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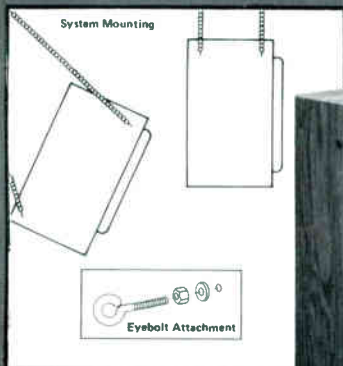
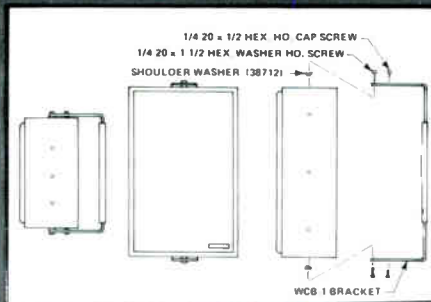
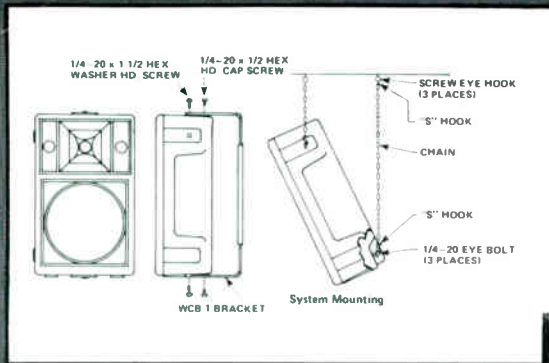
COVERING TELECOMMUNICATIONS
AND ELECTRO-ACOUSTICS

DECEMBER 1984

Where We Stand:

1984 Economic Report

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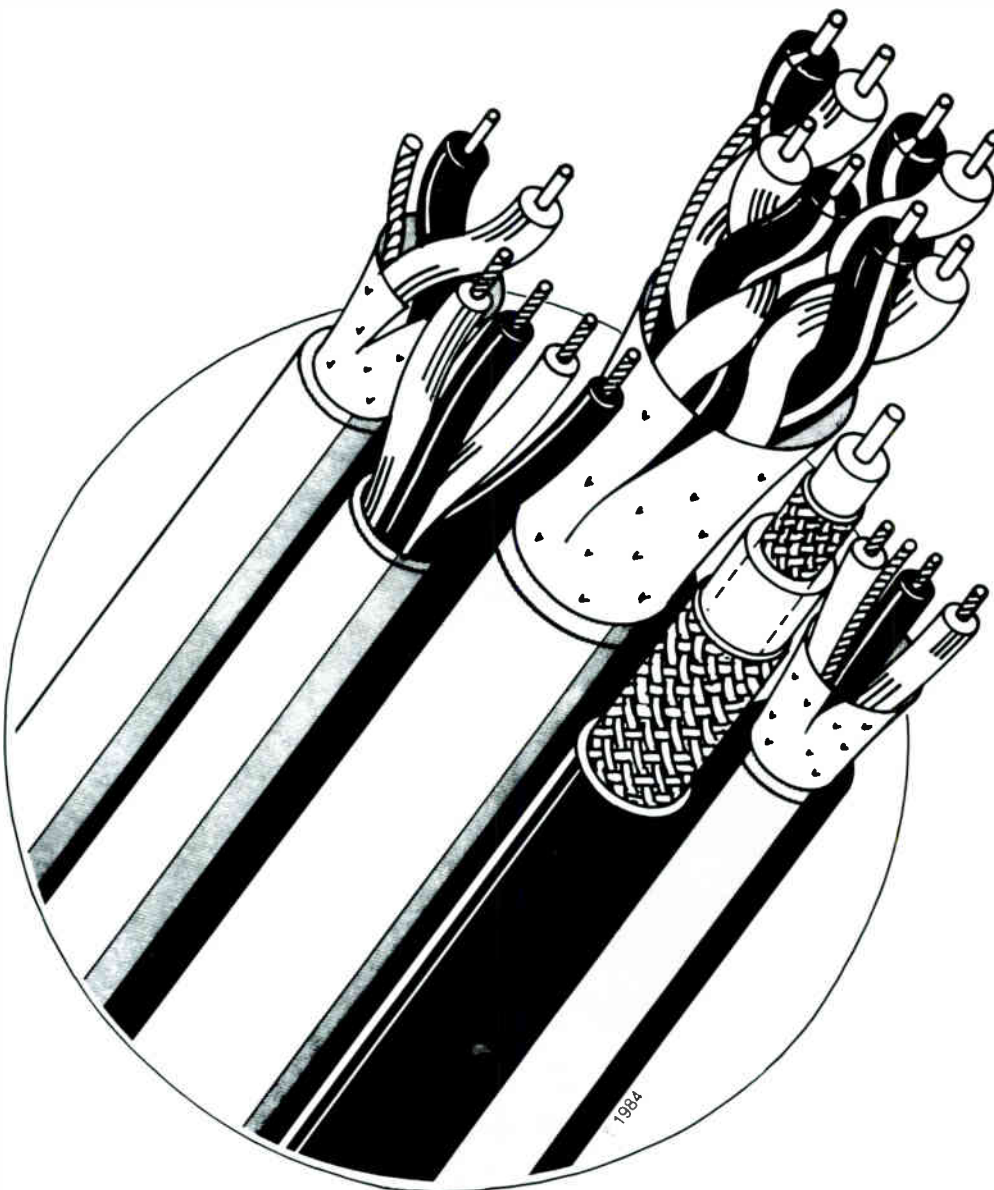
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DECEMBER 1984

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LATE LINES

The 1984 NATA Convention has come and gone!

The impressions gathered through a short hop-scotching survey indicate that the interconnect industry suffers with a slight case of nausea. Witness:

- Among the exhibitors there ran a thread of commonality. Just about from a quarter to a half of the number of competitors offering keysets and PBX systems, would either be out of business, or combined in a merger, or have shrunk back to half their size. Why? The market has reached its absorption level. Sales for the interconnect industry are expected to be flat thru 1985 and into half of 1986!

- Not seen, but not unnoticed, was the word on the IBM-Rolm deal. The consensus was that a head-to-head battle could be shaping up: in the center ring IBM versus AT&T. And that could spell doom for some makers of large switches that have been competing with Western Electric types.

- Meanwhile, whoever struck the death knell over the 1A2 systems was grossly premature. The keysets in any form have been selling handsomely. As a matter of cold statistics, keysets have been the only bright spot in all of the dollar sales figures assembled by industry mavens.

- The problems of personnel, sales and technical (the industry savants have termed the problem, "Human Resources") have witnessed a partial easing, through the hiring of laid-off AT&T personnel.

- Keyphone system suppliers have been crowding their distributors/dealers with a mass of product, pointing to the El Dorado known as the small and medium sized businesses. These are prime targets for increased sales of keysets features, they hail, thinking big profits for all! But the competition seems to gallop along in geometric progression what with AT&T's drive in the identical product-market-price areas.

- Enthusiasm within the precincts of interconnect selling has waned perceptibly. Why? For one, the lack of a strong market. For another, the re-emergence of Centrex. It has sent shivers up the spine of NATA, as expressed by Edwin B. Spievack, president of NATA, in his remarks before the assembled members: "We did out work at this association, maintaining traditional legal and legislative services while initiating new institutional arrangements; building bridges to the carrier industry in hope of reconciling differences that should no longer divide us. . . We became a forum for the meeting of diverse interests; the public and the industry; the regulated carriers and independent manufacturers and distributors. And there was progress. . . But where the carrot would not avail, we used the stick of legal action. . . fought for the retention of separation requirements over AT&T; sought for the maintenance of access charges over Centrex services; sought through state action to stem Centrex rate reductions, contract premiums and access charge offsets; and sought clarification of old termination liability problems which impair the capacity of the consumer to make new product choices. All of these things—and even more—we did, and continue to do. But all of those efforts—and even the successes—do not hide dark clouds just over the horizon. Judge Greene and FCC commissioners are now running on parallel courses. They

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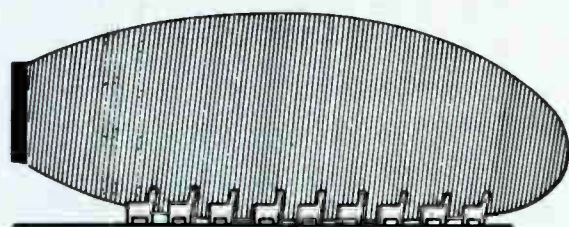
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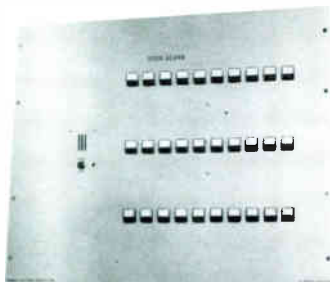
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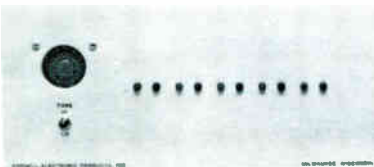
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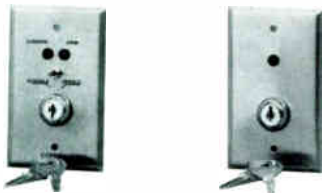
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loudly extol the benefits of competition as they make policies that effectively limit to a few those who can play the competitive game. So, today, we entreat Judge Greene and the FCC to take note that the competitive policies underlying their decision do not tolerate the biased implementation they *now* proclaim; that competitive enterprise is for all, and not for those few who can survive only because their economic well-being is protected by regulation which assures that survival. We here remind Judge Greene to stop disregarding the existence of small business distributing, and to shed his view that competition is only meaningful when it involves the countervailing economic power of a richly endowed few. His job, lest he forgets, is to rule for equality before the law, not to excuse discrimination in the name of equality at the foot of the law. . . Not surprisingly (then) the Regional Bell Operating Companies and the states were quick to seize the advantage, using Centrex and the central offices not only to stem the growth of communications product markets, but to serve as a substitute for those products. While the FCC said access charges would apply to each line of Centrex, it sowed the seeds of cross-subsidy and competitive destruction by authorizing the states to offset the charges; and they did. They allowed the detariffing of Centrex, permitted rate reductions and contract discounts, and Fixed Centrex access charges in ratio to PBX trunk equivalency—all to assure the substitutability of Centrex for PBX and key system products.” The moves by the public carriers, seemingly under the aegis of the Communications Commission, and other regulatory bodies, has induced a drastic cut in sales and in profits—and maybe an evening out of an industry that was forecast as the darling of the century, destined to lead the economy. NATA’s statistical review charts the weaknesses and fall in sales.

• Many distributor organizations have revamped their operations. The drive to survive despite the “freeze” has been witness to three unusual steps (like crocuses in an early spring breaking through) (1) many interconnect dealers are looking back at *intercom systems*—particularly, duplex intercom systems. One exhibitor of duplex reported unusual interest and sales. (2) some interconnect dealers no longer are turning down engineered sound/distribution system bidding. (3) not yet a groundswell among interconnect dealers, but the signs are quite visible: they’re opening departments with their establishment, or at a separate location, “telephone stores for the sale of all types of telecommunication consumer products.”

On the matter of phone stores, John V. Roach/president, CEO and Chairman of Tandy Corporation (owners of Radio Shack) speaking to a luncheon audience at NATA, said (in part): “How did Tandy and Radio Shack get into the telephone business in the first place? Was it part of some great strategic play? Certainly not initially. We slipped into the business by selling reconditioned telephones for the private use of our customers (we were even enjoined once in about 1967 for this) and later a small line of telephones and accessories. When the marketplace was opened up to FCC-approved equipment we began selling answering devices and other telephone equipment, often of our own manufacture, because of the limited availability of competitively priced equipment. We’ve learned a lot about telephones in the last six years. One of the things we’ve learned is that telephones require more testing than most consumer products because the network is not as consistent around the country as you would have thought. We’ve learned a lot about lightning protection as well, which now is built into all our equipment. Of course this transition in marketing either corresponded with or permitted to happen, the introduction of new electronic technology in equipment design. The widespread applications of new technologies in the industry, by the major electronic innovators of the world, have insured that consumers are reaping at least one benefit of regulatory change—more interesting and more affordable telephones. These new technologies and attendant marketing opportunities are having their impact on the systems business as well. While we have learned that the systems business, from a product standpoint, has some extraordinary development problems, whether it be our attempts or those of more traditional manufacturers, new products, new market segments and new affordability will prevail. In fact, the two to eight incoming lines segment of the market may revolutionize the industry. Whether new key systems or new services like cellular mobile telephone opportunities exist for marketing quantities significant enough to bring marketing oriented companies into the forefront of the industry, quantity is the real key to change. When the quantities are in the tens of thousands or millions of units range, production techniques, sales techniques and support are different than in the hundreds of thousands or millions of units

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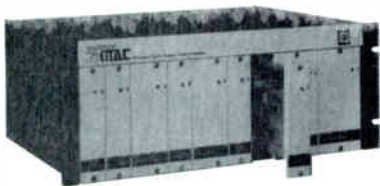
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range. Not only are techniques different, there must be innovative design because unit prices must reduce with quantity. In fact, in the long run it is price that makes the quantities possible. As each of us strategize for how best to deal with this ever evolving market, we find both new allies and new competitors. Clearly, most compete with AT&T maybe more than ever. This monopoly long distance carrier poses as a lurching giant with its tremendous ability to cross subsidize through advertising any business it enters. As long as the FCC and others stick to their positions of keeping regulated and unregulated businesses in separate subsidiaries, it will possibly reduce the cross subsidization in theory, although I doubt that it will totally in practice. There is no question that in the divestiture proceedings the assignment of the Bell logo to the operating companies is a key factor in making the marketplace more competitive in reality.

Computer-oriented phone application products commanded attention. It was established that it was the wizardry, and not the immediate demand for this segment of the communications market that drew the large audience.

Of more immediate need and interest was the peripheral equipment . . . equipment that permitted the interconnect dealer to return to his on-going customer (through short or long term lease) and upgrade the embedded system. Although the industry could be concerned with the 4th and 5th generation of switches, there still existed a considerable number of switches from the second and third generation, that could be enhanced with the addition of peripherals.

Who looked into the future—the near future—for answers to these problems of competition, products, markets?

Two United States Senators proffered their views:

Senator Gary Hart (D-Colorado) at a Breakfast Meeting pointed to six steps that could see a dramatic revival of the interconnect industry, and the general economic welfare of the nation: Sen. Hart looked for (1) an intensive public drive to update the national infra-structure, through the introduction of new national policies; rebuild bridges, water and sewer systems, government buildings and the like. The need for telecommunications in this area, he thought, would be great.

(2) Sen. Hart believes we need to reform the tax policy to allow for greater industrial investment so that old industries can be revived.

(3) Reform the military structure.

(4) Sen. Hart seeks a policy that will guarantee to new technology and international trade for the United States, long-term economic survival.

(5) He said the need for Research and Development in all fields has to be a national policy if we are to have viable industries in the United States.

(6) Lastly, Sen. Hart opts for a meaningful worker training program.

Senator John C. Danforth (R-Missouri) who is Chairman/Senate International Trade Subcommittee, said (in part) that the bill, "Telecommunications Trade Act of 1984 (S.2618)" is not injurious to the telecommunications industry, that the telecommunications industry had not given the bill enough thought. S.2618 increases sharply tariffs on imports of telecommunications products, and gives the President three years to negotiate open-market telecommunications trade agreements with foreign countries. Countries not providing reciprocal market access to U.S. firms after 3 years would face duties of up to 35 percent on their telecommunications products entering the U.S. In recent years, Danforth has played an increasingly active role in Telecommunications issues—both as they relate to foreign trade and to the restructuring of the domestic industry.

The Senator said he was convinced that his bill is equitable for the manufacturer and distributor of both domestic and import product. What he seeks is more quid pro quo.

Almost 6000 people actively engaged in the sale/marketing/installation/servicing of telecommunications systems (and those peripherally associated) viewed the products and systems on display under the banner theme, "Make the Right Connections."

Increasingly, it was noted, that not too many "right connections" were cemented on the exhibit floor, because financial statements nor credit ratings were available from an inside breastpocket. Established distributor/dealerships remained knotted; the newer buyer, in some instances, was shunted off to one of their "national distributors" (North or Graybar) for product availability. There was no point in fracturing an old relationship with the "good old boys."

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For more than 40 years, the parent company of Panasonic, Matsushita Electric, has supplied the international commercial sound market with products. Dependable, quality products that are the result of the engineering expertise, sophisticated testing and rigorous quality-control standards of Matsushita — one of the largest and most innovative electronics companies in the world.

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Our 30, 60 and 120 watt 5-input Mixer Power Amps (Models WA-735P, WA-745P, WA-755P respectively) feature a built-in AM/FM tuner, three low impedance microphone inputs, a transformer balanced auxiliary input for telephone paging, a voice-activated priority circuit and a tone generator for sound level setting. Plus a two-tone calling chime for paging.

Many of these features are offered without an AM/FM tuner in our other 60 and 120 watt 5-input Mixer Power Amps (Models WA-740P, WA-750P).

Our 15 and 30 watt 4-input Mixer Power Amps (Models WA-300P, WA-320P) feature two low impedance microphone inputs and a transformer balanced auxiliary input for telephone paging. And both can be powered by a DC 13.2 volt source for portable operation.

Remember: Panasonic is a leading name in advanced sound technology. So, if you're looking for Commercial Sound System equipment, follow a leader: Panasonic.

For more information on Panasonic Commercial Sound Systems, please contact: Commercial Sound Systems Department, Audio-Video Systems Division, Panasonic Industrial Company, One Panasonic Way, Secaucus, NJ 07094.

Panasonic
Industrial Company

Tip & Ring

GARY STANFILL NAMED PRESIDENT OF CETEC VEGA

Gary J. Stanfill has been appointed President of Cetec Vega, a division of Cetec Corporation.

Stanfill, 44, has served as General Manager of Cetec Vega since January 1983. Prior to that responsibility he was Director of Engineering for the division, responsible for product design and development for both wireless microphones and signaling products.

Previous to joining Cetec Vega in September 1980, Stanfill was an engineering manager for Resdel Engineering, and prior to that, held engineering positions with ITT Federal Electric for 12 years.

Cetec Vega is the leading manufacturer of wireless microphones and wireless walkaround intercom systems. The division also manufactures tone signaling equipment for industrial communications, including selective calling, command and control, remote monitoring, and status-reporting equipment and systems.

LIZ COOK-VASQUEZ APPOINTED CATV DISTRICT MANAGER—SOUTHWEST REGION

Liz Cook-Vasquez has been appointed CATV District Manager-Southwest for Anixter Communications, it was announced by Tony Barclay, Vice President of CATV, South Region. Ms. Cook-Vasquez will be based out of the company's new Southwestern Regional headquarters in Dallas, and will be responsible for directing CATV sales in Texas, Oklahoma and Louisiana.

Cook-Vasquez was most recently Inside Sales Manager in Anixter's Houston offices. Prior to joining the company in 1980, she was a purchasing agent for Rodgers Cable Systems in Syracuse, N.Y. She holds a B.S. from New York State University.

Anixter Communications is a supply specialist to the cable TV and telephone industries, and maintains a fully stocked network of computer linked distribution centers in the U.S. and Canada. Anixter Communications is a unit of Anixter



Stanfill

Bros., Inc., a New York Stock Exchange listed company.

EV ENGINEERING EXPANSION STRENGTHENS CAPABILITIES

Electro-Voice of Buchanan, Michigan, continues to expand its engineering department in all areas, according to Allen F. Eberts, Director of Engineering. As a result of increased funding and restructuring, the expansion program affects all five major engineering groups which include the research group as well as the microphone, loudspeaker, electronics and military products development groups.

"EV has always been active in engineering research," Eberts explained. "The research group will now be formally responsible for the study of the basic technologies of sound and will become a resource for the other engineering groups. The work of the expanded research group will make it easier to maintain EV's leadership in audio technology."

Other engineering groups have also been strengthened. Within the last year, the Microphone Group, led by Chief Engineer Alan R. Watson, has doubled in size according to Eberts, and "we have

expanded the Loudspeaker Group under Chief Engineer Raymond J. Newman's leadership to make it the strongest in the industry," Eberts said.

The Electronics Group under the leadership of Christof Heidelberger, with its already extensive solid-state experience, has added capability in the area of digital audio and is expected to provide new advances for EV in audio electronics. Backing up these groups is a strong core of mechanical engineering and services personnel.

Eberts concluded by saying, "It is particularly encouraging that this company has supported the expansion effort even during a past, but fairly recent, economic downturn that necessitated cutbacks by many others in our industry. During that time and at present, Electro-Voice continues to aggressively invest in technical research while simultaneously conducting an ongoing worldwide search for the calibre of scientist fundamental to Electro-Voice engineering standards."

Electro-Voice, Inc. is a supplier of high-technology microphones, loudspeaker systems and electronics to professional, military and consumer markets worldwide. EV is a subsidiary of Gulton Industries, Inc., a New York Stock Exchange Company with home offices in Princeton, New Jersey.

LEXICON APPOINTS LANCE KORTHALS DIRECTOR OF MARKETING & SALES

Lance Korthals has been appointed Director of Marketing and Sales for Lexicon Inc., Waltham, Mass. The company is a leading designer and manufacturer of high-quality digital reverberation systems, delay lines and other digital audio processing equipment for performing artists, recording studios, radio and television broadcasting and for the teleproduction industry.

Prior to joining Lexicon, Mr. Korthals had been Director of Marketing and Sales for the Professional Products Division of dbx Inc., Newton, Mass., a manufacturer of noise reduction and audio processing equipment for the professional recording, broadcasting and consumer audio markets. Previous posts held by Mr. Korthals include executive positions with Altair Corporation, Saline, Michigan, and with Interactive Systems, Inc., and Head Sound, Inc., both of Ann Arbor, Michigan.

Mr. Korthals is a Magna Cum Laude graduate from the University of Michigan, receiving a B.S. in Engineering in 1973. He currently resides in Newton, Mass.

**J.W. DAVIS & COMPANY
ANNOUNCES THE ELECTION
OF J.E. MITCHELL TO VICE
PRESIDENT-ENGINEERING**

J.E. Mitchell has been elected vice president-engineering of J.W. Davis & Company, Dallas, Texas. Previously, he was employed as an engineer by the Instrumentation Lab of Georgia Tech where his duties included the design, calibration, testing and repair of analog and digital equipment used in academic research.

Mr. Mitchell received his B.S. degree in Physics from Georgia Tech where he has done graduate work under Dr. Eugene Patronis. He will complete his M.S. degree in December 1984. For over six years he worked as a performer and technician with musical groups. He earlier was employed as a mechanic preparing Alpha-Romeo and BMW automobiles for competition.

**JETZKE NAMED NATIONAL
SALES MANAGER FOR
UNIVERSITY SOUND**

Altec Lansing Commercial Sales Vice President Gary Rilling has announced the appointment of David Jetzke as National Sales Manager for the company's University Sound division.

Jetzke's experience includes 10 years in Sales and Marketing with the Toro Company of Minneapolis, MN, where he served most recently as Regional Sales Manager.

Jetzke will be based at 500 S. Main St., Suite 1, North Tower, Orange, CA 92668.

**ALTEC LANSING NAMES
CAMPBELL NATIONAL
SALES MANAGER,
COMMERCIAL SALES**

Altec Lansing Commercial Sales Vice President Gary Rilling has announced the promotion of Gayle Campbell to National Sales Manager of Commercial Products. Campbell will also continue to be responsible for Altec's Government Sales.

Formerly Western Regional Sales Manager for Altec, Campbell's experience also includes nine years as Altec's Midwestern District Manager and six years in commercial sound contracting.

Rilling said Campbell's promotion is part of Altec Lansing's program of restructuring

December 1984

**“Once the show starts,
I don't have time to
worry about my mics.”**

As Chief Audio Engineer for the Carlton Celebrity Room in Minneapolis, Peter Greenlund has miked the biggest names in show business. From the normal speaking voice of an emcee or comedian to the hard-hitting vocals of the rock, country or pop singer, Peter has had to balance his system for all levels of dynamic range and amplification. He knows that his entire sound system is only as good as his microphones, and once the show begins, it's too late to worry about mic failure. When a performer requires a wireless microphone, Peter chooses the dependable Telex dynamic cardioid mic with FMR receiver.

The decision to use Telex as the "house system" was made after carefully evaluating several wireless mics in the demanding acoustical environment of Carlton's Backroom Lounge as well as the larger Celebrity Room. Peter liked the full dynamic range and impressive

signal-to-noise ratio. In addition to great sound quality at a reasonable cost, Telex also provided unmatched signal dependability because of a patented dual antenna diversity option. Now, no matter how far a performer strays from center stage, the Telex dual diversity system effectively prevents "drop-outs" or "picket fencing", and does it without the switching noise commonly associated with other diversity systems.

We're pleased that so many audio engineers and sound contractors have recently discovered our unique diversity receiver, lightweight lavalier mic and our handheld microphone/transmitter. For more information and detailed specifications, write to Telex Communications, Inc., 9600 Aldrich Ave. So., Minneapolis, MN 55420.

For quick information, call toll free **800-328-3771** or in Minnesota call (612) 887-5550.

Peter Greenlund
Chief Audio Engineer
Carlton Celebrity Room
Minneapolis, Minnesota

TELEX

Crosstalk

REPCON '84 ATTRACTS MORE BUYERS THAN EVER BEFORE

"A record 1,456 buyers attended Repcon '84, making it our best attended show ever," remarked Lou Keller, Keller and Associates, Lindenhurst, NY, show chairman for Repcon '84. The annual fall electronics exhibition was sponsored by the New York Chapter of the Electronic Representatives Association (ERA) consisting of the metro area's leading manufacturer representative firms serving dealers, distributors, sound contractors, mass merchandisers and chain stores.

The program, including 34 booths reserved by 15 firms, exhibited hundreds of major manufacturers' lines of audio, video, computer hardware, telephone, and all new security and pro sound products. Professionals from New York, New Jersey, and Connecticut metro area dealer and distributor organizations came to Terrace on the Park, Flushing Meadow Park, NY, to see the latest in electronics merchandise during the show's two-day run.

Two seminars were an important part of Repcon '84's expanded program. "Professional Sound Systems," conducted by David L. Klepper of KMK Associates, White Plains, NY, covered the business opportunities in pro sound and some practical applications to pro sound system installation. Stuart Crump, Jr., publisher/editor-in-chief of Personal Communications magazine, led a workshop entitled "So You Want to Go into the Cellular Phone Business" detailing the potential impact of cellular communications in the New York market.

PLYLE INDUSTRIES ADDS NEW 25,000 SQ. FT. PRODUCTION FACILITY

Pyle Industries, Inc., manufacturer of Pyle Driver™ speakers, has acquired and put into high gear an additional 25,000 square feet of production space. Along with this increased production capability, Pyle Industries has also added personnel and equipment to both their sales and shipping departments.

This expansion program comes as a result of the increase in sales experienced by Pyle Industries during fiscal 1984. Sales per units sold increased over 20 percent during the fiscal year, with a minimum of 20 percent growth antici-

pated for fiscal 1985. Because of this growth, expansion of manufacturing, sales, inventory and shipping has become a top priority at Pyle Industries.

President of Pyle Industries, Frank Pyle, Jr., expressed his excitement over this expansion project by saying, "Over the years, Pyle has been known for a quality product and top-notch service. On-time deliveries have been the rule, rather than the exception. Now, as we experience this period of fast, steady growth, we are committed to making the necessary investments to maintain our reputation for superior speakers and exceptional service to our customers.

"Expansion is a welcome project at Pyle, because expansion means we have been successful in making the consumer aware of our product, in part because of our ever growing consumer advertising program and strong dealer support.

SO. CAL. CHAPTER ELECTRONIC REPS. ASSN. FOUND NEW DIVISIONS

The Southern California Chapter of the Electronic Representatives Association has established a Sound, Signal and Security Division to serve professional audio, commercial sound and audio/visual products representatives. Chairman of the new division is Wes Alderson, president of WesTech Marketing, Culver City.

Alderson, prime mover behind the new division, said the formation enables representatives in the "sound, alarm, music, professional audio and audio/visual markets to become involved in an organization of representatives with similar goals. Acting as a group we can accomplish goals which are good for the industry, our manufacturers, our accounts and, therefore, good for us."

Alderson said the division plans to be a sponsor of a western regional sound show in the Los Angeles area during 1985.

Other officers of the new division are Vice Chairman Don Forth, Forth Associates, West Covina, CA, and Treasurer Dick Schnepf, Dick Schnepf Associates, Grenada Hills, CA.

VISITORS APPLAUD KENTUCKIANA EXHIBITS

The eighth biennial Kentuckiana Sound & Communications Seminar, held October 29 and 30, had a new look and visitors liked it. Open exhibit hours provided ample time to see all participating companies and the vast majority of

visitors favored this over the previous format of 40-minute scheduled sessions. A total of 69 companies from 30 cities in Indiana and Kentucky sent their employees to the Indianapolis Airport Hilton to attend this seminar. Forty-seven exhibit booths displayed sound, security and video products. Seminar speakers were: John Strand, Community Light & Sound, Inc.; Ray Dudek, Financial Consultants and Advisory Corp.; John Charczuk, The Auth Company; and Larry Bright, The Computer Experience, Inc.

The host companies for this event are members of the Indiana/Kentucky chapter of the Electronic Representatives Association and include: Bruce Dawson & Associates; Elmarcon, Inc.; Kingston Sales Corp.; Maish Sales; Midwest Representatives, Inc.; Robert Milsk Co., Inc.; Monfort Electronics Marketing, Inc.; New/Era Sales, Inc.; PRO Marketing Systems, Inc.

ATLAS SOUND AND SOUNDOLIER DIVISION OF AMERICAN TRADING AND PRODUCTION CORPORATION MAKE ORGANIZATION CHANGES

Changes in marketing and sales management of the Atlas Sound Division, headquartered in Parsippany, NJ, and the Soundolier Division, headquartered in St. Louis, MO, of American Trading and Production Corporation, a Maryland corporation, were announced by Norman Friedman, president of both divisions, effective November 1, 1984.

Herbert M. Jaffe has been designated as Vice President for Marketing for both Atlas Sound and Soundolier. Jaffe has directed the marketing and sales activities of Atlas Sound since 1969, and most recently was Vice President of Marketing of Atlas Sound.

Paul Grote has been selected as Director of Sales for Atlas Sound and Soundolier and will direct the sales activities for both divisions. Mr. Grote, with Soundolier since 1968 in executive sales and engineering positions, for the past six years has been Soundolier's National Sales Manager.

David A. Chambers, Atlas Sound's Distributor Sales Manager, has been promoted to National Sales Manager for Atlas Sound.

Tony Dalba, Assistant Sales Manager-Soundolier, has been promoted to National Sales Manager of the Soundolier Division.

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'84—AN ECONOMIC ROUNDUP

By Jerome J. Brookman

This is the 9th Annual ECONOMIC REPORT.

There are few bright spots. It is a reflection of an economy that moved in half-steps through the year. In only two areas was there an elevated sales curve; pro audio and duplex intercom systems.

Pro audio enjoyed a successful year because of the increased construction of leisure palaces: the domed stadiums and new convention centers.

Duplex intercom witnessed a most successful year because the financial markets of the world were effectively tied together, for their profit. The 2-track system in this application was much more than a time and dollar saver! It could mean the economic viability of a nation, when dealing in dollars through their national banks, in the international markets!

In the United States, where much of the economy is pinned on new and renewal construction, the sale of new systems was braked somewhat because of a few new buildings being put in place; the reconstruction market slowed because of credit ratings and the high cost of mortgage money. Business plans to improve capital positions by purchasing new plants and equipment limped along. The Bureau of Economic Analysis reported, at the end of September 1984 . . . "spending was \$269.2 billion in 1983, 4.8 percent less than in 1982 (for new plant and equipment) . . . the latest estimate of planned spending for 1984 is \$1.4 billion lower than that reported for June from the survey conducted in late April and May. That survey showed planned spending of \$309.0 billion for 1984, 14.8 percent more than 1983 spending. A downward revision in non-manufacturing industries more than offset an upward revision in manufacturing industries."

One can extrapolate answers from survey figures, predicting either upward or downward buying/selling trends. But not this time.

The expectations for the ensuing year cannot be easily interpreted. There are no discernable markers now in several product/systems areas that effect distributor sales. Interconnect is expected to remain flat through all of 1985 and into the first half of 1986.

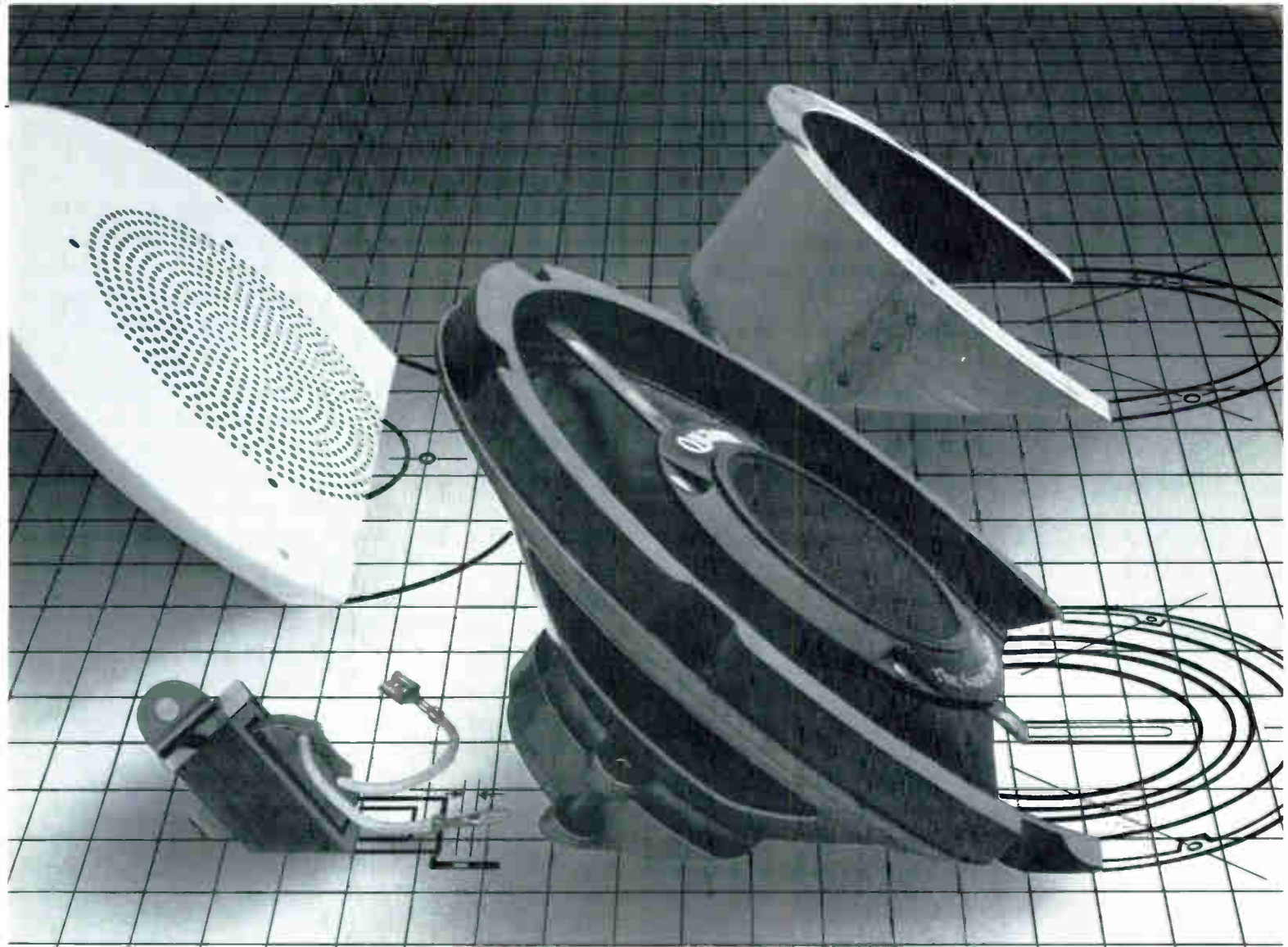
Audio products/sales may continue on an linear curve . . . maybe hyped somewhat by a surge in the recording industry, or another grand tour by a big-name combo.

Security systems are expected to run on one rail, because crime statistics from national and local police forces indicate that crime is down in all areas—burglary, vandalism, and other crimes against property. That kind of information usually lulls a market into a false sense of security.

Withall, 1985 beckons the prime supplier of products/systems to rethink his strategies for manufacture and sales in all regions of the U.S. Do you sell the distributor and support his sales efforts; or do you abandon the distributor and sell the BOCs? It's a most pressing problem for the prime supplier, no doubt.

Distributor loyalty to product brands will be underwritten by the actions of prime suppliers. The distributors' drive for more sales in his local trading area may depend upon the strategies and action of national marketing managers of branded products/systems. Many factors are bound to come into play during 1985 that could determine the lifespan of many suppliers, because the number of competitors of a product (keyphones, especially) are likely to fracture any brand loyalty arrangement. With an almost static marketplace, there are few "safety nets" out there for national marketing and sales managers, able to "pick up" another distributor, sound in economics, technical abilities and professional sales help. 1985 could be a heavy shake-out year for all elements within the sound and telecommunications industry!

This is the 9th annual ECONOMIC REPORT . . . for your study, and success!



If you take us apart, you'll take us on.

When we decided to expand the Quam line to include ceiling baffles, backbox enclosures and assemblies, we wanted to do more than just complement our loudspeaker offerings. We wanted to give the contractor another choice. Judging from the growing list of contractors who have switched to Quam, we did just that, with an unbeatable combination of quality, price and service.

Take us apart for a side-by-side comparison of ceiling baffles, for

example. From the heavier gauge metal to the more durable epoxy finish, Quam baffles are made in our own plant to look, install and perform better. The same is true of the entire Quam line, from enclosures to transformers to 8" speakers.

You don't pay a premium for this higher quality, because as always, Quam's prices are very competitive. Nor do you pay the hidden cost of maintaining inventory. All catalogued

items, including assemblies, are ready to ship on receipt of order from our 70,000-piece warehouse stock. You buy Quam only as you need the parts.

Take us apart. Then take the competition apart. You'll see that Quam is your best choice. Call or write for your free Quam commercial sound products catalog, and take us on. It's the sound decision.

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Economic Report/Audio

With a relatively flat economic scene in the United States through all of 1984, the full range of audio product sales—manufacturer to his distributor/contractor customer—scored an impressive 8.8 percent increase.

The breakdown of sales to the distributor/contractor only:

Amplifiers (all types) . . . \$117,638,000

Microphones—\$154,068,000

Speakers—\$148,076,000

Signal processing gear—\$45,407,000

Much of the product was absorbed in three major areas:

A) the leisure market with its domed construction plant installed product at an unprecedented rate. Some analysts have included the convention construction sites by municipalities as part of the leisure market. Then add the privately financed Fairs (New Orleans, Knoxville et al.), and the ingesting of audio product by this market is understandable.

B) the corporate boardroom hit its

full stride among contractors, who found many systems “packaged” by the prime supplier to meet his every need. What with teleconferencing and videoconferencing adding to the product build-up, the dollar volume for audio product during the year scored impressively.

C) state and municipal governments became large purchasers of audio and telecommunications equipment, as a way of strengthening their security.

According to several reports; Dodge, Frost & Sullivan, Commerce Department/Bureau of Economic Analysis, et al., the institutional market remained relatively quiet. There was little new construction by either public or private money. Yet, there was not a complete standstill: reconstruction and upgrading activity among healthcare areas continued at an even pace, in the neighborhood of about 5 to 6 percent value of a new system sale.

On the Pro Audio side the expanded

sale of product was hyped by entertainment combos moving across college campuses and local theaters and stadiums, led by the Michael Jackson troupe! Several suppliers of pro audio product reported increases in sales that soared to 60 percent. And they anticipate an even greater sale in the upcoming year, through the introduction of more product.

Associated with audio product sales is the subscription areas—background music libraries and recording studios and on premise players.

Despite the royalty hassle that has been on-going between the licensing bureaus—ASCAP, BMI, SESAC, et al., impacting adversely on the individual background music supplier, their volume increased perceptibly, they report. Some music system contractors reported increased volume in excess of 10 percent. And the recording studios had a banner year with music material recorded for industrial and home and car applications! The Electronic Industries Association reports that the tape recorder business reached \$1.8 billion in 1983.

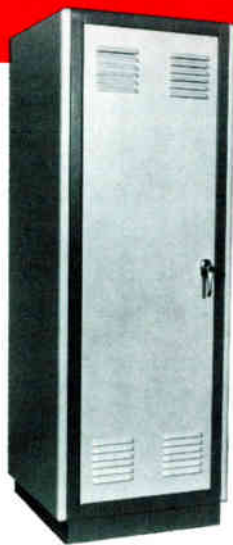
This increase is in the face of much “music on the hold” being supplied by an FM tuner!

The larger sale of background music was generated by music contractors going vertically to the three large users of background music: (1) the clothing retailing area with its specialty shops, demanding music in the foreground; (2) restaurants that now intersperse their programming with “native” music as it were: Italian, Spanish, Continental; (3) commercial and industrial accounts concerned with maintaining production levels, and a less stressful ambience.

Prime suppliers were reluctant, somewhat timid, in suggesting what they were anticipating for the upcoming year. If the federal government can hold down interest rates, increase the money supply, erect barriers against certain imported products, if new construction will step up its building rate . . . if . . . if . . . then it is possible the audio product sales for 1985 might tally about a 10 to 15 percent increase!

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Intercom & Engineered Cable Systems

The market research firm of Frost & Sullivan, Inc., reviewing the small business needs of telecommunications, noted in the keyphone section, that . . . "Stand-alone intercom systems are distributed in this market almost exclusively through dealers and stocking distributors, which usually supply paging, security and other systems. From 345,000 this year, the installed base is predicted to rise to 400,000 units in 1990. In terms of sales, 1984's \$111 million will increase to \$124 million in 1990."

S&C survey revealed a dollar sales figure of \$97 million for both simplex and duplex systems!

Duplex system sales through 1984 tallied \$26.180 million for an almost 10 percent increase over 1983.

What triggered this marked increase was the urgent needs of the financial communities (brokerage, banks, insurance and commodity markets) throughout the world, tied with telephone and cable lines, in need of a second track for intercom. Coupled with the stock and money markets were national and international governments needs; defense and financial.

The surprising increase in intercom sales can be directly related to the stand-still of interconnect sales, generally. Some areas of interconnect have been witness to a steady sale—keysets, for one; trader turrets for another. But it is these very vertical product application areas that have boosted the sale of intercom! The 2-track system finds itself in the enviable position of being a "must" because of the time element! Not in all instances, but in some, price is not the determining factor, for a single line service, especially in the financial markets.

New system sales were reported rattling along at a 10 to 40 percent increase for all prime suppliers. The new and emerging markets bought without regard for price; the one consideration being an independent system, with

mature or sophistication features that equaled public carrier or interconnect offerings.

Coupled with the closed intercom system—the duplex or simplex connection—was the radio pocket pager for intercom extension purposes. This system product for the first time since its introduction registered a 60 per cent increase for one supplier. And induced a second supplier to add the radio pocket pager to his product mix.

Additionally, the headphone wireless intercom system joined the wired headphone intercom system, commonly used in broadcast and theatrical areas, and gained a 19 per cent increase in sales to the distributor.

Analysts are of the opinion that these unusual increases in the sale and use of these intercom systems, can be

ascribed to a growing sophistication among certain vertical trades—servicers for the computer industry in need of pocket pagers; security agents within hotel/motel complexes. And, naturally, an extension of communications within the healthcare industry.

What grips the attention of analysts of the industry, more particularly the prime supplier of domestic and offshore product, is that price has never been a determinant; but features, reliability and ease of operation are paramount in the buyers view.

The supplier ranks for duplex intercom systems and radio pocket pagers are growing through the introduction of more offshore product.

Withall, this product/system projects a 10 per cent increase in sales for the 1985 selling year.

Move up to the standard of communications with the Beyer DT 109s.



Demanding engineers no longer have to "settle" for marginal or sub-standard communications headsets just because there's nothing else available. Representing a higher standard of communications excellence, the Beyer DT 109s feature a dynamic noise-cancelling boom mic with a frequency response of 40 to 12,000 Hz for unmatched intelligibility and comfortable double-muff headphones to insure isolation and prevent fatigue. Beyer DT 108 single-muff headphones are also available.

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Economic Report/ Interconnect

Centrex. Chaos. Competition.

Three little words that cast a pall over the interconnect industry. North American Telecommunications Association (NATA) reports the industry has come to a sales halt, will probably be at a stand-still through all of 1985 and probably into the first half of 1986!

NATA reported that sales for 1984 are expected to plunge 18.1 percent to \$2.3 billion from last year's \$2.8 billion marking a slide unprecedented in the interconnect business in recent years.

The NATA study shows that any projected growth is in "other revenues", a category that includes service offerings, lease revenues, and secondary sales to established customers, moves, changes, installation and maintenance.

- PBX sales were estimated to have tallied \$975 million for 1984.

- Keyphones were estimated to have run up a sales volume of \$720 million.

- The remaining balance of \$1.2 billion is ascribed to "other revenues".

Why the plunge? There are as many explanations as there are analysts within and without the industry. The consensus is:

- Judge Greene and the FCC allowing the divested AT&T and its associated BOCs to engage in non-regulated services has produced a competitive situation fraught with disaster for interconnection;

- Telcos purchasing of interconnect companies without a "wrist slap" from either the Justice Department or Judge Greene has poured salt into a wound.

- Prime suppliers selling over the heads of their distributors to the BOCs; prime suppliers view their distributors as two distinct types of customers: the large distributor (Telecom Plus, Executone, Centel et. al.) is the customer; the small distributor is

the local dealer whose hand must be held to spur sales, extend credit terms, counsel on operations.

- The marketplace has absorbed as much PBX gear as it can digest for the next 7 to 14 years, according to the industry's own count of equipment life-span.

- Centrex is digging a hole for PBX. Interconnection's market share of PBX—distributor sales—accounted for 9 percent of the total volume of shipments in 1983. Smaller dealers accounted for 31 percent of shipments.

Keyphones—1A2, electronic and hybrid—looking toward small and medium businesses need for more sophisticated telecommunications products, project a sale of their system to bring the total embedded units to number in excess of \$3.5 million in 1990, at an estimated dollar sales volume of \$2.3 billion. So says Frost & Sullivan Inc.

The expectation of "other revenues" to underpin the interconnect market, might also include "retailing telephone equipment", primarily single line sets for residential use. However, this product marketing witnessed a turbulent year. NATA's "Statistical Review" submits that retail sales levels are at an estimated 19.7 million units for 1983. The BOCs reported the loss of 22.7 million residential sets in 1983. Independent telcos also experienced an overall loss of residential equipment. Thus, retail sales of telephone equipment for 1984 stood at: telephones—\$1,240,000,000 (\$40 average price); cordless phones—\$490,000,000 (\$80 per average price).

Business communications Co. Inc., (researchers) reported in a recently concluded market study, that... "deregulation has meant and will continue to mean more sales of corded and cordless telephones by non-AT&T suppliers. Unfortunately, extreme price competition will erode dollar sales and profitability as telephones

become a consumer electronic item. At the same time, the consumer will also buy enhanced decorator special telephone sets and new generation message center devices which will help maintain total dollar sales so that total dollar sales in 1988 just about equal 1983 dollar sales."

The BCC survey continues: "the office key sets and PBX systems will do fairly well as the manufacturers continue to upgrade equipment, as digital switching needs are increased and as users demand more function. Again, AT&T, will lose market share to the interconnect manufacturer. The total market will grow from \$1.6 billion in 1983 to \$2.2 billion in 1993."

It would appear that market researchers viewing the interconnect market must be using a kaleidoscope.

What's ahead for interconnect in the ensuing year?

- Sales strategies will be revamped by all prime suppliers of switches to nudge a marketplace that languishes; to maintain prices.

- To counter the Centrex thrust by AT&T, there'll be more court action. However, it isn't likely to halt Centrex sales for AT&T is up with new migration tactics, new product and a plan to buy the user embedded product, if that's the only way it can ring up a sale.

- "Other revenue" will include peripherals—SMDR, ACD, Cost accounting, et. al.

- Prime suppliers will continue to push product upon BOCs and "holding the price" may dictate a need to bend a little.

- There could be a widening of the distributor (local) networks for it was demonstrated most efficiently in 1983 that the closer working arrangements with the smaller dealer by the prime supplier afforded both of them better control of product sale over competition. That has not been the case with the larger distributor.



In the early evening of Sept. 17, 1973, Jay Barth was at the wheel of a 22 ft. utility truck that was loaded with sound equipment. Just south of Benton Harbor, MI an oncoming car crossed the center-line; fortunately Jay steered clear of the impending head-on collision. Unfortunately, a soft shoulder caused the truck to roll two and one half times. Exit several Crown DC-300A's through the metal roof of the truck's cargo area.

The airborne 300A's finally came to rest — scattered about in a muddy field, where they remained partially submerged for four and a half hours.

Jay miraculously escaped injury; the amplifiers apparently had not.

Unbelievably, after a short time under a blow-dryer all the amps worked perfectly and are still going strong.

The rest — and the truck, is history.



CROWN

1718 W. Mishawaka Road, Elkhart, IN 46517
(219) 294-5571

Economic Report/Engineering

In 1981, reports the EIA, the U.S. revenues amounted to \$105.94 million for associated hardware/software for all videotext services. Revenues for 1982 are estimated at \$250 million.

Market research analysts expect total revenues for videotext services and accompanying hardware/software to approach \$7 billion by 1997, a compound growth rate of 93.9 percent. Other experts maintain that by the end of the decade, annual revenues could reach \$5.5 billion in a market where 10 to 20 percent of all U.S. homes will

receive the services.

Videotext systems, for the independent sound and telecommunications systems contractor is less a hardware sale, and more a labor intensive service; wiring up the establishment, and supplying the interface device for cable company or telephone company. But the computer, another contractor wiring job, has influenced the way some information is transmitted, and some of the activity impinges upon the contractor servicing of cabling.

Engineered cable systems, although

it incorporates the sound distribution/reinforcement arrangements, is now devoted to the areas of computer cabling, plus videotext 2-way information systems linking terminals to large data bases either by cable or telephone. With the videotext's 2-way capacity, the videotext computer which is coming into increasing play within an establishment, is expanding the amount of information available and allowing for transaction services that complement other transmission modes.

. . . Security

The security system market comprises three areas: (A) the use of the CCTV for surveillance; (B) the wired system attached to a central station, ADT—for example; (C) fire protection systems.

These figures relate only to the on-premise system of sight and sound security systems: CCTV and fire protection.

S&C estimates that the sale of CCTV products/systems from the manufacturer to his distributor/contractor customer remained constant; approximately \$400 million in 1984. However, there is an anticipated increase for 1985 of 12 percent.

The Electronic Industries Association in its "Market Data Book" states: "CCTV is projected to show a growth of 12%, with system sales expected to total \$775 million in 1995! Analysts believe that the growth in sales of all CCTV systems will stem from the increased use of solid state technology and from new developments in fiber optics, microwave transmission and camera lens technology. . . . In addition to increasing the effectiveness of a guard force, a CCTV camera functions as a deterrent to potential thieves, can be used as an automatic intrusion alarm, and can provide a recording of actual intrusions and thefts. . . ."

The residential market shows the

greatest potential of all security system markets. Almost two-thirds of all burglaries and more than 70 percent of all fires in 1980 occurred in residences. The residential sector accounted for 67 percent of all burglary losses and 55 percent of all fire losses in the United States.

Analysts—within and without the industry—see a major leap in the sale of CCTV and fire security apparatus with the wider use of microwave and cable system facilities. The ability to give almost instantaneous reporting of status of a location under "siege" by a thief or a smoldering fire, is expected to increase the sale of these security devices, by a measure of 10 percent or better.

Additionally, the insurance underwriter councils are investigating these security systems, in some instances are supporting research therein, and for obvious reasons. Insurance premiums are under pressure by clients for a lower rate should the client "wire up" his premises for greater security, and feed a protection agency; the local police/fire precinct, or an independent assurer such as an ADT.

Between the home market and the commercial/industrial market for security systems, the estimate is that by 1995 this end of the business will see a \$4.2 billion sale!

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Interconnect Companies Find A Growth Business

By Dave Bryan

Meet six men: all in the interconnect business, some exclusively, others have recently added telephone systems sales within the past year. Here's how they view their operation.

Superior Communications, Inc.

How's the telephone business? In answer, David Klein, Controller, drew a chart. His brother, Bob, who is President of the company, added a personnel and vehicle count.

	'81	'82	'83	'84	'85
Sales:	\$167,000	\$402,000	\$1.1 mill	\$4.8 mill	\$10. mill (estimated)
Personnel:	4	8	15	46	55
Vehicles:					
Wagons	1	1	1	2	2
Trucks		2	4	9	11
Cars				3	4
Vans				1	1

David Klein remarks, "In '82 our inventory was worth \$30,000 at normal dealer's cost; today it's running \$250,000 and we turn seventy-five percent of it every two weeks. That's over 20 turns a year."

The company thinks 500 lines is their maximum, and they try to avoid multi-building installations because it involves the phone company and "complications." Bob remarks, "We prefer jobs where we can handle everything ourselves. Two lines and up."

Their expansion is essentially by referral. Bob explains, "We started just doing installations as a subcontractor for larger companies. That gave us experience with different product lines and taught us which products to take on later to sell—and which to avoid. At that time we had a station wagon, two little offices and storage space equivalent to a two-car garage, and four technical people including me. Then when a local paging-intercom-telephone company went out of business, I bought their inventory and I had their customer list. That group of accounts was the base that made our rapid growth possible."

He notes, "I knew their customers because I'd been Operations Director for the defunct company. We continued the

service to the customers, and if they wanted an extension put in we'd go out and buy one for them. It was one-ze, two-ze kind of purchasing at that time."

His background? "Thirteen years with Bell in Devnver, but I didn't have enough seniority to make staying there practical. So I came to work in L.A. and later started Superior Communications."

Bob's final contribution to the discussion is in regard to his selling and bidding. "We never try to be lowball in our bids. We know our costs, overhead, the service we'll have to provide, the time needed for customers' education with their new phone systems, and we account for all of this in our bidding. I think today's educated customers are quite willing to pay for all that: they want good service back-up almost more than anything." He credits his sales performance to his ability to diagram systems for customers "right there on their desks" and to answer any questions they have regarding system operation. "I don't have to call the factory or anything like that. But more than salesmanship, I think it's because we are selling service; that's what we do best and what customers want the most."

Alert Communications Company

When a thirty-five year old telephone answering service company decides to expand into the telephone equipment sales and interconnect business, they do it right—according to Ken DuBois, General Manager of Alert Communications Company's new Communications Division. He says, "In another month we'll have completed our first full year, and our gross sales will be one-and-a-half million dollars."

He explains, "The management originally thought we would use their existing 5,000 or more answering service customers as a base for business telephone systems sales. Actually, there were two of them beating on our door when we first opened up here, and perhaps half a dozen altogether bought systems. But all

the other 200 plus system customers were developed through normal sales efforts, manufacturers' leads, the Yellow Pages, and referrals. We have five full-time salespeople: two ladies and three men. Mrs. Darlene Burton is one of our best."

She remarks, "I'm busy following up leads right now, inquiries too. Everybody seems to want new phones, but I suppose eventually I'll get around to selling to our answering service clients. I try to work by referrals and I never cold-call."

Her technique is to call or visit a possible customer, get all the information she can use about the new system's functions and features—this is sometimes a telephone "visit"—and then after she's prepared a proposal for the customer she makes an in-person visit for her presentation. While she talks, DuBois sketches out a chart that outlined his division's progress in the past 11 months.

David says, "We made one mistake. We took on a product line we thought was going to be viable, but it turned out to be a terrible product; we had to keep going back and repairing it, and it's cost us a lot of money." Bob agrees, "A bad product really haunts anyone in this business, and it can easily put an interconnect dealer under. But we have both TIE and Toshiba, excellent lines! Ultracom too."

Controller David says, "The next worst mistake is to be too conservative. We didn't make that one. We're aggressive and pursued Ultracom: to do it we had to work with our bank, hock our houses and cars, and provide a letter of credit to protect our supplier. As a matter of fact," he adds, "this is the first time we've had to go to the bank; up to now we've been able to pay for everything out of earnings."

Bob comments, "A lot of our recent growth was due to Ultracom; it was the right thing for us to do."

Both brothers are accountants from The University of Colorado, the state where their father ran a series of grocery stores. Bob says, "Originally we thought to open a C.P.A. shop, but I went to work for Bell and Dave went into the dry clean-

ing business—he had one of the largest in Los Angeles. Later, after I found myself trying to do everything here myself, and it turned out to be impossible, he joined me. I'm very glad we're together again."

The brothers doubt if the fantastic growth they've demonstrated could be duplicated today. "Competition is stronger and the chance of acquiring a customer base as we did probably wouldn't happen, but good growth in this business is possible." The company is now into rentals of telephone systems with forty percent of the customer's rent money applicable to the purchase of equipment if he so decides. It's twenty percent of Superior Communications' gross and increasing fast. Bob explains a reason, "Renting protects customers against equipment becoming obsolete, and if they want to switch to a newer system we'll help them do it."

David remarks, "The average rental period is three years, and that's protection against price increases via Bell and the P.U.C."

Their future plans? David fields the question. "We'd like to pause after next year and take a breath. Cash flow is the problem with too fast a growth: collections one month aren't enough to buy merchandise for next month's activity and it's easily possible for us to outgrow our credit lines." He states, "We can get to about \$18,000,000 in sales and then we'll have to pause for about a year." Brightening a bit, he adds, "But I can say we haven't had one bad account. Not even one."

	Small Key Systems (Ten phones or less)	Medium Key Systems (The rest of the key market)	Medium PBX Systems (Up to 200 lines)
Average Sale:	\$5,000	\$12,000	\$25,000
Markup:	80 to 100%	80 to 100%	30 to 60%
Results:	40% over targeted sales.	10% over targeted sales.	60% below targeted sales.

He adds, "Our gross sales 'pie' is 45% small key systems, 35% medium key systems, and only 20% PBX's. We've been almost a full year in business; next year we expect to double our sales, but after that we'll increase only 35% annually and that's without any expansion of fixed costs such as buildings, trucks, and so on. What I want is a steady and controlled growth in the long term."

To get into the telephone equipment business, Alert's management hired DuBois fifteen months ago, had him plan his new division, hired the necessary peo-



Superior Communications' David (r) and Bob Klein

ple and purchased equipment. The division now has four people in Administration and Support Services, six in Sales and Marketing, three in the Customer Service Department, and twelve in Operations. The Customer Service Department handles accounts after the sale and includes detailed systems engineering, customer training, and programming of systems. Operations takes care of installations, repair service, testing equipment and warehousing. DuBois says, "Alert wanted to do it right on a long term basis and they will invest \$250,000 to do it. We think profits will exceed our original investment by the end of the third year but it could be a year earlier."

Why? "Because the market is changing. People are expecting more of their phone systems; even one-line home telephones are now starting to put in small key phone systems—multiple lines too. We don't think customers would have done it two years ago, but it's happening. We are exceeding our targeted sales for these small systems, and it's occurring in areas we didn't expect."

By comparison to DuBois' division of 25 employees, Alert's answering service has 12 officers, 300 employees, and sales of over five million dollars. He's quick to point out the company's progressiveness: "They were first in Southern California to use computerized answering equipment; and they decided to go into the interconnect business because it's growing very fast everywhere. They hired me; we got the people we needed fast, and by the third month this division was 'shaken down' and running smoothly."

DuBois is ex-Air Force. He smiles, "We had shake-down flights there too."

The company installs two lines, Toshiba and Iwatsu, both electronic, but installs 1A2 systems when they best fit the customers' needs. Asked if they'd had any difficulties with product lines, DuBois smiles and shakes his head. "No, that's why they hired me. I worked for a local operating company in Minnesota, also for TIE back east; I was a financial trouble shooter—I'm an accountant—and I do know the industry."

He explains why it's sometimes difficult for a new interconnect dealer to acquire certain product lines. "It's because suppliers like to be paid, and because the interconnect business isn't quite as profitable as a lot of new dealers think. Sure the gross mark is good, but profits after long term expenses usually end up as ten to twelve percent of sales. When I hear of twenty percent profits, I feel customers might not be getting full services and complete value for their money." He smiles and adds, "The trouble with any business' long term viewpoint is the company must put money back into the place. We're doing that, but we are limiting our installations to systems of 200 lines or less just to help turn our money around faster. We aren't a large division, but sometimes we have to put out \$200,000 in a month for equipment and labor before we get anything back."

He feels the electronic systems are more trouble free than 1A2's, go through check-out faster—a bench-test before every installation—and offer sufficient features to keep most customers pleased for years ahead. "Obsolescence isn't going to be a problem for us."

Pricewise, Alert isn't low bidder. DuBois believes his pricing is right in the middle. "We know what we have to

charge to make a profit and we stay there; we can't back down much. Our absolute profit is best in the PBX jobs although less as compared as a percentage to sales. The key business keeps our doors open, the PBX part generates the profits that justify our existence to management."

Regarding competition, the company management seems to believe small interconnect dealers may be selling *at their own cost* and hence earning only their labor: that they are essentially buying the jobs to keep working. But with more experienced buyers and dealers—as in medium key systems to PBX systems—jobs don't close as fast and specifications may be written. DuBois mentions he doesn't go after business where communications consultants get involved, probably because there's not a lot a consultant can do since the equipment is factory designed, and because the company's main market is small business telephone systems where consultants aren't active.

Asked about any "oddball" installations, DuBois volunteered one. "It was two buildings of sixty telephones and a switch; a system for group of psychologists there. They had problems with conversations suddenly being interrupted, problems in telephone conversations between doctors and their patients: it was darned serious. It turned out to be a technical problem *in the central office* and eventually the telephone company refunded \$1,600 to that medical group. But it took a very fancy diagnostic routine to discover exactly what that problem was."

Asked about her most interesting sale, Mrs. Darlene Burton smiles and says, "It was a Beverly Hills furrier. I'd made a visit just to get information, but instead he had me lay out a system on paper right there in his office; then he bought it on the spot." She laughs and adds, "No, I didn't get a fur coat out of the deal."

The Telephone Shop

"We've got the best collection of bells and ringers in town," says Ron Knaus proudly. The front room of The Telephone Shop in Long Beach displays a variety of telephones, answering machines, and accessories. Pointing to the displays, he says, "This just pays the rent; the shop in the back is where the profit comes from: we repair instruments, and sell and install three to five telephone systems a day. Our gross is around one-and-a-half million dollars."

The split? "The store up front brings



Technicians at The Telephone Shop

in maybe \$350,000," he said, "but selling instruments is a low-profit business. Eighty percent of the net comes from repair work and installations."

Started in 1969 the business specialized in instrument repair. Ron explains, "We still get 25 percent of that work from all over the United States. Did you ever try to get a telephone fixed in Boston? It's almost impossible. At that time we had no real competition, and later on we started selling instruments, and now we install complete systems." The company has five technicians, two trucks, and installs systems locally; in Pueblo, Colorado; in Palm Springs; and in Saint Louis; Chicago; and even on the east coast.

Ron notes, "Those out-of-town jobs are mostly telephone cost-accounting systems for hotels, but we put in a PBX system about once a month; we did an answering service that had 1,000 lines, but most of our work is installing telephone systems for small businesses with three lines and four instruments: they generally price out at \$2,500. Electronics versus 1A2 systems split about 60-40." The company has a free 800 number for incoming calls for service.

The Telephone Shop does interesting jobs including helping hospitals monitor the hearts of cardiac patients over the phone, installing telephone system on navy ships, renting out lines with machines loaded with taped information, and supplying telephone debugging equipment. Ron notes, "For the bigger jobs we have to subcontract out for the extra labor, naturally; we're just a little store. And we are doing well on those rented machines because the customers want them right here on our premises in case instant service is ever needed."

Behind the shop is a large repair facility

and warehouse. Inventory is valued at \$400,000; part of the service area is floored with anti-static mats to simplify checkout of systems to be installed elsewhere, and Ron shows a section upstairs where he intends to put in a dispatcher's desk for better control of present and future technicians aboard trucks in the field.

Their computer helps speed up office work. Ron shows a Spread Sheet program that his son Eric had written to quote small business telephone systems to customers while they are calling in on a line. The demonstration took about one minute; the hard copy print-out showed the basic price, sales tax, and several leasing and payment schedules too. It was very fast!

Since Ron is a full-time airline pilot, his son, Eric, runs the business; "He's also F.C.C. certified in all the lines we sell," says Ron. "He's attended lots of schools and seminars and is as competent a technician as we could hope for." Eric was graduated from Columbia University with a business administration degree in economics, but he's fascinated by electronics and the communications business.

Growth? "It's been healthy at thirty-five percent a year in the small business telephone systems," says Ron. "That's after the original jump and when things settled down. But we found the answering machine business has slowed a lot because of competition from discount and department stores, and same is true of individual instrument sales. The telephone *system* business looks good and very steady."

Ansafone Of Orange

"We'd been thinking about the small business telephone system market," admits Phil Sims, "and our technicians reported customers would ask, 'You don't sell telephone systems, do you?' so one day I took the initiative when I was selling an answering machine. I asked my customer if he wanted to continue renting or did he prefer to buy his own system. He bought, and we've been selling telephone systems ever since.

Sims is Sales Manager for Ansafone of Orange, an 18 year old company headed by Clifford White and Edward Johnson; the company offers both live and machine answering. Sims says, "We're into phone systems almost a year now, install 15 to 18 a month, but that will increase to



Ansafoone's Edward Johnson and Phil Sims

20 or 25 a month soon. The increase is from a backlog of orders for the new Compact Phone System from Telephonic Equipment Corporation." He continues, "We're growing at 10 to 15 percent a month and we expect it to continue through '85. Next year we'll install 350 to 400 phone systems for sure."

Most of the sales are 1A2 systems, not skinnywire electronics. Why? "Because 1A2's are cheaper," explains Sims. "A six line, seven phone electronic system with three speakers price out at \$6,000 to

\$7,400 depending, but I can install the 1A2 equivalent for \$3,800. The wire difference doesn't usually save anything; in the past year I've only found one building that wasn't already pre-wired with 25 pair cable. Just one." He notes, "We seem to be having more trouble with the electronic systems; it's hard to tell because out of a dozen sales only one will turn out electronic."

Ansafoone of Orange buys from Graybar Electric, Telephonic Equipment and others. Sims says, "We are trying to represent Toshiba, and that will happen soon. They're fussy; they want us to have a Toshiba trained technician aboard *before* we represent them."

Regarding inventory, he remarks, "We stock what we need because it isn't available locally, but being as this is the L.A. area we find most inventory is available with a short drive. Everything here is fairly close to us, and that's strictly a Westerner's view."

He and the staff learned about telephone systems from attending seminars, visiting factories, reading brochures and manuals. "There are two kinds of schools," he says, "one for salesmen and

another for technicians. I recommend both."

Referrals and the Yellow Pages have been their advertising routes to date. "We're just now starting to advertise in two local businessmen's magazines," he says, "and to send fliers to our answering service customers. So far we've been so busy selling to everyone else that we can only claim four or five of our answering service clients as phone system customers too, but that will change. Our flier asks, Let us be your complete telephone company?" He adds, "Right now it's a mad rush of business, but I am sure that by next year the rush will be tapering down. Fly-by-night operators, those without the necessary cash reserves to stay in business and back it up with good service, will fall out of the marketplace. Then business will be steady and good for those companies who believe in good service."

His company offers customers a service guarantee for \$3 per month, per instrument. "It covers everything except maybe pouring coffee into the KSU," laughs Sims, "and there are no minimums. Some interconnect dealers sell the coverage for \$2 or \$2.50 a month

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per instrument, but they have \$50 minimums. We don't."

If the price of a system is too high for a potential customer, Sims suggests a leasing arrangement. The leasing company buys the paper from Ansafone of Orange immediately. Sims says, "Most customers pay on system delivery and checkout, but since the giant firms tend to be slow paying, we hesitate to install systems of over 32 lines. We think those larger companies would want to tie up our service crews too much, make difficulties in our cash flow too. But, by contrast the small businessmen pay very promptly; some don't even wait until the end of the month. . . . We're very pleased with them."

GMF Sound, Inc.

The interconnect business is healthy, but there's other ways to keep busy and profitable—even when all the technical sharpness required is at a person's fingertips. Don Bethune, President of GMF Sound, Incorporated, frankly isn't sure he wants to dilute his business efforts with telephone work.

He does extremely challenging work: his company designs, manufactures, and installs sophisticated sound systems for churches, theaters, even on a several mile stretch of the Pacific beach. He's an authorized Altec Corporation dealer, and he's also installed several small key telephone systems: One in his own offices, several more in customer premises. He understands telephone systems and the interconnect business.

He explains, "There's been a real burst of interest and activity in the telephone business. I have a definite feeling of responsibility for my employees here and that's why I'd like to make more money and keep them all busy working. But I have to admit there *wasn't any challenge at all* to the few telephone systems we were involved in. We just hooked them



GMF Sound's Don Bethune (c) at work



Audiomatic's Harry Inouye (l) and technician

up and that was it; they all worked fine."

The complexities of difficult sound design jobs for sound reinforcement systems in difficult environments definitely appeals to Bethune. In his experience telephone systems are just *too easy* to hold his interest. He's also unsure of the effects of competition on the telephone system business. "In the past year alone there's been a tremendous number of people who jumped into it; they could become very cut-throat competitively. I don't think I'd enter into that game unless I were to hire some salesmen and in that way develop enough work to keep my staff busy and solidly booked, but so far it doesn't appear to be what a person could go into unless he were quite committed. I think it should only be viewed as a long-term business by those going into it. Therefore, I'm sitting back and watching to see what happens."

He makes very good sense! It's a lucky man who is so thoroughly interested, actually fascinated, by his work that he doesn't want to needlessly dilute his efforts. Some of the sound systems he's designed and installed are extremely prestigious.

Audiomatic

"A plantation kid from Maui, Hawaii," is how Harry Inouye describes himself. "But I went to high school and then to Cal State right here in L.A. and I've lived here ever since."

Engineering degree? "No, I was a sociology major," he smiles. "That's nothing; I have a friend who graduated in engineering and now he sells real estate." Harry Inouye is a very comfortable per-

son to be with, but he's definitely not the "sales type."

His company, Audiomatic, installs telephone systems, sells and services Code-A-Phone automatic answering machines plus several other brands. Inouye explains, "I worked for a dealer a year, then when he changed businesses the Code-A-Phone company asked me to continue service to their market here. That was 12 years ago and I've been doing it ever since. We do field work as well as take care of the carry-in business."

Why the switch to telephone systems? "The market is always changing," says Inouye. "Gradually, after the fair trade laws ended, the prices for answering machines came down a lot. Profits dropped. It used to be that a good remote answering machine would cost \$400, but today they're available from \$150 to \$300; and where a dealer used to make \$100 to \$200 profit, he now can make as little as \$30. Answering machines are now sold through discount stores, and some manufacturers were talking of producing 'throw-away' machines priced at \$60 to \$80 which would have wrecked the repair business. It scared me, and I realized I'd have to get into a business where there was a good profit margin: telephone systems or personal computers. Then I tested both with advertisements in the Yellow Pages.

The resulting flood of phone calls, mostly about telephones, stunned Inouye. "First, I turned these leads over to a friend in the business," he said, "and then I got some franchises plus a lot of good advice and help from other dealers. I decided it was time to sink or swim, and

I bought a couple of telephone systems and that's how it all began."

"At that time, last February," he says, "I'm sure my suppliers realized that a lot of people were getting into the phone business: unemployed aerospace workers, ex-telephone company personnel, and people like me. Also, Code-A-Phone was getting their telephone products ready. They had Call Controllers—an accounting system—plus Call Restrictors. They bought a company already making a telephone system, and they set about designing their own too." He adds, "So, I got a lot of help, and in no time we were selling and installing about 20 systems a month."

The first job Inouye did was at cost to let him get "his feet wet." He says, "I invested a lot of time in learning the business. I spent a day at Telephonic Equipment Company; most of that was learning about their Call Sequencer—a queuing device. It's expensive but actually you can't hire anyone for a year to do the work without spending a lot more money. I've been to other schools and seminars and expect to attend more."

Those factory schools run for a week or two; the cost is \$300 or more for tuition, and extras are transportation, food, and hotel rooms. Inouye says, "They're absolutely essential because some phone systems are quite complicated with computers and all. I felt very lucky when a manufacturer called me and told me my number, my chance to attend their school, had come up. Those schools are heavily backlogged and applicants have to wait months to attend."

At first Inouye sold and installed with the aid of one helper. The business was replacing I.T.T. systems and Audiomatic was busy doing 20 a month. "Then we started feeling the competition and sales dropped to about 12. You can't blame people for wanting to jump in," says Inouye, "after all, a typical system was billing for \$3,000 installed."

To cure this slow-down and get sales back up to one a day, Inouye plans to advertise a lot more, use direct mail too, and to hire salesmen to visit small businesses. "They'll just let everyone know we're in the business, ask if in the future people think they might want to own their own system, and state that we can answer any questions people might want to ask. It will be a survey type call and not high pressure at all."

He looks around his store. "It's a good

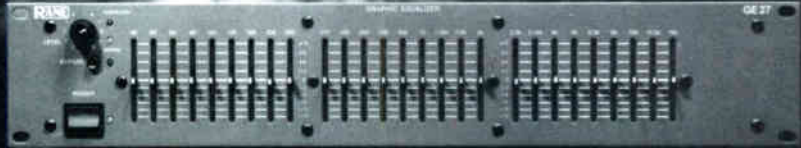
business: telephone systems and answering machines. In less than a year the phone system work has become half our sales gross; 90 percent of the customers pay cash just as soon as they are satisfied the system works perfectly—and that's only a few days after installation. The other ten percent want payment plans and we sell the paper to get our money right away. We supply service at \$50 a visit; that would be \$75 to \$100 if they had called the telephone company. We already have very qualified electronics people aboard here, and I pass on to them whatever I learn from the seminars and schools I attend. The only trouble is I need to double my store space to about

2,000 square feet, put in more displays and bench space. That's next."

Asked about jobs requiring lots of lines or perhaps a PBX installation, Inouye replies, "I can't help those customers yet, and besides I don't want to get into competition with the larger interconnect dealers. I'm comfortable right now with the small business market." His store has seven employees.

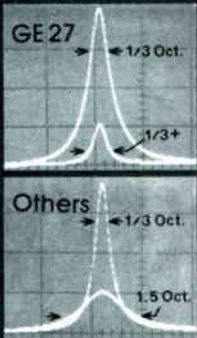
Inouye does everything on earnings and doesn't visit the bank much. He's technically oriented. "I have to know how things work because otherwise things can come back to haunt us." He smiles again and adds, "It's comforting to me to understand the world."

GE 27 STATE VARIABLE THIRD OCTAVE EQUALIZER




THE NEW STANDARD IN GRAPHICS

The GE 27 State Variable filters maintain a constant $\frac{1}{3}$ octave bandwidth at all slider positions, unlike all other graphic designs which suffer increasing bandwidth with decreasing amounts of boost or cut. The consistent precision of the GE 27 allows significantly greater feedback control without adverse effect on overall sound quality. And it yields a much higher degree of system accuracy in less time, due to reduced adjacent filter overlap at moderate amounts of boost/cut...a difference you can hear and appreciate.



The GE 27 State Variable design has indeed revolutionized the $\frac{1}{3}$ octave format, creating a new standard against which all other graphic equalizers will be compared, regardless of cost. And yet the GE 27 is only \$449 suggested list price.

Which proves that smart technology doesn't have to be expensive.



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Security Systems For The New York Convention Center

The New York Convention Center likes to call itself “*The Center of the World.*” Designed by the renowned architectural firm of I.M. Pei & Partners, it will be a world-class meeting and exhibit hall. MCC Powers and Bogen Division, Lear Siegler, Inc., are making it a showcase of safety, as well.

The upcoming building is intended to strike awe in the heart of a first-time viewer. Over 150 ft. high in some sections, it will cast 22 acres of glitter along the Hudson River shoreline of Manhattan.

Its glass walls will shape the largest single exhibition hall in the Americas, plus other exhibit areas, meeting rooms, convention-style hall, kitchens, executive suites and carefully planned loading areas for exhibitors, all done on a gargantuan

scale. Where else will one find 10,000 hot meals being served to elegant banquets and receptions in a single evening?

When the joint venture of Comstock-Luis won its highly coveted bid as a contractor for the convention center, it hired MCC Powers of Pinebrook, New Jersey, to install the center’s automated monitoring and control system. This system will control the security, electrical, electronic, heating, ventilating, life safety and air conditioning systems.

In turn, MCC Powers, a unit of Mark Controls, headquartered in Northbrook, Illinois, chose its supplies with great care. MCC Powers furnished much of the cost information used in its new employer’s bid and had to be sure to stay within those limits. This company also demands both quality and prompt delivery.

This is why Bogen Division, Lear Siegler, Inc., was tapped for a two-part security set-up in this enormous undertaking: an audio evacuation and panic control system and a scream alarm system.

The Audio Evacuation/Panic Control System (AE/PC) by Bogen has met most fire board and municipal code approvals and is listed by test labs in both the United States and Canada. This emergency alerting and communication system has proved itself, not only by meeting or exceeding all standards, but through its work in high-rise and other large buildings all over the world.

AE/PC stands guard over such diverse locations as the MGM Grand in Las Vegas and the Cook County Courthouse in Chicago. Constructed in modules to suit both building and budget, the system

centers on the LSCP-1, a command center panel with an alarm tone generator, two emergency communications channels, self-supervision of all its electronic functions, and many other important features.

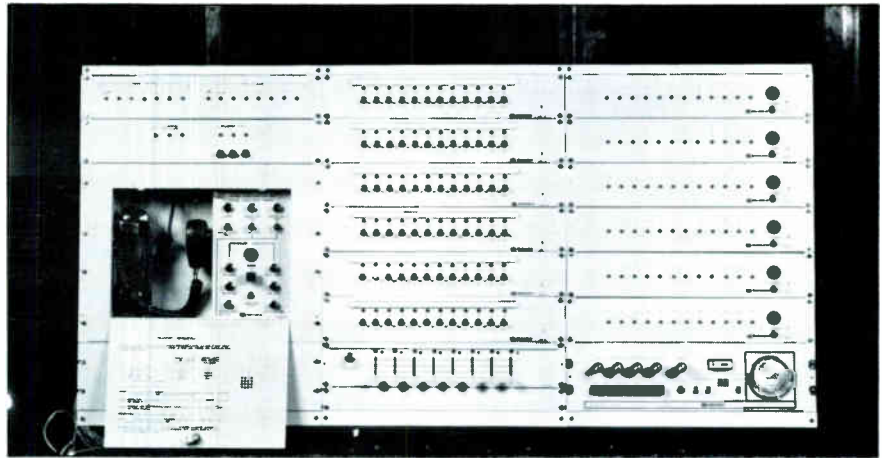
The size of the convention center necessitates 51 speaker zones as part of its state-of-the-art fire alarm system. The center will have its own mini fire department with two large pumping stations and special fire trucks. However, an emergency could mean anything from a fire to an electrical blackout.

Management personnel of every large building is duty-bound to give information and guidance to all occupants during an emergency in order to prevent panic or worse. This building has provisions to accommodate 85,000 persons in the course of a day and to seat 35,000 persons at one time in its largest hall. That number would be in addition to employees of the center and employees of exhibitors at the time of an emergency. That's a lot of people to move under stress conditions. Emergency communication via the AE/PC is vital.

Bogen's AE/PC will be housed in the Fire Management and Security Room. This room also will be home base for the Automated Monitoring and Control System (AMCS) that MCC Powers is responsible to install. It will offer the security guards a sweeping vista of data fanned across the L-shaped console. One section of this console is reserved for LSCP-1, the control center of the AE/PC.

Heading the long list of LSCP-1 features is its self-contained alarm generator that automatically sounds throughout the speaker system in the endangered areas. However, its clear, distinct tones cannot be responsible for a false alarm. Those tones must be triggered by an external system: a sprinkler going on in one of the center's 117 sprinkler zones with their 27,000 sprinkler heads or someone pulling a fire alarm box in the building. When such information goes to the building's security office and its fire department, it also opens two closed contacts in the LSCP-1.

The open contacts activate a flashing light on the control panel as the AE/PC's automatic slow-whoop warning tone goes out to the affected areas. Voice announcements have priority and can take over the sound system at any time during the alarm. The AE/PC has facilities for a



Bogen's AE/PC Keeps Communications Open

user-supplied tape player and general instructions can be put on a cassette tape as a back-up device. Like voiced announcements, the taped instructions will have priority in the system.

The alarm tone also will shut off when someone at the control desk presses the LSCP-1's Manual/All-Call switch. In this condition, the alarm light continues to flash for the duration of the emergency, and the alarm continues in the danger zones. However, with the Manual Alarm button, it now can sound in other zones as well. This gives the person in charge the option of sending alarms and messages to other zones or throughout the building, at will.

In addition to providing a simple, reliable path to alert and instruct building occupants in an emergency, the LSCP-1 also gives two-way communications to emergency workers, such as firefighters. Both a microphone and a phone handset provide access to the AE/PC's two communications channels. These channels allow messages to any or all areas in the center with the flick of a zone switch.

The microphone is available for getting out information to the endangered area when no reply is necessary. The handset usually would be used by the fire chief to receive updating information on conditions and to give orders.

In this instance, the handset specifically serves custom-designed, in-house emergency telephone lines set in Bogen's LSWS warden stations. These lines, to be used only by emergency workers, have two sets of annunciator LEDs, mounted just above the LSCP-1. One set will signal which line is calling, the other set annunciates line failure. Two push buttons send tone annunciation to the

phones, which are at key locations in the building.

The warden station phones will put firefighters and others in touch with the command post. These workers also will carry four-channel walkie-talkies to communicate among themselves.

The LSCP-1 continuously supervises, and allows testing of six electrical functions. Testing is checked by light and sound indicators. Supervision of AC power, relay power and alarm generator includes the ability to switch the system, imperceptibly and automatically, to standby sources for each function as needed.

Failure indicators on the LSCP-1 will show if one of the power amps or a telephone line is malfunctioning. The architects specified custom-made annunciator panels with LEDs that show which amplifier or line needs attention; this will mean shorter down times. The control panel also is very audible in its report if all systems are not returned to their original positions after an emergency, so that they will be ready for the next time.

The LSCP-1 is installed as part of three racks that were custom-assembled by Bogen for MCC Powers. The LSCP-1 and telephone and power amplifier indicator panels make up one of the racks.

The other two racks include six 12-zone speaker-line supervisor panels, six 12-zone relay zone switchbanks and a separate control center for the scream-alarm system.

Altogether, these panels form the essential LED/tone network that directs security guards to trouble, whether sensed by a sprinkler, noted by an observer or caused by a scuffle in an unguarded area. Most importantly, this



12-Zone Panels Monitor Separate Areas

network allows occupant-notification of possible danger and paths to safety.

12-Zone Panels

The six 12-zone speaker-line supervisor panels, Bogen's LSSV-12, continuously monitor each of the speaker zones. An open, short or significant load change in a zone will start a warning tone as the appropriate LED lights on the switchbank. A panel switch allows the fault tone to be shut off, but the LED stays on until the condition in the speaker system is corrected.

LSRZ-12 is Bogen's model number for the six 12-zone relay zone switchbanks being installed at the New York Convention Center. Each switchbank automatically picks up the alarm tone of the LSCP-1. A System 600/FMS indexes the switchbank to send it to the zone from which that alarm originated. Although this switchbank offers a programming choice of sending the alarm to one, two or three zones, one zone was considered the best choice for the convention center's unique structure. This switchbank has two channels so that a dedicated alarm amplifier can send a separate tone according to the situation in that particular zone.

LED annunciators on the switchbank indicate to the guard on duty which area sent the alarm. Other selected zones can receive messages and the same or another

alarm tone when the switches for those zones are thrown.

The Amplifiers

The center's AE/PC and scream alarm systems are designed to utilize the power of six MT-250C and 2 MT-125C power amplifiers. These amps are part of a series created by Bogen for general use but also specifically for life-safety applications.

Bogen's MT-C series was the first power amplifier group to gain a listing under the recently formulated Underwriters Laboratory 1480 Standard for Fire Protective Signaling Systems. This standard demands continuous output at full rated power for a minimum of 250 hours.

The MT-C also has such life-safety features as capability for a 24V backup battery and a battery-saving circuit. This reduces idle current to a low value after a minimum of 20 seconds of no signal.

Both the 250-watt MT-250C and the 125-watt MT-125C have protection against line surges, overloads and abnormal heat buildup. They also have an LED overload shutdown indicator and a switchable low-frequency filter.

These power amplifiers are driven by Bogen's 10-watt C20B amplifier. A thermostat is enclosed in its power transformer to protect it against overloads. However, the C10B and all the power amplifiers are duplicated and both the

main and standby amplifiers are under the constant supervision of their own AFDS-2s.

Bogen's Automatic Failure Detector and Substitutor (AFDS-2) injects a set level of a supersonic frequency, 40 kHz, into the inputs of the main and standby amps. With this, it constantly samples their outputs.

If the 40 kHz falls below the adjustable threshold, usually 2 dB, it causes a front-panel LED to indicate whether it is the main or standby amplifier that needs attention.

Pressing a Silence button will halt the fault tone but the LED remains lit until the malfunction is corrected. The Silence button automatically resets at that time. To serve different needs, the detector and oscillator levels and sensitivities of the AFDS-2 are screwdriver-adjustable.

As a safety precaution, the four amplifier racks at the New York Convention Center will be split into two sections and placed on different floors.

Scream Alarm

Bogen's scream alarm system was developed in connection with the many prison and security systems the company has engineered and supplied.

Supplementing the convention center's 66 CCTV cameras feeding 16 monitoring screens, the scream alarm monitors eight zones for unusual noises. Its control panel has a monitor speaker that reproduces these sounds whether the zone's switch is set open or closed.

All solid-state circuitry and all-silicon semiconductors of the scream alarm system's two amplifiers assure reliability for its important work at the convention center. Two amplifiers allow intercom to take place over one channel at the same time that surveillance continues for the other seven zones.

One amplifier offers 35 watts for surveillance. The other, a 4-watt amp, is more than sufficient to send a message to one or more zones when needed.

Understandably, the center prefers not to disclose the location and size of these zones. An extra feature available to security is a precedence annunciator lamp that acts as an all-call indicator on the scream alarm zone switchbank.

The New York Convention Center has met with several difficulties from various quarters as it works toward completion. This will make its grand opening, projected for 1986, even more of a gala occasion than originally envisioned.

1

Acoustic foam "pop" and moisture filter.

2

Three-layer mesh grille resists denting for better element protection and appearance.

3

High-output moving-coil dynamic cardioid capsule.

4

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All grille screens soldered (not glued) to brass retaining rings for maximum strength.

6

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7

Precision-machined body of materials selected for perfect balance, shaped for comfort. Aluminum Zinc Alloy

8

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9

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10

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Going wireless? Write to Nady Systems, 1145 65th St., Oakland, CA 94608 for details on the ATM41a/Nady combination.

New Products



TELEPHONE SCRAMBLER

Information Security Associates, Inc., Stamford, CT, are now marketing telephone scrambler. Known as The Talksafe, this high security scrambler measures 1.5 x 7.6 x 9.6" and weighs 3.3 lbs. About the size of textbook, The Talksafe fits easily into a flat attache case or can be tucked into the corner of a carry-on bag.

The Talksafe works on 110 to 240 VAC, 12 VDC automobile connection or internal rechargeable batteries. The telephone connection is an integral acoustical coupler/handset. The 8-digit code protects over 100,000,000 combinations via a time segment rearrangement and reversal scrambling method. With more than an hour of sequence duration, the user's speech is digitized, capturing individual voice characteristics without consuming large quantities of the on-board micro-computer, which scrambles the digitized voice, then reconverting it to analog for transmission by telephone or radio.

The Talksafe is 50% smaller than any existing scrambler and is fully compatible with every known make of telephone.

□ For more information write 740 on the inquiry card. Or write: Information Security Associates, Inc., 350 Fairfield Avenue, Stamford, CT 06902. Telephone: (203) 357-8051.

BASS SYSTEMS

TL optimally vented low-frequency speaker systems from Electro-Voice now include the new DLX low-frequency reproducers, according to Jim Long, Director of Marketing, Professional Sound Reinforcement.

"The TL series has earned a reputation for tight, clean bass in packages of modest physical size," Long said. "TL systems appear in a wide variety of fixed-installation professional sound reinforcement and playback systems around the world, including performing arts centers, auditoriums, churches, arenas, stadiums and clubs. Now, the DLX woofers provide a substantial increase in linear cone excursion—about 7 dB—and twice the long-term average power capacity, up to 400 watts per speaker, all with essentially no change in sensitivity or efficiency."



The TL606DX uses two DL15X drivers in a 7.0-cubic-foot enclosure. Sensitivity is 103 dB, with a 50-Hz 3-dB-down point and an 800-watt power capacity.

The TL806AX model includes a DL12X 12-inch driver in a 1.2-cubic-foot enclosure. Sensitivity is 90 dB, with a 72-Hz 3-dB-down point and a 300-watt power capacity.

The 806DX uses two DL12X drivers in a 2.4-cubic-foot enclosure. Sensitivity is 101 dB, with a 70-Hz 3-dB-down point and a 600-watt power capacity.

□ For more information write 729 on the inquiry card. Or write: Jim Long, Director of Marketing, Professional Sound Reinforcement, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.



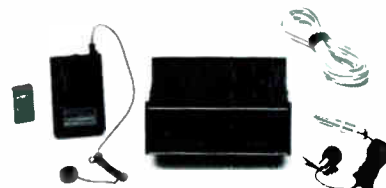
SECURITY SYSTEM

Auto-Tel has introduced Entry-Call Security Systems to help interconnect and operating telephone companies step into a vast new service market by selling and installing telephone-based security systems.

Entry-Call security systems are suited to retro-fit applications because they are said to be easily connected to existing phone lines, without special wiring or intercoms.

With Entry-Call, interconnect and operating telephone companies offer customers security, because only wanted entry is permitted. A separate battery pack keeps the system operating during power outage. System pricing—termed "very competitive"—depends on installation requirements and choice of features and system configuration.

□ For further information, contact: Auto-Tel, 4944 North County Road 18, Minneapolis, MN 55428; (800) 328-8966 or, in Minnesota, (612) 533-7888.



INDUCTION LOOP AMPLIFIER

A new POWR LOOP Amplifier, designed specifically to drive audio induction loops, is now available from

Williams Sound Corp. The POWR LOOP Amplifier, Model PWL LA15P, is used with a microphone or line-level audio input as a program source for POWR LOOP Receivers or hearing aids equipped with a telephone pick-up coil.

The POWR LOOP Amplifier automatically adjusts to loop impedance, allowing the use of 50 to 250 ft. loop cable lengths. Standard telephone cable is used as the loop, with modular connectors for easy set-up. An automatic level control circuit maintains nearly constant power output for a consistent listening level. Complete induction loop systems are also available.

□ For more information, write 727 on the inquiry card. Or write: Williams Sound Corp., 6844 Washington Ave. S., Eden Prairie, MN 55344-9984.



TOUR GUIDE SYSTEM

Williams Sound Corp., Eden Prairie, MN, announces a new COMMUNICATOR Transmitter and Receiver for hearing assistance in guided tour applications. The Transmitter, Model COM T1, is a body-pack wireless microphone, worn by the tour guide. Two microphones are available, a boom-type, noise-cancelling microphone for noisy environments, and a lapel-clip microphone for quiet environments. A COMMUNICATOR Receiver, Model COM R7, is carried by each individual in the tour group. A variety of earphones and headphones are available to suit particular listening requirements. Typical system range is 50 to 100 feet. Both the Transmitter and Receiver are powered by 9 Volt batteries.

□ For more information write 726 on the inquiry card. Or write: Williams Sound Corp. 6844 Washington Ave. S., Eden Prairie, MN 55344-9984 800-328-6190/612-941-2896



DYNAMICS PROCESSING

A prototype of a dynamics processor that combines many popular functions of its other compressor/limiters will be

December 1984

NEW! McGOHAN PUBLIC ADDRESS ZONE PAGING CONTROL SYSTEM MODEL MS-ZP4



A totally new concept in P.A. zone paging applications. This system combines individual preamplifier channels with some unique solid state circuitry that performs all the necessary switching functions in one small package, without expensive and troublesome relays. The outputs are followed by individual booster amplifiers of the required power for each separate zone in the P.A. system. This design greatly simplifies installation, and is virtually maintenance-free. Other features included are too difficult to achieve in a conventional system. Some of the features are:

- Solid State Reliability—9 integrated circuits
- Four zones with all-call (expandable with additional units)
- Transformer-balanced line-level input
- Background music High-Z input
- Zone-programmable music output
- Automatic precedence on selected zones
- Built-in signal generator for page alert
- Input for optional external signal generator
- Dry-circuit control for external generator
- Level controls for each input
- Tone control for background music
- Screw driver adjustment on all controls
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For full specs and pricing contact:

McGohan Electronics, Inc.



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Bensenville, Ill. 60106
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We design intercoms specifically for high noise area use— to deliver clear, penetrating voice communication under the most difficult conditions. In factory production areas, machine shops, steel mills and foundries, loading areas, etc.

Intercom housing is a heavy-duty aluminum casting . . . fully sealed against dust and dirt, corrosion-proof, weatherproof for use indoors or out. All transistorized for dependability. Effective range is from a few feet to several miles.

Each unit both transmits and receives, so only one is required per station. Installation is simple, practical: plug each intercom into power source, make ordinary 2-wire connection between units.

Full range of models includes compatibility with existing sound-power telephone systems. Request complete catalog.



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exhibited by dbx Inc., Newton, Mass., at the Annual Convention of the Audio Engineering Society in New York, October 8-11. The dbx Model 166 is three dynamics processors—noise gate, compressor/limiter and peak clipper—incorporated in a single package. All three functions can be used simultaneously.

The noise gate function of the dbx 166 attenuates noise leakage and other undesirable anomalies occurring in the absence of a desired input signal. Threshold is variable over a wide range. Attack time of the gate is brief to allow the complete transient at the beginning of the signal to come through. Release time is controlled by two proprietary dbx RMS detectors (one fast, one slow), which are selected by a front panel switch.

The amount of gain reduction and compression can be visually monitored via LED displays on the front panel, making it easy for the user to observe how the 166 is working.

Connections are supplied on the rear panel of the Model 166 for inputting an equalizer or other signal processor in its "Side Chain". The Side Chain allows the user to access the signal path that controls the compression and

gating. If an equalizer is input into the side chain, the Model 166 can function as a frequency-dependent compressor. By pressing the Side Chain monitor control, for example, the user can listen directly to the side chain signal after equalization.

The Model 166 also features an output gain control to adjust the output level of the unit, allowing ± 20 dB of gain. A standard one-button hardware bypass is also provided. The 166 can be used either as a single stereo unit or as two independent mono processors. A stereo couple switch links the two channels together to permit true master/slave operation.

□ For more information write 731 on the inquiry card. Or write: dbx Inc., P.O. Box 100C, Newton, Mass. 02195



COMPRESSION DRIVER

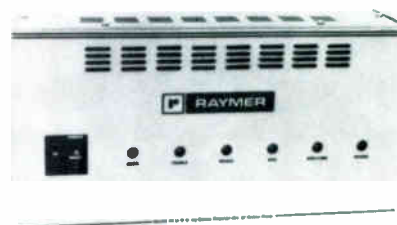
A new high-frequency compression driver, model DH2012 from Electro-Voice, provides 7 dB more output at 20,000 Hz than its predecessor, the DH1012A, according to Jim Long, Director of Marketing/Professional Sound Reinforcement.

Designed for applications that demand both maximum output and wide-band reproduction of music and voice, the DH2012 is appropriate for stadiums, arenas, gymnasiums and large theaters. Churches, auditoriums and performing arts centers are also excellent applications for the DH2012's extended high-frequency response.

EV's proprietary high-temperature winding and electrical bonding technologies assure excellent coil reliability and performance. The DH2012 takes 70 watts of 1,000-20,000-Hz pink noise with a 6-dB crest factor, for two hours. The 500-20,000-Hz rating is 50 watts.

□ For more information write 728 on the inquiry card. Or write: Jim Long,

Director of Marketing/Professional Sound Reinforcement, Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107.



PAGING AMPLIFIERS

With the addition of its new 20-watt Model 1120 and 40-watt Model 1140, Cetec Raymer now offers a full range of paging amplifiers that extends from 10 to 100 watts.

Model 1120 fills the void between 10 and 35 watts, a void in which sound and interconnect contractors have had to use a 40- or 50-watt paging amp where less paging power would be adequate. The 20-watt amp is suited to use in smaller areas where ambient noise is not as important a consideration as space, versatility and reliability.

Both new paging amplifiers offer four inputs: balanced Lo-Z mic input; phone input with transformer; music input with automatic muting; and auxiliary input. They have bass and treble controls and a tamper-deterrent cover and are screwdriver adjustable. Outputs are 4 and 8 ohms and 25 and 70 volts.

□ For more information write 721 on the inquiry card. Or write: Cetec Raymer, 7315 Fulton Avenue, North Hollywood, CA 91605, telephone (213) 875-0423.



VOICE POWERED COMMUNICATION

Critical communications during power failures, or when other emergencies disrupt existing communications systems, are said to be assured by the Voice Powered Communication System produced by the David Clark Company.

Because the system is voice powered, it

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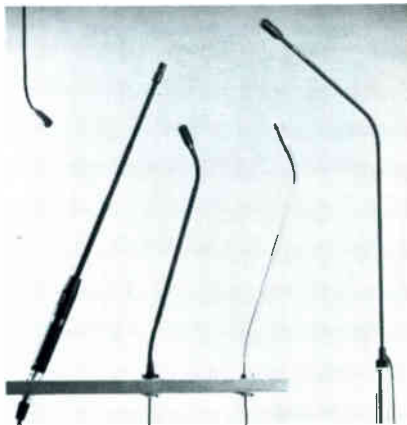
INDUSTRIAL PRODUCTS FOR THE PROFESSIONAL

requires no power sources or batteries of any kind, and is safe to use in flammable atmospheres. Designed for hospitals, chemical plants and other facilities that depend on fast, clear communications, especially in crisis situations, the David Clark Company Voice Powered System can be permanently installed or used as a temporary, portable system.

In many facilities, power failures cause telephones and intercom systems to go dead as emergency power is redirected to key areas. It is essential, however, that electrical maintenance personnel be able to maintain communication between electric switch room, power plant turbine deck and other important areas.

With a permanently installed, Voice Powered Communications System, crews are said to be able to carry out necessary emergency procedures. Jack plates located at strategic locations near key equipment enable personnel to plug into essential communication circuits for directions.

□ For more information, contact: Mr. Jack Kennedy, David Clark Company, Inc., 360 Franklin St., Worcester, MA 01604; (617) 756-6216.



MICROPHONE

Five ultra-low-profile back electret condenser microphones—the AT837, AT853, AT855, AT857 and AT859—are the initial members of an entirely new Audio-Technica UniPoint series which were exhibited at the 1984 AES in New York City, October 8-11, 1984. The announcement was made by Bob Herrold, Audio-Technica's microphone product manager.

According to Herrold, the five new models are said to reproduce sound in a highly natural manner with minimal coloration and, because of their cardioid pickup patterns, may be used at considerable working distance from the sound source.

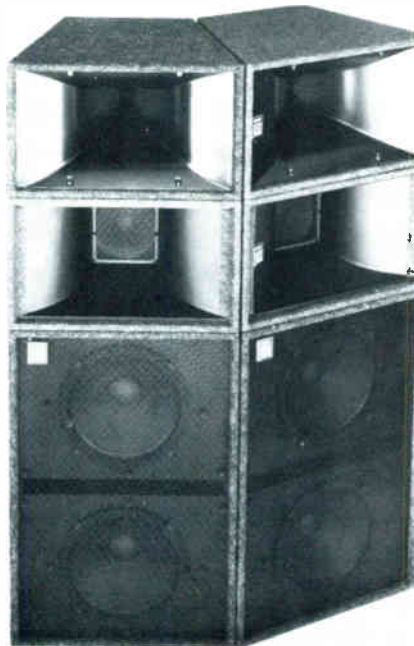
The AT837 is a double gooseneck model with frequency response

tailored for close-up use. The unusual double gooseneck configuration, featuring a straight pipe section with a flexible gooseneck at either end, permits the same freedom of movement that would be possible with a long gooseneck, but it is far easier to keep the microphone from developing the twists and kinks characteristic of the conventional gooseneck model, Herrold points out.

The AT857 double gooseneck model is nearly identical in shape to the AT837, but with frequency response tailored for natural sound reproduction at an extended working distance from the sound source. It may, of course, be used close up, as well, however.

All of the UniPoint microphones feature extremely broad, flat response curves and all are balanced low impedance. Each member of the new series may be operated from a variety of power sources. They may all be used with a 30 V DC source, single-ended without a power module or with any 9-52 V DC phantom power source. In addition, the AT853 and AT859 may be used with a self-contained 1.5 V battery.

□ For more information write 726 on the inquiry card. Or write: Audio-Technical U.S. Inc., Stow, Ohio 44224



MODULAR REINFORCEMENT SYSTEM

The MRS-1 (Modular Reinforcement System 1) from Professional Audio Systems is the first three way,

NEW Outdoor Eaves Mounted Speakers



These unique speakers fit under the eaves to provide a 45° sound projection. Patented weather barrier keeps out moisture, dust, and dirt. Two models are available, a high efficiency model cranks out 50-18,000 Hz response and a general purpose model is rated at 40 watts RMS. Fast, simple installation. Write for Bulletin N-784.

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modular, full range, time corrected PA system available to date. The system is comprised of a double 18" bass module, a single 12" mid-bass module, a constant coverage horn with 2" compression driver, and dedicated electronics.

Controlling the system is the one rack space System Processor. This unit is internally calibrated for the Time Offset Correction™, the cross-over filters, and the turn-on turn-off transient protection. Other than on-off, output levels, and limiter controls, everything is permanently set.

Cabinets are constructed of 3/4" multi-ply with 2" x 3" bracing and are wedge cut for clustering. High density weave exterior adds to systems durability.

□ For more information write 723 on the inquiry card. Or write: Professional Audio Systems, 1224 W. 252nd Street, Harbor City, CA 90710

CONDENSER MIC

Shure Brothers Inc., has introduced the SM91 Unidirectional Condenser Microphone. The SM91 is a low-profile model designed for surface-mounted applications where a unidirectional pickup pattern is desirable.

Like the "pressure zone" micro-



phones in common usage, the Shure SM91 takes advantage of the well-known principle of boundary effect. Because of this principle, placing a Shure SM91 Microphone sufficiently close to a barrier or boundary will cause it to perform with as much as 6 dB higher sensitivity and approximately 3 dB greater rejection of random background noise.

"We're presenting the unidirectional SM91 as a viable alternative to the omnidirectional 'pressure zone' microphones currently in use," said John F. Phelan, Shure's Marketing Manager, Professional Products. "Since this is the first unidirectional microphone that utilizes boundary effect, it has many advantages over other 'pressure zone' models on the market."

At the heart of the SM91 is a new Shure-developed cartridge that pro-

vides high output plus a wide, flat frequency response for accurate sound reproduction and excellent off-axis performance. The SM91 is also supplied with a small, sturdy, low-distortion, high-clipping-level preamplifier which may be powered either by two standard 9-volt batteries or by an 11 to 52 Vdc simplex (phantom) power supply. The preamplifier unit also includes a 12 dB/octave low-frequency cutoff switch for response tailoring, a battery On/Off switch, and a green LED battery condition indicator. Also included is a 25-foot, small-diameter, 2-conductor, shielded interconnecting cable with two 3-socket miniature Switchcraft connectors.

□ For more information write 738 on the inquiry card. Or write: Shure Brothers Inc., Customer Services Department, 222 Hartrey Avenue, Evanston, IL 60204.

MIXER/PREAMPLIFIER

The DM1900 from the Professional Products division of Numark phonos, or two stereo phonos and two stereo tape recorders, plus a balanced/unbalanced input that will accept a



microphone with either a phone plug or XLR connector. The mic input has a professional pan pot control for exact and creative positioning. A fast-acting 12 segment, multi-colored peak reading LED output meter is provided. The DM1900 has built-in ultra-low-noise preamplifier and a selectable variable output to provide the proper output that will drive the most powerful amplifiers.

Slide controls are provided for adjusting the volume of each input, for controlling the output volume of each stereo channel and for adjusting each of the equalizer's six frequency bands. The facing and cueing volume controls are professional-quality four-gang slide controls with feather-touch action, fast response and infinite adjustment sensitivity. The facing and cueing controls automatically adjust the gain levels of the channels being mixed so that volume does not vary during the mixing process. They can be set to mix either Channels 1 and 2 (phone/line inputs) or Channels 3 and 4 (inputs).

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□ For more information write 727 on the inquiry card. Or write: NUMARK ELECTRONICS CORP., 503 Raritan Center, Edison, NJ 08137 201-225-3222



CASSETTE RECORDERS

A new range of recorders has been designed by Neal to provide the means of recording conferences on compact audio cassettes. The Neal 6000 series recorders have two identical three-motor type, logic controlled mechanisms fed by common inputs.

As the first cassette nears the last minute of recording, the second mechanism automatically begins recording in conjunction with the first cassette to ensure of no gaps during automatic changeover. An alarm is then given to alert the operator to change the first cassette so the first cassette is ready for automatic changeover when the second cassette approaches the last minute of its recording length.

Automatic changeover also occurs if a cassette malfunctions for any reason during recording.

□ For more information write 733 on the inquiry card. Or write: Sarasota Automation, 1500 N. Washington Blvd., Sarasota, FL 33577 (813) 366-8770



MINI WIRELESS

Sennheiser Electronic Corporation has introduced a new line of wireless R.F. communication equipment, consisting of the SKM 4031 handheld mic transmitter, SK 2012 body pack transmitter, EK 2012 body pack receiver, and EM 1036 multichannel rack mount receiver. Available in a variety of bandwidths, including UHF high and low, the product line exhibits flexibility and features previously unheard of in wireless technology.

All-battery-operated equipment incorporates a DC-DC voltage converter

which maintains the operating voltage of the unit as the supply voltage drops, thereby avoiding audio distortion and carrier frequency drift. Powered by three AAA batteries, the units are equipped with compander circuitry, crystal controlled oscillators, and select features, which vary from model to model.

□ For more information regarding these products, contact Sennheiser Electronic Corporation, 48 W. 38th St., New York, NY 10018.

SHADE AND SCREEN CONTROLLER

FSR, Inc. has developed a new shade and screen control module, the SC-100. This remote unit will work on either one switch (Open/Close), two switches (Open/Stop, Close) or 3 switches (Open, Stop, Close). Three lamp feedback signals are provided.

This new shade and screen controller lets you mix the number of switches on the panels (i.e. 3 switches on the operators panel, 1 switch at the lectern) and all the switches stay in sync at all times.

□ For more information write 725 on the inquiry card. Or write: FSR, Inc., 40 Commerce Road, Cedar Grove, NJ 07009 (201) 783-3966.

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Supplies & Tools

UNITY ISSUES NEW TUBE CATALOG

More than 7,000 electron tube types are listed in a new catalog issued by Unity Electronics, Elizabeth, New Jersey.

Tube types in the new Unity catalog include special purpose industrial tubes, receiving tubes, transmitting tubes, magnetrons, klystrons, travelling wave tubes, ballasts, and many other tube types. The electron tubes distributed by Unity are products of the world's leading tube manufacturers. All of the receiving tubes in the new catalog are shown with net pricing. All other tubes are indicated with list pricing. The buyer is advised to contact Unity for exact pricing and delivery.

The catalog also contains four pages of IC's and solid state devices available from Unity. Included are digital IC's Schottky devices, diodes, transistors, triacs, varactors, rectifiers, microprocessor components, voltage regulators and many other solid state devices.

The complete Unity catalog may be obtained by contacting Unity Electronics, 107 Trumbull St., Elizabeth, NJ, Att: Norman Miller, marketing manager.

NEW TOOL SPEEDS CUTTING AND STRIPPING OF ELECTRIC WIRE AND CABLE

A new tool that cuts and strips electric wire and multiple cable rapidly while eliminating the danger of accidental damage to copper conductors has been introduced by Sylvax Corporation.

Designed for high-volume mass production work, the Mr. Jaws Professional Wire Stripper saves time and material by self adjusting its action to the thickness of wire insulation and cable sheaths.

The tool has a separate built-in wire cutter and a unique self-adjusting stripper. Single and multiple conductor wire can be cut to the desired length by placing it between the cutter blades and squeezing the tool's plier-like handles.

The Mr. Jaws Professional Wire Stripper can be used to cut and strip 12 ga. to 20 ga. wires. It is available at most industrial wholesalers stocking hand tools.

For additional information, write Dept. RR, Sylvax Corporation, 342 Madison Ave., New NY 10017, or phone (212) 867-5005.

ELECTRONIC TELHORNS PUNCH THROUGH NOISE WHERE STANDARD RINGERS CAN'T

A complete line of loud, electronic ringers, ideal for use in noisy locations or for covering a wide area, are now available from Wheelock Inc. All models have two field-selectable sound patterns (horn or warble) with sound output adjustable to 105 or 110 dBA, depending on model. Designated TelHorn™, the line includes both indoor and outdoor models, with an optional, 70,000 peak-candlepower strobe model available for indoor operation. The strobe can help to grab attention in high ambient noise areas.

For more information, contact: Wheelock Customer Service, Wheelock Inc., "The Signal Source," 273 Branchport Ave., Long Branch, NJ 07740, (201) 222-6880.

ALLIED, PRESTOLITE SPECIALTY WIRE PRODUCTS INTRODUCES 10-DAY DELIVERY SERVICE ON NEC 725, 760, AND 800 PLENUM CABLE PRODUCTS

In a move designed to provide faster service to the communication and construction industries, Allied, Prestolite Specialty Wire Products has announced

its new 10-day delivery service policy—applicable to the most widely specified configurations of UL-Approved NEC 725, 760, and 800 plenum cable products.

With an installed cost of up to 50 percent less than PVC wire with conduit, Prestolite plenum cable products are being used in new and retrofit applications at sites all over the U.S. Applications for NEC 725-2b Class II plenum cable include remote control signaling, public address systems, business interconnects, and security and fire alarm systems.

SIMPSON "8455" LINE LOOP TESTER NOW AVAILABLE FROM DISTRIBUTORS

Simpson Electric Company announced that its "8455" telephone industry line loop tester is now being sold through its worldwide network of distributors.

Simpson Electric Company, a member of the Katy Industries, Inc. Electrical Equipment and Products Group, is headquartered at 853 Dundee Ave., Elgin, IL 60120-3090; phone (312) 697-2260.

MELCO LINE CHECKER PROVIDES FOR QUICK AND EASY TESTING OF VOLTAGES AND WIRING AT THE STATION MODULAR CONNECTOR BLOCK

The M-630 Modular Wiring Checker provides a convenient method of testing voltages and wiring at the station modular connector block. A line test can easily be made in a few seconds without tools or batteries.

The compact design allows the M-630 to fit conveniently in a shirt pocket.

MONSTER CABLE INTRODUCES PROLINK™ SERIES 3 MICROPHONE CABLE

Monster Cable, manufacturer of professional and consumer high-end audio accessories, introduces ProLink™ Series 3, the third product in the ProLink Series of high resolution microphone cables. Ideal for a variety of in-studio applications, ProLink 3 delivers high performance at a low price utilizing an economical winding configuration.

ProLink Series 3 is available off the spool for custom lengths, or in pre-packaged 10-foot, 15-foot and 20-foot pairs terminated with ProLink XLR connectors.

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New Literature

FREE CATALOG OF HARD TO FIND TOOLS

A new catalog of precision tools is offered free by Jensen Tools Inc. Illustrated in full color, the 160-page catalog contains more than 3,000 tools of interest to field engineers, technicians, computer and telecommunication service persons, and electronic hobbyists.

Major categories covered are test equipment, soldering equipment, tweezers, screwdrivers, cutters, drafting supplies, power tools, computer accessories, circuit board equipment, and miscellaneous. Also included are many new products from Jensen and over 40 pages of service kits and tool cases for electronic specialists and technicians.

To obtain a free copy, write Jensen Tools Inc., 7815 S. 46th St., Phoenix, AZ 85040, or call (602) 968-6231.

FALL/WINTER EDITION OF RECONDITIONED TEST EQUIPMENT BROCHURE

Continental Resources, Inc., the pioneer of electronic test equipment rental, has released the fall/winter edition of *Transmitter*, a brochure featuring reconditioned test equipment at significant savings.

The six-page brochure carries products from industry leaders such as Hewlett-Packard, Honeywell, Tektronix and Fluke. Hundreds of different products are listed including; emulators, data analyzers, oscilloscopes, frequency synthesizers, and data recording equipment.

To obtain a free copy of the *Transmitter* brochure or to find the office nearest you, call or write to Continental Resources, Inc., Electronic Instrument Division, 175 Middlesex Turnpike, Bedford, MA 01730, (617) 275-0850.

9C CATALOGUE

This all-new catalogue brings together the complete line of desktop consoles, keyboard consoles, small cases, plastic and diecast boxes previously featured in other Hammond catalogues. Also featured are new miniature cases and high profile plastic cases. All products in this new catalogue have complete, detailed dimensional information.

For further information, contact Hammond Manufacturing Company Inc., 1690 Walden Ave., Buffalo, NY 14225, or phone (716) 894-5710.

TELEX ANNOUNCES WIRELESS MICROPHONE SEMINAR AVAILABLE ON TAPE

Telex Communications, Inc. announces that cassette tapes and outlines of a seminar on wireless microphones, presented at the 1984 NCSA Show by Mr. Jerry B. Wade, Telex sales manager of Professional Microphone Products, are now available free of charge.

To obtain seminar materials and more information about the Telex Wireless Microphone System, call or write: Telex Professional Audio Department, Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, MN 55420, or phone (800) 328-3771, or (612) 887-5550 in Minnesota.

ELECTRONICS AND INDUSTRIAL WIRE & CABLE BROCHURE

A 4-page, 5-color reference brochure, illustrating and listing available products and data-reference, is available on request from OLFLEX® Wire & Cable, Inc., international manufacturers of electrical and electronic cable, connectors, and accessories.

The new brochure covers data on Audio, Broadcast, Coax, Communication, Computer, Crane, Data, Flat Fes-ton, Flat Ribbon, High Temperature, Instrumentation, Pendant, Plenum, Power, and Robotics cables.

For the brochure or more information, write: OLFLEX Wire & Cable, Inc., Dept A55, 30 Plymouth Street, Fairfield, NJ 07006, or call toll free 1-800-225-1336 (in New Jersey call 201-575-1101).

NEW CATALOG FEATURES MILITARY AND SEVERE ENVIRONMENTAL ELECTRO-ACOUSTICAL PRODUCTS

A new 4-page catalog from Accusonic Systems Corp. features a total of 43 severe environment dynamic microphones, loudspeakers, headphones and speaker assemblies. Most of the products are designed to meet or exceed U.S. military specifications.

Additional technical specifications are presented in catalog ASC-92, available free upon request from Accusonic Systems Corp., subsidiary of Designatronics, Inc., 12 Kulick Road, Fairfield, NJ 07006.

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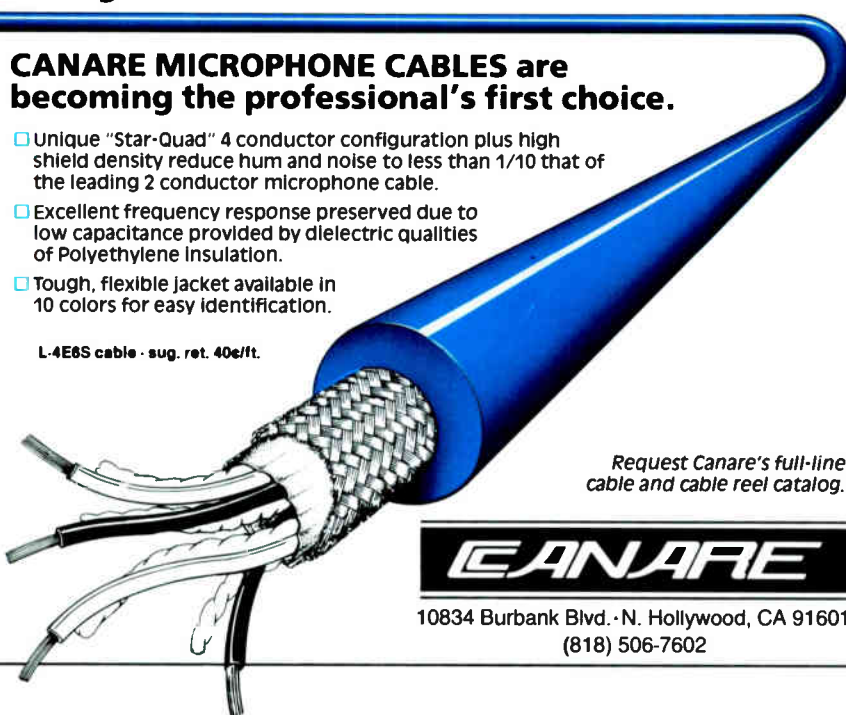
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