

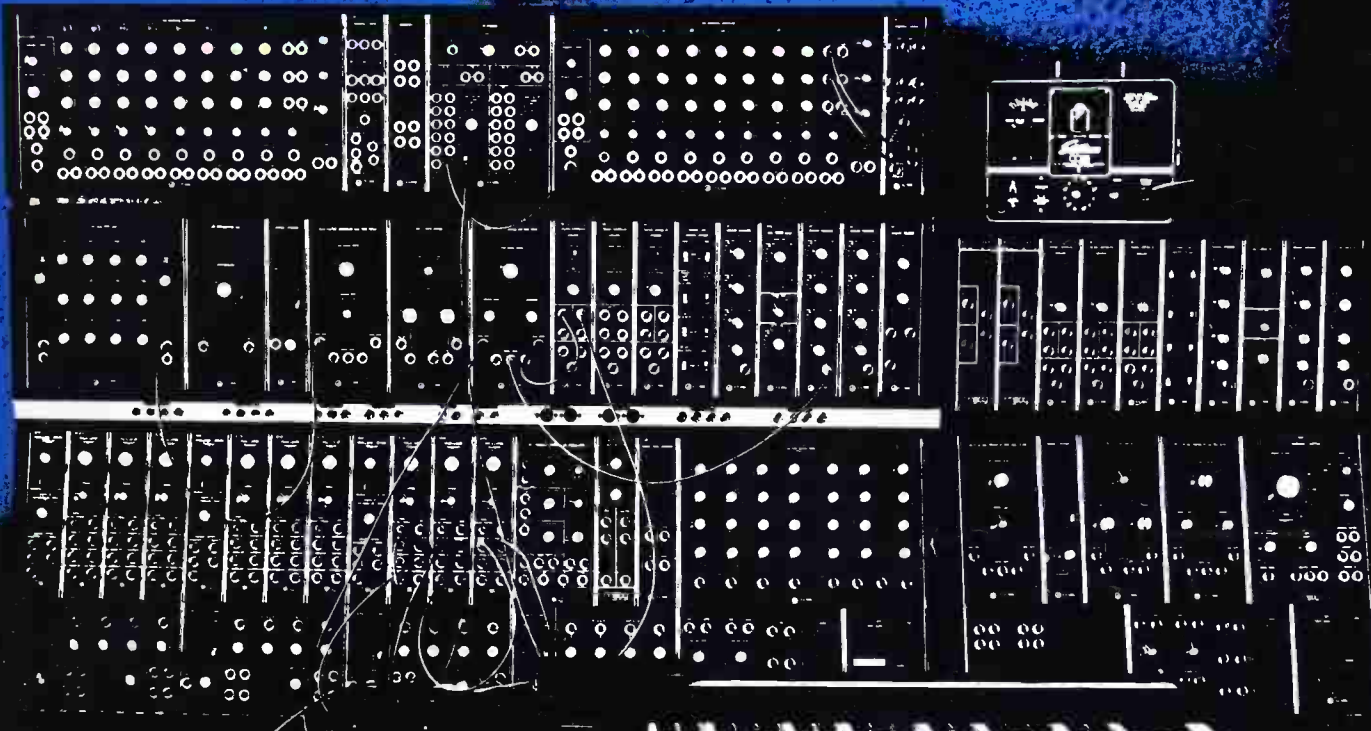
FEBRUARY 1974

BME

BROADCAST MANAGEMENT/ENGINEERING

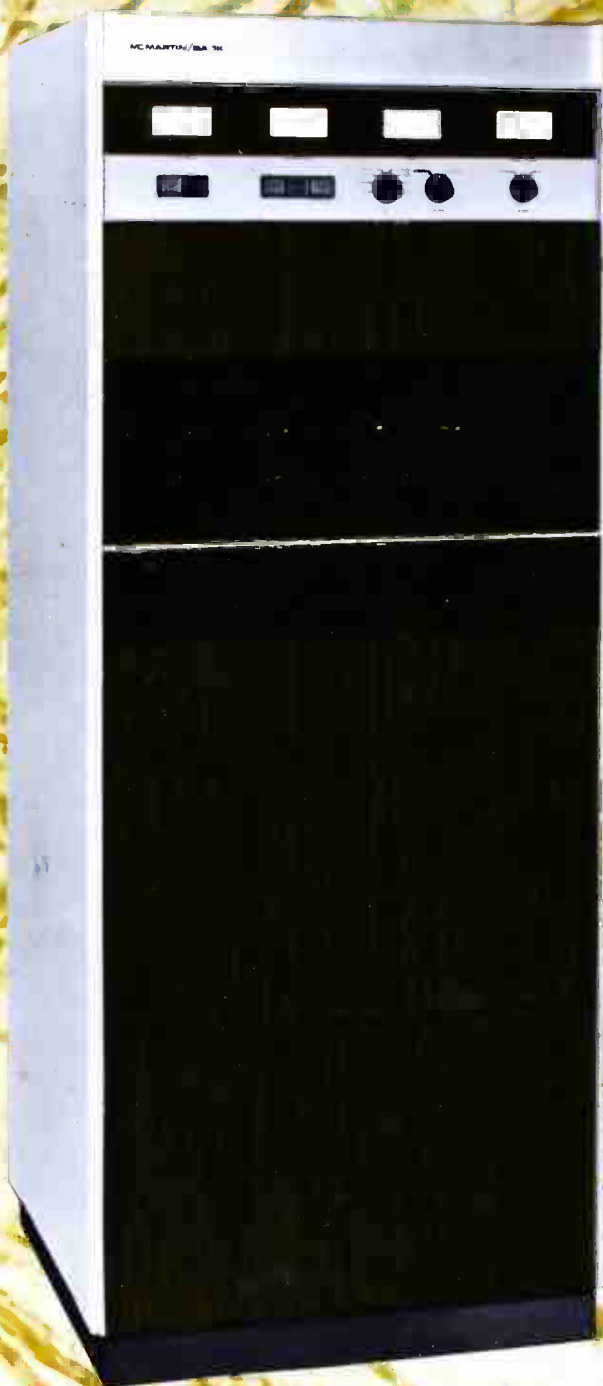
CABLE MANAGEMENT ENGINEERING
CME
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PR



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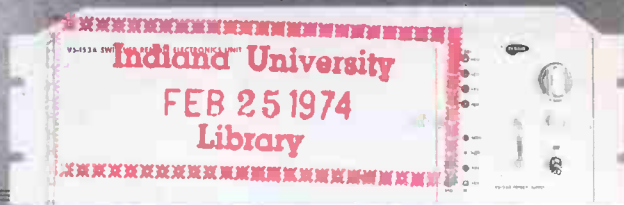
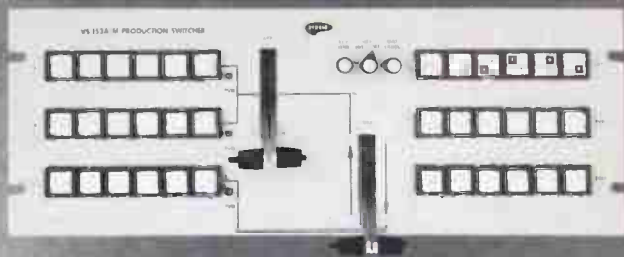
McMartin Industries, Inc. 4500 South 76th Street, Omaha, Nebraska 68127 (402) 331-2000

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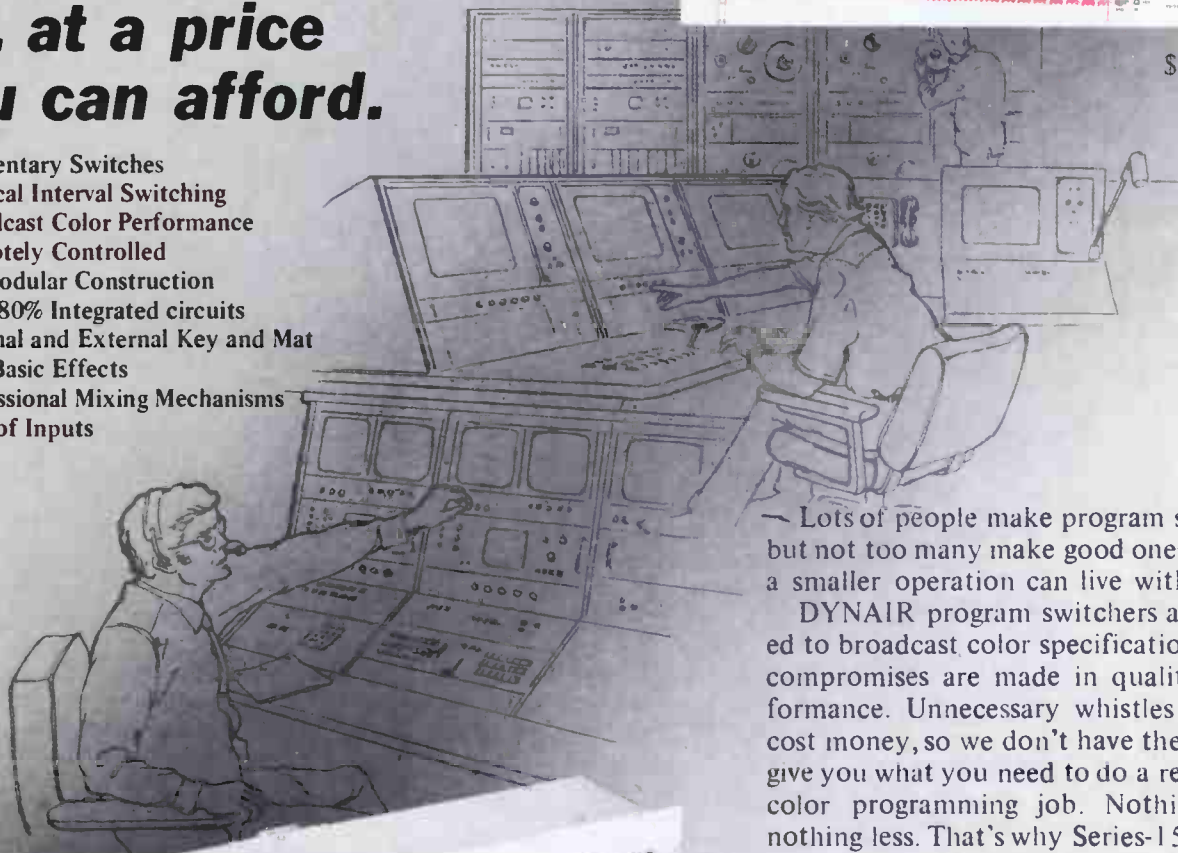
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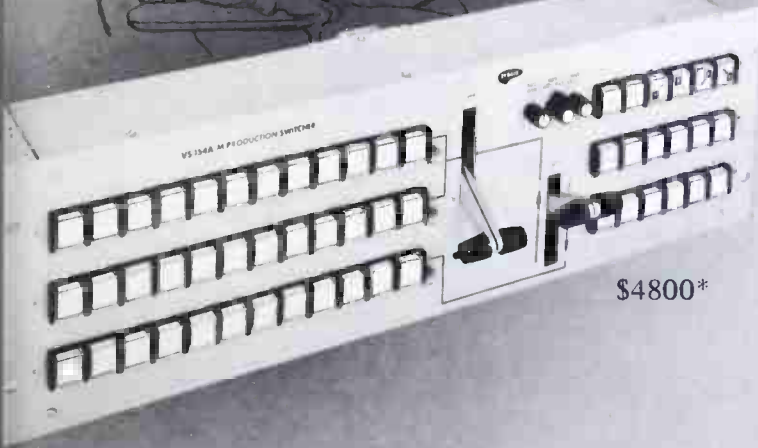
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PHONE: 714-582-9211



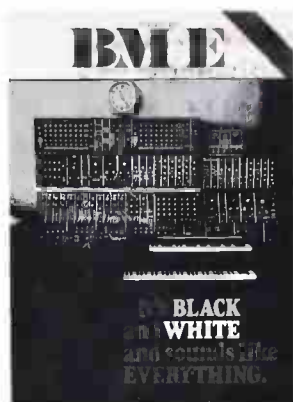
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Momentary switches are featured in DYNAIR's new VS-153A-M and VS-154A-M Program Switchers. And the VS-154A-M has 17 inputs... great for special applications with lots of sources. Also, you can replace your existing mechanically interlocked VS-153A control panel with the momentary version for only \$1500!

*includes remote control unit

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FEBRUARY 1974/VOLUME 10/NUMBER 2



Synthesizers supply a new universe of sound, besides putting the old one at your fingertips. See page 38.

**BROADBAND
INFORMATION SERVICES, INC.**
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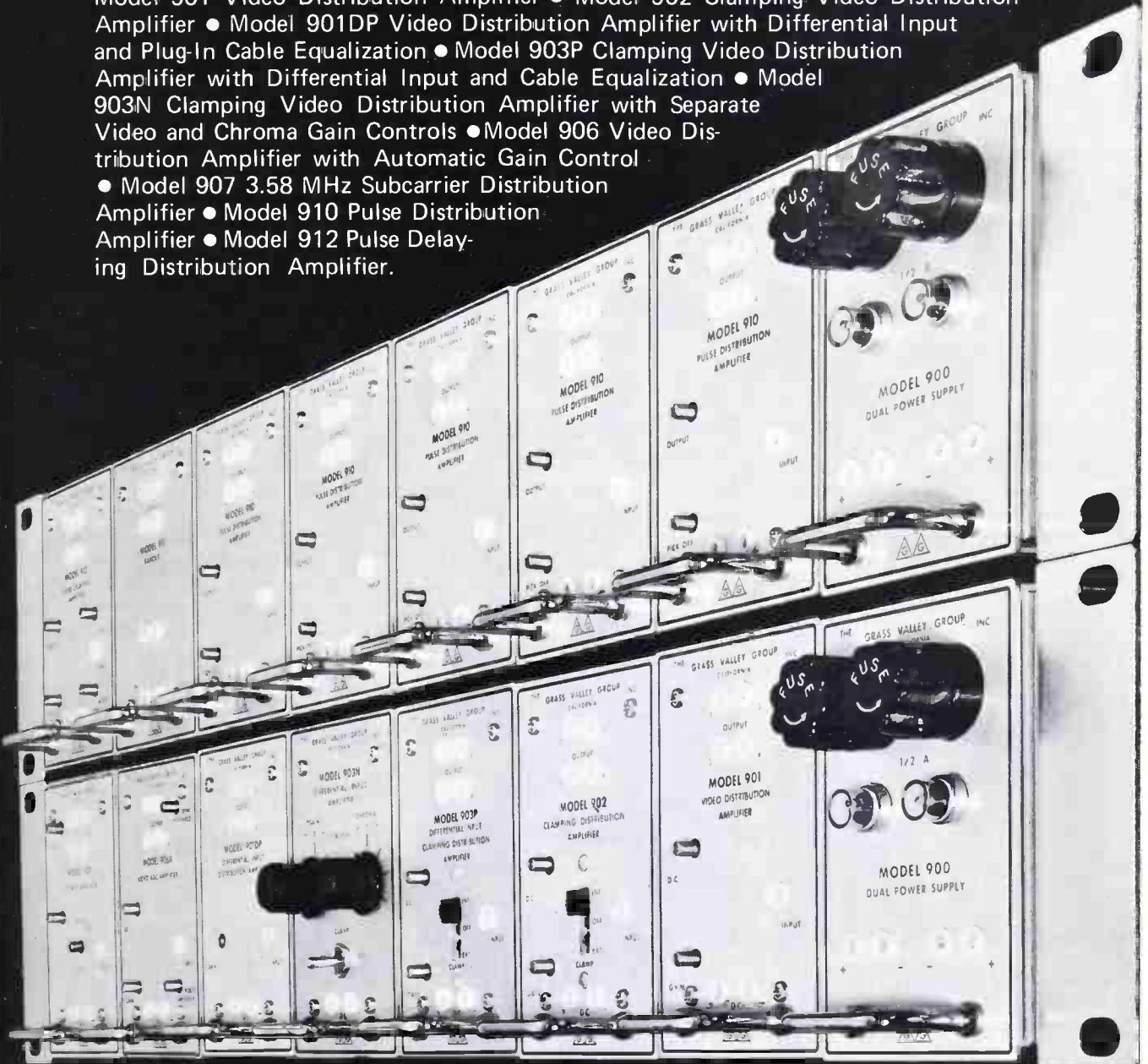


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BROADCAST INDUSTRY NEWS

NAB Attacks "Percentages," Offers Alternatives

Continued, "unalterable" opposition to the use of program percentages in license renewal decisions by the FCC was expressed in year-end comments by John B. Summers, general counsel of the National Association of Broadcasters. "We believe the effect of such action will be to plunge the Commission further into programming judgments," he said in part. But Mr. Summers added that, with the FCC apparently disposed to adopt some percentage system, the NAB recommends that all non-entertainment programming from 6 a.m. to midnight should be in one percentage figure, with no breakdown into news, public service, etc. Further, the statement said, such a standard should be for television only, with percentage guidelines never applied to radio.

NAB Hires PR Firm For Anti-Pay Fight

The National Association of Broadcasters announced that they have retained the public relations firm of Hill and Knowlton to aid in the campaign against pay television. Hill and Knowlton is one of the largest and most successful firms in public relations work, with clients mostly among the large industries. The pay-TV decision will, of course, come from the FCC, but public opinion will have great weight, influencing the FCC directly and through members of Congress.

Geller Suggests New "Fairness" Rules

The FCC should get out of "stopwatching" on programs to check compliance with the Fairness Doctrine,

says Henry Geller in a report issued near the end of the year by the Rand Corporation. Geller, former chief counsel of the FCC, and now a researcher for Rand, prepared the report under a grant from the Ford Foundation. He says that "fairness" should be judged at license renewal time, not on an issue-per-issue basis as is now the practice, and should give the licensee wide latitude on the specifics of achieving a reasonable balance on controversial topics. Other Geller recommendations: continue to issue prompt rulings on personal attacks and political broadcasts, since Congress wants political issues settled during the relevant election period; require a licensee to show *in general* that he has given contrasting viewpoints air time; ask the licensee to list and illustrate annually the ten local and national issues that he gave most coverage to during the year; adopt time percentage guidelines for television (but not radio) on programming on public issues; make the complaint procedure less burdensome, though fair, to the complainant.

Goodbye and Hello, Nick Johnson

As might have been predicted, Nicholas Johnson did not end his career as critic and spur to the broadcast industry when he resigned from the FCC on December 5. Three weeks later came the announcement that he would be chairman of the National Citizens' Committee for Broadcasting, a consumer-oriented group which has been reorganized with new financing and new direction. President will be Albert Kramer, a lawyer specializing in broadcasting issues. The consumer, the industry, and the government should all count on hearing from NCCB.

Needed: Support for Law Putting Engineer on FCC

Broadcasters may want to get in touch with their Congressmen and Senators to support a proposed law which would make it mandatory to have at least one electrical engineer as a Commissioner of the FCC. Introduced last spring by Congressman Staggers, the bill, HR-7667, recognizes the increas-

continued on page 8

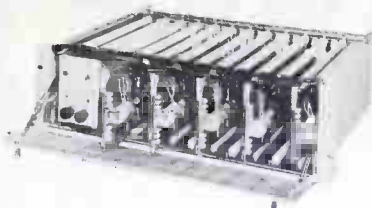
New Pay-Cable Home Terminals

K'Son's new Program Selector, upper left, is combo converter and discrete addressable unit. Oak, upper right, has a new series of decoders including the economy unit shown. Optical Systems, lower left, has abandoned the punched card in favor of six keys on top of unit.

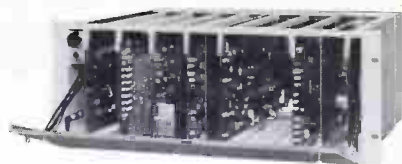
BROADCAST EQUIPMENT SHOWCASE

For more than 20 years, Telemet has built precision products for the broadcast industry. Products designed for long life. To function with the ultimate of efficiency.

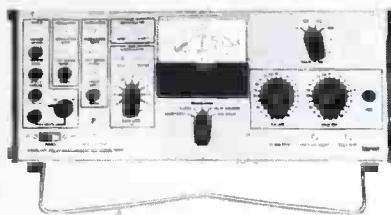
That's why each Telemet product undergoes extensive development and final field testing before it is available to the industry. The result: a long and growing list of satisfied customers.



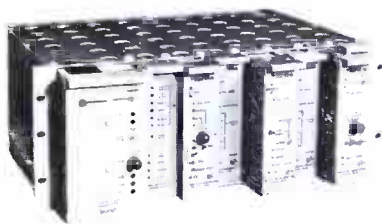
**Audio
DAs**



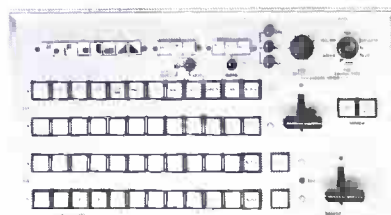
**VIT
Packages**



**Group Delay
Test Sets**



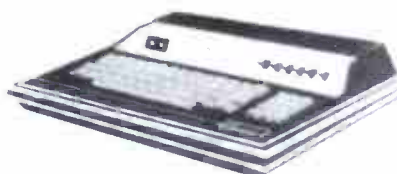
**Video Test
Generators**



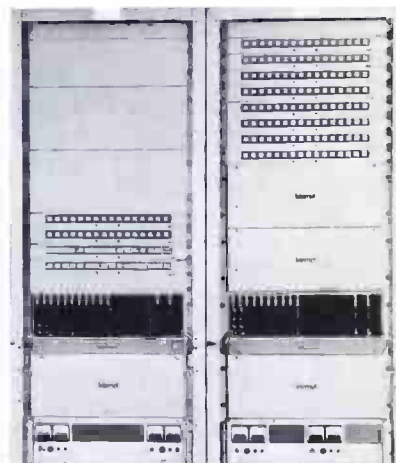
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Your best guide to more in '74...



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It's the brand new 1974 Product Guide to RCA Industrial Tubes available now — free of charge — from your RCA Industrial Tube Distributor on whom you can rely for more service, more product, more information than ever before.

Prepared to help you make the right decisions in selecting product, the newly revised and up-dated 1974 Guide is more comprehensive than last year's edition. It not only covers some 800 commercial types — camera, display, image, industrial receiving, microwave, photo, and power tubes — but shows how they can replace nearly 2,300 industry types. (And for extra measure, the new Guide includes a feature section on "The Modernized Metric System," giving prefixes applicable to International System of Units, common equivalents and conversions, and temperature conversions.)

Ask your RCA Industrial Tube Distributor today for your free copy of the new TPG-200J. Or, to order your copy of this Guide direct from RCA, send your request and 35¢ to: RCA, Commercial Engineering, Section 21B/G7, Harrison, N.J. 07029.

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NEWS

ing technical complexity of the decisions the FCC must make and the necessity of having high technical competence available among the Commissioners. At press time, no date had been set for final consideration of the bill.

Small Stations Need More, Not Less, Control: Parker

Many small and medium-sized radio stations need *more* regulation in the public interest, not the lessening of control now widely discussed, according to Dr. Everett C. Parker, the leading St. George of broadcast consumerist action in this country. In an address to the Federal Communications Bar Association, Dr. Parker said that many such stations are hotbeds of extremist propaganda, pounding on single points of view usually of an ultra-right-wing character, and often promoting anti-Semitism, racism, and distrust of American institutions such as the churches and the government. Dr. Parker laid these faults, plus advertising excesses, particularly on ethnically-oriented stations and those in towns with no newspaper and no broadcast competition.

Second-Tier Communications To Hit \$3 Billion: Report

"Second-tier" communications firms, those supplying specialized terminal equipment and software for data and voice communication to business and industry, will increase revenue from about \$660 million in 1973 to nearly \$3 billion by 1983, according to a report issued by Frost and Sullivan, New York market research firm. The second-tier companies, which "piggyback" on the common carriers for primary communications channels, should buy over \$400 million of hardware—computers, terminals, multiplexers, etc.—by 1983, the report predicts. Explosive growth can be seen, says the report, in the fact that applications to the FCC for the service rose from one (the first) in January 1973, to over 200 by the end of the year.

Cable Net For Sponsored Films Is Set Up

A series of sponsored-film programs on video cassettes will be distributed to a network of cable systems around the country by Modern Talking Picture Service, New York, which for many years has distributed sponsored films to theatres, schools, industries, etc.

continued on page 10

SAVE \$490 ON THIS NEW \$490 STANDARD REFERENCE TAPE

When you buy 12 hours (or equivalents) of Ampex Series 175 Video Tape

This is a reference tape that speeds and simplifies your day.

Use it for positioning the vacuum guide. For indication of frequency response characteristics and adjustment of the gain of the reproduction system. For comparison of carrier frequencies of the video recording system. For verification of level and phase of the control track recording system. For adjustment of audio gain.

It's brand new and it's yours free when you buy 12 hours (or equivalents) of Ampex Series 175 Video Tape.



Costs \$490 but it's FREE

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Have your representative call with my Standard Reference Tape. I'll have my P.O. ready.

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Extras like this, and others, make it important for you to take advantage of this offer now. And that's why we'll give you the \$490 reference tape when you do.

Fill out and mail the coupon today. Offer expires March 15, 1974.

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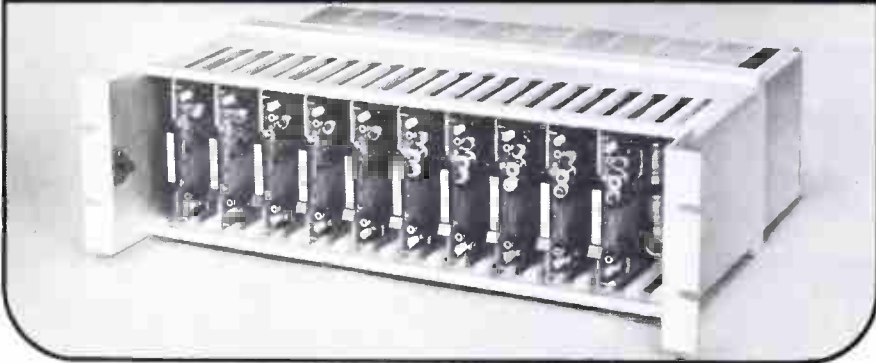
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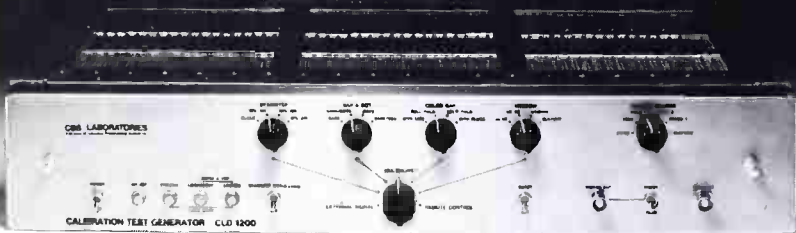


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The CLD-1200's wide range of test signals far exceed industry standards. All test signals are available simultaneously!

The CLD-1200 can even be used as a standard sync generator. From CBS Laboratories, of course.

CBS LABORATORIES

A Division of Columbia Broadcasting System, Inc.
 227 High Ridge Road, Stamford, Connecticut 06905

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NEWS

Calling the plan a "new distribution opportunity for communications executives," Carl Lenz, president, said that individual films would be combined into one-hour shows for continuity, in three series: one on home, garden, family living and consumerism; one on environment, health, education, and related topics; and one on travel and sports.

CRT Display Service Added by IDC

An on-line CRT display which shows results in nearly 50 markets as fast as they are gathered is a new service for clients, says an announcement from IDC Services, Inc. The service will be used to turn up problems in the markets, according to IDC, which can be analyzed and remedied with the aid of IDC's weekly hard-copy reports.

Report Assays Video Products, Markets of Future

Advances in solid-state technology, greatly reducing the cost of video products such as cameras, added to new transmission systems, will probably convert telecommunications to a resource of abundance in a few years, according to a detailed look-ahead made for the U.S. Department of Commerce by the Denver Research Institute. Among the predictions of the voluminous study of innovation and market potentials in video, is a three-to eight-year period for full development of video home devices, with sales of a million player units per year by 1980. The total video products market should rise from the present \$3 billion to about \$7 billion a year in 1985. Other developments foreseen are: Commercial TV stations to go from about 900 to about 1100, educational from 200 to nearly 400; great expansion in use of CCTV; domestic satellites operational in the late 1970s, for both network and direct broadcasts; home terminals to shift broadband emphasis to education and data retrieval; high-resolution television as a potential commercial development (the technology is all here). The "Technological Innovations in Video," complete report, is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va.

Continental Will Build Two-Megawatt Yugo Station

A two-million-watt medium-wave broadcast transmitter, said to be the most powerful of its kind in the world, will be built for the Yugoslavian Gov-

continued on page 15

New Scoopic 16mm cameras and lenses. From Canon.

When you're shooting news and documentary footage on location, surprises are no fun. You've got to be ready for anything, with equipment as tough—and as talented—as you are.

Scoopic cameras and lenses are exceptionally good solutions to the problem. They are lightweight and unusually versatile. They are designed with human engineering in mind, so they handle easily and quite naturally. Perhaps even more important, for equipment of such precision, Canon Scoopic cameras and lenses are utterly dependable in demanding everyday use.

Nothing will prove to you how good Scoopic 16mm equipment is as well as the equipment itself. See your local authorized Canon dealer for a demonstration. Or write directly to Canon for more information today.

SCOOPIC 16M

This is the professional 16mm camera that's perfect for fast-moving news and documentary work. New, brighter-than-ever viewfinder also gives you TV safe-frame markings, T-stop scale, and under- and over-exposure warnings. Exposure control is automatic or manual, at your option. Filming speeds range from 16 to 64 frames per second, plus single frame. Battery power from 12-volt rechargeable NiCd takes you through 1600 feet of film at 24 fps on a single charge. New f:1.8 Canon Macro Zoom lens has 6:1 ratio (12.5 to 75mm) and built-in macro capability, for focusing from as near as 3½ inches from the front of the lens.

SOUND SCOOPIC 200SE

All the compact mobility and handling ease of the 16M, with sound, too! Automatic gain control (AGC) assures no volume



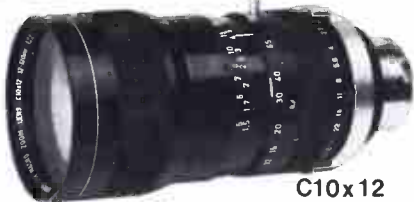
Sound Scoopic 200SE

Scoopic 16M

overloads even under extreme conditions. A special rotating mirror transmits brilliantly bright images to both film plane and viewfinder. Zoom lens has 6:1 ratio and allows filters to be inserted through external filter slot for faster changes with no screwing around. Registration pin for perfect framing, with TV safe-frame markings visible in finder and auto/manual exposure control.

C10x12 MACRO ZOOM LENS

Canon's exclusive ability to manufacture fluorite and incorporate it into lenses of superb quality and light weight is seen at its best in this phenomenal lens. Zooms from 12 to 120mm for a 10:1 ratio, with chromatic aberration reduced to near



C10x12

theoretical limits. Macro focusing begins at a phenomenal .04" from lens front. Use of macro ring and focusing ring plus zoom allows you to produce effects heretofore

possible only in the lab. Fast f:2.2 maximum aperture, with optical performance that rivals prime lenses.

C6x14 ZOOM LENS

This is the first lens ever to be designed specifically for the new Super 16 format. Upholds all the famous Canon standards for lens quality, with fast f:2 max. aperture,



C6x14

unsurpassed sharpness, contrast, and color accuracy. Zooms from 14 to 84mm for a 6:1 ratio. Well balanced and light weight, the C6x14 is an ideal lens for a wide variety of location assignments.

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The SS 7700 series of television production and recording consoles is a logical extension to the McCurdy package approach to engineered systems.

Pre-engineering of the basic design within our production facility, assists the customer to easily determine from his requirements, both the general mechanical and electrical layout for his particular application. The design criteria of the SS 7700 series basic format allows for easy expansion to a maximum of 26 functional channels, which may consist of almost any mix of input channels, submasters and masters. McCurdy manufactured plug-in modules may be used in any or all of the functional channels. Space is available within the standard unit, for applications requiring complex fold-back, echo-send and monitor mix-down functions. An optional companion housing, styled to the basic console, is also available to accommodate the patching required for some applications. Therefore, the flexibility accorded the basic design by these features, allows the total panel layout to be human-engineered for maximum versatility and efficiency.

SS 7700

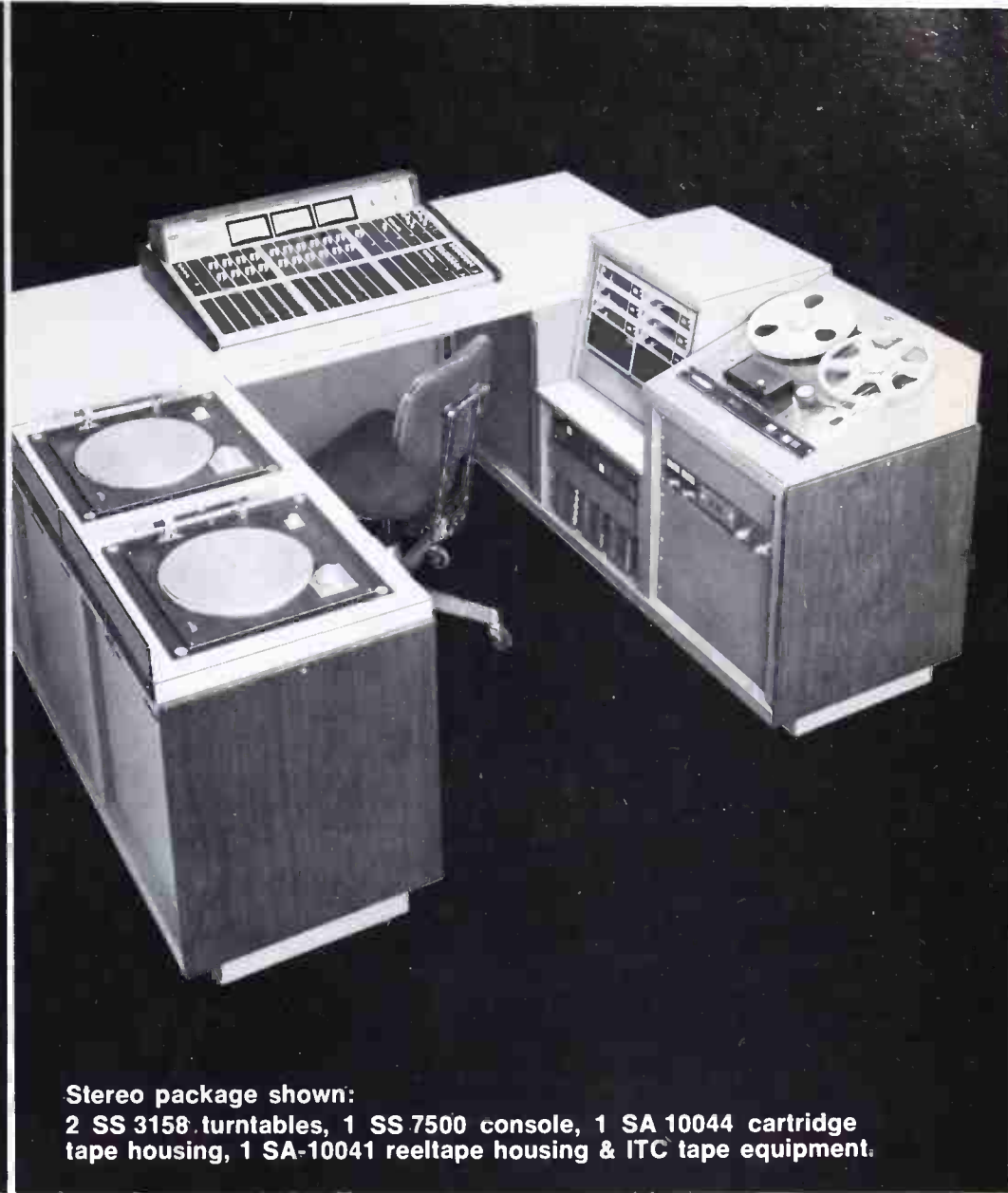
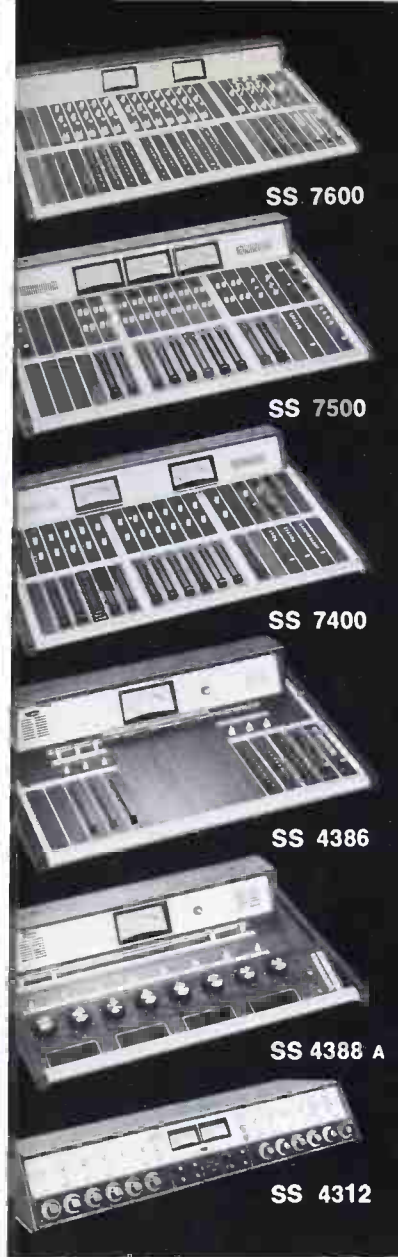


Functions available within each channel include:

Echo-sends	Straight-line faders
Sensitivity	Solo and Cue busses
Phase reversal	Sub or Master Assign pushbuttons.

A full range of auxiliary functions, such as remote controls, are available to ensure that the total design is completely integrated to the user's requirements.

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**Stereo package shown:
 2 SS 3158 turntables, 1 SS 7500 console, 1 SA 10044 cartridge
 tape housing, 1 SA-10041 reeltape housing & ITC tape equipment.**

Here's the McCurdy Package...with options

The McCurdy package approach to the engineering of a system allows the user to easily determine the best selection of standard components to fulfill his requirements.

All aspects of the broadcast function from news booth to full TV or record production can be met with the minimum of interface between units. A full range of furniture allows for the integration for each part of the system into the most convenient working package.

Optional components including disc reproducers, reel tape housings and cartridge tape housings designed for instant operational accessibility, combine with any of the consoles shown to fulfill the basic needs of the broadcaster.

Each system is fully pretested as a total unit and will meet or exceed all broadcast specifications.

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Because they know our CP-16 and CP-16/A cameras *inside out*.

They know that our cameras—no matter how rugged and reliable—will eventually end up on their workbench. For normal service. And sometimes, for major repair due to abnormal field damage.

And so, more than anyone else, they are in a position to appreciate the painstaking care Cinema Products design engineers have given to making our cameras easy to maintain, service and repair.

They most appreciate the fact that the entire CP-16 or CP-16/A camera mechanism can be removed from the camera body in a matter of minutes, giving the serviceman easy access to all mechanical and electronic components. They

also appreciate the fact that the entire CP-16 drive motor system can be easily replaced in less than five minutes! And the thoughtful "little" touches—like the Bristol knob wrenches tucked away inside our Crystasound amplifiers and auxiliary mixers to aid in field servicing. Masters of their craft, they appreciate the workmanship, the meticulous care and attention to detail in assembly, the quality materials and components that go into the manufacturing of the CP-16 and CP-16/A cameras.

More than anyone else, servicemen can appreciate why *cameramen* also love our guts!

Because our cameras perform so reliably. Because minor adjustments and repairs can be made rapidly in the field. Because we've made certain that our dealers and authorized service centers—located throughout the USA and all over the world—are well stocked with critical replacement parts. So that when major repair is required, it is so much easier and quicker to get a CP-16 or CP-16/A back into good working order. And back into the hands of the TV-news-film cameraman. Fast. So the cameraman can get back to filming the action.



**Cameramen
Love Our
Guts Too!**

CP-16/A Camera
shown with new PLC-4
lightweight 400 ft. magazine.

cinema E products
CORPORATION

Technology in the Service of Creativity

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telephone: (213) 478-0711 ■ Telex: 69-1339 ■ Cable: Cinedevco

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**Authorized
CP-16 Dealers
and
Service
Centers**



**North American
LISTING**

CALIFORNIA

D/S Alan Gordon Enterprises, Inc.
5362 N. Cahuenga Blvd.
North Hollywood, Ca. 91601
S Adolph Gasser Inc.
5733 Geary Blvd.
San Francisco, Ca. 94121
S San Diego Camera Exchange
1071 Sixth Ave.
San Diego, Ca. 92101

COLORADO

S Stan Phillips & Associates/
Camera Service
2245 W. 30th Avenue
Denver, Colorado 80211

DISTRICT OF COLUMBIA

D/S Brenner Cine-Sound
5215 Wisconsin Ave., N.W.
Washington, D.C. 20015

FLORIDA

D/S Image Devices, Inc.
811 N.W. 111th St.
Miami, Fla. 33168

GEORGIA

D/S Atlanta Film Equipment Rentals
1848 Briarwood Rd., N.E.
Atlanta, Ga. 30329

HAWAII

S Pacific Instrumentation
5388 Papai Street
Honolulu, Hawaii 96821

ILLINOIS

D/S Victor Duncan, Inc.
676 St. Clair St.
Chicago, Ill. 60611

LOUISIANA

D/S Pan American Films
822 N. Rampart St.
New Orleans, La. 70116

MICHIGAN

D/S Victor Duncan, Inc.
11043 Gratiot Ave.
Detroit, Mich. 48213

MINNESOTA

D/S Galaxy Film Service
1511 Hennepin Ave.
Minneapolis, Minn. 55403

NEW YORK

D/S The Camera Mart
456 W. 55th St.
New York, N.Y. 10019

NORTH CAROLINA

D/S Standard Theatre Supply Co.
125 Higgins St.
Greensboro, N.C. 27420

TENNESSEE

D/S Motion Picture Laboratories, Inc.
781 S. Main St.
Memphis, Tenn. 38102

TEXAS

D/S Victor Duncan, Inc.
2659 Fondren Ave.
Dallas, Texas 75206

UTAH

D/S Stockdale & Co., Inc.
200 E. First South
Salt Lake City, Utah 84111

WASHINGTON

D/S Glazer's Camera Supply
1923 Third Ave.
Seattle, Washington 98101

Phototronics

S 223 West Lake North
Seattle, Washington 98109

CANADA

D/S Alex L. Clark Limited
3751 Bloor Street West
Islington, Ontario M9A 1A2
D/S Branches:
1070 Bleury Street
Montreal 128, Quebec
D/S 7104 Hunterwood Rd., N.W.
Calgary 51, Alberta

MEXICO

D/S Alan Gordon Enterprises, Inc.
c/o R.E.C.E.S.A.
Rio Amazona 85
Mexico 5 D.F.

D — Dealer S — Service D/S — Dealer & Service

cinema E products
CORPORATION

Listing as of: Dec. 1, 1973

NEWS

ernment broadcast agency by Continental Electronics, Dallas manufacturer. The Continental announcement says the order was won against stiff competition from Brown-Boveri of Switzerland and Thomson-CSF of France.

**NARB To Review
Energy Crisis Ads**

Advertisements related to the energy crisis which have been criticized by Sen. McIntyre (D-N.H.) and others will be reviewed by a special panel of the National Advertising Review Board, the ad industry self-regulation agency. Edwin Etherington, chairman of NARB, said he had asked a panel already in existence to look into the disputed ads and make recommendations, if they seem required. The NARB purpose is not, Mr. Etherington said, to develop an ad policy on energy, but to foster truth in ads and heighten the awareness of advertisers of practices that may be contrary to the public interest.

Business Briefs

Boles Associates, Boston foreign-trade firm, has set up a service in Japan for U.S. and European firms that want to buy Japanese products . . . Time-Life Video has ready a multi-media course, "Communicating Successfully," with lessons on many phases of speech making for executives; professional actors, including Robert Morse, illustrate the procedures, and complete workbooks are provided.

McMartin Industries has completed the move to its new, larger headquarters at 4600 S. 76th St., Omaha, Neb., with all divisions under one roof . . . Among programs announced by Great Plains National were: a color geography series, of 15 20-minute lessons, "Understanding Our World;" "Career Awareness," a 21-program series showing real people in various jobs; and a science series for first grade, "Two For Tomorrow," using a couple from outer space, Maser and Laser, who explore our world.

Jerrold Electronics Corp. merged their Systems Design Dept. into the Applications Engineering Dept., aiming for broad-based response to customer needs . . . GTE Sylvania has underway a 225-mile cable system for Pasadena CATV, in Pasadena, Texas, which will have 30 channels when complete in early 1974 . . . U.S. Council of the International Chamber of Commerce, New York, is operating the "Carnet" system, under which technicians and salesmen taking equipment

continued on page 16



Engineer Brian Morgan gets ready for on-air disc playback.

**Stanton.
Everywhere
you turn.**

Hartford's "Top 40" WDRG AM/FM (serving the community for a half century!) relies on Stanton cartridges in a variety of operations.

Stanton's Model 681EE cartridge is their choice for auditioning original recordings and making transfers. Its incredible low mass moving magnetic system (1/5 to 1/10 that of ordinary pickups) and its 10Hz to 20,000Hz response, contribute to its exceptional audio quality not only in professional but in home stereo systems, as well.

For on-the-air use, Stanton 500 Series cartridges are the choice for their ability to withstand rugged handling without sacrifice of audio quality, thus assuring high quality sound with minimum maintenance.

Write for literature to Stanton Magnetics, Inc., Terminal Drive, Plainview, N.Y. 11803.

All Stanton cartridges are designed for use with all 2 and 4 channel matrix derived compatible systems.



STANTON

This ad appeared in:
Modern Hi Fi & Stereo Guide
Circle 113 on Reader Service Card

THE NEW STANDARD

COVERS AM BAND PLUS HARMONICS TO 5 MHz



The Model FIM-41 Field Strength Meter has many more features —

- Measures Harmonics to -80 dB
- High Adjacent Channel Rejection
- Ganged Oscillator/Receiver Tuning
- Stable Operation over wide Temperature Range
- Low Battery Drain Circuits
- Front Panel Speaker
- Large illuminated Meter and Tuning Dial
- Indicates field strength accurately down to 10 μ volts/M
- RF input jack for tuned voltmeter applications

CONTACT US NOW FOR COMPLETE DETAILS
ON OUR LINE OF FIELD STRENGTH METERS

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932 PHILADELPHIA AVE.
SILVER SPRING, MARYLAND 20910 (301) 589-3125

Circle 114 on Reader Service Card

Change
Sound to
Silence
with a

TABERASER



This rugged, heavy duty bulk tape eraser wipes sound from all magnetic tapes, cartridges, cassettes and magnetic film stock; handling up to 2".

It erases with minimum residual noise because the field automatically diminishes at the end of each 30-second cycle.

A thermal control and blower keeps the unit below 71° C.

Priced at only \$395.00.

For the distributor in your area—Call or write:

TABER Manufacturing & Engineering Company
2081 Edison Ave. • San Leandro, Ca. 94577 • (415) 635-3831

Circle 115 on Reader Service Card

NEWS

abroad, not for sale, can bypass most customs procedures.

Production House, San Francisco, has released three new 25-minute documentaries on dieting, on drug abuse, and on Kung Fu, Chinese defense art . . . **Home Box Office** opened a pay-TV channel with Pioneer Cablevision Corp. for movies, sports, and special events on Pioneer's systems in Endicott, Vestal, and other communities in the Binghamton, N.Y., area.

Myers-Oak has underway the Ankeny section of Hawkeye Cablevision's Des Moines system . . . **Tape Reproductions Corp.**, Lenox, Mass., will copy a personal verbal message on a tape cassette and send cassette copies to a list of addressees, as an improvement on writing identical letters . . . **Scientific-Atlanta** is building a 40-mile cable system for CATV West to serve Blackfoot, Idaho.

Admiral Corp., a leading TV receiver maker, merged with Rockwell International Corp. . . . **Guy Gannett Broadcasting Services**, owners of WINZ-AM in Miami, bought WOCN-FM in Miami and will operate it as WINZ-FM . . . **Dyma Engineering** announced they had apparently won a suit for unpaid commissions of \$68,000 against C-Cor Electronics when the New Mexico State Supreme Court refused to upset a pro-Dyma ruling of a lower court.

Collins Radio Co. shareholders approved the merger of that company into Rockwell International Corp. . . . "**Carrascolendas**," bi-lingual children's program produced by KRLN-TV, San Antonio, added to its long list of prizes by winning the UNICEF award in the Japan International Educational Program Contest, in Tokyo, the first American program ever to win . . . **Marconi Electronics** opened a new broadcast sales office at 1309 Stone Mill Court, Stone Mountain, Ga.

Broadcast Computer Services signed WPIX, New York; WTCG, Atlanta; and XETV, San Diego, for their local-mini, central-master computerized accounting service; WPIX will also get input for automatic switching.

Projection Systems, Wayne, N.J., is a new firm that will market the TV projection equipment formerly sold under the Amphicon brand . . . **Data Communications Interface** is a convention and exhibit of data communications products, slated for Dallas March 25 to 27, 1974: info. W.A. Saxton, 160 Speen St., Framingham, Mass.

RCA Broadcast Systems announced price increases of up to 12½% on some radio and television products, effective

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ECONOMICS— THE KEY TO THE FUTURE OF TELEVISION BROADCASTING



**A pre-NAB
Message to the
Broadcast Industry From
Michael A. Moscarello,
President and
Chief Executive Officer
International Video
Corporation**

The opening of the NAB exhibit halls in Houston on March 17 will signal more than just a change in the approach to the annual convention.

It will also represent the beginning of a new era in the way broadcasters think and in their buying habits.

This new approach is not unrelated to changing times and developments in our economy during the past year. Competitive forces now have made price *plus* the performance of a product a greater consideration than performance regardless of price.

Further, with power and petroleum by-product shortages facing us, conservation takes its place along side price and performance as among the major factors a broadcaster examines before purchasing new equipment.

Certainly while not anticipating these problems in our economy we at IVC have been working on product developments that capitalize on new and unique approaches to broadcast television recording and that incorporate great operating cost savings for the user.

Our two major new offerings at NAB will be the IVC-9000 Broadcast Videotape Recorder and the IVC-7000 Studio Camera, both of which combine operating economies and low initial investment with dramatic new performance breakthroughs.

IVC-9000 This new recorder is the most significant development in broadcast television recording since the quad format first came on to the scene 17 years ago. It is without question the finest television production machine ever devised. It will produce a release master that adds a new dimension to video

tape. Yet using two-inch wide tape in a new segmented helical scan format it uses virtually one-half the tape that quads do. Its head life is guaranteed for 1500 hours. When you order the 9000 it will cost you approximately two-thirds as much as quad. The IVC-9000, by the way, is not an engineering dream. Standard production machines will be in place and operating in users' hands before NAB.

IVC-7000 IVC-500A cameras have been the most widely used medium-priced cameras in the broadcast world. Over 200 have been placed in commercial broadcast stations alone in the past two years. At NAB we'll unveil a dramatically new studio camera, the IVC-7000, that will eclipse the performance of models offered by manufacturers of cameras in the \$60,000 to \$80,000 range—but at substantially lower cost. You'll be looking at unprecedented line resolution in both centers and corners. Signal-to-noise will be the highest in the industry. We'll have automatic color balancing as well as bias lighting. Before you add any more cameras to your studios, take a look at what we've come up with.

We submit that it is not necessary to be a billion or even a hundred million dollar company to be innovative in serving the broadcast industry with its two most vital ingredients — recorders and cameras. We're sure we can do it better.

We have something and we want you to see it. We've reserved more exhibit space at NAB than anyone else, with one exception. We don't want you to miss us.

Economics will tell the story of the future of television broadcasting. And we think we have the key.

A handwritten signature in dark ink, appearing to read "Michael A. Moscarello". The signature is written in a cursive, flowing style.



Circle 116 on Reader Service Card

✓ Checklist of Radio & TV Books

MANAGEMENT & OPERATION

- FM Radio Station Operations Handbook**, 2nd Ed., by Editors BM/E Magazine. Most complete collection of FM station data ever published! 320 pps. No. T94 \$9.95
- The Business of Radio Broadcasting**—By Edd Routt. Truly an all-in-one station operating guidebook. 440 pps. No. 587 \$12.95
- Managing Today's Radio Station**—Encompasses management, programming, sales, training, rates, etc. 288 pps. No. 461 \$12.95
- Modern Radio Broadcasting: Management & Operation in Small to Medium Markets**—Straightforward info on all aspects of broadcasting. 288 pps. No. 482 \$12.95
- Broadcast Station Operating Guide**—An invaluable "nuts & bolts" reference for everyone at your station. 256 pps. No. 467 \$12.95
- AM-FM Broadcast Station Planning Guide**—A complete guide to planning, building, and operating an AM, FM, or combined operation. 160 pps., 8 1/2 x 11". No. 500 \$12.95
- Organization & Operation of Broadcast Stations**—Complete rundown on all organizational and operational aspects of running a station. 256 pps. No. 533 \$12.95
- When Pirates Ruled the Waves**—Complete story of British radio ships. No. 299 \$7.95
- Planning the Local UHF-TV Station**—Covers location, equipment, organization, and operation. 296 pps. No. T-43 \$10.00

SPECIAL—FREE OFFER!

Order \$25.00 of books from this ad, send remittance with your order, and we'll send you the above book (T-43) absolutely FREE!

WRITING & COPYWRITING

- Professional Broadcast Writer's Handbook**, by Stanley Field. Covers ALL forms of radio & TV writing! 396 pps. No. 635 \$14.95
- The Anatomy of Local Radio-TV Copy**—Scores of ideas on how to increase station billing with proven, result-getting copy. 104 pps., comb-bound. No. T-90 \$5.95
- The Power Technique of Radio-TV Copywriting**—How to write sales-pulling copy for any purpose. 224 pps. No. 518 \$9.95
- Promotional & Advertising Copywriter's Handbook**—Down-to-earth guide for copywriters. 128 pps., 8 1/2 x 11". No. 579 \$7.95

PRODUCTION, PROGRAMMING & NEWS

- Dimensions of Broadcast Editorializing**, by Ed Routt. Complete handbook on this vital subject! 192 pps. No. 697 \$8.95
- Radio Production Techniques**, by Jay Hoffer. The complete, practical text on production. 204 pps. No. 661 \$12.95
- Modern Radio Programming**, by Raleigh Gaines. How to program every type of radio station! 192 pps. No. 623 \$9.95
- How to Prepare a Production Budget for Film & Video Tape**, by Sylvia Costa. Complete guide to determining finances! 192 pps. No. 645 \$12.95
- How to Write News for B/C & Print Media**, by D. Dary. Practical approach to reporting & writing news. 192 pps. No. 643 \$9.95
- Don't Look at the Camera**, by Sam Ewing. Practical shortcuts to TV photography & filmmaking. 228 pps. No. 649 \$9.95
- Radio Program Ideabook**—All the programming ideas you need to build and hold an audience. 256 pps. No. 268 \$12.95
- Guide to Professional Radio & TV Newscasting**. Practical refresher for pros. 192 pps. No. 535 \$9.95
- Television News Handbook**—Solid, practical grounding in news basics, style and newsroom workings. 256 pps. No. 567 \$9.95
- Radio News Handbook—2nd Ed.** A vital day-to-day guide to improve newscasting. 192 pps., 44 illus. No. 216 \$7.95
- Guidelines for News Reporters**—Scores of practical techniques used by the "pros." 192 pps., 18 illus. No. 516 \$9.95

ANNOUNCING

- You're On the Air!** by Sam Ewing. For would-be, newly employed, or present broadcasters. 192 pps. No. 620 \$7.95
- The Man Behind the Mike**—Offers practical guidance on every phase of announcing. 288 pps., 26 illus. No. 266 \$7.95
- How to Become a Radio Disc Jockey**—A brand-new self study guide for would be radio announcers. 256 pps. No. 557 \$7.95

ADVERTISING, SALES PROMOTION & PUBLICITY

- Handbook of Radio Publicity & Promotion**—A giant 372-page, 250,000-word encyclopedia of over 1500 on-air promo ideas. 372 pps., 3-ring binder. No. 213 \$29.95
- Radio Station Sales Promotions**—300 creative merchandise-moving ideas. Sales tools that really work! No. 214 \$10.00
- Radio Promotion Handbook**—A complete guide on ways to develop better ratings and increase sales. 256 pps. No. 267 \$9.95
- A Common Sense Guide to Professional Advertising**, by Art Lavidge. All about how to create successful ad programs. 304 pps. No. 612 \$9.95
- How to Sell Radio Advertising**—Pitches, approaches, and clinchers; how to counter customer objections. 320 pps. No. 511 \$12.95

FCC RULES & REGULATIONS

- Interpreting FCC Broadcast Rules & Regulations**, Vol. 2—Discusses recent FCC decisions. 192 pps., 20 chap. No. T-492 \$6.95
- Interpreting FCC Broadcast Rules & Regulations**, Vol. 3—Includes new CATV rules. 208 pps., Leatherette. No. 603 \$6.95
- Commercial FCC License Handbook**—Helps you prepare for 1st, 2nd, and 3rd class exams plus broadcast and radar endorsements. 444 pps. No. 582 \$8.95

CATV, VIDEO TAPE & TV STUDIOS

- CATV System Engineering**, New 3rd Ed.—By Wm. A. Rheinfelder. The accepted technical standard of the CATV industry. 256 pps., 126 illus. No. 298 \$12.95
- CATV System Management & Operation**—A complete guidebook to CATV. 256 pps. No. T100 \$12.95
- CATV System Maintenance**—Only book on CATV maintenance, and troubleshooting. 192 pps., 47 illus. No. T-82 \$12.95
- CATV Operator's Handbook**—Covers all aspects from franchise to planning. 352 pps., over 200 illus., 43 chap. No. T-73 \$9.95

SAVE \$11.85 ON CATV COMBO All 4 books above, only \$36.95

- Designing & Maintaining The CATV & Small TV Studio**, by Kenneth Knecht. For cable operators who want to initiate programs. 224 pps. No. 615 \$12.95
- Video Tape Production and Communication Techniques**—An indispensable how-to-do-it handbook on production, direction. 256 pps., 100 illus. No. 541 \$12.95
- MATV Systems Handbook—Design, Installation & Maintenance**, by Allen Pawlowski. Complete—from basics on up! 176 p. No. 657 \$7.95

ENGINEERING

- Passive Equalizer Design Data**, by R. Townsley. First NEW book on the subject in a decade! 496 pps. No. 626 \$19.95
- Broadcast Antenna Systems Handbook—2nd Ed.** Covers AM, FM, & TV antenna systems! 240 pps. No. T44 \$9.95
- A Guide to Radio & TV B/C Engr. Practice**—A "how-to" book on all aspects of engineering. 288 pps. No. 523 \$12.95
- Acoustic Techniques for Home & Studio**, by Alton Everest. Makes this complex subject truly understandable. 224 pps. No. 646 \$7.95
- Mobile Radio Handbook**, by Leo Sands. Includes all the fine points of 2-way communications. 192 pps. No. 665 \$7.95
- Technical Papers Presented at the NAB Engineering Conference—Annual Issues**. 1967 thru 1973. Order by year. Each \$10.00

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SAVE POSTAGE by remitting with order
Foreign, add 10%. Pa. residents, add 6% sales tax. B-24

NEWS

January 15, 1974 . . . Design Engineers Electronic Components Show is a new convention, to be run by the Electronic Industries Association in Washington in May 1974, to bring together electronic designers and component manufacturers.

The SMPTE Spring Conference has been rescheduled to April 21-26, 1974, and will be at the Century Plaza Hotel, Los Angeles, for a full week of technical sessions and a 92-booth exhibit . . . New Jersey Public Broadcasting won two of four awards by the Philadelphia Press Association for television programming in 1973: the Best Documentary and Best Editorial prizes went to News Director George Perkins and Public Affairs Producer Ken Stein, respectively.

Arvin Systems, Inc. of Dayton has bought Diamond Electronics, and will add the latter's video products lines to its own . . . W.&G. Instruments, Inc., U.S. affiliate of the German instrument firm of Wandel and Goltermann, has bought a larger headquarters in Livingston, N.J., and will move there in March 1974 . . . Rohde and Schwarz will be the exclusive distributors in the U.S. for the Schwarzbeck products in the EMI/EMC measuring field.

Network Analysis Corp. of Glen Cove, N.Y. will apply its computer-aided method to the design of a cable system for Metro Vision, Ltd., Bedford, Nova Scotia . . . Ampex Corp. announced sale of four ACR-25 auto cart machines to CBS, for about \$800,000 . . . Anaconda's Southeast regional CATV sales office has been moved to 5304D Panola Industrial Blvd., Decatur, Ga.

Television Bureau of Advertising reported that network TV investment rose 11.3% in November 1973, to \$223.3 million . . . Oak Industries is expanding manufacturing capacity for CATV equipment, with a new 50,000-square-foot plant at Fitchburg, Wis. . . . "Wally's Workshop," handyman series hosted by Wally Bruner, will be syndicated nationally for the third year, by the sponsor, U.S. Plywood.

Cinema Products Corp. announced delivery of the 1000th CP-16 news-documentary 16mm camera . . . WOPC-TV, channel 38 station in Altoona, Pa., will be the ABC network outlet for Central Pennsylvania.

People

Dr. William E. Glenn Jr. became vice president and director of research of CBS Laboratories . . . Robert H. Walker, formerly vice president, new products, Teledyne Packard Bell, was

continued on page 21



**Nothing ordinary about
this Gates antenna...**

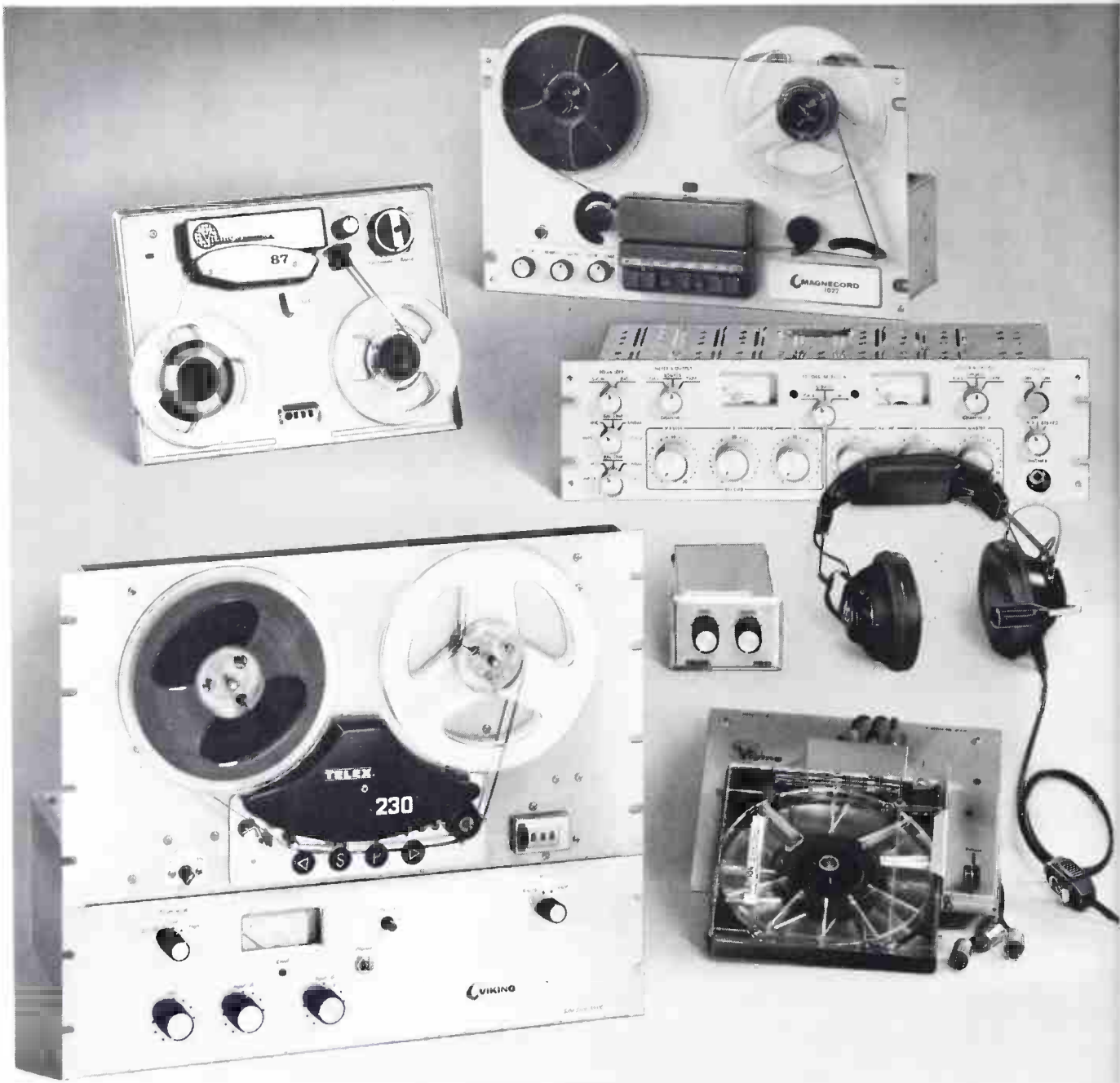
Here's a duplex television antenna broadcasting two VHF signals simultaneously.

We custom-built it for WTOP-TV and WMAL-TV in Washington, D.C. This Channel 7 and Channel 9 antenna was built and tested on Gates antenna range in Syracuse, New York. During the last five years more than 100 television antennas have been built and tested on this range.

We customize antennas to fit the specific needs of our customers. No matter how complex. And thoroughly test your antenna before delivery.

Call or write for more information on how Gates can custom-design an antenna for your operation.

HARRIS
 **GATES DIVISION**
Quincy, Illinois 62301, U.S.A.



For your every broadcast and tape equipment problem or need ...Telex.

You'll find that Telex has both quality and range.

From economical, manually operated tape cartridge transports to heavy duty, commercial/industrial three motor tape transports with hysteresis synchronous capstan drive.

And from compact, monaural tape playback pre-amplifiers to single and dual channel professional magnetic tape record/playback amplifiers.

For recording and reproducing sound of incomparable quality, of course look no further than the standard of the industry Magnecord series.

In fact, look no further than Telex for any and all of your broadcast and tape handling needs, including headphones. For literature, write Telex Communications, Inc., 9600 Aldrich Avenue South, Minneapolis, Minnesota 55420.

PRODUCTS OF SOUND RESEARCH
TELEX
COMMUNICATIONS INC.

CANADA: Double Diamond Electronics Ltd., Scarborough, Ontario
INTERNATIONAL: Telex Export Dept., 9600 Aldrich Ave. S., Minneapolis, Minn. 55420 U.S.A.

7310

Circle 119 on Reader Service Card

NEWS

named general manager of Javelin Electronics, Los Angeles ... **W.F. Jamison** is sales manager for Maryland, Virginia, Delaware, and the District of Columbia for LPB, Inc.

Cox Broadcasting made the following promotions: **J.M. Rupp**, group vice president and general manager; **H.S. Corbett, Jr.**, vice president-subsidiary operations; **R.J. Tucker**, secretary and treasurer; **E.W. Bohn**, vice president, personnel and public relations; **J.A. Landon**, vice president, planning and research; and **A.D. Chunka**, controller and assistant secretary.

Dick Tschudin is the new vice president, commercial production, of Video Cassette Industries ... **Richard Block** was elected president of Kaiser Broadcasting Co. ... **Gary Gunter** joined WSNL-TV as head of the news department.

Alan Kernes was promoted to manager, CATV Systems Department, Anaconda ... **Patricia Grace** was named director of the NAB's job placement operation, matching jobs and applicants in the broadcast industry ... **Neil Webster**, of the Guttenberg TV Cable Company, was elected president of the Iowa Cable Television Association.

John A. Webb is general manager, **R.A. Barlow** marketing manager, and **Lynn Chapman** marketing manager for CATV products, all for RayCom, a new division of Raychem Corp., which will serve CATV and telephone firms ... **Stan Gerber** is branch manager for AKAI America in the metropolitan New York and New Jersey areas.

Peter M. Bartuska is manager of technical services, central region (midwest) for RCA ... **E.C. Oldfield** was promoted to vice president, corporate development, for TeleCable Corporation ... **Robert Holman** is manager of a newly formed Rocky Mountain sales region for Scientific-Atlanta, Inc., with offices in Denver.

Shure Brothers made the following promotions: **K.E. Reichel** to sales engineering manager; **J.H. Schroeder** to assistant manufacturer sales manager; **John Santos** to sales manager for Latin America, Africa, and the Middle East; and **C.R. Asher** to sales manager for Europe and for world military sales.

Richard Anderson, formerly in sales management positions at IBM and Xerox, joined Dictaphone Corp. as vice president, marketing services; and **Frank McCarthy** was promoted to marketing director, systems and special products, for that company.

Pulitzer Publishing Co. made the following promotions in its broadcast division: **J.E. Risk**, to be director of engineering for owned stations KSD,

KSD-TV, and KOAT-TV; **M.L. Walpole**, manager of engineering, KSD-TV; and **Johannes Oelke**, manager of engineering for KSD radio.

John Foerster joined MarketDyne, Philadelphia production firm, as producer-director ... **Catherine Mansfield** became an account executive for CBS Radio Network ... **James O. Palmer** is the new director of sales in the states of Texas, Oklahoma, Arkansas, and Louisiana for Cohu, Inc.

Lloyd D. Wetenkamp became president of Metro Cable, Inc., now constructing several cable systems in Minnesota communities; he replaced Ms. Elisabeth L. Jones, who resigned ...

Angelo Fraticelli was appointed to the new post of manager of customer relations for Technology Inc., HF Photo Division ... **John R. Dillon** became division manager, and **Jay Levergood** replaced Mr. Dillon as marketing director, both in the CATV Division of Scientific-Atlanta.

William J. Smith, Jr. is the sales representative in western Pennsylvania and Ohio for Anixter-Pruzan ... **Joseph A. Mansi** was appointed director of public relations for Metromedia, Inc. ... **Pete Pederson** took over as musical director of the William B. Tanner Co., producers of syndicated music
continued on page 73

AUTOMATION



The Sensible Approach

Automation — today's big word in broadcasting. It usually means high cost and many problems. But at SPOTMASTER, we have given automation a new meaning — simplicity.

Why? Because we have taken the sensible approach to automation. We don't move the cartridges around in complex machines. In fact, hardly anything moves. The cartridges remain fixed, and the sequencing is all electronic and pre-programmable. We do it with our multiple deck units — from 3 to 15 decks in one package. It's simple, it's reliable, it's low in cost, but most of all it's sensible.

Spotmaster®

From BROADCAST ELECTRONICS
A Filmways Company



8810 Brookville Road, Silver Spring, Md. 20910
Phone 301-588-4983

Circle 120 on Reader Service Card

INTERPRETING THE **FCC** RULES & REGULATIONS

New License Renewal Rules and Procedures

The Commission adopted a Memorandum Opinion and Order on December 12, 1973 prescribing new rules and procedures relating to the renewal of broadcast licenses. Therein the Commission granted in part and denied in part several petitions for reconsideration which sought changes in the new renewal rules and procedures promulgated on October 16, 1973.

This article will discuss the new rules, elucidating changes in filing dates, new public inspection file requirements, revision of annual program reporting requirements, and community problems and needs listing requirements. Discussion of public announcement broadcast requirements will be presented in this column next month.

The Renewal Filing Date Change

If a broadcast license expires on or after December 1, 1974, a renewal application must be filed no later than the first day of the fourth full calendar month prior to the expiration of the license. For example, should a license expire on February 4, 1975, a renewal application must be filed no later than October 1, 1974. Note that if the renewal application due date falls on a non-business day, the filing deadline becomes the close of business on the first full business day thereafter.

The Commission decided to implement the proposed filing date change from 90 days prior to the expiration date to four months before that date in order to "provide community groups interested in the performance of local stations with ample time to examine renewal applications, to discuss any problems with licenses, and, if desired, to file timely petitions to deny."

The Commission developed special renewal filing dates for the "transition period" prior to December 1, 1974. During 1974 the following filing dates for renewal applications are applicable:

If license expires on:	... then Renewal filing date is:
February 1, 1974	November 5, 1973
April 1, 1974	January 2, 1974
June 1, 1974	March 4, 1974
August 1, 1974	May 3, 1974
October 1, 1974	July 3, 1974
December 1, 1974	August 1, 1974

A further filing change made by the Commission involves mutually exclusive applications. The deadline for filing a mutually exclusive application with a late filed application has been extended to 90 days subsequent to the Commission's Public Notice of acceptance of the filing of the renewal application. However, a mutually exclusive application with a *timely filed* license renewal application must still be filed by "the end of the first day of the last full calendar month of the expiring license term." Thus, for illustrative purposes, assume a timely filed license renewal application is filed on August 1, 1974. A mutually exclusive application for a

construction permit must therefore be filed not later than November 1, 1974.

New FCC Form 303-A: Annual Programming Report

Licensees of *all* commercial television stations must file (beginning in 1974) an Annual Programming Report showing both (1) the amount of time and (2) the percentage of total operating time devoted to the following types of programs:

- (1) **News**—including reports dealing with current national and international events, including stock market reports; and when an integral part of a news program, commentary, analysis, and sports news.
- (2) **Local News**—all non-network news programs may be classified as local.
- (3) **Public Affairs**—include talk, commentaries, discussion, speeches, editorials, political programs, documentaries, forums, panels, round tables, and similar programs primarily concerning national and international affairs.
- (4) **Local Public Affairs**—same as above, except local in scope.
- (5) **All Other Programming** (excluding entertainment and sports)—includes all other programs which are not intended primarily as entertainment (i.e., quiz, comedy variety, music, drama, etc.) and do not include "play-by-play and pre- or post-game related activities" or "separate programs of sports instructions, news, or information (i.e., fishing opportunities, golfing instructions, etc.)."
- (6) **All Other Local Programming** (excluding entertainment and sports)—same as above, except local in scope.

In conjunction with the above, the Commission defines "local programs" as any program originated or produced by the station, or for the production of which the station is substantially responsible, and employing live talent more than 50% of the time."

The broadcaster must supply programming data on Form 303-A for each of the following time periods: (1) 6:00 a.m. to midnight; (2) 6:00 p.m. to 11:00 p.m. (5:00 p.m. to 10:00 p.m. Central and Mountain time); and (3) midnight to 6:00 a.m. Note that computation of the amount of time devoted to each program category must *exclude* commercial time. Further, both local and non-local "Public Affairs" and "All Other Programming" categories must be supplementally explained in terms of (1) broadcast date, time, and duration, as well as (2) source, and (3) a brief description of each program. On the other hand, "News" programs must be explained only to the extent of (1) and (2) above.

The *initial* Annual Programming Report for *all* commercial television stations must be filed on or before March 1, 1974, and on or before February 1 of each subsequent year. Preparation of the *initial* Annual Programming Report is to be based upon the following composite week dates:

continued on page 24

ONLY ACRODYNE GIVES YOU THE UNEXPECTED IN TV TRANSLATORS



T-230



See the new
T-200 Series
— Booth 717,
NAB '74

New Solid State T-200 Series



T-210

Unexpected *low* price . . . Performance *above* the expected

There are no finer competitively priced TV translators available anywhere than the new T-200 Series from Acrodyne. Check these benefits:

- complete range of power . . . 1 to 1000 watts/ VHF or UHF
- performance exceeding all FCC requirements
- true color rebroadcast fidelity
- modular solid state construction
- high reliability design . . . reduced operational and maintenance costs
- 1-year warranty (first 90 days are unconditional)
- delivery — we're ready to meet your needs *today!*

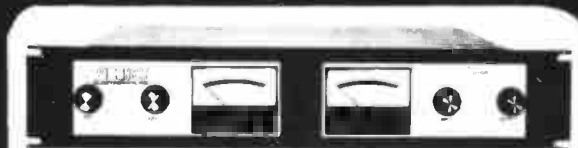
For the *unexpected in price* with *performance above the expected*, the proof is in the asking . . . The new T-200 Series of Solid State TV Translators. Get in touch now.



21 Commerce Drive
Montgomeryville, Pa. 18936 / (215) 368-2600 / TWX 510-661-7265

Circle 121 on Reader Service Card

A NOISE FREE AGC AMPLIFIER WITH A DYNAMIC RANGE PRESERVER



WILKINSON ELECTRONICS GCA-1
STEREO OR MONO

- * Noise — -75db even with loss of input. Automatically “rides” gain without regard to peaks. Exclusive RMS Detector preserves dynamic range. Will not adjust gain if signal removed.
- * Distortion — 0.1% all gain settings.
- * Frequency Response — $\pm 1/4$ db 50HZ to 20KHz any gain setting.

For complete details write:

WILKINSON
ELECTRONICS, INC.

1937 MacDADE BLVD.
WOODLYN, PA. 19094
PHONE (215) 874-5236 874-5237

Circle 122 on Reader Service Card

A LIMITER WITH INSTANTANEOUS ATTACK—LESS THAN 1% DISTORTION



WILKINSON ELECTRONICS LA2-C/S
STEREO OR MONO

- * Distortion — $1/4$ % for 6db of limiting. 1% or less to 20db of limiting.
- * Attack Time — $5/4$ Radians for gain control before clipping.
- * Overlimit Attack Time — Instantaneous.
- * Compression Ratio — More than 35:1.
- * Frequency Response — + 1db 50Hz to 35KHz with full limiting.

For complete details write:

WILKINSON
ELECTRONICS, INC.

1937 MacDADE BLVD.
WOODLYN, PA. 19094
PHONE (215) 874-5236 874-5237

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FCC RULES & REGS

Day	Date
Sunday	April 8, 1973
Monday	December 4, 1972
Tuesday	March 27, 1973
Wednesday	August 9, 1972
Thursday	May 31, 1973
Friday	October 13, 1972
Saturday	January 6, 1973

In explaining the reasons of the *Annual Programming Report*, the Commission has stated that:

The purposes of the annual statistical filings would be (1) to provide the Commission with information regarding nationwide programming during a given composite week which would be valuable in shaping any new policies in this area and in making the Commission, Congress, and any other interested parties better informed; (2) to enable the Commission to make a more complete evaluation of programming performance of the licensee during the past renewal period; and (3) to enable the Commission in a comparative hearing involving a renewal applicant . . . to more readily ascertain if programming during the first two years of the license period differed significantly from programming during the third year."

FCC Form 303, Revised Section IV-B

Commercial television stations whose licenses expire on or after December 1, 1974, must use *revised* Section IV-B (Statement of Program Service). Those commercial television stations whose licenses expire prior to December 1, 1974 (i.e., February 1, April 1, June 1, August 1, and October 1, 1974), will use the *current* Section IV-B.

Public Inspection File

All broadcast licensees (both radio and television) *must* maintain, as of January 16, 1974, and in addition to currently required material, the following *new* material:

- (1) The Public and Broadcasting Procedural Manual;
- (2) Written comments and letters from the public regarding operation of the station and the licensee's programming efforts with the exception of:
 - a) Obscene and defamatory letters;
 - b) Internal and business correspondence;
 - c) Written comments specifically requesting anonymity; and
 - d) Fan letters (i.e., letters regarding a rumored scandal about a performer or seeking autographs, etc.).

While radio licensees need include no more than (1) and (2) above, in their public inspection file, television broadcasters are required to maintain in their file the following *additional* material:

- (3) New FCC Form 303-A, The Annual Report. (See above.)
- (4) The annual listing of problems and needs and typical and illustrative programming broadcast in response thereto. (See below.)

Annual Listing of Problems and Needs

Another new Commission rule is the requirement (as of January 1, 1974) that commercial television licensees place in their public inspection file a yearly list of 10 (or fewer) significant problems and needs of the local area which their station has served for the preceding year. A brief description of typical and illustrative programs or program segments broadcast in response to the listed problems and needs *must* be included. The source and time of broadcast of each listed program or program segment is a further requirement.

The annual problems and needs listing, as described above, must be placed in the public inspection file on the "anniversary" date of the licensee's renewal application filing. Thus, broadcasters whose licenses expire on

continued on page 26

Why our time base correctors should be the apple of your eye

Proven Flexibility in Standalone Time Base Correctors

Regardless of your VTR—power line-locked, capstan servo'd/V-locked, or H-locked—our Delta Series Time Base Correctors and Hue Shift Correctors offer standalone processing of all color signals—either NTSC direct, "NTSC-type" or heterodyne "color under." And in monochrome—either RS-170 or RS-330 industrial sync.

Offering the best economy and flexibility, the Delta 44-328 HETROCOLOR™ TBC works with all types of monochrome and color VTRs. Particularly in cassette VTRs without our TBC, the color tape will be a long way from FCC acceptance. Aside from independently varying sync and subcarrier frequencies, editing capabilities are marginal. The HETROCOLOR TBC is the only unit on the market that allows transfer of heterodyne record VTR signals to a broadcast VTR. Second generation playback of this tape through the TBC corrects the color signal for broadcast with clean electronic splices.

For the best cost/performance package in the business, select the standalone Delta 44-200 NTSC Direct Color TBC coupled with the Delta 7 VELCOR Hue Shift Corrector for the finest in broadcast color processing.

And if you're staying with monochrome somewhere in your system, our Delta 44-028 TBC combines broadcast specs with our lowest price.

For more flexibility, we've added the Delta 23/3.58MHz subcarrier generator as an accessory to the Delta 44-328 TBC for combined outputs that are the equivalent of a broadcast stable NTSC color sync generator.

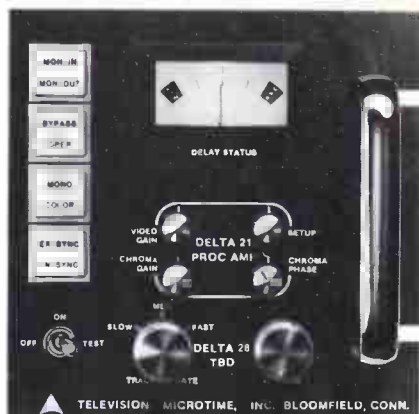
Exclusive Features of Our Growing TBC Family

Optimized Design. Of the several ways to eliminate time base error generated by all VTRs, we primarily use binary related delay lines which are switched in or out of the signal path at line rate. This technique offers the highest output performance looking at all the critical specifications of signal to noise ratio, bandwidth, differential phase and differential gain. There is no tampering with the visual portion of the picture. There is no contouring and quantizing noise as in digital techniques, or differential phase/gain variation as in EVDL techniques.

Velocity Error Corrector. In NTSC direct playbacks from 1" helical and all quad VTRs, color streaking (velocity error) is another problem that must be solved when either interchanging tapes or dubbing through several generations. Adding our Delta 7 VELCOR™ Hue Shift Corrector in front of any broadcast quality TBC, you get faithful color reproduction as well as imperceptible time base jitter throughout the entire picture.

Universal Color Corrector. In "NTSC-type" and "color under" playbacks from 1/2", 3/4" and 1" VTRs, all you need is our exclusive HETROCOLOR TBC, despite the wide variety of color recording and recovery techniques.

Full Proc Amp. All Delta Series TBCs have a built-in Delta 21 proc amp with front panel controls for video gain, setup, chroma gain, and chroma phase. The plug-in Delta 28 with front panel controls for gen-lock tracking rate and H-phase timing is included in all Television Microtime models working with less sophisticated VTRs.



TMI's exclusive built-in Delta 21 proc amp and Delta 28 TBD.

Front Panel Switches. All our TBCs have illuminated front panel switches to provide easy selection of operating modes. These include separate monitor and program video outputs on separate in/out and operate/bypass switches. A failsafe program bypass exists to handle power loss.

Experience is Our Guide

We introduced the first of our Delta family at the Chicago NAB Show in April 1972 and delivered our first production unit to the University of North Carolina two months later. In March 1973 at the Washington NAB Show we introduced two additional TBC models, the Delta 7 Hue Shift Corrector and several accessories. We are now delivering this family of products that work with the whole spectrum of VTRs from 1/2" helical to 2" quad.

But our experience goes back even further. In addition to developing custom TBC products for the networks, we've been supplying delay lines to Ampex Corporation who builds them into the full line corrector in their AVR-1 Teleproduction Recorder.

Look at Who Has What in Time Base Correctors

Review the chart then call us for a demonstration. We're sure you'll be as pleased as our many customers are—in every segment of the television industry—broadcast, CATV, education, medicine, industry, research, government, and OEM. Contact us. Television Microtime.

AVAILABLE FROM LEADING TELEVISION DISTRIBUTORS THROUGHOUT THE UNITED STATES AND CANADA.

	Ampex	RCA	IVC	TMI	CVS
MONO					
All Mono VTRs				44-028	
COLOR					
1/2" line/V-lock				44-328	*502
3/4" line lock				44-328	*502
1" line lock				44-328 7-001	*502
1" V-lock				44-328 or 44-200 (with 14)	500
TBC				7-001	
HSC					
1" H-lock				44-328 or 44-200	500
TBC	790		4102	7-001	
HSC	VELCOMP (Optional built-in)				
2" Quad				44-200 or 44-328	500, if VTR has AMTEC or ATC
TBC	AMTEC COLOTEC PROC AMP	ATC CATC PROC AMP		7-001	
HSC	VELCOMP	CAVEC			

*Announced last June (ask CVS about availability — and specs)

● How do you like them apples?

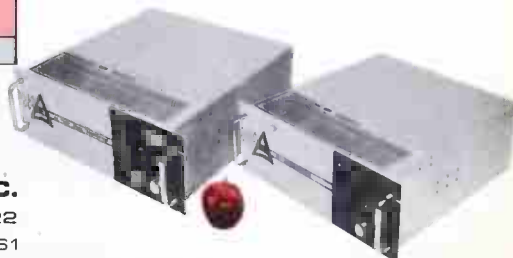


TELEVISION MICROTIME, INC.

1280 Blue Hills Ave., Bloomfield, Conn. 06022

(203) 242-0761

Circle 124 on Reader Service Card



FCC RULES & REGS

or after December 1, 1974 must place the annual problems and needs listing in their public interest files on or before the first day of the fourth full calendar month prior to the expiration date of their license.

During the first few months of the Rule's application, the filing dates for the annual listing of problems and needs will be:

License expires on:	Initial filing date is:	Subsequent filing dates will be:
Feb. 1, 1974	Oct. 1, 1974	Oct. 1, 1975, and each subsequent Oct. 1.
Apr. 1, 1974	Dec. 1, 1974	Dec. 1, 1975, and each subsequent Dec. 1.
June 1, 1974	Mar. 4, 1974	Feb. 1, 1975, and each subsequent Feb. 1.
Aug. 1, 1974	May 3, 1974	Apr. 1, 1975, and each subsequent Apr. 1.
Oct. 1, 1974	July 3, 1974	June 1, 1975, and each subsequent June 1.
Dec. 1, 1974	Aug. 1, 1974	Aug. 1, 1975, and each subsequent Aug. 1.

An *exception* to the above filing dates has been made for commercial television stations whose licenses expire on February 1 and April 1, 1974. Their annual problems and needs listing need not be filed with the Commission until the filing of the 1977 license renewal application. Furthermore, those broadcasters whose licenses expire on June 1, August 1, and October 1, 1974, must file the annual problems and needs listing with the Commission *along with* their license renewal applications. But note that in this latter event (and this event only) such annual problems and needs listing may be submitted in lieu of a

response to Question 4 of current Section IV-B of Form 303. On the other hand, those stations whose licenses expire on or after December 1, 1974, must submit (1) the annual listing, in conjunction with (2) revised Section IV-B of Form 303.

Two further notes. *First*, the annual listing of problems and needs to be submitted to the Commission *must* be limited to five pages; second, licensees are permitted to include supplemental material explaining or expanding upon the material filed with the Commission so long as such material is clearly identified as a continuation of the filed material.

Finally, an annual *formal* survey of community needs and interests (as set forth by the Commission's *Primer on Ascertainment of Community Problems by Broadcast Applicants*) is *not* required by these new Commission Rules. The licensee's obligation regarding ascertainment of problems and needs for the listing filing is *more general* in nature (i.e., "a continuing, positive, diligent effort to ascertain the tastes, needs and desires of the service area"). This is clearly a matter of discretion for the licensee.

Conclusion

The Commission has adopted several major new broadcast license renewal rules and procedures and has revised several prior rules and procedures. Broadcast licensees should study these rules and procedures as well as the dates by which compliance with each will be required.

In next month's "Interpreting ..." column, we will treat both the license renewal announcements (prefile announcements as well as postfile announcements), and the licensee obligation announcements. **BM/E**



At NBC...



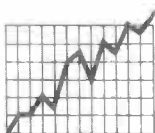
and CBS...

abc

and ABC...



they use more BIW TV broadcast cable



... than any other brand.

... and now a word from our sponsor:

The major networks prefer BIW TV cable for the same reasons local stations do. For one thing, they get proven reliability. BIW was the first TV cable manufacturer, has more experience than anybody else. We're now the supplier of cable for all TV cameras, plus accessory equipment for other studio cable and connector requirements. We also have both East and West Coast facilities for on-the-spot supply, service, and technical help. Write for literature. Or call.

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ALSO FROM
control design corporation

CD25S 25Hz Tone Sensor

Provides control functions for sensing the presence of pre-recorded 25Hz tones on audio material. Features a unique built-in fixed tone alarm and a second tone activation allowing flexibility in source switching, automatic rewind of tape and other features including end-of-tape function.

Circle 165 on Reader Service Card

CD25G 25Hz Tone Generator

Production studio use to insert the standard automation actuating tone. Simple operation.

Start button starts tape transport in motion and actuates audio muting circuit to eliminate bias pops and other tape transport start noises.

Tone button applies 25Hz tone and automatically stops the transport at end of tone. All solid-state unit has been designed to work from all audio sources providing up to 300mV line level.

Circle 166 on Reader Service Card

CD60T Time Announce Control Unit

Designed to add versatility to your automation system. Allows the use of 2 single play cart machines, 2 reel-to-reel transports or a combination of cart and reel-to-reel transport for time announcements. Features a built-in power failure lock . . . will not air a time announcement during a power failure until corrected and . . . Internal IC integrated clock included.

Circle 167 on Reader Service Card

For more information, ask your rep for detailed sheets.

**SEE THE LATEST
IN AUDIO AUTOMATION
AT NAB
BOOTH 616
HOUSTON
MARCH 17-20, 1974**

Introducing CD28 Modular Audio Automation Controllers



New from control design corporation . . .

the people who can show you how automation makes your station money!

Here are the new controllers that interface with all audio sources having full function remotable capability . . . the ideal units to update your present automation with or build a new system around . . . the controllers that help protect your operating personnel from making the human and mechanical errors that cost you profits. In fact, CD28 units are the easiest to program, the easiest to install and the easiest to maintain!

Features include:

- LED displays that don't confuse a 9 with a 4.
- Modular circuitry on plug-in circuit boards.
- Easy expandability to 8,000 events and 92 sources.

The basic CD28 System—audio controller, programmer and power supply—handles up to 2,000 events and 12 audio sources with full random access. Plenty of accessories available.

To protect your automation investment or to learn how CD28 automation can make you money, call the factory sales department or your **control design corporation** rep today.

Circle 168 on Reader Service Card

control design corporation
106 s. pickett street
alexandria, virginia 22304
(703)751-5650

Rep Inquiries Invited

The automated VHF transmitter



The real thing...not just a remote possibility.

The entire "F" line of RCA transmitters is now automated.

So they need far less operator attention.

Every tube not absolutely essential was designed out. That means fewer tubes model-for-model than any other VHF transmitter.

We took out as many tuned circuits as possible. For instance, our totally solid-state IPA has no controls for drift or adjust.

We deleted all the blowers except one. And that controls the whole transmitter.

Then we added automatic control of output power and sync level so you don't have to readjust power.

We topped it off by building in the functions you need for complete remote control.

Result: transmitters that require less attention wherever they're stationed.

For further details, write RCA Broadcast Systems, Bldg. 2-5, Camden, N.J. 08102. Or see your RCA representative.

RCA



Greatest Exhibit Coming

NAB Getting Ready for Houston

A sharply interesting product show will have many state-of-the-art performers, among them new and upgraded versions, from new and old makers, of last year's stars, the time base correctors; and a flock of new portable video cameras that may change TV news practice.

For its 52nd Annual Convention, set for March 17-20 at the Albert Thomas Convention Hall in Houston, Texas, the National Association of Broadcasters was in advanced stages of planning as this issue went to press.

The exhibit area, largest in NAB history at 67,000 square feet (last year's record breaker was 60,000 square feet) was substantially sold out at press time.

The NAB notes, in fact, that the need for a lot more space was one of the main motives for the move to a Convention Center, scattered-hotel battle plan, rather than to the single or grouped-hotel concentration of exhibit and lodging that characterized previous shows. There was simply no single hotel or close combination available that would contain the show at this year's size, and it was clear by the end of last year's show that it would break records again in 1974, with growth of at least 10% in space needed.

The NAB has laid plans to make the new set-up work well, including an elaborate free shuttle-bus system running to all hotels, as noted on page 33. NAB is also supplying free continental breakfasts before the Early Bird sessions, and greatly expanded information and direction services.

The technical program is near final form. It opens with a joint session with the Management on Monday, March 20 at 10:30 a.m. On Monday afternoon, Vincent Wasilewski, president of NAB, will open the Engineering Conference. There will be reports from several all-industry technical committees, including the Engineering Advisory Committee. There will be an FCC/Industry Technical Panel, with

James D. Parker of CBS as moderator, and FCC and industry leaders as panelists.

On Tuesday morning there will be parallel radio and television technical sessions, with seven to ten papers in each session. At the Tuesday luncheon, the NAB's 1974 Engineering Award will go to Joseph B. Epperson, vice president for engineering of the Scripps-Howard Broadcasting Company. There will be no technical sessions on Tuesday afternoon, to give the conventioners time to see the exhibits and visit hospitality quarters.

The engineering conference will resume with the Wednesday morning sessions.

Very few firms had released at press time any information on the equipment they will show in Houston. *BM/E's* March issue will include a complete rundown on exhibitors and their exhibits.

Among the few firms making early announcements were:

- Systems Marketing Corp.—A new video data terminal and encoder for use with automated logging systems.
- Canon—New lenses include a 60° wide-angle 8X zoom (11 mm to 90 mm, f/2) for hand-held cameras; a 24X, close-focusing double zoom (24 mm to 300 mm, f/2) for studio cameras; and a 34X double zoom (24 mm to 800 mm, f/1.8) for field and sports; also a new scopic 16 mm camera.
- Consolidated Video Systems—A new video digital time-base corrector, Model CVS-504, offered for all non-segmented helical VTRs for ¼-, ½-, ¾-, 1-, and 2-inch tape.

In addition, a group of British man-

continued on page 32



Extremely wide range of shots is provided by new Varotol 30 zoom lens to be introduced by Rank Optics, Ltd. Use for close-up is shown above.



One of time-base correctors to be unveiled is Consolidated Video Systems' new CVS-504, for all non-segmented helical video tape recorders.

Advance Tips for Conventioneers: Houston Hotels and Transportation

Going to Houston next month? Here is a list of the main hotels, with addresses and telephone numbers, and maps showing their locations—one for downtown Houston and one for the surrounding areas.

Here also is a rundown on transportation in Houston—the availability and costs of taxis, buses, and airport coaches.



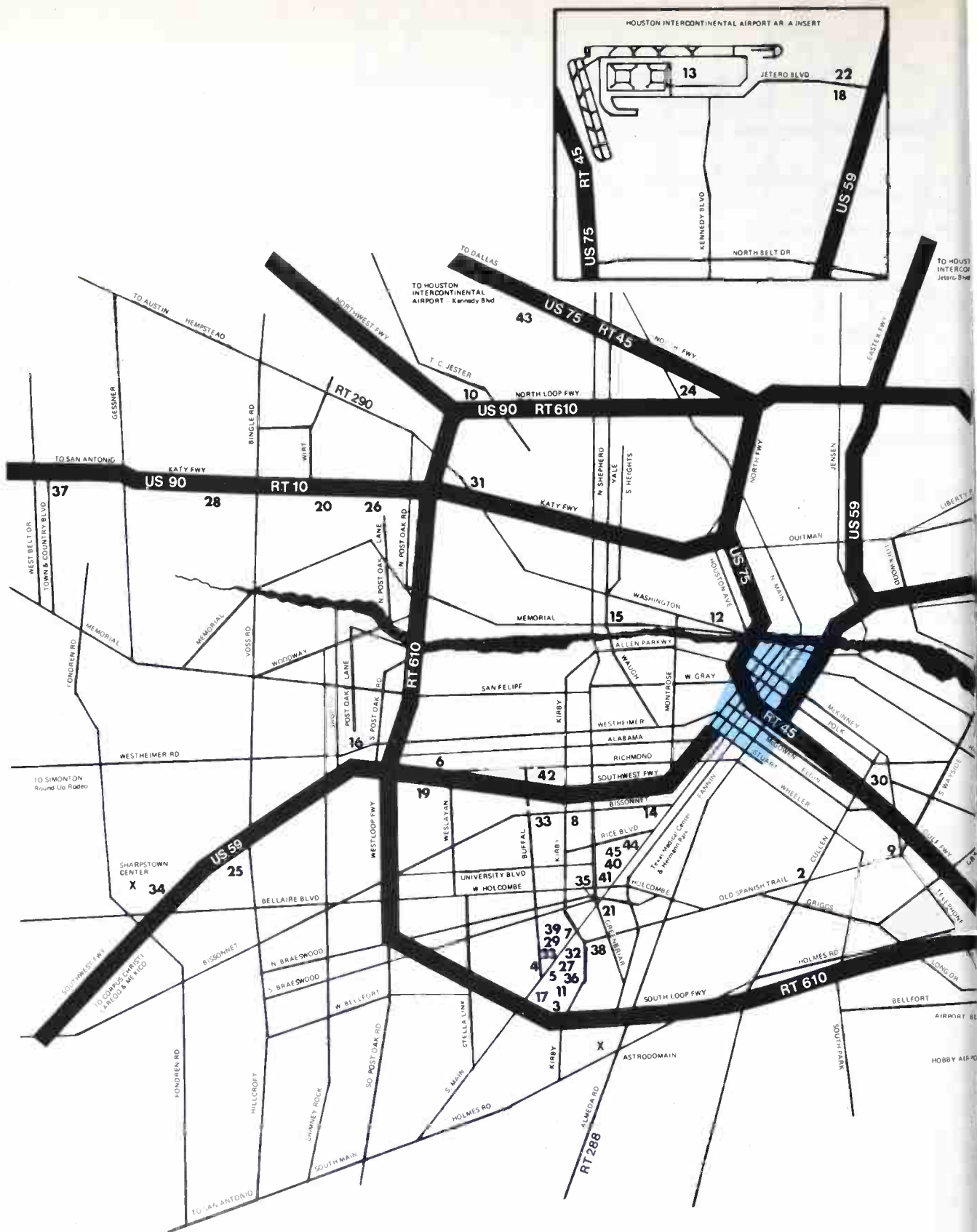
Headset for TV cameraman to be introduced by Racal-Amplivox is leather weight, puts almost no pressure on ear.



Analog-to-digital converter is new unit from Micro Consultants, Ltd., designed for a variety of color television uses.

Downtown Hotels (E = Reserved for equipment manufacturers)

Hotel	Number on Map	Address	Tel. No. (Area 713)
<i>(Reservations thru NAB only)</i>			
Continental Houston Motor-(E)	2	101 Main St.	225-1781
Downtowner Motor Inn-(E)	3	1015 Texas Ave.	228-0911
Holiday Inn-Downtown	4	801 Calhoun St.	224-4442
Hyatt Recency Hotel	6	1200 Louisiana St.	224-2222
Lamar Hotel-(E)	7	Main and Lamar Sts.	224-8511
Rice Hotel	8	Texas Ave. & Main St.	227-2111
Savoy Hotel	9	1616 Main St.	223-0141
Sheraton-Lincoln-(E)	10	Milam and Polk Sts.	224-9041
Texas State Hotel	11	720 Fannin St.	227-2271
Whitehall Hotel	13	1700 Smith St.	227-6461
<i>(Reservations directly with hotel)</i>			
Auditorium Hotel	1	701 Texas St.	227-3351
Hotel Sonesta	5	Smith & Jefferson Sts.	227-6464
William Penn Hotel	12	1423 Texas St.	222-0231



ufacturers summarized their exhibits as follows:

- Marconi—New telecine; Mark VIII cameras; a new hand-held camera.
- Rank Optics Ltd.—Varotal lenses.
- Matthey Printed Products Ltd.—Comprehensive line of pulse and video

- delay equipment; Chroma Corrector for automatic correction of luminance-chrominance gain and delay inequities.
- Racial Amplivex Communications Ltd.—Headsets for TV production use.
- Link Electronics Ltd.—Camera tube test equipment; camera tube con-

ditioner.

- Evershed-Power Optics Ltd.—Digital control for video cameras.
- English Valve Co.—Range of Orthicon, Isocon, Vidicon, and Leddicon camera tubes.
- Engineering Designs and Supplies

Hotels Outside Downtown Area

Hotel	Number on Map	Address	Tel. No. (Area 713)
(Reservations thru NAB only)			
Astroworld Hotel	3	Interstate 610 at Kirby	748-3221
Holiday Inn-Astroworld	11	Interstate 610 at Kirby	748-1050
Holiday Inn-Civic Center	12	2100 Memorial Drive	869-8261
Hotel Plaza	14	5020 Montrose Blvd.	524-3161
Houston Oaks Hotel	16	5011 Westheimer Rd.	623-4300
Marriott Motor Hotel	21	2100 S. Braeswood St.	747-6200
Ramada Inn	24	4225 North Freeway	695-6011
Roadrunner Motor Inn	28	9535 Katy Freeway	467-4411
Shamrock Hilton	35	Main St. and Holcombe Blvd.	668-9211
Tidelands Motor Inn	45	6500 S. Main St.	526-4161
Tides II	40	6700 S. Main St.	522-2811
Towers Motor Hotel	41	2130 W. Holcombe Blvd.	666-1461
Warwick Hotel	44	5701 S. Main St.	526-1991
(Reservations directly with hotel)			
Airport Motor Inn	1	7777 Airport Blvd.	644-1261
Alamo Plaza Motor Hotel	2	4343 Old Spanish Trail	747-6900
Chief Motel	4	9000 S. Main St.	666-4151
Crestwood Motel	5	9001 S. Main St.	667-5691
Executive-Red Carpet Inn	6	4020 Southwest Freeway	623-4720
Grant Motel	7	8200 S. Main St.	667-7451
Gulf Coast Motor Inn	8	4701 Kirby Drive	526-2533
Helena Motor Inn	9	2401 S. Wayside Drive	921-7155
Hilton Inn	10	2504 N. Loop West	688-7711
Host Airport Hotel	13	Airport	443-2310
Houston Memorial Dr. Travelodge	15	310 S. Heights Blvd.	869-4541
Howard Johnson Motor Lodge	17	Interstate 610 at Kirby	748-3435
Jetero Motor Inn	18	6900 Jetero Blvd.	446-3041
La Quinta Motor Inn	19	4015 Southwest Freeway	623-4750
Quality Inn-Airport	22	5805 Jetero Blvd.	446-9131
Red Carpet Inn	26	7611 Katy Freeway	688-2221
Roadrunner Family Lodge	27	9051 S. Main St.	666-3671
Rodeway Inn	31	5820 Katy Freeway	869-9211
Royal Coach Inn	34	7000 Southwest Freeway	771-1311
Sheraton Inn-Astroworld	36	Interstate 610 at Kirby	748-3435
Sheraton Inn-Town & Country	37	910 West Belt Blvd.	467-6411
Sun Valley Motor Hotel	38	1310 Old Spanish Trail	668-0621
Surrey House	39	8330 S. Main St.	667-9261
Travelodge at Houston Southwest	42	2828 Southwest Freeway	255-3050
Vagabond Motor Hotel	43	4815 North Freeway	697-3201

Transportation in Houston

1. NAB Shuttle Buses

The NAB has announced that there will be free shuttle buses running from *all hotels* to the Convention Hall, and back, frequently during each day. Exact schedule had not been decided at press time.

2. Taxi Service

Taxis in Houston are inexpensive: the meter starts at 65 cents, and runs up to \$1.05 for the first mile, 45 cents for each mile or fraction thereafter.

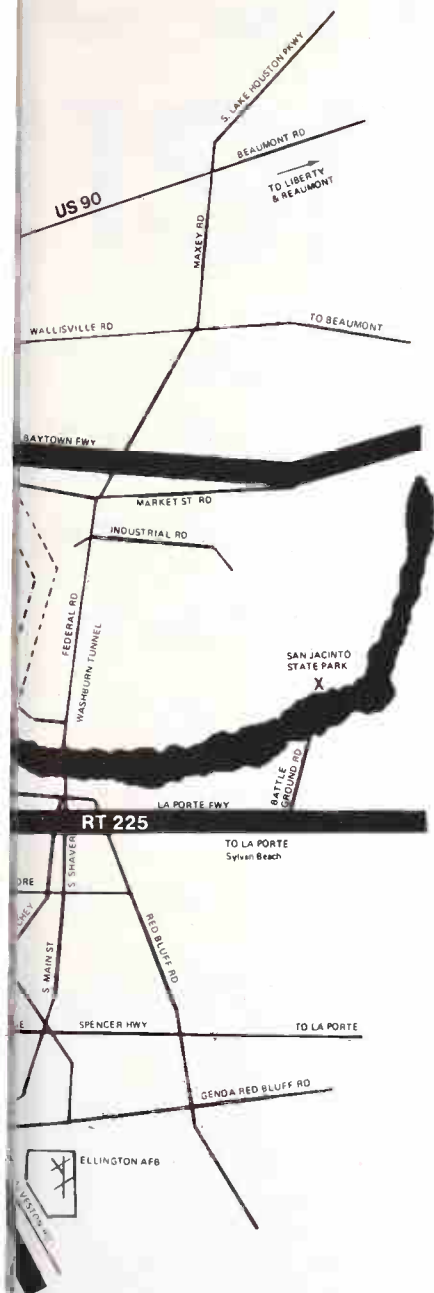
All the downtown hotels shown on Map 1 are less than one mile from the Convention Hall; fares from these hotels to the Hall will range from about 75 cents to \$1.00.

The largest group of hotels outside the downtown area are clustered in the general vicinity of the Astrodome (see Map 2). Since these hotels are five to six miles from the Convention Hall, taxi fares will be \$3 to \$4.

The International Airport is roughly 15 miles north of the downtown area. Taxi fare from the airport to downtown will be, in most cases, \$12 to \$12.50. From the airport to the Astrodome area, fare will be \$15 to \$17.

3. Airport Coaches

Airport coaches run every 30 minutes until 9 p.m.; thereafter every hour. The fare is \$3.50 to any part of the city; roundtrip is \$6.50. Coaches run to several downtown and Astrodome-area hotels. There is a coach stop on Bagby Street, directly across the street from the Convention Hall. (see map).



Ltd.—Polaroid instant caption machine.

• Quantel Ltd. and Micro Consultants, Ltd.—Modules for scientific data acquisition and for digital video systems; a digital time-base corrector.

Cohu's "Performer"

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of set-up—
not like the
complex
competitive
beast.



MODEL 1500 BROADCAST COLOR FILM CAMERA

of the major reasons broadcast stations nationally and internationally are buying the Cohu Model 1500 Film Camera instead of our competitor's products is because it's easy to set-up and easy to operate.

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camera. Breech loading yokes are vertically mounted for freedom from stress and perfect alignment which enable tubes to be removed and re-inserted from the rear of the yoke without disturbing optics or the yoke assemblies. Fully sealed optics which need no cleaning are another time saving feature built into the camera.

The Model 1500 offers the highest in picture quality. Geometric distortion less than 1%, signal-to-noise ratio of 50 dB minimum, and gamma correction 0.5 to 1.0 continuously variable.

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Circle 128 on Reader Service Card

"Focused Triode" Concept Simplifies Transmitter Design

Eimac High-Gain Power Triode For VHF and UHF

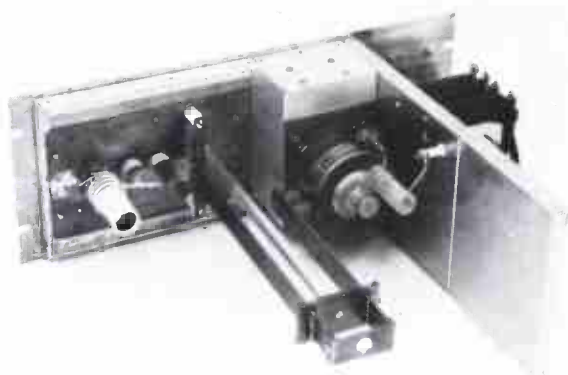
A new power triode for the VHF and UHF bands from Eimac simplifies transmitter design by combining high gain—to 15 dB and above—with elimination of screen and bias supplies. The 8877/3CX1500A7 needs no neutralization, using the "focused triode" concept introduced recently by Eimac.

The tube is of ceramic metal construction, and uses forced-air cooling of base and anode. With zero bias, plate voltage can go as high as 2500. For higher voltages, or for improved efficiency at lower voltages, some bias can be used. Any of four standard bias designs is acceptable: fixed bias from a separate supply; zener diode in the cathode lead; fixed resistor in the cathode lead; grid current resistor. Bias requirement is modest; 20 volts

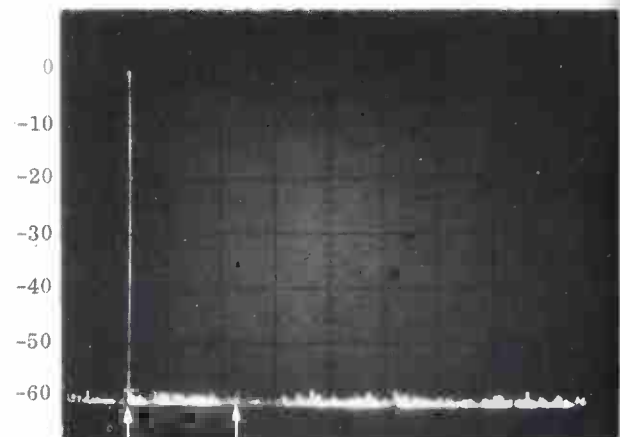
cuts off plate current with 4 kV on the plate. Maximum plate voltage is 4kV, maximum plate current is 1 ampere and maximum plate dissipation is 1500 watts. The heater takes 5 volts at 10 amperes, and is electrically isolated from the cathode.

In a grounded-grid, cathode-driven amplifier at 104 MHz, the 8877 performed as shown in the following:

Eb	Ib	Ic	Po	Pd	Eff	Gain
4.0 kV	1.0A	25 mA	2.60 kW	78 W	65.2%	15.3 dB
3.0	1.0	42	1.96	64.5	65.5	14.8
2.5	1.0	58	1.67	63.5	66.7	14.2
2.0	1.0	60	1.33	64	66.5	13.2
1.5	1.0	68	0.98	65	65.3	11.8

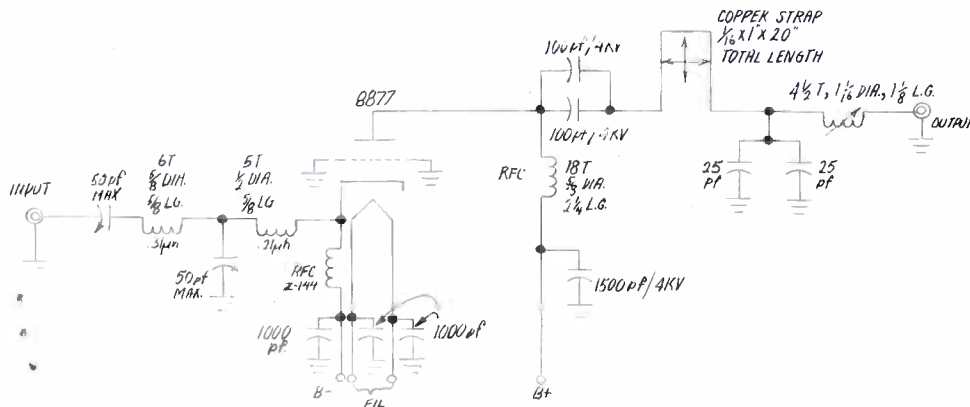


Rear of amplifier used for tests of 8877 triode tube, (see schematic below) with tube in square shield, center right. Detailed results of tests are in table above.



fundamental 3rd harmonic

Performance of 8877 "focused triode" in FM amplifier (104 MHz) can be seen in output spectrum analysis; 3rd harmonic is 59 dB below fundamental, other harmonics are invisible. Power output is shown in table above; amplifier circuit is below.



Amplifier for 104 MHz, which produced up to 2.6 kW of output from a single 8877 tube, with 4 kV on the plate. Amplifier takes only 65-75 watts of drive, has efficiency of about 65%.

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Today's Synthesizers— They Make Real Music

By Walter G. Salm

The broadcaster who hasn't used a synthesizer for at least a few commercials and IDs is almost hopelessly backward. For a less-than-\$1500 investment, any broadcaster or production house can roll its own electronic music.

Electronic music has been a part of broadcasting since 1934, when the Hammond organ first made its appearance in the studio, according to electronic music pioneer Walter Sear, president of Sear Sound. "The theremin was the first real electronic instrument," Sear told *BM/E*, "but never made it because it was too hard to play. I'm one of the few remaining thereminists in the union directory. Bob Moog and I started our careers together making theremin kits."

Sear points out that the theremin was a very difficult instrument requiring years of study—the same kind of loving devotion required by the violin. But it has long since been superseded by synthesizers which can provide the same or better sound without the need for virtuosity.

The synthesizer represents a fifth class of musical instrument, coming as it does after the strings, brasses, woodwinds, and percussion. As a separate class of instrument, it's beginning to come into its own. Early in the synthesizer's life, there were such questions as "Can you make it sound like a bassoon?" Yes, it could be done, but not a very good bassoon. As a keyboard instrument, the synthesizer lacked the subtleties and articulation of the real thing.

Today's game is different. Music and original scores are being written specifically for synthesizers, and it is regarded in the industry as a truly separate musical instrument.

Unlike single-voiced instruments, a typical synthesizer has some 300,000 to 400,000 possible sounds, making a precise description very difficult. With an organ's many voices, the music score generally suggests the stops and registration to use. With a synthesizer, the problem of "correct" sound is at least ten times as great as it is with a large pipe organ.

There are many things the musician can do with a variable-pitch instrument (the synthesizer) that just can't be done with a fixed-pitch instrument (the Hammond organ). This is the main difference between the organ and the synthesizer—hit an "A" key on the organ and you'll always get 440 Hz—or some multiple or sub-multiple of 440. But on a synthesizer, the oscillator itself changes frequency continuously at the turn of a control dial.

Besides the outer-space, science-fiction type of music, the synthesizer has many valid broadcast uses as a straight, honest, musical instrument. One of the determinants for a standard musical instrument is just how closely it can emulate the human voice. Elements of this

voice-like capability are: infinitely variable pitch, infinite sustained decay, attack patterns, vibrato, and all the other things that the human voice can do. The synthesizer does all these and more.

Equipment has been getting better with advances in the state of electronics art. The original Moog synthesizer, for example, could never have been made with vacuum tubes; it would have occupied an entire room—as did the 1957 Mark I synthesizer by RCA. With discrete transistors, the Moog was possible—three cabinets crammed full of circuitry and hardware plus a keyboard. Now with the advent of practical integrated circuit designs, units such as Sear's baby, the Electrocomp synthesizer, are available in compact packages at about one-third the going price for a similar instrument made with discrete components.

Simplified operation

Simplification is the key to Ionic Industries' compact synthesizers. Says Ionic President Alfred Mayer, "With this instrument, we can program, say a Bach invention, that kids would never have in kindergarten, and let the child transpose the invention to where he'd like to hear it—in his own singing range. Then he can change the tempo, the dynamics, and so on; he can achieve what the conductor does without knowing what A or B are. He can outperform any musician by performing a retrograde, an inversion and a development, without computer language, without special training, without an engineering degree." This may be so, but the kid still has to know what buttons to push.

The Ionic "Performer" is billed as the industry's first quadrasonic synthesizer. "Up until now," says Mayer, "all synthesizers have been monaural at this price level. This unit has two channels and we take it 90° out of phase and get two other channels for four separate quadrasonic outputs in the rear."

As a musical instrument, the synthesizer adds a new dimension to the live performance. Some composers refuse to write for electronic instruments, since the usual method is to tape the performance and freeze it for all time. But with a real-time instrument like the Ionic, live performances are practical.

Commercial and ID production are other areas where the synthesizer shines. A composer who works with electronic music can make a recording at the same time that he creates a program. With the program, a synthesizer player can do his own interpretations. But most electronic music today exists as a one-time shot on tape,

t's not open to musical interpretation as are more conventional musical works.

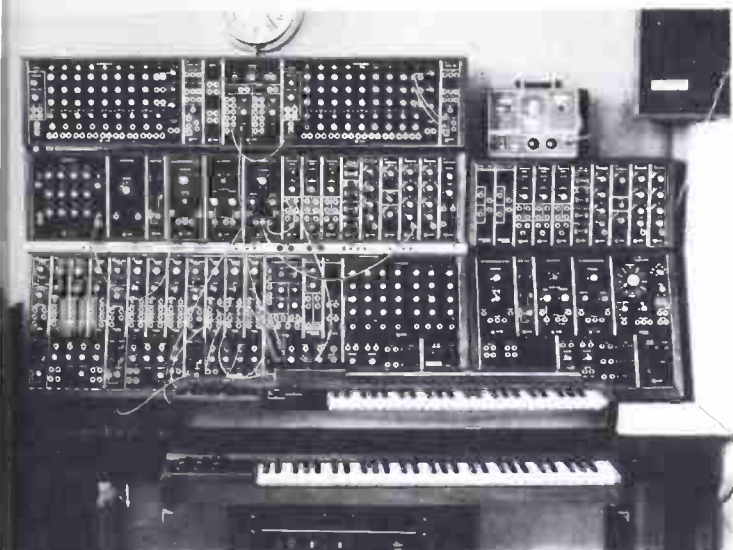
Not too long ago, conductor Pierre Boulez had a very difficult time picking up the proper tempo for a recorded bit of electronic music—part of a score he was conducting. With the advent of the synthesizer program, instead of the frozen performance, a performer can tune up with the orchestra, follow the conductor's tempo, and can play polyphonically.

Broadcasters typically use synthesizers for station IDs. One well-known example is the one used by PBS. Radio

station WPAT in the New York area uses an Ionic ID as do many others across the country.

Production houses and ad agencies are high on electronic sound. "I can't imagine commercials being made any other way," comments Mayer. "We had one customer in Louisville; they were using the synthesizer for everything, and the station developed an identity throughout the entire area because of the kind of sound they were putting out.

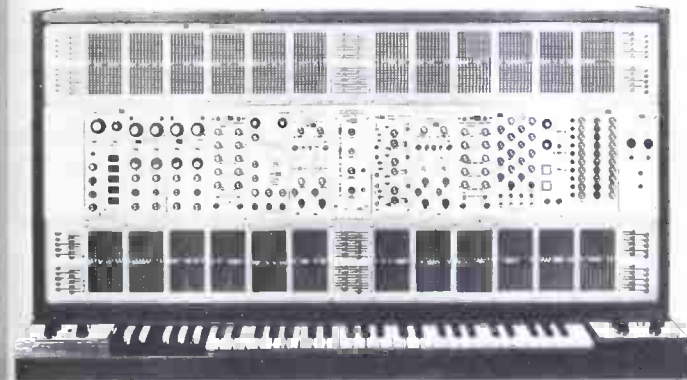
"Interestingly, commercials made with the synthesizer in the South have a totally different kind of sound and
continued on page 74



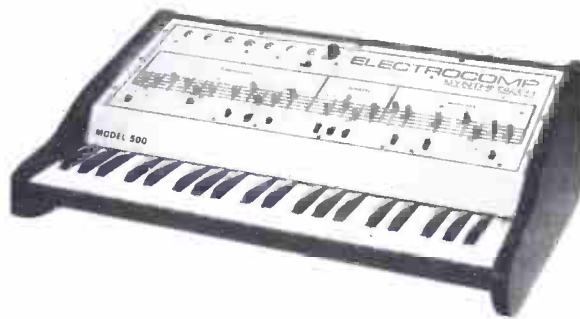
Double-keyboard Moog synthesizer allows not only for production of an infinite variety of original sounds, but can alter sounds from outside sources or use them to modulate internal programs.



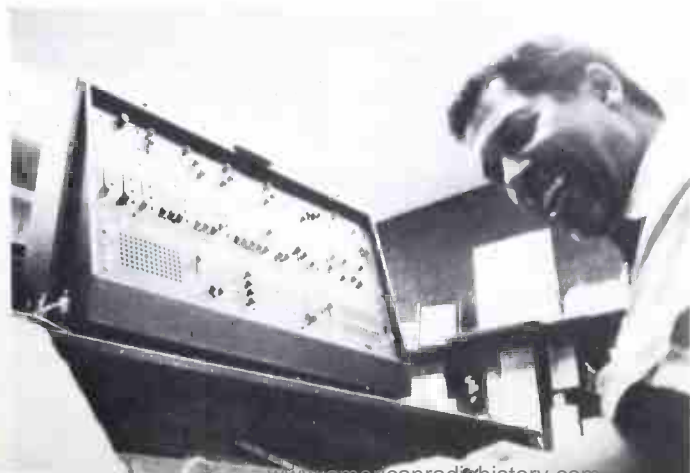
Alfred Mayer of Ionic Industries demonstrates at the keyboard of one of his Putney synthesizers which uses a matrix board with pin inserts for signal routing.



Representative of the very large, extremely flexible synthesizers available is the Arp Model 2500, on which a variety of generator, modulator, and filter functions are supplied on plug-in modules; pin matrices route the signal.



Electrocomp Model 500 is this firm's portable, well adapted to use on stage or in any "location" away from the studio; large studio models are also made under Electrocomp name.



Another portable, the Arp 2600, is being used by John Lewis of the Modern Jazz Quartet to extend and interact with piano tones in a jazz composition. It is adapted to studio use too.

Waveform Distortion Can Ruin Your Color Signal

By Frederick C. Everett

How to watch out for and correct waveform distortion in your transmitter.

The transmitter-transmission system represents the bottleneck through which all the TV signal flows on the way to the public. Thus from the manager/engineer standpoint, this is the equipment that must receive the first attention. An individual camera or tape machine cannot affect the total output of the station, but the transmitter can do so.

Thousands and thousands of dollars are spent on new equipment in TV stations, such as video cameras. If the transmission system has defects, the full benefits of these equipments will not be realized. The cost and trouble of handling the correction of the transmission system are usually so small, it is ridiculous not to take advantage of these simple procedures to make the signal sparkle.

Even a new transmitter and/or antenna cannot guarantee that all sources in the system are free from contributions to distortion.

The real test of the operation of the chain of equipment that represents the transmission system is waveform distortion. This is now quite generally recognized through the industry; however, not nearly enough is done to identify and correct the various forms of waveform distortion in individual stations.

The emergence of CATV systems has further confused the situation. The cumulative nature of waveform distortions must inevitably cause their increase after passing through a CATV system. But the roots can still be found in the station's transmission system, although the trouble may be compounded by the CATV's fundamental problems and/or poor performance.

The several forms of distortion that are important and often neglected in present day color transmission are:

1. Differential gain
2. Differential phase
3. Low and medium frequency amplitude error
4. Low frequency phase error
5. Envelope delay

As noted, these distortions are all *cumulative*. The VIT test signals may not always be a valid indication of distortion levels. The VITs may be applied after the distortion has already originated. There appear to be some doubts in the minds of many operational people that ringing, smear, etc., can be corrected. They can be. Let us examine the various distortions.

Differential gain

Differential gain affects color saturation, color brightness and large color areas. Properly adjusted transmitters will have the internally generated differential gain under control, either through adjustments on the modulator, or on a stabilizing amplifier associated with it. However,

Mr. Everett is a consulting engineer in Fort Lauderdale, Fla.

differential gain often accumulates to a considerable amount, sometimes 30% or so, on long distance video circuits. If the problem receives considerable attention, it may get much better, perhaps not perfect. I submit that it is well to supply an average correction, adjusted occasionally on the incoming signal, so that the error bobbles around zero.

Differential phase

Here again any error should be brought under control at the transmitter. At the end of a long transmission system, an average correction may be desirable on the incoming signal.

Low and medium frequency error

Amplitude response errors at low frequencies produce distortions which persist over a longer time and are more distracting to the viewer. Smear can cause serious injury to the picture quality and is a low frequency amplitude phenomena.

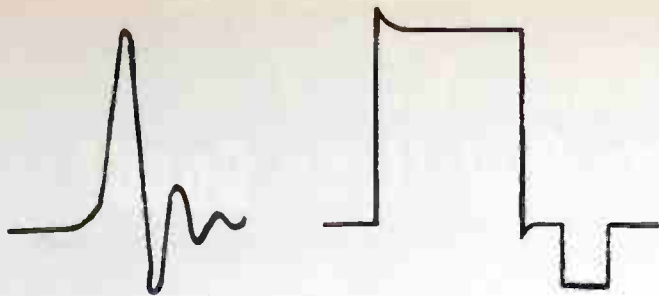
A transmitter which has a relatively moderate amount of low frequency error—a not uncommon situation—will not look too badly off the air, but if the incoming network, or a piece of the originating equipment in the station, has some similar problem, the cumulative streaking or smear may become quite revolting. The transmitter should be separately compensated for this error. Then, if correction is needed at the sources, it too should be separately applied. Low-frequency amplitude error can also originate in the STL. If it does, the STL should be compensated separately.

Low frequency phase error

The transmitter should be properly adjusted for phase performance by means of a suitable and satisfactory low-frequency phase corrector. Not all phase compensating equipments are competent. The intent of the NTSC was that low frequency phase errors should be compensated separately in receivers and transmitters. Because this has generally been ignored in the receivers, some over-compensation of the low frequency phase in the transmitter is desirable.

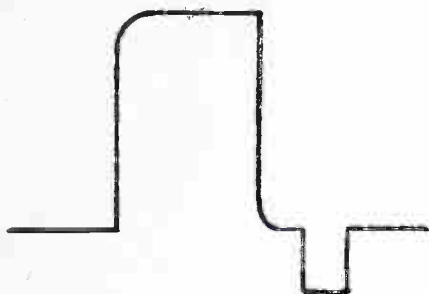
Various transmitter combinations may make it almost impossible to find a correct adjustment of low frequency phase without getting undesired waveform distortions. If this happens, it is sometimes desirable to add a time-domain type of correction to get the best results. Time domain correction, plus extra LF phase compensation, can be added to improve the quadrature distortion of the transmitter-receiver combination.

The envelope detector (diode) of the receiver generates this distortion. With the development of integrated circuitry, there may be a time when the diode detector will be replaced with a synchronous detector.



Envelope delay ringing can be seen in a $\sin^2 T$ pulse at output of system.

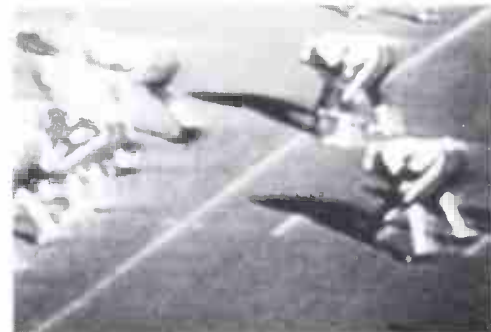
Too little low frequency amplitude, causing exponential overshoot.



Too much low frequency response makes exponential undershoot. The slow rise time will cause smear.



Envelope delay, or exponential overshoot, or a combination, causes picture error. Faults can be in telco lines or station equipment, or both.



Smear and ringing show up in final picture. Often the station equipment adds to faults in telephone lines, raising distortion to unacceptable levels.

But the predistortion will do no harm even if the synchronous detector become preponderant, because it has a crispening effect. The synchronous detector is a long time away.

Sometimes when the best adjustments are made for low frequency phase and quadrature distortion correction, the envelope delay characteristic will be outside the FCC standards. The present standards, however, are not now being enforced; the numbers are widely regarded as obsolete, and we can hope that when new standards are set they will not prevent the broadcasting of the best possible picture. CCIR report 404-1 points out that, with the optimum correction of quadrature and envelope delay, essentially perfect transmission results on the vestigial side-band system.

Envelope delay

Envelope delay is a concomitant of the finite frequency cut-off of the system and makes itself manifest by ringing-repeats. The sharper the cut-off is, the worse the ringing is. The transmitter should have compensation to match the filterplexer, the low-frequency filter required by the FCC rules, plus a stated amount to pre-distort for the cut-off of the receiver.

Because the effect is cumulative, it is necessary to make sure that the entire system is "clean." Some STLs have a very considerable amount of ringing. Obviously the STL should be separately compensated by all-pass networks. Some require as much as 80 to 100 nanoseconds of compensation. Envelope delay ringing can also accumulate on long intercity circuits. And because of sharp cut-off of local loops between the terminals and the studio or from a remote source, delay can originate.

On remotes, ringing can start right at the source, and since the VIT signals are not necessarily applied there, examination of VITs may not uncover the problem. Inspection of the picture itself may be more profitable.

Otherwise, you may find your football fields filled with additional teams. An easily switchable filter is needed to correct remotes for ringing. A multiknob beast cannot be handled.

A common source of ghosts in the transmitted picture is found in mismatch between the antenna and the transmission line. Such a mismatch results in a reflection which comes back down the line and hits the transmitter. Since the transmitter is not a match to the line, there is radiated a reflection which has a delay of twice the length of the transmission line. Transmission is approximately 1 μ second per thousand feet, so every 500 feet makes a delay of about 1 μ second, round trip.

A turnstile antenna equipped with a bridge diplexer has 90° phasing between the lines, which causes the reflection to be in such phase that it comes out the diplexer at the sound transmitter input. It hits the sound transmitter and is reflected from there, provided that the mismatch is symmetrical on both transmission lines. If it is not, there is an anomaly which should be investigated and corrected. If the reflection is symmetrical, it can be absorbed off the sound line by means of a separation filter and sink. Less expensively, it can be cancelled by time-domain methods.

Because of this situation the evaluation of the antenna can only be made on the individual lines feeding the antenna, utilizing directional couplers, because we are interested only in the signal proceeding to the antenna and being radiated there. The situation cannot be assessed by looking at the video input to the diplexer because of the dilution of looking at two lines, and because the reflection is being diverted to the sound input of the diplexer.

Every transmitter-antenna system is different and each needs a careful, correct analysis to identify and correct waveform distortion so that the picture will "hang out on the tube."

BM/E

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Model 701: Frequency and Modulation
(FCC Type Approval 3-187)

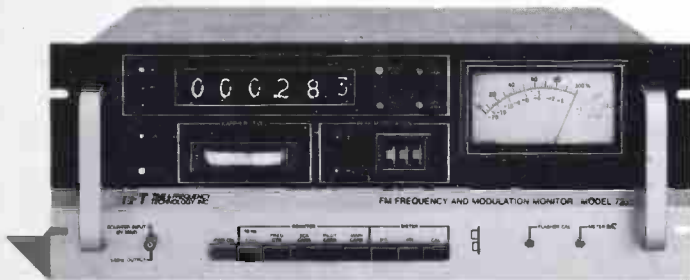
Model 702: Modulation only
(FCC Type Approval 3-189)



AM

Model 713: Frequency and Modulation
(FCC Type Approval 3-195)

Model 732: Modulation only
(FCC Type Approval 3-209)



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Model 723: Frequency and Modulation
(FCC Type Approval 3-202)

Model 734: Modulation only
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CATV/Broadband Communications Systems: Overbuild or Over-build

By O.D. Page, P.E.

Unsuccessful systems, says O.D. Page, are overburdened by excessive capital expenditures and have plants that provide inadequate reliability and performance. They also probably have ineffective marketing programs and a lack of adequate programming. He offers firm advice on how to build a good system and be successful.

The cable TV industry is, in too many cases, initially building too much fixed plant (overbuilding) and tying up necessary capital that could better be used elsewhere (overburdening the expense side of the P&L sheet). Instead, we should take the more conservative approach of building and developing fixed plant to provide known immediate and near-future needs—and become profitable that much sooner.

With those earlier profits, and the savings in initial investment, we could develop new applications and new customers for new services—then add to our plant (over-build) to provide those services at a reasonable profit. That is, we could “run it like a business.”

In many cases, too, we are not building systems with the needed reliability and performance to attract and keep our subscribers. We must pay more attention to the careful planning, development, and implementation of high-performance, high-reliability, low-maintenance systems (for example, too many turnkey system contract awards have been based solely on availability and terms of financing). Experience seems to indicate that once a subscriber is connected, he won't disconnect unless he is dissatisfied with the quality of the service (poor pictures, outages, etc.).

Down the up escalator

The FCC's long-awaited 3rd Report and Order (February 2, 1972) was generally considered a “thaw” that would unfreeze the industry. It was followed by temporary delays in Certificates of Compliance approvals to build new systems to the new rules but, by the end of 1972, a definite upturn in development of new CATV/Broadband Systems was definitely underway, particularly in and around the larger urban areas (top 100 markets).

There were the obstacles of rising interest rates and state imposed moratoriums, but the industry seems slated for continued and accelerated growth. By mid-1973, however, it became evident that some of the major MSOs were not adding subscribers at projected rates, and were not developing new franchises and investing capital

as budgeted for the year. According to many MSOs and operators, and a few editorials, they had not met their projections and budgets because the FCC “hadn't given enough” to the cable TV industry to enable them to attract the subscribers needed to justify the new investments being made. The MSOs were delaying development of their franchises—a few even giving up and returning franchises to the municipal authorities to be reissued, hopefully under better terms to the franchisee. The second half of 1973 saw MSOs making major layoffs.

All of those mid-and-latter-1973 developments have cast the industry into another “depression.” In the face of high unemployment, a shortage of capital, a slowdown of new construction, there has been a general loss of optimism and confidence throughout the industry. We are going through yet another of a series of “feast-and-famine” attitude cycles that periodically visit this very new industry—which nevertheless is still growing.

The nature of the problem?

What is happening? Is it really difficult or impossible to develop subscribers in top 100 markets, even with recent approval of the FCC to import signals, and (especially) to offer premium programming at extra cost to the subscribers?

Blaming the FCC for another recession or depression in CATV, although consistent with past practices in this industry, seems just a bit too simple. For example, how many of the systems which are not realizing projected subscriber growth were started *after March 31, 1972* and/or built under the new FCC regulations? Are the problems really caused by limited program availability? And how many systems have other serious problems—such as ineffective marketing programs; inadequate system performance and picture quality (for a more discriminating market); and/or high maintenance, repair, and system-outage costs?

And, perhaps not least of all, how many new systems are being overbuilt (provided with excess capacity) in a surge of optimism over the great potential for cable television to become, almost overnight, a new broadband communications industry with revenue flowing in from a myriad of new non-CATV services? How much unnecessary capital has been tied up in what will be idle plant

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for years to come—money which could have been used to identify and develop *specific markets* and *real customers* for the many potential services that broadband communication technology, *can* offer and, indeed, money which also could have been used for continued development of technology and improved system reliability? Perhaps we are starting too soon to try to penetrate the center-core urban areas, without the needed technology (reliability); the experience in developing systems in densely populated areas; the knowledge of the programming and special-services market; and/or the necessary commitment in capital.

Elements of success

There are many operators who *have* successfully developed CATV systems in the top 100 markets—both urban and suburban. Investigation of a few of these will reveal that they may have much in common, such as:

1. Implementation of a high-performance, reliable system which delivers clear, sharp pictures; requires little or no maintenance; and has very little down-time, year-round.

2. An adequate, but modest, amount of economically-produced and/or imported additional programming.

3. A generally high degree of interest in providing services to the community, first by becoming profitable and then by determining and filling real needs for new communication services.

Perhaps many of us should take another look at our attitudes toward this new market, and our methods of penetrating and developing it.

It is true that the days of the political franchise and the “built-on-a-shoestring” system are over, and that we now address ourselves to a much more sophisticated industry. Our technology is advancing at an exponential rate, and so are public awareness, financial requirements, and government regulation (sometimes better described as government interference). We need informed, sophisticated guidance in the areas of administration, planning, marketing, technology, finance, and system development.

However, overinvesting in CATV system plant has the same consequences as overinvesting in any other type of capital asset; an overburdened balance sheet which is not attractive to investors.

We must develop systems which adequately fulfill present and near-term requirements and which are readily expandable for potential future needs, but we must *not*, however, invest added capital in “blue sky” fixed plant which may never be used. For example, each dollar invested in excess plant capability and not used for five years would be worth \$1.61 at that time if invested at 10%, or \$2.49 at 20%! And if half of the excess plant were never needed, and the other half not needed for five years, we could afford to wait, and spend \$3.22 or \$4.98 per initial dollar to implement the needed plant in five years.

System development

Planning and development of a reliable, profitable CATV or broadband communication system involves several phases and requires the full cooperation of several agencies or interests. Each of these agencies or organizations must provide the necessary competence and support when it is needed. At each phase of development, generally one agency or organization will or

should play a principal or leading role. These phases and the indicated principal agency assuming the major or leading role during that phase are defined as follows:

Phase	Principal Agency or Organization
1. Invitation for franchise application	Municipality or lowest level of local government, with state and FCC guidance.
2. Franchise application	Applicant—prospective CATV system operator.
3. Franchise award and ordinance	Same as 1 above.
4. Physical implementation	Franchisee/operator.
5. Marketing and business development	Franchisee/operator.
6. Advanced development; future services to the community.	Franchisee/operator.
7. Continued monitoring and support of all phases; on an “advise and consent” basis.	Municipality, and appointed CATV/broadband communications governing board.

A thorough treatment of all of the above phases is beyond the scope of this paper; indeed, a complete treatment of any *one* phase would provide material for a separate paper in itself. However, each of the following sections contain a number of suggestions and comments which hopefully may provoke further thought, and perhaps even a bit of controversy leading to a more thorough examination of our industry and to its promise, problems, and aspirations:

1. Invitation for franchise applications. It is at the franchise invitation phase that steps must be taken to insure that community needs are adequately served and that a reliable, high-performance system will be installed and efficiently (profitably) managed.

It should be borne in mind that the *municipality* or *community* is the only agency or group which cannot walk away from the CATV system itself, once it is built. The *system contractor* will come in and install the system and leave. The *franchisee* or *operator* may sell the system and leave. The *FCC* and *state regulatory commissions* perform their oversight function from a distance. Even the local governing body is subject to re-election. The *community* is the one group which will and must live with the system, as long as it is in existence (and rebuilding and/or replacing a CATV system is an expensive proposition, no matter who pays).

Once an ordinance is issued, the municipality or local government can make no further demands beyond the requirements of that ordinance without the concurrence of the operator.

It is incumbent on the municipality or franchising authority to recognize and understand that the franchisee is assuming a considerable financial risk to come in and develop a system to fulfill community and government needs. It is the franchisee’s first obligation to furnish a useful service to the community. This means he becomes profitable as soon as possible. It is incumbent on the franchisee, or applicant, therefore, to refuse to accept any franchise condition which might seriously hamper him from accomplishing these early objectives. Franchising authorities must cease making unreasonable financial demands and other burdens (such as various “free services,” etc.).

The Invitation for Franchise application or Request

for Proposal (RFP) must be a complete and carefully-drawn document, and will provide the basis for the Franchise Award and the corresponding enabling ordinance. To the extent that this document is clear and complete, the ensuing enabling actions will be more or less straight-forward and routine.

The first step by the local governing body should be to appoint a CATV (or Broadband Communication) Governing Committee. This must be a *working committee* with a charter, a budget, and a schedule. There is no room for political appointees on this committee; each involved segment of the community must be compe-

tently represented, and at least one committee member should be knowledgeable in CATV technology and applications. The committee should be small enough to get something done, and large enough to represent all *significant* elements of the community.

The committee should be chartered, perhaps by the city manager and/or the city attorney and/or the mayor, with council approval, to study the community and formulate a basic Requirements Document which would form the basis for the Request for Proposals (RFP) or franchise application. The RFP should include, but not be restricted to, for example:

Table I CATV System Performance Characteristics

At Subscriber Ground Block Unless Otherwise Specified

Characteristic	FCC Requirement Sec. 76.605(a)	General Guidelines and Remarks All 6-MHz TV channels
A. Channel frequency boundaries	(1) In accordance with Sec. 73.603(a)	In accordance with Sec. 73.603(a), with added midband and superband assignments.
B. Visual carrier frequency, Class I signals	(2) 1.25 MHz \pm 25 KHz above lower boundary of channel. Tolerance increased to \pm 250 KHz if converter used.	Same. Request frequencies and tolerances on Class II signals be specified by applicants. Design objective on all tolerances should be within \pm 25 KHz.
C. Aural carrier frequency, Class I signals	(3) 4.5 MHz \pm 1 KHz above frequency of visual carrier	Same. Request frequencies and tolerances of Class II signals be specified by applicants.
D. Visual signal level (At subscriber terminal): 75 ohms 300 ohms Z ohms	(4) 1 mV (OdBmV) 2 mV $\sqrt{.0133Z}$ mV	3-6dBmV suggested at 75-ohm ground block. (more in high-ambient-signal-level areas); addition of second TV set reduces level at set by 3dB.
E. Variation of visual signal level, each channel.	(5) Not more than 12 dB and (i) within 3dB of any visual signal within 6MHz; and (ii) within 12 dB of any other visual signal on any other channel (iii) A maximum level such that degradation due to signal overload does not occur in the subscriber's TV set.	\pm 10dB Over mean temperature variation in region; \pm 1dB at any trunk amplifier output, on any channel; \pm 3dB from any adjacent signal; \pm 10dB from any other signal on the system; Same. High-level signals can be attenuated at subscriber terminal if necessary. (An overall variation of not more than \pm 7.5 dB in signal level at the set or converter is desirable.)
F. Aural signal level	(6) 13-17 dB below associated visual signal level	Same.
G. Peak-to-peak hum and repetitive transients	(7) Less than 5% of the visual signal level.	Less than 4% of the visual signal level.
H. Channel frequency response	(8) \pm 2dB within -1.0 MHz to + 4.0 MHz of visual carrier	Same. Add: <i>Transmission System Frequency Response:</i>
System frequency response	Not specified	Within (1.5 + N/12) dB where N=Number of amplifiers in cascade, in trunk; <i>Headend Frequency Response:</i> within \pm 1dB within -1.0 MHz to + 4.0 MHz of visual carrier.



Rapid location and remedy of malfunctions in major components will be a necessity in the future.

- Results of a media study of the community, probably made by a retained consulting firm;
- Requirements and desires of the medical community;
- Requirements and desires of the educational and scientific communities;
- Potential applications of broadband communications technology and facilities to security, fire and police protection;
- Requirements of other community and special interest groups;
- Minimum number of channels (waiver required if

fewer than the FCC minimum for the community), and minimum services to be provided;

- Minimum system performance specifications—the present manufacturers' and suppliers' state-of-the-art is such that most of the minimum FCC requirements can and must be exceeded, especially in the larger markets. Table I, while not all-inclusive, offers some guidelines which may be useful. A detailed Technical Study and System Definition Specification should probably be a part of the final Franchise Document.

- A list of tests to be performed on the system, at acceptance. For example: 1. Carrier-to-noise ratio; 2.

Characteristic	FCC Requirement Sec. 76.605(a)	General Guidelines and Remarks All 6-MHz TV channels
I. Carrier (Visual signal level) to noise ratio	(9) 36dB or greater	42dB or greater.
J. Carrier (Visual signal level) to co-channel ratio	(9) 36dB or greater	50dB minimum except in unusual cases. Require technical analyses to justify deviations.
K. Visual-signal-to coherent-disturbance ratio. (rms).	(10) 46dB	Cross-Modulation: 51dB minimum synchronous, 20 channels. 2nd order Intermod: 60dB min. 3rd order Intermod: 70dB min.
L. Terminal isolation (Between subscriber terminals)	(11) 18dB	30dB
M. Radiation	(12) Within FCC requirements, which are as follows: (i)—up to & including 54 MHz: 15 μ V/M @ 100' (ii) over 54; up to & including 216 MHz: 20 μ V/M @ 10' (iii) over 216 MHz: 15 μ V/M @ 100'	Same.
N. RF susceptibility	Not specified by FCC	Headend system; 60 dB attenuation to any external signal, 0-300 MHz. Transmission system; 80 dB attenuation to any external signal, 0-300 MHz, (Greater than 100 dB isolation desirable, especially at lower frequencies).
O. Operating temperature range		Must meet specs over mean annual temperature range in region (Weather Bureau statistics). Must function over maximum annual temperature range in region.
P. Echo-suppression	Not specified	Displacement up to 2 μ s: 40 [1 + 0.462 log (1/2)] dB displacement greater than 2 μ s: 40 dB.
Q. Bi-directional return performance specifications	Not specified	Require applicants to provide performance specifications and test procedures for evaluation and review.
R. Protective measures against corrosion	Not specified	Require applicants to specify/describe. Refer to any technical reports on local conditions on subject.



New equipment can expedite system maintenance and analysis. This Jerrold/Texscan visual strength meter can view the sequential response of all carriers instantly.

Burn-in at the manufacturer's plant is fairly standard as this photo shows. Some operators routinely do an additional burn-in after receiving equipment and before installation. (All repaired items also get a burn-in before being reinstalled.)



Subscriber signal levels; 3. Cross-modulation; 4. Hum-modulation; 5. Frequency response, system components; 6. Terminal isolation; 7. Radiation; 8. Susceptibility to electrical and RF interference; 9. Echoes (ghosts); 10. Picture quality (viewing at levels equivalent to high and low temperature limits). Applicants should be required to furnish detailed test procedures and specifications:

- Provision for inspection of the plant for quality of workmanship, perhaps by the city engineer, who should be provided with the budget and capability (through outside consultants if necessary) to do so. Applicants should be required to furnish system installation standards;

- Provision for continued monitoring and inspection of plant operation and management; performance testing schedules; etc., as determined necessary;

- Estimated or suggested rate-structure range;

- Required or desired franchise fee, and method of payment;

- A list of desired optional features, to be priced. Applicants should be invited to propose additional services and/or system capabilities with pricing data;

- Rights of the franchise holder;

- Rights of local governing body plus reference to state and FCC requirements;

- Length of franchise period;

- Required financial data, proformas, management organization, experience, etc., of applicant (see state and FCC requirements);

- Other pertinent clauses required of a Franchising Ordinance of this type by the local government charter or constitution, and to conform to state and FCC requirements.

Outside consulting and advisory agencies should be used to provide all competence and experience necessary to the formulation of a complete, clearly-written document. The result will be efficient enactment and implementation of a well-written ordinance, and the design, installation, and management of a reliable system which will provide indefinitely, with updating, for the community's needs.

Note also that these guidelines should apply where a franchise is being renewed, and system is being rebuilt.

2. Franchise applications phase. The primary responsibility of any franchise holder is to provide useful services to the community, and to make a fair profit in doing so. Most or all of these services will have been specified, if the municipality offering the franchise has followed the guidelines set forth in 1. above. To the extent that the municipality may not have done so, it is incumbent, nevertheless, on the applicants to follow through and to completely define the services to be provided to the community, with applicable schedules and costs, and the physical plant proposed, with detailed descriptions, performance specifications, and test procedures.

Those franchise applicants who do not have proven in-house capability would do well to retain outside professional support for this critical phase.

Since the physical plant must be designed for high reliability and minimum down-time, this should require, particularly in major markets, serious consideration of stand-by power provisions. In a well-designed and well-maintained system, upwards of 70% of the system down-time will be due to local power failures. A status-monitoring system is also recommended—this capability

would be used, as a minimum, to monitor the levels of two or more channels at each critical amplifier location (e.g., all trunk stations) and to report any amplifier or power supply on stand-by status. If either or both of these features cannot be economically provided initially, system design should be such that they can be added later, at minimum cost, when subscriber saturation has reached a predetermined point.

Applicants will want to conduct their own media surveys, in conjunction with any which might have been provided by the franchising authority, particularly to obtain data for projection of subscriber penetration levels. A considerable intimate knowledge of the community is a prerequisite to preparation of a good franchise application proposal. In addition to market survey data, interviews should be conducted with leading citizens; key members of government; fire and police chiefs; leaders in the religious, medical, educational, business, and scientific communities; and leaders of other key special-interest and community-oriented organizations. From the data thus gathered, a long-range projection of potential broadband communications requirements can be made.

If these steps are taken today's franchise applicants will be more inclined to offer a proposal which is business-oriented and which will avoid the initial "give-away" programs; excessively high capital commitments, and marginal system designs of the past.

3. Franchise-award ordinance. FCC and many state regulations require that all franchise applications be placed on file for public review for a period of time and that public hearings be held prior to award of a franchise. During this period of time, the CATV Governing Committee will evaluate all proposals, requesting clarification as necessary, and conducting public hearings. All non-responsive proposals will be rejected, and the most attractive proposal will be accepted for incorporation into the franchise ordinance, which will also contain all of the information and provisions listed in 1. above. Not all of these factors will be given equal weight in awarding the franchise; special attention must be given to proven records of successful business management; CATV management and community service; physical system design for future expansion, reliability, and performance; and adequacy of financial and capital resources, as examples.

The best proposal is not necessarily the one which offers to spend the most money, or which offers the most in financial consideration or equivalent to the franchise authority—those provisions will generally tend to burden the business financially, and tend to reduce the probability of success or profitability of the business.

The ordinance should provide a means whereby the CATV Governing Committee can cooperatively monitor and review performance, in all phases, with the franchise holder. Further, provisions should be made for periodic review of conditions, and negotiation of the provisions of the ordinance, as required to insure continued satisfactory performance of the franchisee and adequate service to the community, and to provide the franchisee with useful inputs related to present and potential future services he may be able to provide to the community again on an "advise and consent" basis.

4. Physical system implementation. After the ordinance becomes law, the franchise holder will obtain necessary Certificates of Compliance from the FCC and

where applicable) from state and other governing bodies, and will obtain local pole attachment agreements and rights-of-way as required. Next he will finalize detailed system performance specifications and select a tower and headend site preparatory to the design, installation, alignment, and initial proof-testing of the physical plant. This may be the most important phase of system development, in terms of high subscriber penetration, financial success, and community service. Certainly it is the most important from the standpoint that, of all of the characteristics of the business, the physical plant is the most difficult and expensive to change once it is installed. Procedures, policies, rates, terms, ownership, programming, management all can be readily changed through agreement; not so the plant. Physical plant changes will almost always require delays, disruptions, and much added capital.

The franchisee who does not have in-house experience in physical implementation of large CATV systems would do well to retain professional help during this phase. In too many cases the tendency is to hire a chief engineer and let him build the system, which is all well and good if the new chief engineer happens to have extensive experience in both the design and installation, and the operation and maintenance, of large CATV systems. These capabilities and types of experiences are seldom found together.

Competitive bidding to a well-written specification is an essential element to insure best system performance and reliability at minimum associated cost. Too many systems have been built by the bidder offering the best financing plan, or any finance plan, and in many cases the results were as could have been predicted—poor system performance and reliability. Nothing must be permitted to compromise the performance and reliability of the system. And a good system implementation plan begins with a complete, well-defined set of specifications and a set of accurate strand maps of the area.

After the contract is awarded, progress must be monitored and workmanship inspected continually to insure that the necessary quality is being built-in during the installation period. Complete proof-testing, performed and witnessed by qualified engineers, is a necessary element—indeed the test procedures and specifications will themselves, to a large extent, determine the performance of the system.

Performance and reliability levels of the system must be determined to be acceptably high before subscribers are connected. Excessive outages will lose subscribers, who are then unlikely to reconnect.

5. Near-term marketing and applications development. The initial marketing effort will be the most important phase of the entire marketing and application program. At this phase of development of our CATV industry three types of marketing are involved:

- Subscribers
- Advertising/local origination
- Premium TV and other services.

The most significant and immediate area for attention is, of course, subscriber marketing. Mainly, the difference between systems which realize 20 to 25% initial subscriber penetration and those which realize 40 to 50% is attributable to the difference in their marketing programs, from public relations to subscriber drop installations and first billing. It is good advice to retain professional marketing counsel for guidance, training,

and initial sales promotions. The professionals should leave an adequately-trained staff for continuing sales efforts.

Advertising sales must work towards a long-term, gradual build-up and acceptance by local merchants and others of CATV as a medium to help build their business.

Premium-television sales techniques may closely resemble those of subscriber sales, and may well be carried on at the same time, by the same people. Care must be taken in choosing a premium-TV system. Reliability of service is again an essential success factor, along with good programming.

6. Advanced development/new communication services. Initial efforts in the development of a new system should be directed to building sales in known markets: subscribers; some local advertising; and premium-programmed TV. Then it will be time to start developing new ways to serve the community when the business is paying its bills, and preferably showing a profit.

The franchisee should commit a percentage of his profits to the development of new applications and new services in and for the community. Marketing surveys will lead to experimental installations, some of which will develop into useful and profitable new applications of the broadband communications system. The operator can then "go to the bank" and add to his physical plant, if necessary, to provide the new services.

Advanced development activities of this type should continue throughout the life of the franchise, and should be coordinated closely with the local appointed CATV Governing (or Advisory) Board.

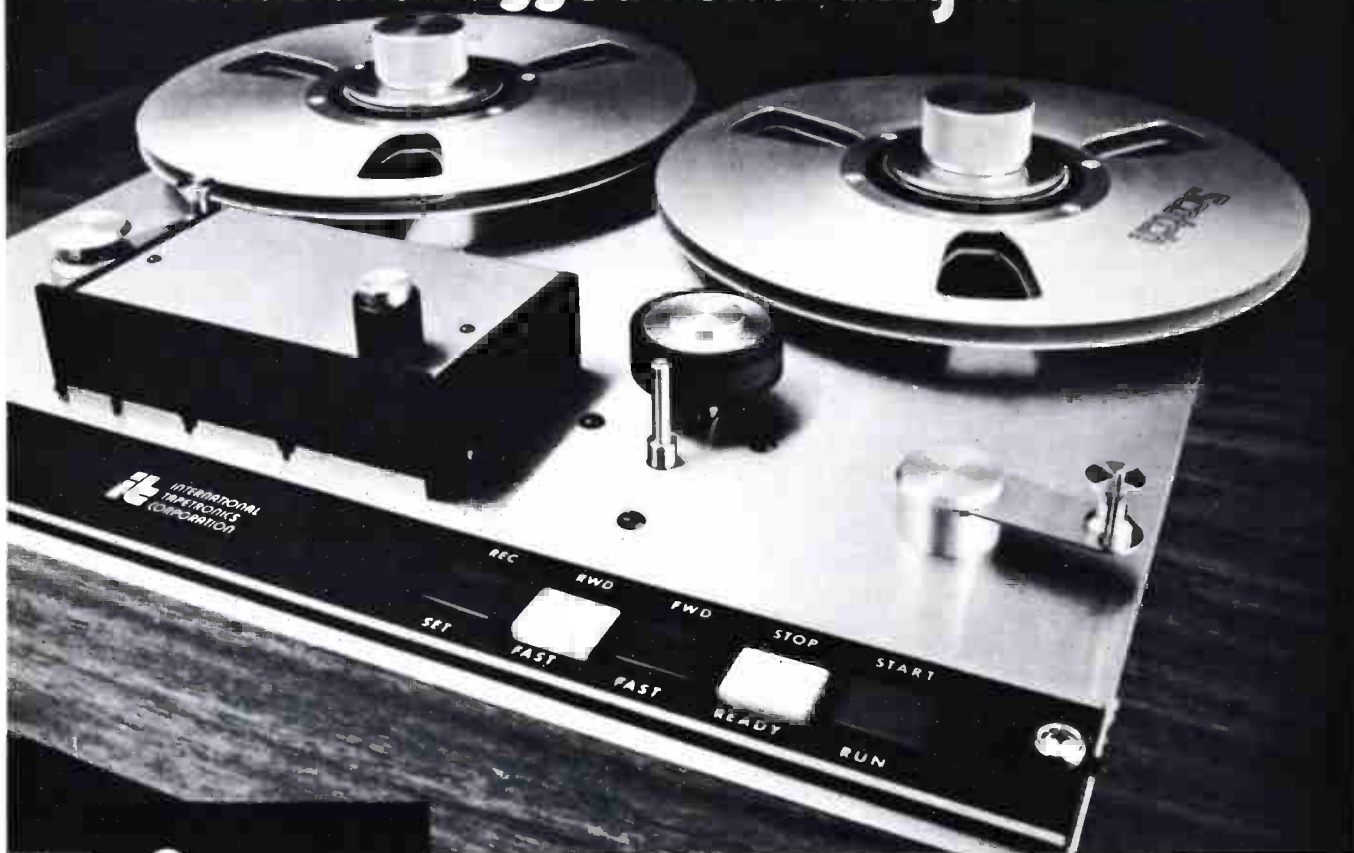
7. Monitoring by local CATV Governing Board. After having written the franchise application RFP and the franchising ordinance, the local CATV Governing Board should go on to play an active part in the continued development of broadband communications services for the community. This should continue to be a small, working committee, with the basic functions of working closely with the system operator to develop new applications for cable, and monitoring the performance of the cable system itself.

The Governing Board should be provided with a budget, from franchise fees, and should be required to meet at prescribed intervals and publish reports to the community. The chairman could be a professional city employee (such as the city manager), a local leader in communications media, a professional consultant retained for the purpose—particularly if he is local, or perhaps a knowledgeable member of the local educational community (such as the head of the Department of Electrical Engineering of a local college).

Hopefully, this brief discussion of the seven phases of CATV system development will serve as a basis for the establishment of much more detailed plans by those who will be developing new systems (or rebuilt systems) in their communities. Hopefully, some of the pitfalls of the past can be avoided. Successful implementation of a modern-day urban or suburban CATV system requires that a wide variety of professional capability and experience be brought together in a cooperative effort. The CATV/broadband communications industry can continue to grow and contribute to the welfare and well-being of the communities involved. Let's get back into our positive attitudes and continue to build good systems.

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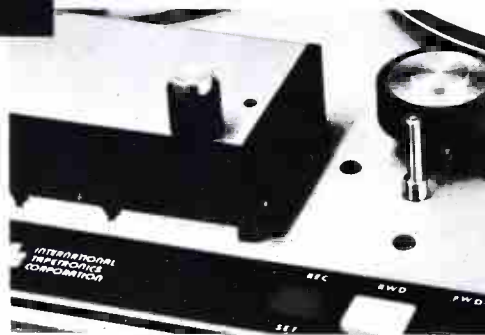
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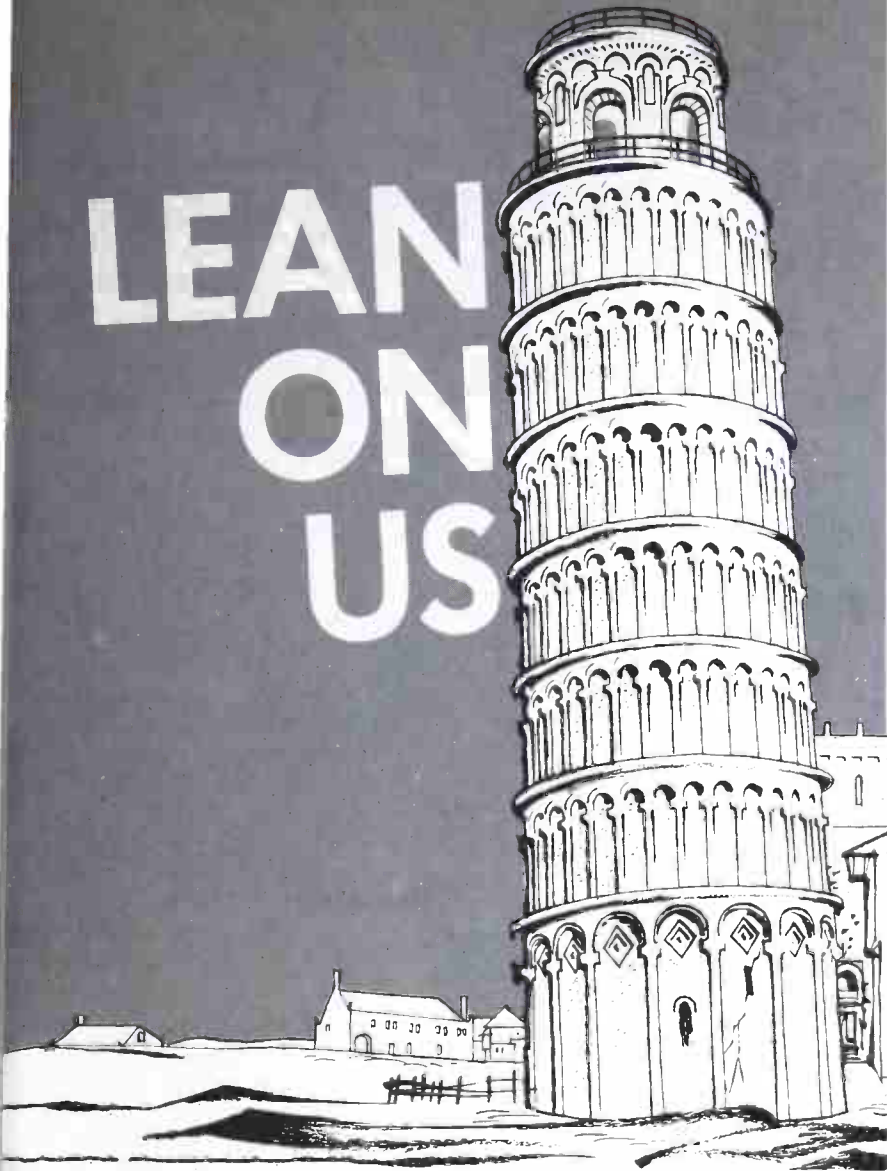


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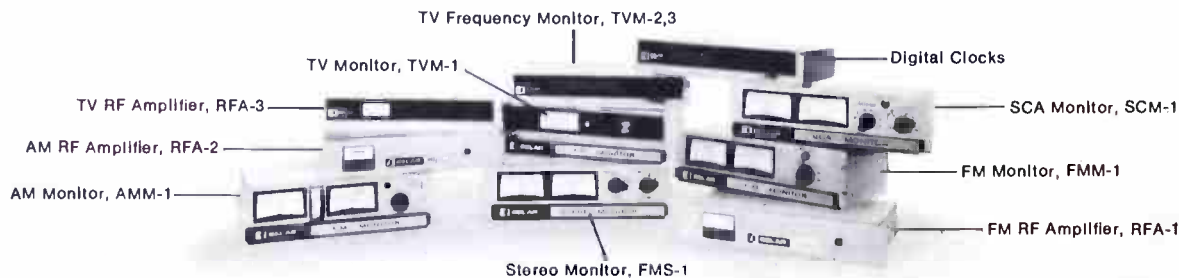
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After years of being unhappy about this lack of circulation for front-line engineering experience, *BM/E* decided that one way to improve matters would be a contest which would stimulate engineers to send us their ideas for publication. In addition to the recognition, we'd give a significant prize for the idea that readers vote the best. *But our primary objective is not to winnow out a few "best" ideas.* We think publication of a substantial volume of good ideas is the important thing, both for the advancement of the industry and for the satisfaction of justified pride on the part of their creators.

Subjects can touch on just about every facet of station technical operation and design. The following list is *suggestive only*, to show the breadth of the acceptable field:

- A particularly efficient way of using telco lines for remotes;
- Preventive maintenance of tape recorders, etc.;
- Simplifying directional antenna measurements;
- Modifying existing equipment for higher quality, greater flexibility;
- Simplifying the monitoring operation;
- Giving news announcers the best technical backup;
- An ideal studio layout for . . . ;
- Getting top performance from . . . ;
- Automatic switching without a full-blown automation system;
- Assuring top quality throughout a stereo audio chain;
- Efficient control unit for remote news pickup crew;
- Solving the ground loop problem in audio equipment;
- Protective measures for antennas and transmission lines;
- Equipment and procedures for maximizing station security;
- Simplifying proof-of-performance measurements;

- Practical methods for improving studio lighting;
- Chasing an elusive noise source;
- Smart ways of meeting FCC requirements.

We repeat: This list is simply to start your thinking; it is *not* a specification. The actual range of possibilities could run into many scores of items.

How it works

Readers are invited to send us descriptions of their favorite engineering creations, technical solutions, or clever how-I-solved-it ideas right now. We will publish all accepted items, beginning with the January 1974 issue. Each month readers will rate the published items on a merit scale of 0 to 10. Highest ranking items will be republished in the issue of December 1974 for a final overall vote. Winners will be informed in February and announced in the March 1975 issue of *BM/E*.

Prizes and awards

There will be one winner in each of four categories: AM (5kW and below); AM (above 5kW); FM; and TV. The prize for each of the winners will be a six-day Windjammer Cruise in the Caribbean for two. (See rules for locations and dates.)

In addition, nine Certificate of Merit awards will be presented: **Audio** (four awards)—TV, FM, AM (Class I or II), AM (Class III or IV); **RF** (four awards)—same classes as audio; and **Video** (one award)—TV. Author of each entry accepted for publication will receive a \$10 honorarium.

Words to the wise: Enter early

Your brainstorm may be a winner, but only if you tell us promptly. We are sure that many good ideas have occurred to more than one engineer. Unfortunately, we will not be able to publish duplicative material.

Rules for BM/E's Great Idea Contest

1. Eligibility: All station personnel are eligible. Consultants to the industry may enter if the entry indicates the specific station or stations using the idea or concept. Manufacturers of equipment or their representatives are not eligible.

2. How to Enter: Use the Official Entry Form on this page or simply send *BM/E* a description of your work. State the objective or problem and your solution. Include diagrams, drawings, or glossy photos, as appropriate. Material must be legible but need not be directly reproducible—although camera-reproducible material is preferred. Length can vary, but should not exceed 1000 words. *BM/E* reserves the right to edit material. Entry should include: Name, title, station affiliation, and the class of station—TV, FM, AM (Class I or II), or AM (Class III or IV). Indicate if idea is completely original with you.

3. Material Accepted for Publication: *BM/E* editors will make all decisions regarding acceptability for publication. If duplicative or similar ideas are received, *BM/E* editors will judge which entry or entries to accept. A \$10 honorarium will be paid for each item published.

4. Voting. Every reader of *BM/E* is entitled to rank the ideas published. This can be done on the ballot in the magazine or by letters or cards sent to the *BM/E* office. A reader can judge one or all ideas published. Readers must assign a point score to each idea on a scale of 0 to 10: e.g., if you think an idea is excellent, score it 10; if you think it is without merit, score it 0; if you like it but want to discriminate, pick the appropriate number between 1 and 9.

5. Winners. Relative ranking of each month's entries will be published after 60 days. Top-rated entries for various categories will be republished in December 1974 for a second and final round of scoring. Final winners will be picked in February 1975 and notified by mail. Winners will be published in the March 1975 issue of *BM/E*.

6. Prizes and Awards. Four top prizes will be awarded—each a six-day cruise for two on a Windjammer in the Caribbean.* Cruise awards will be one each in categories of TV, FM, AM (Class I and II), AM (Class III and IV). In addition, highest ranking entries will receive a *BM/E* Certificate of Merit award, one each for the following nine categories: TV, RF; TV, Video; TV, Audio; FM, RF; FM, Audio; Class I and II Radio, RF; Class I and II Radio, Audio; Class III and IV Radio, RF; Class III and IV Radio, Audio.

*Between months of May to November, choice of cruises: Bahamas, Virgin Islands, West Indies. Deck Cabin accommodations. Travel to and from port cities of Miami, San Juan, or Virgin Islands not included. Authors of top-ranked items will receive Windjammer Cruise information in November 1974.

Entry Form for BM/E Great Idea Contest—1974

Mail to: Editors, *BM/E*
274 Madison Avenue
New York, New York 10016

Name _____ Title _____

Station Call Letters _____

Address _____

City _____

State _____ Zip _____

Licensee _____

Class of Station: TV _____ AM (Class I or II) _____
FM _____ AM (Class III or IV) _____

Title of Entry _____

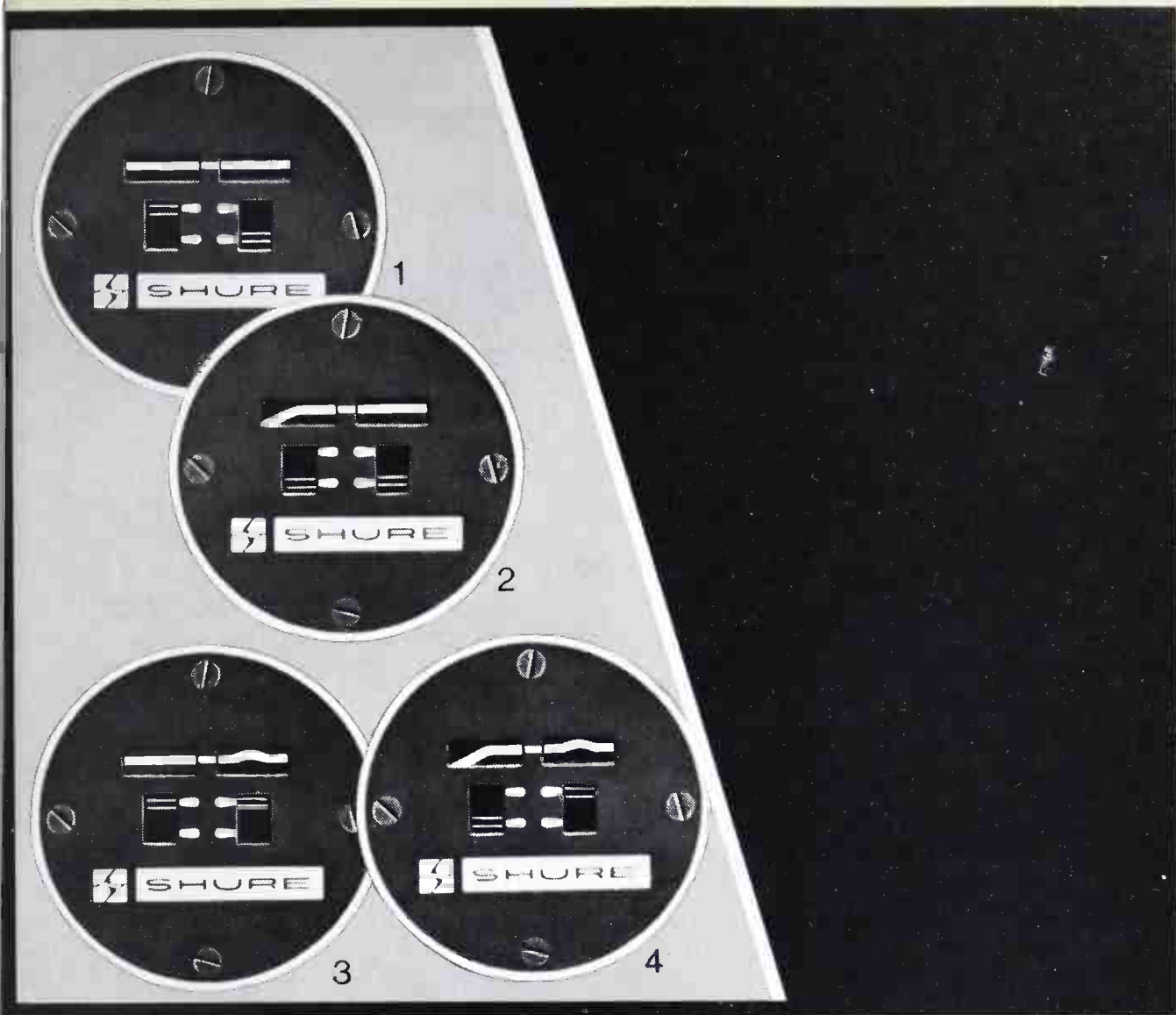
Objective or Problem: (in few words; use separate sheet for details) _____

Solution: (use separate sheet)

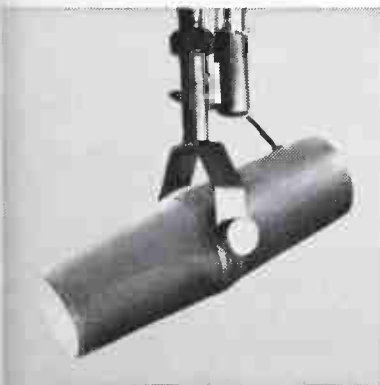
I assert that, to the best of my knowledge,* the idea submitted is original with this station; and I hereby give *BM/E* permission to publish the material.

Signed _____ Date _____

*If you feel credit for prior work or antecedents should be given to someone outside of the station, indicate to whom and when



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Entries in the Great Idea Contest—February 1974

The ideas are flooding in! Engineers across the country are responding to BM/E's invitation to submit their original solutions to problems for publication, with a chance for the Windjammer Cruise prizes.

Engineers!

- Read the ideas—maybe you can use one.
- Vote—use ballot on page 62.
- Send in your own ideas—see contest rules on pages 53-54.

4. Automatic Burst-Phase Corrector

Myles H. Marks, Engineer, WIIC-TV, Pittsburgh, Pa.

Problem: VTRs today do almost everything automatically—except set the burst phase, which must be adjusted manually for each tape played. A few IRE units more or less than standard chroma saturation is not nearly as objectionable as the burst phase being off a few degrees. This problem is amplified when a series of tapes from different sources must be edited together.

Solution: A vertical interval reference signal (VIR) has been discussed, but not yet established. The proposal is to replace this with a VIT consisting of $\frac{1}{2}$ line of Cyan and $\frac{1}{2}$ line of Magenta. This choice is made because in a standard color-bar presentation these hues contain equal amounts of Blue. If

the burst phase varies, an amount of Blue is subtracted from one color and added to the other.

As a tape is played, this two-colored test signal is demodulated and processed, and the Red, Blue and Green components separated. The phase of one test hue (Cyan or Magenta) is inverted and it is added to the other. Then, if the burst phase is correct, the Blue signal should be zero. Any other value will be an error signal, indicating how much the phase is off and in which direction—positive or negative. The error signal can be applied to the burst phase control circuit, to shift the phase until the error voltage nulls.

5. Head-Clog Indicator For VTRs

William Gramling, Engineer, WRC, Washington, D.C.

Problem: On all commonly used quad VTRs, there is no indication of a clogged head while recording until the machine is stopped at the end of the program. Making a protection copy on another machine is not always possible and is expensive in any case.

Solution: The cue track on the tape is not normally used and is available for use as a clog detector. For this purpose, the cue-erase head circuit has

a switch installed so the erase can be disabled. The video band will remain in the cue track during recording. The cue head circuit is also modified so the head can be switched to remain in the playback mode during recording. The output of the cue track is amplified, noise-clipped through a diode and fed to the input of a scope. The display is a horizontal line with narrow pulses on it. The pulses represent video bands passing over the cue head. A clogged head will show as a missing pulse in the series. The video head can be cleared to save the rest of the program. The missing of a pulse can be made to sound an alarm with the use of an "and" gate. The height of the pulses can be used as optimizing indicators.

6. Locating Tripped Circuit Breakers

Dale M. Dwelley, Transmitter Technician, KPIX, San Francisco, Calif.

Problem: With a large bank of circuit breakers on one panel, it is hard to find quickly the ones that have tripped.

Solution: Put brightly-colored adhesive tape on the back sides of the control handles. When a breaker is ON, the tape is out of sight. A tripped breaker stands out clearly.

7. Viewing the VIT Signal

Walter E. Pfeister Jr., Microwave Engineer, Eastern Microwave, Inc., Syracuse, N. Y.

Problem: Vertical Interval Test signals are widely used for signal degradation analysis in television broadcasting, CATV, and CCTV. However, because

continued on page 58

How do you judge them?

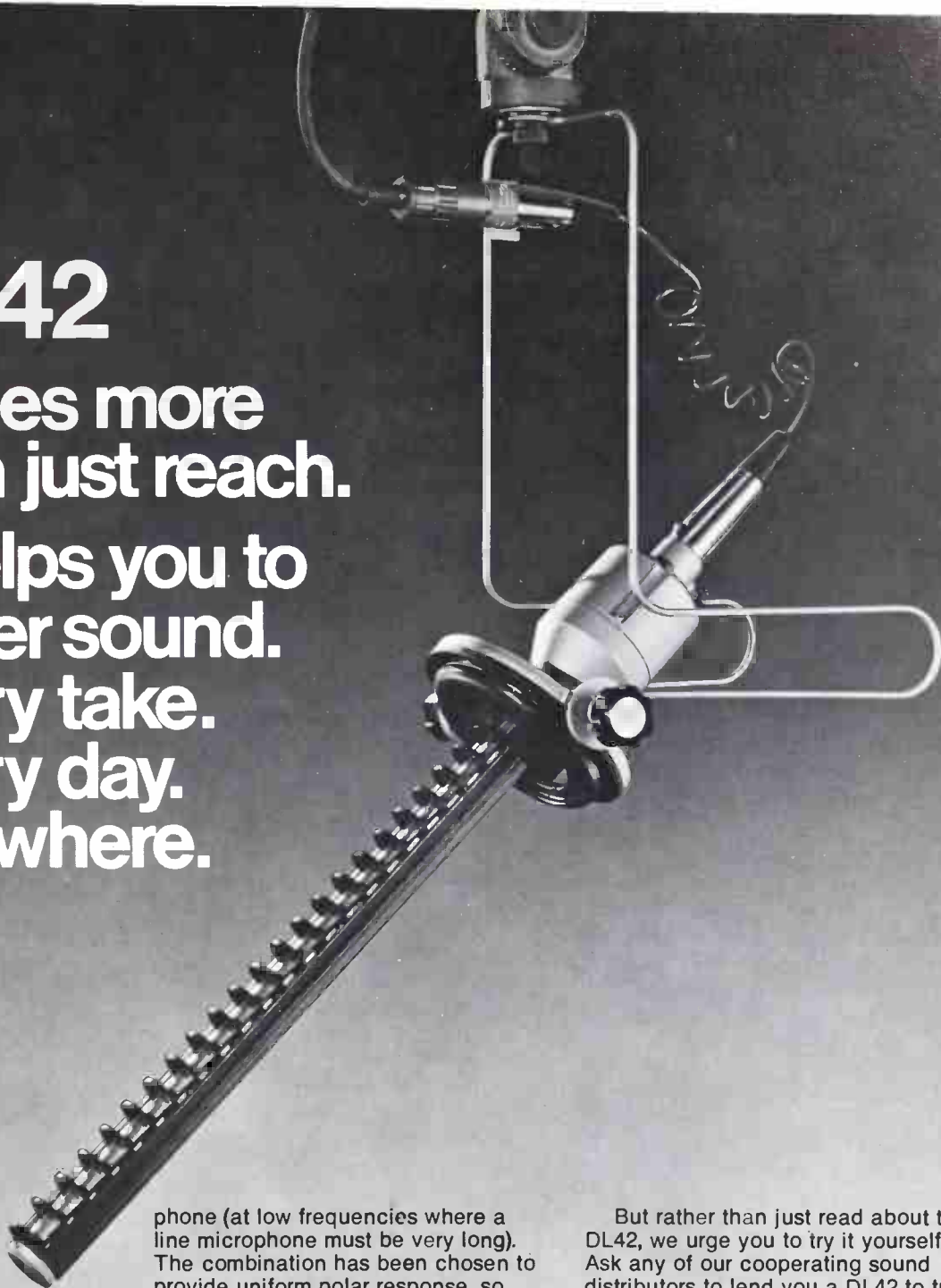
Rate these ideas for us now on the Great Idea Merit Scale. Rate all of the items on a scale of from 0 to 10. If you think the idea is excellent, score it 10; without merit, 0. You can rate all items the same using whatever number you think appropriate, or you can discriminate and rate each one differently. We encourage you to rate all ideas, but you need not if you feel unqualified to rate some. Use the form at the end of this section and mail it to the editors, or write your ranking number on the Reader Service Card in the space "Tell us what you like . . ."

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Every take.
Every day.
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Weight has been reduced to 1/4 of the 642... even less than most highly-directional condenser microphones. And size has been shaved wherever possible. The DL42 is a unique combination of line microphone (at the high frequencies) and cardioid micro-

phone (at low frequencies where a line microphone must be very long). The combination has been chosen to provide uniform polar response, so important to consistent sound quality. Off-mike pickups even sound good (although lower in level), a particular advantage to documentary units and free-wheeling shows where the unexpected is always happening.

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But rather than just read about the DL42, we urge you to try it yourself. Ask any of our cooperating sound distributors to lend you a DL42 to try on your next production. No cost or obligation to serious professional users. Write today for a DL42 technical data sheet. Good reach with good sound. We think you'll like what you hear.



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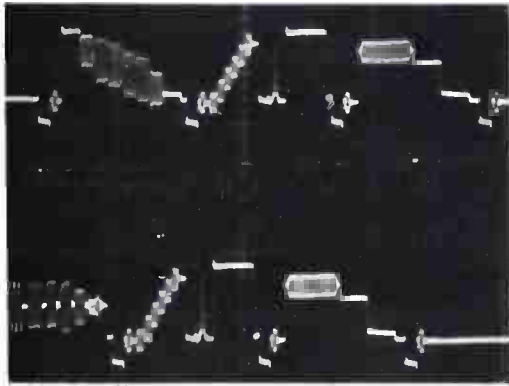
DL42 Cardiline® Dynamic unidirectional microphone including shock-mounted bail, noise-isolating coil cord, screw-on handle for hand-held use, Acoustifoam™ 2-piece windscreens, and carrying case, \$300 suggested professional net.

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of the non-repetitive nature of the VIT in field 1 as compared with that from field 2, direct observation of the signals without the use of a specially designed video waveform monitor has been nearly impossible with normal techniques.

Solution: Since the VIT signals are repetitive compared with the rest of the video signal, careful triggering technique will produce a stable display. It may be necessary first to remove all subcarriers with proper filters, and at least one volt of video is desirable.



VIT of WOR, New York, viewed in Syracuse by technique described. Top, lines 17 and 18 of field-1; bottom, field 2.

With the signal applied, the VIT should be expanded to the full screen width. At first a double image will appear, with the scope jumping from one to the other, since the trigger circuit does not know the difference between the two fields.

Set the vertical input selector to "alternate trace." The scope will lock to one of the fields. Jumper the two vertical inputs together. Field 1 will appear on one trace, field 2 on the other. Both will be rock stable. With this arrangement the time length of each sweep acts as an electronic delay for the other field. This technique has worked well with the Tektronix Model 422 scope and a Telequipment D-67.

8. Adding Variety to ID Slides

Phil George, Switcher, KTPS, Tacoma, Wash.

Problem: To give variety to slide IDs.

Solution: Simply put two slides in the holder—one a scenic, seasonal, or holiday slide, the other clear except for the station's identification. This draws on all the scenic slides in the library for variety. Paper mounts are desirable.

9. Preventing Accidental Voice Circuit Disconnects

Jerome Zuckerman, Engineer, WXYZ-TV, Southfield, Mich.

Problem: At remote pickups of basketball games and other sports, the ball, or a player, occasionally hits the phone button, disconnecting the voice circuit.

Solution: Drill a small hole through the phone button, and insert a nail or pin to keep it in the "connect" position.

10. Sharpening Video From Studio Cameras

Armand Sperduti, Contracting Engineer, American Video Corp., Tucson, Ariz.

Problem: With an image enhancer in the upcoming year's budget, some means was needed to sharpen the video from studio cameras for the fairly long period before the enhancer could be installed.

Solution: Cameras in use were GE Model TE-201s, but the method should work with all similar types. The RGB encoders on these cameras are switchable between three- and four-

tube operation. With the green signal input of the encoder looped to the luminance input, and the encoder switched to four-channel operation, a substantial luminance enhancement was added to the video output of the camera chain. While this is not true luminance enhancement, it will work well in almost all situations.

11. Operating Audio-Follow-Video Relays from Switcher Tally Lights

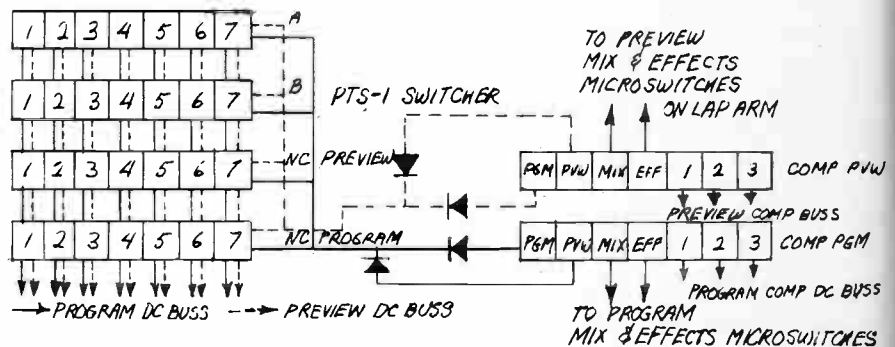
Dennis L. Hill, Engineer, KMEG-TV, Sioux City, Iowa.

Problem: To develop a simple system for operating audio-follow-video relays from the switcher tally light voltages.

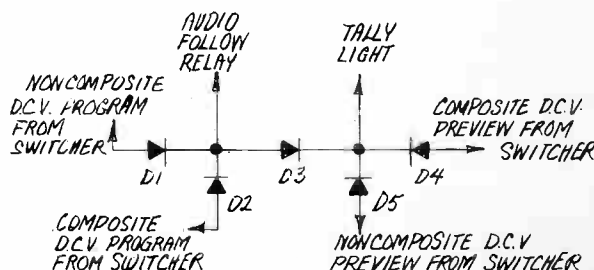
Solution: With an RCA PTS-1 switcher, simple diode logic was built in. Very little modification of the switcher was needed. The switcher has a program composite bank, program non-composite bank, preview composite bank, and preview non-composite bank. There is also an "A" and "B" bank used for mix or effects, which could operate on the program composite or preview composite.

There were buss lines for the pro-

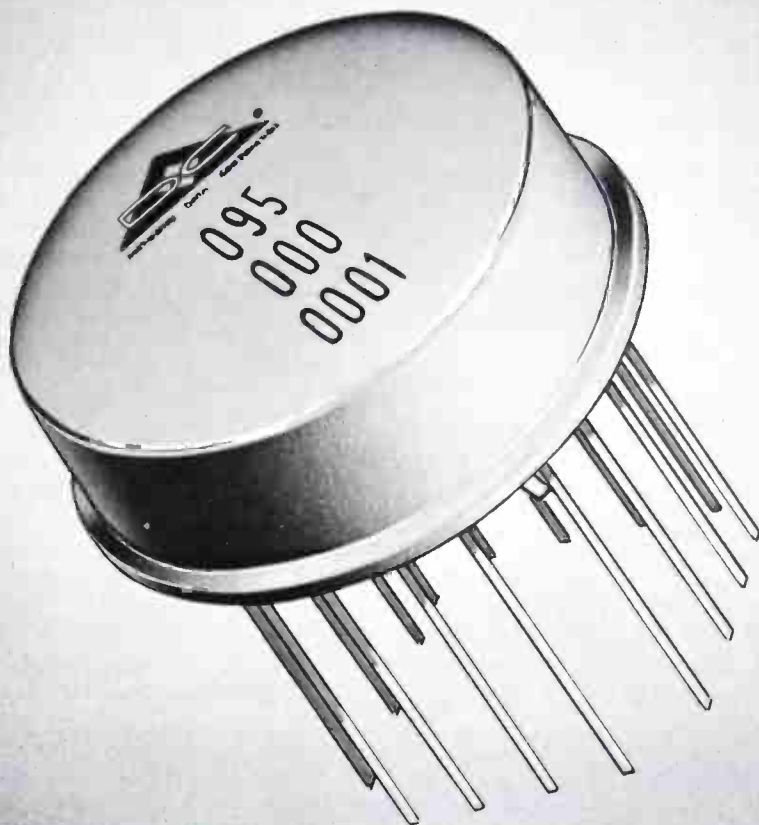
continued on page 60



Connections of busses in PTS-1 switcher as modified by Engineer Hill for audio-follow-video system, with relays tied to tally lights.



Basic logic circuit in audio-follow-video system for one audio and video pair. The circuit must be adapted for each switcher to which it is connected, but the basic logic remains the same. Circuit is repeated for each program pair to be handled.



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gram tally; busses for preview tally were added. The unit has many spare contacts which can be used for the additional busses, as shown in Fig. 1. The basic logic circuit is shown in Fig. 2. This handles one audio and video source, and is repeated for each additional audio-video source. This circuit is not necessarily for all switchers, but illustrates the basic idea. The same diode logic would be used in all cases.

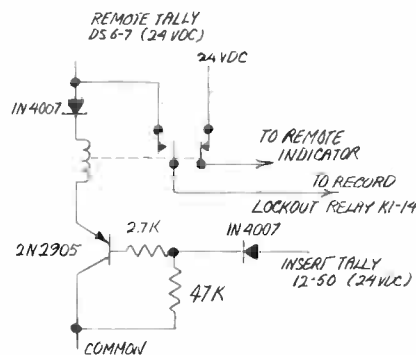
In the circuit, D1, D2, D4, and D5 are isolation diodes to prevent any interaction between voltages feeding back from the program bank to the preview bank, and vice versa. D3 is forward biased when a program button is pressed and lights the tally light and closes the audio-follow relay. D3 is reverse biased if any preview button is pressed, which allows the tally light to light, but does not operate the audio-follow relay.

12. VTR Editing Safety Circuit

Sal Mazzara, United Nations, UN Headquarters, New York, N. Y.

Problem: Using the Datatron 5100 automatic editing system and two Ampex 1200B VTRs, the record machine in the edit mode is placed in

“Insert” and “Remote Control.” After a section of editing is completed, it is checked, which means the system must be taken out of the “Insert” and “Remote Control” modes. If editing is resumed and the “Insert” mode is inadvertently not re-entered, the VTR will record normally and erase the pre-recorded control track, sending hours of previous editing down the drain.



Protection circuit for VTR senses “Insert” tally light, locks out the VTR if Insert mode has not been established.

Solution: An “and” gate (see circuit) was installed on the VTR control panel. The circuit senses the insert and remote control voltages, and drives a recording lockout relay if the electronic editor has not been placed in

the “Insert” mode. There is a remote indication of this record inhibit on the Datatron control panel.

13. Inexpensive Audio-Follow-Video System

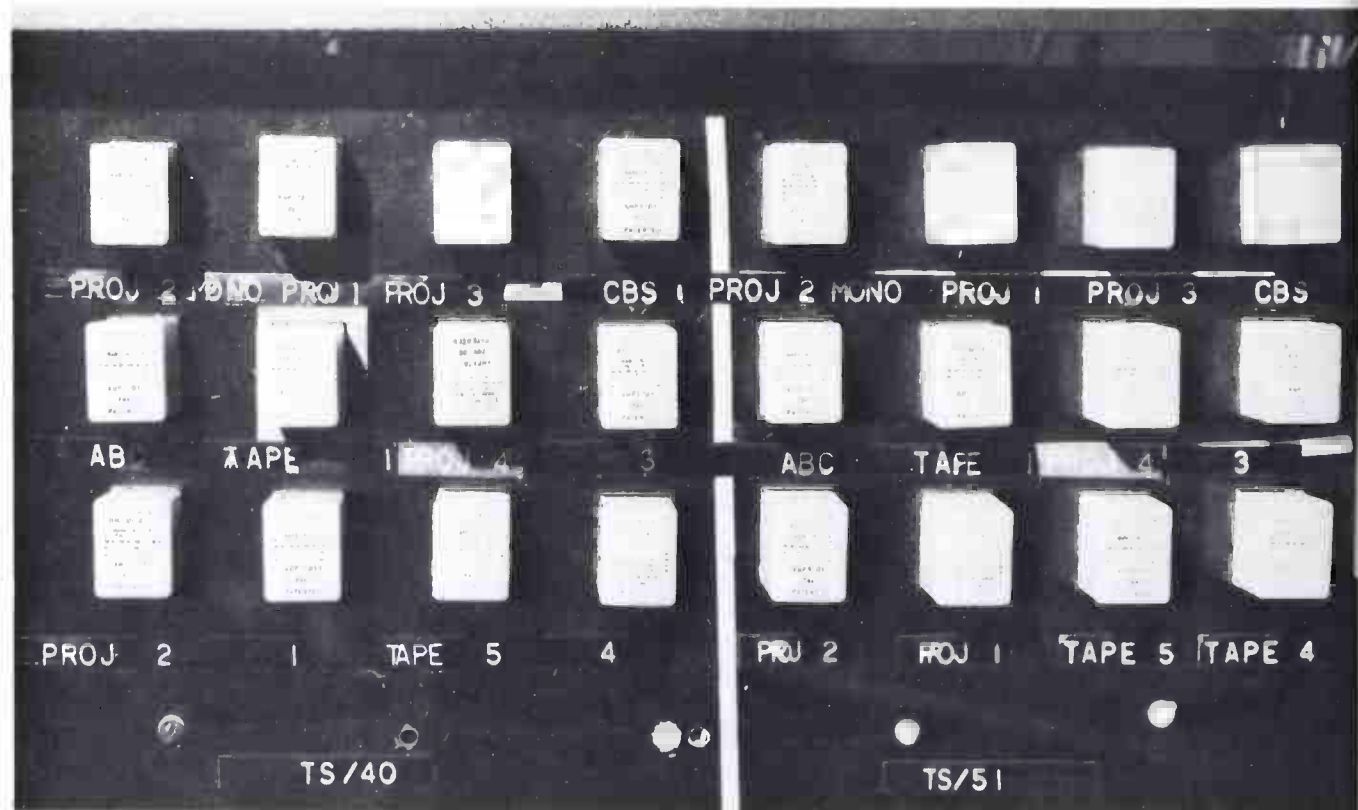
George Grubbs, Production Manager, KNOE-TV, Monroe, La.

Problem: To build an inexpensive audio automation for a local TV station (audio-follow-video) that is reliable and virtually maintenance-free.

Solution: Relays for the audio sources are connected in parallel, with one relay for each source that accompanies a video signal. (See circuit diagram.) The relays are operated by the tally voltages on the video switcher. (Editor’s note: With quite similar objectives, this entry uses somewhat different means from those of Entry No. 11.) Audio output is fed to a single pot on the audio control.

Network and videotape programs present no problems: each has a single video and single audio signal. There are usually two film projectors on the film chain, both feeding the same video output button on the switcher. While one projector is being aired, audio from the other is muted with an addi-

continued on page 62



Audio program relays in audio-follow-video system developed by Engineer George Grubbs for KNOE-TV are driven by tally voltages on video switcher. System also controls multiplexer mirrors on telecine units, to switch from one 16mm projector to another.

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tem at KNOE-TV has been virtually maintenance-free in three years of use.

14. Eliminating Noise In FM Automated Tape

Stephen R. Waldee, Technical Director, KPEN, Mountain View, Calif.

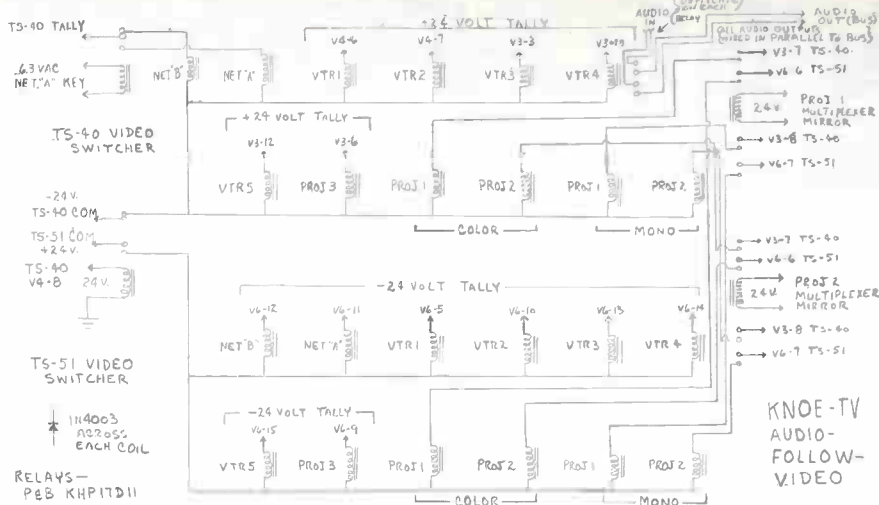
Problem: Often automatic FM stereo stations using considerable compression and limiting sound noisy to the listener because the compression raises the cart background level, may even make the low-frequency cue tones audible. At KPEN, even with an Ampex recorder with 60 dB S/N ratio, 20 dB of compression was making cart noise audible and emphasizing the "recorded" nature of the programming—automated "pop" music.

Solution: The basic scheme is to employ compression when making the recordings, rather than when playing them back on the air. When on the air, only a small amount of peak limiting is used.

The decision was that 20 dB of compression was unnecessary since pop records are already heavily compressed. Additional compression cut down on the liveliness and bite of the music, the brilliance of brass and cymbals. KPEN decided to control only the soft openings and closings that with some selections would trigger the automatic silence sensor, and to equalize the overall loudness of different styles of music.

I designed a simple compressor with a ratio of 2½ to 1, to apply about 6 to 8 dB of gain reduction on the average. Maximum peaks on tapes were held to VU. A peak limiter was installed ahead of the cart recorder, which has very little headroom for peaks. Calibration carts and reels were made so overall recording level could be kept even. Each reel and cart machine is checked monthly to make sure output is exactly 4 dBm. Adding this to the carefully processed tapes, average level and loudness are highly consistent. The peak limiter at the transmitter is set to prevent over-modulation, not to control program level. Tape hiss is almost inaudible and cue tones are no longer evident at the end of each musical selection and cart.

Further, compression release time is a gentle four seconds so that the gain riding is almost inaudible. Off the air, the sound is extremely close to straight, uncompressed recordings, far livelier than the usual "blandness" heard from so many radio stations.



Bank of P&B KHP17D11 relays in KNOE audio-follow-video system are labelled as to audio sources.

tional relay driven by voltage from the multiplex mirrors.

When two inputs are mixed by a lap dissolve, audio from each source is automatically cut 50%. An audio fade amplifier can be used to prevent an abrupt ending of the audio when cutting out of a film, network, or videotape.

If a station adds an automatic system like this one, the old manual system should be left in place. There may be times when audio should remain on the air while the director

wants to program other video, as when putting on a "difficulty" slide during network video trouble. The engineer can use the manual system to keep the audio on the air.

A station building this system should add several extra relays for future equipment growth. The system as a whole can be built for \$50 to \$100 in easily-obtained parts, and it will greatly reduce make-goods for commercials that lost audio. Audio will be smooth and consistent, with audio and video matching at all times. The sys-

Rank each idea on a 0 to 10 scale on the form below, or write your ranking on the Reader Service Card in the back of the magazine in the space "Tell us what you like . . ."

Great Idea Contest
 BM/E
 274 Madison Avenue
 New York, N.Y. 10016

Here's my ranking on a 0 to 10 scale of the February Great Ideas.

- | | | |
|---|---|---|
| 4. Burst-phase corrector | [|] |
| 5. Head-clog indicator | [|] |
| 6. Locating circuit breakers | [|] |
| 7. Viewing VIT signals | [|] |
| 8. Variety for ID slides | [|] |
| 9. Preventing voice circuit disconnects | [|] |
| 10. Sharpening camera video | [|] |
| 11. Audio-follow-video system | [|] |
| 12. VTR edit safety circuit | [|] |
| 13. Audio-follow-video system | [|] |
| 14. Eliminating cart tape noise | [|] |

Name _____ Title _____

Station or Company _____

Enter Your Own Great Idea Now. You May Win a Windjammer Cruise. See Contest Rules.

CME

CABLE MANAGEMENT | ENGINEERING

Supplement to BM/E
BROADCAST MANAGEMENT/ENGINEERING

FEBRUARY 1974

Problems in Serving Urban Markets—Part I

- **Rockford Designs a Single-Hubbed System**
- **Dual Trunk Feeder at Stockton**
- **The Manhattan "Jungle" Experience**
- **Planning for the Philadelphia Suburbs**
- **Plan Envisioned for Portland/Multnomah County, Oregon**
- **Urban Cable TV's Near Term Future: Telecommunications LDS**
- **Interconnection and Subdistricting**

The Care and Feeding of Your VTR and VideoTapes

Problems in Serving Urban Markets—Part I

Conditions today call for planning ahead but minimizing the initial investment. Urban markets have to be built in stages. Decisions made at Rockford, Stockton, and Manhattan are described. Plans for Philadelphia suburbs and Portland are outlined. Part II will look at advances towards broadband networks.

Ed. Note: See also article "CATV/Broadband Communication Systems, Overbuild or Over-Build," by O.D. Page in *BM/E* section.

Wiring urban markets poses a number of problems. A priority question in 1974 is just how much investment should be made in the plant to accommodate the future. This entails decisions regarding channel capacity, provisions for upstream transmission, trunking for dedicated (point-to-point) service, subdividing the area to minimize amplifier cascading (and to provide local neighborhood channels) etc.*

Surprisingly, it's harder to make these decisions today than it was two years ago when *CM/E* addressed itself to the problem of Wiring Markets 51-to-100. Two years ago cable operators anticipated that new applications, such as upstream data transmission, point-to-point services, two-way order, and maybe interactive TV, were right around the corner. This made it easy to decide to put in dual trunk cable and, in some instances, dual feeder cable. Trunk amplifiers that would accept plug-in reverse amplifiers were specified; line extenders that already included bypass filters for two-way were routine. Although it might cost an extra \$2000 a mile to plan for tomorrow, this seemed the less expensive way to go than

*Including all items spelled out in the February 12, 1972 FCC Cable Television Rules.

to pull or string a second cable later, change amplifiers later, etc.

Today it's harder to make that decision. Because of the high cost of money it seems wasteful to install capacity which may not be used for years. In 1974, it is clearer than it was in 1972 on the need for two-way transmission. A few miles of upstream video appears to suffice for the present. Use of the midband is usually a necessity, but a 26-channel converter is generally more than adequate. Data transmission is strictly experimental and there are no for-sure markets—not even for fire alarm or burglar intrusion services. Premium TV can be offered on one-way systems. Interactive TV is five years or more away.

Thus operators are questioning the judiciousness of putting in dual trunk now, except possibly from a central school building or the town hall to the headend. The cost of stringing the extra cable will be offset by the savings of interest on capital. Norm Penwell, G. Norman Penwell & Associates, is even beginning to question the inclusion of two-way filters the first time around. The investment is not heavy and the labor to do it later would be high, but there are two reasons to defer: 1. better designs will be available when the reverse feature is eventually needed; 2. there will be some deterioration of circuits during the unused years.

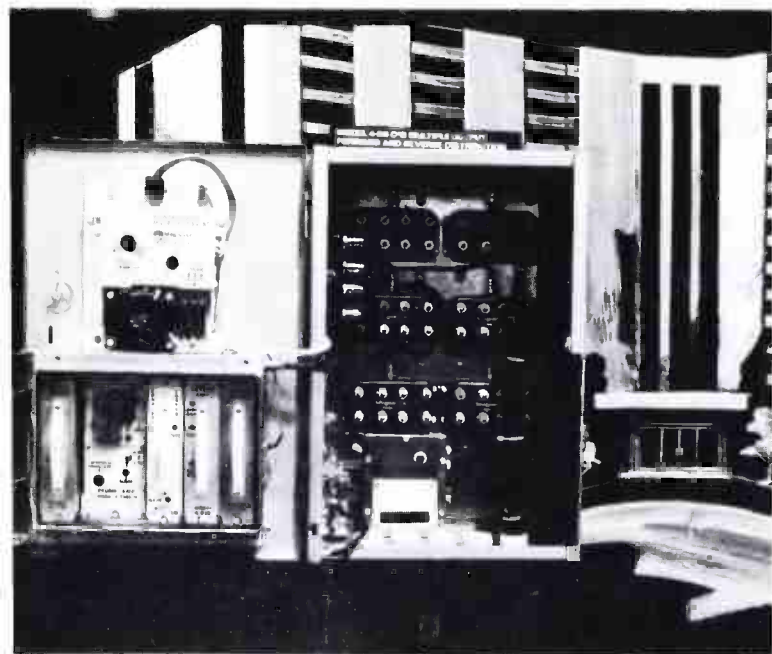
For some cities there are good and sufficient reasons to go all out the first time and examples for doing so can be found. For some markets, dual cable to the home

Ed. Note: In Warner Cable Corp.'s recent decision to withdraw financial support for the Dayton (Ohio) franchise, one of the factors was the requirement for a dual cable system to every subscriber's home (which Dayton adopted after seeing Warner's Akron plant). Warner said it would not build such a system in 1974.

rather than the use of a converter seems sound. It goes without saying that one can plan a system so that it can be converted readily to full capacity. But there are growing reasons for not installing tomorrow's plant today.

It's hard to make the right decision because at the same time the pressure from franchising authorities to install full capacity state-of-the-art system is high.* It thus becomes necessary for franchise holders (and potential holders, i.e., bidders) to demonstrate, not only to

*Cities are more tractable now than they might have been six months ago because they realize that some investments will not pay off at this time and that capital cannot be raised.



A distribution system for apartment houses is always a problem. Above unit was taken by Magnavox to the Western Cable Convention to sample the market. It turned out to be more elaborate (expensive) than most operators wanted.

themselves but to the city, the optimized course to take. This, by necessity, means a full disclosure of investment, revenues, cash flow, etc., and much more of a partnership relationship than the arm's length, almost adversarial stance that the two parties have been taking.

Indeed some consultants who are trying to overcome current financial problems facing cable owners, and the attendant delay to cities in progressing toward new and extra services, are suggesting very close partnership arrangements whereby the city itself may undertake to capitalize the cost of all or part of the system. But more on this subject later.

Not all operators are proceeding with great trepidation

Rockford Designs a Single-Hubbed System By James Wright

Rockford, Illinois, is located some 90 miles WNW of Chicago, and would be considered a "far-fringe" reception area for the Chicago TV stations. The FCC Rules allow the importation of two independents, plus ETVs, into this market, which consists of two UHF and one VHF stations, i.e., all three networks.

The potential size of the Rockford CATV plant is estimated to be 800 miles, and our goal is to build this as a single-hub system, consisting of four independently-fed quadrants. By carefully considering system costs, and after analyzing the possible uses for forward and return channels, we selected a system design which would pass 54-270 MHz in the forward direction and 5-30 MHz in the return direction, on a single cable.

After studying the "noise" and "triple-beat" problems on a 30-channel forward system, and the "noise" accumulation problem on the return system, and after establishing "worse-case" noise and distortion limits for the system as a whole, we began a study of available amplifiers. At that time (late 1972), *nobody* had an amplifier which could meet our specifications for an 800 mile, single-hubbed system. One manufacturer (Magnavox) did have a family of amplifiers in development which showed promise of doing the job. For several compelling reasons our choice was to go with this amplifier despite the fact that it had not been proven in the field. These amplifiers use the IC chip in both forward and return modules and, because of the high output capability of the chips, allow a very efficient system design in terms of amplifier locations per mile of feeder cable and overall cost per mile.

The trunk cable chosen for the system was another "unproven" item in that, at the time the selection was made, no such cable was in existence. This was the 3/4-inch size of the Fused-Disc design by General Cable. Here again superior electrical specifications aided us in making the choice. Subsequently, we discovered a unique characteristic of this type of cable in that dents, and even kinks or cuts, in the sheath do not affect its transmission characteristics over the band of interest, if the damage is between the discs and no water enters the cable.

In the interest of connector integrity, as well as cable longevity, we employ double expansion loops, one on each side of each pole and outside of any equipment. This eliminates cable fatigue problems and also removes most of the forces that act on the connectors. Through

Mr. Wright is electronics systems manager for CATV of Rockford, Inc.

and concern. There are new urban systems coming on stream that promise to be good revenue producers and thus are likely test beds for newer services. Systems that have recently become operational in these categories are Rockford, Ill., and Stockton, Calif. They fairly reflect the state of the art today—workable state of the art, that is.

The systems at Rockford and Stockton possibly have surplus capacity because there was no great concern that the market could not support such systems. Other markets, already well served by a number of strong over-the-air signals, present more of a risk and operators are careful not to invest more than needed.

this isolation of forces and the use of quality connectors with insertion sleeves, installed with torque wrenches, we feel that we are constructing a very "tight" system, which will *stay* "tight."

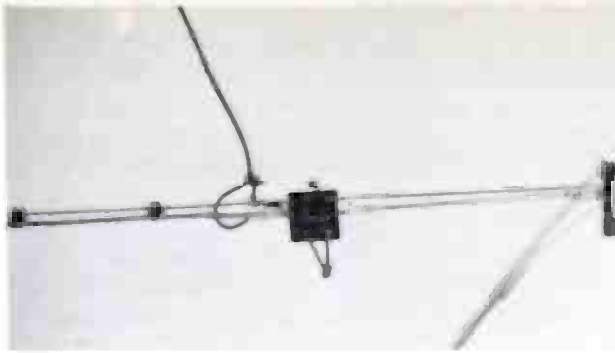
A two-way system will not work unless it is "tight" through to the TV set terminals. To attain this integrity our selection of drop cables is limited. We can use the 8-mil-thick, bonded-construction type (sometimes called the cigarette fold), through to the wall-plate, and then a braid-foil-braid flexible cable from the wall-plate to the matching transformer. To prevent this 8-mil cable from failing due to flexing we chose the messengered version for the aerial "drop" and added 6-inch fatigue loops at each attachment point. Connectors selected were the



Note how expansion loops are formed. Other construction details are shown.



Construction detail showing splitters and line extender amplifiers.



Dual loop is used at tap unit for drop cable which is fragile due to 8-mil shield.



A fatigue loop is also put in drop cable at house attachment.

long-ferruled, hex-crimped versions, and the TV-set matching transformers incorporate both high phase balance and high-pass filtering.

We believe our approach is sound but we have had a difficult job in forcing the construction and installation contractors to adhere to our construction specifications. Only time will tell how we're succeeding; however, we do have a return system comprised of seven cascaded trunk amplifiers and two cascades of two extended amplifiers that is operating. This serves about seven miles of feeder cables and perhaps three hundred "drops." (These eleven amplifiers and 300-plus "drops" comprise our return system at present and therefore our exposure to potential RF interference.) A T-8 transmitter feeds through four of these 1:1 amplifiers to a T-8 receiver at the hub where the signal is patched to any of several forward channels. The signal-to-interference ratio appears to be better than -70 dB under our present operating conditions.

Our system incorporates a CARS-band microwave feed. From a 380 ft. tower, 15 miles towards Chicago, we transmit three Chicago TV stations to a 70 ft. tower atop our Hub building, via three MA-12 G Microwave Associates radio systems. We achieve a fade margin of 42 dB which is nearly 3 dB per mile, a most necessary margin in view of the rain-profile for this area. To date we've had one identifiable rain fade and this covers a period from June 1 to December of last year.

Dual Trunk Dual Feeder At Stockton

By Ronald T. Lask

Big Valley Cablevision, now in construction in the City of Stockton and the County of San Joaquin, California, is unique inasmuch as it is the first fully-active dual-cable, bi-directional system to be built in a top 25 television market.

At present we have approximately 150 miles of system completed out of a total of 550 planned. We are constructing additional plant at the rate of 20 miles per month. Our marketing effort began in September and is

Mr. Lask is chief engineer of Big Valley Cablevision, Inc., Stockton, Calif. Big Valley is an affiliate of Continental Cablevision, Inc.

adding subscribers at the rate of approximately 1200 per month. Our franchise area includes approximately 56,000 homes, so we are optimistic about the prospects of the future of cable communications in the City of Stockton.

Because we have two-way capability in both the trunk and feeder components of the system, bi-directional communications is possible from any point within the system. Two cables, of course, expands the capability of the VHF television receiver from 12 to 24 without the need for a converter.

Prior to designing the plant layout, our personnel spent several months studying the demographics of the

Big Valley's Communication Center uses telephone poles to support the overhang of the building and entrance pergolas. Crossarm design of pergolas, and the use of strand and dual cable between the poles and at entrance walkway, stresses communications aspect of building.



ity. We decided that to fully utilize the two-way capability of the cable communications system it would be wise to design not one master system but, in fact, six smaller systems each serving broad common interest neighborhoods. The boundaries of these six neighborhoods, identified as sub-systems, were determined by a number of factors including minority and ethnic group concentration, location of elementary schools, boundaries of school districts, and various city and county political district lines.

Each of the six sub-systems are connected to our principal Communications Center by a virgin super trunk. This plan allows each of the sub-systems to do programming independently or in concert with any or all of the others. It also means we have the capability of providing services to any one, or all, of the six broad common interest neighborhoods at any given time.

Before beginning construction, much research and thought was given to the problems of installing and operating a fully reverse dual-cable system. It is our plan to be able to operate six video channels in the upstream direction. Little industry experience was available due to the relative newness of two-way dual cable technology.

The headend was designed to obtain greater than 85 dB isolation between A and B cable inputs. E.I.E. (now a division of RCA) distribution equipment was chosen, thereby giving us a single-housing, dual reverse amplifier with greater than 80 dB isolation between the A and B cable including integral diplexers.

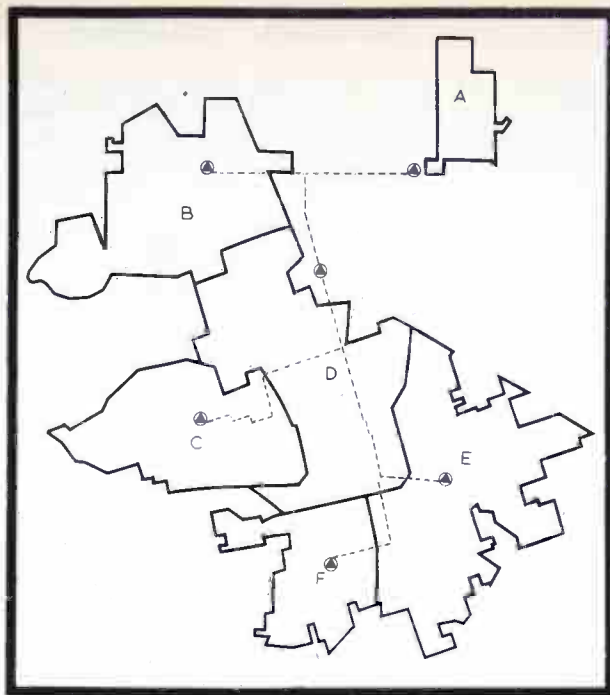
To minimize cross-talk between the two cables, preshielded connectors with stainless steel insert sleeves are being used. A Utility Tool Co. coring tool is used to insure proper installation of the stainless steel sleeve.

All construction, except the stringing of strand and cable, is done by our own splicers and technicians to insure tight quality control. As an extra precaution against co-channel beats between A and B, all B cable processing equipment is phase locked to a cable at the headend.

Each of the six sub-systems utilize a hub concept design to reduce the amplifier noise build-up in the reverse trunk. Early reverse system tests indicated that protection from radio frequency interference (RFI) is necessary. Such RFI problems are substantially reduced by proper "F" connector installation. As an example, our engineers tested a three-foot length of cable (RG-6) using the Belden SEED test device. The RF effectiveness was only 50 dB. The cable was removed and the connectors recrimped. The RF effectiveness was improved to 60 dB. We then put new "F" connectors on the cable, being careful to maintain good shield continuity. The RF effectiveness of the cable was improved to better than 80 dB. Thus we obtained a 30 dB improvement just by remaking the connectors in the hands of a skilled technician.

We expect our two-way flexibility to be put to use particularly in the education area. We are presently involved in several educational programs.

The University of California is currently microwaving live instructional programming from their campus at Davis (Calif.), located just west of Sacramento, to our Communications Center. Students at the Center are able to interrogate the professor using a telephone return system. The classes currently being offered are advanced courses in urban development, water and sewage treatment, and other subjects designed primarily for city and



Map shows how Stockton area was divided into six subdistricts. Section D is served by the Communication Center headend. Sub-headends are at A, B, C, E, and F.

county employees. Phase two of this program will provide for insertion of the live forward direction programs into the cable system for carriage on a mid-band private channel to the University center here in Stockton with the same live student response return capability back to the main campus at Davis.

Three additional educational programs are currently being developed. A program with the Stockton Unified School District, if approved by the Federal Government, will allow a full bi-directional test of our system and its capability as an instructional aid in the area of remedial reading. The program is designed to begin in the southwestern portion of the city which is primarily black residential.

The University of the Pacific, located in Stockton, has a plan which would establish neighborhood learning centers throughout the community for graduate and post-graduate courses. These learning centers would be fed via cable communications. Federal funds are being sought. Incidentally, students from the University of the Pacific attend classes in our building as part of the course offered in communications at the University.

The third program, which will be publicly-announced in January, is the most ambitious test of interactive cable communications services to date. We are not at liberty to divulge additional information on the program at this time except to say that a major funding institution will announce a program designed to fully test the interactive capabilities of cable television using the Stockton system.

Cable television, as we all know, has promised much, but for a myriad of reasons has delivered little beyond the traditional entertainment service. It is our hope that the \$8,000,000 Stockton system currently being constructed will become a pioneer in developing more fully the potential of cable communications in many new areas.

The Manhattan "Jungle" Experience

Manhattan, the concrete-on-top-of-rock turf for Tele-Prompter Manhattan and Sterling Manhattan, presents a fantastic array of urban problems. The two systems have come up with interesting solutions in their ten years of

experience. Some are exportable—others will probably remain, to the relief of others, uniquely Gotham City problems.

Among the unique problems in Manhattan are those associated with trunking under city streets and tunneling from the street to an apartment. Another is interconnection and subdistricting (which is discussed in a separate section). Apartment house subsystems ought to have something in common with those of other cities, but even in this area, Manhattan high-rises are rather atypical. Nonetheless, not all New York apartment buildings are skyscrapers and, even when they are, what you do on the 40th floor is pretty much the same as the 4th.

Actually, TPT doesn't make a big distinction. It now cables a ten-story building about the same as it does a high-rise. This is a shift away from the practices of a few years back. When *CM/E* visited TPT in 1971 (April, *CM/E*, page 4), it was common to locate a feeder amplifier on the roof of a low-story building and run cables down outside walls to individual apartments. Now most everything is done inside in stairwells. As described in 1971, the trunk cable is nearby in a sidewalk amplifier vault. (Trunk cable goes through underground ducts owned by Empire Subway Corp., which has its own franchise with the city. Trunks are directed from these understreet ducts through shortcuts to the sidewalk vault and then back again along the same path to the main duct in a "hemstitch" pattern.)

When TPT is ready to wire an apartment, it subcontracts the job of trenching and pulling the cable from the sidewalk vault to the apartment (or from one apartment to another when that is possible). Inside the apartment, TPT installers take over.

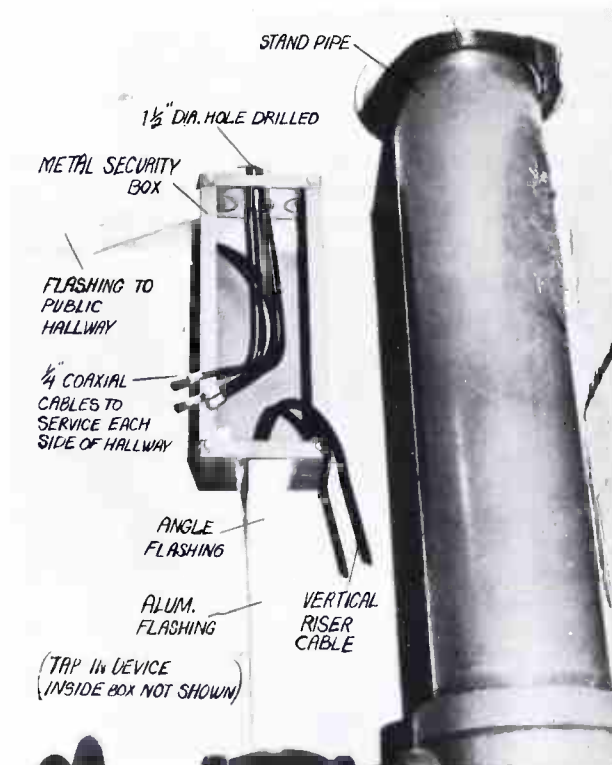
As the illustrations show, the vertical riser cable is one-half inch coax located behind doors in the fire stairwell. Aluminum ducts conceal the cable, which makes for a neat appearing installation and one that discourages vandalism. One-quarter inch coax is fed from the stairwell terminal back into public hallways. This coax is strapped to a molding channel, which is installed all along the hallway. Subscriber taps are usually located over apartment doors. A two-inch strip of aluminum molding (color matched to the hallway) snaps into place to conceal the cable and the tap-offs. The entire installation is neat and unobtrusive.

TPT has made a practice of equipping larger apartments that desire it with a security camera aimed at the front door. Any subscriber can see who is at the front door by viewing channel 1 on his TV set. The security camera signal is fed directly into the distribution system via the security box terminal located nearest the front door.

TPT is just now equipping one apartment complex for the elderly* with a complete two-way system. Each apartment has a terminal for feeding audio and video back into the building distribution system so that it might become a "studio." Occupants of all other apartments can view this program. Typical use does not envision more than one apartment being a video originating point at a given time, but the system is fully capable of two-way from every terminal. A diagram of the system is shown.



Vertical risers are installed between floors in fire stairwells. Aluminum ducts conceal the cable.

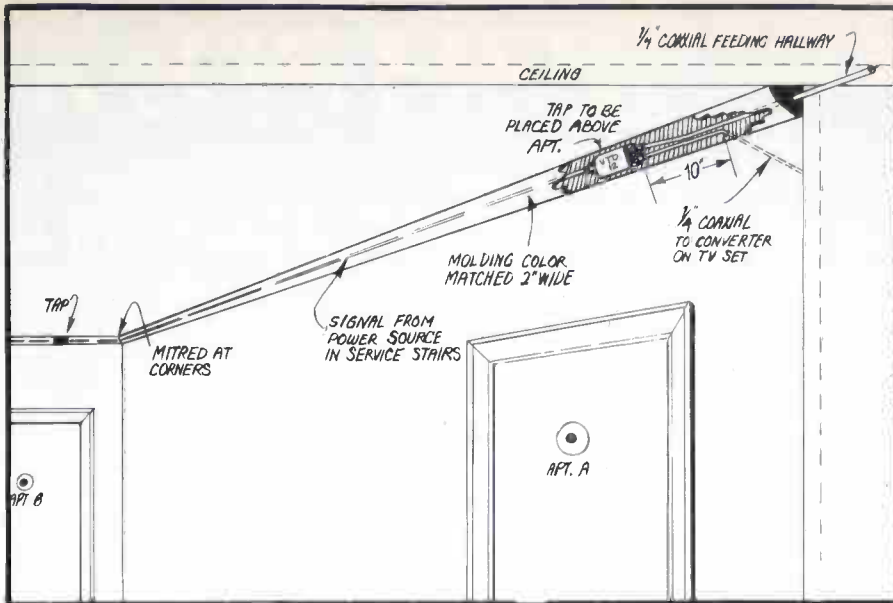


This photo and callouts show details of a typical security box installation.

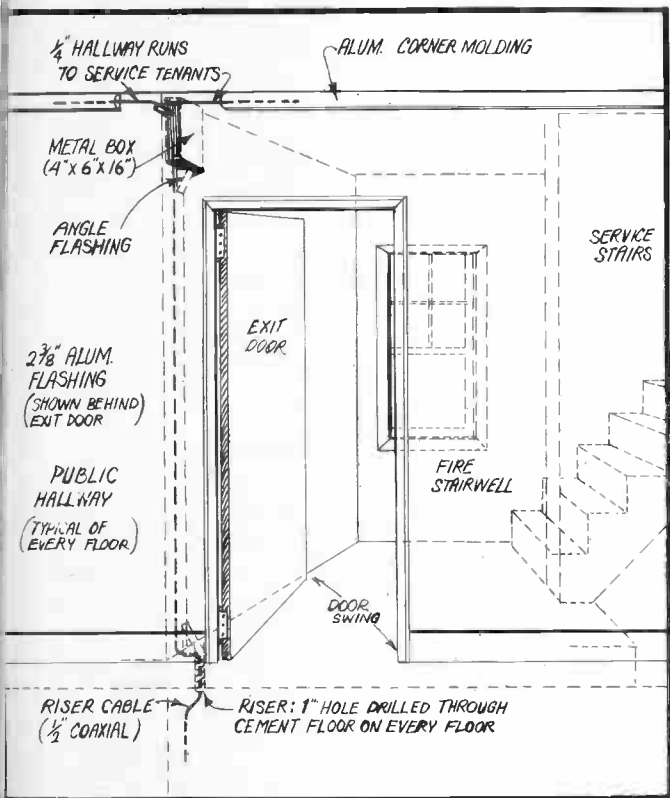
* Known as the Gaylord White project; some supporting funds have come from HEW.



Molding channel is installed inside public hallways. A molding strip snaps into place concealing cable.



Drawing provides greater detail of cable installation in hallways.



Drawing shows how riser holes are drilled between floors. See also upper photo on page opposite.

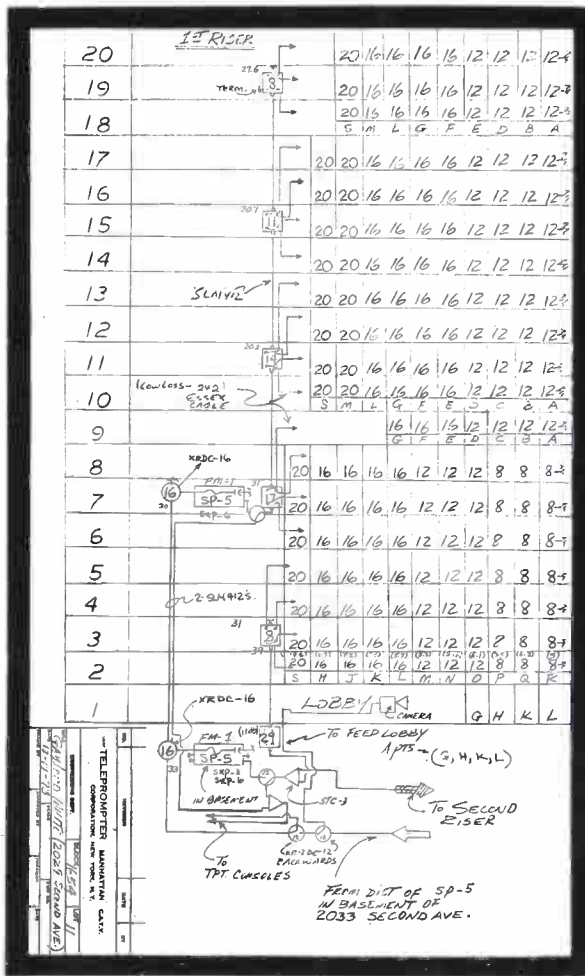


Diagram shows two-way installation in 20-story building. (Numbers refer to impedance of tap offs at various apartments.)

Planning for the Philadelphia Suburbs

One company that has to make the hard decisions soon on how to proceed in this era of high-cost money is the Comcast Corp. In early 1974, Comcast will begin to build in the Philadelphia area (the Greater Northwest Section). Requests for bids will go to manufacturers

shortly.* Decisions regarding specifications are largely up to Comcast to make fully on its own—there are no binding terms in its franchise since the award was granted back in 1966 before cities began demanding specific capabilities. The company will, of course, have

*Comcast's Certificate of Compliance has been recently contested by a citizens' group. The Washington, D.C. Federal Appeals Court should act within 90 days.

to meet the FCC's Third Order and Report stipulation for the top 100 markets.

Comcast's vice president of engineering is Caywood Cooley. He has made up his mind in certain areas, but is proceeding with a plan that will require corporate management to decide which alternatives to take. Biggest of these will be how much channel capacity—26-27 channels, 30 channels, or 35 channels. Manufacturers are being asked to quote on three different capacities. When the quotes are in, Comcast will have to decide which option to take. Obviously, Cooley would like to put in a 35-channel system. But, if the cost differential is great, Comcast will have to decide if the extra cost is justifiable at this time. There is no immediate need for 35 channels. If management decides it will be eight to ten years before that capacity will be required, it might opt for a lesser capacity/cost system for the present.

Cooley is convinced dual trunk is a wise investment. The second trunk will be for upstream signals in the 5 to 50 MHz range—or from 5 to 108 MHz if the isolation of amplifiers is adequate. He assumes there will be some two-way uses, and he does not want to try both downstream and upstream on a single trunk. Cooley says too many difficulties have been experienced in balancing and equalizing single-trunk systems. Further, it is easier to cope with rf ingress and egress when working with separate cables.

Cooley reasons that the money he will save by not buying low- and high-pass filters will offset the cost of stringing the second cable. The cost of getting the second cable will very nearly be only the cost of cable itself.

Cooley sees a side benefit for going dual trunk. For instance, the upstream trunk will carry no 60-cycle power current since the piggyback upstream amplifiers will be drawing power from their downstream counterparts. This means no power frequency filter is needed, and the

spectrum upstream can theoretically extend right down into the audio band. Thus, the potential for audio signaling, or audio control, exists.

Comcast management is going to evaluate another design/cost decision: should the system provide for 100% saturation or is 60% loading a realistic figure? If 60% seems high, why build a feeder system for 100% saturation? Instead of putting in eight-way taps, four will do. Cooley would plan it so that another four-way tap could be added in series (or replaced by an eight-way unit) if the demand arose. Although it is more costly to have to add or exchange taps later, there's real money to be saved in the interim. If the interval is five years or so, savings will more than offset the changeover expenses.

Similarly, Cooley would like to keep his options open on how best to wire apartment houses. This suggests that he put a directional tap on the feeder where an apartment house connection is anticipated, but no amplifier. Amplification will be taken care of inside the apartment house. The eventual plan for the apartment complex will depend on what kind of arrangement is made with the landlord. If the service goes to every unit on a bulk-rate basis, for example, an MATV-like installation is possible. If each occupant is treated as a separate subscriber, the opportunity for remote disconnect should be included, etc.

Cooley is not particularly sanguine about what new services will be put on the cable, but he believes FM should be used more extensively. For instance, he would like to offer subscribers the opportunity to get full quality audio TV sound. This means bypassing the low fidelity audio of the TV set. TV audio could be demodulated at the headend and sent downstream on the normal FM band. Thus, the quality of TV musical programs could be enhanced greatly. Other audio signals could be sent into the home on a quality basis. Short-wave radio is one example.

Plan Envisioned for Portland/Multnomah County, Ore.

Cable TV has been the subject of keen interest in the Portland area for several years. Since 1972, a citizens committee responsible to both the city and county has studied the potential of cable to determine which services would best meet the needs of the metropolitan area. Telecommunications Management Corp. was retained as a consultant. TMC said, in a report to Portland just recently, that the cable system "must be designed with full recognition of the transition now taking place in cable systems—from the shared-antenna entertainment system to a multi-function, broadband area communication system with a powerful capability to affect . . . urban and suburban life."

The design envisioned combines a conventional cable TV system with a point-to-point network that can provide institutional communication services. The initial system proposed by TMC includes a single-trunk 30-channel system (cable A) capable of incorporating three reverse or upstream video channels below 54 MHz. Converters should permit private channel reception by authorized recipients. The initial system also includes a second trunk (cable B) approximately 100 miles in length, designed to permit signal origination from a number of institutions in the city/county area. Cable B

should be activated with an initial inbound capacity of 14 channels. The inbound signals would be redistributed on cable A on a leased-access basis.

Expansion milestones were recommended for the franchise ordinance:

- Another outbound cable C for institutional use after the inbound cable B is used to capacity for a six-month period.
- A fourth cable D, duplicating cable A after 24 channels of cable A are used to capacity.
- Expansion of cable B to additional geographical coverage at three-year increments if the city/county requires it.

The franchise would indicate the initial service area that could be served economically by a cable system (202,000 homes; 1888 street miles; 107 average units/street mile). Other areas would be serviced in accordance with a growth plan. Four area sub-headends are envisioned. Specific interconnection plans are also spelled out. A system maintainability objective is the achievement of a mean-time-to-repair time of less than one hour (on major component malfunctions—not individual subscriber problems.)

Is this another unrealistic plan which cable operators

continued on page CM/E-12

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Urban Cable TV's Near Term Future: Telecommunications LDS

By Selman M. Kremer, president,
Communications Marketing Consultants,
Roslyn Estates, N.Y.

The best way to see the future is to review the past. CATV got its start and impetus because people who knew what television was wanted it—the more and better reception the merrier. From a marketing view, the phenomenon of television was the ingredient of change—not the technology of CATV. Movies were the phenomenon before television and it is highly unlikely that they will return to prominence simply because of the advent of pay-TV systems. New phenomena are just beginning to emerge—new means of banking, purchasing by credit cards, acquiring information, etc.—and it is not yet clear just what technology(ies) will be required. Promoters of VTRs, satellites, and computers are hard at work creating the new trends.

Even though it is difficult, if not impossible, to perceive at the present time what will evolve for sure, it is evident that new disciplines and phenomena are being formulated. And one doesn't have to act helpless just because he cannot see—blind people learn that quickly—but one does have to pay attention to fundamentals because things do not change in revolutionary ways. The process is evolutionary.

How does this apply to CATV you ask? Very simply, CATV is a new form of wired communications and the blue-sky visionaries were right in their predictions. Only their timing was wrong—by about one or two decades. To get a better perspective on this, let's look at the volatile areas that will affect cable TV systems and you will see what I mean. All domains of communications (telephone, telegraph, data and video) are presently undergoing very rapid changes. Yes, these were the reasons why interactive home services were looked upon to be the emerging new phenomena. It is still logical to do so, except that revolutionary notions should be replaced by evolutionary steps. Very simply, people have to become much more exposed to, and trained in, the benefits afforded by interactive broadband communications before it will impact their everyday habits, needs, or wants.

This educational process surely will not begin at the home consumer level, but it will occur, and more speedily than you think, in the business and industrial community. Once this sector has been fully developed, then the phenomenon of interactive broadband communications will come into the home (residential) market. This will take ten to 20 years. So what does CATV do in the meantime? It simply picks up the pieces from its old world and rearranges them as stepping stones to the new world.

This is not so difficult if you are willing to work hard and stay with the basics (you must build the right foundations for any business or venture to be successful). Let's split this into two modes. The first one we're familiar with, even though our achievements to date have been disappointment—namely that associated with the home CATV subscriber. The second mode is almost unknown to most CATV operators and manufacturers, but it is very well known to the telephone, computer, and general data handlers. It is called the business and industrial communications industry and it happens to be undergoing startling changes—the impact of which will be as powerful as the industrial revolution and the automobile were in their time.

We tend to think of the telegraph, telephone, and radio (TV included) as having been tremendous communications trend setters—well that is true, except all of these developments to date, in communications, are about as far developed in the growth of communication technology as was the water pump when it first made possible "inside plumbing." The distribution systems and useful "terminals" that were ultimately developed for both water and electrical systems are just beginning to occur in the world of communications.

What has all of this to do with the two modes of cable TV's new growth? It is the business and industrial community

that is going to pay for the development of interactive terminals, facsimile machines, and all the hundreds of new communication gadgets we hear and read about—the *business* community not the residential community—that is the first and main point to understand if you want to be a part of cable TV's future.

Look at this from another angle. Two recent occurrences, the development of the telephone interconnect market and the specialized common carrier (both made possible by the FCC), have created a golden opportunity for cable TV. Interconnect has opened up the new world of telephone and data terminals (owned or leased by the user), and the specialized common carriers have opened up the "long lines" or intercity routes for the "private communication user." The thing that is holding up even greater developments for both these occurrences is what is called in telecommunications the *local distribution system* (INTRA-city distribution). That is where cable TV comes into the interactive communications picture—*now!!!* The home market, as mentioned before, will develop ten or 20 years from now. The name of the game *today* is for cable TV to become the *broadband local distribution service* for the business community. This can be accomplished over the next ten years (starting now) just as CATV acted as a master antenna over the past 25 years.

The argument against this happening is "there aren't any cables in the urban areas." Well, every cable community has its urban area. (Besides, there were not any cables in the rural and suburban areas 25 years ago when CATV started.) What must be realized is that there are *billions* of dollars being spent for local distribution services on telephone and data. The local telcos cannot possibly handle the massive private systems communications market just beginning to emerge for the new disciplines of high speed data and video. Furthermore, and prophetically, if cable TV does not develop the LDS for interactive business communications, then someone else will (probably the telcos will be forced to). Whoever develops this important new broadband communications service will automatically take over the residential market. So, cable operators, you see you cannot stand still even if you want to—there is a bright new world out there for you in both the residential and business markets. Do not fall prey to the disappointments of the past few years—these were caused by the get-rich-quick artists not by the fundamentalists. It is time the cable TV industry paid attention to basics once again and *marketing* (defined as fulfilling needs and not dreams) is where your attention ought to be.

Every *one-way* system can make the change to serving the business community—it is not simple, but neither is it difficult. Yes, telephone and data, as well as video, can be carried on the cable. Computers, facsimile machines, teletypers, and many applications of audio and video cassettes are awaiting the development of broadband LDS. Why not, cable operators, supply a hungry market with what it wants? You will find some of these new services can be quickly accommodated to the home market.

A 1974 New Year's resolution for cable TV: "I will concentrate on providing good quality service to my present subscribers; I will learn what telecommunications is all about; I will learn how to change my basic passive communications operation into an interactive one; I will learn what communication services (LDS) the business community in my area is presently using or is desirous of using; I will look to make an evolutionary change so I can bend with the changes and not break myself by trying to go too fast; I will thank my lucky stars that I have a franchise to string coaxial cables and that these cables can be the equivalent of thousands of pairs of twisted wires; and I am going to learn how to make money and provide a new service from my cables for the benefit of myself, my employees, and my community."

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must fight or back away from? The report contains an economic analysis of the cable A entertainment system for various penetrations. Profit starts at the sixth year with 40% penetration; in the seventh year with 30%. Investment is \$32.4 to \$34.2 million. TMC envisions cable B will cost initially \$568,000 or 2-3% of the capital cost of the entertainment system. In addition, an operating support group might be needed at an annual budget of \$250,000. Thus a point-to-point network might be viable if it had revenues of \$400-500,000 by the fifth year.

The TMC report indicates that school districts in the area already spend some money for data telecommunications. Educators would likely spend more if every home were connected. Serious thought is being given to achieving 100% penetration. TMC calculates that an additional \$2 million would have to be invested (assuming no converter). Since this increased overall capital costs by 7-10%, it is not beyond the bounds of feasibility. If there is 100% connection to homes, the cable plant becomes attractive to more users.

In fact, TMC suggests in its report that, during the franchise application phase, bids might be sought on the basis of A and B networks combined, or the B network

alone (but not the A network alone). The idea in back of this approach is to open the B network to bidding to companies specializing in communications services. Assuming the city has already established a Cable Service Support Group to help users to develop new services, network B bidders might be encouraged.

Nevertheless, it is possible that there would be no bidders under the circumstances suggested—particularly if capital continues to demand high interest rates. This does not mean such plans need to be shelved or abandoned. The TMC report does not speculate on alternatives, but Herb Dordick, a TMC vice president, feels that the time is approaching when some cities might consider financing the B network themselves. On the other hand, cities are turning away from cable TV since it seems to offer nothing other than political risk taking. But the opposite is also happening; when mayors envision a point-to-point communication network as a broadband resource that might entice some business or industry to a city, the risk taking becomes more palatable.

There have been no public stands of this sort taken yet, but *CM/E* has talked to a half-dozen consultants to cities who firmly believe that some new arrangement of this sort will be developing the 1974-75 period.

Interconnection and Subdistricting

While there has been a shift away from installing tomorrow's plant today, as discussed earlier in this report, there should be no diminishment of the planning effort. It should always be possible to easily modify a plant to accommodate tomorrow's needs—whatever turn that may take.

An area that demands careful attention is future subdistricting—of being able to isolate certain parts of the system so that subscribers in those areas can be interconnected to view exclusive programs. Such a feature appears to have wide appeal. Some envision the possibility and desirability of a fully-switched network sometime in the future. An advocate of planning for complete interconnection of individual subscribers is Robert Brooks of Telcom Engineering Inc. Telcom is a consultant to a number of cities and it has been, as a regular service of Telcom, proposing a hub plan and subdistrict system that would be compatible with an eventual switched system. Telcom analyzes a city as if it were to have a switched system. This identifies where subdistrict switching centers should be. Within these areas would be an Area Central Office and several Area Neighborhood Offices, to use Brooks' terminology. Neighborhood Offices would be connected to Central Offices by multi-tube coaxial cable. Each home would have a dedicated video pair and order wire. Central Offices (assuming more than one) would be interconnected by multiple coaxial cable or microwave. Initially, of course, the distribution system would be the traditional party line.

In a sense, the cable TV hub system is overlaid on what might be a future switched network system. Brooks reports that it is not too difficult to do such planning. Some cities divide naturally into political subdivisions that make sense from a communications interconnection point of view. Other cities have physical boundaries, such as freeways, rivers, etc., that divide them into regions.

Had such thorough planning taken place in New York

City, it would be easier to prepare for the subdistricting that is to go into effect in Manhattan late in 1974. New York did anticipate subdistricting, and did indeed identify such areas initially. But from a hub planning point of view, the areas did not coincide with what were natural headend centers. Cable trunks were laid along routes that made sense from headend locations and the ducting system that already existed. To now accommodate subdistricting, planners at TelePrompTer Manhattan are mapping out where trunk amplifiers have to be turned around, and some new ducting that will have to go in. It can be done, but it will be expensive. The city is considering an alternative sub plan that would be easier to put into effect.

As mentioned earlier, interconnection in large cities poses some unique problems. TelePrompTer Manhattan has three headend sites in its upper-Manhattan franchise area. It interconnects between these sites by a 16-channel AML microwave. For a period of time, its only interconnect with the lower-Manhattan area, operated by Sterling Manhattan, was via a trunk cable splice. This was less than best because the splice was made at two ends of the cascaded amplifier runs. Now there is a six-channel AML link between the two systems which makes for better quality transmission. All six channels are for non-broadcast use. When the interconnect is fully completed, it means that from one headend site in Sterling's area (atop the G+W Building) there has to be a microwave link to the three different headend sites in TelePrompTer's area. This is no difficult feat with AML, but the transmitter has to be moved to get a clear shot. In terms of feeding upper-Manhattan local channels back to Sterling, one microwave path from TelePrompTer's main studios near the George Washington Bridge back to the G+W Building suffices.

CM/E

Next Month: Part II—Chaska two-way, advance towards broadband communications networks, telecommunications interconnect.

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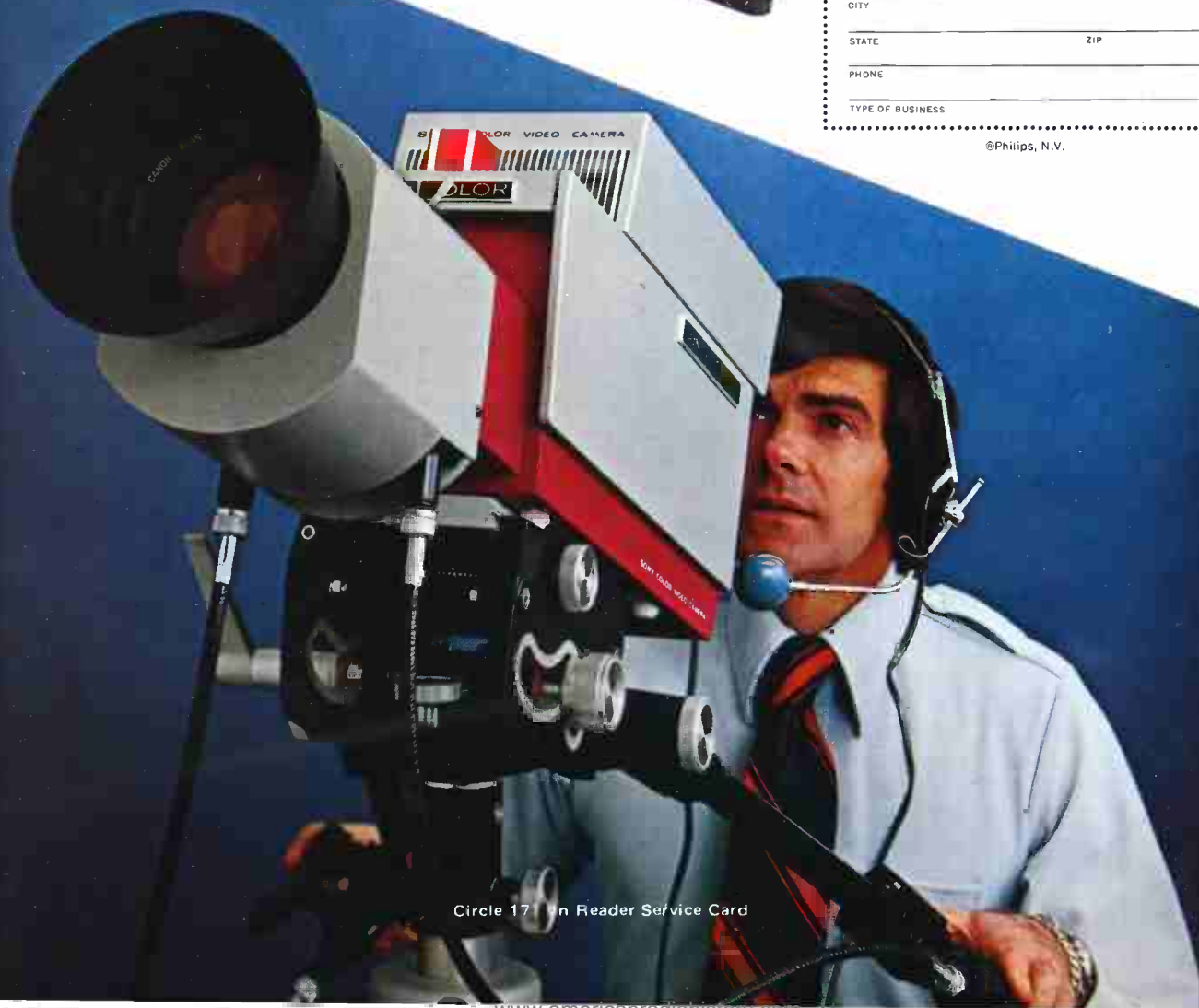
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Circle 17 on Reader Service Card

The Care and Feeding of Your VTR and Video Tape

By Oliver Berliner

It is incredible how well helical-scan VTRs operate and their tapes hold up, considering the neglect and abuse given them. Here are ways to prolong their lives and increase reliability.



Fig. 1. A winder reduces tape and head wear, makes a faster, better wind, and immediately frees VTR for other uses.



Fig. 2. A waveform monitor (with companion picture monitor, right) gives accurate level indications unobtainable on meters. Low cost units available.



Fig. 3. Audio Interfaces permit proper connection to other sources and leads, overcoming drawbacks of EIAJ VTRs.

All photos courtesy Ultra Audio Products.

It is truly remarkable how well "tabletop" VTRs perform in view of the bouncing around they get as portables and the general lack of attention given them. They seem to "make pictures" in spite of the general neglect they receive. Nonetheless, a little thought plus a few moments of your time will reduce even further your chances of disappointment and possible financial loss. First, let's consider the protection your tapes need, both on and off of the machine.

Although it may not seem that way, videotape is subjected to (momentary) high temperature as a result of the pressure from the rotating video heads. Tape must have a high stability so that the loss of oxide during the abrasion process of recording or playback is minimal. Abrasion will diminish the depth of the oxide—ultimately to a point where the tape will no longer be usable. Unfortunately, loose oxide particles end up clogging heads and adding to further wear. Therefore, clean all heads prior to each pass of the tape. This means stationary heads (erase, audio, control track) as well.

Put no undue pressure on the rotating heads when cleaning, nor on the stationary ones, as alignment is critical, especially with the narrow track widths we must contend with. Do not place a tape on the VTR until the heads and the guides you've just cleaned are totally dry. This precaution is necessary because certain cleaning solvents may damage the tape but not the heads. In fact, the following solvents should not be used: M.E.K., Heptane, Acetone, Trichlorethylene, Naptha, Xylene. Each of these chemicals displays one or more of the following undesirable characteristics: Softens or breaks down videotape; is flammable; swells rubber (the idlers); is a health hazard. Carbon tetrachloride is excellent and popular but its fumes constitute a health hazard in continued use. Freon TF is undoubtedly the best all-around solvent, but it's expensive. Probably the best buy is ethyl alcohol, and it should be obtainable in nonflammable form. VTR operators should not eat nor smoke near the machine as invisible crumbs and smoke are major tape contaminants.

A serious problem with respect to tape life and picture/sync quality is created during tape rewind. Here, due to the absence of tape lifters such as those common on professional audio machines, the tape is compelled to be scraped at high speed against all stationary and rotating heads. This action abrades both tape and heads, needlessly shortening their lives and possibly diminishing

Mr. Berliner is president, Telaudio Centre, Burbank, California.

low-frequency response of the tape and high-frequency response of the heads.

Fig. 1 shows an inexpensive accessory rewriter created to eliminate this problem. The "Autowinder" also offers other benefits. It rewinds the tape at the correct tension. Tape wound too tightly may cause "print-through" and "binding," and tape wound too loosely (common on inexpensive videotape recorders) may "cinch" under temperature change and may also wind unevenly with the protruding edges, containing important audio and control track information, subject to curling and edge-damage.

Other advantages of the "autowinder" are that it rewinds an hour's EIAJ tape in about a minute; it shuts off automatically whereas most of these VTRs will require manual resetting of the lever upon completion of the rewind; and rather than tying the VTR up for six to ten minutes of rewind, it frees the machine for immediate other usage.

After rewind (and at all times for that matter) be sure to store your tapes vertically, as an additional precaution against edge-damage, and preferably in a room offering 40%-45% relative humidity at 20°C (68-69°F) temperature. This atmosphere also is conducive to maximum head-life. Other temperatures and humidities will dramatically diminish head-life . . . even as much as 50%.

There are other, more sophisticated, preventive maintenance procedures to follow. Most low-priced "helicals" use sliprings to transfer the RF signal to the spinning video heads. These must be religiously cleaned while great care is exercised to avoid bending the wiper "fingers." Dirty sliprings will ultimately lead to picture and/or sync breakup. If your VTR permits user-balancing of the demodulators, do so occasionally by observing the bottom of the sync pulses and adjusting for minimum RF signal remaining on the video signals.

As you know, audio recorders superimpose the program signal on a high frequency, high level AC bias voltage. This is impractical for video because the bias oscillator would have to be extremely stable at an incredibly high frequency, such as 20 MHz or more. Consequently, the video is instead modulated via double-sideband Frequency Modulation. The modulator's frequency deviations should be checked to ensure that peak-white, sync tips, and black-level all occur at the frequencies recommended by the VTR manufacturer. This can be done by connecting a stable RF oscillator (while an appropriate test signal is applied to the VTR's output) and tuning the oscillator to the required frequency (per manufacturer's specifications). A zero beat

should occur on the "demod's" input when you've selected the specified frequency for each of the three aforementioned parameters (levels). If this is not the case, repair or adjustment may be in order.

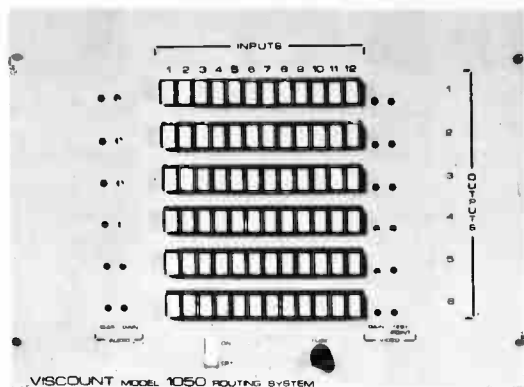
Most color videotape recorders may be switched to record in monochrome. In the monochrome mode, you should feed ten-step staircase pattern into the machine and set the video-level pointer to the "zero" mark on the meter. Since these meters are highly inaccurate for other than reading a sustained video signal, a waveform monitor (Fig. 2) which is the video equivalent of the VU meter used in audio should be used for all program-level indications. For recording in the color mode, it seems as though most EIAJ machines "like" to have the video level set (with standard color bars) just below the "zero" mark. This results in better color rendition most of the time. Then continue to use your waveform monitor for program monitoring at full level on the WFM.

Tip projection (of the video heads) is our final, but not least, concern. Insufficient projection will result in picture drop-outs and reduced signal-to-noise ratio. Too great projection will distort and thus damage the tape irreparably. Thus, tip projection must begin per manufacturer's specifications and be checked periodically to ascertain whether it has fallen below acceptability. You may also wish to assure yourself that the servomechanism is functioning properly. A quick check may be made by playing a tape made on the same VTR. It should track properly with the tracking control in the *automatic* position and also when it is approximately in the center of the manually-variable settings. If you are unable to obtain proper tracking thusly, your VTR may require repair. One of the disappointing aspects of most EIAJ-type VTRs is the low (usually about 1/10th volt across 500 ohms) audio output. This is unsuitable for feeding many mixer amplifiers, or other VTRs, for dubbing. The product shown in Fig. 3 not only boosts the level to +8dBm but also provides a 600 ohm *balanced* output (which may be unbalanced by the user), thus rendering your VTR's audio to "broadcast" standards. You can then feed as much other equipment as desired. Another useful device is also shown. It makes possible the *bridging* connection of professional high level balanced program lines to the unbalanced high impedance inputs of one or even two "tabletop" VTRs while maintaining isolative protection of the program line. Thus these two interface devices not only increase your recorder's versatility, but reduce operator tension and frustration as well when the studio is hectic and busy with production.

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This new 160-page analysis forecasts the major trends affecting the market, providing projections through 1983 for 25 service markets, plus associated computer and peripheral hardware markets, and markets for front end equipment, concentrators, multiplexors, modems, terminals and software services. 28 tables document the study.

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Neiman-Marcus Giving Cable a Big Try

"Cable Catalog" will sell Dallas store's goods in more than 70 communities

The possibility that cable can function as a mail-order "catalog" for a large merchant will get an all-out in-depth assessment in a series of trial programs being developed jointly by Formont Associates, New York software firm, and Neiman-Marcus, Dallas department store giant.

Neiman-Marcus and Formont showed the first program to the press in New York on January 15, and announced that it would start shortly thereafter on more than 70 cable systems in 17 states. Stanley Marcus, chairman of the store, explained that Neiman-Marcus already has a very large mail-order operation, and is eager to find out if the cable programs can help support and extend this operation, possibly at lower cost than print media, which is becoming sharply more expensive.

The half-hour color program gave attractive "live" demonstrations of about 30 products, ranging from modish salad aprons to high-fashion dresses and billfolds to men's pipes, at prices from \$10 to \$120. It was shot in the Neiman-Marcus store, and many of the backgrounds were colorful, exhilarating in themselves. The demonstration program was played from a Sony U-matic cassette, with excellent quality. Formont explained, however, that they will supply the program in any tape form the cable operator wants. Ordering information was repeated several times during the course of the show.

Programs are going to cable operators free during the trial period. Later, Formont will enter an agreement with cable operators who want the program for a percentage of gross revenue from sales made to subscribers, or a flat payment per subscriber, whichever the operator wants.

Mr. Marcus explained further that products in the first program will allow comparison with selling through the printed catalogs, and were also chosen to cover a variety of classes, prices, and types of merchandise. Results will be analyzed carefully to guide production of future programs, since no one has any experience with cable selling. Without any question, the whole industry is going to watch the experiment for major clues to the future of cable.

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Then there was the purchase of a great cable company. You know them — Systems Wire & Cable. Top product line, strictly no-nonsense approach, and tens of thousands of miles out where it counts. Working.

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Today, we've got every element needed to provide total and sophisticated service to system operators — components to turnkey.

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BROADCAST EQUIPMENT

Series of miniaturized TV cameras have standard cylindrical housings of 3-inch diameter. Series 2000 camera includes models with scanning patterns from 525 to 945 lines, horizontal resolution up to 850 lines in center. Usable picture takes 0.1 foot candle, all ten gray shades on scale, 1 foot candle. COHU, INC. 300

Magnetic heads for digital systems are designed for .150-wide tape cassettes. Brush Cassette 150 heads are read-after-write. Feedthrough is rated at less than 5% of output; single or two-channel available. BRUSH. 301

Chart recorder writes analog data, at the same time printing alphanumeric data on the margin. Mark III O.E.M. recorder runs at 25 or 50 mm/sec, has DC to 100 Hz response, and the print head is BCD compatible. GULTON INDUSTRIES. 302

Variable trap for 108 to 174 MHz (CATV mid-band) can be varied in



cancellation depth between 0.5 and 40 dB. Model MWT-4 has single frequency attenuation of over 60 dB; loss outside notch is 1 dB maximum. BLONDER-TONGUE LABS. 303

Constant-current battery charger will charge or trickle-charge batteries from 1.2 volts to 25 volts, at 10 mils to 500 mils. Model BC21 is short-circuit proof, has current regulation to 1%, and has an optional built-in voltmeter. MARATHON BATTERY CO. 304

Integrated circuit for decoder for "discrete" four-channel, CD-4 disc system has a phase-locked loop for maximum response to carrier. Model CD4-392 also includes a sub-channel decoder and matrix amplifier with a high-gain limiter. Two are needed for a complete system. \$1.54 each in quantity. SIGNETICS. 305

TV color picture tubes have new glass with high attenuation for X-rays. Col-

orama A Series includes seven types covering most receiver needs, and also has new phosphors and a new electron gun assembly aimed at high performance, improving brightness in many older sets. RCA. 306

Waterproofing enclosure for CATV splitters and splicers provides total security against water. Box Boy clo-



sure comes in kit form with all components for watertight installation, including Echo Gel, reentrable encapsulation material. COMMUNICATIONS TECHNOLOGY CORP. 307

Aerosol contact cleaner is non-conductive and non-flammable, leaves no residue. Model CD-230 uses a Freon solvent, will not abrade silver or gold nor affect plastics, metals, or rubber. COLE-FLEX CORP. 308

Limiter controls separately both high-frequency energy and broadband program peaks. Model 210 has controls



for high-frequency peak ceiling, attack and release timing. It uses plug-in inserts for frequency-selective limiting. \$490. INOVONICS INC. 309

Ballpoint hex screwdrivers, which drive from any angle, are available in eight metric sizes, from 1.27mm to 6mm. Model LN-8MMBP is a roll-up kit with complete set, or they can be

bought separately. XCELITE, DIV. COOPER INDUSTRIES. 310

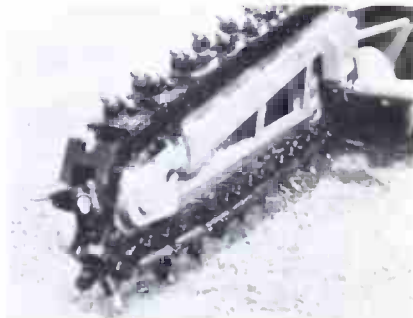
Dynamic microphone intended for top professional use has four-position switch for response tailoring, giving



flat, presence boost, bass roll-off, or combination. Model SM7 has cardioid pattern uniform with frequency and symmetrical around axis. \$240. SHURE BROTHERS. 311

Solid state relays handling 120 or 240 volts at 2.5, 10, or 20 amps can be operated by low-level logic signals. Crydom relays have photo-isolation between input and output, and zero voltage turn-on to reduce transients. INTERNATIONAL RECTIFIER CORP. 312

Alligator chains for trenching in frozen ground or other hard material fit the

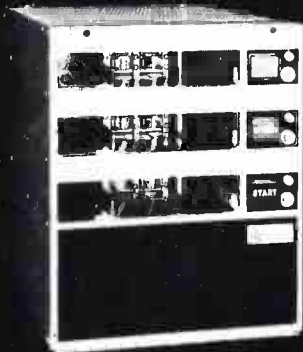


standard R65 Ditch Witch digger. Chains are 110,000-pound test, have removable carbide teeth, trench to 42 inches deep. DITCH WITCH, CHARLES MACHINE WORKS. 313

Tweezer-like resistance heating system allows soldering and unsoldering in tight spaces, with the work piece part of the current path. "ResisTweez" Model TWP-20 is self contained,

continued on page 64

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PRODUCTS

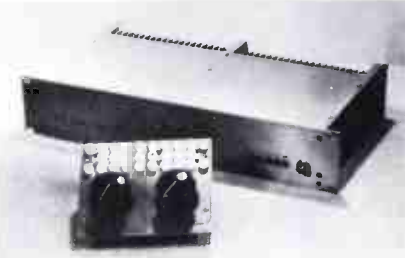
weighs less than 5 oz., has changeable tips that can be formed to fit the work. \$115. PACE INC. 314

Low-cost digital clock provides time of day; elapsed time or count down/up



time. Series M clock has digital display. Time set is with front-panel pushbuttons. \$299. THIEM INDUSTRIES, INC. 315

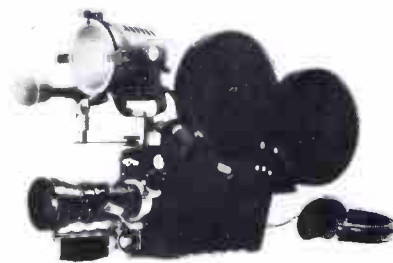
Solid-state audio switcher uses integrated circuits and FETs. Switcher system



is well adapted to miniature integrated circuits; 100-point unit will go on ¼-inch chip. TERRY LLOYD, KSFO. 316

Cassette duplicating system can produce up to 10,000 copies in an 8-hour shift. Model 1200 runs the master tape at 120 ips, can drive up to 12 slaves, comes with all electronics for drive, adjustable for various tape types. \$6750. AUDIO/TEK INC. 317

Focusing spot light for mounting on 16mm camera can operate from 30-volt battery pack (250 watt lamp)

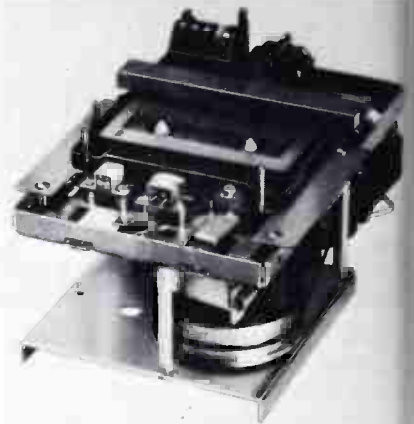


or from 120 volts AC/DC (600 watt lamp). Spot with fixture weighs only 12 ounces, screws on to ½-inch stud, comes with 3-wire cable. \$54. CINEMA PRODUCTS CORP. 318

Square and rectangular solder wave masks for printed circuit boards have pressure-sensitive backing. Masks hold to board, block solder from selected

area, remove easily after use, come in ¼-in. to 2-in. sizes (sides). \$2.15 per 1000. WEBTEK CORP. 319

Audio cassette transport uses one reel motor and one capstan motor to reduce back tension from unused reel



motor. Model A9 has fail-safe braking, self-aligning pinch roller, heads in contact or off tape in fast modes. About \$75. AMILON CORP. 320

Outdoor pan and tilt drive for 2/3-inch cameras is completely weather-sealed. Model V370-APT has motor strength to counteract wind loading; all stops are external, quickly adjustable. VICON INDUSTRIES. 321

Poly-dimensional instrument cabinet can be adjusted to many different sizes and shapes. Model P/D cabinet has



vinyl covered panelling in various colors, has a pie section to put instruments at selected angles. AMCO ENGINEERING CO. 322

Variable video delay unit provides continuous screw adjustment for 3 to 9 ns delays. "Rubber Coax" Model UN3/9 has BNC connectors on each end, 75 ohm impedance. \$40. TELEVISION EQUIPMENT ASSOCIATES. 323

Audio distribution amplifiers have from six to 32 isolated outputs, depending on model. DA Series are rated ±5 dB, 10 Hz to 20 KHz; 26 dB gain; 0.1% or less distortion; 80 dB channel separation; 20 dBm maximum output. \$129 to \$425. RAMKO RESEARCH. 324

continued on page 66



CENTRAL DYNAMICS

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with the
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NAB '74 BOOTH 412

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- VIDEOTAPE EDITING
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The VSP-1200 series offers soft-edge wipes and bordered keys plus the already unique CD mix-effects system. The family includes switchers with 1, 2 or 3 mix-effects groups and a range of other options to meet your specific requirements.



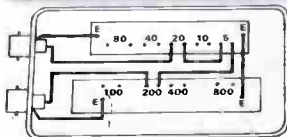
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Example for wiring 225ns
Delay Lines shown looking into pins

Variable



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1. Open it
2. Connect your delay time 5ns to 4500ns (Wiring diagram inside)
3. Close it
4. Plug into Cable

Max rise time 280ns Suitable for Studio timing

... or trim Video

Video delay trim UN3/9

1. Plug in
2. Adjust fine trim Range 3ns to 9ns (2ft to 6ft coax).

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Bill Pegler



Matthey Pulse Delay Units

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PRODUCTS

Audio automation systems are self-contained, compact units (15 inches in standard rack) controlling up to 2000



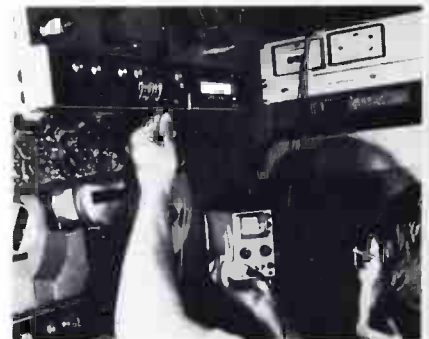
events and 12 audio sources without resetting. CD28 series can handle up to 8000 events with expanded memory. Entry is by standard keyboard, is mastered quickly by non-technical personnel. CONTROL DESIGN CORP. 325

Meter relays include solid-state amplifier allowing full-scale input as low as 5 microamps or 5 millivolts. Types 195 and 196 also have cold-junction and copper-error compensation, are available with mirror scales. GENERAL ELECTRIC CO. 326

Hand-held clamp meter measures current by clamping around conductor, measures voltage and resistance with leads. Model 300/600 is for wire up to 1.02 diameter, Model 1200 for wire to 1.889 diameter. Current ranges are to 1200 A, voltage to 600V, resistance to 5000 ohms. PANASONIC INDUSTRIAL DIVISION. 327

Circuit-board terminal has knurled contact area, will not tilt or wobble. Model K-24 makes contact around the full 360 degrees, can be inserted with ordinary pliers or insertion tools. VECTOR ELECTRONIC CO. 328

Miniature oscilloscope weighs 4 lbs., has 1.5-in. CRT screen enlarged to 2.25-in. with snap-on magnifier. Mini-



scope Model 9601A (single trace) and 9602A (dual trace) covers DC to 5 MHz, 10 mV/division sensitivity, maximum sweep rate of .3 microsec per division, runs on batteries or AC. \$595 up. TELONIC INDUSTRIES, INC. 329

New, medium-priced videotape record- continued on page 68

Canon 10X UNIVERSAL ZOOM

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P 10X20

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PRODUCTS

er locks up for stabilized color pictures in less than 2 seconds. Model TR-61 is compact, measuring 33-in. wide, 24-in. deep and 66-in. high, has rear-side erase heads, picture and waveform monitor switching, tape motion sensor, and three composite or non-composite video outlets. \$75,000. RCA. 330

Bulk tape eraser provides complete erasure of tape up to 1-in. wide, on reels up to 10½-in. in diameter. Model HD-20 erases up to 90dB below saturation level, draws 10 amps at 115 Vac. \$75. MICROTRAN CO. 331

New zoom lens for CCTV cameras covers 15 to 150mm, f/2.5. Zoomar Mark XB-2 is designed particularly for



low-light level cameras, has a permanently-installed attenuator, which ties

in with iris servo control for fully automatic exposure control. ZOOMAR, INC. 332

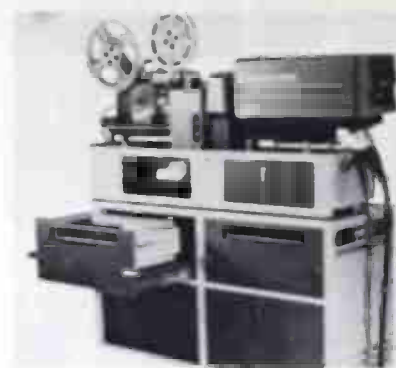
Track trencher has one-hand stick control and full-power tracks. The Task Force 800 has independent motors on the two tracks for counter-rotation, a vibratory plow system that digs from 6-in. wide, 72-in. deep, to 18-in. wide, 36-in. deep at speeds to 1500 fph. Back-hoe, borer, and other optional additions are available. DAVIS MFG. CO. 333

Dual mainstations for dual trunk, single feeder mid-split cable TV distribution systems are for the full 5-300 MHz 35-channel, cable A service. Series MX-404 provides for a 5-30 MHz return. In various configurations, series also provides cable B service, or a separate 5-30 MHz return run. MAGNAVOX. 334

Service monitor tests receivers equipped with crystal filters. Gertsch FM-10CS has internal electronic sweep with rates from 10 to 100 Hz, can sweep 1Fs and crystal filters up to 1 MHz bandwidth. SINGER CO. 335

Pre-sunrise power cutback unit has all units for power cutback on a 3 ft. x 3 ft. panel. Model ML-PSA-50 has RF contactor for switching, output up to 50 watts. MULTRONICS, INC. 336

Complete compact color TV studio assembly includes in one housing two VTRs, a color camera, a 16mm film



projector, and 35mm slide projector, as well as storage space for tape and film. IVC Diplexer Telecine System can be installed against the wall, is 5 ft. long and 2 ft. deep. \$22,000. INTERNATIONAL VIDEO CORP. 337

Low-cost color camera has 1-in. filter-integrated-color Vidicon tube, can use a wide range of lenses, including cable-driven zoom. Model FP-1500 has built-in 3-in. electronic viewfinder, camera control unit for operation with built-in RS-170 sync generator or external sync. Automatic light sensitivity cir- continued on page 70



Spindler & Sauppé TV film chain 2x2 projectors

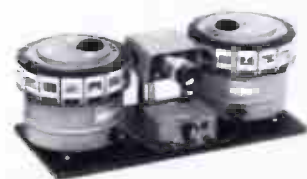
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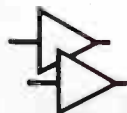
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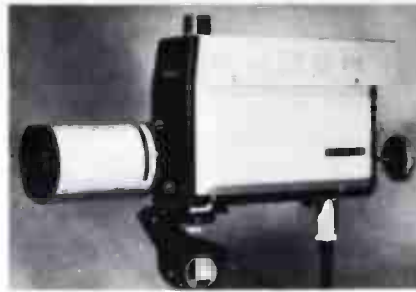
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PRODUCTS



cuit is included, automatic servo-iris is optional. \$4495 (less lens). HITACHI SHIBADEN CORP. 338

Pulse delay unit has tapped modules for connection to select delays over a wide range. Model UN-068 Matthey delay boxes provide 5 to 4500 ns delays in various range configurations. \$40 and up. TELEVISION EQUIPMENT ASSOCIATES. 339

Dual-output power supplies are designed for powering linear ICs, others, requiring plus and minus voltages. HP 62200 Series includes models for plus and minus 12 volts at 1.40A and 3.30 amps, and plus and minus 15 volts at 1.25 amps and 3.00 amps. Units are series regulated for 0.01% line and load stability, 50 microsecond tran-

sient response on load change from 100% to 50%. \$165 (low current), \$225 (high current). HEWLETT-PACKARD. 340

Heavy-duty video camera pan and tilt unit has counter-balanced operation, counteracting spring design. Model V390APT has auto scan, hardened steel gears and bearings, slip-ring electrical interconnections to avoid cable failures. VICON INDUSTRIES, INC. 341

Video sequential switcher provides automatic switching of up to eight composite video or camera inputs. Model 800 Digital Insert Sequential Switcher inserts the input number on screen for input identification, switches on vertical interval to avoid roll, has front panel controls for insert shade (white to black) and switching rate (2 to 30 seconds). QSI SYSTEMS, INC. 342

Compressor-limiter provides independent adjustment of RMS compression and peak limiting. Teletronic BL-40 Modulimiter has continuously variable symmetrical or asymmetrical limiting, attack time (signal dependent) is 500 microseconds to 10 ms, for compressor section, less than 5 microseconds for 10 dB limiting (peak section). Release of compression is dependent on duration. UREI. 344

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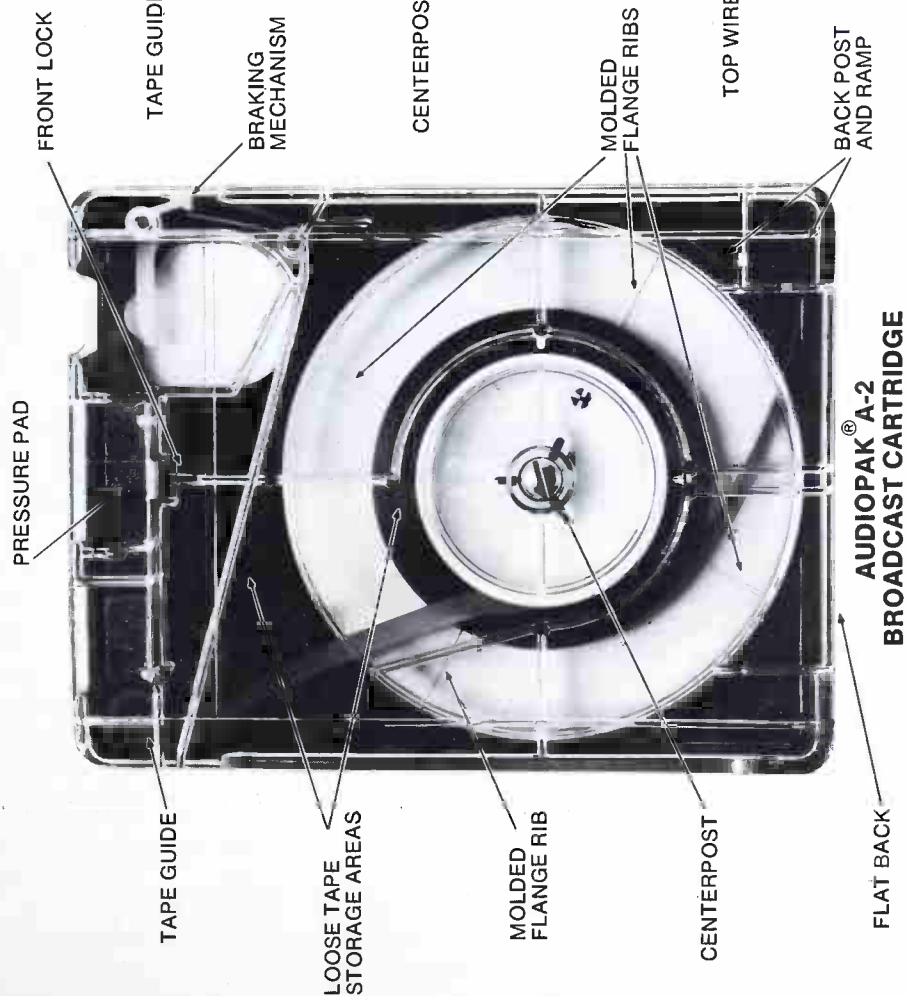
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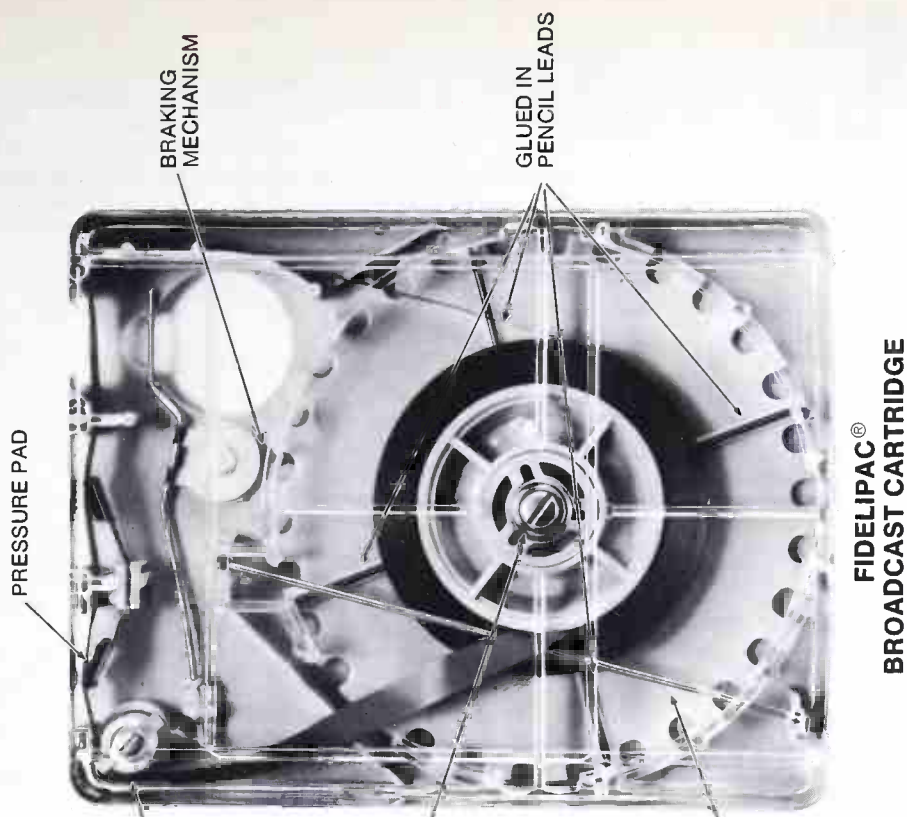
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NEW LIT

For copies of these literature offerings, circle number for appropriate items on Reader Service Card.

Equipment and card modules and cages are subject of eight-panel catalogue. Vector Electronics, Inc. 250

New 1974 catalog of new and used VTR equipment includes units from Sony, Panasonic, Magnavox, AKAI, Ampex, and others. MPCS Communications Industries, Inc. 251

DIP video delay lines are covered in new product bulletins; units operate over range from 5 nanoseconds to 1 microsecond. McGraw-Edison Co. 252

New technical data sheet covers all specifications of video display modules, including message, date/time, and time/temperature units. Datavision, Inc. 253

Rigid coaxial transmission lines and a new series of FM broadcast antennas are subjects of 22-page catalog, giving

full technical and application information. Phelps Dodge Communications Co. 254

Technical Application Note No 11 is a detailed exposition of simultaneous sweep testing of CATV systems, with full instructions. Tektronix. 255

A 10-page full-color brochure illustrates effects obtainable with new VSP-1200 video switcher, among them soft RGB, encoded chroma keys, vignettes, soft edge wipes, camera, and borderline effects, many others. Central Dynamics Corp. 256

Series of technical bulletins covers characteristics, applications, of AML Multi-Channel microwave systems. Theta-Com. 257

"Rectifier News," quarterly publication, in Fall 1973 issue describes, among other technical topics, use of new thyristors to control megawatts. International Rectifier. 258

Series of high-performance RF transistors are described in detail in new four-page catalog. Amperex Electronic Corp. 259

"Local Origination Directory, 1973" presents the results of a survey by the National Cable Television Association of cable systems in the U.S.; it shows the size, equipment, and local origina-

tion activity of each of more than 900 systems. Available from NCTA at 918 16th Street N.W., Washington, D.C., \$2 to members, \$4 to non-members.

Five booklets on the QS four-channel stereo system, explain the system for, respectively, recording engineers, audio equipment dealers, electronics engineers, FM broadcasters, and laymen. Sansui Electronics Corp. 260

Brochure lists and describes test and alignment tapes for cassette, 8-track cartridge, open-reel, and broadcast spot tape machines. Nortronics. 261

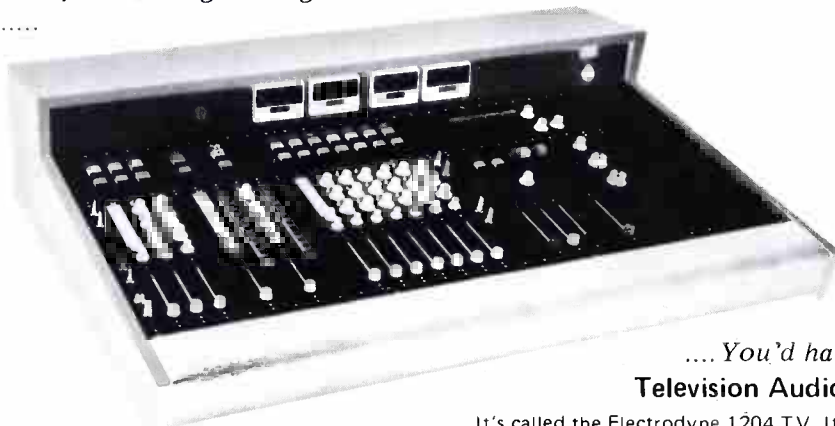
First issue of "Technics Talk" discusses in detail design of new four channel phono pickup, Model 450C. Panasonic. 262

Family of sound measurement equipment gets full technical and applications treatment in new eight-page catalog. Triplett Corp. 263

Sixteen-page data bulletin describes in comprehensive detail features and applications of FM-10 frequency meter-signal generator, for checking AM, FM and SSB systems. Singer Co. 264

Catalog covers MX-404 high output one- and two-way line extender amplifiers, with full applications data. Magnavox. 267

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ograms, IDs, etc.

Richard F. Dubbe became technical director of the Mincom Division, 3M Company ... **James H. Lewis** joined public TV station WJCT in Jacksonville as executive producer of the "Today in the Legislature" series, which will show the Florida state government in action ... **Marianne Faulker** became the first woman vice president of Metromedia Television.

Johan Van Leer joined Tascam Corp. to engage in research and development of new products; he had directed research through a long career at firms including Philips, in Holland, and Shure Brothers and CBS Laboratories in this country ... **Albert Weininger** is the new president of Video Products Co., Menlo Park, Calif., which will distribute the Norel video cassette system in northern California.

Bernard Bernstein was appointed national sales manager of Sansui Electronics Corp. ... **B.W. Hughes** joined Utility Tool Corp. as CATV sales manager; he had been an associate director of NCTA ... **Harry P. MacIntosh** became operations manager for the Cerro ATV Cable Division in Freehold, N.J.

New program manager for New York City's WNYC-FM is **Matt Biberfeld** ... **Andrew Subbiondo** was named vice president and controller of the CBS Radio Division ... **Dermot J. Matthews** will be in charge of sales in the Los Angeles area for Cohu, Inc.

Financial Briefs

Digital Communications Inc.: Sales for nine months to September 30, 1973 were \$1,146,737, up from \$434,321 last year; loss of \$132,248 reflected a write-off of \$187,968 for a discontinued system ... **Gulf & Western Industries Inc.:** Reported record sales and earnings for year ended July 31, 1973 of \$1.93 billion and \$89.2 million, respectively ... **Pioneer-Standard Electronics:** Declared fourth quarter 1973 dividend of four cents a share.

Cox Broadcasting: Declared regular dividend of 8 3/4 cents a share for fourth quarter 1973 ... **General Instrument Corp.:** For nine months to November 25, 1973, sales were \$313,924,830, up from \$7,306,239 ... **Warner Communications, Inc.:** Declared regular dividend of ten cents a share for fourth quarter 1973.

Superior Electronics, Montreal: For six months ended September 30, 1973, revenues were \$4,466,054, up 16%, and earnings were \$161,895, up nearly 200%

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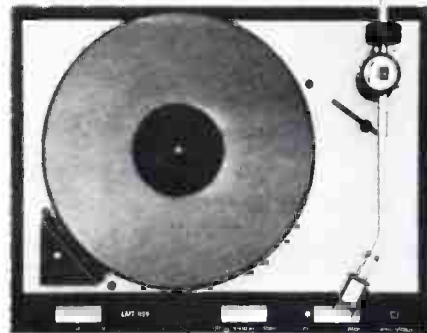
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feel from the Northern approach. One of the first places we got involved with was the University of Wisconsin at Madison. They were running workshops for broadcasters and educational TV—and they've made recordings that have toured the country. Wisconsin is trying to develop its own identifiable sound so people will know where the program was produced."

Mayer believes that the large studio orchestras are also on the way out. He points out that the scoring for "The Andromeda Strain" was done on one of his units, thereby eliminating 98 musicians. He feels that the economics of the industry will demand increasing use of synthesizers.

Sear, on the other hand, feels that economics plays little if any role in the selection of electronic synthesizers. To replace a 28-piece film background orchestra, in his opinion, would require 28 synthesizers or 28 tracks of overdub. Here it boils down to a value judgment of which type of sound will work best for a particular type of film or program, and what type of equipment is being used.

Synthesizers also modulate

Not content to generate their own electronic sounds, synthesizers can also be used as instrument modulators. In broadcasting, an already recorded musical program can be fed through the synthesizer. The musical material

acts as a series of key triggers to produce some truly unusual effects which can be broadcast by themselves or remixed with the original music source.

It's possible to feed a rhythm signal (such as from an electronic organ's "band box") through the synthesizer or modulate the human voice or any musical instrument—virtually anything can be set up as the keying source for the instrument.

Ionic has also introduced a new memory/programmer called a "Sequencer" which enormously expands the synthesizer's capabilities. It's described as three keyboards stored up, and can set up separate programs for pitch, volume, timbre and other functions. It can be set up as a sync track, it can modify, provide inversions, reverses, and myriad other musical tricks without the benefit of a live composer.

"One of the great things about these synthesizers," points out Mayer, "is that you don't have to be an engineer or a musician to operate them. The years of formal training that we normally go through to become musicians is totally unnecessary."

Everyone is certainly enthusiastic about the new generation of synthesizers. A peek under the hood shows an orderly wiring layout, surprisingly spartan, with hundreds of integrated circuits. To do a rear-projection of a similar unit made with vacuum tubes is certainly illuminating. The synthesizer has come a long way since the days of RCA's roomful of Mark I and now it's cheap enough and easy enough to use for not only any broadcaster, but for most living rooms as well. **BM/E**

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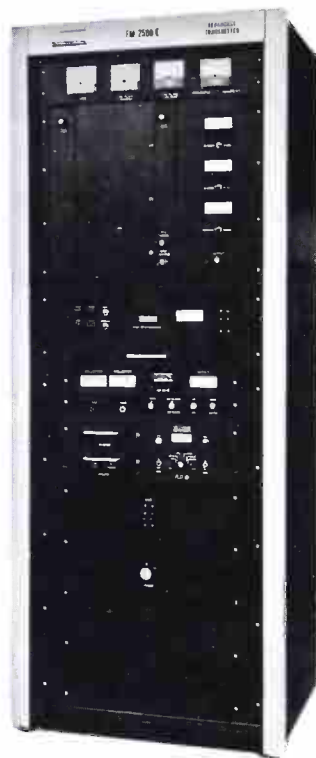
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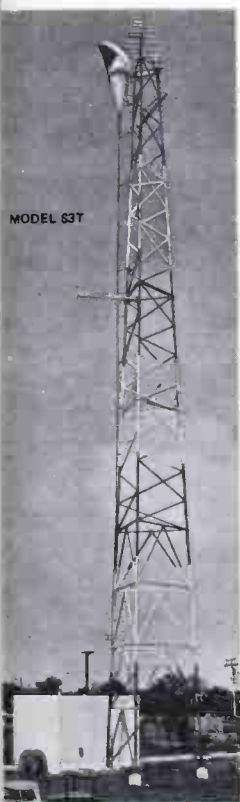
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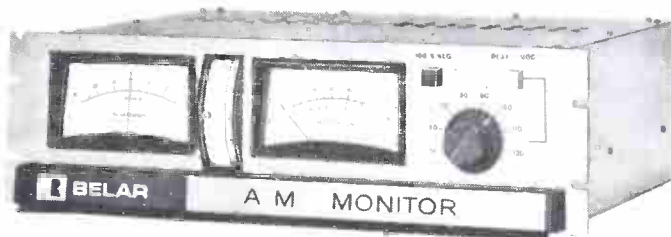
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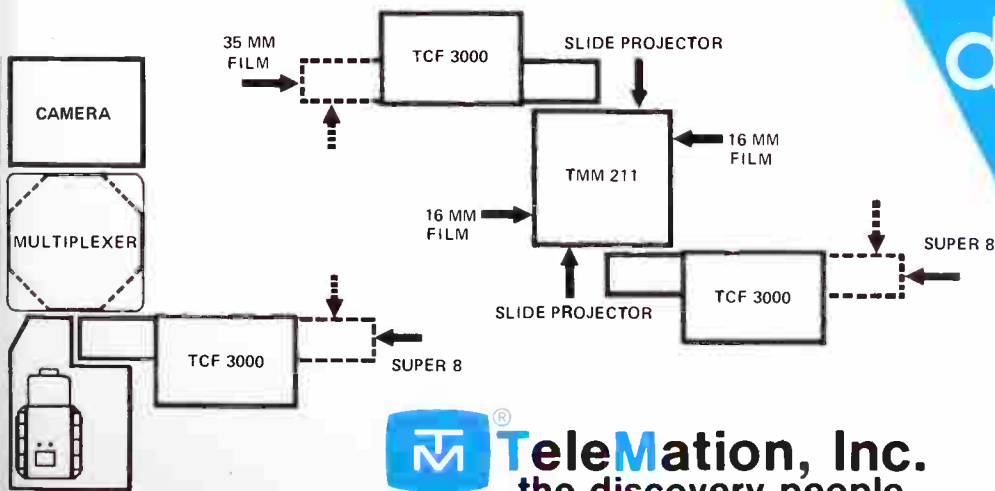
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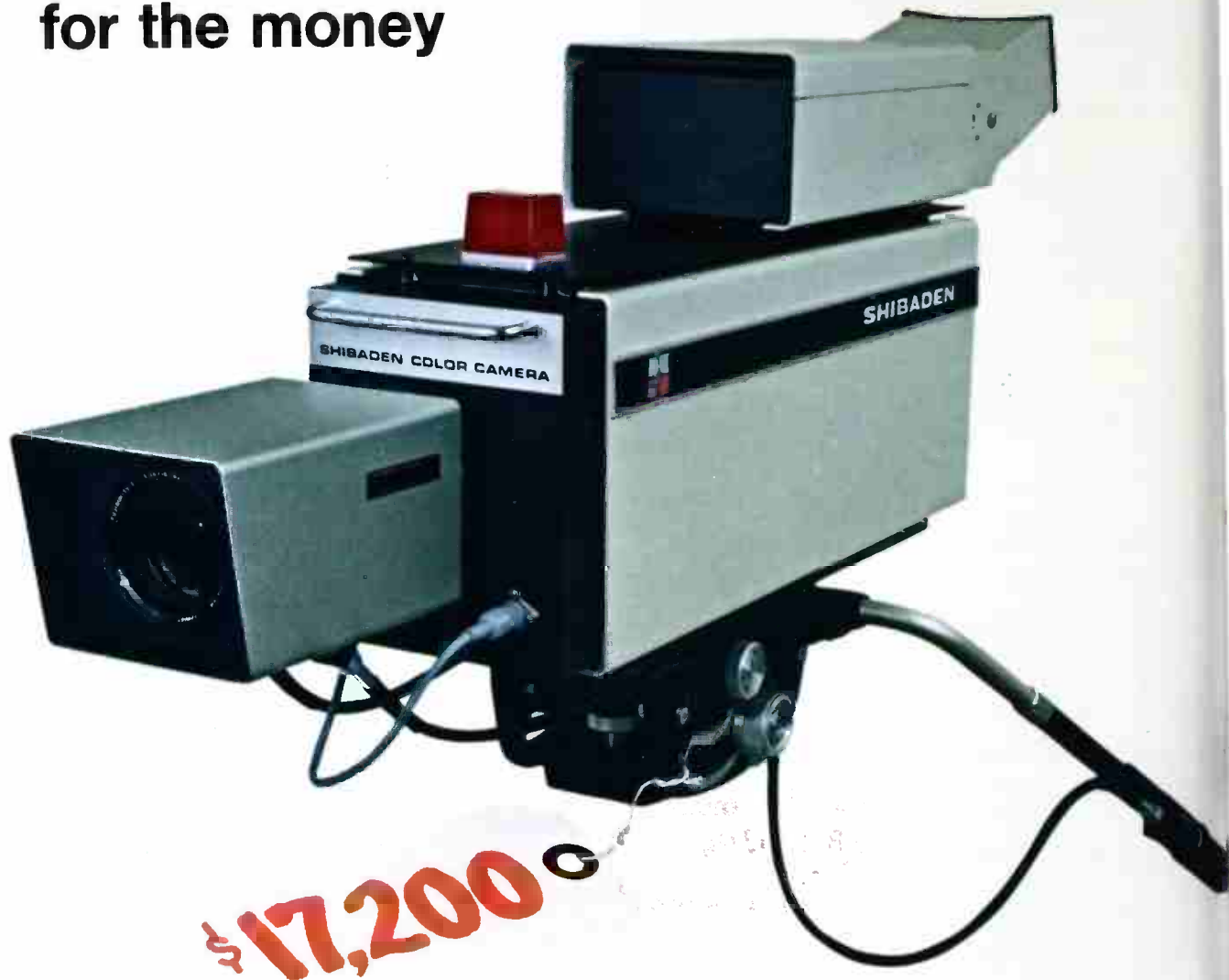
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