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Video Communication Journal

April
1963

Serving the Audio-Video Communications Industry

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*GUIDE — To Licensing Mobile Radio

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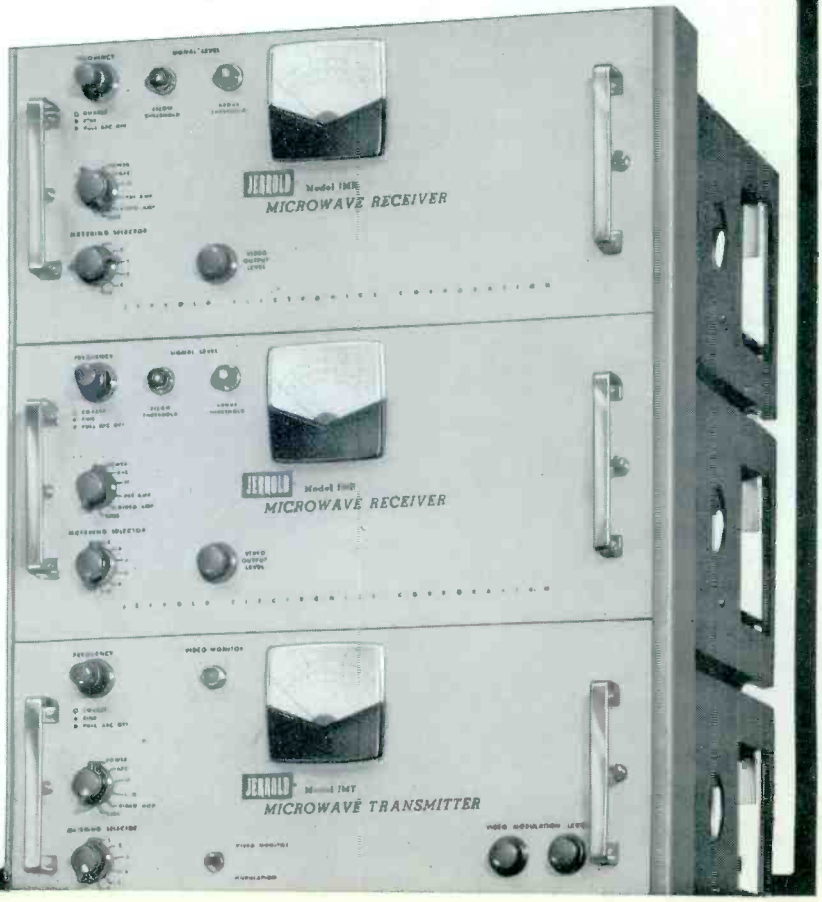

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Channel 1

FCC PROPOSES JOINT COMMITTEE TO PROMOTE UHF TELECASTING

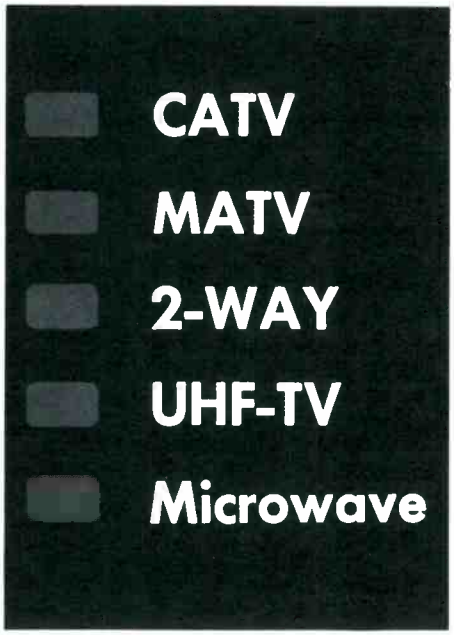
To help expedite the expansion of UHF television service which will be ushered in by all-channel receivers, the Commission proposes to establish a "Committee for the Full Development of UHF Broadcasting" that will be representative of the FCC and the various industry groups interested in this objective. An organizational meeting will be held at a date and place to be announced shortly.

Through such a Committee, which would function over the coming critical years, the Commission could obtain insight into the problems as they arise and, where appropriate, take corrective rule making or other actions. For example. Commission action might be taken to assure, as fully as possible within its jurisdiction, the technical development of UHF broadcasting and reception. As to these important technical aspects, the Commission believes it most desirable that there be a continuing forum for face-to-face exchanges between the UHF broadcasters and the TV set manufacturers.

OFFICIAL ACTION TAKEN TO IMPLEMENT NON-BROADCAST FORFEITURES

On January 30th, the Federal Communications Commission took action towards implementing the new Section 510 of the Communications Act, which was added June 10, 1962. The new section authorizes the Commission to impose small forfeitures on non-broadcast station licensees for twelve specified violations. Violations that can bring about a forfeiture are:

1. Operation of a station by an unauthorized person.
2. Station operation without required identification.
3. Transmission of a false call sign or false distress signal.
4. Operation on an unauthorized frequency, and unauthorized frequency deviation.
5. Transmission of unauthorized communications.



6. Operation which interferes with any distress call or distress communication.
7. Failure to attenuate spurious emissions.
8. Operation with power in excess of that authorized.
9. Rendering an unauthorized communication service.
10. Operating with an unauthorized type of emission.
11. Operating with unauthorized transmitting equipment.
12. Failure to respond to written official communications from the Commission.

These rules will be made effective on February 7th and are applicable to radio stations, radio operators (where applicable), Safety and Special Radio Services, Common Carrier Radio Services, and the non-broadcast Experimental Radio Service.

COLLINS BOARD OF DIRECTORS RE-ELECTED

Collins Radio Company announced recently that it is cancelling plans to sell 557,515 shares of common stock as announced last September 21st. The announcement came during the company's annual stockholders meeting in Cedar Rapids.

A company spokesman said the firm is investigating other financing sources rather than the sale of common stock.

The stockholders also heard President Arthur A. Collins announce the sale of a data communication switching system to Delta Air Lines, the nation's fifth largest air passenger carrier. The system, known as Data Central, will handle all administrative and operational message traffic between the airline's headquarters in Atlanta and its outlying operations throughout the United States and the Carribean.

INDUSTRIAL RADIO SERVICE GRANTS REACH THE 100,000 MARK

Altoona Gas Service, Inc., Tampa, Florida has become the recipient of the 100,000th grant made by the FCC. With the granting of the license, the growth of the Industrial Radio Service has reached an all time high. In the past 10 years the number of stations has gone from 17,000 to 100,000.

According to reports, the number of authorizations has approached the 1,000 per month mark. Future predictions indicate that this figure will continue to grow with more and more businesses realizing the advantages that 2-way communications offer.

MINOW MAY LEAVE COMMISSION

The era of Mr. Newton N. Minow may come to an end sometime this year according to reports. All this has come about when Mr. Minow informed the President that he may leave to go into private business. No specific details were divulged about the meeting between the President and Mr. Minow.

BAKER NAMED DISTRIBUTOR SALES MANAGER AT ADLER

Joseph E. Baker has been appointed Manager of Distributor Sales in the Industrial Products Division of Adler Electronics, Inc. He was formerly a Field Sales Engineer in this Division which markets UHF TV broadcasting systems and educational TV systems.

APRIL 1963
VOLUME 4 — NUMBER 4

VIDEO-COMMUNICATION JOURNAL

Combining Television Horizons and Communication Horizons

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

Editorial

Welcome, Welcome to all the many people in the communications, CATV, MATV, CCTV and ETV fields who will be joining us. I say welcome in light of the fact that in many respects we are new to each other. Also, some of the material in this first issue of Video-Communication Journal is new to one and all.

To begin with, those in the communications field may not be familiar with the MATV (master antenna television), CATV (community antenna television), ETV (educational television), and allied industries. As a note of explanation, the relative growth and age of these industries is very much alike the communications industry. This is not the stopping point, however, in many respects the two fields are paralleling each other.

Every day, throughout the United States, the MATV, CATV, and ETV people are making use of not only 2-way radio for accomplishing the necessary tasks that go along with their field but they are also using complex microwave systems to carry television signals. All this falls in the communications area any way we look at it.

Putting the shoe on the other foot, many of the communications people are engaged in the operation and maintenance of CATV, MATV, ETV systems or are in the CCTV (closed-circuit television) business. Especially with CCTV, this is a field that is fully utilized by all parties for all types of purposes.

As we go along the next few months, I am sure that those in the communications business will become more and more familiar with the facets of the MATV, CATV, and ETV business. In turn, this will work the other way and by mutually sharing information in the various fields we may hope to see the further development of our industries.

RLM

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EUROPEAN BUREAU News items, subscription orders and advertising inquiries in Europe should be directed to Mr. Gordon J. King, Esq., Gordon J. King, Enterprises, Kingsford, South Furzeham Road, Brixham, Devon, Great Britain.

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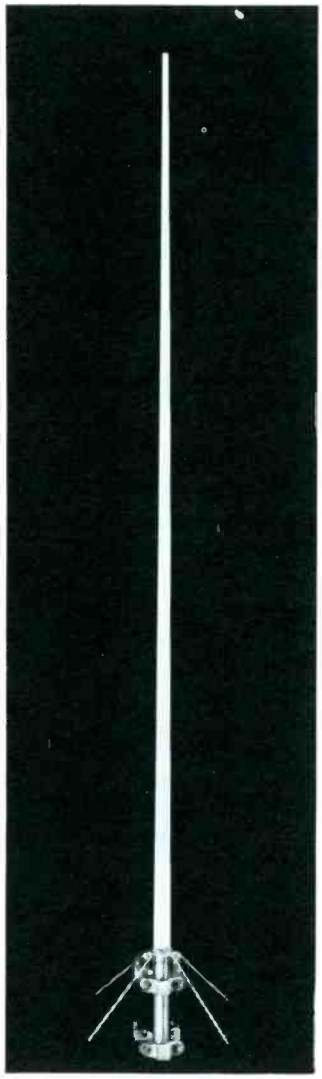

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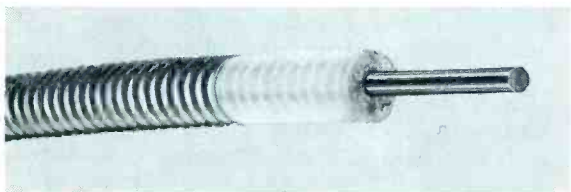

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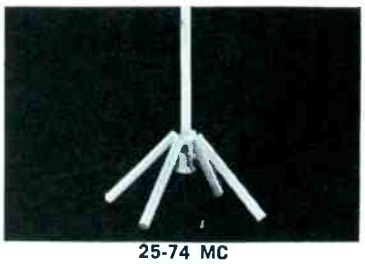
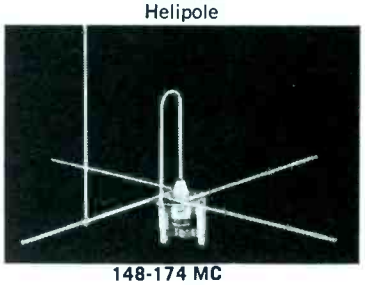
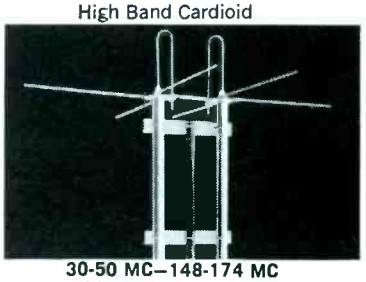


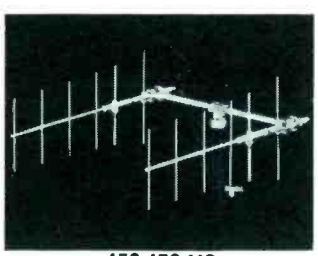
25-74 MC
Helipole



148-174 MC
High Band Cardioid

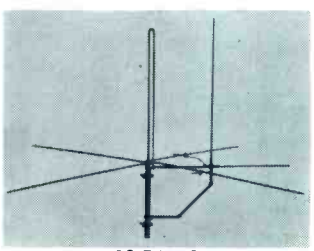


30-50 MC—148-174 MC
Bid rectional Unipoles

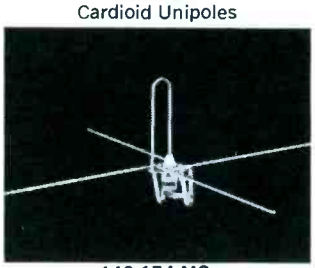


450-470 MC
Yagi Antennas

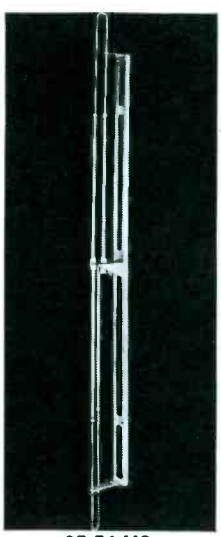
148-174 MC
Corner Reflectcr



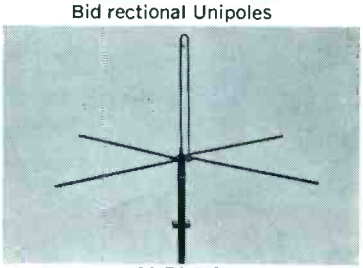
30-54 MC
Cardioid Unipoles



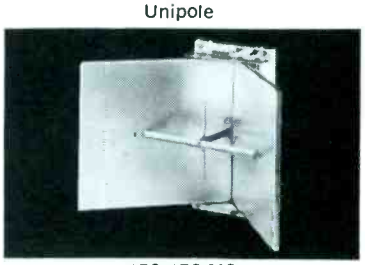
148-174 MC
High Band Unipole



25-54 MC
Side Mounted Arrays



30-76 MC
Unipole



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FCC HORIZONS

FCC actions, applications and public notices reported here are a representative sampling of actions which the Publishers of Video-Communication Journal feel will be of interest to our readers. The listing is by no means a complete report of all FCC actions in or out of these allied fields of communications.

GENERAL ACTIVITIES

By order, the Commission has changed the name of its Field Engineering and Monitoring Bureau to Field Engineering Bureau, and reorganized its present four divisions (Field Operating, Engineering, Monitoring and Inspection and Examination) into three divisions; Field Offices, Monitoring Systems, and Engineering and Facilities, under a continued Office of the Chief of the Bureau. The change was effective March 1.

The Field Offices Division consists now of three branches, Operator and Examination, Inspection and Measurements, and Investigation and Verification.

The Monitoring Systems Division also has three branches; Operations, Methods and Review, and Contracts and Liason.

The Engineering and Facilities Division likewise has three branches; Standards and Facilities, Antenna Survey and Equipment Construction and Installation.

The change-over came as a result of the Booz, Allen and Hamilton organization study of the FCC for the Bureau of the Budget.

The Commission has invited comments to a Notice of Proposed Rule Making looking toward amending Part 10 of the rules to provide that an unlicensed person, after being authorized by the station licensee, may operate a base and fixed station in the Public Safety Radio Services during the course of normal rendition of service on frequencies above 25 Mc/s, having limited communication range. The station licensee would remain responsible for the proper operation of the station and the operator, although unlicensed, would be subject to such sanctions as are provided in the Communications Act. Similar authority is now permitted for mobile station operation.

CATV MICROWAVE ACTIONS

Columbia Communications Company, New Orleans, Louisiana has filed an application for a new fixed video radio station to operate on 6123.1, 6197.2 and 6315.9 Mc/s at a location near LaComb, Louisiana. The firm proposed to relay signals of 3 New Orleans television stations to areas where normal reception is impossible in and around the community of Columbia, Mississippi.

Mid-Kansas, Inc., Junction City, Kansas, has been granted a construction permit for a new fixed video radio station to operate on 6093.5, 6197.2 and 6375.2 Mc/s at a location 0.1 mile north of Clay Center, Kansas. The firm proposes to bring the signals of WDAF-TV, KMBC-TV of Kansas City, and WIBW-TV of Topeka, Kansas to its customers the Vumore Company and Concordia School System, in Concordia, Kansas. WIBW-TV is picked up off the air at Clay Center and the other two signals are presently delivered to Clay Center via off the air microwave.

Mesa Microwave, Inc., Oklahoma City, Oklahoma was granted a construction permit for a new fixed video radio relay station to operate on 6071.2 and 6334.4 Mc/s at a location on the south edge of Hugo, Oklahoma. The station plans to relay the programs of KTVT-11, Dallas, and KTEN-10, Ada (Oklahoma) to Vumore Company, Idabel, Oklahoma.

Alabama Microwave, Inc., Dallas, Texas, was granted a construction permit for a new fixed video radio relay station to operate on frequencies of 6256.5, 6226.8, 6345.5, 6375.2 and 6404.8 Mc/s at a loca-

tion on Capshaw Mountain, Alabama. The station will pick up signals from WTVC-TV (Chattanooga), WLAC and WSIX-TV (Nashville), WCIQ-TV (Mt. Cheaha State Park, Alabama), WBRC-TV and WAPI-TV (Birmingham) for delivering to a receiving location in Decatur, Alabama where the Decatur Cable TV, Inc. system will distribute the signals. Decatur Cable TV will also deliver signals to its subscriber WMSL - TV, Decatur.

Television Microwave, Inc., Elko, Nevada, has filed an application to modify its existing construction permit and add a new frequency for communications, 5940 Mc/s, at a new location, Slide Mountain, Nevada. TMI has also filed a construction permit application for a new fixed video radio relay station to be located on Slide Mountain, Nevada and operate on the frequencies of 5980, 6060, 6140, 6220 and 6300 Mc/s. TMI proposes to add one additional transmitter for the purpose of adding KPIX-TV (San Francisco) and FM station KATT (Walnut Creek) to its existing operation, and retransmit the two additional signals to two separate receiving locations through a power divider. The location of the receiving terminals will be North Lake Tahoe, California and Reno, Nevada.

Microwave Service Company, Tupelo, Mississippi, has filed an application for a construction permit for a 3 channel 1-hop system from Okolona, Mississippi to West Point, Mississippi. MSC proposes to supply the West Point Community Antenna System with otherwise unobtainable quality television reception of the 3 Memphis, Tennessee television stations.

New York Penn Microwave Corporation, Corning, New York has filed an application for a construction permit to install an additional transmitter to operate on 5660.0 Mc/s and add two new points of communication, namely Hornell, New York and Alma Hill, New York. New York Penn also wishes to add a point of communication at Canisteo, New York, and an additional fixed video radio relay station on 6212.2 Mc/s near Alma Hill, New York. The instant purpose of the application is to deliver the signal of television station WPIX-TV, New York, New York as received off the air by its subscriber to independent subscribers.

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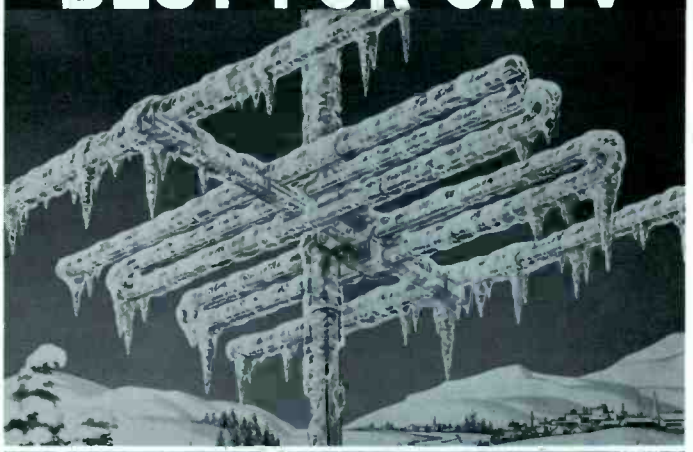

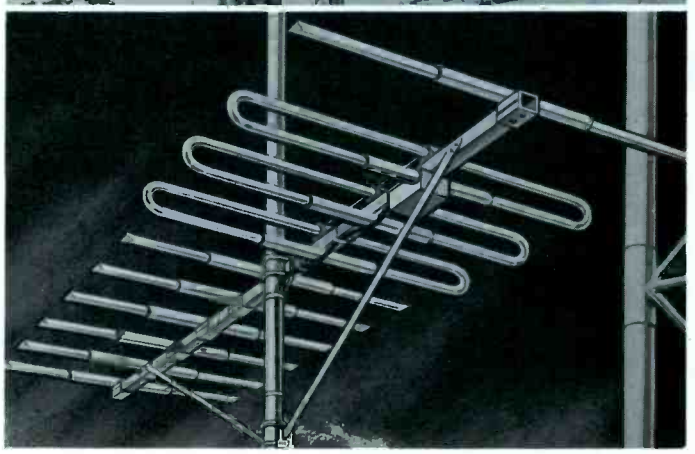

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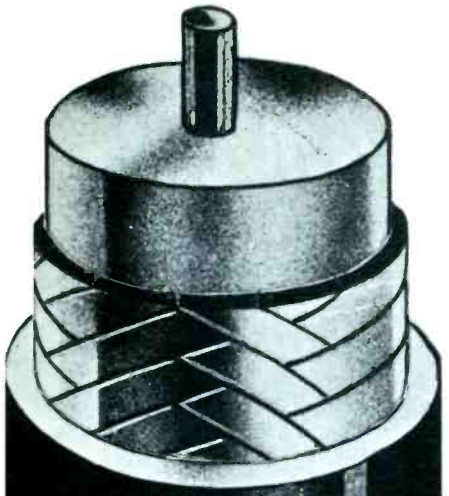

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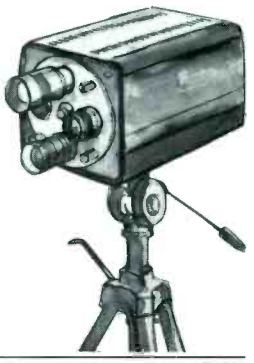


PROGRESS REPORT

Snyder Community Antenna TV, Snyder, Texas, (N.R. Clements, President) reports 23 subscribers gained during January bring the total to 1203 CATV connections. The system is exploring the possibility of adding FM to the system. They currently run 5 channels with 4 employees.

A service and construction vehicle with Utility body was added during February, according to Darrell Parrish, Manager of the system.

The **Waukesha Chapter of the American Red Cross, Milwaukee** (KIY335/W9EKW) reports installinging a new mobile test bench and power supply and the installation of a 3 section stacked coaxial antenna for their 146.670 megacycle tie-in system with local amateur radio operators. 13 30 watt (converted) FM mobile units are in operation, 7 more are being installed. The base is a converted 60 watt FM unit. A second communications system is maintained on 47.420 megacycles, the National Red Cross mobile communications frequency.

Domer Communication and Electronic Services, Canton, Ohio reports installing 93 Aerotron mobile units, 2 base units and 1 complete system during the period December 1 through January 15. David Domer also notes they added 1 service man and a new shop in the same period.

Frank H. Vincent, **Frank's TV Service, Commercial Radio Division, Franklin, Indiana** reports his chief problem at present is meeting the new split channel regulations. "Small counties," he notes, "without sufficient funds to meet the expense of the change-over are dragging their feet."

New personnel include Charles Banks, new FM Broadcast Service Engineer. New Motorola equipment was installed at the Johnson County Sheriff's department. He plans installation of a new console with frequency and modulation meters for WIFN-FM in the next 30 day period.

Harry Tarbell, **Tarbell Electronic Communication Systems, 3619 S.W. 50th Avenue, Portland, Oregon** advises he is an exclusive Communication Manufacturer's representative handling Aerotron, Budelman, Radio Frequency Labs, Plastron, Moore Associates, Hallet and Thiokol Trace. His territory includes Oregon, Washington and Idaho.

ATTENTION-SYSTEMS!

Video-Communication Journal provides a handy tear out post card on heavy card stock between pages 32 and 33 of this issue. CATV-MATV contractors, two-way system contractors and installers are urged to report news of their business operations on these cards. One card is provided for TV reporters, a separate card is supplied for two-way reporters.

F. W. Moulthrop & Associates, 1530 East 12th Street, Oakland, California has been appointed as OEM and distributor sales representatives for the Shure Brothers Company line of microphones and electronic equipment.

Moulthrop forces will represent Shure in Northern California and northern Nevada.

PERSONNEL REPORT

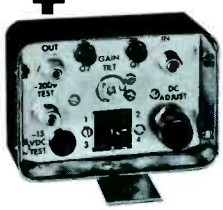
J. Leonard Lovett has been named manager of **Raytheon** Company's Marine Products Operations. Lovett will direct all engineering, manufacturing and mar-

TRUNK AMPLIFIERS

✚

BRIDGING AMPLIFIERS

✚



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CORRUGATED COPPER SHIELD

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Better long term transmission stability

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SUPERIOR 75 OHM
MATCHED CONNECTORS AND MATCHED FITTINGS

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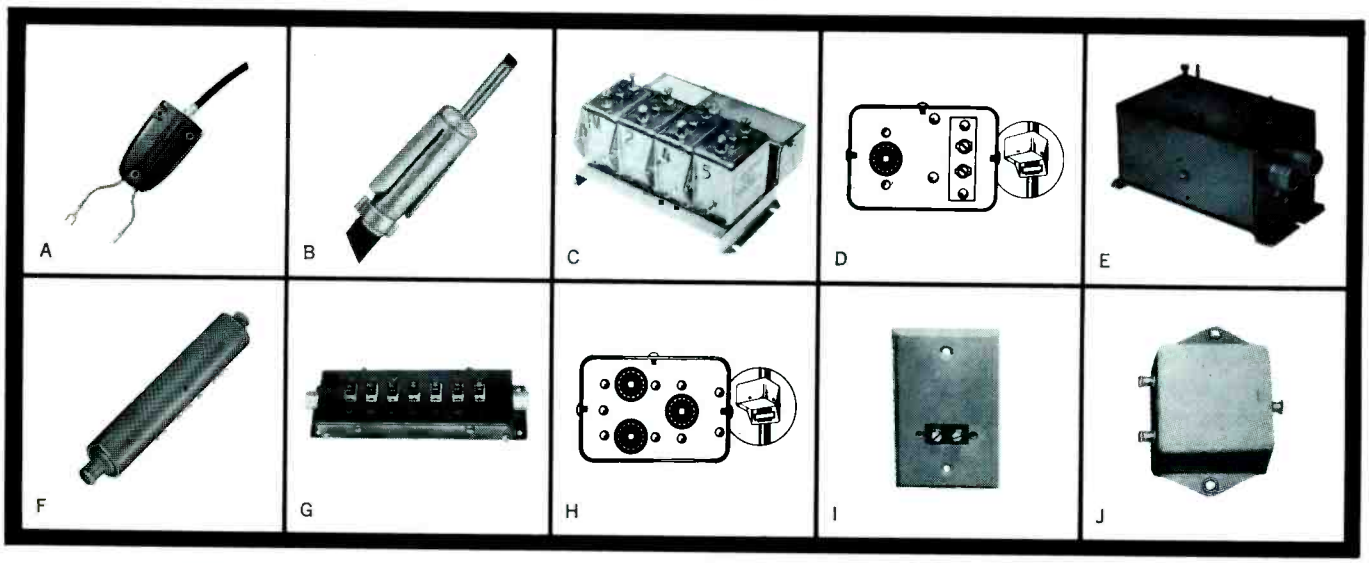
the little things
that make MATV installations
better... easier

BLONDER-TONGUE MASTERLINE ACCESSORIES

"For want of a horse a kingdom was lost"—for want of an effective reliable accessory—the investment in the major equipment in a Master TV antenna system can go down the drain. These Blonder-Tongue engineered MATV accessories will bring out the full potential of any system and deliver the cleanest, strongest signal to the individual TV receivers. What's more, these accessories will slice hours from installation and maintenance time.



A. MATCHING TRANSFORMER, "CABLE MATCH" Save installation time. Save money with the lowest cost, quality matching transformer available. Provides exact match between 75 ohm coax and 300 ohm TV set input. Housed in high impact plastic to eliminate grounding problem with 'hot chassis' TV sets. Uses new Blonder-Tongue solderless AUTOPLUG for secure coax connection, easy disconnect. No more unbraiding coax, no more soldering. Heavy duty output leads with spade lugs for easy connection to TV set terminals.

B. CONNECTORS (SOLDERLESS, PUSH-ON)
P-75S—Solderless AUTOPLUG (illustrated). Major improvement of well known Motorola type auto plug. No need to strip braid or solder inner or outer conductor. Very rugged and reliable.
P-59T—Solderless UHF type male plug for RG-59/u cable
P-11S—Solderless UHF type male plug for RG-11/u cable
QDP—Solderless QD plug for RG-59/u
POU—Push-on UHF plug for RG-59/u
POB—Push-on Benconector plug for RG-59/u
M-73—Solderless Benconector plug for RG-59/u
M-71—Benconector plug for RG-11/u

C. FILTERED MIXERS/SPLITTERS, MODEL MX Versatile units can be used to combine TV/FM signals from several antennas; combine adjacent channels; split the signals from a broadband antenna or from a broadband amplifier and balance channel signal strength from a broadband antenna.

D. OUTDOOR BALUN, MODEL MB-b Outdoor, weather-protected balun matches 300 ohm and 75 ohm lines. Uses UHF type of SO-239 connectors for 75 ohm cable.

E. TUNABLE TRAPS, MODELS MWT-2 & MWT-3 With only these two traps, MATV installers can attenuate any undesired frequency in the entire VHF/FM band. No need to stock a great number of traps. MWT-2 covers 54-108 mc; MWT-3 covers 174-216 mc range. Further, the traps provide at least 60 db attenuation of any VHF/FM frequency with virtually no loss to desired frequencies. They can be tuned simply with an off-the-air signal and TV set for most applications. Type SO-239 connectors.

F. FIXED ATTENUATOR, MODEL FA Least expensive attenuator on market. Available with 3, 6, 10 or 20 db of attenuation. Should more attenuation be needed, it's easy enough to cascade FA's. Quick disconnect connectors make installation easy.

G. VARIABLE ATTENUATORS, MODELS SA-7 and SA-3 Model SA-7 is accurate enough for lab measurements. Installer can select any attenuation from 0 to 62 db in steps of 1 db. Can be used for all frequencies from 0 to 216 mc. The SA-7 can be temporarily connected into any portion of a MATV system to determine optimum attenuation at that point. The SA-3 is a 3 switch attenuator for any frequency from 0 to 216 mc. Selection of attenuation from 0 to 38 db is in these steps: 0, 6, 12, 18, 20, 26, 32 or 38 db.

H. OUTDOOR 2-WAY HYBRID SPLITTER/MIXER, MODEL MDC-2b High quality hybrid splitter/mixer. It can be used to split or combine any signals from 10 to 216 mc, making it suitable for sub-channel systems. Internal insertion loss is less than 0.3 db. Excellent back-match. UHF type SO-239 connectors. Weatherproof.

I. INDOOR FLUSH-MOUNTED TAPOFF, TF-731B **A favorite with installers because it provides a balanced 300 ohm output from a 17 db tapoff. Saves installation time—no soldering, no stripping, no unbraiding cable. 75 ohm bridged input for coax; patented stripless screws for 300 ohm output.**

J. INDOOR MOUNTED SPLITTERS, TS-772 & TS-774 TS-772 (illustrated) low cost hybrid 2-way splitter can be used to split or combine RG-59/u cable. TS-774, inexpensive 4-way quasi-hybrid splitter.

These are just a few of more than hundreds of carefully engineered accessories that make TV installation more efficient and easier. For specifications or data sheets, write: **Dept. TV-4**

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

Sequential Automation

Russ Miller, Video-Communication Journal

Right now the age of automation is pushing our progress forward at an ever increasing rate. Everywhere, in banks, factories, aviation, and sundry other areas, the ability to delineate responsibilities to sophisticated equipment has determined the growth and progress rates of business.

Up until the present time, the community antenna television industry has had no particular need for any form of automation save the use of automatic billing equipment. But, directly ahead it appears that a form of automation is going to be necessary.

The biggest single reason for the foreseeable use of automation is the necessity to avoid local station program duplication. This is a far cry from the normal situation where automatic equipment is used to increase business. None-the-less, it is something that the community antenna television industry has recognized as being essential as a means of promoting better broadcaster-system operator relations.

Why automation? In the first place, those systems that intend to employ equipment to switch the various channels on and off as necessary will have to install appropriate controls and make the necessary provisions for an operator to handle the overall switching. Next, a certain amount of equipment will be needed to do the switching job at the command of the operator. These items will be the prime necessities along with several other things that will necessarily be put into the control circuits. It doesn't appear that any of this will be inexpensive, initially at least. Looking a little farther ahead, there is going to be a certain amount of fixed monthly expense to keep things in running shape and there will be operators to pay. Perhaps the expenses involved in keeping operators can be minimized by using office personnel during the day but there will still be a need for somebody to handle the switching process at night, during weekends and holidays. A quick look at the overall picture seems to indicate that the highest expenditures are going to be made for personnel rather than equipment. This is where automation can be used to advantage. By relegating the switching tasks to completely automatic equipment, a number of problems can be solved all at once. The use of properly designed equipment will insure reliability, accuracy and forever remove the probability of upsetting the subscribers.

Right now, a great many broadcasters are relying upon the automated concept. They are using it to log their programs, make up and distribute their daily shows, and carry all their music, all totally automatic.

Fortunately, this is not the only useage for automatic equipment. Another justifiable reason for its use is to provide the expanding systems with a means of control over head-end equipment whether it be actual control over television channels or over microwave equipment. For instance, take the situation where more channels are available than the system can technically carry. Station "A" may be a normally used and distributed station with a network affiliation. So may the rest of the stations fit into this category. What happens then when another station, not normally used but with sufficient signal to warrant distribution, puts on a special program which is of interest to the system subscribers? Perhaps the whole process of putting this station on the system can be confined to a simple manual operation. On the other hand, suppose that it cannot? What is lost in not carrying the special program may be either nothing or if the subscribers should happen to know about it in advance, maybe some good will. Here, it would seem that automatic equipment with a manual provision could be put to good use

Looking even further than just utilizing control equipment for station switching, what about head-end failures? During the warm summer, this can quickly be rectified by dispatching someone to the site to do the necessary repairs. When winter comes around, the hazards multiply and so do the difficulties. Control equipment whether automatic or not, can be put to work immediately to eliminate the time-lag involved in securing proper repairs by allowing stand-by equipment to be switched on.

There are a great many more uses that can be found for automatic control equipment than those that have been cited. It would seem then that if a method of automatic control could be devised, the community antenna television industry would put it to use. This is the feeling that the personnel at Video-Communication Journal had and subsequently resulted in an experimental unit for accomplishing total automatic control.

Undoubtedly, there will be a multitude of ideas about exactly how an automatic programming system should work. Basically, most everyone should agree that its capabilities must be varied, accurate and dependable. But, what actually are we looking for? The following sets forth what essentially would be expected to achieve totally automatic operation:

1. A means must be devised by which any one channel may be switched on-the-system or off as necessary.
2. The switching process must be automated to eliminate the need for a board operator.

- - For Non-Duplication

3. It must be capable of at least 18 hour operation continuously.
4. A method to change the daily programming schedule must be developed since all programs change on this basis.
5. The overall timing of the station switchovers must be accurate so that a specific schedule is not interrupted other than on the hour, half-hour, or fifteen minutes.
6. A prime method must be developed by which an automated program may be quickly and easily set up and subsequent changes made without a complete disruption of the program.
7. Operation of the equipment must be simplified so untrained personnel may operate it.
8. Closed-circuit audio should be provided so that when any station is switched off the system, music can be substituted to ease the psychological effect upon the subscriber.

Certainly there are a lot of things that are readily apparent when considering the design of such a unit that would meet the above set of requirements. How can all the programming be done without elaborate equipment? This is but one of the many items that were encountered in developing a form of automation applicable to CATV systems. One of the very first ideas that occurred to all of the people involved in designing the sequential automation system at Video-Communication Journal's lab was the use of an audio tape system. Audio tape offered many advantages, the outstanding one being its ability to handle or carry large bits of information. In addition; it would allow programs to be set up and the tape unit operated 24 hours before a change of tape was necessary; audio tape is an inexpensive commodity; the newer tapes have little or no stretch; tape machines are available with hysteresis synchronous motors to insure accuracy.

Figure 1 illustrates, in block diagram form, the whole idea of the automated system as completed. The principle method used throughout the system is based upon using tones to do all the necessary switching. A description of the operation of the unit can best be described by following the process when an already programmed tape is used. Let's say that all the normally used stations appear on-the-air at 7:00 A.M. and it is desired that the equipment be started at this time. Beginning with the heart of the system, the sequential timer, a study of the manufacturer's reference material shows that this timer will start with only a one-second time lag. In order to begin operation at exactly 7:00 A.M. it would be necessary to engage the timer start button at 6:59 A.M. and 59 seconds. If the timer is set properly then it will operate until it reaches its preset time. At this time, the preset timer cam will close a switch applying power to a 0 to 10-second, recycling timer.

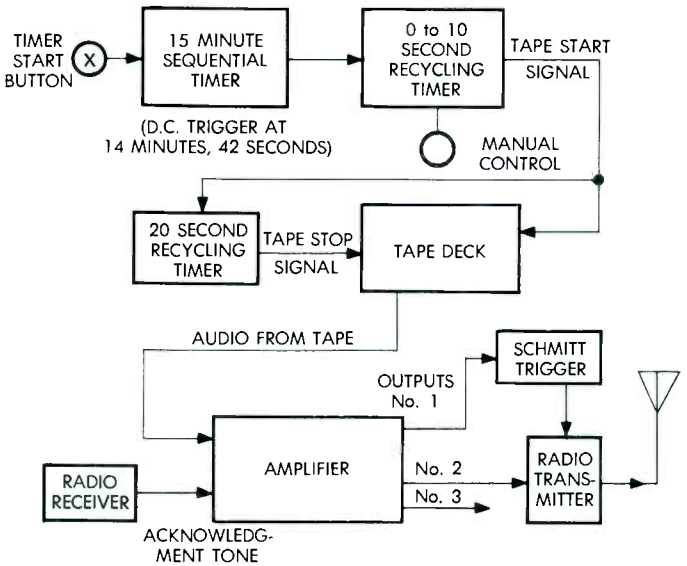


FIGURE 1

As noted on the block diagram, the sequential timer is set up to operate a switch once every 14 minutes and 42 seconds. To explain the reason for this time choice, visualize the fact that a switching function must occur at the head-end precisely on time. This means that only one single tone can be used to signal the equipment "on-the-hour." One single tone is not going to be enough to set into motion all the necessary switching functions. With this experimental system it was decided that a series of tones would be used to **condition** the head-end equipment prior to "on-the-hour" and then at exactly the right time another tone would be used to initiate the necessary equipment transfers. This is the reason for allowing a few seconds time before the hour, half-hour, or fifteen minute period is up so that the conditioning tones could be transmitted to the head-end site.

Proceeding on to the second timer, this 0 to 10-second unit was deemed a necessity in order to correct any initial timing errors or any that might occur during the operating period. Generally, the second timer is set for 5-seconds. If, for instance, the sequential timer is started one or two-seconds early or late the second timer can be used to correct the

initial timing. Or perhaps a momentary power failure will change the timing by a few seconds, again the second timer can be used to correct for this. Unlike the sequential, fifteen minute timer, the second timer is of the recycling type and has a front panel control to adjust the timer period over its range. Whenever the second timer is triggered, it will run until its time period is up and automatically reset itself back to the manual pointer setting.

If the second timer is set for 5-seconds and if the sequential timer was started precisely, then the total time elapsed will be 14 minutes, 47 seconds when the second timer reaches zero. It is at this moment that the tape equipment is started. For the experimental VCJ system, we choose a tape deck that has a relay incorporated to start the tape movement. The particular unit proved to have a starting time of less than ¾ of a second. This was possible since the motor runs constantly in our unit and has high initial torque to allow rapid tape starting.

At the same time that the tape deck is started, an additional, 20-second recycling timer is also started. This timer is used for automatic tape stopping and operates the following way. Once the timer is started it will run until 20-seconds is up and at this time will stop the tape deck, recycle and go back to its preset time. This same timer is also used for programming and has a second switch incorporated that closes when 13-seconds expires.

As mentioned previously, the whole understanding of the system's operation would be based upon a preprogrammed tape. If at this particular time the tape is programmed to switch Channel "A" off, since it duplicates the local station, the necessary conditioning tones would be transmitted from the tape deck to other equipment that in turn passes the information on to the head-end. After the conditioning tones have been transmitted to set up the switching functions, and the 13-second delay period is up, the initiate signal would be transmitted to cause the switching functions to take place. All of these tones would necessarily be on the tape and at such intervals so that the switching function would take place on time. A quick recap of the sequence would appear as follows:

1. At 6:59 A.M. and 59-seconds, the timer start button was depressed and the timer started operation at exactly 7:00 A.M.
2. At 7:14 A.M. and 42 seconds, a switch on the sequential timer started a second, recycling timer set for 5-seconds.
3. At 7:14 A.M. and 47 seconds, a switch on the second timer started the tape deck and another 20-second recycling timer.
4. Immediately after the tape deck started, a series of tones from the tape were transmitted to the head-end site within a 13-second period causing the conditioning of certain equipment preparatory to a switching function.
5. At 7:15 A.M. a single-tone from the tape was transmitted to the head-end site causing the switching function to occur and promptly Channel "A" was cut-off the system to avoid local station program duplication and music is substituted for the Channel "A" audio.
6. At 7:15 A.M. and 7-seconds the 20-second recycling timer trips a switch that stops the tape deck.

This sequence would then continue throughout the day, switching various programs on or off as necessary. In practice, the sequential timer would be started only once and providing that it did not fall out of time by more than a few seconds would not have to be reset but once a week.

Going on to the actual programming tapes, there are a few points that need to be clarified. One is the set up of the tape on the tape deck. Since everything is based upon precisely correct tape timing some means has to be devised so that the tape may be "cued" in. For this purpose a cue-tone is put on the tape during the programming process and there remains only the need to align the tape on the tape deck. This insures that the timing is accurate within a second, surely close enough for any operation. The cue-tone is intended to be put on automatically, each time the tape is programmed. It need only be used at the start of the day, however, unless something should happen that would upset the tape timing during the day like a power failure or tape breakage or equipment breakdown. Once the tape is set up on the tape deck the rest of the timing sequence will be in order since the tape timing is determined by additional timers that are used for programming the tapes only. This eliminates the human element so mistakes are held to a minimum. The exact method used to make up the programming schedule will be gone into later.

In the experimental unit, designed by VCJ personnel, a tape speed of 3¾ ips was selected for accuracy and economy. The total amount of tape footage used during an 18-hour period will be only 450' using this speed so that a 7" reel can be used for a two-day operating period before a tape change is necessary. Needless to say, if a tape deck can be located that will handle 10½" reels, a whole week's program can probably be put on one tape.

Having gone completely through the timing process, it is necessary to consider what happens to the audio tones from the tape. Using the example described in Figure 2, the first tone on the tape is the cue-tone and used for timing purposes only. The

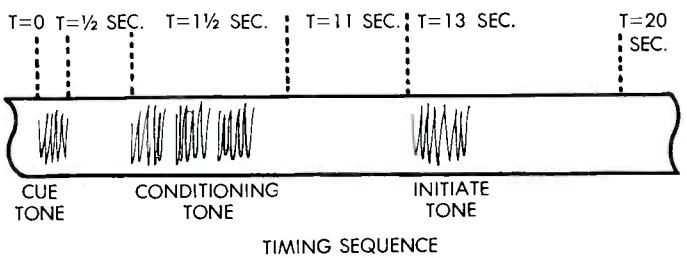


FIGURE 2

second tone or tones are those used solely for conditioning the head-end equipment and last tone is the

(Continued on Page 31)

"130 Feet of Tower - Never Leaving the Ground"

*Mr. Ryan, President of the House of Insurance, Commercial Communications Division, describes a recently developed tower erection kit called the "Kwik-Up Tower Erection Kit," which his firm manufactures in Richmond. The new method of erecting towers requires no man to be more than 12 feet off the ground at any time, and yet towers up to 250 feet can safely be erected in a single day with a crew of not over five men. This revolution in tower erection practices has been adapted to the Rohn series of towers by Mr. Ryan, although other tower types are probably just as suitable using the jig-arrangement described.

H. Michael Ryan*
President, House of Insurance, Inc.
Lombardy & Brook
Richmond 20, Virginia

It is not unusual for the cost of a radio or television communications tower to be equal to the cost of the tower plus the cost of the skilled labor required to install the tower. In many cases the installation costs can exceed the actual tower costs.

With this thought in mind, a method has been devised which allows a crew of five men (1 foreman, 1 assistant foreman and 3 helpers) to erect **or** dismantle a 100-250 foot tower in a single day, and never leave the immediate proximity of the ground.

The savings in labor, insurance and time alone make this type of tower erection something worthy of study by all tower users and installers today.

Basically, the Kwik-Up Tower Erector is a base jig which supports tower sections above it while the work crew slides under the completed tower sections the next section down.

A step by step installation using the Kwik-Up Tower Erector might go something like this.

The tower base is installed, as are the anchors for the guys.

The Kwik-Up Tower Erector is installed on the tower base. The top of the Erector is solidly tied down with 600-800 lbs. of guy tension, plumbing the Kwik-Up Erector.

30 feet of tower is pre-assembled, the antenna(s) mounted on top of the top section, or as required, and antenna lead-in cable(s) attached.

All guys are pre-cut and the top section guys attached to the top section.

The side gate is opened in the Kwik-Up Tower Erector and the pre-assembled 30 foot top section is mounted inside the Erector. The latch gate is closed.

Kwik-Up Erector Kit installed on tower base and guyed, ready for first 30 feet of tower to be slid inside frame.

The winch line from the Erector is fed over the pully at the top of the Kwik-Up Tower Erector and down between the antenna tower and the Erector. The grab hook is attached to the bottom brace of the 30 foot section of tower.

30 foot top section of tower and antenna erected and ready to be lifted into Kwik-Up Erector.

The guys are threaded back to the guy anchors, and loosely coupled through the hooks. On a relatively calm-wind day up to 100 feet of tower can be erected without guying down each section.

The Assistant foreman works the winch with the Foreman standing close to the base on the opposite side of the tower watching the tower. For the first 80 feet the tower will usually stay on its own plumb, after this height guys are used to keep the tower plumb.

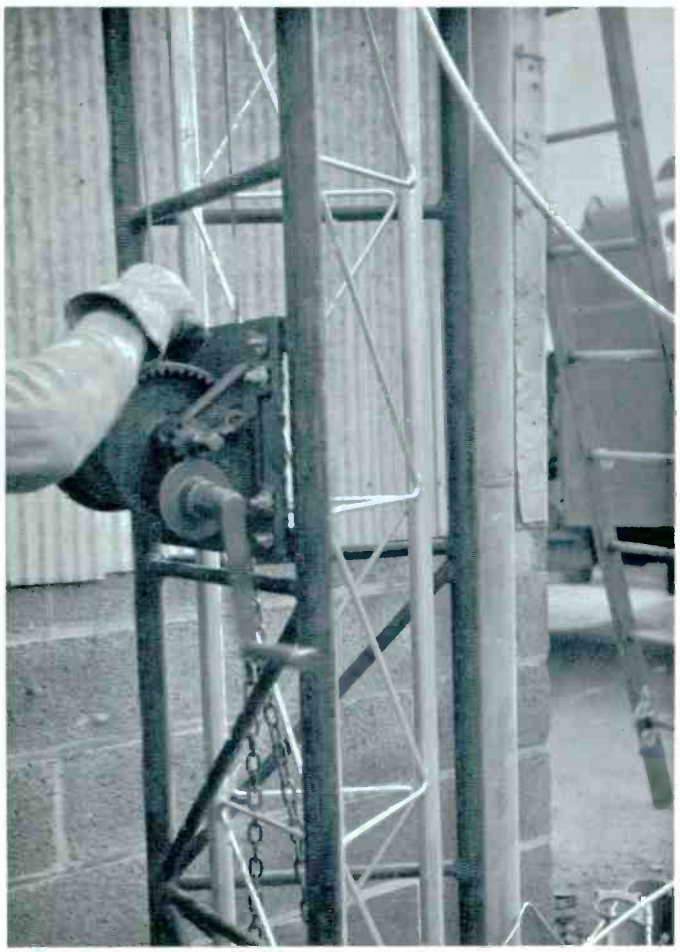
Operating the winch, the tower is raised ten feet. After the antenna tower has been raised ten feet a new section of 10 foot tower is slid under the raised tower section, and the raised 30 foot section is lowered to make contact with the new under section. The two sections are bolted or joined together as provided for by the manufacturer.

Now the 40 feet of tower is elevated another ten feet, and the slide-under procedure is repeated, adding yet another ten foot section of tower.

When the desired height is reached the tower is plumbed completely with guys and made permanent. The Kwik-Up Erector is removed after the tower is made permanent.

The erection can be stopped at any point and the tower secured. Guys are added as the appropriate sections are added and come above the top of the Kwik-Up Erector.

A tower can be dis-mantled, lighting added, or the tower painted in a similar fashion.



Kwik-Up Erector winch and unit with tower mounted inside. Section of tower mounted at this stage is ready to be hoisted ten feet to top of Erector.

Guys are attached to section of tower already lifted above ground before the next section is cranked into place. This is as far as a man ever gets off the ground.

The tower shown installed in the accompanying photographs is a Rohn Number 25 Galvanized Steel tower with a 12½ inch face. The height of the completed tower was 130 feet, topped with a 19 foot Prodelin antenna weighing 30 pounds, and fed with 130 feet of ½ inch foam flex transmission cable.

This tower was erected from start to finish with the crew of one foreman and 3 helpers in 7½ hours.

Erection kits are available to erect towers with 12½ inch, 18½ inch and 26½ inch faces.

CIVIL DEFENSE RADIO FOR RECEPTION AREAS

R. A. Page
General Electric Company
Lynchburg, Virginia

All over the nation, local governments are re-examining their ability to meet a nuclear emergency. Survival programs are being sharpened and refined; there is increasing awareness of the importance of perpetual preparedness.

Located 50 miles from key industrial centers, Auglaize County, Ohio, finds itself in the same position as many governmental entities. While it is unlikely that the county itself would be subjected to a nuclear attack, it is just close enough to prime targets to have a major evacuation problem.

The county has long recognized the need for constant readiness, 24 hours a day. However, the cost would be prohibitive for most communities to keep personnel working 'round-the-clock for Civil Defense purposes alone.

As a solution, county officials have built their alert and evacuation program around a maximum-minimum two-way radio concept designed to help local communities reduce costs.

Engineered and installed for Auglaize County by General Electric Company, the new system gives smaller communities the use of their own mobile radio systems for routine local calls, but has the advantage that a central coordinating office can fill the gap for all towns not operating radio dispatch boards three shifts a day.

For the county's taxpayers, it means Civil Defense equipment is used for normal, every-day activities and is not locked in an empty room awaiting a national emergency. For participating communities, the benefit is full-time dispatch service at night for emergency purposes without the cost of a dispatcher on duty at a local control point to handle messages when calls are at a minimum.

Before the new system was installed, the county had radio in its sheriff's department and some towns had mobile communications gear in their police departments. Town public works and utility trucks operated on police frequencies.

The "usual" approach in a situation like this would be to engineer the system based on what was already in place. In Auglaize County, however, Civil Defense officials recognized that new FCC regulations would have to be met on certain types of equipment prior to November, 1963. While some of the old equipment could be used, much of it could not meet new FCC narrow band regulations and was due for discard.

The maximum-minimum concept permits all of the networks to be on the air at the same time. While identical frequencies are used by the towns for local operations, messages do not interfere with each other.

"Minimum" is defined as the amount of coverage needed by a local community to take care of its own needs. Because most of the towns are small, their vehicles normally operate only within a couple of miles from the local base station. Low antennas are used at the town base station so one town will not interfere with another on the same channel elsewhere in the county.

"Maximum" permits long distance mobile communications through the use of the county Civil Defense radio repeaters, which integrate all towns with the main Civil Defense operation and with each other.

The principal base station for the CD system is at the Civil Defense control center at St. Mary's, Ohio, where a 50-watt repeater unit is located.

Because the CD office itself works on a day-time schedule, the system is remotely-controlled for night-time operation from St. Mary's police department, one mile away. On 24-hour duty, the St. Mary's police dispatch operation serves not only as controller for its own police messages but as integrator for incoming messages from surrounding towns when individual town dispatchers are off-duty.

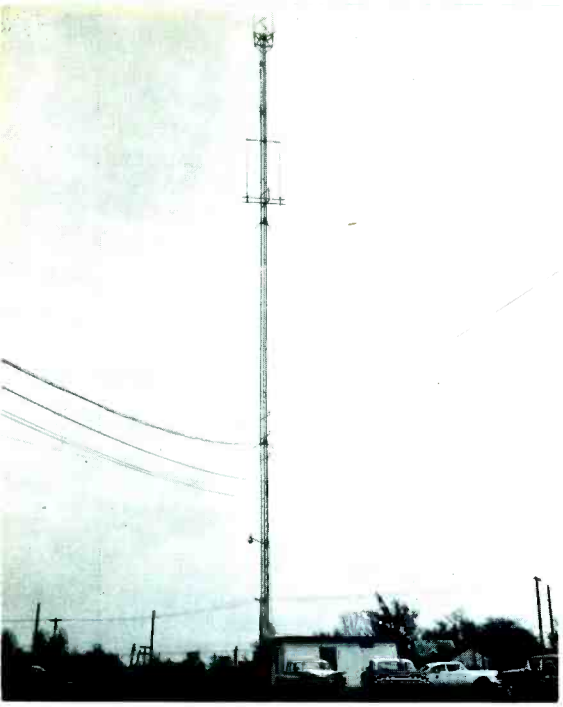
Each town has a fifty-watt base station with two-frequency operation. Most mobile radios in vehicles in the system also are two-frequency units.

On duty at the police building in downtown St. Mary's, Sergeant James H. May keeps in touch not only with police cars in his own city, but with vehicles in all towns in the county. Remote control units at the desk console, provided by General Electric, maintain instant contact through the entire system nework.

Car units converse with their local town dispatcher on one-frequency — Channel A. This does not cause the main Civil Defense repeater to operate.

When a mobile wants to talk to any other mobile unit in the county, or to the main base station, it switches to Channel B. The conversation goes to the repeater point on Channel B, the repeater listens on Channel B and re-transmits automatically on Channel A.

Thus, the repeater establishes



The 150 foot communications tower serves to repeat through 'channel B' the control center radio system over the entire county, and also serves to push the VHF-UHF systems operating for different county and civil groups over the entire county region.

county-wide communication when any individual town wants to communicate on a maximum basis. Ability of the St. Mary's police dispatcher to disable the repeater manually when desired permits operational flexibility and establishes full control at St. Mary's so Civil Defense emergency traffic can take precedence.

At night, Channel B — the repeater frequency — becomes the main frequency for both individual towns and for the control desk at St. Mary's police headquarters. Each individual town gets full-time 24-hour protection.

One of the engineering techniques used by General Electric communication consultants in setting up the Auglaize County CD network was the development of an antenna system at County CD Headquarters which permitted one tower to serve all of the individual networks, including both UHF and VHF frequencies.

While not unusual, the height of the tower at St. Mary's, 150 feet, is a prime factor in increasing effectiveness of the 50-watt CD repeater. It helps boost signal strength of calls from the towns so that county-wide coverage from the repeater point is ample.

The only UHF equipment in the system is operated by the county engineer's staff. This is a separate network in concept from the minimum-maximum system but fits into the total program through remote control receivers monitored by the Civil Defense control point.

In snow removal work and in other daily activities, the engineer's system has saved thousands of dollars for taxpayers in equipment and personnel time.

The county engineer's maintenance vehicles rove through the entire county and communicate with a powerful 250-watt base station at the St. Mary's control center. This would have interfered with individual towns if it had been placed on the Local Government frequency. As a result, the 450 mc. UHF frequency was chosen and the interference problem is eliminated. Towns participating in the VHF network do not have to listen to the routine calls of maintenance trucks. In a CD emergency, however, the CD dispatcher at St. Mary's can manually relay messages from the 450 mc. system to VHF mobiles, unifying the engineer's trucks with other emergency vehicles.

Town fire departments are integrated with the main CD network. The fire system eventually will be equipped with tone frequencies, allowing monitoring of surrounding counties. Designed to operate like several of the mutual aid communication systems functioning in other parts of the nation, this arrangement would provide a benefit in evacuation. Auglaize vehicles could communicate with neighboring counties if Auglaize residents had to be moved.

County Civil Defense Director Arnold Reiher and CD Administrator James E. Price have left no stone unturned in developing their shelter and evacuation program. They have established arrangements for 14 post-attack feeding stations; 800-bed emergency hospital facilities, and more than 200 first aid stations.

Individual hospitals have disaster plans; church camps and other locations where buildings are available have been designated for cafeteria and feeding facilities. Twenty - one radiological monitoring stations are operating with 66 trained volunteer instrument specialists and more are being set up.

Using a chain approach, thousands of citizens are being trained in medical self-help. It is estimated that 15,000 residents can be reached in classes in three years.

More than 160 rescue teams and 300 auxiliary police personnel are ready to function in the county's alert, shelter and decontamination program.

In the event of a nuclear attack on another area of Ohio, Auglaize County feels it will have slightly more than an hour to complete its evacuation and shelter program. Communication will play a vital coordination role. The first word on an impending attack would come to Auglaize County from the area Civil Defense headquarters at Findlay, Ohio. Public Safety organizations—state police, sheriff's patrol, and local police — would swing into operation immediately and the word would then go out to allied public and civilian organizations.

The sheriff's department has its own low band radio system at Wapakoneta but maintains point-to-point radio contact with the Civil Defense control center at St. Mary's. The CD center also has a cross - monitoring arrangement with state police.

Through the CD Conelrad program, commercial radio stations at Lima and Fort Wayne would sound warnings, if an alert came during normal broadcast hours. Both land-line telephones and mobile communications would be used to alert schools and local industries.

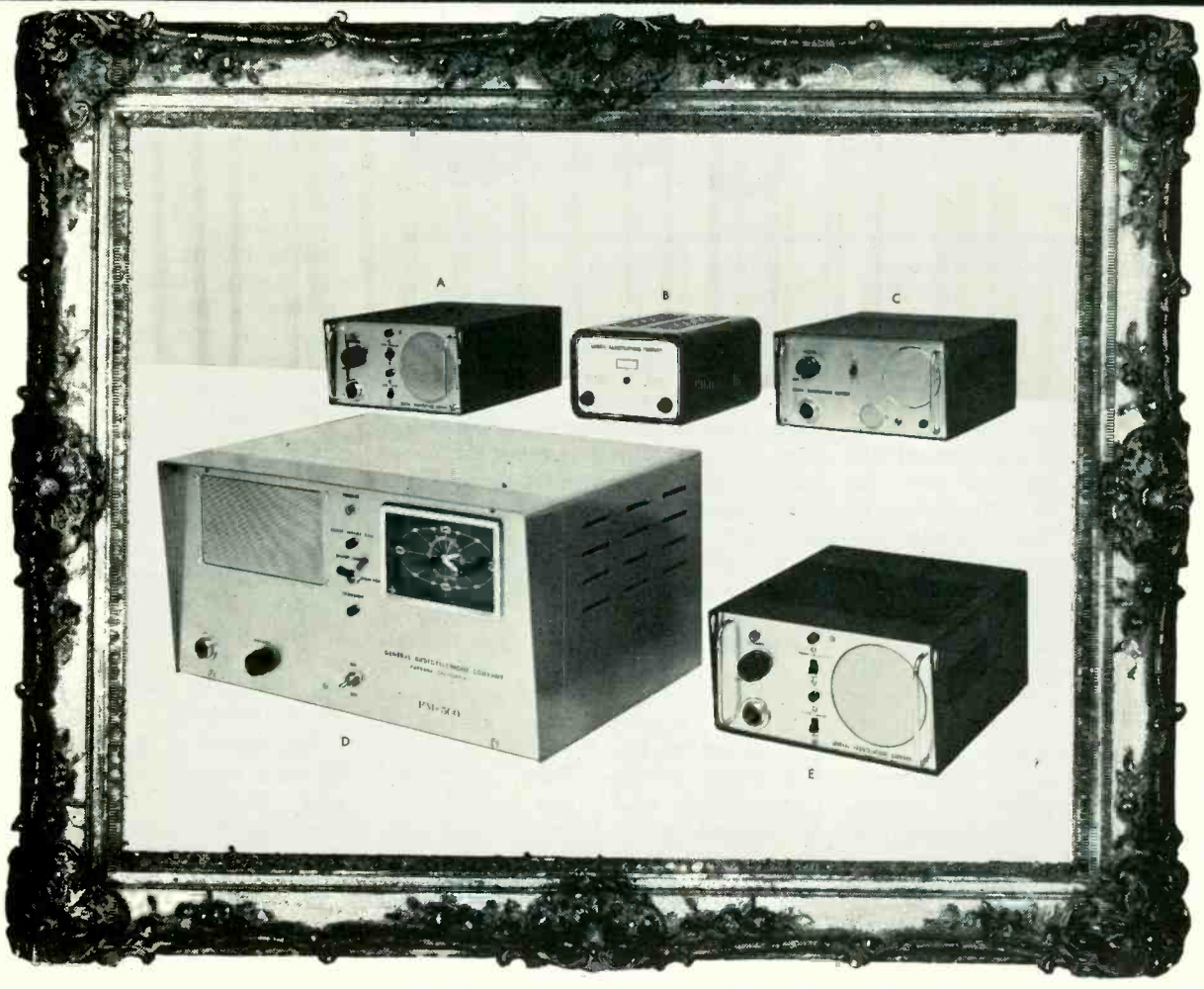
In addition to the main FM mobile radio network, the county now has in operation a RACES (Radio Amateur Communications in Emergency Service) hook-up using 2 and 6 meter amateur frequencies. Using base stations and remote control equipment, the RACES system communicates to privately-owned cars of volunteers in major county communities and has a communications van ready to roll to any key location.

Also available are 62 Citizens Band radios, privately owned, which have no central base station but which would be sub-divided between fire stations in individual communities to assist in the communications program. The firehouses, in turn, are tied into the principal FM minimum-maximum system.

"We have learned through experience," Administrator Price says, "that our communications system is reliable and is functioning well. We are now addressing our attention to other problems."

Financing of the FM radio system was handled with Civil Defense matching funds after agreement on the program was reached by county commissioners, subdivision mayors, township trustees and town civil defense directors.

Money Back Guarantee*



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No other manufacturer of Business Band communications equipment makes such an offer . . because no other manufacturer gives you all the advantages found in General Radiotelephone's "Years Ahead Design" equipment.

QUALITY . . . Each set custom made by an individual skilled technician!

LOW COST TO THE CONSUMER . . . Financially available to a larger market!

LARGER PROFIT . . . More sales of quality products at lower cost!

COMPLETENESS . . . Full line of units and accessories for every consumer need!

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MOBILITY . . . "SNAP-RAK" installation permits 30 second transfer from vehicle to vehicle or from location to location. A must for fleet operation!

INTEGRITY . . . A trusted company name, famous for years as manufacturers of the "Quality Line" in Radio Communications Equipment and Systems!

GOVERNMENT APPROVED . . . Accepted for F.C.C. Parts 10 - 11 - 16 and 21 !

*Test and compare our equipment with no risk to you. Order two units, try them for 30 days, if not entirely satisfied that these sets are superior in quaiiy, performance and styling to any on the market your money will be refunded immediately. Offer applies only to initial purchase of two units to firms with Business Band test equipment and F.C.C. authorized service personnel.

ACT NOW !
Become the authorized General Dealer in your area

A. FM-120 . . . $399.95
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Dept. V4, General Radiotelephone Company,

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Our Man in Public Safety Communications

A few weeks ago your editor received a letter from Horizons Publisher, Bob Cooper. In it he mentioned a new publication to be known as Video-Communications Journal. Bob commented that, "our Television Horizons publication is slanted at private business people in the business of delivering microwave point to point or cable relay closed circuit video to customers. Some of these people operate community antenna (CATV) television reception systems, many provide closed circuit video to schools, banks and even municipalities."

"We feel," continued Bob, "that the overlap in microwave plus the interest that is common in matters of VHF-UHF and even SHF from the FCC's regulatory point of view will lend themselves to a much broader and considerably greater scope publication that will serve everyone better."

My introduction to Television Horizons came with an issue that covered the Annual Cable Television Convention. It had a sketch of a cable car (San Francisco type) on the front cover. I decided then and there that cable was practical. Don't laugh! One is transporting people up and down the hills of San Francisco; the other is transporting pictures to people. Further, in case you are wondering what all this has to do with public safety, not only have six dockets in the last year been in regard to microwave but four of them were in connection with TV proposals. Thus we cannot assume that unless it is a part of land-mobile, we are not concerned.

In fact, one of the big problems in the Public Safety Communications field has been our own narrow view point. The radio man who worked for a Police Department, didn't associate with men from the Fire Department and as for Highway and Road Maintenance, that was construction, etc., not emergency service. Then we began to get our eyes opened. We were all working for the licensee; it was the State, the County or the City that was licensed and we were delegated the authority to keep one or more systems licensed and running.

Gradually, chief administrators began to see the need for a centralized Communications Department. Some counties and cities went to such consolidated departments; even some states created centralized communications divisions. In a number of other states, patrol and maintenance functions were placed in a Highway Department for which the communications men worked. As a result, it has been necessary for many of us to wear numerous hats and belong to numerous groups. Add to this Forestry Conservation, Fish and Game, Water Conservation, Soil Conservation and Flood Control which are all licensed under the Forestry Conservation Radio Service. Then add Local Government, which can be used for all governmental functions and part of a very complex picture begins to take shape. Many of these systems require point to point circuits, which puts us in the microwave business.

Often a mountain top is used for a transmit and receive point for Highway Patrol and Maintenance Radio. It is also a Forestry Fire Lookout plus Fish and Game Radio site. This is where that Communication Division comes into the picture. Why have four separate control links when one microwave system will provide all four? Why have four different departments, each maintaining a piece of it? But this is only part of the picture; let's complete it.

On May 1, 1962 Public Law 87-447 was passed by the 87th Congress. This law adds Part IV to the Communications Act of 1934 and states, "Grants For Educational Television Broadcasting Facilities."

This amendment creates a fund of $32,000,000 to carry out the program. This money is available to public elementary or secondary schools or colleges, the State educational television agency, a college or university deriving its support in whole or in part from tax revenues or a non-profit foundation organized to engage in educational television broadcasting. Grants not to exceed $1,000,000 may be made in any State.

The immediate reaction to passage of this law was Docket No. 14744, followed by Dockets No. 14894 and 14896.

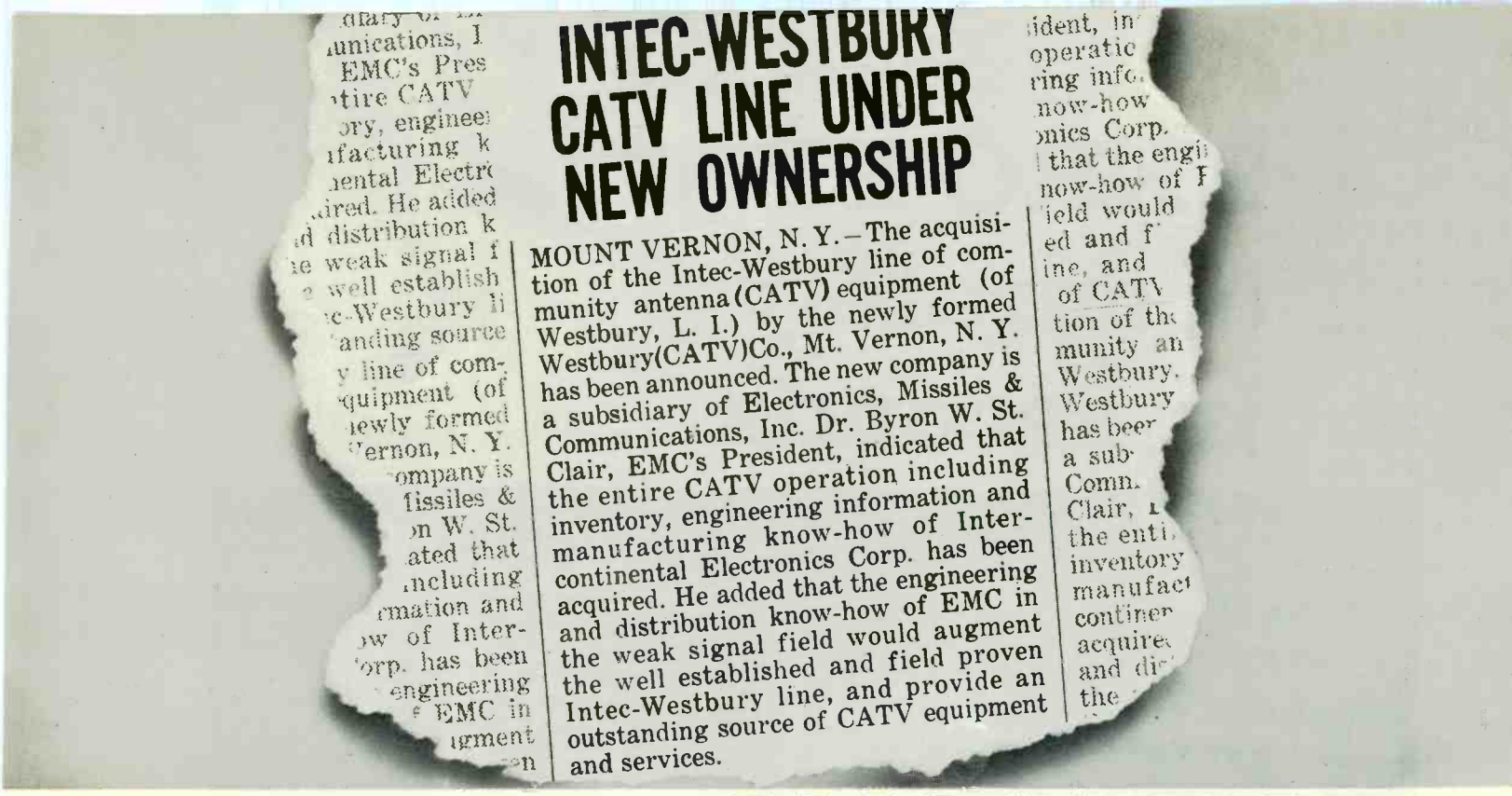
Docket No. 14896 was the result of a petition by the Alabama Educational Television Commission requesting, among other things, availability of the 1850-1990 Mc band for transmission of educational television material. Quoting the Commission, "The band is widely used by operational fixed stations licensed in the various safety and special radio services and there appears to be no acute shortage of broadcast frequencies available to Alabama and other eligible users for relay purposes."

The Nebraska State Committee on Educational TV has proposed creating a six station educational TV net with microwave links between stations. They estimate that $750,000 in Federal funds will be available. Both Alabama and Nebraska have problems in the field of providing educational facilities. Their populations are largely rural so meeting the budget and finding adequate teaching personnel becomes difficult.

The States of Alabama and Nebraska both operate systems in the Police and Highway Maintenance Radio Services. While they do not presently operate microwave systems, some of their neighboring States do. the need for those of us who work in Public Safety communications to know these other fields is thus apparent. To this end, Bob Cooper's new publication does a needed job.

While we are on the subject of doing a job, those microwave links installed throughout the State for educational television look very inviting for another reason. Maybe we could squeeze in a little old voice channel and a couple of keyed tone circuits for teletype to be used by the law enforcement agencies and others who must provide for the Public Safety; or wouldn't this be quite proper?

Why haven't those charged with the internal security of this nation done better? Perhaps it is because our work is less glamorous than television; or maybe it is because we have quietly gone about doing our work without public clamor or a Department of the Federal Government to lend support. Maybe we have been guilty of assuming that the words Police and Public Safety automatically would protect us and provide us with needed spectrum space. In any case, it appears that we have a big job ahead to correct this situation.



INTEC-WESTBURY CATV LINE UNDER NEW OWNERSHIP

MOUNT VERNON, N. Y.—The acquisition of the Intec-Westbury line of community antenna (CATV) equipment (of Westbury, L. I.) by the newly formed Westbury(CATV)Co., Mt. Vernon, N. Y. has been announced. The new company is a subsidiary of Electronics, Missiles & Communications, Inc. Dr. Byron W. St. Clair, EMC's President, indicated that the entire CATV operation including inventory, engineering information and manufacturing know-how of Intercontinental Electronics Corp. has been acquired. He added that the engineering and distribution know-how of EMC in the weak signal field would augment the well established and field proven Intec-Westbury line, and provide an outstanding source of CATV equipment and services.

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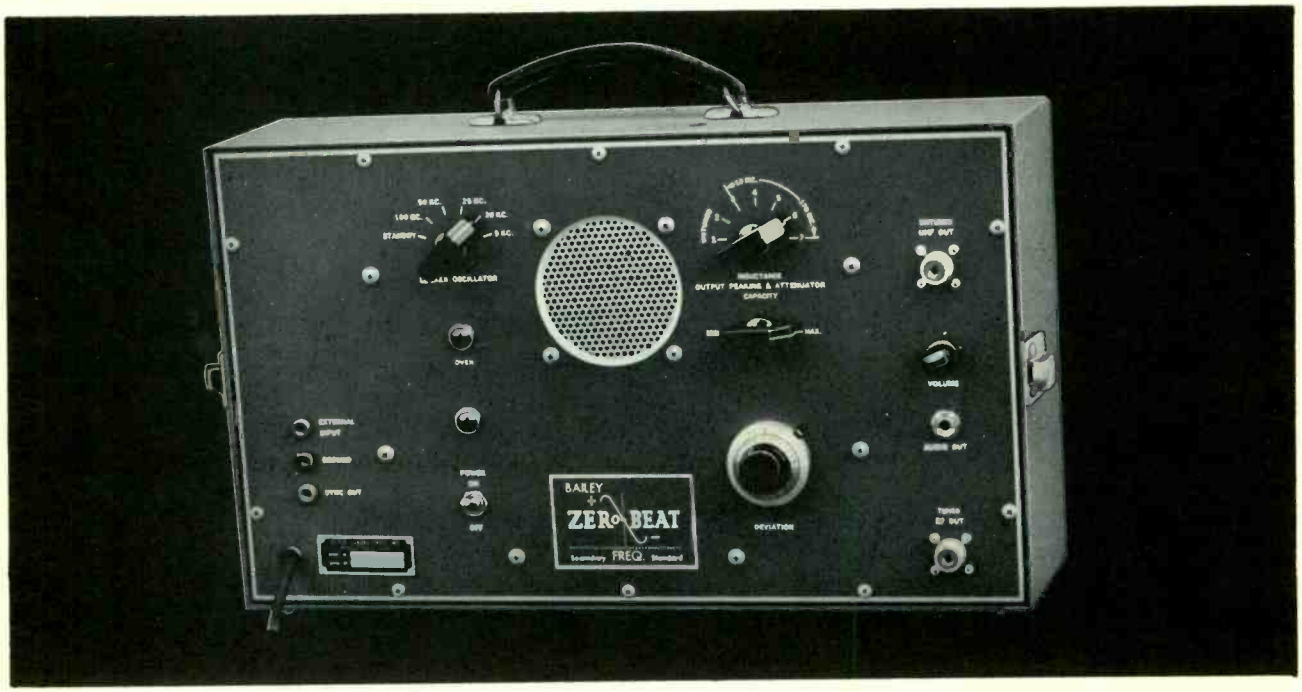

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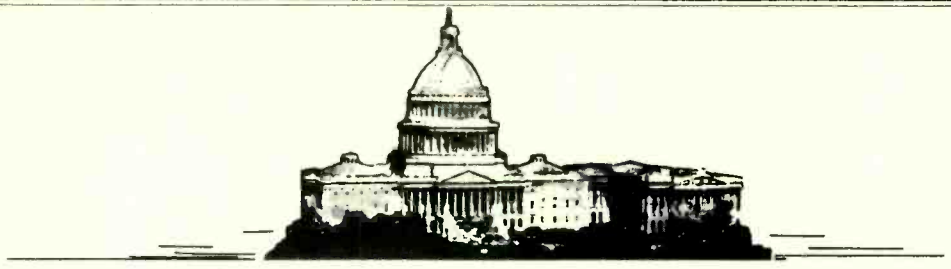

Our Man in Washington

BASIC PRINCIPLES' OF INTERCONNECTION ANNOUNCED BY BELL SYSTEM, RCC INDUSTRY

Agreement on the "basic principles involved" in interconnection of two-way mobile radio facilities furnished by the nation's radio common carrier industry with the landline telephone facilities of the Bell System has been reported by the American Telephone & Telegraph Co. and the RCC industry.

AT&T Assistant Vice President H. L. Kertz, in a letter to National Mobile Radio System President A. J. Spooner, outlined a revised "statement of position", describing the Bell System views as "an expression of broad principles." NMRS and Jeremiah Courtney, communications attorney representing a group of RCC clients, noted that the Bell System statement followed general proposals made by the NMRS Interconnection Committee in a Dec. 3 meeting with AT&T, and a subsequent Jan. 11 meeting between Mr. Courtney and the Bell System representatives in which it was sought to tie Bell System interconnection charges to prevailing exchange rates

The association reported that NMRS General Counsel Norman E. Jorgensen, Mr. Courtney, and AT&T attorneys "are now in process of working out a draft interconnection agreement incorporating the principles which have been agreed upon. This draft agreement"—expected within a couple of weeks—"will then be used as a basis for negotiation between individual Bell System operating companies and the individual RCCs who desire interconnection."

In essence, the Bell System statement of position noted that "Subject to regulatory acceptance, the Bell System companies are willing to negotiate interconnecting agreements on the basis of the broad level of local service charges which industry representatives have stated they would recommend for acceptance by miscellaneous common carriers generally."

These include, AT&T said, a charge "in the order of" five cents per message for calls from an RCC subscriber feeding into the telephone network, or, alternatively, a flat rate "in the general range of" $1 per month per mobile unit, where a flat rate offering is "appropriate."

The general level of these charges, however, it is understood may be lower in areas where charges are lower, for instance, for a business extension telephone. The AT&T statement pointed out that "The rates for specific localities can be expected to vary within a reasonable range of the ($1 or five cent) figures depending on local factors, including the relative level of prevailing charges for basic exchange services in the community."

The new statement of Bell System position replaces a previous stand calling for a flat rate charge of $2, or a charge of ten cents a call. NMRS Interconnection Committee Chairman Jerry S. Stover commented that "if only a third" of the estimated 15,000 RCC mobile units now in service were to be interconnected, the revisions in the Bell System approach would amount to a "saving" to the RCC industry as a whole

The new approach contemplates an "other-line or combination" charge basis. For example, if an RCC charges his customer 15 cents a call, and the negotiated figure for an interconnected call is 4.6 cents, or 5 cents, the total charge to the customer would be 19.6, or 20 cents a call. The RCC customer would owe the 4.6 or 5 cents to the local Bell System, but it could be collected by the RCC and turned over to the telephone company.

On a toll call from an RCC unit into the telephone network, there would be no charge by the Bell System company above the regular toll charge. Also, no additional charge by the Bell System company is contemplated for a call passing from the landline telephone system into the RCC system.

In his letter to Mr. Spooner, Mr. Kertz also noted that the "detailed application" of the Bell System statement of position will be "a matter of negotiation between the particular miscellaneous common carrier and Bell System company involved." He stressed the "mutual importance and advantage of facilitating the individual negotiations in order that interconnection of our common carrier undertakings may become fully regularized without further delay."

In adopting the new position, "in lieu of their earlier proposals of somewhat higher charge level," Mr. Kertz said, the Bell System companies "have given weight to the views of industry representatives as to the character of usage to be expected, including volume and length of calls, as well as to their stated willingness to recommend the execution of agreements where such level of charges would apply."

The statement notes that the Bell System companies "reaffirm" their position "that division of message toll revenues is not appropriate and that the charges for through service should be on an other-line or combination basis."

The telephone companies further feel, it explains, that "service considerations require that they furnish and control the connecting equipment arrangements," and that "They are willing to provide whatever connecting arrangements are reasonably necessary to furnish the flexibility which the miscellaneous common carriers feel they need."

RCCs participating in the interconnection offer, it is understood, will be entitled to one interconnecting trunk per radio channel without charge.

As for the relatively few instances of wide area RCC systems desiring interconnection, the Bell System statement of position points out that "the matter of point of connection of wide area systems (can) be worked out locally on a case-by-case basis, taking into account service and other considerations

KANSAS AND PENNSYLVANIA RCC RENEWALS REQUESTS HEARING

Applicants for new two-way radio common carrier service in Liberal,

Kans., and Pittsburgh, Pa., petitioned the FCC this week to consolidate in hearings on their applications the upcoming renewal applications of the respective existing RCCs which are opposing their applications, if hearings are scheduled on the applications for the proposed new facilities.

Filing the requests this week were Ralph Heng, doing business as Tri-State Communications Co., who is seeking an authorization for Liberal, and Telephone Answering, Inc., who has filed for Pittsburgh. The renewal applications involved — which under FCC rules are to be "placed on file within the next 30 days," it was noted —are those of Two-Way Radio Communications Co. of Kansas, and Allegheny Mobile Communications.

The "petitions to deny," the pleadings this week pointed out, were filed by the latter two firms on Sept. 14, 1961, and May 16, 1962, respectively, and are still pending.

ENGINEERING FIRM TO DESIGN AUTOMATIC DATA HANDLING

Design of a system aimed toward ultimate handling of the entire process of government agencies' frequency selection, engineering, and record-keeping by automatic data methods has been assigned to the engineering firm of HBR-Singer, Inc., under a six-month contract by HRB-Singer and the government's Director of Telecommunications Management.

The first step in what undoubtedly will be a long-range and long-term project was taken by the Office of Emergency Planning after observation of electronic data processing developments over a period of five or six years. It is now felt that the state of the art has advanced sufficiently to make possible the projection or "postulation" of an operating system of frequency engineering.

The organization headed by Dr. Irvin Stewart, Director of Telecommunications Management, said that specific objectives of the study are as follows: selection of the most appropriate part of the radio spectrum for an intended use; selection of frequencies compatible with existing necessary uses; storage and retrieval of technical factors governing future selections; printing of frequency authorizations; and recording and printing of lists of technical particulars.

In the study, HRB-Singer first will survey in detail the operations of the Interdepartment Radio Advisory Committee and its component groups in assignment of radio frequencies for government uses, including pre and post-assignment activities. It then will develop a systems design providing for use of electronic data processing techniques for initial selection of frequencies in the high frequency range of the spectrum, and for related coordination, data processing, record-keeping, and printed output.

Finally, it will recommend ways of carrying out elements of the new system which can be performed with existing punched card equipment, or with minor modifications, to improve present productivity and still be compatible with the proposed transition to EDP techniques.

COMMERCE OTS ANNOUNCES STUDY ON IMPROVING FM RECEIVER DESIGN

Availability of a research report prepared for the armed forces which outlines methods under which "design of frequency modulation radio receivers can be carried out with more exactness and with less distortion of the signal," has been announced by the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. (Order AD-282-110 for $2 a copy).

The "purpose" of the 84-page study, by a Brooklyn Polytechnic Institute engineer, OTS said, is to "bridge some of the existing gaps in the theory of frequency modulation and to provide a more complete theoretical design procedure for FM receivers."

RCA ASKS SPECIFIED INTERFERENCE SAFEGUARD

Clear specifications that business radio service users of the frequencies in the 1850-1990 megacycle band licensed for closed circuit educational television services should protect existing licensees of the frequencies, was asked of the FCC by RCA Communications. RCA pointed out that present rules governing the band contain such a footnote, but that new rule proposals by the FCC does not. The company noted that it operates four international control stations in the band involved, and that the band is also widely used for operational fixed microwave purposes.

TELEVISION VIA LASER BEAM

"A laboratory model" of a communications system which transmits and receives television pictures "on a light beam generated by a laser device" was demonstrated recently by the General Telephone & Electronics Corp., which said the demonstration "is believed to be the first transmission by laser beam of a microwave signal carrying television information."

GT&E said the method of optical laser communications shown this week "establishes the ultimate potential of optical links," and "will serve as a focal point for the future development work that is required to improve the performance of diverse optical communications components." Much development work "remains to be done over the next five to 10 years before optical laser communications links can be considered for application on a practical basis,"

PRINCIPAL BROADCAST VIEWS FILED ON PROPOSALS TO CONDITION CATV MICROWAVE GRANTS

The broadcasting industry has offered its principal arguments in favor of mid-December FCC rules proposals to govern the grant of authorizations in the business radio service for microwave stations to relay television programs to community antenna TV distribution systems, and in contrast to the comments from the National Community Television Association, which had contended that the Commission is exceeding its authority by the rule proposal.

A number of broadcasters, major networks, and the National Association of Broadcasters supported adoption of the FCC proposals designed to protect local television stations from CATV systems in areas where they may be competitive with broadcasters, and suggested that the Commission go another step and bar such microwave stations from carrying signals of television stations without the latter's prior written consent.

NAB declared that it recognizes "that the issue of censorship will be introduced in connection with this proposal. In accordance with our traditional position, we are opposed to censorship in any form. We do not, however, believe that this proposal involves such questions."

The association noted that FCC regulations governing industrial radio services "limit the types of communications that stations in these services may transmit," and added that "We construe the restrictions that the Commission would impose in this proceeding as a further addition to these limitations."

NAB said the FCC proposals are aimed only at "certain situations" where it would be "contrary to the public interest, convenience and necessity to grant a business radio service application unless certain conditions are satisfied by the applicant. This is a valid exercise of the licensing power." As to its suggestion for a further prohibition against "unauthorized rebroadcasts of TV signals by CATV-microwave systems," NAB declared "That the broadcaster has an inherent right in the signal he puts on the air is, we believe, beyond question. It is his signal."

What Does F.C.C. Mean To You?

What is the F. C. C.?

F. C. C. stands for Federal Communications Commission. This is an agency of the Federal Government, created by Congress to regulate all wire and radio communication and radio and television broadcasting in the United States.

What is an F. C. C. Operator License?

The F. C. C. requires that only qualified persons be allowed to install, maintain, and operate electronic communications equipment, including radio and television broadcast transmitters. To determine who is qualified to take on such responsibility, the F. C. C. gives technical examinations. Operator licenses are awarded to those who pass these examinations. There are different types and classes of operator licenses, based on the type and difficulty of the examination passed.

What are the Different Types of Operator Licenses?

The F. C. C. grants three different types (or groups) of operator licenses – commercial radiotelePHONE, commercial radioteleGRAPH, and amateur.

COMMERCIAL RADIOTELE*PHONE* operator licenses are those required of technicians and engineers responsible for the proper operation of electronic equipment involved in the transmission of voice, music, or pictures. For example, a person who installs or maintains two-way mobile radio systems or radio and television broadcast equipment must hold a radiotelePHONE license. (A knowledge of Morse code is NOT required to obtain such a license.)

COMMERCIAL RADIOTELE*GRAPH* operator licenses are those required of the operators and maintenance men working with communications equipment which involves the use of Morse code. For example, a radio operator on board a merchant ship must hold a radioteleGRAPH license. (The ability to send and receive Morse is required to obtain such a license.)

AMATEUR operator licenses are those required of radio "hams"–people who are radio hobbyists and experimenters. (A knowledge of Morse code is necessary to be a "ham".)

What are the Different Classes of RadiotelePHONE Licenses?

Each type (or group) of licenses is divided into different *classes*. There are *three* classes of radiotelephone licenses, as follows:

(1) Third Class Radiotelephone License. No previous license or on-the-job experience is required to qualify for the examination for this license. The examination consists of F. C. C. Elements I and II covering radio laws, F. C. C. regulations, and basic operating practices.

(2) Second Class Radiotelephone License. No on-the-job experience is required for this examination. However, the applicant must have already passed examination Elements I and II. The *second class* radiotelephone examination consists of F. C. C. Element III. It is mostly technical and covers basic radiotelephone theory (including electrical calculations), vacuum tubes, transistors, amplifiers, oscillators, power supplies, amplitude modulation, frequency modulation, measuring instruments, transmitters, receivers, antennas and transmission lines, etc.

(3) First Class Radiotelephone License. No on-the-job experience is required to qualify for this examination. However, the applicant must have already passed examination Elements I, II, and III. (If the applicant wishes, he may take all four elements at the same sitting, but this is not the general practice.) The *first class* radiotelephone examination consists of F. C. C. Element IV. It is mostly technical covering advanced radiotelephone theory and basic television theory. This examination covers generally the same subject matter as the second class examination, but the questions are more difficult and involve more mathematics.

Which License Qualifies for Which Jobs?

The THIRD CLASS radiotelephone license is of value primarily in that it qualifies you to take the second class examination. The scope of authority covered by a third class license is extremely limited.

The SECOND CLASS radiotelephone license qualifies you to install, maintain, and operate most all radiotelephone equipment except commercial broadcast station equipment.

The FIRST CLASS radiotelephone license qualifies you to install, maintain, and operate every type of radiotelephone equipment (except amateur, of course) including all radio and television stations in the United States, and in its Territories and Possessions. This is the highest class of radiotelephone license available.

How Long Does it Take to Prepare for F. C. C. Exams?

The time required to prepare for F. C. C. examinations naturally varies with the individual, depending on his background and aptitude. Grantham training prepares the student to pass F. C. C. exams in a minimum of time.

In the Grantham *correspondence course*, the average beginner should prepare for his *second class* radiotelephone license after from 300 to 350 hours of study. This same student should then prepare for his *first class* license in approximately 75 additional hours of study.

Grantham offers exactly the same course in resident (classroom) training in four major cities in the United States. This is one of the +'s of the Grantham training program. Home study students may, for any reason, transfer to classroom training simply by paying the balance of their home study tuition; they may then apply this entire amount to the resident class of their choice.

In the Grantham resident course, you prepare for your first class F. C. C. license in 8 weeks, 12 weeks, 20 weeks, or 30 weeks, depending on which class schedule you select.

What is the Grantham Approach?

In electronics the same basic principles apply regardless of one's specialization within the field. But, in teaching electronics, relating these basic principles to a specific application gives the subject a frame of reference and makes it easier for the student to learn. To have you memorize Ohm's or Kirchhoff's laws, for example, without relating them to specific applications would be like learning a language phonetically without being able to understand or speak it. The Grantham course, therefore, teaches you basic electronics as it relates to the field of communications.

Why Choose Grantham Training?

In the short time necessary to complete the course, you will acquire a knowledge of electronics – of the laws and theories of electronics, and their applications to the operation of practical equipment. These "basics" are presented in a logical, step-by-step manner, with the necessary math integrated into the course, from the viewpoint that you have no prior knowledge of the subject. In fact, everything in the course is presented from this viewpoint – nothing is taken for granted where your education is concerned. Thus, as a Grantham graduate, you are prepared to begin working at the technical level in any phase of electronics.

Should You Memorize or Understand?

If you believe that electronics can be learned through memorizing by rote, our course is not for you. But, if you want to be able to *think* and *reason* electronics, we believe no other home study school offers so much knowledge and service in relation to time and money expended as Grantham does.

Is Grantham Training Accredited?

Grantham School of Electronics is accredited by the Accrediting Commission of the National Home Study Council. The Accrediting Commission has been approved by the U.S. Office of Education as a "nationally recognized accrediting agency" under the terms of Public Laws 82-550 and 85-864.

Two "Door-Openers" to Employment

(1) First Class Commercial F. C. C. License: The Grantham course prepares you to pass the examination for this license, which is actually a "diploma" issued by the U.S. Government to certify qualified electronics technicians. It assures a prospective electronics employer that you are a man with the necessary knowledge to "build" with his company.

(2) Pre-Employment Exams Given By Industry: You are qualified to make an excellent showing on the exams which many industrial electronics firms require of a potential employee.

For further details concerning F.C.C. licenses and our training, send for our FREE booklet, "Careers in Electronics". Clip the coupon below and mail it to the School.

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Please send me your free booklet telling how I can get my commercial F.C.C. license quickly. I understand there is no obligation and no salesman will call.

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City _____ State _____

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☐ Home Study, ☐ Resident Classes

Austin CATV System to Use Inter-City Microwave

John G. Campbell of TV Cable of Austin, has recently announced plans calling for the construction of a large system within the City of Austin, Texas.

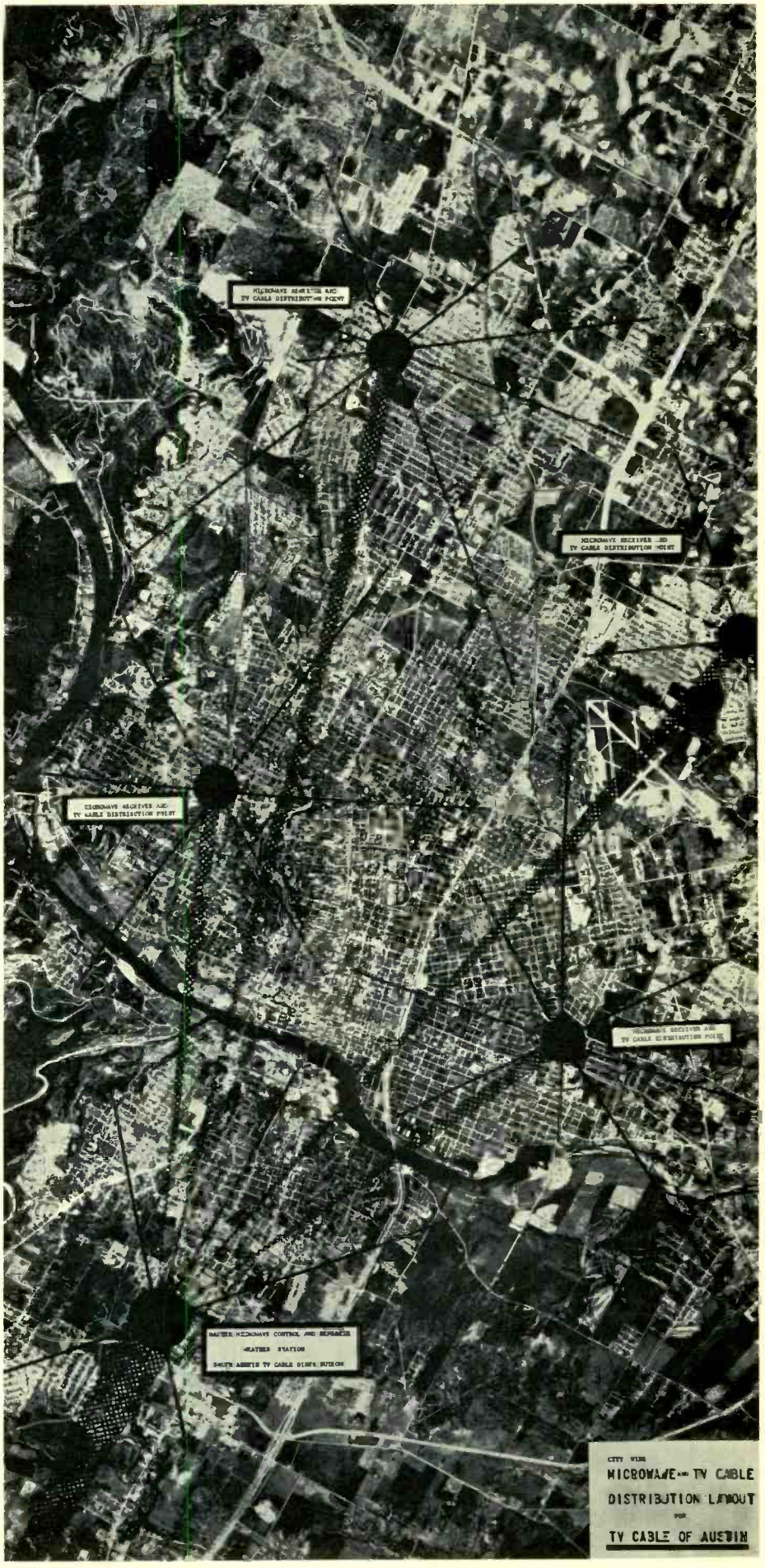
Because of the size of the city, Mr. Campbell has departed from the conventional system which usually consists of one long continuous cascaded trunk installation. Instead the system will utilize five smaller systems linked with microwave facilities.

The three San Antonio VHF channels together with the Spanish UHF channel will be picked up at an off-air pickup point in the San Marcos area and microwaved into the master microwave control repeater station in South Austin.

At the master station, weather news, present and future Austin TV channels, the educational channel, the civil defense operation and disaster alarm system will be merged with the other TV signals and microwaved to the other receiving point centrally located in four areas within the city.

From each such receiving point, trunk lines and feeder lines will be extended so as to serve the adjacent areas. All areas will be developed simultaneously, making available the best in TV viewing to the citizens of Austin as compared to a conventional system which would build from one side of town to the other. The problems of maintaining continuous and uninterrupted services are substantially reduced in this design when compared to a conventional system.

Mr. Campbell stated additionally that his Austin business office will be open in the near future.



REPORT ON MOBILE FIELD STRENGTH MEASURMENTS

New York City UHF-TV Project

Daniel B. Hutton
Office of Chief Engineer
Federal Communications Commission
Washington 25, D.C.

SUMMARY

This report concerns the mobile field strength measurements portion of the New York City UHF-TV Project. Measurements were made on Channels 2, 7 and 31 to compare the relative effectiveness of low VHF, high VHF and UHF television broadcasts from the Empire State Building. Incidental measurements were made on Channel 77 to find the extent of coverage of a translator station on the George Washington Bridge. Measurements were made on 8 radials and two circular arcs centered upon the Empire State Building, using methods recommended in the TASO report.

In general, it was found that television signal strength drops faster with distance on UHF than it does on VHF, but where the signals are weak UHF is less subject to man-made noise than VHF. High VHF signal variations resemble UHF variations more than they do low VHF variations. Overall indications from the radial measurements are that the difference between winter and summer propagation of television signals on either VHF or UHF on the average amounts to less than ± 1 db.

1. BROADCASTS

Station WCBS-TV, Channel 2, and WABC-TV, Channel 7, operate from the Empire State Building and made no changes in their operations for these tests. Experimental television station WUHF, Channel 31, was built by the FCC on the Empire State Building expressly for this Project. Circular and horizontally polarized signals were broadcast by station WUHF but only the horizontally polarized measurements are reported herein. The circular polarized measurements will be reported at a later date. Programs broadcast by Station WUHF were from many sources, including duplications of broadcasts from many of the VHF stations on the Empire State Building. The translator station, Channel 77 was installed by Adler Electronics, Inc. on the east tower of the George Washington Bridge to rebroadcast the WUHF programs and thus provide a low-power form of multicasting for this test.

2. POWERS

The maximum effective radiated powers of the stations were as follows:

WCBS-TV, Channel 2, operated with a visual power of 40.75 kw (16.1 dbk). WABC-TV, Channel 7, operated with a visual power of 110 kw (20.4 dbk). The aural powers of these two stations were of no prime concern in this experiment. WUHF, Channel 31, operated with a visual power of 865 kw (29.38 dbk) and an aural power of 432 kw (26.38 dbk). Variations in the WUHF power were recorded in the transmitter logs.

The translator station, Channel 77, operated with a visual peak power of approximately 1.65 kw (2.2 dbk) and an aural power of approximately 0.83 kw (-0.8 dbk).

3. ANTENNAS AND PATTERNS

Station WCBS-TV and WABC-TV operate with antennas which produce omnidirectional patterns and no attempt has been made to consider small pattern variations. Station WUHF employed two antennas referred to here as the horn and main. The horn antenna was designed to produce either circular or horizontal polarization the patterns of which were very similar. Since this report covers only horizontal polarization, those vertical and horizontal patterns only are shown, Fig. 1. The horn antenna was installed in a window on the 80th floor of the Empire State Building such that the maximum of the beam was at a bearing of 29° true. It was designed however, to produce the maximum at a depression angle of 5° below the horizontal. The beam had an azimuthal width to the half-power points of 34° and a corresponding vertical width of 30°. Since the beam was mechanically tilted downward 5°, the difference in radiated power in the direction of the main beam, 29° true, was for all practical purposes insignificant from 10 miles on out. The horn measurements thus serve as a quasi-standard for comparison with the main antenna measurements at the same set of locations on the 29° radial.

4. MEASUREMENTS AND OBSERVATIONS

Mobile field strength measurements were made at 338 locations in winter and again in summer. Most of the 2777 measurements taken were made on Channels 2, 7 and 31 under identical physical conditions. Of these, 110 measurements were made on Channel 77 in summer only after the translator station started broadcasting and then only where the signal was strong enough to be measured. Throughout this report any reference to VHF measurements generally includes Channel 2 and 7 only, whereas UHF includes 31 and 77 only.

Observations of picture quality are not reported herein. A limited amount of viewing and listening was done which indicated that good reception could in general be achieved where the TV field strength was above the marginal values in the areas where the field car was operated. If the signals varied

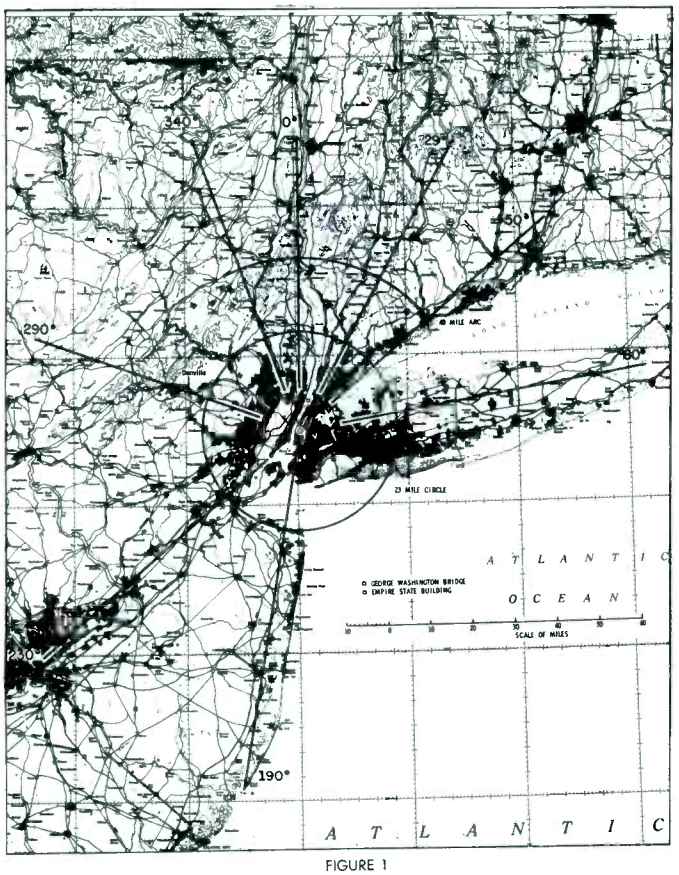


FIGURE 1

Greater New York City region, surveyed during the course of the UHF testing program, indicating the radials (8) and 23 and 40 mile arcs discussed in the text.

greatly because of adjacent trees or buildings, the picture would also be variable in quality and an orientation of the antenna at a fixed point which would produce a good picture might not exist. Since a good picture could be achieved by moving the vehicle a small distance to a good signal area, little time was spent on observations on this phase of the Project. VHF picture observations using the dipoles which were used for measurement on Channels 2 and 7 were not made because these antennas are not considered typical for viewing VHF television.

The corner reflector provided good reception on Channel 77 as well as on Channel 31. For example 44 miles out at a bearing of 55 degrees true from George Washington Bridge, the corner reflector provided the receiver with a signal that resulted in good sound. The picture would not form but any reception at all was unexpected in that the translator station antenna pattern showed no appreciable radiation in this direction.

5. MEASURING LOCATIONS

Measuring locations were established on eight radials and two circular arcs centered upon the Empire State Building. The eight radials were determined as follows:

A Radial, 190° true— As near the Atlantic coast as possible with sufficient land range for the measurements.

B Radial, 230° true— Previously used in tests by RCA[2].

C Radial, 290° true— Previously used in tests by RCA.

D Radial, 340° true— Very rough terrain.

E Radial, 0° true— Standard bearing, FCC rules.

F Radial, 29° true— In direction of maximum of horn antenna lobe and in line with streets of Manhattan.

G Radial, 50° true— As near Long Island Sound as possible.

H Radial, 80° true— For great land range on Long Island.

Measuring locations on the eight radials were established at approximately 2 mile intervals starting at 10 miles and extending out as far as signals could be measured on all three channels, 2, 7 and 31. An average of about 31 points were established on each radial. Locations on the 23 mile circle and the 40 mile arc were established somewhat irregularly between the true bearings of about 50 and 330 degrees to the north of the Empire State Building where measurements were made on the horn pattern. Elsewhere on the 23 mile circle locations were roughly 2 miles apart. Incidentally, the 23 mile circle was selected because it crosses the Hudson River at the Tappan Zee Bridge and the 40 mile circle because it crosses the river at Bear Mountain Bridge.

Fig. 1 shows, in heavy lines, segments of the eight radials and the two circular arcs which contain all the measuring locations discussed in this report. Measurements of course were not made where these lines cross water.

TASO and the Industry Advisory Committees recommendations were followed as closely as possible in establishing the measuring locations. Where a point on a radial could not be established on a road at an exact even mile from the Empire State Building, it was placed on the road nearest to the even mile distance. Actual mileages are tabulated in this report.

6. PROFILES

Elevations above mean sea level were taken off the topographical maps at sufficient intervals along each radial to draw profiles with enough detail to indicate the shadowing situations along each radial.

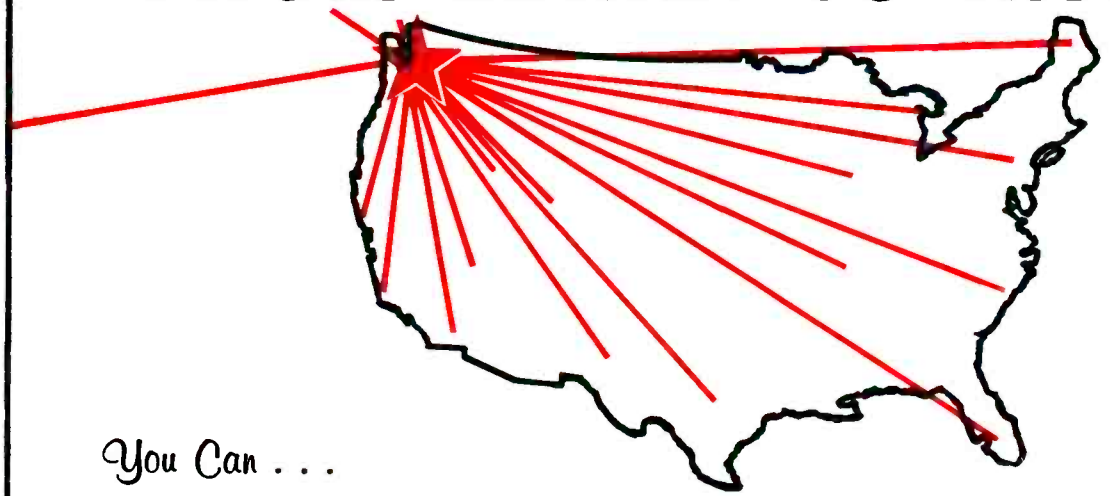
Since these profiles are drawn on 4/3 earth radius scale, a line drawn from the antenna height at zero miles to any point on the profile will show whether or not that point has line-of-sight with the stations. Stations WUHF, WCBS-TV and WABC-TV are all at essentially the same height, 1330 feet above mean sea level. The WUHF horn antenna at the 80th floor was 1010 feet above mean sea level. It was not deemed worth while to draw profiles to any of the measuring locations on the 23 mile circle, the 40 mile arc or any of the Channel 77 measuring locations.

7. MEASURING TECHNIQUES

Field strength meters were checked for accuracy each morning by means of external secondary standard signals. This was done after an ample warm-up period for the field strength meters and the signal generators and was done only once each day because regular AC power was required for the signal generators and because the field strength meters were sufficiently stable that more frequent checks were unnecessary. The transmission line between antenna and field strength meter was checked from time to time for change in losses, if any.

(Continued on Page 29)

FROM MAINE TO HAWAII



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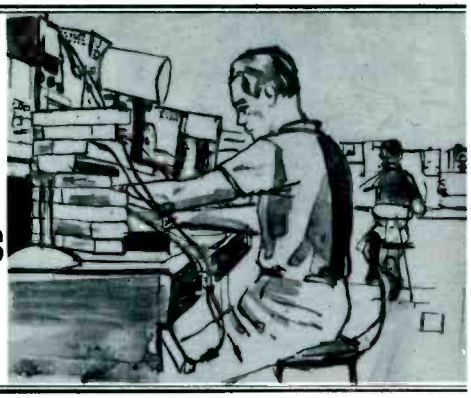
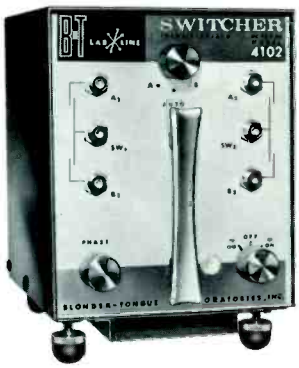




COMMUNICATIONS EQUIPMENT

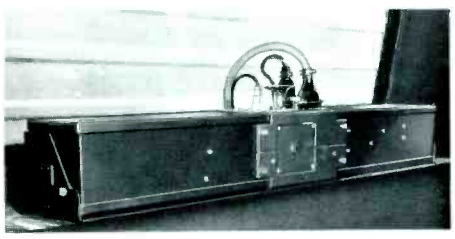
Hammarlund Mfg. Company, 53 West 23rd street, New York 10, New York has announced a new line of crystal controlled, fixed frequency FM communications monitor receivers for the 25-54 and 144-174 megacycle bands. The new double conversion, super heterodyne monitor receivers are available in narrow-band (plus/minus 5 kc deviation) and wide band (plus/minus 15 kc deviation) types, and in single channel and multi-channel versions. The monitor receivers are available with or without internal decoder (tone) and can be used with external frequency division and coded tone pulse selective signaling devices.

The Hammarlund MR500-X receiver is a narrow band model for the 144-174 megacycle band; the MR51X is a wide band model for the same band. The MR60-X is a narrow band model for the 25-54 megacycle band, the MR61-X is a wide band model of the same unit.

Radio Corporation of America has announced a new "Long-Line" model of their Super-Carfone two-way radio.

The new packaging concept of the ultra-transistorized unit is designed to expand the choice of installation locations and provide for installation in vehicles which ordinarily lack space to accommodate two-way radios.

The new unit has an external length of 36 inches and measures 4.5 inches high and 5 inches wide. It may be mounted horizontally or vertically behind the driver or along door jambs, in the trunk department or under the dashboard.



COMMUNICATIONS ANTENNAS

Prodelin, Incorporated, Hightstown, New Jersey has announced a new-low cost Lewis Base Station Antenna offering reliability and ruggedness for 144-174 megacycle operation.

The omni-directional antenna incorporates an impedance matching inductor which permits the antenna to be matched for maximum efficiency in the field. The manufacturer notes this eliminates the need for field or factory cutting of elements.

A VSWR of 1.1 to 1 over a 6 megacycle bandwidth centers on the operating frequency. The antenna is constructed with high strength stainless steel radiating element and is designed to mount directly to a 1 inch IPS pipe. Total weight of the antenna is 2.5 pounds, length is 53 inches. Maximum power capability is 150 watts. List price is $25.00 each.

MICROWAVE COMPONENTS

LEL, Inc. announces a new addition to its line of system components. Known as LEL-line, LEL has developed a quality strip transmission line utilizing new materials and techniques. Among the new LEL-Line microwave components is a binary power divider, designated series DSB. The low frequency unit operates in the frequency range 500 megacycles to 4,000 megacycles and features low insertion loss and phase coherence error of less than 1 percent. These units are available with 2, 4 or 8 outputs, each covering three octaves, and can be optimized to any particular frequency designed to your specific requirements. Price is $100.00 per unit.

Ainslie Corporation, 531 Pond Street, Braintree, Massachusetts announces the development of a new line of communications microwave antenna systems for the 6 KMC band. The antennas are available in 2 foot through 14 foot sizes and consist of a sectional horn feed mounted in a precision spun parabolic reflector.

The feeds available are tuned in three broad ranges, 5925-7425 megacycles, so the VSWR remains below 1.1 to 1 for any specific range. The horn is hermetically sealed and means are provided for attaching guy wires to models more than 4 feet in diameter.

CLOSED CIRCUIT VIDEO EQUIPMENT

A solid-state RF switcher for testing and aligning the inputs and outputs of amplifiers, TV sets and CATV-MATV equipment has been announced by **Blonder-Tongue Laboratories, Inc., 9 Alling Street, Newark 2, New Jersey.**

The new Lab-line RF switcher performs comparative measurements on equipment in virtually all laboratory and production line testing operations Designated model 4102, it nets at $215.00.

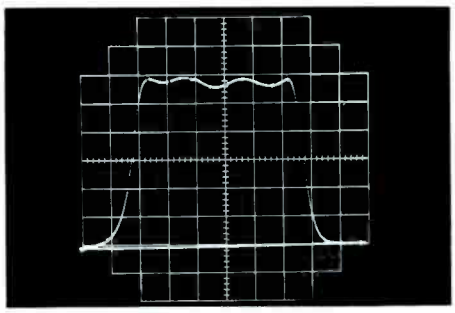
Used with an oscilloscope, the unit can display simultaneously the detected inputs and outputs of equipment under test, measuring such features as attenuation, flatness, and amplifier gain. The 4102 also serves as a general oscilloscope switch in the lab.

The new unit covers from DC to 900 megacycles.

Blonder Tongue also announces a new Observer-2 model closed circuit camera designed for ETV systems. The camera features a vidicon tube and associated circuitry is transistorized. An 8 inch viewfinder screen shows the operator exactly what the camera is viewing.

Community Engineering Corporation, 234 East College Avenue, State College, Pennsylvania has a new series of low noise UHF amplifiers. Narrow (10 mc/s) and octave bandwidths will be available in standard units for frequencies up to 1 KMC. Noise figures available vary from 3 db for 10 m/s units to 10 db maximum for octave units, dependent also on center frequency.

The amplifier response shown of the model CRO unit is for a passband of 100 megacycles centered on 650 megacycles. This unit exhibits a maximum noise figure of 7 db.



TEST EQUIPMENT

A test instrument to measure and test all types of Silicon Rectifiers has been announced by **SECO Electronics, Inc., Dept. 166, 1201 S. Clover Drive, Minneapolis 20, Minnesota.** The model 600 SCR Analyzer tests SCR performance and characteristics without a scope and accommodates SCR's from ½ to 225 amps, 25 to 600 volts. The unit sells for $46.95 and operates from any 105-130 vac source.

SECO also announces their model 88 tube tester which they guarantee against obsolescence.

The unit is unconditionally guaranteed to be up-to-date and adaptor kits are available, with set up data at no cost for a period of one year after the purchase of the unit.

The unit is small and compact. The meter reads grid emission and all common leakage and short faults in one step. Filament continuity and open elements are also indicated as well as cathode emission in a low impedance circuit. Grid circuit and tube merit test scales show all tube faults on a single burnout-proof meter.

The day's measuring schedule started about 9:00 A.M. when station WUHF commenced operation at full power. Channel 2 and 7 could be measured before this time, since WCBS-TV and WABC-TV came on the air somewhat earlier. After an antenna was mounted on the mast and hoisted to the standard 30 foot height, it was oriented toward the station. The field strength meter was set on the station frequency and then calibrated from its internal impulse generator. When the meter indication was peaked with respect to frequency and antenna orientation the signal strength was recorded on the Esterline Angus chart for a 100 foot run of the vehicle.

If maximum signal came from a direction not toward the station another record was made of that signal.

Photographs taken with a Polaroid camera of the measuring locations were very useful if not indispensible for returning to the exact measuring locations at later dates. Since these pictures were taken in the direction of the station they also give information on the terrain near each point over which the signal must travel.

External noises were not usually troublesome on Channel 31. If a noise spike of short duration showed up on the record it was ignored. For weak VHF-TV signals however, man-made noises, especially those from the vehicle motor, or passing vehicles, were intolerable.

8. PRECAUTIONS

Dipole antennas used for Channel 2 and Channel 7 reception having figure eight patterns receive equally from opposite directions. The corner reflector antenna used for Channel 31 reception has a high front-to-back ratio pattern and receives primarily from one direction. It therefore seems reasonable that Channel 2 and Channel 7 measurments can be compared with each other more favorably than they can be compared with Channel 31 measurements. It is also noted that the dipole antennas probably receive more noise from the vehicle motor than would a directional antenna on VHF comparable to the corner reflector on UHF.

Vehicle speed with respect to field strength meter circuit and recorder actions could be a critical matter. It is possible that the speed of approximately 2 m.p.h., usually taken on the 100 foot runs is too high for the charge and especially the discharge rates of the meter quasi peak circuits as well as the recorder mechanical actions. There is some indication that the maxima are somewhat too low, the minima somewhat too high, and the medians somewhat high with a vehicle speed of 2 m.p.h. as was used. It is also noted that the swing of the antenna on top of a limber 30 foot mast would also affect the recordings in this respect.

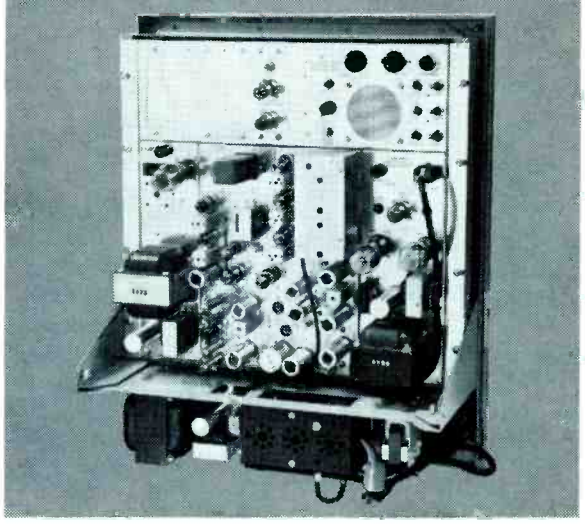
It is generally well-known that the terrain over which a TV signal travels has something to do with the magnitude of the signal. Attention is called to the 23 mile circle and measurements made thereon. Where the signals crossed various lengths of water path just before they were measured, the Ch. 2 signal was practically no higher, the Ch. 7 signal was somewhat higher and the Ch. 31 signal was considerably higher.

9. TABULATIONS

Tabulations include measuring location number, date, time of day the Ch. 31 visual measurement was

(Continued on Page 33)

KAAR RADIO COMMUNICATION PRODUCTS



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EXPERIENCE IS KEY TO EFFICIENCY AT NEW BRUNSWICK SERVICE CENTER

The value of experience and solid training for efficient, high quality radio maintenance is very much in evidence at Mobile Radio Dispatch Service, Inc., New Brunswick, New Jersey.

Under the strong guidance of Peter T. Kroeger, President, the Motorola service center maintains two-way radio and other communications equipment utilized by city, county and state governmental agencies, utilities, trucking companies, industrial and business companies operating throughout central New Jersey.

In servicing over 200 two-way radio base stations and 2,000 moible radios, Kroeger employs a staff of 10 technicians who have compiled an accumulative total of 165 years of licensed experience. This averages out at 16.5 years of licensed experience for each man.

Besides the 10 technicians, Mobile Radio Dispatch Service has three specialists in installation work, and a staff of administrative people.

President Kroeger heads up the list of experienced radio men having had a license for more than 30 years now. His service supervisor, Gene Smith, checks in with 20 years. Kroeger's "newest man" has 10 years of licensed experience.

Kroeger got started in electronics as a shipboard radio operator working for several commercial lines. He also served as radio operator for the yacht "Corsair" owned by J. Pierpont Morgan, Sr., and during the War was in the U.S. Navy retiring in 1947 as a Commander. Kroeger is a graduate of Columbia University and has completed post graduate work in Communications at the United States Naval Academy.

The affable president of Mobile Radio Dispatch Service went into business for himself after his retirement, being authorized as a Motorola service station in New Jersey in 1948.

During the past 15 years, Kroeger has built the business into one of the most successful in the industry. His "philosophy" of business is to provide highly efficient, top quality radio servicing.

TECHNICIANS for service company line up in front of their vehicles prior to the day's calls.

In addition to having a staff of experienced technicians, Kroeger utilizes 12 vehicles to handle servicing at the location of his customers. Two of the vehicles are customized vans containing complete test and service equipment, built-in service bench and a full stock of needed parts. The other 10 vehicles are station wagons.

OPERATIONS of Mobile Radio Dispatch Service, Inc., are coordinated in this building located in East Brunswick, N.J.

Mobile Radio Dispatch Service's Shop facilities comprise 5,000 square feet of space providing separate service, installation, stock and office facilities. The garage area contains sufficient space to service radios in several vehicles simultaneously.

Kroeger backs up his experienced staff and complete facilities with a solid training program. All of his men regularly attend service clinics and schools and three technicians are currently enrolled in the Motorola Training Institute's two-way radio maintenance course.

DAY'S END finds the equipment used in mobile servicing lined up and available for the next day's work.

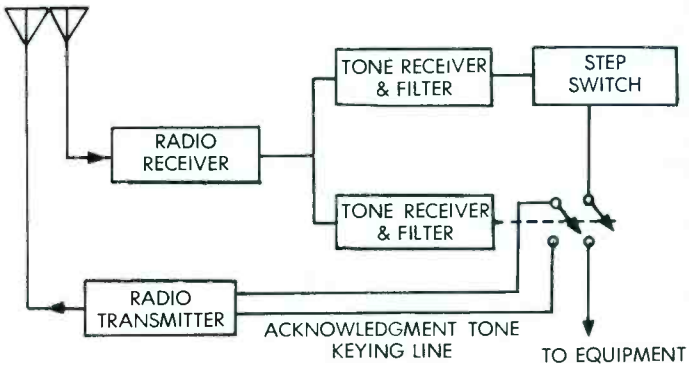
"The clinics, schools and home-study course enable our men to remain up-to-date on all new radio developments," explained Kroeger, "and also make them more efficient by providing them specific techniques in servicing."

The training also helps the company in its specialized work. Mobile Radio Dispatch Service, for example. installed the unique New Jersey Turnpike radio sign control system which instantly activates specific messages on any one, several or all 67 neon signs on the 131 mile road. The company also maintains pocket radio, radio paging and closed-circuit television equipment utilized in New Jersey.

trigger or initiate signal to accomplish the transfer process. In practice only the second and last tones are used. These tones are fed to an appropriate audio amplifier and then on to three different points. Output No. 1 goes to a Schmitt trigger which turns a radio transmitter on and off. Output No. 2 goes to the radio transmitter's modulator. Output No. 3 feeds an auxiliary speaker for monitoring and cueing purposes.

Besides the amplifier input for the audio from the tape deck there is another input that is connected to a radio receiver. This input is for the acknowledgement tone from the head-end. In a way this is a double-check on the equipment operation and will serve to isolate any trouble with the automated system. The acknowledgement tone is sent from the head-end site only when the switching function occurs and lets the operator know that the system is operating as it should.

The equipment for the head-end site was designed for considerably more tasks than necessary and can be wired-in as desired to make use of the extra switch contacts. Referring to Figure 3, the equipment uses only two tone receivers, a radio transmitter-receiver, and a stepping relay. The tone receivers are the most important items and are designed to



HEAD-END EQUIPMENT
FIGURE 3

utilize tone filters on their inputs so extraneous off-frequency tone signals, especially very strong ones, will not inadvertently key the tone receivers. One of the two tone receivers is the "dialing" receiver and operates the step-switch. This constitutes the "conditioning" phase of the operation and the other tone receiver completes the connection to the equipment from the step-switch. The radio transmitter-receiver used is put to a two-fold job. The receiver feeds the tone receivers and the transmitter sends out an acknowledgement tone. The latter operation is accomplished by using built-in circuits that are triggered by the initiate tone.

NEXT MONTH, PART TWO OF "AUTOMATION-FOR NON-DUPLICATION" WILL DESCRIBE THE PROGRAMMING METHODS AND ASSOCIATED EQUIPMENT. ALSO, THE ACTUAL CIRCUITS USED IN THE EXPERIMENTAL VERSION WILL BE GONE INTO IN DETAIL.

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The Librarian is engineered and built for 24-hour duty. It's fully automatic and requires no attention. Equipped with two 10½" tape reels the Librarian can be programmed via an electronic intersperser with limitless combinations so no two numbers ever follow each other in monotonous sequence. Interesting? Write today and find out how profitably the Librarian can fit in your system.

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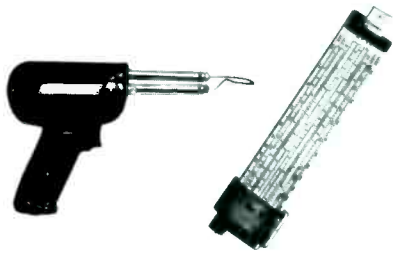


Horizons Lab Report

For many years now the cascode circuit has been one of the favorites of many engineers when designing relatively low noise r.f. amplifier stages into VHF receiving equipment.

"The gain of a pentode with the noise figure of a triode" is the way many people describe it.

But the high reputation of the cascode circuit has led to many instances where it is now being employed where it was never intended to perform.

A BIT OF HISTORY

The year 1944 was a long time ago. At that time, the best performing r.f. amplifier tube readily available was the 6AK5. It was a pentode, and as such had a fairly high noise figure, but it also had lower noise figure than other pentodes and gain far in excess of 1944-style triodes.

The man who invented our circuit was a scientist named Wallman, and during the first public years of its existance, many called it 'The Wallman Circuit.' However, Wallman himself preferred to call it the 'cascode circuit' since it cascaded two triodes to act like a pentode — and when the TV makers grabbed it for their post war television receivers, the name Cascode stuck.

The original Wallman circuit used two 6AK5 tubes; the first was connected as a triode, with screen strapped to the plate, while the second 6AK5 operated as a grounded grid pentode. Later, Wallman reported no increase in gain could be had by using a pentode in the second stage so the circuit was reduced to a pair of triodes.

The time was late 1944, and now the Cascode was without question the best means of obtaining relatively low noise from 30 to 300 megacycles.

Even in 1954, ten years hence, it was still the best circuit available at reasonable cost. The advent of mass produced television made available large numbers of tube types especially designed for cascode service, at moderate cost.

But TV receiver manufacturers were already looking for ways and means of cutting production costs. By the winter of 1957-8, many of them had abandoned the cascode as an unnecessary circuit. Instead they were using a neutrode circuit consisting of a single neutralized triode. Performance in terms of noise figure was equal to or better than the cascode circuit; the pentode type gain was no longer needed because of higher gain i.f. strips, higher power transmitters and low noise mixer circuits.

Today, literally dozens of different circuits are available. Some use grounded grid triodes, others are of the neutrode type, the cascode is still with us, and we have the **super-tube** series with the 7788 and others.

Eighteen years ago, even ten years ago, the cascode was the only answer. Today it is but one of many answers, although many continue to use it as if it were the only answer.

WHY USE IT?

This is not to say the cascode is obsolete. Far from it. Used properly, it is still a very good circuit for its intended purpose.

What it is saying is that use of the cascode circuit with tubes which were especially designed to eliminate any need for cascode circuitry is neither good design nor is it fully practical.

For example, much time and energy has been spent trying to use Nuvistors in the cascode configuration. WHY? A Nuvistor is designed primarily for use as a neutrode amplifier and utilized this way it will outperform almost all conventional cascodes. The same qualities which make this possible also make it impossible to obtain fully satisfactory service from Nuvistors when they are connected in cascode configuration.

CASCODE CIRCUIT ANALYSIS

Operation of the cascode is best explained by separating it into two stages (one for each tube section) and examining each individually.

The first stage (Figure 1) is a conventional grounded-cathode amplifier. As such, the first thought most people have is that it **should** oscillate wildly since it is an unneutralized triode.

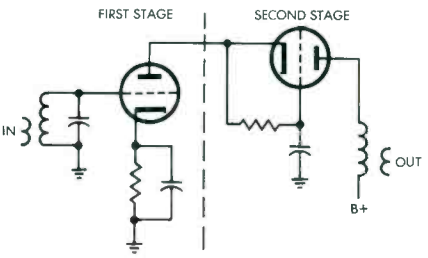


FIGURE ONE—Typical basic circuit of a cascode amplifier showing division into "stages" discussed in text. Parts values depend on tubes and frequency; Typical cathode resistor is 68 ohms. Bypasses usually are .001mF, second "stage" grid resistor 470,000 ohms.

However, feedback theory tells us that, in order for a stage to oscillate, the feedback voltage **must** be greater than the stage losses.

Let's take an arbitrary signal of 1 volt at the grid of the stage. The amplified output voltage at the plate (by standard amplifier theory) will be equal to the tube's amplification factor, times the input voltage, times the ratio of load resistance (in ohms) to the sum of load resistance and plate resistance.

Typical amplification factor of a cascode-designed tube is in the neighborhood of 40. Plate resistance may be the range of 5,000 ohms or higher. But the load resistance is the input impedance of the second, grounded-grid stage! And this input impedance, like all grounded-grid stages, is very low. Almost always it is lower than 500 ohms, and sometimes as low as 100.

Let's plug these figures in: the equation comes out 40 (amplification factor) times 1 (input voltage times 500/5500 — ratio of R1 to Rp plus Rl) and this all multiplies out to an output voltage of 2.86 volts.

Now let's look at the feedback path. Feedback in a triode occurs through a built-in capacitive voltage divider made up of the grid-plate capacity and the grid-cathode

(Continued on Page 34)

made, air line distance between transmitter and each measuring location, basic field strength data and corrections for transmitter powers on Ch. 31

10. RESULTS

In general, it is observed that television signal strength drops faster with distance on UHF than it does on VHF, but where the signals are weak UHF is less subject to man-made noise than VHF. It is seen that high VHF signal variations resemble UHF variations more than they do low VHF variations. Overall indications from the radial measurements are that the difference between winter and summer propagation of televisions signals on either VHF or UHF on the average amounts to less than ± 1 db.

It is seen from the tabulations of Ch. 77 measurements that aural and visual signals could generally be measured as far out as 20 miles from the George Washington Bridge. Because of the very low transmitter power, erratic signals were received at greater distances regardless of the antenna pattern. For example, at a distance of 44.11 miles in the direction of 55.32° true from the George Washington Bridge, the aural signal was entirely satisfactory, even though the translator antenna pattern indicated substantially no radiation in this direction. The picture, however, was Grade 6 and could not be brought in.

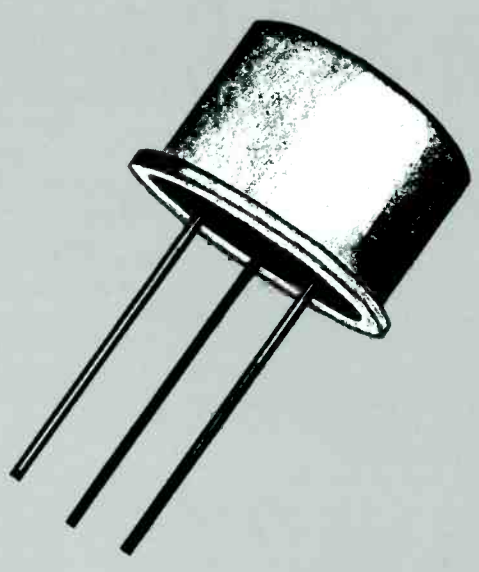
It should be noted that at the greater distances there seems to be a tendency for the effects of beam tilt to be reduced. Whether or not this is a real effect is not known, inasmuch as all points at large distances involve correction for field strength receiver noise, a computation which is very sensitive to the value of the set noise.

Personnel from the Office of the Chief Engineer in Washington. D.C. who worked on this phase of the Project, according to the amount of time spent with the mobile equipment in the field are: Arnold Skrivseth, George Waldo, Roger Carey, Charles Sheets, Donald Eddins, Frank Rose. Harry Fine, Elton Davis, Jack Damelin, William Daniel, Louis Manning and Jules Deitz.

REFERENCES:

1. S. R. Jones, A. Maestrie, R. W. Masters, and M. L. Parker "A UHF-TV Transmitting Antenna for the Empire State Building," IRE International Convention Record, Vol. 10, Part 7, pp 113-120, March 1962.
2. George H. Brown, Jess Epstein and Donald W. Peterson, "Comparative Propagation Measurements: Television Transmitters at 67.25, 288, 510 and 910 Megacycles," RCA Review Vol. IX, No. 2, pp 177-201, June 1948.
3. Report of the Television Allocations Study Organization to the Federal Communications Commission, "Engineering Aspects of Television Allocation," pp 284-286, March 16, 1959.

The Editors of Video-Communications Journal present this report on the Federal Communications Commission UHF television evaluation project recently completed in New York City, in the hopes that this abbreviated data will show some of the methods and results compiled during the Commission's year long test program. This report, compiled by Danied B. Hutton, will be followed in a subsequent issue by a second, Report on Receiver Installations, prepared by Jules Deitz, Office of the Chief Engineer, Federal Communications Commission.



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LAB REPORT (Continued from Page 32)

capacity. Normally the grid-cathode capacity is several times greater than that from grid to plate, so that only a fraction of the output voltage appears at the grid.

Specifically, in a cascode-designed tube, only one-fourth or less of the output voltage appears. Usually, it's much less.

So, going back to our figures, one-fourth of 2.86 volts can appear at the grid when 1 volt is originally fed in. This is a feedback voltage of 0.715 volts, which is less than the original input. Feedback is less than the stage loss, and the circuit cannot oscillate.

Now let's see how we can get the gain of a pentode, after proving that the gain of the first stage is almost always less than 4 and frequently even less than 1.

This can be proved mathematically — but it takes many columns of algebra to do it and the result is hardly worth the effort.

The way it works out is this: the gain of two amplifier stages in cascade is equal to the product of the gain of the first stage times the gain of the second.

The gain of the first stage, mathematically, is the standard equation for the gain of a grounded-cathode amplifier. The gain of the second stage, taken the same way, is the equation for the gain of a grounded-grid amplifier.

So the gain of a cascode **must** be equal to the product of these

And after all the algebra, you come out with a most complex-looking equation (Figure 2). But if (and this is almost always the case) the two tubes are similar in characteristics, and if the plate resistance of the first stage is large compared to the input impedance of the second, this complex-looking equation reduces to a much simpler form: gain is equal to transconductance of the first stage times the load resistance of the second.

And this is identical to the equation for the gain of a pentode!

Note that **all** of this theory is based on the idea that the second stage is a true grounded-grid stage. In the modern version of the cascode circuit, this stage is actually at fairly high DC potential but is grounded for RF through a capacitor.

$$\text{GAIN}_{\text{CASCODE}} = \frac{\mu_1 \times R_{L_2}}{R_{P_1} + \frac{R_{P_2} + R_{L_2}}{\mu_2 + 2}}$$

WHERE μ_1 = FIRST-STAGE AMPLIFICATION FACTOR
R_{P_1} = FIRST-STAGE PLATE RESISTANCE
μ_2 = SECOND-STAGE AMPLIFICATION FACTOR
R_{P_2} = SECOND-STAGE PLATE RESISTANCE
R_{L_2} = SECOND-STAGE LOAD RESISTANCE

FIGURE 2—Accurate equation for gain of a cascode amplifier. Usually, most of this can be eliminated and equation reduced to: gain equals product of first stage transconductance (in mhos) and second stage load resistance/impedance (in ohms). Reduced equation is identical to equation of gain for a pentode.

TROUBLES WITH THE CASCODE

If, for any reason, the second-stage grid is **not** completely grounded for the signal, all sorts of troubles can develop.

For one thing, if the grid is not grounded the input impedance of this stage can rise — and as it rises it can cause the first stage to approach the conditions for oscillation.

Before actual oscillation breaks out, re-generation will take place. The effect of re-generation will be to produce a high noise level, counteracting the effect of the stage.

Such an effect has been discovered in at least one commercial version of the cascode circuit. If your cascode amplifier seems to have too much noise, check that second-stage grid!

Some tubes, used in the cascode arrangement, have a strong tendency to overload. Others perform even better in cascode than they do in other circuits. This is one of the reasons we recommend that you use **only** cascode-designed tubes in the cascode circuit.

At one time it was all the rage to cascade two cascodes for extra gain. This is useless. **One** cascode will give you all the performance you can use. A pentode in the next stage of the amplifier will equal the gain and will not be so easy to overload.

Note that we have not mentioned the "neutralizing" adjustment usually found in cascode circuits. At 54 Mc, this adjustment is not needed and is actually a hindrance since it can easily be **mis**-adjusted to produce regeneration. At 150 Mc and above, it may or may not be needed. Its purpose is to cancel out whatever feedback remains in the first tube, thus reducing regeneration and resulting noise to the lowest possible level. Its value should be such that it resonates at the operating frequency with the grid-plate capacitance of the tube.

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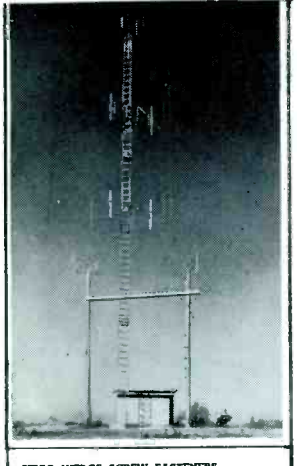

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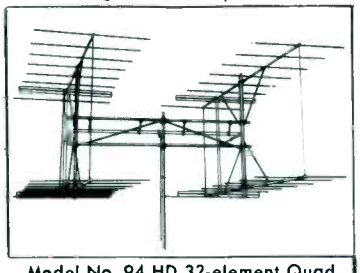

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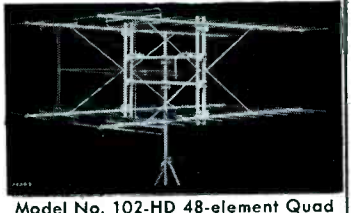

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keting activities for the company's several brands of Marine products.

Lovett will operate out of the Raytheon Apelco division plant in South San Francisco, California.

Philip Bell, executive vice-president of **Pearce Simpson, Inc.**, has been named President and chief executive officer of the Miami Florida manufacturer of communications equipment.

CONTRACT REPORT

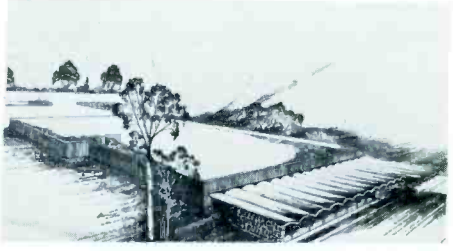
The U.S. Coast Guard has awarded a contract for 200 single sideband, compatible AM radiotelephone transceiver sets to the **Hammarlund Manufacturing Company,** New York. The announcement of the contract award was made by Stuart Meyer, President of Hammarlund. Design of the new equipment will be at Hammarlund's New York City plant, and fabrication and production check-out will be at the firm's Mars Hill, North Carolina facility.

NEW FACILITIES

Perma-Power Company is building a new factory at 5740 North Tripp Avenue, Chicago.

The one story building will provide Perma-Power with approximately twice as much space as the company now occupies at 3100 N. Elston Avenue. The new plant will house manufacturing, warehousing and office facilities. Moving date for the new plant was April 1.

Research facilities to be provided by Purdue University, Lafayette, Indiana was a deciding factor in locating a new ½ million dollar plant in that Indiana City according to W. S. Parsons, President of the **Centralab division of Globe-Union, Inc.**



The new facility will employ approximately 200 workers.

CATALOGUES ANNOUNCED

The Andrew Corporation, P.O. Box 807, Chicago 42, Illinois has announced a new catalogue for Two-Way communications antennas. Designated as catalogue 'F,' the 16 page publication includes 26 fixed station antennas, the line of Foam **Heliax** cables, connectors and mounts applicable to base station installations.

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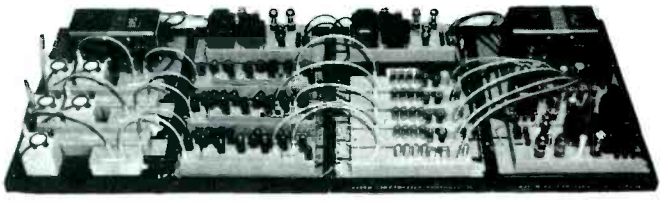

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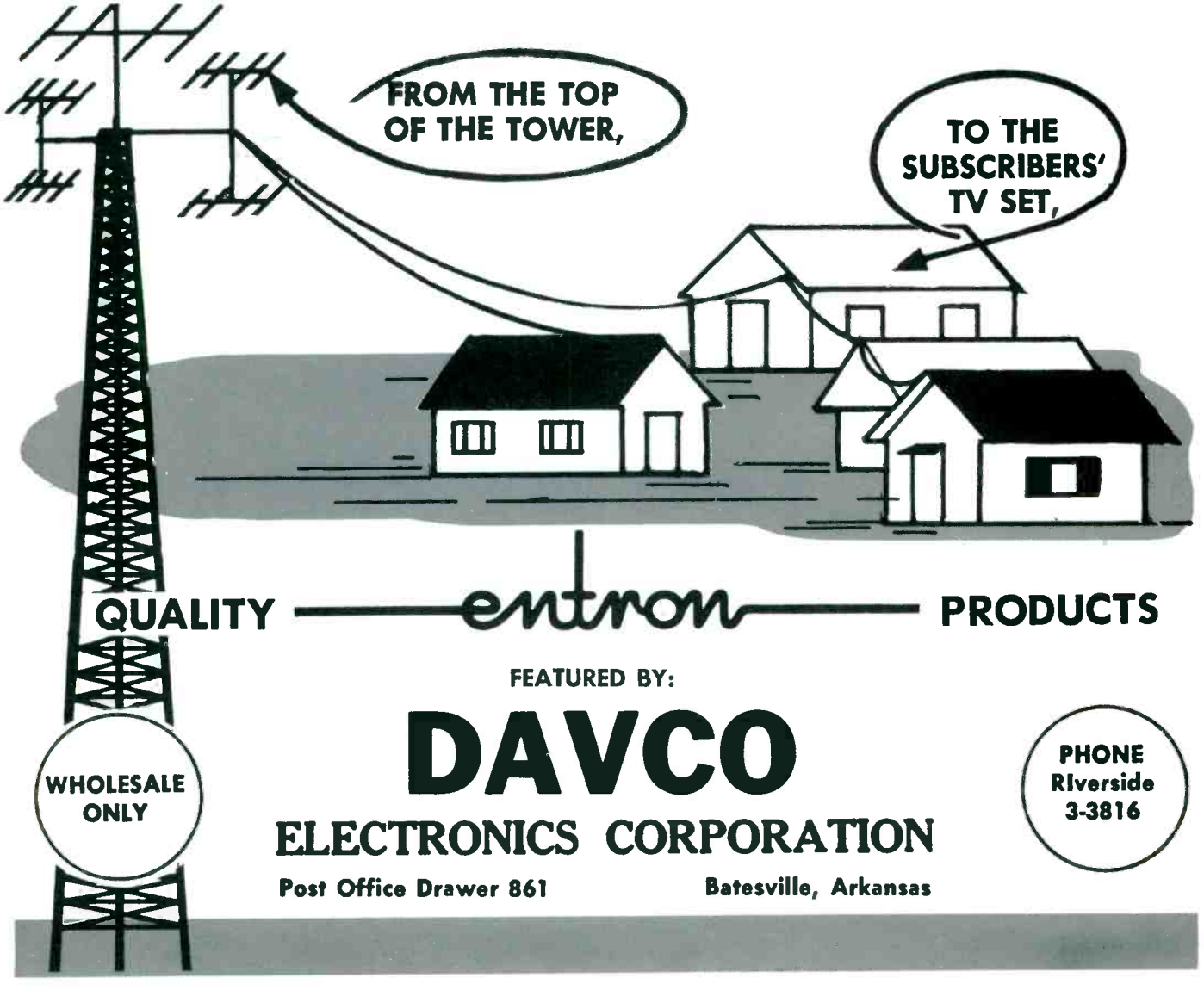

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A GUIDE TO LICENSING MOBILE RADIO SYSTEMS

Fred Macklin*
Communications Company
300 Greco Avenue
Coral Gables, Florida

*Mr. Macklin is associated with COMCO, one of the nation's foremost suppliers of two-way communications equipment for private business, industry and public safety radio users. This guide to two-way radio practices is presented as a reference works for those firms either studying the use of two-way radio, or contemplating preparation of a study guide for prospective customers or new employees.

All radio transmitters in the United States must be licensed by the Federal Communications Commission. The method and form of licensing applications depends upon the radio service in which the transmitter is to be used.

The most popular radio services in terms of VHF-UHF communications systems are the Public Safety Radio Services (Part 10 of the FCC rules), Industrial Radio Services (Part 11 of the FCC rules), and the Land Transportation Radio Services (Part 16 of the FCC rules).

Radio equipment, to operate in any of these radio services, must be **type accepted** by the FCC. This means that the equipment, before it can be sold and installed into a system licensed by the FCC, must meet detailed design and operational specifications as set forth by the FCC. This requirement is to protect licensed users of these services from experiencing interference or disruption of service resulting from spurious or incorrect transmissions emanating from other stations in the same or other services, as a result of improperly designed and functioning equipment.

It is possible to license equipment which does not appear on the FCC's "List of Equipment Acceptable for Licensing," although the procedure is involved. The government requires that any equipment to be installed in a radio system be either on the "Type Accepted List" or that the equipment in question be certified for proper operation by an acceptable standards laboratory, if not the FCC's engineering office itself.

Applications for radio stations licensed under Parts 10, 11 or 16 of the Commission Rules and Regulations are made on FCC form 400. Form 400 certifies that the applicant has a copy of the Applicable section of the rules, and that he has read and understands the applicable sections. This means that before a prospective user files for a license application on Form 400, he must obtain from the Government Printing Office a copy of the proper rules. The Commission has grouped by volumes the rules and regulations governing all radio services into volume units. Volume V contains the rules and regulations covering Part 10, 11 and 16 radio services. This volume is available from the U.S. Government Printing Office, Washington 25, D.C. for $2.50. Form 400's are available from the Federal Communications Commission, Washington 25, D.C., or from regional FCC offices. There is no charge.

USERS OF PART 10

The types of radio services covered by Part 10 of the Commission's rules and regulations are as follows:

Police Radio Service

Fire Radio Service

Forestry-Conservation Radio Service

Special Emergency Radio Services, including:

a) Physicians and Veterinarians
b) Ambulance Operators and Rescue Squads
c) School buses and Beach Patrols
d) State Guard Radio Service
e) Local Government Radio Service

USERS OF PART 11

The type of radio services covered by Part 11 of the Commission's rules and regulations are as follows:

Power Radio Service
a) Electric Power Companies
b) Gas Distribution Pipe Line Companies
c) Water Companies

Forest Products Radio Service

Petroleum Radio Service

Motion Picture Radio Service

Relay Press Radio Service

Business Radio Service
a) Any person engaged in a commercial activity.
b) Educational or Philanthropic institutions
d) Hospitals, clinics and medical associations
e) Industrial Radio Location Service

Special Industrial Radio Service
a) Agricultural Activities and Ranches
b) Heavy construction
c) Mine operation
d) Specialized services leading to industrial operations for public health
e) Ice and fuel delivery
f) Delivery of ready mixed concrete for asphalt
g) Misc. Public Service Activities

Manufacturers Radio Service

Telephone Maintenance Radio Service

USERS OF PART 16

The type of radio services covered by Part 16 of the Commission's rules and regulations are as follows:

Motor Carrier Radio Service

Railroad Radio Service

Taxicab Radio Service

Automobile Emergency Radio Service (wreckers)

LICENSING CONSIDERATIONS

Licensees of industrial, land

transportation and domestic (Parts 10, 11 and 16) radio stations are not required to have licensed operators at base stations or mobile units. Licensees in the Public Safety Radio Service (Part 10) are required to have a restricted Radio Telephone Operator's Permit. This permit is issued without benefit of examination, although rules require the licensee to state in his application that he has a knowledge of FCC Rules and Regulations.

All transmitters licensed under Part 10, 11 and 16 of the Commission's rules must be tagged with an FCC Identification Form, form 452-C, of plate metal or other durable material. This form, form 452-C, states who the owner and operator of the station is, and the station call letters.

Under fairly recent modifications of the FAA rules and regulations, concurrent tower construction application forms must be filed with the FAA (usually accompanying your FCC filing) when towers are constructed within a radius of 3 miles of an existing or proposed airport or landing strip, or if the proposed tower will exceed 170 feet in height at distances greater than 3 miles.

Whatever the case, some form of coordination between your FCC filing and the FAA filing is required with nearly all applications.

In the case of some applications, especially in metropolitan areas of medium to dense population, frequency coordination is required before the FCC application for the proposed station is filed. Frequency coordination requires that the applicant check with the local or regional established Coordinating Committee(s) to ascertain the extent of the present and filed for occupancy on channels immediately adjacent to the proposed station's frequency, and on the proposed frequency. In some areas channel loading in certain services is already so severe that no new stations may be authorized. This is particularly true of the Public Safety (Part 10) Radio Service applications.

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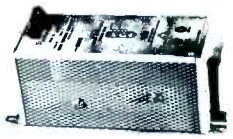

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Log Book

March 18—Comment deadline on FCC proposals to drop operator licensing requirement for public safety radio base and fixed stations.

March 20-23—Spring conference of Electronic Industries Association. Statler-Hilton Hotel. Washington, D.C.

March 22—Annual meeeing of Operational Fixed Microwave Council. Gramercy Inn. Washington, D.C.

March 25-28—International Convention of the Institute of Electrical & Electronics Engineers. New York Coliseum and Waldorf-Astoria Hotel. New York City.

April 1—Comment deadline on FCC proposals to permit railroad microwave systems to carry public telegrams "in those instances where, were it not for the presence of railroad radio facilities, telegraph service could not be provided."

April 1—FCC hearing on applications of Oregon Mobile Radio, Empire Communications of Medford, and Medford Business Exchange, for new radio common carrier service in Medford, Ore.

April 1—Persons operating in the special industrial radio service on frequencies previously available for assignment in the service, but which are no longer available for assignment in the service, must switch frequencies.

May 1—Four new frequencies become available for the local government radio service—46.52, 46.54, 46.56 and 46.58 mc.

May 14-17—Annual meeting of Industrial Communications Association. Eden Roc Hotel. Miami Beach, Fla.

June 4—Annual meeting of National Petroleum Radio Frequency Coordinating Association. Statler Hotel. Washington, D.C.

June 5-6—Semi-annual meeting of American Petroleum Institute Central Committee on Communications Facilities. Statler Hotel. Washington, D.C.

June 15—Persons previously eligible in the special industrial radio service, who received licenses prior to June 15, 1958, but no longer eligible, must transfer to other radio services in which they are eligible.

June 18-21—Annual meeting of National Committee for Utilities Radio. Jung Hotel. New Orleans, La.

Aug. 13-16—National APCO Conference. Leamington Hotel. Minneapolis, Minn.

Oct. 31—Mobile radio users must meet full narrow band technical standards of FCC.

DIRECTORY ADDENDUM

TELEMATION, INC.

Complete line of weatherboard equipment; radio controlled and pre-programmed RF and video switchers; closed-circuit studio equipment; agents for GE. For further information write to: 167 Social Hall Avenue, Salt Lake City 11, Utah.

ELSCO

Sales agents. Handles video and RF demodulation systems; closed-circuit facilities; studio and transmitter equipment. For further information write to: 167 Social Hall Avenue, Salt Lake City 11, Utah.

CRAFTSMAN ELECTRONICS PRODUCTS CO.

Manufacturer of matching transformers, splitters and fittings. Address: 21 Elni Street, Oneonta, New York.

ABERDEEN COMPANY

Manufacturers of stainless steel CATV lashing wire. .045 diameter wire, Type 430 with wax coated finish is available for immediate delivery from either the East or West coast. Offices are located at 3833 Wilshire Blvd., Los Angeles 5, California.

BROCHURES AVAILABLE ON GE VIDICON CAMERAS

General Electric's Technical Products Operation has available three new brochures describing GE's complete line of compact vidicon cameras for closed-circuit television applications. The eight-page, two-color brochures cover the new TE-14 and TE-15 cameras, and the TE-9 camera. Included are performance features and specifications, model and accessory data, and basic guides for system building. Brochures are available from: Advertising, General Electric Company, Technical Products Operation, 212 W. Division Street, Syracuse 3, New York.

CANADIAN ACTIONS

The Board of Broadcast Governors in a February 11th announcement recommended that a CBC application for a license to establish a new French-language television station at Timmins, Ontario be approved. The new facility is slated to occupy Channel 9 with an effective radiated power of 16 kw, video and 8 kw, audio.

At the same time, an application by Channel Seven Television Limited was recommended for denial. Channel Seven Television Limited had applied for a license to establish a new television rebroadcasting station at Brandon, Manitoba to receive programs by off-the-air pickup from station CJAY-TV, Winnipeg, Manitoba, on Channel 7 and to retransmit those programs on Channel 4 with an ERP of 26 kw, video and 14 kw, audio. In denying the application, the Board stated, "The establishment of a TV rebroadcasting station in Brandon would not be consistent with the policy set out in the Board's Statement of General Policy with Respect to Rebroadcasting Stations of December 27, 1961. In the opinion of the Board the licensing of a rebroadcasting station to carry the service of CJAY-TV Winnipeg into the Brandon area would prejudice the local service now being offered there."

Brandon, Manitoba did, however, become the recipient of a new FM radio station inasmuch as the Board recommended that the application of Western Manitoba Broadcasters Limited be approved. The new FM station proposes to operate on a frequency of 96.1 Mc with an ERP of 29 kw.

Ottawa, Ontario looks like it is to have a new FM station also. Radio Prestige Limited applied for a license to operate an FM facility on 101.7 Mc with an ERP of 39 kw. The Board subsequently recommended that this application be approved.

Another Board action recommended for approval, an application by Raymond Crepault on behalf of a company to be incorporated. This applicant had applied for a 93.3 Mc FM station license in Montreal, Quebec. Proposed ERP of the station is 52.2 kw and will be a French-language operation.

SELF-SUPPORTING TOWERS FROM UTILITY

Taking advantage of the inherent strength of standard steel pipe enables one major fabricator of radio towers to reduce both weight and costs in self-supporting units without sacrificing safety.

Objective analysis, according to Utility Tower Company, Oklahoma City, Oklahoma, has determined that wind pressure on cylindrical tower members is only two-thirds that encountered on flat members.

Self-supporting Utility towers are designed to meet several separate stresses—shear, compression, uplift torque and bending. Of these, compression is the greatest. In winds of hurricane velocity, the bending moment on a single leg of a triangular tower may rise to a total of 1,500,000 foot-pounds at the base or 22,000 pounds per square inch.

Self-supporting towers manufactured by Utility Tower range in height from 40 to 275 feet. Leg members, fabricated from Jones & Laughlin Steel Corporation standard pipe, may be from ¾-inch up to 5-inch double extra strong depending upon height and design pressures.

Each tower is built to its specified height in 20-foot increments which are assembled in jigs and welded together in Utility Tower's plant.

VHF COMMUNICATIONS!
10 WATT TRANSCEIVER

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FEATURES: Built-in speaker • Press-to-talk microphone • Automatic noise limiter • Self contained power supply • Temperature controlled crystal oven • Front panel operation of squelch and volume controls • 5" high x 12½" wide x 8½" deep • DC units: 12½ pounds net.

RELIABLE 2-WAY COMMUNICATIONS AT LOWEST PRICES!

Single channel crystal-controlled transmitter and receiver. Stabilized to .0005% with conservative 10 watts output. United States FCC type accepted and licensed.

Brand new units, aligned, preset, and guaranteed on any VHF frequency between 118 and 174 MC. Available in 6 volt DC, 12 volt DC, or 117 volt AC models. Specify voltage and crystal requirements with order.

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CATV Operators

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NOW – GO 12 CHANNELS

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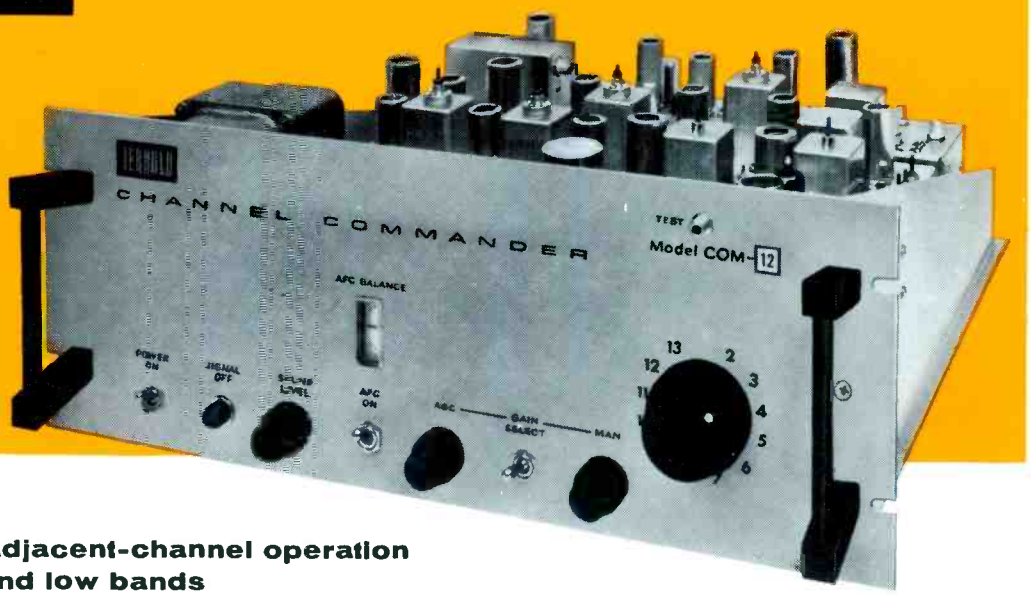

- **Permits adjacent-channel operation on high and low bands**
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You can now offer CATV reception on all twelve VHF channels with no adjacent-channel interference! By adding a Jerrold Channel Commander to your head end for each adjacent channel desired, you achieve 12-channel operation with minimum equipment.

The Channel Commander is a complete, compact unit which processes, controls, and delivers clear, interference-free signals on any desired VHF channel, including direct operation on the received frequency in both the high and the low bands.

In conjunction with Jerrold microwave and all-band-system equipment, the Channel Commander gives you command of the entire VHF band, lets you offer CATV subscribers the widest choice of entertainment possible over their present TV sets.

Channel Commander's compact modular design and compatibility with your present head-end equipment lets you "go 12 channels" immediately or in channel-at-a-time stages. Call your Jerrold factory representative or write for complete technical data.

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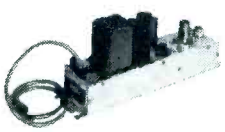
As more and more CATV owners make the *wide band* decision for the construction of new systems and the conversion of old ones, they turn to SKL for equipment and engineering with *experience.*

First in the wide band field, SKL pioneered the all-channel CATV system a decade ago. Since then, thousands of SKL wide band distributed amplifiers and their associated equipment — over many millions of actual operating hours — have demonstrated their high fidelity performance, their continuing reliability, their low maintenance cost year after year.

They have built SKL's solid reputation for top quality. They have proved that in *every* way, SKL is *first* in wide band systems.

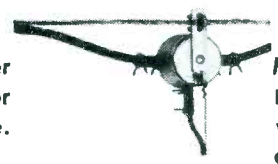
Just a Few of SKL's Wide Band "Firsts":

1950
First wide band distributed main line amplifier.



1952
First automatic level control unit for *wide band* systems.

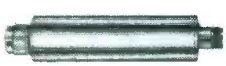
1954
First Multivider line splitter for *wide band* use.



1956
First Chromatap line tap for *wide band* application.

1958
First wide band distributed feeder line amplifier.

1959
First "Thermatic" gain control for *wide band* systems.



1960
First "Thermatic" *wide band* line equalizer.

1961
First high gain thermally controlled wide band distributed amplifier.

. . . And in **1962,** the *first* automatic pilot controlled slope equalizer for wide band systems.

For the most advanced wide band equipment — backed by the most experienced engineering — call the leader in the field. Call SKL *first!*

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