Laboratory automation systems & workcells

Part 1 of 10 *Please see accompanying article on page 22*	Abbott Laboratories Diagnostics Division Suzanne Macaitis suzanne.macaitis@abbott.com 100 Abbott Park Rd., D9JE AP6C-4 Abbott Park, IL 60064-3500 847-936-3323 www.abbottdiagnostics.com	Abbott Laboratories Diagnostics Division Suzanne Macaitis suzanne.macaitis@abbott.com 100 Abbott Park Rd., D9JE AP6C-4 Abbott Park, IL 60064-3500 847-936-3323 www.abbottdiagnostics.com
Name of system/First year installed	**FE 500/2000 (See also Tecan listing, part 10)**	**Inpeco Automation Series/in development**
Automation products that are available		
• Process control software/Transportation systems	no/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/in development	yes/yes/yes
• Specimen integrity monitor/Auto. aliquoting	yes/yes	no/yes
• Instrument (analyzer) interfaces/Auto. recapping	no/no	yes/yes
System architecture	open system	open system
% of staff dedicated to clinical automation system	50%	—
% of budget dedicated to R&D for clin. auto. technology	15%	—
Company's primary product category	lab automation systems	instruments/reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	Sybase SQL Anywhere/Windows NT/—/dynamic download, host query	proprietary: Oracle (Middleware)/Windows NT/—/Touchscreen
Software features/functionality		
• Patient demographics & insurance data/Rules-based architecture	n/a/LAS SW feature	LIS requirement/LAS SW feature
• Supports data retrieval/Internet connectivity	LAS SW feature/n/a	LAS SW feature/functionality via Middleware
• Online real-time help system/QC/Stats & management reports	LAS SW feature/n/a/n/a	LAS SW feature/functionality via Middleware/functionality via Middleware
• Evaluates validity and releasability of results from automated analyzers	n/a	functionality via Middleware
• 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)	LAS SW feature	n/a
• Supports specimen carrier and level identification	n/a	LAS SW feature
• Unique bar-code number per container required	n/a	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	n/a/n/a	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/functionality via Middleware
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/n/a
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/—	LAS SW feature/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Cerner, Cerner Millennium, Misys, SCC, Citation, McKesson, Triple G, Molis, Per Se, Meditech, Medisolution/ASTM, HL7	—
No. of live sites installed in N. America/Outside N. America	40/62	—/2
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	conveyor/—/—	—/yes/300
• Supports automatic rerouting for reflex/repeat/dilutions	—	yes
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles multiple tube sizes concurrently
• Modular hardware/Installed options/Device functions independent of track	—/—/—	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/—	compressed air, electricity/quarterly
• Carrier type/Scalable system	single specimen container per carrier/—	single specimen container per carrier/modular components are fully scalable and can be upgraded in client's facility
Automated centrifugation available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/300 @ 10–min spin time	—/yes/320
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles multiple tube sizes concurrently
• For multi-unit centrifuges, each cent. operates independently for rate and time	—	yes
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/300 input, 300 output
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard	16x100, 13x100, 16x75, 13x75, handles multiple tube sizes concurrently
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/600
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, screw top or stoppers, handles mult-sizes concurrently
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, any manufacturer's rack	16x100, 13x100, 16x75, 13x75, handles multiple tube sizes concurrently
Specimen integrity monitor available	yes	yes (via analyzers)
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	— (HIL analysis & clot detection)/yes/—
• Types of containers device can accommodate	level sensing & clot detection	16x100, 13x100, 16x75, 13x75
Automated aliquoting available	yes	in development
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/—	—/—/—
• Types of containers device can accommodate	13x75 prepackaged secondary tubes	16x100, 13x100, 16x75, 13x75
• System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes/yes	yes/—/yes, via sample weighting
Instrument (analyzer) interfaces		
• Rules-based instrument interface control subsystem	—	yes
• Process control of instrument via control subsystem	—	yes
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	—/—/—	robotic arm interface/point-of-reference sampling/depends on alayzer
• Immunoassay/Urinalysis	—/—	point-of-reference sampling/depends on analyzer
Instruments to which your system/product is interfaced	contact vendor	can be customized to client's needs—immunoassay, chemistry, hematology, coag, UA and other Esoteric analyzers
Other robotic products/components to which system, product is linked	—	can be customized to client's needs
Automated recapper available	no	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/yes/300
• Types of containers device can accommodate	—	plastic, multiple tube sizes
Automated storage and retrieval available	in development	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/yes/300 (maximum: 20,000 tube capacity)
• Types of containers device can accommodate	—	16x100, 13x100, 16x75, 13x75
• Refrigeration available	—	yes
Longitudinal upgrade pathway or plan to protect users' investments	contact vendor	modular, scalable open architecture; can grow and be upgraded
Ave. time to install sys./Who provides service and support/Hours support is available	6 weeks/Tecan and authorized service providers/24/7	depends on configuration/Abbott/24/7
On-site biomedical engineer required/User group meets regularly	no/—	no/first meeting to be held in 2005
List price	$450k	varies by module
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	—	—
Distinguishing features	• flexibility, footprint, completely configurable	• highly flexible—open, scalable architecture, mult-tube type adapts to client's unique workflow, stat prioritization, space efficient • advanced SW enables real-time rules-based repeat/rerun testing • auto tube release—advanced technologies minimize TAT, cost & improve efficiency

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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

SYSTEM REVIEW SERIES

Laboratory automation systems & workcells

Part 2 of 10

Please see accompanying article on page 22

	AI Scientific Pty. Ltd. **David Halstead** david.halstead@aiscientific.com **10 Hornibrook Esp.** **Clontarf, Qld 4019 Australia** **+61 7 3105 5011** www.aiscientific.com	**A&T Corp.** **Akira Igarashi** igarashi@alice.aandt.co.jp **1799 Old Bayshore Hwy., Ste. 168** **Burlingame, CA 94010-1319** **650-346-6543** www.aandt.co.jp
Name of system/First year installed	**PathFinder/1998**	**CLINILOG/1993**
Automation products that are available		
• Process control software/Transportation systems	yes/no	yes/yes
• Auto. centrifugation/Auto. input or accessioning	in development/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes	yes/yes/yes
• Specimen integrity monitor/Auto. aliquoting	in development/yes	no/yes
• Instrument (analyzer) interfaces/Auto. recapping	no/yes	yes/no
System architecture	open system	open system
% of staff dedicated to clinical automation system	n/a	10%
% of budget dedicated to R&D for clin. auto. technology	15%	10%
Company's primary product category	laboratory automation systems	laboratory automation systems, instruments and reagents, information sys.
Information systems technology for your automation system Database/Operating system/Server/User interface	Paradox, Microsoft SQL server/Windows 95, 98, 2000, NT4/Windows 2000 Server, NT4 Workstation/Borland C++, Borland Delphi	SQL/Windows 2000 server/Intel-based Enterprise Server/GIII, A&T proprietary
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/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	LIS requirement	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)	LAS SW feature	LAS SW feature
• Supports specimen carrier and level identification	LAS SW feature	LAS SW feature
• Unique bar-code number per container required	n/a	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	n/a/n/a	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/—	LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/LAS SW feature
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Kestral, Triple G, Detente, Denoema, Olivetti, QuadraMed, Bayer/ASTM, 1394	A&T, Triple G/ASTM, HL7
No. of live sites installed in N. America/Outside N. America	—/45	0/70
Transportation systems available	no	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	—	3.0/yes/300
• Supports automatic rerouting for reflex/repeat/dilutions	—	yes
• Types of containers device can accommodate	—	16x100, 13x100, 16x75, 13x75
• Modular hardware/Installed options/Device functions independent of track	—	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/network connection	electricity/quarterly
• Carrier type/Scalable system	—	single specimen container per carrier/yes (modular base, flexible design)
Automated centrifugation available	in development	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/—/550 tubes	—/yes/250
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75, 16x108	16x100, 13x100, 16x75, 13x75
• For multi-unit centrifuges, each cent. operates independently for rate and time	—	yes
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/yes/500	—/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 16x108, 13x75, screw cap, rubber stopper	16x100, 13x100, 16x75, 13x75
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/—/500	—/yes/330
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75, 16x108	16x100, 13x100, 16x75, 13x75
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/yes/500 tubes	—/yes/330
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75, 16x108, any vendor's rack	16x100, 13x100, 16x75, 13x75
Specimen integrity monitor available	in development	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	level sensing & clot detection	—
Automated aliquoting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/—/500	—/yes/250
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, aliquot can be 12x75 or 16x100	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	yes
• Process control of instrument via control subsystem	no	yes
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	—/—/—	pt.-of-reference sampling/pt.-of-reference sampling/pt.-of-reference sampling
• Immunoassay/Urinalysis	—/—	pt.-of-reference sampling/pt.-of-reference sampling
Instruments to which your system/product is interfaced	n/a, interfaces LIS only	Bayer Advia 1650, Centaur; Abbott Aeroset, i2000; Tosoh AIA 1800
Other robotic products/components to which system, product is linked	—	—
Automated recapper available	yes	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	Mk2/yes/500	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	—
Automated storage and retrieval available	no	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/yes/300
• Types of containers device can accommodate	—	16x100, 13x100, 16x75, 13x75
• Refrigeration available	samples placed in storage racks can be refrig.—manual remo. & storage	no
Longitudinal upgrade pathway or plan to protect users' investments	—	scalable modular automation can be designed from front-end workcell until full-scale TLA format; step-wise construction or upgrade by LAN-like IT solution
Ave. time to install sys./Who provides service and support/Hours support is available	4 weeks/AI Scientific and authorized service providers/24/7	1 week/A&T or designated service engineer/depends on contract
On-site biomedical engineer required/User group meets regularly	no/no	no/no
List price	—	varies by configuration
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	—	—/—
Distinguishing features	• patented camera-based "correct specimen container" recognition • delivers capped or uncapped daughter tubes in two sizes • large automated sorting table accepts up to 30 destinations • does not require conductive tips	• open modular automation • high-speed single tube transportation • LAN-like information technology realizes single connection to LIS and flexible upgrade

† Renamed Clinical and Laboratory Standards Institute in 2004
** Ave. throughput in specimen containers per hr per device*

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Laboratory automation systems & workcells

Part 3 of 10 *Please see accompanying article on page 22*	Bayer Diagnostics Michele Zwickl michele.zwickl.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6008 bayerdiag.com and labnews.com	Bayer Diagnostics Michele Zwickl michele.zwickl.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6008 bayerdiag.com and labnews.com
Name of system/First year installed	**Advia LabCell/1998**	**Advia WorkCell (chemistry & immunoassay instruments)/2000**
Automation products that are available		
• Process control software/Transportation systems	yes/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes/yes	no/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes (storage & mapping)	no/yes/yes (storage & mapping)
• Specimen integrity monitor/Auto. aliquoting	no/no	no/no
• Instrument (analyzer) interfaces/Auto. recapping	yes/no	yes/no
System architecture	open system	closed system
% of staff dedicated to clinical automation system	8%	8%
% of budget dedicated to R&D for clin. auto. technology	8%	8%
Company's primary product category	laboratory solutions	laboratory solutions
Information systems technology for your automation system Database/Operating system/Server/User interface	SQL & Progress/Windows NT/Windows 2000/Bayer-user interface (proprietary)	SQL & Progress/Windows NT/Windows 2000/Bayer-user interface (proprietary)
Software features/functionality		
• Patient demographics & insurance data/Rules-based architecture	LIS requirement/LAS SW feature	LIS requirement/LAS SW feature
• Supports data retrieval/Internet connectivity	LAS SW feature/LIS requirement	LAS SW feature/LIS requirement
• Online real-time help system/QC/Stats & management reports	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	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	via error management
• Supports specimen carrier and level identification	LAS SW feature	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)	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 (load balancing)
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/—	LAS SW feature/—
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature (database mgmt)/—	LAS SW feature (database mgmt)/—
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	SCL 2000, Misys, Labzis II, LMX, NetLab, Telepath-iSoft, OSI, others/ASTM	Cerner PathNet & Millennium & Citation, Misys, Antrim, Siemens, Meditech, NetLab, Data Innovations, SCC Softlab, Per Se, others/ASTM
No. of live sites installed in N. America/Outside N. America	10/28	75/43
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	—/no/2,000	—/no/2,000
• Supports automatic rerouting for reflex/repeat/dilutions	yes	yes
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/weekly, monthly, quarterly, annually	compressed air, electricity/weekly, monthly, quarterly, annually
• Carrier type/Scalable system	single specimen container per carrier/yes	single specimen container per carrier/yes
Automated centrifugation available	yes	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/240	—
• Types of containers device can accommodate	11.5–16.2 mm (diam) & 75–100 mm (ht.)	—
• For multi-unit centrifuges, each cent. operates independently for rate and time	yes	—
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/no/600	—/no/600
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)
Automated decapping available	yes	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/240	—
• Types of containers device can accommodate	11.5–16.2 mm (diam) & 75–100 mm (ht.); cap, plug, screw top	—
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/no/600	—/no/600
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)
Specimen integrity monitor available	within each instrument	within each instrument
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated aliquoting available	no	no
• 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	yes	yes
• Process control of instrument via control subsystem	no (high level only)	no (high level only)
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	robotic arm interface/pt.-of-reference sampling/robotic arm interface	n/a/pt.-of-reference sampling/n/a
• Immunoassay/Urinalysis	pt.-of-reference sampling & robotic arm interface (both avail.)/ pt.-of-reference sampling	pt.-of-reference sampling/n/a
Instruments to which your system/product is interfaced	Bayer: Advia 120, 1650, 2120, 2400, & Centaur; Clinitek Atlas, Immuno1, Stago STA-R	Bayer: Advia 1650, 2400, & Centaur
Other robotic products/components to which system, product is linked	none	none
Automated recapper available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated storage and retrieval available	software tracking retrieval	software tracking retrieval
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
• Refrigeration available	no	no
Longitudinal upgrade pathway or plan to protect users' investments	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	future chemistry & immunochem. systems from Bayer will be compatible; can be upgraded to LabCell
Ave. time to install sys./Who provides service and support/Hours support is available	1 month/Bayer Diagnostics/24/7	2 weeks/Bayer Diagnostics/24/7
On-site biomedical engineer required/User group meets regularly	no/yes	no/yes
List price	varies by configuration	varies by configuration
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	—/—	—/—
Distinguishing features	• 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	• instruments can operate separately from track for backup • pre- and postanalytical sorting capability • single-tube carrier vs. rack carrier • upgradability allows customers to grow into a larger system or Advia LabCell • single LIS connection for system & instruments

† *Renamed Clinical and Laboratory Standards Institute in 2004*
* *Ave. throughput in specimen containers per hr per device*

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Laboratory automation systems & workcells

Part 4 of 10 *Please see accompanying article on page 22*	Beckman Coulter Ron Berman rberman@beckman.com 200 S. Kraemer Blvd., Brea, CA 92821 714-993-8817 www.beckmancoulter.com	Dade Behring Inc. Ken Koziak Glasgow Business Community, P.O. Box 6101, Newark, DE 19714-6101 302-631-9440 www.dadebehring.com
Name of system/First year installed	Power Processor/1994	StreamLab Analytical Workcell/2002
Automation products that are available		
• Process control software/Transportation systems	yes/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes	yes/yes/yes
• Specimen integrity monitor/Auto. aliquoting	yes (available in analyzer)/yes	yes/yes
• Instrument (analyzer) interfaces/Auto. recapping	yes/yes	yes/in development
System architecture	open system	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	lab automation systems and instruments/reagents	instruments and reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	SQL/Windows NT/client server/Windows	proprietary file system/Windows NT/n/a/Labview touchscreen guide
Software features/functionality		
• Patient demographics & insurance data/Rules-based architecture	LAS SW feature, LIS requirement/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature
• Supports data retrieval/Internet connectivity	LAS SW feature/LAS SW feature	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/LAS SW feature/n/a
• Evaluates validity and releasability of results from automated analyzers	LAS SW feature	LIS requirement
• 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	n/a
• Supports specimen carrier and level identification	LAS SW feature	LAS SW feature
• Unique bar-code number per container required	LAS SW feature	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	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/n/a
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Vista, Per Se, Siemens, Cerner, FlexLab, McKesson, Meditech, Misys, others/direct LIS, Power Processor, HL7	Cerner, Meditech, SCC, Horus, Misys, SwissLab, Medicom, Izasa, Confidentia, Saudi Bus. Machines, others/DBASTM, Dimension Protocol, HL7, ASTM
No. of live sites installed in N. America/Outside N. America	225/100	17/15
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	3/yes/900	StreamLab/yes/300
• Supports automatic rerouting for reflex/repeat/dilutions	yes	yes
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/monthly	compressed air, electricity/weekly
• Carrier type/Scalable system	single specimen container per carrier/yes	single specimen container per carrier/yes
Automated centrifugation available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/300–450	StreamLab/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
• For multi-unit centrifuges, each cent. operates independently for rate and time	yes	yes
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/900	StreamLab/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/600	StreamLab/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/500	StreamLab/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously
Specimen integrity monitor available	yes	yes, clot detection & sample level sensing, HIL check
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/90	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	—
Automated aliquoting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/450	Dimension sample transfer module/yes/480 (4 analyzers)
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	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	yes	yes
• Process control of instrument via control subsystem	yes	yes
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	pt.-of-ref. sampling & robotic arm interf./pt.-of-ref. sampling & robotic arm interf./pt.-of-ref. sampling & robotic arm interf.	in development for Sysmex CA-7000
• Immunoassay/Urinalysis	pt.-of-ref. sampl. & robot. arm interf./pt.-of-ref. sampl. & robot. arm interf.	DPC Immulite 2000 & 2500
Instruments to which your system/product is interfaced	Abbott Architect, AxSym; Bayer Centaur, Atlas; Beckman Coulter: LX20, DXI 800, LH 750; Ortho: Vitros 950, 250 Eci; Roche Modular; Stago Star; Sysmex CA-6000, VA 2000	Dade Behring Dimension RxL Max Integrated Chemistry System, DPC Immulite 2000 & 2500
Other robotic products/components to which system, product is linked	—	—
Automated recapper available	yes	in development
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/500	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	—
Automated storage and retrieval available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	3/yes/—	StreamLab/yes/300
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75
• Refrigeration available	yes	no
Longitudinal upgrade pathway or plan to protect users' investments	all systems may be upgraded (software & hardware) due to modular design (HW) and new software versions	modular systems can change/grow with user needs
Ave. time to install sys./Who provides service and support/Hours support is available	7–30 days/Beckman Coulter (worldwide)/24/7	5 days/Dade Behring/24/7
On-site biomedical engineer required/User group meets regularly	no/yes	no/yes
List price	depends on configuration—contact vendor	contact Dade Behring representative for all pricing information
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	—/—	—/—
Distinguishing features	• refrigerated storage with recapping & auto rerun • totally open system—connects to any manufacturer's analyzers • intelligent aliquoting—measures serum volume and transfers based on poriority, dead volume, and requested test volume	• analytical workcell links to multiple Dimension RxL systems via single operater interface for multi-tasking and workload management • automated pre- and post-analytical functions • intelligent software routes samples to optimize throughput and TAT • space efficient and open architecture can be customized

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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

Laboratory automation systems & workcells

Part 5 of 10 *Please see accompanying article on page 22*	MDS Laboratory Services Gary Hall ghall@mdsintl.com 100 International Blvd., Toronto, Ontario M9W 6J6 Canada 416-675-6777 www.mdsdx.com	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com 2 Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com
Name of system/First year installed	AutoLab System/1994	Olympus OLA2500 High Speed Sorter/2004
Automation products that are available		
• Process control software/Transportation systems	yes/yes	no/no
• Auto. centrifugation/Auto. input or accessioning	no/yes	no/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes (software only)	yes/yes/yes
• Specimen integrity monitor/Auto. aliquoting	no/no	in development/no
• Instrument (analyzer) interfaces/Auto. recapping	yes/yes	yes/in development
System architecture	open system	open system
% of staff dedicated to clinical automation system	n/a	—
% of budget dedicated to R&D for clin. auto. technology	n/a	—
Company's primary product category	health & life sciences	instruments/reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	MS SQL server, relational/Windows 2000 server & workstation/Intel-based Enterprise servers/graphical Windows based	Microsoft Access/Windows NT/—/touch-screen, keyboard, touchpad
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/LAS SW feature
• Online real-time help system/QC/Stats & management reports	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LIS requirement/n/a
• Evaluates validity and releasability of results from automated analyzers	LAS SW feature	LIS requirement
• 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
• Supports specimen carrier and level identification	LAS SW feature	LAS SW feature
• Unique bar-code number per container required	LAS SW feature	no
• Specimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature	LAS SW feature/LIS requirement
• Specimen scheduling/Instrument scheduling	n/a/n/a	LAS SW feature/LIS requirement
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature	LAS SW feature/n/a
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/n/a
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/partially	LAS SW feature/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Meditech, Triple G, LabGem, Cerner, intRlab/HL7	Cerner, Misys, Modulus, Data Innovations/Olympus interface format; conforms to ASTM 1381-91
No. of live sites installed in N. America/Outside N. America	7 HW & SW; 7 SW only/0	6/30
Transportation systems available	yes	no
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	II/partially/1,000 or 2,000	—
• Supports automatic rerouting for reflex/repeat/dilutions	yes	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	—
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/weekly	electricity/semiannual
• Carrier type/Scalable system	—/yes	—/—
Automated centrifugation available	no	no
• 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	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	II/partially/1,000–4,000	—/yes/1,200
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	16x100, 13x100, 16x75, 13x75 & 10.5–17 mm diam., 70–110 mm ht.
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	II/partially/1,000	—/yes/1,200
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., BD Vacutainer, BD Hemoguard, Sarstedt monovette, screw top closures, all at same time, Terumo foil top with optional unit
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	II/partially/1,000	—/yes/1,200
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., sorting to any mftr's sample holder
Specimen integrity monitor available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated aliquoting available	no	no
• 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	—/—/—	yes/no/yes
Instrument (analyzer) interfaces		
• Rules-based instrument interface control subsystem	yes	no
• Process control of instrument via control subsystem	yes	no
Physical/hardware (instrument/specimen) interface		sorts to any analyzer rack
• Hematology/Chemistry/Coagulation	—/pt.-of-reference/—	sorts to any analyzer rack
• Immunoassay/Urinalysis	pt.-of-reference/—	sorts to any analyzer rack
Instruments to which your system/product is interfaced	Sysmex 2100/LASC; OCD Vitros; Dade Dimension RXL/MAX; Bayer Centaur; Abbott AxSym & Cell Dyn; Roche Integra; Coulter STKS/GEN-S, Immulite 2000, Sebia PE, Clinitek, SCC/Atlas, BD Probetec	—
Other robotic products/components to which system, product is linked	n/a	—
Automated recapper available	yes	in development
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	II/partially/1,000	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	—
Automated storage and retrieval available	software only	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/yes/1,200
• Types of containers device can accommodate	—	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht.
• Refrigeration available	—	no
Longitudinal upgrade pathway or plan to protect users' investments	SW upgrades provided anually under support agreements	open, modular systems are compatible with most instruments/systems
Ave. time to install sys./Who provides service and support/Hours support is available	4 weeks/MDS/24/7	1 week/Olympus America Inc. Diagnostic Systems Group/24/7
On-site biomedical engineer required/User group meets regularly	no/no	no/—
List price	n/a	$250k
Individual list prices for components		
• Process control software/Transportation systems	n/a	n/a
• Auto. centrifugation/Auto. input, accessioning	n/a	n/a
• Auto. decapping/Auto. sorting/Auto. storage & retrieval	n/a	n/a
• Specimen integrity monitor/Automated aliquoting	n/a	n/a
• Instrument (analyzer) interfaces/Automated recapping	n/a	n/a
Distinguishing features	• specimen transport carriers (STC) snap together for use throughout client's operation • strong belief and focus in value and development of automation SW • auto. tools and lab mgmt. expertise to customize tools for client	• fastest throughput of its kind currently in the market • cap color recognition and sample level detection modules • easy-to-change configurations, from sorter/decapper to archive preparation

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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

Laboratory automation systems & workcells

Part 6 of 10 *Please see accompanying article on page 22*	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com 2 Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com	Ortho-Clinical Diagnostics Mia Ares-Borcky mares@ocdus.jnj.com 1001 US Hwy 202, Raritan, NJ 08869 908-218-8638 www.orthoclinical.com
Name of system/First year installed	Olympus OLA2500 Lab Automation System/2001	enGen Series Automation Systems, designed and manufactured by Thermo Electron Corp./2000
Automation products that are available		
• Process control software/Transportation systems	no/no	yes/yes
• Auto. centrifugation/Auto. input or accessioning	no/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes	yes/yes/no
• Specimen integrity monitor/Auto. aliquoting	in development/yes	no/yes
• Instrument (analyzer) interfaces/Auto. recapping	yes/in development	yes/no
System architecture	open system	open system
% of staff dedicated to clinical automation system	—	n/a
% of budget dedicated to R&D for clin. auto. technology	—	n/a
Company's primary product category	instruments/reagents	instruments/reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	Microsoft Access/Windows NT/—/touch-screen, keyboard, touchpad	Object database/Windows XP/—/GUI
Software features/functionality		
• Patient demographics & insurance data/Rules-based architecture	LAS SW feature, LIS requirement/LAS SW feature	LIS requirement/n/a
• 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/LIS requirement/n/a	n/a/LIS requirement/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	LIS requirement	LIS requirement
• 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)	LAS SW feature	LIS requirement
• Supports specimen carrier and level identification	LAS SW feature	LAS SW feature
• Unique bar-code number per container required	no	LAS SW feature
• 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/LIS requirement	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/LIS requirement
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/—
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/LAS SW feature	n/a/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Cerner, Misys, Modulus, Data Innovations/Olympus interface format; conforms to ASTM 1381-91	—/HL7 or ASTM
No. of live sites installed in N. America/Outside N. America	10/150	—/—
Transportation systems available	no	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	—	—/yes/500
• Supports automatic rerouting for reflex/repeat/dilutions	—	yes
• Types of containers device can accommodate	—	16x100, 13x100, 13x75, 13x100
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/no
• Required utilities/Required maintenance	electricity/semiannual	compressed air, electricity/—
• Carrier type/Scalable system	—/—	single specimen container per carrier/yes
Automated centrifugation available	no	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/yes/up to 400 samples
• Types of containers device can accommodate	—	13x100, 13x75
• 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/800	—/yes/up to 500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht.	16x100, 13x100, 13x75, 16x75
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/—	—/yes/up to 500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., BD Vacutainer, BD Hemoguard, Sarstedt monovette, screw-top closures, all at same time, Terumo foil top w/ optional unit	16x100, 13x100, 13x75, 16x75
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/800	—/yes/500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., sorting to any manufacturer's sample holder	16x100, 13x100, 13x75, 16x75
Specimen integrity monitor available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated aliquoting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/650	—/yes/up to 240 samples
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 10–16 mm diam., 70–110 mm ht.	16x100, 13x100, 13x75, 16x75
• 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	yes
• Process control of instrument via control subsystem	no	—
Physical/hardware (instrument/specimen) interface	n/a—sorts to any analyzer rack	
• Hematology/Chemistry/Coagulation	n/a—sorts to any analyzer rack	point-of-reference sampling & robotic arm interface for all three
• Immunoassay/Urinalysis	n/a—sorts to any analyzer rack	point-of-reference sampling & robotic arm interface for both
Instruments to which your system/product is interfaced	—	Ortho VITROS 950AT, 250AT; Bayer Advia 1650; Abbott Architect; Konelab 30i & 60i, Roche Modular; VITROS 5,1 FS AT (in development)
Other robotic products/components to which system, product is linked	—	—
Automated recapper available	in development	in development
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated storage and retrieval available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/800	—/yes/up to 500 samples
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht.	16x100, 13x100, 13x75, 16x75
• Refrigeration available	no	—
Longitudinal upgrade pathway or plan to protect users' investments	open, modular systems are compatible with most instruments/systems	—
Ave. time to install sys./Who provides service and support/Hours support is available	1–2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7	1–2 weeks/Ortho-Clinical Diagnostics/24/7
On-site biomedical engineer required/User group meets regularly	no/no	no/no
List price	$350k	$400k–$2M, depends on configuration
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	—	—
Distinguishing features	• fast throughput, high capacity, open system sorting to any manufacturer racks • uninterrupted processing with access to output samples • expandable configuration to fit various needs	• upgradable—phased implementation is built into design • versatile—process control provides continuous sample tracking • flexible—open system can be interfaced to variety of different analyzers

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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Laboratory automation systems & workcells

Part 7 of 10 *Please see accompanying article on page 22*	PVT LabSystems LLC info@pvtlabsystems.com 530 Means St., Ste. 120 Atlanta, GA 30318 404-586-6837 www.pvtlabsystems.com	PVT LabSystems LLC info@pvtlabsystems.com 530 Means St., Ste. 120 Atlanta, GA 30318 404-586-6837 www.pvtlabsystems.com
Name of system/First year installed	**Aliquoting System RSD 800A/2002**	**Workstation/2003**
Automation products that are available		
• Process control software/Transportation systems	yes/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes (can be upgraded to workstation)/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes (via software)	yes/yes/yes (via software)
• Specimen integrity monitor/Auto. aliquoting	yes/yes	yes/yes
• Instrument (analyzer) interfaces/Auto. recapping	yes (via software)/yes	yes (via software)/yes
System architecture	open system	open system
% of staff dedicated to clinical automation system	100%	100%
% of budget dedicated to R&D for clin. auto. technology	50% of annual investment	50% of annual investment
Company's primary product category	laboratory automation systems	laboratory automation systems
Information systems technology for your automation system Database/Operating system/Server/User interface	ISAM/QNX (Linux)/—/GUI	ISAM/QNX (Linux)/—/GUI
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/n/a
• Online real-time help system/QC/Stats & management reports	LAS SW feature/n/a/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	n/a	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)	LAS SW feature	LAS SW feature
• Supports specimen carrier and level identification	LAS SW feature	n/a
• Unique bar-code number per container required	n/a	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	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/n/a
• Storage retrieval & disposal/Supports approved NCCLS standards	n/a/LAS SW feature	n/a/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Cerner, MCS, LDS, Systek, Providens, Mips, Bayer, Molis, Omega, Misys, Vertex, Data Innovations, others/ASTM	Cerner, MCS, LDS, Systek, Providens, Mips, Bayer, Molis, Omega, Misys, Vertex, Data Innovations/ASTM, Medat
No. of live sites installed in N. America/Outside N. America	2 (plus 30 of former versions)/34 (plus 100 of former versions)	0/3 (other versions 17 times)
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	—	—
• Supports automatic rerouting for reflex/repeat/dilutions	—	—
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/yes
• Required utilities/Required maintenance	compressed air, electricity/counterwise (every 6 months)	compressed air, electricity/counterwise (every 6 months)
• Carrier type/Scalable system	multiple specimen container in various carriers	multiple specimen container in various carriers
Automated centrifugation available	yes ACM-8	yes ACM-8
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	ACM or ACM-8/yes/400 or 800	ACM or ACM-8/yes/ACM=400; ACM-8=800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
• For multi-unit centrifuges, each cent. operates independently for rate and time	yes ACM-8	yes
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	input sorter/yes/800	input sorter/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	decapping module/yes/800	decapping module/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	output sorter/yes/800	output sorter/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Specimen integrity monitor available	yes, as option	yes, as option
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	QSI module/yes/800	QSI module/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Automated aliquoting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	aliquoting unit/yes/300 primary tubes if 100% aliquot. means 600 throughput	aliquoting unit/yes/300 primary tubes if 100% aliquot. means 600 throughput
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
• 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	no
• Process control of instrument via control subsystem	no	no
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	sorts to any kind of analyzer rack	sorts to any kind of analyzer rack
• Immunoassay/Urinalysis	sorts to any kind of analyzer rack	sorts to any kind of analyzer rack
Instruments to which your system/product is interfaced	—	—
Other robotic products/components to which system, product is linked	—	—
Automated recapper available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	RCS module/yes/800	RCS module/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Automated storage and retrieval available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/800	—/yes/800
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
• Refrigeration available	—	—
Longitudinal upgrade pathway or plan to protect users' investments	modules can be upgraded	modules can be upgraded
Ave. time to install sys./Who provides service and support/Hours support is available	1–2 weeks/PVT LabSystems/24/7 available on request	1–2 weeks/PVT LabSystems/24/7 available on request
On-site biomedical engineer required/User group meets regularly	no/no	no/no
List price	$215k–$315k without automatic centrifuge module	$330k–$490k
Individual list prices for components		
• Process control software/Transportation systems	$10k–$40k/—	$10k–$40k/—
• Auto. centrifugation/Auto. input, accessioning	$109–175k/included	included/included
• Auto. decapping/Auto. sorting/Auto. storage & retrieval	included/included/—	included/included/—
• Specimen integrity monitor/Automated aliquoting	~$60k/included	~$60k/included
• Instrument (analyzer) interfaces/Automated recapping	—/$38k	—/$38k
Distinguishing features	• one platform (basic platform) can be assembled with all modules for a so-called all-in-one system • low consumable costs through standard products • the quality module QSI (specimen integrity monitor and volume measuring)	• independent from any IVD company • automated centrifuge can work with tubes or racks • all kinds of tubes and racks can be used

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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

SYSTEM REVIEW SERIES

Laboratory automation systems & workcells

Part 8 of 10 *Please see accompanying article on page 22*	PVT LabSystems LLC info@pvtlabsystems.com 530 Means St., Ste. 120, Atlanta, GA 30318 404-586-6837 www.pvtlabsystems.com	Roche Diagnostics Lisa Davis lisa.davis@roche.com 9115 Hague Rd., Indianapolis, IN 46250 317-521-3531 us.labsystems.roche.com
Name of system/First year installed	**Sorting System RSD 800/2001**	**Modular Pre-Analytics Plus/1997; Hitachi/1990**
Automation products that are available		
• Process control software/Transportation systems	yes/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/yes	yes/yes/no
• Specimen integrity monitor/Auto. aliquoting	yes/yes	yes/yes
• Instrument (analyzer) interfaces/Auto. recapping	yes/yes	yes/yes
System architecture	open system	closed system (modular systems)
% of staff dedicated to clinical automation system	100%	100%
% of budget dedicated to R&D for clin. auto. technology	50% of annual investment	100%
Company's primary product category	laboratory automation systems	instruments, reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	ISAM/QNX (Linux)/—/GUI	—/Windows NT, Unix/—/—
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/—/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	n/a	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)	LAS SW feature	—
• Supports specimen carrier and level identification	LAS SW feature	LAS SW feature
• Unique bar-code number per container required	n/a	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	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/LAS SW feature
• Supports multiple hardware config./Supports other proprietary transport. hardware	—/n/a	—/—
• Storage retrieval & disposal/Supports approved NCCLS standards	—/—	—/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Cerner, MCS, LDS, Medat, Systek, Providens, Mips, Bayer, Molis, Omega, Misys, Vertex, Zavacore, DI/ASTM	Cerner, Cerner Millennium, Misys, Vista, McKesson, Soft, Department of Defense LIS to LAS/ASTM-HL7 for DI Instrument Manager to LIS, unique DI-IM to MPA
No. of live sites installed in N. America/Outside N. America	2/29	20/150
Transportation systems available	yes	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	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75, rubber or hemoguard
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/yes	yes/floor mounted/no, fully integrated automation & analytics
• Required utilities/Required maintenance	compressed air, electricity/counterwise (every 6 months)	electricity, water (for analyzers)/weekly
• Carrier type/Scalable system	multiple specimen container in various carriers	multiple specimen container per carrier (5 positions)/yes
Automated centrifugation available	yes, as option	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	ACM or ACM-8/yes/400 or 800	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, ACM-8	yes, 2 can run at 500 per hr
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	input sorter/yes/800	system 3 or 7/yes/600
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	decapping module/yes/800	system 3 or 7/yes/400
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	output sorter/yes/800	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, as option	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	QSI module/yes/800	n/a
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Automated aliquoting available	no	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/—	system 7/yes/500
• Types of containers device can accommodate	—	16x100, 13x100, 16x75, 13x75
• System inspects samples for bar code/Reports clots/Reports QNS specimens	—	yes/yes/yes
Instrument (analyzer) interfaces		
• Rules-based instrument interface control subsystem	no	yes
• Process control of instrument via control subsystem	no	yes
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	sorts to any kind of analyzer rack	no/pt.-of-reference sampling/pt.-of-reference sampling
• Immunoassay/Urinalysis	sorts to any kind of analyzer rack	pt.-of-reference sampling/no
Instruments to which your system/product is interfaced	—	Roche/Hitachi Modular Systems—Clin Chemistry, Immunoassay, Integrated Systems Stago•R
Other robotic products/components to which system, product is linked	—	—
Automated recapper available	yes, as option	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	RCS module/yes/800	System 7/yes/500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available	yes	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	1–2 weeks/PVT LabSystems LLC/24/7 available on request	<2 weeks/Roche/24/7
On-site biomedical engineer required/User group meets regularly	no/no	no/no
List price	$141k–$260k	$300–$800k, depending on system configuration
Individual list prices for components		
• Process control software/Transportation systems	$10k–$40k/—	n/a
• Auto. centrifugation/Auto. input, accessioning	$109–175k/included	n/a
• Auto. decapping/Auto. sorting/Auto. storage & retrieval	included/included/—	n/a
• Specimen integrity monitor/Automated aliquoting	~$60k/no	n/a
• Instrument (analyzer) interfaces/Automated recapping	—/~$38k	n/a
Distinguishing features	• recapping can be used for all kinds of tubes • perfect solution for archiving • PVT offers customized solutions	• install coordinated by PMI certified project manager • fully integrated and designed to work with Modular Analytics • connectivity with proven track record • processing time <12 minutes including a 5 minute spin time • total hands-off sample processing

† *Renamed Clinical and Laboratory Standards Institute in 2004*
* *Ave. throughput in specimen containers per hr per device*

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

Laboratory automation systems & workcells

Part 9 of 10 *Please see accompanying article on page 22*	Sysmex America Inc. Nilam Patel 1 Nelson C. White Parkway Mundelein, IL 60060 847-996-4500 www.sysmex.com	Sysmex America Inc. Nilam Patel 1 Nelson C. White Parkway Mundelein, IL 60060 847-996-4500 www.sysmex.com
Name of system/First year installed	**Sysmex HST-N Systemization/1991**	**Sysmex Alpha N Hematology Transport System/1991**
Automation products that are available		
• Process control software/Transportation systems	yes/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	no/yes	—/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	no/no/no	—/—/—
• Specimen integrity monitor/Auto. aliquoting	yes/no	yes/n/a
• Instrument (analyzer) interfaces/Auto. recapping	yes/no	yes/n/a
System architecture	open system	closed system
% of staff dedicated to clinical automation system	25%	25%
% of budget dedicated to R&D for clin. auto. technology	15%	15%
Company's primary product category	lab automation systems, instruments, reagents, information systems, hematology, coagulation, urinalysis, IT	lab automation systems, instruments, reagents, information systems, hematology, coagulation, urinalysis, IT
Information systems technology for your automation system Database/Operating system/Server/User interface	Sybase/Windows 98, NT, Unix/—/—	Sybase/Windows 98, NT/Windows 98, NT/Windows
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/LAS SW feature	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/LAS SW feature/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	LAS SW feature	LAS SW feature
• Specimen tracking/Priority processing/Random-access specimen movement	LAS SW feature/LAS SW feature/n/a	LAS SW feature/LAS SW feature/LAS SW feature
• Supports accession No. redundancy (duplicate specimen ID)	n/a	n/a
• Supports specimen carrier and level identification	LAS SW feature	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)	LAS SW feature/n/a	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/LAS SW feature	LAS SW feature/n/a
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/LAS SW feature	n/a/n/a
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/LAS SW feature	LAS SW feature/—
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS with your LAS	Cerner, Misys, Soft, McKesson, Triple G, Meditech, DI, Molis, Antrim/ ASTM, TCP-IP	Cerner, Misys, Soft, McKesson, Triple G, Meditech, DI, Molis, Antrim/ ASTM, TCP-IP
No. of live sites installed in N. America/Outside N. America	100/>1,000	>100/>200
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	—/yes/config. dependent	—/—/>150
• Supports automatic rerouting for reflex/repeat/dilutions	yes	no
• Types of containers device can accommodate	16x75, 13x75, rubber stopper, hemoguard	13x75, 16x75, rubber stopper, hemoguard
• Modular hardware/Installed options/Device functions independent of track	yes/floor mounted/no	yes/benchtop/no
• Required utilities/Required maintenance	electricity/none	electricity/none
• Carrier type/Scalable system	multiple specimen container per carrier/yes	multiple specimen container per carrier/yes (to HST-N multiple versions)
Automated centrifugation available	no	no
• 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	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	1.08/yes/depends on configuration	1.08/yes/depends on configuration
• Types of containers device can accommodate	13x100, 13x75, 16x75	13x100, 13x75, 16x75
Automated decapping available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated sorting available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Specimen integrity monitor available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
Automated aliquoting available	no	no
• 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	yes	yes
• Process control of instrument via control subsystem	yes	yes
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	physical hardware available for hematology & coag only	no/no/no
• Immunoassay/Urinalysis	no/no	no/no
Instruments to which your system/product is interfaced	Sysmex XE-2100/XE-2100L/XE-2100D	Sysmex XE-2100/XE-2100L/XE-2100D
Other robotic products/components to which system, product is linked	none/interliner (ERS analytes)	work area manager (WAM)
Automated recapper available	no	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—/—/—
• Types of containers device can accommodate	—	—
Automated storage and retrieval available	yes	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/yes/depends on configuration	—/yes/depends on configuration
• Types of containers device can accommodate	13x100, 13x75, 16x75	13x75, 16x75, 16x75
• Refrigeration available	no	no
Longitudinal upgrade pathway or plan to protect users' investments	scalable automation	upgrade to HST-N
Ave. time to install sys./Who provides service and support/Hours support is available	1 week/Sysmex/24/7	3–5 days/Sysmex/24/7
On-site biomedical engineer required/User group meets regularly	no/yes	no/yes
List price	depends on system configuration	$360k
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	—	—
Distinguishing features	• upgradable, scalable • proven automation in coag and hematology—10+years • quick implementation—one week	• upgradable, scalable • work area manager • proven automation—10+ years

† *Renamed Clinical and Laboratory Standards Institute in 2004*

* *Ave. throughput in specimen containers per hr per device*

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SYSTEM REVIEW SERIES

Laboratory automation systems & workcells

Part 10 of 10 *Please see accompanying article on page 22*	Tecan Donna Crook donna.crook@tecan.com Research Triangle Park, NC 800-352-5128 www.tecan.com	Thermo Electron Corp. Janne Jarvinen info.cca.fi@thermo.com Ratastie 2, P.O. Box 100 FIN 06210 Vantaa, Finland +358 9 329 100 www.thermo.com
Name of system/First year installed	FE 500/2000	TCAutomation/2000
Automation products that are available		
• Process control software/Transportation systems	no/yes	yes/yes
• Auto. centrifugation/Auto. input or accessioning	yes/yes	yes/yes
• Auto. decapping/Auto. sorting/Auto. storage and retrieval	yes/yes/in development	yes/yes/in development
• Specimen integrity monitor/Auto. aliquoting	yes/yes	no/yes
• Instrument (analyzer) interfaces/Auto. recapping	no/no	yes/in development
System architecture	open system	open system
% of staff dedicated to clinical automation system	50%	—
% of budget dedicated to R&D for clin. auto. technology	15%	—
Company's primary product category	lab automation systems	lab automation systems and instruments, reagents
Information systems technology for your automation system Database/Operating system/Server/User interface	Sybase SQL Anywhere/Windows NT/—/dynamic download, host query	object database/Windows XP/—/GUI
Software features/functionality		
• Patient demographics & insurance data/Rules-based architecture	n/a/LAS SW feature	LIS requirement/n/a
• Supports data retrieval/Internet connectivity	LAS SW feature/n/a	LAS SW feature/n/a
• Online real-time help system/QC/Stats & management reports	LAS SW feature/n/a/n/a	n/a/LIS requirement/LAS SW feature
• Evaluates validity and releasability of results from automated analyzers	n/a	LIS requirement
• 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)	LAS SW feature	LIS requirement
• Supports specimen carrier and level identification	n/a	LAS SW feature
• Unique bar-code number per container required	n/a	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	n/a/n/a	LAS SW feature/LAS SW feature
• Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/LIS requirement
• Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/—
• Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/—	n/a/LAS SW feature
LISs and versions interfaced and live with LAS/How LISs are interfaced with your LAS	Misys, SCC, Cerner, Citation, McKesson, Triple G, MediSolution, Per Se, Meditech/ASTM, HL7	—/HL7
No. of live sites installed in N. America/Outside N. America	40/62	0/16
Transportation systems available	yes	yes
• Version/conforms to NCCLS† Standards Auto 1-5/Ave. throughput*	conveyor/—/—	—/yes/1,000 tubes per hr
• Supports automatic rerouting for reflex/repeat/dilutions	—	yes
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75
• Modular hardware/Installed options/Device functions independent of track	—/—/—	yes/floor mounted/no
• Required utilities/Required maintenance	compressed air, electricity/—	compressed air, electricity/—
• Carrier type/Scalable system	single specimen container per carrier/—	single specimen container per carrier/yes
Automated centrifugation available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/300 @ 10–min. spin time	—/yes/400
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	13x100, 13x75, 16x100, 16x75
• For multi-unit centrifuges, each cent. operates independently for rate and time	—	yes
Automated input/accessioning available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard	16x100, 13x100, 16x75, 13x75
Automated decapping available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75
Automated sorting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/500	—/yes/500
• Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, any manufacturer's rack	16x100, 13x100, 16x75, 13x75
Specimen integrity monitor available	yes	no
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	level sensing & clot detection	—
Automated aliquoting available	yes	yes
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—/—/—	—/yes/240
• Types of containers device can accommodate	13x75 prepackaged secondary tubes	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	—	—
• Process control of instrument via control subsystem	—	—
Physical/hardware (instrument/specimen) interface		
• Hematology/Chemistry/Coagulation	—/—/—	—/pt.-of-reference-sampling & robotic arm interface/ pt.-of-reference sampling & robotic arm interface
• Immunoassay/Urinalysis	—/—	pt.-of-reference sampling & robotic arm interface for both
Instruments to which your system/product is interfaced	contact vendor	Roche Modular, Konelab 30 & 60, Bayer Advia 1650 & Centaur, Abbott Architect, Ortho Clinical VITROS 250AT & 950 AT & 5,1 FS AT, DPC SMS, Immulite 2500 & 2200, Stago STA-R
Other robotic products/components to which system, product is linked	—	—
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	in development	in development
• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	—	—
• Types of containers device can accommodate	—	—
• Refrigeration available	—	—
Longitudinal upgrade pathway or plan to protect users' investments	contact vendor	—
Ave. time to install sys./Who provides service and support/Hours support is available	6 weeks/Tecan and authorized service providers/24/7	1–2 weeks/local distributor/depends on agreement
On-site biomedical engineer required/User group meets regularly	no/—	no/no
List price	$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	—	—
• Instrument (analyzer) interfaces/Automated recapping	—	—
Distinguishing features	• flexibility, footprint, completely configurable	• modularity—the system can be extended to meet customer needs; both workcell and preanalytical part can be upgraded and linked as needed • multi-tube carrier with programmable chip • open—can be linked to a variety of different analyzers

† *Renamed Clinical and Laboratory Standards Institute in 2004*
* *Ave. throughput in specimen containers per hr per device*

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