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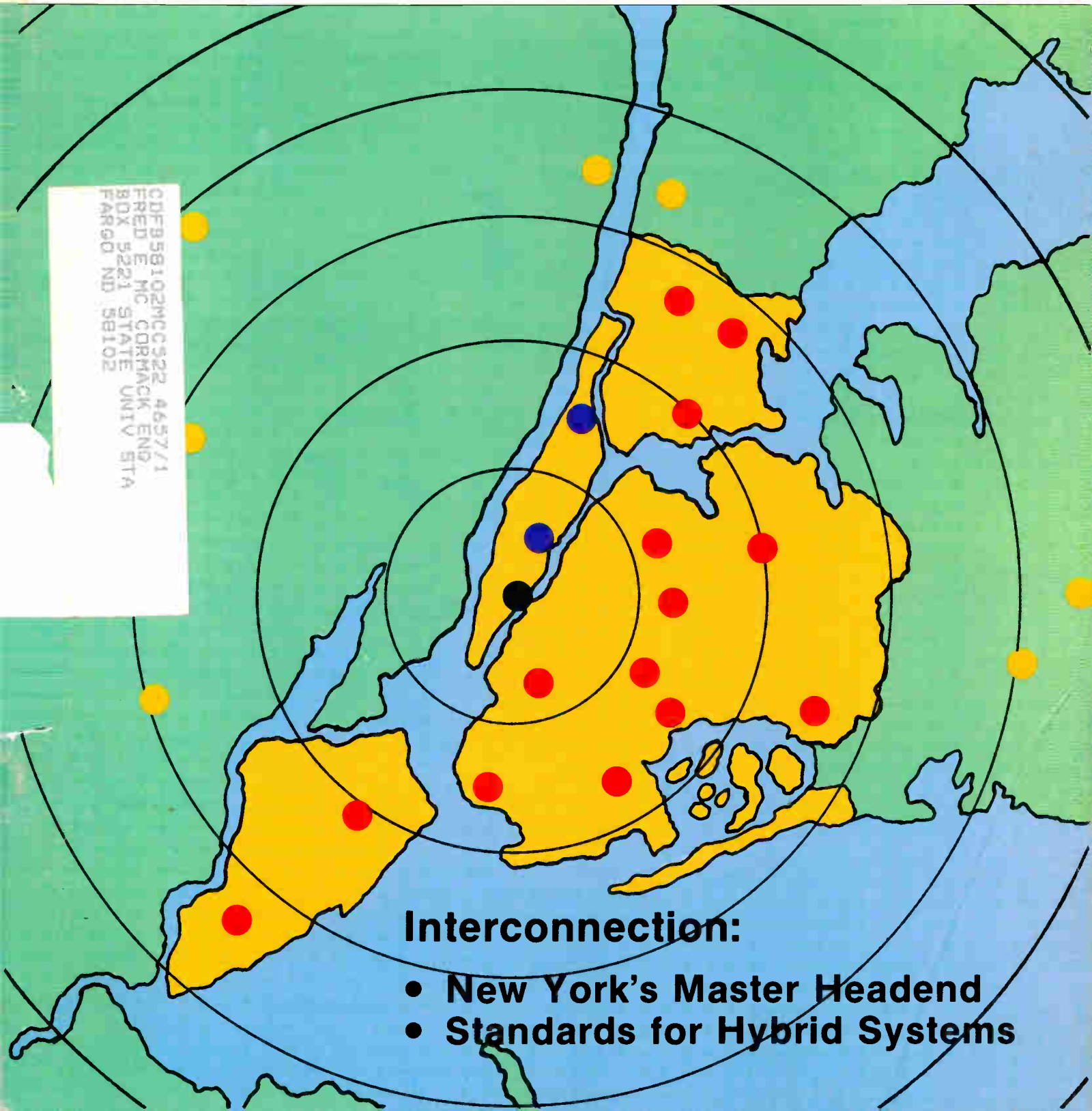
Communications Engineering Digest/The Magazine of Broadband Technology November 1981



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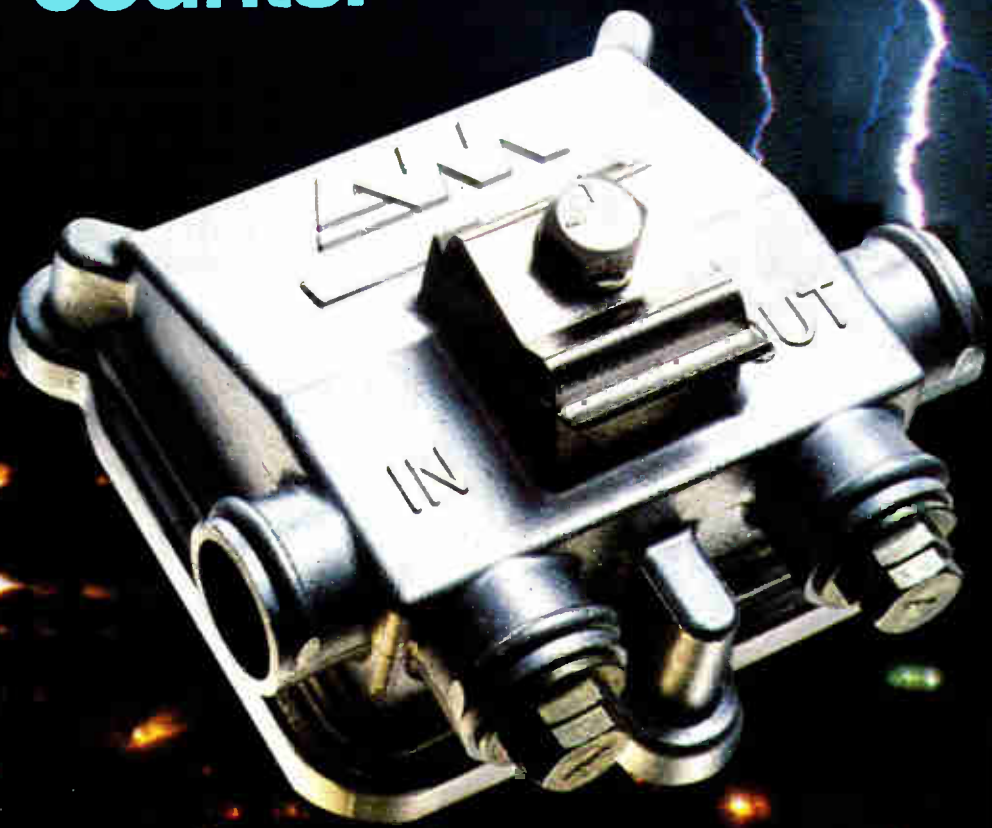

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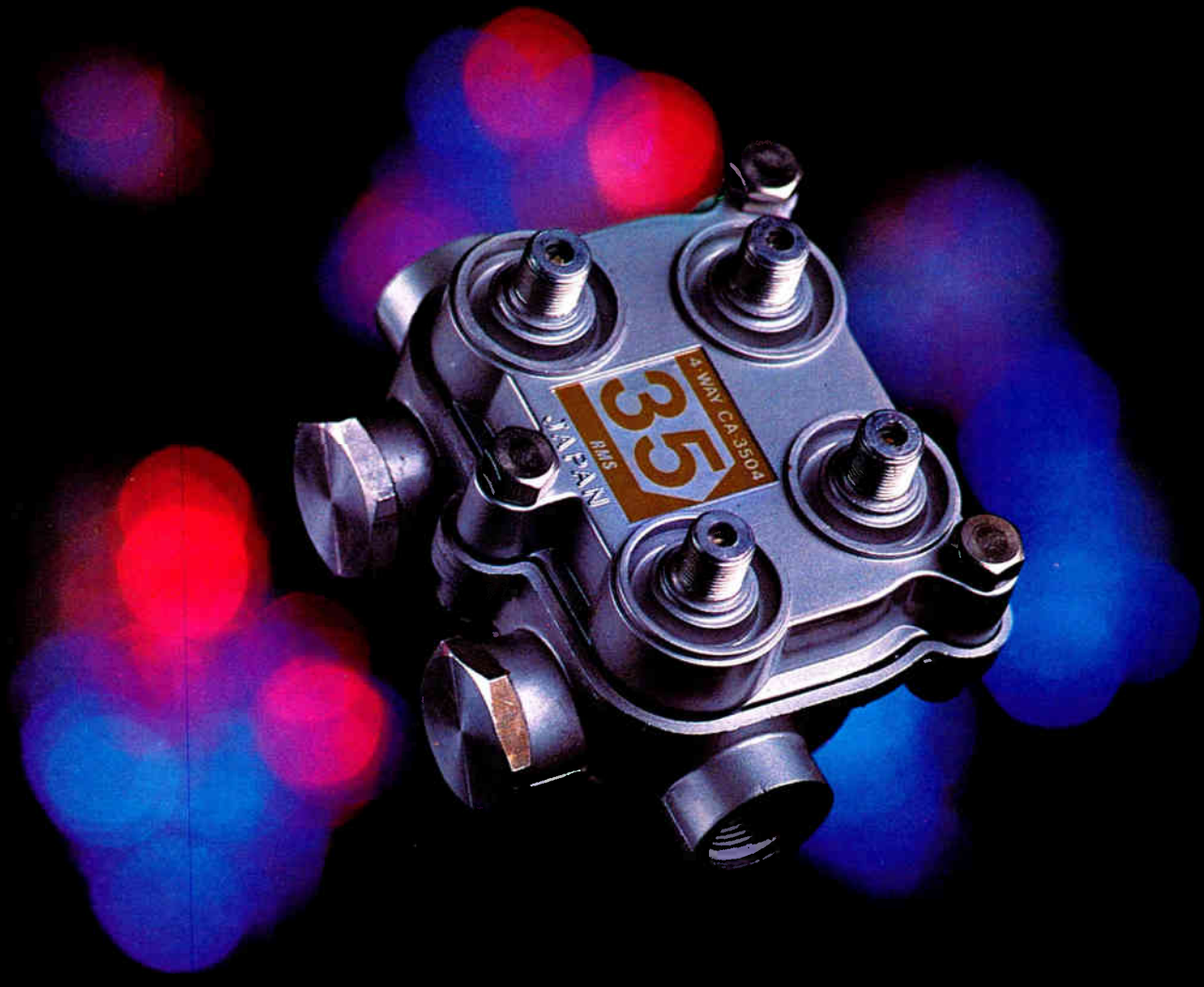

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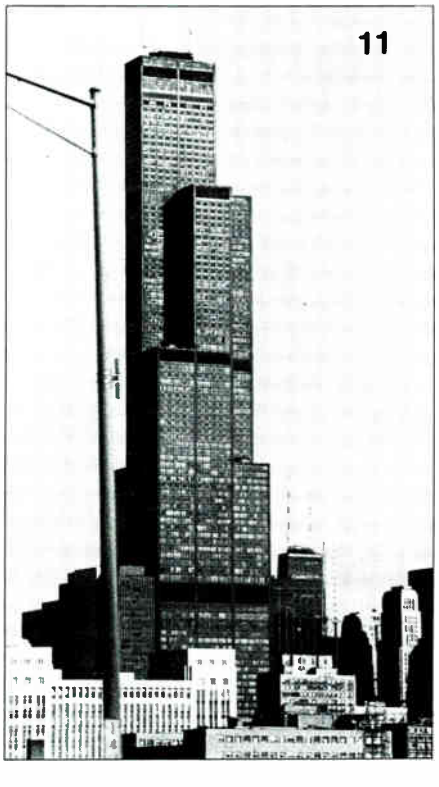

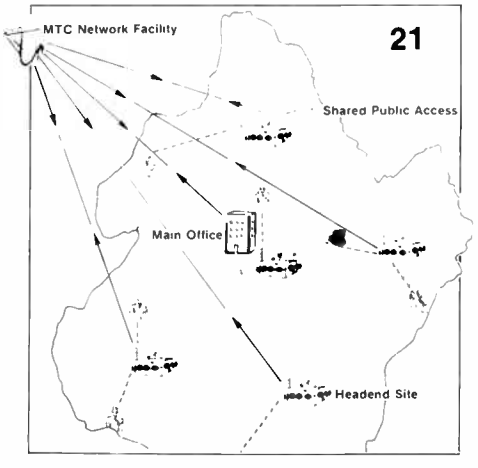

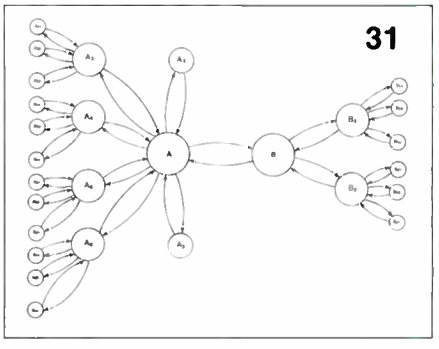

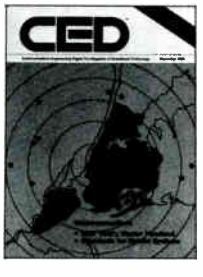

About the Cover
Manhattan will be the center of things for regional interconnection of the five New York boroughs' cable systems. The Metropolitan Transmission Center located in lower Manhattan will be the master headend.

CED (USPS 300-510) is published monthly by Titsch Publishing, Inc., P.O. Box Box 5400-TA, Denver, Colorado 80217 • November 1981, Volume 7, Number 11. Subscription Price: 1 year, $20.00; 2 years, $35.00. Canada and Mexico add $6.00, and other foreign subscribers add $12.00 per year. Second class postage paid at Denver, CO. **CED** is published on behalf of all parties, including the Society of Cable Television Engineers (SCTE). POSTMASTER: Please send form 3579 to P.O. Box 5400-TA, Denver, Colorado 80217. BPA membership applied for May 1981.

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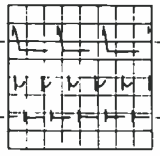

Must the Show Go On?

DBS may be the microwave of the future to the STV industry, but to Los Angeles County officials it's an unneeded toy that may cost taxpayers $15 million to relocate public safety microwave bands taken over by game shows and commercials. At a recent press conference aimed at turning Congressional attention to the problem, a county communication specialist explained that many public agencies and private firms ranging from the Southern California Rapid Transit District to Lockheed Aircraft now use part of the 12 GHz band which is most desirable for transmission of signals. County government, which has most of its law enforcement, fire protection, paramedic, data processing and mobile radio units geared to 12 GHz, would lose $15 million through overhauls of the Sheriff's department alone. County Supervisor Pete Schabarum, leading the fight against loss of the 12 GHz band, emphasized that Los Angeles is already "well-served" by various forms of television service, including seven VHF and nine UHF stations, and said it was "unconscionable" for the FCC to consider forcing L.A. county to spend millions on equipment alterations when health and welfare services are being cut back through lack of funds.

Fear of Spying

Cable's breaking into the emergency alarm business seems to have some traditional alarm companies fearful. At the International Security Conference and Exposition in New York, September 23 to 25, only two cable security manufacturers were in the lineup of exhibitors, TOCOM and CableBus Systems, and they were one booth away from each other in a side room off the main floor. A Thursday morning seminar titled, "Coaxial Cable for Alarm Monitoring and Its Effect on Residential Security," featured speakers from four security system companies that have ventured into cable operations. TOCOM and CableBus were not invited to speak and could only attend the seminar if they paid the full $50 fee. Both cable firms opted not to go. Conference attendees came away either confused or unconvinced of cable's capabilities in the home security market. While eschewing a conspiracy theory, the cable security exhibitors felt they did not receive a fair hearing.

Double Your Video

"Something of a revolution" is how NEC America, Inc., officials characterized their new digital video system for simultaneous transmission of two programs over one channel via satellite. Introduced in New York, the DV-10 (dual-video) transmission system takes two analog signals, digitizes them and horizontally compresses them into one signal for single channel up- and downlink via satellite transponder. At the earth station receiving end, the dual signal is decoded into two signals for analog transmission to viewers' sets. The DV-10 further offers the ability to provide time-base correction for videotape recordings supplied as input signals, according to NEC sources. "Both transponder users and broadcasters frequently use U-matic videotape recorders as input signals to their video transmission equipment and require relatively expensive TBCs to stabilize the signal for transmission," said Dennis Fraser, NEC vice president. "The NEC DV-10 simultaneously time-base corrects both input channels without the need for external equipment. Both channels may also be combined for a single input of normal characteristics as need dictates." Field tested in Japan, the dual-video system is considered by the company to be a significant advance over the alternate field method, vertical compression or other multiplexing techniques because picture resolution and other signal quality factors are not sacrificed. Applications will be in satellite transmission, long line transmission, teleconferencing and cable networking.

Dishes on the Menu

While news reporters munched on shrimp and avocado salad, roast beef, and broccoli souffle', company officials announced Channel Master's entree into the private and commercial earth station market. On the patio outside the Tavern-On-The-Green, amid the autumn leaves of Central Park, Channel Master's earth station antennas were demonstrated for the reporters. Almost in spite of this idyllic setting, company officials made it clear that Channel Master means business. Announced by Richard Deutsch, Channel Master executive vice president, the satellite reception system consists of a ten- to 16-foot dish-shaped antenna, a mounting system and electronic components. The antenna is manually rotatable but a remote control option will be available in 90 days, Deutsch stated. Deutsch emphasized that Channel Master's early entry into the earth station market and its substantial commitment in this area prepares the company for future developments, such as Direct Broadcast Satellites (DBS). Certainly one of the better dishes served to date, Channel Master's system competes for a share of a potential $5 billion market in the future, according to officials. Pass the strawberries, please.

Sowing OATS

Pending further testing by engineers at Savac International and Southern Satellite Systems, Inc., Savac's new 2.98-meter "OATS" earth station antenna's reception capabilities seem to be a mystery. According to Savac President Gil Hodges, "Just how it works is unclear." The dish looks like a typical parabolic divided into four parts by walls intersecting in the center of the dish, not unlike the dish a mother would serve to a baby just ready for solid food with the portions separated. However, company officials quickly suggest that the dish is not a parabolic antenna but a four-element array of isolated parabolic vectors. This special configuration, called off-axis target squelch (OATS), increases the ability of the antenna to receive a narrow beam signal and to reject off-axis signals from the side lobes. The internal walls which are parallel to the optical axis seem to somehow attenuate off-axis beams. The walls also contribute to temperature stabilization and structural strength while reducing torque due to wind velocity, according to company sources. If it does all that, who cares how?

Seminars

November

1-4: Scientific-Atlanta, Inc., will hold its seventh annual satellite communications symposium at the Hilton Hotel in Atlanta, Georgia. Ted Turner will be the luncheon speaker on 11/3. Contact Ray Stuart, (404) 441-4000.

1-4: The National Association of Educational Broadcasters will hold its 1981 annual conference at the Hyatt Regency Hotel in New Orleans, Louisiana. Contact the association at (202) 785-1100.

2-6: The Community Antenna Television Association is sponsoring a technical training seminar on system distribution, problems, failures, tests and measurements at the Harbor Motor Inn, West Sacramento, California. Contact the CATA Engineering Office, (305) 562- 7847.

3-5: NEPCON NORTHWEST '81 will be held at the San Mateo (California) Fairgrounds. Contact Cahners Exposition Group, (312) 263-4866.

3-6: The Pennsylvania Cable Television Association will hold its annual convention at the Pocono Hershey Resort. Contact the association at (717) 234-2190.

4-6: EFOC '81, the 2nd European Fiber Optics and Communications Exposition will be held in Cologne, West Germany. Contact Michael O'Bryant at Information Gatekeepers, (617) 739-2022.

5-6: TeleStrategies, Inc., is holding a seminar on "Telecommunications Technologies, Opportunities and Strategies for Senior Management" at the Twin Bridges Marriott, Washington, D.C. Contact Anita Greenberg, (703) 734-7050.

8-10: The Arts/Cable Exchange, sponsored by **University Community Video**, will explore the future of cultural programming on cable in Minneapolis, Minnesota. Contact Pat Brenna, (612) 376-3333.

8-10: Videotech II, a seminar on new media technology sponsored by **"Advertising Age,"** will be held at the Knickerbocker Hotel in Chicago. Contact Allison Jones, (312) 649-5243.

9-11: The **Subscription Television Association's** annual conference will be held at the Hyatt Hotel at the Los Angeles International Airport. Contact Valerie Backlund, (213) 827- 4400.

9-11: Scientific-Atlanta is holding a product training seminar at the Fiesta Motel in Tempe, Arizona. Contact Nancy Byers, (404) 441-4100.

10: A meeting of the **Southern California Cable Club** will be held at the Pacifica Hotel in Westchester. Contact Bruce Kaufman, (213) 278-5644.

10-12: The second annual **Visual Communications Congress/West** will be held at the Century Plaza Hotel, Los Angeles, California. Contact Marylou Donoghue, (212) 725- 2300.

11-13: The 24th annual **New York International Film and TV Festival** will be held at the Sheraton Centre Hotel in New York City. Contact Meredith Anthony, (212) 249-8572.

11-13: A product training seminar sponsored by **Scientific-Atlanta** will be held at the Sheraton Denver Tech Center, Denver. Contact Nancy Byers, (404) 441-4100.

12: The **Bay Area Cable Club** is holding a meeting at the San Francisco Press Club, San Francisco, California. Contact Diane DiSalvo or Lou Soucie, (408) 998-7333.

16: A meeting of the **Dallas Cable Club** will be held at the Hilton Inn, Dallas, Texas. Contact Buzz Hassett, (214) 421-1421.

16-17: The **SCTE** 1981 fall conference on 400 MHz technology will be held at the La Mansion Hotel, San Antonio, Texas. Contact the SCTE at (202) 293-7841.

16-17: TeleStrategies is sponsoring a conference on "Local Carrier Networks" at the New York City Sheraton. Contact Anita Greenberg, (703) 734-7051.

17-18: The annual convention of the **Tennessee Cable Television Association** will be held at the Opryland Hotel in Nashville. Contact Ruth Sharp, (502) 651-3126.

18: The **Appalachian Mid-Atlantic Group** will be holding a metting on "Long Haul Transmissions" at the Sheraton Inn in Hagerstown, Pennsylvania. Contact Don Rice, (800) 692-7370; or Lee Burkholder, (717) 263-8591.

19-20: A seminar on "Understanding Telecommunications Technologies for Non-Engineers" is being sponsored by **TeleStrategies, Inc.**, at the New York Sheraton in New York City. Contact TeleStrategies, (703) 734-7050.

20-22: The first Satellite Video Show, sponsored by **Satellite Television Technology International**, will be held at the Marriott Hotel in Anaheim, California. Contact SVS '81, (405) 396-2574.

29-December 3: The **1981 National Telecommunications Conference**, "Innovative Telecommunications—Key to the Future," will be held in New Orleans, Louisiana, at the Marriott Hotel. Contact Kenneth Black, (504) 586-2384.

30-December 1: Communications Technology Management and the **Annenberg School of Communications** are hosting the second annual "Telecommunications for the '80s" conference at the University of Southern California. Contact Regina Schewe, (703) 734- 3352.

December

1: Paul Kagan & Associates is sponsoring a seminar on "Cable TV Tax Investment" at the Disneyland Hotel in Anaheim. Contact Judy Pinney, (408) 624-1536.

2-4: The **California Cable Television Association's** annual convention, the Western Show, will be held at the Anaheim Convention Center in Anaheim, California. Contact the association, (415) 881-0211.

7-12: A **Community Antenna Television Association**-sponsored technical training seminar on system distribution, problems, failures, tests and measurements will be held at the Hotel Georgian Terrace, Atlanta, Georgia. Contact the CATA Engineering Office, (305) 562-7847.

10-11: "Satellite Communications" is the topic of a seminar sponsored by **TeleStrategies, Inc.**, at the Hyatt Regency O'Hare, Chicago, Illinois. Contact TeleStrategies, (703) 734-7050.

16: A meeting of the **Atlanta Cable Club** will be held at the Atlanta Stadium Club in Atlanta. Contact Cathy Kuhn, (404) 231-5358.

January

11-15: The fourth annual **Communications Networks 1982**

exposition will be held at the Atlanta, Georgia, World Congress Center. Contact Bill Leitch, (617) 879-0700.

February

7-10: The annual convention of the **National Religious Broadcasters** will be held at the Sheraton Washington Hotel in Washington, D.C. Contact the NRB, (201) 575-4000.
9-10: The **Arizona Cable Television Association's** annual convention will be held at the Phoenix Hilton Hotel. Contact the ACTA, (602) 257-9338.
17-19: The 22nd annual Texas Show sponsored by the **Texas Cable TV Association** will be held at the San Antonio Convention Center. Contact Bill Arnold, (512) 345-8888.
23-25: NEPCON West '82 will be held at the Anaheim (California) Convention Center. Contact Cahners Exposition Group, (312) 263-4866.

March

7-9: The annual convention of the **Ohio Cable Television Association** will be held at the Hyatt Regency in Columbus. Contact the OCTA, (614) 461-4014.
11-16: The **National Association of Television Program Executives'** 19th annual conference will be held at the Las Vegas Hilton in Las Vegas, Nevada. Contact NATPE, (717) 626-4424.
16-18: Information Gatekeepers Inc., is sponsoring COMSEC '82, the international communications security conference and exposition, at Boston's Hyatt Regency Cambridge. Contact Michael O'Bryant, (617) 739- 2022.

April

4-7: The 60th annual convention of the **National Association of Broadcasters** will be held at the Dallas Convention Center, Dallas, Texas. Contact the NAB, (202) 293-3500.

May

2-5: The **National Cable Television Association**'s 31st annual convention will be held at Las Vegas Convention Center, Las Vegas, Nevada. Contact Dan Dobson, (202) 775-3606.
4-8: The annual convention of **American Women in Radio and Television** will be held at the Hyatt Regency Embarcadero in San Francisco. Contact David Lindsy, (703) 471-5761.

June

6-9: The "Great Lakes Exposition," sponsored by the **Illinois-Indiana Cable TV Association,** will be held at the Indianapolis Convention Center. Contact (317) 662-0075.

September

15-17: The sixth international fiber optics and communications exposition, **FOC '82**, will be held at the Los Angeles Marriott Hotel. Contact Information Gatekeepers. (671) 739-2022.

October

26-28: The **Atlantic Cable Show** will be held at the Bally Park Place, Del Webb's Claridge and Brighton hotels in Atlantic City, New Jersey. Contact (609) 394-7477.

CED

Volume 7, No. 11

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Editorial

Challenge: Integrated Systems

An exciting and important new industry has been rapidly coalescing over the past decade out of several heretofore independent industries. These industries are converging due to the relatedness of their technological base—their common use of electrical modes of organizing, processing and transmitting of information. In this potentially massive converging of communications and computer technologies, or as some want to call it, 'compunications', cable television systems will or may play an important role.

Message content will consist of data, text, graphics, images, voice and music. The sources for these messages will be universities, libraries, government, businesses, offices, computers and the home. The means of transmission of these messages will be regional switching centers, satellites, microwave, telephone long lines and either optical fiber or coaxial cable or both. CATV systems may be the primary link to and from the home. I say may be because it is not clear at this time whether the cable industry will meet the challenge.

As two articles in this month's **CED** show, this is not just 'blue sky' talk that can be ignored for the time being. Regional transmission centers are a 'here-and-now' feature of the technical landscape. New York's Metropolitan Transmission Center (see the cover story, p. 21) will provide regional interconnection of the five New York boroughs and a complete headend package including commercial advertising insertion capabilities. Designed by Stern Telecommunications Corporation and to be built by 3M Corporation, the New York Metropolitan Transmission Center will serve as many as 2.5 million cable television homes. A master headend for the Chicago area will provide service to 1.5 million once the area is finally wired for cable. Chicago's regional transmission center project will be coordinated by Videopath, Inc., and will serve the ten major cable companies in the metropolitan area. Other major regional projects are being planned around the country.

Increasingly, the effort to achieve uniform compatibility standards for complex interconnected telecommunication networks that include cable systems for two-way interactive data retrieval for the home subscriber are resulting in progress. A feature article (see "Creating Standards for Interconnect Systems," p. 31) by engineers at Communications Technology Management, Inc., summarizes the standards effort and provides a system design model that incorporates a two-way cable system as a sub-node of the larger system.

But all this is predicated on the assumption that cable systems will meet the challenge of the future. It awaits the further evolution of two-way interactive cable networks with their broad bandwidth. And the broader the bandwidth the better.

It may seem incredible to some readers of **CED** but there are many in the cable television industry for whom the existence of this emerging data/telecommunications colossus comes as a revelation. It's true—some in the industry still think of CATV as essentially an entertainment medium and simply cannot conceptualize it as ever being anything else. And it may be this same segment of the industry that fears AT&T's entry into unregulated telecommunications areas without really understanding why they should worry.

Those who blindly fear the change occurring in this industry indeed have more to worry about than they realize. Moreover, this element may so retard the CATV industry as to cause it to miss real opportunities over the next 20 years. While it is true that virtually all of the big-city franchises now being awarded specify a two-way capability, one must always balance this with the sobering reality that over 60 percent of the cable systems nationwide have only a 12 channel capacity. For some, the "blue-sky" is just too bright to look at.

George Sell

Videopath Plans Chicago Master Headend

CHICAGO, ILLINOIS—Chicago has joined the ranks of those metropolitan areas planning regional cable interconnects.

Officials involved with the development of the interconnect, underway for some time now, are enthusiastic about the project. Executives of Videopath, Inc.—a subsidiary of Centel Communications, a major cable operator here—believe the interconnect represents a new frontier for video communications in the Chicago area.

"The network will give the cable companies, advertisers and programmers access to all Chicago area cable television viewers," said Videopath Vice President Jim Hurley. Videopath was formed last spring to develop the interconnect system.

Videopath officials are hoping to connect the ten major area cable companies to the network, which would give the interconnect aproximately 200,000 subscribers. But once the entire Chicago area is wired for cable, the network will have the potential of reaching over 1.5 million people.

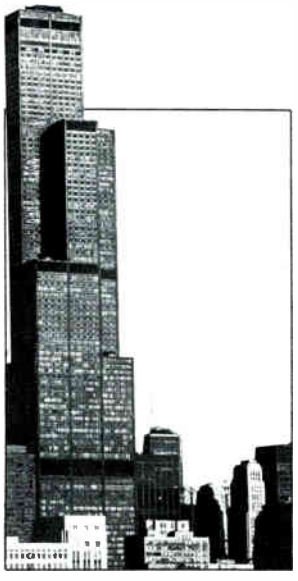
The system, which will operate over microwave links and have satellite uplinks for videoconferencing, will cost Centel about $3 million to construct, Hurley said.

Videopath has completed the necessary frequency surveys and clearance for ten key microwave paths encompassing the seven-county metropolitan Chicago area. This will accommodate the ten major cable companies at the time of the network's start-up.

The company is now filing construction permits with the Federal Communications Commission. Once permits are obtained, construction of the network will begin. Videopath officials have tentatively set the network's operating date for early 1982.

Officials are confident that the interconnect will be successful. "There is going to be a lot of interest," declared Hurley. He believes that as the entire Chicago area becomes wired, giving the network the ability to reach greater numbers of people, the cable industry will see the attractiveness of the idea.

Operating as a common carrier service, the network will be used to distribute regional programming—the type of programming which would not normally be carried by a cable system, said Russell G. Groshans, Videopath vice president of technical planning.



Chicago's interconnect system could link 1.5 million viewers.

He added that special switching capabilities will permit "discrete" connections between two or more cable systems. or microwave points for specific narrowcasting of local programming. Police, educational institutions, hospitals, municipal governments and businesses will also be able to communicate directly through the systems' videoconferencing and data exchange capabilities.

Videopath's interest in this network does not stop with the Chicago area. Ultimately the company would like to have the system hook up with interconnects in other metropolitan areas.

"We're setting our sights wherever our signals can go," said Hurley.

CBS Vaults into Videotex

NEW YORK—CBS Inc. and American Telephone and Telegraph Company confirmed the rumors that have been circulating for two weeks by announcing a joint field test of videotex programming. The experiment is scheduled to involve 200 homes in Ridgewood, New Jersey, beginning in the last quarter of 1982.

Under the terms of the agreement, AT&T will provide the computer software, input terminals and home terminals for the test. CBS will be responsible for all of the programming transmitted. Such programming will include news, sports, assorted information, entertaiment, children's education and various community services.

"Assuming our ability to get local participants, the community services will include banking and home shopping, but that will oepend on the willingness of local merchants," said Barry Smith, vice president of technology for CBS Inc.

AT&T will not be involved in providing any of the programming software. This is a corporate decision that was made to conform to the tenor of S. 898, the telecommunications legislation that requires AT&T to separate itself from the information provided if AT&T controls the conduit.

CBS would not release precise details of the financial commitment involved, but Smith did give some indications.

"CBS and AT&T are splitting the cost of operating the test right down the middle," he said. "We'd announced earlier this year that CBS has a corporate development fund involving cable programming, videodisc, motion picture production and a number of activities that is in the $40 to $50 million range annually. We're prepared to say that this test is an important part of that development fund."

The videotex experiment will be conducted in two phases: the first 100 homes will receive the videotex programming during late 1982 and the second 100 will take part during the first quarter of 1983. CBS and AT&T will procure the transmission facilities from New Jersey Bell at standard tariff rates.

"The telephone system is more than adequate to deliver the kinds of services that we want to test," said Smith, "but some other time in some other place we could deliver the same services through a two-way cable system."

Smith said there are no plans to test videotex over a cable system at the present time, however.

"The next step depends upon the outcome of this test," Smith said. "Obviously, we're hoping we can find business ideas that are solid enough in terms of customer response that we could move into a videotex business."

Videotex Test To Include Bank-at-Home Services

SAN FRANCISCO, CALIFORNIA—Starting in the second quarter of 1982, the Times Mirror Company will initiate a pilot experiment in 350 homes in the Mission Viejo and Palos Verdes area in southern California.

Times Mirror will use Telidon Marc III decoders and will install a 19-inch color TV set in each of the test homes. Half of the homes will test the transmission of data using telephone lines while the other half will use two-way cable facilities.

Jim Holly, vice president for T-M, would not disclose the amount of money being spent on the experiment, but indicated that "it represents several million dollars."

The Bank of America, a division of Bank America Corporation, will be involved in the home banking part of the experiment. Transaction banking and other services are planned. A T-M computer will serve as a gateway into the bank's computers, which will record and process the customers' transactions.

Airline guide information and home shopping (Comp-u-Card) will also be tested. Installation will begin in January with the test to start in February. The entire *Los Angeles Times* classified section will be on-line and retrievable without the use of the tree structure.

"This is an advanced field trial. We believe there is a business here," said Holly.

United Video Wins Rights to Vertical Interval

CHICAGO, IIIINOIS—United Video has won a major victory in a squabble with WGN over the rights to the vertical interval in video transmissions. A judge in U.S. District Court for the Northern District of Illinois denied WGN's request for injunctive relief and dismissed the case filed by the television station earlier this year.

The problem began in February 1981 when WGN began experimenting with data transmission using its vertical interval. WGN planned a data trial for a cable system the company owns in Albuquerque, New Mexico. However, when WGN tried to transmit the data, it discovered that United Video, the common carrier that delivers WGN to cable systems via satellite, was already using the vertical interval for its own experiments with data transmission. WGN filed suit, charging United Video with copyright infringement.

WGN's data was not part of the picture, says Tom Keenze, United Video's vice president for engineering.

"We didn't consider WGN's data to be part of the picture," explained Tom Keenze, United Video's vice president for engineering and operation. "It's a separate service transmitted separately to a closed group of people who can only access it with equipment other than a normal television receiver. Apparently, the judge agreed."

FCC Extends Deadline Of Computer II Decision

WASHINGTON, D.C.—The Federal Communications Commission has extended its March 1, 1982, deadline for implementing the deregulation of new customer premise equipment (CPE). The new timetable sets January 1, 1983, as the milestone for AT&T to begin offering CPE through the separate subsidiary mandated by the FCC's Second Computer Inquiry decision (Computer II).

At the same time, the FCC determined that a bifurcated approach to implementing Computer II was preferred to a "flash cut", or all-at-once, approach. Under the bifurcated plan, the CPE will be deregulated with a "phased-in" approach. The commission said this approach would halt the growth of equipment that eventually must be deregulated, while allowing AT&T and other carriers to begin operating in the competitive marketplace on a nonregulated basis.

Executives Leave Magnavox To Make CATV Equipment

MANLIUS, NEW YORK—Former Magnavox CATV Division President Daniel Mezzalingua has formed a new company to develop and sell electronic equipment for cable services.

"Cable television is on the verge of an explosion in services and I want to be there," Mezzalingua said after his sudden departure from Magnavox in September. Mezzalingua said he had a desire to launch a company to take advantage of the expected "explosion."

The company, named Octagon Scientific, Inc., will provide products for pay programming services as well as the expanding interactive services.

As the cable industry becomes more sophisticated with more consumer services and channels, and as the number of American homes wired to cable increases, Mezzalingua believes that the industry will require a "new type of home channel selector."

Daniel Mezzalingua left Magnavox to start his own cable equipment company.

Other products his new firm plans to develop include:

- Electronic devices that will enable subscribers to have contact with computer information banks to obtain data and information on a variety of topics.
- Computerized equipment to aid the cable operator to reach and activate the converters in his system; eliminating the need to make service calls to subscribers' homes.

These products will not compete with Magnavox, according to Mezzalingua, who said that Octagon will manufacture equipment which will be complementary to products made by Magnavox's CATV division.

Mezzalingua said he decided to leave because he was an "entrepreneurial type" and because he and Magnavox had a difference of opinion over long range strategic goals for the CATV division.

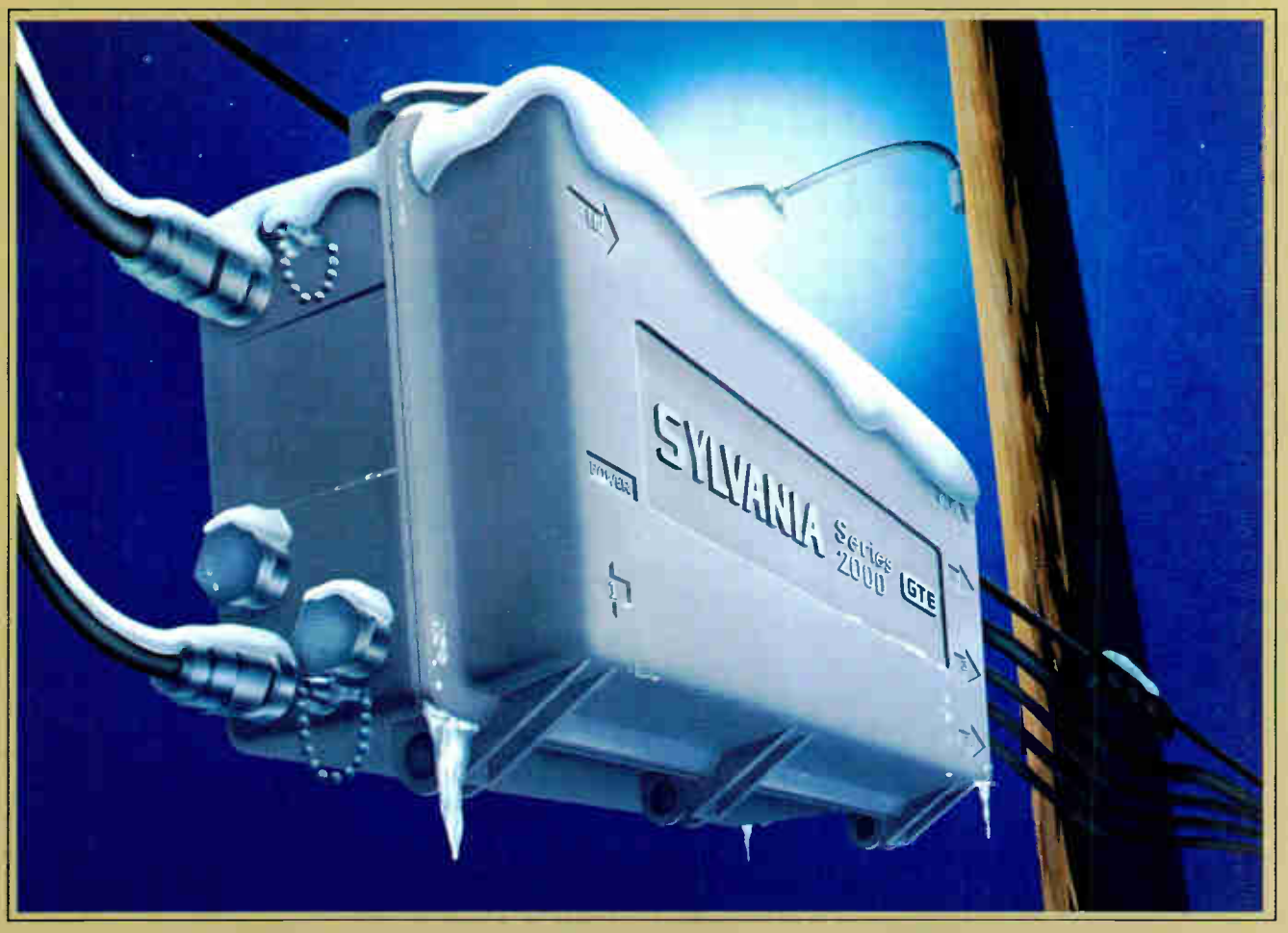
Magnavox CATV Chairman and North American Philips Corporation Vice President Frederik Engle has been named to replace Mezzalingua as head of the division.

In forming his new firm, Mezzalingua brought in three top executives from Magnavox CATV: former international sales manager Peter Warburton, former research and development director Martin Zilenz, and former product engineering director Mike Goldsmith.

Mezzalingua and the other executives have just completed organizing the company and are now discussing with several manufacturers plans for interim production of the equipment Octagon will develop.

The company's own manufacturing facility will begin operation in several years, Mezzalingua said.

The Sylvania 400 MHz line. The signal must go through.



Through rain and snow and sleet and the worst electrical storms, Sylvania amplifiers will deliver your signal.

Whether it's 300 MHz or the new 330 MHz and 400 MHz line, our amplifier stations are made to take a beating from Mother Nature—and come up winners.

If lightning strikes, you're safe. Our Amplifier Stations are equipped with extremely fast acting surge protection devices. What's more, our accurate level and slope control maintains stable output through summer heat and winter cold.

The corrosion-resistant, diecast aluminum housing with a unique, single metal-rubber gasket keeps the weather outside, and the efficient thermal design insures cool and reliable operation inside.

You can't take chances on equipment that will cut off your customers in mid-program. That's why you need Sylvania. We've put our reputation for quality on the line, a reputation that's been standing up to the elements since 1970.

Our new manufacturing plant, a 400 percent increase in staff and computerized customer services all help to make sure that you get reliable Sylvania products when you want them.

For complete details, contact your local Sylvania CATV Transmission Systems sales office. Or phone toll free 800-351-2345 within the continental U.S., except Texas. From Alaska, Hawaii and Texas, call (915) 591-3555 collect.

We'll come through for you.

SYLVANIA CATV Transmissions Systems | GTE

See Us in Booth 115 at the Western CATV Show.

"OUR NEW SONY ALL KNOWN

"Finally there's a ¾-inch recorder that doesn't just inch along," says Fred Rheinstein, president of The Post Group.

A major post-production facility in Hollywood, The Post Group counts among its clients all three networks, PBS, and major cable TV and syndicated production companies. It will edit the new syndicated children's show "We're Moving" entirely on the BVU-800.

"The 800 is amazingly fast. To be able to go backward and forward at 40 times play speed means you can search for your edit points—and find them—more than twice as fast as ever before," continues Rheinstein. "And this machine goes from its highest speed to a still frame. Instantly. Without slewing or breaking up.

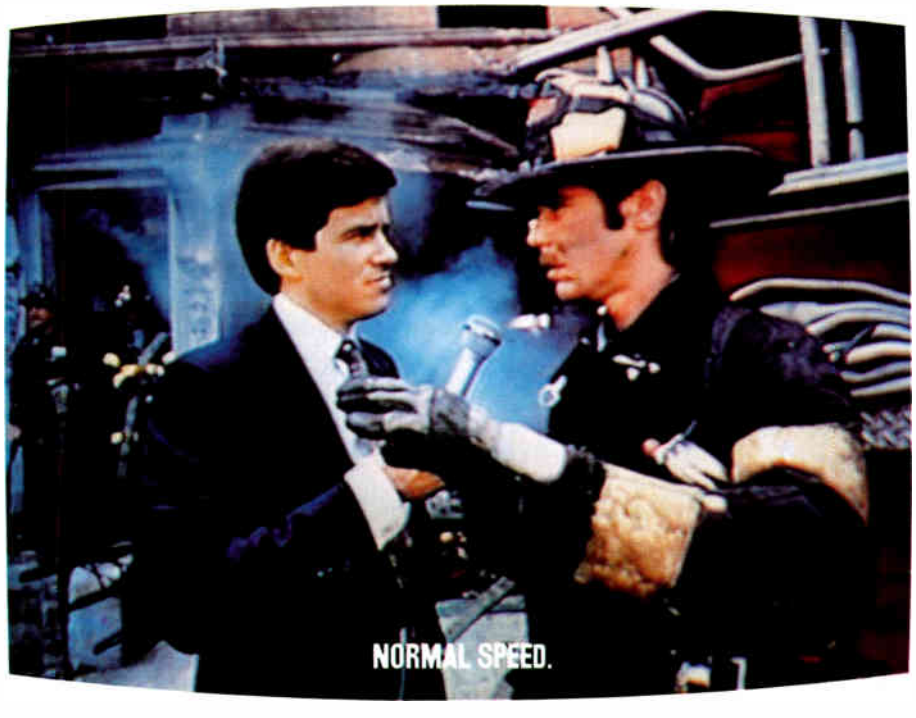
"It also has a direct-drive system, which promises greater reliability and accuracy.

"We have extremely critical clients," says Rheinstein. "They're used to the best performance, in terms of picture quality and in terms of flexibility. This new Sony can deliver it.

"It's the perfect combination of U-matic economy and broadcast quality. It's a true mastering process; with the BVU-800, there's no need to transfer to one-inch and lose a generation in order to edit your tape."

U-MATIC BREAKS SPEED RECORDS."

Fred Rheinstein, THE POST GROUP



Other breakthroughs incorporated in the BVU-800 include its ability to make machine-to-machine cuts without a separate controller; its adjustable, removable edit control panel; and its narrow, front-loading design, which makes rack mounting possible.

"We've always bought a lot of Sony, because we can depend on the company for reliability and innovation," says Rheinstein. "Now, with the BVU-800, Sony makes its competitors look like they're operating in reverse."

Sony makes a full line of 1-inch and ¾-inch broadcast equipment, including cameras, recorders, editors and digital time-base correctors.

For more information, write Sony Broadcast, 9 West 57th St., New York, N.Y. 10019. Or call us in New York/New Jersey at (201) 368-5085; in Chicago at (312) 860-7800; in Los Angeles at (213) 537-4300; or in Atlanta at (404) 451-7671.

SONY®
Broadcast

*When used in conjunction with the BVT-2000 digital time-base corrector.

AVOID UHF/VHF INTERFERENCE.

Downconvert to 1.2 GHz IF with Avantek TVRO receivers.

By block downconverting to 940-1440 MHz (1.2 GHz center frequency) right at the antenna, you eliminate the high-power UHF/VHF interference and in-band harmonic trouble you may encounter with other receivers' lower IF ranges.

To give your subscribers clear, "sparkle-free" pictures, use Avantek's AR-1000 six-channel receiver with our ACA-4220 LNA/downconverter module. Together, these two components give you the critical electronics you need to receive multiple satellite signals for cable television.

And you save money, too, because downconverting at the dish saves you the expense of using a separate downconverter for each receiver, and allows you to use less costly, more flexible cable.

Save space with our compact 6-channel AR-1000 receiver.

If you're considering expansion to 40, 50, even 100 channels, receiver size will be a major consideration in your future. With six channels in just seven inches, Avantek's AR-1000 is the most compact earth station receiver available today.

Send for block downconversion application notes.

Avantek has been a leader in microwave design for 15 years. With more than 15,000 LNAs and 8,000 downconverters now performing reliably worldwide, Avantek has the experience to help you give your subscribers the clear pictures they're paying for.

To get our System Integration Notes or a copy of "Feedpoint Downconversion Leads to Economical TVROs," write Avantek, Inc., 3175 Bowers Avenue, Santa Clara, CA 95051. Or call (408) 496-6710.

Avantek

Avantek is a vertically integrated company.

Deadline Approaches For Technical Abstracts

WASHINGTON, D.C.—The deadline for submission of abstracts for the NCTA 1982 annual convention is fast approaching. The National Cable Television Association is seeking papers for presentation at the spring convention's technical sessions. NCTA officials request that people interested in preparing papers submit a one page, 150 word abstract by November 30.

Participants will be notified of paper selection by December 31. The complete papers will then be due February 15, 1982, for publication in the NCTA official transcript.

The abstracts and suggestions for new seminar topics should be submitted to Wendell H. Bailey, vice president, science and technology, NCTA, 1724 Massachusetts Avenue NW, Washington, D.C. 20036.

Satellites

FCC Decides To Review Two-Degree Spacing

WASHINGTON, D.C.—The Federal Communications Commission has decided to consider two-degree spacing of domestic satellites to meet the increasing demand for service. The new licensing scheme would allow satellites operating in the 4.0 to 6.0 and 12 to 14 GHz bands to be spaced two-degrees apart, thereby increasing the available slots.

Commissioner Joseph Fogarty took exception to a recommendation from Ron Lepkowski, the FCC's chief of domestic satellite facilities, that the industry should decide which scheme was appropriate for the 1990s. But Lepkowski countered that the space industry was "different."

The question of costs in reducing orbital space was raised by Commissioner Abbott Washburn. Smaller spacing will cause interference problems and loss of operational flexibility that can be met only with more expensive equipment. The commission concluded that some flexibility would have to be sacrificed for the additional geosynchronous orbital capacity.

FCC Approves Two Birds

WASHINGTON, D.C.—The Federal Communications Commission has authorized the construction of two new satellites.

Satellite Business Systems has been granted approval to construct its fourth domestic satellite, to be used as an on-ground spare.

Western Union Telegraph Company received permission to build a sixth Westar satellite. But while approving construction of the bird, the FCC has deferred the company's request for an orbital slot and launch authorization. Western Union has sought permission for the sixth satellite since its first two are nearing the end of their life expectancy at the same time that the company's traffic demands are increasing.

SBS has said that it also plans to request launch authority for its third bird, presently an on-ground spare, in order to meet increased service demands.

According to the FCC, no authorizations will be granted until after completion of its Second Generation Satellite rulemaking. Orbital slots were last granted in December 1980 when several companies were given geosynchronous orbital slots.

SCTE News

SCTE Board Approves Liability Insurance Program

WASHINGTON, D.C.—The Board of Directors of the Society of Cable Television Engineers has approved a new benefit for members, a professional liability insurance program called COMMUNI-CARE.

The program will provide up to $100,000 per claim involving professional liability. Coverage is available to all SCTE charter, senior and active member grades.

COMMUNI-CARE is administered by Markel Association Programs.

In another development, National Car Rental and its affiliated groups have increased the discount to SCTE members from three percent to five percent off mileage rates and from 33 percent to 35 percent off regular time and mileage rates. The announcement was made by Tom Dorsey, manager of association sales for National.

SCTE Issues "Guidelines" For Women, Minorities

WASHINGTON, D.C.—The Society of Cable Television Engineers has released the third in a series of *Guidelines* publications, *SCTE Guidelines on Women & Minorities in CATV*. The 80-page publication covers Equal Employment Opportunity and affirmative action programs which could voluntarily be adopted by cable television companies to ensure the fair promotion of women and minorities already in the industry, as well as develop additional sources of manpower.

The 16 chapters include information on court actions and remedies, back pay, the advantages of voluntary affirmative action programs, FCC-EEO requirements, self-audit procedures and checklists, selection standards and testing procedures and upward mobility. The *Guidelines* publication also addresses affirmative action considerations in layoff, recall, discharge, demotion or disciplinary procedures.

SCTE Guidelines on Women & Minorities in CATV is available from the Society of Cable Television Engineers, Inc., 1900 L Street, NW, Washington, D.C. 20036. Price is $18 per copy. All orders must be prepaid.

Other SCTE *Guidelines* are: *Employee Management and Personnel Development* and the SCTE *Member Profile*.

Business Notes

★ **North Supply Company** and **Microwave Associates Communications Company** have signed a distribution agreement. North will distribute Microwave Associates Communications' complete line of satellite products including the VR-3X, 4R-4X, cable modulators, LNAs and antennas.

★ **Magnavox CATV** has announced that **S.A.L. Cable** will serve as a distributor for the full line of Magnavox CATV cable equipment. S.A.L. Cable will stock Magnavox products including amplifiers, the newly-introduced Magnavox Digital System Sentry, line extenders, taps, distribution and subscriber passives, and the new MX-connector series. In addition, Magnavox CATV and Continental Cablevision of Cook County, Inc., have agreed to an exclusive contract for the purchase of Magnavox CATV's 440 MHz distribution equipment.

★ **General Instrument Corporation** has been awarded an $8.4 million contract to supply Rogers Cablesystems, Inc., of Canada with Jerrold 400 digital converters for remote cable TV channel selection. Rogers Cablesystems will utilize the new subscriber terminals in its market area in the provinces of Alberta, British Columbia and Ontario. General Instrument will manufacture the converters in Toronto, where the company's Jerrold Canada Division is headquartered.

★ **C-COR Electronics, Inc.**, has announced an agreement with Warner Amex Cable Communications, Inc., for over $6 million as prime equipment supplier of cable television distribution electronics for the balance of 1981 and 1982. The general supply contract will provide equipment for Dallas, greater St. Louis, Mesquite (a Dallas suburb), Pittsburgh, Cincinnati, greater Cincinnati and other locations. All systems will be multiple cable with two-way active transmission. C-COR will also provide system design services.

Don't let the $695 price fool you. There's a lot of SAM in SAM Jr. In fact, it has the same RF front end as SAM II, the most expensive signal level meter we make.

Just look at those specs: Amplitude accuracy of ±.75 dB over the entire range from −35 dBmV to +60 dBmV. SAM would be proud.

Then there is all electronic tuning with 5 bands covering 10 to 300 MHz. No adapters, no compensators. Plus options that extend the range to 400 MHz, or cover the 470 to 890 MHz UHF spectrum.

Is SAM Jr. tough? Tougher than any wet, windy day. The tightly sealed case is drawn aluminum, with a lexan clad backprinted panel. And what's inside is just as rugged.

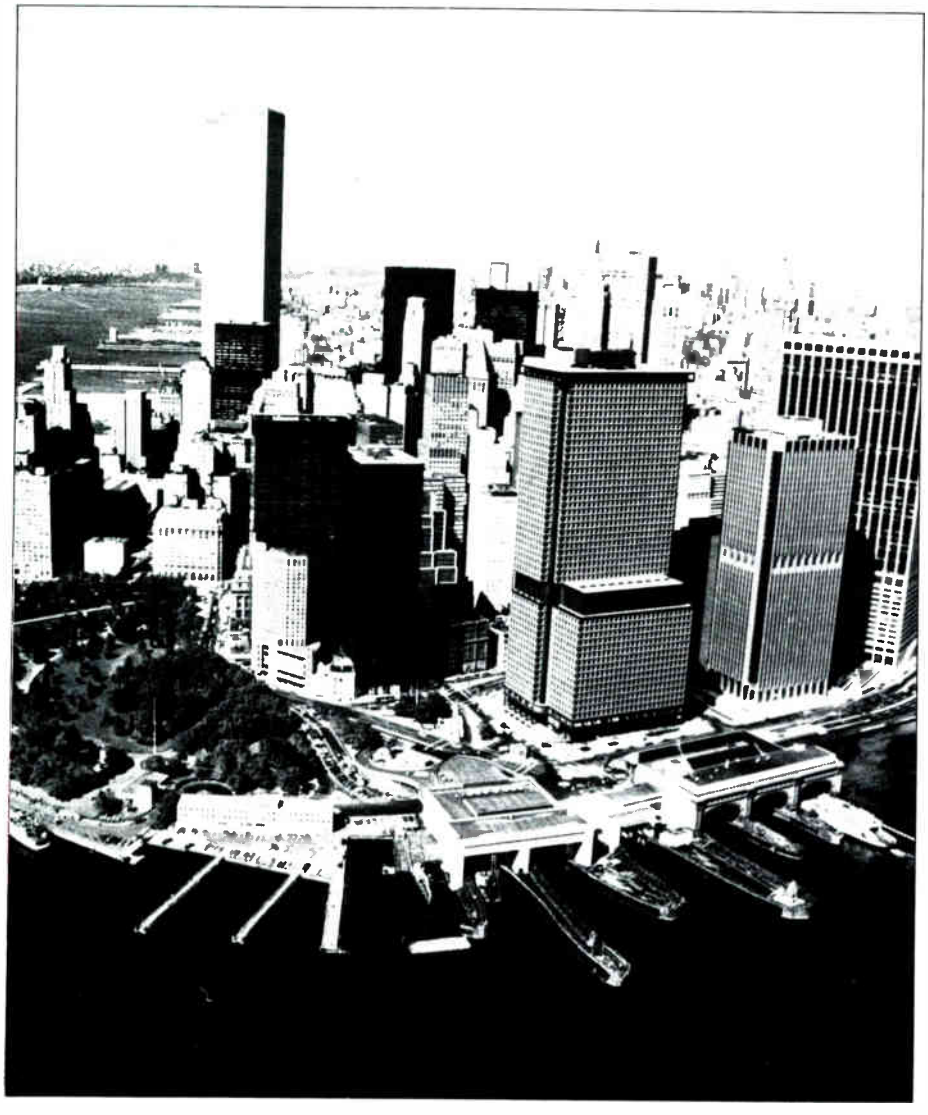
Sam Jr. A name you can trust. At a price that's a little hard to believe.

For details, contact Wavetek Indiana, Inc., 5808 Churchman, P.O. Box 190, Beech Grove, IN 46107. Phone Toll Free 800-428-4424. In Indiana (317) 787-3332. TWX 810-341-3226.

WAVETEK
MID STATE

The lowest priced signal level meter good enough to be called SAM.

Planning New York's Master Headend



By Joseph L. Stern, president, Stern Telecommunications Corporation.

Plans are now in process to build a true master headend located at redundant sites in lower Manhattan. The New York Metropolitan Transmission Center (MTC) will contain a central headend, a transmission control center and an interconnection switching center for subscriber and institutional services. Construction of the center will start within the next 12 months.

There have been many approaches to interconnecting New York area CATV systems but only on a limited basis due to relatively limited need. System interconnections have been available from New Jersey to Westchester, Manhattan and Long Island through the use of a number of cable systems' CARS band equipment. Some program services have been shared and a number of "specials" are distributed over this simple microwave network.

In 1977, Stern Telecommunications Corporation (STC) began investigating an improved interconnection service to tie metropolitan area cable systems togetner, and as a method of distributing "ghost-free" signals by direct feeds from the television stations planning to move to the World Trade Center. Improvement of the limited interconnection between Teleprompter and Manhattan Cable Television was also part of the plan. Most cable operators in the area expressed an interest in the interconnection possibilities of a central operation but they preferred to delay serious consideration until a stronger need was demonstrated.

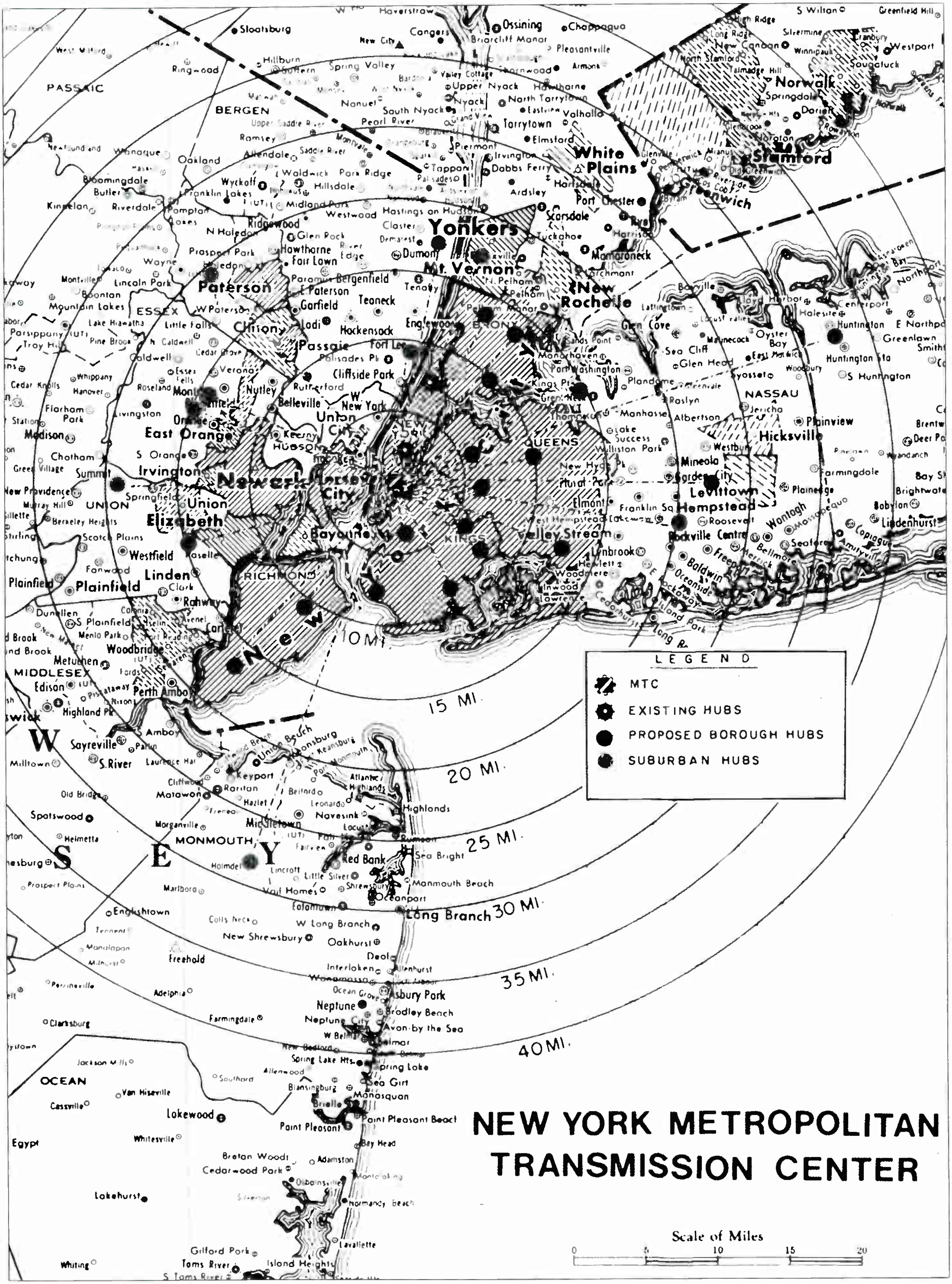

NEW YORK METROPOLITAN TRANSMISSION CENTER
LEGEND
MTC
EXISTING HUBS
PROPOSED BOROUGH HUBS
SUBURBAN HUBS
10 MI.
15 MI.
20 MI.
25 MI.
30 MI.
35 MI.
40 MI.
Scale of Miles
0
5
10
15
20

Table I

Site	Range	Attenuation	Transmit Ant. Gain and Size		Receive Ant. Gain and Size		Azimuth	Misc. Loss	Transmit Power	Receive Signal Level
	(Miles)	(dB)	(dB)	(Ft.)	(dB)	(Ft.)	(Deg.N/E)	(dB)	(dBm)	(-dBm)
1	14.4	143	45	6	45	6	220	3	17	39
2	9	139	45	6	45	6	215	3	17	35
3	6.5	136	41	4	45	6	180	3	17	36
4	7.2	137	41	4	45	6	143	3	17	37
5	3.2	130	41	4	45	6	143	3	17	30
6	5.4	135	41	4	45	6	107	3	17	35
7	7.2	137	41	4	45	6	115	3	17	37
8	7.2	137	41	4	45	6	85	3	17	37
9	11	141	45	6	45	6	106	3	17	37
10	6.3	136	41	4	45	6	62	3	17	36
11	10.4	140	45	6	45	6	72	3	17	36
12	10.8	140	45	6	45	6	41	3	17	36
13	13.5	142	45	6	45	6	32	3	17	38
14	14	143	45	6	45	6	42	3	17	39
15	10.8	140	45	6	45	6	257	3	17	36
16	14.4	143	45	6	45	6	297	3	17	39
17	17.1	144	45	6	45	6	13	3	17	40

MTC Design Data for CARS Band Microwave Paths

A Pressing Need

With the issuance of the New York City Request-For-Proposals for CATV service in the four unwired boroughs, full bi-directional interconnection became a necessity. The RFP and the Supplemental Information Request (SIR) which followed detailed the requirements that cable systems in all five boroughs be interconnected for program exchange for full bi-directional institutional services. The SIR contained the following statement:

9/ In its response to this Request, each applicant should describe in detail how it would participate in the construction and operation of a dedicated Citywide interconnection system, the cost and responsibility for which would be shared among all franchisees. A key component of this interconnection system will be the interconnection of all institutional cables and the subscriber cables in each system within the City in order to provide, at a minimum, data transfers services for municipal and business entities. In addition, each applicant should describe in detail how its system would accomplish statewide, regional, and national interconnection for programming and data transfer services among cities throughout the state, the region, and the nation. Since such interconnection cannot be accomplished solely by microwave but will require satellite uplink, downlink, and transponder facilities, complete descriptions must be provided of the facilities each applicant will have available and the basis upon which such facilities will be utilized and made available to the City.

At about the same time, cable television system advertising began to grow and this growth created a need for centralized advertising insertion. The present method of inserting commercials by "bicycling" videotapes to individual cable operators is considered too cumbersome and impractical for the expanding CATV advertising business.

The MTC will use a custom designed high power AML microwave system.

Twenty Headends

Earlier this year, Teleprompter retained STC to expand our original concept for area-wide interconnection and high-quality signal distribution into a complete transmission center plan. The goal was the provision of a system serving as a full headend for the Teleprompter multiple hubs proposed in Brooklyn and Queens, to provide the same service to all other New York City franchisees, and a citywide interconnection facility. The TPT Brooklyn MTC and hub layout is shown in Figure 1 on page 25.

To serve the four boroughs with cable television service our studies showed that at least 20 headend or hub locations would be required. If each of these were to be equipped with three TVROs (assuming useable sites could be found), a full complement of off-air receiving equipment (assuming ghost-free sites could be found), microwave, processing equipment and tape playback, the total headend package cost would be in excess of $40 million, without any interconnection. Interconnecting all of these hubs, via multi-channel microwave, FM cable and/or fiber optics, would cost another $20 million, for a total of $60 million. The MTC will provide all of the required services for the five boroughs as well as for regional interconnect for a cost of between $7 and $9 million.

The 3M Company has announced that it will undertake to construct the MTC. Its

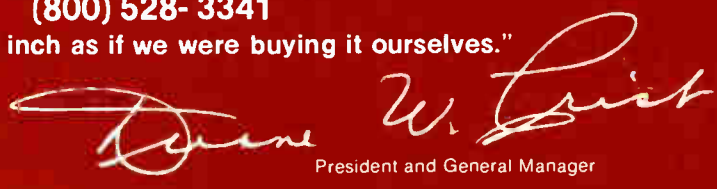
WE'VE SHORTENED OUR NAME, BUT NOT OUR QUEST FOR QUALITY.

Ever since our earliest days, CCS Cable has emphasized quality. Because we do, our trunk and drop cables work as advertised—the first time, the next time, and every time after that. That's the best way to build and keep cable business and we believe in it.

And we're competitive on price and delivery. For specs, prices, terms and timing, call us at:

(800) 528- 3341

"We make every inch as if we were buying it ourselves."



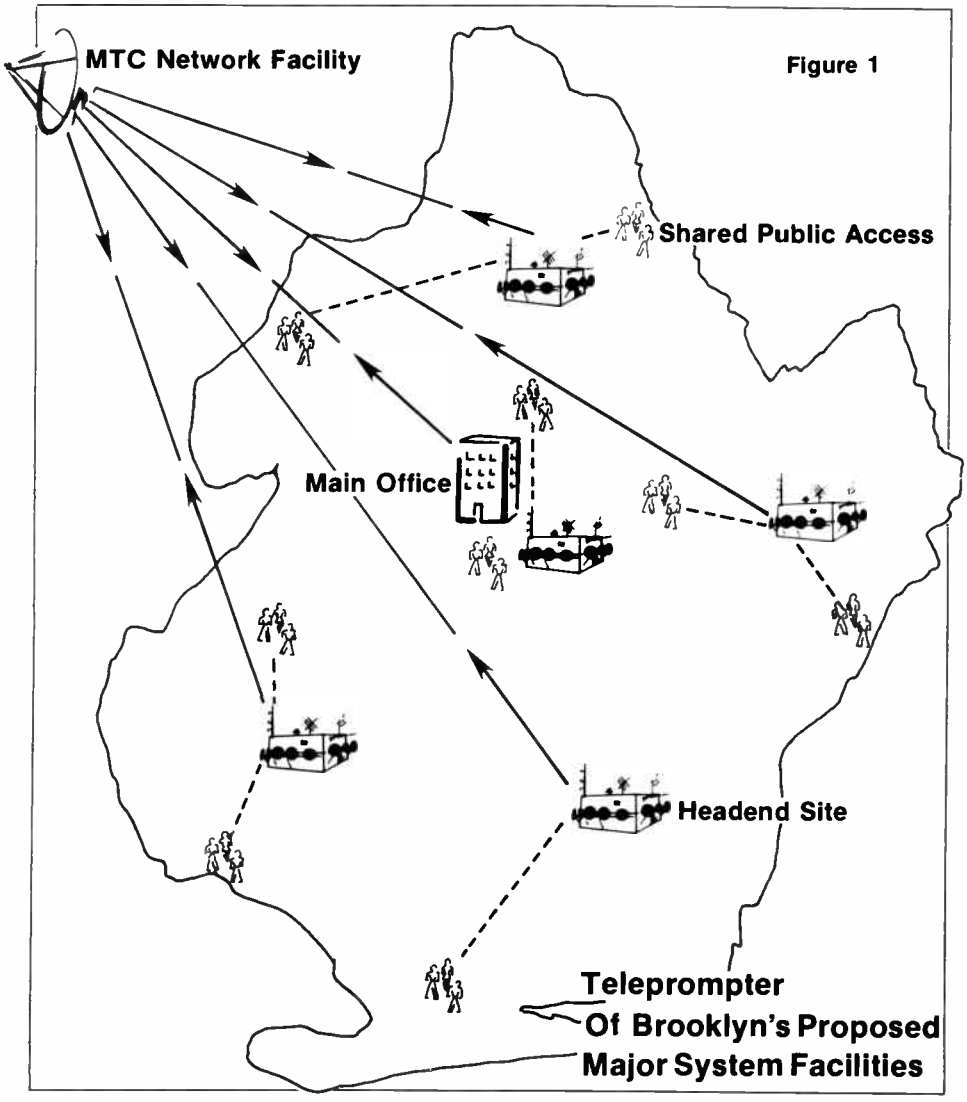
President and General Manager

CCS cable

Division Continental Copper and Steel Industries, Inc.

MAILING
P.O. Box 14710
Phoenix, AZ 85063

PLANT
5707 W. Buckeye Rd.
Phoenix, AZ 85043



subsidiary, Cable Networks, Inc., has been actively selling advertising on seven metropolitan area cable television systems over the past 12 months. Advertising, on videocassette, is inserted locally into satellite or microwave distributed programs. The business is building up rapidly and Cable Networks, Inc., has been searching for an interconnection arrangement which would simplify commercial insertions.

3M feels strongly that the MTC will foster the development of new cable services as well as speed the growth of cable advertising. 3M has retained STC to engineer and manage the entire project. Similar projects are planned for at least three other cities.

Co-op Operation

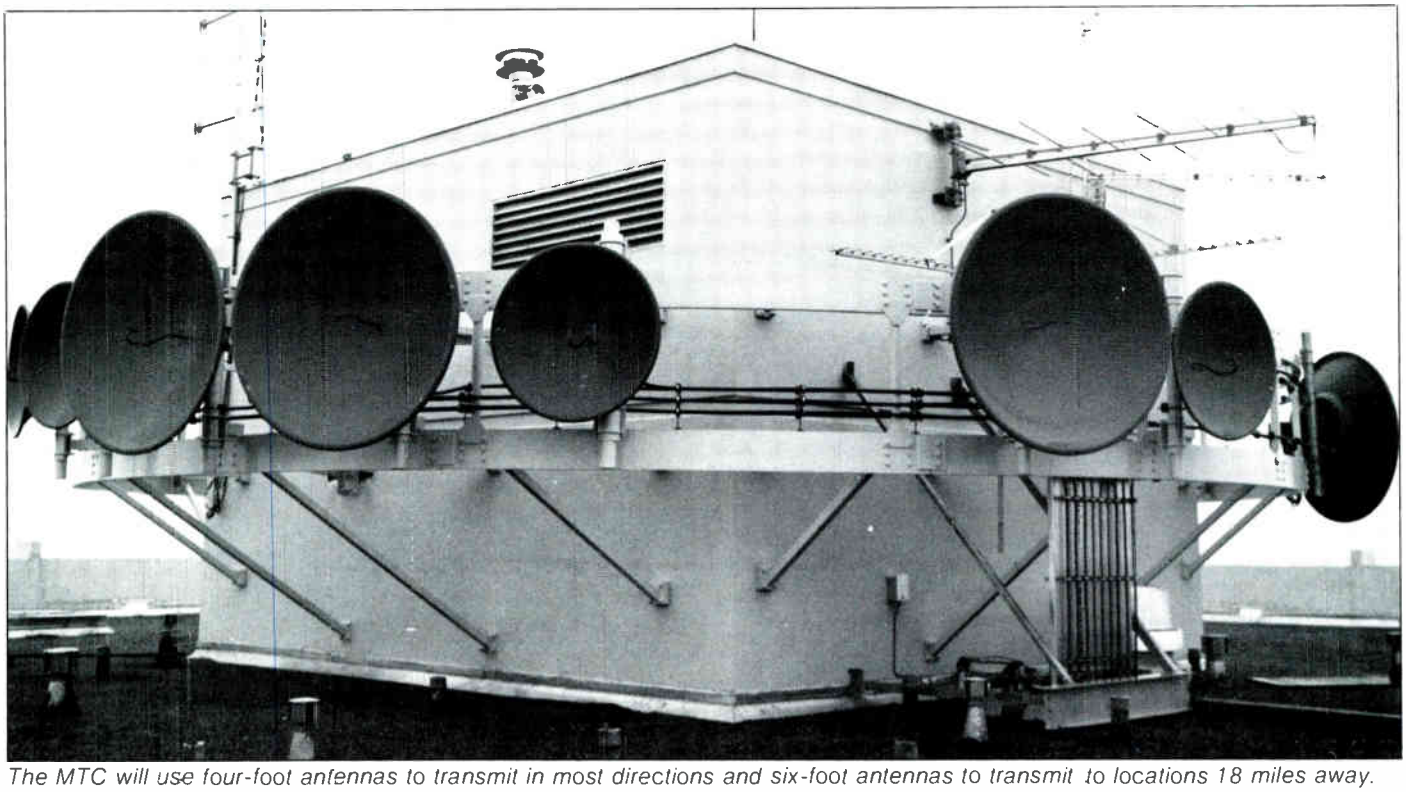
The MTC will be operated as a co-op or consortium, making its services available to all area cable systems. Cable companies will be able to arrange for a wide variety of services depending upon their individual desires. In the same manner, a variety of services will be available to municipal and institutional users of the cable systems.

The major components of the MTC will include:

- an origination and switching center,
- an audio/video and RF processing center, and
- a microwave transmit/receive facility.

The origination center will contain both one-inch and three-quarter-inch tape equipment with computer controlled switching and fully redundant broadcast quality audio/video processing equipment. This center will also be a central source for a variety of text, programs guide, still-frame and audio signals, as well as audio/video programming. Advertising insertion, citywide programming and program exchange services will also be provided.

The audio/video and RF processing center will function as a master headend. Signals received by satellite, microwave, direct feed from broadcast master controls and off-the-air will be demodulated, processed and remodulated. Channel assignments will be made by the cooperating cable systems. Scrambling and addressing services will also be available.



The MTC will use four-foot antennas to transmit in most directions and six-foot antennas to transmit to locations 18 miles away.

All equipment will be provided on a fully redundant basis.

The transmit/receive facility will be equipped to transmit 50 to 100 television channels to at least 20 separate hub sites. Distribution will be through AML and FML microwave, as well as through cable and fiber optics. A frequency allocation plan has been developed that permits efficient spectrum utilization, including the reuse of certain frequencies without interferences. Receiving equipment will permit eight channel transmissions to the MTC. The switching center audio-video-data matrix will route all signals as required.

Site Choices

The location of the MTC will be at specially selected sites in Lower Manhattan, as shown in the metropolitan area map on page 22. The site choices followed surveys to find locations shielded from the broadcasters' 13 GHz transmissions, locations that have clear paths to all proposed hub and interconnection sites and which provide reasonable cable or fiber optics connections to TVRO, broadcasters and common carrier uplink locations.

High quality reliable signals will be available to locations within a range of 20 miles. Four-foot diameter transmitting antennas will be used for most directions, with six foot antennas used for transmission to locations 18 miles or further from the MTC. Receiving antennas at hub sites will be predominantly six feet in diameter. In some cases, the receiving antennas will be shrouded to provide the high degree of directionality required to avoid 12 GHz ENG operations and to allow frequency reuse.

Path loss computations engendered the design of a special switchable preamp system which will provide for an absolute minimum of rain outage time on the longest path. Path reliability will meet the needs of all program and data services. Table 1 on page 23 summarizes design data for these paths.

Each hub site will be equipped with a separate AML transmitting system that can feed up to eight television signals, or their equivalent in data, back to the MTC for distribution to other locations as desired. The system will provide for full citywide interconnections of institutional and program services.

The MTC will use a custom designed high power AML microwave system capable of transmitting up to 100 channels to some 20 hub locations in Queens, Brooklyn, the Bronx and Staten Island. Service will also be available within Manhattan through microwave and cable connections. Six to eight two-way channels will be available for interconnection with locations in New Jersey, Westchester and Nassau County.

FML will be utilized for the transmission of some pay TV programs, as well as for interconnection for relay purposes. Work is underway analyzing 18 GHz and 23 GHz, as well as CARS band operations. Two separate sites are planned to provide both equipment and location redundancy. The MTC sites are relatively close together and will be interconnected by cable and/or fiber optics. The facilities will be staffed 24 hours and the equipment will be redundant and fed by uninterruptible power sources.

Staffing Needs

The MTC operational staff planning includes a team of 15 engineers and technicians. They will operate and maintain the MTC facilities in Manhattan and also maintain all MTC receiving and transmitting equipment at hub locations throughout New York City. Mobile vans will be used to provide preventative maintenance as well as to provide for emergency repairs or replacements.

Administrative personnel will be aided by computer control and reporting systems permitting accurate record keeping of all switching and programming "transactions" to serve the administrative needs of the co-op or consortium operation.

Once in operation, the MTC will provide the highest degree of quality and reliability of multi-channel transmission to 2,500,000 cable television homes in the New York metropolitan area.

Joseph L. Stern, president of Stern Telecommunications Corporation, is an engineer with over 37 years of experience in communications. Prior to founding STC, Stern was an executive with Goldmark Communications and held various executive engineer0 and held various executive engineering positions with CBS Television Services Division for 26 years. A nationally recognized author and lecturer, Stern is actively engaged in consulting on cable television and broadband communications.

This electrifying new performer was born for Cable TV.

Presenting the Gould® Watchman.™

It stays on the job longer because it's designed to take constant charging.

Just the battery you need for standby power to amplify cable signals during utility outages.

In the past, you've had to rely on conventional batteries to perform that function.

Not anymore.

Now Gould, the leader in battery technology, leads again with the first battery specifically engineered for cable television.

The Gould Watchman.

We constructed it of our new Calcium Plus alloy for:

- a low gassing rate.
- less water loss.
- lower cost over the life of the battery.

We gave it longer life with a specific gravity that permits it to accept constant, low voltage charging.

We incorporated premium envelope separators to prevent internal shorting and "treeing" from negative to positive grids.

We added extra electrolyte above the plates to minimize service frequency.

Then, we completed the Watchman with offset, studded terminals that fight corrosion and provide for quick connections. Plus, removable gang vents that make servicing easier.

Add up all those features and you've got a longer lasting, easier to maintain battery.

A battery that costs less money in the long run.

A battery born for Cable TV.

Want to know more? Call us at (612) 681-5388 or mail this coupon today.

YES, tell me more.

Please send complete information on the new Gould Watchman battery.

Name _____

Title _____

Company _____

Address _____

City _____

State _____ Zip _____

Telephone _____

area code number

MAIL TO: Gould Inc.
P.O. Box 43140, St. Paul, MN 55164
Attn: Bob Hasewinkle

CED 11, 81

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Committed to making batteries better than ever.

ONLY ONE CATV SUPPLIER MAKES THIS PROMISE:

S.A.L. gets it Today.

S.A.L. ships every order within 24 hours. That's a promise. And if ever we can't, we'll tell you. Up front. That's a promise, too.

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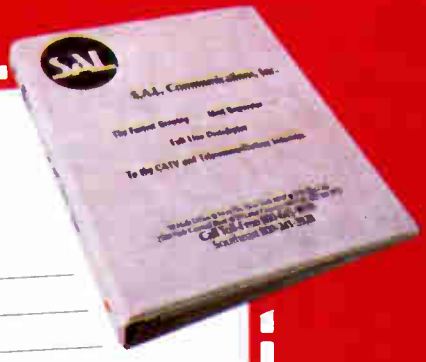

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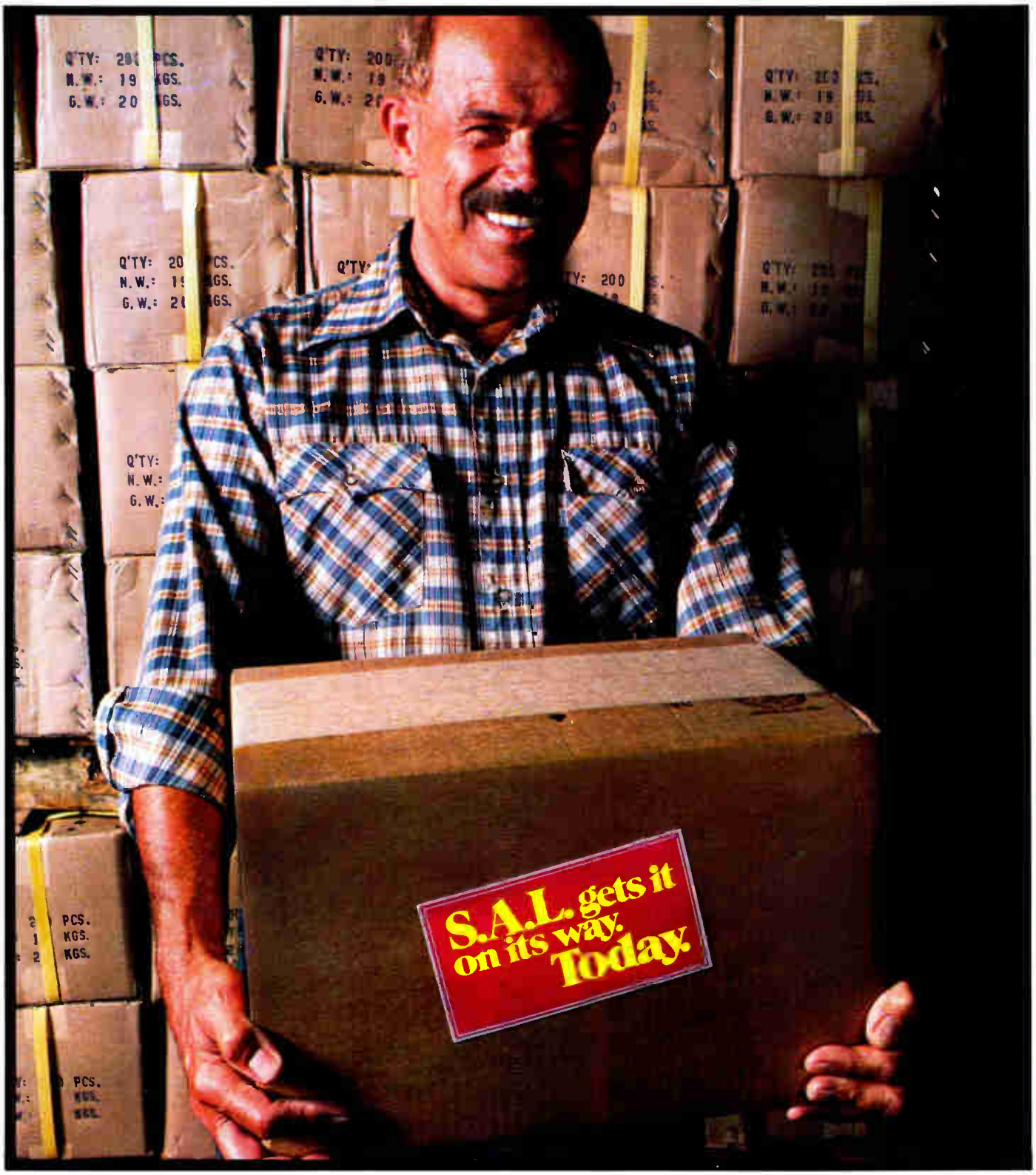

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Creating Standards For Interconnect Systems

The following article addresses issues of concern to all engineers whose areas of technical interest are in one or more of the many communications transmission technologies that are converging as a result of the maturing of interactive data retrieval systems. Cable television systems are but one of the more important of these technologies. This article offers the reader an update on the current state of standardization in the field of hybrid interactive data networks and provides system modelling which includes as an important physical subnode a two-way CATV transmission system interfacing in a larger hybrid interconnected data-based network. Next month's *CED* will include articles dealing with the related areas of videotex, teletext and addressable systems.

By Dr. Charles Alvord, director of computer engineering, and Dr. Howard Blank, vice president of engineering and technology, Communications Technology Management, Inc.

Hybrid interconnect systems, or systems handling various forms of data from multiple-input ports using multiple transmission media, pose special problems for designers who are concerned about channel utilization, bandwidth efficiency and related control, routing and congestion problems. Global solutions to these design issues remain elusive primarily because of a lack of recognized standards for interfacing such systems. This article will summarize some of the more salient aspects of the standardization problem for a broadband coaxial based interconnect system from a practical viewpoint. It will also relate the current efforts of various international committees that are working toward a solution to the standards problem, describe the components of the problem and the attendant difficulties and conclude by citing recent experience at Communications Technology Management, Inc., in developing an interactive data services network (IDSN).

A Dubious Task

In communication systems recoupment of original investment and healthy return on investment are important up front considerations. Low-channel utilization, inefficient use of bandwidth and faulty network routing and control schemes are costly. The nonexistence of standards for the complex interconnect systems make predictions for successful system implementation a highly dubious task. Because standards are not readily available, machine-to-machine incompatabilities and non-transportability of system software usually result in inefficiencies in bandwidth utilization and a slowdown in thruput between nodes. Nonstandard interfaces to "foreign" devices must be made transparent to the system software which provides a protocol or handshaking feature for interprocessor communication. In network theory terminology, this amounts to a gateway processor which is an added expense for interconnection. Each buffering operation costs not only dollars but time in terms of thruput. If thruput is diminished, response times suffer and customers begin walking away or reneging from service. So from a dollar and cents standpoint, a universally accepted standard would (a) improve compatability and transportability of hardware interface and system software; (b) minimize the number of intermediate devices, or gateways, which perform speed and code conversion; (c) minimize the reliance on a particular vendor; and (d) provide a common language for data consumers and design personnel.

What form should the standard take? The format should contain a consistent set of rules which govern data communication between any two points in a network. This set of rules often referred to as a protocol has as many facets as it needs to define the procedures for a virtual encyclopedia of data communication related functions. There are various attempts being made at adding some structure to the encyclopedia.

The International Standards Organization (ISO) has undertaken this monumental task and defined a general protocol structure termed the "Open Systems

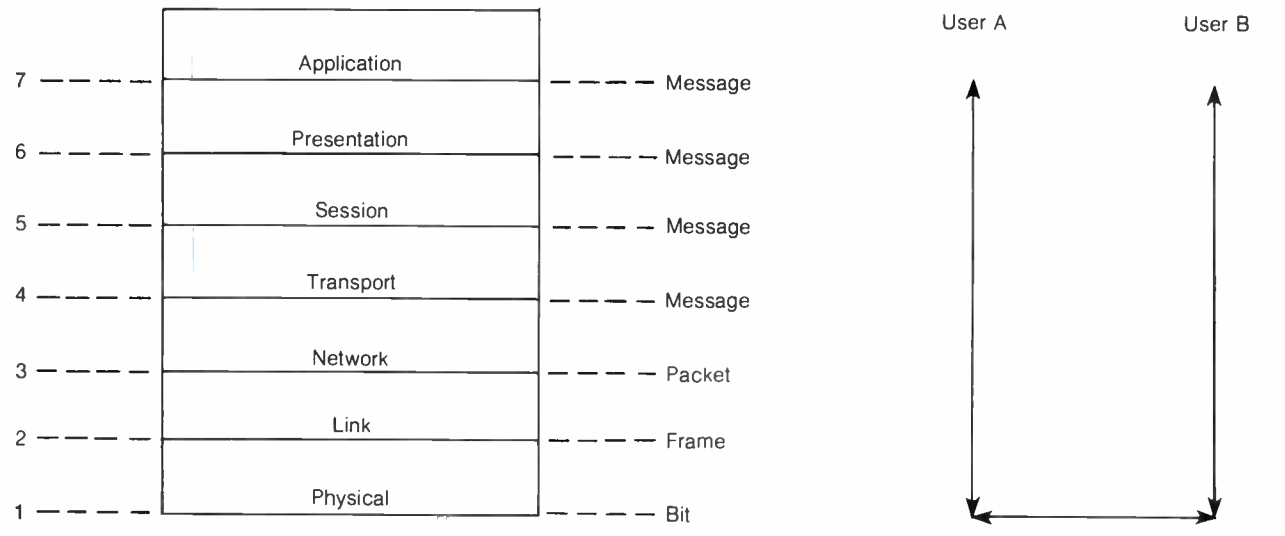

Figure 1 **The Seven Layers of the ISO-OSI Model**

Interconnection" (OSI) reference model. It used fairly general rules to distinguish the protocol functions performed by each layer using a hierarchical structure. The definition of the protocol layers was developed applying a MINIMAX strategy. The concept is to localize functions to a single layer where significant overlap among the functions existed and thereby minimize both the number and compexity of the interfaces between layers. New layers were created only when either (i) a different "level of abstraction" was needed to distinguish between functions being performed or (ii) the information flow could be minimized. The resulting model contained seven layers as seen in Figure 1. The basic concept is that a user on machine "A" has a "message" to exchange with a user on machine "B". The message may be a task executing in machine "A" which needs to fetch data from machine "B" to complete its transaction. The sender's message unit is decomposed into successively smaller units (packet-frame-bit) as the level of communication service gets closer to the physical transmission level of a binary bit stream and then is reassembled up the line to the receiving application task where it is finally serviced. An example of this process is provided below via the CTM interactive data services network.

A Landmark in Interfacing

The International Telephone and Telegraph Consultative Committee (CCITT) also is chartered to make recommendations on data communications interfaces. Its work in packet switching standards has helped it pioneer this field. Some of the standards have gained international acceptance. A good example is CCITT V.24, also known as EIA RS232. As far as interconnected broadband data service networks are concerned, the X.25 standard is a landmark for computer to computer interfacing on packet switched public data networks.

Packet switching is an extremely important technology in the data communications field. The traffic characteristics associated with most information services tend to be bursty and the duty cycle for any particular subscriber on the network is extremely low. The implication with regard to network design needs to be fully understood. An analysis of the characteristics of the three basic forms of switching (circuit, message and packet) in view of the traffic characteristics associated with information services clearly favor packet switching. Packet switching will facilitate: high transmission facility utilization; a more flexible form of network routing; flexible message handling independent of message type; minimal network transit delay; and adaptive flow control. Most of these advantages are not intuitively obvious, as a comparison with circuit switching and message switching will show. Getting back to the CCITT standards work, we cite the X.25 recommendation once again. X.25 consists of three protocol levels: the physical, line and packet protocols. These are conceptually similar to the three lowest OSI model layers. Table I summarizes the CCITT recommendations for packet switched networks that are important to large-scale interconnect systems relying on packet switch techniques.

Another important development in the standards arena that has relevance to this article is the work of the IEEE Local Network Standards Committee. This committee is taking on the ISO model one

Table 1

CCITT Recommendations for Packet Switching Networks

X.1	User classes of service
X.92	Hypothetical reference connections
X.95	Network parameters
X.121	International numbering plan
X.2	User facilities
X.3	Packet assembler-disassembler (PAD)
X.96	Call progress signals
X.9x	Architecture model
X.25	Data terminal equipment/data circuit-terminating equipment interface for packet mode terminals
X.75	International inter-change signaling for packet-switched networks
X.28	DTE/DCE interface of start-stop DTE accessing the PAD
X.29	Interworking between a PAD and a packet mode DTE

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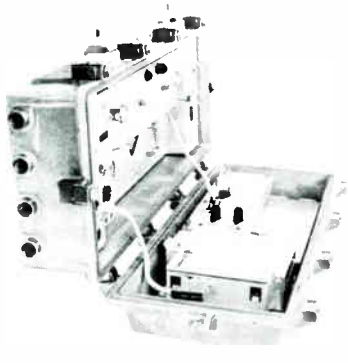

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step at a time. Its primary focus thus far has been on layers 1 and 2. The IEEE functional requirements for the IEEE 802 standard addresses transmission line lengths, data rates, media independence features, reliability and freedom from dependence on intermediary devices.

At the physical layer, the IEEE has defined the Media Access Unit (MAU) as the device which will interface to a particular kind of transmission line. Physical layer functions (i.e., coding/decoding, synchronization, and related handshaking signal procedures) will be performed on the data terminal equipment side of the MAU interface.

"Packet switching will facilitate: high transmission facility utilization; a more flexible form of network routing; flexible message handling independent of message type; minimal network transit delay; and adaptive flow control. Most of these advantages are not intuitively obvious, as a comparison with circuit switching and message switching will show."

The layer 2 standard, the link layer, takes the binary bit stream from the physical layer and forms frames. It prefixes the frame with source and destination addressing bits, places additional bits and frame synchronization bits into a control segment of the frame. It also appends the frame with a code that permits the receiving station to authenticate the correctness of the transmitted bit stream.

The IEEE 802 standard is also attempting to address the method of access rights to the transmission line. It is currently investigating contention access and token passing. A significant amount of information is available on these schemes in the literature, and both have their merits. We make no pretense as to which is better. Each network designer should evaluate his network model to select the most appropriate strategy, based upon his traffic statistics and related parameters.

Related Problems

While these committees have addressed the universal need for a set of rules governing intra- and internetwork data communications and have published recommendations for same, a set of related problems confront network design engineers which are even less likely to be solved by a standard. We have summarized the principal technical issues requiring resolution for complex interconnect systems in Table 2 (page 38)

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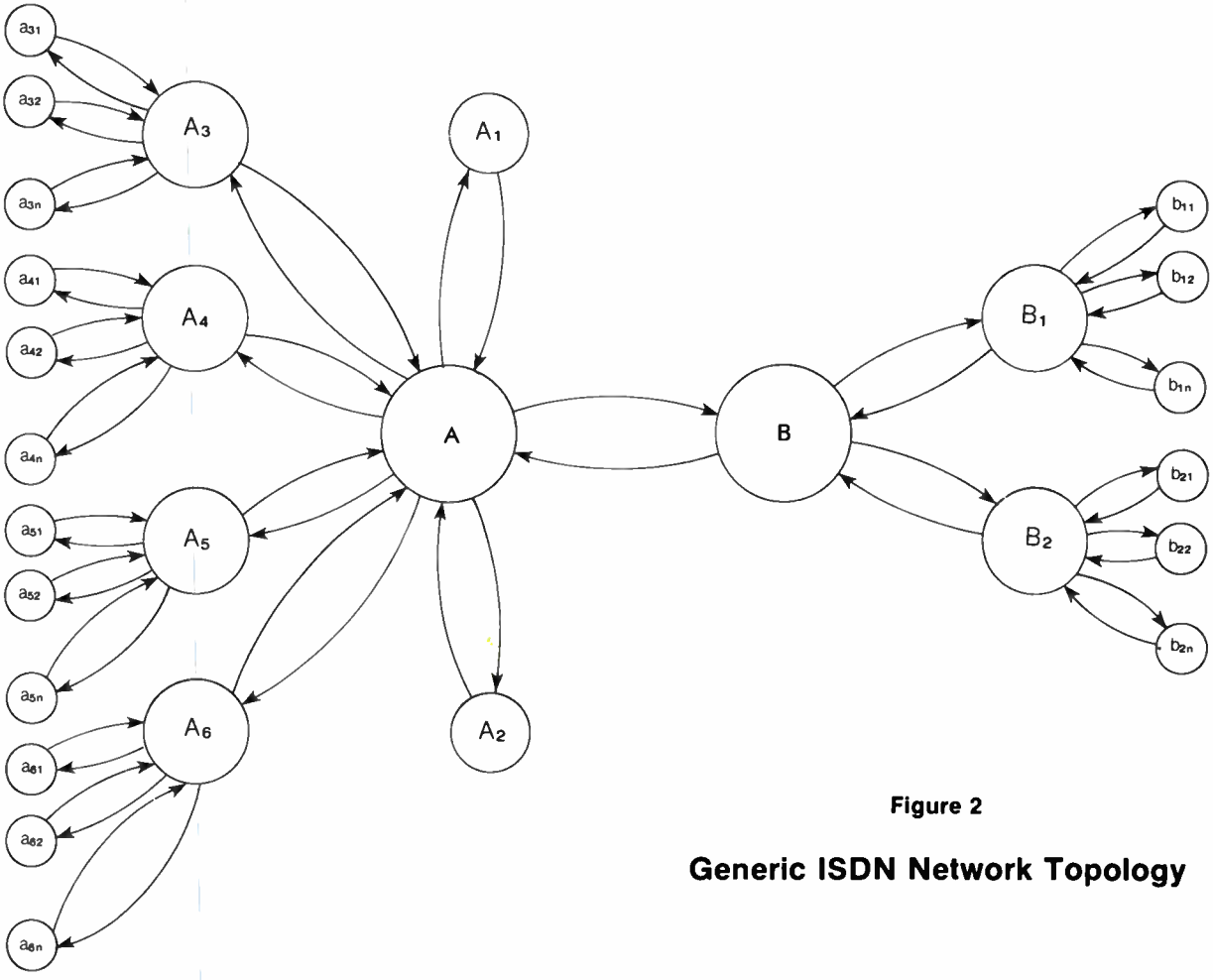

Figure 2

Generic ISDN Network Topology

Table 2:

Key Design Issues in Complex Interconnect System Protocol Layers

Protocol Layers / Design Factor	1 Physical	2 Link	3 Network	4 Transport	5 Session	6 Present.	7 Applic.
Bandwidth	X						
BER	X						
Signal levels	X						
Modulation	X						
Framing		X					
Synchronization		X					
Transmission line sharing		X					
Error detection		X	X				
Error correction		X					
Connection establishment		X					
Congestion			X				
Routing			X				
Formation/deformation of packets			X				
Connection to foreign devices				X			
Flow control				X			
Buffering				X			
Network security and privacy						X	
Encoding/decoding						X	
Distribution of data							X

using the OSI reference model layers. Each issue will be defined and related to a generic interactive data services network.

Prior to this discussion we introduce the network topology of our generic IDSN (reference is made in Figure 2). This network is of the multi-star variety. We show two nodes of a multi-star architecture. These are A and B. Two levels of sub-nodes are shown. The level one subnode A_i and B_i are the primary interconnects to the nodes A and B. The second level's sub-notes are shown with small letters and are double subscripted, a_{ij} and b_{ij}. The distinction between nodes and sub-nodes is made primarily because of the bandwidth and processing properties at each level. Each nodal entity has the capability to communicate with any other nodal entity in the network. An example of this using the OSI reference model protocol will be shown later.

Let's assume that all second level subnotes are CATV subscribers who are vying for one of the interactive data services shown on page 44 in Table 3 (the contents of this table will be described later) and, therefore, have some processing capability. Furthermore, assume that the first level subnodes are cable head-

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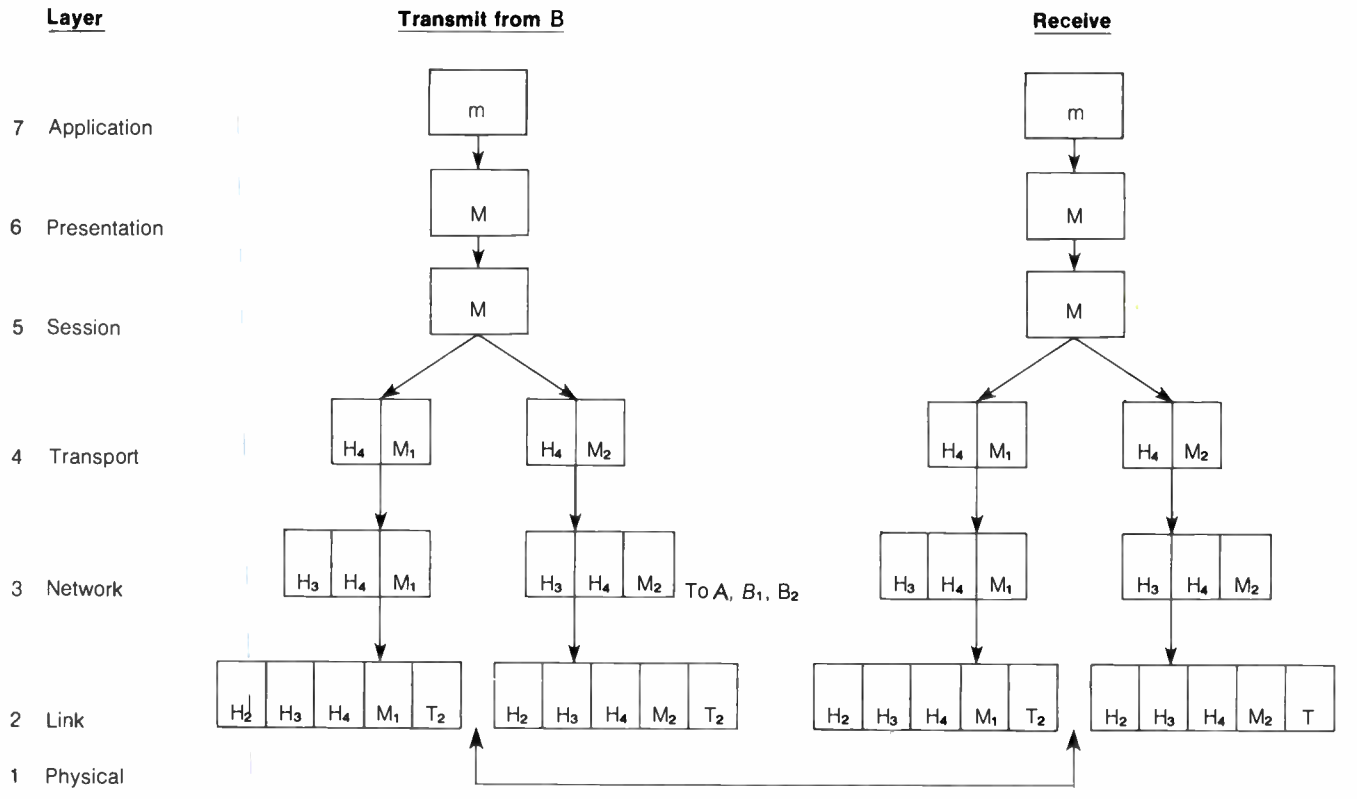

Figure 3 **Tracing the Multi-layer Protocol for a Sample Transaction in ISDN**

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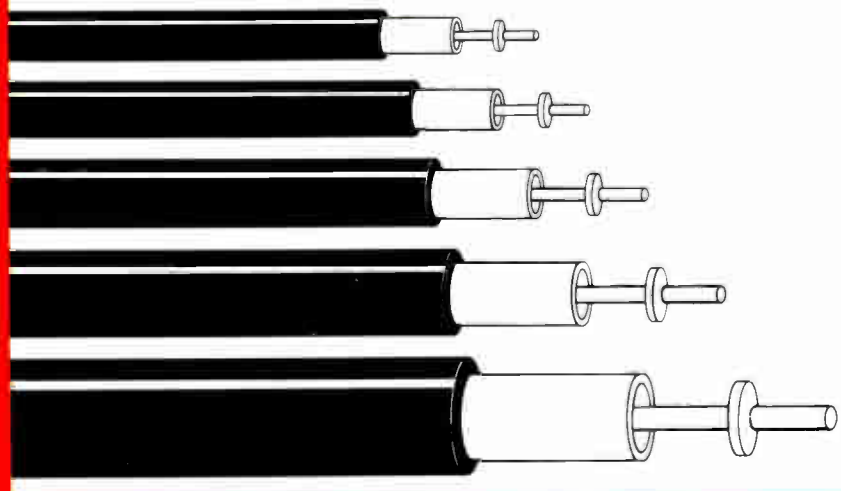

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ends (A_3-A_6) when connected to a second level sub-node (a_{3l}, . . . a_{3n}, . . . a_{4n}, . . . a_{6n}), or are foreign networks (A_1 & A_2) vying for service through the primary node (e.g., a DEMS system or a TELCO trunk). The physical interconnect involves coaxial cable, digital microwave, and satellite. The generic interfaces are summarized at the physical level in Table 4 on page 46.

Physical Layer Protocol

In order to address issues at the physical layer protocol, we introduce the generic services that we postulate for the IDSN. Table 3 summarizes 19 interactive services and bounds each with the important technical parameters which matter in analyzing the bandwidth problem. Parameters "a-c" and "d-f" are used to compute the upstream and downstream data rates per service and per subscriber. The demand factor, or utilization factor for a channel, is computed using parameters "g-j". The utilization factor is then multplied by the respective upstream and downstream data rate to obtain the average sustained bit transmission rate during some "peak-period" interval on a per subscriber basis. It is clear from an analysis of Table 3 that the upstream data bandwidth consumers are the games, telephony, telewriting and videophone services. This holds true for the downstream data rate as well.

How then is this information used to compute a bandwidth requirement for a system as complex as is shown in Figure 2? The answer involves modeling of the network as a whole, at single step intervals. Initially, we need to examine as realistically as possible the true demand placed on the cable headend (A_3 for example). This can only be done by estimating the traffic parameters during the peak period for a nominal subscribership. If we assume the majority of the information of interest is resident in the database maintained at the headend and that one broadband cable channel is used per each direction (say 24-30 MHz upstream and 220-226 MHz downstream), we can begin budgeting the channels for a maximum subscribership. Let's assume that headend A_3 is being modeled. We know, given "n" subscribers on that channel, that the total demand for service placed on the headend is the sum of the individual arrivals from the "n" subscriber to the headend plus the arrivals for service coming from A and the locally originated material which requires processing support. If we assume no contention on the channel, or a discipline which effectively orthogonalizes the channel into a set of fixed slots with some sort of token passing, we can compute a maximum subscribership for a processor of size "M" where the average response time is to be no greater than "k" seconds. This is not necessarily the most efficient use of the channel and will certainly limit the ultimate subscribership. Analyzing the channel with contention involves the use of a more dynamic channel allocation model, but this will generally permit a larger subscribership and more efficient use of an otherwise scarce resource.

Model Protocol Layers

Before expanding the complexity of the network model to analyze the intricacies of the other interfaces and arrival/service rates, it is instructive to illustrate the interoperability of the OSI reference model protocol layers. Figure 3 on page 40 overviews this process.

Given a message "m" produced by a task running in the application layer, an information originator in the primary node has prepared a new product data set that he wants inserted into the database of one or more headends (A_3-A_5, B_1-B_2) and is requesting that this change be broadcast to subscribers downstream (a_{3l}-a_{3n}; a_{41}-a_{4n}; a_{51}-a_{5n}; b_{11}-b_{1n}; b_{21}-b_{2n}). The application layer task passed this data set in the form of a message "m" to the presentation layer. The presentation layer transforms the data set into a compressed form via a suitable technique to use more efficiently bandwidth and digital storage at each headend and passes a new

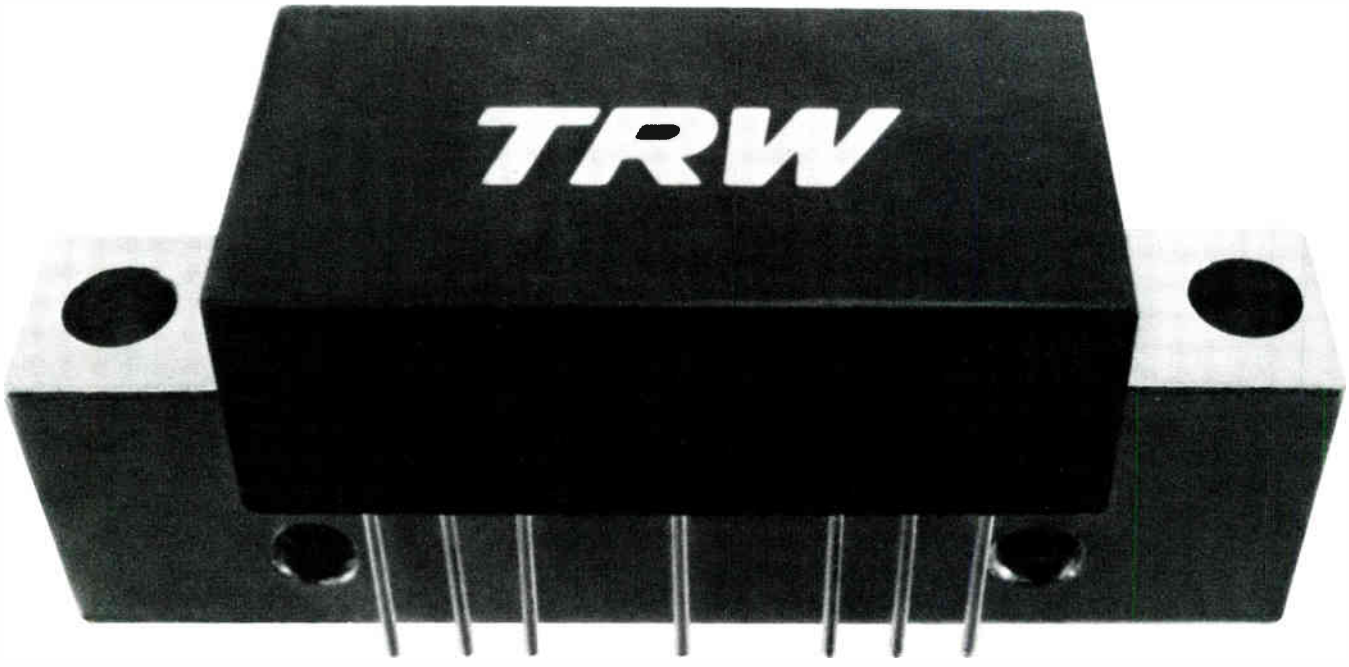

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Table 3:

General Services and Key Technical Parameters For an IDSN

	a	b	c	d	e	f	g	h	i	j
Advertising	L	L	L	H	L	L	L	L	B	L
Info retrieval	L	L	M	M	L	M	H	M	B	L
Interest matching	L	L	L	M	L	L	M	L	B	L
Messaging (short)	L	L	L	H	L	L	L	M	B	L
Electronic mail	H	L	L	L	L	L	H	L	B	L
Commerc. trnsctns	L	M	M	L	M	M	M	M	B	L
Questionnaires	L	M	M	H	M	M	M	L	B	L
Auction bidding	L	L	M	M	L	M	M	L	B	L
Pers. database	L	M	M	L	M	M	H	M	B	L
Computation	L	M	H	L	M	H	H	L	B	L
Games	L	H	H	L	H	H	H	L	C	M
Education	L	M	H	H	M	H	H	L	B	L
Telephony	H	H	H	H	H	H	M	H	C	L
Videophone	H	H	H	H	H	H	M	L	C	L
Facsimile	H	L	L	M	L	L	L	M	B	L
Telewriting	M	L	L	L	L	L	H	M	B	L
Home security	L	M	L	L	M	L	L	H	B	L
Remote meter rdg.	L	M	L	L	M	L	L	L	B	H
Energy mgmt	L	L	L	L	L	L	L	H	B	L

Legend:
a— upstream bits/interaction (a≤1K=L; 1K<a≤50K=M; a>50K=H)
b— upstream interactions/second (b≤0.1=L; 0.1≤b<0.5=M; b>0.5=H)
c— upstream interactions/call (c≤10=L; 10<c≤100=M; c>100=H)
d— downstream bits/interaction (d≤1K=L; 1K<d≤50K=M; c>100=H)
e— downstream interactions/second (e≤ 0.1=L; 0.1<e≤0.5=M; e>0.5=H)
f— downstream interactions/call (f≤10=L; 10<f≤100=M; f>100=H)
g— call duration (seconds) (g≤100=L; 100<g≤500=M; g>500=H)
h— call frequency (calls/month) (h≤30=L; 30<h≤100=M; h>100=H)
i— transmission type (B — bursty; C — continuous)
j— penetration (%) (j≤25=L; 25<j≤50=M; j>50=H)

message "M" to the session layer. The session layer does not modify "M" but simply regulates the direction of flow of messages between the presentation layer and the transport layer.

The transport layer takes the variable length message "M" formed by the presentation layer and decomposes it into a set of smaller fixed length messages (or packets) and prefixes each with a header. The header will include control information, such as sequence numbers, to allow the transport layer on the destination machine to reassemble the data frames (i.e., data frames may be transmitted out of order as a result of retransmission or some other congestion anomoly).

The network layer is responsible for determining which physical line to the destination is to be used as the transmission path. It converts the logical line suggested by the application layer message "m" to the physical line via a communication routing table which lists all physical paths from source to destination. The paths actually selected will depend upon circuit status and traffic statistics, since in a fully connected multistar topology, multiple logical lines between two communicating entities will exist.

In this example, node B routes the packet stream to primary node A and to B_1 and B_2. The network layer will also attach its own reader and pass the data units to the link layer. The link layer adds a header and trailer to each packet. The trailer is appended to the packet for

"The network layer is responsible for determining which physical line to the destination is to be used as the transmission path. It converts the logical line suggested by the application layer message 'm' to the physical line via a communication routing table which lists all physical paths from source to destination."

purposes of error detection and correction. It passes the augmented packet to the physical level protocol for transmission at the receiving machine (A, B_1 and B_2); the packets are serviced; their corrections checked; headers stripped-off; and the message is reassembled by performing a sequence of operations

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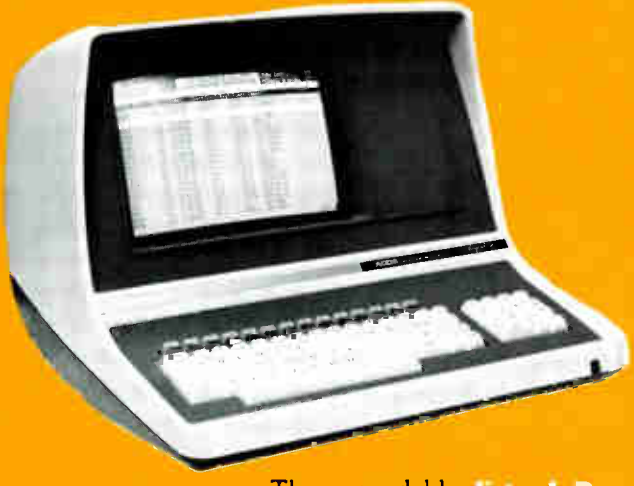

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4. HOLD mode permits you to select and release a HOLD event, either with or without execution.
5. MANUAL OPERATION mode permits you to enter a special list of events for manual execution and to execute those events.
6. SET mode permits you to set the Auto Control on orr off, set the Message Display on or off, re-sequence the event item numbers for the entire database or set the system clock or the calendar date.
7. DEFINE mode permits you to define or delete names of sources, destinations, units or functions or to define or delete Display Messages.

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Table 4:

General Physical Level Interface Summary

Interconnect	Example	Transmission
Primary node-primary node	A — B	Satellite
Primary node-1st level subnode	A — A_1	Microwave
1st level subnode-2nd level subnode	A_3 — a_{31}	Coaxial cable

which are the mirror image of those used in going from layer 7 to 1. The servicing of this message will tell the communications tasks executing in A, B_1 and B_2 to retransmit the newly acquired data set after storing. A dispatches this data set to A_3-A_5. The foreign networks A_1 and A_2 will be told that a change to the database has been made when a request by the foreign network is made for some service. The respective cable headends (A_3-A_5 and B_1-B_2) will update their respective databases and dispatch the message to the cable subscribers currently logged on.

An analysis of the network model between A_i and A or B_i and B requires that solutions to the congestion, routing, flow control and buffering problems be found. Routing and flow control are often cited as the two most important factors in determining the performance of a network. Inefficient control schemes chew up CPU time and network bandwidth, often resulting in congested networks and deadlock states in buffer pools. Ideally, a routing and flow control mechanism will not consume resources. Today's modern data communications networks all use some form of adaptive routing. That is they use information on the *current* state of the network to base their routing decisions on. Our generic IDSN is no different. It should include some form of adaptive routing.

An adaptive routing scheme which has good efficiency for a generic IDSN such as we have described was originally proposed by Boorstyn and Livne. It involves the use of a two-step heuristic. Step one requires the solution of an assignment problem where there is a search for an assignment of paths. This is made for each pair of nodes that need to communicate, that are "good" in some sense. Rather than employing a possibly exhaustive search for the "best" path, the path selection might be based strictly upon use of low utilization circuits, the minimum number of hops between two nodes, or some other decision criteria. Ties found during this selection process are handed-off to the next step of the heuristic where the departure of a packet from a node to another node is modeled as a multiple choice, chance-constrained queuing problem. A comparison of this method with nonadaptive routing methods indicates that it is possible to reduce the time delay in packet processing by a factor which is roughly the equivalent of the average degree (# of outgoing links from a node) of the nodes in the network.

Routing Techniques

Efficient routing techniques may not be sufficient in a "store and forward" environment since blocking, a particularly disastrous form of contention, can still occur and idle network resources. Kaufman, Gopinath and Wunderlich have proposed the use of a "structured buffer pool with reservation" to eliminate the possibility of node-to-node blocking. In this procedure, packets enter a nodal facility and are placed into the "inboard" queue of the overall buffer pool existing at that node. Each packet is then out processed by the routing and switching processor (perhaps the adaptive routing scheme suggested by Boorstyn). Packets destined for other nodes are placed into an "outbound" queue in the buffer pool. Packets are sent when there is space in the inbound queue of the receiving packet switch and other related network processing (e.g., acknowledgements) has been completed. The analysis by Kaufman et al shows how to set-up the structured buffer pool with reservation, assuming that arrival and service rates are known a priori for the network.

"Efficient routing techniques may not be sufficient in a 'store and forward' environment since blocking, a particularly disastrous form of contention, can still occur and idle network resources."

It is hoped that this article has imparted some feeling for the difficulty of fielding complex interconnect systems, a problem made worse by the virtual existence of "recognized" standards of relevance. However, based upon the work of the various committees and the lessons being learned by the numerous experimenters today, future endeavors are anticipated to be much less cumbersome and more efficient in general. The more successful ventures will have "solved" the types of problems discussed here. We intend to see this through with our generic IDSN in the near future.

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Dr. Alvord is responsible for specifying architectures and selecting digital equipment for CTM's computer-based telecommunications systems. He recently joined CTM after working as a design engineer for seven years at HRB-Singer Corporation. Dr. Blank, an expert in the data communications field, has been with CTM for one and a half years.

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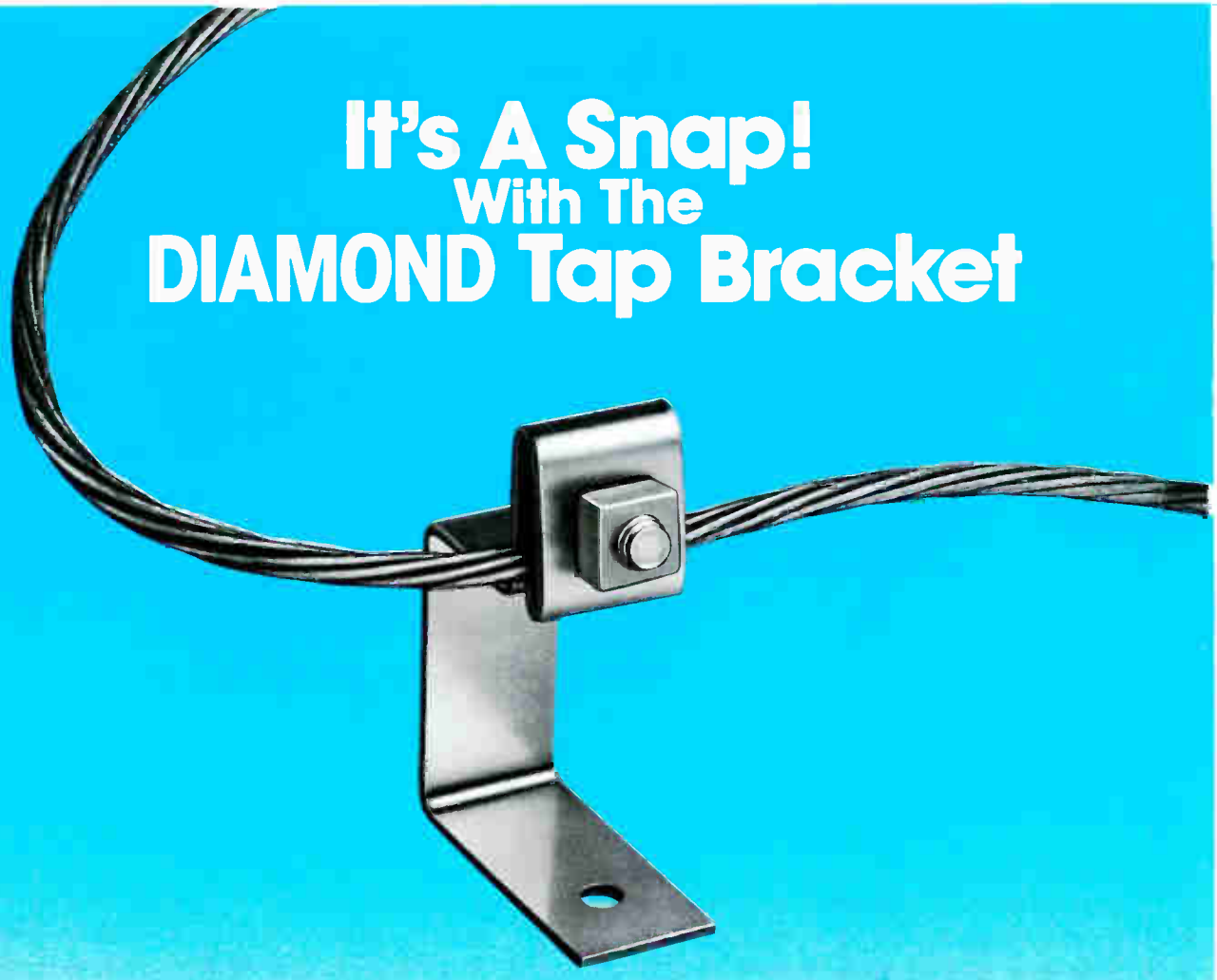

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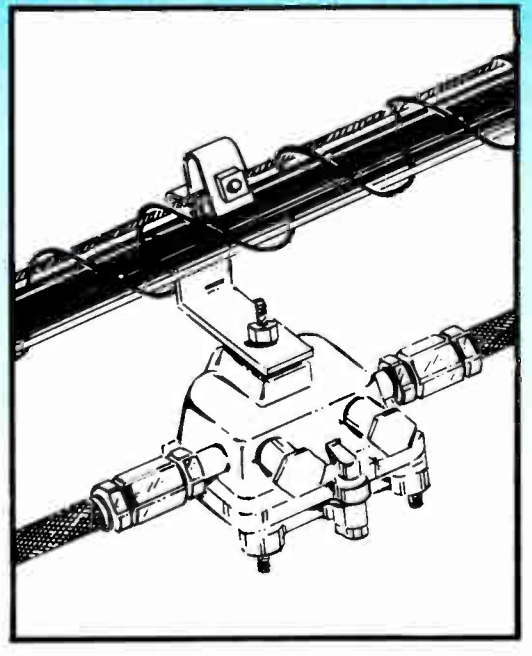

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Product Profile

Due to the multiplicity of types of CATV line passive devices and the large number of manufacturers in the market, **CED** will feature in this month's Product Profile only one type of passive device—directional taps. Other types of passives, along with the many other equipment elements of operating CATV systems, will be featured in future issues of **CED**.

Directional taps, also known as subscriber taps or multitaps, are the outdoor devices that provide the point of connection between the subscriber and the distribution thru-line or feeder-line in an operating CATV system. The tap is mounted on the aerial messenger strand or underground in a pedestal and the thru-line is inserted into the proper input and output ports of the tap. The subscribers are hooked up by means of a drop line, i.e. a cable connected to the tap at the connector ports on 'F' ports and strung to the individual homes nearby.

A variety of directional taps are available in terms of quality, price and features as the following chart will show. Manufacturers should be contacted for specific information on fine points of construction and use. Some of the fine points to look for in taps are the interchangibility or modularity of construction that will allow for removal of the plate from the housing without disturbing the thru-line connections, thus allowing easy tap loss value changes as need arises. Another factor is the type of metal used in construction and whether the 'F' ports are unitary in the die casting or separately attached to the plate or housing.

The hardware such as the strand clamp, the bolts and plugs may or may not be corrosion resistant. The housing and plate may be specially coated against corrosion. Special weather-proofing gaskets and membranes may be supplied to prevent moisture from entering the device. The housing may be designed with "drip lips" that will draw rain away from the ports. Also ports may be cast so shoulders are provided that will help retain heat-shrink sleeves.

Some manufacturers offer taps with special swivel or rotating seizure mechanisms that allow for conversion from strand to pedestal configurations without removing the center conductor seizure screw. Others provide a single piece connecting post to allow the seizure to be separate from the electronics.

Many taps have an upward frequency range to 300 MHz, while others have been expanded to 400 MHz or 500 MHz or higher. Close attention, however, should be paid to such factors as return losses and tap-to-tap isolation figures for taps operating over 400 MHz.

The new wave in directional taps is the addressable tap. Addressable taps, forming a part in an overall addressable system, provide central operation and control over connect/disconnect and address any number of subscribers for standard or pay service.

Another new development is the manually programmable tap. By this method, operators can economically control the services going to subscribers' homes with internally-housed traps that are modular plug-ins for each connector port.

In the following chart, basic unit prices are included for most models. The reader must realize that the price is for single units when that unit is bought in lots of 2,000 by a system operator. This is listed to give the reader some sense of pricing although prices vary and are almost always negotiable.

Next month's **CED** Product Profile will feature trunk and bridger amplifiers.

Directional Taps

Product Profile

Model	Bandwidth	Output Ports	Mount	Return Loss	Power Passing	Tap-to-Tap Isolation	Hum Modulation	Special Features	Availability	Cost in 2,000 Lots
Blonder-Tongue Laboratories, Old Bridge, New Jersey										
DMT Series	5-300 MHz	Two-way and four-way fixed	Strand or pedestal	20 dB min.	10 amps	20 dB	N/A	Aluminum alloy housing; moisture sealing gaskets; preselect from eight tap loss options.	Immediate	$18.59 (two-way) $23.28 (four-way)
Cabletenna Corporation, East Brunswick, New Jersey										
TD7 Series	5-400 MHz	Two-way and four-way mod.	Strand or pedestal	20 dB min.	7.0 amps	30 dB min.	N/A	Aluminum alloy housing; moisture sealing gaskets; puncture sealing rubber membrane on "F" ports; preselect from ten tap loss options.	Immediate	N/A
Century III Electronics, Anaheim, California										
2500 Series	5-300 MHz	Two-way and four-way mod.	Strand or pedestal	20 dB min.	6.0 amps	30 dB	Greater than -70 dB	Hybrid circuitry; built-in sleeves all ports; die cast aluminum alloy housing and plate; optional strand mountings and metal "F" terminators; preselect from 11 tap loss options.	Immediate	$7.75 (two-way) $8.00 (four-way)
Colormax Electronic Corporation, Edison, New Jersey										
CMT Series	5-400 MHz	Two-way and four-way mod	Strand or pedestal	20 dB min.	7.0 amps	30 dB min.	N/A	Aluminum alloy housing; moisture sealing gaskets all ports; puncture sealing rubber membrane on "F" ports; preselect from ten tap loss options.	Immediate	$7.50
Delta-Benco-Cascade Ltd., Rexdale, Ontario										
IT-4 with power passing tap	10-400 MHz	Four-way addressable	Strand, outside wall, or pedestal	16 dB min.	8.0 amps	25 dB min. (10-300 MHz) 21 dB min. (300-400 MHz)	-60 dB max.	A one port power passing tap connects to four port addressable splitter for subscriber tapping; provides basic and two pay services; various trapping modalities; optional addressable external traps; die cast aluminum housings; modular construction; preselect from 13 tap loss options.	60-day lead	$138 (IT-4) $12.50 (power passing tap)
Eagle Comtronics, Inc., Clay, New York										
EC2-400 and EC4-400 Series	5-500 MHz	Two-way and four-way mod	Strand or pedestal	20 dB (18 dB at 500 MHz)	6.0 amps	30 dB (20 dB at 500 MHz)	-75 dB	Die cast aluminum alloy housing; low insertion loss; moisture sealing gaskets; optional aluminum alloy or brass "F" ports; optional irridite or E coating; preselect from ten tap loss options.	Immediate	$7.00
Gamco Industries, Roselle, New Jersey										
GPT 5504 Series	5-400 MHz	Four-way programmable	Strand	18 dB min	6.0 amps	26 dB	-70 dB	Plug-in modules to program ports for "full," "regular" (no pay) or "terminated" service are internally housed; die cast aluminum alloy housing; preselect from six tap loss options.	Three-week lead	$27.00
GT 5500 Series	5-400 MHz	Two-way and four-way mod.	Strand or pedestal	18 dB min.	6.0 amps	26 dB	-70 dB	Die cast aluminum housing; optional triple plated coating; preselect from 11 (two-way) or nine (four-way) tap loss options.	Immediate	$7.10 (two-way) $7.25 (four-way)
GTT 5508 Series	5-400 MHz	Eight-way programmable	Strand	18 dB min.	6.0 amps	26 dB	-70 dB	Plug-in modules allow trapping of various ports; die cast aluminum alloy housing; preselect from six tap loss options.	Three-week lead	$31.00
Intercept Corporation, Clifton, New Jersey										
ICM Series	5-300 MHz	Two-way and four-way mod	Strand or pedestal	20 dB min.	6.0 amps	30 dB min	N/A	Aluminum alloy housing; stainless steel hardware; moisture sealing gaskets all ports; puncture sealing rubber membranes on "F" ports; drip skirts and shrink sleeving; preselect from ten tap loss options.	Immediate	$6.25
ICM 400 Series	5-400 MHz	Two-way and four-way mod	Strand or pedestal	20 dB min.	6.0 amps	30 dB min	N/A	Aluminum alloy housing; stainless steel hardware; moisture sealing gaskets all ports; puncture sealing rubber membranes on "F" ports; drip skirts and shrink sleeving; preselect from ten tap loss options	Immediate	$7.30
Jerrold Division, Hatboro, Pennsylvania										
FFT Series	5-400 MHz	Two-way, four-way and eight-way mod	Strand or pedestal	20 dB min.	7.0 amps	30 dB (20 dB 300-400 MHz)	-70 dB	Die cast aluminum alloy housing and plate with irridite and resin coating; weather sealing gaskets; puncture sealing "F" ports; drip skirts and shrink sleeving; preselect from 15 tap loss (two-way), 14 tap loss (four-way), and 11 tap loss (eight-way) options.	Immediate	$7.70 (two-way) $8.25 (four-way) $16.90 (eight-way)

Model	Bandwidth	Output Ports	Mount	Return Loss	Power Passing	Tap-to-Tap Isolation	Hum Modulation	Special Features	Availability	Cost in 2,000 Lots
Keystone Electronics Corporation, Hoboken, New Jersey										
DT-330	5-400 MHz	Four-way mod	Strand or pedestal	20 dB min	5.0 amps	30 dB min	Better than -60 dB	Die cast zinc housing with irridite coating; shrink sleeving; metal-to-metal housing and plate fit; preselect from nine tap loss options.	Immediate	$7.65
Magnavox CATV Systems, Manlius, New York										
MX-5700 Series	5-440 MHz	Two-way, four-way and eight-way mod.	Strand or pedestal	20 dB min.	6.0 amps	28 dB	-70 dB	Aluminum alloy housing with irridite and prohm coating, wire mesh gasket, sealed "F" ports, weatherseal gasket, preselect from ten tap loss options.	30-day lead	$8.00 $20.00 (eight-way)
Merrill Cable Electronics, Phoenix, Arizona										
Nova CAP-TAP	5-400 MHz	Four-way and 16-way (multi-dwelling) addressable	Strand (four-way) and in-door (16-way)	16 dB min	8.0 amps	25 dB	-60 dB	System configuration includes processor unit and computer interface, optional preselected basic, one pay or two pay service; steel housing; preselect from ten tap loss options	60-day lead	$570 (16-way) $196 (four-way) basic service
RCA Cablevision Systems, Van Nuys, California										
DT Series	5-330 MHz	Two-way, four-way and eight-way mod	Strand or pedestal	20 dB min	6.0 amps	30 dB	-70 dB	Aluminum alloy housing, stainless steel hardware, moisture sealing gasket, puncture sealing rubber membrane on "F" ports, drip skirts on housing and ports; preselect from up to 13 tap loss options	Immediate	$6.50 (two-way) $6.85 (four-way) $13.57 (eight-way)
DT Series	5-450 MHz	Two-way, four-way and eight-way mod.	Strand or pedestal	20 dB min.	6.0 amps	30 dB	-70 dB	Aluminum alloy housing, stainless steel hardware, moisture sealing gasket, puncture sealing rubber membrane on "F" ports, drip skirts on housing and ports, preselect from up to 13 tap loss options	Immediate	$7.11 (two-way) $7.51 (four-way) $15.28 (eight-way)
RMS CATV Division, Bronx, New York										
ECONOTAP Series	5-300 Mhz	Two-way and four-way fixed	Strand or pedestal	20 dB min	6.0 amps	30 dB	-70 dB	Die cast aluminum housing with acrylic coating, stainless steel hardware, preselect from up to 11 tap loss options	Immediate	$6.40 (two-way) $6.50 (four-way)
ECONOTAP Series	5-400 MHz	Two-way and four-way fixed	Strand or pedestal	20 dB min	6.0 amps	30 dB	-70 dB	Die cast aluminum housing with acrylic coating, stainless steel hardware, preselect from up to 11 tap loss options	Immediate	$7.40 (two-way) $7.50 (four-way)
UNITAP Series	5-300 MHz	Two-way, four-way, six-way and eight-way mod.	Strand or pedestal	20 dB min	6.0 amps	30 dB	-70 dB	Die cast housing with acrylic coating, individual drip shields on connectors, preselect from up to ten tap loss options, stainless steel hardware	Immediate	$8.79 (two-way) $8.99 (four-way) $16.90 (six-way) $17.42 (eight-way)
UNITAP Series	5-400 MHz	Two-way, four-way, six-way and eight-way mod.	Strand or pedestal	20 dB min	6.0 amps	30 dB (two-four-way) and 28 dB (six-, eight-way)	-70 dB min	Die cast housing with acrylic coating, individual drip shields on connectors, stainless steel hardware, preselect from up to 13 tap loss options (two-, four-way) and up to 11 tap loss options (six-, eight-way)	Immediate	$9.79 (two-way) $9.99 (four-way) $19.12 (six-way) $19.73 (eight-way)
Scientific-Atlanta, Inc., Atlanta, Georgia										
STD Series	5-400 MHz	Two-way, four-way and eight-way mod	Strand or pedestal	18 dB min	6.0 amps	28 dB min	-70 dB max	Die cast aluminum alloy housing, moisture sealing gasket, puncture sealing rubber membranes on "F" ports, stainless steel hardware, preselect from up to 13 tap loss options	Immediate	$6.69 (two-way) $6.95 (four-way) $14.95 (eight-way)
Sylvania CATV Division, El Paso, Texas										
3200 Series	5-300 MHz	Eight-way mod.	Strand or pedestal	20 dB min	6.0 amps	20 dB min	-65 dB	Die cast aluminum housing, plug-in splitter plate, drip lip with O ring seal, stainless steel hardware, preselect from ten tap loss options	Immediate	$18.25
6400 Series	5-450 MHz	Two-way and four-way mod	Strand or pedestal	20 dB min (18 dB 300-400 MHz)	6.0 amps	30 dB min (24 dB min 300-400 MHz)	-70 dB	Die cast aluminum housing, shrink sleeving and O ring gaskets, special swivel seizures allow various installation methods; preselect from up to 11 tap loss options	60-day lead	$7.00
Texscan/Theta-Com, Phoenix, Arizona										
DTM Series	5-400 MHz	Two-way and four-way mod	Strand or pedestal	20 dB min	7.0 amps	30 dB	-70 dB	Aluminum alloy housing, stainless steel hardware, weatherproof sealing on housing, plates and ports, preselect from 11 tap loss options	30-day lead	$7.25 (two-way) $7.45 (four-way
DTA Series	5-300 MHz	Eight-way fixed	Strand or pedestal	20 dB min	7.0 amps	25 dB	-70 dB	Polyurethane finish, tin plated brass "F" ports, weatherproof sealing on housing, plate and ports, preselect from nine tap loss options	Immediate	$18.70
Trans USA Corporation CATV Division, East Brunswick, New Jersey										
OT-40	5-400 MHz	Four-way mod	Strand or pedestal	20 dB min	10 amps	30 dB min	-60 dB min	Aluminum alloy housing; stainless steel hardware; preselect from nine tap loss options.	Dec '81	N/A

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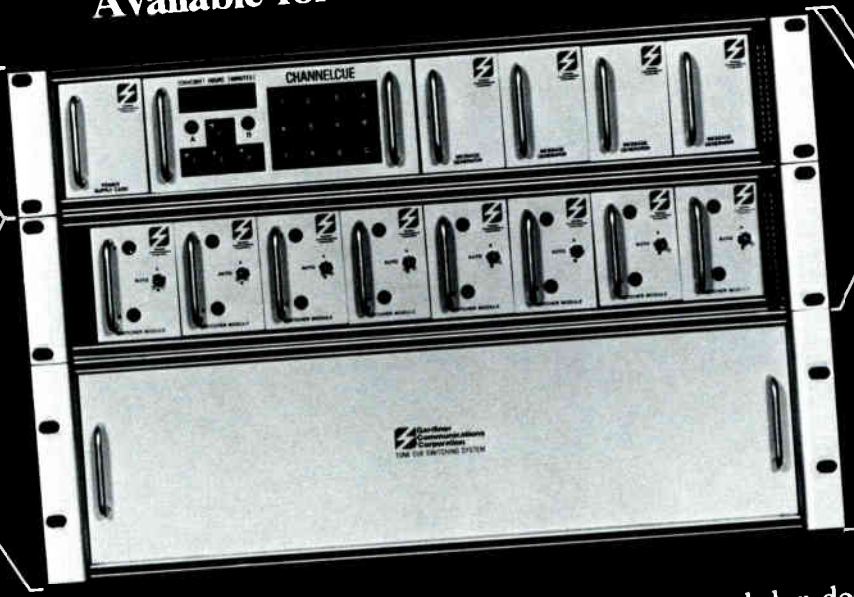

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Pulling Strings

Although most of the readers of **CED** are technicians and engineers in the telecommunications fields, our readers are also managers and supervisors. There is one fact which is frequently overlooked or ignored by some non-technical people—many upper-level technical people are also managers or supervisors to some degree. They are often required to supervise other technical employees, help set up and maintain budget projections and perform other management oriented duties.

Many technical people have been moved into supervisory positions with little or no formal management training or experience. They are simply promoted into the position and left to "sink or swim." Contrary to the seemingly standard operating procedure (or theory) of many large companies, just because a person is highly qualified as a technician or engineer does not automatically qualify that person to manage or supervise other people. Good management skills can be acquired, sometimes over a long period of time, by almost everyone, but few people are born to the position.

In many cases, personnel management is nothing more complex than treating your people as you would wish to be treated by your supervisor or manager. A liberal helping of common sense can also help to make the transition from technician or engineer to supervisor much smoother. The following management common sense is primarily intended for those who have had limited training and/or experience in personnel supervision. However, even an experienced manager should be able to gather a few thoughts from it.

General Dwight D. Eisenhower was prone to demonstrate his principle of leadership at every given opportunity with a simple piece of string. He would place it on a table and say "Pull it and it will follow you wherever you take it. Push it and it goes nowhere." The art of supervision and management is the same way. Few people do as well when they are pushed as when they are led or guided. If people do not or will not follow directions from a manager or supervisor voluntarily, if they must be pushed, the manager is not effectively managing the people. All good managers know, or should know, that they can get more and better production from their people by working with them and by showing, not just telling, them how to make their jobs easier and more effective.

There are a number of working guidelines or "rules" used by successful managers and supervisors to improve employee morale and productivity. Five of the more common sense ones are:

1. Always give your people full credit for what they do. If the credit is rightfully theirs, it is ethically dishonest to take personal credit for it. Managers who are insecure in their own positions may sometimes falsely claim credit to enhance their appearance to their own supervisors.

2. Be courteous toward your employees. Show them a genuine concern for their ideas, feelings, situations and wishes. Don't be afraid or ashamed to express genuine feelings. Employees will understand and accept you as well as you do them. A rude or overbearing personality is not conducive toward productive employee/manager relations.

3. If an employee is doing, or has done, an outstanding job, don't hesitate to praise them publicly. When you tell someone they have done well, especially in the presence of their peers, you create or enhance their desire to do even better next time. You have instilled a special type of pride in them. People thrive on honest, deserved praise. But, it must be honest. False praise will cost you the respect of everyone, even the person you are praising.

4. Be as concise and explicit in your instructions and directions to others as possible. Make sure they really understand what they are supposed to do, how you wish it done, and, just as important, why it should be done. This helps employees to feel that they are a part of the team, not just hired hands.

5. Be fair, but firm when employee discipline is required. It is often distasteful to managers to have to discipline or discharge employees, even when it is well deserved. Very few people enjoy giving or receiving criticism. When it must be done, it should always be done in private. Nothing shatters an employee's morale worse than being disciplined in the presence of others, particularly in front of other employees. It may make a boss feel important or powerful to "chew-out" an errant employee, but all it proves is that the boss is not a good manager. The employee will never forget or forgive such treatment. Always remember that criticism, no matter how it is presented or phrased, does not tend to build self-confidence or to motivate people as much as deserved praise.

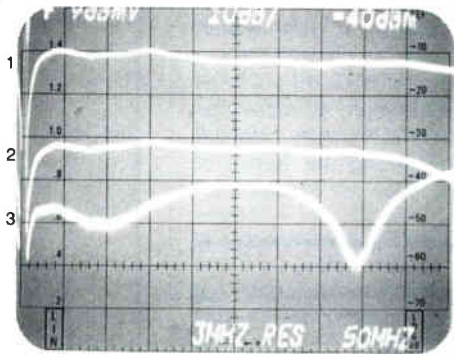
Any supervisor or manager who deserves the title is always eager to increase his skill at leading, managing, and motivating people. Many take college courses, read books on the subject, and otherwise attempt to enhance their knowledge. These methods are excellent so long as a manager remembers that technique alone cannot make them a good manager. Most employees would rather see the traits of honesty, truthfulness, and a real concern and liking for people in their manager than the most polished techniques and smooth vocal abilities attainable.

Sincerity and integrity in a manager's relationship with employees cannot be faked, at least not for a long period of time. If you have the best interests of your personnel at heart, it will show in your actions time after time. Also, any manager who is more concerned with personal gain or prestige will be easily identified by everyday actions. No matter how glib or well educated a manager may be, their true nature will soon become apparent to the people who work with them each day. A sincere, concerned manager does not have to advertise the fact—it will soon become common knowledge to the people below and above him/her within the company. No manager can buy or force employee goodwill, they earn it by their actions.

No manager can do his or her job well and still please everyone all the time. Managers can be aware of what their people want and deserve, or think they deserve, and provide it when possible. Just showing your employees that you are aware of them as fellow human beings, and showing concern for them, can be a big step toward becoming a really successful manager or supervisor.

Glenn Chambers

ICM 400
2 AND 4 OUTPUT MULTI-TAP



Swept-analyzer Print
Response of a typical tap

Trace 1: Thru response
Trace 2: Tap output (– 23 db)
Trace 3: Isolation between taps

- Corrosion resistant aluminum alloy housing
- Captive stainless steel hardware
- Moisture sealing gaskets. O-ring sealing
- Puncture sealing rubber membrane on "F" connectors
- Aerial or pedestal mounting
- Color coded db value
- Modular construction, interchangeable tap plates
- Low insertion loss
- High tap to tap isolation
- Full 5-400 MHz frequency range

The ICM series of multi-taps provide 2 or 4 way subscriber taps over a broad range of tap values. Modular design enables the operator to remove the base plate and circuit board as a unit without removing the center seize or the strand mounting. Changing the base plate will not affect downstream operation. The housing is fabricated from a corrosion resistant aluminum alloy. Stainless steel hardware is used throughout, including the strand clamp. The housing and all ports have separate moisture sealing gaskets and the subscriber ports have a puncture sealing rubber membrane. All connector ports, including subscriber ports, have large shoulders and anti-slip ribs for use with shrink sleeving. Housing and cover plate as well as the subscriber taps have drip skirts. The unit can be either messenger or pedestal mounted. The ICM is color coded to denote the db value of the component unit.

Specifications:

Bandwidth	5-400 MHz
Return loss	20 db min. (all ports)
Tap-to-Tap Isolation	30 db min.
Response flatness	± .25 db
Power Passing	6 amp. AC/DC
Tap loss	± 1 db of assigned value
Impedance	75 ohms
Input/Output ports	5/8" female
Subscriber ports	F type female
Tap plate torques	12 ft./lbs. removal torque 15 ft./lbs. securing torque

Model No.	Tap Loss* (db)	Max. Insertion Loss (db) 50 MHz	400 MHz	Tap to output isolation (db)
ICM400/2-8	8	3.4	4.0	26
ICM400/2-11	11	—	2.0	28
ICM400/2-14	14	0.8	1.4	30
ICM400/2-17	17	0.5	1.0	32
ICM400/2-20	20	0.4	0.8	35
ICM400/2-23	23	0.4	0.8	38
ICM400/2-26	26	0.4	0.8	41
ICM400/2-29	29	0.4	0.8	47
ICM400/2-32	32	0.3	0.6	47
ICM400/2-35	35	0.3	0.6	50
ICM400/4-7	7	—	—	21
ICM400/4-11	11	3.4	3.9	26
ICM400/4-14	14	1.6	2.0	29
ICM400/4-17	17	0.9	1.6	32
ICM400/4-20	20	0.6	0.8	35
ICM400/4-23	23	0.4	0.8	38
ICM400/4-26	26	0.4	0.6	41
ICM400/4-29	29	0.4	0.6	44
ICM400/4-32	32	0.4	0.6	47
ICM400/4-35	35	0.4	0.6	50

*Average tap loss is within ± 1 db of assigned value.

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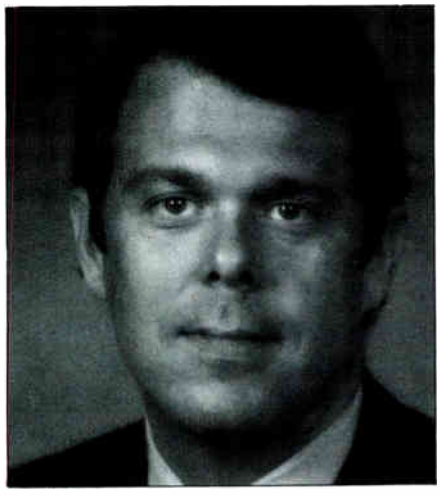
People News

★ **American Television and Communications Corporation** has named **Charles Gramlich** general manager of its newly acquired Capital Cable Company, a cable system serving Austin, Texas, and surrounding communities. Gramlich will oversee the expansion of the system from 12 channels to 54. Gramlich was formerly regional manager for ATC's south central region.

Other members of the senior management team for the system are **Phil Knudsen** (former ATC north central regional manager), operations manager; and **Don Lotz** (former regional engineer for ATC's Pennsylvania region), director of engineering.



Charles Gramlich

★ **Sammons of Fort Worth** has named **William L. Coker** chief construction coordinator. Coker is responsible for supervising construction of the 1,400-mile overhead cable grid, as well as the 300 miles of underground cable.

Before joining Sammons of Fort Worth, Coker was general manager of Sugar Land CATV Ltd., responsible for building the new cable television company and for constructing the new cable television system in Sugar Land, Texas.

★ **Warner Amex Satellite Entertainment Company** has announced the appointment of **Kevin Hamburger** as manager, engineering. Hamburger's responsibilities will involve him in the engineering aspects of the production and distribution of WASEC's program services. He reports to Dom Stasi, director, engineering. Prior to joining WASEC, Hamburger was an audio/video systems engineer at ABC-TV and a design engineer at WNET/13, New York. He is graduate of Rensselaer Polytechnic Institute.

★ **G. F. (Jerry) Haisman** has joined **CATV Subscriber Services'** Construction Division as general manager. Prior to joining CSS, Haisman was construction manager for the state of Iowa with McDonald Group, Inc.

Jerry Haisman

★ **Heritage Communications, Inc.**, has announced the appointment of **William E. (Skip) Pratt** as the general manager for the firm's Mississippi cable television systems.

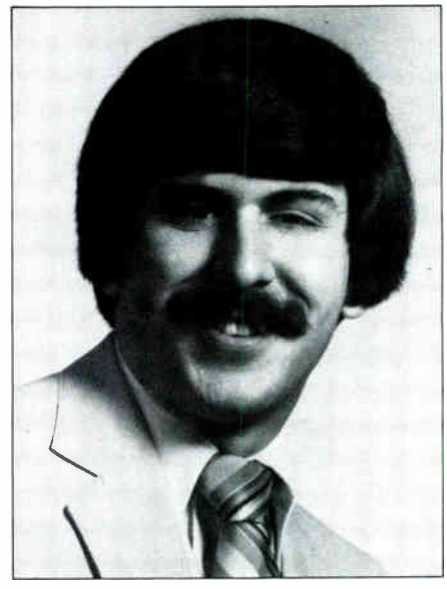
Prior to joining Heritage, Pratt was manager of several Teleprompter Corporation cable TV systems in the suburbs of St. Louis.

Before joining Teleprompter Corporation, Pratt was area director of corporate development for Sammons Communications, where he was responsible for the complete development of cable television franchising throughout 91 municipalities of the St. Louis County area.

★Bill Mickelson, president of **Mickelson Media, Inc.,** has announced the appointment of two new regional vice presidents. **Lester Gutierrez** has assumed duties as vice president of Western operations, and **Allen Summers** took on the role of vice president of Southern operations. The two appointments are part of a corporate reorganization that divides MMI into two operating regions with corporate headquarters in Hastings, Minnesota. Prior to the appointment, Gutierrez served as Western regional manager and Summers as corporate engineer. Gutierrez has been with MMI for five years, joining the company in Las Vegas, New Mexico, as installer.

★ **Jeffrey M. Curreri** has been named development engineer at **Times Fiber Communications, Inc.** Curreri will be involved primarily in the design and development of digital circuitry for CATV components.

Curreri joins Times Fiber Communications, Inc., after serving for three years as president of Data-Com Network Services, Inc. Prior to working for Data-Com, he was an electronic systems engineer with Frontier Engineering.



Jeffrey Curreri

★ **William M. Watts** is now a senior process engineer for **Siecor Optical Cable**. Watts joined Superior Cable, which is also a service of Siecor, in 1961, as a senior draftsman. Since 1961 he has held several engineering positions.

★ **John D. Matejovich** was appointed director of technical services for the Western division of **Warner Amex Cable Communications.**

Matejovich will be responsible for planning and coordinating technical activities throughout the Western division which operates 66 systems in 11 states serving more than 342,000 subscribers. He will provide engineering and operations support to the three regional organizations within the division.

Matejovich, who had been regional engineering manager for the Central Region where he directed operations for 40 systems in nine states for Warner Amex, joined the company in 1970 as an engineer in the Akron system. Prior to 1970, he was chief technician for the DuBois Cable System and a field engineer for the Vikoa Corporation.

★ **United Video, Inc.**, has promoted **Michael T. Peyton** to director of project development, and named **Cecil W. "Jack" Riley** director of microwave development. Both are new positions.

Peyton joined UVI in January 1980 as manager of administration and special projects in engineering. One of Peyton's newly assigned projects is overseeing the construction of United's $1 million satellite uplink facility near Chicago, which is to be completed in September.

Previously director of field operations, Riley started with the company in January as field manager. He is now responsible for development of microwave services utilizing present or proposed United facilities to increase the innovative applications of microwave communications.

★ **Storer Cable Communications** has appointed three general managers in Florida and one in the New England.

Jim Boso has been named general manager for Storer's Dade/Broward system. Boso was formerly station manager of WWCO, Mercury Broadcasting in Waterbury, Connecticut, and vice president, general manager for Mel Wheeler Broadcasting, Inc., in Dallas.

Chip Winston will take over as Dade Cable's general manager. Winston was formerly Storer's general manager for the Dunedin/Tarpon Springs system, and assistant manager for Dade/Broward.

Douglas Spiker has been named general manager for Storer's Pasco County new-build system, which will have a capacity of 108 channels. Spiker was assistant manager for Dade/Broward.

In New England, **Barbara Silkworth**, formerly system manager in Storer's Eatontown, New Jersey, franchise, has been brought to Woodbridge, Connecticut, as general manager of the New England area, serving the Connecticut area. Silkworth began her career in cable television as manager of Futurevision Cable Enterprises, Inc., in 1972. Silkworth served as a board member of the New Jersey Cable Television Association and was recently elected secretary to the Cable TV Network of New Jersey, an industry-sponsored interconnect of all cable systems in New Jersey.

In another move, **Bill Langendorf** was named as general manager of Storer's 34 franchises in the Dallas-Fort Worth Metroplex. He replaces **Jim Jenkins** who will become a vice president and general manager of Storer's franchises in the Houston area. Langendorf, who has 14 years of experience in the cable industry, joined Storer six years ago as system manager of its Sarasota, Florida, system and was recently district manager of Storer's Arkansas operations.

Jenkins has six years of cable industry experience and has been with Storer since 1978 where he served as assistant manager of the Charleston system. He has also served as manager of Storer's cable systems in Hollywood, Venice and Dunedin, Florida.

★ **Dana Webb** has been appointed regional manager for the Northeast Region of **Continental Cablevision of Ohio, Inc.** Dana will oversee Continental's systems in the Cleveland area and will be involved in both the operations and construction phases of the various systems.

Dana joined Continental in April 1980 as system manager for the company's Findlay and Fostoria offices. A year later he was appointed assistant regional manager for the Northeast Region.

★ **Cox Cable Communications** has announced the promotion of **Cecil McCoy** to system engineer for the company's second largest cable operation, Cox Cable Tidewater.

McCoy has 15 years of experience in the electronics field and has been instrumental in the development of the Cox Cable system serving the communities of Portsmouth, Virginia Beach and Norfolk since February 1977.

McCoy holds a Third Class FCC License and is completing work toward a Second Class License. He is active in numerous cable activities.

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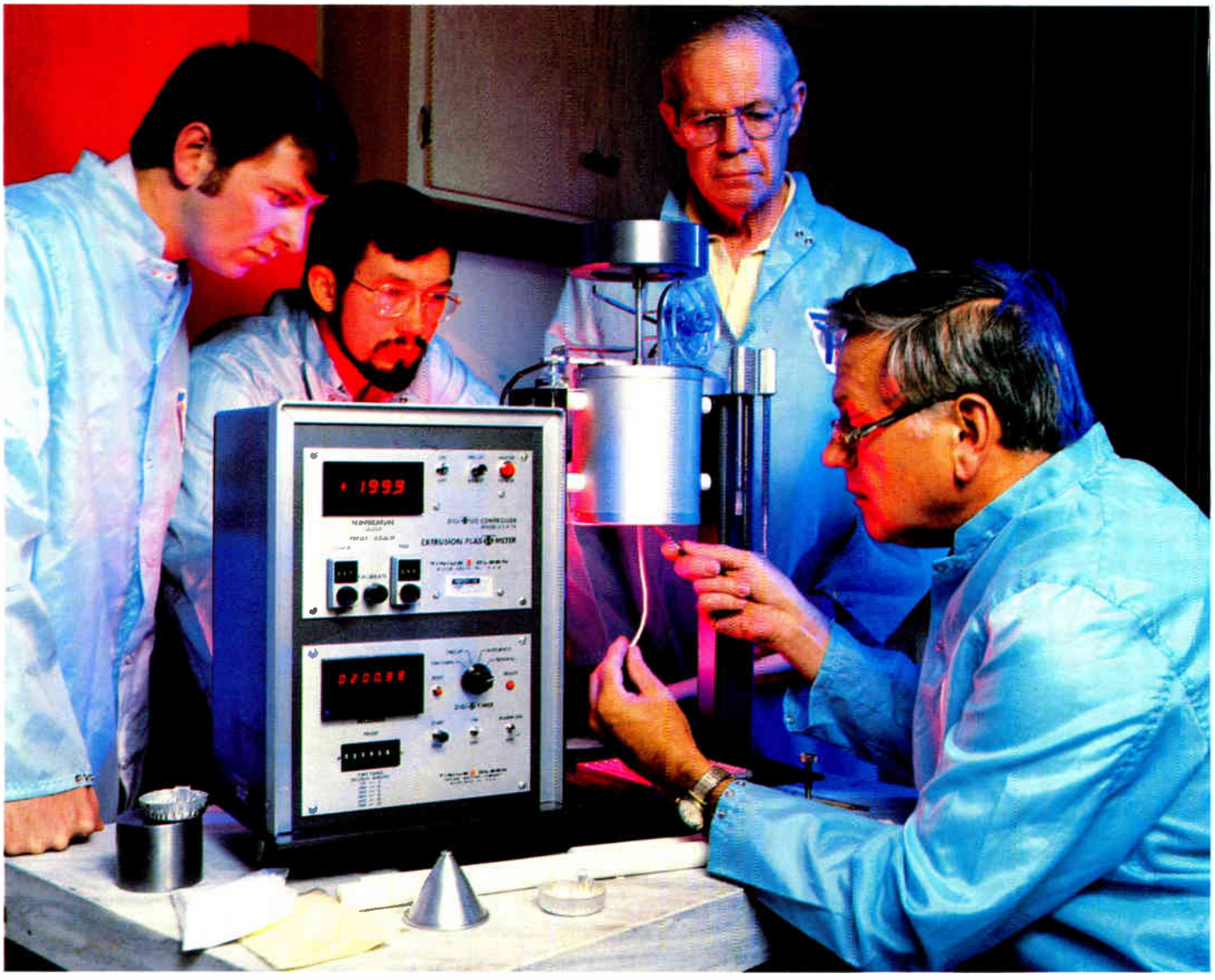

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Q. Now that distant signal importation is legal, we want to bring in one independent channel. Our biggest problem is that the station is about 90 air miles distant and a computerized signal survey indicates very poor signal levels even with four stacked (quad) antennas. I have heard there are some very large antennas which might work for us. Do you have any ideas or suggestions?

A. There are several methods which can be used to bring in distant signals. Since we don't know your financial situation, we will just make some suggestions.

Probably the best, and most expensive, method for a cable television system to import signals over a 90 mile path is the use of microwave. If common carrier is available, this could save dollars in capital expenditures but would cost in monthly tariffs. CARS band microwave could allow you to build a signal receiving site nearer to the TV transmitter and microwave the signal into your headend. This can cost many thousands of dollars for equipment, property, etc. Picture quality should be good on either type of well designed and maintained microwave system.

If you would rather try a less expensive method, you might wish to install a rhombic antenna to see if its performance is satisfactory. These are constructed from four wooden poles set in a diamond configuration with one end of the longest dimension toward the TV station. Copper or copper-clad steel wire is strung on the poles to form the antenna. We have had reports of rhombic

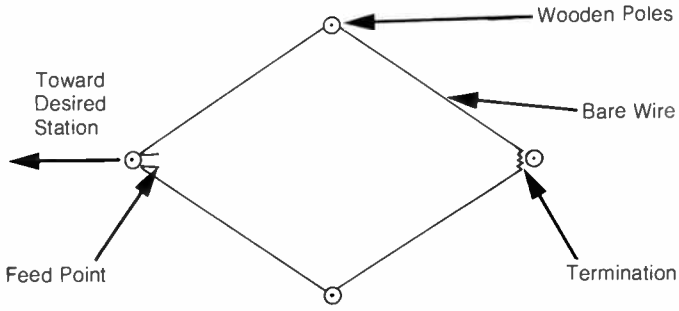


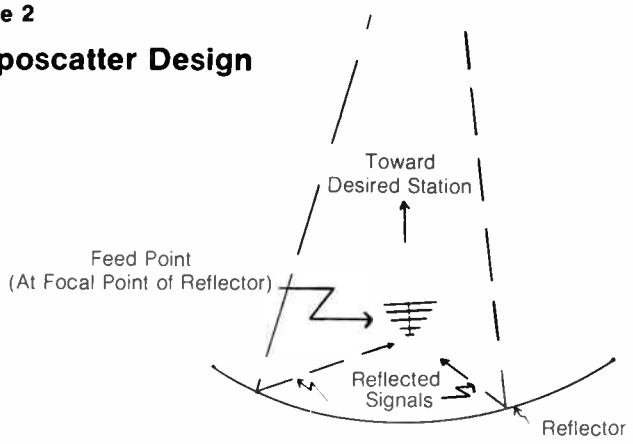
Figure 1 **Rhombic Design**

antennas working well over as much as a 120 mile flat path. Figure 1 illustrates the rhombic design.

Another type of "long haul" antenna is designed to receive tropospheric scatter signals. Tropos consist of a very large screened reflector which is designed to focus signals into a regular antenna. The principle is somewhat similar to that of a parabolic earth station receiver. A tropo is illustrated in Figure 2.

Figure 2

Troposcatter Design



The major drawback to either antenna is that they are very large in size and therefore require a large amount of land space. Also, they may be subject to periodic signal fades and to damage from wind storms.

Also, you probably know that signal levels may be increased by adding more antennas like those in the quad stack. Each time the number of antennas is doubled, your received signal levels should increase by about 3.0 dB if the antennas are properly matched and combined. This could run into a great number of antennas and be very expensive if much stacking is to be done.

Q. We have a problem here which is not really technical, but it does concern our technical personnel. We have installed a popular low-cost radiation detection transmitter on the system to allow our techs and installers to monitor signal leakage as they drive around the system. The frequency of the transmitter is in the FM radio band and can be received as a series of varying tones on any inexpensive automobile or portable FM radio. This is where the problems arise.

Although we have been talking to our people, modifying the radios etc., it does not seem that we can get them to leave the radios set to the transmitter's frequency. Short of buying some of the more expensive fixed-tune receivers, which will be turned off, or firing someone as an example, I'm not sure how to solve the problem. Does anyone have a good solution?

A. I can certainly sympathize with both you and your techs. You need to make sure the system is as free of signal leakage as is possible. On the other hand, listening to a radio tuned as a monitor, when it could be receiving music, can be very boring to a young tech or installer.

One of the brighter chief techs that I know has come up with a solution that works for him and might work for others. He simply changed the frequency of the radiation transmitter to the same frequency as the two-way radios in his system. Since the commercial communications transceivers are in all installer and technical vehicles, he figured he might as well take advantage of their sophisticated antennas, squelch circuits and frequency stability for radiation monitoring.

Now, his techs can use their FM radios for any listening they desire. When they are near a system leakage source, the two-way radio squelch is broken and the techs are alerted. He claims that this system is near perfect, and his techs and installers are happy also.

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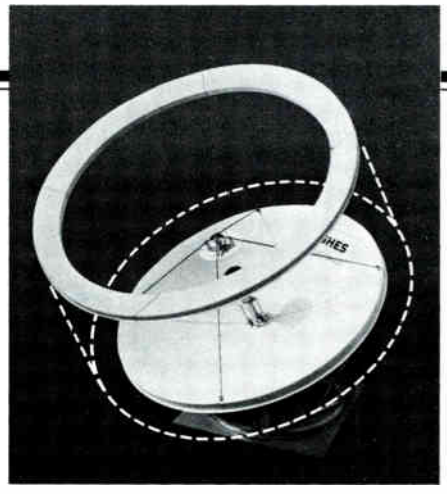

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*Patent applied for

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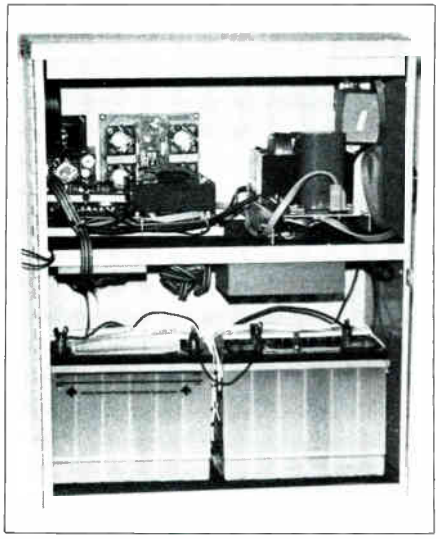
Product News

Power Supplies

Power Supply Monitoring Available on Lectro

Communications Distribution Corporation has announced that Lectro standby power supplies can now be updated to accommodate status monitoring. The system, the ASCII, is based on the standard used on most teletype and home computers and does not require a computer programmer, according to the company. To interrogate a power supply in the system, an operator need only type four ASCII characters and a question mark.

The headend interface modem is housed in a 3.5-inch rack mount unit. It is supplied with a 24-hour real time clock, audible alarm and external outputs and an RS-232 interface for remote or local printer use.



Lectro standby power supplies can now be equipped with ASCII status montitoring.

Should a power outage occur, an alarm will indicate that the supply has been switched to standby. Further monitoring of the battery parameters will indicate expected standby time. After the outage is over, the ASCII senses line AC voltage and returns the power supply to normal operation.

In maintenance mode, the ASCII periodically switches the power supplies to standby and monitors battery voltage and current performance. The system checks for battery condition, low water and other possible malfunctions.

The system operates on the digital analog principle, as compared to a dry contact closures method. With the digital analog method, the operator has control of numerous functions and controls, rather than a single function or control. The operator receives an exact reading of the voltage and current levels on the power supplies in the cable system within specified tolerances. When used as a stand alone with its own computer, the power supplies in the cable system can be checked at any time without disturbing other programs being carried on in a central computer used for security or other purposes.

For information, contact Communications Distribution Corporation, P.O. Box 567, Athens, Georgia 30601; (404) 353-1159.

Converters

LNR Introduces Converter, Translator

LNR Communications, Inc., has introduced a new low-profile RF to IF converter and a Ku to C-band frequency translator.

The model DC4-E1 converter is designed for small terminal satellite earth stations. Available in single thread and redundant configurations, this unit offers low phase noise and good frequency stability for digital and voice carriers, such as QPSK and FM-SCPC, according to the company. The DC4-E1 measures1.75 inches in height and is designed for 19-inch rack mounting. Interfaces are coax connectors, so that the signal may be carried on low-cost coaxial cable. FET LNA power on the RF input connector is available as an option. Low translation phase noise is assured by an internal crystal controlled phase-locked oscillator.

LNR's model DC12/4 translator provides block down conversion of the entire 11.7-12.2 GHz frequency assignment to 3.7-4.2 GHz. Also, the unit can be used to downconvert a Ku-band video signal into an unused channel in a 24 channel C-band TV receiver at a cable TV headend. The DC12/4 interfaces directly with a 12 GHz LNA and 4.0 GHz receivers or converters and is suitable for video message or data carriers. The unit is equipped with summary alarm and power supply.

The model DC4-E1 RF to IF converter from LNR Communications.

For information, contact LNR Communications, Inc., 180 Marcus Boulevard, Hauppauge, New York 11787; (516) 273-7111

Cable

Times Wire & Cable Unveils Plenum Cables

A new data and audio/video coaxial cable that can be installed in air plenums without conduit is being marketed by the Times Wire & Cable Division of **Times Fiber Communications, Inc.**

Times' PL series cables utilize a high-velocity flourocarbon dielectric. This dielectric is bonded to the center conductor, preventing signal degradation or shorting from moisture which may collect in the cable, according to the company.

Times' PL series cables are available in a wide range of constructions, including RG6/U, RG11/U and RG59/U types (75Ω) for hook-up of video systems.

For information, contact the Industrial Products Group, Times Fiber Communications, Inc., 358 Hall Avenue, P.O. Box 384, Wallingford, Connecticut 06492, (203) 265-8500.

Test Equipment

Wavetek Introduces Sweep Generator, Modulation Meter

Wavetek Indiana, Inc., has brought out its model 4101 modulation meter and its model 1080 sweep generator.

The model 4101 is capable of automatically measuring either AM or FM modulation of R.F. signals in the range of 1.5 MHz to 2.0 GHz at levels as low as 3.0mV. Either +, - or difference modulation may be measured. Push-button control determines operating mode, range, audio filters and de-emphasis networks. Standard de-emphasis networks of 50, 75, and 750 μsecs are selectable, making the model 4101 useful for checking FM broadcast transmitters. A re-chargeable battery pack option is available providing up to seven hours continuous operation before re-charging for field use.

The model 1080 covers a frequency range from 1.0 MHz to 1,000 MHz and has three modes of operation: full sweep, ΔF

and C.W. In full sweep mode, the start-stop frequencies are fixed at 1.0 MHz and 1,000 MHz, respectively, and a variable marker, controlled by a ten-turn potentiometer is displayed on a three plus one LED digital readout. This control and frequency indicator becomes the center frequency of the sweep by pushing the function control button which switches to the ΔF mode. The sweep may then be expanded by the sweep width controls from 1,000 MHz to 200 kHz for maximum resolution.

The 1080 has a variable power output from +13 to -70 dBm and is displayed on a three digit LED readout to a resolution of 0.1 dB. An "auto-zero" circuit automatically corrects for long-term drift by periodically resetting the zero frequency of the oscillator. A wide variety of sweep rates are selectable along with adjustable marker amplitude and width.

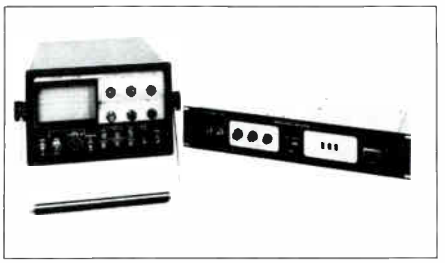
For information, contact Wavetek Indiana, Inc., 5808 Churchman, P.O. Box 190, Beech Grove, Indiana 46107; (317) 787-3332.

The model 1080 sweep generator from Wavetek Indiana, Inc.

Avantek Announces Sweep System

Avantek, Inc., has announced the introduction of its CR/CT-4000 remote automatic sweep system with full 5.0 to 440 MHz (58-channel) bandwidth coverage. Using a permanently-installed headend transmitter (CT-4000) and a portable, battery-operated tracking receiver/spectrum analyzer (CR-4000), the system permits technicians to view the total response of the CATV system without interfering with subscribers' reception. Thus, the testing and adjustment of CATV systems can be done during prime-time viewing hours, according to the company.

The Avantek CR-4000 receiver is a portable unit that operates up to 2.5 hours on a fully-charged internal battery pack. It may be connected to any point in the system—such as amplifier output tap, subscriber tap or at the subscriber's set—where it will detect and display the low-level 5.0 to 440 MHz swept test signal generated by the associated transmitter. The receiver can also be operated as a spectrum analyzer for observing desired signals, beats and spurious products throughout the CATV frequency range.



The Avantek CR/CT-4000 remote automatic sweep system.

The CT-4000 transmitter, installed at the CATV headend, continuously generates a signal approximately 30 to 35 dB below the video levels, which sweeps through the 5.0 to 440 MHz frequency range in approximately 25 milliseconds. The combination of low-level signal with short per-channel "dwell" makes this test signal virtually invisible to the subscriber. The CT-4000 may also be used as a sweep generator with variable sweep rate and adjustable start and stop frequencies for bench-testing active or passive CATV components.

For information, contact Avantek, Inc., 3275 Bowers Avenue, Santa Clara, California 95051; (408) 496-6710.

Miscellaneous

Stanley Hydraulic Tools Introduces AL31 Alternator

Stanley Hydraulic Tools has added the AL31 alternator to its line of hydraulic powered hand tools. The AL31 is designed to furnish job-site electrical power to operate lights and heaters and for fusing plastic pipe. Capable of handling 3,000 watts, continuous duty, the AL31 features short-circuit protection and over-capacity surge capability. Solid state excitation system and volt meter are standard. For information, contact Stanley Hydraulic Tools, 3810 S.E. Naef Road, Milwaukie, Oregon 97222; (503) 659-5660.

Panduit Develops Crimping Tool System

An electric/hydraulic compression connector crimping system has been developed by **Panduit Corporation**. The system includes a CT-920CH crimping head which develops 12 tons of force, a CT-900HP 10,000 psi electric/hydraulic pump, a ten-feet factory filled non-conductive hose and remote controls.

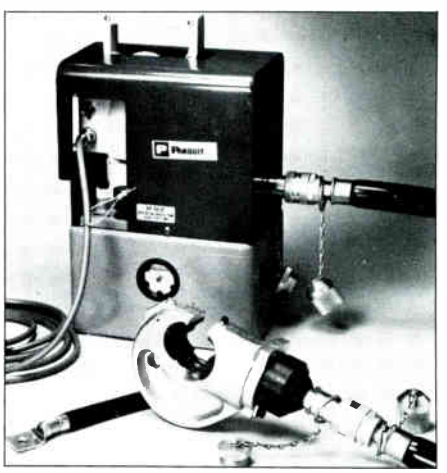
The tool offers a crimping range of #8 AWG through 750 MCM for copper lugs (400 MCM copper splices) and #6 AWG through 600 MCM for aluminum lugs (400 MCM aluminum splices). Color coded snap-in dies assure proper mating of die and connector.

The system features an embossed die index number which is pressed into the connector during the crimping process. This makes possible fast on-site certification that the correct crimping die was utilized and eliminates the need for destructive testing, according to the company. In addition, the circular design of the die provides total containment and a full periphery crimp. At the completion of the crimping cycle, the pump shuts off automatically.

One feature of the Panduit hydraulic tool system is the ability to use the remote control for jogging the two-stage rapid ram advance. This permits holding the connector in the tool and frees the installer's hands for cable insertion.

The CT-900HP pump features adjustable pressure settings, a visual fluid level check and an on/off control switch. Parker-type hydraulic fittings are used on the pump, the remote crimping head and the hose which is supplied pre-filled with non-flammable hydraulic fluid.

For information, contact Panduit Corporation, 17301 Ridgeland Avenue, Tinley Park, Illinois 60477; (312) 532-1800.



Panduit Corporation's CT-920 hydraulic crimping tool system.

Eagle Comtronics Develops 15-Tier Descrambler

Eagle Comtronics, Inc., has developed a 15-tier descrambler. The initial model can be used with any present or future convertor with Channel 2, 3, or 4 output. The unit will offer 15-tier control with each tier having unlimited channels, according to the company.

The scrambling/descrambling function of the product is achieved through sync-suppression in-band. The unit features a potted, tamperproof tier identification matrix. The descrambler does not utilize the audio subcarrier for sync information, making it ideal for AML transmission. The headend scrambler utilizes a modular concept, according to the company.

For information, contact Eagle Comtronics, Inc., 4562 Waterhouse Road, Clay, New York 13041; (315) 622-3402.

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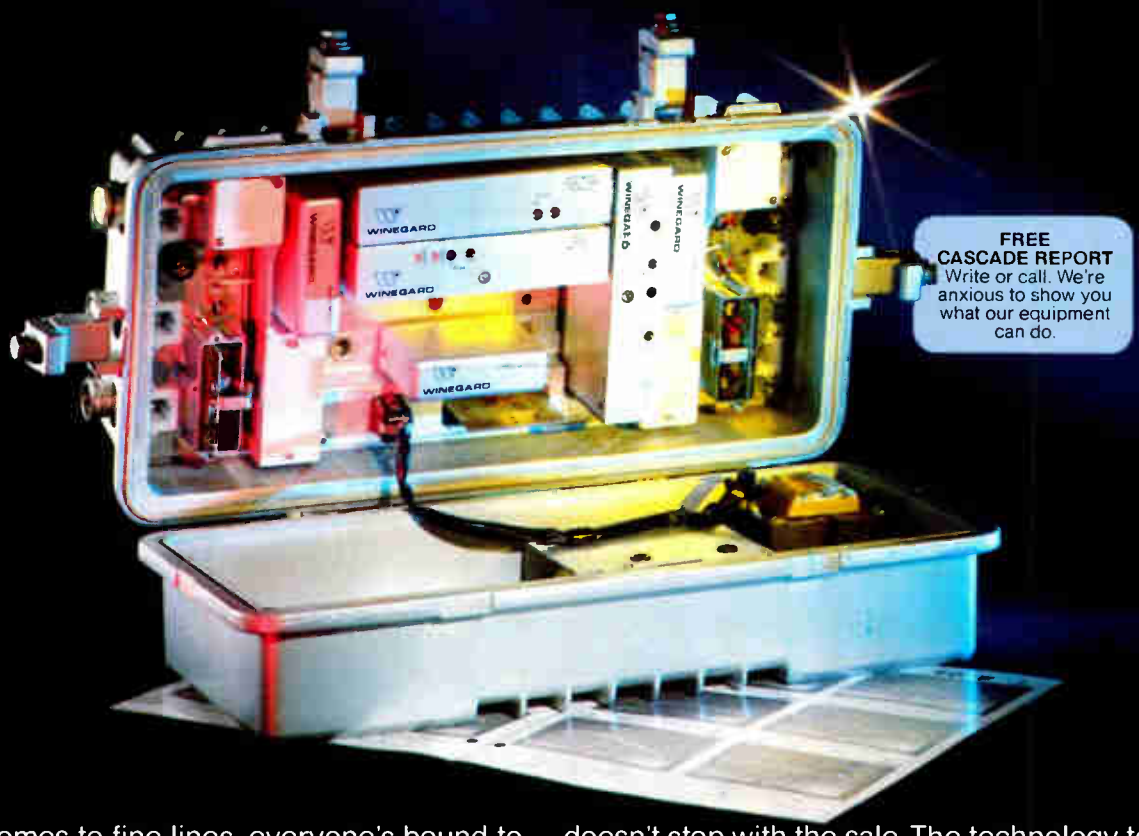

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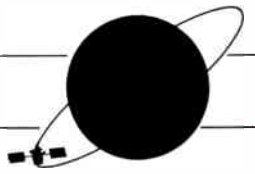

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
ARTS		9:00 p.m./12:00 a.m.		F1,#1
ACSN	Weekdays: Weekends:	6:00 a.m./4:00 p.m. 6:00 a.m./1:00 p.m.	192°/#	F1,#16
AETN	Mon.-Sat.: Sunday:	4:00 p.m./7:00 p.m. 4:00 p.m./6:00 p.m.		F1,#16
BET		11:00 p.m./2:00 a.m.	018°/#	F1,#9
Bravo		8:00 p.m./6:00 a.m.		Comstar D-2, #3H
Cabletext		24 hrs.	None	F1,#6 Vertical Blanking
CBN		24 hrs.	None	F1,#8
CBS Cable		4:30 p.m./4:30 a.m.	524°/#	Westar III, #6
Cinemax		24 hrs.	None	F1,#20 (E,C) F1,#23 (M,P)
CNN		24 hrs.	None	F1,#14
C-SPAN	Weekdays: Sundays:	10:00 a.m. to 6:00 p.m. Precedes USA Network, three to four hours	195°/#	F1,#9
ESPN		24 hrs.	None	F1,#7
Escapade		8:00 p.m./6:00 a.m.		Comstar D-2,#4V
Eternal Word Television Network		7:00 p.m./11:00 p.m.		Westar III,#12
GalaVision	Weekdays: Saturdays: Sundays:	8:00 p.m./3:00 a.m. 3:00 p.m./3:30 a.m. 1:30 p.m./3:00 a.m.		F1,#18
HBO	Nov. 1	6:00 a.m. 2:40 p.m.	Program	F1,#24 (E,C)
	Nov. 2	5:30 a.m. 2:30 p.m.	729°/#	F1,#22 (M,P)
	Nov. 3	5:30 a.m. 2:00 p.m.	Scramble	
	Nov. 4	6:00 a.m. 2:26 p.m.	835°/#	
	Nov. 5	5:30 a.m. 2:35 p.m.	Duplication	
	Nov. 6	5:00 a.m.	940°/#	
	Nov. 7			
	Nov. 8	2:19 p.m.		
	Nov. 9	5:30 a.m. 3:26 p.m.		
	Nov. 10	5:00 a.m. 2:15 p.m.		
	Nov. 11	5:30 a.m. 3:17 p.m.		
	Nov. 12	5:30 a.m. 2:57 p.m.		
	Nov. 13	5:00 a.m.		
	Nov. 14			
	Nov. 15	2:05 p.m.		
	Nov. 16	5:30 a.m. 2:57 p.m.		
	Nov. 17	5:00 a.m. 2:52 p.m.		
	Nov. 18	5:00 a.m. 2:20 p.m.		
	Nov. 19	5:00 a.m. 2:46 p.m.		
	Nov. 20	5:00 a.m.		
	Nov. 21			
	Nov. 22	2:24 p.m.		
	Nov. 23	5:00 a.m. 2:10 p.m.		
	Nov. 24	5:00 a.m. 2:26 p.m.		
	Nov. 25	6:00 a.m. 4:20 p.m.		
	Nov. 26	3:00 a.m. 3:34 p.m.		
	Nov. 27	2:30 a.m.		
	Nov. 28			
	Nov. 29	2:20 p.m.		
	Nov. 30	5:00 a.m. 2:04 p.m.		
HTN		8:00 p.m./2:00 p.m.	517°/#	F1,#21 (P)

Signal	Day	Start/Stop	Alert Tones	Satellite/ Transponders
Lifestyle		24 hrs.	None	F1,#3
The Movie Channel		24 hrs.	None	F1,#5
Modern Satellite Network	Weekdays: Weekends:	noon/5:00 p.m. 8:00 a.m./1:00 p.m.	243°/#	F1,#22
MTV: Music Television		24 hrs.	None	F1,#11
National Christian Network		6:00 a.m./8:00 p.m.	073°/#	Comstar D-2,#4V
National Jewish Network	Sunday:	noon/4:00 p.m.		F1,#16
Nickelodeon		8:00 a.m./9:00 p.m.	311°/# (E,C,M) 519°/# (P)	F1,#1
North American Newstime		24 hrs.	None	F1,#6
PTL		24 hrs.	None	F1,#2
Private Screenings	Fri.-Sat.:	12:00 a.m./3:00 a.m.		Westar III,#7
Reuters	Weekdays:	4:00 a.m./7:00 p.m.	None	F1,#18
SIN		24 hrs.	None	Westar III, #8
SPN		24 hrs.	None	Westar III, #9
Showtime		24 hrs.	None	F1,#12 (E,C) F1,#10 (M,P)
Trinity (KTBN)		24 hrs.	None	Comstar D-2, #9V
USA Network		24 hrs.	None	F1,#9

Calliope. Weekdays: 6:00 p.m. to 7:00 p.m. Saturdays: 8:30 a.m. to 11:30 a.m.

The English Channel. Tuesdays: 11:30 p.m. to 1:30 a.m., except Nov. 10, 9:00 p.m. to 11:00 p.m. Saturdays: 12:30 p.m. to 3:30 p.m. Sundays: 10:30 p.m. to 12:30 a.m., except Nov. 8, 11:00 p.m. to 1:00 a.m.; Nov. 29: 5:30 p.m. to 7:30 p.m.

WFMT	24 hrs.	None	F1,#3	Subcarrier
WGN	24 hrs.	None	F1,#3	
WOR	24 hrs.	None	F1,#17	
WTBS	24 hrs.	None	F1,#6	
Women's Channel	24 hrs.	None	F1,#6	Subcarrier

E=eastern M=mountain
C=central P=pacific

All program times are listed for the eastern time zone, unless otherwise noted.

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With Advance Traps, you are assured of traditional Eagle quality. Our traps are **completely potted to prevent absorption**, are stable over wide temperature ranges (-40° to +140°F) and our machined and interlocked housing is stronger than standard traps with welded or soldered cases.

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5-NF A-F, mid band	-75db	1.0db	-5db	-1db
5-NF G-I, mid band	-75db	1.5db	-6db	-1db
5-NF 7-13, high band	-75db	2.0db	-10db	-2db
5-NF J-W, super band	-70db	3.0db	-15db	-3db

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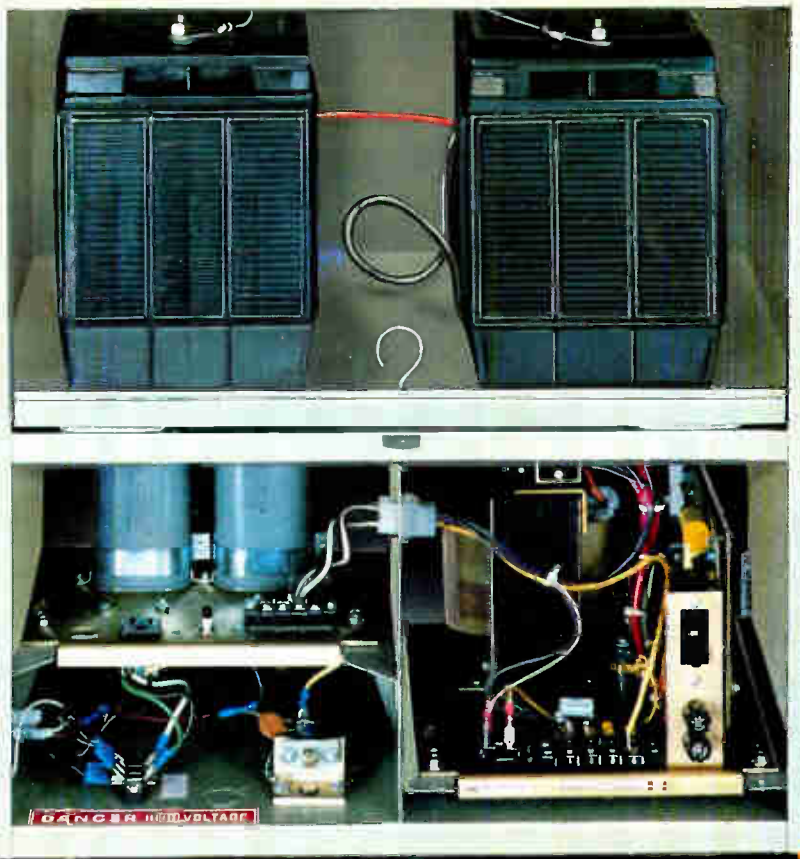

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