In This Issue...
1970 Convention Report
Basics of Studio Patching
New Products Reviewed
Add subscribers who live beyond your feeders

RANGER Line Extender Amplifiers

CATV operators get a new flexibility and economy in feeder line extension by using RANGER Line Extender Amplifiers.

Jerrold Model RLE-2 amplifiers are such excellent performers they can be cascaded to create a low-cost feeder system. They are housed in weather-and radiation-proof diecast aluminum housings. Access to the housing requires removal of only four hexhead stainless steel bolts. The printed-circuit board of the RLE-2 can be removed from the housing for inspection without disturbing the cable connections.

Jerrold Model RLE-1 amplifiers are economy versions used singly as feeder-line extenders to reach a few additional subscribers. They resemble the RLE-2 in every way except fittings and cable must be removed before circuit can be lifted from housing.

SELECTED SPECIFICATIONS

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<thead>
<tr>
<th></th>
<th>RLE-2</th>
<th>RLE-1</th>
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</thead>
<tbody>
<tr>
<td>OUTPUT CAPABILITY for each of 12 channels with cross-mod down</td>
<td>41 dBmV</td>
<td>35 dBmV</td>
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<td>GAIN AT 240 MHz, fixed</td>
<td>41 dB</td>
<td>35 dB</td>
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<td>FREQUENCY RANGE</td>
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<td>FLATNESS over entire range</td>
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<td>±0.75 dB</td>
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<tr>
<td>TILT, fixed</td>
<td>5 dB</td>
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<td>IMPEDANCE, input &amp; output</td>
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<td>75 ohms</td>
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<tr>
<td>NOISE FIGURE at CH 13</td>
<td>12 dB max</td>
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<tr>
<td>CONNECTORS</td>
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<td>QF-412</td>
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Order from your Jerrold CATV salesman, or request full information from Jerrold Electronics Corporation, CATV Systems Division, 401 Walnut St., Philadelphia, Pa. 19105

Phone: 215-925-9870  TWX: 710-670-0263

FIRST IN CATV
What a way to grow!

System expansion with TeleMation

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We planned it that way so you could build your local origination system one step at a time, or in one giant step, without fear of obsolescence at any point.

All TeleMation origination gear is production oriented, provides integrated broadcast quality, operates at the highest performance standards and is easily expandable.

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It’s good for your system.

Our best selling TMC-2100 Series Camera.

TELEMATION
The Total System Supplier

2275 South West Temple
Salt Lake City, Utah 84115
(801) 486-7564

A 3 Bay Console housing studio control equipment.

July, 1970, Volume 7, Number 7
TV COMMUNICATIONS is published on the first day of each month by Communicaction Publishing Corporation, 1900 West Yale, Englewood, Colorado 80110. Second Class postage is paid at Englewood, Colorado with additional entries made at Oklahoma City, Oklahoma. SUBSCRIPTIONS: One Year, $10. Two Years, $17. Three Years, $26. Foreign subscriptions (except Canada) add $4 per year.
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COMM/SCOPE COAXIALS ARE COVERED FOR FIVE YEARS!
If anything is going to go wrong with a cable, the first year is the period of greatest probability.

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In fact, Comm/Scope Extended Spectrum Coaxials are the only ones that are guaranteed for five years!

It’s your assurance that Comm/Scope Extended Spectrum Coaxials are the finest you can buy, at any price.

For full coverage to 300 MHz and beyond, always specify Comm/Scope Extended Spectrum Coaxials. Available now in Alumagard® and Coppergard® constructions for aerial or direct burial installations.

And they’re guaranteed for five years!
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July, 1970
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1500 miles of strand and hardware... from Pruzan to Akron Cablevision.

Who says Pruzan can't handle large orders? Not Akron Cablevision. It takes 1500 miles of strand and hardware to handle their new system. Not to mention tons of miscellaneous supplies and drop materials. One order, one Pruzan man responsible for it...and shipping to their predetermined schedules will assure on-time delivery.

At Pruzan, you get all the benefits of our extensive background in handling large orders. Plus competitive prices, availability of major lines and access to Anixter's huge interconnected inventory. Give us the tough orders...the LARGE orders...and watch us perform.

* It's really 2416 highway miles to Akron from Seattle. We'll be glad to take your order for that much cable, strand and hardware.


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One of the ANIXTER companies.
ARE YOU REALLY SAVING?

... By not getting jacketed Sealmetic ABD cable at the same price as unjacketed aluminum cable?

... By stocking three types of cable when Sealmetic ABD Cable can be used for Aerial, Buried and Duct applications or any of these combinations?

... By foregoing the longer service life only Anaconda builds into all Sealmetic ABD Polyethylene jacketed cables?

... By not buying jacketed CATV Cable?

Buy it and try it—prove to yourself that Sealmetic ABD CATV Cable is easier and more economical to install and maintain.
Anaconda Wire and Cable Company
Communications and Electronics Division
Sycamore, Illinois 60178
Michelangelo would have been pleased.

Michelangelo once summed up his working philosophy in eight words: "Trifles make perfection and perfection is no trifle."

Here at Benco, we don't have a Michelangelo. But we do have men who give painstaking attention to details. The details instrumental in delivering a perfect picture via CATV. If Michelangelo was around today, we think he would have been pleased to work for Benco. He was our kind of guy. A perfectionist.

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PACEMAKER T. Model 40-250 B. Distribution amplifier especially designed for MATV systems connected to CATV. Adjustable tilt and gain controls. Up to 250 Mhz bandwidth. Output handling, +45 dBmV.

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In Canada: Benco Television Associates,
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When cable operators want professional system design, engineering, construction, rebuild or expansion service, they turn to Communication Systems Corporation.

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COMMUNICATION SYSTEMS CORP.

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CATV: Jack the Giant Killer?

Fact Number One: Cable TV has vast potential. Fact Number Two: That potential will be realized. Fact Number Three: It is uncertain whether today’s industry owners will enjoy the benefits of that potential.

Men of imagination will develop the cable communications industry of tomorrow. Now that a thaw of the cable freeze seems imminent, cable can grow—in the hands of those who now own it—or in the hands of imaginative men as yet unaware of its potential.

Today’s owners have one advantage: They were there first. They should be the first to realize and invest in the opportunities of tomorrow. Tomorrow, many giants will be anxious to move into cable, and competition for the cable stakes will be hot and heavy.

Most cablenmen are holding their breath while awaiting the final jell of the Commission’s decision on the Public Dividend Program. But some have already heaved a sigh of relief and leaned back in their rockers to await the decision—which Burch has said will not harm CATV as it exists today. They simply aren’t worried—as long as their current business is not affected.

Guilty of the same kind of unimaginative thinking are those who think the proposed rules are like a handful of magic beans which will be planted to automatically result in a harvest of golden eggs for all cablenmen in the business today.

No regulatory scheme will insure automatic success for today’s industry owners, although it may make the success of cable communications nearly certain. It takes flexible men of vision and stubborn will to keep up with an exploding industry, and those unwilling to assume this role might as well get out now or run the risk of missing out on tomorrow’s profits.

Think of it for just a moment. If the FCC limits new franchise fees to two percent, competition for franchises will take on a whole new hue. The name of the game won’t be how much you’re willing to pay the city, but how much service you’re willing to give the public. With strong service orientation, countless new services will pop up and become widespread within a decade.

If Minneapolis and Tulsa and San Diego subscribers are getting special services, it won’t be long until subscribers in Mankato and Ponca City and Palm Springs are demanding the same things. And the small to medium-sized system operator who is not geared to grow, will be overbuilt by any of dozens of tough-minded competitors who are willing to provide extra services—along with standard television reception—at a good profit.

If you as a businessman are not service-oriented, and anxious to give your subscribers what they need, it’s time for a change.

Don’t wait until you hear the rattle of competitive gunfire in the distance. The only way to kill the giants you’ll face in the future is to be quicker, smarter and tougher. And the time to start muscle-building is now.
NOBODY MAKES BETTER SOLID SEAMLESS ALUMINUM SHEATHED CO-AX THAN PLASTOID.

Plastoid is the highest quality, but competitively priced aluminum sheathed coaxial. The lower attenuation, the longer life design deliver a picture that's sharper, clearer, more desirable; a selling plus for new subscribers.

Using Plastoid is like cutting the distance you have to cascade. All footage is swepttested and certified for minimum return loss of 26 db. (30 db available upon request.) This can mean sizable savings in installation or extension.

Lengths of up to 2500 feet are available. Make your system as long or short as you want. Then call us collect at 212/786-6200 and whatever your distance is, we'll do it a little better.

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| TYPE  | O.D. (NOM.) CONDUCTOR | O.D. (NOM.) DIELECTRIC | OVERALL O.D. (NOM.) UNJACKETED | OVERALL O.D. (NOM.) JACKETED | NET WEIGHT LB. PER 100 FT.
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Attenuation in Decibels Per 100 Feet

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<td>.89</td>
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**Also available for direct burial with high molecular weight poly jacket, self-sealant flooding compound, and rodent repellent jacketing.**
Who says NCTI is any good?

The management of 351 progressive CATV firms who have employees enrolled right now with NCTI. These firms include 19 of the top 20 multiple system operators in the industry. How about your firm? Is it one of those 351, or are your technicians still learning by trial and error at your expense?

What’s so different about NCTI?

The difference between NCTI training and the many other supposedly similar programs is very simple. NCTI courses are specific. NCTI courses are prepared by the best technicians in the industry. They are CATV men. They are interested in teaching general electronics theory to an adequate degree, but they also have the ability to teach specific solutions to specific CATV problems. These men know the questions, and that’s important when you’re trusting them for the answers. NCTI courses are instantly applicable to the job. What your men study tonight . . . they use tomorrow. That’s the difference! A big difference!
Recent Commission move to formalize Public Dividend Program is encouraging. Although an undetermined time still lies between the proposal and its birth as a regulatory force, cablemen can take heart that it will become a reality in some form or other.

As the proposal evolves, it will probably include more severe demands on the large top-market cable systems destined to come into existence. At the same time, pressures and costs to smaller systems in the top markets and on existing systems is likely to actually decrease.

Commissioner Burch has indicated his intention to avoid damaging the existing CATV industry. Smaller systems will probably be exempt from the 5% public broadcasting support provision, for instance.

At the same time, increasing pressure will be brought to bear regarding the industry’s role in the top markets, where 89% of the nation’s viewing public awaits cable. Someone will have to “pay the broadcast piper,” and it will probably be those who venture into the big, high stake markets.

Recent broadcast lobby moves are symptomatic of an industry which is panicked. The Free Television News Bureau is about the least rational move NAB has ever made regarding CATV, but it shouldn’t be taken lightly. As CATV’s muscle develops, look for even greater show of strength from broadcasters, who will be even harder to get along with now that it’s tougher for them to get a piece of the cable pie.

The result of cable growth should be a better television product for the viewing public. Networks and fat V’s will be forced to invest more of their burgeoning profits in more meaningful programming. CATV has been hailed as the knight in shining armor who will replace the programming dearth with succulent television, rich in content and diversity. Problem is, about all CATV has to offer at the present time is a technology which will make this possible.

The CATV industry as it exists today has neither the background nor the money to come up with vast programming improvements in the immediate future. Improvements, if they are to come, will have to come from existing sources at first, and CATV will be just the catalyst to foster the healthy competition which will in turn spawn new programming fare.
Sweep your entire CATV system with no program interference

These two super-compact instruments do the job. Easier and faster than ever before.

At the head end, a solid state sweep/signal generator transmits the signal.

In the field, one operator with a single, highly-portable receiver completes the tests. Without disturbing subscriber reception.

No excess baggage. No frills. No Nighttime tests. Because Texscan designed this system from scratch. Specifically for CATV. To make your summation sweeps easier. Faster. More reliable. And at a sensible cost.

For demonstration or technical data write, or call collect: Texscan Corporation, 2446 N. Shadeland Ave., Indianapolis, Indiana 46219. AC 317/357-8781.
Planning Your Future

Very few people can predict their futures with any degree of certainty. However, you can take some of the mystery out of the future by following the steps outlined below. They won't guarantee instant success, but they can help put you on the right track.

Begin by following these simple steps. First, analyze yourself, then appraise your opportunities. Realize which elements you can control and which ones you can't, then formulate a plan of action.

One of the difficult and most important factors in trying to design your future is honest introspection. You must analyze your wants, as well as your capacities and aptitudes. And don't kid yourself.

Deciding what you want out of your job means deciding what you want out of life, and which of your goals the job can provide. Consultants find that most managers list these among their important needs; respect from others, freedom from unwanted change, new knowledge and understanding, power and authority, independence, self-expression and above all, challenge.

After you decide whether you are getting what you want out of your job, and what more you want, your desires must be modified by your abilities to reach these goals.

The ability to get along with others and get things done through them is most important for managers, probably more important than mental ability, experience and drive. However, it takes a combination of all these in varying degrees.

In appraising your opportunities, try to learn all you can about the duties involved in any job you might be in line for or which you think you are capable of. This may seem obvious, but many a manager after he is promoted, finds that his new position includes functions not apparent from the outside. They may call for adjustments in work habits, new knowledge or great patience in dealing with conflicting personalities.

No matter how effective you seem to be in your job, your success and progress are ultimately determined by your boss according to his own method of evaluation. He may, of course, be helped in this evaluation by recommendations and opinions from colleagues. But the final decision is up to his judgment. Therefore, understanding the personalities and policies of your superiors is a necessity.

Once you have analyzed yourself, decided on your goals, appraised your ability and potential, and estimated the opportunities that seem to match your abilities and interests, start moving toward these goals.

Finally, make sure your work goals are consistent with your life goals. If you can succeed in doing this, you will be well on your way to success. Next month...tips on accurate communication to improve the effectiveness of the communications manager.
Up Down, Up Down . . . despite all the advances in color receivers and broadcasting techniques, the only way the viewer can cope with color variations from one program segment to the next is to keep adjusting the hue control on his set. Even an athlete can't keep up with it! Now, the CBS Laboratories' Color Corrector changes all that. For the first time the broadcaster can correct encoded signals at a single viewing point to achieve consistent color values from a variety of signal sources. Program material from cameras, tapes and film with wide ranging color values can be matched to each other to reduce the viewer's subjective shock from one program segment to the next. The Color Corrector can be installed with cameras or VTR's or film chains or in the program line.

Let your audience relax.
Write or call collect. 203-327-2000.

PROFESSIONAL PRODUCTS
CBS LABORATORIES
A Division of Columbia Broadcasting System, Inc., 227 High Ridge Road, Stamford, Connecticut 06905
convenient color signal measurements

- Advanced measurement capabilities
- Push-button operating convenience
- Dual-display inputs
- All silicon solid-state reliability. Cool, quiet operation

The Tektronix Type 520 NTSC Vectorscope provides new operator convenience, advanced measurement capability and silicon solid-state reliability. Push-button operating controls permit rapid selection of displays for quick analysis of color signal characteristics. A luminance channel separates the luminance (Y) component of composite color signals for display at a line rate. Combining the Y component with the chrominance demodulator outputs provides displays of the Red (R), Green (G), and Blue (B) values, revealing luminance to chrominance amplitude and delay errors if present. Line Rate displays of chrominance demodulated along the I or Q axis are provided for checking encoder performance.

Phase and amplitude accuracy of the vector presentation is verified by internally generated test signals. Errors in color encoding, video tape recording or transmission processes are readily apparent and are easily measured. Separate 0° to 360° phase shifters provide independent phase control of channel A and B displays. Excellent resolution for measuring small phase-angles is provided by a 30° precision calibrated phase shifter where 1 inch of dial movement represents approximately 1° of phase shift. Differential gain and differential phase measurements are made with accuracies within 1% for gain and 0.2° for phase. A unique graticule switching arrangement provides automatic selection of an IRE graticule or an illuminated parallax-free vector graticule. The selection occurs at the same time the operating mode is established.

The Type 520 Vectorscope provides the ability to check equipment performance during regular programming times through the utilization of Vertical Interval Test Signals. A digital line selector permits positive selection of Vertical Interval Test Signals from lines 7 through 21 of either field 1 or field 2.

For a demonstration contact your nearby Tektronix field engineer or write: Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005.

Type 520 NTSC Vectorscope .......................... $2150
Rackmount Type R520 NTSC Vectorscope .......................... $2175

U.S. Sales Prices, FOB Beaverton, Oregon

Tektronix, Inc.
committed to progress in waveform measurement
FCC PREPARES CATV REGULATIONS PACKAGE

The FCC at "Late News" press time had just completed preparation of its sweeping package of CATV regulations and proposals.

The prime area of dispute was the "CATV Public Dividend Plan," which won approval of the Commission, with some modifications. But the proposals will not be adopted as rules or even as interim procedures. They will simply be proposals.

Commissioners Divided on Issues

A total of seven documents were issued. A 4-3 split was the vote count on the controversial portions, such as the "public dividend plan." Opposing Chairman Dean Burch and his majority were Commissioners Robert Bartley, Kenneth A. Cox, and Robert Wells. Joining Burch and the majority were Robert E. Lee, Nicholas Johnson, and H. Rex Lee.

Only two of the documents embody effective rules — and they will be restrictive in nature. All the Commission plans that might meet with favor in the cable industry are simply proposals. As is well known, proposals sometimes are not adopted at all, or are adopted in vastly different forms, or languish for years before any action at all.

Dividend Plan: Issued as Proposal

The CATV public dividend plan has been issued as a proposal. It follows the essential form as reported earlier including seven-tenths of one percent of a system's CATV revenue be paid for copyright liability on distant signals. For each distant signal, another seven-tenths of one percent would be levied to encompass all educational signals imported.

The document does suggest, however, that it might not be high enough a copyright scale and also notes that the amount is subject to readjustment. The proposal retains the idea of UHF stations inserting commercials locally in distant signals, but suggests that CATV systems share substantially in the cost of such insertion. The initial proposal was that the UHF stations bear the cost.

The plan also retains the requirements that 5 percent of the CATV systems revenue go to support the noncommercial Corporation for Public Broadcasting.

Technical standards include requests for comments on 20 and 40 channel CATVs, the extent of two-way communications that should be required in new systems and a possible requirement that all CATVs provide local channel and program facilities within its franchise area.

Same Market TV Out of CATV

A final rule was adopted banning television station ownership of cable in the same market and banning all network ownership of cable.

The Commission proposes to ban newspaper and radio cross-ownership of CATV systems in the same market. It will also seek to limit total number of systems and the total number of subscribers that any one CATV owner may have.

The petition to reconsider the Commission's earlier rule that large cable systems be required to originate programming beginning January 1, 1971, was dismissed by the Commission. It will, however, extend the effective date of that date to April 1, 1971. It also will apply pay television...
rules to any programs carried by CATV systems that require per-channel or per-program payment. Along with the television station and ownership ban, these rules are the only firm action by the Commission in the documents proposed for consideration.

An inquiry will also be begun by the Commission into the complex snarl of federal-state relations and regulations of CATV. FCC did, however, propose a two percent maximum franchise fee.

KANSAS HIGH COURT THROWS OUT WICHITA FRANCHISE

The Supreme Court of Kansas has issued an unusual decision invalidating the CATV franchise for the city of Wichita.

The court, in handing down its decision, emphasized the word "unreasonable" and listed five points of objection to the franchise. The five points were:

1. City cannot enact unreasonable ordinances under guise of police power.
2. Municipality has no authority under police power to regulate business of a private commercial enterprise arbitrarily and unreasonably under the guise of promoting public health or public welfare of a community.
3. Ordinance regulating public streets may be sustained under municipality's police power, but the regulatory provisions chosen must be reasonably designed to accomplish the purpose and have a rational relationship.
4. Ordinance which empowers officers of a city to issue a CATV system franchise or refuse such franchise at will is arbitrary and void.
5. Ordinance which attempts to force a private commercial enterprise to submit to regulation as a public utility before it can do business in the city is unreasonable and void.

The Supreme Court decision overturned a previous district court decision on the case filed by Community Antenna Television of Wichita, Inc., against the City of Wichita, Kan.

The high court said that "we find nothing in the business of a CATV system which would reflect on public health or morals. What the system brings into the home is first broadcast by an authorized broadcasting company. We do not believe that the requirements and provisions in the ordinance . . . have any rational relationship to the use and rightful regulation of the city streets."

The court specified—speaking of the ordinance—that it deals "more with the management of the internal affairs of the CATV system, which for our review here must be considered as a commercial enterprise. We are also of the opinion that the ordinance puts it in the power of the city commission to grant or refuse a franchise at will," said the court decision.

20-YEAR NYC FRANCHISES BEFORE CITY BOARD

The City of New York has disclosed details of the twenty-year cable television franchise contract that it proposes to award to Manhattan Cable Television and to TelePrompTer, authorizing the companies to construct and operate a "broadband communications facility" in Manhattan. In addition to CATV service, the companies are permitted to offer "burglar alarm, data or other electronic intelligence transmission, facsimile reproduction and home shopping" services.
Unique process assures uniform dielectric... minimizes return loss of Foamflex® coax.

FOAMFLEX, the original foam dielectric coax, set very high performance standards for its imitators when first introduced in 1955. It still does.

Our exclusive "micro-foaming" is a key factor. During manufacture, the foam dielectric is continuously and precisely monitored to insure uniform density within very close tolerances. This, along with stringent on-center tolerances makes FOAMFLEX mechanically... and electrically near perfect.

Specified average characteristic impedance is the best in the industry (75 ± 2 ohms). Structural return loss is kept to a minimum and attenuation is exceptionally stable, even at high-band frequencies...and over a wide temperature range.

FOAMFLEX costs no more than its imitators. Immediate deliveries are available in all standard sizes from our New York plant or one of our strategically located warehouses.

For full details, contact one of our local sales offices... or Phelps Dodge Communications Company, 60 Dodge Avenue, North Haven, Conn. 06473. (203 239-3311)

Phelps Dodge coax for every need. Exclusive SPIRAFIL® II air-dielectric for lowest loss...and FOAMFLEX, the original foam-dielectric cable. Both at competitive prices.
FCC Takes Tentative Steps On Limiting Ownership of CATV

FCC in an all day meeting June 11, took a giant step toward the eventual adoption of a new package of CATV rules. The Commission scheduled another meeting and final approval and issuance of the package was not expected for another couple of weeks.

Signals Not Discussed

Tentative Commission votes were taken on ownership limitation and technical standards, though the distant signals provisions of the “CATV public dividend plan” were not discussed.

The crucial tentative decisions hinged on ownership and the Commission decided to ban network ownership of cable systems and forbid television station CATV cross-ownership in the same community. It was decided that a similar cross-ownership ban on newspapers and radio stations will not be adopted immediately as rules but will be issued as proposals for comment.

3 Years Given

The network and television ownership ban will be effective retroactively with current owners given 3 years to dispose of conflicting interests. Trades will be acceptable to the Commission.

Such ownership rules have been under consideration since late last year.

Multiple cable ownership will also be the subject of rulemaking proposals. Several different possibilities for restrictions will be suggested by the FCC. Ideas will be invited on limiting the number of systems, number of total subscribers and area concentration of ownership of any single CATV owner.

CATV To ‘Breathe Better’ Under Rules Says Burch

At a hearing before the Senate Appropriations Subcommittee, FCC Chairman Dean Burch spelled out his philosophy on the regulation of cable television programming.

After he mentioned new CATV rules to the subcommittee chairman, John O. Pastore (D-R.I.), who is also Chairman of the Senate Communications Subcom-

Cypress, Harriscope Merge

The contract joining Cypress Communications Corp. with Harriscope Cable Corp. has just been signed by (seated left to right) Burt I. Harris and Leon N. Papernow, president and chairman of the executive committee, respectively, of the newly combined firm. Shaking hands with Papernow is Richard C. Memhard, president of Shelter Resources Corp. Also shown are directors of Cypress, Thomas M. Curtin and Thor W. Kolle, Jr.
Enter: The age of sophisticated thin-film circuitry for CATV cable systems!

How do you design quality service into large, elaborate metropolitan cable systems? . . . quality that keeps subscribers satisfied?

One of the best places to start is with the amplifiers. Anaconda Electronics did. And, the result is this new hybrid IC, Century 21 Amplifier.

At its heart is the industry’s first application of thin-film, microcircuitry designed specifically for cable communications.

The reason why an IC amplifier delivers better quality signals than conventional amplifiers is that thin-film hybrid microcircuits make it possible to incorporate as much sophistication, or circuit complexity, as is absolutely necessary for the best possible performance with optimum reliability or repeatability.

Anaconda Electronic’s use of advanced IC techniques in the Century 21 results in a minimum number of discrete components thus affording a high reliability factor in each unit.

The totally modular Century 21 is basically a high-performance, unidirectional, push-pull CATV amplifier, but designed with optional two-way transmission capabilities.

This new amplifier not only provides excellent stability and repeatability, but it offers the broadest bandwidth of any cable communications amplifier available today.

For the best built-in quality throughout your cable system, no matter how large (or small) get all the facts about Century 21, the new one from Anaconda Electronics — first in IC technology. You’ll see it at booths 3-14 & 3-15 at the 1970 Chicago NCTA Convention.

"The Right Equipment Makes the Difference"
committee, Pastore asked how FCC could protect regular television outlets from having their programming pirated by CATV networks and shown to the public for a charge.

H & B, TPT Stockholders Approve Merger Plans

Stockholders of both TelePrompTer and H&B have overwhelmingly voted approval of the merger plans of the two firms. Once the Federal Communications Commission and the Securities and Exchange Commission also give their approvals, the "new" company's existence as by far the largest CATV system operator will be finalized.

Shareholders of both firms met in New York City. TelePrompTer holders voted 1,003,505 shares in favor of the merger, 2,098 against. H&B stockholders voted 4,562,970 for the merger, 20,848 against. TelePrompTer will be the survivor.

Burch: says it's too early.

Burch said that the Commission would not let that happen, but he stressed that it is too early to try to impose severe restrictions on cable programs. He pointed out that only one major city, New York City, is currently wired. He indicated, however, that FCC eventually may limit programming on cable operations much the same way it proposes to do so on subscription television.

He said that the new rules under consideration would allow CATV to "breathe better" without hurting commercial television. "Although these proposals do not constitute final action," Burch told Pastore, "I believe it is significant in demonstrating that real efforts are being made by the Commission to address itself to a major policy issue which must be resolved without further delay."

Burch, whose new but vigorous chairmanship was praised by Pastore, asked for the full $24,900,000 budget originally set out for the FCC in the administration's request to Congress. The House took $175,000 off that total.
When you invest in amplifiers for your cable television system, you'll find many competitive manufacturers who will engineer a system that is "spectacular" in the number of amplifier units they'll install on your cable. They need all those amplifiers to do the job! Not so with C-COR.

C-COR engineering reduces the number of amplifiers ... and thus the number of problems. HTP/HTP — half the parts, half the problems. With a C-COR system, you get the greatest signal fidelity even on the longest cascade. This means improved reliability and lower maintenance cost ... all with a picture that is stable throughout your system.

C-COR uses high gain, high output trunk amplifiers with gains tailored to the specific trunk length. These amplifiers are spaced at 34 to 40 dB to go that specific distance with lower noise and less distortion. This makes it possible to operate the longest trunk to meet any performance standard.

C-COR bridging amplifiers, with an output capability of 6 to 10 dB above those commonly used, provide maximum efficiency for the distribution portion of the system. The higher operating level increases the feeder length and drastically reduces the number of line extenders — reducing maintenance cost and operating problems.

It's a great sight to see the pyramid of performers on the circus high-wire ... but each one added, increases the possibility of a costly problem. In a cable system, you can do without costly problems. Call on C-COR to provide a better system with fewer parts when you are constructing or rebuilding.

Spectacular... But Not For a Cable System

C-COR Amplifiers ... Rated First Where Performance Is Rated First
Company officials said they expect no opposition from either the FCC or the SEC; nevertheless, estimates are that the government approvals would come no earlier than this month.

Illinois-Indiana Meeting
Is Legislative Success

Slanted toward legislative progress in the states of the Illinois-Indiana CATV Association, the annual meeting of the association took on additional sparkle with an unexpectedly large turnout of state legislators at the meeting.

Discussion on a recently defeated bill which would have placed CATV under jurisdiction of the Illinois Public Utility Commission was the main topic of conversation at the meeting held in Springfield, Ill. Election of officers and a list of notable speakers rounded off the three days of meetings.

All state representatives from Illinois were invited to attend the meeting and 89 of the state solons were counted in attendance. The association membership was particularly proud of the turnout in addition to its effective lobby which resulted in the defeat of a recently-introduced PUC bill.

The bill was held in the House Municipalities Committee and not delivered to the floor for a vote. The PUC bill would have repealed a two-year-old Municipalities Bill which granted cities the right to franchise and tax CATV systems, and in addition would have given the PUC the right to regulate the industry.

New officers elected in a last-day business meeting are Chuck Younger, Quincy Cablevision, Quincy, Ill., president; and Phil Aston, Lafayette Cable TV Co., Lafayette, Ind., vice president. New second vice president is Al Stelk, Kankakee Cable TV, Kankakee, Ill., and new secretary-treasurer is Doug Phillips, Flora Cable TV, Flora, Ill. New directors for the upcoming term are Don Johnson, Rock River Cablevision, Sterling, Ill., and George Nichols.
Our biggest competitor...

...our own model 900 directional tap. Four years of proven reliability and improvements such as center seized connectors, stainless steel hardware and expanded bandpass width make the 900 almost unbeatable...but we're going to keep working on it...

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Quinton Cable TV, Quinton, Ind.

First day sessions of the annual meeting featured Ralph Demgen speaking on “Copyright and CATV,” John Guinn discussing “Choosing Our Course in Origination,” and Ed Schaffer talking on local regulation of CATV.

Featured guest speakers were Don Taverner and Bill Adler of NCTA, who spoke on the state of the industry and what cablers should do to improve it.

NCTA Endorses Federal Preemption of CATV

NCTA's board of directors has endorsed in principle “federal preemption of the field of CATV regulation consistent with the orderly growth of the cable TV industry.”

The action, which approves the recommendation of the NCTA Regulatory Research Committee, was in response to increased state action in the field of public utility commission regulation.

NCTA President Donald V. Taverner said that the action doesn't change the NCTA position on copyright.

Comments on Political Time May Include NCTA

Democrats have taken several actions on the political front that may have profound impact on television and, more and more, on CATV.

The House Democratic caucus generally rallied around Senate-passed legislation that would revoke the equal time law for Presidential and Vice Presidential candidates and would put a spending limit on television time buying in political races. Candidates would be limited to seven cents per vote for that office polled by their party in the previous election.

Representative Torbert Macdonald (D-Mass.) and his Communications Subcommittee, or perhaps the Parent House Commerce Committee chaired by Representative Harley O. Staggers (D-W.Va.), will hold hearings on the measure. Republicans are expected to oppose the bill, partly because their party is in much better financial shape than the Democrats and wouldn't mind being able to buy up huge blocks of air time if opponents lacked similar money.

NCTA may very well be asked to testify at the hearing, and Congressmen are aware that cable operators have often allowed political candidates to appear on their local channels. They are interested in what charges may eventually result and how costs can be kept down.

In a related action, the Democratic National Committee has asked FCC for a declaratory ruling that the television industry cannot deny responsible political groups the right to purchase commercial time for the purpose of fund solicitation and discussion of public issues.

NCTA Appoints New Assistant to President

Larry D. Bowin, 26, has been appointed assistant to NCTA President Donald V. Taverner.

He has been assistant to the president of Metropolitan Pittsburgh Educational Television for the past two years. That was the post filled by Taverner before he joined NCTA, so in effect Bowin is simply retaining his slot with the new NCTA president.

“At NCTA,” the official announcement of the appointment said, “Bowin will be responsible for the implementation of special projects and association activities not normally handled by the various NCTA departments. He will also assist in the management and administration of NCTA office activities and concerns.”

The new NCTA staffer, who is married and has one child, holds a B.A. in Communications Arts from the University of Cincinnati, an M.A. from Ohio University, and has credits toward a Ph.D. in Communications Arts.

Taverner said of Bowin that “he brings to NCTA and the cable industry a strong background in education, television production, management and organization.”
Another distinction for Akron, TVC, and Kaiser CATV!

Long-famed as the world's rubber products capital, Akron, Ohio, will soon have another claim to fame... one of the world's largest and finest CATV systems. TeleVision Communications Corporation (TVC), holder of the Akron franchise, chose Kaiser's new Phoenician XR (Extended Range) Series for this 1,300-mile dual-cable installation after careful evaluation. The "XR" Series incorporates the latest in push-pull techniques, and is capable of carrying up to 32 TV channels plus FM on each cable. This is the largest CATV equipment order ever placed for a single location! Which backs up what we've been saying all along: From the smallest system to the largest, Kaiser CATV can provide "just right" equipment of latest design and highest reliability. If you're thinking small or thinking big, think first of Kaiser CATV.

Kaiser CATV
Division of Kaiser Aerospace & Electronics Corporation
P.O. Box 9728, Phoenix, Arizona 85020, Phone (602) 944-4411
Systems

John F. Gault has been named vice president, marketing of American Television and Communications Corp., according to Monroe Rifkin, president. Formerly president of Commonwealth Cable Television, Inc., Gault will now headquarter in New York City for Denver-based ATC. In his new position he reportedly will be primarily responsible for the development and implementation of marketing programs to acquire new cable television franchises and to broaden the firm's subscriber base.

Community Tele-Communications, Inc., an operating division of Tele-Communications, Inc., has promoted J.C. Sparkman to the position of general manager, according to W.R. Brazeal, executive vice president. Previously district manager at large for the firm, Sparkman will now assume responsibility for administration of the firm's existing CATV properties. He joined the company in May, 1969, from the Jerrold Corp., where he served as national sales manager, MSO.

Garden State TV Cable, operator of an 11 video channel system serving Vineland, N.J., has appointed Arthur D. Heiny as general manager, according to William Bause, vice president of the Reeves Cable Division of Reeves Telecom Corp. Heiny was most recently vice president and general manager of Valley Cable TV, a Time-Life affiliate, which operates a 143-mile cable complex located in western Pennsylvania.

Suppliers

Joseph H. Pascual has been promoted to the position of plant manager of the Essex International, Inc. Communications & CATV Division facility in Decatur. Pascual was formerly manager of production and inventory control. He joined Essex in March, 1966, after having been associated with Anaconda Wire and Cable for 10 years.

Gordon E. Halverson has been promoted to the CATV Sales Department of the Pruzan Company. He has been an assistant purchasing agent with the Seattle firm since 1969. Prior to joining Pruzan, Halverson was a buyer in the Boeing Company Aerospace Division for more than three years.

The Finney Co., manufacturer of Finco Antennas, Bedford, Ohio, has announced the appointment of Tore B. Nordahl to the newly created position of chief engineer, Electronic Division. Prior to his new position, Nordahl held senior design engineering positions with Kaiser CATV, HTV Systems, Inc., and systems engineer with TelePrompTer Corp.

Cal-Tel Construction Co. has announced the promotion of Bruce Lukkarila to the position of engineer manager. In his new position, Lukkarila will be responsible for strand mapping, system design, alignment of electronics and proof of performance. He was formerly with Bakersfield (Calif.) Cable TV where he was in charge of engineering and construction.
Plug Level Monitor modules into your Unicom trunk amplifiers; hook up a Cascade Status Monitor at any suitable point in the trunk line, then sit back and watch the performance of any amplifier you wish. Better still, let the monitor do the watching, it will tell you (audibly or visually) if anything goes wrong.

Now that’s being level headed!
The 1970 Convention: CATV Has Come of Age!

The following wrap-up report, along with the Trade Show reviews on pages 44 and 54, reflect the vitality of the 19th annual NCTA Convention.

"So many have committed so much in the likelihood of your success. Your faith in your own future should be renewed."

The words are FCC Chairman Dean Burch's, spoken on the afternoon of the final day of the NCTA 19th Annual Convention. And they summed up well the mood of hopeful excitement which infected the over 5,000 cable people meeting in Chicago.

Chicago was definitely "where the action was" in CATV. The new technology on display, the prestigious visitors on hand and the full and solid ranks of cable operators all testified to the commitment which Chairman Burch noted.

The exhibit floor was constantly busy, filled with cable people eager to see the advanced, new design equipment. Two-way displays, ranging from understated simplicity to elaborate set-ups, attracted throngs. So did the local origination booths where operators could try out everything from a time-weather machine to a full color studio.

Long-time cablemen such as Charlie Clements, vice president of Tele-Vue, looked around the Palmer House and could only grin thinking of the forty or so cable people present at the first annual convention in Pottsville, Pennsylvania. One measure, small perhaps, but significant, of the distance the industry has come in the past two decades was the guest list at the 1970 show. For the first time in its history, the CATV industry welcomed the chief executive officers of such industrial giants as Anaconda, Kaiser Industries and Essex International.

"Some Kind of Magic"

If some of the "family familiarity" is missing from the 1970 CATV industry, it has been replaced with a sense of fully mature professionalism. Yet the faith of the few gathered in Pottsville has been kept by the many gathered in Chicago. "You people have something on your side which nobody else has...some kind of magic," said Dr. Eugene Rostow, Yale law professor who headed the President's Task Force on Telecommunications.

Rostow's address to the Convention emphasized—as did all of the speeches—the tremendous promise and potential of cable communications. Herbert G. Kien, White House Director of Communications, reflected a similar attitude in his address. "The name of the game," he said, "is innovation. Your industry can go in many directions...but it depends on you." And NCTA president Donald V. Taverner, in a vibrant keynote address, said, "My confidence in this industry has never been firmer, my optimism never higher."

In a message spiced with his usual dry humor, Taverner reminded CATVers that, despite the very real problems they have had in the past, the past must be used to build on,—not to live in.
He spoke of the FCC, and pledged his personal assurance that the Commission leadership "does not want to either damage or destroy the existing industry."

"The Time is Now Right"

But of all the words spoken at the Convention, the most encouraging by far were those of FCC Chairman Dean Burch. He was welcomed with a standing ovation ... and concluded his speech to another.

"I do not come here as a saviour of your industry," he said. Yet his caution failed to dampen the enthusiasm of his audience which heard for the first time ever from an FCC Chairman: "The time is now right for a breakthrough for your industry."

But if those were words never before heard, Burch had others even more inspiring and far more concrete: "It is time — indeed, past time — to act on distant
signals. We owe it not only to you, but to the American public."

Again and again throughout the Convention the same sentiment was repeated many times: CATV has come of age, and cable people have their faces to the future, demanding of themselves and others that they meet the challenge of cable communications.

The mood was typified perhaps by an incident on the final day of the convention. A panel discussion on "The TV Receiver-CATV Interface" was in session with representatives from several of the leading receiver manufacturers among those at the speakers' table. Part way through the presentation, Sruki Switzer, Chief Engineer for Maclean-Hunter CATV in Toronto, asked permission to interrupt.

"You are telling us," he said, "all of the things you cannot do for us! I've been unable to get the tuner I need — no manufacturer has been willing to make that investment. Our firm has, therefore, committed a half-million dollars to get that tuner developed ourselves. But willing to invest or not — whether you think you can meet our challenge or not — in the next years, you are going to have to meet our challenge. We will be dictating to you the standards!" And, amid applause from the audience, he left the meeting.

The Issues Have Changed

Some of the issues which were so burning at the conventions in Boston and San Francisco got scarcely a nod from this year's convention-goers.

For example, during the session, "Broadcasters Look at CATV — And a Response," the broadcasting representatives (John Summers, chief counsel for NAB, and Martin Firestone, counsel for ACTS) presented the hard-line broadcast position with no quarter given. Yet the response from the audience after the presentations was almost casual. More than one listener spoke up to point out that a substantial number of broadcasters are CATVers. And one member of the audience remarked, "I've been a broadcaster for years, and these arguments against CATV remind me of nothing so much as the old futile arguments that radio made years ago against the upstart television."

The panel on telcos, utilities and power companies which played to a standing-room-only crowd last year drew a fair audience again this year — but an audience without the same adrenaline level this time. Far more real concern was in evidence at the session on labor unions — a subject which only a few years ago didn't even rate a mention.

Interest in broadband services also reached a new high. A full-length management session chaired by Archer Taylor of Malarkey, Taylor and Associates treated such cable applications as distribution of electronic mail, meter reading and shop-at-home.

 Appropriately, the man who for many personifies the concept of broadband cable communications was honored with the Larry Boggs Award for outstanding service to the CATV industry...Irving B.

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Designed for improved performance, flexibility, convenience

Rugged die-cast housing and face plate...color coded for easy identification...optional weatherproof seal between plate and housing...5/8-24 threaded entry...available with 412, 500, 750 or VSF connectors...strain relief plate for drop line messenger cable 2 and 4 tap models, strand or pedestal mounting...tap values of 10, 15, 20, 25, 30, 35 dB...power handling capability 12A at 60 VAC.

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Flexibility, still the keynote of Delta's Power Passing Directional Multi-taps, is now enhanced by improved performance. It's simple to change your system subscriber connection from 2 to 4, or 4 to 2, or even a 0 db through plate. You change only the plate—the housing stays in place, even with VSF connectors.
Kahn, president and board chairman of TelePrompTer Corp.

New England cable operator Al Ricci—a long-time favorite on CATV Convention stages—made the presentation to Kahn. “This year’s recipient of the Boggs Award,” said Ricci, “burst upon the industry like an atomic bomb a decade ago. Now, it has never been considered particularly pleasant or desirable to be in the impact area of a bomb. In this instance, the experience for many of us was, initially, a staggering one.”

“Once we had determined, however,” Ricci continued, “that the gentleman was indeed for real... that he had come prepared to go the distance... we began to appreciate him... a man recognized as one of the industry’s spokesmen, his words heard from Wall Street to Washington.”

Wall Street was listening to CATV—and vice versa—at this 19th Convention. A number of investment bankers and brokers stopped by to visit, some to stay. Considering the number of men in the audience whose interests are tied to public companies, a session on taking cable firms public was particularly timely. Although the panelists spoke cautiously about today’s market, and although considerable comment about the depressed Dow Jones was heard around the tables; no sentiment but optimism was expressed concerning the cable market.

Sales Better for Everybody

And despite the tight money situation, more than one operator went on a buying spree in the exhibit area. A vice president of one of the leading manufacturers commented: “Sales are better this year than they’ve ever been—better for everybody, not only our company.” And another manufacturer’s manager, relaxing in a hospitality suite after midnight, reflected with considerable satisfaction that he couldn’t even staff his booth with enough people to handle the crowd that day.

Even the annual membership meeting had an element of the unexpected. Ed Allen, nominated by petition for the office of secretary, and Bob Weary, nominated by petition for a directorship, won over opponents proposed by the official nominating committee... an event which lent strength to nominating committee chairman Beisswenger’s plea for reform of the nominating process.

Ralph Demgen, choice of the nominating committee for national chairman, was also the unanimous choice of the membership. Praised by retiring chairman Bill Adler for his dedication to the cable television industry, Demgen gave ample evidence of his feelings in a fervent “inaugural address.” He challenged the men and women of cable television to join NCTA, to work for NCTA, and to unite in pursuit of their goals... to give proof of Don Tavner’s statement in his keynote address that “One of our greatest resources is the quantity and quality of leadership in this industry.”

John Gwin, elected vice-chairman of the association, was also honored at a final-day luncheon with an award for the best committee leadership work in the past year. Gwin had served as Legislative Committee chairman. Claude Stevanus, nominee for treasurer, was also elected unanimously to that office by the membership.

Seven new directors were chosen, six of them to fill three-year terms and one to fill a one-year term left vacant by the resignation of Fred Lieberman. The full-term directors are: Polly Dunn, Columbus (Miss.) TV Cable Corp.; Eugene Iacopi, Television Signal Corp. of San Francisco, Calif.; Lawrence “Duff” Kliever, Peninsula Cable Corp.; Bruce Lovett, American Television and Communications; Bruce Merrill, Ameco; and Robert Weary. Bill Karnes of Trans-Video was elected to the one-year term.

Also elected to the board was Robert Behringer, vice president and manager of Kaiser CATV. Selected in a separate meeting of the NCTA Associate Members, Behringer will represent that group on the Board for a one-year term.

This 19th Annual NCTA Convention can only be summarized as a source of immediate, exciting promise for the cable industry. This obviously upbeat note was dynamically spurred by FCC Chairman Burch’s words on Wednesday; but was also already clearly evident in the enthusiasm over many facets of cable technology. Two-way transmission, auxiliary services, cablecasting hardware and software, and advanced concepts in system management and marketing all received unprecedented interest from cablemen. For those who have been associated with CATV for any number of years, it was dramatically apparent that CATV has indeed come of age!
We brought CATV to western Colorado

...with Denver-area color quality by Collins

Western Telecommunications, Inc. is making the mountain west colorful with its extensive CATV operations.

Bob Magness, president of the Denver-based company, says: "Our CATV operations succeed only when our subscribers are happy with the color and quality we bring into their homes."

"We have found performance-proven microwave equipment an important consideration, especially when these systems are located through mountainous terrain."

Across the country, Collins microwave systems are on the job for Mr. Magness' Western Telecommunications and other CATV operations.

Collins microwave systems are examples of the engineering and manufacturing excellence achieved at Collins through use of the C-System, an integrated, computer-controlled system for design and production.

To learn more about Collins colorful world of CATV, write Department 400, Collins Radio Company, Dallas, Texas 75207. Phone: (214) 235-9511.
Patching Your Way To Greater Flexibility

This two-part article on patching and switching provides basic insight into multiplying the usability of your expensive origination equipment.

By Jack A. Richel

Both patching and switching allow the CATV operator to connect any number of inputs to any number of outputs, thereby increasing the flexibility of his origination system. This article discusses the relative merits of the two systems.

Part I — Patching

Patching has been around since the late 1800's when a telephone operator sat facing rows of switch jacks. By taking a cord with a plug on each end, she could interconnect any two of the jacks. Each jack represented either a subscriber of an outside line to the rest of the world so that she had almost complete flexibility in connecting any one in the system to anyone else. We say almost complete flexibility since her interconnections were limited by the number of cords she had and the outside calls were limited by the number of outside lines available.

When radio developed, it too, utilized audio signals like the telephone and jack panels were employed to give the control room engineer maximum flexibility in interconnecting various pieces of equipment. In radio and TV terminology, these jack panels are called "patch" panels, but their operation is basically the same. Any microphone, record player, telephone line or audio tape recorder can be interconnected by means of a patch panel and patch cords to any output such as appropriate mixer inputs on the audio mixing console, or to monitor amplifiers and speakers, or to the transmitter.

The same techniques were used for the audio equipment in the TV control rooms when television came into existence. Later video patch panels were developed which allow the control operator...
It took just 90 minutes to finish the job at West Valley Cablevision's new plant in Yakima, Washington. And the same convenience, economy, and quality can be built into your system with a new MOBILT Head-End Building from Fort Worth Tower Company. Designed expressly to house CATV and microwave electronic equipment, MOBILTS withstand any climate or location problem... house electronic equipment according to the most rigid standards.

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■ REDUCED COST AND WAITING TIME
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■ QUALITY CONSTRUCTION
MOBILTS are designed expressly to house electronic equipment. Result? Problems like inadequate tightness, poor ventilation and improper sealing of doors are non-existent. And... an absolute minimum of maintenance is required.

■ FAST DELIVERY
No matter what the weather conditions, site or local labor situations, MOBILTS offer fast delivery and uniformity. We promise delivery on time.
Many options are available in size, outside finish, wiring and ventilation. You owe it to yourself to write for full specifications on these rugged, versatile head-end buildings. You'll find one exactly suited to your needs... at an economical price.

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to patch video just like audio. We'll discuss this a little later in the article.

In general, both audio and video patch panels can be described as a panel designed to fit a standard 19" rack with rows of holes across it into which are fitted jacks. Connections to and from pieces of equipment are connected to the rear of the jacks. Patch cord plugs can be inserted into the jacks through the front holes on the panel. The holes are designed in pairs either side by side or one above the other for easy identification. If they are located one above the other it is common practice to designate all the top holes as inputs and the bottom holes as outputs. We'll see why in a moment. Let's assume for a moment that a certain signal generating device is always connected to a certain amplifier. The signal generating device output would be permanently wired to the top jack and the amplifier input permanently wired to the bottom jack; they may now be interconnected in three ways:

1. A normal patch cord can be patched from the top hole to the bottom one making the normal connection between the two devices.

2. A "looping plug" may be used to interconnect the two. A looping plug usually consists of two plugs mounted in a block of insulating material to space them the right distance apart to fit the top and the bottom hole at the same time. Wiring inside the block connects the two plugs so that when it is inserted between the top and bottom holes a normal interconnection is made between the two devices.

3. A third method is called "normal-through" and the input and output jacks are wired together on the rear of the panel to make the normal connection. This method requires nothing to be plugged into the hole at all. Insertion of a patch cord actuates extra switch contacts on the jack and the normal-through connection is broken and it can be patched like any other patch panel.

Naturally the purpose of any patch panel is to allow any input to be changed to any output. This might be for normal operation, or it might be to isolate or bypass a defective unit for emergency or maintenance purposes. The neatest in appearance of the three types of patch panel is the "normal-through," since there are no patch cords or looping plugs in it, unless you wish to bypass something. Naturally this is the more expensive of the three types.

**Audio Patch Panels**

Audio patch panels come in a variety of configurations and sizes. Early patch panels were made of heavy slabs of bakelite while today's panels may be made of either phenolic or aluminum. The jacks themselves have either palladium or silver contacts, and can be had in anything from two basic contacts to ones which switch up to six circuits. They come in two conductor and three conductor styles. Size of patch panels vary from a single row type with 26 jacks or 13 pairs, to a double panel with 52 jacks or 26 pairs. Multiple panels can be mounted one above the other to give any number of total jacks. So far we have been discussing standard jack panels with 1/4" jacks. There are new miniature jack panels with smaller diameter jacks and it is possible to buy a single panel with 96 such jacks on it or 48 pairs.

Audio patch cords are obtainable in length from 6" to 10' but the more common ones are 2 or 4 feet long. They may have a single plug on each end with two conductors on each plug or three conductors on each plug. Or, they may have double plugs on each end with two or three conductor plugs on each leg.

Telephone terminology has stuck to the contacts on these plugs and they are called "tip," "ring" and "sleeve." The two conductor types look like ordinary phone plugs with the sleeve being the brass barrel just ahead of the handle. The sleeve gets its name from the contact sleeve around the hole in the jack into which the plug is inserted. The tip is the rounded end of the plug and it is insulated from the sleeve by a spacer. A three conductor plug has a second short sleeve (or "ring") just ahead of the main sleeve also insulated from both the sleeve and tip by insulating spacers.

Audio circuits can be wired either balanced, or unbalanced on a patch panel. If unbalanced, the center conductor of the audio
cable can be connected to the tip and the shield of the cable to the sleeve. Thus a two conductor plug can carry the entire circuit. If the plug is to carry a balanced circuit the plug must either be double or it must be of the three conductor type. If double, one side of the balanced line is connected to one tip and the other side of the balanced line connected to the other tip with both sleeves connected to the shield. If a three circuit plug is used, one side of the line can go to the tip, one to the ring and the shield to the sleeve. Balanced wiring is preferred to reduce hum pickup, but the devices to be patched must be capable of balanced operation.

Audio jack panels and patch cords are made by a number of companies such as ADC, Switchcraft and Western Electric. Prices for patch panels start as low as $10 each and can run to several hundred dollars. Patch cords are usually six to ten dollars each.

Video Patch Panels

Video patch panels consist of a phenolic or aluminum 19" rack panel with rows of holes behind which are mounted the video jacks. These are usually gold plated to minimize high frequency losses and are generally quite attractive. Depending on how they were manufactured, connections to the rear of the jacks may be made by directly soldering the center conductor and shield of the coaxial cable to the jack, or the rear of the jack may be made to fit a BNC or a UHF coaxial connector. The jacks are made to maintain the concentricity and impedance of the coaxial cable and so are the patchplugs.

Like audio patch panels the video patch panel usually has a top and bottom row of holes with the input on the top and the output on the bottom. A patch cord may be inserted in the top and bottom holes to complete the circuit, a video looping plug may be used, or the video patch panel may be designed for normal-through operation.

Standard video patch panel sizes may range from one with 12 jacks to one with 52 jacks mounted on it. Any number of these can be stacked one above the other if additional circuits are required.

Video patch cords are made from coaxial cable and the plug looks like a stepped sleeve or tube, with the center pin mounted concentrically. Standard lengths are 6, 12, 18, 24 and 36 inches long, although special lengths are expensive and may cost several hundred dollars each. Principal suppliers of video patch panels at the moment seem to be Trompeter Electronics, Inc. and Cooke Engineering Company.

You can build your own video patch panel by mounting a number of BNC or UHF female coaxial connectors, and use the mating male plugs on each end of a short piece of coaxial cable as a patch cord. However, a word of caution here: neither BNC or UHF connectors are a true 75 ohm impedance and the mismatch may cause some high frequency losses.

Audio and video patch panels do have some disadvantages. Patching is usually used on a one-to-one ratio with one jack to the device input and one to the output. This makes it difficult to take the output from one device and feed several others. Of course, one can arrange to have distribution amplifiers associated with a patch panel, but then it takes two jacks for the input if it has a looping input and four more jacks for the output, just to accommodate one distribution amplifier.

If you do not have normal-through panels, it is possible to leave the device unterminated if a patch cord or looping plug is not left in the jacks. If both high level and low level audio are brought to the same patch panel, it is possible to get feed-through from one to another if they are not physically isolated. Even though there are designation strips on the patch panels to identify the jacks it is possible to patch an output in where an input should go.

Finally, in television work if patch panels are used, one must have audio panels for the audio, and video panel for the video, and they must work together. The appropriate audio and video patch panel, and the way your system is interconnected from time to time. For example, lets suppose that you only have a six input switcher/fader and you have eight possible inputs you could feed to it. All eight input devices could be brought up to the top row of jacks on the video patch panel and the six switch inputs could be brought to six of the bottom jacks. Then by patch cord any of the eight inputs could be patched to any of the six inputs.

Video patch panels are fairly well suited to a professional type of switching and can eliminate many of the problems of patch panels.
The recent FCC ruling regarding local origination of TV programming caught many a cable owner at loose ends.

But it's really a marvelous opportunity.

And Ampex can help. Because Ampex equipment is in virtually every TV station in America. Which means we know TV broadcasting. And TV cablecasting. We're also pretty deep into closed-circuit TV for schools, hospitals, and businesses. Which means we have an extremely wide range of video equipment.

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Technical questions? Our Video Institute offers courses to train you and your personnel in all phases of technique and production.

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Give us a call. We're ready when you are.
Studio Notebook
answers to program problems

QUESTION: From Jack Williams, Manager, TelePrompTer of Liberal, Kansas.
What is the best arrangement for video monitors?

ANSWER: Video monitors have two primary uses: (1) to check the quality of video signals; and (2) to assist in directing the program.

CHECKING THE SIGNAL QUALITY

The first place a CATV program director will recognize such signal problems as noise, instability, loss of sync, streaking, or vidicon tube lag is usually on a video monitor in the control room. As soon as this is detected, the problem should be studied more closely on a waveform monitor, and adjustments in the camera or video recorder can be made.

There is a great temptation to adjust the horizontal, vertical, brightness and contrast controls of the video monitor to make a relatively bad picture look better in your control room. These adjustments have nothing to do, of course, with changing the quality of signal delivered to the modulator and home TV receivers. You may overdrive the video gain of the system to improve the appearance of the picture on the monitor, but succeed only in introducing audio buzz or flashing in the RF system. The level of signal delivered to an RF modulator is critical, and the video monitor is a poor test.

CONTROLLING THE PROGRAM

The typical CATV cable-casting system has two live cameras, a video tape recorder, a film chain and automatic time, weather, and news for program sources. There is, in my opinion, a natural priority scale for video monitors for each of these sources.

The most critical combination of monitors is as follows: Have a monitor for each live camera. You essentially create your programs from these. A preview monitor is needed to "cue up" other sources. A program monitor gives a continuous check on the source which is going to the modulator or VTR.

The next monitor to add would be special effects monitor, since there is considerable adjusting between camera sources before the picture is ready to switch on line.

If a large proportion of programming is videotape replay or film, monitors for these sources become the next in priority.

The best placement of monitors in the control room console, from left to right, is as follows: camera 1, camera 2, preview, program, special effects, film and VTR. In a single man operation when one waveform monitor is used, it is best placed under the preview or program monitors. When a video man is used, the waveform monitor is best placed near the camera control units. The video production switcher should be placed below the program monitor.
Our package for 8.9 million die-hard American sports enthusiasts. We’ve got an international CATV exclusive on the most exciting and diversified package of blue-ribbon sports films ever assembled for the dedicated sports fan.

Recent and past NFL and college football classics, top NCAA events, America Cup races, basketball, championship golf and bowling, the blazing Indy “500,” World Famous Hunting and Fishing—even Bridge with Goren. And these just scratch the surface!

Two special local origination packages: 21 tapes (42 hours) 14 tapes (28 hours). Write today for rates and full details.

Be kind to a sports nut this month.
NCTA Trade Show Review:
Equipment for the Studio

Displays of cablecasting gear took up much of the Trade Show space this year. So much to see... so much to consider. But, what do you really need for a successful origination studio?

By Jack A. Rickel
Communications Consultant

The glittering array of lights, cameras, monitors, video tape recorders and pretty models left little doubt in anyone's mind that the theme of this year's NCTA exhibits was origination.

A few old timers were in evidence, but for many of the companies represented, it was their first time to exhibit at NCTA. A few of the newcomers readily admitted they weren't sure they understood what it was the cable originator wanted. Nor, for that matter, did many of the cable operators themselves. To the system operator who was just getting started in origination, it must have seemed complex, confusing and expensive. Some exhibitor booth personnel were friendly and helpful. Others ranged from hard-sell hucksters, through highly technical engineer types that talked over the heads of many of the attendees, to some who displayed complete indifference.

Color origination equipment was widely displayed and the results were generally excellent. Most of the pictures were being produced under almost ideal conditions. The system operator who buys one of these color systems and expects to obtain the same brilliant colors and snap when operating under his own conditions, would do well to remember (a) light levels were high on many of the exhibits or models being televised in color (some of them as high as 250 foot candles) and (b) several of the color cameras were fitted with expensive zoom lenses.

To enhance their apparent brightness and color fidelity, some of the color pictures were displayed on professional color video monitors costing in excess of $2,000. The smarter exhibitors mounted these monitors in areas of subdued lighting so that brightness and contrast controls could be adjusted for optimum operation.

Color cameras generally fell into two price ranges: the modest price range of $7,000 to $10,000 and the lower end of the professional broadcast camera range of $29,000 to $35,000. Norelco provided one exception with a three-plumbicon color camera in the $21,000 to $27,500 range.

In the modest price range, there were many companies offering color cameras such as Sony, RCA, IVC, GBC and Shibaden.

There were only three companies showing the higher priced color cameras, Ampex, Commercial Electronics and General Electric. The Commercial Electronics camera used three SEC tubes which incorporate image intensifiers and produce correct color with light levels as low as 5 foot candles. It sells for about $35,000.

Sony had developed a three input, one output optical multiplexer for their DXC-5000 viewfinder color camera. It eliminates the necessity to remove the zoom lens and substitute a fixed lens for film use. The camera is mounted on the multiplexer and an adapter lens converts the zoom lens to film use. The camera complete with camera control, cable and
Jack A. Rickel, president and principal stockholder of Jack A. Rickel & Associates, has designed and supervised installation of nearly 100 television studios. He has served as a consultant to CATV systems in Pennsylvania, Nevada, Alabama, Virginia, Minnesota and California.

Mr. Rickel designed the first color, dial-access system for the National Military Command Center at the Pentagon. He has served as a communications consultant for the Air Force and for the White House.

From this wealth of communications and studio design background, Jack Rickel serves TV Communications magazine as a regular Contributing Editor. His articles on the basics of CATV studio equipment and design appear each month.

Zoom lens costs $8,500. The multiplexer and adapter lens costs $1,450.

Video tape recorders varied from a new little 1/2" tape unit that did an excellent job of recording and playing back color video for $1,200, to full broadcast compatible 1" recorders priced as high as $18,000. Among those manufacturers represented were Ampex, GBC, IVC, Shibaden, Sony and Diamond.

Switchers were displayed by Central Dynamics, Dynair, Computer Image Corporation, Telemet, TeleMation, Riker Maxon and RCA. Dynair has a nice little vertical interval switcher-fader, the VS-150A that has three non-composite inputs. It sells for $750. Computer Image has a more elaborate version in the same price range. Trompeter Electronics has an interesting combination video patch with tally lights and a matrix switch that offers the flexibility to do almost any video switching requirement.

Black and white cameras ran the gamut from $300 self-contained units to two-piece systems in the $7,500 range. One of the best looking new cameras was the General Electric TE-26. It will accept any vidicon, automatically adjust itself over a 20,000:1 light range, operate with internal 2:1 sync or external EIA, and produce a true 800 line resolution picture. Its price? Less than $1,500 ($1,460 to be exact). A lower priced unit of the same family, the TE-33 carries a price tag of only $600. Norelco has a nice looking single plumbicon black and white viewfinder...
camera for $7,500. This includes a zoom lens with automatic iris, camera control and cable.

Camera mounting equipment, lenses, monitors and video processing equipment appeared pretty much unchanged with no striking innovations.

Catel does have a new modulator line in which the adjacent channeling filters are an integral part of the unit rather than items of equipment to be purchased separately. AV Systems, new to the CATV industry, displayed a complete portable studio and new film chain.

The present situation in CATV origination brings to mind the early days of educational and instructional television when the educator did not know what he wanted and the suppliers and manufacturers did not know what it was the educator wanted to do with it. A lot of systems didn't work properly and a lot of money was spent unwisely. The same thing could happen to cable originators.

If you're a cable operator planning to originate, get some design help from someone who understands your needs, your financial position, the peculiar requirements of your environment, and the equipment offered by all companies. Every system and its needs are different and you are no exception. The few dollars spent for expert guidance can save you untold grief and expense in the future.

Gilbert's Diamond-G Coaxial Cable Connectors are CATV's standard for quality and performance under all operating conditions. High volume production is the key to their low cost. The units illustrated are but three of hundreds carried in stock:

ALUMINUM CABLE CONNECTORS
RG-59/U CABLE CONNECTORS
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CORRUGATED COPPER SHIELD CABLE CONNECTORS
and
CABLE TERMINATIONS  FITTINGS & ACCESSORIES  CHASSIS MOUNTINGS
CABLE EXPANDING TOOLS

Write us, whatever your cable connector or accessory need. There's a complete catalog for the asking.
July 1970

**TV Communications**

**CATV Technician**

This Month...
Trade Show Review
CATV State-of-the-Art
New Cable Products

At the 1970 NCTA Convention Trade Show, Amacuda Electronics featured their new thin film hybrid amplifiers. Analysis of this and other new products begins on page 54.
Less signal distortion, less interference, less noise and less maintenance result in a more profitable operation with Scientific-Atlanta equipment. Consider these examples:

Demodulators have phase-locked synchronous detectors. Quadrature distortion is eliminated. Differential gain and phase distortion are reduced to the lowest levels in the industry.

Solid state signal processors have crystal controlled converters with FET circuitry to minimize cross-modulation. Modular design reduces system down time.

Cavity-tuned V-IF preamplifiers in weatherproof enclosures minimize adjacent channel interference, noise, and maintenance.

Rugged broadband antennas, designed for optimum electrical characteristics, have demonstrated less co-channel interference, less maintenance and maximum gain.

See what we mean.
Your subscribers will.

For more on less, contact Dick Walters, Marketing Manager, Commercial Communications, Scientific-Atlanta, Inc. P.O. Box 13654, Atlanta, Georgia 30324. Phone 404-448-8499.
A State-of-the-Art Review: Expanding Cable Capability

If the CATV operator is to expand as a "cable communications entrepreneur," he must first understand the technology behind two-way and multi-channel operations. Part 2.

By I. Switzer, Chief Engineer
Maclean-Hunter Cable TV Limited

The following thoughts (and those for next month's installment in this series) comprised a paper presented by this author at the 1970 International Convention of the Institute of Electrical and Electronics Engineers (IEEE). CATV development is hampered when limited to twelve channels. This article and the one next month seek to appraise the various approaches to multi-channel transmission systems.

UHF Cable Transmission

As we look toward more than 12-channel systems, it is natural to investigate the possibilities of further adaptation of the television broadcasting system into cable transmission systems. The broadcast system, after all, has 82 channels available, 12 channels in the VHF band (54-216 MHz) and 70 in the UHF band (470-890 MHz). Cable systems may ultimately be successfully operated using those transmission channels. The following advantages and disadvantages may be cited:

ADVANTAGES
1. There are a growing number of home television receivers equipped to receive these channels without any modification or adaptation.
2. These channels are presently allocated to television services. Signal leakage into or out of the system would not affect other services.
3. 70 of the 82 channels are available in a single octave (470-890 MHz). This eases some of the system amplifier problems.

DISADVANTAGES
1. The UHF tuners on most home receivers are very inconvenient to use. It is difficult to find and identify any particular channel. With a large number of channels, closely spaced, this becomes an even greater problem.
2. Many UHF equipped receivers will not handle adjacent channels at UHF in a satisfactory way. The basic selectivity is provided in the receiver IF and this is identical to selectivity at VHF frequencies, but the UHF tuners usually have inadequate RF selectivity and are prone to "front end" overload problems when handling adjacent channels. Local oscillator radiation from the antenna terminals may be excessive, and image rejection inadequate. These are all factors in considering reception of a large number of contiguous channels. The FCC recognizes these shortcomings in UHF receivers by careful separation of channel allocations with regard to sound image, picture image, local oscillator radiation, IF beat, and intermodulation interferences. UHF tuners will need considerable improvement to make them suitable for use on a multi-channel UHF cable transmission system (See Table I).
3. Cable losses at UHF frequencies are very high. Cable attenuation at 890 MHz is almost exactly double the loss at 216 MHz. A typical large system today has about 1,000 dB of loss at 216 MHz between the head-end and the farthest subscriber. At 890 MHz this loss would be almost 2,000 dB! (Some losses do not increase for UHF frequencies, e.g., losses in splitters, tap devices, etc.). Assuming that 20 dB amplifier spacing remains practical at these frequencies, about 100 amplifiers in cascade would be required. Single octave operation could be employed for the UHF section of the amplifier. This would eliminate second order distortion problems, but third order problems in the form of cross-modulation and intermodulation...
would still be a severe problem, particularly since the amplifier loading has been increased. An increased number of TV channels is, after all, the whole intent of the system.

4. Equalization problems in a cascade of 100 amplifiers at UHF frequencies would be very severe. Any repetitive deviation from ideal equalization becomes a very serious problem. Errors in equalization can cause some channels to be very high in level, causing overload problems; while others may be simultaneously low in level, causing noise problems. The more amplifiers in cascade the
tiﬁcation would require ampliﬁers with very stringent performance speciﬁcations.

6. Cable and connector technology would have to be develop-
oped to permit construction of large scale systems that would operate to these frequency limits. Although small UHF distribution systems have been demonstrated in Europe with as many as 8 ampliﬁers in cascade, and UHF is being distributed in single ampliﬁer systems in individual buildings on this continent, it seems unlikely that UHF distribution will become a practical technique for multi-channel TV distribution on a large scale within the next 5 years.

Extended Band UHF

The use of VHF frequencies (generally below 300 MHz) which can be separated into 3 bands for consideration.

BELOW CHANNEL 2

Eight TV channels could be stacked in the space from 6 MHz to 54 MHz and another channel might be carried at baseband in the space below 6 MHz, but most cable systems might prefer to reserve this spectrum space for reverse direction (two-way) transmission.

The space below 54 MHz uses more than three octaves to provide only eight TV channels. Many aspects of transmission technology problems are compounded in multi-octave systems.

BETWEEN CHANNELS 6 AND 7

The FM broadcast service

![Hamlin MCC-100 set top converter.](image)

![TPI Gamut 26 set top converter.](image)

![AEL converter for rear-set mounting.](image)

| Table I: UHF Station Separations, FCC Regulations* (Channels 14-83). |
|---|---|---|
| Type of interference | Channel separation | Required mileage separation:† |
| Co-channel | 0 | | |
| Adjacent channel | ±1 (6 mc per sec) | Zone I, 155 miles |
| Sound image | ±14 (84 mc per sec) | Zone II, 175 miles |
| Picture image | ±15 (90 mc per sec) | Zone III, 205 miles |
| Local oscillator | ±7 (42 mc per sec) | 55 miles |
| If beat | ±8 (48 mc per sec) | 60 miles |
| Intermodulation | ±2 through ±5 | 20 miles |

* The station separations are based on the use in television receivers of the following intermediate frequencies: 41.25 mc per sec for the sound carrier; 45.75 mc per sec for the picture carrier.

† Channel separation indicates the difference in the channel numbers of the interfering and desired stations. Example: a station on channel 43 may be interfered with by a station on channel 57 ( = 43 — 14), due to the sound-image responses of the receiver. Such stations must be separated at least 60 miles.

†† The zones indicated for co-channel separations are defined in Table 2.12. The separations for the other forms of interference apply to all zones.

The spectrum space below 300 MHz which is not occupied by the twelve standard VHF TV channels occupies 88-108 MHz and this spectrum space is usually used for FM radio services in cable systems. The band 108-174 MHz has room for eleven TV channels. The band 108-118 MHz is used in "radio service" by aircraft navigation services (VOR and localizers).

Some fear has been expressed that leakage from cable systems carrying TV channels in this frequency band might cause interference to these navigational services. The issue has not been firmly resolved and there has been no regulatory guidance from government on the question. System leakage on any frequency not assigned to broadcast television service could conceivably cause
interference to radio services and there is some question as to how one grades various radio services in order of "holiness."

There certainly does not seem to be any trouble of significant magnitude from the millions of local oscillator signals from home FM radio receivers which radiate into this band. Room can be found in this band for at least seven or eight additional channels. ABOVE CHANNEL 13

There is room for fourteen additional channels in the space between channel 13 and the arbitrary limit of 300 MHz which we have placed on this type of operation.

ADVANTAGES
1. A significant number of additional channels can be added within the technical constraints of presently available VHF technology. Extension of system bandwidth to 300 MHz increases cable losses only 17% over those at 216 MHz. This increase can be handled by improvements in cable design currently available, e.g. air core and polystyrene foam cables. The number of amplifiers in cascade is increased only modestly, or not at all if we use somewhat improved cables. The increase in amplifier loading, while appreciable, is not beyond present expectations of amplifier development. Present amplifier technology should be applicable to the needs of this kind of service.

2. There is good expectation that TV set tuners and set-top converters derived from TV tuners will be readily adaptable to adjacent channel operation in this frequency range.

DISADVANTAGES
1. The VHF broadcast channel allocations were planned to be free of second order harmonic and intermodulation problems (except for minor problems between channels 6 and 7), and free of image and local oscillator problems in the receivers. Use of additional non-standard channels makes these considerations into formidable problems.

2. The ordinary household receiver is not equipped to receive the additional channels. The various forms of adaptation and conversion to make these addi-

![Figure 1: "Block Converter" at Back of Set.](image1)

![Figure 2: "Block Converter" at Entrance of Home Serves Several Sets.](image2)

![Figure 3: "Block Converter" at Pole Serves Several Homes.](image3)

**Conversion Systems for Extended Band VHF**

A number of variations of these systems are possible. They vary mostly in the position of the required converter.

In a single-cable, extended-band system the required converter is usually placed on top of the receiver. The converter is a double conversion system which converts the desired cable channel to IF (usually standard RV IF, 41-47 MHz) and then converts the IF to a standard TV channel for the subscriber's TV receiver. The subscriber uses the tuner on the converter instead of the tuner on his own receiver. The tuner mechanisms in the converter are usually derived from standard VHF tuner designs.
A “block” converter may be used (see Figure 1). This usually takes seven contiguous channels at a time from the “mid-band” (118-174 MHz), or from the “super-band” (above 216 MHz), and converts them to the “standard” channels 7-13 for reception on the subscriber’s receiver. The subscriber uses a selector switch to select either the “normal” 7-13 block, or the converted 7-13 block. Some block converters convert the non-standard channels to a block of UHF channels for reception on the subscriber’s receiver. There is considerable skepticism as to the ability of many home UHF receivers to receive a contiguous block of UHF channels in a truly satisfactory way.

The block converter could be placed at the entrance to the home (see Figure 2), at which point it could serve several sets in the home by means of dual drops to each receiver, or remote controlled switches could be installed. These switches could be controlled by DC signals on the service line.

The location of the converter can be further moved up the system by incorporating it in the subscriber service tap unit, which taps the distribution line just outside the subscriber’s home (see Figure 3). A converter in such a location could serve several homes, with a dual drop into each home. Remote switching at this point would mean that each set in the home would have to watch the same block of channels, unless a separate drop is run to each receiver in the home.

The block converter can be moved still further up the system — to the bridging amplifier. Block converters at this point drive dual distribution cables, and dual drops are derived from the distribution cables, just as in a complete dual cable system (see Figure 4). At this point, only the trunk is operated as a single-cable, extended-band-width system. Since the trunk cables are only a
small proportion of the total cable footage and cost in a system, there would seem to be little advantage over going dual cable all the way back to the head-end (see Figure 5).

The cost trade-offs involved in receiver functions remain unchanged.

3. There is some improvement in reliability to the extent that the system is partially redundant.

DISADVANTAGES
1. High initial capital costs are involved in building a completely duplicated system.
2. Higher maintenance costs are involved in maintaining two separate cable systems.
3. Dual systems are susceptible to cross feeds from cable to cable. This susceptibility could be reduced by phase-locking channels in the A and B cables to each other. The beat between slightly different carrier frequencies is visible before the cross-talk effect. Phase-locking would eliminate the beat problem.
4. Each cable system is subject to the technical problems still inherent in normal 12 channel operation. There has been no alleviation of these problems. If normal 12 channel operation in a particular area is hampered because of direct pick-up problems, i.e. ghosts or beats caused by pick-up of strong local broadcast signals by the receiver itself, then this problem will exist on both cables. In some cities four or more channels are lost for cable use (seven in New York City) because of direct pick-up problems. In a dual or multiple cable system, these channels would be lost in each of the cables.

Next month the author concludes his review of multi-channel transmission systems and takes a look at “switched systems.”

Multi-Cable Systems

One of the ways to avoid the problem of non-standard channels at the receiver is to avoid their use by multiplying the number of transmission cables operated in parallel. Several dual-cable systems have been built by simply building two complete, identical 12-channel systems side by side, right through to the home receiver. A selector switch at the TV receiver then connects it to either cable. This type of operation could presumably be extended to three or more cables in parallel.

ADVANTAGES
1. It is simple and direct. No new technology or significant items of new equipment are required. Practical application did require development of service drop cable with improved shielding characteristics and a suitable selector switch for the receiver.
2. No converters or receiver modifications required. The subscriber need only operate a simple A-B selector switch. All ordinary systems of this kind are very involved and there is not enough experience or cost data available yet on all the possible variations to give conclusive support to any particular version of these.
NCTA Trade Show Review: An Analysis of New Products

Two-way...thin film hybrid amplifiers...and other new innovations. Yet, some segments of CATV technology seem to be lagging. The Chief Engineer for a major MSO takes a critical look at what the commercial venders are offering our industry.

By I. Switzer, Chief Engineer
Maclean-Hunter Cable TV Limited

The year 1970 will probably be remembered by most as the year of the "two-way breakthrough." Certainly two-way equipment and associated "communications concepts" took up most of the exhibition space and provided most of the glamour in the 1970 exhibition. The longest lasting technical innovation of 1970, however, will probably be the introduction of thin film hybrid techniques in CATV amplifiers.

Thin Film Hybrids

Anaconda Electronics featured production prototypes of their new "Century-21" line of amplifiers, built around thin film hybrid amplifier modules developed for Anaconda by Hewlett-Packard. A "thin film hybrid" is a cross between an integrated circuit and an ordinary printed circuit board. Thin film hybrids are built up of IC-type substrates using IC techniques to build up all the interconnections and resistors. Transistors and capacitors are added as individual "chips." All the active RF elements are mounted on one small ¾ inch square substrate which then goes into a single sealed package about the size of an ordinary power transistor.

Advantages have been summarized in Anaconda's literature and I say "Amen" to almost all their claims. I am very enthusiastic about the prospects for this new amplifier technology. I think it is the greatest new development in CATV amplifiers since the introduction of successful transistorized amplifiers.

The collaboration of Anaconda and Hewlett-Packard on the development of the special hybrid modules continues a trend in equipment development started a few years ago by the Hughes-TelePrompTer alliance. CATV equipment performance requirements have outstripped the capabilities of the companies that first developed cable equipment. The new generation amplifiers and associated equipment require the talents and capabilities of a broader cross-section of the electronics industry. I have seen the kind of equipment, laboratories, scientists and engineers required to successfully make these new micro-circuit devices. They could not possibly be developed by CATV equipment manufacturers on their own.

I fully expect that the new hybrid microcircuits will deliver what they promise and that the exhibition a year from now will find virtually every CATV equipment manufacturer showing prototypes of new amplifiers developed in partnerships with semiconductor manufacturers who have supplied the necessary micro-circuit capability.

The exhibition was, of course, full of rumors of similar developments by other companies. It seems certain that Fairchild, a major semi-conductor device manufacturer, will bring out a complete line of amplifiers using their own hybrid micro-circuits later this year. Vikoa and Jerrold spoke of small amplifiers with what appear to be thick film hybrids.

"Two-Way" Everything

"Two-way" on cable systems seemed to take up at least part of every equipment manufacturer's display space. Even manufacturers of lowly passives were concerned with the ability of their devices to pass the extra bandwidth that two-way operation requires, parti-
DORN-CO PEDESTALS

- domed top cover (flat top also available)
- air vents
- yellow warning decal
- high-impact rigid plastic construction
- minimum shipping weight
- grass-green color
- built-in locking device
- generous slip-joint overlap
- internal grounding strap
- ground level
- feed-through holes for RG-59
tapered bottom opening
- mounting/grounding bar

EFF. MAY 15, 1970

LOWEST PRICES

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NOW!
A QUALITY FULL-LINE ENCLOSURE

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"System Owner," Can Have Designed Into Your System For Maximum Results At A Minimum COST!!

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SARASOTA, FLA. 33578
Telephone 813/955-6283
cularly at the low end of the cable frequency spectrum.

Jerrold, as is often the case, was trying to tell me "black" when everyone else was telling me "white." The Jerrold two-way system display promoted a combination of dual cable and two-way. (I boned up on the Jerrold system by reading the literature after I got home.) Distribution legs are run on a frequency-division, two-way basis. At bridger locations, the reverse direction information is gathered together, suitably changed in frequency, and fed into a reverse direction trunk which takes it back to the system head-end or hub.

A single-cable, two-way system is rather grudgingly offered for those who insist on this method of operation. Sub-low bypass filters are packaged in outboard housings to be attached to the regular Jerrold equipment. The Jerrold engineers question the ability of a single-cable, two-way system to provide really first class results because of the problems introduced by the pair of by-pass filters required at each main trunk amplifier. Maybe they're right and are telling me "white" and everyone else is telling me "black." Jerrold recommends that you don't fiddle around with two-way on your trunk lines — put in an extra reverse trunk line!

The companies with most two-way experience seem to be HTV and Cascade. Both are delivering two-way equipment right now and have some degree of practical experience with it. Cascade had an interesting system-fault alarm system to go with their two-way line of equipment.

Almost everyone else had two-way capability, whether with filters built right into the housings or with filters and amplifiers bolted on outside. The difference seemed to be how recently the equipment housings had been designed.

The exhibition welcomed several new amplifier manufacturers. Sylvania showed new equipment and is representative of interest in our market by a major electronics company. Electronic Industrial Engineering is a small firm braving the financial hazards of the amplifier game. EIE's equipment featured built in two-way and dual-amplifier capability. Sylvania's main sales feature is very tight AGC and good distortion performance achieved with single-ended circuit designs.

Both SKL and Entron appear to have survived acquisition and plant moves. SKL's designs always were a few years ahead of their time and the older designs still had some appeal in this year's exhibition. Entron showed new housings and both firms will no doubt be back even stronger at the 1971 exhibition.

**Terminals Missing**

Notably missing was any strong showing of two-way terminal equipment. Even for such obvious applications as cablecasting there did not seem to be any visible pieces of equipment for getting the cablecast into the sub-low band and then back out of it again. Jerrold showed a solid-state version of their venerable CDX sub-low to V converter, but this piece was not really intended for this kind of single channel application. Cablecasters using two-way transmission in their systems will probably have to look around for custom pieces of equipment.

There was some attention to the special problems of UHF conversion. C-Cor showed a "deluxe" UHF converter. Entron displayed the "deluxe" model that they have made for several years. CAS had a UHF front-end for their head-end processor. This plug-in converted direct from UHF to IF frequency for head-end processing.

Head-end equipment got a significant boost up the technical ladder from the new modulator shown by Scientific-Atlanta. This unit modulates at IF frequencies but does not mix aural and visual carriers until after they have been up-converted in separate mixers, thus avoiding a significant source of distortion in head-end equipment. This should be a good example to other manufacturers of head-end equipment. Dynair's new demodulator is noteworthy for its new type of sound trap which considerably reduces
envelope delay distortion. Telemet modulators and demodulators exhibited remarkable "back-to-back" performance in transmission of standard video test waveforms. Blondie-Tongue makes a pitch for simplicity in head-ends with new solid-state "strip" amplifiers and associated accessories. These were noteworthy for their inclusion of automatic changeover to stand-by strips.

There was nothing drastically new in test equipment, although some pieces were worthy of note. Don Kirk, of St. Petersburg Communications, showed a number of small portable test sets for CATV. These are all very light and portable and show careful attention to providing the operating features and accuracies that working system technicians will actually need. These were not laboratory instruments but seem to be worthwhile technicians' tools.

Along the same line, Craftsman had a small TDR adapter for attachment to medium quality oscilloscopes. The adapter box provides a pulse generator and a well calibrated time marker system for converting any medium quality oscilloscope into a cable fault locator. Texscan showed their version of an "in-system" summation sweeper. This unit featured a very long persistence oscilloscope tube which saves a great deal of money when compared to the storage oscilloscopes used by other systems.

The "more-than-23-channel" art does not seem to have advanced the way that it might have in the last year. Converters were visible but hardly featured. AEL had their block converter for super-band channels. Jerrold showed the prototype of a mid-band block converter. Craftsman had a new varactor tuned set-top converter, but neither this varactor unit nor the "conventional" set-top converters shown by others appeared to be "world beaters" or attract any very special attention.

Some miscellaneous items of interest were scattered through the exhibition. Data Technology had a digital weather display system compatible with their news service display equipment. Chomeics showed heat shrink tubing with a conductive inner coating designed to reduce signal radiation at connectors and splices.

Switched Systems

I had expected to see a major promotion push for Ameco's Discade system. This system for remote selection of TV channels using something like a telephone dial at the TV set has been demonstrated within the past year and I understand that field trials of the equipment are now under way. There was practically no mention of it in Ameco's booth and practically no discussion. Rediffusion International and Leghorn Corporation had a sizable joint display and demonstration of their switched distribution system. The system is essentially the same one that Rediffusion demonstrated in Washington about 14 months ago. It uses balanced pair (actually a balanced signal pair and an additional signaling pair) for connecting subscribers to the switching center. The system uses electro-mechanical switching, a technique which has probably not been incorporated in new design switching systems for ten years or more. The balanced pair transmission is also foreign to North American practice. British car manufacturers do not argue as to which is the proper side of the road to drive on, so I am surprised that Rediffusion should choose to base their switching distribution system on balanced pair transmission. The concept works just as well with coaxial service lines, and the use of coxials would probably be much easier to sell to North Americans.

I gave scant notice to the variety of "communications concepts" that were on display. Most of the hardware seemed to be empty cases or hardware borrowed from specialists in other fields. I don't think we are quite ready yet for serious consideration of the hardware required to implement all the communications potential of our cable systems. This year I am concentrating on building the best and broadest cable system that I can.
MARKER GENERATORS
FEATURE LOW COST

Kay Elemetrics has announced the availability of model PM100 and PM300 variable pulse market generators. The new, low-cost market plug-ins feature twin variable pulse markers that are designed for easy and quick calibration for the particular frequency range being swept. The accuracy, setability, and readability are said to be far better than the performance of the usual "full-scale" variable markers. The model PM100 is designed for use in the Kay 154C, 50KHz-110MHz sweep generator. The PM300 is for use in the Kay 159D, 400KHz-300KHz sweeper. In addition to the two variable markers with direct reading, digital frequency dials, each unit includes crystal comb markers at 1 and 10 MHz intervals, marker mixing circuits and range calibrate controls.

The units are priced at $395 each. For more information on these new products contact Kay Eleometrics Corp. (formerly Kay Electric Company), 12 Maple Avenue, Pine Brook, New Jersey.

JERROLD ALL-CHANNEL HYBRID TV SPLITTERS

A new type of all-channel signal splitter, one that connects two TV receivers to one ultra-tap, is offered by Jerrold Electronics Corporation. The ultra-splitter, model 1572G, plugs into a Jerrold outlet and instantly converts from a single outlet to a dual outlet. The unit is captivated by the same screw that holds a UT cover plate. The hybrid unit prevents interaction between receivers, mates with "G" (gamma) fittings and is used for all-channel color TV. Splitting loss is 3.5 dB from 54 to 216 MHz and 3.8 dB from 470 to 890 MHz. Isolation between outputs is 15 dB. Price for 1572G is $9.25.

For further information on this new product contact Jerrold Electronics Corporation, Distributor Sales Division, 401 Walnut St., Philadelphia, Pa. 19105.

AC POWER SUPPLIES
NEW FROM GLENTRONICS

Glentronics, Inc. offers a line of AC output power supplies which are available with either single or multiple outputs and at frequencies of 60 Hz, 400 Hz, or as specified. Manufacturer claims overall efficiency of the power supplies is more than 90%. The units are available for converting either AC or DC inputs, with or without automatic transfer, to outputs ranging from 0 to 1500 VAC at 1 KVA, single phase. All power supplies inherently incorporate automatic overcurrent and short-circuit protection. Regulation with a plus or minus 15% line change is plus or minus 1%. Voltage regulation of plus or minus 2% can be held with a 0 to 100% variation in load. All units are designed to meet or exceed FCC requirements for RFI.

For further information on these new products contact Glentronics, Inc., 748 East Alosta Avenue, Glendora, California.

DISTRIBUTION CENTER SERVES 32 TV SETS

View-All Television Products has introduced an active distribution center for feeding up to 32 television sets from a single drop. The plug-in amplifier has its gain adjusted to compensate for the splitter insertion losses. The distribution center also includes a spare amplifier. The electronics is housed in a convenient, lockable, electrical box.
Everyone in CATV talks about lower costs, but only an SKL system does something about it.

Every SKL/262A high-level distribution amplifier you add drives an extra 4000 feet of cable at no extra cost. Outputs 10 db higher than any existing distribution amplifier eliminate many bridging and line extension amplifiers. Result: more branch lines, extra coverage area, maximum system flexibility at lowest cost. Learn how this high gain, high output, low cross-modulation amplifier delivers pictures of highest quality—free of objectionable noise, distortion and interference. Write, Spencer-Kennedy Laboratories, Inc., 2 Lowell Ave., Winchester, Mass. 01890.
HIGH ISOLATION NOTED FOR DOW-KEY COAX SWITCH

Dow-Key Company has announced the addition of a new multi-position, single-pole model to their series 78, manually operated, coaxial switches. The new switch features very high isolation between ports, due to the use of a patented means for grounding unused terminals.

The new switch is usable at frequencies up to 1,000 MHz. At 400 MHz, isolation between terminals is 100 dB, minimum, and VSWR is 1.15:1, maximum. The switch illustrated is an ST3T model. Connectors may be types UHF, BNC, or N.

We just cut the cost of air travel.

With our new Man-lift*, the trip from ground level to working level costs less than ever before. And it takes less than a minute to make. The unit is electrically powered and fully accessible from the ground. It frees up to 80% of the vehicle for storage. And it reaches working heights of 30, 35, or 40 feet.

Units are available van-mounted (30' only), truck-mounted, or ready for mounting on your own vehicle. An insulated basket (and third section) is optional. Write for detailed bulletin.

*Patents Pending

ALTEC MANUFACTURING CO., INC.
1759 Vanderbilt Road • Birmingham, Alabama 35201

Q-E MANUFACTURING HAS TWO-WAY CABLE BLOCK

Q-E Manufacturing Company announces availability of their patented two-way cable block. Constructed of high-tensile aluminum and cadmium plated alloy steel, it supports cable to 2 1/2" in diameter and will lock securely to string cable in either direction. Designed to withstand mistreatment, the 4 1/4 pound tool can be disassembled with a wrench should parts need replacement. A special roller has also been developed for greater safety in stringing coaxial cable. The block is priced at $12.90.

TELEMET TEST SYSTEM IS A TWO-PIECE UNIT

Telemet Company has announced a solid-state differential phase and gain test system, model 3703-A1, for measuring APL's (Average picture levels) of 10, 50 and 90 percent. The new system is fully compatible to Western Electric Kelly Set 47 B/C, says Telemet. Another feature of the system, claims Telemet, is that it is internally self-calibrating. In terms of sensitivity, the differential phase of 100mV scope deflection is 5 degrees. Practical resolution is better than .1 degree, limited only by oscilloscope sensitivity and noise. Differential gain of 100mV of scope deflection is equal to 1 dB. Practical resolution is .02dB, limited by oscilloscope sensitivity and noise.

For further information on this new system contact Telemet Company, Amityville, New York 11701.
JERROLD PRESENTS
COMPACT TV CAMERA

The TVC-500 television camera presented by Jerrold Electronics Corporation is designed to develop clear and sharp monochrome pictures in video or in RF signal at a switch-selected output. Video is viewed on a monitor but when the camera is switched to RF output, the pictures are displayed on a standard TV receiver. The operator, with a screwdriver adjustment, can select output frequency covering channels 2 through 6. Complete within itself, the TVC-500 camera contains synchronizing circuits and an RF modulator. Output level on a composite signal is 1.4 V p-p while video level output is 1 V p-p; RF output is greater than 29.5 dBmV (30 mV) and output impedance is 75 ohms. Horizontal resolution of center is 550 lines on video output and 300 lines on RF output. Each camera (6 lbs. including lens) is supplied with a 25 mm F/1.8 lens at $325.00 dealer net. Wide angle and telephoto lenses are available.

For further information on this product contact Jerrold Electronics Corporation, Distributor Sales Division, 401 Walnut St., Philadelphia, Pa. 19105.

COLORCASTING CENTER
OFFERED BY RCA

RCA has announced its new Colorcasting Program Distribution Center, a complete system for selecting and originating color programs from motion picture film, slides or video tape. The packaged system, priced at $24,950, is operated from a 20-inch control console which includes a built-in RCA 860 color video recorder/reproducer, a switching system, a four-input audio mixer/amplifier, and monochrome picture and waveform monitors. Two 16mm film projectors, a slide projector, optical multiplexer and RCA’s single-tube color camera for film origination the PK-701, complete the Center. Its console also is adaptable for “live” TV camera control and is equipped with casters for alternate use aboard vehicles at remote program recording assignments.

C-COR INTRODUCES
CROSS MOD TEST SET

A complete signal generation and measurement unit specifically designed for measuring cross modulation on CATV amplifiers under actual loaded operating conditions has been introduced by C-Cor Electronics Inc. Known as Cross Modulation Test Set model TSI-20, the unit provides for measurement on 20 channels in accordance with NCTA standards of square wave modulation (50% duty cycle). Test procedures call for loading the amplifier with the desired number of channels, each modulated at 100%, except for the channel to be measured. Percentage of cross modulation (or dB down from 100%) as induced by the amplifier on an unmodulated channel, is measured by means of a selective voltmeter-wave analyzer which has been calibrated by a known percent modulation.

For further information on this new product contact C-Cor Electronics Inc., State College, Pa. 16801.
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Contact Director of Marketing, Wayne Wilson. Wayne will assist you in your total marketing efforts with the general market and media information you require, including research. Direct mail lists are also available.
SALES MANAGER
Fast-moving, CATV equipment manufacturer in southwest has opening for experienced CATV sales manager. Minimum of five years experience in CATV sales. Thoroughly familiar with technical aspects of equipment (B.S.E.E. preferred) and peculiarities of CATV market. Excellent company benefits and possibility of growth with the company for the right man. Send resume to TV Communications, Dept. T670-4.

PROGRAM DIRECTOR-MANAGER

CATV CIRCUIT DESIGNER
CATV equipment manufacturer in southwest has opening for experienced CATV circuit designer. Must be familiar with basic CATV system theory, solid state design, TV-receiver design and state-of-the-art procedures. B.S.E.E. minimum preferred. Send resume to TV Communications, Dept. T670-3.

POSITION WANTED
Chief Technician experienced in management and supervision of large crews seeking position. Complete resume furnished on request. Reply to TV Communications, Dept. #770-3.

POSITION WANTED
 Experienced chief technician wants to relocate to Southwest or West Coast. Position wanted as chief technician or manager-technician. Reply to TV Communications, Dept. T770-1.

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CANADIANS
DEPEND ON CATV EXPERIENCE
DEPEND ON NORAM

CATV SYSTEMS

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T V  C omm u n i c a t i o n s  

CATV TECH, WANTED IMMEDIATELY

GROUNDBLOCK FOR RG-59 HOUSE DROPS
Type 59GB
Available with or without splice fitting

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P. O. Box 573
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Vikoa and A.C.E.C. Awarded Contract for Huge European CATV Complex

Charleroi, Belgium... Ateliers de Constructions Electriques de Charleroi, a most distinguished and respected manufacturer of electrical and electronic equipment for nearly 100 years, has been awarded an exclusive license to produce Vikoa Futura Amplifiers and associated equipment for CATV systems throughout the Benelux countries (Belgium, The Netherlands and Luxembourg).

A most significant result of the licensing agreement between A.C.E.C. and Vikoa has been the award of a contract to A.C.E.C. for the construction of a 1250 mile, 18 Channel CATV system at Liege... Belgium's fourth largest city.

This unique system, perhaps the most technically sophisticated in the world, will carry up to 28 channels, utilizing four different transmission standards. Initially, the system will carry seven "off-the-air" UHF stations converted to VHF for transmission, plus three additional "off-the-air" VHF stations. Several of these signals will be carried in the Midband portion of the frequency spectrum because of the wider bandwidths required. Three of the channels carried will be: the Luxembourg program, black and white, 819 lines, 7 MHz bandwidth; the French First Network, black and white, 819 lines, 14 MHz bandwidth; and the French Second Network, color, 625 lines, 8 MHz bandwidth. The French color program will be transmitted twice over the system using different color transmission systems: PAL (Phase Alternation Line) and SECAM (Sequential with Memory).

These different transmission methods require the flat response and distortion-free amplification characteristics inherent in Vikoa Futura Amplifiers.

The three "French Standard" programs (including the Luxembourg program) are received at a site 60 miles south of Liege and relayed by microwave to the two Head-Ends of the system. The two Head-Ends will transmit over the mainline system using Vikoa Futura Mainline and Mainline-Bridging Amplifiers to feed an extensive distribution system employing approximately 4000 Vikoa Futura Line Extender Amplifiers. System ancillary equipment including splitters, directional taps, power supplies and connectors will also be constructed by A.C.E.C. under Vikoa license.

The Liege CATV system layout consists of two semi-circles surrounding the city with a Head-End at each center and has a potential of ninety-thousand subscribers.