

On the road to automation, proceed with caution

Anne Ford

It's an old analogy, but an apt one: Automating a laboratory without first streamlining its processes is like paving a cowpath. Ignore that maxim, and your lab might end up meandering along a back road while others are zipping down the freeway. "The best way to start is to get rid of the inefficiencies. That can be accomplished without starting on automation," points out Peter Bambic, Ortho-Clinical Diagnostics worldwide product director for lab automation.

Ken Koziak, Dade Behring product manager for automation, agrees. "The marketplace is asking for an intelligent approach to automation, as opposed to 'automate everything,'" he says. "If you understand the workflow, you can identify the pinch points that cause the problems. Then you bring in automation to provide solutions."

It might seem odd to hear manufacturers advising labs to exercise restraint in purchasing their products, but it's common sense. These systems represent a big commitment—and if a laboratory ends up saddled with an expensive and ineffective process, it's going to be a very unhappy customer. So as a preemptive measure, many manufacturers try to give laboratories a preview of what automation will and won't do for them. "A lot of customers want to go into the what-if situation," says Abbott Laboratories' Darin Leigh, product development manager for perianalytics. "So we're very much into building simulation models of our automation. We can give our customer the actual throughput of our instrumentation based on their workload within 95 percent accuracy."

One factor fueling laboratories' commitment anxiety is the difficulty of predicting future needs. "The system needs to be expandable to cope with changing demands," says Thermo-Clinical sales manager Klas Vuorinen. Equally important, he says, is the ability to connect analyzers from different manufacturers to the system. "An investment in automation is longer than the life cycle of an analyzer," he says. "It's important for users to know that they can change the analyzers without having to change the whole automation system."

Bayer and PVT are just two of the vendors offering features designed to provide this kind of flexibility. PVT head of marketing and sales overseas Miriam Hoelzel says, "We're independent from any analyzer company, so the lab or hospital can use all the racks or tubes they have from the different analytic companies." Along similar lines, Bayer accepts "multiple size tubes all at the same time," says Bayer senior marketing manager Mike Iskra. "A lot of different automation systems allow you to accept only one size tube, and others will say you can accept various size tubes but you have to choose between one or another."

Still feeling phobic? Consider automation software rather than hardware. "A lot of people look at hardware as a solution when actually there's software out there

that can serve the same purpose without the huge capital investment of bringing in a piece of automation," says Leigh. He sees more and more laboratories taking this approach. Besides, as Gary Hall, MDS director of automation systems, says pragmatically, "There has to be some software to track where those specimens are—and there is even more value in software that brings efficiencies to the analytical process."

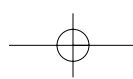
For many laboratories, the real incentive for adopting automation lies in its labor-maximizing benefits, says Andy Hay, Sysmex director of marketing. "Most of the drivers we see towards automation somehow relate back to labor. Ten years ago we were talking about excess labor; now we're talking about gaps in the workforce and how to spread what you've got thinner." Ron Berman of Beckman Coulter draws an enticing picture of automation's labor advantages: "The specimen comes to the lab, it's got a bar-code label on it, they put it on the automation system, and the operator never has to worry about that specimen again until they dispose of it."

While automation can help a laboratory grow without increasing the size of its labor pool, it can, paradoxically, also help recruit and retain staff members. "You bring in automation, you allow labs to do more with less stress, and it's less stressful environments that attract and keep good people," Koziak says.

Manufacturers are trying to minimize some of the other, nonlabor laboratory resources an automation system requires as well. Tecan, for example, is trying to save laboratories floor space by keeping the footprint of its FE 500 system small. "It's mobile, and it doesn't require reconstruction. It's not like dropping 30 feet of metal in the middle of the laboratory," says Donna Crook, business unit manager for clinical diagnostics. "It's the size of an instrument, so it's 7 feet—it's very compact."

While pondering their automation choices, laboratories can look forward to new products and features from at least two companies, Roche and A&T. Peter Stegger, PhD, Roche marketing manager for laboratory integration, says his company will introduce new automation system features at this year's American Association for Clinical Chemistry meeting. "There's some promising things in the pipeline," he adds. Meanwhile, A&T's Akira Igarashi says his company is introducing an open modular automation system. The system was scheduled to go live in Japan at CAPTODAY press time.

CAPTODAY's lineup of laboratory automation systems includes products from the companies listed above and from AI Scientific, LAB-Interlink, and Olympus America. Vendors supplied the information listed. Readers interested in a particular system should confirm that it has the stated features and capabilities. □

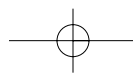


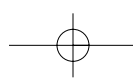
Laboratory automation systems & workcells

Part 1 of 10	Abbott Laboratories Diagnostics Division Edward Mede ed.mede@abbott.com 100 Abbott Park Rd. Abbott Park, IL 60064-3500 847-937-3335 www.abbottdiagnostics.com	AI Scientific Pty. Ltd. David Halstead david.halstead@aiscientific.com 10 Hornibrook Esp. Clontarf, Qld 4019 Australia +61 7 3105 5011 www.aiscientific.com
<i>Please see accompanying article on page 22</i>		
Name of system/First year installed	FE 500/2000 (See also Tecan listing, part 10)	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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	no/yes yes/yes yes/yes/in development yes/yes no/no open system 50% 15% lab automation systems Sybase SQL Anywhere/Windows NT—/dynamic download, host query	yes/no in development/yes yes/yes/yes in development/yes no/yes open system n/a 15% laboratory automation systems 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 • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards	n/a/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a/n/a n/a LAS SW feature/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/n/a LAS SW feature/n/a LAS SW feature/—	LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/—/LAS SW feature 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/— 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, Per Se, Meditech/ASTM	Kestral, MelbPath, Triple G, Apollo, Bayer/ASTM, HL7
No. of live sites installed in N. America/Outside N. America Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system	36/51 yes conveyor/—/— — 16x100, 13x100, 16x75, 13x75 —/—/— compressed air, electricity/— single specimen container per carrier/—	—/37 no — — — — compressed air, electricity/network connection —
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* • Types of containers device can accommodate Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available • 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* • Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/—/300 @ 10—min spin time 16x100, 13x100, 16x75, 13x75 — yes —/—/500 16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard yes —/—/500 16x100, 13x100, 16x75, 13x75 yes —/—/500 16x100, 13x100, 16x75, 13x75, any manufacturer's rack yes — level sensing & clot detection yes —/—/— 13x75 prepackaged secondary tubes yes/yes/yes	in development Mk2/—/550 tubes 16x100, 13x100, 16x75, 13x75, 12x75, 16x108 — yes Mk2/yes/500 16x100, 13x100, 16x75, 16x108, 13x75, screw cap, rubber stopper yes Mk2/—/500 16x100, 13x100, 16x75, 13x75, 12x75, 16x108 yes Mk2/yes/500 tubes 16x100, 13x100, 16x75, 13x75, 12x75, 16x108, any vendor's rack in development — level sensing & clot detection yes Mk2/—/500 16x100, 13x100, 16x75, 13x75, aliquot can be 12x75 or 16x100 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 • Immunoassay/Urinalysis	— — —/—/— —/—	no no —/—/— —/—
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	no — —	yes Mk2/yes/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 • Refrigeration available 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	in development — — — contact vendor 6 weeks/Tecan and authorized service providers/24/7 no/—	no — — — — 4 weeks/AI Scientific and authorized service providers/24/7 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	\$450k — — — — —	— — — — — —
Distinguishing features	• flexibility, footprint, completely configurable	• 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
* Ave. throughput in specimen containers per hr per device		

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

Survey editors: Raymond Aller, MD; Rodney S. Markin, MD, PhD; Robin Felder, PhD

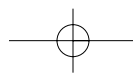


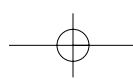


Laboratory automation systems & workcells

Part 2 of 10	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	Bayer Diagnostics Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6123 bayerdiag.com and labnews.com
<i>Please see accompanying article on page 22</i>		
Name of system/First year installed	Clinilog/1993	Advia LabCell/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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/no/no no/yes yes/no open system 10% 10% laboratory automation systems, instruments and reagents, information sys. SQL/Windows NT/Windows NT/Windows NT	yes/yes yes/yes yes/yes/yes (storage & mapping) no/in development yes/no open system 8% 8% laboratory solutions SQL & Progress/Windows NT/Windows 2000/Bayer-user interface (proprietary)
Software features/functionality • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards	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 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/LIS requirement 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 (load balancing) 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, TechniData/ASTM, HL7	SCL 2000, Misys, Labzis II, LMX, NetLab, Telepath-iSoft, OSI, MCS/HL7, ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system	0/65 yes 2.0-3.0/yes/360 yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes electricity/quarterly single specimen container per carrier/yes	2/10 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
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* • Types of containers device can accommodate Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available • 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* • Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/yes/250 16x100, 13x100, 16x75, 13x75 yes yes —/yes/300 16x100, 13x100, 16x75, 13x75 yes —/yes/350 16x100, 13x100, 16x75, 13x75 no — — no — — yes —/yes/250 16x100, 13x100, 16x75, 13x75 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 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 — —
Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface • Hematology/Chemistry/Coagulation • Immunoassay/Urinalysis	yes yes pt.-of-reference sampling/pt.-of-reference sampling/pt.-of-reference sampling pt.-of-reference sampling/pt.-of-reference sampling	yes no (high level only) robotic arm interface/pt.-of-reference sampling/robotic arm interface pt.-of-reference sampling & robotic arm interface (both avail.)/ pt.-of-reference sampling
Instruments to which your system/product is interfaced	Bayer Advia 1650, Centaur; Coulter Gen-S; Abbott Aeroset i2000; Tosoh AI21; A&T 502X	Bayer: Advia 120, 1650, 2400, & Centaur; Clinitek Atlas, Immuno1, Stago STA-R
Other robotic products/components to which system, product is linked	—	none
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate	no — —	no — —
Automated storage and retrieval available • 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	no — — no scalable modular automation can be designed from front-end workcell until full-scale TLA format; step wise construction or upgrade by LAN-like information technology 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
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/A&T or designated service engineer/depends on contract no/no	1 month/Bayer Diagnostics/24/7 no/yes
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	— —/— —/— —/—/— —/— —/—	varies by configuration —/— —/— —/—/— —/— —/—
Distinguishing features (supplied by vendor)	• open modular automation • high-speed single tube transportation • LAN-like information technology realizes single connection to LIS and flexible upgrade	• 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
* Ave. throughput in specimen containers per hr per device		

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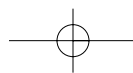


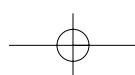


Laboratory automation systems & workcells

Part 3 of 10 Please see accompanying article on page 22	Bayer Diagnostics Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6123 bayerdiag.com and labnews.com	Beckman Coulter Ron Berman rberman@beckman.com 200 S. Kraemer Blvd., Brea, CA 92821 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 <ul style="list-style-type: none"> • 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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes no/yes no/yes/yes (storage & mapping) no/no yes/no closed system 8% 8% laboratory solutions SQL & Progress/Windows NT/Windows 2000/Bayer-user interface (proprietary)	yes/yes yes/yes yes/yes/yes yes (available in analyzer)/yes yes/yes open system 5% 7% lab automation systems and instruments/reagents SQL/Windows NT/client server/Windows
Software features/functionality <ul style="list-style-type: none"> • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards 	LIS requirement/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 via error management LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature (load balancing) LAS SW feature/LAS SW feature LAS SW feature/— LAS SW feature (database mgmt)/—	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 n/a 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/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner PathNet & Millennium & Citation, Misys, Antrim, Meditech, NetLab, Data Innovations, SCC Softlab, Per Se, others/ASTM, HL7	Antrim, Bayer, Cerner, FlexLab, McKesson, Medisolution, Meditech, others/ direct with LIS, consolidated download or listen on analyzer line
No. of live sites installed in N. America/Outside N. America Transportation systems available Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions Types of containers device can accommodate Modular hardware/Installed options/Device functions independent of track Required utilities/Required maintenance Carrier type/Scalable system	52/26 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	180/85 yes 3/yes/900 yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes compressed air, electricity/monthly single specimen container per carrier/yes
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* Types of containers device can accommodate Automated decapping available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Automated sorting available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Specimen integrity monitor available 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* Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	no — — — yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5-16.2 mm (diam.) & 75-100 mm (ht.) no — — yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5-16.2 mm (diam.) & 75-100 mm (ht.) within each instrument — — no — — —	yes 3/yes/300-450 16x100, 13x100, 16x75, 13x75 yes yes 3/yes/900 16x100, 13x100, 16x75, 13x75 yes 3/yes/600 16x100, 13x100, 16x75, 13x75 yes 3/yes/500 16x100, 13x100, 16x75, 13x75 yes —/yes/90 16x100, 13x100, 16x75, 13x75 yes 3/yes/450 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none"> • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none"> • Hematology/Chemistry/Coagulation • Immunoassay/Urinalysis 	yes no (high level only) n/a/pt.-of-reference sampling/n/a pt.-of-reference sampling/n/a	yes yes pt.-of-ref. sampling & robotic arm interf./pt.-of-ref. sampling & robotic arm interf./pt.-of-ref. sampling & robotic arm interf. pt.-of-ref. sampl. & robot. arm interf./pt.-of-ref. sampl. & robot. arm interf.
Instruments to which your system/product is interfaced	Bayer: Advia 1650, 2400, & Centaur	Abbott Architect; Bayer Centaur, Atlas; Beckman Coulter: LX20, DXI 800, LH 750; Ortho: Vitros 950 & 250; Roche Modular; Stago Star; Sysmex CA-6000, VA 2000
Other robotic products/components to which system, product is linked	none	—
Automated recapper available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	no — —	yes 3/yes/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 Refrigeration available 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	software tracking retrieval — — no future chemistry & immunochem. systems from Bayer will be compatible; can be upgraded to LabCell 2 weeks/Bayer Diagnostics/24/7 no/yes	yes 3/yes/— 16x100, 13x100, 16x75, 13x75 yes all systems may be upgraded (software & hardware) due to modular design (HW) and new software versions 7-30 days/Beckman Coulter (worldwide)/24/7 no/yes
List price Individual list prices for components <ul style="list-style-type: none"> • 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 	varies by configuration —/— —/— —/—/— —/— —/—	depends on configuration contact vendor contact vendor contact vendor contact vendor contact vendor
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • refrigerated storage with recapping & auto rerun • totally open system—connects to any manufacturer's analyzers • intelligent aliquoting—measures serum volume and transfers based on priority, dead volume, & requested test volume
* Ave. throughput in specimen containers per hr per device		

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

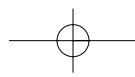


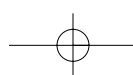


Laboratory automation systems & workcells

Part 4 of 10	Dade Behring Inc. Ken Koziak Glasgow Business Community P.O. Box 6101, Newark, DE 19714-6101 302-631-9440 www.dadebehring.com	LAB-InterLink Inc. info@labinterlink.com 1011 S. Saddle Creek Rd. Omaha, NE 68106-1943 800-449-2527/402-595-3767 www.labinterlink.com
<i>Please see accompanying article on page 22</i>		
Name of system/First year installed	StreamLab Analytical Workcell/2002	LAB-Frame/1996
Automation products that are available <ul style="list-style-type: none"> • 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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/no yes/yes yes/no open system — — instruments and reagents proprietary file system/Windows NT/n/a/Labview touchscreen guide	yes/yes yes/yes yes/yes/yes yes/yes yes/yes open system 100% 15% laboratory automation systems Oracle/Unix/Compaq DS-10 or DS-20/Oracle Forms-GUI
Software features/functionality <ul style="list-style-type: none"> • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards 	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature n/a 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/n/a 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 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 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, Meditech, SCC, Olanonea, Horus/—	Misys 5.2 & 5.2.3, Cerner, SCC, Meditech, McKesson, ALG, Rubicon, Triple G, PGP, Philips, MIPS/HL7, ASTM
No. of live sites installed in N. America/Outside N. America Transportation systems available <ul style="list-style-type: none"> • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system 	5/6 yes StreamLab/yes/300 yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes compressed air, electricity/weekly single specimen container per carrier/yes	26/4 yes current/yes/1,000 yes 16x100, 13x100, 13x75, 12x75 yes/floor, overhead, & subfloor mounted/yes electricity/quarterly single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated input/accessioning available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none"> • 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 StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes, clot detection & sample level sensing, HIL check — — yes Dimension sample transfer module/yes/480 (4 analyzers) 16x100, 13x100, 16x75, 13x75 yes/yes/yes	yes current/yes/200-500 16x100, 13x100, 13x75 yes yes current/yes/800-1,000 16x100, 13x100, 13x75 yes current/yes/250-400 16x100, 13x100, 13x75, 12x75 yes current/yes/400 16x100, 13x100, 13x75 yes alpha/yes/400 16x100, 13x100, 13x75 yes current/yes/75 primaries per hr; 225 secondaries per hr; 1:3 ratio 16x100, 13x100, 13x75 yes/yes, with aliquoter/yes, with aliquoter
Instrument (analyzer) interfaces <ul style="list-style-type: none"> • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none"> • Hematology/Chemistry/Coagulation • Immunoassay/Urinalysis 	yes yes in development for Sysmex CA-7000 in development for DPC Immulite 2000	yes yes robotic arm interface/pt.-of-reference sampling/robotic arm interface pt.-of-reference sampling, robotic arm interface/no
Instruments to which your system/product is interfaced	Dade Behring Dimension RxL Max Integrated Chemistry System	Ortho Vitros 950AT & 250AT; Roche Hitachi 912; Bayer Centaur & Immuno-1; Abbott Architect 2000, Cell Dyn 4000; IL MLA 1600C; MDA 180; Sysmex HST; Diagnostica Stago STA-R; DPC Immulite 2000; others customizable to client's needs
Other robotic products/components to which system, product is linked	—	—
Automated recapper available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate 	no — —	yes current/yes/750 16x100, 13x100, 13x75, 12x75
Automated storage and retrieval available <ul style="list-style-type: none"> • 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75 no modular systems can change/grow with user needs 5 days/Dade Behring/24/7 no/yes	yes current/yes/300 16x100, 13x100, 13x75, 12x75 yes easily upgraded 2 weeks/LAB-InterLink/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none"> • 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 	contact Dade Behring representative for all pricing information —/— —/— —/—/— —/— —/—	— —/— —/— —/—/— —/— —/—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • analytical workcell links to multiple Dimension RxL systems via single operator interface for multi-tasking & workload management • automated pre- & post-analytical functions • intelligent software routes samples to optimize throughput & turnaround time • space efficient & open architecture can be customized 	<ul style="list-style-type: none"> • LAB-Manager—advanced software system yields process control for open-connectivity lab • long-term protection due to unbiased, open support from any manufacturer; convenient plug and play modularity
* Ave. throughput in specimen containers per hr per device		

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

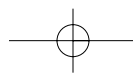


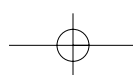


Laboratory automation systems & workcells

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 Two 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 <ul style="list-style-type: none"> • 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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes no/yes yes/yes/yes (software only) no/no yes/yes open system n/a n/a health & life sciences MS SQL server, relational/Windows 2000 server & workstation/Intel-based Enterprise servers/graphical Windows based	no/no no/yes yes/yes/yes in development/no yes/in development open system — — instruments/reagents Microsoft Access/Windows NT/—/touch-screen, keyboard, touchpad
Software features/functionality <ul style="list-style-type: none"> • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards 	LIS requirement/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature n/a LAS SW feature LAS SW feature LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a LAS SW feature/partially	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature no LAS SW feature/LIS requirement LAS SW feature/LIS requirement LAS SW feature/n/a LAS SW feature/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Meditech, Triple G, Rubicon, LabGem, Cerner Classic/HL7	Cerner, Misys, Data Innovations/RS232C, network, Olympus interface format/conforms to ASTM 1381-91
No. of live sites installed in N. America/Outside N. America Transportation systems available <ul style="list-style-type: none"> • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system 	7 HW & SW; 7 SW only/0 yes //partially/1,000 or 2,000 per hr yes 16x100, 13x100, 16x75, 13x75, 12x75 yes/floor mounted/yes compressed air, electricity/weekly single spec. cont. carriers that can be converted into multiple/yes	0/2 no — — — yes/floor mounted/yes electricity/semiannual —/can be modified to standard system with aliquoting
Automated centrifugation available <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none"> • 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 	no — — — yes //partially/2,000 per hr 16x100, 13x100, 16x75, 13x75, 12x75 yes //partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75 yes //partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75 no — — no — —/—/—	no — — — yes —/yes/1,200 16x100, 13x100, 16x75, 13x75 & 10.5–17 mm diam., 70–110 mm ht. yes —/yes/1,200 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 yes —/yes/1,200 16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., sorting to any mfr's sample holder no — — no — yes/no/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none"> • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none"> • Hematology/Chemistry/Coagulation • Immunoassay/Urinalysis 	yes yes —/pt.-of-reference/— pt.-of-reference/—	no no sorts to any analyzer rack sorts to any analyzer rack 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	—
Other robotic products/components to which system, product is linked	n/a	—
Automated recapper available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate 	yes //partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75	in development — —
Automated storage and retrieval available <ul style="list-style-type: none"> • 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	software only — — — SW upgrades provided annually under support agreements 4 weeks/MDS/24/7 no/no	yes —/yes/1,200 16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht. no open, modular systems are compatible with most instruments/systems 1 week/Olympus America Inc. Diagnostic Systems Group/24/7 no/—
List price Individual list prices for components <ul style="list-style-type: none"> • 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 	n/a n/a n/a n/a n/a n/a	\$250k n/a n/a n/a n/a n/a
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • fastest throughput of its kind currently in the market • cap color recognition and sample level detection modules • easy-to-change configurations, from sorter/recapper to archive preparation
* Ave. throughput in specimen containers per hr per device		

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

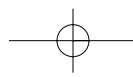




Laboratory automation systems & workcells

Part 6 of 10 <i>Please see accompanying article on page 22</i>	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com	Ortho-Clinical Diagnostics Melissa Heard mheard@occlus.jnj.com 1001 US Hwy 202, Raritan, NJ 08869 908-218-8480 www.orthoclinical.com
Name of system/First year installed	Olympus OLA2500/2001	enGen Series Automation Systems, designed and manufactured by Thermo Electron Corp./2000
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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	no/no no/yes yes/yes/yes in development/yes yes/in development open system — — instruments/reagents Microsoft Access/Windows NT/—/touch-screen, keyboard, touchpad	yes/yes yes/yes yes/yes/no no/yes yes/no open system n/a n/a instruments/reagents Object database/Windows XP/—/GUI
Software features/functionality • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature no LAS SW feature/LIS requirement LAS SW feature/LIS requirement LAS SW feature/n/a LAS SW feature/n/a LAS SW feature/LAS SW feature	LIS requirement/n/a LAS SW feature/n/a n/a/LIS requirement/LAS SW feature LIS requirement 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/LIS requirement LAS SW feature/— n/a/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner, Misisys, Data Innovations/RS232C, network Olympus interface format/conforms to ASTM 1381-91	—/HL7 or ASTM
No. of live sites installed in N. America/Outside N. America Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system	5/120 no — — yes/floor mounted/yes electricity/semiannual —/standard config. expands to twin-sorter or tandem with 2x capacity	—/— yes —/yes/500 yes 16x100, 13x100, 13x75, 13x100 yes/floor mounted/no compressed air, electricity/— single specimen container per carrier/yes
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* • Types of containers device can accommodate Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available • 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* • Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	no — — yes —/yes/800 16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht. yes —/yes/— 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 yes —/yes/800 16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht., sorting to any manufacturer's sample holder no — — yes —/yes/650 16x100, 13x100, 16x75, 13x75, 10–16 mm diam., 70–110 mm ht. yes/yes/yes	yes —/yes/up to 400 samples 13x100, 13x75 — yes —/yes/up to 500 16x100, 13x100, 13x75, 16x75 yes —/yes/up to 500 16x100, 13x100, 13x75, 16x75 yes —/yes/500 16x100, 13x100, 13x75, 16x75 no — — yes —/yes/up to 240 samples 16x100, 13x100, 13x75, 16x75 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 • Immunoassay/Urinalysis	no no sorts to any analyzer rack sorts to any analyzer rack sorts to any analyzer rack	yes — point-of-reference sampling & robotic arm interface for all three 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
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 — —	in development — —
Automated storage and retrieval available • 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes —/yes/800 16x100, 13x100, 16x75, 13x75, 10.5–17 mm diam., 70–110 mm ht. no open, modular systems are compatible with most instruments/systems 1–2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 no/no	yes —/yes/up to 500 samples 16x100, 13x100, 13x75, 16x75 — — 1–2 weeks/Ortho-Clinical Diagnostics/24/7 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	\$350k — — — — —	\$400k–\$2M, depends on configuration available upon request/available upon request available upon request/available upon request available upon request/available upon request available upon request/available upon request available upon request/available upon request
Distinguishing features (supplied by vendor)	• 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
* Ave. throughput in specimen containers per hr per device		

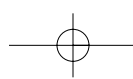
Tabulation does not represent an endorsement by the College of American Pathologists.



Laboratory automation systems & workcells

Part 7 of 10	PVT LabSystems LLC info@pvtlabsystems.com 225 Peachtree St. NE, Ste. 506 Atlanta, GA 30303 404-586-6837 www.pvtlabsystems.com	PVT LabSystems LLC info@pvtlabsystems.com 225 Peachtree St. NE, Ste. 506 Atlanta, GA 30303 404-586-6837 www.pvtlabsystems.com
<i>Please see accompanying article on page 22</i>		
Name of system/First year installed	Aliquoting System RSD 800A/2002	Workstation/2003
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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/yes (via software) yes/yes yes (via software)/yes open system 100% 80% of annual investment laboratory automation systems ISAM/QNX (Linux)/—/GUI	yes/yes yes/yes yes/yes/yes (via software) yes/yes yes (via software)/yes open system 100% 80% of annual investment laboratory automation systems ISAM/QNX (Linux)/—/GUI
Software features/functionality • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a/LAS SW feature n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature n/a LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a n/a/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature n/a LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a n/a/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, Misys, Vertex, Zavacore, Data Innovations/ASTM	Cerner, MCS, LDS, Medat, Systek, Providens, Mips, Bayer, Molis, Omega, Misys, Vertex, Zavacore, Data Innovations/ASTM
No. of live sites installed in N. America/Outside N. America Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system	2 (and 30 of former version)/17 (and 100 of former version) no — — — — — —	0/1 (and 17 of former version) no — — — — — —
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* • Types of containers device can accommodate Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available • 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* • Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	yes (upgradable to Workstation possible) ACM or ACM-8/yes/400 or 800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes input sorter/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes decapping module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes output sorter/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes QSI module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes aliquoting unit/yes/300 primary tubes if 100% aliquot. means 600 throughput 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes/yes/yes	yes ACM or ACM-8/yes/ACM=400; ACM-8=800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes input sorter/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes decapping module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes output sorter/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes QSI module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 yes aliquoting unit/yes/300 primary tubes if 100% aliquot. means 600 throughput 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92 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 • Immunoassay/Urinalysis	no no no/no/no no/no	no no no/no/no no/no
Instruments to which your system/product is interfaced	—	—
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	yes RCS module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92	yes RCS module/yes/800 16x100, 13x100, 16x75, 13x75, 11.5x65, 13x65, 15.3x92
Automated storage and retrieval available • 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	no — — — modules can be upgraded 2-3 weeks/PVT LabSystems/8 AM-5 PM M-F (24/7 avail. on request) no/no	no — — — modules can be upgraded 2-3 weeks/PVT LabSystems/8 AM-5 PM M-F (24/7 avail. on request) 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	\$215k-\$315k without automatic centrifuge module \$10k-\$40k/— \$109k/included included/included/— ~\$60k/included —/\$38k	\$330k-\$490k \$10k-\$40k/— included/included included/included/— ~\$60k/included —/\$38k
Distinguishing features (supplied by vendor)	• one platform (basic platform) can be assembled with all modules for a so-called all-in-one system • recapping module works with all different tube sizes • the quality module QSI (specimen integrity monitor)	• independent from any IVD company • automated centrifuge can work with tubes or racks • all kinds of tubes and racks can be used
* Ave. throughput in specimen containers per hr per device		

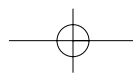
Tabulation does not represent an endorsement by the College of American Pathologists.

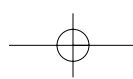


Laboratory automation systems & workcells

Part 8 of 10	Roche Diagnostics Peter Stegger peter.stegger@roche.com 9115 Hague Rd., Indianapolis, IN 46250 317-521-4033 us.labsystems.roche.com	Roche Diagnostics Peter Stegger peter.stegger@roche.com 9115 Hague Rd., Indianapolis, IN 46250 317-521-4033 us.labsystems.roche.com
<i>Please see accompanying article on page 22</i>		
Name of system/First year installed	PSD 1/1997; VS II/1999	Modular Pre-Analytics/1997; Hitachi/1990
Automation products that are available <ul style="list-style-type: none"> 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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/no no/yes PSD 1 (yes), VS II (no)/yes/no PSD 1 (no), VS II (yes)/PSD 1 (no), VS II (yes) no/no open system 15 employees n/a instruments, reagents —/Windows NT, Unix/—/—	yes/yes yes/yes yes/yes/no yes/yes yes/yes closed system (modular systems) 15 employees n/a instruments, reagents —/Windows NT, Unix/—/—
Software features/functionality <ul style="list-style-type: none"> Patient demographics & insurance data/Rules-based architecture Supports data retrieval/Internet connectivity Online real-time help system/QC/Stats & management reports 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 Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports approved NCCLS standards 	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a/LAS SW feature n/a 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/n/a 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/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 auto. sys.	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/SMART, Soft v1.x, Soft v2.x, Per Se, Antrim 3.x, Antrim (Common Cents), McKesson Starlab, McKesson Advantage, Homegrown Systems, TopLab, Omnitech, ASTM/Ethernet, HL7 2.4/Ethernet, HL7 2.1/Ethernet, HL7 2.4/serial	Cerner v3.x, Misys v5.2 w/o Smart, Misys v5.23 w/o Smart, Misys v5.3 w/o Smart, Misys v5.3 w/ 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 Transportation systems available <ul style="list-style-type: none"> Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions Types of containers device can accommodate Modular hardware/Installed options/Device functions independent of track Required utilities/Required maintenance Carrier type/Scalable system 	PSD 1, 50/130; VS II, 30/65 no — — 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap —/—/— compressed air, electricity/weekly multiple specimen container per carrier (5 positions)/yes	15/140 yes MPA system 3 or 7/yes/600 yes 16x100, 13x100, 16x75, 13x75, rubber or hemoguard yes/floor mounted/no, fully integrated automation & analytics electricity, water (for analyzers)/weekly multiple specimen container per carrier (5 positions)/yes
Automated centrifugation available <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none"> Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none"> Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none"> Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none"> 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 	no — — yes PSD 1/yes/900-1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap yes PSD 1/yes/900-1,200 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 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap VS II/yes n/a 16x100, 13x100, 16x75, 13x75 yes VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75 yes/yes/yes	yes system 3 or 7/yes/250 16x100, 13x100, 16x75, 13x75 yes, 2 can run at 500 per hr yes system 3 or 7/yes/600 16x100, 13x100, 16x75, 13x75 yes system 3 or 7/yes/400 16x100, 13x100, 16x75, 13x75 yes system 7/yes/500 16x100, 13x100, 16x75, 13x75 yes n/a 16x100, 13x100, 16x75, 13x75 yes system 7/yes/500 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none"> Rules-based instrument interface control subsystem Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none"> Hematology/Chemistry/Coagulation Immunoassay/Urinalysis 	no no no/no/no no/no	yes yes no/pt.-of-reference sampling/pt.-of-reference sampling pt.-of-reference sampling/no
Instruments to which your system/product is interfaced	none	Roche/Hitachi Modular Systems—Clin Chemistry, Immunoassay, Integrated Systems Stago•R
Other robotic products/components to which system, product is linked	none	—
Automated recapper available <ul style="list-style-type: none"> Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 	no — —	yes System 7/yes/500 16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available <ul style="list-style-type: none"> 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes 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) can be easily configured to meet changing workloads & demands 3 days to 1 week/Roche/24/7 no/no	no — no customers can place modules to increase capacity & functionality <2 weeks/Roche/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none"> 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 	PSD 1: \$175k; VS II: \$200k — — — —	\$300-\$800k, depending on system configuration n/a n/a n/a n/a n/a
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> 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 task targeted automation 	<ul style="list-style-type: none"> fully integrated and designed to work with analytics easy implementation, no hassles with third-party analyzers and interfaces total hands-off results driven by reliability high-level LIS expertise
* Ave. throughput in specimen containers per hr per device		

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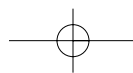


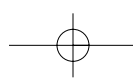


Laboratory automation systems & workcells

Part 9 of 10	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
Please see accompanying article on page 22		
Name of system/First year installed	Sysmex Systemization—HST-N/—	Alpha N Hematology Transport System/2000
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	Sybase/Windows 98, NT, Unix/—/—	Sybase/Windows 98, NT/Windows 98, NT/Windows
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/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/—
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner, Misys, SCC, McKesson, Triple G, Meditech, Molis, Antrim/ASTM, TCP IP	Cerner, Misys, SCC, McKesson, Triple G, Meditech, Molis, Antrim/ASTM, TCP IP
No. of live sites installed in N. America/Outside N. America	85/1,000	>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/—	Sysmex XE-2100, XE-2100L/—
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 (supplied by vendor)	<ul style="list-style-type: none"> • upgradable, scalable • proven automation in coag & hematology—10+ years • quick implementation—one week 	<ul style="list-style-type: none"> • upgradable, scalable • work area manager • proven automation—10+ years
* 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 10 of 10 <i>Please see accompanying article on page 22</i>	Tecan Donna Crook donna.crook@tecan.com Research Triangle Park, NC 800-352-5128 www.tecan.com	Thermo Electron Corp. Klas Vuorinen 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 <ul style="list-style-type: none"> • 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 % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	no/yes yes/yes yes/yes/in development yes/yes no/no open system 50% 15% lab automation systems Sybase SQL Anywhere/Windows NT—/dynamic download, host query	yes/yes yes/yes yes/yes/in development no/yes yes/in development open system — — lab automation systems and instruments, reagents object database/Windows XP—/GUI
Software features/functionality <ul style="list-style-type: none"> • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • 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 • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports approved NCCLS standards 	n/a/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a/n/a n/a LAS SW feature/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/n/a LAS SW feature/n/a LAS SW feature/—	LIS requirement/n/a LAS SW feature/n/a n/a/LIS requirement/LAS SW feature LIS requirement 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/LIS requirement LAS SW feature/— n/a/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Misys, SCC, Cerner, Citation, McKesson, Triple G, Molis, Per Se, Meditech/ASTM	—/HL7
No. of live sites installed in N. America/Outside N. America Transportation systems available <ul style="list-style-type: none"> • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system 	36/51 yes conveyor/—/— — 16x100, 13x100, 16x75, 13x75 —/—/— compressed air, electricity/— single specimen container per carrier/—	0/16 yes —/yes/1,000 tubes per hr yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/no compressed air, electricity/— single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated input/accessioning available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none"> • 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 —/—/300 @ 10-min spin time 16x100, 13x100, 16x75, 13x75 — yes —/—/500 16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard yes —/—/500 16x100, 13x100, 16x75, 13x75 yes —/—/500 16x100, 13x100, 16x75, 13x75, any manufacturer's rack yes — level sensing & clot detection yes —/—/— 13x75 prepackaged secondary tubes yes/yes/yes	yes —/yes/400 13x100, 13x75, 16x100, 16x75 yes yes —/yes/500 16x100, 13x100, 16x75, 13x75 yes —/yes/500 16x100, 13x100, 16x75, 13x75 yes — — yes —/yes/240 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none"> • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none"> • Hematology/Chemistry/Coagulation <ul style="list-style-type: none"> • Immunoassay/Urinalysis 	— — —/—/— —/—	— — —/pt.-of-reference-sampling & robotic arm interface/ pt.-of-reference sampling & robotic arm interface 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, Abbott Architect, Ortho Clinical Vitros 250AT & 950 AT
Other robotic products/components to which system, product is linked	—	—
Automated recapper available <ul style="list-style-type: none"> • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate 	no — —	in development —/—/— —
Automated storage and retrieval available <ul style="list-style-type: none"> • 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 Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	in development — — — contact vendor 6 weeks/Tecan and authorized service providers/24/7 no/—	in development — — — — 1-2 weeks/local distributor/depends on agreement no/no
List price Individual list prices for components <ul style="list-style-type: none"> • 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 	\$450k — — — — —	— — — — —
Distinguishing features (supplied by vendor)	• 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
* Ave. throughput in specimen containers per hr per device		

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

