NCTA CONVENTION
Shoreham Hotel-Washington, D.C.
June 17-22

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JUNE 1962

tv horizons

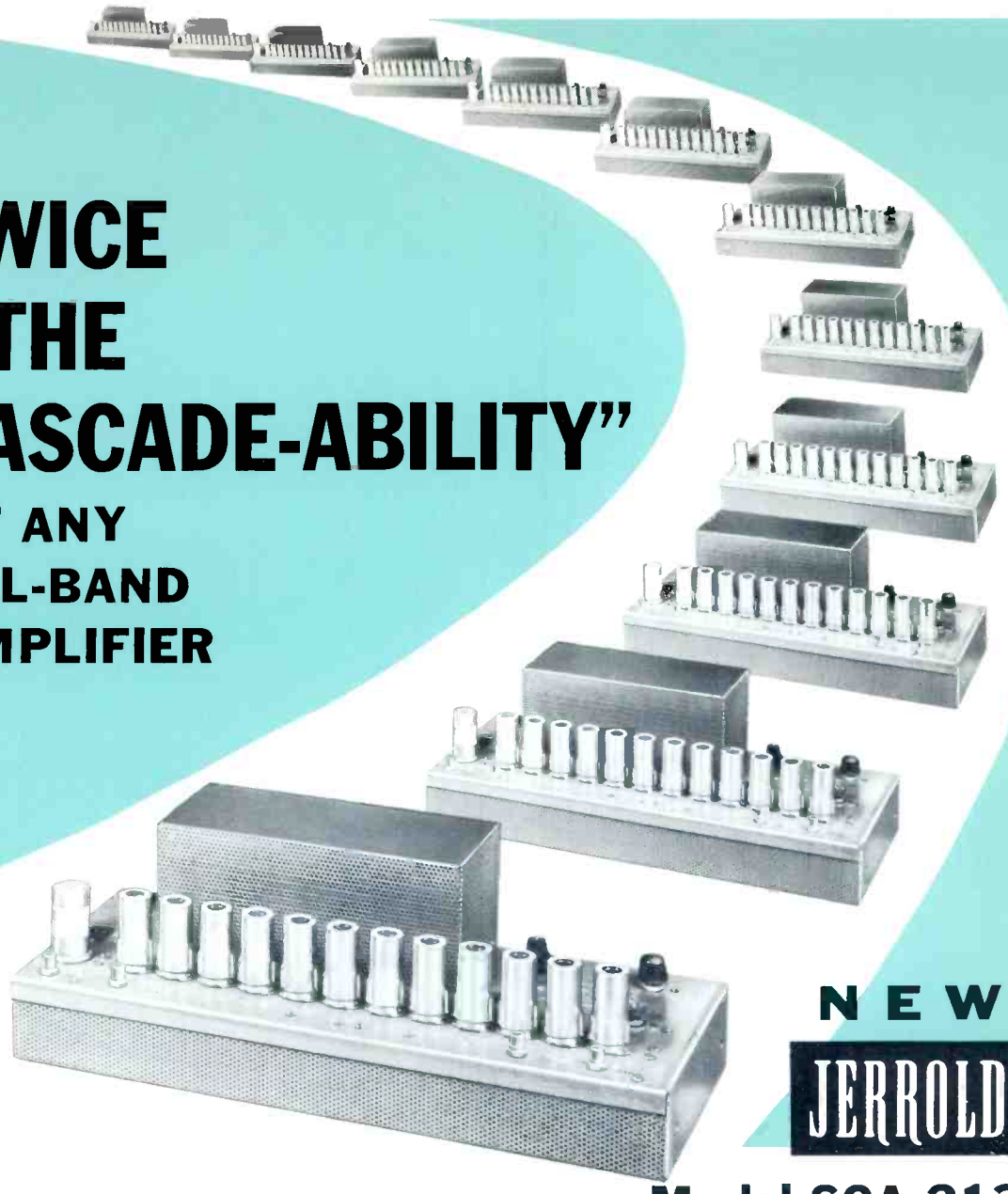
SPECIAL REPORT

Cable Television Comes to Wilmington, N. C.

The Professional Television Journal

IN THIS ISSUE

TWICE THE "CASCADE-ABILITY" OF ANY ALL-BAND AMPLIFIER



NEW

JERROLD®

Model SCA-213

SUPER CASCADER AMPLIFIER

Two years in engineering, the new Jerrold all-band Super Cascader Amplifier is the ideal amplifier for expanding your system to the ultimate in all-band capabilities. The Model SCA-213 is designed for use in new or existing systems wherever maximum "cascade-ability" and reliability in an all-band trunk-line amplifier are prime requirements.

Provides 28 db of gain @ 216 mc, and output of 45 dbj* per channel for seven channels at a cross-modulation distortion of only 0.14%. The Super Cascader has been meticulously engineered to provide long-life, trouble-free, economical service. Write for complete technical data.

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

FEATURES

- MAXIMUM "CASCADE-ABILITY"
- EXTRA-WIDE BANDWIDTH (6-220 mc)
- PLUG-IN EQUALIZERS COMPENSATE FOR CABLE LOSSES
- FREQUENCY RESPONSE FLAT WITHIN ±½ db WITH EQUALIZATION
- VOLTAGE-STABILIZED TRANSFORMER
- PLUG-IN AGC (Use with Jerrold Model AGC-213)
- LOW NOISE FIGURE
- HIGH OUTPUT CAPABILITY

JERROLD ELECTRONICS CORPORATION *Community Systems Division Dept. IDS-227*

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Channel 1

WIRE THE WEST COAST? H & B OF COURSE!

H & B American Corporation, Beverly Hills and Key Television, Inc. (KEYT), Santa Barbara, California have reached an agreement for the joint development of community antenna television systems in Santa Barbara and San Luis Obispo counties.

Leon Papernow, H & B Vice President in charge of operations, told TVH KEYT is now associated with H & B in pending applications in the cities of San Luis Obispo, Atascadero, Paso Robles, Pismo Beach, Grover City, Morro Bay, Arroyo Grande, Shell Beach, Cayucos, Mission Hills and Vandenberg Village.

All of these cities and towns are served by KEYT, as well as a San Luis Obispo station. Los Angeles television will be microwaved into the region, it is said.

Other applications are also to be filed in the two counties. Both counties lie along the California coast between Santa Barbara and Salinas, in central California.

NEW PEOPLE, POSITIONS

Richard Helhoski has been appointed Director of Marketing at Blonder Tongue Labs, Newark, N. J. Helhoski comes to B-T from Magnovox where he served as Director of the contract sales division. Prior to joining Magnovox, he was manager of RCA's service branches in Dayton and Cincinnati.

Directors of *Entron, Inc.*, Bladensburg, Maryland, have elected James Lahey as their President and Chief Executive Officer. Mr. Lahey has been that firm's Executive Vice President. Henry M. Diambra, who has been President, was elected Chairman of the Board. Lahey, age 40, joined Entron in 1961 from Thompson-Ramo-Wooldridge, Inc. where he served as assistant to the Vice President for Commercial Electronics.

The Board of Directors at *H & B American Corporation*, Beverly Hills, California, has appointed Leon N. Papernow, Vice President in charge of operations.

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

Papernow will continue to serve as Executive Vice President on H & B Communications Corporation, a wholly-owned subsidiary.

Prior to joining H & B, Papernow was with Jerrold Electronics Corporation.

NEW CATV FIRM FORMS-KATONA

Further evidence of the healthy growth of our industry has appeared as Anthony S. Katona, veteran engineer and management consultant in the CATV industry announces the formation of Katona Electronics Company. Headquarters for the new company are in Levittown, Pennsylvania. Manufacturing facilities are located in nearby Bristol, Pa.

The new company will serve the CATV industry with system equipment, coaxial cable and consulting services. Mr. Katona has been in the industry almost since its birth. He was associated with Jerrold Electronics Corporation for over ten years and more recently associated with Craftsman Electronics Products, Inc., as Vice President in charge of sales and engineering.

Katona states the goal of his new company is to utilize his background in the business to make available industry TV systems equipment "with quality you can see."

One of the first product lines to be introduced will be a complete line of top quality TV systems coaxial cable bearing the KATONA label. Other TV systems equipment will be announced as the new design and production facilities are made ready.

Anthony S. Katona

KATONA Electronics intends to be on hand at the NCTA trade show in Washington this month as a new Associate Member of the Association.

CREDIT TO WBZ-TV

Spencer - Kennedy Laboratories, Inc., Boston, Massachusetts would like to thank the Chief Engineer of station WBZ-TV, Channel 4, Boston, for assistance in setting up the experiments and for permission to publish the pictures which appeared in the May 1962 issue of Television Horizons under the title "CATV Reflections—Part Two". Any distortion in the test pattern, as it appears in the photos shown, is due either to the TV receiver used for reception, or to the special conditions which were to be illustrated by the experiment.

RB Cooper, Jr.
Publisher

JUNE 1962
VOLUME 3 • NUMBER 6

TELEVISION HORIZONS

Post Office Box 1557 • Oklahoma City 1, Oklahoma

EDITORIAL

Well here we are, bags packed, camera loaded with film, several dozen sharp pencils and our usual editorial notebook of yellow scratch paper. June 17 is still several weeks away, but we are ready.

What do we plan to accamplish at this year's Cable Televisian Trade Show and Canvention? A great deal, we hape.

Auxiliary services in particular catches our editorial eye. We have high hapes af gleaning a great deal af factual informatian on the many ingeniaus ways CATV system operators the country aver are using auxiliary services ta build system goad-will and increase the value and importance af the service they offer. We are especially intrigued by the many law-cost but very effective methods devised af late ta provide such services as "Community Bulletin Boards, Cammunity Alerts and Cammunity Weather-Casts" to the system subscriber.

From the technical standpoint, we intend to learn more about the industry trend to broad-band systems. Is there a trend? Is it affecting only new systems, or is it showing up in replacement systems as well? Is it really less expensive? Haw much, if any, daes it cut maintenance?

FM multiplex still catches our fancy. How many systems have adopted it? Are more about to? Is it worthwhile only in large systems?

Finally, we intend to find out where last year's "big problems" stand today. Has the microwave fever cooled down? Is the big activity in CATV system sales over, for the time being, or is another flurry of sales around the corner?

What are our big problems this year? Are they internal, or external? How are we fighting them, and how do we intend to cope with them in the 12 months ahead?

Obviously, we will be mighty busy, if we manage to learn the answers to only 50% of these questions! However **you** can help by asking us for a copy of our Canvention Questionnaire, completing it and returning it to us. Our questionnaire will cover many of these points, and any light you can shed an aur questions will contribute to the general knowledge of our industry in 1962-63.

See you at the Shoreham Hotel, June 17-22!

R. B. Cooper, Jr.

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1952-1962
A DECADE OF DEPENDABILITY

S K L
WIDE BAND CATV SYSTEMS

PROVED BY PERFORMANCE THROUGH THE YEARS

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

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

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

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

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

SKL SOLID STATE SYSTEMS

See our transistorized system demonstration at the NCTA Convention, June 17-22, Washington, D. C., or write for further information.

ENGINEERING IN P. R.

—PART ONE—

Community antenna system public relations takes many forms, dependent upon local conditions which warrant certain actions to counteract "reactions".

In this series, prepared by the Horizons staff from material submitted by CATV operators in Canada and the United States, our basis for discussion will be one theme; *goodwill.* This month's installment will approach "goodwill" as a function of novel engineering approaches to closed circuit video.

We eagerly solicit additional engineering data of the type presented here for future sections of this series.

Up to six projectors can be clustered around the camera in diagram one, while the camera feeds directly into a modulator which is fed with audio from either an off-the-air FM station or taped music. The six opaque projectors will each carry a small set of weather dials (reporting temperature, wind velocity and direction, humidity, etc.) and all of the projectors will project onto the small screen. The camera will pick up the image from the screen and a sequence timer will sequence all of the projectors and advance the slides required. This operator intends to project commercial advertisements and public announcements atlernately with the weather dials. In this particular town, which has only a single weekly newspaper, the CATV system feels it will have the most powerful local advertising tool available.

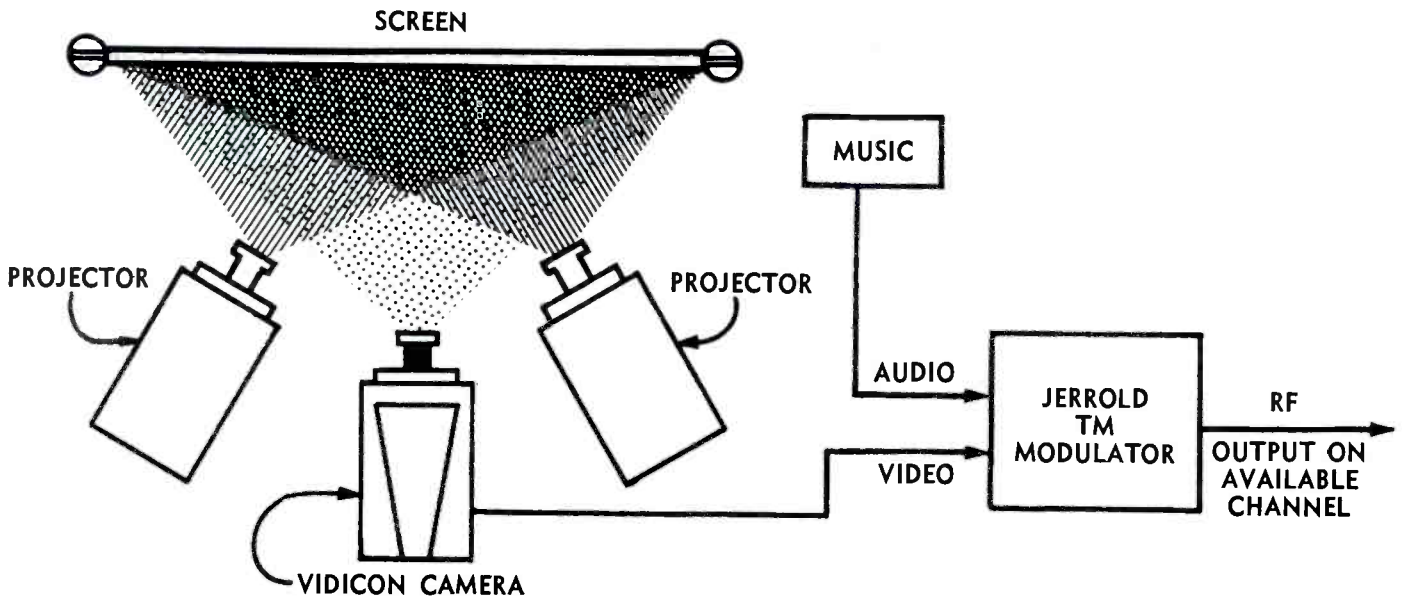


Diagram One

VIDICON PROJECTOR AND SCREEN

Recent announcements by Blonder-Tongue and others in the field of miniature vidicon cameras, utilizing transistorized components, has created considerable interest on the part of CATV system operators who are interested in low cost slide and film projection systems. One operator proposed to construct the following system (see diagram one) patterned after the weathercasting service offered by Hobbs, New Mexico CATV system operator Lloyd Calhoun. As will be detailed shortly, Calhoun offers a live "Weathercasting Service" on an unused channel.

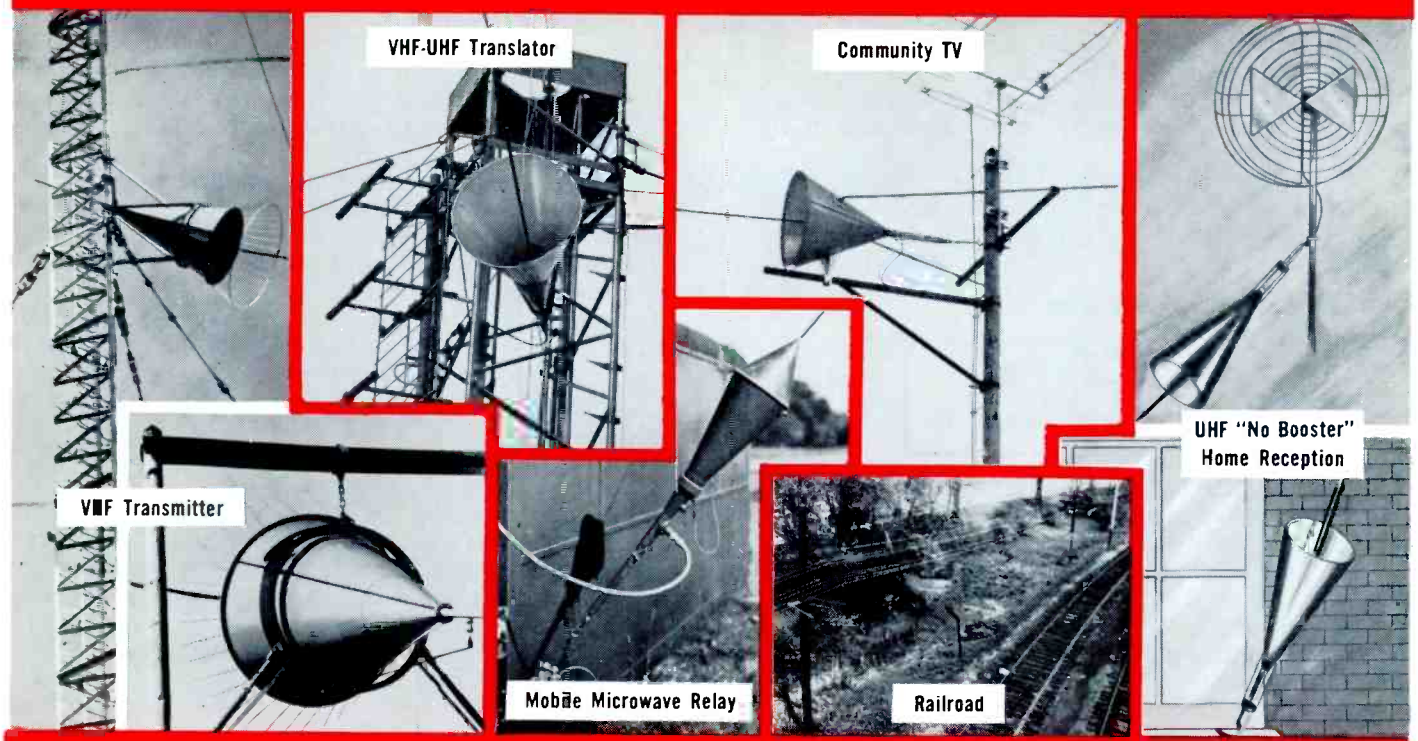
USING B & K DYNASCAN

Co-ax Television Ltd., Saskatoon and Estevan, Saskatchewan makes use of a B & K Dynascan unit for emergency applications. The B & K unit, model 1075, puts out a signal at r.f. frequencies with self-contained synchronizing and blanking pulses which will operate any standard TV receiver. Co-ax Television reports "we normally use only the r.f. output

"G-Line" TRANSMISSION LINE

LOW-LOSS • BROAD BAND • LIGHT WEIGHT

Patent Nos. 2,685,068 — 2,867,778 — 2,921,277 — 2,921,979 — 2,946,970 — 2,971,170 and others granted or pending.



CONDUCTORS FOR G-LINE SYSTEMS

Low Power Feeder

High Power Feeder

G-LINE also supplying power

HIGH POWER LAUNCHERS OR RECEIVERS

- RF Feeder Lines
- Transmitters
- Translators
- Microwave Relays
- Mobile Radios

MICROWAVE BY WIRE

LOW POWER LAUNCHERS OR RECEIVERS

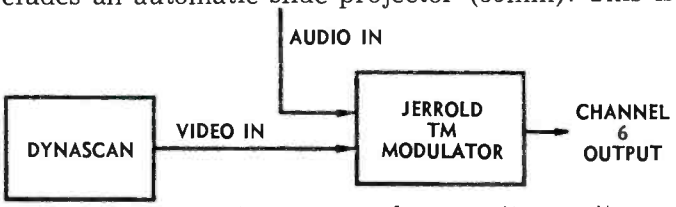
- Closed Circuit (Community) TV
- Home Reception & Educational TV
- Railroad Communication & Signaling
- Industrial TV & Supervisory Systems
- Vehicular Communication & Control

MICROWAVE BY POLE LINE

"G-Line" SURFACE CONDUCTION INC., 1501 Broadway, New York 36, N. Y.

of the Dynascan on channel 6, which happens to be a spare channel on our system. We use a good tight bandpass filter to eliminate lower sidebands and spurious radiations from the Dynascan. For emergency use we take video output from the Dynascan, amplify it in the video amp associated with our microwave, and feed the video input of our Jerrold modulators which are a part of the head end. We interrupt normal programs (on channels other than 6) only in real emergencies and when requested to do so by civic authorities because to do so is a violation of our DOT license and could incur legal action by broadcasters.

"We do not particularly like the Dynascan because of its lack of versatility and its lack of stability. B & K does manufacture a better unit that includes an automatic slide projector (35mm). This is



in use by some CATV systems because it permits use of standard 35 mm slides and affords more versatility in slide changes."

Co-ax Television has used this system, which is applicable to even the smallest CATV system, to warn cable subscribers of pending storms that develop with lightning speed and massive force on the plains of Canada.

Another CATV operator in California utilizes the B & K basic unit to provide viewers with "Community Bulletin-Board" announcements, items for sale by subscribers, etc. The famous "One line, one week, one dollar" has been transformed into "one slide, one day, one dollar" by this enterprising operator who only wishes to cover the cost of the slide in the charge of $1.00.

HOBBS WEATHER STORY

Last year's NCTA convention was the scene of a Public Service Presentation to Lloyd Calhoun of Hobbs Television Company, Hobbs, New Mexico. The award was made because of Calhoun's original and unique application of closed circuit video as a means of forewarning area residents of pending changes in old lady weather. As Calhoun observes "New Mexico weather is in a constant state of change."

The Hobbs CATV system, when searching for a truly useful, unique form of public service, did well to pick the weather as a subject of presentation.

However the decision was only the beginning. The problem of developing the equipment for the system proved to be an expensive one, by most CATV standards. When the system was completed, Calhoun's company had expended approximately $12,000.

Here is what they got for their money. 24 hours per day, approximately twice per minute, the local CATV subscribers (some 5,000 connections currently) view (a) local time, (b) wind direction, (c) wind velocity, (d) barometer, (e) humidity and (f) temperature.

Calhoun reports "we have experienced no difficulty whatsoever in the continuous operation of the Dage Vidicon camera. It has operated since April 1961 without shutdown and we have not had to replace the Vidicon to date."

Calhoun covers a portion of his cost each month by setting the service out for sponsorship. The local newspaper pays $135.00 per month to be identified on the screen with the weather and time information.

In Calhoun's system, only one of the six dials are on the screen at a time. A rotating step-by-step mechanism provides the proper instrument to the Vidicon image on a sequence basis. A set of 45 degree mirrors rotated on a Geneva movement positions the proper image on the Vidicon plate for five seconds before moving on to the next dial.

The weather instruments were manufactured by Bendix-Friez of Baltimore.

The service, carried on a heretofore unused channel is complemented on the audio section by a high-quality FM music station broadcasting from 7 AM to 12 midnight.

Last June Hobbs Television Cable added another weather service to the system by providing pick-up of the local Federal Aviation Agency weather broadcasts (on VHF radio in the 115 megacycle region). Intended primarily for pilots, the addition provides area forecasts and coverage seldom made available to civilians because of the frequency of the radio broadcasts.

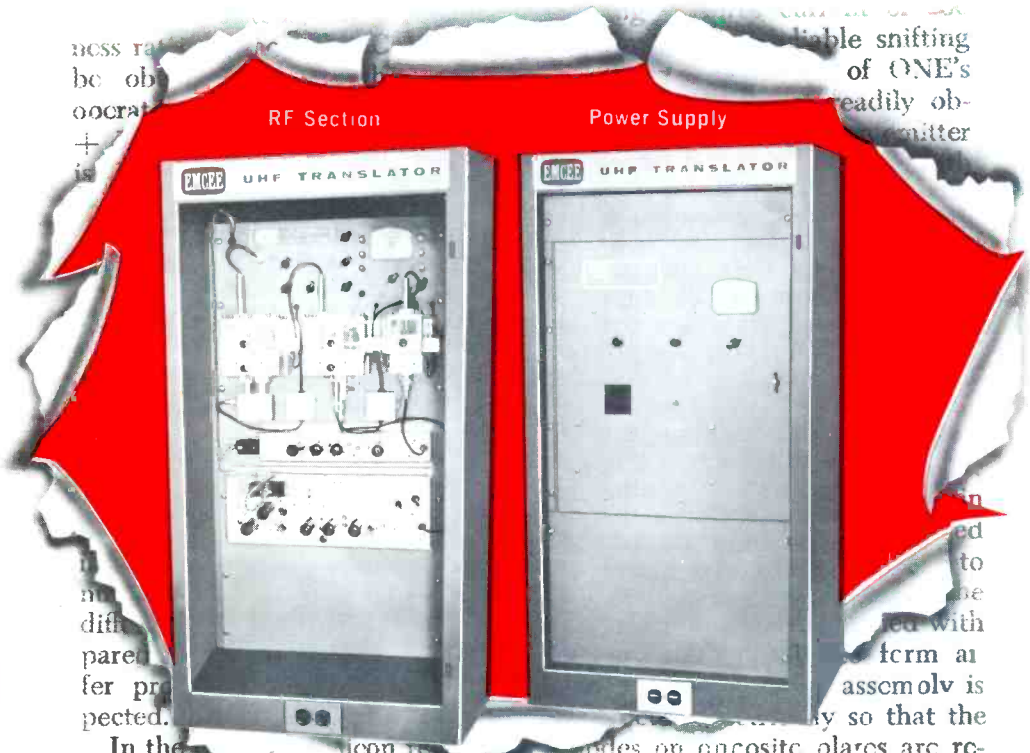
Hobbs uses an SKL 12 channel broadband system, which leaves plenty of room for additional expansion of service to the community in the years ahead. While weathercasting is of prime importance to a large number of the Hobbs, New Mexico cable viewers, it will not remain the only "public service" of Hobbs TV in the future.

Translator News

EMCEE

At last! A spectacular

BREAKTHROUGH in UHF TRANSLATORS by EMCEE



The many features indicated in this new UHF concept are just a small portion of the many new advances incorporated in this new EMCEE UNIT. PLEASE NOTE THIS FACT ALONE: EMCEE *offers a complete 100 Watt UHF Translator* . . . at a price complete competitive with what you would expect to pay for a 100 Watt Amplifier alone! If you're looking for a UHF Translator . . . try EMCEE and see!

- New concept in Translator UHF Circuitry increases reliability, ease of tuning minimizes costs all along the line.
- Full metering of all important operating parameters, including *separate measurements* of *visual* and *aural* powers, visual measurement is true peak sync.
- *Visual-Aural* power ratio *control* permits easy adjustment of ratio.
- Built-in *Plate Supply* and *Heater* Voltage regulator ends line voltage variation problems forever.

This is just a sampling of the new features available for the first time ever in any translator.

EMCEE

ELECTRONICS, MISSILES AND COMMUNICATIONS, INC.

262 East Third Street • Mount Vernon 4, New York • MO 8-3012

Electronics, Missiles & Communications, Inc.
262 East Third Street • Mount Vernon, New York

Gentlemen: Please rush detailed specifications of the all-new EMCEE Model

☐ HTU-100 UHF Translator just released.

☐ Catalog B showing world's most complete line of VHF Translators

NAME _____

ADDRESS _____ CITY _____ STATE _____

AN ARGUMENT FOR . . .

TRANSISTOR CATV

by
P. L. de BOURGKNECHT
Chief Engineer
and
JACOB SHEKEL
Director, Instrument Division
SPENCER-KENNEDY LABORATORIES, INC.
1320 Soldiers Field Road
Boston 35, Massachusetts

Introduction

After many years of experience in design of vacuum-tube electronic circuits and systems, an engineer does not usually turn to "the solid state" for the mere sake of novelty. As a matter of fact, the complete readjustment to the ways of thinking and doing things as required by the new technique is invaribly quite frightening to an engineer whose endeavors previously followed the path of electronics through the grid of a tube. Similarly, the management of an organization whose products for many years were designed around vacuum tubes and their associated circuits would show a very poor sense of responsibility if it jumped on such new and different techniques as offered by solid-state techniques without considering all the implications.

When SKL decided to add solid-state equipment to its line of distributed vacuum-tube amplifiers, it was not the result of some emotional impulse. It was fully recognized from the beginning, that a transistor is not just "something like a vacuum tube, only different", not even "similar to a vacuum-tube, only better in many respects". It is a component that should be treated on its own merits, and transistor circuits should not be designed as a modification of existing vacuum-tube circuits. Instead, new circuits should be developed to realize the full potential of the transistors as a paramount objective. It was immediately obvious that the philosophy of the TV system should be re-examined, to clear it of some well-entrenched notions which had evolved from vacuum-tube techniques and their limitations.

Solid-state devices

Let us first review, in brief, some of the most important characteristics common to solid-state devices (transistors, diodes, etc.) and especially those pertinent to the design of cable CATV systems.

1) *Life time*

When used in a conservative circuit, the lifetime of a transistor or diode is known to exceed that of a vacuum-tube by a very sizable factor. At a junction temperature of 100° C, a rate of failure of one unit per 1,000,000 hours of operation is believed to be a reasonable estimate. Let us recall that 1,000,000 hours are 114 years and 28 days (± 1 day, depending on where the leap-years fall). Oh, yes, and 16 hours.

2) *Aging*

During its complete life span, the device does not exhibit any aging characteristics, so that no tuning or adjustment is necessary after the initial setting. The only adjustments necessary in the system are due to changes in cable attenuation, and with suitable AGC circuits, they too can be eliminated. The circuit designer is now free to develop the circuits for optimum performance, without any allowances for aging.

3) *Power consumption*

No filament power is needed, and extremely low voltages are required for operation. Thus, primary power efficiency is enormously increased, and cable-powered systems become practical. The system designer is free to place the amplifier at optimum locations and need not be concerned with cabinet, local power or pole locations. This fact radically changes the concept of installation costs.

A word about economics

The scientific achievements on which the solid-state techniques are based are quite impressive, and it is obvious that they make it technically possible to design almost ideal TV systems. However, it would be devoid of any significance to consider only the technical aspects without assurance that their translation into business language would lie within limits of economic feasibility. The scientist may be happy computing his signal/noise ratio, whereas the engineer has to balance it against the income/investment ratio to be expected from the same system.

It does not necessarily follow that the least expensive system will display the poorest TV pictures, but it is almost invariably true that the best *long term* investment is made with the best engineered system. We believe that the system we propose is the best possible system within reasonable price limits and with only very minor compromises as compared to the technically ideal system.

In developing the system, the goal of SKL was to utilize the basic features of solid-state devices to their fullest and to provide the complete system with the same advantages. In spite of much higher material costs in the equipment, the total purchase and installation costs compare favorably with those applying to a vacuum-tube system. This was made possible largely by special effort in design and production methods.

System considerations

A cabled TV system is, in effect, a complex piece of equipment, whose sub-assemblies are spread over considerable distances and are subjected to various abuses from their environment. It is therefore of utmost importance that a system be engineered as a single entity, rather than as a collection of separately designed units. The specifications of an amplifier are meaningless until its exact function and location are known with respect to the rest of the system.

On the other hand, it is economically unfeasible that the components be tailor-made for each system. The list of basic components

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

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

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

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

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

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

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

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

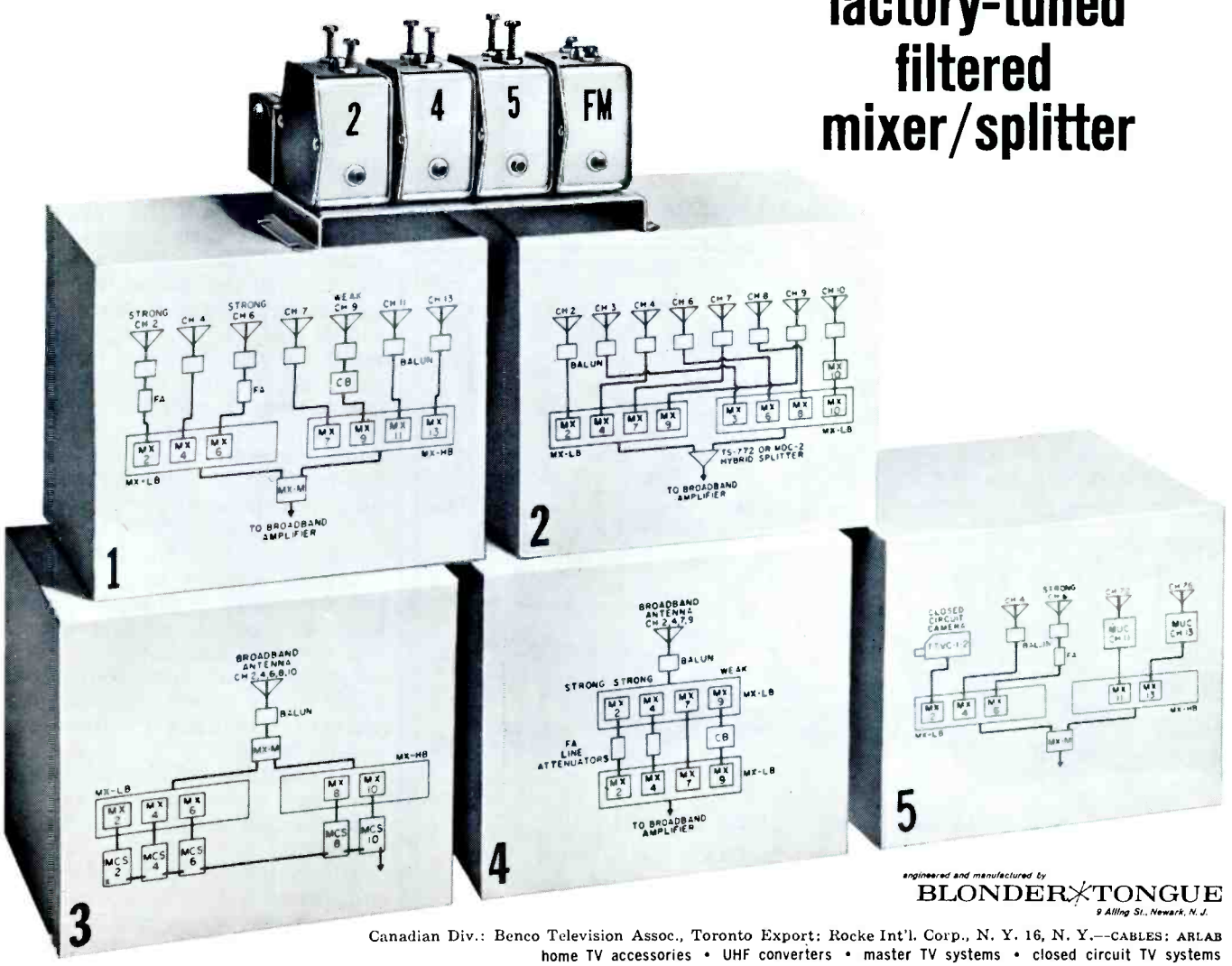
4. Balances signal strengths from a broadband antenna.

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

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

NEW BLONDER-TONGUE MX

factory-tuned filtered mixer/splitter



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

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

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

should be short, and at the same time allow enough versatility to construct as many different systems and types of systems as may occur in cabled TV work. For example, the basic amplifier of the system should be suitable both for long untapped main feeders and for distribution lines with heavy flat losses.

The main trunk

The basic consideration for the components in the main trunk line is that they be inherently suitable for very long lines. It is well known that this calls for amplifiers that introduce the possible minimum of any disturbance that may accumulate as the signal proceeds along the line. The sources of these cumulative disturbances are: noise in the input stage, cross-modulation in the output stage, and reflections both at the input and output terminals. One goal of the designer is to minimize these as much as possible within the present state of the art.

There is, however, another theoretical fact that is not so well known. Suppose that we know the input and output specifications of an amplifier and the quality of the signal required at the end of the line. The longest line is possible, in theory, if the gain of each repeater amplifier is kept down to 8.7 db.

This theoretical optimum gain is unreasonable for both practical and economic considerations. Fortunately, the theory also shows that if the repeater gain is increased to 10 or even 16 db, the reduction in permissible line length is very slight, but it starts falling off drastically if the repeaters have gain in excess of 26 db. On the other hand, a repeater with a gain below 20 db cannot be considered as an economical solution for a trunk line (unless absolutely necessary, when the system length really has to be pushed to its utmost limit). It then appears that for the majority of cable TV systems, a repeater in the range of 20-26 db represents a typical example of the harmonious marriage between dollars and db's, with the benediction of sound engineering practices.

The economics of the system are greatly improved by the fact that the solid state amplifier does not need a cabinet and a power supply at every station, so that the theoretical advantages of lower gain amplifiers can be utilized without increasing the installation and maintenance costs.

The layout of a well designed system always includes some safety factors, if the TV picture quality is to be assured under all operating conditions. The input to the repeater amplifiers is usually kept above the theoretically allowed minimum, and the output is kept below the theoretical maximum. These safety factors are intended to take up the effect of variations in the repeaters (aging) and the cables (temperature variations which affect the losses). The special properties of solid-state devices allow the designer to keep these safety factors at their minimum, which is much lower than in vacuum-tube systems with comparable quality. Since the solid-state devices do not exhibit any aging effects, this part of the improvement is self-evident. The second part, that has to do with thermal effects in the cable, may require a more detailed explanation.

Assume that the system has been laid out for the cable losses computed at 125°F, so that the loss for the highest channel in each section is equal to the gain of the amplifier, and the lower losses at the lowest channel are brought to the same value by an equalizer. At any temperature below 125°F, the losses are therefore less than the gain of the repeater, and the signal builds up from station to station, with larger build-up for the lower channels. Installing an occasional automatic level control station is an effective remedy, but by no means a complete one, for the amplifiers between the ALC stations will still be submitted to relative inequities. The safety-factor allowed in the maximum permissible signal level must include the build-up of signal between ALC stations. The real solution for this difficulty would be given if the gain of *each amplifier* could be controlled automatically, preferably with automatic slope control as well.

In vacuum-tube systems, providing an ALC for every amplifier will result in prohibitive complexity and cost, but a solid-state system can take such an added feature in its stride. Since the repeaters are cable-powered anyway, there is a communication link between the amplifiers in addition to the regular TV information. This link is used to supply ALC information to each amplifier on the line, and all of them increase or drop their gain in step. As a result, the signal level is the same at the output of all the amplifiers, and their output capabilities are used at the maximum, without any need to allow for a safety factor.

To keep the ALC system operative and dependable at all times, our practice is to rely on a locally generated pilot carrier, which is well controlled in frequency and amplitude. As an added safety, for

(Continued—Page 21)

answer:

TIMES!

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

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WANT MORE SIGNAL?

NOVEL YAGI ANTENNA DESIGN

—Staff—

Most antenna designers—though they may differ about many other points—agree on one thing: with the single exception of the parabolic reflector, the yagi antenna offers the highest gain in a practical design.

This fact is witnessed by the phenomenal number of yagi-derived designs in use today.

In fact, were it not for a number of problems intimately allied with the basic design concept, the yagi quite possibly might be the *only* type of antenna used in weak-signal VHF/UHF reception.

From the CATV standpoint, the chief problem is one of bandwidth. The conventional yagi design offers a bandwidth no greater than 1 percent of center frequency—which means that such an antenna cut for Channel 2 would give only 0.570 mc of bandwidth. This is a far cry from the 6 mc needed for proper reception of a TV signal!

The bandwidth limitation in the high-gain yagi design stems from two factors: these factors are the feed-point network and the element phasing.

For maximum gain, element phasing must be such that bandwidth is inherently limited. In other words, this is the old gain-bandwidth equation (found so frequently in video amplifiers) cropping up again. This is seldom a real problem, since elements may be phased for a 6-mc bandwidth without sacrificing more than 1 to 2 db of gain.

The real bugaboo in the past has been the *feed-point network*. This phrase may be a bit unfamiliar to you, since we just invented it (no generic term for the items existed previously). It refers to the circuit between the feedline and the antenna driven element itself; in other words, the network which would be called a "matching network" in a transmitting antenna.

Such a network is necessary in a yagi antenna for two reasons, one mechanical and the other electrical.

The mechanical reason is simply one of element strength in high winds; it's desirable to have the driven element made of one piece of metal to eliminate the possibility of weak joints where the driven element is supported!

The electrical reason is a bit more complicated. Impedance of the driven element, at its center (if it's broken at the center and fed there) is only about 20 ohms in any long-yagi design. If this is connected to a 300-ohm line, the resulting mismatch is excessive and power transfer efficiency drops drastically. If this is connected to a 72-ohm line, a lesser although substantial amount of mis-match still exists.

Therefore, some sort of network is necessary to raise the 20-ohm impedance to approximately 300 ohms, or 72 ohms, allowing a perfect match and obtaining maximum transfer efficiency.

A number of such networks have been used in the past, and many are still in use. Most, though, are inherently high-Q devices—and as such, suffer a bandwidth limitation.

Thus, a wide-band feed-point network would eliminate the worst bugaboo of the yagi antenna and allow extended development of this design.

That's what this article is all about—just such a wide-band network, reduced to practice in the Horizons Labs. But before we describe it, let's review some of the existing matching devices.

Maintenance truck in an **ameco** all-band cable powered transistorized system.

JERROLD SALES CLIMB TO RECORD HIGH

Jerrold Electronics Corporation has reported the highest sales and earnings in the company's 14 year history.

According to Sidney Harman, President of Jerrold, Jerrold showed a 137 percent increase in earnings on 51 percent higher sales for the fiscal year ended February 28, 1962.

BLONDER TONGUE BREAKS AT PARTS SHOW

Blonder Tongue Labs, Newark, N. J. featured a number of 'feature-introductory prices on several new items' at the Chicago 1962 Electronic Parts Distributors Show. Among the new units and prices shown were the Ampli-Coupler, Model B-33, a low-cost three set amplified coupler, and the Quadro-booster, model IT-4, a new four-set home transistor booster.

One of the most widely used is the folded dipole; in its most common form, this network offers a 4-to-1 impedance step-up. This brings the impedance up to 80 ohms, still quite a mismatch for 300 ohm systems —but since the dipole is more wide-band in its characteristics than most other such networks, the mismatch is tolerated in many applications.

Also in wide use is the "T" network, similar to a folded dipole connected part-way out the driven element instead of at the ends. This offers the possibility of a perfect impedance match, but the bandwidth drops as the connection points move in toward the center of the driven element.

Tuning stubs have been explored, but all of these are inherently high-Q devices and offer too little bandwidth for most use. The possibility of using *two* tuning stubs in series has also been investigated by several workers; this approach looks promising but complicated.

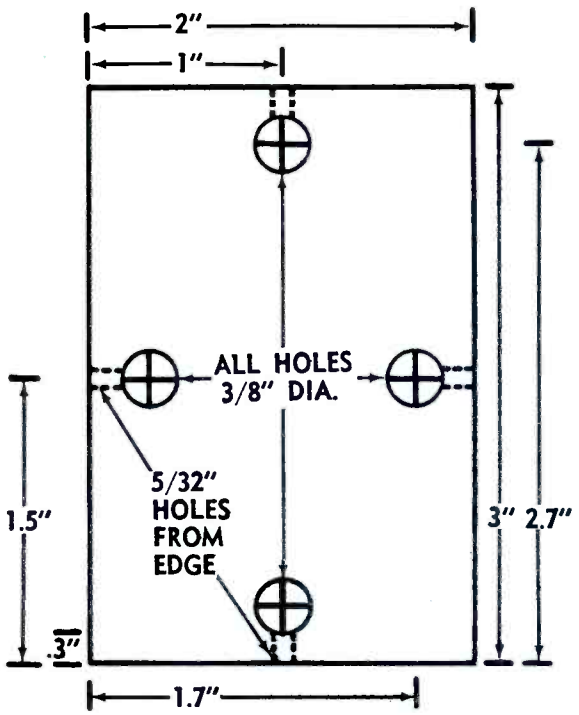

Figure Two

So far in this review, we note that the folded dipole offers the best bandwidth. Let's go back to it a moment.

By using elements of different diameters, the impedance characteristics of the dipole can be made whatever we want. Thus, we can obtain a perfect match together with wide-band characteristics.

However, to get the 16-to-1 impedance step-up we desire (20 ohms to 300 ohms), we must use either a very large driven element (undesirable because of wind resistance) or a very small matching wire (undesirable because of mechanical stability factors).

Therein lies the secret of the *Horizons Dipole*: The conventional two-wire folded dipole is *not* the only way to get the step-up we want.

For instance, a *four-wire* folded dipole, if the wires are arranged at the vertices of a rhombus, gives a 16-to-1 step-up. This is plently close for a good match.

So what, you may say. What about mechanical stability? This is all very interesting on a theoretical basis, but how do you hold the thing on a boom 500 feet in the air?

To answer this, we offer one more fact: the *diameter* of the four wires is unimportant, provided only that all four have the same dimensions and that they are arranged in the rhombus pattern shown in Figure 1.

Thus, by using ¼ to ½ inch aluminum tubing for each of the wires. inserting polystyrene spacing blocks along the element to maintain the spacing constant all along the length, and using ¼-inch aluminum plate for the shorting blocks at the ends, we come up with an element which is as sturdy as anything ever hung on a yagi boom—yet has a built-in matching transformer and a feed-point impedance of from 280 to 320 ohms depending on the yagi tuning and antenna height.

Figure One

In this antenna, 3/16-inch OD tubing was used and element spacing was as shown in Figure 2 (actual size cross-section template).

In addition to the two aluminum end plates, six plastic spacers were used. Two were located near the boom on each side as shown, while the third (on each side) was mid-way between the boom and the end of the element. Each spacer was made from ½-inch lucite, and all six spacers together with the two end plates were drilled simultaneously to assure a perfect pattern.

Boom material for this antenna was 2-inch aluminum tubing; this dictated the A-C spacing shown in Figure 2. The distance from hole A to hole C should be equal to the boom diameter plus the diameter of one element.

The key point in the spacing is that the two triangles formed by holes A-B-D and C-B-D must be equilateral; in other words, to change the design for a different boom or element diameter, first locate holes A and C as described in the preceding paragraph. Next, draw a line connecting their centers. Now, construct angles passing through the centers of each hole at 30 degrees to the line connecting centers. Where these angle-lines intersect at each side are the centers of holes B and D. To check, center-to-center spacing should be equal between A and B, B and C, C and D, and D and A.

The element which passes through hole C is split at its center, to attach the feed-line. The other three elements are full-length, and all three attach securely to the boom. Elements B and D pass through holes in the boom, while element A passes over the top of the boom and is fastened by a sheet-metal screw.

Spacing of directors and reflectors for maximum gain consistent with bandwidth is best done by using the technique of Dr. R. K. Reynolds, as reported in the Transactions of the I.R.E. Professional Group on Antennas and Propagation. If you do not have access to this information, simply follow your usual procedures for determining element lengths and spacing —the difference, now, is that you don't have to worry about the bandwidth of the feed-point network!

THE JERROLD CATV MEN (

Join us at the NCTA Show!

When NCTA members throughout the country converge on Washington, D.C., June 18 to 22, they'll find tremendous activity around the Jerrold booth and the Jerrold Hospitality Suite.

They'll be able to talk CATV in a relaxed atmosphere with the men who make Jerrold Community Systems Division the top organization in the industry.

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RATION
phia 32, Pa.

"HOW'S UHF DOING IN NYC?"

by
LON CANTOR
Blonder-Tongue Labs
Newark, N.J.

While the FCC is surveying the effectiveness of UHF in New York City, independent TV service technicians are also making informal tests of channel 31 reception in this city's mammoth "canyon areas." So far, results are impressively good.

While these technicians don't pretend to be working with the scientific exactitude of the FCC, their results are, in many ways, even more revealing than those of the FCC. For one thing, the sample is larger, as is the area being tested. Although the FCC plans eventually to test 5,000 locations, their published results are based on only 100 sites. The area tested was limited to within 25 miles of the Empire State Building.

Independent TV technicians on the other hand, have made a much larger number of installations in areas ranging from midtown Manhattan to suburbs 50 miles away. And these installations were not made by engineers with all the time in the world—they were made by technicians who had to be in and out fast in order to make a profit.

Blonder-Tongue Laboratories, makers of the only UHF converters available in the New York market, has made an effort to compile and analyze the results of about 300 of these installations.

In general, the results coincided with those of the FCC study. From the installing technician's point of view, the most important differences between UHF and VHF are:

1. UHF will not cover areas as large as VHF. This is a disadvantage to an individual TV channel owner, but it is an advantage to the public as a whole. Not only are there 70 UHF channels compared with only 12 VHF, but UHF channels can be much more closely spaced. A VHF channel can cause interference more than 100 miles past the point where it provides usable service; a UHF channel causes interference only a few miles beyond its usable service range.

However, good channel 31 signals have been received as far as 50 miles away from the Empire State building, using a mast mounted UHF amplifier and stacked bowties.

2. Building losses are higher at UHF. This means that more outdoor antennas will be needed. However, installation experience has shown that indoor antennas will suffice in many locations, provided the right spot in the right room is chosen for the antenna.

3. Cable losses are higher at UHF. This means that cable must be installed more carefully to provide good reception and to prevent callbacks. Also, a better quality foam twinlead should be used.

Perhaps the most experienced UHF installer in metropolitan New York is TV Milty. Milty has installed converters in almost 200 locations. (Most of these converters were installed in various hospitals and institutions for Comeback, Inc. Comeback is experimenting with the use of UHF TV as a means of therapeutic recreation). In only two locations was Milty unable to get satisfactory channel 31 pictures using an indoor antenna. Strangely enough, both these locations were within 10 miles of the transmitter. One was an apartment on the ninth floor of a project. Between this project and the Empire State building were six more project buildings and a hospital. While he was able to get acceptable signals on the roof of the building and in other apartments, no spot in any room of this particular apartment yielded a usable picture. Another was a private home at the upper end of the Bronx. Milty was unable to find acceptable signals anywhere in the house. He hooked the converter directly to the existing outdoor VHF antenna and still pictures were poor. He noticed, however, that even VHF pictures were not what they should be. He finally found that a UHF bowtie on a 10 foot mast with a Blonder-Tongue model UB *Ultrabooster* pre-amplifier was required to get really good pictures. Technicians have found the Ultrabooster (see Figure 1) to be remarkably effective. It has brought in good pictures where all other methods have failed.

Model UB Ultrabooster

For all of his other installations, Milty used simple indoor antennas. Since there were no indoor UHF antennas readily available, he had two types made up especially for him. One is a dipole made of 300 ohm twinlead. The other consists of two quarter wave stubs on a rabbit ear base.

Because he had to reduce installation time as much as possible in order to make a profit, Milty worked out a definite procedure that he followed when entering a home or a public building.

First, he determined what type of antenna the customer was using for VHF. If the building utilized a master TV antenna, Milty knew he would have to use an indoor UHF antenna. He tried first the quarter wave stubs on top of the TV set (see Figure 2). If the picture wasn't good, Milty then tried his 300 ohm

Figure 2

dipole (see Figure 3). While the 300 ohm dipole did not pull in any more signal than the quarter wave stubs, it had the advantage of being easier to orient. He probed the walls, the window sills and the floor, looking for the most convenient spot in the room that would give him a good picture. In some cases, he was unable to install the 300 ohm dipole in the same room as the TV receiver. In one instance he found that the only place in the apartment that provided a good signal was a spot three inches off the floor on the wall facing the Empire State building.

In private homes, Milty generally tried to use the existing VHF antenna, whether it was an indoor or an outdoor type. Normally a top-of-the-set VHF rabbit ear worked fine for both UHF and VHF. He simply connected it in parallel to both the UHF and VHF terminals of the converter. This, of course, ruined the impedance match, but in very strong signal areas it seldom made any difference.

Some portable TV sets have built-in rabbit ears. The type with only a single ear, however, won't work for UHF.

The built-in type of antennas used on console and table models

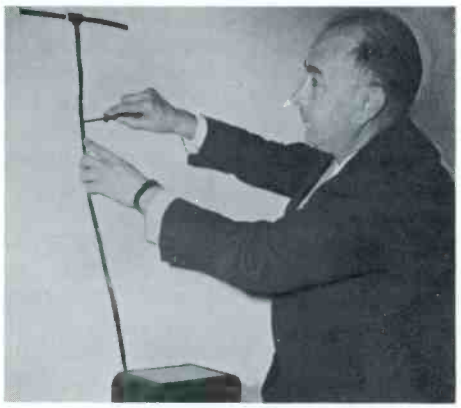


Figure 3

(consisting generally of nothing more than a length of wire coiled onto the back cover) however, does almost as good a job on UHF as the quarter wave stub antenna.

When VHF rabbit ears are used for UHF, Milty found that they worked best when fully closed. He also noticed that the selector switch was usually even more effective for UHF than for VHF.

If the home used an outdoor VHF antenna, Milty's first step was to connect it directly to the UHF terminals of the converter and see if it provided good pictures. If it did, he then used either a UHF/VHF coupler or two 150 ohm resistors in parallel to connect the VHF antenna to both the UHF and VHF terminals of the converter.

Once the converter and antenna were installed, Milty found he had to spend about 10 minutes explaining it to the customer. He showed the customer that the TV set had to be tuned to channel 6, with the fine tuner in about the center of its range. Then he demonstrated how to tune the converter. Customers generally had a little more trouble tuning the BTC-99R, a single tube converter, than the BTU-2S, an amplified converter (see Figure 4).

For this reason, and because the amplified converter improves the signal-to-noise ratio when used with older sets, Milty says "From now on I'm going to install only two tube converters—especially if it's a contract job. They're much easier to tune and it takes less labor to install them."

BTU—2S

Milty found that, including orientation, the average installation took him about an hour. His easiest job was in a room on the 18th floor of the Hotel Dorset on 54th Street. He simply stuck a UHF antenna on top of the TV set, hooked it up to the converter (a BTU-2S) and it outperformed the hotel MATV system. While there was slight ghosting on VHF, there was no ghost at all on UHF and contrast was better. He was in and out within 20 minutes.

His hardest job was in a basement of a hospital on Staten Island. First he tried their VHF rabbit ear, but it didn't work. Then he tried the UHF quarter wave stubs—still a very snowy picture. Using a long wire, he probed the entire room with the 300 ohm folded dipole. He felt sure he could find a good spot because upstairs, on the first floor, he had just installed a converter and got a perfect picture with no trouble at all. Finally, after almost 2 hours, he found a good antenna site; about 25 feet from the TV set, over a doorway. He stapled the antenna in place and used a BTU-2S. The picture quality was quite satisfactory, almost as good as the VHF. Milty found that most customers were quite pleased with their UHF reception.

EFFECT OF UHF TEST

With the channel 31 test, the FCC seems to have removed the last doubts as to the feasibility of UHF. There has never been much doubt about the need for more TV channels to provide:

1. TV coverage for isolated areas
2. Expansion of ETV
3. More competition.

The first step in the swing to UHF will be passage of a bill requiring all TV set manufacturers to build UHF tuners into all of their receivers. Passage of this bill seems inevitable. Assured at last of an audience, UHF channels will spring up all over the country. Present VHF channels will probably telecast on both UHF and VHF simultaneously, until the VHF can be dropped.

Although purchasers of new TV sets will be able to receive the new UHF channels, families with older receivers will not. About 50 million TV receivers in use today will have to be converted for UHF. Some receivers can be converted with a UHF strip in the tuner, but this provides for only one channel and is generally unprofitable in terms of labor. Most customers will prefer a top-of-the-set converter, tunable to all channels. Experience has shown that the average conversion costs the customer about $40.00. In other words, TV technicians can expect a bonus of about 2 billion dollars worth of conversion business during the next few years.

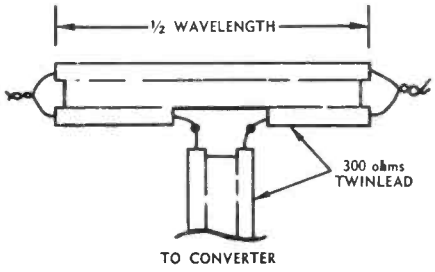
HOW TO INSTALL A UHF CONVERTER

Choose an antenna first. Indoor antennas will usually suffice for areas within about 15 miles of the transmitter. If the customer already uses an outdoor VHF antenna, it will probably serve for UHF as well. If it does not, use a UHF bowtie. In fringe areas it may be necessary to stack UHF bowties.

Then choose a converter. Use a one-tube converter only in good signal areas and with TV receivers having good tuners and IF tubes. In all other cases, a two-tube converter will provide a better picture.

For deep fringe areas, use a UHF mast mounted pre-amplifier such as the Blonder-Tongue ULTRA-BOOSTER.

If there are no indoor UHF antennas in your area, it's easy enough to make your own, either out of 300 ohm twinlead or from a short length of number 14 wire.



½ Wave Dipole

Figure 5 shows a 300 ohm folded dipole. The length of the dipole is equal to half a wavelength. This can be calculated using the formula:

$$\lambda = \frac{V}{F}$$

λ is wavelength in meters
V is velocity, or speed of light in meters
F is the UHF channel center frequency in cycles.

Since the center frequency of channel 31 is 575 megacycles and

there are .0254 inches to a meter, we can compute the wavelength of channel 31 in inches with the formula:

$$\lambda = \frac{3 \times 10^8}{.0254\ (575 \times 10^6}$$

$\lambda = 20.5$ inches

However, the velocity of propagation in 300 ohm twinlead is only about 0.8 times the velocity in air, therefore the 300 ohm folded dipole should be ½ (20.5 x 0.8) or 8.2 inches long.

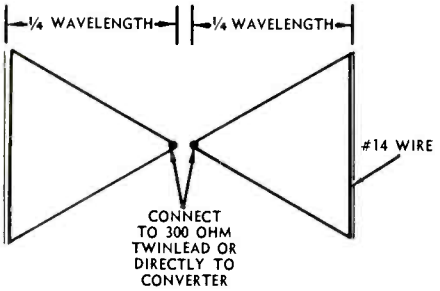
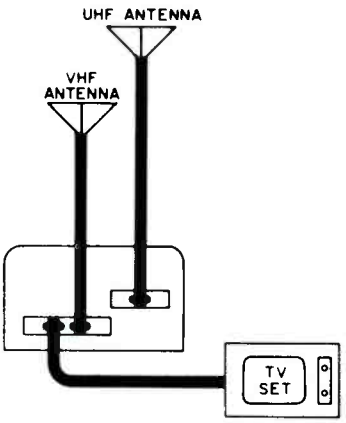
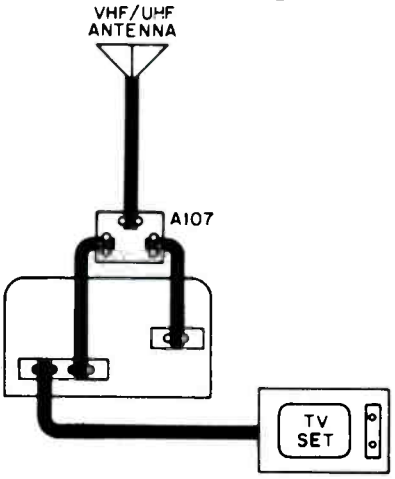


Figure 6 shows a pair of quarter wave stubs made from number 14 wire. They can be mounted right on the converter terminals. Calculate the wavelength as was done for the dipole, but no velocity factor correction is necessary. The wavelength of channel 31 is 20.5 inches. To find the length of a quarter wave stub, we simply divide by four and get a little over 5 inches per stub.



The converter has three sets of stripless terminals, one marked "UHF ANT.", another marked "VHF ANT." and the third marked "TV SET." Connect the "TV SET" terminals to the TV receiver antenna terminals. If you are using two separate antennas, connect each to the appropriate converter terminals as shown in Figure 7. To use one antenna for both UHF and VHF, you will need some way of splitting the signal. A Blonder-Tongue model A-107 VHF/UHF splitter is ideal for this purpose, since it is virtually loss-less (see Figure 8.) It is less expensive, however, simply to use two 150 ohm resistors as shown in Figure 9.

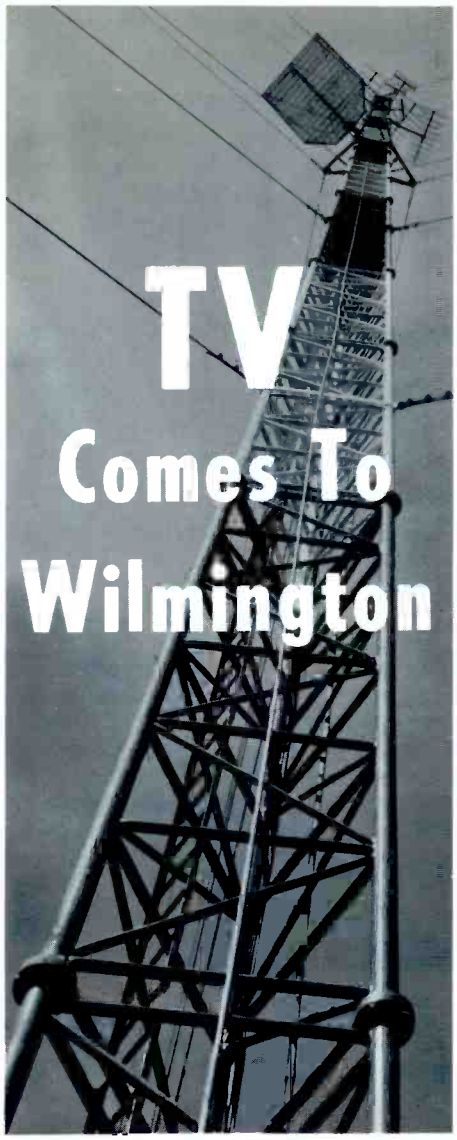


Some TV receivers have a pair of terminals on their back cover marked "UHF." In most cases, this terminal board is not connected to anything. Remember that the output of the converter is a VHF channel, either channel 5 or channel 6. Therefore, be sure to connect the converter output to the receiver terminals marked "VHF."

Another thing that has caused installers in the New York area

(Continued—Page 27)

TV Comes To Wilmington



Back in the October 1961 issue of Television Horizons we reported on initial plans to bring Cable television to Wilmington, North Carolina. The plan, financed by Cable Television Company, culminated in mid-April when 5 channel television came to Wilmington with fanfare and ceremony seldom matched in the CATV world.

Prime contractor for the system was Jerrold Electronics Corporation, Philadelphia. Jerrold installed approximately 128 miles of coaxial cable with a system investment originally estimated to total $500,000. The system is the largest of its kind ever installed in this country, and probably the largest in the world.

The man behind the CTC system in Wilmington is none other than Martin F. Malarkey, one of the pioneers in CATV in the United States. Malarkey became interested in CATV in Pottsville, Pennsylvania in 1950. He subsequently installed three similar systems in Pennsylvania and one in West Virginia. In 1952 Malarkey founded the National Community Television Association (NCTA) and served as its President for five years. Under his leadership the NCTA grew from its original nine members to more than 500. He constructed the Delaware Community Antenna system in Salisbury, Maryland in 1960 and still serves as President of that firm.

One of the best examples of CATV system promotion to date served a major function on April 15 when Cable Television Company, Wilmington, began service. A ten page three color newspaper insert, a part of the Sunday Star News, announced the new service with a wealth of background material telling the story behind the system, its backers and operators. The public image of the system was thus launched on very excellent footing by a little spade work down ahead of time.

Local television dealers were solicited to take advertising in the special section, announcing the availability of CATV in their stores for display purposes. In the special section CTC stated its operating policies including the fact that they are not in the business of selling, installing or servicing television receivers.

"Cable Television Company is a local business firm organized for the express purpose of designing, building and operating a master antenna television system (CATV), that will make available to every home in the Wilmington area the signals from distant television stations." With this statement of fact and intentions, the entire Wilmington area was introduced to the new master antenna service.

Five channels are provided on the system, including local WECT in Wilmington. Also available are WRAL-5, Raleigh, WITN-7, Washington (N.C.), WNCT-9, Greenville and WTVD-11, Durham-Raleigh.

Signals for the CATV system are provided via microwave over a 22 mile hop which originates at a 449 foot tower at St. Helena's Colony, N.C. A 150 foot microwave receiving tower is located in downtown Wilmington, and the base of the tower rests next to a building which houses the de-modulation gear and associated amplifiers, splitters, etc. for placing the signal on the cable.

While Wilmington represents the largest CATV system installation to date, the announcement that it is "in operation" preceded only by days another announcement that the last details have been worked out to wire Santa Barbara, California with a 7 or more channel system. This, then, will be the largest, when it is operational.

TRANSISTOR CATV

(Continued From Page 10)

the unlikely event of failure in the pilot generator, the system has a fail-safe feature: without the pilot, it shifts into a second, predetermined mode of operation, but snaps back into automatic control the moment the pilot comes on.

Last but not least, the amplifiers should preferably have a flat frequency response, so that they would be suitable both to untapped main lines and to tapped distribution feeders that have a heavy flat loss. The various slopes of cable losses are taken care of by a limited variety of equalizers. Both the repeater amplifiers and associated equalizers are housed in weatherproof cylindrical tubes, for easy installation right on the messenger wire that carries the coaxial cable.

Head end equipment

The same qualities that make the solid-state amplifier a good line repeater are even more apparent in their effect on the design of head-end equipment. The pre-amplifiers, amplifiers and converters, all single-channel components, have several tuned stages each. In vacuum-tube instruments, the tuning may be severely affected by tube aging, with resulting changes in internal capacitances. The design of the circuit is always to some mean value, and has to allow margin for variations. On the other hand, the solid-state devices permit the design of selective filter circuits to their full capabilities, with the assurance that once a component has been tuned, its performance will not deteriorate for the lifetime of the equipment, and there is never any need to check or retune it. Any selective circuits can be made as sharp as possible, with the assurance that they will stay that way.

The ability to supply power through the cable comes in very handy in the preamplifier. If the low-noise features of a preamplifier are to be fully realized, it has to be mounted as close as possible to the antenna, because any cable loss that precedes it will result in a higher effective noise figure. Here again the cable-powering feature enables us to place the component at the point which is most favorable for the system performance.

Each channel amplifier feeds ALC information back to the preamplifier. (This is done even if the incoming signal is converted to another channel, so that the preamplifier and amplifier are tuned to two different TV channels). The ALC operates on the picture carrier of the channel and has a fail-safe feature similar to that of the trunk line ALC's. In case the picture carrier accidentally goes off the air, the amplifier goes into a predetermined idling state and snaps back to regular ALC operation the moment the carrier comes on again. This is done to eliminate the possibility that the sound carrier will come booming in through a wide-open amplifier at full gain and cross-modulate all other signals in the system.

The solid-state converters designed for the head-end have the same features of non-aging, permanently-aligned circuits. In addition, the frequency of the local oscillator is crystal-controlled.

Conclusion

We feel that a good TV transmission system should have the following features:

1) Reasonable (and competitive) purchase and installation costs.
2) Moderate-gain repeaters to allow the design of the longest possible lines within any given noise and cross-modulation specification.
3) A pilot controlled ALC system, with fully automatic fail-safe devices.
4) Automatic level control at every amplifier, automatic slope control as often as economically practical, and thermally governed compensation for changes in gain and slope due to temperature variations.
5) Ease of installation, utmost reliability and very limited maintenance.
6) Rugged mechanical design and waterproof enclosures.

The transistors, by their very nature, readily suggested solutions to the last three objectives above. The first three objectives have been satisfied at the expense of several years of sustained engineering efforts.

TRANSLATOR TRIAL IN NYC

Channel 77 is also in use during the Channel 31 NYC test. Adler Electronics, New Rochelle, New York recently completed installation of one of their 100 watt units at a location which includes a transmitting antenna mounted on the George Washington Bridge. The beam pattern of the transmitting antenna is southeasterly over most of Manhatten, Lower Bronx, Brooklyn and Queens.

BOOSTER DEADLINE EXTENDED-AGAIN

Once again the FCC has extended 'the last possible date' that VHF boosters can re-tool for legal operation as VHF translators. The April 30 deadline, by which all VHF repeaters operating under temporary authority were to have completed construction and filed for operation as licensed translators, has been set back to July 31.

NEW EQUIPMENT

Jerrold Electronics Corporation, Philadelphia, has introduced a new high output extra wideband amplifier which makes possible all-channel coverage in CATV systems.

The new 'Super Cascader Amplifier' (model SCA-213) is based on the distributed gain principle, recently discussed in Television Horizons by Gordon J. King.

The SCA-213 Super Cascader features 29 db gain, an output of 45 dbj per channel for seven channels at an intermodulation distortion figure of 0.14%. The amplifier features plug-in equalizers, very low noise figure and low VSWR figures.

The amplifier can be applied to new all-band systems or to expansion of existing systems.

Benco Television Associates, Ltd. has announced a newly designed fully transistorized field strength and wattmeter, model FSP-3. The new unit is described by Benco as "truly portable, self contained with its own battery power pack, rugged in construction and available with 50 or 75 ohm power measuring adaptors." Selectivity of the unit is 52-220 mc/s with 5 uV the sensitivity threshold. Power consumption is 17 milliamps at 9.25 volts, and the 8 Mallory mercury cells will supply up to 180 hours of continuous use. In the watt measuring classification, the FSP-3 will handle up to 10 watts of RF. Suggested dealer price in Canada is $365.00.

First Electronics Corporation, 119 East Sixth Street, Michigan City, Indiana has introduced a new AM/FM package designed to provide AM or FM signals on vacant and unused CATV-MATV channels.

Known as the *Micro/Mitter*, the firm states the unit is a new approach to wired music requirements. By installing one Micro/Mitter for each channel desired and tuning the FM/AM tuner in each to a desired station or connecting

the Micro/Mitter to tape, record or wired source of music, an unused TV channel is put to work. The unit may also be used to transmit closed circuit or education TV. Unique in the equipment is its separate sound input for tape, or record player and wired music. Futhermore, during operation the TV screen remains clear and blank through the Micro/Mitter's ability to generate its own TV blanking signal.

With a simple addition of an inexpensive video origination unit, the Micro/Mitter becomes a miniature TV station capable of transmitting either closed circuit programs or slide announcements, in addition to the audio signals.

Model VIK 940 series

BROADBAND AMPLIFIER

ALL VHF TV CHANNELS AND FM

- FOR DISTRIBUTION
- FOR LINES IN SMALL SYSTEMS
- FOR LINE EXTENDERS

The VIKING BROADBAND AMPLIFIER is an amplifier designed for the future. It amplifies the entire low and high TV band and the entire FM band at 40 db.

It is designed with broadband tuning in each stage so that all tubes can be changed without bandpass change.

It uses passive output shaping for fine control of tilt without effect on operating characteristics.

It has an ultra low noise figure comparable to head end pre-amplifiers.

It does all this with only six tubes of two types, in either standard or 10,000 hour versions.

The features of the VIKING amplifier could only be achieved by the most advanced design techniques with the needs of the CATV industry in mind.

The all-band and FM coverage insures that no matter what TV or FM stations appear, this amplifier is equipped to handle them. The circuit design insures that the system operator need not "twiddle" coils or tuning cores with the exception of three tilt controls for line equalization. The proper bandpass is built-in. Since each interstage is tuned flat across the entire band, individual tube characteristics do not effect the tuning, and tubes may be replaced in the field with negligible effect on the bandpass.

Since only six tubes are used, four 6DJ8's (or 6922's), and two 12BY7A's (or 7733's), stocking tubes for the amplifier is simplified. These high-quality tubes, used in conservative operation, guarantee excellent stability and long life.

The input stage uses electronic impedance loading to achieve an excellent input V.S.W.R., and simultaneously, the correct impedance for optimum noise figure. All signals are handled at approximately the same level in the broadly tuned, non-peaked interstages, resulting in high, uniform output capability.

SPECIFICATIONS

BANDWIDTH: 54-108 mc
174-216 mc at ± 0.75 db per band

GAIN: 40 db, min.

NOISE FIGURE: Lo band-4.5 db average
Hi band-7.5 db average

GAIN CONTROLS: Manual, to – 20 db, separate low and high band controls, bandpass remaining within ± 1 db.

TILT CONTROLS: Lo band-6 db
Hi band-5 db , flat within ± 1 db thru 27 db of cable at 88 mc and 40 db of cable at 216 mc

IMPEDANCE: 75 ohms, input and output

INPUT V.S.W.R.: 1.5:1 at full gain, maximum
1.7:1 at any setting of gain, maximum

TEST POINTS: – 20 db., input and output

LEVELS FOR PASSABLE PICTURE:
(0 dbmv = 1 millivolt)

MINIMUM INPUT:
Lo band – 20 dbmv (100μv) per channel
Hi band — 16 dbmv (160μv) per channel

MAXIMUM INPUT: 40 dbmv (.1 v.) total per band for less than 1% cross-modulation

MAXIMUM OUTPUT: 64 dbmv (1.7 v.) total per band for less than 1% or 67 dbmv (2.5 v.) for less than 3% cross-modulation

TUBES: Standard Models-4-6DJ8, 2-12BY7A
Deluxe Models-4-6922, 2-7733

CONNECTORS: Type "F" or "UHF", trunkline; Type "C", test points

RECTIFIERS: Silicon

POWER: 117 V., 60 cps, 45 watts, 0.45 amps.

DIMENSIONS: 10" wide, 6⅝" deep, 5" high

SHIPPING WEIGHT: 9 pounds

Model No.	*Fittings*	*Tubes*
#VIK-940	F	Standard
#VIK-941	F	10,000 hour
#VIK-942	UHF	Standard
#VIK-943	UHF	10,000 hour

OUR MAN IN EUROPE

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

In the UK there are three primary commercial interests in wire broadcasting. There is the interest of the relay operator, the interest of the radio and television dealer and the interest of the film people. As these diverse interests are somewhat incompatible, a "political situation" sometimes occurs during the period when an exclusive wiring franchise is being negotiated.

If the area has a "valuable" subscriber potential, then there may be three or four, or even more, relay-interested organisations in the field. It rarely happens that the franchise for a specific area is given to more than one operator, although this may happen in certain unusual cases. The Town or City Council invariably appoints a subcommittee to investigate the merits and demerits of the systems put forward by the various applicants, and the recommendations of this sub-committee are nearly always accepted by the Council.

More and more Councils are becoming increasingly aware of the attributes of coaxial relays systems from both aspects of improved pictures and freedom from roof-top aerials, and Councils now often **invite** relay organisations to submit details of their systems for consideration. In the past the converse was true—relay organisations used to approach Councils for permission to erect wire.

Must Work Off-Air Sets

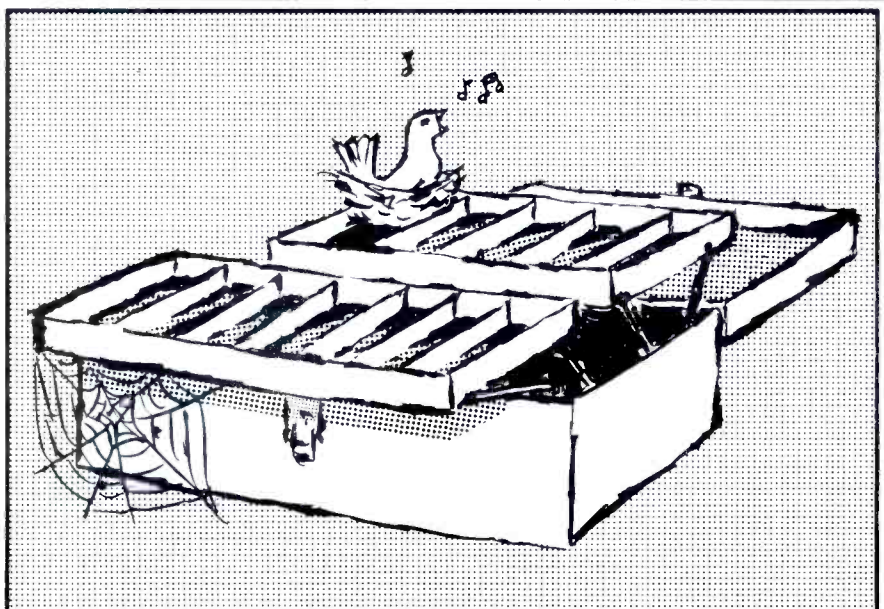
Before a franchise is given to a relay operator or organisation, two major requirements are usually stipulated. These are (1) that the proposed system is suitable for use with ordinary off-air receivers and (2) that the relay operator will not enter into the sale or rental of receivers in unfair competition with the local radio and television dealers.

Although there are two very large relay companies in operation over here who base their business on the rental of receivers and sound terminal units as well as on signal distribution, the trend is now to make the terminal equipment available to radio and television dealers operating in the area so that they may also sell equipment which is suitable only for the relay. In that way unfair competition is avoided. This type of system uses multiwires, as distinct from coaxial cable, and distributes physical audio and relatively low-frequency video- and sound-modulated carriers. A special receiver (or adaptor for an ordinary receiver) is, therefore, necessary on that system.

The majority of new systems being installed, however, are of the coaxial cable variety, distributing at present at v.h.f. on off-air channels. Many of these are being engineered, financed and operated by radio and television dealers. A group of dealers forms an operating company, chooses an equipment manufacturer and consultant, applies for a concession—and usually gets it without too much trouble—and erects the system on a piecemeal basis, starting first in those areas where the off-air signals are known to be poor. The Councils are usually quite happy with this arrangement, since it is considered in many circles that radio and television is the prerogative of dealers, anyway.

Film-Folk Tie-Up

It often happens, however, that the dealers, even as a group, are unable to raise sufficient capital to instigate a system. When this is the case, they may either endeavour to obtain capital from an appropriate organisation or they may even join into a company which has film interests. In either way, the dealers



Tube caddy in an **ameco** fully transistorized all-band system.

usually ensure that their retailing and renting interests are adequately protected.

On the other hand, the film-folk themselves may evolve a relay-operating company, or have the majority of share interest in such a company. When this is the case, the idea is usually to purchase relay systems and companies already in operation or to go all-out to obtain Council franchises and wiring concessions. Provided the company guarantees to erect a system suitable for ordinary receivers, and also provided the local dealers are reasonably happy with the proposed arrangements, the film-controlled company usually secures the franchise in the end.

Community-Owned Systems

To maintain a condition of equilibrium between the three major interests, it has been suggested that "community-owned" systems could represent the ultimate answer. The idea would be to establish a Community Relay Association, to which all viewers keen on improved reception and a greater choice of programmes without roof-top aerials would be invited to participate. There would be an entrance fee and a yearly subscription, the former to help with the initial launching and the latter for development and maintenance. By becoming a member, one would automatically assign wayleave clearance on any property owned to the Association. This in itself would considerably reduce the initial expenses.

The system would be *managed* by Officers of the Association, and two main Committees would be formed. An Engineering Committee which would appoint an Engineering Consultant and Wiring Contractors, and a Management Committee which would deal with the day-to-day operating problems. This Committee would also negotiate with film interests in an endeavour to do a deal with regard to the future film rights on the system.

The Association would then be nicely tied together by having a representative of the local dealers on the Technical Committee, and also a representative of the Council's engineering department and an advisor from the film organisation. In that way all the interests would be working together towards a common goal, within their own specific spheres.

Viewers would be happy in the knowledge that they are getting "piped TV" for the smallest possible outlay. Indeed, after a while, particularly should pay-TV come to pass, viewer-members would not only get piped signals for free, but they would also make a profit. They would, of course, pay for closed-circuit films in the ordinary way. The Council would be happy in the knowledge that roof-top aerials would progressively diminish and that there would be no clash of major interests. And the dealers would be happy because then they could go on handling sales, rentals and repairs without being in direct competition with the relay.

It is hoped shortly to launch a system on this basis as a trial, and reports as to its progress will be given in these columns from time to time.

New System for Pay-TV

There are many who consider that pay-TV will be within the framework of recommendations to be made shortly by the Pilkington Committee on the future of broadcasting in the UK, and with this in mind several manufacturers and others who have piped TV interests have established research sections to explore inexpensive methods of pay-TV control.

An interesting contribution in this connection has recently been made by Marconi's Wireless Telegraphic Co., Ltd., under the name of "PayVision". This has several unique features, and differs somewhat from other systems since it does not require a coin box on the viewer's set.

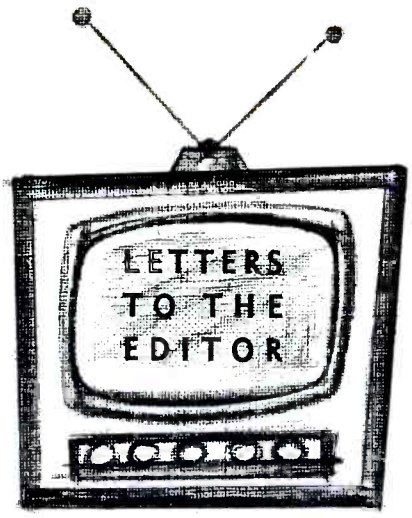
Instead of a coin box, a relatively simple three-push-button unit is connected to the subscriber's receiver at the aerial socket. One button allows the viewer to preview forthcoming closed-circuit programmes free of charge, while another button, worked in conjunction with a key, allows the viewer to receive the film programme which is already on the network.

When the "key" is operated, signals are fed back over the network to an automatic central accounting office, which employs an electronic computer for processing the data into subscribers' accounts.

To be Continued.

NEW VHF CHANNELS FOR MEXICO, USA

Through an inter-government agreement, Mexico and the United States have agreed to have several additional VHF television station assignments to the border area stretching from southern California to the Gulf Coast of Texas. The majority of the new assignments are in Texas and Arizona although some also appear in New Mexico and southern California. A complete breakdown of the new allocations may be procured from the FCC, Washington 25, D.C.



Dear Sir:

I recently read in the May 1962 edition of Electronic Industries an Editorial by Shelby A. McMillion, Publisher. In it he states "As the FCC plans an all out shift to UHF, there will be a transition period of six years during which VHF stations will be broadcasting on both the VHF and UHF bands. After that, all telecosting will be UHF."

Is this true? Will it happen? What (new) equipment will be needed for CATV?

Please . . what are the facts?

Richard A. Borrett
Clear TV Company
South Laguna, California

Richard:

For nearly two years we have been reporting in Television Horizons that the FCC was rapidly backing itself into an allocations corner from which they would have but one escape . . . UHF. While Congress may fight such a move, and delay it; and while multi-million dollar funds may be established by VHF telecasters to fight and delay the move to UHF, it "apparently" is coming.

When it does come, CATV systems will both prosper and be caught in a cost squeeze. On the one hand, many areas now within range of standard VHF telecast signals will fall outside the range of UHF reception from these same stations, after the shift to the Ultra Highs. This means an expanded market area for CATV, all across the nation.

On the other hand, equipment will become more expensive and many of us will have to start from scratch. Crystal controlled-ultra sensitive UHF to VHF converters will be needed to convert the UHF signals down to our carrier frequencies now in use on the cables, or VHF. It would be foolish to attempt to distribute signals on coaxial cable at UHF frequencies as cable losses alone would necessitate amplifiers every few hundred feet.

Mr. Ike Blonder, Blonder-Tongue Labs, Newark, New Jersey presented a very interesting talk on this topic at the 10th Annual NCTA convention in San Francisco last year. I suggest you drop B-T a line and ask for a copy of his address.

Editor

Dear Mr. Cooper:

Have been receiving and enjoying your fine publication for many months now. Congratulations on your format change to the standard size page.

As Editor of the TSA Newsletter, I have been doing whatever possible to gain additional readers for Television Horizons. Most recently I introduced the Chief Engineer of a newly formed Educational TV station in this area to your magazine.

Incidentially, cable TV seems to be expanding in the Ithaca, New York area. Perhaps you are already aware of this.

Warren Baker, K2ECJ
Editor-Television Service Association Newsletter

Mr. Baker:

Ithaca, New York has a system installed by Anthony Ceracche back in May, 1952. We remember rather well because we were living in Ithaca at the time! Ceracche TV Corp. now has some 5800 subscribers in a 6 channel system.

Editor

Dear Editor:

So far TVH has been excellent. I wouldn't want to miss even one issue. It not only helps one in the field, it also gives the engineer something to relate to and ponder over. Your reporting of what is new and what is actively being done and contemplated in all areas of our field is most helpful also. Keep up the good work and thanks very much for keeping after me so that I didn't miss my subscription renewal notice!

Lew Armour
Signoture Electronics
29 Palms, California

Dear Mr. Cooper:

One of the objectives of our Association is to keep member broadcasters appraised of noteworthy opinions and comments regarding matters affecting the radio and television industries. We were impressed with your editorial regarding community antennas in the March issue, and believe it would be of interest to TV station management.

Accordingly, we would like to have your permission to reproduce the editorial, in full, for distribution to our television members. Of course proper credit lines will be furnished.

Dan W. Shields
National Association of Broadcasters

Mr. Shields:

Permission granted. I believe you will find a large percentage of telecasting management, interested in CATV problems, has already read this editorial however, judging from the number of comments received here!

Editor

Editor:

Regarding your question on Page 5 of the March issue of Television Horizons, always happy to have more material on Microwave in CATV and TV broadcasting.

E. B. Craney
Butte, Montana

ICC TO REP CCTV, MICROWAVE

Intercontinental Communications Corp., Los Angeles, announces it has been appointed manufacturer's representatives for the closed circuit television equipment from Sylvania, and Industrial Television and Microwave's microwave equipment. ICC, a subsidiary of Davis Industries, Los Angeles, specializes in the design, installation and service of closed circuit television systems.

WINEGARD SALES UP 55%

Sales of Winegard TV antenna amplifiers and accessories were up 55% in 1961 over 1960, according to a recent announcement from President John R. Winegard.

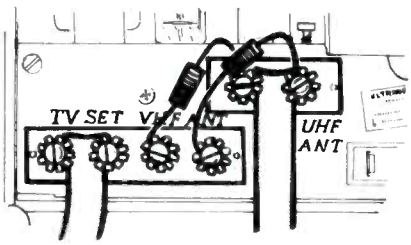
A new factory was completed during 1961, and plans for yet another addition are going ahead on schedule as sales in the first two months of 1962 show a 51% increase over the record months in 1961. Winegard expects to announce a number of new products shortly.

HOW'S UHF DOING . . .

(Continued From 19)

difficulty is the fact that in many TV receivers the channel 6 tuner strip has been removed. This can be a problem. If you get no indication of a picture or sound at all on channel 6, try tuning to channel 5, even if there is a channel 5 in your area (or vice versa). If you see any indication at all on channel 5, you can be fairly sure that the converter and the antenna are working properly but the tuner strip has been removed.

There is no problem installing a UHF outdoor antenna. In fact, since it's smaller, it's a little easier than installing an antenna for VHF. As with indoor installations, however, antenna orientation may be more critical.



Lead-in loss is increased considerably at UHF. Keep UHF lead-in as short as possible and don't use spliced pieces. Use as few standoff insulators as possible in fringe areas, since they increase loss.

Ordinary 300 ohm twinlead should be used for UHF only indoors. Even hollow tubular twinlead should not be used outdoors. Both types of cable can cause callbacks because when they get wet, losses increase by as much as six times. Thus, the system can work satisfactorily when installed, but the first rainfall may cause a snowstorm on the TV screen.

The new heavy duty polyfoam cables (Belden #8325, Amphenol #214-05, RCA #933014, etc.) are recommended for outdoor UHF installations.

The UHF boom will have an effect not only on technicians serving private homes but on CATV operators and MATV installers as well. Cable losses are so high at UHF that no practical method of distributing UHF signals has yet been devised. Therefore, even when all-channel sets are in most homes, signals will still have to be converted for MATV and CATV systems. The best thing for this purpose is a crystal controlled unit such as the Blonder-Tongue MUC, the Benco CO-3 or the Jerrold model 503. For economy, a non-crystal-controlled unit (Blonder-Tongue UC-2 or Jerrold U2V) can be used, provided it is mounted in an area where temperature does not vary more than about 20° Fahrenheit.

In fringe areas, use the UB ULTRABOOSTER as pre-amplifier for the converter. The ULTRABOOSTER is available with 75 ohm and 50 ohm connectors for CATV and MATV use.

In The July TVH

—Complete NCTA—

—Convention Report—

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After two years of extensive research and development, AMECO has produced a line of transistorized all-band cable-powered amplifiers that provide the most economical means of all-band CATV distribution possible.

Thoroughly tested and proven in the field, AMECO'S all-band transistorized amplifiers are operating in systems today!

The AMECO line of transistorized amplifiers and remote cable power accessories are ready for *Immediate delivery* !

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- LOW NOISE FIGURE (10 DB)
- 50-110 MC AND 170-218 MC BANDWIDTH
- EXTERNAL TILT AND GAIN CONTROLS
- CABLE POWERED OR DIRECT POWERED
- PROVIDES 24 VAC POWER ON OUTPUT FOR ATB-10 BRIDGING AMPLIFIER

only **$225.00***

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FULLY TRANSISTORIZED BRIDGING AMPLIFIER

- 40-220 MC BANDWIDTH
- 3 DB PLUG-IN PADS
- COMES WITH 2 AND 4 OUTPUTS
- LOW NOISE FIGURE (8 DB With "0" DB PAD)
- 10 DB GAIN
- CABLE POWERED OR DIRECT POWERED
- PROVIDES DC POWER ON OUTPUTS FOR ATM-20 LINE EXTENDERS

only **$135.15***

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FULLY TRANSISTORIZED CASCADABLE LINE EXTENDER AMPLIFIER

- 20 DB USABLE GAIN
- LOW NOISE FIGURE (6 DB)
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- CABLE POWERED OR DIRECT POWERED
- EXTERNAL TILT-GAIN CONTROL
- TEST POINT ON OUTPUT

only **$69.50***

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