgraded to LabCell	
Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	2 weeks/Bayer Diagnostics/24/7 no/yes	7-30 days, depends on config. of system/Beckman Coulter/24/7 no/yes
List price	varies by configuration	\$450k for standard configuration
Individual list prices for components	Tanco by configuration	4 100 A 101 Orania a Configuration
Process control software/Transportation systems	_/_ _/_	contact vendor
Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval	—/— —/—/—	contact vendor contact vendor
Specimen integrity monitor/Automated aliquoting	_/_	contact vendor
Instrument (analyzer) interfaces/Automated recapping		contact vendor
Distinguishing features	• instruments can operate separately from track for backup	system design, installation, training, technical support, and service
	pre- and postanalytical sorting capability single-tube carrier vs. rack carrier	provided by Beckman Coulter • totally open—connects to any manufacturer's analyzer
	single-tube carrier vs. rack carrier upgradability allows customers to grow into a larger system or Advia LabCell	• intelligent aliquoting—measures serum volume and transfers based on
* Ave. throughput in specimen containers per hr per device	single LIS connection for system & instruments	dead volume plus requested test volume

NEW 10th Edition

> An Introduction to Phlebotomy



An introduction to philebotomy

Turk officer



The tenth edition of this comprehensive, illustrated resource manual includes information on:

- Blood collection device disposal, in compliance with OSHA's clarification to the Bloodborne Pathogens Standard, which prohibits tube holder reuse
- satery avareness and precautions, valls an emphasis on needlestic leadery and prevention
- Rundamental techniques of phiebotomy proper laboratory practice, and professionalism
- Standard blood collection techniques, as well as heelstick techniques for babies, finger puncture techniques for children and adults, and special techniques for difficult venipunctures and patients receiving intravenous fluids
- Recommended order of draw for multiple specimens



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Laboratory automation systems & workcells

	Dade Behring
Part 4 of 11	Contact Dade Behring representative
	1717 Deerfield Rd., Deerfield IL 60015 800-242-3233
Please see accompanying article on page 33	www.dadebehring.com
Name of system/First year installed	StreamLab Analytical Workcell/2000
	Silvaineas / iliai juvai 110110011/2000
Automation products that are available • Process control software/Transportation systems	yes/yes
Auto. centrifugation/Auto. input or accessioning	yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/no
Specimen integrity monitor/Auto. aliquoting Instrument (analyzer) interfaces/Auto. recapping	no/yes yes/no
System architecture	open system
% of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology	_
Company's primary product category	instruments and reagents
Information systems technology for your automation system	proprietary file system/Windows NT/n/a/Labview touchscreen guide
Database/Operating system/Server/User interface	
Software features/functionality	
Patient demographics & insurance data/Rules-based architecture Supports data retrieval/Internet connectivity	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/LAS SW feature
Online real-time help system/QC/Stats & management reports	LAS SW feature/LAS SW feature/n/a
Evaluates validity and releasability of results from automated analyzers	LIS requirement
Specimen tracking/Priority processing/Random-access specimen movement Supports accession No. redundancy (duplicate specimen ID)	LAS SW feature/LAS SW feature/LAS SW feature n/a
Supports specimen carrier and level identification	LAS SW feature
Unique bar-code number per container required Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature, LIS requirement LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling	LAS SW feature/LAS SW feature
Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature
Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	none/ASTM
No. of live sites installed in N. America/Outside N. America	2/—
Transportation systems available	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*	StreamLab/yes/300
Supports automatic rerouting for reflex/repeat/dilutions Types of containers device can accommodate	yes 16x100, 13x100, 16x75, 13x75
Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes
Required utilities/Required maintenance Carrier type/Scalable system	compressed air, electricity/weekly single specimen container per carrier/ves
, , , , , , , , , , , , , , , , , , ,	omgio oposinion containio per carrier/yes
Automated centrifugation available	yes Stream ob /wo /200
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
For multi-unit centrifuges, each cent. operates independently for rate and time	yes
Automated input/accessioning available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes StreamLab/yes/300
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes StreamLab/yes/300
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Automated sorting available	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Specimen integrity monitor available	no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_
Automated aliquoting available	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Dimension sample transfer module/yes/480 (4 analyzers)
Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces	• •
Rules-based instrument interface control subsystem	_
Process control of instrument via control subsystem Physical/bardware (instrument/speciment) interface.	_
Physical/hardware (instrument/specimen) interface • Hematology/Chemistry/Coagulation	no/ptof-reference sampling/no
• Immunoassay/Urinalysis	ptof-reference sampling/ptof-reference sampling
Instruments to which your system/product is interfaced	Dade Behring Dimension RxL Max Integrated Clinical Chemistry System
Other robotic products/components to which system, product is linked	none
Automated recapper available	no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_
	Via
Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes StreamLab/yes/300
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75
Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments	no modular systems can change/grow with user needs
Ave. time to install sys./Who provides service and support/Hours support is available	5 days/Dade Behring/24/7
On-site biomedical engineer required/User group meets regularly	no/no
List price Individual list prices for components	contact Dade Behring representative for all pricing information
Process control software/Transportation systems	-/-
Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval	—/— —/—/—
Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting	-/-/- -/-
Instrument (analyzer) interfaces/Automated recapping	<u>-</u> /_
Distinguishing features	StreamLab is a modular system providing alternatives to different size labs
	seeking a wide range of automated solutions, from small-scale, preanalytical
	workstations to complete preanalytical processing, testing, and post-test sample management

* Ave. throughput in specimen containers per hr per device

Tabulation does not represent an endorsement by the College of American Pathologists

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Software National Processing Section (Company)		Information systems technology for your automation system	•	
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- Carrier type/Scalable system — — — — — — — — — — — — — — — — — — —	
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Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens Instrument (analyzer) interfaces Rules-based instrument interface control subsystem no — —/yes/650 16x100, 13x100, 16x75, 13x75, 10–16 mm diam., 70–110 mm yes/yes/yes ves/yes/yes no no	
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Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem no no	ht.
Rules-based instrument interface control subsystem no no	
Physical/hardware (instrument/specimen) interface sorts to any analyzer rack sorts to any analyzer rack • Hematology/Chemistry/Coagulation sorts to any analyzer rack sorts to any analyzer rack	
• Immunoassay/Urinalysis sorts to any analyzer rack	
Instruments to which your system/product is interfaced can be interfaced w/ any automation transportation track —	
Other robotic products/components to which system, product is linked — — —	
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate no no no no no no —————————————	
Automated storage and retrieval available yes yes	
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* —/yes/1,500 —/yes/800	
• Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm	ht.
Refrigeration available no Longitudinal upgrade pathway or plan to protect users' investments open, modular systems are compatible with most diagnostic open, modular systems are compatible with most diagnostic	
instruments and automation systems instruments and automation systems	
Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly 1 week/Olympus America Inc. Diagnostic Systems Group/24/7 1-2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 1-2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 no/-	24/7
List price \$250k \$350k	
Individual list prices for components • Process control software/Transportation systems n/a — ———————————————————————————————	
• Auto. centrifugation/Auto. input, accessioning n/a —	
Auto. decapping/Auto. sorting/Auto. storage & retrieval A Specimen integrity monitor/Automated eliqueting	
Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping Instrument (analyzer) interfaces/Automated recapping	
Distinguishing features • fastest throughput of its kind currently in the market • cap color recognition and sample level detection modules • manufacturer racks	
 easy-to-change configurations, from sorter/decapper to archive uninterrupted processing with access to output samples 	
* Ave. throughput in specimen containers per hr per device preparation • easy-to-change configurations, from sorter/decapper to arctive • uninterrupted processing with access to output samples • expandable configuration to fit various needs	

1			
4		Olympus America Inc.	Ortho-Clinical
	Part 7 of 11	Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-223-0125	Melissa Heard 1001 US Hwy 202, Raritan, NJ 08869 908-218-8480
	Please see accompanying article on page 33	www.olympus.com	www.ortho-clinical.com
	Name of system/First year installed	Olympus OLA4000/2001	enGen Series Automation Systems, designed and built by Lab-Interlink Inc./1996
ľ	Automation products that are available		
	 Process control software/Transportation systems Auto. centrifugation/Auto. input or accessioning 	no/no yes/yes	yes/yes yes/yes
	 Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliquoting 	yes/yes yes/yes	yes/yes yes/yes
	Instrument (analyzer) interfaces/Auto. recapping System architecture	yes/no open system	yes/yes open system
	% of staff dedicated to clinical automation system	—	n/a
	% of budget dedicated to R&D for clin. auto. technology Company's primary product category	instruments/reagents	n/a instruments/reagents
	Information systems technology for your automation system Database/Operating system/Server/User interface	Microsoft Access/Windows NT/—/touch-screen, keyboard, touch-pad	Oracle/Unix/Compaq/GUI
	Software features/functionality • Patient demographics & insurance data/Rules-based architecture	LAS SW feature, LIS requirement/LAS SW feature, LIS requirement	LAS SW feature/LAS SW feature
	Supports data retrieval/Internet connectivity Online real-time help system/QC/Stats & management reports	LAS SW feature/n/a LAS SW feature/LAS SW feature/n/a	LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/LAS SW feature
	Evaluates validity and releasability of results from automated analyzers	LAS SW feature	LIS requirement
	Specimen tracking/Priority processing/Random-access specimen movement Supports accession No. redundancy (duplicate specimen ID)	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature, LIS requirement	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature
	Supports specimen carrier and level identification Unique bar-code number per container required	LAS SW feature LIS requirement	LAS SW feature LAS SW feature
	Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
	Specimen scheduling/Instrument scheduling Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
	Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/n/a LAS SW feature/LAS SW feature	LAS SW feature/n/a LAS SW feature/LAS SW feature
-	LIS interfaces that are live/How LISs are interfaced with auto. sys.	—/—	Cerner, Misys, SCC, McKesson, Meditech, ALG, Rubicon. Triple G,
	No. of live sites installed in N. America/Outside N. America	0/2	PGP, Philips, MIPS/HL7, ASTM 26/4
	Transportation systems available	no	yes
	Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions	Ξ	current/yes/800 yes
	Types of containers device can accommodate Modular hardware/installed options/Device functions independent of track	— yes/floor mounted/yes	16x100, 13x100, 13x75, 12x75 yes/floor mounted/yes
	Required utilities/Required maintenance Carrier type/Scalable system	electricity/semiannual —/can be configured with any combination of two AU640 and/or	electricity/quarterly
	• Carrier type/Scalable system	AU2700 analyzers	single specimen container per carrier/yes
	Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/400	yes current/yes/200-500
	Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht.	16x100, 13x100, 13x75
	 For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available 	n/a yes	yes yes
	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	—/yes/— 16x100, 13x100, 16x75, 13x75	current/yes/800-1,000 16x100, 13x100, 13x75
	Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/—	yes current/yes/250-400
	Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht.	16x100, 13x100, 13x75, 12x75
	Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/—	yes current/yes/400
	Types of containers device can accommodate Specimen integrity monitor available	16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht., for any manufacturer's sample rack no	16x100, 13x100, 13x75 yes
	 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* 	-	alpha/yes/400
	Types of containers device can accommodate Automated aliquoting available	no	16x100, 13x100, 13x75 yes
	 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 		current/yes/75 primaries per hr; 225 secondaries per hr; 1:3 ratio 16x100, 13x100, 13x75
	System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes/yes	yes/yes, with aliquoter/yes, with aliquoter
	Instrument (analyzer) interfaces Rules-based instrument interface control subsystem Process control of instrument via control subsystem	yes yes	yes yes
	Physical/hardware (instrument/specimen) interface • Hematology/Chemistry/Coagulation	no/robotic arm interface/no	robotic arm interface/ptof-reference sampling/robotic arm interface
	Immunoassay/Urinalysis	robotic arm interface/robotic arm interface	ptof-reference sampling, robotic arm interface/no
	Instruments to which your system/product is interfaced Other robotic products/components to which system, product is linked	Olympus AU640, Olympus AU2700 n/a	Vitros 950 AT, 250 AT; Advia Centaur; DPC 2000; Cell Dyn 4000; Stago STA-R; Abbott Architect i2000; Olympus AU2700 experienced in facilitating development of OEM interfaces
-	Automated recapper available	no	
	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate		yes current/yes/750 16x100, 13x100, 13x75, 12x75
	Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no 	yes current/yes/—
	Types of containers device can accommodate Refrigeration available	Ξ	16x100, 13x100, 13x75, 12x75
	Neurogeration available Longitudinal upgrade pathway or plan to protect users' investments	_	yes interchangeable components throughout, common software and
	Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	1–2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 no/no	transport for all products, adherence to NCCLS, HL7, & ASTM 2 weeks/Ortho-Clinical Diagnostics & Lab-Interlink/24/7 no/no
	List price Individual list prices for components	\$500k	\$500k-\$2M, depends on configuration
	Process control software/Transportation systems	_	available upon request
	Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval	Ξ	available upon request available upon request
	Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping	Ξ	available upon request available upon request
-	Distinguishing features	complete flexible workcell automation system with output sorting	autoprocessing/most advanced software design and user benefits
	* Ave. throughput in specimen containers per hr per device	to any analyzer rack • CPU for complete sample and data management of multiple analyzers	flexibility, upgradable, versatile, open architecture stand-alone preanalytics through total lab automation
L	abulation does not represent an endorsement by the College of American Pathologists	,,,	

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Laboratory automation systems & workcells

	PVT LabSystems LLC	Roche Diagnostics
Part 8 of 11	Reto Tietz info@pvtlabsystems.com	Peter Stegger peter.stegger@roche.com
	3741 Venture Dr., Ste. 335, Duluth, GA 30096 770-232-4527	9115 Hague Rd., Indianapolis, IN 46250 317-521-4033
Please see accompanying article on page 33	www.pvtlabsystems.com	us.labsystems.roche.com
		<u> </u>
Name of system/First year installed	Aliquoting System RSD 800A/2002	Modular Pre-analytics/1997; Hitachi/1990
Automation products that are available		
Process control software/Transportation systems	yes/yes	yes/yes
Auto. centrifugation/Auto. input or accessioning Auto decoration/Auto. action/Auto actions	yes/yes	yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliquoting	yes/yes/via software yes/yes	yes/yes/no yes/yes
Instrument (analyzer) interfaces/Auto. recapping	via software/yes	ves/ves
System architecture	open system	closed system (modular systems)
% of staff dedicated to clinical automation system	100%	15 employees
% of budget dedicated to R&D for clin. auto. technology Company's primary product category	50% (of annual investment) laboratory automation systems	n/a instruments, reagents
Information systems technology for your automation system	ISAM/QNX (Linux)/—/GUI	—/Windows NT, Unix/—/—
Database/Operating system/Server/User interface	,	*
Software features/functionality		
Patient demographics & insurance data/Rules-based architecture	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
Supports data retrieval/Internet connectivity	LAS SW feature/n/a	LAS SW feature/LAS SW feature
Online real-time help system/QC/Stats & management reports	LAS SW feature/LAS SW feature	LAS SW feature/—/LAS SW feature
 Evaluates validity and releasability of results from automated analyzers Specimen tracking/Priority processing/Random-access specimen movement 	LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature LAS SW feature/LAS SW feature
Supports accession No. redundancy (duplicate specimen ID)	n/a	— Catale/LAS SW leature/LAS SW leature
• Supports specimen carrier and level identification	n/a	LAS SW feature
Unique bar-code number per container required	LAS SW feature	LAS SW feature
Specimen routing/Multistop routing (one tube to multiple workstations) Specimen schoduling/instrument schoduling	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature LAS SW feature/n/a	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/—	—/—
Storage retrieval & disposal/Supports proposed NCCLS standards	n/a/LAS SW feature	—/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner, MCS, LDS, Medat, Systek, Providens, Mips, Bayer, Molis, Omega,	Cerner v3.x, Misys v5.2 w/o Smart, Misys v5.23 w/o Smart, Misys v5.3
Lis interfaces that are live/now Liss are interfaced with auto. sys.	Misys, Vertex, Zavacore/ASTM	w/o Smart, Misys v5.2 w/o Smart, VA Vista/DHCP, Soft v2.x, Per Se, McKesson Starlab, Department of Defense (CHCS)/ASTM/Ethernet, ASTM/serial, HL7 2.4/Ethernet, HL7 2.4/serial
No. of live sites installed in N. America/Outside N. America	2 (but 5 of former version)/8 (and 70 of former version)	10/110
No. of live sites installed in N. America/outside N. America Transportation systems available	2 (but 5 of former version)/8 (and 70 of former version) no	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*		MPA system 3 or 7/yes/600
Supports automatic rerouting for reflex/repeat/dilutions	_	yes
Types of containers device can accommodate Modular hardware/installed options/Device functions independent of track	_	16x100, 13x100, 16x75, 13x75, rubber or hemoguard yes/floor mounted/no, fully integrated automation & analytics
Required utilities/Required maintenance	_ _	electricity, water (for analyzers)/weekly
Carrier type/Scalable system	_	multiple specimen container per carrier (5 positions)/yes
Automoted contributation qualified		
Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes ACM/yes/400	yes system 3 or 7/yes/250
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
• For multi-unit centrifuges, each cent. operates independently for rate and time	yes	yes, 2 can run at 500 per hr
Automated input/accessioning available	yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	input-sorter/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	system 3 or 7/yes/600 16x100, 13x100, 16x75, 13x75
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	decapping unit/yes/800	system 3 or 7/yes/400
Types of containers device can accommodate Automated sorting available	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes output sorter/yes/800	yes system 7/yes/500
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Specimen integrity monitor available	yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	QSI module/yes/800	n/a
Types of containers device can accommodate Automated aliquoting available	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes	16x100, 13x100, 16x75, 13x75 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	aliquoting unit/yes/300 primary tubes if 100% aliquot. means 600 throughput	system 7/yes/500
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes/yes	yes/yes/yes
Instrument (analyzer) interfaces		
Rules-based instrument interface control subsystem	no	_
Process control of instrument via control subsystem Physical/bardware (instrument/specimen) interface Instrument/specimen)	no	yes
Physical/hardware (instrument/specimen) interface • Hematology/Chemistry/Coagulation	no/no/no	—/no, ptof-reference sampling/—
• Immunoassay/Urinalysis	no/no	no, ptof-reference sampling/—
Instruments to which your austern (avadust is interfered		Doobs/Hitsohi Madulay Customs Oliv Obarr C Income
Instruments to which your system/product is interfaced	_	Roche/Hitachi Modular Systems Clin Chem & Immunoassay
Other robotic products/components to which system, product is linked	_	_
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes RCS module/yes/800	yes System 7/yes/500
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 (no glass tubes)	——————————————————————————————————————
··		
Automated storage and retrieval available	no	no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate		_
Refrigeration available	_	no
Longitudinal upgrade pathway or plan to protect users' investments	modules can be upgraded	customers can place modules to increase capacity & functionality
Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	2–3 weeks/PVT LabSystems LLC/8 _{AM} –5 _{PM} M–F (24/7 avail. on request) no/no	<2 weeks/Roche/24/7 no/no
on site biomedical engineer required/oser group meets regulally	110/110	110/110
List price	\$170-\$250k without Automatic Centrifuge	\$300-\$800k, depending on system configuration
Individual list prices for components	ATI 4001 /	,
Process control software/Transportation systems	\$7k-\$30k/— \$85k/included	n/a n/a
	\$85k/included	n/a n/a
Auto. centrifugation/Auto. input, accessioning	included/included/—	
	included/included/— about \$50k/included	n/a
Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval		
Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping	about \$50k/included —/\$30k	n/a n/a
 Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting 	about \$50k/included	n/a
Auto. centrifugation/Auto. input, accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping	about \$50k/included -/\$30k • one platform can be assembled with all modules for so-called all-in-	n/a n/a • fully integrated and designed to work with analytics

Tabulation does not represent an endorsement by the College of American Pathologists

Part 9 of 11		Roche Diagnostics Peter Stegger peter.stegger@roche.com 9115 Hague Rd., Indianapolis, IN 46250	Sysmex Corp. or America Tammy Kutz mktcom@sysmex.com Gilmer Road, 6699 RFD
Please see accompanying article on page 33		317-521-4033 us.labsystems.roche.com	Long Grove, IL 60047 847-726-3500 www.sysmex.com
Name of system/First year installed		PSD 1/1997; VS II/1999	Sysmex Systemization—HST, CST/1990
Automation products that are available • Process control software/Transportation systems		yes/no	yes/yes
Auto. centrifugation/Auto. input or accessioning Auto. decapping/Auto. sorting/Auto. storage and retrice Specimen integrity monitor/Auto. aliquoting	eval	no/yes PSD 1 (yes), VS II (no)/yes/no PSD 1 (no), VS II (yes)/PSD 1 (no), VS II (yes)	no/yes no/yes/yes yes/no
Instrument (analyzer) interfaces/Auto. recapping System architecture		no/no open system	yes/no closed system
% of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology		15 employees n/a	25% —
Company ¹ s primary product category Information systems technology for your automation sy		instruments, reagents	lab automation systems, instruments, information systems
Database/Operating system/Server/User interface Software features/functionality		—/Windows NT, Unix/—/—	Sybase/Windows 98, NT, Unix/—/—
Patient demographics & insurance data/Rules-based a Supports data retrieval/Internet connectivity	architecture	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
Online real-time help system/QC/Stats & management Evaluates validity and releasability of results from aut		LAS SW feature/n/a/LAS SW feature n/a	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature
Specimen tracking/Priority processing/Random-acces Supports accession No. redundancy (duplicate speciments)	s specimen movement	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature	LAS SW feature/LAS SW feature/n/a n/a
Supports specimen carrier and level identification Unique bar-code number per container required Casainan required	mla susukatatan	LAS SW feature n/a	LAS SW feature LAS SW feature
Specimen routing/Multistop routing (one tube to multi Specimen scheduling/Instrument scheduling Routes test to workstation/Automatic reflex, repeat, descriptions.)		LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/n/a	LAS SW feature/n/a n/a/n/a LAS SW feature/LAS SW feature
Noutes test to workstation/Automatic renex, repeat, d Supports multiple hardware config./Supports other pr Storage retrieval & disposal/Supports proposed NCCL:	oprietary transport. hardware		LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with		Cerner v3.x, Misys 5.2 w/o SMART, Misys v5.23 w/o SMART, Misys v5.3 w/o SMART, Misys v5.3 w/o SMART, Misys v5.3 w/SMART, Soft v1.x, Soft v2.x, Per Se, Antrim (Common Cents), McKesson Starlab, McKesson AdVantage, Homegrown	Cerner, Misys, SCC, McKesson, Triple G, Antrim/ASTM, TCP IP
		Systems, TopLab, Omnitech, ASTM/ Ethernet, ASTM/serial, HL7 2.4/Ethernet, HL7 2.1/Ethernet, HL7 2.4/serial	
No. of live sites installed in N. America/Outside N. Americ Transportation systems available		PSD 1 45/85; VS II 25/55 no	180/700 yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. thru Supports automatic rerouting for reflex/repeat/dilutions Types of containers device an accommodate.		— — 16v100 12v100 16v75 12v75 hamaguard rubbar caray can	—/yes/config. dependent; max. 600 samples per hr yes
Types of containers device can accommodate Modular hardware/Installed options/Device functions ir Required utilities/Required maintenance	dependent of track	16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap —/—/— compressed air, electricity/weekly	16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes electricity/daily, weekly, monthly for analyzers; quarterly, annually for auto.
Carrier type/Scalable system		multiple specimen container per carrier (5 positions)/yes	multiple specimen container per carrier/yes
Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. the	roughput*	no 	no
Types of containers device can accommodate For multi-unit centrifuges, each cent. operates indepen Automated input/accessioning available	dently for rate and time	— yes	— — yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. th Types of containers device can accommodate	roughput*	PSD 1/yes/900–1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap	1.08/yes/150 per device per hr x 4 13x100, 13x75
Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. the	roughput*	yes PSD 1/yes/900–1,200 16/100 13/100 16/75 13/75 hamazuard withou carey can	no —
Types of containers device can accommodate Automated sorting available Version/Conforms to NCCLS Standards Auto 1-5/Ave. th	roughput*	16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap yes PSD 1/yes/900–1,200; VS II/yes/340 with 1 aliquot per primary tube	
Types of containers device can accommodate Specimen integrity monitor available		16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap VS II/yes	 no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. th Types of containers device can accommodate	roughput*	n/a 16x100, 13x100, 16x75, 13x75	_ _
Automated aliquoting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. th	roughput*	yes VS II/yes/340 with 1 aliquot per primary tube	no —
Types of containers device can accommodate System inspects samples for bar code/Reports clots/Re	ports QNS specimens	16x100, 13x100, 16x75, 13x75 yes/yes	_
Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem		no	yes
Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface		no	yes
Hematology/Chemistry/Coagulation Immunoassay/Urinalysis		no/no/no no/no	ptof-reference sampling/—/ptof-reference sampling —/—
Instruments to which your system/product is interfaced Other robotic products/components to which system, pro	duct is linked	none none	Sysmex XE-2100, SE-9500, R-3500, SP-100, CA-1500, & CA-6000 none
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. th	roughput*	no	no
Types of containers device can accommodate Automated storage and retrieval available		yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. th Types of containers device can accommodate Refrigeration available		PSD 1/yes/1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap no (uses a special archive rack)	PCDPS 1.08/yes/150 per device per hr x 4 13x100, 13x75 no
Longitudinal upgrade pathway or plan to protect users' in Ave. time to install sys./Who provides service and support On-site biomedical engineer required/User group meets re	t/Hours support is available	can be easily configured to meet changing workloads & demands 3 days to 1 week/Roche/24/7 no/no	all upgrades for Sysmex hematology & coagulation analyzers were com- patible with the automation and PC-DPS 1 week/Roche Diagnostics/24/7 no/yes
List price Individual list prices for components		PSD 1: \$175k; VS II: \$200k	depends on system configuration
Process control software/Transportation systems Auto. centrifugation/Auto. input, accessioning		_ _	_
Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping		_ 	=
Instrument (analyzer) interfaces/Automated recapping Distinguishing features		PSD 1: stand-alone archiving; low-cost, easy implementation; sorting, decapping, exceptional handling, archiving; VS II: archiving, aliquoting and sorting; fast, easy setup and install.; exceptional notification & separation	able to take collected data and turn into usable information proven implementation within 90 days of receiving purchase order, on-site implementation is successfully completed in one week
* Ave. throughput in specimen containers per hr per det		• task targeted automation	provided islands of automation in coag and hematology for 10+ years

Laboratory automation systems & workcells

	-	
	Sysmex Corp. or America	Tecan
Part 10 of 11	Tammy Kutz mktcom@sysmex.com	Donna Crook donna.crook@tecan.com
	Gilmer Road, 6699 RFD	Research Triangle Park, NC
	Long Grove, IL 60047	800-352-5128
Please see accompanying article on page 33	847-726-3500 www.sysmex.com	www.tecan.com
Trouble does decempanying article on page de	611 120 0000 11111.0joiniox.com	TTTTT.COURTOUR
Name of system/First year installed	XE-Alpha N Hematology Transport System/2000	FE 500/2000
Humo of System/r not your motuned	AL Alpha it Homatology Transport Gyotom/2000	1 2 000/2000
Automation products that are available		
		vaeluee
Process control software/Transportation systems	—/—	yes/yes
Auto. centrifugation/Auto. input or accessioning	-/-	yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval	—/yes/yes	yes/yes/in development
Specimen integrity monitor/Auto. aliquoting	_/ _	yes/yes
Instrument (analyzer) interfaces/Auto. recapping	yes/—	no/in development
System architecture	closed system	open system
% of staff dedicated to clinical automation system	25%	50%
% of budget dedicated to R&D for clin. auto. technology		15%
Company's primary product category	lab automation systems, instruments, reagents, information systems,	lab automation systems
Company o primary product outogory	hematology, coagulation, urinalysis, IT	iab automation dystoms
Information quaterns technology for your outernation system	ilematology, coagulation, urmalysis, m	
Information systems technology for your automation system	Cubasa (Mindaura 00, NT/Mindaura 00 NT/Mindaura	Cubaca COL Amuruhaya (Mindayya NT/ /dumamia dayyalaad baak ayyan
Database/Operating system/Server/User interface	Sybase/Windows 98, NT/Windows 98 NT/Windows	Sybase SQL Anywhere/Windows NT/—/dynamic download, host query
Software features/functionality		
Patient demographics & insurance data/Rules-based architecture	LAS SW feature/LAS SW feature	n/a/LAS SW feature
Supports data retrieval/Internet connectivity	LAS SW feature/LAS SW feature	LAS SW feature/n/a
Online real-time help system/QC/Stats & management reports	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/n/a/n/a
Evaluates validity and releasability of results from automated analyzers	LAS SW feature	n/a
Specimen tracking/Priority processing/Random-access specimen movement	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
Supports accession No. redundancy (duplicate specimen ID)	n/a	LAS SW feature/LAS SW feature/LAS SW feature
Supports accession No. redundancy (duplicate specimen lb) Supports specimen carrier and level identification	LAS SW feature	
		n/a
Unique bar-code number per container required	LAS SW feature	n/a
Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling	n/a/n/a	n/a/n/a
Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/n/a
 Supports multiple hardware config./Supports other proprietary transport. hardware 		LAS SW feature/n/a
Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/—	LAS SW feature/—
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner, Misys, SCC, McKesson, Triple G, Antrim/ASTM, TCP IP	Misys, SCC, Cerner, Citation, McKesson, Triple G, Molis/ASTM
	, , , , , , , , , , , , , , , , , , , ,	, , ,
No. of live sites installed in N. America/Outside N. America	>20/>200	34/32
Transportation systems available	yes	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/>100	
		conveyor/—/—
Supports automatic rerouting for reflex/repeat/dilutions	no no	
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75
Modular hardware/Installed options/Device functions independent of track	yes/—/no	_/_/ _
Required utilities/Required maintenance	—/—	compressed air, electricity/—
Carrier type/Scalable system	multiple specimen container per carrier/yes (to HST-N multiple versions)	single specimen container per carrier/—
Automated centrifugation available	no e	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	—/—/300 @ 10-min spin time
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75
For multi-unit centrifuges, each cent. operates independently for rate and time	_	_
Automated input/accessioning available	no	VAC
	110	yes / /500
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	—/—/500
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard
Automated decapping available	no no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	—/—/500
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75
Automated sorting available	no no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	—/—/500
Types of containers device can accommodate	_	16x100, 13x100, 16x75, 13x75, any manufacturer's rack
Specimen integrity monitor available	no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	_
Types of containers device can accommodate	_	level sensing & clot detection
Automated aliquoting available	no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_	—/—/—
Types of containers device can accommodate	_	
		13x75 prepackaged secondary tubes
System inspects samples for bar code/Reports clots/Reports QNS specimens	_	yes/yes/yes
Incharge and (analysis) indeeds are		
Instrument (analyzer) interfaces		
Rules-based instrument interface control subsystem	yes	_
Process control of instrument via control subsystem	_	_
Physical/hardware (instrument/specimen) interface		
Hematology/Chemistry/Coagulation	ptof-reference sampling/no/no	—/—/—
• Immunoassay/Urinalysis	no/no	-/-
	A	
Instruments to which your system/product is interfaced	Sysmex XE-2100, XE-2100L	contact vendor
Other robotic products/components to which system, product is linked	work area manager (WAM)	_
Automated recapper available	no	in development
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_/_/ _	_
Types of containers device can accommodate	_	_
Automated storage and retrieval available	no	in development
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/—	_
Types of containers device can accommodate	_	_
Refrigeration available	no	
Longitudinal upgrade pathway or plan to protect users' investments	upgrade to HST-N island of automation	contact vendor
Ave. time to install sys./Who provides service and support/Hours support is available	- / -	6 weeks/Tecan-based service and support/24/7
On-site biomedical engineer required/User group meets regularly	no/yes	no/—
List price	\$360k	\$450k
Individual list prices for components		
Process control software/Transportation systems	_	_
Auto. centrifugation/Auto. input, accessioning	_	_
Auto. decapping/Auto. sorting/Auto. storage & retrieval	_	_
Specimen integrity monitor/Automated aliquoting	_	_
Specimen integrity momon/Automated anduoting Instrument (analyzer) interfaces/Automated recapping	_	_
moramoni (analyzor) interiaces/Automateu recapping		
Distinguishing features	• ungradability	flexibility footnrint completely configurable
Distinguishing features	upgradability fluorescence flow cytometry	flexibility, footprint, completely configurable
	muorescence now cytometry work area manager	
* Ave. throughput in specimen containers per hr per device		

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Laboratory automation systems & workcells

-	
	TI 51 1 0
Daylet of the	Thermo Electron Corp. Klas Vuorinen klas.vuorinen@thermoclinical.com
Part 11 of 11	Ratastie 2, P.O. Box 100 FIN 01621
	Vantaa, Finland
	+358 9 802 766
Please see accompanying article on page 33	www.thermo.com
Name of system/First year installed	Thermo Clinical Automation/2000
,	
Automation products that are available	,
Process control software/Transportation systems Auto. centrifugation/Auto. input or accessioning	yes/yes yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes
Specimen integrity monitor/Auto. aliquoting	no/yes
Instrument (analyzer) interfaces/Auto. recapping	yes/no
System architecture % of staff dedicated to clinical automation system	open system
% of budget dedicated to R&D for clin. auto. technology	_
Company's primary product category	lab automation systems and instruments/reagents
Information systems technology for your automation system	object database/Windows NT/—/GUI
Database/Operating system/Server/User interface	
Software features/functionality	
Patient demographics & insurance data/Rules-based architecture	LIS requirement/—
Supports data retrieval/Internet connectivity Online real-time help system/QC/Stats & management reports	LIS requirement/— n/a/—/—
Evaluates validity and releasability of results from automated analyzers	LIS requirement
Specimen tracking/Priority processing/Random-access specimen movement	LAS SW feature/LAS SW feature
Supports accession No. redundancy (duplicate specimen ID) Supports accession	LIS requirement
Supports specimen carrier and level identification Unique bar-code number per container required	LAS SW feature LAS SW feature
Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling	LAS SW feature/LAS SW feature
Routes test to workstation/Automatic reflex, repeat, dilutions Supports multiple hardware config /Supports other proprietary transport, hardware	LAS SW feature/LIS requirement LAS SW feature/—
Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/— LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	<i>-</i> /-
No. of live sites installed in N. America/Outside N. America	0/11
Transportation systems available	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions	—/yes/500
Supports automatic rerouting for reflex/repear/undulons Types of containers device can accommodate	yes 16x100, 13x100, 16x75, 13x75, 11–16.8 mm diam., 110 mm ht.
Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/—
Required utilities/Required maintenance	compressed air, electricity/—
Carrier type/Scalable system	single specimen container per carrier/yes
Automated centrifugation available	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	n/a/yes/400
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.
For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available	yes yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/500
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11-16.8 mm in diam., 110 mm ht.
Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/500
Types of containers device can accommodate	—/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.
Automated sorting available	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/500
Types of containers device can accommodate Specimen integrity monitor available	16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	_
Types of containers device can accommodate	_
Automated aliquoting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes
Types of containers device can accommodate	—/yes/240 secondary tubes 16x100, 13x100, 16x75, 13x75, 11-16.8 mm in diam., 110 mm ht.
System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes
Instrument (analyzer) interfaces	
Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem	_
Process control of instrument via control subsystem	_
Physical/hardware (instrument/specimen) interface	and and and an annual second s
Hematology/Chemistry/Coagulation	ptof-reference sampling/ptof-reference-sampling & robotic arm interface/ ptof-reference sampling
Immunoassay/Urinalysis	ptof-reference sampling ptof-reference sampling/ptof-reference-sampling
Instruments to which your system/product is interfaced	Roche Modular, Konelab, Bayer Advia 1650, Abbott Architect
Other robotic products/components to which system, product is linked	_
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no —/—/—
Types of containers device can accommodate	
Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/500
Version/Conforms to NGCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	—/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.
Refrigeration available	no
Longitudinal upgrade pathway or plan to protect users' investments	1. 2 weeks/local distributes/danands on cover-
Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	1–2 weeks/local distributor/depends on agreement no/no
List price	_
Individual list prices for components • Process control software/Transportation systems	_
Auto. centrifugation/Auto. input, accessioning	_
Auto. decapping/Auto. sorting/Auto. storage & retrieval	_
Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping	_
- monument (analyzer) interfaces/Automateu recapping	
Distinguishing features	modularity—the system can be extended to meet customer needs; both workcell
	and preanalytical part can be upgraded and linked as needed
	multitube carrier with programmable chip open—can be linked to a variety of different analyzers
	,

* Ave. throughput in specimen containers per hr per device

Tabulation does not represent an endorsement by the College of American Pathologists