$5.00 per year

JULY
1962

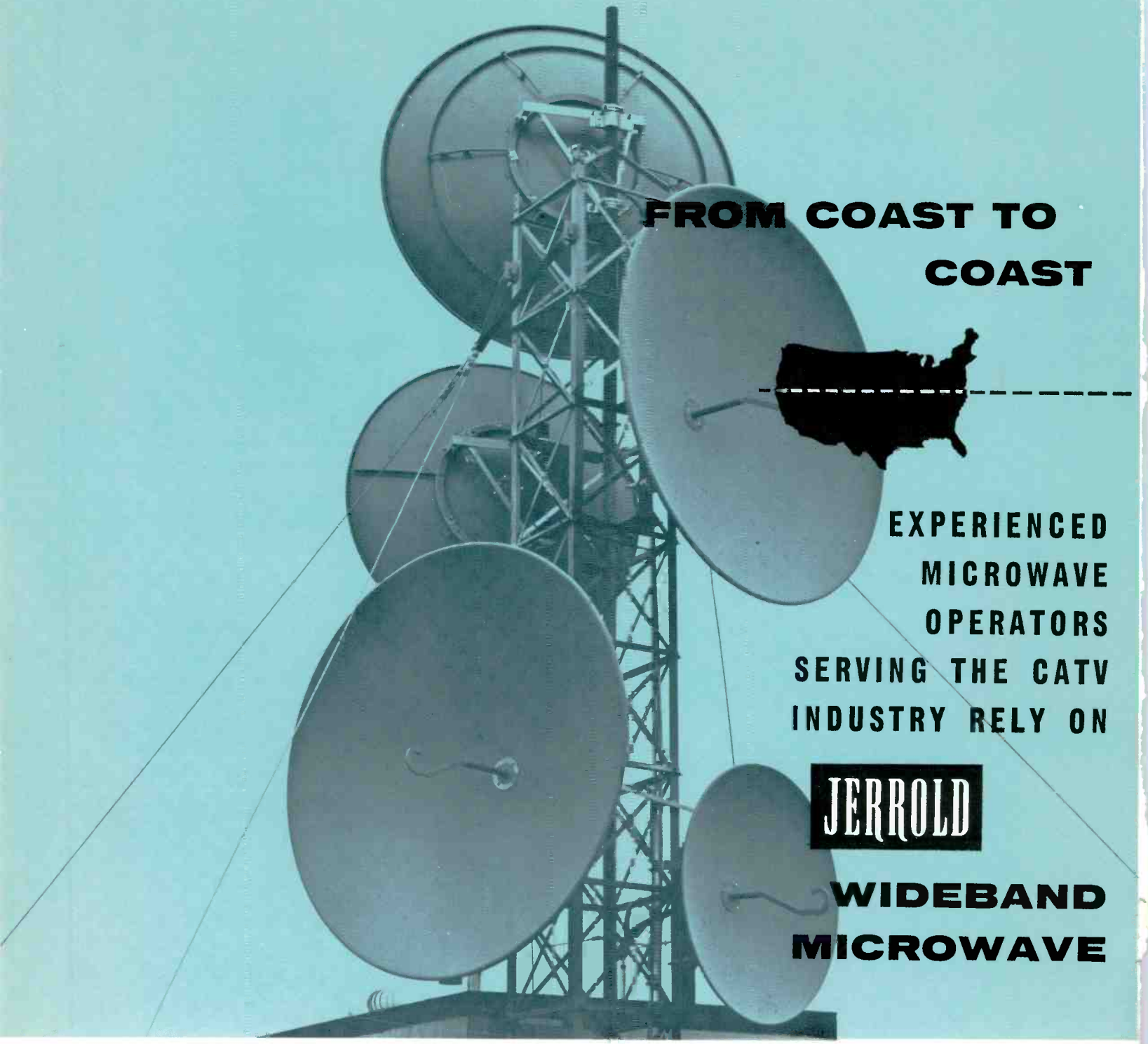
tv horizons

NATIONAL COMMUNITY TELEVISION ASSOCIATION INCORPORATED

Abel Cable

The Professional Television Journal

IN THIS ISSUE



FROM COAST TO COAST

EXPERIENCED MICROWAVE OPERATORS SERVING THE CATV INDUSTRY RELY ON

JERROLD

WIDEBAND MICROWAVE

MARTIN F. MALARKEY
President, Eastern Shore Microwave Relay Co.

JOHN WALSONAVICH
President, Service Electric Microwave Co.

CHARLES W. FRIBLEY, JR.
President, New York-Penn Microwave Corp.

PAUL McADAM

BOB MAGNESS
Partners, Western Microwave.

Channel 1

- CATV
- MATV
- Fringe TV
- ETV
- UHF-TV
- Associated Industries' News

SPECIAL INTEREST GROUPS EYE UHF

An attitude of "if you don't want it, we do" is developing among special interest broadcasting groups the nation over who are eyeing UHF as an opportunity to climb on the telecasting bandwagon. A multi-million dollar promotion is currently on the drawing boards in Los Angeles where Spanish International Broadcasting Company is planning an early fall air date for the city's first full time operational UHF station. The station will telecast spanish language programs only, many directly from the XEW network in Mexico. Owners of the station include the backers of Mexico's largest cinema theatre chain, and the owners of Mexico's largest video network. A number of UHF converter-tuner manufacturers have been consulted for possible tie-ins through department and drug store merchandising of UHF converter-tuner and antenna packages. One chain store reportedly will offer a fixed channel converter (from Sarkes Tarzian) and antenna combination for under $18.00 to the consumer. Over 750,000 people in the Los Angeles basin are of Spanish extraction, the bulk directly from Mexico.

A similar operation is apparently planned for New York City, by Spanish International. A recent application for a UHF channel in Patterson, New Jersey would serve the same function as the new Los Angeles outlet.

FCC Chairman Newton N. Minow, speaking before the U. S. Conference of Mayors, in Miami during May, noted "adoption by Congress of all-channel television receiver legislation will make possible a great expansion of television's service to municipalities, as well as to education and to entertainment."

Minow was commenting on the increased interest in UHF by just such groups as Spanish International.

CATV RELAYS IN CANADA TO 7,000 MC?

An official source in the Department of Transport has told Television Horizons that while his department will still consider applications from Canadian CATV systems who wish to utilize microwave relay in the 1990 to 2110 megacycle region, "we are encouraging that all future systems of this nature be operated in the 7,000 megacycle band."

The statement came following a query to the DOT from TVH requesting information on two systems recently licensed to relay video programs in the 960 megacycle band.

One year ago Benco Television Associates, Ltd. introduced a 2.5 watt UHF "translator" which received DOT approval to operate into the 960 megacycle region. Two CATV systems have since been installed, using 960 megacycle "translator" relays as a means of providing signals to the system headends.

The DOT spokesman noted " . . . the 960 Mc/s system you inquire about is a very special case because of the circumstances of the area and its distance from a major centre of population; however, present policy does not permit the use of the 960 Mc/s band for this type of service.

"Plans are now underway which will eventually require such systems to be operated in the vicinity of 7,000 megacycles."

COMMISSION DENIES CARTER MOUNTAIN APPEAL

By Memorandum Opinion and Order, the FCC has denied the petition by Carter Mountain Transmission Corporation for reconsideration of a February 14 Decision which denied its application for additional microwave TV relay facilities to serve CATV systems in Thermopolis, Riverton and Lander, Wyoming, and which granted a Protest by Chief Washakie TV, licensee of station KWRB-TV in Riverton. The Commission also accepted a petition filed by the National Community Television Association, Inc., and noted the NCTA brief supporting the Carter Mountain petition. The Memorandum Opinion stated the Commission's action as set forth in the action was not dictated by the adverse effect the grant would have on the local station (KWRB), but rather by the resultant effect the same would have on the public interest. The Commission noted: "Thus, the economic injury to the licensee standing alone was not the motivating factor which warranted the action taken by the Commission in this proceeding. However, when the economic impact is of such a nature as to result in an adverse effect on the public interest,then it is incumbent upon the Commission to make a determination as to where the best overall public interest lies."

Commissioner Bartley did not participate in the decision, Commissioner Cross voted against the action.

ANOTHER 'HUGE' SYSTEM

The growing large dollar investment trend in CATV systems for large metropolitan areas has jumped yet another peg in the wild flurry to spend huge sums for an anticipated even larger return.

James Y. Nishimura, formerly associated with INTEC, Westbury, L. I., New York, announces that his firm, Communications Systems, Inc., Huntington, New York has received the green light from the Savannah, Georgia City Council to wire the entire city with a 9 channel system.

Plans call for the erection of a 740 foot tower to receive off-the-air signals from 7 stations normally considered fringe in the Savannah area, and the two local Savannah stations. The system will also carry educational programs from the Georgia Educational Television Network.

The Georgia Television Cable Company will operate from Savannah, and will be headed by George Eng of Norfolk, Virginia. Plans call for preliminary installation of equipment, providing cable signals to limited areas of Savannah, by Thanksgiving Day. A total of $1.2 million will be expended on the huge project.

JULY 1962
VOLUME 3 • NUMBER 7

TELEVISION HORIZONS

PUBLISHED MONTHLY BY HORIZONS PUBLICATIONS
Post Office Box 1557 • Oklahoma City 1, Oklahoma

EDITORIAL

If you haven't already taken notice, please turn to the subscription card in this issue of Television Horizons.

The short phrase printed there signifies a new era of devotion for Television Horizons, the closed circuit-master antenna video industry.

By way of explanation, a brief bit of history of this publication might not be out of place. In the earliest of early days "Television Horizons" was called "DXing Horizons." It delved into all forms of weak signal video reception, including cable distribution and re-broadcast (booster, translator) forms of signal redistribution.

Over the period of years the two major forms of bringing television to that portion of the public outside the so-called 'normal' viewing range became diverse and distinctly separate entities.

In other words, translators and cable distribution systems simply are not *bedside partners*. We feel we ought to know —as we have honestly tried to keep the two somewhat congenial, at least in the pages of Television Horizons.

But—you can fight a losing battle only so long.

In the months ahead Television Horizons will be undergoing an expansion program. An increased interest in management directed editorial material will go hand-in-hand with a larger magazine, i.e., increased number of pages per month.

And, effective with the August issue, Television Horizons takes on its first full time Managing Editor, a gent known as Russ Miller.

We've said it before, and we will say it again. Ours is a growing—yea—even exploding industry. It's our ever more complex responsibility to chronicle that growth for you.

RBC

TABLE OF CONTENTS

FEATURES

DEPARTMENTS

STAFF

R. B. Cooper, Jr., W5KHT
Publisher-Editor

Jim Kyle, K5JKX
Managing Editor

Jamie Jones
Associate Editor

Les Farey
Lon Cantor
Charles Wigutow
Marv Mitchell
Vic Nicholson
Contributing Editors

Gordon J. King
"Our Man In Europe"

Patrick T. Pogue
Business Manager

Stanley M. Searle
Art Director

Patty J. Cummings
Circulation Manager

EDITORIAL OFFICES
4 NW 7th Street
Oklahoma City, Oklahoma
CEntral 2-1108

BUSINESS OFFICES
P.O. Box 1557
Oklahoma City 1, Okla.
CEntral 2-6290

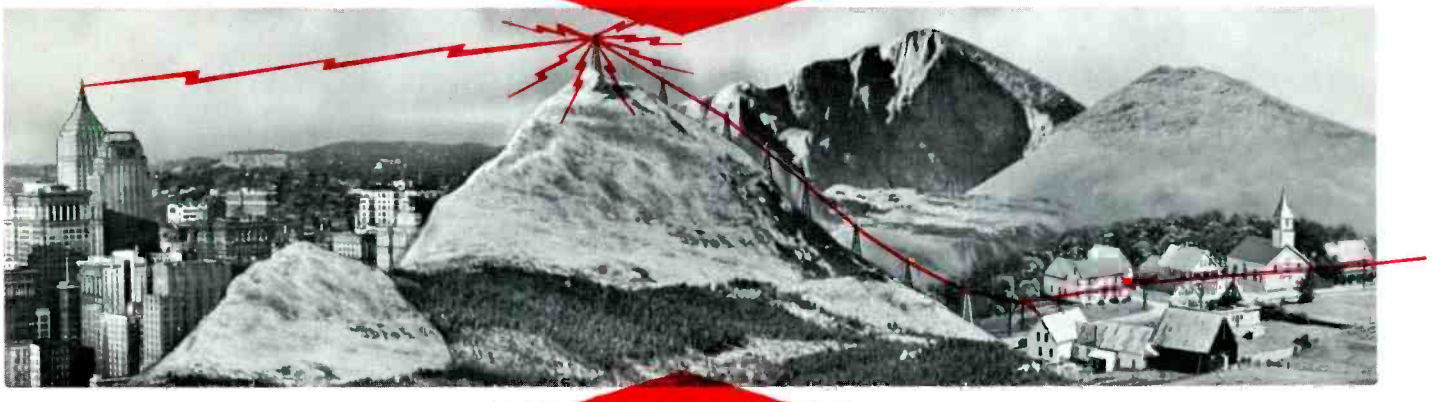
ADVERTISING: Television Horizons accepts commercial display advertising from bona fide manufacturers of electronics equipment and apparatus dealing with the CATV, MATV, fringe-TV, ETV and rebroadcast TV industries. Advertising rate card and circulation data upon request.

CIRCULATION: Television Horizons is circulated through the mails and in person on the 5th of each month to an average of 7,500 readers in the CATV, MATV, TV servicing, fringe-TV, ETV and TV broadcast (and rebroadcast) industries. Circulation is both paid and controlled. Detailed circulation breakdown, by reader occupation, is available upon request.

SUBSCRIPTION: Subscription rates in the United States and Canada $5.00 per year. Subscription includes the Annual Directory edition, issued every December. Single magazine copies $.50 each. Single Directory Editions $1.00 each. Subscription remittances should be made by bank money order or check. Two year subscription rate U.S.A. and Canada—$8.00. Subscriptions outside the U.S.A., Canada $6.00 per year.

TELEVISION HORIZONS (title registered U.S. Post Office) entered as second class postage material December 30, 1960. Second Class Postage Paid at Oklahoma City, Okla. Address of publisher in Oklahoma City is 4 NW 7th Street.

1952-1962
A DECADE OF DEPENDABILITY



S K L
WIDE BAND CATV SYSTEMS

PROVED BY PERFORMANCE THROUGH THE YEARS

Some time ago it was stated that seven-channel systems don't grow on catalog sheets. We certainly agree.

SKL wide band systems, whether they carry seven, eight, nine or ten channels, grew a decade ago from *original* design concepts. These were demonstrated in a full line of wide band equipment which has never become obsolete since.

Operators of SKL wide band systems have never been second-guessed. They have never had to waste money by throwing out inadequate equipment and buying expensive replacements which again reached obsolescence.

At SKL, catalog sheets grow on wide band systems — and describe the only wide band system equipment which has been tested by time and proved by performance.

SKL SPENCER-KENNEDY LABORATORIES, INC.
1320 SOLDIERS FIELD ROAD
BOSTON 35, MASS.

SKL SOLID STATE SYSTEMS

The Field Engineer Learns About . . .

CATV AUXILIARY SERVICE

PREPARED BY LON CANTOR, TVH CONTRIBUTING EDITOR

AUXILIARY SERVICES

The CATV system in the little town of Lincoln Valley was a pretty sight. It rolled straight down the mountainside and then spread out to blanket the town. Hank and Bob were just completing their test of the signal at the southern extremity of the system.

Their portable TV set verified what their field strength meter had told them—signals were strong, clean and ghost free on all six channels. Satisfied, Hank began to pack up his gear.

It looks good," conceded Bob, "But why did they want to add those high band channels. Weren't their customers satisfied with the service?"

"The Lincoln Cable Company wasn't losing all its subscribers, if that's what you mean," replied Hank drily. "Do you think they should have waited till they did? The CATV business is competitive, like anything else. The operators who sit on their complacent duffs are going to lose out. The trend today is for more and better service. That's why so many systems, like this one, are changing over from low band only systems to all band systems. It's expensive, but it's worth it. The more you give your customers, the more dependant they are on you. People aren't satisfied with one or two channels anymore. In fact, many aggressive CATV operators are adding Auxiliary Services."

"Auxiliary Services," repeated Bob, "What's that?"

"Just what the name implies—new services that can be added to CATV systems. Systems that expand from low band to all band find they have room for additional programming."

"Such as what?" demanded Bob. "What do they use for source material if they're already carrying all the channels in this area on their system?"

"Well, there are at least three sources of program material that I can think of—closed circuit TV, audio and UHF."

"I don't get it." Bob shook his head. "You can't send UHF over a cable system, can you? What about the high cable losses of UHF?"

"Haven't you ever heard of converters?" ask Hank. "You know, a lot of operators are overlooking UHF. But UHF figures to become very important in the next couple a years. It's practically a sure thing that Congress will pass the all-channel bill and the President is certain to sign it into law. When all TV receiver manufacturers are required by law to build UHF tuners into all their sets, you'll see a sharp rise in the number of UHF channels. And many of these will be local channels, competing with the cable companies."

"What can the cable operators do?"

"In many cases, they can carry the UHF channel on their system. Take this Lincoln Valley system." Hank sketched the head-end (see Figure 1) "It looks something like this, right? Let's suppose that UHF channel 33 comes on in the area. It would be simple to add it to the system. All you'd need would be a crystal controlled UHF to VHF converter, such as a Blonder-Tongue MUC, a Benco CO-3 or a Jerrold 503. Of course, you'd have to convert to an adjacent channel, so you'd need a trap (Benco HI-Q-15). You'd set the trap to full attenuation of the lower channel sound carrier and then back off until it attenuates it by about 8 db."

"What do you do if the UHF signal is too weak to drive the converter," asked Bob? "Is there any such thing as a UHF preamplifier?"

"Yes, there is," replied Hank. "UHF preamplifiers used to be very expensive. But last year Blonder-Tongue came up with their model UB. And I understand Jerrold is coming out with a similar unit. If you're more than about 35 miles from the transmitting antenna or blocked off by hills or trees, a UHF preamplifier is a good idea. The complete Lincoln Valley Head-End would look like this (see Figure 2.) You don't have to worry about picking up channel 6 on the channel 5 antenna or vice-versa, so no bandpass filters are needed. The only adjacent channel trouble you might run into is that the channel 5 sound carrier might slop into the channel 6 (converted from 33) picture. Of course, the CA's are AGC controlled so the outputs of 5 and 6 are about equal. Still, to make sure there will be no trouble even on TV receivers with poor adjacent channel traps, you should attenuate the Channel 5 sound carrier. You could use the tilt control on the CA, but I don't recommend it. It pays to invest in a trap, like Blonder-Tongue MWT or a Benco HI-Q-75. You don't want to trap out the 5 sound altogether, but it's easy to adjust a phase cancellation trap for about 8 db of alternation."

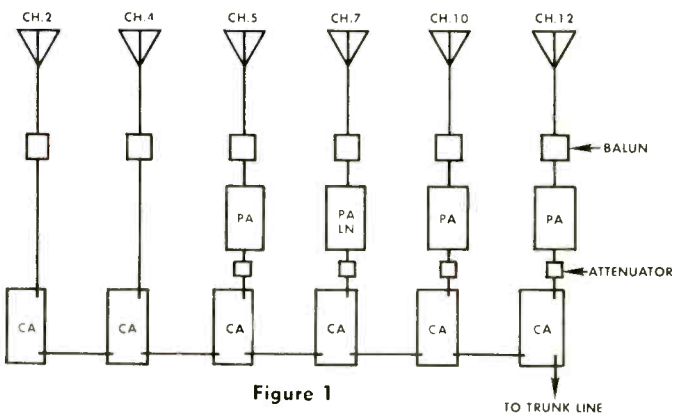


Figure 1

"Looks easy enough," agreed Bob. "Now what about this audio deal you mentioned?"

"Nothing to it," said Hank. "You just add a sound channel to the system—usually an FM station."

"Wait a minute," protested Bob. "Plenty of systems carry FM already. That's no auxiliary service."

"You don't understand," Hank elucidated. "This is not the same thing. If you send ordinary FM signals on a cable system, the subscribers need an FM tuner to hear them. And,

by the way, a lot of smart operators are adding FM to their systems. But that's not what I'm talking about. There's a new type of unit out that actually changes an FM station—or any other audio source—into a complete TV channel. It simply generates its own crystal controlled picture carrier and uses the audio source to modulate a sound carrier 4.5 MC away. You sent it through the system like any other TV channel and the subscriber doesn't need an FM tuner—he can listen to the audio on his TV set, tuned to the appropriate channel."

"What does he see on the screen?" asked Bob.

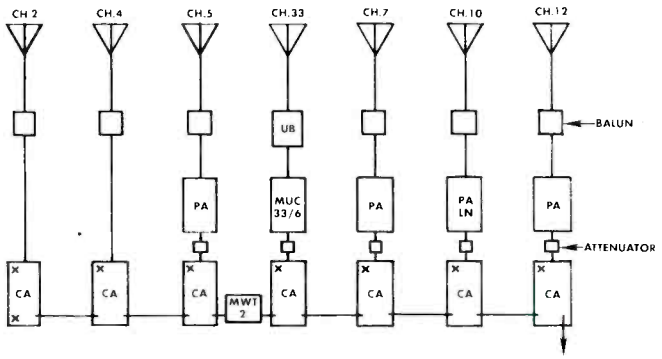
"Nothing. Just a blank raster. These units have been used in MATV systems for quite some time now. It's only recently that CATV operators have begun to see their possibilities. Blonder-Tongue calls their unit the Audio Master. First Electronics call theirs the Micro/Mitter, and Jerrold has one called the Audiotrol. I think we'll be seeing more and more of them used, both in MATV and CATV. They're designed so that picture and sound carriers are individually adjustable, so you don't need any traps for adjacent channel use."

"Okay," said Bob. "Now what has closed circuit TV got to do with a CATV system? Unless you consider a CATV system to be a closed circuit."

"Oh no," said Hank. "Don't you realize that some CATV operators are originating their own programming? There's even a fellow in New Mexico who has set up his own weather station. He uses CCTV cameras to send constant local weather information to his subscribers."

"Isn't CCTV expensive?" asked Bob.

"Not since vidicon cameras were perfected," Hank replied. "You can pick up a good vidicon camera for about $850 these days. Lots of times, the CATV operator doesn't even



have to pay for the CCTV equipment. For example, I'm sure you've heard that CATV is being used to aid education."

"Yeah, I have," mused Bob. "How does that work out?"

"Programs are originated in the school. Many times, the CATV operator uses his electronic savvy to help them set the CCTV studio up—and he may even install at MATV system in the school. But he really provides a service when he transports the signal along his cable system. Not only can his subscribers get the educational TV programs, but he can send it to other schools in the area. As a matter of fact, with the educational TV bill passed, just carrying signals from school to school is becoming a lucrative business."

"Is it hard to set up an ETV studio? Does it take any special knowledge?"

"Not especially. It depends on how complicated a system you want. Let's take the simplest kind of a CCTV system. This is just a single camera, hooked up to a single monitor. Whatever the camera sees can be viewed on the monitor.

"By the way, cameras can put out either video or RF signals. If you use a video output camera, you need a video monitor. That's just like a TV receiver without a tuner, IF, AGC or audio. On the other hand, if you use an RF output camera, you can display what it picks up on an ordinary TV set."

"Oh, I get it," nodded Bob, "If you want to save money you use a video monitor because it's less complicated and cheaper."

Hank snorted. "That's a laugh! Video monitors cost a lot more than TV sets—at least double. After all, TV receivers are mass produced."

"Then why does anyone ever use video?"

"A good question. Sometimes I wonder about that. I think a lot of people use video because they don't know any better. To be fair, though, video will give you better resolution."

"In other words, you get a sharper picture," Bob nodded. "What's the actual difference in resolution?"

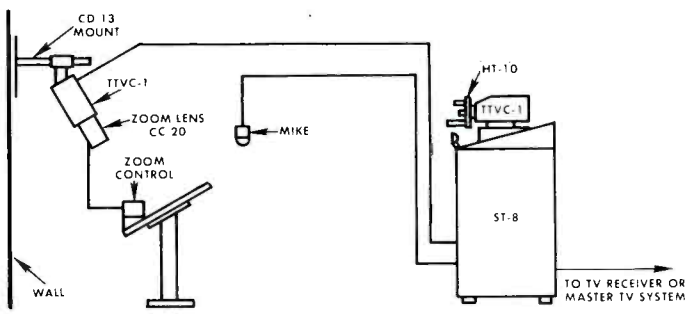
"This is a little hard to explain. There are two kinds of resolution—horizontal and vertical. Vertical resolution is limited by the number of scanning lines. There are 525 scanning lines, minus 50 that are used for vertical retrace and blanking, but the average person only sees about 350. This goes for both video and RF.

"Horizontal resolution is a different matter. A good vidicon camera can provide as much as 650 lines and they can be seen on a monitor. The average TV receiver, though, cuts this down to about 350 lines or about equal to the vertical. (Actually, the screen is 4/3 as wide as it is high, so when we say 350 lines of horizontal resolution, we means we can actually see 4/3 times 350 lines.) To make a long story short, the increased resolution is apparent only at the center of the screen and you have to be on top of the monitor to see it. The picture you get on a TV receiver is as good as the best commercial channels. So, unless you're showing fine detail, video is a waste of effort. And, remember, if you're going to send the signal out on a CATV system, you'll have to convert it to RF anyhow."

"What if you want voice on the channel, along with the picture?" asked Bob. "What good is an ETV lecture without audio?"

"A good point. If you were running a video system, you'd need a separate audio line. With RF, you just use the audio to modulate a carrier 4.5 MC away from the picture carrier and you have a complete channel—sound and picture.

"Let's forget the one camera deal and talk about a more practical ETV origination system. For smooth programming, you need at least two cameras. Here's one of the simplest, most effective ways of originating an ETV class (see Figure 3).



"The ST-2 (see Figure 4) is a movable console with twin 8 inch monitors, an audio-video modulator, an audio pre-amp, inputs for two cameras and all the controls and switches you need. One camera is mounted right on the console, but it pans and tilts with its own friction head. Usually a student operates the console. The other . . ."

"Wait a minute," interrupted Bob, "You're going to fast. What the heck is a friction head—and what's a pan and tilt?"

Hank explained patiently. "To pan is to move the camera horizontally—from side to side. To tilt is to move the camera up and down—vertically. In other words, to aim the camera

(Continued Page 22)

REPORT TO THE INDUSTRY

NCTA —1962— CONVENTION

STANLEY M. SEARLE

The NCTA 11th annual meeting was jam-packed with matters of vital interest to everyone in the CATV industry. Area of greatest importance included all-band operation, auxiliary CATV services, new developments in financing and management and the role of the FCC in CATV. An improved climate of CATV-Broadcaster relations was also apparent at the convention. Naturally, there were some intriguing projections into the future of cable television. And adding to the impact and interest of the convention were some well known government figures . . . along with top flight entertainers.

Vice President Lyndon B. Johnson was on hand at a congressional reception to present a flag to NCTA chairman Glen Flinn of Tyler, Texas. Keynote speaker was Rep. Oren Harris (D., Ark.), Chairman of the House Committee on Interstate and Foreign Commerce. Harris paid tribute to the community antenna television industry as a "real example of grass roots demand and development." He said that the CATV industry "reveals the development of an entirely new industry in the best American tradition."

"CATV systems serve more than three million subscribers in 46 states," Harris stated. "Today more than $450,000,000 has been invested in community antenna reception and the industry has caught the imagination of, and challenged some of the country's largest entertainment and financial organizations," he said.

Rep. Oren Harris addresses NCTA as Keynote Speaker. Warns of possible Congressional investigation of FCC authority over CATV.

Vice President Lyndon B. Johnson presents a flag recently flown over the Capital in Washington, D. C. to Glenn Flinn of Tyler, Texas, 1962 Chairman of the National Community Television Association. Mr. Flinn is president of the Television Cable Service Co., Inc., of Tyler and Jacksanville. The flag presentation took place at a Congressional reception in Washington during NCTA's 11th Annual Convention. Mr. William Dalton, NCTA President is shown at left.

"Except for Legal Problems . . ."

Harris predicted that CATV is facing a rosy future "except for some of the legal problems confronting your industry." Considering these in detail, he mentioned the problem that has been presented by cities or counties which attempt to regulate television through non-duplication agreements. This sort of action, Harris pointed out, should no longer present a problem since the U. S. District Court, District of Minn., First Division, enjoined a Minnesota city from attempting to impose such a non-duplication agreement on a CATV system. He suggested that, "The pertinent court decisions in these matters should be brought to the attention of the local authorities and their jurisdiction should be challenged in the courts if necessary."

"One Real Threat . . . FCC Regulation"

"Finally," Harris told the CATV people (and 5 FCC commissioners present at the speaker's table), "there is one real threat which you presently face and this threat is that without the benefit of CATV legislation, the FCC may proceed to regulate CATV through their jurisdiction over microwave common carrier operations. The threat flows from the FCC's decision in the Carter Mountain Case. That is the case that denied a common carrier microwave company a license unless the CATV system which it intended to serve would agree to carry the local television programs and avoid duplication of its programs."

Harris noted that the FCC's own Common Carrier Bureau filed a dissenting brief calling the FCC decision "arbitrary and discriminatory." The Common Carrier Bureau held that although the FCC has consistently ruled that it does not have jurisdiction over CATV, the approach in the Carter

HOLT Advanced Engineering

Now gives you the Model LH-BB-AGC

Broad-Band Line Amplifier

The Model LH-BB-AGC Broad-Band Line Amplifier by Holt is designed for channels 2 through 6, FM, and 7 through 13. High stability is obtained through the use of a complete automatic gain control circuit with very excellent holding quality for each band.

FEATURES:

Designed for Continuous Commercial Service, long life, low operating cost, high gain, low noise, low power consumption, linear curve response, variable tilt and low maintenance. It has a separate AGC circuit for low and high bands. All of these carefully engineered features add up to happier customers . . . higher profits for you!

SPECIFICATIONS:

Type	Broad-band ch. 2 through 6, 95 mc. and 7 through 13
Tilt	Ch. 2 to 6, 4 to 9 db. variable, ch. 7 to 13, 2 to 4 db.
Control	Manual or automatic gain
Input	6 to 15 db. (0 db. at 1000 mv.)
Suggested input	10 to 15 db.
Output	40 db. 12 channel, 46 db. 7-9-11-13
Alignment	Factory aligned and can be aligned by technician with proper equipment.
Gain	40 db. at ch. 6, 46 db. at ch. 13
Power Consumption	50 watts, 115 volts, 60 cps.
Test point	20 db. down
Impedance	Input 75 ohms, output 75 ohms
Curve	Linear plus or minus .5 db.
Noise figure	Low-band, 7.5 db.; High-band, 8.5 db.
Input match	1.25-1
Dimensions	7 x 5⅝ x 11 inches
Tube complement	(2) 6922, (2) 12BY7, (2) 6AW8, (3) 7717

Automatic Gain Control, 1 db. output change for 6 db. input change. Units can be aligned on low-band from ch. 2 through 108 mc. on request.

PRICES

DELUXE MODEL	$425.00
SUPER DELUXE (A.C. Regulated)	$460.00
ULTRA DELUXE (A.C. & D.C. Regulated)	$499.00

CATV Owners and Engineers: Write or call today for free consultation and data.

Holt Electronic Research

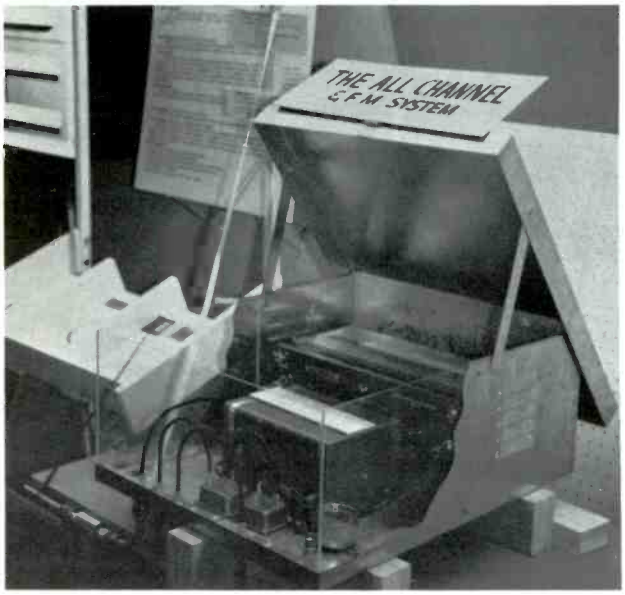
COMPLETE COMMUNITY TELEVISION SYSTEMS AND ACCESSORIES

105 EAST SPRUCE STREET · MAHANOY CITY, PENNA. Phone 773-1370

Jerrold's new "Channel Commander" exhibited at the NCTA show is " . . . a compact head end for up to 12 VHF channels . . . compatible with existing equipment." Shown above is just a part of Jerrold Electronics' large display.

Mountain case was a method of indirectly controlling the industry. The CCB held that the Commission's restrictions would have to "be applied to all common carriers, alike, across the board."

Harris concluded that, "if the Common Carrier Bureau is right in its warning and conclusion, then this decision contains frightful implications which should give concern not only to your industry but also to telephone companies, broadcasters and other businesses, too." If the FCC decision



Telesystem Services Corporation of Glenside, Pa., displayed this chain distributed type all-channel trunk amplifier with separate external bridging . . . feeding cascade type distributor amplifier.

is upheld in the courts," Harris said, "this will change the FCC's and the courts' previous holdings on the duties and obligations of common carriers. If the Commission's new interpretation is sustained, Congress is likely to be asked to hold hearings and re-examine what should be the scope of the commission's powers over common carriers."

All-Band Enthusiasm . . .

All-Band CATV operation was discussed at the All-Band Equipment Luncheon on Thursday, June 21st. Al Ricci, NCTA director and systems owner from Keene, N. H., introduced the subject with the comment that he has already

Ameco of Phoenix, Arizona, had two booths at the convention. This one demonstrated their new "Weather Scan" equipment. Also on display were Ameco all-band transistorized amplifiers and other CATV components.

gone to a 12 channel operation and is "looking forward to more channels." Fred Lieberman, President of Telesystem Services Corporation, Glenside, Pa., took a strong stand in favor of all-band CATV operation.

He stated, "if you build low-band, you are designing trouble and expense into your system." Lieberman also noted "Don't be afraid to make a fair rate adjustment if you give more when you make the adjustment, and if you handle the change right, public relations-wise." While advocating the move to all-band operation Lieberman did stress that 70 percent of all-band equipment goes unused at present, leaving "great possibilities for other services, including two-way communication."

Pay TV and CATV

Also addressing the All-Band Luncheon, Bill Daniels predicted that "pay TV is just over the horizon . . . it is inevitable." Of all the bold predictions heard at the convention perhaps the most significant was Daniels' statement, "I think you are going to see CATV systems going into three station markets."

Irv Kahn, TelePrompTer President, addressing the All-Band luncheon audience said "pay TV will be proved out soon . . . and it will snowball . . . participation will start in CATV homes." Another significant statement, "The telephone company represents the greatest threat to our auxiliary services field . . ."

These three happy Canadians at the Blonder-Tongue booth are (l. to r.) Dave Campbell, owner, and Sam Salvin, Chief Engineer, of Cable TV Ltd., Montreal (largest CATV operation in the world) and Harry Gray of Benco Television Associates, Ltd.

ideal building block for any tv system–matv, cctv, etv, catv

The new MX series is typical of the creative engineering employed in all Blonder-Tongue Master TV system products. This factory-tuned filtered/mixer splitter requires no alignment in the field. With any system it provides filtering action, minimizes loss and permits balance of signal — on up to 8 channels. Ends the problems faced in mixing adjacent channels — whether they are equal, or they have to be equalized.

The MX is both efficient and economical to use. You don't pay for channels you don't need. You can buy a factory pre-tuned MX for precisely those channels for which it is needed.

The MX series consists of 4 separate types of units: (1) *Bandpass Filters, from MX-2, to MX-13,* (Including MX-FM) — can be used separately or with the MX series bases to form mixers or splitters. Pre-tuned to the desired channel. (2) *Mixing Base, MX-LB* — Mounts MX series filters. Accommodates up to four lo band (MX-2 thru MX-FM) filters. Also, up to three hi band filters can be mixed with lo band filters on an MX-LB. (3) *Mixing Base, MX-HB.* Mounts up to 4 hi band (MX-7 thru MX-13) filters. (4) *Hi–Lo Splitter/Mixer,* MX-M Mixes or splits hi band and lo band signals.

5 situations in which the MX is the ideal building block:

1. Combines signals from several antennas. Signals are equalized by: amplifying weak channels with single channel amplifiers (Blonder-Tongue CB); attenuating strong channels with a fixed attenuator (Blonder-Tongue FA).

2. Combines adjacent channels — Model MX-B serves as mixing base in both cases, because hi and lo-band channels are mixed in each case. Hybrid splitter (Blonder-Tongue TS-772 or MDC-2) used to combine outputs of the two bases to provide isolation between adjacent channels. Before mixing, channels are balanced by using single-channel amplifiers (CB) and fixed attenuators (FA).

3. Splits the signals from a broadband antenna as shown in #3. Also can split signals from a broadband amplifier.

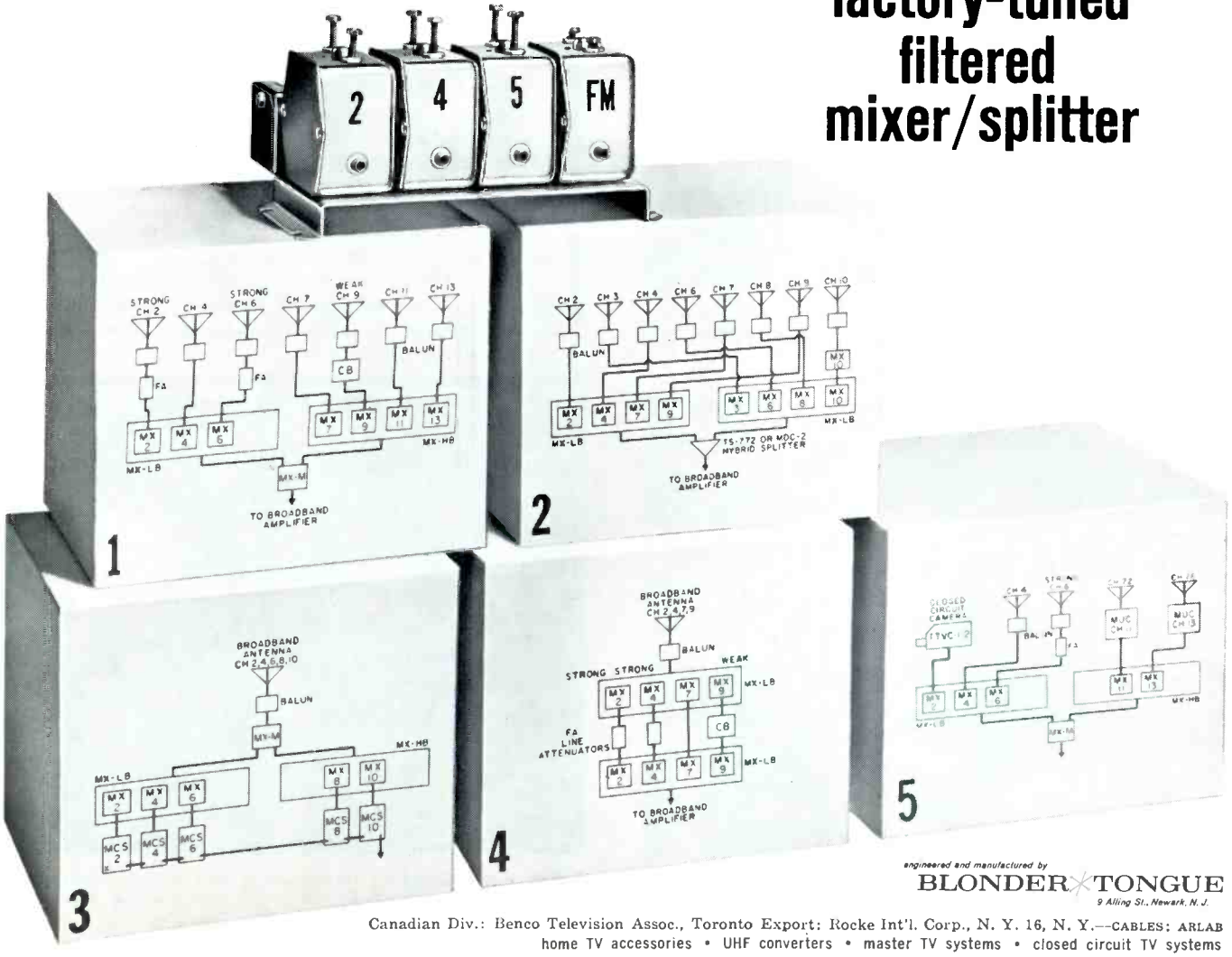
4. Balances signal strengths from a broadband antenna.

5. Mixes a CCTV camera into a Master TV system.

The MX is just one of a series of advance-engineered Blonder-Tongue products for superior Master TV system performance. Write today for details on the new FA series of fixed attenuators: MWT tuneable wave traps.

NEW BLONDER-TONGUE MX

factory-tuned filtered mixer/splitter



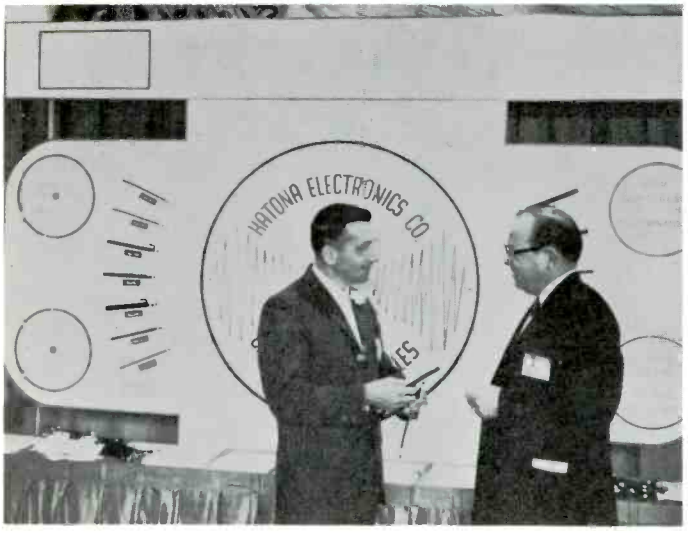
engineered and manufactured by
BLONDER-TONGUE
9 Alling St., Newark, N. J.

Canadian Div.: Benco Television Assoc., Toronto Export: Rocke Int'l. Corp., N. Y. 16, N. Y.—CABLES: ARLAB

home TV accessories • UHF converters • master TV systems • closed circuit TV systems

At the large Spencer-Kennedy Laboratories booth Staunton C. Trimble of Barnsville, W. Va., (l.) and Burford Seville, Cumberland, Md., talk with SKL's R. X. Cullinane (back to camera).

Shown at the Miami Electronics Inc. booth are Ectore Reynaldo and John Echegoyen, both of ME. Reynaldo is holding their new completely transistorized 25 db gain line amplfiier.



Anthony S. Katona of Katona Electronics Company talks cable with J. E. "Johnny" Mankin of Tyler, Texas.

George Anthony, President of Tape-Athon and Noel Palm, Sales manager, exhibited background music equipment for CATV systems use. This Inglewood, California, firm has found a substantial demand for taped music systems in the CATV field.

DON ANDERSSON JOINS NCTA STAFF

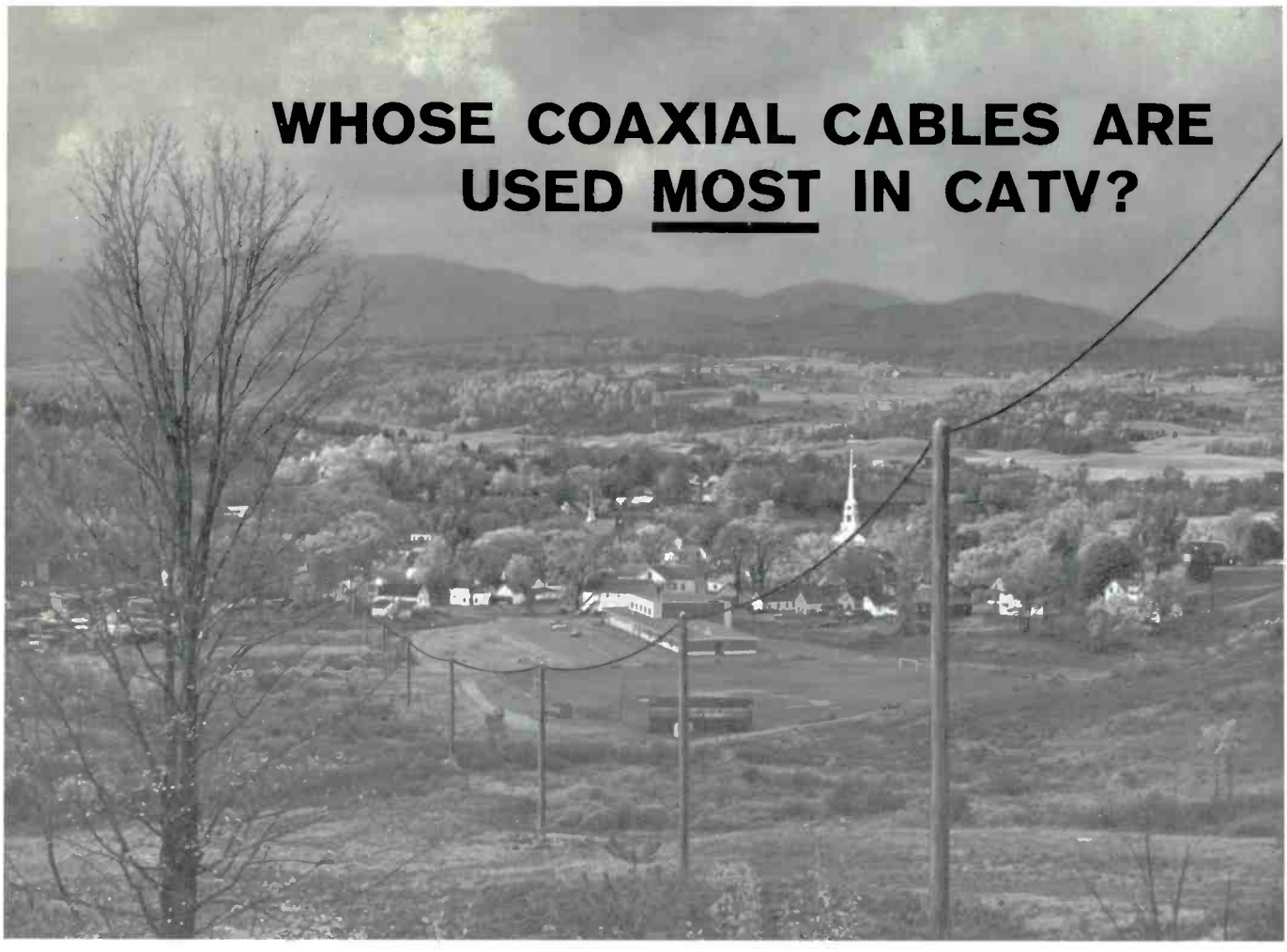
The newly appointed Director of Information of the NCTA is Don Andersson. His tireless efforts during the convention were a great help to all news media covering the meeting.

Prior to joining the National Community Television Association, Don was associated with a public relations firm in Washington, D.C. In addition, Andersson brings to the NCTA post seven years experience in the national trade association field, having served in the public relations departments of the National Coal Association and the Association of American Railroads.

Don graduated from Boston University and holds a master's degree in Radio and Television Broadcasting. He has been an instructor in communications at Boston University and the American University. He was assistant director of audio-visual education for the Massachusetts Department of Education.

We join with others in the CATV industry in extending a sincere welcome to Don Andersson. His value to the National Community Television Association is already quite apparent.

Collins Radio Company introduced a new 5 watt transmitter at the NCTA show. Discussing its merits here are Don Mehl (l.) and Bob Morris, both of Collins.



answer:

TIMES!

Today there are more than 400 million feet of Times' CATV cable in use throughout the nation—more than any other manufacturer's. Times has produced coaxial cable for CATV since the industry began. In addition, Times has pioneered *every* major cable improvement—and has set the industry's standards for TV transmission cables. This unequalled record makes Times the first choice for the newest, most advanced cables.

TIMES' NEW JT 400 SERIES GIVES BEST RESULTS

The latest Times cable to win industry acclaim is the JT 400 Series—the first proved "Strip-Braid" coaxial cable. Field tests on operating systems for over two years have proved the JT 400 Series cables to be the most economical cables in use today. There are now more than 8 million feet of JT 400 Series cables in operation giving the most efficient and reliable cable service for all-band systems. Exclusive JT 400 Series features include:

- Best attenuation uniformity (Cables sweep flat within 0.5 db in 40 db of cable).
- Best radiation characteristics.
- Best impedance uniformity.
- Lighter weight by 20-40%.
- Same O.D. on single and double shielded versions are possible.
- Double shielded versions with the equivalent characteristics to previous double shielded, double jacketed cables.
- Cable sizes fit existing pressure taps.
- Times' Xelon jacket assures proved long life.

Times' CATV cables are available for immediate delivery. For further information, wire or write direct to Times' Sales Manager.

*A DuPont Trademark

TIMES WIRE AND CABLE
Division of The International Silver Company
Wallingford, Connecticut

TRANSMISSION SYSTEM DESIGN AND ENGINEERING • STANDARD & SPECIAL PURPOSE COAXIAL CABLE • MULTICONDUCTOR CABLE • COMPLETE CABLE ASSEMBLIES • TEFLON* HOOK-UP WIRE

Good food and good entertainment were enjoyed by all at the Wednesday evening banquet and gala show, "The Best of Broadway". Pictured above (l. to r. behind table) are Kerwin McMahon of Viking Cable Co., William I. Shlank, CATV operator from New Haven, Conn.; Charles E. Clements, CATV owner, Waterville, Wash., Fred G. Goddard, systems owner from Aberdeen, Wash.; Fred's daughter, Mrs. John C. Pyle of Eugene, Ore.; Stanley M. Searle of TV Horizons magazine, Oklahoma City, Okla.; (our apologies to the two gentlemen in front of table at left—whose identities are unknown to us.) Seated at right (foreground) are Robert McCaw, systems operator, Seattle, Wash.; and Lee Stoner, CATV owner from La Grande, Ore.

Flinn Heads NCTA Slate

Glenn H. Flinn, president of Television Cable Service Co. of Tyler and Jacksonville, Tex., was re-elected to a one-year term as National Chairman of the National Community Television Association at the June 20th election held during the 11th Annual NCTA Convention in the Shoreham Hotel, Washington, D.C.

Also elected to one-year terms as officers of NCTA were:

National Vice-Chairman, Fred G. Goddard, president of Harbor Television Corp., Aberdeen, Washington.

Secretary, Benjamin J. Conroy, Jr., president of Uvalde Television Cable Corp., Uvalde, Texas.

M. William Adler, president of Weston Television Cable Corp., Weston, W. Va., was re-elected Treasurer.

Elected to three-year terms to the NCTA Board of Directors were: F. Gordon Fuqua, technical director of the Community Antenna Division of the National General Corp., Beverly Hills, Calif., and manager of the Bluefield TV Cable Co., Bluefield, W. Va.; Robert Regan, president of Minnesota TV Signal Distributing Co., Mankato and New Ulm, Minn.; Fred J. Stevenson, president of Rogers Television Cable Inc., Rogers, Ark.; Robert J. Tarlton, president of Panther Valley TV Co., Inc., Lansford, Pa.; Frank Thompson, vice president of Rochester Video, Rochester, Minn., and retiring NCTA secretary; and Sidney E. Young, president of Rutland Cable TV, Inc. and West Rutland Cable TV, Inc., Rutland, Vt.

John Walsonavich, operator of community antenna systems in areas of East-Central Pa., elected to a one-year term in 1961, was re-elected as a member of the NCTA Board for a three-year term.

Martin F. Malarkey, president of Cable Television Co., Wilmington, N. C., was elected to a two-year term on the Board.

Sandford Randolph, manager of Clarksburg TV Cable Co., Clarksburg, W. Va.; and Ralph "Bud" Weir, president of Junction City Television, Inc., Junction City, Kan., were elected to one-year terms.

New Found CATV Financial Interest

One of the most significant developments in the CATV field during the last 24 months is the new interest in CATV from financial quarters. Underlining this fact was the presence of a number of representatives of financing institutions at the CATV convention. Bill Daniels noted that in the last 24 months investors "have started coming to us!" He stated "Real progress is being made in obtaining financing from banks at slightly over prime rates." He also predicted the next 10 years will see many new investors coming into the industry.

Leon Papernow, Executive Vice President of H & B Communications, also addressed the All-Band Luncheon. Both he and Daniels made reference to interest that is being expressed in CATV in many foreign countries. Those mentioned included Germany, France, the British Isles, and Peru.

Improved CATV-Broadcaster relations were evidenced in many ways at the convention. Bill Daniels expressed confidence that "99 percent of the broadcasters are our friends." In his address, Rep. Harris praised the CATV operators for the "great improvement" in their relations with the television broadcasting industry. Harris stated that the problem of cooperation between CATV systems and TV broadcast interests "can no longer be regarded as acute."

Jerome R. "Tad" Reeves, General Manager of KDKA-TV, Pittsburg, receives National Award for Distinguished Service from NCTA Director Fred G. Goddard of Aberdeen, Wash.

Jerome R. "Tad" Reeves, General Manager of KDKA-TV Pittsburgh, addressed the NCTA convention-goers in an air of complete congeniality. His remarks were devoted to the serious responsibilities of the entire television industry in regard to the education as well as entertainment of the American public and peoples around the world. Citing the great responsibility of television as a primary educational medium, he urged all of us in the industry to meet our awesome challenge. He emphasized the responsibility of television to "constantly remember the graduate of June, 1962, with his shining new diploma, who has a lifetime of learning still ahead of him. It must never forget the millions of earlier graduates, and the millions who never graduated." Reeves pointed out that, "Science has given us one of the most wondrous gifts in the history of mankind. In our own stumbling democratic way of life we have in an amazingly few short years fashioned this into one of the strongest tools for integrating our people, for sharing a culture that was formerly enjoyed by the few and privileged."

The NCTA Distinguished Service Award was presented to "Tad" Reeves at the close of his address. The presentation was made by Fred G. Goddard, NCTA director and CATV system operator from Aberdeen, Washington.

Additional Convention Coverage—August

OUR MAN IN EUROPE

GORDON J. KING
Assoc. Brit. I.R.E.
Brixham, Devon, England

The British Institution of Radio Engineers has already observed that "it is possible to foresee a national distribution system of both sound and television programmes in Great Britian" and that "the use of wired distribution would simplify any change in TV standards." These observations were made in the Brit.I.R.E. recommendations to the Pilkington Committee on the future of broadcasting in the U-K.

At the time of writing this report the whole of the country is anxiously awaiting the recommendations of the Pilkington Committee, a Committee which was established by the Government way back in 1958. It is estimated that this Committee's deliberations will be made known around the middle of this year, and its findings are likely severely to influence future activities in the fields of radio and television entertainment.

The major factors which have been in debate are pay-TV, colour TV and 625 lines. Many feel that pay-TV will be given the green light, probably on wire—or a combination of wire and air, that colour TV will be introduced on an experimental basis and that there will be a progressive change to 625 lines, retaining 405 lines until existing 405-line sets are past their prime.

Already manufacturers are producing so-called dual-standards receivers, with a switch giving operation either on 405 or 625 lines. Somes sets also have switched video modulation, vision channel bandwidth and FM intercarrier sound circuits. Similarly, colour TV sets are being produced on a limited scale in anticipation of such a service and several organisations have entered into the development of pay-TV systems of various kinds. The PayVision system was briefly mentioned in the last report.

The possibilities of pay-TV and colour are causing some excitement in the CATV world, for with the shortage of off-air spectrum space and the large number of shared channels which are already in use, off-air pay-TV is hardly likely to be encouraged on a wide scale. Relay operators and equipment manufacturers are highlighting the desirability of running a colour service via coaxial, as distinct from off-air; it is said that wire can bring quicker, cheaper and better pictures. In this context, several large relay systems have been staging full colour demonstrations over their pipes with a great deal of success.

Fringe Areas Diminishing

Past reports have made it clear that the rapid rise in relay popularity in the U-K was fostered essentially by the use of high power stations leaving many areas in the fringe of the main signals. Many areas, particularly those around the South and West coasts, were badly shielded from the main beams and were effectively without TV signals. Privately-owned translators are not allowed. Fringe areas of this kind thus became the targets for piped TV operators and hundreds of miles of wire was erected. And piped signals really sold!

The authorities then started phase two of off-air signal coverage by the installation of translators and low-powered stations carrying not only TV in Bands I and III but also FM in Band II. Many fringe areas disappeared over night and relay operators were left with a costly installation in an area of high signal field. Few systems fell into disuse but the majority continued on a reduced rate of income and a tightening of belts. Some operators investigated terminal units and where allowed by the franchise, dealt in both signal and set. This latter idea reduced the red, whilst also causing political situations with councils and radio and television dealers. Not all fringe areas were removed, however, for there remained many which were outside the scope of even translators.

Even translators did not quell the interest in coaxial relay, though they may have been instrumental in suppressing the rate of rise of wired viewers generally.

Subscriber Growth

Sound-only relay was in existence in the U-K before the advent of television, and in 1951 (when television was only just starting) there were already well over 900,000 sound-only subscribers working from neat audio. During the period 1951 to 1960 the number of subscribers taking TV increased from a mere 300 to around 450,000, but this large increase did little to boast the *total* number of subscribers (sound and television) because with the increase in interest of television, sound-only subscribers and sound-only systems were disconnected. The curve in Fig. 1 gives a bird's-eye picture of the state of affairs over the last nine years, from which it will be seen that the *total* number of subscribers rose by only about 85,000. However, it will be seen that TV subscribers follows a very rapid rate of incline, and systems to which these subscribers are connected are essentially coaxial ones.

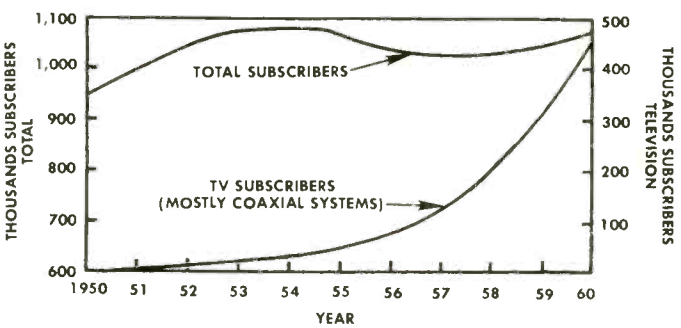


Figure 1

Showing the wired subscriber position in the UK up to 1960. In spite of the sharp rise of TV subscribers, the total number of subscribers has only just been maintained owing to the closing down and re-engineering of sound-only systems.

The picture is further developed in the curve at Fig. 2, which shows the numbers of the various relay *systems* over the same period of time. For example, TV-only systems did not appear until about 1954 and rose in the subsequent six years to about 100, while TV and sound systems started round about 1951 and numbered almost 300 by 1960. Sound-only systems have undergone a progressive decline, from about 350 in 1950 to about 150 in 1960. The trend is that old systems are either having TV added or are being replaced by coaxial systems carrying either TV-only or (more usual) TV and sound. In 1960 71 new coaxial systems were installed!

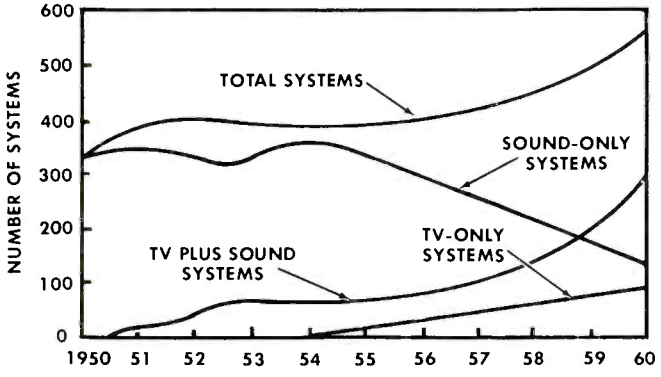


Figure 2

These curves show the number of systems in use in the UK up to 1960. The TV plus sound and the TV-only systems are essentially coaxial ones, while the sound-only systems use multiwire. These curves relate to systems with an average of 2,000 subscribers. There are many more smaller communal aerial systems also in operation.

The systems considered in Fig. 2 are all fairly large, the average number of subscribers per system being in excess of 2,000. There are hundreds of smaller systems not included in the curve, such as communal aerial systems catering for between, say, 50 to 500 subscribers. It is estimated that the peak will occur at about 100 new coaxial systems per year within the next year or so, giving an increase of about 100,000 new subscribers per year.

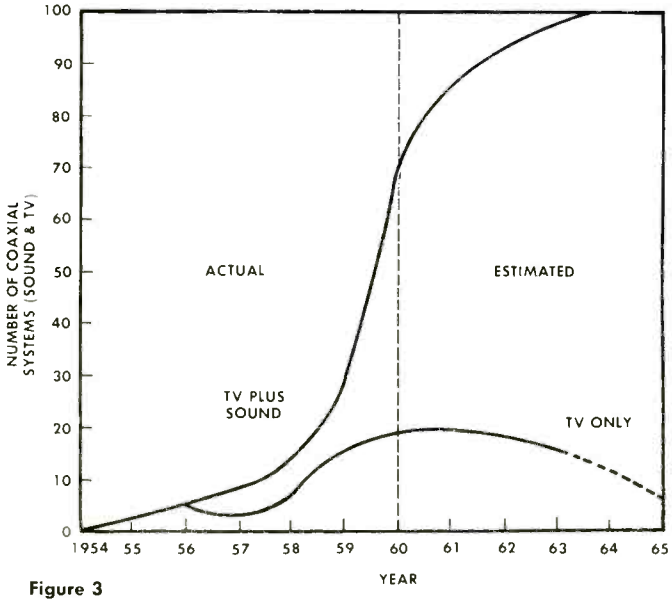


Figure 3

Here is shown the rapid rise of new coaxial systems up to 1960 and the estimated future growth. TV-only systems are unlikely to expand, since the trend is now to add VHF-FM sound to coaxial systems.

The curves of Fig. 3 show how new coaxial TV plus sound and TV-only systems have grown since 1954 and the estimated rise for subsequent years. TV-only systems will decline, of course, since the trend is to pipe VHF-FM sound and television, and there is also a likelihood of low-frequency sound carriers being used, as mentioned in last month's report. The estimated growth does not take into account pay-TV on wire, and if this is recommended by the Pilkington Committee, then the growth of coaxial systems will be very much greater than that estimated. There is, indeed, a big future for coaxial television in the UK in spite of local translators. It should also be noted that multiwire systems, using low-frequency video-modulated carriers, are also being developed, but at a smaller rate than coaxial systems.

Signals In The UHF Bands

The Pilkington Committee is also expected to recommend the use of Bands IV and V for new television programmes, and if 625 lines are adopted it is probable that a single programme may be duplicated in the UHF bands so that it runs at 405 lines at VHF and 625 lines at UHF. This means that many more fringe areas will develop in the UK, and the situation is likely to be comparable to that which existed when Band III went on the air—before the Band III service was extended sufficiently for country-wide coverage. This, then, is another big factor in favour of coaxial broadcasting.

Thus, although right at the moment it may seem that the general need for coaxial broadcasting has diminished, there is almost certain to be a great boost one way or another in the near future.

After obtaining the blessing of the local council in terms of a wiring franchise, UK operators also have to acquire various permissions for the erection of the master aerial system, aerial station building and other large pieces of equipment and plant. Before operation can be commenced, a relay license must be obtained from the Postmaster General, and this has various stipulations which must be heeded by the operator. For example, the equipment must come up to certain standards in terms of radiation, signal level, quality and so on and, in the main, it must be of British manufacturer or at least assembled in this country. The operator is called upon to keep a log of existing and new subscribers and make a periodic return in this connection.

British Translators

To end this report, a brief description of the type of translator which is used here would be of interest. In accordance with normal practice, the translator is sited on high ground overlooking the area to be covered and converts the sound and vision frequencies from one channel to another in Band I and III, but not from Band I to Band II or vice versa. This it does without demodulation to audio or video.

The station produces in the range of 1 to 10 watts in the aerial system, with the higher power usually beamed in one specific direction as required to reduce the trouble from adjacent channel interference in areas where the signal is not particularly required. Weather-proof and insect-proof cabinets house the electronic equipment which is totally automatic in operation.

Since we use amplitude modulation for both sound and vision, intermodulation difficulties are introduced by the use of a shared amplifier, and for that reason separate amplifiers are provided for sound and vision, using common frequency changing oscillators. The double frequency changing process facilitates the rejection of spurious signals and gives extra protection against "in band" feedback. The first frequency operation gives "standard" sound and vision i.f. signals, which are amplified and given a.g.c., while the second process produces vision and sound frequencies at the required channel.

To be Continued.

Not All Freeways Are In Southern California!

SUPER HIGHWAY DISTRIBUTION SYSTEM

by Jacob Shekel
Spencer-Kennedy Laboratories, Inc.
1320 Soldiers Field Road
Boston, 35, Massachusetts

Introduction

The coaxial cable that is used in signal distribution systems is similar to the best super-highway systems ever built.

It is a divided dual highway: Different signals may travel in both directions along the cable, without interference between signals transmitted in opposite directions. All the signals, of course, pass through the same space inside the cable; but the lack of interference between the signals is so complete, as if there really were an actual embankment separating the two directions of traffic.

It is a multi-lane highway: Not a two, four, or eight-lane highway, but actually an infinite-lane highway. An infinite number of signals can go in either direction, without any mutual interference. There is no physical separation between lanes—but the separation could not be any better by actual physical means.

It is a limited-access highway: Due to the shielding around the cable, signals may enter or leave only at the points prescribed by the design of the system, that is the terminals or the taps.

These characteristics are realized if the splices and connections between cable sections, and at the terminal equipment at both ends, are "matched to the characteristic impedance of the cable." What this matching means—in super-highway terms—is that the center embankment is unbroken, so that no traffic can spill over into an oppositely going lane (no "reflections").

The Traffic Problem

Some cable TV systems actually carry signals in both directions, and realize the full potential of the super-highway at their disposal. Educational closed-circuit TV systems may run two-way communications. Even in a CATV system, it is possible to include one or more locally generated programs, send them up the trunk to the head-end station to combine with the other programs, and then send everything down for distribution.

The regular CATV system is supposed to carry signals in one direction only: from the head-end to the distribution area, and from the taps to the customers. Nevertheless, there always are signals that go in the opposite direction, but they are *undesired* signals. They may be reflections generated at imperfectly matched connections; they may be reflections that originate in the drop-line and get into the distribution line through the taps; they may even be spurious radiations from a faulty receiver that is connected to the end of a drop-line.

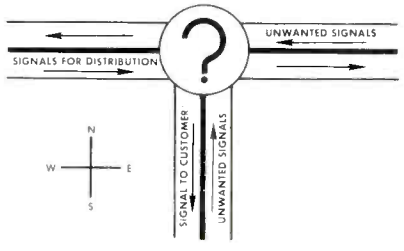


Figure 1

At any tap point of the system we are presented with a traffic problem, as shown in Figure 1.

1. Traffic along the main highway should have an uninterrupted flow, with the desired signals on the eastbound lanes, the unwanted signals on the westbound lanes, and no spill-over.
2. Signals on the eastbound lanes should be able to turn into the southbound lane on the branching highway and reach the customer.
3. Westbound signals should have no access to the branching highway.
4. Northbound signals should be directed into the westbound lanes, and thus be excluded from access to any other branch line.

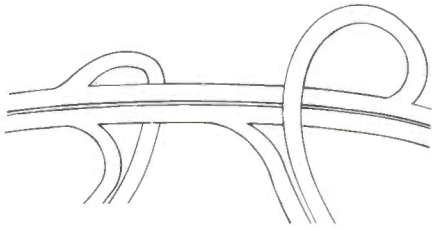


Figure 2

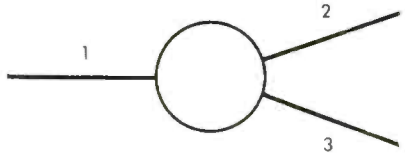
The Interchange

Figure 2 shows a sketch of a super-highway with two interchanges that conform to the traffic rules above. Each branching highway is fed by the eastbound lane only, and can return traffic only into the westbound lane. In particular, no traffic can pass from one branching highway into another.

An interchange system such as the one shown here may be a little rough on tourists, and it is unlikely to be found on any actual highway; but it is a perfect model for the layout of a CATV system, because it permits complete control of the traffic that reaches the customer at the end of the branching highway.

The Traffic-flow Table

A junction between transmission lines can be described and specified in a manner similar to that of the traffic problem above. Let us first take a specific example, shown in Figure 3.



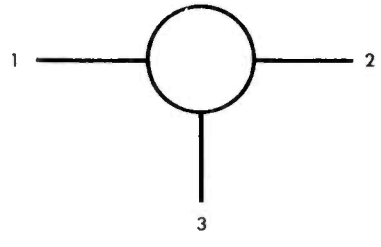
	1	2	3
1	0	0.50	0.50
2	0.85	0.10	0.05
3	0.80	0.05	0.05

Figure 3

The "traffic flow" through the junction can be organized in the form of a table, where one row and one column are assigned to each terminal in the junction. The entries that appear in each row of the table show how the signal power that enters into that terminal is divided into

portions that come out of the various terminals. For example, the first row, with entries 0-.50-.50 shows that, any signal that enters at terminal #1 is split equally (in power) between the outputs at terminals #2 and #3. The second row shows that, of the power entering at terminal #2, 85% come out of #1, 5% come out of #3, and 10% come out back at #2, that is, there is a 10% power reflection. The third line similarly shows the distribution of any power coming into terminal #3: 5% reflected back out of #3, 5% leak out of #2, and 80% come out of #1. The last three numbers add up to 90% only, so that 10% of any power entering into terminal #3 are somehow lost inside the junction. (This can hardly happen in actual highway junctions, but is a very regular occurrence in transmission line junctions, where some power is always internally dissipated.

It is obvious that the hypothetical junction of Figure 3 is some type of power splitter, with #1 as input, #2 and #3 as outputs. It can also be used as a combiner, with signals fed into #2 and #3, with #1 as a combined output. As a splitter, it has ideal properties; it is not an ideal combiner, because of the reflections at #2 and #3, the "leakage" between #2 and #3, and the loss of some of the signal into #3.



	1	2	3
1	R1	T	C
2	T	R2	I
3	C	I	R3

Figure 4

We can now turn to the general type of junction, and see the significance of the various entries in the "traffic flow" table. Figure 4 shows a general 3-line junction, but the same method can easily be applied to the junction between any number of lines.

As in the specific example of Figure 3, each row refers to the signal coming *into* the respective terminal, and each column to the signals leaving *out* of the respective terminals. The power that enters into terminal #1 is split into three portions:

R1—the portion coming back out of #1, which is the power reflection coefficient.

T—the transmitted power, that is the portion coming out of terminal #2.

C—the portion of input power that is coupled into terminal #3.

Note that the numerical values represented by these letter symbols are *power ratios*, so that a 10 db coupling factor means $C = 0.1$, and a "transmission loss of 1 db (maximum)" means "T = 0.794 (minimum)." Except for the reflection term *R1*, the *names* used for the other terms are arbitrary and may depend on the intended application, whereas the *meaning* of the term is clearly defined by its position in the table.

By similar reasoning, *R2* and *R3* indicate the reflection coefficients at #2 and #3, respectively, and *I* denotes the coupling of a signal coming into #2 and leaving by #3. (This may arbitrarily be called the "Isolation" or "Inverse Coupling").

Signal Traffic Regulations

No self-respecting traffic system can be free of regulations and restrictions; our signal traffic system is no exception to this rule.

In general, it is possible to design a transmission-line junction to realize the properties shown by any given traffic-flow table, subject to two restrictions:

1. The table must have the symmetrical form exemplified by the table in Figure 4. The coupling from #1 to #3, say, must be the same as that from #3 to #1, and this must also hold for any other pair of input terminals.

2. The sum of the numbers in each row must be unity or less. (All numbers in the table must of course be positive numbers.)

The first restriction is imposed by the components out of which the junction is supposed to be constructed. It may be waived if the design may include tubes, transistors, ferromagnetic materials, or other components that exhibit "nonreciprocal" properties. (We shall not discuss these properties in this article, since it is assumed that such components will not be used in tap junctions of a CATV distribution system.)

The second restriction reflects the energy balance in the junction, and implies that the total signal power coming out of all the terminals, due to any input signal, can not be more than the power of that input signal. If every row of the table totals exactly 100%, the junction is "lossless"; if at least one row of the table totals less than 100%, some power must be absorbed within the junction. This restriction may be waived if the junction incorporates an amplifier, or some other device that provides signal power gain. In that case, some rows may total more than 100%, indicating that more power leaves the junction than enters it.

As mentioned before, it will be assumed that the junctions conform to both restrictions. (Note that the junction in Figure 3 violates the first rule; it is intended only as an illustrative example, and not as a blueprint for an actual junction.)

The Ideal Tap Coupler

We are now ready to translate the traffic problem of the TV distribution system into a traffic-flow table that specifies a three-line junction (see Figure 5). It is assumed that the main-line signal enters at #1 and leaves at #2, and #3 is connected to the drop-line.

First, it would be good practice to have the junction matched at all terminals, so that it will not generate any additional reflections of its own. The ideal junction should then have:

$$R1 = 0$$
$$R2 = 0$$
$$R3 = 0$$

Suppose now that a 10-db coupler has to be designed. This means that any signal entering at #1 should split between outputs # 2 and #3, with 10% of the power going to #3. Ideally, all the rest, that is 90%,should come out of #2. The terms in the first line of the table should then be:

$$C = 0.10$$
$$T = 0.90$$

(This, incidentally, means that the ideal 10-db coupler has an inevitable insertion loss of 0.46 db in the main line.) The symmetry of the table now fixes the entries for the first column of the table at the same values. The only entry left unspecified so far is *I*. This should be zero, so that a signal coming into #2 should have no coupling into the line connected to #3.

Now that the traffic-flow table is complete (see Figure 5b), we check the totals of the second and third row, and find that each row fails to reach 100%. In fact, 10% of the power coming into #2, and 90% of the power coming into #3, never leave the junction, hence must be absorbed by it. (In this respect, the ideal tap differs from the highway interchange, which is not supposed to "absorb" any traffic.) The junction must then be "lossy," and has to include some components to absorb power (resistors); but it is designed so that only *unwanted* signals are absorbed.

The fact that *I* is different from *C* is the reason why this type of ideal tap is called a *directional coupler*, for the coupling into the tap line depends on the di-

(Continued Page 24)

CATV Industry Pioneer

Our industry began in a small way, and there were few pioneers. You can count them on your fingers. Jim Davidson of DAVCO Electronics, Batesville, Arkansas was one of these.

Davidson manages three Corporations all specializing in CATV system operation and construction. His history in wired video distribution goes back to 1948 . . . a period when there were probably fewer two set couplers in existance than there are full size CATV systems operating today!

DAVCO is the oldest CATV operator in the mid-south. System installations include a 21 set master system, on up to a 2,626 set system. For the past 11 years CATV systems have been DAVCO's only business. Unlike many system contractors in the business today, DAVCO not only plans a system, procures the materials and engineerings the installation, they will also complete the installation by *signing up your subscribers* and putting the operation into gear.

DAVCO Electronics Corporation encompasses (a) a distributorship of all materials, coaxial cables, electronic equipment, etc. for CATV; (b) a distributorship of radio and tv parts, antennas, AM-FM radios, tuners, Hi-Fi, stereo, speakers, etc. to the servicing trade; (c) an engineering and design service for all types of CATV and multiple installations; and, (d) a contracting and construction department equipped to do all types of CATV and master TV installations, turnkey.

DAVCO's fleet includes six trucks (which are currently constructing systems in several states) and a twin engine AZTEC airplane which Davidson himself uses to do the contract bidding and sales work throughout the large mid-south region served. The plane also serves to haul equipment (up to a ton) when needed, and crews. Several otherwise in-accessible spots have been reached with the AZTEC. Jim Davidson notes "I've owned three Beechcrafts prior to this plane, and consider a plane a very important ingredient to my work."

Much of DAVCO's current work consists of up-dating 'mickey-mouse' systems installed many years ago. As the sys-

Modern day pioneers use whatever up-to-date instruments they can place at their disposal. With Davidson, this means a Twin Engine Aztec which will haul six persons or a ton of CATV cargo at speeds to 200 miles per hour.

Jim Davidson "DAVCO"

Batesville, Arkansas

Jim Davidsan's "stamping grounds" includes the south-central partion of the United States. These CATV operators, part af 50 who attended a April 27-28 regional meeting in Hat Springs, Arkansas, form the backbone for the DAVCO aperation.

tems grew, and the equipment aged, the owners realized the need for improved equipment. DAVCO has an unusual approach to system head ends, as photo two shows. In the DAVCO plant, head-ends are custom designed, outfitted and put into operational form before ever getting to the field. Each sub-assembly is custom picked, tested and integrated as a part of the whole unit. Davidson notes "This is one way we know that the equipment is pre-cooked and matched under laboratory conditions, long before it gets into the field."

Apparently the method pays off, mid-south customers have purchased more than 60 such systems.

Davidson feels every head-end has peculiar problems different from every other (based upon channels to be used, conversions to be made, signal levels and AGC to work with), and that each unit should be operated under as ideal conditions as possible during initial check out. This cuts down field engineering time and maintenance can be held to a minimum. Entron equipment is used in all DAVCO installations.

DAVCO learned, the hard way, that field service follow up is a must. Customer relations are hard to come by initially, and they *can be* even harder to keep! DAVCO recently added a new engineer to travel the mid-south assisting customers with their problems. Today, twenty people make up the DAVCO backbone. Additional field installation personnel are hired as needed when large installations are underway.

The future for DAVCO? "Unequalled" quips Jim Davidson. "New communities need CATV every month. Expansion of present service, up-dating of old services really keeps us hopping."

DAVCO's motto might well serve as food for thought for others in the industry. "Remember, there is absolutely no substitute for experience.

WE WIRED

A. J. Reeves
Jerrold Electronics Corp.
Philadelphia, Pennsylvania

This is the story of how Wilmington, North Carolina, greeted a new community antenna system. The story illustrates the substantial need of the residents of the area for the specific services which community antenna television offers. It reflects the advanced development of catv equipment and techniques and, generally, the accomplishments of the industry, which is now geared to provide economical television reception to larger population areas than ever before.

Wilmington, North Carolina, is the site of the newest and largest community antenna system in the United States. Its approximately 130 miles of system is owned and operated by Cable Television Company, a company which represents the effective combination of men with long experience in the technique and management of community antenna systems with local business interests.

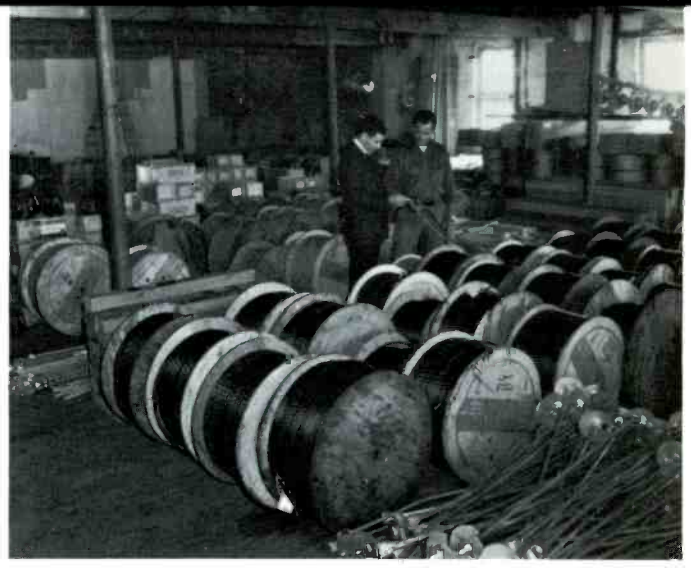
Martin F. Malarkey, company president, is a pioneer in the community antenna system industry. Formerly president of systems in Pennsylvania, Virginia and Maryland, he currently also heads the Delmarva Community Antenna Corporation in Salisbury, Maryland. He is a founder of the National Community Television Association and is one of the men responsible for the outstanding development of the industry.

A major stockholder in the company is Julius S. Brody, president of radio station WGNI in Wilmington. Another major stockholder is Dan D. Cameron, a man of wide business interests in Wilmington. He is also president of WECT (Channel 6), the only television station located in the Wilmington area.

His attitude is down-to-earth. "This had to come," he said "... the people of Wilmington wanted a choice of stations and this was a logical result. I am proud to be a part of this effort. And ... it's good business."

These people, with Jerrold Electronics Corporation, which designed, equipped and installed the system, in Martin Malarkey's words "made a tremendous and careful effort to bring the best television reception available to Wilmington."

Open House for Coble Television Company drew a large crowd of Wilmington residents. Wilmington dealers displayed popular brond television receivers ond the entire town was introduced to 5 channel television.



Mountoins of electronic equipment, including 378 miles of cooxial cable, 150 miles of strand support wire and 236 amplifiers filled a Wilmington warehouse in November of 1961.

On April 15th, at the National Guard Armory on Carolina Beach Road in Wilmington, thousands of people representing all elements of the population, streamed into the Armory for a day and a half to attend the official Opening of Cable Television Company. Few of them had ever heard of a community antenna system. All of them asked "Will it really work?"

Wilmington is a modern city, with office buildings, housing developments, swank restaurants and busy traffic interspersing the gardens, wide lawns and gracious old homes. But until Cable Television Company brought its services to the city, residents could receive only one television channel. Station WECT (Channel 6) provided good programming—but it was the only nearby channel that was available.

When, by means of microwave, coaxial cable, and a carefully designed community antenna system, Cable Television Company made available television channels from Raleigh, Washington, N. C., Greenville and Durham, as well as additional channels of FM music, the people of Wilmington reacted as if they suddenly had access to an enchanted television oasis.

The doors of the Armory were opened at 1 o'clock to a substantial crowd which had been gathering since 10 in the morning. Inside the Armory, thousands of people clustered around the exhibits of appliance dealers. At each booth each television set displayed one of the channels now available. The viewers were completely absorbed and made only perfunctory attempts to keep the children moving. They saw clearly defined pictures and heard fine sound on every channel. They discovered that the community antenna system "worked."

People who left the Armory, returned later to see the color programs. The colors were clear and brilliant and one of the dealers sold a color TV set within the hour.

A mother of several small children—one of 100 persons who had applied for the cable company's service long before the Opening and, in fact, before an advertising program for the system had begun—said she and her husband intended to

WILMINGTON, N. C.

In a record time of seven months, Jerrold crews installed 130 miles of 5 channel television in Wilmington. The crews worked throughout the winter to ready for an early spring opening.

buy a color television set for their Christmas present to each other, now that there was a choice of programs. "We will have so much more to offer the children," she stated.

Mayor O. O. Allsbrook commented, "I feel that the city should be very happy and proud to have this company as part of the Wilmington family. I feel sure it will mean a boost in employment, promote the sale of additional television sets and create additional television repair work."

This is also the point of view of the appliance dealers and the television servicement of Wilmington.

Harry Dobbins of Dobbins Appliance Center stated, "This is the biggest break Wilmington has had for us in years." Bill Sutton of Sutton Council Furniture said "Everyone is interested in more television" and described the excited interest in sets in his store which were tuned to the newly available channels.

Herman Musselwhite of Musselwhite Radio and TV service said, "I think people will be buying second and third sets, and the servicemen can use this new business."

The new cable company will make a contribution to the educational picture of Wilmington. The County Superintendent of Schools accepted, with thanks, the offer of free installation and service to area schools by Frank Waters, Manager of Cable Television Company. Wilmington College also asked that it be included in the offer when the system is extended into the North Winter Park area—and it will be.

The President of the Bank of Wilmington, Mr. Emsley A. Laney, said he is very interested in the potential for education provided by the increased number of channels received. "In addition," he stated, "we will have a much wider choice of programs—and that's appealing."

For the period the opening of the system, residents of Wilmington kept phones busy from morning to night in the office of Cable Television Company. Applications for service poured in. Wilmington wanted—by the hundreds—the service supplied by Cable Television Company.

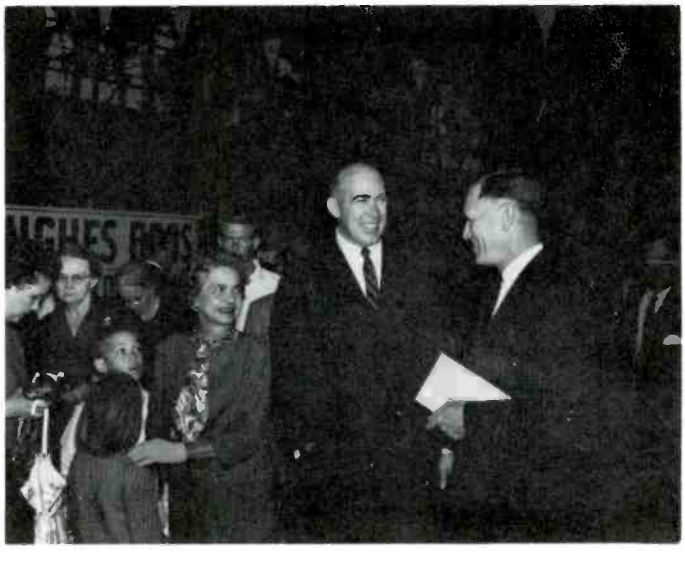
Jerrold Electronics Corporation, selected by Martin Malarkey to design, equip and install the system has, in the words of Martin Malarkey "been a specialist in this field for longer than anyone in the industry. It has specialized in the development of the art throughout the years."

In planning the Wilmington system, fact-finding surveys were the first order of business for Jerrold. Engineers discovered that television channels from Raleigh, Durham, Washington and Greenville, N. C. could be received in the vicinity of St. Helena Community in Pender County. Jerrold had entered the microwave equipment field in 1961 in order to provide a considerable extension to the facilities offered the catv industry. It was determined to use this equipment for relaying signal to Wilmington because of the distance from the transmitting stations—85 to 120 miles from St. Helena.

Jerrold, prior to installation of the system, had spent many man-hours in evaluating data and designing the system. The company's Drafting Department, worked for more than 35 man-days on preparation of construction drawings, in line with the contract between Cable Television Company and Jerrold. Fifty man-days were spent in planning the routing of coaxial cable on utility company poles. (According to Lee Zemnick, Manager of Jerrold's Community Systems Division, the cooperation of Carolina Power and Light Company and Southern Bell Telephone Company was "terrific." Thirty additional survey days were necessary.

In the record time of seven months, 130 miles of system had been built by five Jerrold crews with the cooperation of 'support' men—construction engineers, warehousemen, technicians, field engineers. In addition to building the two towers, they had strung cable from the Wilmington tower along a route of utility poles. They had placed amplifiers at charted places throughout the system, in order to maintain constant, high quality television reception level every where along the system.

The residents of the Wilmington area now know about community antenna systems—and as a result, they are settling down appreciatively to a new era of television and FM entertainment.



Cable Television Company President Martin Malarkey (1) and Mr. Laney, President of The Bank of Wilmington seemed pleased with the new firm's opening day progress.

CATV APPLICATIONS—Cont. from Page 5

at what you want to view, you pan and tilt it. The friction head is the gadget that sits on top of a tripod and makes it easy for you to pan and tilt the camera.

"Now, as I was saying, the second camera is mounted over the teacher's head, aiming right at the lectern. Whenever the teacher wants to show a paper or something, he just sticks it on the lectern. If he wants a close-up of the object, he uses the remote control to zoom in on it."

"There are two cameras—do they both go out through the system," asked Bob.

Figure 4

"No. The student who operates the ST-2 PORTA-STUDIO sees one camera pick-up on each of the 8" monitors. He decided which of the signals he wants to send out. He switches the camera in and out at will. The video from the camera that's switched in is sent to the audio-video modulator, along with the sound picked up by the microphone."

"I see," said Bob. "Then you have a complete TV channel. But how do we hook it into the CATV system?"

"Nothing to it," Hank replied. "We just make sure we originate on a channel not used in our system. The ST-2 has a built-in AGC controlled signal channel amplifier so we just mix it into our head end like any other single channel amplifier. But you have to be careful if you're using a camera with an RF output, rather than with an audio-video modulator. Most cameras put out a double sideband RF."

"You mean the RF carrier is modulated on both sides?" asked Bob.

"Right. As you know, the commercial signals are filtered to a single sideband. There's no problem with double sideband unless you want to use the lower adjacent channel in the system."

"I get you," said Bob. "If I originate on channel 6, the lower side band will interfere with channel 5. What would I have to do if I wanted to use channel 5 in the system?"

"You ask me that," countered Hank, "after all the time I've spent talking to you about filters and traps? Obviously, you'd use a band pass filter to get rid of the other sideband. You might have to use a few, cascased, to make your selectivity real sharp. Remember, with double sideband transmission, there's a carrier 4.5 MC below the picture carrier—you might use a trap to get rid of it.

"Another thing to keep in mind is that they'll probably want to see the program in all the rooms in the school. Not only that, but a lot of schools want to be able to use every room in the school as a studio."

"What do you do—put in two sets of cables?" asked Bob.

"Nope. One well planned distribution system does the job. Let me show you how it's done (see Figure 5). You originate on a sub-channel. Then you can plug the origination equipment into any outlet in the system. It goes through the tapoff, up through the 4 way splitter and into the AN-2-75. The AN-2-75 splits the sub-channel off and sends it into the head-end, where it's converted to an unused channel and mixed back into the system."

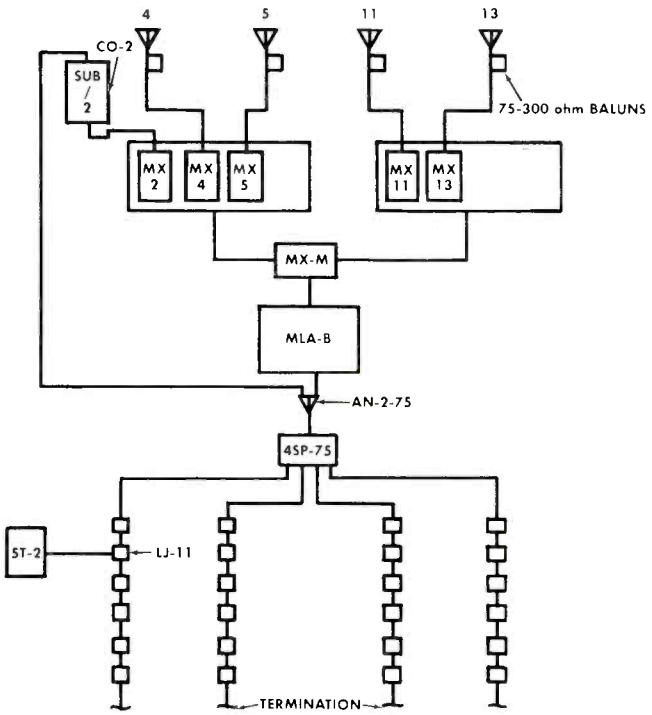


Figure 5

"Wait a minute," demanded Bob. "Why do you use a sub-channel? Why not originate on channel 2 in the first place and you wouldn't need a converter?"

"Uh huh," nodded Hank. "That would work all right—except that it might oscillate. You've got practically a closed loop between the input and the output of the amplifier for channel 2. The only thing that might save you is the isolation between branch lines in the 2-way splitter you'd use to replace the AN-2-75. And even if it didn't oscillate, you'd probable get ghosts in the branch where the signal is originated."

"How come?" asked Bob.

"Because that branch would get channel 2 twice, once directly from the source and once from the head end amplifier. Take my word for it, it's good engineering to practice to convert the signal."

"You know," mused Bob, "I'd like to play around with one of those closed circuit TV cameras. Wonder how I'd look on TV anyhow. Maybe I could teach a course on ETV—electronics or something."

"Talk about the blind leading the blind," moaned Hank.

"You don't have to be an expert to be a teacher," opined Bob. "It's how you present your material that counts. You gotta have the old personality—really put the stuff over. Why, I'd be the greatest daytime attractive since People are Funny."

"You're funny," agreed Hank. "But looks aren't everything."

GIGANTIC ALL-BAND CONTRACT TO AMECO

AMECO, Phoenix, Arizona based CATV firm has landed what they proclaim to be "the nation's largest all-band community antenna television system contract." The huge system is to go into Santa Barbara, California.

The announcement, made jointly by Harry C. Butcher, President of Cable TV of Santa Barbara and Bruce Merrill, President of AMECO, Inc. came after successful conclusion of negotiations between the two firms.

Although the contract price was not announced, a spokesman for AMECO revealed that the amount of the transaction sets a new high for "turn-key" contracts in the CATV industry.

The Santa Barbara system will carry the seven Los Angeles television channels and local channel 3, KEYT, in Santa Barbara. The entire system will be equipped with AMECO's new all-band transistorized equipment.

Harry Butcher, a retired Vice President of the Columbia Broadcasting System, has been active in broadcasting for years. He previously owned KIVA-TV in Yuma, Arizona, which he later sold to Bruce Merrill of AMECO. He became interested in CATV after his sale of KIVA.

Construction of the huge system, which will service approximately 20,000 homes in Santa Barbara, was to begin by June 1. AMECO is also constructing an all-band transistorized system in Panama City, Florida, which is nearly as large as the Santa Barbara system. Cost of the two systems together is estimated to exceed one million dollars.

NUVISTOR FM ANTENNA MOUNTED AMPLIFIER

TELco, Tapetone Electronic Laboratories, 99 Elm Street, West Newton 65, Massachusetts, industry leader in the field of low noise VHF-UHF communications receiving equipment, has introduced a Model 194 completely enclosed antenna mounting FM preamplifier. The unit uses four 6CW4 Nuvistors, is available for any frequency from 88 to 108 megacycles. The unit has a guaranteed noise figure of 2 db or better. Input and output impedances are 75 ohms. Power is supplied to the unit through a 24 vac transformer which feeds the lower voltage up the coaxial line to the amplifier. VSWR of less than 1.05 to 1 is guaranteed, with proper antenna matching. Price is $75.00 and delivery is from stock.

PRODELIN ENTERS CATV MARKETING

A 75 ohm version of Spir-O-foam coaxial cable for community and closed circuit television services has been announced by A. Haselman, Executive Vice President of Prodelin, Inc., Highstown, N. J. designers and manufacturers of antenna and transmission line systems.

"Ideally suited for trunking cable applications, the new version is a foamed polyethylene-insulated, aluminum sheathed semi-flexible cable designed for low-loss broadband performance, fast and simple installations. Cable features include unlimited operating life, perfect RF shielding, clearly marked sheaths for east length measurements and cable identification.

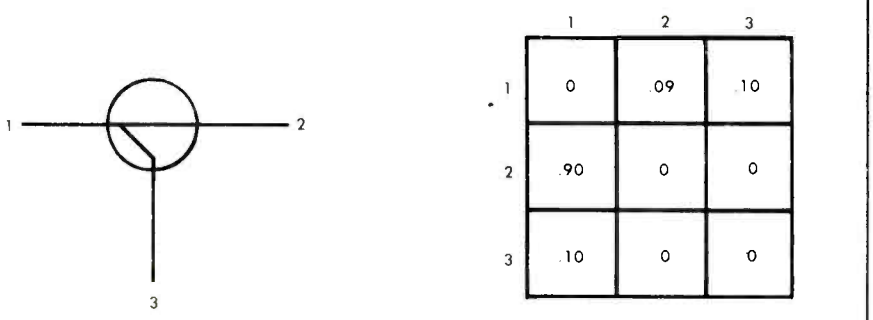
"Electrically matched to the Spir-O-Foam cable, Prodelin Spir-O-Lok connectors are installed quickly and easily in the field. No soldering connections and no special flaring tools are required.

Prodelin may be contacted by writing "Mr. A. Haselman, Prodelin Inc., Highstown, N. J."

Continued from Page 17

rection in which the signal is traveling. The ratio I/C (usually expressed in db) is the *directivity* of the coupler. A simple capacitive tap has $I = C$, so the directivity is 0 db (in other words, it is a totally non-directional coupler).

In a previous article* we showed some pictures which proved the effectiveness of directional-coupler taps in eliminating ghosts from the TV picture. We also pointed out that "a directivity of 24 db or more will guarantee a ghost-free picture, at any VHF-TV frequency, under all conditions." Experimental proof of this claim is shown in Figure 6. There is a full 100% reflection at the open end of the main line, and the distance of 250 ft. (of RG-11/U coaxial cable) is the critical distance for the channel used in the experiment. Yet Figure 6c shows that a clear picture can be delivered to the customer even under these extreme conditions.



(a) Schematic Representation of Directional Coupler

	1	2	3
1	0	.09	.10
2	.90	0	0
3	.10	0	0

(b) Ideal Traffic-Flow Table for 10 db Coupler

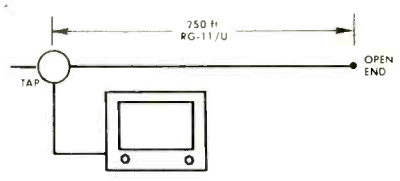
	1	2	3
1	.01 max	.794 min	.10
2	.794 min	.01 max	.001 max
3	.10	.001 max	.01 max

(c) Specifications for SKL Type 462 Chromatap

	1	2	3
1	.003	.89	.10
2	.89	.003	.0002
3	.10	.0002	.0016

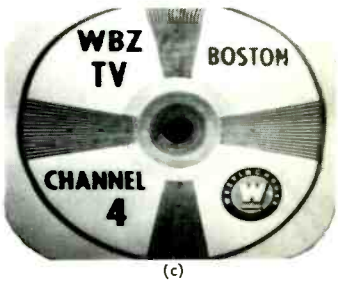
(d) Actual Measurements on SKL Type 462 Cromatap

Figure 5



(a)

(b)



(c)

Figure 6

A Practical Directional-Coupler Tap

Figures 5c and 5d show the traffic-flow tables for a directional-coupler tap that is used in TV distribution systems (SKL type 462 Chromatap). The table in 5c shows the specified values, translated from the sales bulletin; comparison with Figure 5b will show how much deviation is permitted from the ideal values. The last table shows actual measurements made on a typical unit.

The same information is given below, in the more commonly used "decibel language."

	Bulletin Specification (compare Fig. 5c)	Measured (compare Fig. 5d)
Coupling to side-line	10 db	10 db
Insertion loss	Less than 1 db	0.51 db
Isolation	Greater than 30 db	37 db
Return loss, main line	Greater than 20 db	25.2 db
Return loss side line	Greater than 20 db	28 db

The insertion loss, 0.51 db, is only 0.05 db higher than the absolute minimum associated with the ideal 10-db tap. The directivity of this coupler is the difference (of db values) between "isolation" and "coupling;" it is implicitly specified as greater than 20 db, and measured to be 27 db.

Conclusion

Judging by the effect on the quality of the product delivered to the customer, the directivity of the tap has the same purpose, and is as important, as the matching of connectors and terminal equipment.

The perceptible effect of a ghost on the picture at the end of a customer drop line is determined by the sum of the return loss that generates the ghost, and the directivity of the tap. The ghost can be eliminated by increasing the directivity, as well as by improving the match, and the two values can be traded on a direct db-for-db basis.

A transmission line which is well designed, with fairly well matched connectors and terminal equipment, but with non-directional taps, is a system that solves only half the problem, and disregards another aspect which is just as important. It is somehow similar to having the New York Thruway running through Manhattan at 5:00 p.m., with unlimited access to all side-streets; and who would ever dream of designing a system like this?

Acknowledgment

The writer would like to thank the Chief Engineer of Station WBZ-TV, Channel 4, Boston, for assistance in setting up the experiments and for permission to publish the pictures that appeared in this article and in the previous one. Any distortion in the test-pattern, as it appears in these pictures, is due either to the TV receiver used for the reception, or to the special conditions which were to be illustrated by the experiment.

*May 1962 Television Horizons, CATV Reflections, Jacob Shekel

READ TO GREAT FALLS FOR TPT

Appointment of Leslie H. Read as Manager of the Great Falls, Montana Community TV Cable Company, Inc. was announced recently by TelePrompTer Corporation, owner of the system.

Read, 26, has been manager for the past 16 months of TelePrompTer's Elmira, New York CATV system. He is a native of Great Neck, New York.

INTRODUCING TYPE 49

KATONA SPECTRUM MATCHED TV SYSTEM SUBSCRIBER DROP CABLE AT SPECIAL PRICE

– FEATURES –

- **CELLULAR DIELECTRIC** . . . provides up to 33% less loss compared to standard RG-59/U type cable. Ideal for long house drops and for all band system operation. Approx. 2 db less loss per 100 feet at Ch. 13. **Ideal for All-Band operation.**
- **FLAT WIRE COPPER SHIELD** . . . results in greatly improved radiation attenuation characteristics, reduces radiation and pick-up of spurious interference in the house drop lines where your primary signals are naturally at low level.
- **NON-CONTAMINATING JACKET** . . . of high molecular weight polyethylene. Specially compounded with improved temperature characteristics insuring excellent LONG LIFE expectancy.
- **SPECTRUM MATCHED** . . . design, production standards every step of the way insures top quality throughout.

NEW

- **SIZE** . . . same as RG-59/U. Use standard 59/U type connectors.
- **TYPE 49-M** . . . available with built-in No. 9 galvanized steel, high tensile supporting wire for easy installation of messengered drops.
- **DELIVERY** . . . available for immediate delivery with freight F.O.B. destination on all orders of 200 pounds or more, within continental limits of U.S.A. Shipping method and routing at seller's option.
- **SPECIAL INTRODUCTORY PRICES** . . . listed below. Special price offer expires midnight July 31, 1962, after which standard published prices go into effect.

TYPE	0 – 4999 Ft.	5000 Ft. or over	Shipping Wt./1000 Ft.
49	$29.75/M Ft.	$27.95/M Ft.	36 lbs.
49-M	$38.95/M Ft.	$36.25/M Ft.	51 lbs.

- **DISCOUNT** . . . Additional 2% cash discount for payment within 10 days of invoice date. Net 30 days. Write for prices and specs on Complete Line of Katona Spectrum Matched Cables.

Katona Electronics Company

MANUFACTURER - CONTRACTOR - CONSULTANT

KATONA

TELEVISION & CLOSED CIRCUIT DISTRIBUTION SYSTEMS EQUIPMENT - COAXIAL CABLE AND ACCESSORIES

140 FORSYTHIA DRIVE NORTH, LEVITTOWN, PENNSYLVANIA AREA CODE 215 WIndsor 5-4575

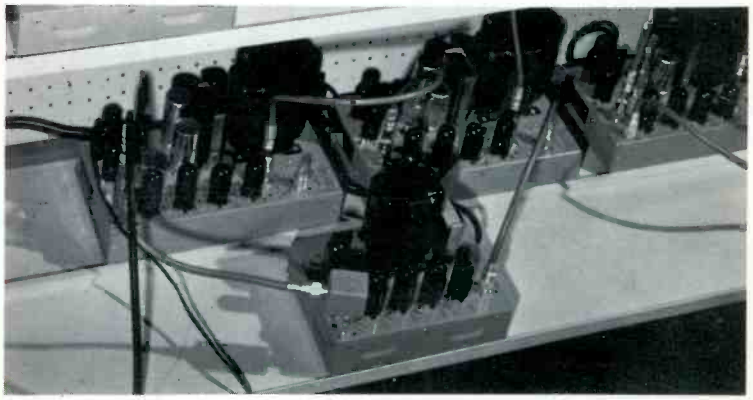
They came . . .

They saw . . .

They marveled . . .

- They came to the CATV Convention in the Nation's Capital
- They saw ENTRON's new ADABAND in operation, supplementing a low band system, pulling in all channels . . . both LOW and HIGH bands!
- They marveled at ADABAND's easy installation . . . installed while the present low band system continues operation . . .
- They marveled at ADABAND's compatibility with the present low band system . . .

Live demonstration with 45 amplifiers cascaded



Model LRA–40 and model HRA–400 heart of the ADABAND

An ADABAND plan for any system

Those that saw . . . recognized ENTRON's new Adaband as the answer to their high band questions . . . both in ease of installation, and operation. IF YOU ARE PRESENTLY RECEIVING ONLY THE LOW BAND CHANNELS . . . ADABAND! Receive the low band and the high band with equipment that is compatible with your present system. No trunkline equipment need be discarded with Adaband.

- Inquire about the all band design for new or existing systems. A complete new catalogue and price list is available. Also, write us about your present low band system. We'll be happy to offer an Adaband design especially for your system.

entron
INCORPORATED

4902 Lawrence Avenue, Bladensburg, Maryland • APpleton 7-9585