PROCEEDINGS

Papers presented at the
Seventh International Fiber Optic Communications and
Local Area Networks Exposition in the USA
Atlantic City, NJ USA, October 10-14, 1983
# CONTENTS

## OPENING SESSION SESSION 1 & 2 Fiber Optics & Local Area Networks

- "Developments in Sources, Detectors and Transmitters and Receiver Subsystems for Fiber Optic Communications"
  M. Ettenberg, RCA Laboratories, Princeton, NJ. ................................................................. 3
- "Looking Forward By Looking At the Past-A Review of the Past Year in the Fiber Optics Industry"
  P. Polishuk, Information Gatekeepers, Inc., Boston, MA. .................................................. 3a

## SESSION 3 Single Mode Technology and Applications

- "Trends and Achievements in Single-Mode Fiber Manufactured by OVD"
  C.M. Lemrow, Corning Glass Works, Telecommunications Products Division, Corning, NY. .......... 7-9
- "Optimized Design and Fabrication of Single-Mode Fiber"
- "Experience with Single-Mode Cables"
  J. Brouhard, Siecor Corp., Hickory, NC. .................................................................................. 15
- "The PCG Fibre - A Very High, NA, Large Core, Polymer Clad Fiber"
  L. Vacha, Sieverts Kabelverk AB, Sundbyberg, SWEDEN. ....................................................... 16-19
- "UV Cured Protective Coatings for Optical Fibers"
- "Advanced Splicing Equipment for Single Mode Fibre"
  Uwe Bottcher, Sieverts Kabelverk AB, Sundbyberg, SWEDEN. ..................................................... 21-25

## SESSION 4 Fiber Optics and Local Area Network Markets and Projections

- "Fiber Optics Markets and Projections"
  J. Fulenwider, Arthur D. Little, Inc., Burlington, MA. ............................................................... 29
- "Analysis of Japan's Optoelectronic Marketing Strategy"
  P. Polishuk, Information Gatekeepers, Inc., Boston, MA. ..................................................... 30-33b
- "Fiber Optic Test Equipment Markets"
  J. Hayes, FOTEC, Inc., Boston, MA. .......................................................................................... 33-35
- "Local Area Network Markets and Projections"
  T. Culmone, Arthur D. Little, Inc., Cambridge, MA. .................................................................. 36
- "Review & Trends in Fiber Optic Local Area Networking"
  A. Husain, Technology Strategy Center, Honeywell Control Systems, Roseville, MN. ................ 37-40

## SESSION 5 Interconnection of LANs with Other Networks

- "Slotted Ring Local Area Network Systems"
- "TRW Local Area Network Systems"
  L.V. Greene, Jr., TRW Defense Systems Group, Redondo Beach, CA. ................................. 47
- "Some Design Considerations for Fiber Optic Gateways"
- "Optical Atmospheric Communications in a Local Area Network"
  J. Fridman, The MITRE Corp., Bedford, MA. .......................................................................... 49-51
- "The Fibre Optic LAN Concept, ZAM-10-1"
  B. Viklund, Sieverts Kabelverk, Ericsson, Stockholm, SWEDEN. .............................................. 52-54
CONTENTS

SESSION 6 OFFICE APPLICATIONS OF LANs

"The Datapoint Arc Local Network: a Proven Token-Passing Local Area Network"
A.J. Malinger, Datapoint Corp., San Antonio, TX ................................................. 57-60

"WangNet - Reaching Beyond Tomorrow"
B. Richardson, Wang Labs, WangNET Div., Lowell, MA ........................................ 61-65

"IBM's Positioning in the Office Environment"
G. Kolony, Forrester Research, Cambridge, MA ..................................................... 66

"Application of LANs to the Office Environment"
P.M. Kay, Ztel, Inc., Andover, MA ................................................................. 67

"Overview: Office Applications of LANs"
J. McDowell, Radionics/Network Technology Corp., Salinas, CA .......................... 68

SESSION 7 Telephone Applications of Fiber Optics

"Intercom Systems with Fiber Optic Ring Bus and Internal Repeaters"
C.J. Georgopoulos, School of Engineering, University of Thrace, Xanthi, GREECE .................................................. 71-75

"The Fiber SLC™ System - A New Alternative to Metallic Feeder"
R.K. Samras and D. Setzer, Bell Laboratories, Whippany, NJ ................................ 76

"Advantages of OTDR Method of Evaluating Fiber Optic Telephone Cable"
Ben Dyner, Biddle Instruments, Blue Bell, PA .................................................... 77-79

"Telephone Applications of Fiber Optics - Markets/Applications" 
R. Runk, Western Electric Co, Burlington, MA .................................................... 80

"Optical and Geometrical Results of 46 Transmission Lines of Three Inter-Office Trials in Spain During 1982-1983"
R. Diaz del la Iglesia, J. Atin Balbas and J. Diaz Coetijo, Normative Tecnica, CTNE, Madrid, SPAIN .............................................. 81

SESSION 8 Next Generation Fiber Optics System Design Considerations

"A Comprehensive Computer Model for the Performance Analysis of a Wide Range of Fiber Optic Communication Systems"
B.S. Vidula, Optelecom, Inc., Gaithersburg, MD and T.W. Leonard and H.V. Do,
ITT Electro-Optical Products Division, Roanoke, VA ............................................ 85-91

"Reliability Considerations in Designing Fiber Optic Transmitters"
H.O. Sorensen, Hewlett-Packard Co., Palo Alto, CA ........................................ 92-94

"Design Considerations of Single-Mode Fiber Systems"
K. Ogawa, Bell Laboratories, Holmdel, NJ .......................................................... 95-96

"Design Considerations for Fiber Optic Data Communications Systems"
C. Bloom, Hewlett-Packard Co., Palo Alto, CA ................................................... 97-99

OTHER SPEAKERS
Dr. L. Campbell, M/A Com DCC Inc., Germantown, MD ...................................... 100

SESSION 9 Fiber Optics in the Local Area Network - I

"Macrolan: A High Performance Network"
R.W. Stevens, ICL Mainframe Systems Development Division, Manchester, ENGLAND .............................................. 103-107

"The AGORA Fiber Optic Local Area Network - Information Marketplace"
P.J. Nicholson, AETNA Telecommunications Laboratories, Westborough, MA ............. 108-112

"A Fiber Optic Local Area Network for Video, PCM and FDM Transmission"
S.S. Lympany, Siecor FiberLAN, Research Triangle Park, NC ................................ 113-116
## CONTENTS

"On Survivable Rings"

"A New Multiplexer System for IBM and ITT Courier Installation"
Dr. M. Weinberg, Fibronics International Inc., Hyannis, MA .......... 123

"Optical Fibers for Local Area Networks"
M. See, IBM Corp., Research Triangle Park, NC .......... 124

### SESSION 10 Military Applications of Local Area Networks

"Lanfots - A Fiber Optic Transmission Systems for a Local Area Network"
G.R. Mangus, Martin Marietta Aerospace, Denver, CO .......... 127-130

"A High Speed Local Area Network Using Spread Spectrum Code Division Multiple Access Techniques"
C. Smythe and C.T. Spracklen, University of Durham, UNITED KINGDOM .......... 131-134

"Implementation of a Local Area Network for Tactical Systems"
R. Foss, Sperry Univac, St. Paul, MN .......... 135

"Hyperlan: A High Performance Fiber Optics LAN"
Dr. K. Keiser, GTE Corp., Communications System Division, Needham Heights, MA .......... 136

"Local Area Design for Command Centers"
O. Gooding, Litton Systems, AMECOM Division, College Park, MD .......... 136a

### SESSION 11 Fiber Optic Passive Components

"Crosstalk Penalty in Digital Fiber Optic Systems Employing Wavelength Division Multiplexing Couplers/Decouplers"

"Prism Gratings for Fiber Optics Multiplexing"
R. Erdman, PTR Optics, Waltham, MA, C.H. Perry, Northeastern University, Boston, MA and C. Parmenter, PTR Optics Corp., Waltham, MA .......... 143-147

"Fiber Optic Cable Assembly Specifications"
J. Ellis, Siecor Corp., Hickory, NC .......... 148-148d

"Non-Reflective Fiber Components"
Bill Sinclair, JDS Optics, Ottawa, Ontario, CANADA .......... 149-150

"Recent Developments in Optical Directional Couplers"
Dr. Shahidi, Phalo Electron, Toronto, Ontario, CANADA .......... 151

"Injection Molded Active Bidirectional Coupler"
H. Roberts, AETNA Telecommunications Labs, Westboro, MA .......... 152-155

### SESSION 12 Trade-Offs Between LAN Transmission Media

"Computing Network Concepts and Technical Considerations"
R.W. Gibson, Boeing Computer Services, Seattle, WA .......... 159-162

"Design Procedure for Fiber Optic Local Area Networks"
M.R. Finley, Jr., Universite Laval, Quebec, CANADA .......... 163-171

"GNET: A Low Cost Star/RS232 LAN for Office Environments"
R.J. McQueen, Institute of Computer Science, University of Guelph, Guelph, Ontario, CANADA .......... 172-174

"Cost Trade-Offs of LANs"
R. DeMent, Digital Equipment Corp., Tewksbury, MA .......... 175-178

"Trade-offs Between LAN Transmission Media"
Dr. L. Campbell, M/A Com DCC, Inc., Germantown, MD .......... 179
SESSION 13 Military Applications of Fiber Optics

"System Considerations for Long Haul Fiber Optic Transmission System (FOTS-LH)"

"Overview - The Tactical Generic Cable Replacement Program"
R. Taylor, GTE Corp., Communications Systems Division, Needham Heights, MA .................. 185

"Field Expedient Fiber Optic Splice Kit"
L.N. Wesson and J.F. Larkin, TRW ECG Research and Developments Labs., Philadelphia, PA,
M.H. Hodge and J.G. Woods, TRW Fiber Optic Products, Connector Division, Philadelphia, PA,
C.E. Loscoe, U.S. Army Communications-Electronics Command (CECOM), Ft. Monmouth, NJ .................. 186-191

"Fibre-Optic MIL-STD-1553B Multiplex System"

"MIL-STD-1773: Status, Applications and Implementation"
D. Porter, ITT Electro-Optical Products Division, Roanoke, VA .................. 194

SESSION 14 Fiber Optics Local Area Networking - II

"Monet: A Multimedia Local Area Network for the Office of the Future"
A. Takagi, S. Yamada and S. Sugawara, NTT Yokosuka Electrical Communications Laboratories, Kanagawa, JAPAN .................. 197-202

"Implementation of D-NET at TRW Technology Research Center"
C. Tseng, B. Chen and A. Jalali, TRW Technology Research Center, El Segundo, CA .................. 203-207


"Bidirectional Light-Wave Bus"
A. Albanese, Bell Telephone Laboratories, Murray Hill, NJ .................. 214-215

"High Speed Fiber Optic Networking"
A. Husain, Technology Strategy Center, Honeywell Control Systems Roseville, MN,
and Dr. William R. Franta, Department of Computer Science, University of Minnesota, Minneapolis, MN .................. 216-221

SESSION 15 State-of-the-Art Fiber Optic Sources

"High Power AlGaAs Lasers for Optical Communications"
Dr. D. Botez, RCA Laboratories, Princeton, NJ .................. 225-231

"Short-Cavity Single-Frequency 1.3 \mu m InGaAsP Injection Lasers - A Review"
Dr. T.P. Lee, Bell Laboratories, Holmdel, NJ .................. 232-235

"Low Threshold Channeled Substrate Narrow Stripe 1.3 \mu m GaInAsP Lasers"
Dr. C.J. Hwang, General Optronics Corp., Edison, NJ .................. 236

"Long Wavelength Buried Heterostructure Lasers"
Dr. P.D. Wright, Bell Laboratories, Murray Hill, NJ .................. 237-240

"Vapor Phase Epitaxy Sources and Detectors"
Dr. G.H. Olsen, RCA Laboratories, Princeton, NJ .................. 241-246

"The Reliability of Diode Lasers"
Dr. P.J. Anthony, Bell Laboratories, Murray Hill, NJ .................. 247-249

"High Power Channeled Substrate Narrow Stripe GaAlAs/GaAs Laser with Double Current Confinements"
R.J. Fu, C.J. Hwang and C.S. Hwang General Optronics Corp., Edison, NJ .................. 250-252
CONTENTS

SESSION 16
Process Control Applications of Fiber Optics

"Field Experience with Process Control Application of Fiber Optic Communication"
P.M. Blaiklock, L.G. Heine and E.L. Weiss, Leeds & Northrup Co., North Wales, PA .................. 255-258

"Universal Wiring: A Fiber Optic Networking Concept"
W.B. Bielawski, Siecor FiberLAN, Research Triangle Park, NC .................................................. 259-261

"Fibre Optic Distributed Process Control System"
E. Hornung, NKT Electronics, Herlev, DENMARK ................................................................. 262

"Process Control Applications Utilizing Fiber Optics"
A. Fairaizl, Conductron Corp., Leominster, MA ................................................................. 263

SESSION 17 CATV Applications of Fiber Optics

"High Radiance, High Speed, Low Cost AlGaAs LED’s for CATV and LAN Applications"
A.H. Wey, and T.U. Robertson, and D.W. Stevenson, Motorola, Inc., Phoenix, AZ ..................... 269-271

"CATV Applications of Fiber Optics - The Warner-Amex Experience"
R. McDevitt, Warner-Amex, Plainfield, NJ .............................................................................. 272-275

"CATV Supertrunking Using Digital Transmission on Single Mode Fibers"
S.D. Personick, A. Jalali, T.V. Muiou, D. Arnstein and A. Jackson, TRW Technology Research Center, El Segundo, CA .............................................................. 276-279

"Experimental Teledistribution Network with Optical Fibres: the Network of Lille (FRANCE)"
P. Bocqueho, A Division of Thomson-CSF, Conflans, FRANCE, and B. Desert, CUDL, Lille, FRANCE ................................................................. 280-286

"MiniHub Experiences at Times Fiber Communications"
J. Herman, Times Fiber Communications, Inc., Wallingford, CT .............................................. 287

SESSION 18 Factory Applications of Local Area Networks

"The Hubnet Transport and Session Protocols"
P.I.P. Boulton and E.S. Lee, Computer Systems Research Group, University of Toronto, Ontario, CANADA .............................................................. 290-294

"Controller-Infrared Network Links"
C.J. Georgopoulos, School of Engineering, University of Thrace, Xanthi, GREECE .................. 295-299

"Fiber Optic Lever Displacement Sensors and Automated Reflectance Compensation Improvements"
C. Kissinger, Mechanical Technology, Inc., Latham, NY ...................................................... 300-304

"Simplified Transmitter/Receiver and Related Component for Local Area Networks"

"A New Duplex Connector for Local Area Networks"
R. Williams and P. Garner, Thomas & Betts, Corp., Raritan, NJ ............................................. 310

"A Local Area Network for Automated Robotic Vehicles"
R. Smith, Consultant, Stockton, CA .................................................................................. 311

SESSION 19 New Product Session — Fiber Optics and Local Area Networks

FIBER OPTICS

"Adhesiveless Termination of Fiber-Optic Connectors"
J. Ashman & T. Bowen, AMP Inc., Harrisburg, PA .............................................................. 317

"The FOTEC 11000 Fiber Optic Component Inspector"
P.W. Fitzgerald, Fotec, Inc., Boston, MA ............................................................................ 318

"Automatic Single-Mode Fiber Splicing"
H. Yoshida, Fujikura Ltd., Tokyo, Japan ............................................................................ 319
CONTENTS

“High Quality Fiber Optic Signal Source”
C. Hentschel, Hewlett-Packard GmbH., Boeblingen, WEST GERMANY

“Optical Fiber Attenuators”
W. J. Sinclair, JDS OPTICS Inc., Ottawa, CANADA

“WDM Couplers and Optical Switches”
W. J. Sinclair, JDS OPTICS Inc., Ottawa, CANADA

“Wavelength Division Multiplexing Using Reflective Optics”
N.S. Kapany and F.C. Unterleitner, Kaptron Inc., Palo Alto, CA

“Digital Optical TV Transmission”
E. Hornung, NKT Electronics, Herlev, DENMARK

“Digital Optical Telecommunications System”
E. Hornung, NKT Electronics, Herlev DENMARK

“Optical Fiber Dispersion Measurement System”
E. Hornung, NKT Electronics, Herlev, DENMARK

“Integrated Video, Voice & Data System”
E. Hornung, NKT Electronics, Herlev, DENMARK

“SE 10 Signal Enhancement System”
R.E. Park, Opto-Electronics, Oakville, Ontario, CANADA

“FS 10 Fiber Splitter Test”
R.E. Park, Opto-Electronics, Oakville, Ontario, CANADA

“High Performance Field Test Set-Model 2250XP”
P. Wendland, Photodyne Inc., Newbury Park, CA

“RE 601 Optical Time Reflectometer”
F. Leonhard, RE Instruments Corp., Westlake, OH

“Tau-tron’s 5410 Multimode Optical Loss Test Set”
D. Perlmutter, Tau-tron Inc., Chelmsford, MA

“Step Index Fiber and Cable & TFC Connectors”
M. Rubera, Times Fiber Communications, Wallingford, CT

LOCAL AREA NETWORKS

“Bridge Communications Product Line Overview”
E. Goldberg, Bridge Communications, Waltham, MA

“StationMate”
R. German, Complexx Systems Inc., Huntsville, AL

“First IEEE Standard for Broadband Local Area Network Modem”
T. Bolton, Concord Data, Waltham, MA

“The ARCNET Local Area Network: Design and Implementation of a Local Area Network”
A.J. Malinger, Datapoint Corp., San Antonio, TX

“LANtap: A High Performance Low Cost Optical Coupler”
P.A. Bulteel, GTE ATEA, ATEALAAN, Herentals, BELGIUM

“LAND: Local Area Network Driver”
J.J. Parker, Zenith Radio Corp., CRT and Component Sales, Glenview, IL

“Surface Acoustic Wave Filters”
J.J. Parker, Zenith Radio Corp., CRT and Component Sales, Glenview, IL