

AUG 25 1953

AUGUST, 1953

# Radio-Television SERVICE DEALER

ALEXANDER PLAKADIS  
17701 W 25TH ST  
MAY 26 1953  
ALEXANDER PLAKADIS  
MAY 26 1953



The Professional Radio-TVman's Magazine

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- Sync Circuits, Part I  
(TV Symposium Series No. 7)
- UHF Antenna Symposium, Part 3
- Philco UHF Tuners and Converters
- New C-R Tester
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- UHF-VHF Station List
- Video Speed Servicing Systems

**AM-FM-TV-SOUND**

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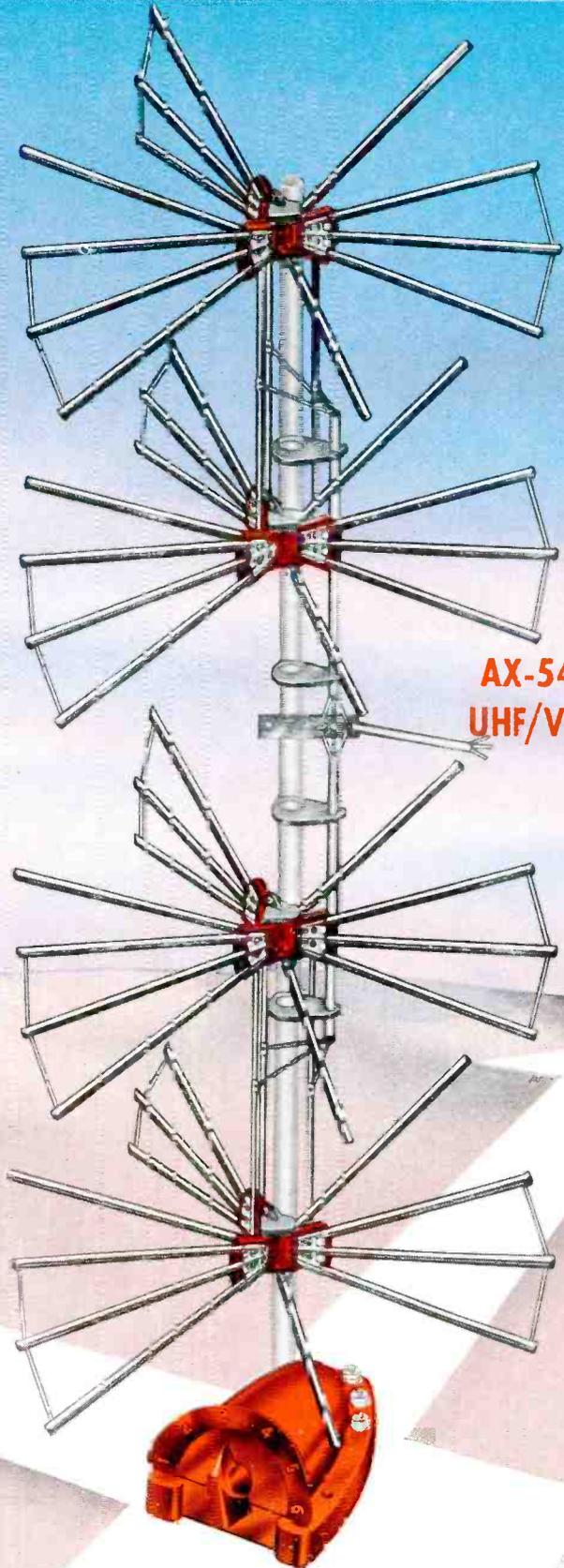
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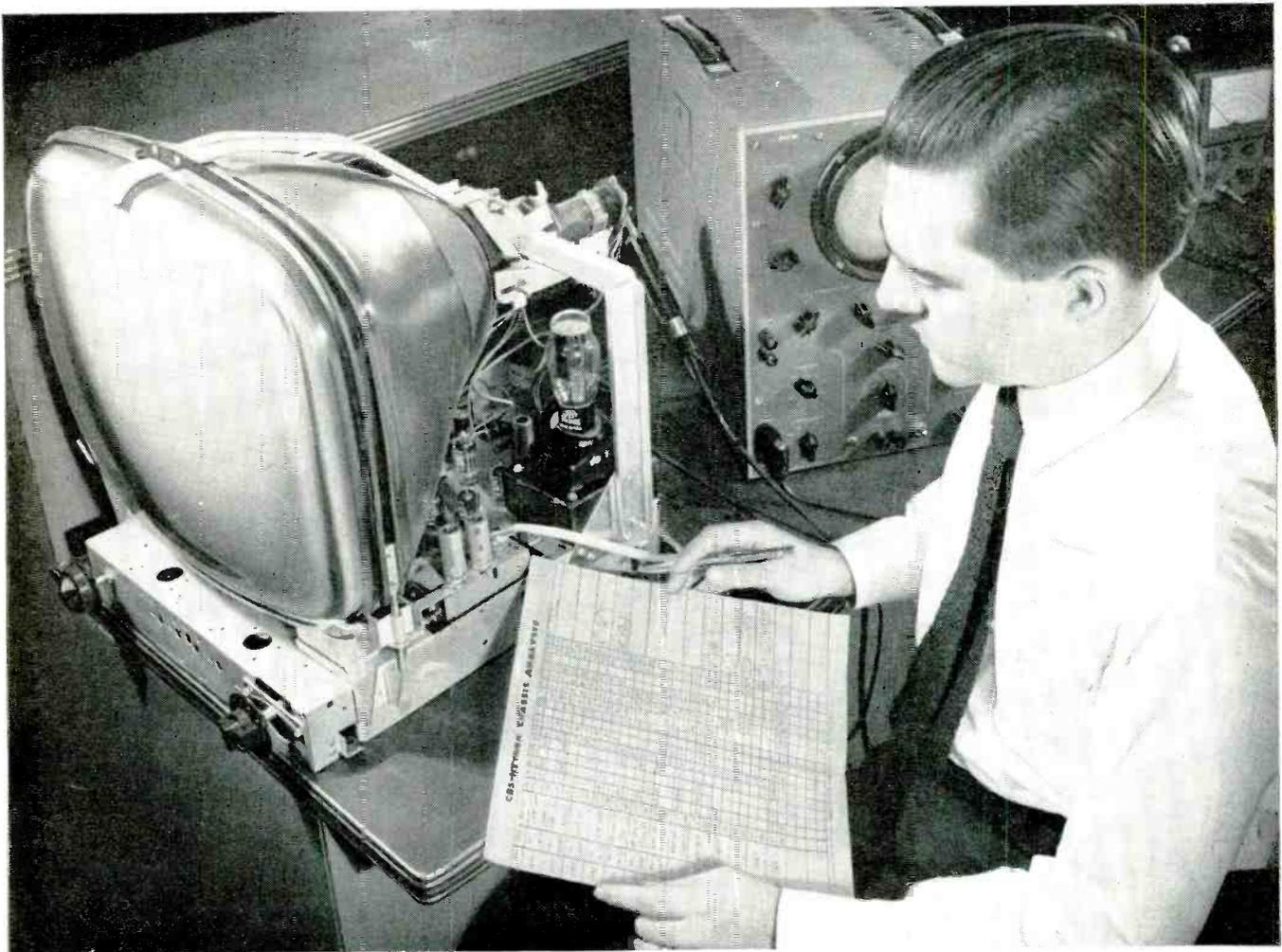
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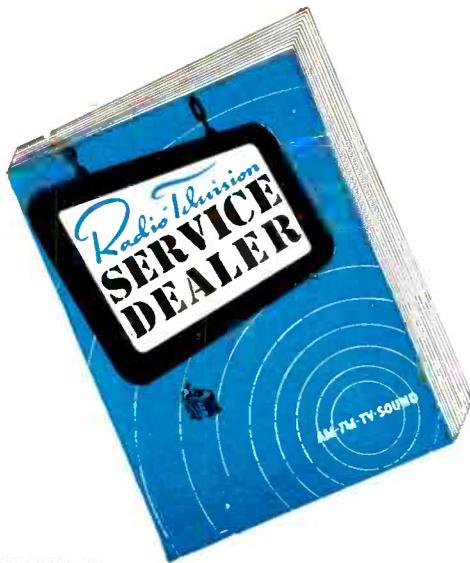
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67 WEST 44TH ST.  
NEW YORK 36, N. Y.



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RADIO-TELEVISION SERVICE DEALER is published Monthly by Cowan Pub. Corp., 67 West 44th St., New York 36, N. Y. Subscription price: \$2 per year in the United States, U.S. Poss. & Canada; elsewhere \$3. Single Copies 25c. Reentered as second class matter Sept. 25, 1950 at the Post Office at New York, N. Y. under the Act of Mar. 3, 1879. Copyright 1953, Cowan Pub. Corp.

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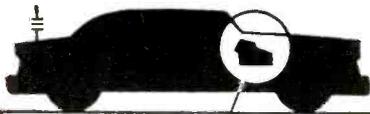
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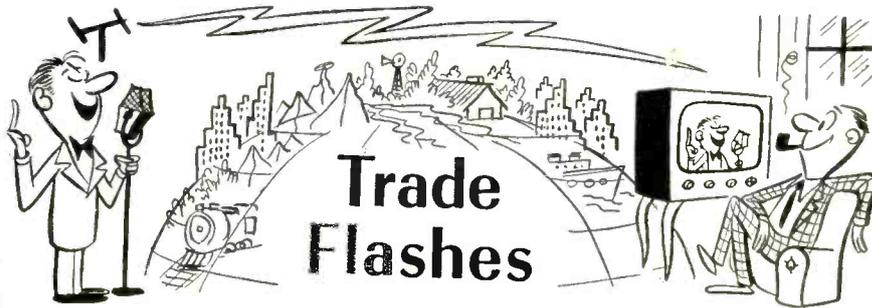
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### **Survey Shows Public Has High Regard For Television Servicemen**

The television service industry continues to receive the hearty endorsement of TV set owners across the country. This is shown in a nationwide survey made by Elmo Roper, noted market research expert, which reveals TV set owners increasingly find technicians competent, prompt, polite. Results of the study show an even higher public regard for television technicians than was revealed in a similar survey taken by Roper last year. The surveys are part of a continuous study sponsored by the RCA Victor Division of the Radio Corporation of America and the RCA Service Company.

Questioned on cost of service, more than two out of three customers described the servicemen's charges as entirely reasonable. Only one out of ten considered service bills excessive.

The Roper survey is believed to be the only scientific, impartial, nationwide sampling ever made to determine authentic public attitude toward technicians who install and maintain the nation's 24 million television receivers, according to Mr. Cahill, president of the RCA Service Company. Over 5,000 families were interviewed, representing an accurate cross-section of adults in TV areas throughout the country. While other surveys have been conducted on this subject, they have been confined to local areas, he said.

### **"Far Above" Response In GE Service Contest**

"The nation's radio and television dealers certainly are sharpening their sense of sales promotion," observed G. A. Bradford, advertising manager of the General Electric Tube Department, as he checked over the first three weeks' entries received in the Tube Department's \$7,125 "Write Your Own Ticket" contest which closes August 31. Bradford said the number

of entries to date already is "far above" those received last year in a similar G-E contest to encourage dealers to build service business. "We're getting even more entries than we expected," he said, "and the suggestions cover every possible part of the radio-television service business."

The contest is open to all radio and television service dealers and their employees. A top prize of \$2,500 will go to the contestant who makes the best 50-words-or-less explanation of how he would spend \$2,500 to improve service business. A total of 140 prizes will be awarded, including the top award and four \$500 prizes.

### **TV Installation Problems Aired At Holyoke**

The role played by the television service technician in providing set owners with good TV pictures was discussed by Martin Bettan, Director of Sales and Engineering for RMS (Radio Merchandise Sales, Inc.) on a Holyoke telecast over station WHYN-TV. This was the first Eastern broadcast by RMS, and is part of that company's program to build good relations between servicemen and their customers. Interviewed by Mr. Fred Peach, of the local station's Club 55 telecast, Mr. Bettan likened the television technician to a doctor, a trained individual whose studies and experiences best qualify him to perform his services. "The day of installing aluminum rods in any old convenient place is over," Mr. Bettan said. "Especially with the *uhf* frequencies, only a properly trained technician can be expected to provide a correct installation."

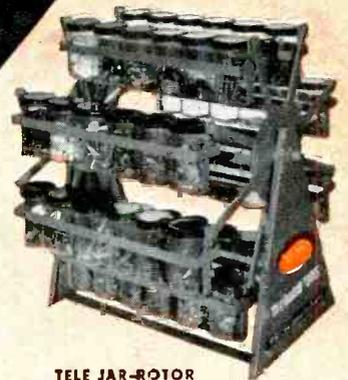
Future RMS participation in station-sponsored public service broadcasts is scheduled for Zanesville, Ohio, Ft. Lauderdale, Florida, and Madison, Wisconsin. Tapes of these telecasts are available from RMS, and are freely offered to all service organizations who

[Continued on page 12]

To help you boost your sales  
and make more money



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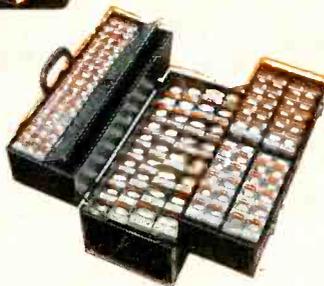
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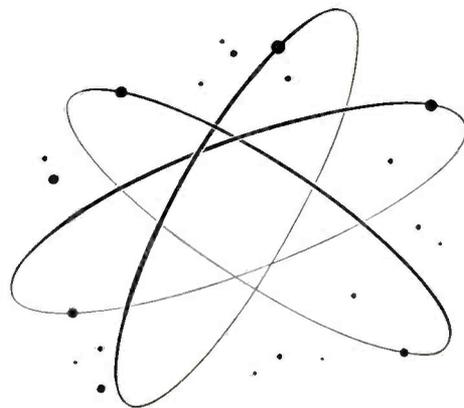
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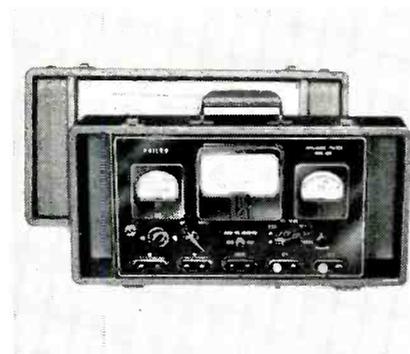
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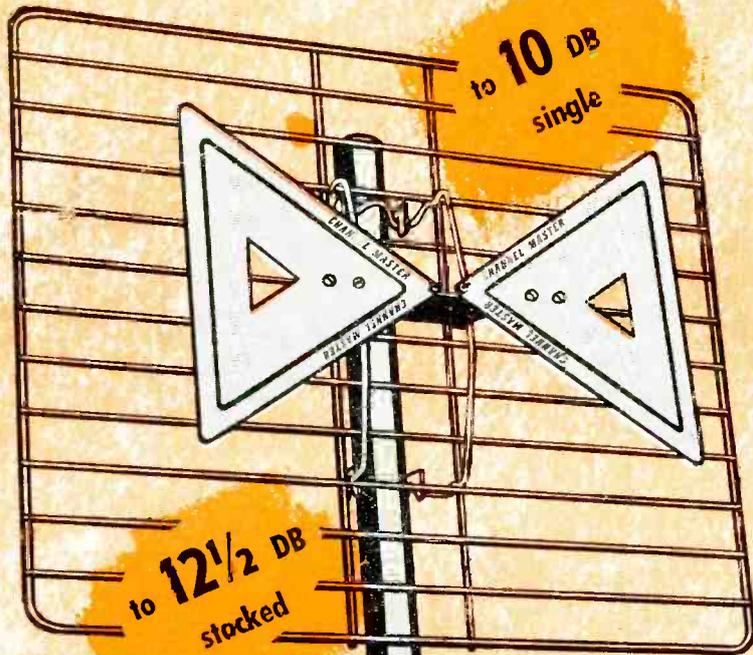
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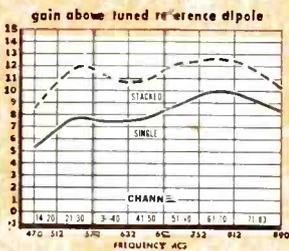
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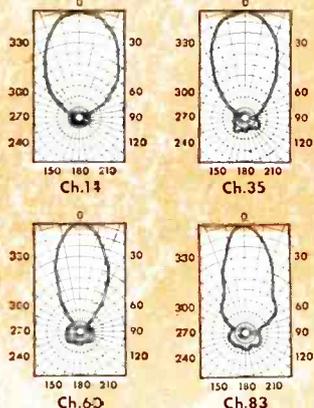
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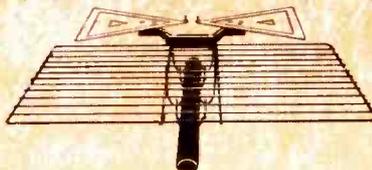
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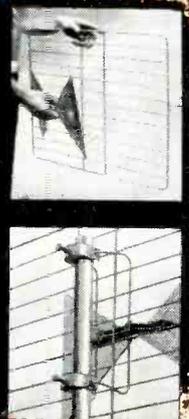
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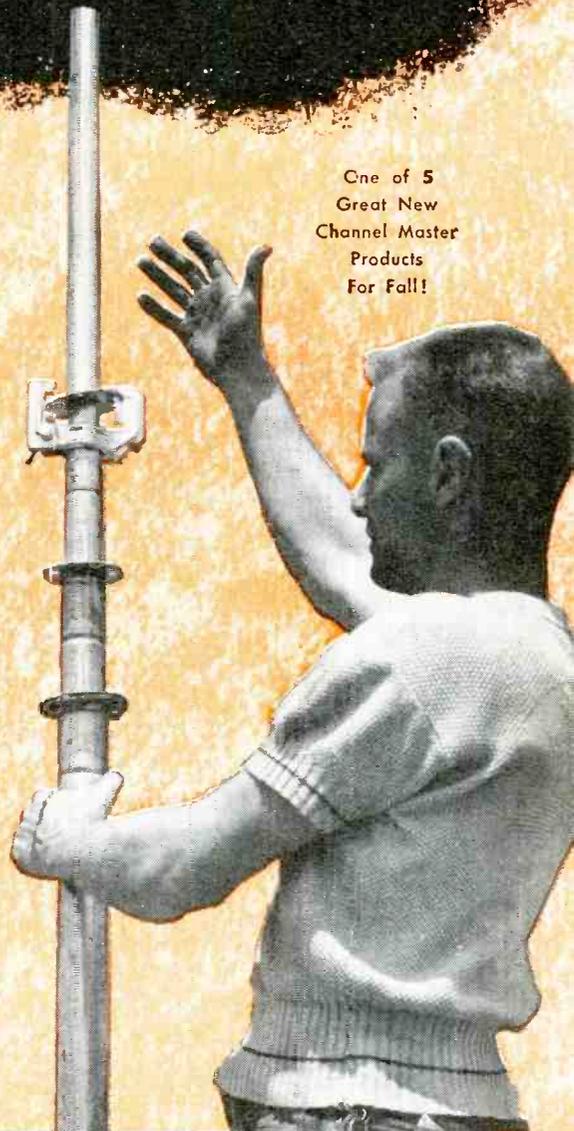
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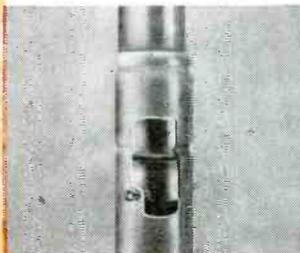
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## EDITORIAL

by S. R. COWAN

### Non-Unity is Dangerous

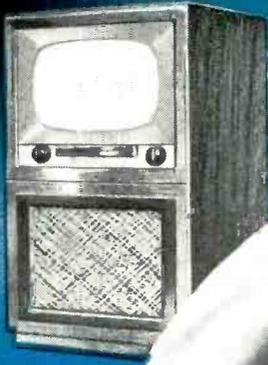
Since the servicing business began it has been comprised mainly of humble, honest, sincere men whose greatest fault apparently is that they are individualists wishing to conduct their affairs as independents.

Generally the wish to be an independent—an individualist—is admirable. But there comes a time when unity of thought and action is advantageous, even vital to the survival of independence. That time is here, and NOW! Otherwise without unity, coordination and cooperation any "organized opposition" can and will wreak its will and undermine hoped-for gains of the individualists.

Take the case of proposed licensing laws for those engaged in radio-TV service work, generally advocated by politicians and groups *not* engaged in service work. In some states there are organized proponents of Municipal laws and others who advocate State-wide legislation. And in these same states there are servicemen and service associations who: 1)—oppose any type of licensing; 2)—those who favor local ordinances; and 3)—still others favoring state laws. Disunity opposes unity. The very fact that organized groups are involved places the non-cooperating unorganized independents in great jeopardy and if the latter are realistic they will appreciate that soon they may be forced to work under licensing laws which they not only opposed but which might even be disastrous because they didn't even have a voice in their establishment.

The purpose of this particular editorial is not to oppose or advocate any type of licensing law whatever. Instead our purpose is to make clear the fundamental truth of that adage: "In Unity There Is Strength." Servicemen and Service Dealers everywhere—regardless of their personal desire for independence, or their pro or con opinions of legislative control—must immediately seek each other's cooperation, preferably through membership in existent, or in the formation of new associations and federations of associations within states. Basically they must forego personal desires and unite with a single common sense progressive policy working for the betterment of the majority.

Our surveys show that in many cities an ever-increasing amount of service work is going to the service departments of big-name receiver manufacturers' distributors mainly because the public has more confidence dealing with big-nationally advertised brand name affiliates than in working with independent servicemen and service organizations. If this trend towards big-names continues it can only be at the expense of local independents and parts jobbers. Thus we urge: Organize and cooperate before the damage becomes irreparable—and before untenable laws are imposed because nothing was done by mutual agreement of independents to protect their independence.



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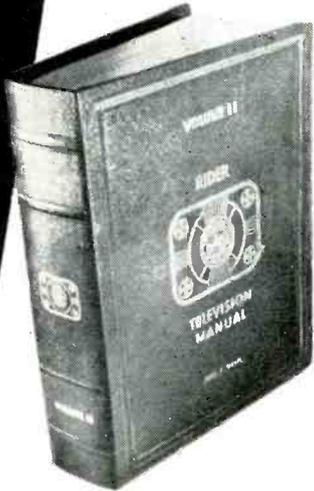
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[from page 4]

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### TV Experts To Hear Service

#### Lecture

Approximately 1000 television experts attended a meeting on "How to Interpret What You See in UHF" on July 8, in the grand ballroom of the Somerset Hotel, Boston. Attendance at the meeting, sponsored by Raytheon Manufacturing Company was by invitation tickets obtained from Raytheon distributors. The principal speaker was William Ashby, of Raytheon's lecture staff. He discussed many of the servicing problems for the new television sets operating in the UHF (Ultra High Frequency) band.

### GE Receives Service Award

John T. Thompson, left, manager of replacement tube sales for the General Electric Tube Department, receives a special plaque honoring the Tube Department "for unselfish cooperation with the electronic service industry," from Ben Sims, president of the Radio Television Technicians Guild of Boston, at the guild's regular meeting.

Award honors the G-E Tube De-



GE official receiving service award.

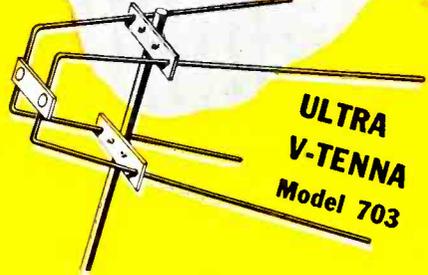
partment for instituting and carrying out a nation-wide public relations program in the interests of the TV service industry. In center is A. C. W. Saunders, president of the Saunders Radio and Television School, Boston, main speaker at the meeting. He declared that "the foundation of any service business is customer confidence," and told guild members that "in seeking to improve conditions in any industry, we help all honest servicemen." Previously, the G-E Tube Department received other awards for its public relations program from the National Alliance of Television and Electronics Service Associations, the Associated Radio and Television Service Dealers, Inc., of Columbus, Ohio,

# GO TESCO!

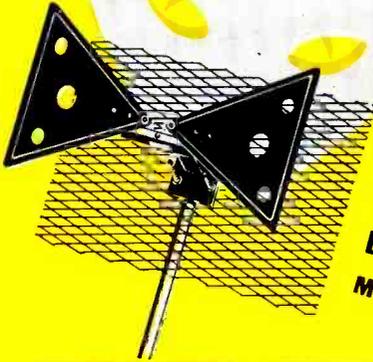
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and from the Federation of Radio Servicemen's Associations of Pennsylvania.

#### Federal Introduces Gift Program For Serviceman

An attractive gift program to hit the television service market has been launched by the Federal Telephone and Radio Corporation in cooperation with distributors of "Best in Sight" TV picture tubes. Two valuable and useful items—a tool and tube caddy and a Weller soldering gun—are being offered by Federal through the purchase of TV tubes every serviceman makes in the daily course of his business. This special offer will

run through the month of August as part of an intensive campaign by Federal to help the serviceman build customer good will with highest-quality, long life picture tube replacements.

#### 25,000 Expected To Attend

##### Audiorama — The 1953 Audio Fair

More than 25,000 music lovers, audiophiles, and sound engineers will pour through the entrance of Manhattan's famous Hotel New Yorker, October 14, 15, 16 and 17 to make the 1953 Audio Fair the greatest public exhibit in audio Hi-Fi history, according to an announcement by Harry N.

Reizes, Fair Manager. Using the attendance at previous Fairs in New York, Chicago and Los Angeles as a basis of comparison, the estimate of 25,000 visitors to the 1953 conclave of high-fidelity fans is very conservative, Mr. Reizes said.

Indicative of industry growth and the acceptance of the New York Audio Fair as the official meeting place of manufacturers, dealers, and hobbyists alike, is the fact that the Fair this year will occupy three floors of the Hotel New Yorker.

"Audio has become a distinct entity in the panorama of our daily existence," Mr. Reizes said in his announcement. "We feel that the word 'Audiorama' dramatizes the extent to which audio has earned acceptance as one of the prime amenities in the American scene. Hence its choice as the theme of the 1953 Audio Fair," he concluded.

In keeping with the policy established with the first Audio Fair five years ago, the 1953 event will be open to all interested parties, professional and amateur, free of charge.

#### CBS-Columbia Report High Volume Of Television Orders For Fall

Volume of orders placed for CBS-Columbia television receivers at the recently-completed distributors' meeting of the firm indicates that the sale of TV sets in the second half of the year will make this year the biggest in the company's history. Roland D. Payne, Manager of Sales of CBS-Columbia Inc., television manufacturing subsidiary of the Columbia Broadcasting System, revealed that orders placed for TV and radio sets approximated 7½ million dollars for the next three months' period, almost fifty per cent more volume than was placed at the same meeting a year ago.

#### Five-Month Television Production Sets Record for Period, RTMA Reports

Television set production during the first five months of this year topped all previous January-May periods on record, the Radio-Television Manufacturers Association announced. Radio output for the period was more than 1.6 million sets above the same five months of 1952. During the first 21 weeks of this year, 3,309,757 television sets and 6,102,711 radios were manufactured, according to the RTMA report. In 1952, a total of 1,957,083 TV receivers and 4,469,432 radios were produced in the same period. The May television output was estimated at 481,936 sets by the Association, only 4,064 units under the record for the month of 486,000 established in May 1950.

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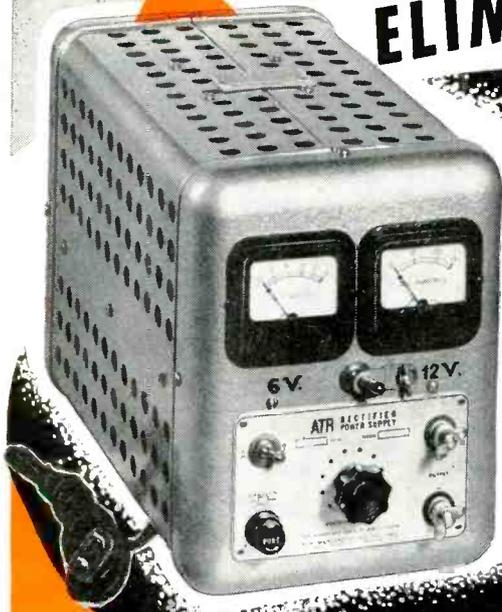
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Radio production for May was 1,108,991 sets compared with 843,569 units manufactured in the same 1952 month. Radios with FM circuits manufactured during May totaled 41,275 units. An additional 276 television sets with FM facilities also were produced. The May radio production report showed the manufacture of 278,156 home sets, 129,391 clock radios, 204,065 portables and 497,379 auto radios.

**Opening Gun For Big Tesco Program**

This striking display at the May Parts Show, Chicago, May 16-22, was used as a springboard to introducing a new dramatic campaign by TV Products Co., Springfield Gardens, N. Y., well known manufacturers of popular "Tesco" antennas. Elliot March and David Fox, Tesco owners, are shown here discussing details of the campaign with their advertising agency head, Ed Conti of Conti Advertising Agency, Inc.



A very ingenious campaign theme has been evolved around the slogan "It's the cat's whiskers and just as sensitive." The cat's whiskers motif will be dramatically carried out in bleed color pages in all national trade magazines and in unusual promotions using the extremely decorative Jean Nevin and Doris Africk so strikingly evident in this photograph. Tesco plans include continuous, intensive campaigning throughout the year to stimulate distributor sales and increase popular acceptance of Tesco products.

**Du Mont Exhibits Complete Line At Chicago Furniture Mart**

New improved television picture circuits which provide the highest degree of sensitivity ever found in a complete Du Mont television receiver line, optional 82-channel tuning, and authentic bench-crafted mahogany and blond cabinetry were features of the complete line of sixteen Allen B. Du Mont Laboratories, Inc., receivers displayed at the annual American Furni-

*[Continued on page 56]*



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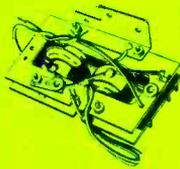
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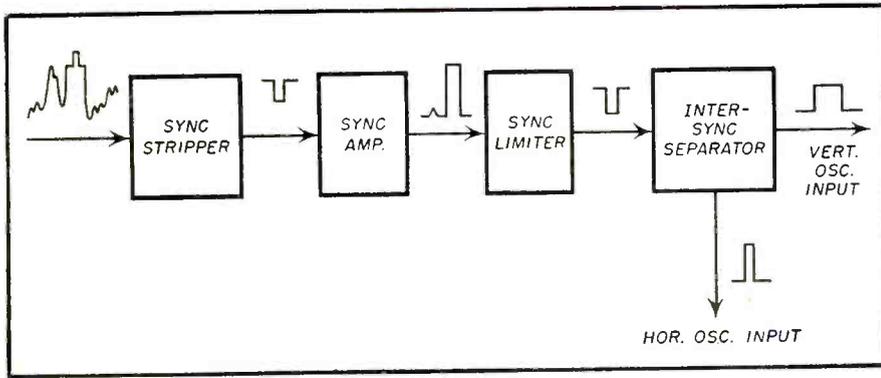


Fig. 1—Basic block diagram of sync section.

# SYNC CIRCUITS

## Symposium Series No. 7

### PART 1

by LEONARD LIEBERMAN

SYNC separation circuitry is the least standardized commercially. Where other sections fall into two or three categories, sync circuits vary considerably. Sync separators makes use of just about every tube characteristic to accomplish their purpose. They use plate saturation, cut-off bias, grid current flow, cathode drivers, cathode followers, etc.

Figure 1 is a block diagram of the general sync functions. Let us examine each block separately. In some sets, we will find a separate tube for each function and in others several functions being performed by a single tube. The basic operation, however, still remains the same.

#### Sync Stripper

The term "sync stripper" is more nearly descriptive of this stage than the more generally used "sync separator." What this stage does is strip the video information from the composite video signal, leaving only the sync pulses to be amplified. The general description of the stage operation is as follows: The composite video signal is taken off at some point after the video second detector. The rectified signal is fed to an amplitude discriminator tube. The output of this tube now contains only the sync pulses (Fig.

This portion of the symposium series is divided into two installments. The first deals with basic sync operation and circuitry; the second with applications of sync circuits in representative receivers. Previous articles on sync circuits appearing in this magazine form the sum and substance of the material herewith presented.

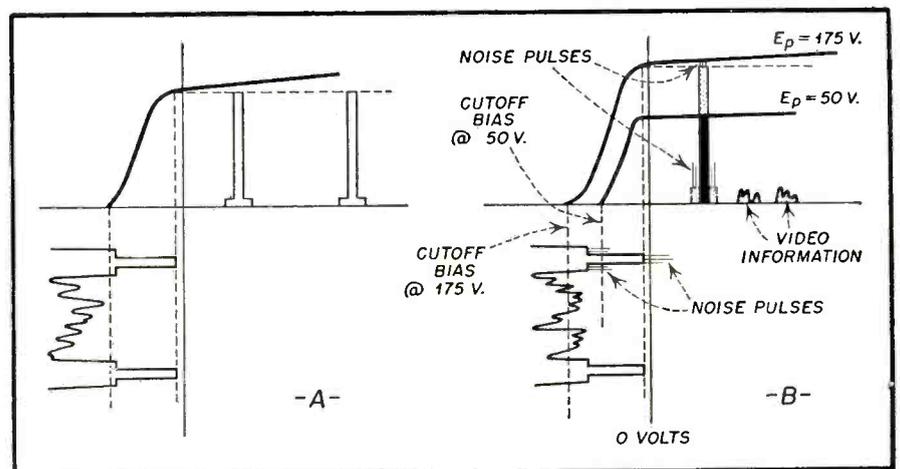


Fig. 6—(A)—Biasing to cut-off only. (B) biasing to cut-off and reducing plate voltage. Solid bar indicates  $I_p$  pulse with bias and low plate voltage.

2). The sync take-off point can be the video second detector load resistor (Fig. 3a); the agc rectifier (Fig. 3b); the video amplifier plate circuit (Fig. 3c); or the dc restorer diode (Fig. 3d). The sync stripper can be a diode (Fig. 4a), a triode (Fig. 4b) or a pentode (Fig. 4c).

The action of the diode sync stripper (Fig. 4a) is quite simple and is the most basic of the stripper circuits. The first composite signal arriving at the input will cause the diode to conduct. This conduction will cause C1 to charge up to the peak value of the signal; that is the top of the sync pulse. The RC time is such that C1 discharges approximately 25% in the time of one line (63.5 usec). Thus, when the next sync pulse arrives, the tube conducts for the time of the pulse. This conduction current causes a voltage to appear across R2 which corresponds to the sync pulse.

Triode and pentode sync strippers more generally operate on the basis of tube-cut-off characteristics (Fig. 5). This type of tube operation is the one most commonly used. The requirements for this operation are:

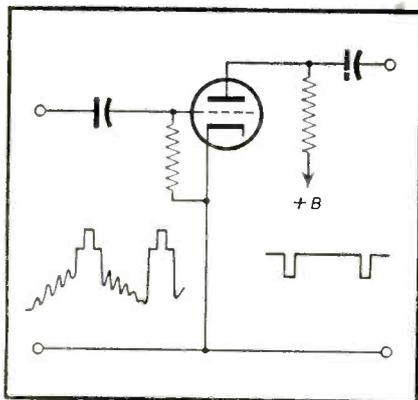


Fig. 2—Sync-stripper circuit.

1. That the tube have a sharp cut-off.
2. That the sync signal be of a large enough amplitude to extend the grid bias from cut-off to zero volts.
3. That the signal input has the sync pulse in the positive direction.
4. That the sync pulse amplitudes be approximately the same.
5. That the sync level of the transmitted video signal in the area be constant. By sync level is meant the percentage of sync to the overall signal (Fig. 6).

The tube must be of the sharp cut-off type, otherwise, the video information will not be cut off in pictures containing a large amount of black information. This could result in some waveform distortion and also of triggering of the sweep oscillators.

The sync portion of the signal should be of an amplitude large enough so that with the bias set properly, only the sync information extends beyond

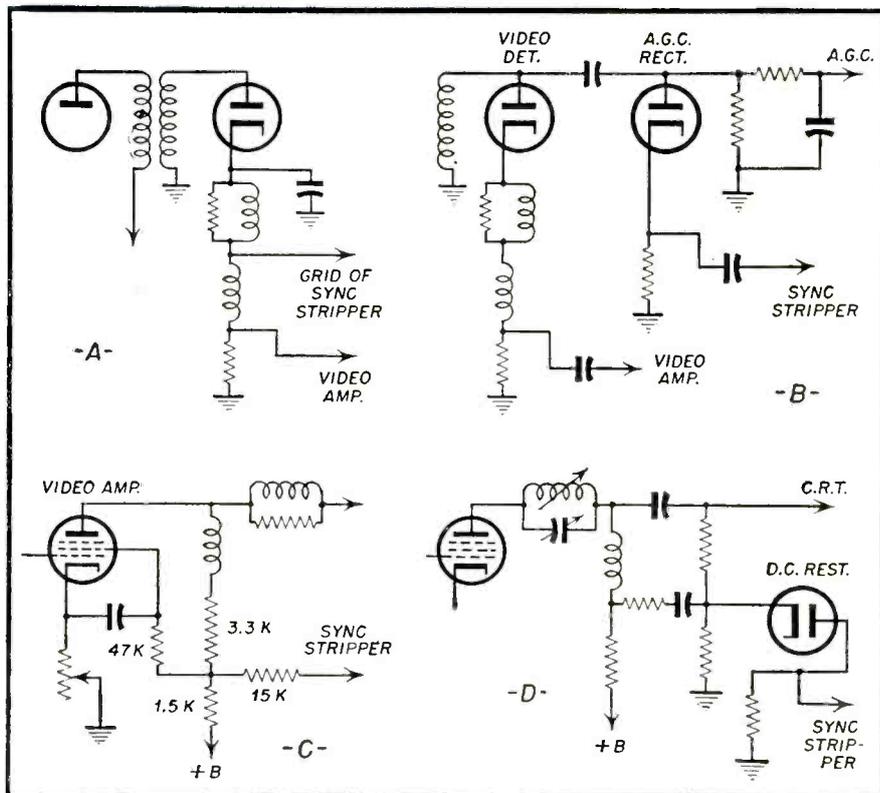


Fig. 3—Sync take-off points. (A) Video detector. (B) A-G-C rectifier. (C) Video amplifier plate. (D) D-C restorer.

cut-off. It should also extend to or beyond the zero grid voltage point. This condition is sometimes met by causing the stripper bias point to be varied by the signal strength (see diode action in pentodes, above). It is more often met by reducing the plate voltage (if the stripper is a triode) or plate and screen voltage if it is a pentode (Fig. 5b).

The reason for the requirement for the sync portion of the signal to extend

the grid bias from cut-off to at least zero volts is that in this manner the output of the stripper can be kept constant. A constant output is obtained by clipping due to plate saturation, grid current flow above zero volts, and negative grid bias cut-off. Another advantage gained by this positive limiting operation, is the elimination of any noise pulses riding on top of the sync pulse. This positive limiting action is

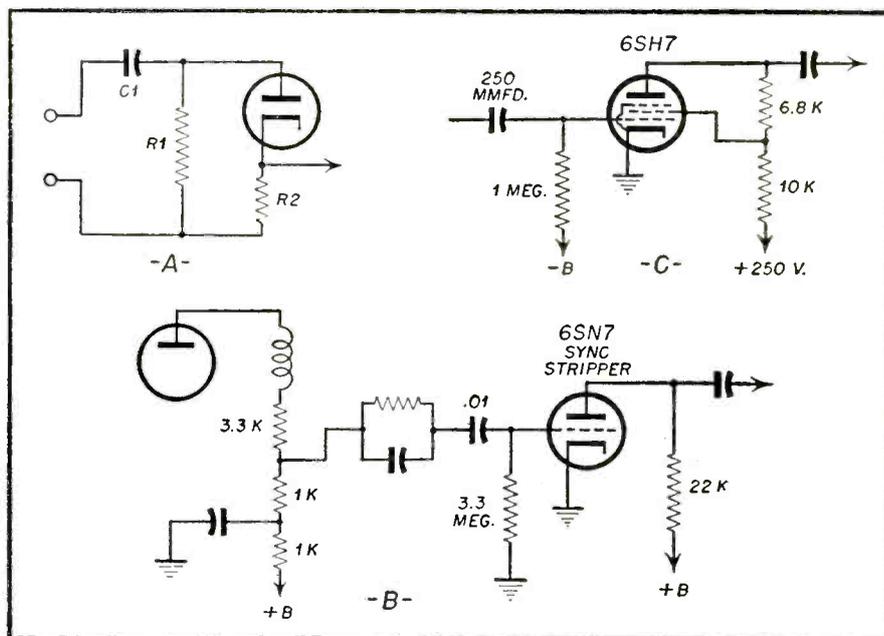


Fig. 4—Various types of sync strippers. (A) Diode stripper. (B) Triode stripper. (C) Pentode stripper.

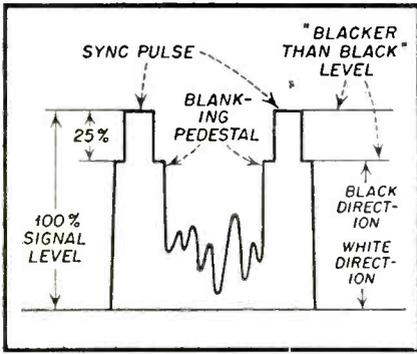


Fig. 7—Sync level standards.

sometimes performed in the stripper and sometimes in a following limiter stage.

Figure 7 shows why the bias level should be that of the weakest signal received. If this bias were permanently fixed with a strong signal in mind, such as in Fig. 7a when a weak signal comes along, the results would be as shown in Fig. 7b.

The bias on the sync tube is often made a function of signal strength in order to accommodate variations in sync amplitude. In many sets, a sufficient amplitude is assured prior to the stripper stage. Whether or not an additional stage is required, is determined by: (a) the sync take-off point and; (b) the polarity of the signal at the take-off point.

#### Sync Take-off Point

The sync take-off point is sometimes taken off at the video second detector. In this case the detector is so designed that the sync stripper stage does not load down the circuit at this point. The signal however, is usually in the order of 2 to 5 volts peak-to-peak. Because of this an amplifier stage is usually inserted between this take-off point and the sync stripper. If the detector output is of the positive picture phase type, then the output of the amplifier is taken off the plate circuit. If, how-

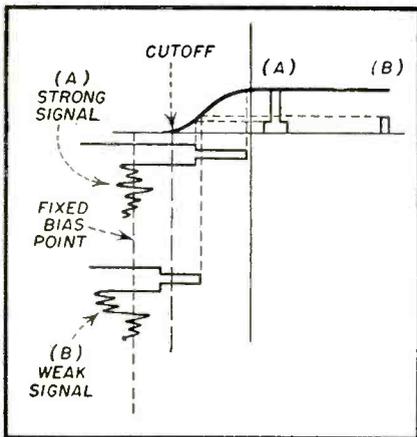


Fig. 8—Effect of fixed bias with weak and strong signal reception.

ever, the detector output is picture phase negative (that is the sync pulse is in the most positive direction), the amplifier output is taken off the cathode (Fig. 8).

Other sync take-off points are the video amplifier plate (Fig. 9) and the dc restorer diode load (Fig. 10) if one is used. These two systems have several advantages over the detector take-off point. They also present several special problems. The advantages of these take-off points are that the signal taken off has already been amplified by the video amplifier. This eliminates the need for a separate amplifier tube prior to the sync separator. In addition, by means of grid current flow in the video amplifier, the tops of the sync pulses can be compressed slightly

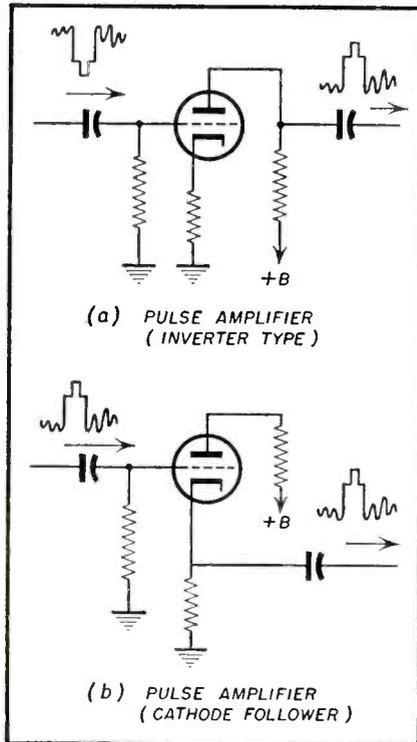


Fig. 9—Two types of pulse amplifier circuits of the negative picture phase type.

resulting in a better impulse-noise immunity. The disadvantages of these take-off points are that the input of a sync stripper across the video load resistor has a tendency to distort the amplifier response. This, in turn, causes the value of the sync take-off resistor to be critical. If it is too large, the amount of signal fed the sync stripper would be sufficient, but the loading of the video amplifier would cause distortion. If the resistor value is too small, the loading would be reduced but the amount of sync fed into the sync system will be of insufficient amplitude. When the sync is taken off the dc restorer diode, any sudden change in overall pix brightness level

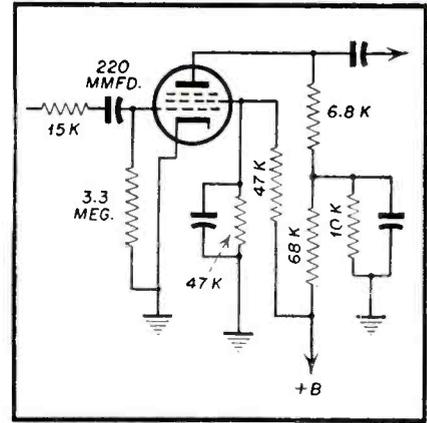


Fig. 5—Multi-purpose pentode stripper. Triodes and pentodes operate on tube cut-off characteristics.

might cause a corresponding shift in the level at which the sync is taken off. This, in turn, will cause the vertical sync level to suddenly jump and cause a momentary vertical roll.

#### Sync Limiter

After the sync stripper, a limiter or leveler stage follows. This stage does two things, it insures that all pulses at its output are constant and also of the correct polarity to trigger the horizontal and vertical oscillators. The bias of this stage is such that the input pulse goes below cut-off and into the region of grid conduction and plate saturation. The purpose of this biasing and plate voltage arrangement is to clean out any noise pulses which might be present on the sync pulse and also to get rid of any video which might still be present.

A number of examples of current design trends can be seen in the following paragraphs. It is interesting to note the wide variety of circuits such as we discussed earlier.

[To be continued]

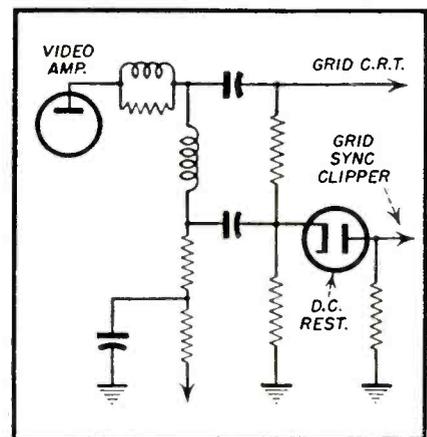
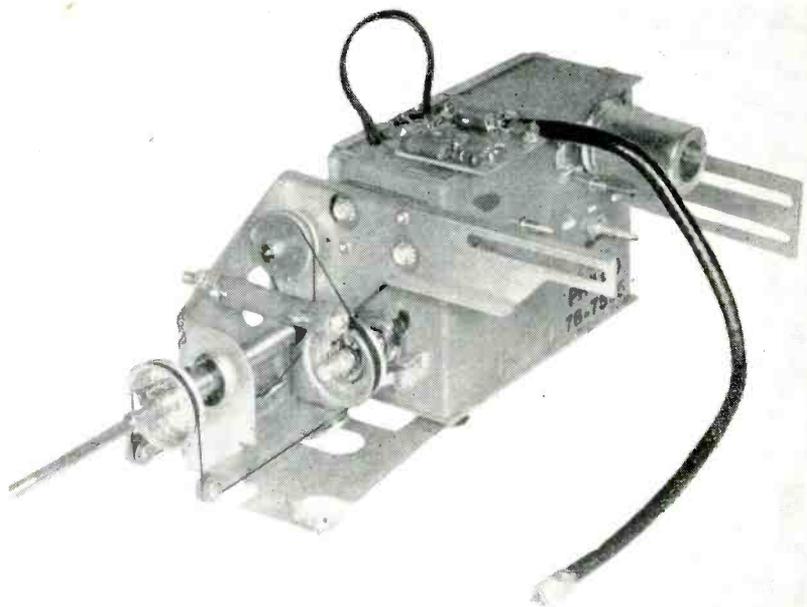


Fig. 10—D-C restorer as a sync take-off point.

Fig. 1—Philco UHF Tuner-Adapter UT-21 which consists of a *uhf* converter and a *vhf* preamplifier unit, a *uhf-vhf* switch, and all necessary hardware and mounting mechanisms.



# PHILCO UHF TUNERS and CONVERTERS

by DAN LERNER

SINCE at present the input resistances of most so-called *rf* amplifiers are very low, and the tube transconductance is appreciably reduced by transit time commercial *uhf* tuners and converters cannot economically use *uhf* amplifier tubes. Instead, in most commercial *uhf* units the incoming *uhf* signal is fed directly or through a tuned network to a crystal mixing circuit. Special crystals must be used to keep the signal to noise ratio as high as possible.

At 500 megacycles a quarter wave is about six inches long and at 900 megacycles it is about three inches long. When loaded across its terminals by the capacities of vacuum tubes, crystal detectors, and other components, these resonant sections or quarter wave lengths become even shorter than the lengths mentioned above. Of course, this implies that at frequencies within the *uhf* spectrum it is difficult to build resonant circuits with lumped constants, that is coils and condensers.

In order to combat the familiar troubles in *uhf* design the Philco *uhf*

tuners and converters described below use a unique type of tuning arrangement. By means of precision ganged tuning capacitors and an inductance which is essentially an extension of one section of the tuning condenser stator, the tuning problem has been successfully overcome. This general design of low-loss lumped constant elements produces a *uhf* tuner with a very high signal to noise ratio and gain.

The Philco *uhf* Tuner-Adapter UT-21, see Fig. 1, provides for reception of all *uhf* signals. It is designed for installation in many of Philco's late 1951 and 1952 TV receivers.

Actually the unit consists of a *uhf* converter and a *vhf* preamplifier unit, a *uhf-vhf* switch, and all necessary hardware and mounting mechanisms.

An examination of the Philco unit UT-21 indicates that a *uhf* tuner is not as complex a mechanism as might be supposed. It is a mechanically precise unit that has been simplified to a great degree.

#### Circuit Description

The incoming *uhf* signals are fed

through the 300 ohm antenna input line to the antenna panel, see Fig. 2. On this panel are mounted two 680  $\mu\mu\text{f}$ . isolating condensers, one on each side of the line. The signal is then fed from the antenna panel to the antenna tank of the tuner *L1, L2*, by means of a 150 ohm matching stub. (The matching stub serves as an impedance matching transformer to balance out the amount of change in load to the *rf* tank due to frequency change over the *uhf* spectrum.)

The *rf* system actually consists of two tank circuits coupled through mutual inductance and capacity. In turn the crystal circuit is coupled to the *rf* system by mutual inductance.

*UHF* preselection occurs by tuning the antenna and mixer tank to resonance. The mixer circuit uses a special low noise *uhf* crystal CD1 and a double tuned transformer consisting of inductances *L16* and *L17*, and an 8  $\mu\mu\text{f}$  condenser which feeds the *vhf* energy to the grid of the preamplifier.

The local oscillator signal at *uhf* is generated by a 6AF4, tube V1, in the

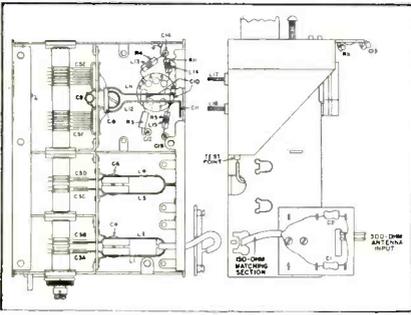


Fig. 3—Base layout of UHF Tuner-Adapter, with Oscillator and Mixer Boards removed.

schematic. The oscillator is actually a modified Colpitts oscillator with series tuning. Its output is low impedance link coupled by means of a miniature section of 300 ohm line. The *uhf* oscillator signal is picked up by an inductance loop at one end of the 300 ohm line and the inductance loop on the other end couples the oscillator signal to the mixer. See Figs. 3 and 4.

The oscillator signal at *uhf* beats against the incoming *uhf* station signal to produce a *vhf* beat resultant that is within the range of the *vhf* tuner when it is set to either Channel 2 or 3.

In order to gain additional amplification which overcomes the conversion loss in the crystal and helps provide a better overall noise figure, an extra stage of low noise pre-amplification is used.

Since the channels 2 and 3 are adjacent channels, it is unusual for any TV area to receive both channels 2 and 3 simultaneously. Thus, if a particular area receives Channel 2 normally, the *vhf* tuner is set to Channel 3 to receive the *uhf* station. The opposite is true if Channel 3 is normally received. The *uhf* tuner mixer circuit has a bandpass of at least 12 *mc*.

The preamplifier section uses a 6BQ7, V2 in the schematic (Fig 2). This tube is used as a low noise cascode *vhf* amplifier. As stated previously, the *uhf* crystal mixer output is coupled into the input of the 6BQ7 through a doubled tuned transformer. For better noise figure the first or input section of the 6BQ7 is neutralized. No gain is realized in the first section, since the plate load of the first stage is effectively 1/*gm*. The output from the first section is coupled directly to the cathode of the second section. This section

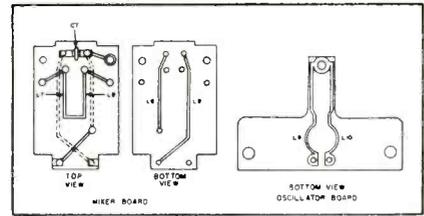


Fig. 4—Oscillator Board with Mixer Board with connections.

amplifies the incoming *vhf* signal. Its output is coupled to the wafer switch and eventually the input circuit of the *vhf* tuner by means of low "Q" transformer which retains the original 12 *mc* minimum bandpass. The output of the transformer is approximately 300 ohms to match the *vhf* tuner's input impedance.

#### Tuner Adapter 43-6473

The Philco *uhf* tuner adapter 43-6473, see Fig. 5, is used with many of the late 1952 and present TV receivers. It differs from the UT-21 in that it contains no *vhf* preamplifier, that is the incoming *uhf* station signal

[Continued on page 62]

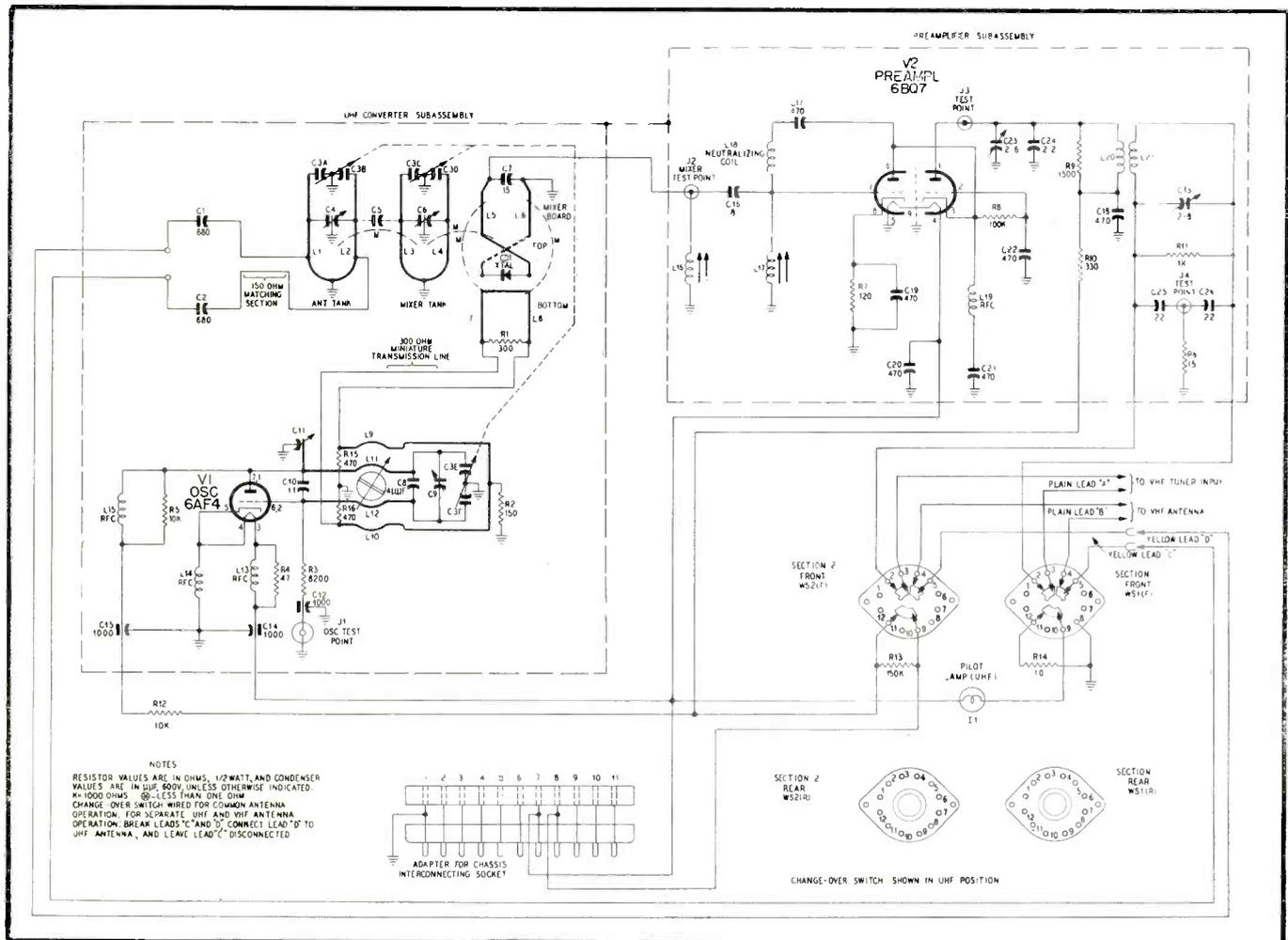


Fig. 2—Circuit diagram of Philco UHF Tuner-Adapter UT-21.

# A New C-R TESTER

by JESSE DINES

**This article discusses the basic circuitry, operation, and applications of a new C-R tester. The measurement of a condenser, in terms of its capacitance and leakage is extremely important to the servicing technician. Other applications concerned with resistance and inductance measurements are also discussed.**

A RECENT Mallory product is a capacitor, inductor and resistor checker designated Model CRT 1. It uses a simple ac bridge to measure fixed, and variable-type resistors, as well as resistive-type attenuators. See Fig. 1.  $R_X$  is the resistor to be measured.

The Range Selector switch is positioned to the approximate resistance value needed to balance the bridge. Final precise bridge balancing is accomplished by the 10K vernier control. When the bridge is balanced, currents  $I_1$  and  $I_2$  are of the same magnitude, and points  $A$  and  $B$  are at the same potential. This makes the voltage at the grid of the 6C4 amplifier zero. In turn, the 6C4 plate voltage and, therefore, the 6E5 grid voltage is raised to maximum. Thus, the 6E5 conducts heavily and its green eye opening reaches its widest angle.

Although the CRT-1 cannot measure resistance over 50 megs directly, its range can be extended by paralleling a known resistor from 20 to 50 megs across the resistor to be measured. The combined resistance of the two resistors

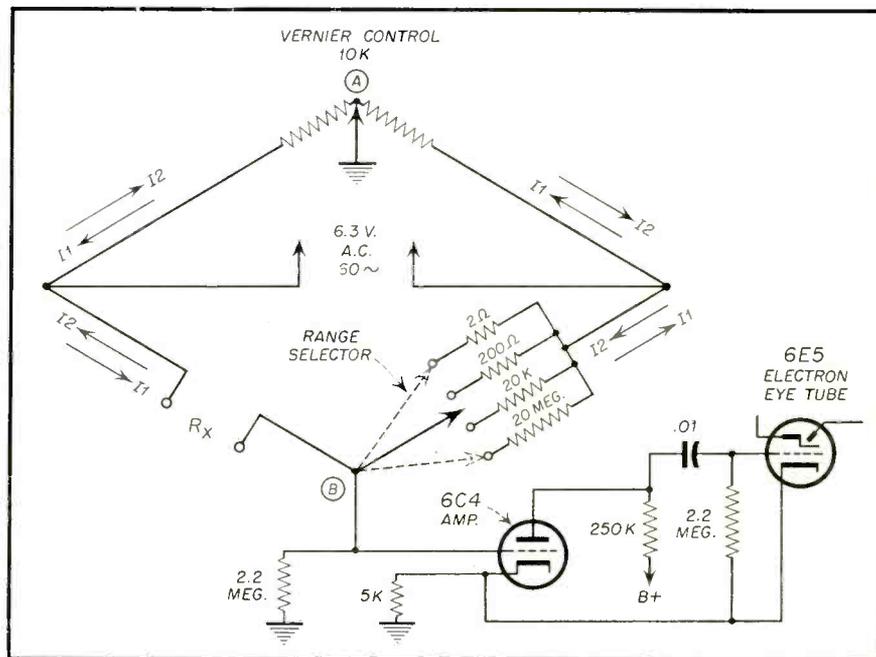


Fig. 1—Bridge circuit used to measure resistance.

Capacitance in MFD	DC Leakage in uA			
	100V	200V	400V	450V and Up
.15 or less	.2	.4	.8	.8
.25	.4	.8	1.0	1.0
1.00	.6	1.0	2.0	2.0
Greater than 1.00	1.0	2.0	4.0	4.0

Chart 1—Maximum leakage current values of mica and paper dielectric (non-electrolytic) capacitors.

can then be measured; and by the formula:

$$R_X = R_m R_s / R_s - R_m$$

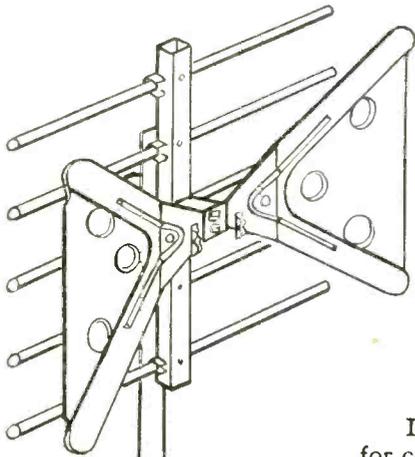
$R_m$  = the measured resistance value and

$R_s$  = the resistance of the known resistor,

the unknown resistance ( $R_X$ ) can be computed.

As an example of how this formula may be used, consider the case where

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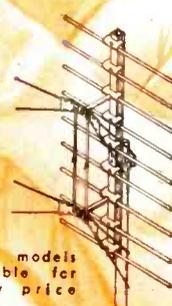
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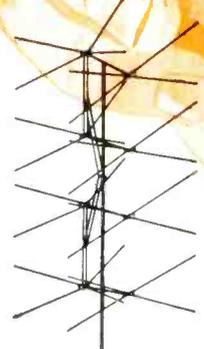
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Originators and Manufacturers of "CONICAL-V-BEAMS" — insist on the Original!

Mallory CRT-1 C-R tester. New design of this instrument permits it to measure a wide range of capacitance, resistance and inductance.



a resistor, of unknown value, is placed in parallel with a 20 meg resistor, and the combination is measured. The tester reveals that the parallel combination resistance is 15 megohm. The value of the unknown resistor,  $R_x$ , is then:

$$R_x = 60 \text{ megs}$$

A capacitor's true operating quality is based principally upon two factors, namely: the correctness of its capacitance value and its *dc* leakage resistance. The *CRT-1* measures both, and in addition gives the power factor of the capacitor, the determination of which is relatively unimportant except for high capacitance values. The *ac*

bridge shown in *Fig. 2* measures all three: capacitance, *dc* leakage resistance, and power factor.

The *ac* capacitor bridge shown in *Fig. 2* works similar to the resistance bridge in *Fig. 1*. When the bridge is properly balanced, the magnitudes of currents  $I_1$  and  $I_2$  are equal; points C and D are then at zero potential; the 6C4 amplifier plate voltage is maximum; and the 6E5 indicator eye opens to its widest angle. The capacitor bridge is balanced by inserting different capacitors or combinations of capacitors and resistors into one of its arms, and adjusting the vernier control.

To be checked properly, capacitors should be tested for leakage resistances. The *CRT-1* measures the *dc* leakage current of  $C_x$ , the capacitor to be checked, by means of the voltage divider network, which is shown in *Fig. 3*. Approximately 450 volts *dc* (the exact value being dependent upon the setting of the 20K rheostat) is divided between voltage drops  $E_1$  and  $E_2$ . Note that the voltage  $E_2$  is also the same voltage which appears from grid to ground of the 6C4 amplifier; this, in turn, determines the angle width of the electron eye tube. To add the correct value of resistance for proper bridge balancing, the 5 meg resistor is adjusted so that  $E_1$  equals  $E_2$ . This makes the grid voltage of the 6C4 zero, with respect to ground, and, consequently, its plate voltage rises to its highest point. The 6E5, in turn, conducts heavily and its eye opening reaches its widest angle. A calibrated dial, associated with the 5 meg rheostat, directly reveals the *dc* leakage current. *Chart No. 1* permits you to determine whether the current value read makes the capacitor acceptable for circuitry. The insulation resistance, if desired, may then be computed by Ohm's law.

It is advisable to measure leakage, in the manner described above, before checking their capacitance values. If the leakage is found improper, the condenser should be discarded; if proper, it should be then checked for capacitance and power factor. Electrolytic capacitance measurements follow the same procedure as that of paper, mica, and ceramic capacitors.

To measure the power factor of the electrolytic, the *CRT-1* is first set up to measure its precise capacitance. The power factor, percentagewise, is obtained after adjusting the dual power factor control (*Fig. 2*) for maximum

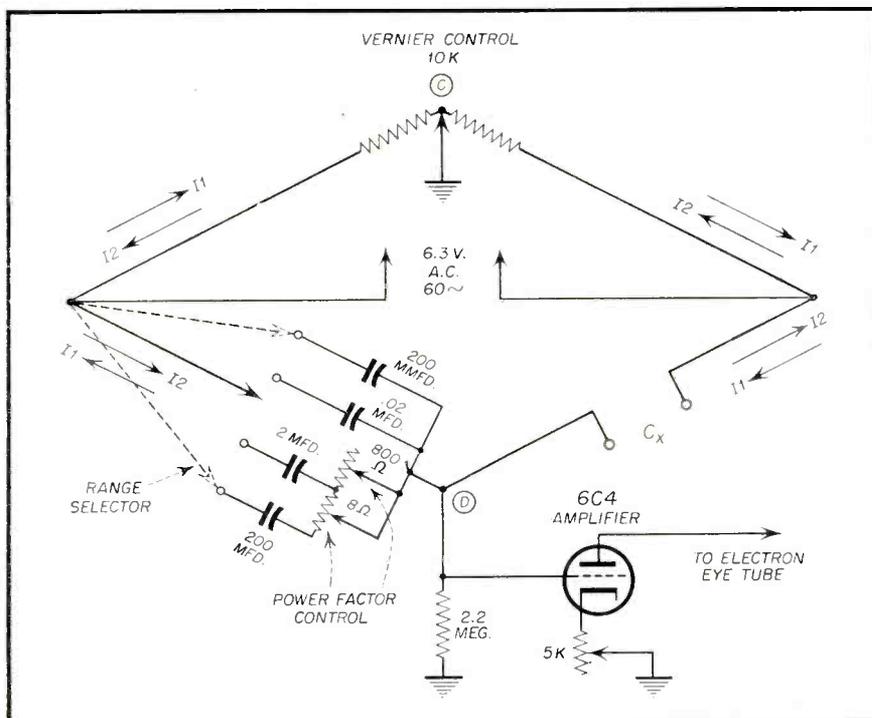
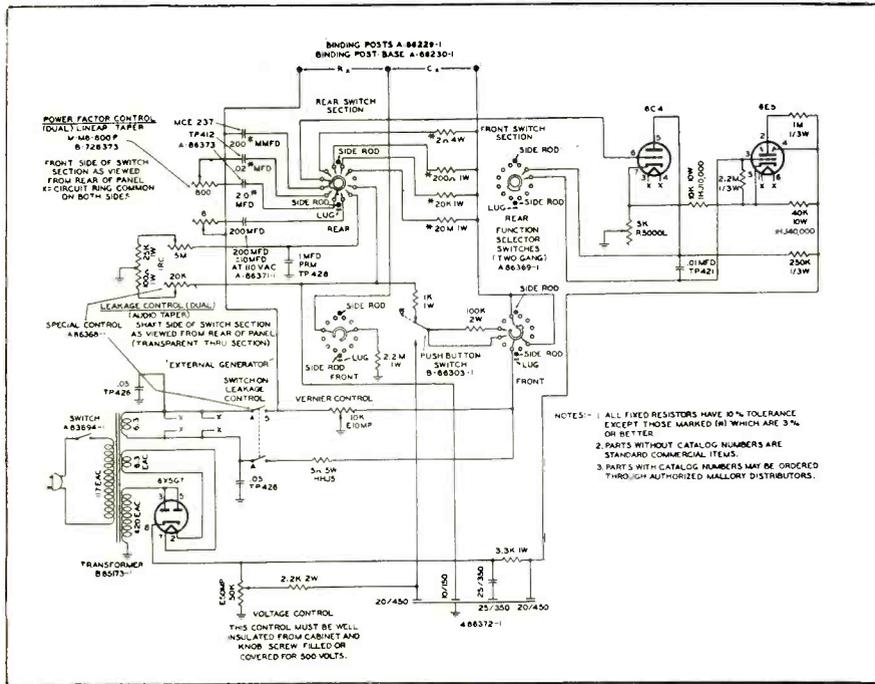


Fig. 2—Bridge circuit used to measure capacitance and power factor.



Circuit diagram of Mallory CRT-1 C-R tester

electron eye opening. Chart No. 2 is used to determine the acceptability of the electrolytic in terms of leakage current ratings.

then turned to obtain maximum eye deflection, and a percentage reading is thus obtained. The unknown inductance is computed by the formula:

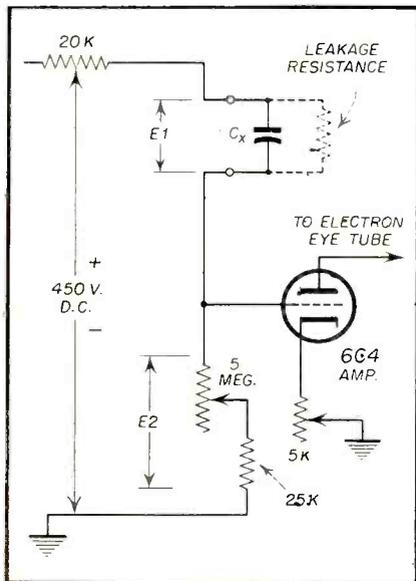


Fig. 3—Bridge circuit used to measure leakage resistance.

Although the CRT-1 makes no provision for measuring inductance directly, the tester can be made suitable for this purpose by matching it against inductors of known values. This testing procedure, incidentally, is also applicable to resistors and capacitors.

The known standard inductor is placed in the CX terminal (Fig. 2), and the unknown inductor in the RX terminal (Fig. 1). The vernier control is

Capacitance in MFD	DC Leakage in mA				
	25V	150V	250V	350V	450V and Up
5 or less	4	4	4	5	5
10	4	5	5	6	7
20	5	7	7	8	10
30	6	9	9	10	12
40	6	1.1	1.1	1.2	1.3
50	8	1.3	1.3	1.3	1.4
100	1.3	2.3	2.5	2.5	2.8
200	1.8	2.5	4.0	4.0	
500	2.0	2.8			
1000	2.5	3.5			
2000	3.0				
4000	4.0				
6000	6.0				
Greater than 6000	8.0				

Chart 2—Maximum leakage current values of electrolytic capacitors for different operating voltage ratings.

$$Lu = Lk \times D\% / 100$$
 where,  $Lu$  is the unknown inductor being measured,  $Lk$  is the standard known inductor, and  $D\%$  is the percentage reading obtained.

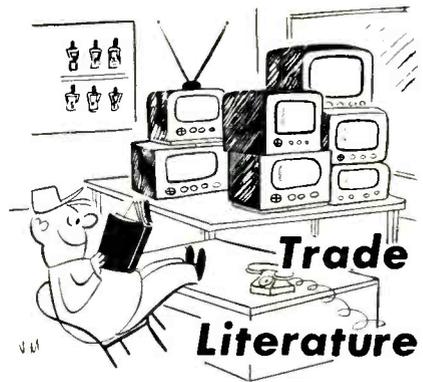
To determine an unknown capacitance,  $Cu$  by measuring it against a known standard, use the formula:

$$Cu = Ck \times 100 / D\%$$
 where,  $Ck$  is the known standard capacitor.

For an unknown resistance,  $Ru$ , use the formula:

$$Ru = Rk \times D\% / 100$$
 where,  $Rk$  is the standard resistor.

Note that the CRT-1 also provides for the employment of other frequencies, besides 60 cycles, for use in the ac bridge when making any of the aforementioned comparison tests.



An up-to-the-minute, 20-page revised replacement parts catalog just issued by Sprague provides complete, easy-to-find data on the most complete line of modern capacitors for nearly every radio and television service, lab, amateur radio, and experimental need. The new catalog, C-609 may be obtained direct by writing to the Sprague Products Co., Marshall Street, North Adams, Mass.

A spiral bound service information book containing schematic diagrams of all Du Mont television receivers is now available to servicemen. The Television Service Data Book is distributed by the Replacement Parts Department of Allen B. Du Mont Laboratories, Inc., Cathode-ray Tube Division. The book is available to servicemen through Du Mont parts distributors.

An educational picture booklet of photographs, cutaway drawings, and exploded views showing structural details of electron tubes used in home entertainment, industrial, and military electronic equipment, has been published by the Tube Department of the RCA Victor Division, Radio Corporation of America. Containing 16 pages and priced at \$.25, the book can be obtained from Commercial Engineering, RCA Tube Department, Harrison, N. J.

Just off the press is a brand-new 32-page catalog on television hardware. Fully illustrated, the brochure lists everything needed by TV servicemen from stand-offs in an extremely wide variety to the latest model UHF antennas. Copies of the new "Telco" publication No. T-54 may be obtained by writing direct to Television Hardware Mfg. Co. (Division of General Cement Mfg. Co.), 919 Taylor Avenue, Rockford, Illinois.

Clarostat announces the addition of 23 new numbers to its RTV or matched TV control replacement line.

[Continued on page 52]

# U. H. F. ANTENNAS

## Part 3

by **RUDOLF F. GRAF**

### Combination VHF and UHF Antennas

A number of antennas have appeared on the market which are designed to cover all of the existing TV channels, namely Channels 2 to 83. This is generally accomplished in one of two different ways. Either the antenna itself is designed to cover all channels effectively (with or without an initial adjustment), or there are two separate antennas with the signals being combined in one common transmission line.

In the first part of this symposium we have already covered the adjustable 11-element End Fire "V" and the Trombone antenna. These two antennas are combination *vhf* and *uhf* antennas: where the same array is used for all bands.

Another all-channel antenna is the "Ultra Q-Tee" marketed by La Pointe Electronics Inc. This antenna is illustrated in Fig. 17a. Also shown in the illustration are the printed circuits which serve as isolation networks between the various receiving sections of the antenna. Let us briefly go over the operation of this antenna.

Essentially there are three bands to be covered. The low end of the *vhf* band (Channels 2 to 6), the upper end of the *vhf* band (Channels 7 to 13) and the *uhf* band (Channels 14 to 83). The filter marked "X" serves as a band rejection filter between the *vhf* section and the "V" type *uhf* antenna marked "G". The electrical equivalent of this printed circuit filter is shown. It actually consists of three pair of parallel resonant circuits which act as isolation filters. They are resonant at 69 mc, 195 mc and 680 mc respectively. Throughout the entire *uhf* band, the 69 mc and 195 mc filters are practically short circuits so that the *uhf* signal is unimpeded in its way to the transmission line which is connected at the two points  $P_1$  and  $P_2$ .

A similar and opposite action takes place at *vhf*. The signal from the *vhf* section of the antenna is passed with practically no loss through the 680 mc filter section to the points  $P_1$  and  $P_2$ . The two smaller filters marked Y are resonant at 195 mc and serve to isolate

Final installment on the symposium chapter covering UHF antennas. Included in this discussion are combination UHF-VHF antennas, and cross-over networks.

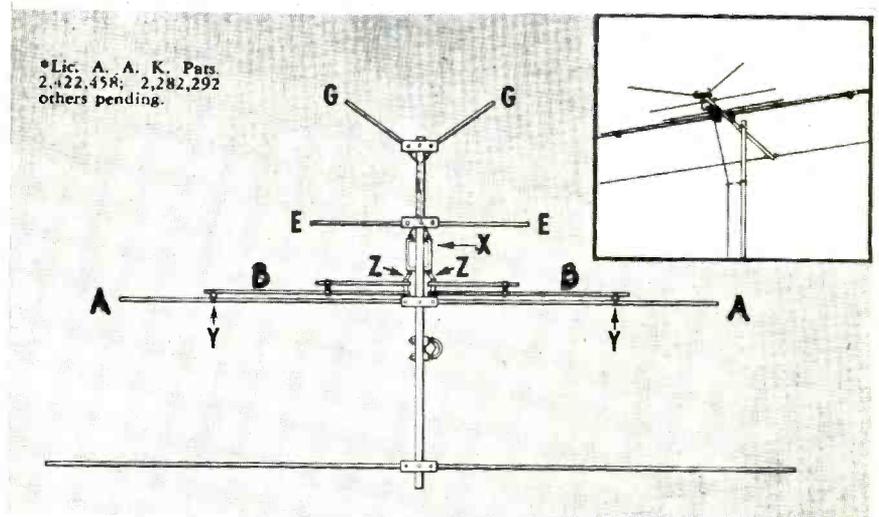


Fig. 17a—"Ultra Q-Tee" manufactured by La Pointe Electronics Inc.

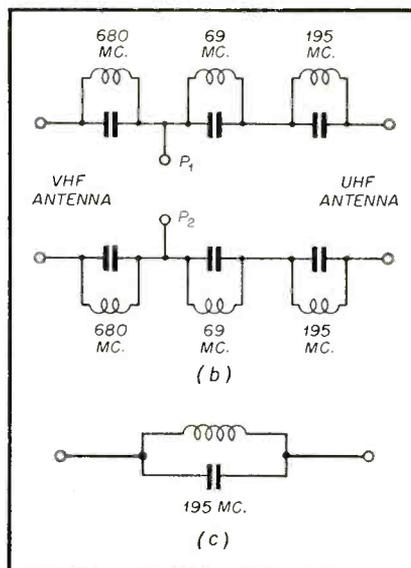


Fig. 17b and c—Electrical equivalents of printed circuits filters and cross-over networks used in "Ultra Q-Tee" antennas manufactured by La Pointe.

the low channel *vhf* dipole (A-A) from the high channel *uhf* dipole (B-B).

The printed circuit "Y" is marketed separately under the trade name of "Mighty Match" and it may be used to couple any two *vhf* and *uhf* antennas to a common transmission line. It may also be used to separate *vhf* and *uhf* signals that are coming down from the antenna in one transmission line, and feed them to separate input terminals on a converter or TV receiver.

### VHF-UHF Couplers

Practically every major antenna manufacturer has marketed a *vhf-uhf* coupler, or crossover network, or as it is sometimes called, a "duplexer". Some of the couplers have six terminals (three pairs) and some have eight (four pairs). Those with three pairs of terminals are used as follows: One pair goes to the *uhf* antenna, one to the receiver, and the other to the *vhf* antenna. If there are four pairs of terminals, one pair goes to the *uhf* antenna, one to the receiver, the third to the low chan-

nel *uhf* antenna (2 to 6) and the fourth to the high channel *uhf* antenna (7 to 13). The couplers must be completely water and moisture proof since they are used outdoors. If water or dirt should settle on the circuit elements, their characteristics would change and they would become inoperative.

Some of these networks are illustrated in Fig. 18. Also shown is a forward tilted Bowtie attached to a standard conical antenna. The filter prevents interaction between the *vhf* and the *uhf* signals and permits the use of a single transmission line to the receiver or converter.

#### UHF Indoor Antennas

A number of *uhf* indoor antennas have recently made their appearance. A few of these are illustrated in Fig. 19. There is no doubt that some of them will give a satisfactory picture in a primary service area under favorable conditions. Nevertheless, as has been so well proven the *vhf*, present day antennas are not yet so efficient as to make it possible to get optimum reception in all cases without a good outdoor antenna installation.

#### Transmission Lines

Many types of transmission lines are now in use and many more of them with new and different constructions are appearing every day. The transmission line is a very important part of any installation. No matter how effective the antenna, if the line losses

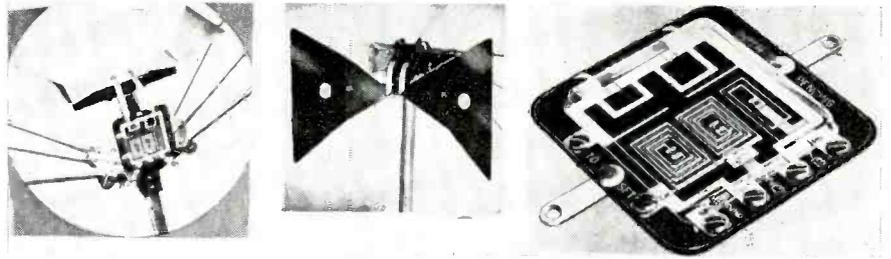


Fig. 18a—Cross-over networks used by JFD (left and right), and Channel Master (center).

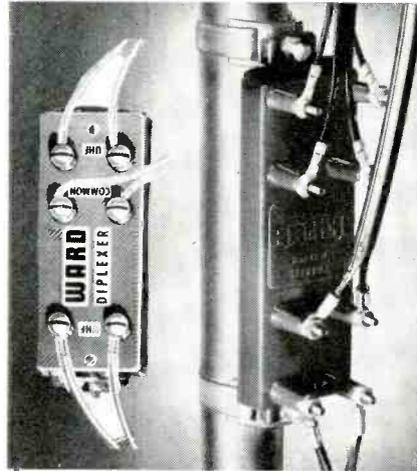


Fig. 18b—Cross-over network used by Channel Master (left), and Ward (right). These permit the use of one downlead with combination *uhf* and *vhf* antennas.

are high, the signal will be lost before it can reach the receiver.

Without, at the moment, being concerned with the impedance, there are essentially four types of transmission lines we can choose from. First, will be considered the 300 ohm flat and 300 ohm tubular (or oval), shielded line and open line. The best of these, as far as low loss is concerned, is the open line. It is somewhat more difficult to handle than the others, but if long distances are to be covered, open line is about your best bet. The shielded line should be used if interference is present. Although its losses are quite high, it is not affected by climatic conditions.

No serious difficulty has been encountered due to diathermy interference. Also, ignition interference has been found to be almost non-existent. Even if it is found to exist in any particular locale, its effect on the picture has been so slight as to go unnoticed.

The tubular and the oval line, as well as the many variations thereof, seem to be about the most popular. They are lower priced than the former two types and are easier to handle. The flat 300 ohm line we have used so far on *uhf* installations, is not satisfactory for *uhf*. The initial losses are too high, and if the line is wet, the losses become prohibitive.

#### General Installation Instructions

It has been shown that with present day transmitters and transmitting antennas reliable *uhf* reception can be had within approximately 50 miles over flat terrain. Even within this range, there may be a number of dead spots that require special attention. The signal strength required for satisfactory *uhf* reception is quite a bit higher than that necessary for satisfactory *vhf* reception. Minimum signal levels for TV have been established by the FCC, as follows:

<i>Channels:</i>			
2-6	220	microvolts	per meter
7-13	632	"	"
14-83	1264	"	"

The term microvolts per meter re-

[Continued on page 62]

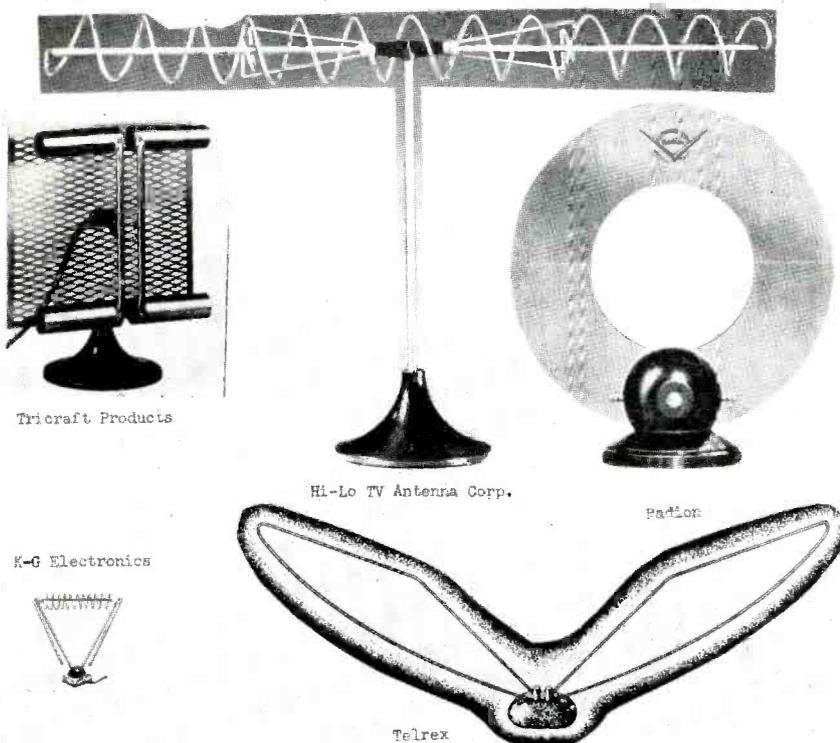


Fig. 19—Various types of *uhf* indoor antennas.

# VIDEO SPEED SERVICING SYSTEMS

## 11th INSTALLMENT

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Arvin	TE 337	Pix	June	40	AR-337-4
Arvin	TE 337	Pix	June	40	AR-337-5
Arvin	TE 337	Pix	June	40	AR-337-6
Belmont Raytheon	20AY21	Pix	July	27	BE-Y21-1
Belmont Raytheon	20AY21	Pix	July	27	BE-Y21-2
Belmont Raytheon	20AY21	Pix	July	27	BE-Y21-3
Belmont Raytheon	20AY21	Pix	July	28	BE-Y21-4
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CBS-Columbia	2000-1	Pix	August	31	CB2000-1
CBS-Columbia	2000-1	Pix	August	31	CB2000-2
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Capelhart-Farnsworth	CX33	Pix	August	33	CA33-20
Capelhart-Farnsworth	CX33	Pix	August	33	CA33-21
Capelhart-Farnsworth	CX33	Pix	August	34	CA33-22
Capelhart-Farnsworth	CX33	Pix	August	34	CA33-23
Capelhart-Farnsworth	CX33	Pix	August	34	CA33-24
DuMont	RA117	Pix	July	29	DM-117-1
DuMont	RA117	Pix	July	29	DM-117-2
DuMont	RA117	Raster	July	29	DM-117-3
DuMont	RA117	Pix	July	30	DM-117-4
DuMont	RA117	Sync	July	30	DM-117-5
DuMont	RA117	Sync	July	30	DM-117-6
Emerson	120144	Pix	July	31	EM-144-1
Emerson	120144	Pix	July	31	EM-144-2
Emerson	120144	Sync	July	31	EM-144-3
Emerson	120144	Sync	July	32	EM-144-4
Emerson	120144	Pix	July	32	EM-144-5
Emerson	120144	Sync	July	32	EM-144-6
Motorola	TS 292	Pix	June	41	MO292-1
Motorola	TS 292	Pix	June	41	MO292-2
Motorola	TS 292	Pix	June	41	MO292-3
Motorola	TS 292	Pix	June	42	MO292-4
Motorola	TS 292	Pix	June	42	MO292-5
Motorola	TS 292	Pix	June	42	MO292-6
RCA	KCS34	Pix	August	35	RC34-7
RCA	KCS34	Pix	August	35	RC34-8
RCA	KCS34	Pix	August	35	RC34-9
RCA	KCS34	Sound	August	36	RC34-10
RCA	KCS34	Raster	August	36	RC34-11
RCA	KCS34	Pix	August	36	RC34-12
Stewart-Warner	9300	Pix	June	43	SW9300-1
Stewart-Warner	9300	Pix	June	43	SW9300-2
Stewart-Warner	9300	Pix	June	43	SW9300-3
Stewart-Warner	9300	Pix	June	44	SW9300-4
Stewart-Warner	9300	Sound	June	44	SW9300-5
Stewart-Warner	9300	Sound	June	44	SW9300-6
Stromberg-Carlson	17 Series	Pix	August	37	SC17-1
Stromberg-Carlson	17 Series	Pix	August	37	SC17-2
Stromberg-Carlson	17 Series	Pix	August	37	SC17-3
Stromberg-Carlson	17 Series	Pix	August	38	SC17-4
Stromberg-Carlson	17 Series	Pix	August	38	SC17-5
Stromberg-Carlson	17 Series	Pix	August	38	SC17-6
Transvision	"A" Series	Raster	July	33	TA-A-1
Transvision	"A" Series	Raster	July	33	TA-A-2
Transvision	"A" Series	Sync	July	33	TA-A-3
Transvision	"A" Series	Pix	July	34	TA-A-4
Transvision	"A" Series	Pix	July	34	TA-A-5
Transvision	"A" Series	Pix	July	34	TA-A-6
Truetone	2D1235B	Raster	June	45	TU1235-1
Truetone	2D1235B	Pix	June	45	TU1235-2
Truetone	2D1235B	Pix	June	45	TU1235-3
Truetone	2D1235B	Pix	June	46	TU1235-4
Truetone	2D1235B	Pix	June	46	TU1235-5
Truetone	2D1235B	Pix	June	46	TU1235-6

# Vertical RETRACE BLANKING

by AL KINCKINER

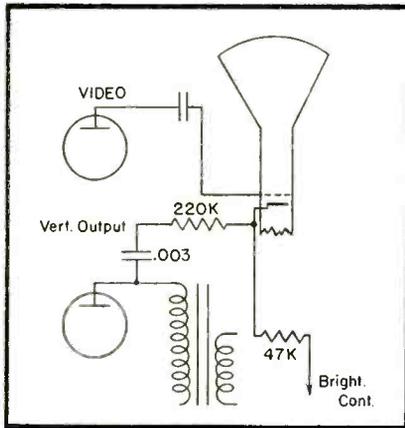


Fig. 1—Old standby. Note values given only on pertinent blanking components.

THOUGH the addition of vertical retrace blanking has been fairly well covered by many recent articles, appearing in manufacturers and regular trade journals, too frequently the drawbacks inherent in such circuit revisions or additions have been totally ignored. For example, the circuit suggested on various Admiral chassis has the unwanted effect of causing *raster ringing*. Again the transposing of the vertical sweep forming pulse components in various Westinghouse models leads to *condenser breakdown* in the transposed circuit.

In Fig. 1 is the simplest, most ef-

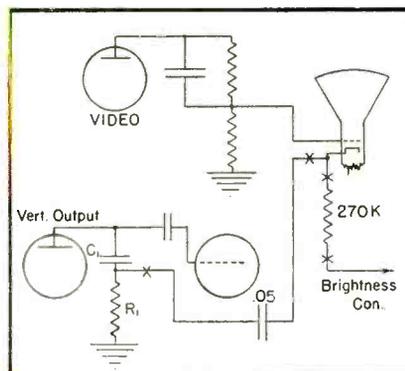


Fig. 2—Admiral retrace blanking.

ficient circuit for use on sets using grid-modulated, cathode-biased picture tubes. The added 47K resistor prevents raster ringing or other unwanted modulation in the picture, and the short time factor of the coupling network produces a sharp pulse which gives very sharp blanking and does not effect the vertical peaking. The only drawback to the circuit is its limited use to grid-modulated, cathode-biased sets.

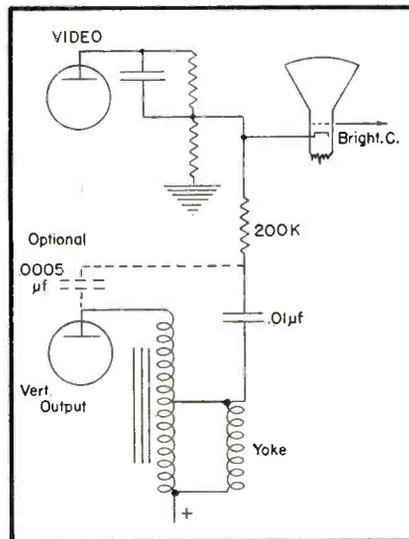


Fig. 3—Improved blanking. Note optional circuit for higher blanking pulse if desired.

Figure 2 is the aforementioned Admiral circuit. It has several drawbacks, one of which being the isolating resistor (270K) which has a rather large value and can cause stray modulation of the grid as well as raster ringing, unless the lead from brightness control to the grid is shielded. Another drawback is sufficient pulse amplitude, causing retrace to be present on some channels only. The comparatively large coupling condenser .05  $\mu$ f also has some effect on vertical peaking which can cause bunching or spreading at the top of the picture. A more efficient circuit is shown in Fig. 3 for these sets.

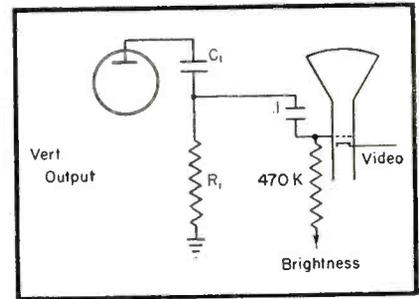


Fig. 4—Westinghouse circuit. Use higher voltage rating for capacitor C1.

Figure 4 shows the Westinghouse sets previously mentioned, with C1, R1 in their new transposed positions. When in this position, C1 frequently breaks down and should be replaced at the time of adding retrace blanking with a condenser of higher voltage rating. The coupling condenser (.1  $\mu$ f) should be of smaller size, .03  $\mu$ f or .05  $\mu$ f, and as such will effect vertical peaking considerably less.

Figure 5 is a Zenith circuit presented only as a note of interest. Note the extra winding on the vertical output transformer where the blanking pulse is generated, and the feedback from the kine grid to vertical output tube cathode. As picture tube brightness is increased so is the blanking pulse level.

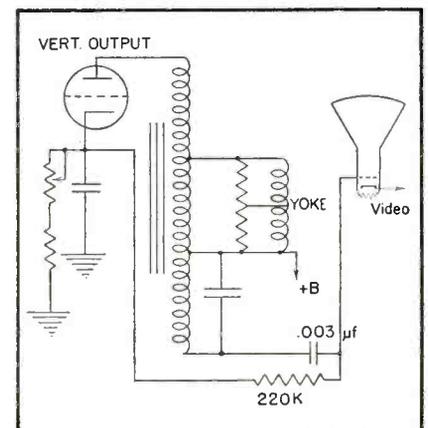


Fig. 5—Circuit used by Zenith.

# ASSOCIATION NEWS



NATESA Friends of Service Management Awards are presented to, left to right: Neal Hunter, Sprague; Frank Mansfield, Sylvania; Frank Moch, NATESA President; John Thompson, General Electric, at the Spring convention held at Kansas City, Missouri.

## NATESA

The dates for the Annual Fall NATESA Convention have been definitely set for October 9th, 10th and 11th in the completely new convention facilities of the Morrison Hotel in Chicago. A very large number of exhibitors of parts and components, together with a display by set manufacturers will be featured. The usual seminars, lectures, business discussions, banquets, floor shows, business and fun will take place. A new departure in this type of show will be an integral part of the convention. A public show will be held at which all of the latest developments will be featured, both from civilian and military standpoint. Public relations clinics will be held to acquaint the public with the true facts of service. No expense will be spared to do a real consumer education job.

## ESFETA

The Empire State Federation of Electronic Technicians Association Incorporated elected officers at a recent meeting held at the Hotel Arlington in Binghamton, New York. They are: Max Liebowitz, President, representing Associated Radio Television Servicemen of New York; John Wheaton, Vice-President, representing Long Is-

land Radio Television Guild; Charles Kohl, Treasurer, representing Electronic Technicians Association of Kingston, New York; Wayne Shaw, Secretary, representing Radio Servicemen of America; Andrew Wentworth, Sergeant-at-Arms, representing Radio Technicians Guild of Rochester.

## Radio Technicians Guild of Rochester

At the meeting held May 5th, a new panel of officers was elected for the following year. Alfred Best moves up to the Presidency, William DeVries becomes V.P.; Francis Stoffel still has the best pencil and so retains the Secretariat, while Bert Lewis becomes Treasurer. Also elected as Directors were Abraham Andzer, Theodore Cornish, Edward Fiske, Harold Eskin, William Brewerton, Norman McGovern and Donald Snell. Bert Lewis was presented with the "WHAM Leadership Award" by WHAM-FM-TV of Rochester for helping the cause of independent service organization immeasurably.

## Long Island Electronic Technicians Association, Inc.

Vol. 1 No. 1. of the LIETA News has recently been published with the following information:

"Our Aims: to advance and promote ethical relations among electronic technicians and between electronic technicians and the general public; to provide educational and recreational facilities for its members; to provide technical assistance to its members; and to increase the technical ability of its members and improve the quality of their work and their prestige in the community; to advance and promote cooperation within the electronic industry, between manufacturer, the distributor, the service manager and the technician; to set up chapters of L.I.E.T.A., Inc., throughout Long Island in Kings, Queens, Nassau and Suffolk Counties; to always keep the



Here is a scene from one of the TV service classes at Miami University. Educational program sponsored by Herman Radio Supply Co., for radio and TV servicemen, with Pete and Ed giving the demonstrated lectures.

members in mind when planning programs; to keep in touch with the members and to bring to them, for their discussion and decision, any and all legislation, association news, etc., or anything that might affect their futures in the industry and guarantee to the members that they will always be fairly represented."

## Television Service Dealers Association

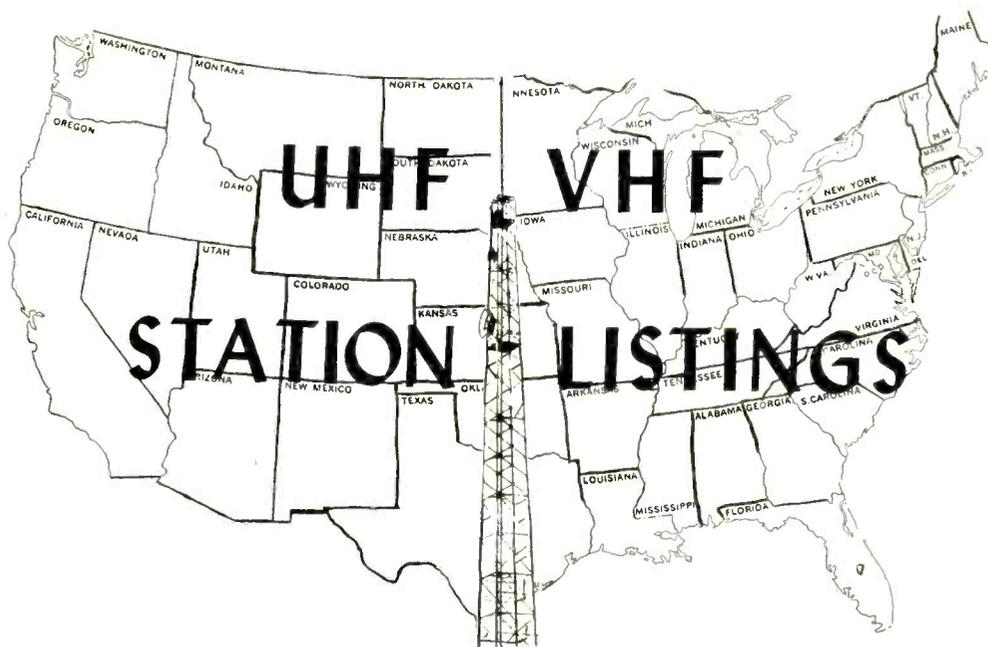
Philadelphia service group has installed the following officers to serve one-year terms: Louis J. Smith, head of the local television service firm bearing his name, was elected President; Charles Knoell, of the Charles Knoell Co., Vice-President; Harrison Neel, Neel TV Servicing Corp., Yeadon, Pa., Secretary, and Martin Bernoff, Merit TV Service Co., Secretary.

The group will launch an advertising drive, pointing up the service industry, and asking the local consumers to patronize TSDA firms, in order to boost service business during the slow summer period.

## The National Electronic Technician and Service Dealers Associations

Delegates from Pennsylvania, New Jersey, New York and Long Island attended a meeting June 7th, in New

[Continued on page 58]



Compilation shown below lists the present status of the new TV stations that have been authorized by the Federal Communications Commission after lifting of "Freeze".

State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational	State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational
		UHF	VHF					UHF	VHF		
<b>Alabama</b>						<b>Colorado</b>					
Birmingham	WSGN-TV	42			C	Colorado Springs	KRDO-TV	13			C
	WJLN-TV	48			C		KKTV		11	12-8-52	C
Decatur	WMSL	23		10-15-53	C	Denver	KDEN	26			C
Gasden	WTVS	21		8-1-53	C		KIRV	20			C
Mobile	WKAB-TV	48		12-29-52	C	Denver	KFEL-TV		2	7-19-52	C
	WALA-TV		10	1-14-53	C	Grand Junction			5		C
Montgomery	WCOV-TV	20		4-6-53	C	Pueblo	KBTW		9	10-2-53	C
							KDZA-TV		3	3-22-53	C
<b>Arizona</b>						<b>Connecticut</b>					
Tucson	KVOA-TV		4		C	Bridgeport	WICC-TV	43		3-12-53	C
	KCNA-TV		9		C		WSJL	49			C
Tucson	KOPO-TV		13	1-13-53	C	Bridgeport		71			E
Mesa	KTYL		12	4-15-53	C	Hartford		24			E
Yuma			11		C	New Britain	WKNB-TV	30		2-11-53	C
<b>Arkansas</b>						<b>Delaware</b>					
Fort Smith	KFSA-TV	22		6-1-53	C	Dover		40			C
Little Rock	KETV	23		Now	C	<b>Florida</b>					
	KRTV				C	Fort Lauderdale	WITV	23		Late 1953	C
<b>California</b>						<b>Georgia</b>					
Bakersfield	KAFY-TV	29		May, 1953	C	Columbus	WMAZ-TV	28		Late 1953	C
Chico			12	8-1-53	C			13		8-1-53	C
Eureka	KIEM		3		C	Macon		47		7-15-53	C
Fresno	KMJ-TV	24			C	Rome	WROM		9		C
Los Angeles	KPIK-TV	22			C	Valdosta	WGOV	37		Late Summer	C
Los Angeles	KUSC-TV	28		March, 1953	E	Warner-Robins			13		C
Salinas	KICO	28			C	<b>Other States</b>					
San Bernadino	KITO-TV	18			C	Alabama					
San Francisco		20			C	Arizona					
		32			C	Arkansas					
Salinas	KMBY	52			C	California					
San Diego			10		C	Colorado					
San Luis Obispo			6		C	Connecticut					
Santa Barbara	KEYT		3	May-June '53	C	Delaware					
Stockton	KTVU-TV	36		9-1-53	C	Florida					
Yuba City			8		C	Georgia					

State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational
		UHF	VHF		
<b>Hawaii</b>					
Honolulu	KGMB-TV		9	12 - 1-52	C
	KONA		11	11-22-52	C
<b>Idaho</b>					
Boise	KTVI		9	Fall 1953	C
	KIDO-TV		7		C
	KIFI		8	Late 1953	C
Idaho Falls	KID		3		C
Nampa			6		C
Pocatello	KWIK		10	Spring 1954	C
	KJRL		6		C
Twin Falls			11		C
<b>Illinois</b>					
Belleville	WTVI	54			C
Bloomington		15		Fall 1953	C
Champaign	WCIA-TV		3	Summer '53	C
Chicago		20			C
		26			C
Danville	WDAN-TV	24			C
Decatur	WTVP	17		7 - 1-53	C
Harrisburg		22			C
Peoria	WTVH-TV	19		6 - 1-53	C
	WEEK-TV	43		1-29-53	C
Rockford	WTVO	39		April, '53	C
Springfield		20			C
<b>Indiana</b>					
Indianapolis		67			C
		26			C
Lafayette	WFAM-TV	59			C
Marcon		29			C
Muncie	WLBC-TV	49		4-15-53	C
Princeton		52			C
South Bend	WSBT-TV	34		12-22-52	C
<b>Iowa</b>					
Davenport		36			C
Des Moines		17			C
Fort Dodge	KQTV	21		10 - 1-53	C
Sioux City	KWTV	36		3-29-53	C
	KVTV		9	3-14-53	C
<b>Kansas</b>					
Hutchinson	KTVH		12	7 - 1-53	C
Manhattan	KSAC-TV		8		E
Pittsburgh	KOAM		7	8 - 1-53	C
Wichita	KEDD-TV	16		5-15-53	C
<b>Kentucky</b>					
Ashland	WPTV	59		5 - 1-53	C
Henderson	WEHT	50		5 - 1-53	C
Louisville	WKLO-TV	21			C
Richmond		60			C
	WLOU-TV	41			C
<b>Louisiana</b>					
Baton Rouge	KHTV	40			C
Monroe	KNOE-TV		8		C
	WAFB-TV	28		Now	C
Lake Charles	WTAG	25		Apr.-June '53	C
Monroe	KFAZ	43			C
New Orleans	WJMR	20			C
		61		5-18-53	C
<b>Maine</b>					
Bangor	WABI-TV		5	1-21-53	C
Portland	WPMT	53		9 - 1-53	C
<b>Maryland</b>					
Baltimore	WITH	60			C
Frederick	WFMD-TV	62			C
Salisbury	WBOC-TV	16		10 - 1-53	C
<b>Massachusetts</b>					
Boston		50			C
Cambridge		56			C
Fall River	WSEE-TV	46			C
Holyoke	WHYN-TV	55		Now	C
New Bedford	WNBH-TV	28			C
North Adams	WBRK	74			C
Northampton	WACE	36		Fall '53	C
Springfield	WWLP	61		Now	C

State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational
		UHF	VHF		
<b>Michigan</b>					
Ann Arbor	WPAG-TV	20		Now	C
Battle Creek	WBKZ-TV	64			C
	WBCK-TV	58			C
Benton Harbor	WHFB	42			C
East Lansing	WKAR-TV	60			E
Flint	WCTV	28			C
	WTAC-TV	16			C
Jackson	WIBM-TV	48			C
Kalamazoo	WKMI	36			C
Lansing	WILS	54		9 - 1-53	C
Muskegon	WTVM	35			C
Saginaw	WKNX-TV	57		April '53	C
<b>Minnesota</b>					
Austin			6		C
Duluth	WFTV	38			C
Rochester	KROC-TV		10	Apr. '53	C
St. Cloud	WJON-TV		7	May-June '53	C
St. Paul	WCOW-TV	17		11-15-53	C
<b>Mississippi</b>					
Columbus		28			C
Gulfport	WGCM	56			C
Jackson	WJTV	25		1-20-53	C
Meridian	WCOC-TV	30			C
<b>Missouri</b>					
Clayton	KFUO	30			C
Columbia	KOMU-TV		8	July 1953	C
Festus	KACY	14		7 - 1-53	C
St. Louis	KSTM-TV	36			C
	WIL	42		Late 1953	C
Hannibal	KHMO		7		C
Kansas City	KCTY	25			C
Sedalia	KDRO		6		C
Springfield	KTTS-TV		10	3-14-53	C
St. Joseph	KFEQ		2	Spring '53	C
<b>Montana</b>					
Billings	KOOK		2		C
			8	Early Fall	C
Butte	KOPR-TV		4		C
	KXLF		6		C
Great Falls	KFBB-TV		5		C
Missoula	KGVO		13	Spring '54	C
<b>Nebraska</b>					
Lincoln	KFOR-TV		10	Now	C
	KOLN-TV		12	2-10-53	C
<b>Nevada</b>					
Las Vegas			8		C
Reno	KSTV		8		C
<b>North Carolina</b>					
Asheville	WISE-TV	62		Now	C
Charlotte	WAYS	36		Fall, '53	C
Durham	WCIG-TV	46		11 - 1-53	C
Greensboro	WCOG-TV	57			C
Greenville	WNCT-TV		(9)	9 - 1-53	C
Hendersonville		27		Mid-Summer '53	C
Mount Airy	WPAQ-TV	55		Fall '53	C
Raleigh	WNAO-TV	28		5 - 1-53	C
Winston-Salem	WTOB	26		July-Aug. '53	C
<b>North Dakota</b>					
Bismark			5	Early Fall	C
			12	Early Fall	C
Fargo	WDAY-TV		6		C
Minot	KCJB		13	6-15-53	C
			10	Early Fall	C
<b>New Mexico</b>					
Albuquerque	KGGM-TV		13	11 - 1-53	C
Clovis			12		C
Roswell			8		C
Santa Fe			2		C
<b>New Jersey</b>					
Asbury Park	WRTV	58		Late 1953	C
Atlantic City		52			C
	WFGP-TV	46		Now	E
New Brunswick	WTLV	19			E

State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational
		UHF	VHF		
<b>New York</b>					
			10		C
Albany	WRTV	17			C
Buffalo	WBES	59			C
Binghamton	WQTV	46			C
	WBUF	17			C
	WTVF	23			C
Elmira		18			C
	WTVE	24			C
Ithaca			14		C
Jamestown	WJJN	58			C
Kingston	WKNY-TV	66			C
New York	WEOK-TV	21			C
Poughkeepsie	WGTV	25			F
Rochester	WROH	21			E
Syracuse	WHTV	43			E
Watertown	WWNY	48			C
<b>Ohio</b>					
Akron	WAKR-TV	49			C
Ashtabula	WICA	15			C
Dayton	WIFE	22			C
Lima	WIMA-TV	35			C
	WLOG-TV	73		Now	C
Massillon	WMAC-TV	23			C
Sandusky	WLEC-TV	42		12 - 1-53	C
Warren	WHHH	67			C
Youngstown	WUTV	21			C
	WFMJ-TV	73		2 - 9-53	C
	WKBN-TV	27		1-11-53	C
Zanesville	WHIZ-TV	50			C
<b>Oklahoma</b>					
Lawton	KSWO-TV		7	3 - 8-53	C
Oklahoma City	KLPR	19		9 - 1-53	C
		25			C
Tulsa		23			C
<b>Oregon</b>					
Eugene		20			C
Medford			5		C
Portland	KPTV	27		9-19-52	C
Salem		23		July '53	C
<b>Pennsylvania</b>					
Altoona	WFBG-TV		10	3 - 2-53	C
Bethlehem	WLEV-TV	51		Now	C
Chambersburg	WCHA-TV	46		Late Summer '53	C
Easton	WGLV	57			C
Harrisburg	WTPA	71			C
	WHP-TV	55			C
Hazleton	WAZL-TV	63			C
Johnstown	WARD	56			C
New Castle	WKST-TV	45		Now	C
Philadelphia	WIP-TV	29			C
Pittsburgh	WKJF-TV	53		Now	C
	WTVQ	47		Aug. 1953	C
	WENS	16		July-Aug. '53	C
Reading	WHUM-TV	61		4-15-53	C
Scranton	WTVU	73		4-15-53	C
	WGBI-TV	22			C
	WARM-TV	16		Early Fall	C
Wilkes-Barre	WBRE-TV	28		1 - 1-53	C
	WILK-TV	34		8 - 1-53	C
Williamsport	WRAC-TV	36			C
York	WNOW-TV	49		Mid-Summer '53	C
Youngstown	WFMJ-TV	73		2-18-53	C
	WSBA-TV	43		12-23-52	C
<b>Puerto Rico</b>					
	WKAQ-TV		2		C
<b>South Carolina</b>					
Charleston	WCSC	5			C
Columbia	WIS-TV	10		9 - 1-53	C
Columbia	WNOK-TV	67			C
	WCOS-TV	25			C
Greenville	WGVL	23			C
<b>South Dakota</b>					
Sioux Falls	KELO-TV		11	3 - 1-53	C

State & City	Call Letter	CHANNEL		Date on Air	Commercial or Educational
		UHF	VHF		
<b>Tennessee</b>					
Chattanooga	WOUN	49			C
	WTVT	43			C
Johnson City	WJHL		11	9 - 1-53	C
Knoxville		26			C
Memphis	WHBQ		13	8 - 1-53	C
<b>Texas</b>					
Amarillo	KFDA-TV		10	3-30-53	C
	KGNC-TV		4	3-11-53	C
Austin	KTBC-TV		7	11-27-52	C
	KCTV	18			C
	KTVA	24			C
Beaumont	KBMT	31			C
Dallas	KLIF	29			C
		23			C
El Paso	KEPO		13		C
	KROD		4	12-14-52	C
	KTSM-TV		9	12-31-52	C
Fort Worth		20			C
Galveston	KTVR	41			C
	KGUL-TV		1	3-22-53	C
Houston	KUHT		8		E
	KNUZ-TV	39		July '53	C
		23			C
Longview		32			C
Lubbock	KCBO-TV		11	March-Apr. '53	C
	KDUB-TV		13	11-13-52	C
Lufkin	KTRE-TV		9	11 - 1-53	C
McAllen	KRIO	20		Sept. '53	C
Midland			2		C
San Angelo	KGKL		3		C
	KTXL		8		C
San Antonio		35			C
Sherman		46		Late Summer	C
Temple	KTEM		6		C
Tyler		19			C
Texarkana	KCMC		6	May '53	C
Victoria	KNAL	19			C
Waco	KANG-TV	34			C
Wichita Falls	KTWV	22			C
	KWFT-TV		6	3 - 1-53	C
	KFDX-TV		3	Now	C
<b>Utah</b>					
Salt Lake City			2		C
<b>Virginia</b>					
Charlottesville	WCHV	64		9 - 1-53	C
Danville	WBTM-TV	24			C
Hampton	WVEC	15		8- 1-53	C
Harrisonburg	WSVA-TV		3	May-June	C
Lynchburg	WLVA-TV		13	2 - 8-53	C
	WWOD	16			C
Newport News	WACH	33		June '53	C
Roanoke	WROV-TV	27		2-15-53	C
	WSLS-TV		10	12-11-52	C
<b>Washington</b>					
Bellingham	KVOS-TV		12	Apr.-June '53	C
Spokane	KXLY-TV		4	2 - 1-53	C
	KHQ-TV		6	12-19-52	C
Tacoma	KMO-TV		13		C
	KTNT-TV		11	3 - 1-53	C
Yakima	KIMA-TV	29		July 1, '53	C
	KIT-TV	23			C
<b>West Virginia</b>					
Charleston		49		July, '53	C
Parkersburg		15			C
Wheeling	WLTV	51		Oct., 1953	C
<b>Wisconsin</b>					
Beloit	WGEZ	57		Fall '53	C
Eau Claire	WEAU		13	Fall '53	C
Green Bay	WBAY-TV		2	3 - 7-53	C
Madison		33			C
	WKOW	27			C
Milwaukee	WCAN	25			C
Neenah	WNAM-TV	42		Fall '53	C
Oshkosh	WOSH-TV	48			C
<b>Wyoming</b>					
Cheyenne	KFBC-TV		5		C

# PERSONNEL NOTES

Meet the key men responsible for the manufacture and distribution of servicemen's products.

Eugene M. Keys of Evanston, Ill. was named president of the Edwin I. Gutham Co. of Chicago. He formerly was the executive vice president of the electronic components manufacturing company. Mr. Keys is active in the electronic components industry and, at present, is serving as chairman of the coils section of the Radio and Television Manufacturers Association.



Eugene F. Peterson of Schenectady has been appointed manager of marketing for the General Electric Company's Radio and Television Department. Mr. Peterson was manager of marketing for the company's Tube Department, with headquarters in Schenectady, prior to his present appointment. His new headquarters will be at the G-E Electronics Park plant here.



Appointment of Ralph R. Stubbe as assistant chief engineer was announced by General Instrument Corporation. Mr. Stubbe, whose 15 years in the electronics industry has been spent with such firms as Westinghouse Electric, Hazeltine Electronics, National Broadcasting Company and Hoffman Radio.



The Pyramid Electric Company announces the appointment of J. K. Poff as Sales Manager of the Jobber Division. Mr. Poff has been intimately connected with the radio and electronics industry for almost 25 years, and is a member of the "Old Timers Club." Before joining Pyramid, Mr. Poff was jobber sales manager with the Erie Resistor Corp.



Haldorson Transformer Company, Chicago, has announced the appointment of Mr. Paul W. Nief for the New England territory. Mr. Nief, with headquarters at 15 Oak Street Westport, Connecticut, will represent Haldorson in Connecticut, Massachusetts, Rhode Island, New Hampshire, Vermont and Maine.



Sylvania Electric Products Inc. announced the appointment of E. Finley Carter as Vice President and Technical Director of the company. In his new capacity, Mr. Carter will furnish technical counsel to Sylvania's management and engineering groups, and will handle broad technical relations with industry and other organizations.



J. R. Bengel of the manufacturers' rep firm, Technical Representation, will handle the Merit Coil & Transformer Corp. line in Eastern Pennsylvania, Delaware and Southern New Jersey, it was announced. He is a member of the IRE, "The Representatives," national manufacturers' reps organization, the National Small Business Men's Association and the Manufacturers' Agents National Association.



An outstanding physicist and chemist, long specializing in the printed-circuit art, Miss E'lise Harmon, heads the printed-circuit activities of Aerovox Corporation. Previous to joining Aerovox, Miss Harmon was chemist and engineer at the Bureau of Standards and also with the Naval Research Bureau in Washington.

Edward L. Nung, formerly manager of the Long Island City parts division plant for Sylvania Electric, has been named manager of the Tuner Division of P. R. Mallory & Co. Inc. at Indianapolis. Mr. Nung's business experience has been primarily in production and material control.

Carl A. Odening, Superintendent of the Columbia, Tennessee plant of National Carbon Company, a division of Union Carbide and Carbon Corporation, has been awarded an Alfred P. Sloan Fellowship under the Executive Development Program at Massachusetts Institute of Technology.



CBS-Columbia Inc., announces the appointment of Harry Scheeter as General Manager of CBS-Columbia Distributors Inc., the New York factory branch distributing CBS-Columbia Radio and Television receivers in the metropolitan area. Mr. Scheeter is a veteran of 23 years in the radio industry both in the retail and wholesaling parts of the business.



# NEW TUBES

## NU Germanium Diodes

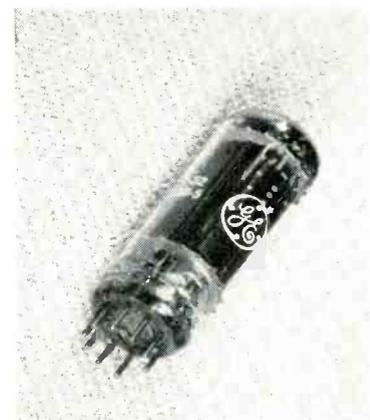
A line of 19 point-contact germanium diodes has just been announced by the Transistor Division of the National Union Radio Corporation at Hatboro, Pennsylvania. These diodes embody the results of many years of experience in the semi-conductor field and are produced under the exacting conditions now recognized as necessary for a product with uniform and lasting characteristics under the severe conditions required in service. The encasing cartridge is composed of a plastic material impervious to moisture and having excellent electrical characteristics and mechanical stability at high temperatures. The stiff terminal pins permit clipping of the unit into spring terminals either for test or for circuit application, and the flexible leads permit soldering or

other suitable connection means. The units are assembled in air-conditioned surroundings and are vacuum impregnated with an inert wax as a final step before acceptance tests are made. The N.U. diode, therefore, withstands severe temperature-humidity cycling without failure. All electrical specifications are given for a temperature of 25° C., and operation to 75° C. is permissible without permanent effect on characteristics.

The N.U. line of diodes includes units for computer applications, video detectors, U.H.F. mixers to 900 megacycles, as well as general-purpose units suitable for operation up to 200 volts.

## G.E. 6CL6

General Electric's Tube Department recently announced that a new power pentode for use in the video output



stage of television receivers has been added to the G-E receiving tube line.

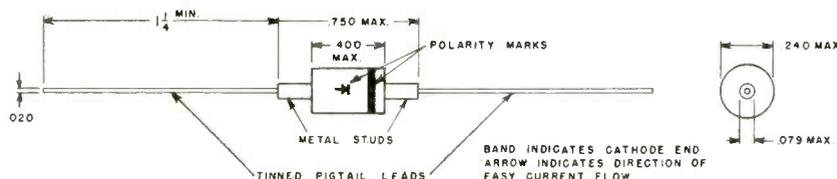
Using this tube it is possible to obtain a voltage gain of from 40 to 45 in wide band video circuits. The tube features high trans-conductance, low capacitances, and high output current capability.

The tube, type 6CL6, provides a high plate current at low plate voltages and can supply enough peak-to-peak output voltage to drive large picture tubes with high efficiency and low amplitude distortion. It is capable of supplying 132 volts peak-to-peak output across a load resistor of 3,900 ohms.

In addition to its use in video output service, this new nine-pin miniature may also be used as a wide-band amplifier in industrial and laboratory equipment.

## Workman 5TV4

Workman TV, Inc., manufacturer of Teaneck, N. J., has introduced its new Model 5TV4 "B" Plus Booster. This



## ELECTRICAL SPECIFICATIONS \*

TYPE	MIN. FORWARD CURRENT mAdc	MAX. REVERSE CURRENT μAdc	REVERSE VOLTAGE FOR ZERO DYNAMIC RESISTANCE (MIN.)	APPLICATION
NU34	5.0 @ 1.0 v.	50 @ -10v. 800 @ -50v.	75	65 v. computer diode
NU38	3.0 @ 1.0 v.	6 @ -3v. 625 @ -100v.	120	100 v. general purpose diode
NU39	1.5 @ 1.0 v.	200 @ -100v. 800 @ -200v.	225	200 v. general purpose diode
NU58	4.0 @ 1.0 v.	800 @ -100v.	120	100 v. general purpose diode
1N34A	5.0 @ 1.0 v.	30 @ -10v. 500 @ -50v.	75	65 v. computer diode
1N38A	4.0 @ 1.0 v.	5 @ -3v. 500 @ -100v.	120	100 v. computer diode
1N48	4.0 @ 1.0 v.	833 @ -50v.	85	75 v. general purpose diode
1N51	2.5 @ 1.0 v.	1667 @ -50v.	50	40 v. general purpose diode
1N54A	5.0 @ 1.0 v.	7 @ -10v. 100 @ -50v.	75	65 v. high back res. diode
1N55A	4.0 @ 1.0 v.	500 @ -150v.	170	150 v. general purpose diode
1N58A	4.0 @ 1.0 v.	600 @ -100v.	120	100 v. general purpose diode
1N63	4.0 @ 1.0 v.	50 @ -50v.	125	100 v. high back res. diode
1N64	44 mc rectification efficiency test		25	Video detector
1N65	2.5 @ 1.0 v.	200 @ -50v.	85	75 v. general purpose diode
1N69 †	5.0 @ 1.0 v.	50 @ -10v. 830 @ -50v.	75	65 v. 100 mc rectifier
1N70 †	3.0 @ 1.0 v.	25 @ -10v. 300 @ -50v.	125	100 v. general purpose diode
1N72	Noise & rect. test @ 500 mc		5	UHF mixer to 900 mc.
1N75	2.5 @ 1.0 v.	50 @ -50v.	125	100 v. general purpose diode
1N81 †	3.0 @ 1.0 v.	10 @ -10v.	50	40 v. general purpose diode

† JAN preferred types.

\* At 25° C. Operation to 75° C. permissible without permanent effect on characteristics.

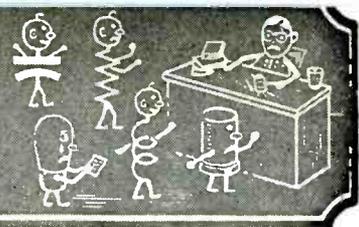
Exposure to ambient temperatures above 100° C. may result in failure.



unit is said to replace the 5U4G in TV receivers for more height, width and gain by the addition of an extra 30 volts to the low voltage supply. A built-in time delay (patent pending) acts as a choke input. Other advantages

[Continued on page 54]

# CIRCUIT COURT



## Westinghouse V2214-Sync Separation and Clipping

In the Westinghouse V2214 Sync System (Fig. 1) the bias of the sync separator is obtained by grid leak action. During the positive portions of the input signal, the sync separator grid is driven positive. The resultant current flow through the relatively low cathode-to-grid resistance charges *C403* nearly to the peak amplitude of the sync pulses (which are the most positive portion of the signal). Between sync pulses, when the applied signal goes negative, *C403* discharges through the 1 megohm grid resistor, *R406*, and the resultant voltage developed across *R406* is negative at the grid of the tube. During the next positive pulse, the grid is again driven positive into conduction, *C403* charges, and the process is repeated. Since the cathode-to-grid resistance inside the tube is less during conduction than the 1 megohm grid resistor, *C403* charges at a fast rate and discharges at a relatively slow rate. As a result, the voltage at the grid of the tube is predominantly negative and its value is determined by the amplitude of the applied signal. However, the signal amplitude is not the only factor that determines the amount of bias developed. If the duration of the positive pulses increases and the time between pulses decreases, *C403* will charge to a higher value and will not have time to discharge as completely as before. The net result will be an increase in the negative bias voltage. This is exactly what happens during the time of the serrated vertical pulse. Since the bias is higher during this period, the vertical pulse is not amplified as much as the other pulses.

Amplification of the vertical pulses would be reduced to a detrimental level if *C404* and *R407* were not included in the circuit. The purpose of *C404* is to provide additional coupling for the 60 cps vertical blanking pulse. With this pulse present at the grid of the tube, the vertical sync pulse which rides on top of the blanking pulse appears at a higher positive level and therefore receives greater amplification. The purpose of *R407* is to reduce the effect of *C404* on the time constant of the coupling network. A short time constant is desirable to minimize the effects caused by noise.

The output signal consisting of a series of negative-going sync pulses appears across *R408*. This signal is applied to the phase detector which will

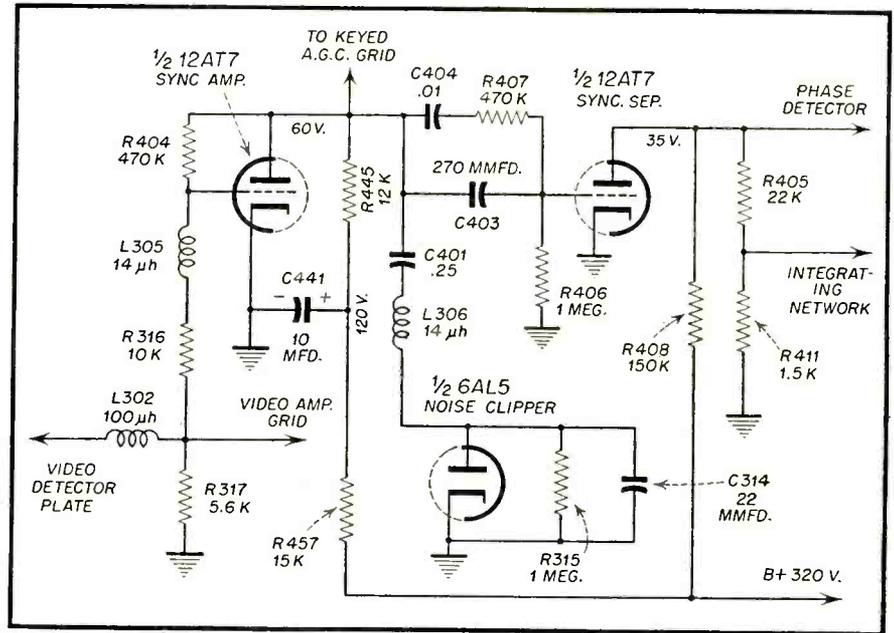


Fig. 1—Partial schematic of Westinghouse V2214.

be discussed later. The signal is also applied through the voltage divider, *R405* and *R411*, to the integrating network. Before proceeding to the integrating network, the operation of the noise clipper circuit should be examined.

The Noise Clipper action is as follows: The positive-going sync pulses at the plate of the sync amplifier drive the plate of the noise clipper positive. Under this condition, the diode conducts and *C401* charges. After the sync pulse passes, *C401* discharges slowly through *R315*, thus applying a negative potential to the plate of the diode. Since the discharge time constant of *C401* and *R315* is very long as compared to the intervals between positive pulses, *C401* discharges only slightly and the negative potential is maintained at the plate of the diode. As a result, the diode conducts only slightly during the succeeding positive pulses. However, if a noise pulse having an amplitude greater than the sync pulses appears, the negative potential at the diode plate is overcome and the diode conducts, effectively shunting the noise pulse to ground. In this manner, any noise pulses at the grid of the sync separator are clipped to the level of the sync pulses and the effects of the noise are greatly reduced.

### Zenith "K" Series—AGC Amplifier

The agc amplifier in the Zenith "K" series (Fig. 2) is of the "gated" type in which the agc voltage devel-

oped is proportional to the amplitude of the transmitted sync pulses.

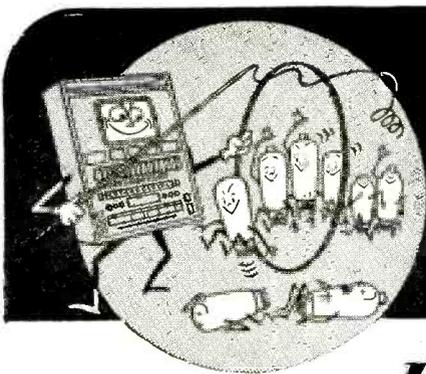
The tube used is one-half of a 12AX7 in contrast with the usual pentode used in this type of circuit. Fixed bias is applied to the cathode by connecting it to a voltage divider network consisting of *R40*, *R39* and *R38*. The resistor, *R40*, is adjustable so that the cathode may be operated at the proper value for "gating" of the 12AX7 on the sync pulses only and not on the pedestal.

The grid is kept at a fixed potential to ground by means of another voltage divider network which consists of *R41* and *R5*. *R5* connects to the 6U8 first video amplifier plate and to B+ plus through the video amplifier plate load resistors. The positive voltage at the grid is less than that at the cathode so that the net grid bias is negative.

This network also supplies the grid with the composite video and sync signal. The sync pulses at the 12AX7 grid are sync phase positive with respect to ground. Therefore, only the sync pulses cause conduction in the 12AX7 since all other information lies beyond the cut-off point.

The 12AX7 plate load resistor, *R37*, is returned to the cathode and its voltage divider. A 15.75 kc pulse, approximately 100 volts peak to peak, is taken from the grid of the horizontal discharge tube and applied to the 12AX7 plate through *C39* (.002 µf). If

[Continued on page 60]

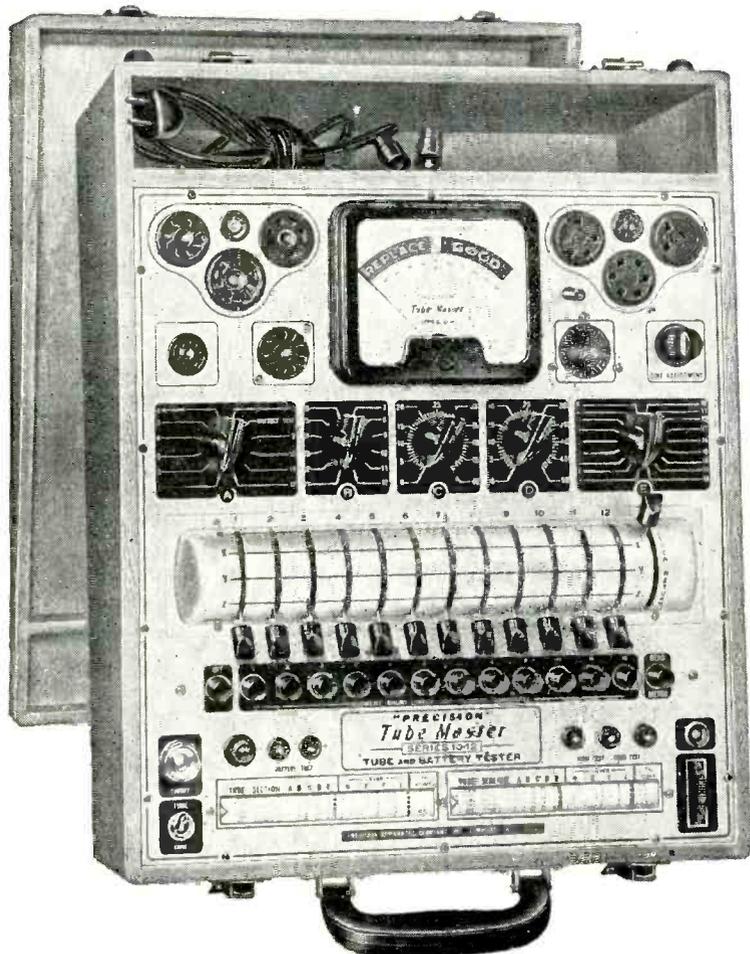


# THE INSTRUMENT THAT DEMANDS **OVERALL PERFORMANCE** FROM THE TUBE UNDER TEST!

## *PRECISION* SERIES 10-12

# *Electronamic*\* Tube PERFORMANCE Tester

with 12 element free-point Master Lever Selector System



MODEL 10-12-P (illustrated): in sloping, portable hardwood case with tool compartment and hinged removable cover.  
 Sizes 13 $\frac{3}{4}$ " x 17 $\frac{1}{4}$ " x 5 $\frac{3}{4}$ ".....\$107.50  
 MODEL 10-12-C (Counter Type) \$112.25  
 MODEL 10-12-PM (Panel Mount) \$112.25

To test modern tubes for only one characteristic will not necessarily reveal **OVERALL PERFORMANCE CAPABILITIES**. Modern tube circuits look for more than just mutual conductance or other single factor.

It has been conclusively proven that even though a tube may work well in one circuit, it might fail to work in another—simply because different circuits demand different relative performance characteristics, such as amplification factor, plate resistance, power output, emissive capability, etc.

In the PRECISION "ELECTRONAMIC" Circuit, the tube under test is made to *perform* under appropriately phased and selected individual element potentials, encompassing a wide range of plate family characteristic curves. This COMPLETE PATH OF OPERATION is electronically integrated by the indicating meter circuit in the positive performance terms of *Replace-Weak-Good*.

The efficiency of this "Electronamic" test results from encompassing several fundamental tube characteristics, NOT JUST ONE. Accordingly, when a tube passes this demanding OVERALL PERFORMANCE test, it can be relied upon, to a very high degree, to work satisfactorily.

\*REG. U.S. PAT. OFF. T. M. 439,008

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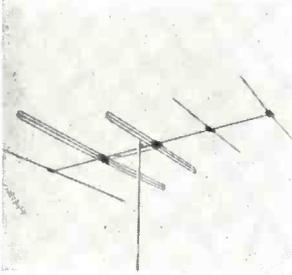
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# New



# Products



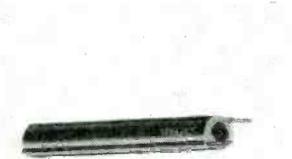
### VHF Antenna

Channel Master Corporation, has announced the development of a new, preassembled 5-element Broad Band VHF Yagi, designated Model No. 626. This antenna gives high, uniform gain over the entire low band, covering channels 2, 3, 4, 5, and 6. This model includes all the features of Channel Master's famous Z-Match impedance-matching system, which provides for perfect 300 ohm match in both single and stacked arrays.



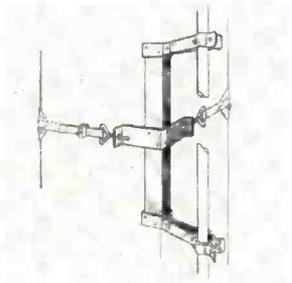
### Encapsulated Rectifiers

Radio Receptor Co., Inc., has just developed a new line of encapsulated selenium rectifiers. The research department has formulated a casting resin that makes it possible to encapsulate selenium rectifiers as a complete self-contained unit operating at normal voltage and current ratings. Intimate contact with all the cells of the stack enables the stack to be exposed to temperatures ranging from -55°C to over 150°C.



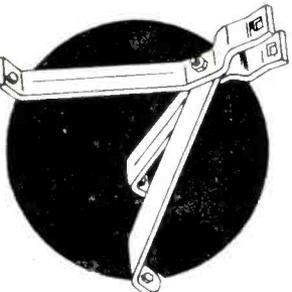
### 300 Ohm Twin Lead Cable

U.S. Wire & Cable Corp., introduces a new, flexible cable called "Hol-O-Kor" that has been designed to fulfill the need for a low-loss lead-in 300 ohm line for uhf reception. This cable has special construction features so that changes in weather and atmospheric conditions do not affect either impedance or its electrical efficiency. The signal strength remains at a maximum, whether used for uhf or vhf.



### 1-Piece Antenna Mounting

South River is now producing their UM-1—a one-piece Chimney Antenna Mounting instead of the conventional two pieces. Easy to install because: the rounded, wide-flared lips enable the installer to "snap-in" the antenna and mast without removing the protective coating from the mast; the spring tension of the mast holders retain the mast—freeing the hands of the installer so that he can bolt the mast in permanently.



### Aluminum Wall Bracket

Kenwood Engineering Co., Inc., announces a new low priced 6" Aluminum Wall Bracket. The bracket is made from a tempered aluminum alloy (61-ST6) which has a tensile strength of 45,000 pounds per square inch. Snap-in feature eliminates holding of mast while applying hardware; carriage bolts for easy one hand tightening, and only one wrench required for entire installation.

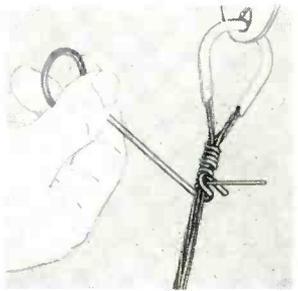
### UHF-TV Converter

The Turner Company is now marketing a new UHF-TV Converter especially designed for low signal area installations. The Converter features a two-section preselector with two silver-plated coaxial cavity tuners; a double shielded fundamental oscillator; and broadband amplifier with cascode circuit. Signal power loss in the preselector is reduced to a low 3 db and the noise figure is a maximum 17½ db to a minimum 15½ db.



### New Serving Tool

Copperweld Steel Company has announced the development of an ingenious serving tool for dead-ending their non-rusting radio and television guy strand. With this tool, the wires of the strand itself can be tightly wrapped or served forming a neat-finished dead-end without the use of clamps or clips. Dead-ends made with this device develop the full strength of the strand and will not pull free.



### New RAM Flybacks

RAM Electronics Sales Co.—The trend toward compactness of video chassis has manifested itself in such sets as those put out by Zenith and others recently . . . where the flyback is required to be under the chassis or in other hard-to-get-at locations. The RAM Models X070 and X073 transformers are designed explicitly for this purpose—being unusually compact and specifically engineered for this type of circuit.



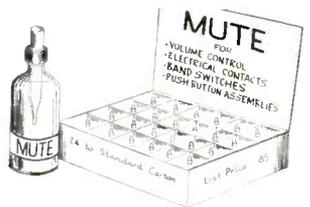
### UHF-VHF Antenna Coupler

Radio Merchandise Sales, Inc., introduces Ultradapt, Model UVC-2 uhf-vhf antenna coupler. Coupler isolates antennas from each other when a single down lead is used, thereby preventing ghosts or other forms of interaction between the two antennas. Designed for 300 ohm impedance, the unit is completely sealed to prevent entrance of moisture. Compact, wafer-like unit mounts quickly to mast by means of straps provided.



### Volume Control Restorer

Carolynne Mfg. Co., is adding a volume control restorer and contact cleaner to its line. It will be marketed under the trade name of "MUTE". The control restorer oils as it cleans. It will not change capacitance; will not harm metals; and will not harm insulation. It will eliminate static. "MUTE" comes with a handy combination dropper-stopper for easy application.



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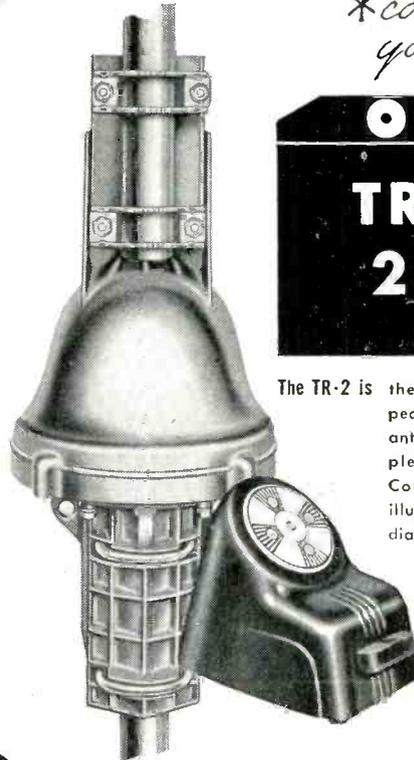
**TR  
11 & 12**



The TR-12 is a special combination value consisting of complete rotor including thrust bearing... handsome modern design plastic cabinet with meter control dial—

The TR-11 is the same unit without the thrust bearing.

**TR  
2**



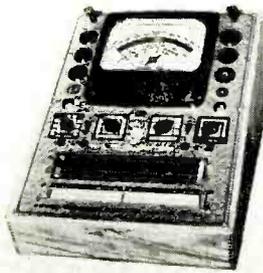
The TR-2 is the HEAVY DUTY rotor especially suited for special TV antenna installations. Complete rotor with "Compass Control" cabinet having illuminated "perfect pattern" dial.



**THE RADIART CORPORATION**  
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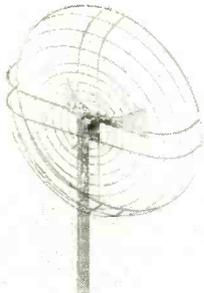


**CORNELL-DUBILIER ELEC. CORP.**  
SOUTH PLAINFIELD, NEW JERSEY



### Tube-Battery Tester

Electronic Measurements Corporation, has announced the addition of a new Tube-Battery-Ohm Capacity Tester to their well-known line of quality electric testing equipment. EMC Model 207 features a large, easy to read, 7½" meter for counter use. It is a durable, accurate instrument that gives direct readings for all tubes through the standard emission method of testing. Four-position lever type switches are used.



### "Para Bow" UHF Antenna

JFD Manufacturing Company, Inc., announce production of the "Golden Para Bow." Reflects more of the uhf signal toward the Bowtie dipole from all directions, increases the receiving power of the antenna and also prevents snow and ghost-producing back and side signals. This antenna complete with "Bronzidite" anti-rust, anti-corrosion plating is backed by JFD's "Gold Seal" one-year guarantee.

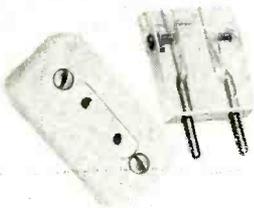
### One Call Kit

The popular and utilitarian One Call Kit introduced by Littelfuse, Inc. as a time-saving aid for television service men has been brought up to date. The revised kit represents the latest usages of fuses as indicated by service men. With the handy, practical and highly compact selection of fuses found in the kit, service men can handle 95 per cent of all their needs.



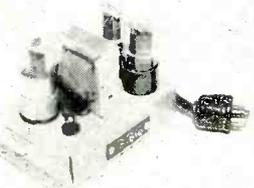
### "Tiny-Mite" TV Coupler

A new multiple TV Set Coupler and Lead-in Socket combined in one compact unit measuring just 15/16" x 1¼" x ½" has been announced by Mosley Electronics, Inc., St. Louis, Missouri. The new "Tiny-Mite" is said to minimize interaction between sets and to reduce oscillator radiation from the transmission line. Each unit will operate two television sets from one antenna.



### TV Sound Amplifier

Vidairne Electronics Mfg. Co., Lynbrook, L. I., have introduced a TV push-pull amplifier that can be readily attached to a TV receiver, thus improving the sound qualities. The new three-tube amplifier, known as Model A-131, has a wider frequency response, yet the power drawn from the TV set is only 14 watts. It can be installed by the TV set owner provided his receiver's sound output tube is either a 6V6, 6K6, or 6Y6.



### Portable UHF/VHF Antenna

Snyder Manufacturing Company has placed on the market a new TV antenna. Named the "3D", the antenna covers all channels from 2 to 83 and affords maximum adjustments to take advantage of weaker than normal indoor signals. With two 3-section, gold tone brass staffs the antenna features the Directional 6-position Beam Selector which uses a new criss-cross phasing element in a variety of circuit arrangements.



### UHF All-Channel TV

#### Converter

Granco Products, Inc., announces the production of a low cost uhf all-channel television converter known as the "Star." This highly engineered unit incorporates coaxial tuned cavity elements to insure very low noise, high gain and excellent frequency stability. The converter is simple to install and requires no IF adjustments.



### Wire-Wound Control

Clarostat Mfg. Co., Inc. now producing an inexpensive, extra-compact, highly-convenient control. It has no shaft, but is screwdriver-adjusted by means of a slot in the rotor. Mounting is by means of rivets or screws. Contact arm is grounded to case, while insulated terminal protrudes either parallel to or at right angle to mounting surface. Available with two terminals for use as potentiometer.



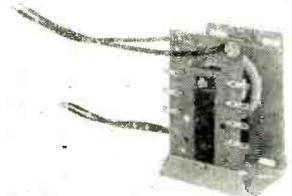
### Book Display Rack

John F. Rider Publisher, Inc., is making available to their distributors a specially constructed wire book display rack. This collapsible steel wire unit holds approximately 70 Rider books with display space for more than 15 different titles. The rack is 32 inches high, 20 inches wide and 14 inches deep and is attractively painted in bronze blue. The bottom of the rack has a holder for 3" x 5" circulars.



### Flyback Transformer

Halderson Transformer Co., is now making deliveries on the FB410, its new multi-purpose flyback transformer. Described as a veritable stock assortment of flybacks in one component, FB410 is equipped with a universal mounting bracket which permits replacement of many different mounting types without drilling a single hole. Flexible construction permits conformation with popular inductively coupled and autoformer type horizontal output circuits.



### Dynamic Microphone

The first small size lavalier-type dynamic microphone for chest, desk or hand use in public address is announced by Electro-Voice, Inc., Buchanan, Michigan. Unlike any lapel microphone, the new Model 647 offers full-range E-V dynamic microphone quality, ruggedness and performance characteristics for indoor and outdoor use. Frequency response is smooth, peak-free 60-13,000 cps, specially compensated for chest resonance.



### Broad-Band Yagi

A new broad-band, triple-driven antenna is announced by Technical Appliance Corporation, manufacturers of Taco antennas and accessories. The new antenna provides a high, and relatively flat response over the entire vhf low band channels 2 through 6. The antenna consists of three directors, three driven elements plus reflector. Gain is of the order of seven db throughout the low band.



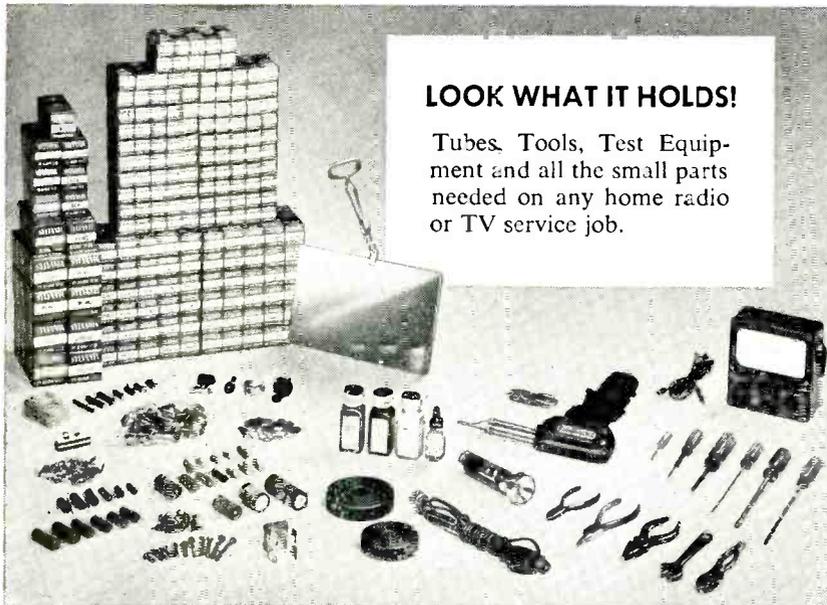


**Servicemen! Here's Your Sylvania**

# T-N-T CHEST

**(TUBE AND TOOL)**

*The Most Valuable Service Aid You've Ever Seen!*



Talk about a useful servicing aid . . . this Sylvania T-N-T (Tube and Tool) Chest is really it! Carries more tubes, tools and parts than any chest on the market!

**LOOK AT THESE FEATURES:**

- Bass and fir plywood case
- Waterproof Du Pont Fabrikoid cover
- Holds 187 receiving tubes
- Lightweight folding aluminum tool and parts tray
- Unbreakable plastic handle
- Brass-plated hardware
- Room for mirror and ohmmeter
- It's a complete, portable service shop!

**ACT NOW . . . Offer Limited!**

This chest is now yours for only \$5.00 and 30 Sylvania Premium Tokens. Offer good only between August 1st and November 15th. See your Sylvania Distributor who has these kits now.

# SYLVANIA

Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

**LIGHTING • RADIO • ELECTRONICS • TELEVISION**

In Canada: Sylvania Electric (Canada) Ltd.  
University Tower Building, St. Catherine St., Montreal, P. Q.

*Remember, you get 1 Sylvania Premium Token with every 25 receiving tubes or with every picture tube you buy.*

## TRADE LITERATURE

[from page 27]

The big 292-page *Second Edition* of the Clarostat TV Control Replacement Manual issued at the beginning of the year, lists RTV numbers up to RTV-370. Also, for the convenience of all servicemen, these sheets are appearing in rotation. The sheets may be had directly by addressing Clarostat Mfg. Co., Inc., Dover, N. H.

A time-saving *Substitution Chart* for television picture tubes has been compiled by CBS-Hytron engineers, and is now available without charge from

distributors, or direct from the company's main office at Danvers, Mass. The chart includes all electromagnetically deflected tubes, regardless of make. An index leads to the proper Substitution Group listing all readily interchangeable types, and from this group the service man can pick an available type with the least number of necessary service adjustments.

\* \* \*

Channel Master Corporation, Ellenville, New York has announced publication of an informative new booklet, "Antennas and Boosters," discussing the factors which determine the performance of television antennas and

boosters. Written specifically for the benefit of TV installation and servicemen, the 16-page booklet, profusely illustrated with photographs and charts, was written with the purpose to help installation men understand the qualities which determine the performance of TV antennas and boosters.

New Simpson *uhf* booklet explains adaptability of servicing equipment for *uhf* receiver applications. The Simpson booklet, "How To Use The Simpson 479-480 For UHF Alignment" is free and may be obtained by writing directly to the Simpson Electric Company, 5200 W. Kenzie Street, Chicago 44, Illinois.

\* \* \*

New IRC Varistors (non-linear resistors). Comprehensive data on voltage current characteristics, current ratings, temperature characteristics, typical applications, dimensions, etc. 6 pages—detailed charts and graphs. Write International Resistance Company (Special Products Div.), 401 N. Broad Street, Philadelphia 8, Pa. for *Catalog Bulletin SR-3*.

\* \* \*

Presenting the adaptability, versatility and application of Cratex Rubberized Abrasives, together with complete specifications and prices is the interesting content of the new *Cratex Catalog No. 53*, just issued. The new 8 page catalog contains a most complete and comprehensive treatise about rubberized abrasives on burring, smoothing and polishing operations and their use in industrial establishments. The new *Catalog No. 53* is available free from Cratex Manufacturing Company, 81 Natoma Street, San Francisco 5, California.

\* \* \*

A colorful, comprehensive *Bulletin No. 182* has been issued on the new Electro-Voice *UHF Converter and VHF Boosters*. It tells how effectively the E-V 3300 *UHF Converter* adds all *uhf* stations to *vhf* TV sets, how easily it is installed, how smoothly and precisely it works. It also explains how the E-V *Tune-O-Matic* and the *Tenna-Top Boosters* improve TV reception in fringe areas and troublesome locations. For a copy of *Bulletin 182*, write to Electro-Voice, Inc., Buchanan, Michigan.

\* \* \*

The eighth edition of its *Picture Tube Data Chart* has just been announced by the Cathode-ray Tube Division of Allen B. Du Mont Laboratories, Inc. This chart, said to be the most comprehensive of its kind, lists complete specifications for more than 150 picture tubes of all manufacturers and is being made available to servicemen.

\* \* \*



Your reputation as a skilled Service Man depends a great deal on your choice of replacement parts. The performance of replacement speakers reflects upon your ability and knowledge. Be sure the reflection is favorable. Specify Utah\* speakers—and your customers will say "That Service Man Knows His Business!"

\*All Utah speakers have exclusive Utah Universal Angle Mounting.

FREE . . . WRITE TODAY FOR THE NEW UTAH  
REPLACEMENT SPEAKER CATALOG S201

Export Dept. Rocke International Corporation, N. Y. C.

utah

**RADIO PRODUCTS CO., INC.**  
HUNTINGTON, INDIANA

A WHOLLY OWNED SUBSIDIARY OF NEWPORT STEEL CORPORATION

# NEW



**TIGHTEST SEAL**  
LOCKS IN PERFORMANCE

**TOUGHEST SHELL**  
LOCKS OUT TROUBLE



**ATTRACTIVE YELLOW MOLDED PLASTIC SHELL**

Non-inflammable. Will not burn or melt under soldering iron or flame.

**BONDED SEAL**

Positive, heat resistant, non-inflammable bond seals leads and shell, locks out humidity.

**FIRMLY SECURED LEAD**  
Can't be pulled out, even under soldering iron heat.



PATENT PENDING

## ASTRON BLUE-POINT<sup>†</sup> MOLDED PLASTIC PAPER Capacitors

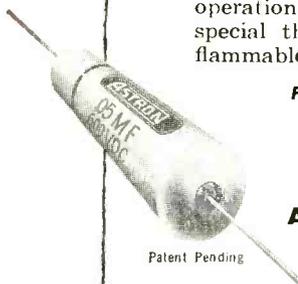
THE NEWEST ADDITION  
TO THE **SM<sup>†</sup>** LINE

Yes, the ASTRON BLUE-POINT's *tighter seal* and *tougher shell* give you heat and moisture protection to a degree never before possible—providing a longer life and greater dependability than has ever been achieved in a molded plastic capacitor! BLUE-POINT is a capacitor you can rely on *completely*, under every condition.

BLUE-POINT is suitable for continuous operation at 85°C. The bonded seal uses a special thermo-setting, heat-resistant, non-inflammable bonding agent—*positive* protection

against moisture. Solder leads as close to the capacitor as you like—they *won't* pull out! Every BLUE-POINT is clearly marked with voltage and capacitance, bears outside foil identification. Every BLUE-POINT is *tested* and *guaranteed*. Look for the ASTRON BLUE-POINT when you buy capacitors from your jobber, or if he doesn't carry it, send us his name. Insist on ASTRON BLUE-POINT, the capacitor you *know* you can depend on. Order a supply today.

For complete performance characteristics, specifications and listings, write for Bulletin AB-20A



Patent Pending

DEPEND ON—INSIST ON

ASTRON CORPORATION



255 Grant Ave., E. Newark, N. J.

†Trade Mark

Safety Margin capacitors for every radio, television and electronic use.

Save time... effort...  
and equipment with

# Equipto

## Electronic Chassis and Equipment Stand

Here's an ideal unit for transporting television sets, chassis, or other heavy equipment or for use as a portable stand to hold heavy testing equipment and television sets. It has a rugged all-steel construction and is the right height for full working convenience. It rolls noiselessly on big 2½" rubber wheels. Finished in olive green, polymerized, shock-resistant enamel. Available without wheels, if desired.



**Equipto** AURORA, ILLINOIS

Division of Aurora Equipment Company  
810 Prairie Avenue, Aurora, Illinois  
Steel Shelving . . . Parts Bins . . . Drawer Units

A new 20 page catalog on "Glasseal" capacitors has been released by the Pyramid Electric Company, 1445 Hudson Boulevard, North Bergen, New Jersey. Entitled Catalog PG-3, it contains complete engineering data, performance curves, construction styles, sizes, capacitance and voltage listings for the subminiature units. Copies of the attractive, two-color catalog are available without charge on letterhead request to the manufacturer.

A new 36-page catalog of television antennas and accessories has just been published by RMS (Radio Merchandise Sales, Inc.) New York City. The catalog is in effect a page by page description of accessories used from the rooftops right to the set itself. As a further aid to the servicemen for whom the catalog is intended, RMS has included a technical data section. Copies can be obtained by writing RMS, 2016 Bronxdale Avenue, New York 60, N.Y.

Dealers and servicemen, in addition to Mallory Distributors, are now receiving the new 1953 Mallory Distributor Catalog No. 553 of precision electronic components. The catalog lists and describes more than 2200 items, mostly replacement components, which are handled through the distributor system of the P. R. Mallory & Co. Inc. Mallory Catalog 553 may be obtained by writing to P. R. Mallory & Co. Inc., 3029 East Washington St., Indianapolis 6, Indiana.

## TUBE NEWS

[from page 45]

claimed by the manufacturer are additional filtering and infrequent replacement.

### Sylvania 6T4

A new miniature 7-pin medium mu triode, designated the 6T4, has recently been released by the Radio Tube Division of Sylvania Electric Products Inc.

The Sylvania Type 6T4 was designed for the service as an oscillator in television tuners or converters covering the new *uhf* bands. The tube features short bulb, t-5½ construction, having a maximum over-all length of 1¾ inches, and a maximum seated height of 1½ inches. The Sylvania 6T4 also features double plate and grid connections to reduce lead inductance. In circuits designed for its use the 6T4 is capable of operation up to 1000 mc.

When operated with 80 volts on the plate and a plate current of 18 ma, the Sylvania Type 6T4 has a transconductance of 7000 unhos, and an amplification factor of 13, and a plate resistance of 1860 ohms.

**STOP  
BLACK BORDERS  
ON TV PICTURE**  
Use a  
**"B" Plus Booster**  
Model STV4 Replaces 5U4G

**Anytime!** Pulling a Tube beats  
Pulling a Chassis

WHEN YOU NEED • More Height • More Width  
• More Gain • Better Overall Performance

Built-in Time Delay to Protect TV Set  
Write for free information



THE  
**STV4**  
GETS RESULTS

- SUPPLIES EXTRA 30-40 VOLTS TO LOW VOLTAGE SUPPLY
- GIVES FULL SIZE PICTURE WHEN LOW LINE VOLTAGE OR WEAK TUBES CUT PICTURE SIZE.
- GIVES EXTRA GAIN NEEDED IN FRINGE AREA

STANDARD R.T.M.A. GUARANTEE  
PAT. APPLIED FOR

**WORKMAN**  
**TV**  
TEANECK, NEW JERSEY

Sold  
Through  
Authorized  
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Only.

List Price \$6.40.

*Compare these features  
with any oscilloscope*

**TRIPLET**

**3441**

- **Vertical Sensitivity,**  
10 MV with 2 MC band width.  
4 MC band width at 20 MV.
- **Vertical Amplifier.**  
Response usable beyond 4 MC.  
Shows a 300 KC square  
wave with no distortion.
- **Direct reading** peak to peak  
voltmeter included, with  
eight ranges.
- **Vertical reversing switch** for  
changing polarity—wave form  
shows in conventional manner.
- **Linear Time Base,** 10 cps to 60  
KC seconds linear available  
at panel.
- **Dual control** for perfect  
focus over entire screen.
- **Phone jack on front panel**  
connected to output or vertical  
amplifier, so you can hear  
as you see.

For this great combination  
of service values, see this  
oscilloscope with all the extra  
features at your distributor's.



*and now Compare Quality per Dollar*

USA DEALER NET \$199.50

TRIPLET ELECTRICAL INSTRUMENT CO., BLUFFTON, OHIO

**TRIPLET**

## TRADE FLASHES

[from page 16]

ture Mart, Chicago. Included in the exhibit was the 30-inch Du Mont "Royal Sovereign" the largest television receiver in the world. The "Royal Sovereign" offers 526 square inches of picture, more than twice the picture area of 21-inch receivers presently on the market.

### Wescon Ready To Set New Records

Final preparations being made by Wescon (Western Electronic Show and

Convention) indicate that new records will be set August 19th when the event opens in the San Francisco Civic Auditorium. This joint enterprise, co-sponsored by IRE (7th Region) (Institute of Radio Engineers) and WCEMA (West Coast Electronic Manufacturers Association) ranks second in the nation in number and interest of technical session presentations and in number and scope of manufacturers' and publishers' exhibits. An attendance of 15,000 is expected. The general public will not be admitted.

The Show will include a new total of 370 exhibit booths displaying

products of nearly 500 electronic manufacturers,—a new exhibit section having been opened since last reported figures to answer the needs of 48 manufacturers who could not be accommodated in the original floor plan. Exhibits will include seven trade magazines, textbook and service manual publishers, and exhibits by National Bureau of Standards—Corona Laboratories; and Naval Electronics Laboratory, San Diego.

### Erie Resistor Representative

#### Admiral C. A. Rumble Dies

Rear Admiral Cyril A. Rumble, USN (Retired) died recently at his Washington, D.C. residence. He was Director of Government Relations for Erie Resistor Corporation, Erie, Pa., and was in charge of its Washington, D.C. Office. He was well known in the electronic industry, having served in many capacities up to his retirement from the U.S. Navy in June of 1950.

Surviving Admiral Rumble are his wife, Mrs. C. A. Rumble, two sons and a daughter.

### The Rauland Corporation

#### Increases Storage Facilities

To keep pace with the continually increasing orders for its quality television tubes, The Rauland Corporation has obtained a five-story warehouse at 3501 West Potomac Avenue in Chicago. The building affords additional storage facilities of 160,000 square feet.

### Participant List Close To Capacity

#### At Chicago Audio Fair

Announcement of fifteen additional exhibitors at the *Sight and Sound Exposition and Audio Fair in Chicago*, to be held at the Palmer House here September 1, 2 and 3, brings the participant list close to capacity, the Show management said recently. The Exposition, the first public showing of both audio and video products in the mid-west, will include demonstrations of latest developments in all types of sound equipment, recording devices, television and allied products.

### McDaniel Elected RTMA President;

#### Sprague new Chairman of the Board

Glen McDaniel, of New York City, was elected as temporary president of RTMA pending the selection of another full time paid president. He also will continue as general counsel of the Association. The RTMA Board of Directors also elected Robert C. Sprague, chairman of the board, Sprague Electric Co., North Adams, Mass., as chairman of the RTMA board for the next fiscal year.

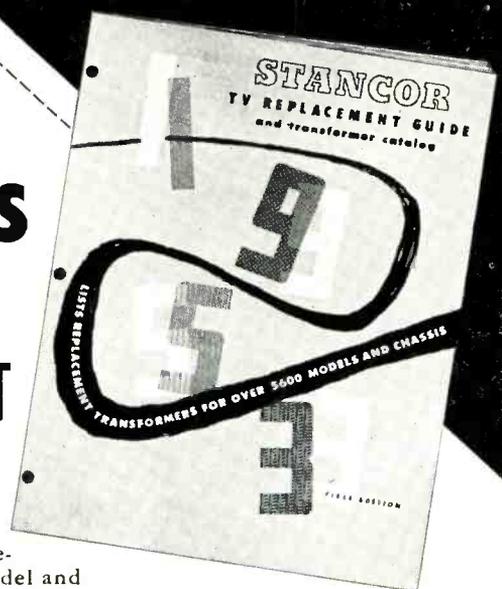
• • •

# LOOKING for the RIGHT TV REPLACEMENT TRANSFORMER?



you'll find it in

## STANCOR'S NEW TV REPLACEMENT GUIDE



Easier to use . . . lists replacements by manufacturer's model and chassis number and also by original part number.

Up-to-date . . . over 5600 models and chassis are covered, including virtually all sets built prior to 1953 as well as most 1953 models.

*You'll save time and trouble when you use this valuable Stancor reference. Get it now from your Stancor distributor, or write us directly for your free copy.*

---

### FIVE NEW STANCOR EXACT REPLACEMENT FLYBACKS

Stancor Part No.	Exact Replacement For	No. of Models Using Flyback
A-8137	Hoffman #5035	29
A-8220	Philco #32-8555	24
A-8221	Philco #32-8565	18
A-8222	Philco #32-8533 & #32-8534	38
A-8223	Philco #32-8572	15

Many of these units are the result of recommendations of the Stancor Servicemen Advisory board, composed of the top TV servicemen throughout the country.

**PLUS** A-8126, Universal vertical blocking-oscillator transformer for all Philco sets, including 1953 models.

**CHICAGO STANDARD TRANSFORMER CORPORATION**  
3586 ELSTON AVENUE • CHICAGO 18, ILLINOIS  
EXPORT SALES—Roburn Agencies, Inc., 39 Warren St., New York 7, N. Y.





# This man can save you service-time, work and money

**Y**OUR Centralab Distributor has Custom Controls for 277 major manufacturer's listing in his Centralab Control Guide. Each is cataloged for quick reference so he can fill your orders accurately and systematically.

These controls are factory-specified type equipment on practically all major radio and TV sets on the market today. They're *exact* duplicates of the original part — some even closer tolerance than specified by the original set manufacturer — produced with the same modern, precision equipment and *carrying the same Centralab guarantee.*

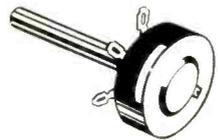
To give you an idea of the wide usage, these 277 major manufacturers use these same controls in 50,552 different applications. That's a mighty strong tribute to the performance of Centralab controls!

Remember, when you use genuine Centralab replacements, you have assurance of a lasting repair job. Because they are custom-designed, you work faster . . . make a cleaner installation . . . insure greater customer satisfaction. That's why it's a good idea to see your Centralab Distributor *first* for genuine control replacements.

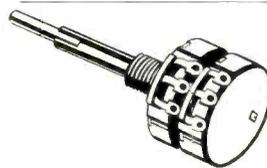
## HERE ARE JUST 4 EXAMPLES OF THE WIDE USAGE OF CENTRALAB CONTROLS



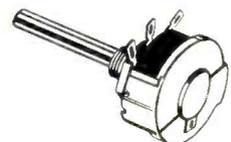
**SVS-926** — Focus Control — used as original equipment by 6 manufacturers in 120 applications.



**S-119** — Volume Control — installed as original equipment on sets of 5 manufacturers in 12 applications.



**SBB-505** — Vertical and Horizontal Hold Control — included as original equipment in 38 applications by 4 manufacturers.



**F-122** — Volume Control — 6 manufacturers use this control as original equipment in 9 applications.

# Centralab

# DO YOU USE...

## ERIE

### ... the Most Complete Line of Ceramic Replacement Capacitors

ERIE FEED-THRU CERAMICONS



ERIE UNIVERSAL 20KV CERAMICONS



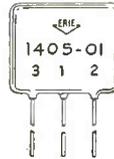
ERIE BUTTON SILVER MICA CAPACITORS



ERIE CERAMICON and TUBULAR TRIMMERS



ERIE PRINTED CIRCUITS



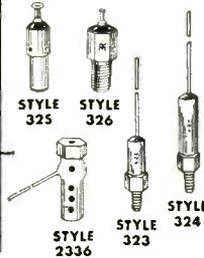
ERIE Electronic Components have long enjoyed the reputation of being always of the highest quality. They are produced by experienced craftsmen, in a factory equipped with the finest machinery, much of which was designed and built especially for ERIE. Leading builders of radio and TV sets have approved ERIE components and have been using them for 25 years.

ERIE components are stocked by leading electronic distributors everywhere.

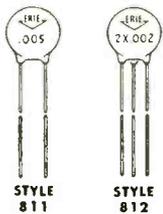
ERIE CERAMICONS



ERIE STAND-OFF CERAMICONS



ERIE DISC and PLATE CERAMICONS



# ERIE

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Factories: ERIE, PA. • LONDON, ENGLAND • TORONTO, CANADA

## ASSOCIATION NEWS

[from page 40]

York City in which final details were completed for obtaining a Charter of Incorporation. Roger Haines, President, of Haddonfield, New Jersey, presided. A resolution was passed which states that NETSDA will aid all associations requesting assistance in their license problems. A study and a brief discussion was held on a booklet printed by RTMA entitled "How To Get Good Television Service Without Destroying Free Enterprise." The next meeting of NETSDA will be held at Lily Lake, Luzerne County, Pennsylvania, Sunday, July 26th.

L. J. Helk

### FRSAP

The Pennsylvania State Federation met Sunday, June 21st, in Williamsport, Pa. All affiliated chapters were represented. Milan Krupa, president, of Wilkes-Barre, presided. The Television Service Dealers Association of Philadelphia was voted in as a new member chapter. Mr. Louis Smith headed the Philadelphia organization. Discussion and action was taken on the following: plans for the joint Federation and NETSDA meeting to take place Sunday, July 26th at Lily Lake, Luzerne County and in conjunction with the Luzerne Chapters Annual Clam-Bake and Outing. Arrangements under way for the proposed Eastern Conference to be held in late Summer in Philadelphia.

L. J. Helk

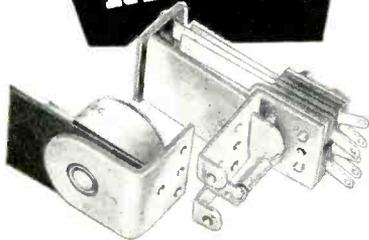
### Radio and Television Servicemen of New Jersey, Inc.

Harold B. Rhodes, of Paterson, was re-elected President of the Radio and Television Servicemen of New Jersey, Inc., at the fourth annual meeting of the association June 8. Also elected were: Fred E. Berdy, Vice-President; J. Palmer Murphy, executive Secretary-Treasurer; Jerome J. Gelman, Counsel. All are from Paterson. Named to the Board of Trustees for terms of two years were: Harry Weinberg and Norman Goodman of Paterson; A. Auerbach of Rochelle Park; and H. A. Shelladay of West Milford. Other members of the Board of Trustees are Aaron Edelman of Cliffside Park; Kenneth Smith of Mountain View; Edmund Trifari of Paterson; and Herbert Mandl of Passaic.

In his annual report, President Rhodes laid down three major fields in which a serviceman's association must be constantly active if it is to be successful and worth while. The categories are: services to members; public relations and advertising; and meeting

Service Men!

# THE GUARDIAN SERIES 200 RELAY...



## Interchangeable COIL and CONTACT SWITCH ASSEMBLIES Save Time—Cut Costs!

★ Coil assembly includes coil and field piece. Contact assembly consists of switch blades, armature, return spring and mounting bracket. Standard and Midget contact assemblies in either S.P.D.T. or D.P.D.T. are interchangeable and can be used with any of 13 coils described below.

### CONTACT SWITCH ASSEMBLIES

CAT. NO.	TYPE	COMBINATION
200-1	Standard 8 amps	Single Pole Double Throw
200-2	Standard 8 amps	Double Pole Double Throw
200-3	Standard Contact Switch Parts Kit with complete assembly and wiring details	
200-4	Standard 12.5 amps	Double Pole Double Throw
200-5	Standard 8 amps	Four Pole Double Throw
200-M1	Midget 8 amps	Single Pole Double Throw
200-M2	Midget 8 amps	Double Pole Double Throw
200-M3	Midget Contact Switch Parts Kit with complete assembly and wiring details.	

### 13 COILS ASSEMBLIES

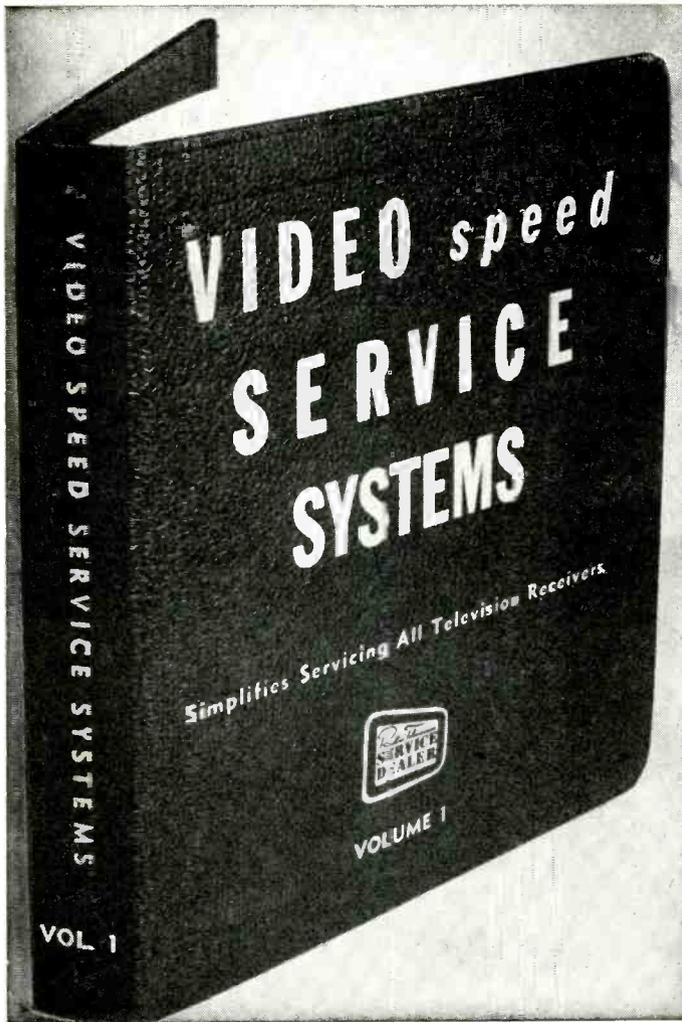
A.C. COILS*		D.C. COILS	
CAT. NO.	VOLTS	CAT. NO.	VOLTS
200-6A	6 A.C.	200-6D	6 D.C.
200-12A	12 A.C.	200-12D	12 D.C.
200-24A	24 A.C.	200-24D	24 D.C.
200-115A	115 A.C.	200-32D	32 D.C.
		200-110D	110 D.C.
		200-5000D	for current type

\*All A. C. coils available in 25 and 60 cycles

# GUARDIAN ELECTRIC

1606-J W. WALNUT STREET CHICAGO 12, ILLINOIS  
A COMPLETE LINE OF RELAYS SERVING THE RADIO INDUSTRY

# Order Yours Now!



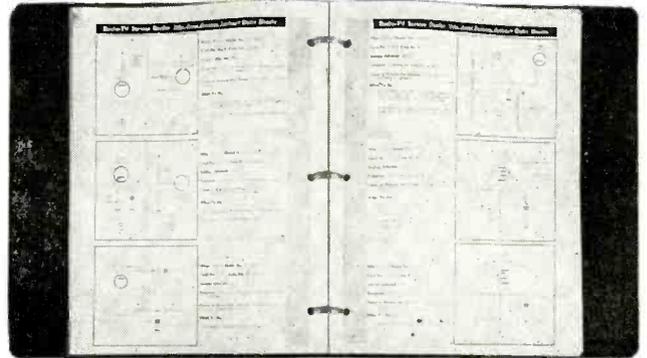
## VIDEO speed SERVICING SYSTEMS

**\$4 95**  
• (post paid)

**Distributors—order your supply now!**

Service Dealers—get your copy of VSSS from your Distributor. If he can't supply you, order direct by mail from us.

Contains over 600 Service Items representing over 1000 of the most-serviced Television models now in use. Over 25 different manufacturers' lines are covered.



The expansion type ring binder (of finest quality) is 9 x 12 inches, holds all 224 pages of VSSS Vol. 1, and has room for another year's supply of VSSS Data Sheets. Opens flat for bench use. TVset models and chassis are cross indexed for speedy reference.

Video Speed Servicing Systems IS GUARANTEED To Simplify Servicing All TVsets. 24 (or more) new Data Items are published in every issue of "Radio-Television Service Dealer" as a regular monthly feature.

### TEAR OFF AND MAIL NOW

RADIO-TELEVISION SERVICE DEALER  
67 West 44th Street, New York 36, N. Y.

Please send me post-paid VIDEO SPEED SERVICING SYSTEMS Volume 1. Enclosed herewith is

my  check  money order for \$\_\_\_\_\_ for \_\_\_\_\_ copies at \$4.95 each.

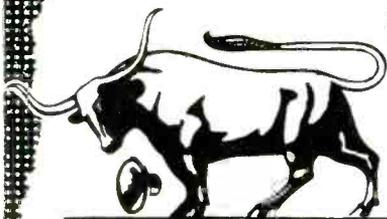
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Address .....

City ..... Zone ..... State .....

Preferred  
for Original  
Equipment

Proven  
for  
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**OXFORD**

## Speakers

There is an application for every Oxford Speaker . . . and an Oxford Speaker for every application.

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ELECTRIC  
CORPORATION**

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Chicago 15, Illinois

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NEW YORK CITY

industry wide problems. For the coming year he named Felix Bremy chairman of a committee on Industry Relations, and James Ryan chairman of the committee on Public Education. Rhodes declared that the Association would continue its very close association with the Greater Paterson Chamber of Commerce and the Paterson Better Business Committee during the coming year, calling such cooperation essential to the welfare of independent service companies.

#### Association of TV Service

##### Companies of Greater St. Louis

President Vince Lutz has been re-elected for the 3rd term. With him the following were voted in: Roland Beasley, 1st V.P. for his second term; Edward Gore, 2nd V.P.; Morton Singer, Secretary, 2nd term; and Buck Gaynow, Sergeant-at-Arms, 2nd term.

The results of a questionnaire were announced as follows: Limiting parts jobbers to strictly wholesale sales, 100%; licensing, 50%; outlawing "gimmick" ads, 100%; monthly credit ratings, 95%; mutual problem discussions, 95%; technical lectures, 90%.

#### Utah Association of Radio and Television Servicemen

A new trade association in the Rocky Mountain area was officially launched as of June 1, 1953. Its officers are: J. F. Burns, President; James W. Neilson, Vice-President; Robert J. Magness, Secretary-Treasurer; Dean Pieper, General Manager.

Incorporating as a non-profit educational association, their basic objective is to promote the welfare, progress and well being of the radio and television

service industry in the state of Utah. A broad public relations program is planned to better acquaint the general public with the problems of and in the electronics service industry. Membership is open to radio and television service shops, service men, distributors, dealers and others allied with the electronics field.

#### TISA—Illinois

The licensing bill which would have enabled the city of Chicago to license TV service businesses and technicians was defeated in committee. For some unexplained reason only opponents of the bill were notified to appear at a postponed public hearing which under Illinois law should have been called for exactly one week following its originally scheduled day. Even though TISA was not finished in its testimony at the first hearing they were not given notice of the change of dates.

With the recent defeat of licensing, TISA has called for a meeting of local set distributor sales managers and service managers for the purpose of working out a plan to clean out the few unethical service companies who are doing so much to undermine the entire TV industry. Also, a move toward closer co-operation between the local parts jobbers and TISA members was inaugurated through a meeting of the interested parties. A total of twelve jobbers organizations, who account for the bulk of business in the area answered the call. A new liaison committee was established and will meet to work out pressing problems to mutual satisfaction.

• • •

## CIRCUIT COURT

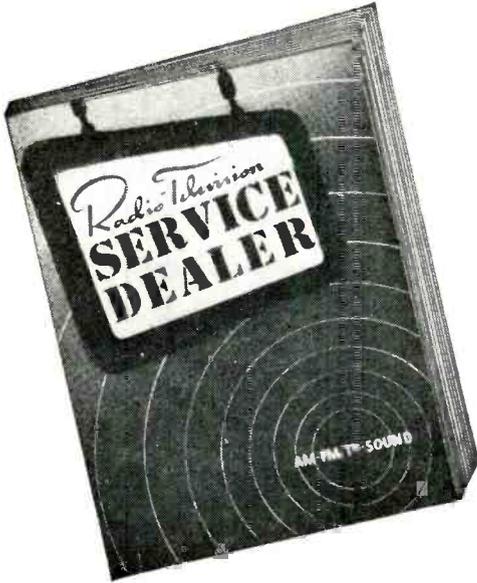
[from page 46]

the horizontal oscillator is operating at 15.75 *kc* and is "in phase" with the transmitted horizontal sync pulse, the oscillator pulse will be applied to the 12AX7 plate at the same instant that the sync pulse is applied to its grid.

A positive pulse will result on tube conduction, the electrons travelling externally through R37 back to cathode. This places the plate at a negative potential with respect to cathode. This negative voltage will be applied to the filter comprising R49, C15, C18, R3 and C30. The time constant of this filter is comparatively long and since the charging process repeats each time a horizontal sync pulse appears at the 12AX7 grid, the average voltage on the *agc* line, with respect to ground will be negative. The degree of conduction in the 12AX7 is determined by the amplitude of the positive sync pulse applied to its grid. Therefore, the negative *agc* voltage

will vary in proportion to the sync pulse amplitude which, in turn, is proportional to the strength of the signal being received.

In a weak signal area very little *agc* voltage will be developed since the sync pulse applied to the 12AX7 grid will be low in amplitude and will not drive the tube into heavy conduction. Consequently, the gain of the *rf* and *if* amplifier will increase. When the signal is very weak, the 12AX7 plate, being returned through R37 to cathode and through R38 to B+, will swing in a slightly positive direction and the *agc* voltage, with respect to ground, may actually be of a positive polarity. The *rf* amplifier grid, however, is returned to the *agc* line through a 2.2 meg. resistor (R3) and, due to contact potential, will be maintained slightly negative even though the *agc* line may be positive. The 6CB6 first *if* amplifier has some bias applied to its



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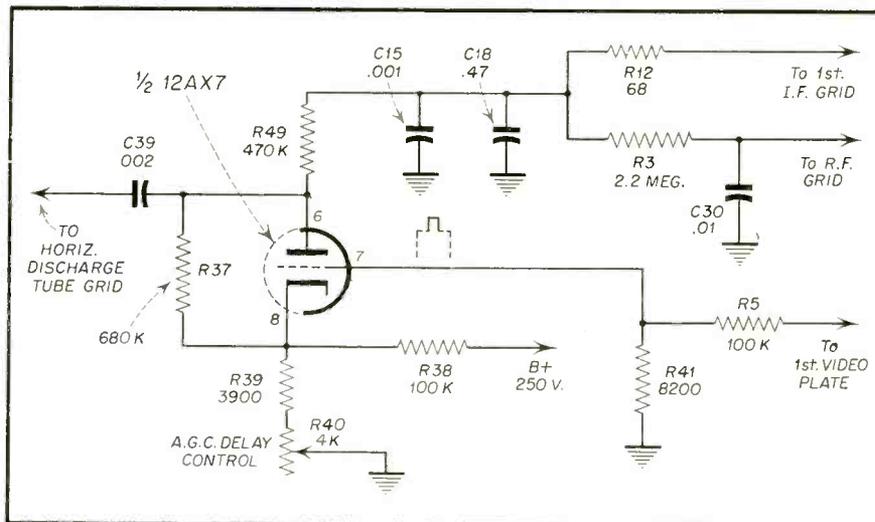


Fig. 2—Partial schematic of Zenith "K" Series.

cathode and the *agc* voltage is permitted to swing positive by this amount. When the signal level increases to the point where the *agc* voltage passes through zero, the noise figure of the *rf* amplifier is no longer in-

portant and the 6BK7 is then rapidly cut off by a further increase of the *agc* voltage in a negative direction. This type of *agc* circuit is known as a "double delayed" gated *agc* system.

• • •

## PHILCO TUNER

[from page 22]

is heterodyned in the *uhf* tuner down to the *vhf* receiver intermediate frequency.

The circuit is very similar to the UT-21 converter type (see Fig. 6) except that the local oscillator is above the station signal. The incoming *rf* signal and the oscillator signal are mixed in the crystal mixer circuit to produce the 40 *mc* intermediate signal.

In order to achieve high signal to noise ratio in the *uhf* position the *rf* amplifier and the mixer stages are switched to operate as 40 *mc* intermediate frequency amplifiers.

### Servicing And Alignment Of The UHF Tuners

At the present writing, there is very little *uhf* servicing equipment on the

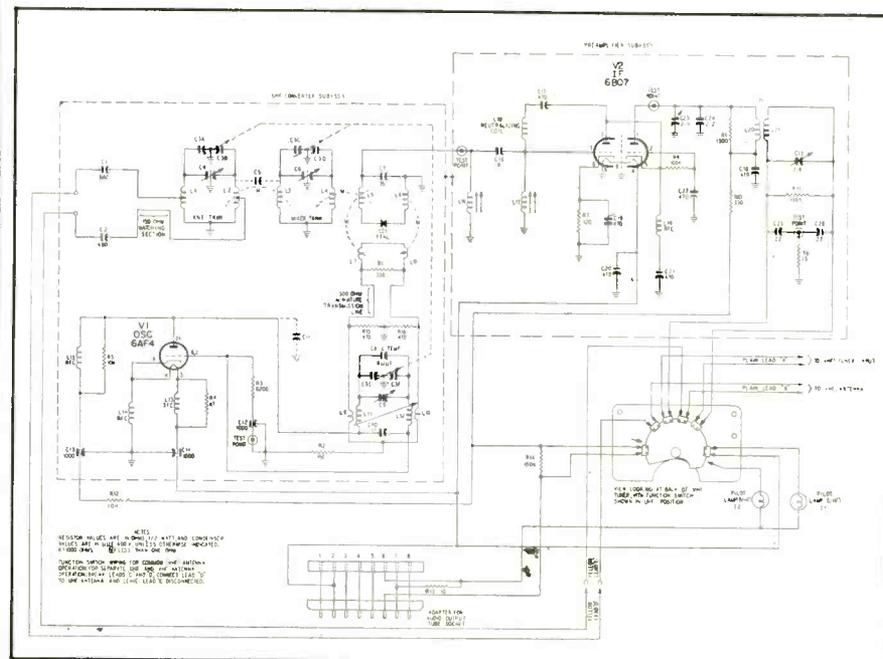


Fig. 6—Circuit diagram of Philco #43-6473 Tuner-Adapter.

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market; that is, there are no "service-priced" *uhf* signal generators or accompanying accessories to properly perform tuner service work. It is recommended therefore, that field service work be kept to a minimum.

Only minor repairs, such as crystal replacement, tube replacement, or external lead change should be attempted. If alignment is indicated, the unit should be returned to the factory. It is important to remember that some variations may be found in 6AF4 oscillator tubes; therefore, if a tube is replaced, the substitute should be made that will permit the tuner to operate as near its original normally operating condition as possible.

External check points are provided on the outside surface of the units.

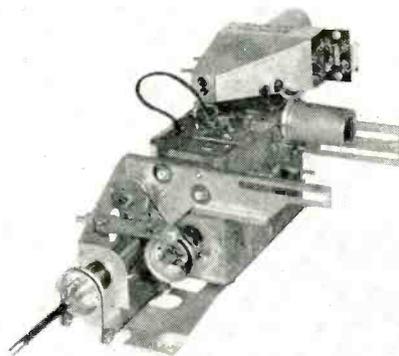


Fig. 5—The Philco *UHF* Tuner-Adapter #43-6473, contains no *vhf* pre-amplifier and is used in present TV receivers.

These provide easy access to check the crystal current and oscillator plate current. See Figs. 2 and 6. At present they are for factory use and until field servicing techniques are developed serve no useful function to the serviceman.

• • •

## UHF SYMPOSIUM

[from page 29]

fers to the effective voltage which will be intercepted by an antenna exactly one meter long. (39.37 inches)

The ability of a signal to get around obstacles and over hills is dependent on its frequency. Since *uhf* signals have a very high frequency, they have characteristics that are quite similar to that of a beam of light. In other words they have a tendency to travel in straight lines. Nevertheless, receiving sites which are not within "line of sight" of the transmitting antenna may still enjoy good reception by

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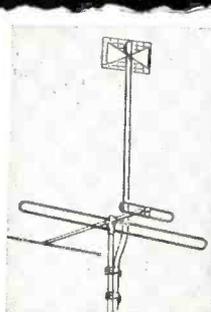
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Because of the short wavelength of *uhf* signals multiple reflections are a fairly common occurrence. These reflections may be caused by buildings, foliage, hills or other surfaces. When choosing a site for the receiving antenna, it is important to avoid any possible change in receiving conditions that may occur due to a change in seasons.

In all *uhf* installations probing should be done for the best possible antenna site. This should be done with a test antenna or with the antenna used for the actual installation. The signal output of the antenna should be connected to a *uhf* field-strength meter. If a field-strength meter is not available, connect directly to the receiver. Now, try different mast heights and different horizontal positions until you find the highest field-strength meter reading, or the best possible picture on the receiver. A distance of one foot in either direction may spell the difference between a good and an unsatisfactory picture. So take our time probing for a good spot. Remember that maximum height does not always assure the best picture.

Finally, here are some check points for a successful *uhf* antenna installation:

1. Select the proper antenna for your particular location.
2. Make sure that all connections are mechanically and electrically tight and secure.
3. Probe for best antenna site both vertically and horizontally.
4. Do not use flat twinlead for outdoor *uhf* installations. Use specially designed, good grade *uhf* transmission lines.
5. Support the transmission line at least 7" from all surfaces with standoff insulators, when making outdoor installations.
6. Mount antenna as rigidly as possible to prevent it from swaying and causing annoying picture flutters.
7. Do not let unshielded transmission line come in contact with any metal surface.
8. Do not bend transmission line at sharp angles. Use smooth and gradual bends at all times.
9. Do not use long horizontal runs of transmission line if possible. Make connections short and direct.
10. Do not choose an antenna site near large trees since receiving conditions may change with the seasons.
11. Use a good *uhf* lightning arrester with every installation.

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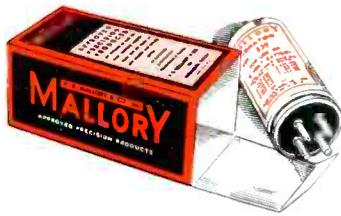
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