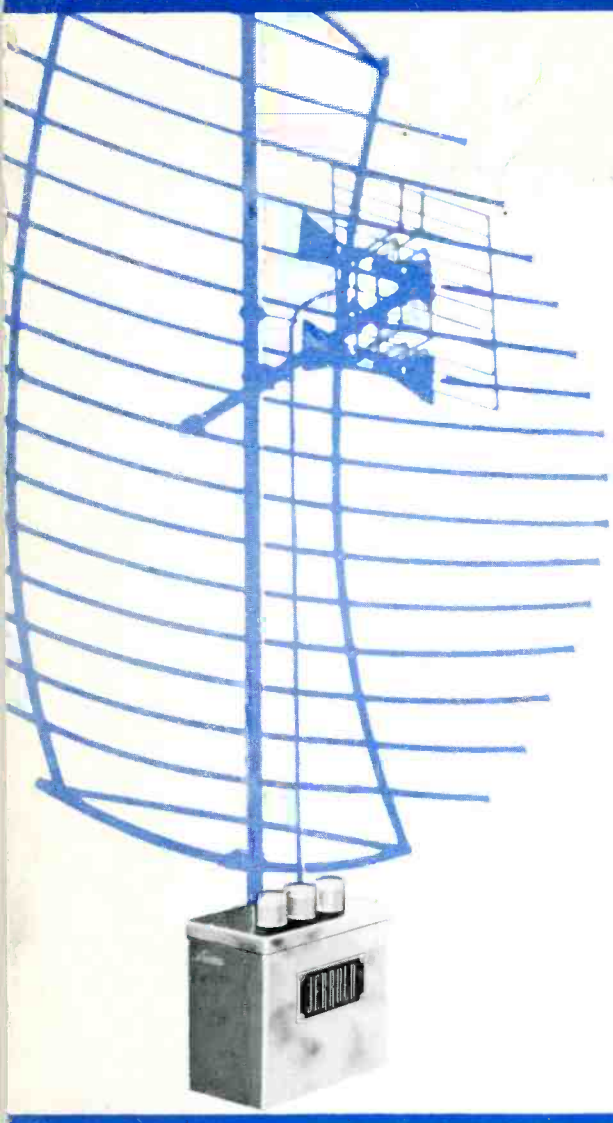
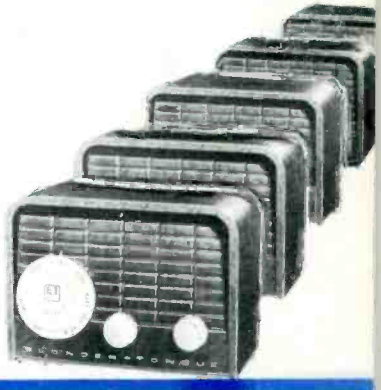
SEPTEMBER 1961
40 CENTS

TELEVISION HORIZONS



? THE UHF QUESTION



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Al Bowdy, KCOP Television
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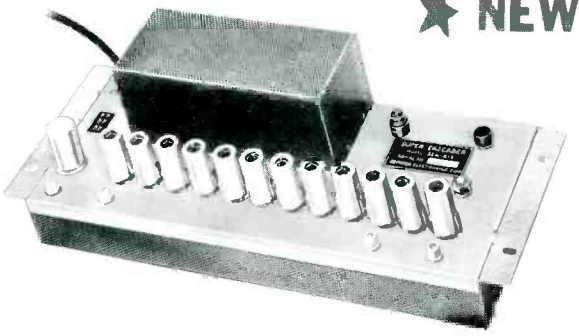
Los Angeles 38, Calif.

THIS MONTH

Three new stars in the JERROLD CATV galaxy



★ NEW! ALL-BAND SUPER-CASCADER AMPLIFIER, Model SCA-213

Features *twice the cascadability* of any other all-band amplifier. The ultimate unit for any new or existing all-band system. Provides for AGC, plug-in equalization, and an output capability of 45dbj* per channel for seven channels with only 0.14% intermodulation distortion.

*0 dbj = 1,000 microvolts across 75 ohms.

★ NEW!

STRIP-BRAID COAXIAL CABLES— Series JT-400

Permits faster, easier, less costly installations. New revolutionary strip braid decreases attenuation, reduces over-all cable weight by 20 to 40%, provides better impedance uniformity, and makes possible single- and double-shielded cables with same O.D. A new line of Jerrold adapta-fit connectors and weatherproof splices mates this revolutionary cable to standard "F" series fittings.

★ NEW! WIDE-BAND MICROWAVE SYSTEMS—Series "J"

Designed specifically for the CATV industry. New compact modular construction, exceptional frequency stability (.005%), 1-watt output, front-panel metering of all tubes and circuits, and an 8mc baseband. Units stack on common waveguide without use of accessory isolators or circulators, and have individual power supplies for high reliability.

If you missed these and the other new Jerrold products at the NCTA Show, see your Jerrold Community Systems factory representative or write for full information.

JERROLD® **ELECTRONICS CORPORATION • Community Systems Division**

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Channel 1

Exclusive and Late News of the TELEVISION RECEPTION INDUSTRY

Graduation Time

Interest in Television Horizons has never been higher, nor has it grown so much in a thirty day period as the past thirty. This publication's positive stand in the UHF television question, our steadfast belief that both cabled-wired television and translator television are needed and necessary on the American-Canadian Television scene, and our prodding for more and better products for both VHF and UHF off the air reception has won us a place on every prominent and busy television engineer and technician's bookshelf from coast to coast.

Thus it is only fitting that Television Horizons grow up a bit to keep ourselves paced with the growth of the industry . . . an industry we play a pretty important part in.

Two issues away . . . in November . . . Television Horizons will take on a new physical appearance, with an enlarged "magazine size" 8 by 11 format, three columns of type per page. Additionally, several editorial changes will be made to the TVH format and a few surprises are in store for those readers who watch our masthead carefully. All of the details on the "Graduation of Televison Horizons into big-book size" will appear next month.

Translator Pitfalls

Look for a series of changes in the VHF translator line up in the months ahead! One spring-time starter in the field has cut back his entire plant force to two persons following lack of field acceptance of the unit by the mass market. Yet another spring starter in the field is bemoaning the lack of qualified representatives to pitch his product to isolated communities.

It was just one year ago that only one honest-to-goodness manufacturer of the VHF type unit existed in the field. And it was just six months ago that nine manufacturers of VHF translators met the public in Salt Lake City. Now the cycle appears to be complete with consolidations and marketing mergers added to out and out failures in the field, the six month ago figure of nine has jelled back to three active promoters of the unit. Of the three, two were in the same or allied fields one year ago, and the third was merely a dream.

The FCC, meanwhile, is still concerned about a reported 250 plus VHF Boosters who continue to operate oblivious of the law.

Cable Consolidations

While the VHF translator business seems to have run its cycle, the CATV world could not be brighter. During the past thirty days the NCTA's newly elected Board met in Chicago to formulate plans for public service and group activities in the year ahead. One of the announced positive steps taken by the CATV set is a new nationwide program of adding educational television outlets to existing CATV line-ups wherever possible.

Meeting at the Drake Hotel, Chicago, the NCTA Board voted to push an educational TV drive to all of the nation's 1200 plus cabled systems, as a means of providing upgraded educational standards for the thousands of smaller communities served by CATV.

The program will be coordinated by the NCTA's Educational Policy Council, chaired by Homer Bergren, Seattle, Washington, veteran CATV operator in the Northwest. The Council will work closely in the project with William G. Harley, President of the National Association of Educational Broadcasters.

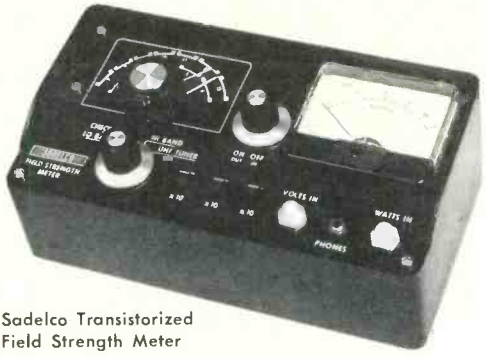
Winegard-Channel Master Enter Pact

The Winegard Company and the Channel Master Corporation have announced a new royalty bearing patent license entered into by

the two firms under Winegard Patent 2,700,105. This license agreement is based upon the termination of the pending action between the Winegard Company and Channel Master in a manner agreeable to both parties.

Sadelco Announces Transistorized TV Field Strength Meter

Sadelco, Incorporated, a new firm founded and head up by Harry L. Sadel of 601 West 26th Street, New York 1, New York, will soon announce a brand new unit for off-the-air television signal plotting in remote and power-



Sadelco Transistorized Field Strength Meter

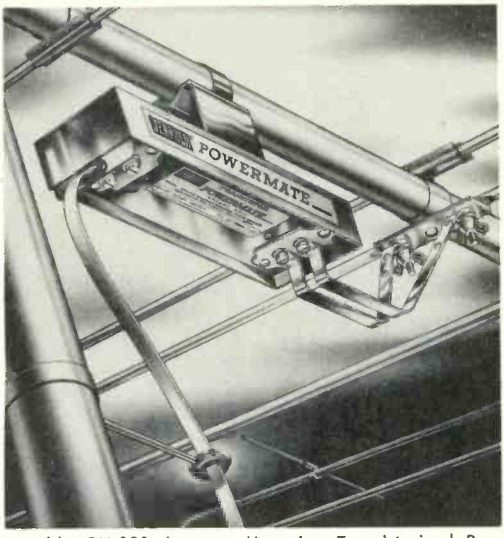
less areas. The new *Sadelco* Transistorized Field Strength Meter is light weight (two and a half pounds), compact (8 inchs by 4 inches by 2.5 inches) and battery operated (two-standard nine volt cells). The new meter covers the VHF-TV spectrum in two ranges (2-6, 7-13) with individual dial calibration markings for video and audio carriers on all channels, 75 ohm input with accessory 300 to 75 ohm matching transformer, and a separate 75 ohm input for measuring power output on one watt VHF translators. A UHF position will handle an accessory UHF tuner which will be made available soon. The range is twenty microvolts to one volt in four 20 db. steps. The manufacturer claims the unit is "just what the doctor ordered" for locating TV signals in remote areas, establishing antenna gain and directivity, measuring amplifier gain, and complete check out of master and CATV systems.

The announced dealer price is $195.00 per meter.

Jerrold Announced Transistorized Preamp

Jerrold Electronics Corporation has unvieled a new transistorized antenna preamplifier.

The Model APM-101 mounts directly at the all channel antenna dipole "for maximum



Jerrold APM-101 Antenna Mounting Transistorized Preamplifier.

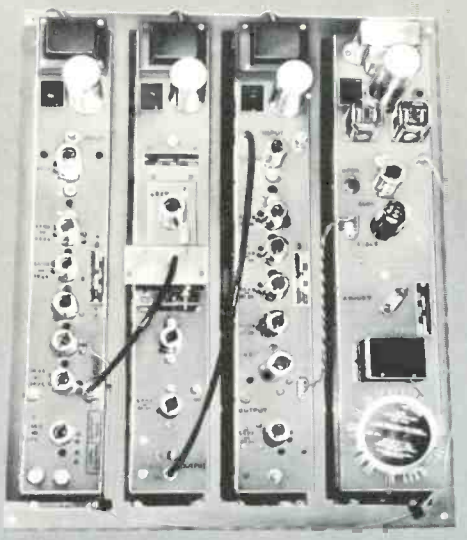
gain and signal to noise ratio." Signal gain, through the preamplifier, averages 13.9 db. (25 times power gain) at channel thirteen and 18.25 db. (67 times power gain) at channel two. The AC supply provides 15 volts to the amplifier mounted at the antenna from a two set splitter chassis which in turn mounts at a convient spot near the receiver. The power for the unit is carried to the preamplifier along the 300 ohm twinline.

Collins Radio 11-15 Kmc Receiver

Collins 12 Kmc Microwave Ready

The Collins Radio Company, Dallas, Texas has announced its new series of six to eight kmc. and eleven to fifteen kmc. microwave. Transmitter power outputs of 100 milliwatts and one watt are available in the 6-8 kmc. range, and 50 and 500 milliwatts in the eleven to fifteen kmc. range. The new systems are especially well suited to video relaying circuits; the 11-15 kmc. equipment is expected to find wide application among CATV system owners interested in privately owned microwave circuits. RBC

AVAILABLE FROM BLONDER-TONGUE



NEW BENCO (MODEL T-6) VHF TRANSLATOR (FCC TYPE ACCEPTED)

U.S. USER PRICE $834

THE ECONOMICAL APPROACH TO TRANSLATOR INSTALLATIONS

The Benco T-6 VHF Translator is a straightforward unit—it is business-like with no frills, yet it provides all the capabilities necessary for top performance in a translator installation at an economical price. It is a high quality translator, meeting all FCC requirements.

The T-6 provides one watt of undistorted power. It will cover distances from 8 to 30 miles. Its low noise preamp includes AGC to maintain satisfactory picture quality with input signals as low as 50 microvolts. The T-6 is equipped with an identification unit which meets FCC specifications. It sends out identifying signals and provides automatic shutoff when the master station goes off the air. If the T-6 is installed in a remote or inaccessible area, it can easily be equipped with the RC-1 remote control unit to turn the translator power on or off from a distance of 5 miles or more.

TECHNICAL SPECIFICATIONS

Primary Power Source	117 v ± 10% 60 c/s
Power Consumption	120 W
Temperature Ambient	—30°C to + 50°C
Overall Noise Figure	
Low Band	4 db ± 1 db
High Band	6 db ± 1 db
Recommended Input	50—4000 microvolts
Max. Permissible Power	1 Watt (Peak Power)
Frequency Stability	.02%
Gain (maximum)	105 db
Band Width	6 Mc (3 db points)
Dimensions (metal base)	18"x22½"
Weight	27 lbs.

BENCO VHF AND UHF TRANSLATORS FOR EVERY TYPE OF INSTALLATION

MODEL T-1 VHF TRANSLATOR *FCC type-accepted.* 1 watt output for U. S. use. There is no finer translator available today. It not only meets but exceeds FCC specifications. Some of its features include a noise proof automatic shutoff; regulated power supply for stable operation even at the end of poor quality power lines; and underrated output section for continuous service; a weatherproof housing; quick easy coding of identification unit; built-in direct reading power meter.

MODEL T-14 VHF-TO-UHF TRANSLATOR *FCC type-accepted.* 2.5 watts output. For United States use. Includes identification units with automatic "on/off," power indicator and voltage regulator. VHF input, channels 7-13.

MODEL T-13 VHF-TO-UHF. Same as T-14 except: VHF input, channels 2-6; not yet FCC type accepted.

If you're planning a translator installation, contact Blonder-Tongue. DEPT. TH-9
Free layout service; field engineering assistance at nominal cost are available.

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GENERAL

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"Television Horizons' readers — always the first to know, the best informed, the first to act."

JUDGE FOR YOURSELF...

The Long Awaited Push to UHF!

In the past thirty days the "handwriting on the UHF television wall" has become increasingly clear. In a fast-moving multi-pronged attack the Federal Communications Commission stepped up its long expected drive to the UHF television range and issued a series of decisions and announced yet another series of intentions regarding the ultimate move of all television in the United States to the ultra high frequency range. This Television Horizons' report groups into logical order Commission actions in the UHF-TV field in the past 30-45 days and leaves it up to you—the reader—to decide, "Is the long-expected push to UHF television here?"

The stage was set on July 26th, when the Commission, en banc, denied the application of television station WHAS-11, Louisville, Kentucky to move that station's transmitter site to a point 19 miles northeast of Louisville. The original WHAS application looked to be merely another bid for "the tallest television tower in the world." WHAS had applied for permission to shift the transmitter site to an elevated piece of ground near Brownsboro, Kentucky, some 19 miles northeast of Louisville. With the move came an application to go from a 600 foot tower to a 1,859 foot tower.

Following the usual complaints from the FAA the Commission engineers noted the proposed WHAS site would place the new antenna 58 miles from Lexington, Kentucky. Lexington is currently a UHF preserve, with WKYT-27 and WLEX-18 operating there. WKYT is a CBS affiliate, *as is WHAS*. The move would place an excellent quality grade B signal from WHAS into Lexington, and the demise of WKYT might well be expected to follow.

In its July 26 announcement, the Commission noted *"The issues of (this) proceeding concerned potential air hazard of the proposed tower and the impact upon UHF television in Lexington, Kentucky. The decision stated that failure of one of the Lexington UHF stations (presumably WKYT is meant here—Ed.) would contravene the third and fourth priorities of the Sixth Report and Order through the loss by nearly 40,000 persons of their only service, and by Lexington's reduction to but one local service. If both Lexington stations were to fail the first and second priorities would be violated in that 61,336 persons would lose their only service and Lexington would be left without local service."* The Commission further noted, *"The very real possibility that either or both Lexington stations would be forced off the air in the event of a grant to WHAS, makes it patently clear that violence, rather observance, of the priorities of the Sixth Report and Order would result from a grant of the (WHAS) application, and it is concluded that such (a grant) would not serve the public interest, convenience, and necessity."*

With this action on the part of the six Commissioners (Commissioner Cross did not participate) the stage was set for what was to follow July 28th.

Now some observers may contend the stage for the July 28th action was really set on July 20th, when Hearing Examiner Jay A. Kyle issued an initial decision looking toward (1) allocating channel 31 to Evansville, Indiana, deleting channel 7 from that city, and (2) modifying the construction permit of WTVW (now operating on channel 7) in favor of channel 31.

Although we have not seen this hypothesis expounded in print, it has been kicked around considerably in Washington press circles.

On July 28th the Commission's press relations department laid out a five and one-half page public notice concerning the Commission's future policy direction towards UHF telecasting. The size of the announcement (five and one-half pages) itself was noteworthy.

What It Said

The announcement was captioned with the heading "Multi-pronged UHF Program Proposed."

It read in part: "By notice of Proposed Rule Making, the Commission invites comments by October 2 on a series of steps aimed at encouraging and facilitating fuller utilization of the UHF channels. Careful studies of the television problem led to the Commission's announcement in April 1959 that it would be necessary to seek solutions among five alternate modes of allocating spectrum space to television. Three of these solutions contemplated expansion of the number of VHF channels, the fourth contemplated a 70 channel UHF-only system, while the fifth looked toward more effective use of the present 82 channel VHF-UHF system. Announcement late last year that additional frequencies in the VHF and lower UHF portions of the radio spectrum could not be obtained from the Department of Defense made it clear that fulfillment of the objectives of the nation's television system can be achieved only through much fuller utilization of the presently allocated UHF channels. *It is not yet clear whether a nationwide, competitive system can be obtained through the use of the UHF channels only.* Though this may eventually be found to be feasible, present efforts must be concentrated upon developing a system involving greatly expanded use of the UHF channels in combination with the now virtually saturated twelve VHF channels.

"Accordingly, the Commission (has) launched a multi-pronged program designed to lower the barriers which have stood in the way of progress in UHF telecasting. In summary, the program consists of:

(1) Express and unqualified recognition that the UHF spectrum is indispensable to the achievement of a nationwide fully competitive television service.

(2) Encouragement of the use of UHF facilities through the creation of all-UHF areas in markets where multiple services would probably develop if sufficient comparable services, not possible under present conditions, can thereby be made available. This involves an expanded program of deintermixture. (EDITOR'S NOTE: See July issue Television Horizons for report titled "Four FCC UHF Target Areas.")

(3) Confining interim assignment of additional VHF frequencies at substandard spacings to the most pressing cases of need for early competitive outlets in the major markets where there are already two VHF stations and where the addition of a third VHF station would not impinge significantly upon existing UHF service.

(4) Relaxation of some of the technical requirements for UHF broadcasting, thereby making possible the construction and operation of UHF stations at lower cost.

(5) Permitting VHF stations to operate parallel UHF outlets in the same community under waivers of the duopoly rule. This will involve earmarking for such dual operations enough UHF channels to provide a UHF outlet for each existing VHF station, as well as for all holders of VHF construction permits. This pool of channels for commercial use will be reserved for a period of three years from the effective date of legislation authorizing the Commission to fix standards for television receivers shipped in interstate or foreign commerce, if such be passed, or until December 31, 1965, whichever date shall first occur.

(6) Earmarking sufficient additional UHF channels to provide for educational needs, taking into account an updated assessment of those needs now being undertaken by educators.

(7) Elimination of the table of UHF channel assignments and substitution in its place of an assignment system under which anyone desiring to build a station in a particular community may apply for the lowest locally available UHF channel without antecedent rule making.

(8) Eliminating comparative hearings for UHF channels to the end that a qualified applicant will be granted any channel for which he has applied before anyone else (has applied). Such construction permits shall be cancelled unless that station authorized is built within the time specified therein or any extension thereof granted for a good cause shown.

(9) EMPLOYING UHF TRANSLATORS AS THE PREFERRED MEANS OF BRINGING TELEVISION SERVICE TO ANY REMAINING WHITE AREAS.

De-intermixture

Part two of the above expressed Commission intent concerns "the encouragement of the use of UHF facilities through the creation of all-UHF markets." In a word, this means deintermixture of markets where a single VHF station is now competing with one or more UHF stations.

Accordingly, the Commission has announced intent to remove the following VHF stations from the following eight market regions:

Madison, Wisconsin (WISC-3);
Rockford, Illinois (WREX-13);
Hartford, Connecticut (WTIC-3);
Erie, Pennsylvania (WICU-12);
Binghamton, New York (WNBF-12);
Champaign (WICA-3)-Urbana-Danville-Springfield, Decatur, Illinois;
Columbia, South Carolina (WIS-10);
and
Montgomery, Alabama (WSFA-12).

Of these eight, four were released previously to readers in the July Television Horizons. One not previously released, although scheduled for early deintermixture, is Montgomery, Alabama. With WSFA-12 operating on VHF, and WCOV-20 operating on UHF at the present time, it is interesting to note elsewhere in Commission records a pair of applications granted during late July and early August for *two additional UHF telecasters* in the city. One is for an educational station on channel 26, while the second calls for a third commercial station in town, this one to operate on channel 32 with an ERP of 234 kw.

A Formula?

In the July Television Horizons a report titled "Four FCC UHF Target Areas" discussed apparent Commission thinking regarding UHF set saturation in regions now served by VHF and UHF stations, intermixed. The following table charts the eight cities now publicly marked for deintermixture, and shows official Commission accepted figures of UHF set conversion in each of these cities.

Madisan, Wisc. — Dane County	**99 percent**
Rackford, Ill. — Winnebaga Cty.	**97 percent**
Hartford, Conn. — Hartford Cty.	**90 percent**
Erie, Pa. — Erie County	**74 percent**
Binghamton, N.Y.—Broome Cty.	**73 percent**
Champaign, Ill.—Champaign Cty.	**62 percent**
Columbia, S.C.—Richland Cty.	**68 percent**
Montgomery, Ala.— Montgomery County	**94 percent**

Not All Rosey for UHF

Although the first definite overall UHF program pattern seems to be forming, there is still expressed concern on the part of the Commission to provide a third channel of local television to eight "top 75 market regions" now operating with but two local service channels. The Commission stated it feels the immediate need to provide a third network service to the following cities makes it mandatory that VHF "drop-in" assignments be made in these cities:

Baton Rouge, Louisiana—Drop in channel 11
Dayton, Ohio—Drop in channel 11
Birmingham, Alabama—Drop in channel 3
Jacksonville, Florida—Drop in channel 10
Knoxville, Tennessee—Drop in channel 8
Johnstown, Pa.—Drop in channel 8
Charlotte, North Carolina—Drop in channel 6
Oklahoma City, Okla.—Delete channel 5 from Enid Okla., adding it to Oklahoma City

Elimination of UHF TV Table Assignments

The Commission proposes to amend the rules to enable a qualified applicant to designate and apply for any UHF channel available for local assignment meeting prescribed separation rules. In this connection the Commission invites comments on methods and restrictions it should take to safeguard against the taking up of UHF channels in a manner which would result in ultimately inefficient distribution of UHF assignments and earlier saturation than would occur under the present system of fixed assignments. (*Editor's note:* Readers are referred to an article appearing in this issue of TVH by Arnold Skrivseth, FCC Engineer, concerning one FCC proposed method of channel allocations based upon mathematical computation of minimum mileage separations et al.) One method which may have merit, and which the Commission is presently studying, would make groups of channels available alternately to major markets or smaller outlying cities to help preserve equitable distribution and avoid undue concentration of all the more desirable UHF assignments in the larger cities to the deprivation of smaller communities. Such a system might retain the advantages of a fixed city-by-city table of allocations and at the same time provide the degree of flexibility needed to stimulate the development of UHF TV by making low channels more easily available to early starters. The first applicant for a locally available channel would tentatively pre-empt it as against subsequent applicants, and the pre-emption would be confirmed upon any subsequent grant of the application. The Commission would rigorously require such grantees to build and start operating within a prescribed time, with extensions to be considered only for brief periods when good cause is amply shown. At such time as local availabilities approach saturation, the opportunity to so pre-empt a channel would be discontinued and the Commission would then recur to the traditional system of competitive hearings for mutually exclusive applications.

Handwriting on the Wall

To the astute reader, the meaning of all of the foregoing should be exceedingly clear. Here at last the FCC has laid out the blue print for a truly nationwide system of television. The fact that the Commission is ready to abandon a table of UHF assignments in favor of adopting a "first come—first serve" system for the ultra high channels is in itself very indicative of the meaning the Commission wishes read into the "Multi-Pronged Drive to UHF."

(Continued on page 28)

Here is . . .

THE FCC UHF ASSIGNMENT PLAN

for

TOTAL UHF TELEVISION

Prepared by
Arnold G. Skrivseth
Office of Chief Engineer
Federal Communications Commission
Washington 25, D.C.

SUMMARY: Studies have been conducted in Europe of the most efficient means of assigning channels when a number of conditions must be met as in the situation encountered in the UHF-TV band. The results of these studies have recently been published and from these an arrangement of channels has been developed which would theoretically permit assignment of over 8,000 stations in the UHF-TV band in the forty-eight states of the continental U.S. without violation of any of the "taboos" involved in the FCC rules. However, the taboos impose severe restrictions on the flexibility of assignment if this efficiency is to be approached.

— — —

There recently appeared articles in the E.B.U. Review and the Rundfunktechnische Mitteilungen of December 1959, February 1960, and April 1960 by H. Eden, H. W. *Fastert and K. H. Kaltbeitzer of the Institute* für Rundfunktechnik, Hamburg, Germany on the general subject of television assignment plans including a mathematical derivation of a scheme for arriving at the most efficient arrangement of channels under the conditions encountered in UHF-TV assignment plans under the FCC rules. The method set forth in these publications was used for determination of a channel arrangement which would allow more efficient assignment of UHF channels than is possible under an equilateral triangle grid.

Starting with the assumption that as many stations as possible are desired, then it follows that the best arrangement should be one using every sixth channel at a given location. This results from the fact that there are "taboo" separation requirements for all of the lesser channel separations, and greater channel separations would result in fewer stations per location. Since a spread in locations would increase the effect of the taboos this six-channel separation should result in an assignment efficiency which is as good as or better than any other arrangement.

The following conditions are required to be met by Section 3.610 of the Commission's Rules in Zone I.

Channel separation	Mileage required	Reason
0	155	Co-channel
1	55	Adjacent channel
2	20	Intermodulation
3	20	Intermodulation
4	20	Intermodulation
5	20	Intermodulation
7	60	Oscillator
8	20	IF Beat
14	60	Sound image
15	75	Picture image

For convenience the following numbers will be used to designate the associated channels:

Group Number	Channel numbers
0	14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80
1	15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81
2	16, 22, 28, 34, 40, 46, 52, 58, 64, 70, 76, 82
3	17, 23, 29, 35, 41, 47, 53, 59,, 65, 71, 77, 83
4	18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78
5	19, 25, 31, 37, 43, 49, 55, 61, 67, 73, 79

Groups 0 through 3 contain 12 channels each, which is the maximum that can be as-

signed to any single location under the Commission's rules. Groups 4 and 5 contain 11 channels.

Comparison of the channel numbers with the requirements of Section 3.610 given above will show that the following minimum mileage separations between the above groups are required:

Groups	Mileage	Groups	Mileage
0 vs 1	60	2 vs 3	60
0 vs 2	60	2 vs 4	60
0 vs 3	75	2 vs 5	75
0 vs 4	60	3 vs 4	60
0 vs 5	60	3 vs 5	60
1 vs 2	60	4 vs 5	60
1 vs 3	60	and vice versa	
1 vs 4	75		
1 vs 5	60		

From reference (2) one obtains the following equations:

(1) $t_1 + t_2 + t_3 = zC$

which here becomes

$t_1 + t_2 + t_3 = 6$

Where t_1, t_2, t_3 constitute a triad, i.e., three numbers

$z = -2, -1, 0, 1, 2$, etc.

C = number of channel groups to be assigned (here 6)

(2) $c + zC = \begin{vmatrix} a & b \\ t_1 & t_2 \end{vmatrix}$

$= at_2 \quad -bt_1$

Where a, b are multiples of the basic triangular lattice, i.e., coordinates of the desired point in units of the basic triangular lattice.

c is the number of the channel group.

Choose z so that 0 is less than or equal to c and less than C thus for our example c will be channel group 0, 1, 2, 3, 4, or 5.

Under the conditions set forth in reference (2) and with six channel groups (i.e., C = 6) there are only three possible triads which can be obtained from equation (1), namely:

0, 1, 5
1, 1, 4
1, 2, 3

Inserting the first two numbers of these triads into equation (2) one obtains the three possible arrangements of channels. The 0, 1, 5 triad results in such an inefficient arrangement when adjusted for co-channel separation that it will not be considered further.

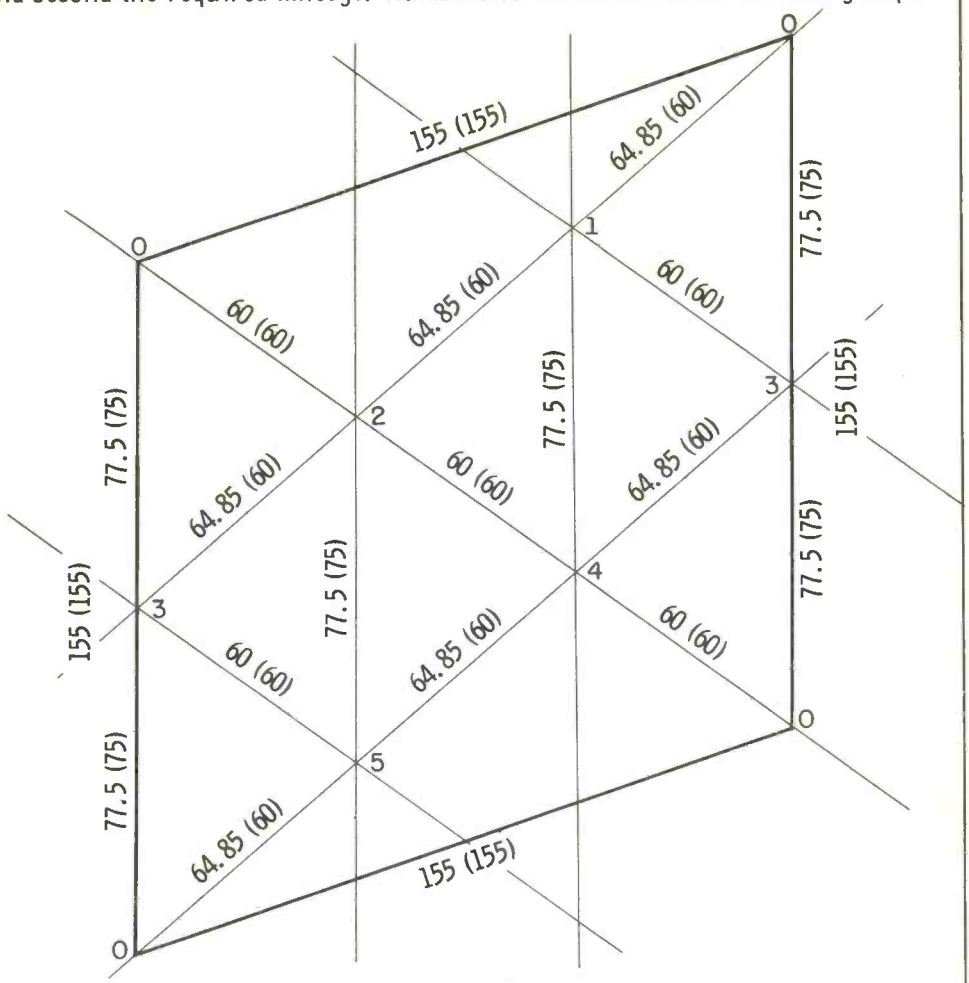
The 1, 1, 4 triad results in the arrangement shown in Figure 1. As originally plotted the triangular grid would consist of equilateral triangles 60 miles on a side. However, inspection will show that this does not meet all of the specified requirements for mileage separation. The triangles are then adjusted so that, first, the co-channel separation between channel groups 0 is 155 miles (automatically making the 0-3, 1-4, and 2-5 spacings 77.5 miles which exceeds the 75 mile requirement). Then the short diagonal of the rhombus is adjusted to 180 miles (i.e. 3 times 60) so as to meet the requirement of 60 miles for 0-2, 2-4, and 4-0 (or 0-4). Again this automatically makes 1-3, 1-5, and 3-5 60 miles. The dimensions 0-1, 1-2, 2-3, 3-4, 4-5, and 0-5 become 64.85 miles which exceeds the 60 mile requirement. A check of these modified spacings will show that they now meet all the rule requirements for Zone I.

The 1, 2, 3 triad results in the same arrangement as in Figure 1 for the 1, 1, 4 triad except for orientation of the grid. Since orientation of such a grid can be considered as independent of the arrangement of the grid, for our purposes the 1, 2, 3 and 1, 1, 4 triads are equivalent. However, in working with the 1, 2, 3 triad and adjusting the rhombus to meet the mileage separation requirements a variation of the rhombus of Figure 1 was obtained, which is shown in Figure 2. Here the 0-2, 2-4, and 4-0 spacing became 69.40 miles rather than the 60 miles required. This can be considered to be a modification of the rhombus in the direction of making it a square. Actually any rhombus between these two conditions would be satisfactory with slight variation in efficiency. Variation outside this range would require increase in co-channel spacing and thus more rapid reduction in efficiency.

As a standard of comparison the area of a rhombus 155 miles on a side with acute angles of 60 degrees (i.e., one made up of two equilateral triangles) is 20,806 square miles. If all the channels could be assigned in such a rhombus it would mean that there would be no loss in assignments under the Commission's rules. Thus the "taboos" would have resulted in no loss in assignment efficiency and we thus assign a value of 100% efficiency to such an arrangement. *No arrangement has been found which meets this condition.* However, compared to this rhombus, the 1, 1, 4 triad results in a rhombus with an area of 22,715 square miles or an efficiency of 91.6 percent compared to the equilateral triangle rhombus. The rhombus of Figure 2 has an area of 23,902

BASIC RHOMBUS FOR UHF-TV ASSIGNMENT PLAN

Numbers thus: 77.5 (75) show first the actual mileage and second the required mileage. Numbers at intersections are channel groups.

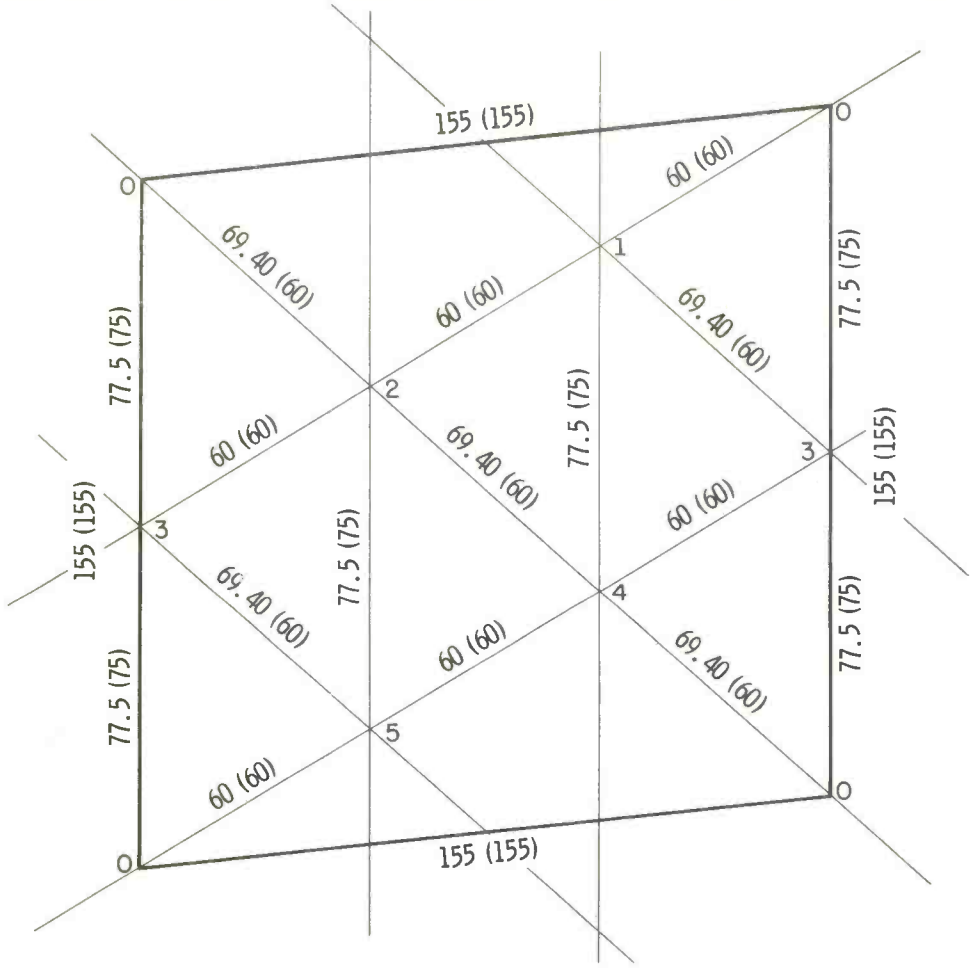


Channel Group	Channels
0	14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80
1	15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81
2	16, 22, 28, 34, 40, 46, 52, 58, 64, 70, 76, 82
3	17, 23, 29, 35, 41, 47, 53, 59, 65, 71, 77, 83
4	18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78,
5	19, 25, 31, 37, 43, 49, 55, 61, 67, 73, 79,

Fig. 1

BASIC RHOMBUS FOR UHF-TV ASSIGNMENT PLAN

Numbers thus: 77.5 (75) show first the actual mileage and second the required mileage. Numbers at intersections are channel groups.



Channel Group	Channels
0	14, 20, 26, 32, 38, 44, 50, 56, 62, 68, 74, 80
1	15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81
2	16, 22, 28, 34, 40, 46, 52, 58, 64, 70, 76, 82
3	17, 23, 29, 35, 41, 47, 53, 59, 65, 71, 77, 83
4	18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78,
5	19, 25, 31, 37, 43, 49, 55, 61, 67, 73, 79

Fig. 2

square miles or an efficiency of 87.1%.

Since the rhombus of Figure 1 is the most efficient of the possibilities, it may be of interest to consider what could be done by assigning stations in accordance with this arrangement throughout the 48 contiguous states. This may not be a practical arrangement but it should be of interest to know what could be done without violating any of the "taboos" and using the co-channel spacing set up for Zone I throughout the 48 contiguous states. Taking the area of the United States as 3,022,387 square miles and dividing this figure by 22,715 one obtains a figure of 133 assignments per channel. This multiplied by 70 channels results in the possibility of 9,310 assignments in this portion of the country. This figure would be subject to some change when an actual grid is superimposed on a map of the country since there may be a slight loss due to edge effects.

The total number of assignments would be reduced when Zone II and Zone III co-channel spacings are taken into account. In these zones the 1, 1, 4 triad would still be the most efficient arrangement but the rhombus should be adjusted for 175 and 205 mile co-channel spacings, respectively. The Zone II rhombus would have nearly 60 degree acute angles since the short diagonal would be 180 miles and the sides 175. In Zone III the rhombus would have 60 degree acute angles and there would be some excess above the required spacing between assignments to meet the taboos. The area of the 1, 1, 4 triad rhombus which meets the Zone II conditions is 27,015 square miles which would result in 111 assignments per channel as computed above, or 7,777 assignments within the 48 states. For Zone III conditions the rhombus has an area of 36,415 square miles giving 83 assignments per channel or 5,810 assignments within the 48 states if assignments were made throughout the country on this basis. Without going through the procedure of determining the area of Zones I, II, and III the above figures would indicate that about 8,000 assignments could be made in the portion of the country included within the 48 contiguous states and the District of Columbia.

Going back to the Zone I conditions it is of interest to note that if such an arrangement were used throughout the country and all assignments were occupied no one would be more than 40 miles from a station. *In addition, there would be a minimum of 11 signals available throughout the area. At the spots which are 40 miles from the stations, there would be between 34 and 36 signals available, arriving from three different directions.* For Zone II and Zone III the same number of signals would be available but the distances would be somewhat greater.

To disperse stations to a greater number of locations, it would be necessary to go through the above procedure for different numbers of channels at each location. A preliminary investigation of such an arrangement indicates that it would be considerably less efficient than the arrangement set forth above.

The arrangement of channels described herein can be adjusted slightly to accomodate variations in desired transmitter locations. However, it should be realized that any such variation will reduce the total number of stations possible. The adjustment amounts to using a grid inscribed on a transparent rubber membrane and moving the various intersections in the desired directions but not permitting them to fall below the minimum required spacing.

Conclusion

A theoretical arrangement of channel assignments has been found which results in very little loss in assignment efficiency which can be attributed to the UHF "taboos" in the Commission's rules. The arrangement of channels should provide a guide to show where the best location for a given channel would be. In addition, it provides a base line from which to calculate the assignment efficiency which is achieved in practice.

If this plan were used for station assignments a number of advantages and disadvantages would be obtained. Some of these are:

Advantages:

(1) 91.6% efficiency with respect to an ideal equilateral triangle lattice

(2) Using Zone I spacing, no location more than 40 miles from an assignment

(3) A minimum of 11 services would ultimately be available throughout the country, if stations were installed at all possible locations.

(4) Approximately 8,000 stations throughout the contiguous U.S., using 70 channels.

Disadvantages:

(1) Stations must be located very closely

(Continued on page 28)

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by M. Tepper

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TRANSLATORS ARE MY BUSINESS

ST. JAMES, MINNESOTA—Inside the translator shack Engineer John Klindworth checks the off the air quality of his UHF translators.

The Story of John Klindworth, K & M Electronics — A Division of Miratel — Minneapolis, Minnesota

(Part Two)

In the August Television Horizons the story of John Klindworth and his Translator Installation and engineering service began to unfold. In this issue, Television Horizons tours a series of Klindworth installations in central and southern Minnesota surveying the impact this man and his products have had on the upper-midwest video scene.

John Klindworth met your reporter's mid morning flight at the Minneapolis St. Paul airport in what he quickly defined as a "light snowstorm." To a Californian wearing a lightweight summer suit, any snowstorm can hardly be termed "light!" So sneezing and wheezing we made our way over slush covered streets to his office for a session of planning and briefing. I was here to ask questions, take photos and generally act like a reporter, following an invitation John extended in Salt Lake City during the Translator Conference in March.

"I wanted to fly you around the state" he began, "but this snow changes my plans."

We tried to act hurt that we wouldn't have the opportunity to fly the region, but underneath our frostbitten exterior we were thankful for the snow . . . at least for the moment.

"So . . . " he added "suppose we start out in the car and see how many installations we can cover before nightfall?"

We agreed and off we went heading west into the wind driven snow which the car radio repeatedly reminded us "was out of season."

As we drove John talked. "We aren't entirely against VHF. In fact, it is just a matter of doing a good enough job to cover the people who want the signals. For example, we are placing a VHF system in Mitchell, South Dakota. This is a pocket of people closely grouped, and there is little problem with off-the-air VHF signals on co or adjacent channels. But here in Minnesota, at least in the southern and central part, there just aren't enough VHF channels to go around. Deep fringe viewers often have two or more stations per channel, and that is on every channel. So when you go to pick a channel for a V translator, you really are fighting a losing battle. Even if you find a channel, the range of the translator may be severely limited by co-channel interference that shows up everytime the weather changes. So in the final analysis, translators in this country—except in rare shielded pockets—means UHF, and that is where we have concentrated our effort."

Most translator installers don't make an effort to work with the TV broadcast stations, we noted. Are you an exception?

"Yes . . .as a matter of fact I am. I feel that the TV broadcasters themselves have a tremendous stake in the reception of their signals out in the fringes. For this reason we always notify a station of a planned installation which might use their signal, long before we are required to get their permission for rebroadcast. And often the station is so enthusiastic over the proposed system they help out in any way possible. For example the TV broadcasters in Des Moines, Iowa were so interested in the Carroll, Iowa installations they chipped in $3,000 each to help foot the bill for the UHF units. Carroll has approximately 2500 sets working off of the translators, which works out to $1.20 per set contribution on the part of the broadcasters."

In your early days, when you were not

able to point to many, or any, previous installations in Minnesota as proof that you could do what you said you could on paper, how did you sell your idea to the towns?

"I recall one of our early installations, in Bemidji, Minnesota. I proposed my plan to the local JC's there and they really got behind the idea. However I was first to admit that I was inexperienced in an actual installation of this type, and in fact, could not even show them an installation like it anywhere!

The real problem in Bemidji was not the idea of translators as much as it was the fact that this system was our first multiple hop system. The Bemidji translators feed off of UHF translators located in Minnesota.

Finally I thought about installations in Oregon and Washington, and suggested the JC representative call Harlow Speckhart, and then George Frese. Now I had never talked with either of them, but I felt certain they could convince the Bemidji group that translators were real, did work, and would work, as I had outlined a proposal for the Bemidji region. The telephone call did the trick, and today the Bemidji system serves 1,500 sets with an operating expense of approximately $10,000 per year."

Our first operating translator stop was Bird Island, Minnesota, where the three UHF translator channels operating with ten watt Adler units feed signal from a 450 foot tower west into Olivia, Minnesota. Airline, the distance east to Minneapolis is just under ninety miles. In many regions of the mid-west ninety miles is considered perfectly acceptable fringe and Olivia is no exception. Driving into the eastern outskirts of Olivia we saw a multitude of all-channel VHF yagis, but, conviently mounted below four out of five yagis we spotted various types of UHF receiving antennas. The wind was whipping through the antennas at forty-five miles per hour, and every so often a cumbersome VHF array lost a western guy line and before our eyes tumbled to the roofline. This was a mild late-winter storm!

We stopped at three receiving sites in Olivia, at distances varying from eight to fifteen miles from the ten watt translator site. The eight mile site utilized a single bow-tie with screen reflector for a receiving antenna, while the fifteen mile site had a twenty-four element colineer array above the roofline. Reception was good to excellent at each installation, although we noted flat line in use at one of the homes. Each site was using a Blonder Tongue tuneable converter of the BT-2 series.

Leaving Olivia behind we headed south and slightly east towards Redwood Falls.

"My most extensive system," John began again, "serves International Falls, Minnesota. This is actually a dual town situation with the substantial part of the town located on the Canadian side of the line. A cabled TV system serves the downtown and residential areas of town with signals out of Duluth and Superior, on a multiple hop microwave system. The distance from Duluth-Superior to International Falls is approximately 200 miles, over the top of the Iron Range. Signals don't travel very far in this country and I knew from flying the path and spotting the four hop microwave system in use by the wired system that I would need four hops also. The CATV microwave sites are located on government property so the problem of 'joint tenancy' was not overwhelming. We decided to spot our multiple hop translator system at each of the microwave sites, four in all. Believe me . . . this four hop two channel system had us worried for awhile! I wasn't too sure how well the signal quality would hold up going through the four hops . . . and we did have our problems with smear. Bandpass changes had to be made in the translators to hold the quality for suceeding hops down the line.

""This system in International Falls now has approximately twenty percent Canadian funds in it, and the total cost was $105,000. The maintenance problems are more expensive on this system than any other, simply because of the four hops. Total sets using the two channel translator system is estimated at 2,000. We have been maintaining the system for $8,500 per year, which means we actually lose money on it."

The Redwood Falls translator system is the midst of a region in southern-central Minnesota which Klindworth proudly hails as his UHF center. To the north is the Olivia system, while thirty minutes to the south is the St. James, Minnesota system. And even though the transmitting antennas used at each of the systems is directional towards the west, we noted an occasional farmhouse between Olivia and Redwood Falls which mounted UHF antennas in both directions. We were soon to see a region between Redwood Falls and St. James where whole towns were split in half receiving either one set of signals or the other.

On the way into Redwood Falls we asked Klindworth about the "freeloader viewers" in

these in-between towns who get their video "free."

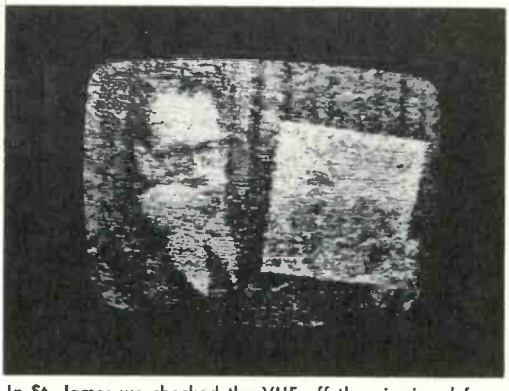
"There isn't much you can do about them, for they weren't supposed to get signals when the system was planned. As it turned out the systems just worked better than we had originally thought they would, and the transmitting antennas were not as sharp at the cut-off point as we had hoped they would be. So these smaller towns, with 100-250 or 500 sets share the viewing of UHF, but not the expense. One of the systems tried to get support from an in between town, but they were laughed right out of the area. Said the town . . . 'Why should we help you support YOUR television system? We get snowy pictures anyhow'."

The Redwood Falls system is a four channel operation which began with ten watters and is now on 100 watters. The receiving site is actually east of town by some six miles, located on a bluff above Morton, Minnesota. The 450 foot tower was at the end of a winding snow covered mush-dirt road which we couldn't traverse. The town itself is located on a flat area. UHF set saturation in Redwood Falls is very high . . . we counted eighty-two homes in a 100 home residential section with bow ties or some form of UHF antenna topside . . . and public interest in the translators is high. We stopped at a Zenith dealer's shop to inspect his installation equipment, and found the owner ready to talk about the system.

"UHF has meant a great deal to my town" he offered, "and for the most part the town's people really accept it as their only form of reception. And one thing it did for me" he noted, "I don't spend nearly as much time on 70 foot towers mounting big VHF arrays and changing burned out 6BK7's!"

Dusk was falling when we left Redwood Falls and John Klindworth suggested we head southeast to see some of the reception from the St. James, Minnesota translator installation.

In St. James we saw a number of VHF and UHF arrays, and stopped at a local dealer to witness reception on both V and U. The VHF reception came from an all channel yagi array mounted forty feet above ground. The Minneapolis signals traveled ninety miles to St. James. At the same time the UHF array was thirty-five feet above ground, hauling in the 100 watt UHF signals over a fifteen mile path. If the floor model set was any indication of the average reception differences found on other sets in the region, we found it hard to believe anyone could be foolish enough to invest money in a VHF array (see photos)!



In St. James we checked the VHF off the air signal from WCCO-4 against the translator signal, utilizing the antenna system shown below. This is WCCO direct, 90 airline miles.

WCCO through the translator.

Klindworth regards St. James as one of his best installations, with four channels available on a 600 foot Utility tower. The UHF signals apparently get out well from the location, for we found a multitude of UHF receiving antennas as much as twenty-seven miles northwest of the transmitter site.

(Continued on page 27)

The Responsible Reader

The CATV system reader may be a system's manager, a system's engineer or a system's technician. He is in a position to influence purchasing decisions regardless of his title, simply because he is an individual entrusted with a responsibility to his customer, and his system owner.

The CATV system reader is obligated through the exchange of currency to provide the very best possible service to his subscribers. And he is obligated to conduct his affairs in a manner befitting the dignity and importance of his industry. Lastly, he is obligated to show a margin of profit return to his principals.

For these reasons and these reasons alone, the CATV reader must exercise extreme caution when allowing *personal feelings* over competitive types of television reception to dominate his purchasing choice.

He owes it to himself to be big enough not to be small. Think over these sage words of advice . . . and then double check your "bandwagon ticket" for re-assurance that the wagon you are about to board is headed in the direction you honestly want to go.

Help Wanted

TV by Erling, 3211 Sharon Court, Lafayette, California requests information from CATV systems utilizing underground buried coaxial cable. Erling notes he has installed 40,000 feet of cable beneath the earth's surface, and while this part of the system has been in operation for nearly two years, he doesn't feel it has been "tried and true" long enough to give a good indication of what trouble, if any, he can expect in the years ahead.

Lafayette is located in the San Francisco Bay Area of California where daytime temperatures occasionally reach 100 degrees, and seldom dip below 45 at night. The weather is dry, with twenty inches of rain in the winter. Who has information?

TPT Adds Two New Systems

TelePrompTer Corporation has acquired its tenth and eleventh CATV systems. The new systems are located in Houghton, Michigan and Johnstown, Pennsylvania.

Northern Community Systems, Inc. carries both Canadian and American signals into Houghton.

Purchase of the Houghton and Johnstown systems brings to 25,000 the number of subscribers on TPT systems.

CATV Microwave Continues to Grow

Filings with the FCC in the CATV microwave field continued during August. Microrelay of New Mexico proposes to furnish a three channel service by means of a power split at Cedar Mountain to bring the signals of KOB-TV, KOAT-TV and KGGM-TV, all Albuquerque, into Carlsbad for service to a CATV system operated by Darrell A. Swayze there.

Greater Microwave Carrier Corporation of Kingston, New York proposes to carry the signals of five New York City television stations to the Kingston CATV system. The stations to be carried are WCBS, WNBC, WNEW, WNTA and WOR.

Harmon Elected Prexy of Jerrold

Jerrold Electronics, Philadelphia has announced the election of Sidney Harmon as President and chief executive officer of the Jerrold Corporation. He succeeds the company's founder, Milton J. Shapp, who remains as chairman of the Board of Directors.

Mr. Harmon was president of Harmon-Kardon, Inc., leading manufacturer of high fidelity instruments and electronic components for data processing when the company was merged with Jerrold late in February of this year.

Jerrold was begun by Mr. Shapp in 1948 with a $500 investment. The following year

SIDNEY HARMAN

Mr. Shapp and Jerrold engineers developed a technique for providing television reception to fringe area communities through the installation of cable TV distribution equipment. The first community system installed by Jerrold was at Lansford, Pennsylvania, in 1950, and is credited with sparking the development of the community antenna system industry.

Ed Shafer to INTEC

An expanded CATV marketing program is underway at INTEC, Intercontinental Electronics Corporation, Westbury, L.I., New York. Heading up the new push in the community antenna field is newly appointed CATV Marketing Director Ed Shafer, formerly Blonder Tongue. The appointment is to a brand new position at INTEC, according to Leonard Goldman, Marketing Vice President for INTEC.

EDWARD SHAFER

Shafer will direct sales and customer relations for the division lines of master TV, educational TV and closed circuit television in addition to the present CATV interests.

Also announced during the past month at INTEC is the appointment of John W. Lyons as Customer and Sales Relations Representative for the Alabama, Georgia and Florida region.

Lyons most recently supervised the installation of a CATV system at Fort Sill, Oklahoma for INTEC. Prior to that time he was with Gulf Coast Teleception Company of Florida.

Unusual Form of CATV

San Francisco CATV delegates during the June National Convention were apparently unaware of a mushrooming western twist to CATV which got its start right in downtown San Francisco. The new twist to CATV is the brain child of one Marino L. Iacopi, an Italian born electronics engineer with a flair for making better the "worst."

Iacopi has expanded the master antenna concept into a growing business right in downtown San Francisco! His approach is straightforward . . . his results extraordinary. Iacopi installs master antenna service to a square block at a time, feeding the "individual systems" with rooftop antennas from sites located atop a nearby tall structure. Because of the rolling hillside nature of the city, Iacopi has found viewers anxious to hook on to his snowfree—crystal clear system. He charges $48.60 for hook on and $4.32 per month for each drop. Most of his installations are in multiple dwelling buildings, thus easing the load of the actual streetside runs.

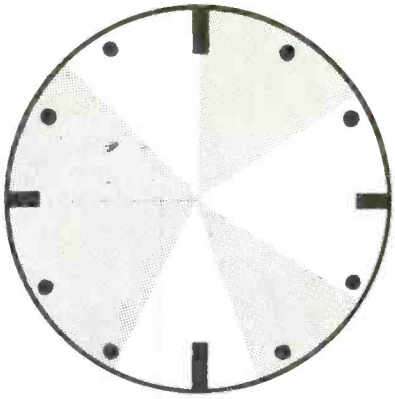
In addition to the snowfree reception Iacopi offers on San Francisco channels, he feeds channel 12 Chico into his systems during periods when sporting events are shut out of San Francisco because of black out regulations.

To date the Italian Engineer's systems serve 1,000 subscribers with four separate antennas. Seven additional systems are in the planning stages.

Boorom Joins CATV Brokerage Firm

Warren J. Boorom, Director of Advertising and Promotion for Metro-Media, Inc. has left that post to join the nationwide CATV Brokerage firm of Hamilton-Landis and Associates. Boorom will join the Washington office of Hamilton-Landis and Associates September 15th.

PART-TIME TELEVISION



"Is It In The Public's Interest?"

One should never underestimate the ingenuity of the American mind. For example, deprive a man and his family of television reception, and make him a second rate citizen. Then watch him . . . see how long it takes him to find a television signal. Observe how he finds the weak signal first, how he improves upon it, making it stronger, and getting every microvolt of signal out of the air into his electronic equipment.

Now deprive a man of television, by telling him that while he has gone to all of the time and expense to get that weak signal, you couldn't care less! Tell him you own the signal . . . and tell him you don't want him watching it.

What will he do? Watch the signal anyhow, or abide by your wishes and turn his receiver off?

Perhaps there is a third choice, as there was in Palm Springs, California, the source for this special Horizons' report, "Part-Time Television."

Palm Springs, California's resort town status is best accentuated by the region's 6,000 plus motel-hotel rooms. The potential number of television receivers in the town is many times the number of any other town of similar population in the country, because of the unique number one business of the area, tourists.

Under the constant push-push-push of translator enthusiast Frank Bennent, the Palm Springs Hotel and Apartment Association has recently taken up the staff for improved full-time all network television in the city, at a cost that all motel and hotel owners believe they can afford.

The refusal of Los Angeles television stations to grant rebroadcast permission on anything other than network originated programs to the Palm Springs Translators led Bennent to investigate the possibility of bringing in signals from other areas.

Acting on his theory, Bennent and his Engineer began probing for San Diego signals. Their first attempts to find San Diego signal near the same hilltop site which provides Los Angeles reception for the head end of the two Los Angeles translators proved only partially successful. DOWN the hillside some 400 yards Bennent's engineer found 90 microvolts of channel 6 signal from XETV in Tijuana. At the time of the discovery channel 6 was an independent station carrying films and syndicated programming. Soon after, however, XETV became an affiliated station of the ABC network, catering to the San Diego market. With KNXT (CBS) and KRCA (NBC) operating on a part-time basis for the Palm Springs area, XETV was then added to the translator line-up.

With translators operating carrying each of the three networks, translator backer Frank Bennent went to the Palm Springs Hotel and Apartment Association with a complete plan to provide full-time three channel television to Palm Springs using all three San Diego stations. Bennent's engineer had found a mountain top site southwest of the city (the present site is northeast of Palm Springs) where San Diego was 400 microvolts or better on all channels.

In July the program to bring hotel and apartment support behind the translator program got underway. The Association circulated data on the operating costs of the planned full-time translator system versus existing charges on another type of system available in Palm Springs. The yearly "signal use" charges for hotel sets will run $12.00 per set on the translator system, $69.00 per year per set on the competing system.

Each hotel will require a head end system consisting of a crystal controlled UHF converter for each of the translator channels, three cut-to-channel translator receiving yagis, one broad band VHF amplifier for distribution, and a mixer unit. The expected cost of each of the master head end installations is $550. Each such system will handle thirty television

XETV currently provides ABC network television to Palm Springs. This translator signal is accomplished with only 90 uV of XETV head end signal.

receivers, with an additional VHF amplifiier unit needed for additional receivers.

Added to this basic head end cost will be the wiring costs of each of the hotels-motels.

RCA Service Company heard about the renewed interest in translator reception in Palm Springs, and through Bennent's office has offered a master lease program to the larger motels and hotels, which includes the receivers, antennas, installation, service to the sets and insurance for the sets.

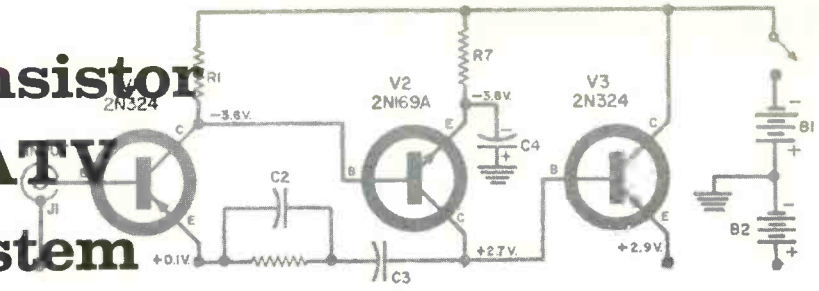
The Hotel Association's program reached a head in late July as an ambitious drive got underway to obtain the pledges necessary to raise the funds for the project. Printed literature went out to all of the motels-hotels and apartments, describing the savings the translator system would invoke over an existing wired system. The savings varied from "installation costs paid for in savings over a two year period" (five sets) to "Annual Signal Savings—$4,500" (100 sets).

Of course the motel and hotel operators will be sacrificing seven Los Angeles channels on the wired system for three San Diego channels on the translator system. The San Diego channels will be full-time (as opposed to part-time translators at the present time) offering all three networks.

So the cycle is complete. The Palm Springs urban area will now have its translator television, as the downtown area already has cable television. And while the road for adequate full-time translator television has been a tough one to travel, the goal is now in sight, and once again the imaginative American mind has found a way to overcome obstacles, no matter how great they may appear to be at the outset.

RBC

Transistor CATV System



By
Lon Cantor
Blonder-Tongue Labs., Inc.

The inherent advantages of transistors over tubes are especially important in the CATV field. CATV operators are particularly attracted by the fact that transistors require far less power than tubes—and far less service.

Until recently, no one was able to design and manufacture a complete transistorized TV system. Benco and Spencer-Kennedy, however, have had transistorized systems on the market for some time now and Ameco entered the field this summer. Other manufacturers are expected to follow.

There are already a number of successful Benco T-Amp systems in Canada. The first one in the United States will be a 8,000 plus drop system at Gunthersville, Alabama.

A Canadian pioneer in transistor CATV operation, Nick Huysmen comments, "As far as maintenance is concerned, compared to a tube system, we save more than $1,200.00 per year on tubes alone."

How It Works

The Benco T-Amp system is not a transistorized version of a tube system—it is a completely new concept in CATV equipment. It consists of six basic units (see Figure 1) which are assembled to make a complete system.

(1) An Oscillator

The purpose of the oscillator is to provide an AGC reference signal. It works in conjunction with the power supply to vary the gain of the amplifiers. The amplifiers in this system are designed so that if their supply voltage increases, gain increases, and vice-versa. The oscillator generates a crystal controlled signal of about 2000 microvolts at 52.33 mc. This signal is amplified by each successive amplifier in the line, to the power supply. The unit supply unit measures the amplitude of the 52.33 mc. signal. If cable temperature changes cause the 52.33 mc. reference voltage to become weak, the supply voltage is increased. At 52.33 mc., therefore, system gain is held constant.

At frequencies other than 52.33 mc., of course, the unequal attenuating characteristics of the cable can cause fluctuation in signal level.

These fluctuations are too small, however, to cause either overload or a poor signal-to-noise ratio at any time, unless too many amplifiers are cascaded.

(2) A Power Supply

The power supply provides DC power for the rest of the system. It is the only point in the system where AC power is required. A single power supply will handle up to 75 line amplifiers. The power supply also acts in conjunction with the oscillator to keep the gains of the amplifiers constant.

(3) Amplifiers

There are three different types of amplifiers used in the T-Amp system.

A. *Type A* is used for branch lines. It is specifically designed to compensate for the tapoff loss. It has a flat response curve and a gain of at least 10 db. Once the tapoff loss has been overcome, the branch line can be extended or used for subscribers (using type "B" or "C" amplifiers).

B. *Type B* is used where tapoffs to subscribers are expected. It provides a sloped gain to compensate for about 500 ft. of RG 11/U foam cable plus 14 subscribers. A built in variable attenuator allows for situations where there are fewer subscribers.

C. *Type C* is used where there are long runs of cable with no tapoffs. It provides the proper sloped gain to compensate for the loss in 900 feet of RG 11/U foam.

All of the amplifiers are equipped with monitor outputs, 12 db. down. Since the monitor output contains DC, however, a T-blok should be used to prevent burning out the meter.

A distinct advantage of the T-Amp system over tube systems is that all of the amplifiers are completely weatherproof. They mount right in the cable completely eliminating line boxes.

(4) A Branching Tapoff

To provide a branch line from a main run. The isolation loss of the T-Branch must be compensated for by a Type A amplifier.

(5) A Terminating Unit

To be used at the end of each branch line. The T-Term passes RF but blocks DC. It is a 75 ohm one-half watt terminator.

(6) A DC Blocking Device which Passes RF

The T-Blok is used to connect the T-Amp system to tube units. T-Amps are generally used with conventional head ends and distribution systems.

Installation and Use

The T-Amp system can carry up to 7 channels (2, 3, 4, 5, 6 and two sub-channels). The head end should receive these channels and convert them if necessary. Generally, each channel should be fed into the first T-Amp amplifier at 3000 microvolts of picture and 750 microvolts of sound. Adjacent channel interference must be eliminated with filters.

The power supply should be located on a utility pole at the end of the main line. Install a weatherproof switch or circuit breaker near the T-PWR and hire a licensed electrician to connect it to the power line.

Install the oscillator and the amplifiers at correct spacing and check the Head End.

Then use a DC voltmeter to measure the DC cable voltage at the power supply test point. It should read about 35 volts at 25°C (less when colder, more when hotter). Cable voltage should be maintained at between 25 and 45 volts.

The power supply is equipped with an automatic cut out. This removes power from the cable in case of any shorts, and automatically restores the power when the short is eliminated.

To extend the main line past the power supply, remove the power supply termination resistor. Feed the output into a conventional single channel head end and you can then start all over again. The input to the new head end, however, must use a trap to remove the 52.33 mc. AGC reference signal. A new 52.33 mc. reference signal will be supplied by the oscillator in the subsequent T-Amp system.

LC

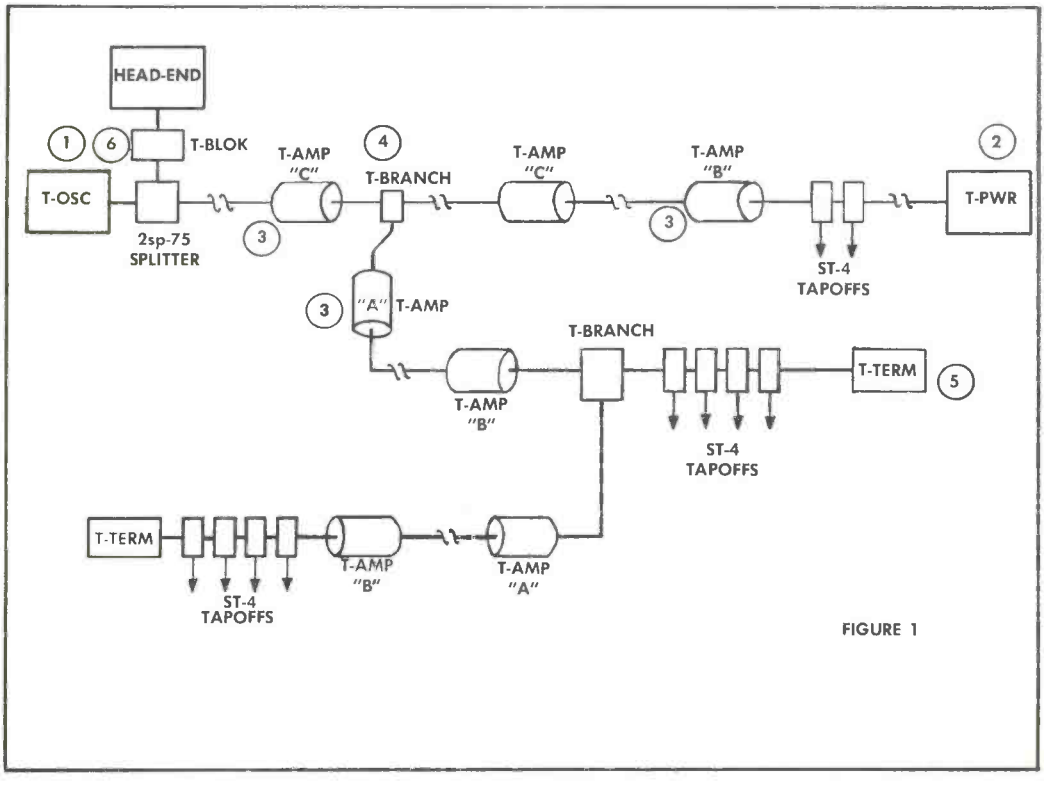


FIGURE 1

An Announcement from the Publisher

In the months ahead Television Horizons will be taking on a completely new look. Our page size is stepping up to 8x11, which means that every issue of TVH will contain just that much more information and news about the off-the-air television reception industry.

A very special DIRECTORY ISSUE is planned for December, in which every piece of weak signal TV equipment manufactured in the United States and Canada will be tabulated and listed, complete with photos and prices, in easy to read catalogue style. You, as a reader, will value this issue for ready reference for years ahead.

Our industry is growing . . . and growing at a rapid rate. The growth in the years ahead will always be reflected first, and foremost, in the industry publication *Television Horizons*.

R. B. Cooper, Jr.
Publisher

TRANSLATOR TOPICS

Prepared monthly by
James Beamer
P. O. Box 833
Livingston, Montana

Help!

Letters to your editor indicate a need for information on how to proceed in obtaining a permanent license for your translator after the FCC has OKed the construction permit, and equipment changes have been completed.

Let us assume your construction permit has received FCC approval—FCC form 346—and all the equipment changes made to bring it up to FCC standards. The next step is to notify the Engineer in Charge of your Regional FCC office that you are now ready to begin program tests. This should be done with a telegram. If you have not done this please do so at once even though you have been in operation for some time.

The following is a sample form for your use. *Chico TV Club having completed installation of equipment as proposed in FCC form 346, BPTTV-277 and BPMTTV-1 is now starting program testing.*

Signed Marjorie Miller
Secretary, Chico TV Club
Emmigrant, Montana

(The BPMTTV-1 is the first modification of a construction permit issued by the FCC for a translator.)

The second step is to file, as soon as possible, an application for a permanent license. This is done on FCC form 347 (Do not confuse this with the form 347-A which you have already filed for a temporary license. They are different in form and meaning.). Upon receiving your approval for the construction permit the FCC should have sent you the necessary four copies of the 347's for you to fill out. If they did not, request these forms from the Engineer in Charge of your district when you notify him of your program testing. The 347's should be completed and sent to the Commission as soon as possible.

It might be well to note that the permanent license you will receive on submission of the 347 will be good for only one year and must be renewed after that time. The calendar year will be from June first of this year to June first of next year. All clubs will have to file for renewal of license June 1, 1962 and at that time each following year.

Dave Bridge in LaMarr, Colorado reports the FCC is holding up the granting of CP's for three translators in LaMarr. *Reason*—a CP has been granted for a low power TV station in LaMarr to the local broadcasting station. Commission thinking on this case and similar applications is that the town *will be* served with a signal, and the translators will not be necessary.

When brought to the attention of Jesse Slusser, President of the National TV Translator Association, Jesse issued the following statement: "The National TV Translator Association is of the opinion that this refusal to act on translator CP's by the Commission where TV station CP's for local broadcasting stations have been issued *and not acted upon,* is not in the public interest and the Commission should take immediate steps to correct this situation. If allowed to remain unchecked, the present policy could and would present a very convenient method of harressment of translators to anyone opposed to their being installed. It further means any town with a TV station might expect to be restricted to one television signal only. However the Association recognizes the need for the continued growth and development of local TV stations and will encourage the development of *non-duplication of programming* between the local station and the translators. The Association reiterates again that good faith on the part of the holder of the CP for the local station must be shown by building the station and placing it on the air."

The Wyoming TV Repeater Association held its annual meeting at the Townsend Hotel in Casper Wyo. June 25th. Discussion centered on the proposed rule change of the FCC to allow translators to use a second one-watt final amplifier in conjunction with their equipment to serve a second community. General opinion was that this will aid a number of areas in Wyoming, if adopted. The present

officers were reelected for the ensuing year. Included were Gene Ewing, Buffalo, President and Edwin Moyer, Sheridan, Secretary. A committee was established to formulate a bill to present to the next State Legislature to establish tax districts to support the translators. Observers say they expect the bill will be permissive in nature and will place the tax, if passed, on the individual TV sets.

More Modifications

The translator sales picture continues to be one of flux and change. Several VHF groups have filed petitions to change their operating units to competitive models even after the FCC has granted licenses.

Bert B. Williamson of Belt, Montana, filed a request to amend his CP to show use of a TEPCO TE-1A VHF translator in lieu of a Eitel TR-10-1 as originally filed.

Meanwhile the Commission continues to receive requests for waivers of the old February 1 deadline for registering VHF Boosters with the Commission. The FCC field force has been active this past summer digging out the hold outs who either refused to file proper FCC forms over the winter, or through ignorance are just now learning of the FCC rulings.

The most recent waivers were granted to Thompson TV Association serving Thompson, Cisco and Crescent Junction, Colorado; the Niobara Community Club of Niobara, Nebraska; Glendale TV Club of Glendale, Oregon; and the Quemado TV Association of Quemado, New Mexico.

CATV System Files

Transcontinent Television Corporation, owner-operator of a series of prominent wired TV systems, has filed an application to construct a channel 8 VHF translator to serve Wamego, Kansas with the signal of WDAF television in Kansas City, Mo.

TTC also filed an application to serve Manhatten, Kansas with the same WDAF signal on channel 11.

Miscellaneous Filings

The Village of Park Rapids, Minnesota has received its construction permit for channel 12 operation repeating WDAY-TV from Fargo, North Dakota. This is the fourth VHF translator granted in Minnesota.

Sam S. Broach of Big Stone Gap, Virginia has filed an application to utilize channel 9 for relaying WLOS-13 to his community.

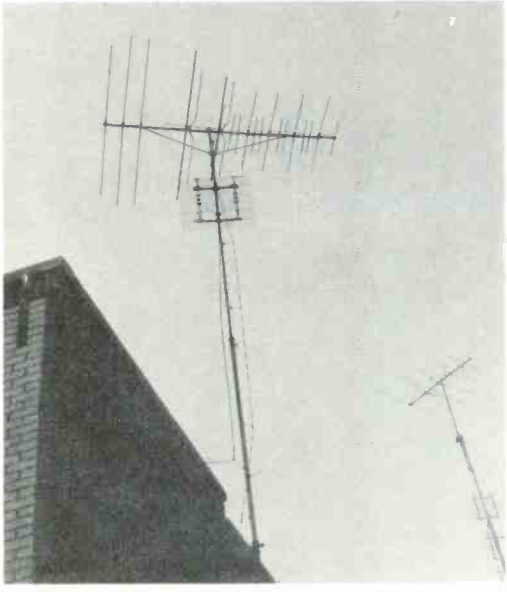
The new Blonder Tongue-Benco T-12 and T-13 UHF translators are catching on in fine style. Several applications were filed in the state of Washington this past month specifying these units, including three on behalf of the Apple Valley TV Association to serve Wenatchee, Washington.

Elsewhere on the UHF scene, the Bay Area Educational Television Association of San Francisco (licensee of KQED-9, San Francisco) has filed the first of a string of applications for extending the educational station's signal into outlying regions through the use of translators. The first unit will cover Walnut Creek and Concord, California. JB

TRANSLATORS ARE MY BUSINESS

(Continued from page 16)

On our way back into Minneapolis that April evening we had time to mull over in our



Popular Winegard Color Ceptor all channel VHF yagi 40 feet above ground, 8 bay Bow Tie with screen reflector 35 feet above ground. Flat line lead in on VHF, tubular line on UHF. Photo taken in St. James, Minnesota.

mind the pages of notes we transcribed while listening to Klindworth talk about his policies and formulas for getting the most out of a UHF translator installation.

Some of his more candid comments included, "one thing I learned from the first installations, don't be optimistic OUT LOUD and don't oversell. It's always better to offer less and give more, than to offer more, and then find you can only deliver less."

"Don't guarantee adeuqate signal unless there is electrical line of sight between the TV transmitting towers and the translator receiving towers. Our contract with the citizens' groups reads 'We will give a properly designed and engineered translator system,' and that is just what we do. How proper, and so on, depends on the amount of money they raise, which in turn determines how high we can go with the 400 foot, 500 foot or 600 foot tower."

BASE of the Olivia 450 foot tower and the translator shack in a snow and windswept field in western Minnesota. Shack houses three UHF translators, associated amplifiers and test equipment.

"The JC group in Eau Claire, Wisconsin liked the translator system idea so much that they wanted to form a private corporation to take over the operation of the system."

"Our rule of thumb for participation is fifty percent of the homes will participate in financing a translator system. Take the total population of the area and divide by three for a rough estimate of the number of sets."

"When something goes wrong on a tower, we replace the entire unit, bring it down for a complete lab test and re-alignment. We stock replacement converters, transistor preamplifiers for all of our systems. We never replace tubes or trouble shoot a unit 'in the air'."

And finally, "If this industry didn't have 6AN4's we could double the operational time for trouble free UHF translators. Right now, three months without trouble is about all we can expect out of a translator . . . and then, bang . . . a 6AN4 goes!"

CONCLUSION — NEXT MONTH "TRANSLATORS ARE MY BUSINESS"

THE LONG AWAITED PUSH TO UHF!

(Continued from page 7)

Now the pressure is placed on the currently operating VHF telecaster, AND, the television broadcaster aspirant. For if the VHF 'caster wishes to sit tight and hold down his fort for a while longer, he may well see the prime UHF channels (i.e., 40 and down) snapped up before him. On the other hand, he may decide to call the Commission's hand and sit tight . . . hoping that his fellow telecasters will do likewise. But let one VHF telecaster decide to file for a UHF channel for concurrent "V" and "U" operation, and others in that same area will be forced to follow suit. This apparently is what the Commission is counting on.

And to make matters even more realistic, the Commission intends to put teeth into its grants of UHF channels. "A prescribed time limit will be placed on all permittees to place the station in operation." What could be clearer?

In other words, you can't apply for a channel, get a permit, and then sit on it. You either build, or you loose your permit. The meaning is obvious . . . and it is only too clear that NOW the Commission means business with the UHF question. RBC

THE FCC UHF ASSIGNMENT PLAN

(Continued from page 12)

according to plan to gain the maximum efficiency

(2) Stations would be roughly 60 miles apart with no intermediate assignments possible

(3) Many stations would not be in centers of population since cities do not often fall on the intersections of an equi-spaced grid

(4) Station assignments might fall in unreasonable locations with respect to geography, air lanes, etc. AGS

WORLD'S ONLY **ELECTRONIC** ANTENNAS FOR

SUPER-POWERFUL FM

MODEL PF-8 FM STEREO-TRON YAGI — GOLD ANODIZED

This is the world's most powerful FM antenna. Because Multiplex requires an antenna with greater sensitivity and gain to offset the power loss of the carrier and subcarrier, Winegard's PF-8 is the best antenna you can install for Multiplex. When you hook up a PF-8, weak signals come in like "locals".

The PF-8 has a minimum gain of 26 DB over a folded dipole with a flat frequency response of ± ¼ DB from 88 to 108 m.c. It features a built-in TV-FM coupler and has eight elements with EXCLUSIVE "TAPERED T" driven element engineered perfectly to match the powerful transistorized, direct coupled, *built-in* amplifier. It is *available two ways* — Model PF-8 for 300 ohm twin lead or Model PF-8C for 75 ohm coax.

2 NEW TRANSISTORIZED WINEGARD ELECTRONIC FM ANTENNAS FOR LONG DISTANCE FM AND MULTIPLEX

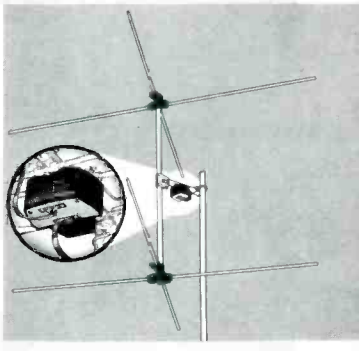
Now WINEGARD brings you super-powerful FM antennas with *BUILT-IN* transistorized amplifiers for L-O-N-G range FM and multiplex reception. You can offer your customers the PF-8 FM STEREO-TRON Yagi (directional) or the PF-4 FM ELECTRONIC Turnstile (omni-directional). Both models deliver unexcelled performance far beyond ordinary FM antennas—open a new field of opportunity in the fast growing FM and Multiplex market.

Here Are Some Important Features of Winegard Electronic FM Antennas

1. Transistorized amplifier is designed as *part of* the "Tapered T" driven element (model PF-8) for unprecedented efficiency and signal-to-noise ratio.
2. Built-In FM-TV coupler allows you to use one power supply and down lead when used with a WINEGARD POWERTRON TV antenna.
3. Gold anodized finish—100% corrosion-proofed—all hardware irridized. This is the finest finish of any antenna—meets U.S. Navy specifications.
4. The quality of craftsmanship and materials in these antennas tell their own story—perfect mechanical balance—100 m.p.h. wind tested.

MODEL FM-8—Non-Electronic Yagi — Gold Anodized. The FM-8 is the finest non-electronic FM antenna available. It features the same Winegard "Tapered T" driven element and construction as our super-powerful PF-8.

MODEL FM-3T — Non-Electronic FM Turnstile — Gold Anodized. Very popular WINEGARD omni-directional FM antenna. Has WINEGARD'S offset mount and is gold anodized. Easy to install — can be mounted on same mast as TV antenna.



MODEL PF-4 FM ELECTRONIC TURNSTILE — GOLD ANODIZED

Most powerful non-directional FM antenna with 16 DB gain in all directions over a folded dipole. Has Winegard offset mount and transistorized amplifier with TV-FM coupler. Model PF-4 has 300 ohm output.

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Watch Winegard go in '61 National Consumer Advertising this Fall in LIFE, LOOK, SUCCESSFUL FARMING, FIELD AND STREAM, SUNSET.

POWERTRON MODEL P-55 14 Elements

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SUPER POWERTRON MODEL SP-55X 30 Elements

Write for Technical Bulletins or Ask Your Distributor

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ANTENNA SYSTEMS

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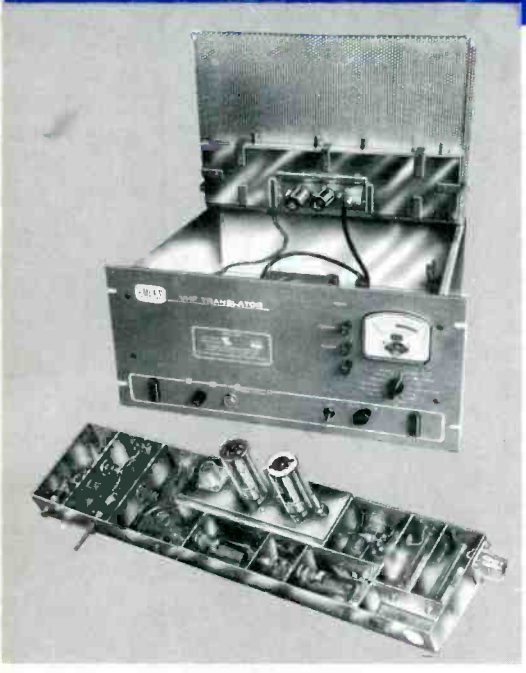
Here's Why EMCEE Has Now Created a Special Design VHF Translator for UHF Inputs!



UHF INPUT • MODEL U-HRV
Rack Model shown, Desk Cabinet Model Available.

1. Frequency stability requirements are nearly ten times more severe for UHF inputs than for VHF inputs.
2. Pre-selection and band pass stability problems require completely different tuned circuit techniques.
3. To meet the requirements of the FCC Rules Part 4 Sub part G, a completely new type acceptance application is required for this more complicated translator.
4. Cable system U-V converters represent only problems in translator systems. Integrated design is even more important here.

That's why EMCEE offers you today, the only UHF input translator 100% designed for the specific purpose, retaining all the features of the widely acclaimed Model HRV VHF input translator.

- Full performance down to 100 microvolt input — any UHF channel.
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- All tubes reasonably priced and readily available. UHF circuits are RCA Nuvistors®.
- Full output — 1 watt — any specified VHF channel.
- Double conversion, of course.

**Application pending*

Model HRV — Standard VHF translator.

Model 4-MXA — **MULTIPLE OUTPUT AMPLIFIER** — Four 1 watt outputs to serve up to four communities from one site in accordance with requirements of FCC rule making.

Model HRV-10X — **10** watts for use where higher powers are authorized.

Canadian users — now available — Model HRV-10 to take full advantage of DOT rules.

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Gentlemen:

___Please rush free planning package including data sheet, complete installation check list, coverage calculation form.

___Please send free reprint of FCC rules covering translators.

___UHF Input Data Sheet.

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