

Contributors to This Issue

W. G. Albert, Bell Laboratories, 1951—. Mr. Albert was initially engaged in the physical design of terminal equipment for the L3 Coaxial System and microwave transmission systems. He also worked on the physical design and development of the A4 and A5 channel banks, L multiplex, mastergroup multiplex, and L4 and L5 coaxial system line repeaters. He is now supervisor of the Reliability and Digital Banks Physical Design Group. Member, IEEE.

Robert E. Anderson, B.S.E.E., 1940, University of Wisconsin; E. I. duPont de Nemours and Co., 1940-43; Radio Research Laboratory, Harvard University, 1943-45; Bell Laboratories, 1945—. At Bell Laboratories, Mr. Anderson has worked on the development of video transmission systems for television, the L3 carrier, automatic-restoral alarm circuits for N2 and N3 carrier, the equalizer remote control system for L4 carrier, and most recently, on the transmission surveillance system for the L5 carrier system. Member, IEEE, Eta Kappa Nu.

E. H. Angell, B.S.E.E., 1964, Union College; M.S. (E.E.), 1965, Harvard University; Bell Laboratories, 1964—. Mr. Angell has been engaged in circuit design work for coaxial systems. He is currently supervisor of the L5 repeatered line group. Member, IEEE.

John F. Barry, B.S., 1961, M.S., 1963 (Electrical Engineering), Northeastern University; Bell Laboratories, 1961-1972; Western Electric, 1972—. Mr. Barry initially worked on the development of the *Bellboy*® personal signaling receiver, the 3A FM terminals, and the 2A IF restoration switch system. Later he worked on the development of the jumbogroup frequency supply. Since 1972, he has been a member of a special design group.

R. K. Bates, AT&T Long Lines, 1941-1953; Bell Laboratories, 1953—. At Bell Laboratories, Mr. Bates has worked on private-line telegraph switching systems including the 82B1 system for the U.S. Navy and the Delta Airlines reservation system. In long-haul carrier work, Mr. Bates has worked on the L4 system and, most recently, on the basic jumbogroup trunk bay for the L5 system.

Philip J. Baun, Jr., B.S.E.E., 1959, University of Wisconsin; M.S.E.E., 1961, Northeastern University; Bell Laboratories, 1959—. Mr. Baun, a member of the Coaxial Systems Department, is responsible for the L5 transmission surveillance software. He has had previous experience in the design and development of passive networks and in the analysis and characterization of electronic circuits for toll transmission systems via analog and digital computation. Member, IEEE, Tau Beta Pi, Eta Kappa Nu.

Richard Ming-Ming Chen, Dipl. El. Eng., 1959, Chiao Tung University, China; M.S., 1965, Pratt Institute; Ph.D., 1968, Rutgers University; Faculty Member, El. Eng. Dept., 1959–1962, Peking Constructional Industrial College, Peking, China; Bell Laboratories, 1968—. Mr. Chen has been engaged in the areas of optimization, simulation, tolerance assignment, and partitioning techniques for large scale problems. Member, IEEE, Eta Kappa Nu, Sigma Xi.

Yo-Sung Cho, B.S.E.E., 1962, Seoul (Korea) National University; M.S., 1966, and Ph.D., 1968, Yale University; Honeywell E.D.P. Division, 1964–1965 and 1967–1969; Bell Laboratories, 1969—. Mr. Cho made equalization studies of the L5 coaxial transmission system employing manual and automatic equalizers. He was also engaged in the development of the equalizer adjustment system which is used for the equalization of the L5 line. His subsequent work includes design of exploratory repeater amplifiers for a future coaxial transmission system. He is presently supervisor of the group developing terminal multiplexing equipment for coaxial and radio transmission systems. Member, IEEE.

Fred A. D'Altroy, B.A., 1949, M.A., 1951, University of British Columbia; Ph.D., 1956, Purdue University; Bell Laboratories, 1955—. Mr. D'Altroy has been engaged in the development of semiconductor devices since 1956. He is currently supervisor of a group having responsibility for the Triac pnpn devices, pnp transistors, and npn ultra-linear transistor.

Albert F. Flint, A. E., 1962, Wentworth Institute; Bell Telephone Laboratories, 1962—. Mr. Flint has worked on the design and development of precision crystal oscillators. Since 1971, he has worked mainly on the development of clock oscillators for several systems.

J. L. Garrison, B.E.E., 1934, and M.E.E., 1936, Polytechnic Institute of Brooklyn; Bell Laboratories, 1936—. Mr. Garrison has worked on the design of transmission transformers, on the final development of transistors, and on technical publications. He now supervises a group engaged in development of transmission networks. Member, Sigma Xi, Tau Beta Pi, registered professional engineer in New Jersey and New Hampshire.

John H. Green, B.S.E.E., 1966, and M.S.E.E. 1968, Northeastern University; Bell Laboratories, 1966—. Mr. Green has been involved in various terminal system developments for L-carrier systems including mastergroup multiplex and line protection switching systems. He is currently involved in digital channel bank development. Member, Tau Beta Pi.

B. H. Hamilton, B.S.E.E., 1949, University of Kansas; Bell Laboratories, 1950—. Mr. Hamilton has worked on development of power conversion and control circuits, new energy conversion techniques, and medium- to high-voltage dc-to-dc converters. He is presently supervisor of a circuit-development group. Senior member, IEEE, member, Kappa Eta Kappa, Sigma Tau, Tau Beta Pi.

Charles F. Hempstead, B.S., 1949, Northwestern University; Ph.D. (Physics), 1955, Cornell University; Bell Laboratories, 1954—. Mr. Hempstead designed millimeter wavelength backward-wave oscillators and studied solids for maser applications until 1961. He was then concerned with Type II superconductors for high magnetic field generation, followed by research on visual perception of motion. Presently he supervises a group developing new applications of wide-band computer-controlled test equipment for precise component characterization. Member, IEEE, Sigma Xi, Phi Beta Kappa.

Fred J. Herr, B.S.E.E., 1942, Cooper Union; M.S., 1952, Stevens Institute of Technology; Bell Laboratories, 1936—. At Bell Laboratories, Mr. Herr was first engaged in the development of measuring equipment for coaxial transmission systems. He was later concerned with system design analysis of long-haul coaxial and type-N short-haul carrier systems. He participated in early feasibility experiments on color television transmission on coaxial systems and worked on the design specification of new video measuring equipment. He participated in the laying of the Alaskan and second transatlantic submarine cable

systems and did the system design analysis and terminal maintenance planning for the SD submarine cable system. Currently, he supervises the test equipment planning and application group for coaxial transmission systems. Member, Tau Beta Pi.

Richard M. Jacobs, B.S. (Chemistry), 1954, Brooklyn College; B.S.E.E., 1959, University of Wisconsin; M.S.E.E., 1961, Lehigh University; Bell Laboratories, 1959—. Mr. Jacobs has been engaged in the development of transistors and integrated circuits since 1959. He is currently head of a department responsible for the development of discrete devices and integrated circuits.

Frank C. Kelcourse, B.S.E.E., 1959, M.S.E.E., 1962, Northeastern University; Bell Laboratories, 1959—. Mr. Kelcourse worked initially on FDM terminals, including the design of transmission amplifiers, modulators, and carrier supplies, and subsequently on the design of wideband feedback amplifiers for the L4 line repeaters. He has supervised groups responsible for the final development of the L4 equalizing and remote control systems and for the equalization, planning, and design of the L5 system. He is currently supervisor of a systems studies and applications group responsible for analyses and applications related to analog, digital, and hybrid transmission systems. Member, Tau Beta Pi.

Kenneth P. Kretsch, B.S.E.E., 1959, Pennsylvania State University; M.E.E., 1961, New York University; Bell Laboratories, 1959—. Mr. Kretsch began at Bell Laboratories in the switching research area, participating in research into time-division switching systems. He also participated in the development of a message switching system and was responsible for system design of high-speed processors for use in telephone switching systems. Currently, he is responsible for equalization of the L5 coaxial cable system. Member, IEEE.

Y. L. Kuo, M.S. (E.E.), 1961, Oklahoma State University; Ph.D. (E.E.), 1966, University of California; Assistant Professor, 1966–1970, Purdue University; Bell Laboratories, 1970—. Mr. Kuo's primary interest is in the area of active device modeling and computer-aided analysis of nonlinear networks.

M. L. Liou, B.S., 1956, National Taiwan University; M.S., 1961, Drexel Institute of Technology; Ph.D., 1964, Stanford University;

Bell Laboratories, 1963—. Mr. Liou is presently supervisor of the Analysis and Interactive Computing Group providing analytical and computational support to the transmission system development at Merrimack Valley. His fields of interest have included system theory, numerical analysis, optimization, and computer-aided design of circuits and various components in radio and cable transmission systems. Member, IEEE, Eta Kappa Nu, Sigma Xi.

Michael M. Luniewicz, B.S.E.E., 1958, University of Massachusetts; M.S. (engineering), 1961, Northeastern University; Bell Laboratories, 1960—. Mr. Luniewicz has been engaged in circuit design and development for multiplex terminals and coaxial lines.

Robert E. Maurer, B.S.E.E., 1962, M.S.E.E., 1964, Ph.D., 1968, Northeastern University; Bell Laboratories, 1962—. In addition to supervising a group responsible for the development of analog multiplex equipment, Mr. Maurer has worked on the design of the equalizing repeater for the L4 system, the analysis and modeling of intermodulation distortion, the equalization of random channels, and analysis and exploratory development related to the transmission of high-speed digital signals over sharply band-limited analog channels. He presently supervises a system-planning group working on a new baseband digital system for exchange area application. Associate Editor, *IEEE Transactions on Communications*. Member, Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi, Sigma Xi.

Samuel Mottel, B.S.M.E., 1950, City College of New York; M.S.M.E., 1968, Newark College of Engineering; Bell Laboratories, 1952—. Mr. Mottel has been concerned with physical design of power equipment. He has worked on power for carrier systems, microwave systems, submarine cables, key telephones, ringing and tone plants. He supervises a group responsible for physical design of a variety of power equipment.

Joseph M. Nacci, B.S. (Physics), 1956, University of Rhode Island; Bell Laboratories, 1956—. Mr. Nacci has been active in the design and development of a wide variety of silicon transistors and integrated circuits. These include pnp transistors of all types, npn ultralinear transistors, silicon based capacitors, and pnp integrated circuits.

Sundaram Narayanan, B. Tech., 1960, Indian Institute of Technology, Kharagpur, India; M.S., 1963, and Ph.D. (Electrical Engineering), 1965, Carnegie-Mellon University; Bell Laboratories, 1965—. Mr. Narayanan has worked on nonlinear distortion in transistor amplifiers and the use of high-speed digital signals over band-limited analog channels. He was supervisor of a group developing precision signal source and is presently supervisor of a group working on a new multiplex arrangement for L5 and a basic repeater design for an advanced coaxial system. Member, IEEE, Sigma Xi.

James F. Oberst, B.E.E., 1964, Manhattan College; M.S., 1966, and Ph.D. (Electrical Engineering), 1969, Polytechnic Institute of Brooklyn; Assistant Professor of Electrical Engineering, Polytechnic Institute of Brooklyn, 1968–1969; Bell Laboratories, 1969—. Since joining Bell Laboratories, Mr. Oberst has worked on various aspects of PCM transmission over cable and synchronization for FDM terminal equipment. He is presently working on PCM channel banks.

Arthur Olsen, Jr., B.S.E.E., 1959, Worcester Polytechnic Institute; M.S.E.E., 1961, Northeastern University; Bell Laboratories, 1959—. Mr. Olsen has been responsible for the design and development of transmission networks and magnetic components. He presently supervises a magnetic components group.

Edward J. Panner, B.S.E.E., 1962, Lafayette College; Bell Laboratories, 1949—. Mr. Panner has been engaged in device development principally for transmission systems involving technologies ranging from klystrons and general-purpose tubes to transistors and integrated circuits. Member, Tau Beta Pi, Eta Kappa Nu, Phi Beta Kappa.

Henry S. Pustarfi, A.E., 1955, Newark College of Engineering; Bell Laboratories, 1951—. Mr. Pustarfi has worked on the development of quartz crystal filters, temperature-control circuits, and thermoelectric ovens. He is presently engaged in the development of crystal-controlled oscillators, temperature-control devices, and precision frequency standards.

Richard W. Sanders, B.S.E.E., 1959, University of Vermont; M.S.E.E., 1961, Northeastern University; Bell Laboratories, 1959–1972; Western Electric Company, 1972—. At Bell Laboratories, Mr.

Sanders was engaged in the development of coaxial transmission systems, specifically protection switching for the L4 and L5 Coaxial-Carrier Transmission Systems. At Western Electric, he is presently involved in test engineering for the voice-band interface frame and the digroup terminal for the No. 4 ess project. Member, IEEE, Tau Beta Pi.

T. H. Simmonds, Jr., B.S.E.E., 1954, University of Virginia; M.S.E.E., 1961, Northeastern University; Active Naval Reserve, 1954-1958; Bell Laboratories, 1954 and 1958—. Mr. Simmonds' early work was on a variety of filters and networks for long- and short-haul carrier transmission systems. As supervisor of a networks group in the Transmission Systems Networks Department he is responsible for work on transmission filters and networks for carrier and radio transmission systems. Member, IEEE, Tau Beta Pi.

Robert P. Snicer, B.S.E.E., 1966, and M.S.E.E., 1967, Massachusetts Institute of Technology; Bell Laboratories, 1967—. Since joining Bell Laboratories, Mr. Snicer has been engaged in transmission system development and computer-aided design. He presently supervises a network design group. Member, IEEE, Eta Kappa Nu, Tau Beta Pi, Sigma Xi.

John L. Thomas, B.S.E.E., 1957, University of Maine; M.E.E., 1960, New York University; Bell Laboratories, 1957—. Mr. Thomas engaged initially in circuit design work associated with special applications of submarine cable systems. He worked on systems analysis and supervised a group responsible for the circuit design of shore terminal transmission facilities associated with the SF submarine cable system. He later supervised a group responsible for repeater, equalizer, and special test set circuit design for submarine cable systems. He is presently responsible for the design of transmission surveillance and fault location circuitry for the L5 coaxial system. Member, Phi Kappa Phi, Tau Beta Pi.

Edward D. Walsh, B.S.E.E., 1965, Gannon College; M. Eng., 1966, and Ph.D., 1968, Rensselaer Polytechnic Institute; Bell Laboratories, 1968—. Mr. Walsh engaged initially in the frequency domain characterization of high-frequency active and passive devices. He has

developed a general-purpose frequency domain simulation program for transmission circuits. He is presently working on Monte Carlo simulation programs for transmission circuits. Member, IEEE.

R. J. Wirtz, B.S. (M.E.), 1950, Brown University; Bell Laboratories, 1956—. Mr. Wirtz was at first involved in resistor development and the physical design of the N3 Carrier System. He later supervised the physical design of the L4 Coaxial System. He is currently supervisor of the Coaxial System Physical Design Group responsible for the design of long-haul carrier systems.

Donald J. Zorn, A.A. (electronic engineering), Wentworth Institute, 1959; B.S. (industrial technology), Northeastern University, 1965; Bell Laboratories, 1959—. Mr. Zorn has worked in the development of A5 channel banks, L-multiplex, MMX-multiplex, and the L4 coaxial system, and is currently working on the L5 coaxial system. In addition, he has worked on several special development projects, including a carrier supply for channel banks used in the initial *Telstar* operations and a special pilot supply for the NORAD headquarters carrier system. Member, Sigma Epsilon Rho.