

# HEWLETT-PACKARD JOURNAL

Volume 34 January 1983 through December 1983

# Index

Hewlett-Packard Company, 3000 Hanover Street, Palo Alto, California 94304 U.S.A.  
Hewlett-Packard Central Mailing Dept., Van Heuven Goedhartlaan 121, 1181 KK Amstelveen, The Netherlands  
Hewlett-Packard (Canada) Ltd., 6877 Goreway Drive, Mississauga, Ontario L4V 1M8 Canada  
Yokogawa-Hewlett-Packard Ltd., Suginami-ku, Tokyo 168 Japan

## PART 1: Chronological Index

### January 1983

- HP-IL: A Low-Cost Digital Interface for Portable Applications,  
Roger D. Quick and Steven L. Harper  
HP-IL Interconnect System, James H. Fleming  
The Electronics Interface for the Hewlett-Packard Interface Loop,  
Carl J. Landsness  
A CMOS Integrated Circuit for the HP-IL Interface, Steven L. Harper  
CMOSC: Low-Power Technology for Personal Computers, David E. Hackleman, Norman L. Johnson, Craig S. Lage, John J. Vietor, and Robert L. Tillman  
Advanced Oven Design Assures Repeatability in New Gas Chromatograph, Paul C. Dryden, Horace R. Johnson, Jr., and Douglas H. Smith  
What Is Gas Chromatography?, Fred W. Rowland  
Electronic Flow Control: A New Level of Automation for Gas Chromatography, Kurt B. Augenblick, Michael A. Casale, J. Edwin Cusack, and Andrew J. Murphy

### February 1983

- A Portable, Low-Cost, High-Performance Digital Multimeter for the HP-IL, Jack P. Trautman and Lawrence A. DesJardin  
Low-Cost and Portability Come to Data Acquisition/Control Products, James J. Ressmeyer  
Data Acquisition and Control Software for the 3421A Using the HP-85 Computer, David F. Leonard  
Low-Cost Instrument Control: A New ROM for the HP-41 Handheld Computers, David L. Wolpert  
Electronic Mail for the Interactive Office, Ian J. Fuller  
Integrated Tools Improve Programmer Productivity, Anil K. Shenoy and Carolyn M. Bircher

### March 1983

- Extensive Logic Development and Support Capability In One Convenient System, Michael W. Davis, John A. Scharrer, and Robert G. Wickliff, Jr.  
HP 64000 Terminal Software, Paul D. Bame  
The HP 64000 Measurement System, Kipper K. Fulghum  
Mainframe Design for an Integrated Engineering Workstation, Jeffrey H. Smith, Carlton E. Glitzke, and Alan J. DeVilbiss  
A Modular Analyzer for Software Analysis in the 64000 System, Richard A. Nygaard, Jr., Frederick J. Palmer, Bryce S. Goodwin, Jr., Stan W. Bowlin, and Steven R. Williams  
A Modular Logic Timing Analyzer for the 64000 System, Joel A. Zellmer, John E. Hanna, and David L. Neuder  
Emulators for 16-Bit Microprocessors, David B. Richey and John P. Romano  
High-Level Language Compilers for Developing Microprocessor Systems, Martin W. Smith and Joel D. Tesler

### April 1983

- A New Microcomputer-Controlled Laser Dimensional Measurement and Analysis System, Robert C. Quenelle and Lawrence J. Wuerz  
Dimensional Metrology Software Eases Calibration, Lawrence J. Wuerz and Christopher Burns  
Automatic Compensation, Deane A. Gardner  
Laser Optical Components for Machine Tool and Other Calibrations, Richard R. Baldwin, Larry E. Truhe, and David C. Woodruff  
Manufacturing the Laser Tube, Richard H. Grote  
Mechanical Design Features of the Laser Head, Charles R. Steinmetz

- Noise Figure Meter Sets Records for Accuracy, Repeatability, and Convenience, Howard L. Swain and Rick M. Cox  
Laboratory Notebook—Mass Storage Unit Exerciser

### May 1983

- 2-to-26.5-GHz Synthesized Signal Generator Has Internally Leveled Pulse Modulation, William W. Heinz and Paul A. Zander  
Sample-and-Hold Leveling System, Ronald K. Larson  
A Wideband YIG-Tuned Multiplier and Pulsed Signal Generation System, Ronald K. Larson and Lawrence A. Stark  
Autopeaking, Paul A. Zander  
Compact Digital Cassette Drive for Low-Cost Mass Storage, William A. Buskirk, Charles W. Gilson, and David J. Shelley  
Scientific Pocket Calculator Extends Range of Built-In Functions, Eric A. Evett, Paul J. McClellan, and Joseph P. Tanzini  
A Pocket Calculator for Computer Science Professionals, Eric A. Evett

### June 1983

- A Portable Computer for Field, Office, or Bench Applications, Donald E. Morris, Anthony S. Ridolfo, and Donald L. Morris  
A Telephone Interface for HP-IL Controllers, Sidnee Snell and Brian G. Spreadbury  
HP-IL and the HP-75 Portable Computer, Dennis C. York  
High-Capability Electronics Systems for a Compact, Battery-Operated Computer, Elizabeth Brooks, Robert J. Livengood, Rex C. Smith, and Timothy F. Myers  
Handpulled Magnetic Card, Mass Storage System for a Portable Computer, Kenneth R. Hoecker, James R. Schwartz, Francis A. Young, and Dean R. Johnson  
The HP-75 Production Card Recorder, David B. Patton  
Integration of the HP-75's Handpulled Card Reader Electronics in CMOS, Thomas J. Arnold and Billy E. Thayer  
A New Family of Pulse and Pulse/Function Generators, Michael Fleischer, Helmut Rossner, and Uwe Neumann  
Designing Bipolar Integrated Circuits for a Pulse/Function Generator Family, Christian Hentschel, Adolf Leiter, Stephan Traub, Horst Schweikardt, and Volker Eberle

### July 1983

- A High-Speed System for AC Parametric Digital Hardware Analysis, Andreas Wilbs and Klaus-Peter Behrens  
A High-Speed Data Generator for Digital Testing, Ulrich Hübner, Werner Berkel, Heinz Nüssle, and Josef Becker  
High-Speed Data Analyzer Tests Threshold and Timing Parameters, Dieter Kible, Bernhard Roth, Martin Dietze, and Ulrich Schöttmer  
Data Analyzer Software/Firmware Design, Roberto Mottola and Eckhard Paul  
Power Supplies for the Stimulus/Response System, Ulrich Otto and Horst Link  
New Multi-Frequency LCZ Meters Offer Higher-Speed Impedance Measurements, Tomio Wakasugi, Takeshi Kyo, and Toshio Tamamura

### August 1983

- VLSI Technology Packs 32-Bit Computer System into a Small Package, Joseph W. Beyers, Eugene R. Zeller, and S. Dana Seccombe  
An 18-MHz, 32-Bit VLSI Microprocessor, Kevin P. Burkhardt, Mark A. Forsyth, Mark E. Hammer, and Darius F. Tanksalvala

Instruction Set for a Single-Chip 32-Bit Processor, James G. Fiasconaro  
 VLSI I/O Processor for a 32-Bit Computer System, Fred J. Gross, William S. Jaffe, and Donald R. Weiss  
 High-Performance VLSI Memory System, Clifford G. Lob, Mark J. Reed, Joseph P. Fucetola, and Mark A. Ludwig  
 18-MHz Clock Distribution System, Clifford G. Lob and Alexander O. Elkins  
 128K-Bit NMOS Dynamic RAM with Redundancy, John K. Wheeler, John R. Spencer, Dale R. Beucler, and Charlie G. Kohlhardt  
 Finstrate: A New Concept in VLSI Packaging, Arun K. Malhotra, Glen E. Leinbach, Jeffery J. Straw, and Guy R. Wagner  
 NMOS-III Process Technology, James M. Mikkelsen, Fung-Sun Fei, Arun K. Malhotra, and S. Dana Seccombe  
 Two-Layer Refractory Metal IC Process, James P. Roland, Norman E. Hendrickson, Daniel D. Kessler, Donald E. Novy, Jr., and David W. Quint  
 NMOS-III Photolithography, Howard E. Abraham, Keith G. Bartlett, Gary L. Hillis, Mark Stoltz, and Martin S. Wilson

#### September 1983

A Color Presentation Graphics Workstation, Sharon O. Mead, William R. Taylor, Kenneth A. Mintz, and Catherine M. Potter  
 Designing Software for High-Performance Graphics, Robert R. Burns and Dale A. Luck  
 Logic Design for a Graphics Subsystem, Craig W. Diserens, Curtis L. Dowdy, and William R. Taylor  
 A High-Resolution Color Monitor, Mark Hanlon, Geoffrey G. Moyer, and Paul G. Winninghoff  
 The Graphics Workstation as an Extensible Computer Terminal, Edward Tang, Otakar Blazek, Thomas K. Landgraf, Paula H. Ng, and Stephen P. Pacheco  
 A Computer-Aided Test and Tracking System, Michael R. Perkins, Susan Snitzer, and Charles W. Andrews  
 Product Design of a Friendly Color Graphics Workstation, Dennis C. Thompson, Kenneth D. Boetzer, Mark A. Della Bona, and Badir M. Mousa  
 AUTOPLOT/2700: A Single Approach to Custom Chart Generation, Stanley A. Balazer and John M. Perry  
 PAINTBRUSH/2700: A General-Purpose Picture Creator, John R. Alburger, Jim L. Davis, Diane A. Rodriguez, and Barbara A. Stanley

#### October 1983

Ultrasound Imaging: An Overview, H. Edward Karrer and Arthur

M. Dickey  
 History of HP's Ultrasound System, John T. Hart  
 An Ultrasound Imaging System, Lawrence W. Banks  
 Quantitative Analysis for Ultrasound Imaging, Rachel M. Kinicki  
 A Physician's View of Echocardiographic Imaging, Richard L. Popp, M.D.  
 An Acoustic Transducer Array for Medical Imaging—Part I, John Larson, III  
 An Acoustic Transducer Array for Medical Imaging—Part II, David G. Miller  
 Transducer Test System Design, George A. Fisher  
 Radiated Power Characteristics of Diagnostic Ultrasound Transducers, Thomas L. Szabo and Gary A. Seavey  
 A Scan Conversion Algorithm for Displaying Ultrasound Images, Steven C. Leavitt, Barry F. Hunt, and Hugh C. Larsen  
 Ultrasound Image Quality, Richard A. Snyder and Richard J. Conrad  
 Coherent Speckle in Ultrasound Images, Paul A. Magnin

#### November 1983

Device-Independent Software for Business Graphics, Yvonne Temple  
 A Decision Support Chartmaker, Janet Elich Morris and Richard J. Simms, Jr.  
 An Easy-to-Use Chartmaker, Martha Seaver, Robert W. Dea, and Richard J. Simms, Jr.  
 Convenient Creation and Manipulation of Presentation Aids, Chayaboon Purnaveja and Janet Swift  
 Graphics Capabilities on a Laser Printer, Tamara C. Baker, William J. Toms, James C. Bratnober, and Gerald T. Wade  
 Special Report: The Center for Integrated Systems, Frederick H. Gardner

#### December 1983

Control Hardware for an Ultrasound Imaging System, Richard H. Jundanian, Janet R. Accettura, and John N. Dukes  
 Ultrasound System Software, Joseph M. Luszcz, William A. Koppes, David C. Hempstead, and Robert J. Kunz  
 Electronic Scanner for a Phased-Array Ultrasound Transducer, Ronald D. Gatzke, James T. Fearnside, and Sydney M. Karp  
 A Mixing Scheme to Focus a Transducer Array Dynamically, Robert N. McKnight  
 Display System for Ultrasound Images, Raymond G. O'Connell, James R. Mniece, and Alwyn P. D'Sa  
 Fused Silica Capillary Columns for Gas Chromatography, Paul A. Larson, Bruce L. Ryder, and Thomas J. Stark

## PART 2: Subject Index

Subject	Month	C	
		Calculator, handheld, computer science	Sept.
		Calculator, handheld, scientific	Nov.
		Calibration, electronic	Dec.
		Cardiac analysis, ultrasound	July
		Card reader, handpulled	Mar.
		Card recorder, production	Apr.
		Cassette drive, HP-IL	
		Center for Integrated Systems	
		Chart files	
		Chartmaker software packages	
		Chromatograph, gas	
		Chromatograph columns	
		Clock, IC, 18-MHz	
		Clock; IC, 18-MHz	
		CMOS IC, analog plus digital circuits	
		CMOS IC, card reader	
		CMOS IC, HP-IL interface	
		CMOS process	
		Code, MFM	
		Code, three-level, HP-IL	
		Color graphics	
		Color palettes	
	May	Columns, fused silica capillary	
	May	Comparator, LCZ measurement	
	Jan.	Compatibility, system testing	
	Oct.	Compensation, laser measurements	
	June	Compilers, high-level languages, logic development	
	June	Complex function calculations, handheld calculator	
	May	Complex matrix calculations, handheld calculator	
	Nov.	Component testing	
	Nov.	Computer, portable	
	Jan.	Contacts, external, VLSI	
	Dec.	Controller, memory, VLSI	
	Aug.	Controller, ultrasound system	
	June	CPU, 32-bit, VLSI	
	June	D	
	Jan.	Data acquisition/control, HP-IL	
	Jan.	Data bases, HPMALL	
	June	Data logging	

Data storage, cassette drive	May	HMAIL	Feb.	Multimeter, digital, HP-IL	Feb.
DC bias, programmable	July	HPToolset	Feb.	Multiple CPU architecture	Aug.
Decision support graphics software (DSG/3000)					
Defect control, VLSI process	Nov.	I			
Delay line, summing	Aug.	IC processing, CMOS	Jan.	NMOS-III process	Aug.
Design philosophy	Dec.	IC processing, NMOS-III	Aug.	Noise figure meter	Apr.
Detector, noise power	Feb.	IF assembly, noise figure meter	Apr.	Noise figure theory	Apr.
Detector, vector ratio	Apr.	Imaging, ultrasound	Oct./Dec.	Noise source	Apr.
Device-independent software	July	Image quality, ultrasound	Oct.	Noise temperature	Apr.
Digital control unit, signal generator	Nov.	Instruction set, HP-75	June	Nonlinearity, interferometer	Apr.
Dimensional metrology	May	Instruction set, HP 3421A	Feb.		
Diode noise source	Apr.	Instruction set, 32-bit CPU	Aug.		
Display subsystem, ultrasound imaging	Apr.	Instrument control, handheld computer		O	
Dynamic focusing, phased array	Oct./Dec.	Integrated Systems, Center for Integration, software packages	Feb.	Obstetric analysis, ultrasound	Oct.
		Intensity measurement, ultrasound	Nov.	Office automation, electronic mail	Feb.
		Interconnect system, HP-IL	Nov.	Optical system, laser	
		Interface, component handler	Oct.	interferometer	
		Interface, digital serial	Jan.	Oven, gas chromatograph	Apr.
		Interface, stripchart recorder	July		Jan.
Echocardiography	Oct./Dec.	Interface, telephone, HP-IL	Jan.		
Electronic flow control, GC	Jan.	Interferometer system, laser	Dec.	P	
Electronic mail	Feb.	Intermodule bus	June	Packaging, portable computer	June
Electronics system, portable computer	June	Intrinsics, graphics	June	Packaging, VLSI	Aug.
EMI, HP-IL	Jan.	Inverse assembler	Apr.	PAINTBRUSH/3000	Sept.
Emulators, 16-bit microprocessors	Mar.	Inverse assembly language	Mar.	Parallel operation, data analyzer	July
Equivalent circuit model, ultrasound transducer	Oct.	Iodine-stabilized laser	Nov.	Parallelism measurement	Apr.
Error processing, ultrasound system	Dec.		Mar.	Parameter testing, digital	July
ESD, HP-IL	Jan.	K	Apr.	Pellicles, VLSI photolithography	Aug.
ESD protection, portable computer	June	Keyboard scanning	Dec.	Phased-array transducer	Oct./Dec.
Excess noise ratio (ENR)	Apr.	KLM model, ultrasound transducer	Oct.	Photolithography, NMOS-III	Aug.
Exerciser, mass storage	Apr.			Physician's view, ultrasound systems	Oct.
F		L		Pick, CRT graphics	Sept.
Fiber optics, GC columns	Dec.	Laboratory Notebook: Mass storage exerciser		Picture creator (PAINTBRUSH)	Sept.
Figure files	Nov.			Pitch measurement	Apr.
File system, HPToolset	Feb.			pnp, electronic	June
File system, portable computer	June			Polar-to-rectangular coordinate conversion	Oct.
Files, multiversion	Feb.			Polygon area fill	Sept.
Finstrate, fabrication	Aug.			Position measurement	Apr.
Flatness measurement	Apr.			Power supply, CRT terminal	Sept.
Flow control, gas chromatograph	Jan.			Power supply, data generator/ analyzer	July
Focusing, dynamic,	Oct./Dec.			Power supply, display subsystem	Dec.
Fused silica capillary columns	Dec.			PRESENTATION/3000	Sept.
Fusing, polysilicon link	Aug.			Presentation graphics software	Sept./Nov.
G		M		Pressure transducer, GC	Jan.
Gain measurement	Apr.	Machine tool calibration		Processor-independent bus	Sept.
Gas chromatography	Jan./Dec.	Mail, electronic		Processor, I/O, VLSI	Aug.
Gas chromatography, fused silica columns for	Dec.	Master/slave cells, scanner		Production equipment, laser	Apr.
Graphics, color workstation	Sept.	Matrices, singular		Programming aid (HPToolset)	Feb.
Graphics, laser printer	Nov.	Matrix calculations, handheld calculator		Projection, DSG/3000	Nov.
Graphics software, business	Nov.	Measurement system, logic development system		Pulse/function generators, 20 and 50 MHz	June
Graphics tablet	Sept./Nov.	Medical instrumentation		Pulse generator, 50 MHz	June
H		Memory, bank-switched		Pulse generator, RF	May
Handler, component, interface	July	Memory system, 32-bit, VLSI		Pulse injection	May
Head, magnetic, assembly	May/June	Memory, ultrasound imaging		Pulse modulation system	May
HP 9000 Computer	Aug.	Message frame, HP-IL		Pulse transformer, interface electronics	Jan.
HPDESKMANAGER (formerly HMAIL)	Feb.	Metallization, VLSI		Pulse width generator (Rate IC)	June
HPDRAW	Nov.	Mixing, phased-array phase shifting			
HPEASYCHART	Nov.	M-mode imaging, ultrasound	Dec.	Q	
HP-IB, internal bus design	Dec.	Model, laser interferometer optics	Oct./Dec.	Queue processing, internal bus	Dec.
HP-IL, Hewlett-Packard Interface Loop	Jan.	Module, Memory/Processor		R	
HP-IL instruments	Feb.	Motor drive system, design		RAM, 128-bit, VLSI	Aug.
HP-IL peripheral, cassette drive	May	Multifrequency measurements		Range detection, logic state analysis	Mar.
HP-IL system, HP-75	June	Multimeter, digital, HP-IB		Rate integrated circuit	June
				Redundancy, VLSI RAM	Aug.
				Refractory metallization, VLSI	Aug.

Register map, HP-IL interface IC	Jan.	T	Sept./Nov.	U	Ultrasound intensity, definitions and measurement	Oct.
Relative error, complex functions	May	Tablet, graphics	Dec.	Ultrasound, radiated power	Oct.	
Restriction, DSG/3000	Nov.	Task management system	Sept.	Ultrasound system, medical	Oct.	
ROM/RAM intrinsics strategy	Sept.	Terminal, color graphics	Mar.	Ultrasound transducer, fabrication	Oct./Dec.	
<b>S</b>		Terminal software, logic development system		University research, industry support	Oct.	
Safety, ultrasound intensity levels	Oct.	Testing, automated, VLSI parameter	July/Aug.		Nov.	
Sample point, programmable	July	Testing, on-chip capability	Aug.			
Scanner, ultrasound system	Dec.	TGC (time gain compensation)	Oct./Dec.			
Self-describing (SD) files	Nov.	32-bit computer system				
Servo, velocity control	May	Timing analyzer	Aug.			
Signal generator, synthesized, 2-26.5 GHz	May	Timing analyzer subsystem	Mar.			
Sine shaper (Booster IC)	June	Timing chip (Rate IC)	June			
Slope generator (Snake IC)	June	TM/frame card	Dec.			
Snake integrated circuit	June	Transducer design, phased-array	Oct.			
Software analyzer subsystem	Mar.	Transducer, ultrasound	Oct./Dec.			
Software, data acquisition/control	Feb.	Transformation, DSG/3000	Nov.			
Software, performance overview	Mar.	Transformation matrices, HPDRAW				
Software, ultrasound system	Dec.	Transport system, electronic mail	Nov.			
Sorting, DSG/3000	Nov.	Transport mechanism, cassette drive	Feb.			
Speckle, coherent, ultrasound image	Oct.	Triggering, data generator/analyizer	May			
Stanford University, Center for Integrated Systems	Nov.	Tri-state pod	July			
State analysis subsystem	Mar.	Trucks, master and slave	Feb.			
State diagrams, HP-IL	Jan.	TSAM (HPToolset file access method)	Feb.			
Step-recovery diode bias	May	Tungsten, IC metal process	Aug.			
Storage cell, VLSI RAM	Aug.	Tuning, automatic, YIG-tuned multiplier	May			
Substrate, multilayer	Aug.	Two-layer resist process	Aug.			
Synthesized signal generator, 2-26.5 GHz	May					

## PART 3: Model Number Index

HP-11C	Calculator	Jan.	10772A	Turning Mirror	Apr.
HP-15C	Scientific Programmable Calculator	May	10773A	Flatness Mirror	Apr.
HP-16C	Programmable Calculator	May	10774A/75A	Straightness Reflector	Apr.
HP-41	Handheld Computer	Feb.	10776A	Straightness Accessory Kit	Apr.
HP-75	Portable Computer	June	10784A	Optical Square	Apr.
HP 9000	Computer	Aug.	10785A	Base	Apr.
346B	Noise Source	Apr.	11726A	Post and Height Adjuster	Apr.
2700	Color Graphics Workstation	Sept.	13273T	Service Support Kit	May
3056DL	Data Logging System	Feb.	16064A	Data Tablet	Sept.
3421A	Data Acquisition/Control Unit	Feb.	19091	Comparator/Handler Interface	July
3468A	Multimeter	Feb.	19306A/B/C	Fused Silica Capillary Columns	Dec.
3478A	Multimeter	Feb.		Electronic Flow Controller/ Pressure Regulator	Jan.
4145A	Semiconductor Parameter Analyzer		21200A	2.5-MHz Transducer	Oct.
4276A	LCZ Meter	Apr.	21205A	3.5-MHz Transducer	Oct.
4277A	LCZ Meter	July	21206A	3.5-MHz Transducer	Oct.
5508A	Measurement Display	July	21210A	5.0-MHz Transducer	Oct.
5518A	Laser Head	Apr.	21211A	5.0-MHz Transducer	Oct.
5528A	Laser Measurement System	Apr.	32108A	HPDRAW	Nov.
5790A	Gas Chromatograph	Jan.	32109A	HPEASYCHART	Nov.
5880A	Gas Chromatograph	Jan.	32110A	Business Graphics Package	Nov.
8111A	Pulse/Function Generator	June	32250A	DSG/3000	Nov.
8112A	Pulse Generator	June	32350A	HPToolset	Feb.
8116A	Pulse/Function Generator	June	36570A	HPMAIL	Feb.
8180A	Data Generator	June	36583	2680A Graphics Package	Nov.
8181A	Extender	July	44468A	Data Acquisition/Control	
8182A	Data Analyzer	July		Package ROM	Feb.
8673A	Synthesized Signal Generator	May	55280A	Linear Measurement Kit	Apr.
8970A	Noise Figure Meter	Apr.	55288A	Dimensional Metrology	
10751A	Air Sensor	Apr.	64100A	Analysis System	Apr.
10752A	Material Temperature Sensor	Apr.	64110A	Development Station	Mar.
10753A	Tripod	Apr.	64155A	Development Station	Mar.
10766A	Linear Interferometer	Apr.	64271A	Memory Controller	Mar.
10770A	Angular Interferometer	Apr.	64302A	Emulation Controller	Mar.
				48-Channel Analyzer	Mar.

64600S	Timing Analyzer	Mar.	82160A	HP-IL Interface Module	Jan.
64620S	Logic State/Software Analyzer	Mar.	82161A	Digital Cassette Drive	May/June
77020A	Ultrasound Imaging System	Oct./Dec.	82166A	HP-IL Converter	Jan.
77200A	Scanner	Oct./Dec.	82166C	HP-IL Interface Kit	Jan.
77400A	Display Subsystem	Oct./Dec.	82168A	Acoustic Coupler	June
77900A	Controller	Oct./Dec.	92233B	Book	July/Nov.

## PART 4: Author Index

Abraham, Howard E.	Aug.	Fucetola, Joseph P.	Aug.	Luszcz, Joseph M.	Dec.	Seavey, Gary A.	Oct.
Accettura, Janet R.	Dec.	Fulghum, Kipper K.	Mar.	Lutnesky, Gary G.	June	Seccombe, S. Dana	Aug.
Alburger, John R.	Sept.	Fuller, Ian J.	Feb.			Shelley, David J.	May
Andrews, Charles W.	Sept.					Shenoy, Anil K.	Feb.
Arnold, Thomas J.	June	Gardner, Deane A.	Apr.	Magnin, Paul A.	Oct.	Simms, Richard J., Jr.	Nov.
Augenblick, Kurt B.	Jan.	Gardner, Frederick H.	Nov.	Malhotra, Arun K.	Aug.	Slutz, Robert	Aug.
Baker, Tamara C.	Nov.	Gatzke, Ronald D.	Dec.	Mason, Lee S.	June	Smith, Douglas H.	Jan.
Balazer, Stanley A.	Sept.	Gilson, Charles W.	May	McClellan, Paul J.	May	Smith, Jeffrey H.	Mar.
Baldwin, Richard R.	Apr.	Glitzke, Carlton E.	Mar.	McKnight, Robert N.	Dec.	Smith, Martin W.	Mar.
Bame, Paul D.	Mar.	Goodwin, Bryce S., Jr.	Mar.	Mead, Sharon O.	Sept.	Smith, Rex C.	June
Banks, Lawrence W.	Oct.	Gross, Fred J.	Aug.	Mikkelson, James M.	Aug.	Snell, Sidnee	June
Bartlett, Keith G.	Aug.	Grote, Richard H.	Apr.	Miller, David G.	Oct.	Snitzer, Susan	Sept.
Becker, Josef	July	Hackleman, David E.	Jan.	Mintz, Kenneth A.	Sept.	Snyder, Richard A.	Oct.
Behrens, Klaus-Peter	July	Hall, Lawrence A.	Aug.	Mniece, James R.	Dec.	Spencer, John R.	Aug.
Berkel, Werner	July	Hammer, Mark E.	Aug.	Morris, Donald E.	June	Spreadbury, Brian G.	June
Beucler, Dale R.	Aug.	Hanlon, Mark	Sept.	Morris, Donald L.	June	Stanley, Barbara A.	Sept.
Beyers, Joseph W.	Aug.	Hanna, John E.	Mar.	Morris, Janet Elich	Nov.	Stark, Lawrence A.	May
Bircher, Carolyn M.	Feb.	Harper, Steven L.	Jan.	Mottola, Roberto	July	Stark, Thomas J.	Dec.
Blazek, Otakar	Sept.	Hart, John T.	Oct.	Mousa, Badir M.	Sept.	Steinmetz, Charles R.	Apr.
Boetzer, Kenneth D.	Sept.	Heinz, William W.	May	Moyer, Geoffrey G.	Sept.	Stoltz, Mark	Aug.
Bowlin, Stan W.	Mar.	Hempstead, David C.	Dec.	Murphy, Andrew J.	Jan.	Straw, Jeffery J.	Aug.
Bratnober, James C.	Nov.	Hendrickson, Norman E.	Aug.	Myers, Timothy F.	June	Swain, Howard L.	Apr.
Brooks, Elizabeth	June	Hentschel, Christian	June	Neuder, David L.	Mar.	Swift, Janet	Nov.
Bunting, Harry	Apr.	Hillis, Gary L.	Aug.	Neumann, Uwe	June	Szabo, Thomas L.	Oct.
Burkhart, Kevin P.	Aug.	Hoecker, Kenneth R.	June	Ng, Paula H.	Sept.		
Burns, Christopher	Apr.	Hübner, Ulrich	July	Novy, Donald E., Jr.	Aug.	Tamamura, Toshio	July
Burns, Robert R.	Sept.	Hunt, Barry F.	Oct.	Nüssle, Heinz	July	Tang, Edward	Sept.
Buskirk, William A.	May	Ikemoto, Jin-ichi	Apr.	Nygaard, Richard A., Jr.	Mar.	Tanksalvala, Darius F.	Aug.
Casale, Michael A.	Jan.	Jaffe, William S.	Aug.	O'Connell, Raymond G.	Dec.	Tanzini, Joseph P.	May
Chambers, Donald R.	Apr.	Johnson, Dean R.	June	Otto, Ulrich	July	Taylor, William R.	Sept.
Conrad, Richard J.	Oct.	Johnson, Horace R., Jr.	Jan.	Pacheco, Stephen P.	Sept.	Temple, Yvonne	Nov.
Cox, Rick M.	Apr.	Johnson, Norman L.	Jan.	Palmer, Frederick J.	Mar.	Terrell, William C.	Aug.
Cusack, J. Edwin	Jan.	Jundanian, Richard H.	Dec.	Patton, David B.	June	Tesler, Joel D.	Mar.
Davis, Jim L.	Sept.	Karp, Sydney M.	Dec.	Paul, Eckhard	July	Thayer, Billy E.	June
Davis, Michael W.	Mar.	Karrer, H. Edward	Oct.	Perkins, Michael R.	Sept.	Thompson, Dennis C.	Sept.
Dea, Robert W.	Nov.	Kessler, Daniel D.	Aug.	Perry, John M.	Sept.	Tillman, Robert L.	Jan.
DeBoer, Douglas F.	Aug.	Kible, Dieter	July	Popp, Richard L., M.D.	Oct.	Toms, William J.	Nov.
Della Bona, Mark A.	Sept.	Kinicki, Rachel M.	Oct.	Potter, Catherine M.	Sept.	Traub, Stephan	June
DesJardin, Lawrence A.	Feb.	Kohlhardt, Charlie G.	Aug.	Purnaveja, Chayaboon	Nov.	Trautman, Jack P.	Feb.
DeVilbiss, Alan J.	Mar.	Koppes, William A.	Dec.	Quenelle, Robert C.	Apr.	Truhe, Larry E.	Apr.
Dickey, Arthur M.	Oct.	Kunz, Robert J.	Dec.	Quick, Roger D.	Jan.	Vietor, John J.	Jan.
Dietze, Martin	July	Kyo, Takeshi	July	Quint, David W.	Aug.		
Diserens, Craig W.	Sept.						
Dowdy, Curtis L.	Sept.	Lage, Craig S.	Jan.	Reed, Mark J.	Aug.	Weiss, Donald R.	Aug.
Dryden, Paul C.	Jan.	LaMaster, Frederick P.	Aug.	Ressmeyer, James J.	Feb.	Wheeler, John K.	Aug.
D'Sa, Alwyn P.	Dec.	Landgraf, Thomas K.	Sept.	Richey, David B.	Mar.	Wickliff, Robert G., Jr.	Mar.
Dukes, John N.	Dec.	Landsness, Carl J.	Jan.	Ridolfo, Anthony S.	June	Wilbs, Andreas	July
Eberle, Volker	June	Larsen, Hugh C.	Oct.	Rodriguez, Diane A.	Sept.	Williams, Steven R.	Mar.
Elkins, Alexander O.	Aug.	Larson, John D., III	Dec.	Roland, James P.	Aug.	Wilson, Martin S.	Aug.
Evett, Eric A.	May	Larson, Paul A.	May	Romano, John P.	Mar.	Winninghoff, Paul G.	Sept.
Fearnside, James T.	Dec.	Larson, Ronald K.	Oct.	Rossner, Helmut	June	Wolpert, David L.	Feb.
Fei, Fung-Sun	Aug.	Leavitt, Steven C.	Aug.	Roth, Bernhard	July	Woodruff, David C.	Apr.
Fiasconaro, James G.	Aug.	Leinbach, Glen E.	Aug.	Rowland, Fred W.	Jan.	Wuerz, Lawrence J.	Apr.
Fisher, George A.	Oct.	Leiter, Adolf	June	Ryder, Bruce L.	Dec.		
Fleming, James H.	Jan.	Leonard, David F.	Feb.				
Fleischer, Michael	June	Link, Horst	July	Scharrer, John A.	Mar.	York, Dennis C.	June
Fogg, O. Douglas	Aug.	Livengood, Robert J.	June	Schöttmer, Ulrich	July	Young, Francis A.	June
Forsyth, Mark A.	Aug.	Lob, Clifford G.	Aug.	Schwartz, James R.	June	Zeller, Eugene R.	Aug.
		Luck, Dale A.	Sept.	Schweikardt, Horst	June	Zellmer, Joel A.	Mar.
		Ludwig, Mark A.	Aug.	Seaver, Martha	Nov.	Zander, Paul A.	May