

# TECHNICIAN

& *Circuit Digests*

**SPECIAL ANTENNA ISSUE**

Including 1955 TV Receiver Specs

your **IRC** distributor can

# Save

you over

# 50%



on IRC Type BT  $\frac{1}{2}$  Watt and 1 Watt Resistors  
in new handy RESIST-O-CARD form

*if you buy now!*

*Here's your special price selection*

ASSORTMENT NUMBER	IRC RESISTOR TYPE	QUANTITY ON CARD	BALANCED ASSORTMENT OF	COST IF BOUGHT SINGLY	SPECIAL DEALER PRICE
Resist-O-Card #15	BTS $\frac{1}{2}$ watt	100 most popular resistors	20 values	\$12.00 net	<b>\$5.95</b>
Resist-O-Card #16	BTS $\frac{1}{2}$ watt	100 often needed resistors	57 values	\$12.00 net	<b>\$5.95</b>
Resist-O-Card #17	BTA 1 watt	74 most popular resistors	20 values	\$13.32 net	<b>\$6.59</b>
Resist-O-Card #18	BTA 1 watt	74 often needed resistors	45 values	\$13.32 net	<b>\$6.59</b>

For a Limited Time Your IRC Distributor has popular, balanced assortments of BTS and BTA resistors in handy RESIST-O-CARD form. IRC RESIST-O-CARDS SAVE YOU OVER 50% of the regular cost of IRC resistors.

**Distributor RESIST-O-CARD Stocks are Limited. Order now and save real money!**

- ✓ Choose from 4 Resist-O-Card assortments. In combination they give complete coverage.
- ✓ Resist-O-Cards are factory-packed from current IRC production.
- ✓ Handy card-mounted stocks. Hang right at service bench ready to use.
- ✓ Individual ranges and RETMA Color Code Chart on each card.



INTERNATIONAL RESISTANCE COMPANY  
Wherever the Circuit Says  $\sim\sim\sim$  425 N. Broad St., Philadelphia 8, Pa.





# A first PERFORMANCE

Introducing the longest line of replacement loud speakers with the lowest inventory requirement.

The highest performance in replacement loud speakers at the lowest cost.

## THE NEW Viking Replacement Speakers by JENSEN.

Completely redesigned for all today's requirements, the new Viking speakers are completely streamlined both for stocking, selling and performance. Viking is the most complete line for radio, TV, replacement and general purpose applications—there are 13 models including 3 ovals

### **BUT**

because of the ingenuity of the Jensen design, you need only one universally applicable model in each speaker size. Your inventory requirements are lower than for any other speaker line—your stock investment is cut to the bone.

And the Viking speakers are universal. The new Viking design is the most compact, has the least depth of all the replacement speakers. They'll fit into even the most crowded sets. And with the most compact design Viking has introduced greatly improved efficiency, heavier magnets, truly permanent alignment, at no increase in price in all models 6" and smaller.

Free with all sizes from 3" to 6" Viking speakers new free, easy-mount combination transformer and chassis mount bracket.

# Jensen

**MANUFACTURING COMPANY**

Division of The Muter Company  
6601 South Laramie Avenue • Chicago 38, Illinois  
In Canada: COPPER WIRE PRODUCTS, LTD., Licensee



offers

50

SALES AND SHOP AIDS

to help YOU make more money!



**ILLUMINATED "SERVICE DEPT." SIGN**

Dress up your shop with this easy-to-hang direction sign. Supplied ready to hang.



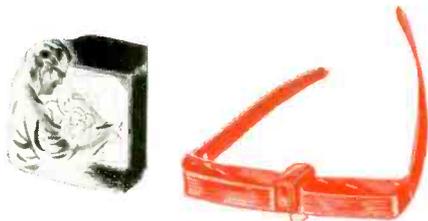
**TUBE and TOOL CARRYING CASE**

Holds 137 tubes and necessary repair tools — all tubes are in full view.



**RAYTHEON ConvertTV Seats**

Ideal for shop or home use, or as incentive gifts on TV set sales.



**RAYTHEON BROWLITE**

A new kind of flashlight that frees both hands for service work.



**ILLUMINATED OUTDOOR SIGN**

Double sided, — formed plastic face sign for outdoor use. 36" x 24". A real traffic stopper.

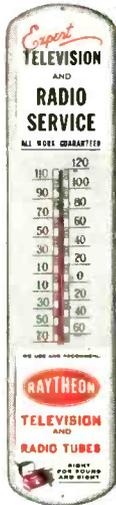


**PRESSURE-SENSITIVE REPAIR STICKERS**

Stick to any surface without moistening. Packaged in handy dispenser box.



**OUTDOOR THERMOMETER**



**COLOR SPOT SIGNS**

A brand new set of transparent window signs every service shop needs.



**TRANSPARENT PLASTIC WINDOW STREAMER**

**TUBE SHELF IDENTIFICATION LABELS BOOK**

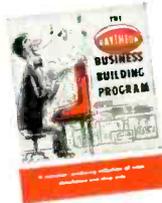


Labels for over 480 current Raytheon Radio and TV tube type designations. Easy to apply.



**WINDOW DISPLAYS**

Bright, full color displays to sell your service. Both are varnished and easled.



**They're all in this FREE BOOKLET! It's yours for the asking**

You'll find many more money-making sales stimulators and time-saving shop aids in this booklet — all designed to help you make more money by increasing service business and saving valuable time. Many are free and others are made available through your Raytheon Tube Distributor at less than cost. To get a copy of the booklet write to Raytheon Manufacturing Company, Receiving and Cathode Ray Tube Operations, 55 Chapel Street, Newton 58, Mass. Department C.



Excellence in Electronics

**RAYTHEON MANUFACTURING COMPANY**

Receiving and Cathode Ray Tube Operations  
Newton, Mass., Chicago, Ill., Atlanta, Ga., Los Angeles, Calif.

RAYTHEON MAKES ALL THESE:

RECEIVING AND PICTURE TUBES • RELIABLE SUBMINIATURE AND MINIATURE TUBES • SEMICONDUCTOR DIODES AND TRANSISTORS • NUCLEONIC TUBES • MICROWAVE TUBES

WESTON INTRODUCES NEW LINE OF INSTRUMENTS THAT SIMPLIFY

AND SPEED-UP SERVICING AND ALIGNMENT OF ALL TV RECEIVERS

INCLUDING COLOR. PRECISION BUILT-- DESIGNED TO DEFEAT

OBSOLESCENCE -- PRICED RIGHT FOR SERVICEMEN

# WESTON 980 LINE TV TEST EQUIPMENT

In the new 980 Line, WESTON offers TV technicians not only a group of superior, up-to-the-minute instruments, but a new, *greatly simplified and time-saving method* of TV receiver alignment as well.

The instruments in this line represent a completely new approach in test equipment design and operation . . . instruments that set entirely new standards in *performance . . . in operating simplicity . . . in value!*

In the new simplified method of alignment which they provide, it is no longer necessary to connect the calibrator to the receiver. This simplified hook-up eliminates the spurious markers and receiver oscillations encountered with conventional hook-ups. Further, there is no disappearance of markers at trap resonant frequencies. And there are many other advantages, too; all enabling you to do a *better alignment job, in one-half the usual time, and at far higher profit.*

980 Line instruments are available to TV technicians through leading distributors. Literature giving complete information gladly sent on request. Return the coupon today.



**MODEL 985**  
**CALIBRATOR**

—a time-saving instrument for TV shop, engineering laboratory, and industrial alignment applications. Negative and positive Z-axis markers are provided for wave-form pattern analysis. Extremely useful for making linearity adjustments, calibrating signal generators, and determining signals of unknown frequencies. Generated markers are visible even at sound trap frequencies. Generated frequencies are *fundamentals* . . . not harmonics. Simultaneous multiple marker insertion . . . no distortion of response curve . . . fewer connections to TV receiver.

**MODEL 983**  
**OSCILLOSCOPE**



—a high gain, wide band oscilloscope. Band width of 4.5 megacycles allows accurate display of video frequencies, including pulse wave forms and color synchronizing bursts. High sensitivity of 17 millivolts per inch makes it ideal for setting resonant traps, as a general null indicator, signal tracing in low level stages, phase measurements as well as for sweep frequency visual alignment of TV receivers. Has provisions for internal calibration, internal phased sine wave, and Z-axis intensity modulation. Reversal of polarity of both horizontal and vertical signals accomplished by means of toggle switching. Identical vertical and horizontal amplifiers . . . direct coupling used throughout.



**MODEL 984**  
**SWEEP**  
**GENERATOR**

—for efficient trouble shooting and lab practice in problems of sound and video IF circuits, associated trap circuits, TV tuners, video amplifiers and all-purpose

visual alignment. RF OUTPUT: Frequency modulated signal, TV channels 2 to 13 inclusive, complete FM coverage available by means of two preset selector positions. FREQUENCIES ARE FUNDAMENTALS OF THE OSCILLATOR FREQUENCY. IF/VIDEO OUTPUT: Frequency modulated signals ranging to 50 megacycles, continuous tuning, signals free from harmonics. SWEEP WIDTH: Full 10 megacycles on all channels. OUTPUT VOLTAGE (RMS): 0.1 Volt, sweep is linear. Output is essentially flat.



**MODEL 981**  
**PROPORTIONAL**  
**MUTUAL CONDUCTANCE**  
**TUBE CHECKER**

—provides meter measurement of leakage resistance as high as 5 megohms between tube elements . . . nine single circuit, twelve position selector switches protect against obsolescence . . . three toggle switches

make it possible to check and compare sections of twin-section tubes at only one setting of selector switch. Transconductance measurements high as 30,000 micromhos with filtered d-c plate, screen grid, and control grid potentials. Precision voltage divider network and switch provides signal voltages of 0.65, 1.3, 2.6, and 5.2 volts peak to peak at a frequency of 5000 cycles. Tubes checked more closely to circuit operating conditions. Better Gm accuracy obtained.



**MODEL 982**  
**VACUUM TUBE**  
**VOLTMETER**

—a self-contained, battery operated Vacuum Tube Voltmeter, particularly adaptable to the Radio-TV servic-

ing industry where the requirements of peak to peak measurements of a-c voltages exclude the use of conventional meters. Makes possible quantitative measurement of all complex wave form voltages utilized in video, sync and deflection circuits with no a-c line interference in critical measurements. Battery operation affords complete isolation from spurious response due to stray a-c fields and circulating ground currents. *Circuit loading on peak to peak measurements eliminated.*

**MODEL 980**  
**ANALYZER**



—highly versatile, accurate and rugged volt-ohm-milliammeter with a combination of functional ranges which provide a wide range of test measurement applications in the electronic field. D-c sensitivity of 20,000 ohms/volt, a-c sensitivity 1000 ohms/volt. Accuracy 2% d-c, 3% a-c. Range and functional switching greatly simplified by use of a single dial for all ranges and functions.

for TV it's the 980 Line  
**WESTON**  
test equipment

WESTON Electrical Instrument Corporation  
614 Frelinghuysen Ave., Newark 5, N. J.

Send copy of bulletin TN

Name \_\_\_\_\_

Address \_\_\_\_\_

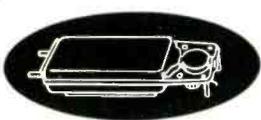
City \_\_\_\_\_ State \_\_\_\_\_

# SHURE

# NEW

crystal pickup cartridges  
replace 210!

AT A TOTAL COST OF ONLY \$18.00 LIST



The MODEL W68 replaces 41 Crystal Cartridges made by the five leading manufacturers.

The W68 is a "Muted Stylus" type, Dual-Weight Cartridge. The dual weight makes it possible to replace either aluminum or steel case cartridges—without adjusting tone-arm balance. With weight slug net weight is 25 grams; without weight slug net weight is 12 grams. The W68 is equipped with the famous A62A silent-tracking, "Muted Stylus" needle.

STANDARD CARTRIDGE FOR 78 RPM RECORDS

MODEL NO.	TYPE	LIST PRICE	OUTPUT LEVEL	MIN. NEEDLE FORCE	RESPONSE TO	NET WT.	SHURE NEEDLE NO.
W68	Crystal	7.50	1.8V	1 gr.	4,500 c.p.s.	Dual Weight 25 grams or 12 grams	A62A



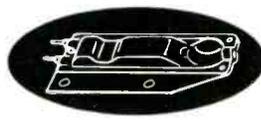
The MODEL W78 replaces 149 Cartridges made by the five leading manufacturers.

Model W78 is a Dual-Volt, Dual-Weight Cartridge—so versatile it replaces 149 other cartridges! This cartridge alone will become a sensation overnight—because it replaces steel or aluminum case cartridges, of either high or low output! The W78 provides the broadest coverage at the lowest investment—only \$5.55 list.

General Information: With weight slug, net weight is 25 grams; without weight slug, net weight is 12 grams. In addition, Model W78 has a capacitor, furnished as an accessory. Without capacitor, output is 4.0 volts; with capacitor, output is 2.0 volts.

STANDARD CARTRIDGE FOR 78 RPM RECORDS

MODEL NO.	TYPE	LIST PRICE	OUTPUT LEVEL	MIN. NEEDLE FORCE	RESPONSE TO	NET WT.	SHURE NEEDLE NO.
W78	Crystal	5.55	4.0V or 2.0V	1 gr.	6,000 c.p.s.	Dual Weight 25 grams or 12 grams	None



The MODEL W70 replaces 20 "Special" Cartridges.

Model W70 is a completely new cartridge in the Shure line. It replaces all the Webster "CX" and "C" Series Cartridges, comes equipped with all the necessary accessories. The W70 is more than an adequate replacement: it is an improvement, because it uses pin jaws—doing away with laborious "threading" of leads through the tone-arm.

ALL PURPOSE SINGLE NEEDLE CARTRIDGE FOR 33 1/3, 45, 78 RPM RECORDS

MODEL NO.	TYPE	LIST PRICE	OUTPUT LEVEL	MIN. NEEDLE FORCE	RESPONSE TO	NET WT.	SHURE NEEDLE NO.
W70	Crystal	4.95	3.0V 3.0V	10-15 grams	5,000 c.p.s.	16 grams	None

**SHURE** *The Mark of Quality*

## LETTERS

### To the Editors

#### Backs Stripped-Set Stand

EDITORS, TECHNICIAN:

We have steadfastly maintained that the only television that should be placed on the market should be that television which can give the distributor, the dealer and, above all, the customer continuous and satisfactory performance. The unsuspecting public, technically speaking, has stood the cost of the unscrupulous manufacturers' experiments far too often in the past.

I sincerely believe in the American philosophy of mass production to lower the cost of fine merchandise . . . but I cannot digest the circuit design . . . which you aptly call "stripped down."

ALVIN A. STUMPF, Pres.  
Unitized Electronics, Inc.  
Cleveland, Ohio

#### Shop-Hints Book Again

EDITORS, TECHNICIAN:

I think it would be a terrific idea for you to issue a book on Shop Hints, since it is one of the best parts of your magazine.

JOSEPH EDELSON  
Bronx, N. Y.

#### Sighting on Same Target

EDITORS, TECHNICIAN:

This organization wishes me, as secretary, to thank your publication's management for the "right-to-the-point" editorial entitled *Hi-Fi Mfrs: Standards are Overdue*, which appeared in your May issue.

This organization has been campaigning for the setting of *minimum* standards for some time, and we are continuing our efforts in this direction.

LEON J. HELK, Sec'y  
Federation of Radio Servicemen's Associations of Pennsylvania

#### ARTICLES WANTED

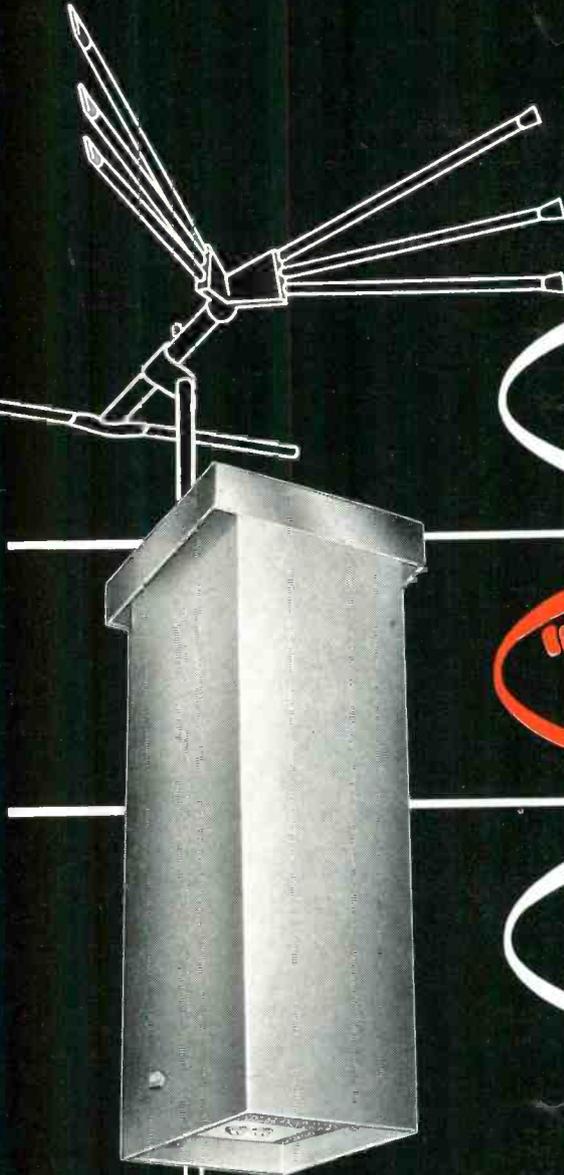
TECHNICIAN is in the market for short articles from expert servicemen on the following subjects:

- Hi-Fi (Theory and Servicing)
- TV and Radio Interference
- Industrial Electronics (Theory and Servicing)
- TV Antennas (Installation and Servicing)
- Test Equipment
- UHF

Preferred length is three typewritten pages, double-spaced. Two or three drawings should accompany the articles.

If you'd like to do a piece for us, query first, telling us something about your background, and briefly summarizing what you propose to write about. Payment is excellent.

Write to S. C. Silver, Managing Editor, TECHNICIAN, Caldwell-Clements, Inc., 480 Lexington Ave., N. Y. 17, N. Y.



Introducing the

**"DE-SNOWER"**

heart of Jerrold's famous  
community TV system

**NOW MADE FOR HOME USE**

- **LOWEST NOISE:**  
only 6db. Better than most cascode TV tuners.
- **HIGH GAIN:**  
25db. on all channels.
- **ANTENNA MOUNTED:**  
for best signal-to-noise ratio even with long lead-ins.
- **SINGLE COAX CABLE:**  
feeds 24 volt power up to "De-Snow," and strong clear signals down to receiver.
- **TWO MODELS:**  
Channels 2-6, or 2-13. Flat response for color.

The only way to improve the performance of modern cascode tuner TV sets is to mount a *lower noise* cascode amplifier right at the antenna. This is the principle employed by Jerrold in designing head-end equipment for its famous community systems where as many as 5,000 sets are connected to a single antenna.

The Jerrold "De-Snow" is a broadband antenna-mounted preamplifier using low-noise 6BQ7-A's ahead of 6AK5 and 6CB6 tubes to provide a whopping 25 db gain on all VHF Channels. With this high output, shielded coax can advantageously be used to further reduce noise pick-up on the antenna lead. A Jerrold signal step-up transformer matches the 72 ohm coax to 300 ohm receiver inputs. This combination provides the cleanest "de-snowed" pictures attainable in any fringe area.

See the "De-Snow" at your parts distributor or write to Jerrold for illustrated literature on the complete "De-Snow" line—antenna-mounted Preamplifiers, 8-outlet Distribution Amplifiers, Impedance Matchers, and Coax Connectors.

**SEE ALSO...**

**"De-Snow" Distribution Amplifier**  
8 outputs . . . 15db gain . . . 72 or 300 ohm inputs from one all-band or separate high-low arrays, or from "De-Snow" Preamplifier.

**Model 704A Field Strength Meter**

A professional, low cost instrument for calibrated, direct-reading measurements of signal intensity, % modulation, and % distortion from 54 to 220 mc. *A must for color . . . A must for distribution system servicing.*

**JERROLD**

**JERROLD ELECTRONICS CORPORATION**  
26th & Dickinson Sts., Philadelphia 46, Pa.

# NOW! 2 WAYS TO GET

## CHANNEL MASTER'S

# ROTO-KING

the new  
rotator  
with  
these  
10  
superior  
features



model no. 9521

model no. 9520

without directional indicator.

### 10. Midget Control Cabinet

— a beauty!

Beautifully styled. Smallest cabinet on the market, only 2 3/4" x 4". Blends harmoniously with any type of home decor. Fingertip control bar. An eye-appealing sales clincher!



Write for complete technical literature.

1

### Flexible Worm Gear

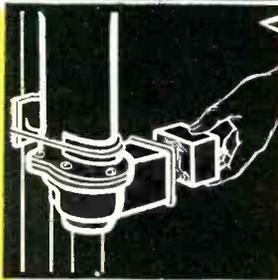
Actually comes in contact with more gear teeth than straight-bar worm gear. This means no-slip gear control, no back-lash, no binding; longer life.



2

### Motor Easily Removed

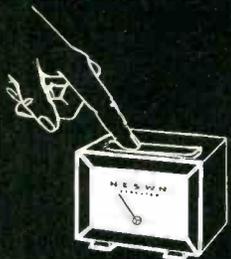
Motor instantly removed from housing — faster, easier to replace than cartridge types. Lowest servicing cost, because motor is separate from gear train.



3

### Electrical and Mechanical Stops

Hair-line accuracy. No over-shooting. No drifting or coasting. Perfect tuning



4

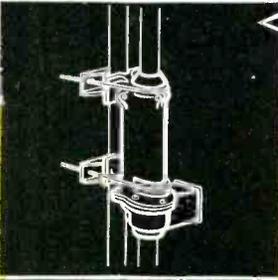
### Lightweight — Strong

All-aluminum die castings, steel reinforced. Built-in guy wire anchors.

5

### Straight-Thru Mast Mounting

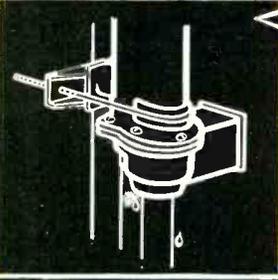
Both rotating and stationary masts go completely through rotor. Grips 12" section of rotating mast, for greatest resistance to horizontal thrust.



6

### Weatherproof

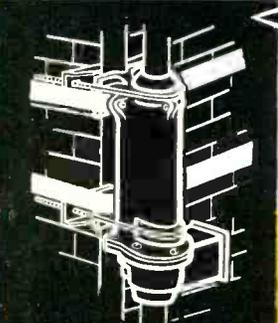
Straight-Thru design permits water to drain freely. Weather cannot interfere with performance of rotator.



7

### Extremely High Torque

Will turn any 4-bay antenna in wind with ease.



8

### Built-in Chimney Mount

And — rotor takes up to 1 5/8" mast.

### Built-in Thrust Bearing

3-race ball bearing. Takes heaviest loads without strain.

# RECEPTION FROM ALL DIRECTIONS!

**CHANNEL MASTER'S all-new**

## **SELECTENNA**

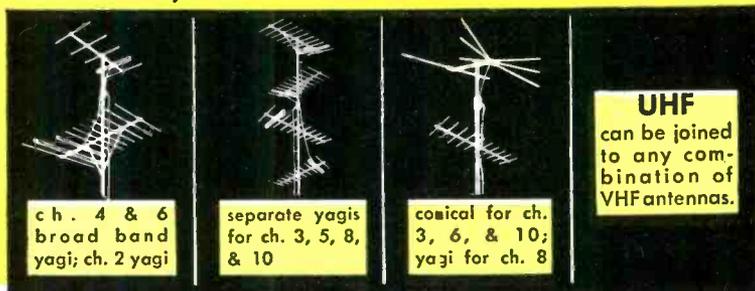
**coupling system**

**A truly revolutionary  
Channel Master development  
that permits  
unlimited antenna combinations  
with only one transmission line!**

**No moving parts — No motors  
No switches — Fully automatic!**

- For the first time, you can tie together any combination of antennas, including separate antennas operating on the SAME BAND.
- Ideal for areas currently using rotators, manually-operated selector switches, and "omni-directional" antennas.
- System is installed quickly, economically — one filter needed for each channel. UHF easily added.

**TYPICAL COMBINATIONS — never before possible!**  
Only one down-lead to the set.



**DOES NOT OBSOLETE THE ROTATOR —**

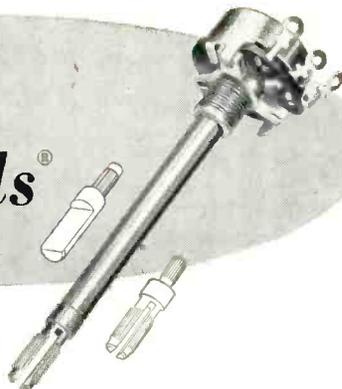
but gives the installation man a new approach to an old problem. Choose the system that provides the better answer to each individual installation.

Couplers snap together. This interlocked stack, consisting of four Antenna Couplers and one Hi-Lo Coupler, would join the 4 antennas in combination on the left.



**CHANNEL MASTER CORP.** ELLENVILLE, N. Y.  
World's Largest Manufacturer of TV Antennas

**Mallory  
Midgetrols®**



## Right for You and Your Customers

**Because** of excellent drift characteristics and extremely accurate taper curves, Mallory Midgetrols give your customers the set performance they want—long and trouble-free. Mallory Midgetrols are engineered for precision performance in both TV and radio sets despite variations in temperature and humidity.

**Because** of simplified design and construction, Mallory Midgetrols are easy to install quickly. Round, tubular shafts can be cut fast, accurately . . . are easily adapted for split-knurl, flatted, or set screw type knobs. And you can attach AC switches without control disassembly.

**Because** from every angle—quality, price, performance—Mallory Midgetrols are right for you . . . and your customers. Use them always.

### *Look at ALL 3 Features of this Mallory Control "Deal"*

- (1) With the special Mallory Control Kit you get a selection of controls and switches that give coverage of more than 50 radio and TV set models. (2) The Controls are selected on the basis of set popularity in your area. (3) You get FREE

a metal storage cabinet when you buy this deal.

Ask your Mallory Distributor or write P. O. Box 1558, Indianapolis, Indiana.



P. R. MALLORY & CO. Inc.  
**MALLORY**

CAPACITORS • CONTROLS • VIBRATORS • SWITCHES • RESISTORS  
RECTIFIERS • POWER SUPPLIES • CONVERTERS • MERCURY BATTERIES

**APPROVED PRECISION PRODUCTS**

**P. R. MALLORY & CO. Inc., INDIANAPOLIS 6, INDIANA**

# TECHNICIAN & Circuit Digests

CALDWELL-CLEMENTS, INC., 480 LEXINGTON AVENUE, NEW YORK 17, N. Y.

## . . . and AWAY WE GO

We are on the threshold of the greatest volume of TV-radio-electronic service business the country has ever seen. With color TV very definitely on its way, B & W set ownership increasing, Hi-Fi and other electronic equipment entering more homes daily, and radio holding its own, service volume is headed for an all-time high.

Start thinking *now* about cutting yourself a piece of the pie. New programs coming up will furnish a billion and a quarter dollars worth of entertainment and education for the American public—*free!* With so much to see and hear, and oncoming cold weather to drive them indoors, people will depend very heavily for amusement on their TV-radio-audio equipment. Increasing importance will be placed on keeping this equipment in tip-top shape, and that's where the technician-dealer comes in.

You can be assured of a fair share of the vast service business that is developing, by paying attention to the following:

**Public Relations.** The maintenance of good public relations is a *must*, particularly in these days, when the industry is under fire. You, Mr. technician-dealer, are the industry's front man. The industry is, to a large extent, judged by what *you* do, and how *you* talk and act. If you make an unfavorable impression on a customer, it is not improbable that some other local serviceman may feel the distrust you have helped generate. As the old saying goes—let's hang together, or we'll hang separately.

**Store Set-Up.** Are your windows neat and appetizingly dressed? Do you change your window display regularly? Is your shop interior attractive? Is your test equipment set-up calculated to inspire confidence? Don't neglect the psychological effect your store set-up

has on customers. Everything visible in your store has some impact on the customer. Make that impact one that works *to* your advantage, not *against* it. Remember—big business is often built on small details.

**Parts Purchasing.** Ask for your choice of components and equipment *by brand name*. Select these items *intelligently*. Ask yourself: Is the manufacturer giving you protection when you buy his components? Is the margin of profit he's allowing you adequate? Your purchasing power is a mighty weapon—use it to improve conditions in the industry.

**Associations.** Are you giving time to association work? Your association is working for you, and is in a much better position than you are to get the cooperation of manufacturers in solving your problems. Your association is a clearing house for important information, and keeps an eye on legislation affecting you. Are you giving it your *full* support?

**Co-op Advertising.** Manufacturers who use substantial appropriations to promote good will for you via TV and radio (spot announcements, etc.) also deserve your support. So do those who provide cooperative advertising to boost your business. Ask your local distributor about manufacturers' plans which pay for part of your advertising bills.

**To Sum Up:** There is a big volume of service business ahead; the estimated service bill for 1955 is \$1.8 billions, compared with \$1.6 billions for 1954. How much **YOU** get depends on 1—your efforts as an individual, and 2—your successful functioning as part of a group.

Don't fumble the ball now. Are you going to sit back and pick up the scraps—or are you going out after the gravy? Your future is in your hands. Make this your turning point.

# Tuning In the

**TV SET SALES CONTINUE** at a healthy rate, with many erstwhile crepe-hangers hanging their heads. Almost everyone guessed wrong on '54, and before the year ends, it's likely that dealers will have sold as many as 6,200,000 sets to consumers—a million more than numbers of experts predicted when the year bowed in. Price-cutting continues to be on the rampage, with dealers in some cities offering "\$249.95" sets at \$99.69—"You save \$150," and so on. Many dealers are "selling up" these days because of the slim profits in the stripped sets, and some merchants point out that the advent of the low-enders helped to restimulate interest in the technique of "selling up"—a technique that has been advocated by authorities on merchandising for a great many years.

**BY JAN. 1, 1955, THERE WILL BE** nearly 33 million TV sets in use, *TECHNICIAN* editors estimate, and this slew of B & W receivers, together with the increasing number of color sets, presents a rosy outlook for the technician. Add to these the millions of radios, recorders, phonos and other electronic devices, and we see—plenty of business to go 'round for those who go after it.

**INDISCRIMINATE TUBE REPLACEMENT** may be costing you and your customers a lot of money. Tests made by one manufacturer (Magnavox) on in-warranty tubes returned as defective indicate that about 40% of them are good! Sometimes it's nothing more than a defective socket contact, momentarily closed when you insert a substitute tube, that leads you to the wrong conclusion. At other times, a circuit defect will cause failure of operation with a perfectly good tube; when operation is restored (without repairing the fault) by insertion of another tube with slightly different characteristics, the original tube may be wrongly condemned. **Moral:** Check circuit performance carefully before retiring a suspect tube!

**GROWTH OF BINAURAL HI-FI** has brought on a new wrinkle in AM-FM tuners. One manufacturer (National Co.) is making a tuner that permits simultaneous reception of FM and AM, with separate tuning controls for each band. This facilitates home pick-up of binaural transmissions sent out by stations that transmit on both AM and FM. Two different sound signals are broadcast, one on each band. The audio amplifier used in conjunction with such tuners must, of course, be part of a binaural set-up.

**NEED FOR ASSOCIATIONS** isn't confined to our country. At a recent convention of radio dealers in Jullunder, India, it was decided to form the PRDA—Punjab Radio Dealers' Association. Organization is pledged to work for good will among dealers and encourage united action.

**HEAR ABOUT THE BASHFUL TV TECHNICIAN** who blushed when he was called on to service a stripped set?



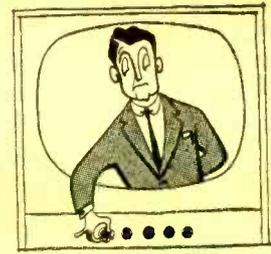
**COMMUNITY ANTENNA SYSTEMS** have grown in three years to more than 300. They serve over 150,000 homes throughout the country, and represent an investment of about \$25 million, according to Milton J. Shapp, prexy of Jerrold Electronics. This fast-spreading solution to the problem of bringing TV beyond the fringe has, most significantly, resulted in the sale of about \$45 million worth of extra TV sets. An example of what such systems can do: Casper, Wyoming, gets its TV signal by microwave relay from Laramie, nearly 200 mi. away. Signal originating in Denver is picked up off-the-air in Laramie, which is in the fringe area for Denver transmitters! Closed coax cable in Casper distributes signal to homes.

**THAT TECHNICIAN'S DUMB GIRL FRIEND** is around again. She thinks a mixer grid is a cooking utensil, a 6BY6 a piece of lumber, and she's dead certain that pickup arms are what guys in cars wave at her when she's waiting for a bus. . . . When her boy friend told her that he was having some trouble with a woofer, she suggested he write to our "Tough Dog" editor for advice. Actually, this dame gets tweeter and tweeter every day.

**STORAGE BATTERY WITH LIFE** more than double that of conventional types has been developed by Exide, the company announces. The "new" batteries have actually been in existence and under test for 17 years, and have been operated in normal industrial applications, side by side with conventional units. The 17-year life claimed for the new units compares with 7 years for old-type storage cells. Patents have been granted for the lead-antimony-arsenic-silver alloy used in the grid structure of the battery plates.

**EUROPEAN HI-FI:** Sharp upward trend in the sale of quality audio components marks a Hi-Fi boom on the continent comparable to ours. For example, Europe is now selling one record changer for every 2 sold in our country, according to Peter Jensen, prexy of Jensen Industries. Now touring the continent, the head of the stylus-manufacturing concern considers the figures quite significant, especially since the average European family cannot as readily afford to invest in Hi-Fi as its American counterpart.

# Picture .....



**TALK ABOUT HI-FI CHAOS;** Have you heard of the Hi-Fi guy who emptied his pocketbook to buy a "super" system that was clean beyond 16,000 cps—then found out his hearing "dropped out" at 9,000? You might say he was trapped in some vicious cycles.

**FEW SHOP OPERATORS EXPRESS MUCH** interest in time-payment plans for repair and installation work, though some who use and advertise this technique say: "It does attract new business. And not only from the low-bracket folk, either. . . . Some people seem to think they are 'insuring' themselves against having to pay anything excessive on call-back work by time payments." A large Eastern shop owner says, "Time-payments on servicing may work in a few industrial areas, and would be okay during an economic recession. But at present—not for me."

**SIGN OF THE TIMES:** One TV set maker, Spartan, announces that it will no longer stock replacement pix tubes in the following sizes: 10, 12½, 16, 19 and 20 inches. The 14, 17 and 21 in. (or larger) rectangular crt's are the basic types to stock these days.

**NOW AND THEN A SERVICE MANAGER GRIPES** ABOUT the number of different pix size tubes he has to stock nowadays. Brother, let's look back five years to a really hectic situation. In 1949, sets were being made to accommodate the following tube sizes: 3, 7, 10, 12, 15, 16, 19 and 20 inches! The 3-in. tubes were, of course, used in projection sets.

**PRINTED DEFLECTION YOKE** is the latest design wrinkle from France. The flat, stamped unit looks like a light-weight foil; it is wrapped around the neck of the crt. Designed to concentrate the magnetic deflecting field for maximum effect on the electron beam, the unit is said to be far more efficient than conventional windings. Its use may eliminate the need for heavy-duty type vertical and horizontal output tubes, reducing set manufacturing costs, receiver prices and set wattage consumption.

**ONE GUY'S DEFINITION OF PARASITIC OSCILLATION:** A gold-digging dame dancing the rumba with a sugar daddy.



**AND SPEAKING ABOUT COMPONENTS,** most of the parts—probably 90 percent of the total—are turned out by women who "man" the nation's production lines. Conversely, at serviceman levels, one finds only a very small number of women—about 5 percent, perhaps, out of the total employed—who have anything to do with TV-radio service work.

**THOUGH THERE ARE PLENTY OF GRIPES** about poor quality control on TV sets these days, few technicians have much to complain about when it comes to tubes and components. The vastly improved final-check techniques set up in factories has resulted in a remarkably high degree of excellence, in spite of the fact that production has been speeded up through greater mechanization. In cases where defects do crop up, few shop owners experience anything but prompt, honest replacement by distributors.

**SOME SHOP OWNERS FAIL TO** take full advantage of manufacturer-supplied identification and display material. This material, when properly employed, ties in well with national advertising by the manufacturers, and helps get across the idea that standard, top-quality replacement parts are being used in service work.

**IN 1964—10 YEARS HENCE—the** replacement market will stand at 476 million dollars in color picture tubes, 69 million dollars in black-and-white crt's, and 321 million dollars in receiving tube types, predicts John T. Thompson, manager of distributor sales for the G-E Tube Department at Schenectady.

**EUROPEAN-AMERICAN HI-FI:** Popularity of European-made packaged Hi-Fi systems in this country is on the rise. The trend is, perhaps, due in part to the fine reputation of foreign speakers, as well as other imported components; it is also explained by the smaller relative cost of European Hi-Fi systems (made possible by lower wages received by foreign labor).

**BIG RECEIVER MANUFACTURERS** making a serious bid for a share of the Hi-Fi business, with more and more packaged instruments being launched under famous names.

## CALENDAR OF COMING EVENTS

- Sept. 19-22: Heart of America Repts 8th Conference, Rockaway Beach, Lake Tanycomo, Missouri.
- Sept. 24-26: Fifth Annual TV-Radio Service Industry Convention and Exhibitions, Morrison Hotel, Chicago, Ill.
- Sept. 30-Oct. 2: High Fidelity Show, Washington Athletic Club, International Sight and Sound Exposition, Palmer House, Chicago, Ill.
- Oct. 4-6: Tenth Annual National Electronics Conference, Hotel Sherman, Chicago, Ill.
- Oct. 8-20: Radio-Electronics-Television Mfrs. Assoc. Radio Fall Meeting, Hotel Syracuse, Syracuse, N.Y.
- Oct. 13-16: The Audio Fair, Sponsored by Audio Engineering Society, Hotel New Yorker, New York.
- Oct. 22: Distributors' Seminar, sponsored by Radio Parts & Electronic Equip. Shows, Inc. & National Electronic Distributors Assoc., Dallas, Texas.

# Servicing Improper Picture

Concludes Analysis of Hue and Saturation Troubles. Symptoms,

BY PETER ORNE  
AND  
SOL HELLER

• In our preceding article, adjustments regulating the phase relations of various color stages were discussed. In this piece, we will consider the problem of adjusting the relative amplitudes of the different color signals correctly, to obtain a properly-colored picture. This adjustment, when properly made, assures that the amplitudes of  $Y$ ,  $I$ , and  $Q$  signals applied to the matrix are in the correct relation to each other.

In the RCA color receiver under discussion, there is a service adjustment for achieving the proper relationship between the  $Q$  and  $I$  signals. This adjustment is made by suitable

manipulation of the  $I$  gain control. (If  $Q$  is fixed and  $I$  is varied, the the  $Q/I$  ratio will change.) Let's consider some background information before we describe how the proper setting of the  $I$  gain control is made.

An inspection of the color vector diagram (Fig. 1A) will be helpful in understanding the effects of changing the  $I$  gain control setting. Note, first, that there are colors that are made up predominantly of one component; for instance, cyan is very largely composed of  $-I$ ; orange is chiefly  $+I$ ; green is chiefly  $-Q$ ; magenta is substantially  $+Q$ .

If the relation between  $I$  and  $Q$  is correct, the colors referred to will appear equal in intensity (when they are seen in the bar pattern on the crt screen). If this  $I/Q$  relationship

is, on the other hand, incorrect—if the  $I$  component is, for example, excessively large—this state of affairs will no longer hold. In the instance just assumed, green and magenta will appear pale compared to orange and cyan.

Colors made up of chiefly one component will, of course, not be the only one affected; we must also consider what will happen to colors made up of two components, containing approximately equal amounts of  $I$  and  $Q$ .

Let's take yellow as an example. Yellow, you may remember, is made up of 32%  $+I$ , and 31%  $-Q$ . What will be the effect of excessive  $I$  on yellow?

For one thing, its intensity will be excessive, compared to the intensity of colors containing mostly  $Q$ , such as green. In addition, the wrong hue will be present—i.e., more orange than yellow will be visible. This is so because yellow is the resultant of  $+I$  and  $-Q$  (see Fig. 1). The larger the  $+I$  component becomes, the closer will the resultant vector come toward red (Fig. 2).

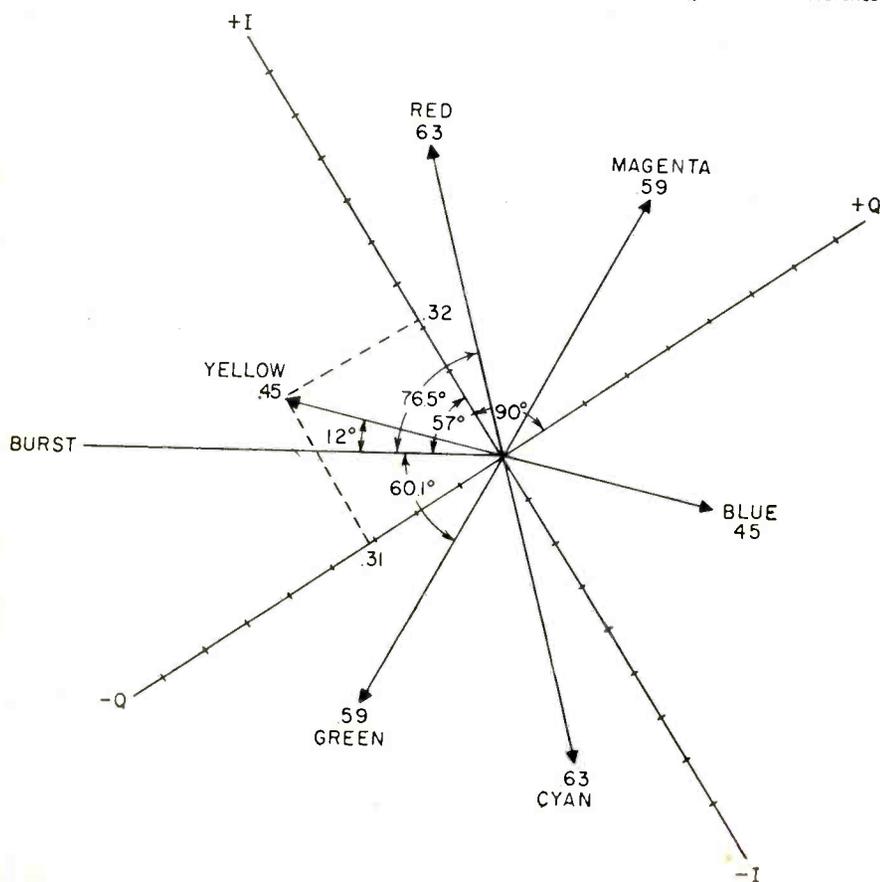
Now, how can a corrective adjustment be most easily made? The reader may remember that the largest amount of color information is fed to the blue gun. (The algebraic sum of the  $I$ ,  $Q$  and  $Y$  values shown at the left in Fig. 3 gives the largest total for blue.) The output of the blue amplifier will therefore be the most critical, as far as proper balance of the  $I$  and  $Q$  signals are concerned. This output point is therefore a logical one to check, when a corrective adjustment is made.

## Correct $Y$ , $I$ , and $Q$ Levels

If the three components  $Y$ ,  $I$  and  $Q$  are correctly proportioned, equal amplitudes will be evident for the signals produced by bars containing blue (blue, cyan and magenta), when these signal amplitudes are viewed on the scope at the output of the blue amplifier. No output will be seen at this point for any other colors (except white, of course).

When the amount of  $I$  present is excessive compared to  $Q$ , the effect will be most clearly manifested by

Fig. 1—Color vector diagram showing the amplitude and phase of the colors most important to the serviceman. Hues not shown fall between the colors of which they are compounded—for example, orange would (if shown) lie between yellow and red. Amplitudes of the various vectors indicate fully-saturated colors. Phase of burst is given for reference.



# Tinting in the Color Receiver

## Adjustment Procedures. Setting Chroma and I Gain Controls

the unequal outputs seen on the scope (at the output of the blue amplifier) for the three bars containing blue. It should be kept in mind that magenta contains some  $+I$ , while cyan and blue contain some  $-I$  (refer to Fig. 1). An excessive amount of  $I$  signal will, in consequence, cause the blue amplifier output for magenta (as viewed on a scope) to be small, while the output for the cyan and blue bars will be larger.

### Blue Amplifier Output

(The signal output at the blue amplifier, when receiver operation is normal, has the following components:

$$\text{For magenta bar:} \\ -.30I + .89Q + .41Y = 1$$

$$\text{For blue bar:} \\ +.36I + .53Q + .11Y = 1$$

$$\text{For cyan bar:} \\ +.66I - .36Q + .70Y = 1$$

The amplitude of the signal measured will, thus, be the same for each of the three bars.

In the case of excessive  $I$  signal, however—say  $I$  has doubled—the bars will produce output signals made up as follows:

$$\text{For magenta bar:} \\ -.60I + .89Q + .41Y = .70$$

$$\text{For blue bar:} \\ .72I + .53Q + .11Y = 1.36$$

$$\text{For cyan bar:} \\ 1.32I - .36Q + .70Y = 1.66$$

Note that the output for magenta goes *below* normal, while the output for blue and cyan goes *above*.)

If the  $I$  signal component is insufficient, it can readily be demonstrated, by a process of reasoning similar to one directly preceding, that the blue amplifier output for the cyan and blue bars will be *small*, while the output for the magenta bar will be *large*.

It must be clearly understood that when we say output, we are referring to the amplitude of output seen on a scope, when the latter is connected between the blue gun of the crt and ground.

If no scope is available, this adjustment may be roughly checked by inspecting the color crt. Since the output of the blue gun alone is

going to be looked at, the red and green guns are shut off by turning the red and green screen voltages all the way down. The bar pattern on the crt is then inspected, and the  $I$  gain control is adjusted to get equal intensities in the magenta, blue and cyan bars.

The adjustment is somewhat complicated by the fact that the chroma control setting affects it. The chroma control is a customer-operated one; it regulates the level of the chrominance or color signals, with respect to brightness—i.e., it controls the color saturation present.

There is really only one correct setting for the chroma control. Why not then use a fixed resistor here, instead of complicating life for the customer by giving him another potentiometer to play with?

### Chroma Control Function

The answer may be found in the fact that relatively small changes occurring at the antenna can produce a change in the level of the sub-carrier, compared with the rest of the signal. The saturation of the colors in the picture will, in consequence, be affected. The set owner compensates for these changes by adjusting the chroma control. It is worth pointing out that customers differ with respect to the chroma control setting they find most pleasing.

To adjust the chroma control correctly, inspect the output of the blue gun. Now, the color signals should cancel the brightness information present at the blue gun, when bars that contain no blue are being scanned (thus keeping the blue gun cut off at these times). The adjustment of the chroma control is therefore varied until the blue-containing bars (magenta, blue, cyan) produce *equal* output, while all the other bars provide *zero* output.

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*Peter Orne is a crackerjack TV-radio serviceman who "graduated" to engineering work. He recently spent 6 months working on color receivers for his company (Garod). Peter has been earning \$10 per hour as a lecturer on color TV in a New York trade school.*

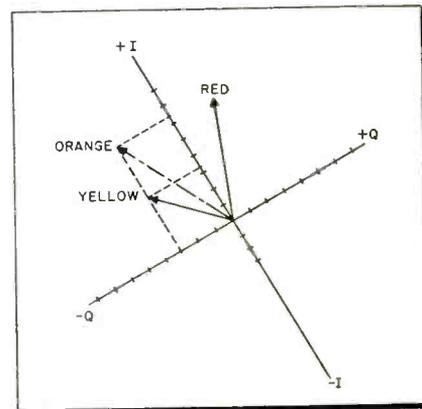


Fig. 2—Effect of doubling  $I$ . Yellow is reproduced as an excessively-bright orange.

The chroma control adjustment, it can be seen, is similar to that of the  $I$  gain control. The two adjustments show some interaction with respect to their effect on the output of blue amplifier. Both controls should be adjusted at the same time, with attention being paid mostly to getting the blue-containing bars equal in amplitude when the  $I$  gain control is adjusted, while no output for the other bars is sought when the chroma control is being adjusted. Going back and forth between the two adjustments a number of times will usually be required.

When either of the adjustments does not produce the desired results, trouble in the control itself, or in the circuit associated with it, is indicated.

Low gain in the  $I$  section will evidence itself in the impossibility of getting the outputs for the magenta, blue and cyan bars equal.

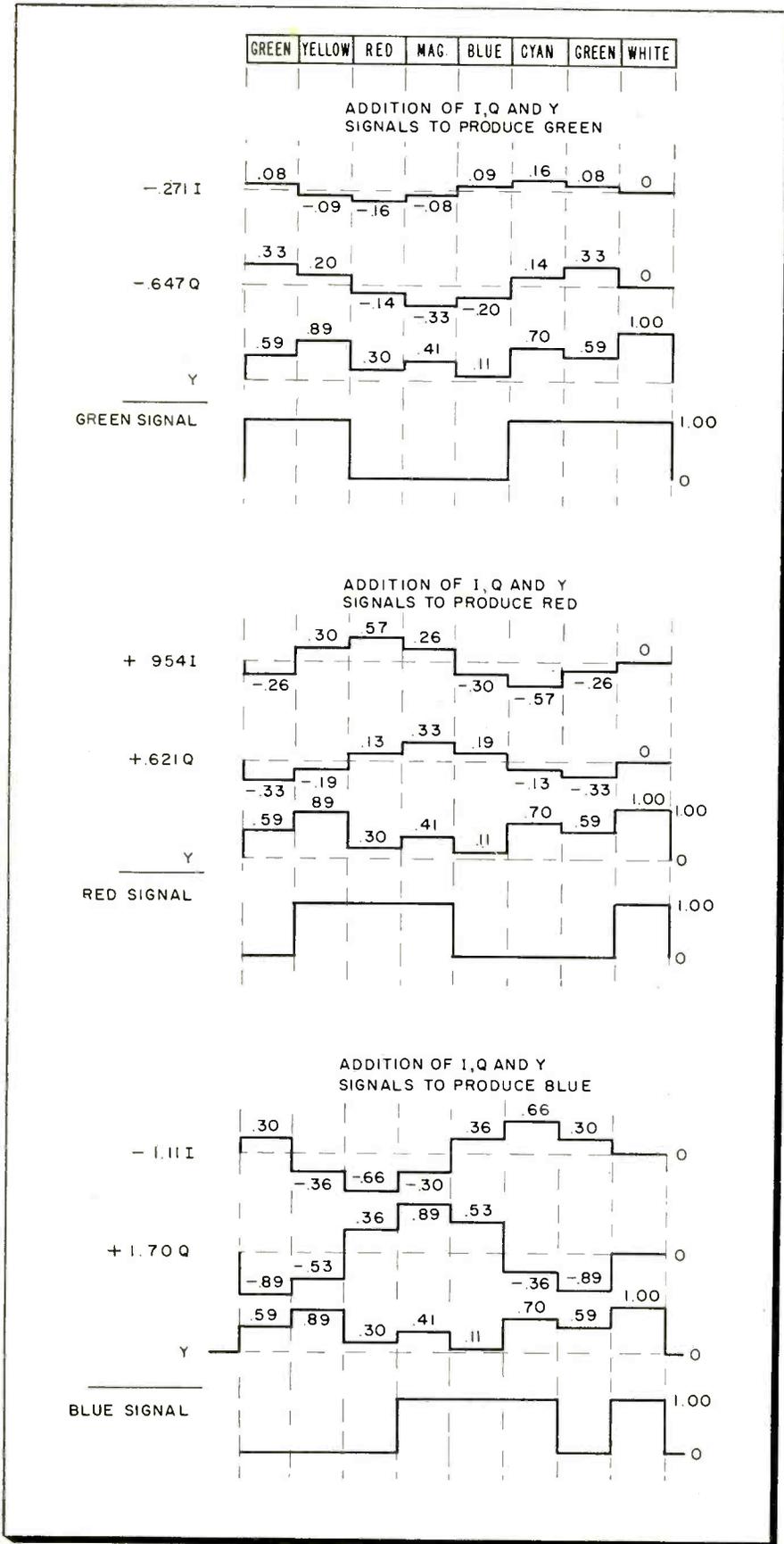
### Low 3.58 MC Output

Low output of the 3.58 mc oscillator will cause insufficient saturation—that is, the output of the color decoders (the  $I$  and  $Q$  demodulators) will be too small, if insufficient oscillator voltage is fed to them.

Low gain in the  $Y$  channel will cause excessive chroma—that is, the colors will appear to be overly saturated; pinks will be red, and reds will be too brilliant.

The appearance of a color picture

Fig. 3—Make-up of the green, red and blue signals. A bar pattern is assumed as the signal input to the receiver. Colors in the bar pattern are shown at the top. The detected Y, Q and I components are combined at the receiver matrix in the amounts indicated to produce green, red and blue signals. After amplification, these signals are applied to their respective guns in the cathode-ray tube of the color receiver. The algebraic sum of I, Q and Y is largest for blue. The process indicated is the reverse of the one that takes place at the transmitter, where green, red and blue output signals of color-TV cameras are broken down into Y, Q and I information.



when the I gain and saturation controls are incorrectly set may be summarized as follows: Insufficient I gain produces brilliant grass, and dull, orangy flesh tones. Excessive I gain causes bright, pinkish flesh tones and dull greens. An insufficient chroma setting produces a faintly-tinted picture, like a pastel painting, or a faded painting. An excessive chroma setting will cause colors to be exceedingly bright—similar to some extent to the bright shiny hats and socks worn by certain teenagers.

### Color Broadcast Problems

Switch from black & white transmission to color is tough enough, but did you know that some stations will have the headache of converting a color program to monochrome? Here's how the problem arises: FCC station equipment performance requirements for color transmissions are more rigid than those for b & w. Some transmitters meet the specs for monochrome, but not for color. When one of these stations gets a color program from an affiliate, it must either forego use of the material or have some way of converting it to b & w. Du Mont suggests a simple band-stop filter, sharply tuned to the color sub-carrier. It provides about 23 db attenuation at 3.58 mc. Degradation of high-frequency luminance information is not considered serious, since the filter permits good response beyond 3 mc and again at 4 mc, on either side of the color sub-carrier.

### Tube Developments

"Stacked" electron tubes, made of ceramic instead of glass and shorter than the conventional types, are being called the tubes of the future by Sylvania Electric, in whose laboratories the new types were developed. The stacked units are said to maintain a high degree of stability under unusual extremes of temperature, vibration and shock. The tubes were recently demonstrated to the armed services.

A 3-gun cathode ray tube for use with multi-channel scopes, type 53RAP, has been announced by Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Penna. Up to 3 simultaneous traces can be shown and compared on the face of this 5-in. scope tube.

Zenith Radio Corp. announces a new line of Cinebeam pix tubes. These crt's, which feature metallized reflective coatings in back of the phosphor area for greater brightness in conjunction with dark faceplate glass, are said to produce increased picture clarity.



# Hi-Fi: It's **YOUR** Baby

## New Mass-Marketing Approach

### Favors Technician and Dealer

Although the end of World War II heralded a rash of developments in electronic equipment for home use, the mushroom growth of television led some of us to forget about anything else. Nevertheless, while TV spread across the nation, the long-playing microgroove record was finding a place in the American home. Tape recorders that could be bought and operated by laymen were coming into the picture. More FM receivers were sold. Top-quality phono pickups appeared at prices low enough to take them out of the professional-use-only category. More recently we have seen the entry of pre-recorded tapes and inexpensive non-recording tape playback units.

#### Mass Market On Way

The outlook these factors have added up to is no secret: Sound reproduction in the home is possible with a life-like clarity and realism undreamed of only a few years ago—the consumer likes it—and he can have it for an investment that he won't consider out of line. But the really big news on the Hi-Fi front is this: The false starts seem to be over. Hi-Fi appears ready for the mass market. It could never become big business while a crazy-quilt pattern of distribution and pricing prevailed, while distributors and jobbers sold a few pieces of equipment to a handful of hobbyists.

Right now there are fewer than 800 audio sales outlets throughout the country as against more than 50 million record purchasers—and the size of the latter group will give you an idea of the potential market for Hi-Fi equipment of the right kind sold in the right way. Whether you're in service only or sell as well, this is bread and butter for you. What's more, opening the door to you is bread and butter to the manufacturer. He's finding that out. And here are some of the things he's doing about it:

*Packaged audio units*, ready to play on delivery without the services of an engineer, are getting a bigger play. Also along these lines, cabinet styling is getting attention. How far would TV have gone if the consumer had to buy the picture tube, tuner and deflection chassis separately, then string wires all over his living room to tie up these exposed parts?

*Big brand names* are entering the field and girding their loins for a big push. Side by side with the regular Hi-Fi-only equipment manufacturers, who have been carrying the ball for years, will be virtually every important maker of TV-radio equipment.

*Revised 2-step merchandising setups* will put the TV-radio dealer and service technician right back into the picture. Manufacturers are now interested in Hi-Fi lines they can give to a distributor which he, in turn, can profitably sell to dealers rather than to the public. Some Hi-Fi makers are setting up local factory distributorships, as part of this plan, that will make complete lines locally available to retailers on short notice. This helps the smaller retailers, who cannot invest in stocking full lines themselves. This also helps local service technicians, who will be faced with the problem of keeping audio units in repair or getting replacement parts for them. There are also indications that preferential discounts to retailing distributors, which have helped them compete unfairly against legit retailers, are on their way out.

*Fair trade* is entering the picture. Some of the new lines will be price-fixed. Some are being denied to the discount houses.

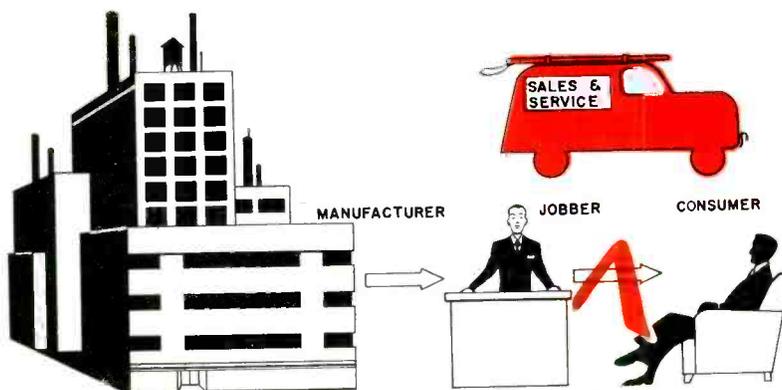
*Advertising support* is on the way. At least one major manufacturer is setting up local cooperative funds for dealers, based on purchases, to help cover advertising costs. Dealer-slanted sales aids and other promotional material is on the way.

#### Technician Training

*Technical training programs* for service technicians are being worked out. What are the special problems of Hi-Fi service? What equipment is needed? Manufacturer-sponsored training programs gave you the answers to similar questions for monochrome TV. You're getting the answers now for color TV. You'll get them for Hi-Fi too.

Long established names in the audio field that have committed themselves to one or more of the mentioned policies include Jensen Manufacturing (loudspeakers), Regency (tuners and amplifiers), Berlant (tape recorders) and Webcor (tape recorders and record players). Radio-TV set makers now entering Hi-Fi seem to be pointing in the same direction.

Nobody has found a way of making a high-fidelity system without using tubes, condensers, resistors and the other familiar electronic components. As long as these items are involved, Hi-Fi belongs to you. Are you getting ready to step in?



# Localizing Troubles in the

## Identifying Reflection Sources; Capacitance Checks for Determining

BY MICHAEL CRAIG

**Antenna vs Receiver-Caused Reflections.** To determine whether multiple images on the screen are due to troubles within the receiver, or external to it, rotate the set's fine tuning control and note whether or not there is a change in the *position* and *relative intensity* of the images. If there is, the fault almost certainly lies within the receiver, and may be due to a defective i-f or r-f tube, improperly-functioning circuit, open bypass capacitor, or misalignment. If, when one side of the lead-in to the set is disconnected, the reflections remain *fixed* in position while the fine tuning control is

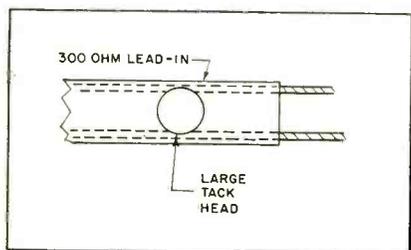


Fig. 1.—How tack head can cause lead-in short.

rotated (although their intensity may change), a mismatch of the lead-in to the set is indicated.

It is a good policy to carry an indoor antenna along in the car for a quick substitution check, when troubles of such a nature exist. Disconnect the transmission line leads from the antenna terminals, and substitute the lead-in from a rabbit-ear unit. Place the original lead-in as far away from the set as possible, so as not to obscure the results; considerable transfer of energy can take place to the indoor antenna from this disconnected line, even when the latter is five or six feet away. If exactly the same *type* of images are seen, and these images do *not* change their position when the fine tuning control is rotated, the trouble lies *outside* of the antenna system, and is also *not within* the set. This does not mean that a different antenna system would not help matters in some cases by sharpening the lobe of reception; it does

mean, however, that the symptoms are chiefly caused by reflections from some building or hill in the surrounding area.

If changing to the indoor antenna eliminates the trouble, even though the signal is reduced, at least two possibilities exist. Either something is wrong in the antenna system, or the reflected signal is shielded from striking the indoor antenna due to an obstructing object. The antenna mast may have loosened and caused the whole array to twist off to one side; or the transmission line connections to the antenna may have pulled loose or broken off; or a short or open may have developed in the lead-in circuit.

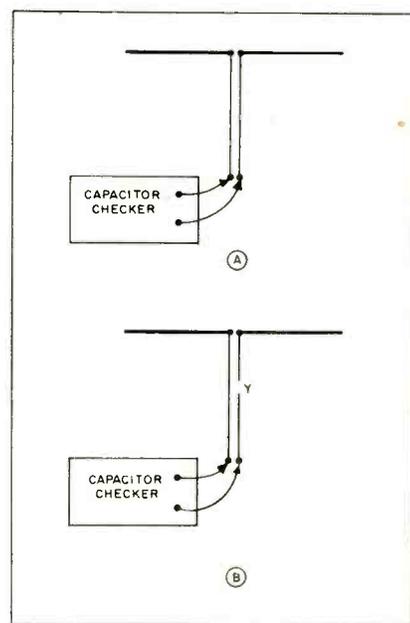
**Transmission Line Tests.** Ingenuity is sometimes needed even in making a few simple, quick checks to determine whether the transmission line is open or shorted. With a folded dipole type of antenna, the solution is very simple. Just connect an ohmmeter across the lead-in after removing the wires from the TV input terminals, and read the resistance value of the loop that goes up one side of the line, around the dipole, and back down to the meter. This test is **NOT** a fool-proof indication that all is right with the lead-in *unless* the actual resistance that should be present is taken into consideration, not just the fact that continuity exists around the loop.

With ordinary 300-ohm lead-in, the average value of resistance of 100 ft. of line with the far end shorted and the meter connected across the other end is very close to 2 ohms. If the "economy type" of lead-in is used, the resistance will be slightly higher, due to the smaller cross-section of copper present. If the length of the lead-in is approximately 75 ft. from set to antenna, and the meter shows only  $\frac{1}{2}$  ohm resistance, a short in the line at some point is indicated; the ratio of the meter reading to the total expected value will give the serviceman a rough idea as to where to look for the trouble. The customer may have installed his own antenna, using carpet tacks to fasten the lead-in to the beams in the basement, be-

fore bringing it out through the window on the way up to the roof; possibly a tack head has shorted the wires in the lead-in (see Fig. 1).

**Case History.** In one case involving the writer, a customer complained of intermittent reception, the picture looking as if it was being badly shaken up. The symptoms were similar to those produced by a very bad microphonic tube. Any movement on the floor, such as walking, closing a door, tapping the set, the wall, or jarring almost anything in the room would be enough to affect the picture. After changing tubes until blue in the face, without result, the writer lifted the set off the floor and had the customer tap the side of the cabinet. No appreciable change was noted in the picture; it was observed, however, that with the set on the floor, tapping affected the picture greatly. This meant that vibrations were being transmitted to the floor when the cabinet was rapped, or when something was moved in the room; this in turn affected the set . . . But how?

Fig. 2A—Checking lead-in capacitance. B—If the line is broken at Y, capacitance measurements obtained will be different when the leads are reversed. The higher reading will appear when leads are connected as shown.



# Television Antenna System

## Whether Lead-In Defects Exist. Resistance and Flashlight Tests

An indoor antenna was connected to the input terminals of the set, and the lead-in from the outdoor antenna removed. The trouble now cleared up completely! Channel 11, which was barely discernable before, came in reasonably good. Stamping on the floor had very little effect, and rapping on the cabinet made no difference. The picture stayed put!

When the ohmmeter was connected across the lead-in wires from the antenna, the meter jumped all over the scale if the floor was walked on. The wind was quite strong at the time (it was evening) but the meter wouldn't budge as long as no one moved around the room. That eliminated the antenna proper, and put the finger on the lead-in itself, since the antenna was *not* of the folded dipole type, and there could be no normal closed circuit around the lead-in loop.

The lead-in was traced through a closet and down to the basement, where it ran for about 8 ft. parallel to and above the furnace pipe to the chimney—just five inches above it, in fact. What had happened was that

the heat from the pipe had softened the plastic of the lead-in, causing it to curl up on itself. In at least one spot, the shrinkage was so great that the wires touched each other through the softened plastic. This was causing the intermittent trouble upstairs (the set was located almost directly above the furnace pipe). Any vibration in the set or room was sufficient to make and break the short.

The cure, of course, was simple; a new piece of lead-in was spliced into the circuit and re-routed away from the source of heat. An interesting sidelight is this: even when the wires were not shorting, the impedance of the line must have been

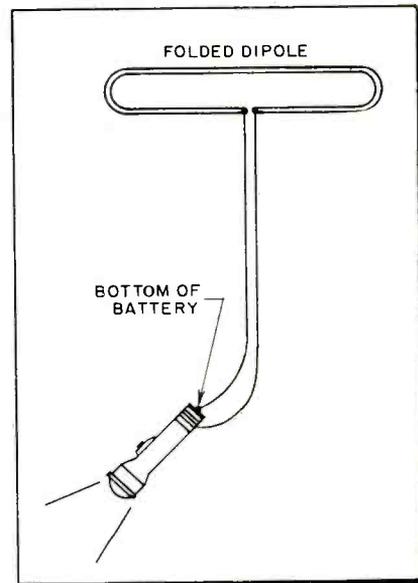


Fig. 5—Checking folded dipole line with flashlight. Bottom cap of flash is first removed.

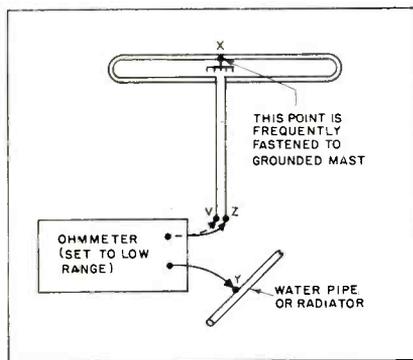


Fig. 4—Testing folded dipole line for continuity. Since point X is electrically the same as Y, sections V-X and Z-X may be effectively checked by testing from V to Y, and Z to Y.

drastically lowered, since the capacitance of the line per foot had risen to approximately 15 mmfd per foot, instead of the usual 4 or 5 mfd.

**Lead-In Capacitance Measurements.** In the case of a straight dipole, it is impossible to get a dc reading on an ohmmeter, unless the line has a bad dc leak, or is shorted, as in the case previously described. An open in the line cannot therefore be detected through resistance measurements. A different method can, however, be used to determine whether the line—at least for its lower two-thirds portion—is open-circuited at any point.

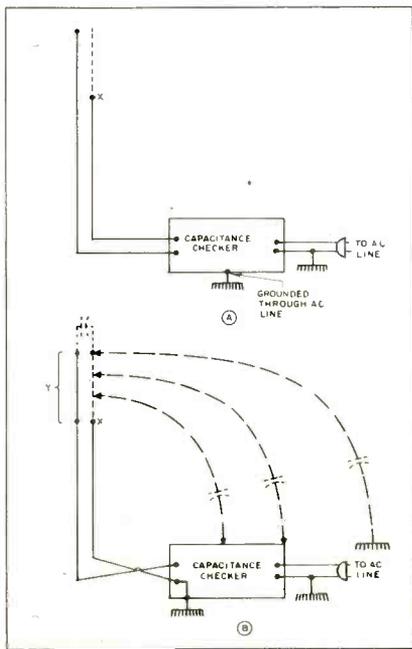
It is impractical to use this method for the entire line up to the antenna because the line's exact length can-

not be measured without getting up on the roof, and if you're going that far, you won't need any shortcuts. The method referred to consists of connecting a capacitance checker across the 300-ohm lead-in wires (removing them first from the receiver) and measuring the capacitance. If the line is estimated to be 100 ft. long, it should measure 100 x 4 mfd (4 mfd/ft. is the normal capacitance of 300-ohm twin-lead), or 400 mfd. If, instead, the line measures only about 150 mfd, one side of the line is open at some point between one third and one half of the way up to the antenna proper.

In making a line capacitance check to determine whether an open-circuit exists, make *two* capacitance measurements, the second one being made with the terminals reversed (See Fig. 2). If both readings are *identical*, the lead-in is probably ok; if they aren't, a broken circuit in the line is indicated. The lower of the two readings obtained, in the latter case, represents the capacitance actually present. The "hot" test lead of the capacitance checker is tapped into the broken-wire side of the lead-in, when this lower reading is measured.

The reason we say that the lead-in

Fig. 3—When capacitance checker's "hot" terminal is connected to the broken side of the lead-in (A), the reading will be lower than when connections are reversed (B).



is probably not open-circuited if both readings are identical is this: the difference in the effective length of the two wires produced by an open-circuit would show up as a variation in the two readings. Make sure the lead-in is not grounded at any point by making a resistance check between some good "earthed" point and each side of the line.

Let's clarify the theory behind the test procedure just described. It is a known fact that a lead-in has a definite capacitance to ground; so does an antenna, even a single-wire type, or a rod-type unit used in auto installations.

Consider Fig. 3A. The "high" lead of the checker is connected to the shorter or open-circuited side of the lead-in in this sketch. The break occurs at X.

Now, it makes very little difference how much longer the other wire is, since it is effectively grounded for r-f through the checker (i.e., through the case and the transformer and bypass capacitors in the checker). So long as the long wire is at least as long as the other wire, the capacitance of the shorter wire to ground will be independent of the long wire's length, since the long wire is merely an extension of ground. Thus, the actual capacitance measured, when the checker is connected as in Fig. 3A, is that of the short wire (as far as point X) to ground.

Now, if the leads are reversed, as in Fig. 3B, a different set of conditions is set up. The capacitance of the short wire (as far as point X) to ground remains the same as before. In this case, however, the length of long lead above point X is now effectively an antenna, not merely a section of lead-in. A capacitance now exists between this antenna and any grounded object, as well as ground itself. A capacitance is also present between the good section of lead-in above point X (section Y) to the open-circuited opposite section (indicated by dotted lines), and between this open-circuited line section and ground. (The capacitance of the open-circuited line section to ground is of no importance in the case illustrated in Fig. 3A, since the opposite section of line is grounded, and a capacitance from ground to ground does not show up on the test referred to.) Thus a larger capacitance will be measured with the lead-in connected as in Fig. 3B, than when it is connected as in Fig. 3A.

A coaxial line may be checked in a manner similar to the one described for checking twin lead. Make

certain, though, that the "low" test lead of the capacitance checker is connected to the outer shield of the cable, while the "hot" lead goes to the inner conductor, otherwise no reading or a meaningless reading will be obtained.

The capacitance of coax cable runs approximately 15 to 40 mmfd per foot, depending on the impedance of the particular cable being used; unless the normal capacitance per foot of cable is known, a check of the lead-in according to the procedure previously described will be of little value. If an excess of coax lead is present, cut off a foot of it and measure the capacitance between conductors. With this information to go on, checking the (known) cable length present for proper capacitance becomes very simple.

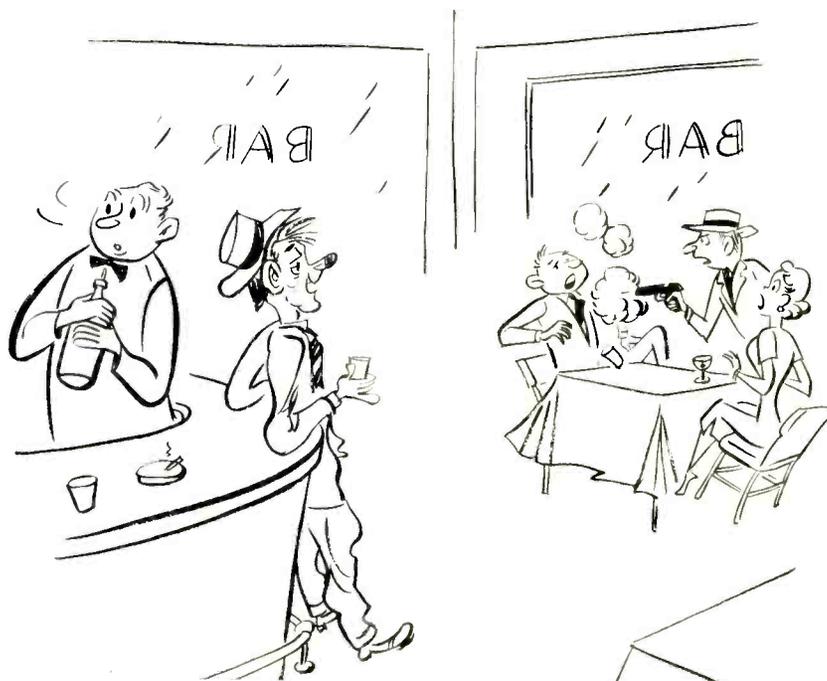
To prevent damage to a "hot-chassis" type capacitance checker, use an isolation transformer. When one is not available, simply connect two .1 mfd capacitors, one in series with each lead-in, when making the tests described.

**Resistance-Checking Folded Dipole Installation.** The center point of a folded dipole antenna is frequently grounded to the mast, which is in turn grounded to earth through a heavy wire, for lightning protection. When resistance-testing an installation of this type, an ohmmeter may be connected between a water pipe or similar "earthed" point, and

each side of the 300-ohm line in turn (see Fig. 4). The resistance measured should be the same in each case. If it isn't, one side of the line may have a high resistance in it, or an open-circuit, or even be shorted to some grounded object. To protect against possible damage to the meter (in cases where a difference in potential may exist between the two points to which the meter is connected) always take a reading on a high range setting first.

#### Checking Lead-In with Flashlight.

A very rough but quick check for line shorts or continuity can be made in the following manner: Unscrew the bottom cap of an ordinary flashlight, and turn the switch on. Then connect the two wires from the lead-in, one to the end battery and the other to the case, as illustrated in Fig. 5. If the flashlight lights up when this is done and the antenna is of the *straight dipole type*, the line is definitely shorted somewhere along its length. If the flashlight *doesn't* light when used on a line leading to a *folded dipole antenna element*, the lead is either open or broken off at the terminal on the antenna, usually the latter. If the bulb lights very dimly in the folded dipole test, the presence of a high-resistance connection somewhere in the circuit is indicated; if it lights up to what appears to be full brilliance, the chances are that the line is shorted at a point relatively near the set.



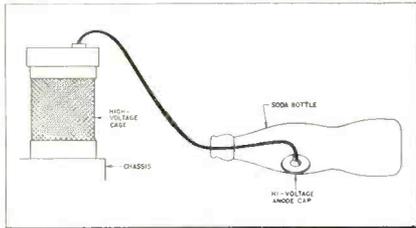
"I see you got your television fixed."

# Shop Hints to Speed Servicing

Tips for Home and Bench Service Contributed by Readers

## Safe "Cache" for HV Lead

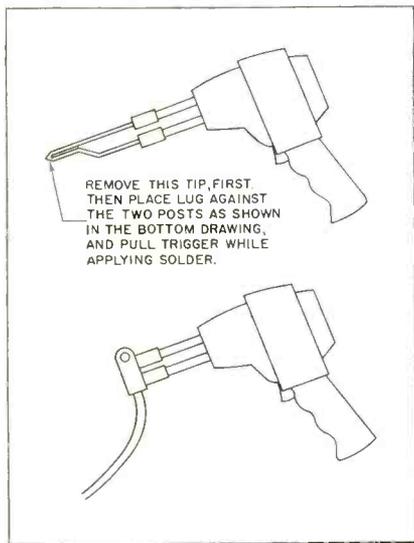
In many of the older-model television sets, the picture tube is separate from the chassis. To eliminate danger of high-voltage shocks, when



working on this type of chassis (without the picture tube), just slip the high-voltage anode cap into an empty soda pop bottle, and put the latter to a side (see sketch).—*Al Resnick, Brooklyn, N. Y.*

## Soldering to Heavy Cable

In shops where auto radios are repaired, it is often necessary to solder a large lug to a heavy wire cable. This calls for a big, hot iron, and lots of time. The job can be done very quickly, however, by using a gun, as shown in the drawing. First remove the tip from the gun. Then



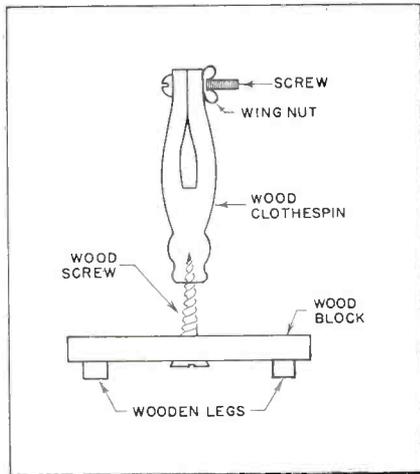
place the lug to be soldered against the two metal posts, as shown, and turn on the switch for a short period, while solder is applied. The method outlined works much faster than one using a simple, old-type iron. The high current drain will not harm the gun over a short period.—*Joseph Amorose, Richmond, Va.*

## Cleaning Contrast Control

There seemed to be no way left but to pull the chassis of this RCA "Millionproof" chassis. We had tried all the known tricks for getting cleaner fluid into the contrast control, but without success. Just as we began to remove the other knobs, an idea struck us. Fishing some 3/8-in. plastic sleeve out of the tool box, we cut a piece 3 inches long. The sleeve was screwed tightly over the threaded portion of the control, and fluid was poured in. It didn't leak out, so we blew until we were red in the face for 2 minutes thereafter. Set worked fine from then on, and hasn't come back to the shop (this was 6 months ago).—*B. Bolton, Stamford, Conn.*

## 3rd Hand for Soldering

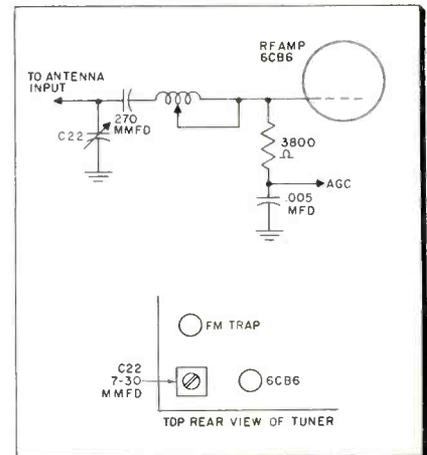
Here is an insulated vise which I have been using successfully for many years. It does not draw heat from the work and it is portable. It



is wonderful for small delicate work—i.e., RCA-make phono plug wiring, xtal wiring and other cases where a third hand would be most welcome.—*John L. Mancini, Winthrop, Mass.*

## Alignment Hint

In some RCA '51 receivers (6T53, 6T54, 6T64, 6T65, 6T71, 6T74, 6T75, 6T76), difficulty was experienced in obtaining sufficient signal on Channel 11. The trouble was finally traced to the r-f antenna trimmer (C-22), located between the FM trap and the 6CB6 r-f tube on top of the tuner. While this trimmer had only a minor



effect on Channels 4 and 5 in this area, it could completely trap out Channel 11 at one setting, and decrease the input greatly within 1/2 turn of this critical setting. To correct such trouble, watch the picture and adjust the trimmer for maximum amount of snow (weakest signal). Then, from this starting point, turn the trimmer counter-clockwise sufficiently to bring up the signal on Channel 11, or any other high-band station in your area. Use an insulated screwdriver, and watch out for the high voltage on the picture tube alongside!—*M. G. Goldberg, St. Paul, Minn.*

## Home-made Cleaner Sprayer

To avoid the expense of continually buying contact and volume-control cleaner in costly pressurized cans, I make use of an empty plastic bottle, the kind that originally contain window spray fluid. By filling the bottle with contact cleaner, you can get the same results obtained with the pressurized cans at a fraction of the cost. I use a bottle that holds about 3.75 fl. oz. It can be carried easily in a service kit. Pressure on the sides of the bottle sends out a fine spray.—*Herbert A. Wahl, Redondo Beach, Calif.*

## SHOP HINTS WANTED

TECHNICIAN will pay \$5 for acceptable shop hints. We are particularly interested in hints on the following subjects: Hi-Fi servicing, TV and radio interference, industrial electronics, TV antennas, test equipment and UHF. Unacceptable items will be returned. Send your hints to "Shop Hints" Editor, TECHNICIAN, Caldwell-Clements, Inc., 480 Lexington Ave., N. Y. 17, N. Y.

# Two New Tuners for

## Anchor TV 900 Features Low-Cost Segments • Sarkes Tarzian

A new type of 82-channel turret tuner that is said to switch stations, whether VHF or UHF, with the same ease as familiar VHF tuners, is now being produced by Anchor Radio Corp. of Chicago.

The TV 900 tuner features several departures from current all-channel tuner design, intended to achieve automatic switching, better performance over the entire spectrum, electrical and mechanical simplicity, compactness, non-radiation and low cost.

As a replacement unit, the TV 900 may be mounted in the same space occupied by any VHF turret tuner; or it may be mounted on the side of the cabinet, if desired. The voltage requirements are not critical, as the circuit is highly stable. Adjust-

ments for adapting the unit to any standard TV set are actually simpler than those required when installing a VHF tuner.

Improved performance is achieved with the use of the new 6AN4 tubes. One 6AN4 is employed as an r-f amplifier which functions on all 82 channels. The 6AN4 is used in place of a crystal mixer. Instead of a conversion loss, an actual gain is realized in this circuit. A 6T4 oscillator operates at the fundamental with full output even on Channel 83.

Radiation is reduced to less than the limit prescribed by R.E.T.M.A. and the F.C.C., according to the manufacturer.

Low cost is permitted by the mechanical design of the TV 900, which allows pre-tuned fixed-fre-

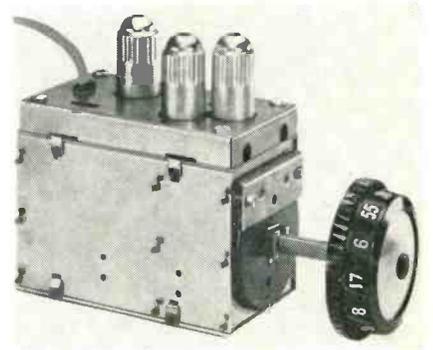


Photo illustrating new Anchor UHF-VHF tuner.

quency channel segments to be simply snapped into the rotor. These are not so-called converter strips, but are inexpensive tuned circuits individually mounted and attractively packaged in clear plastic boxes. Each box contains 3 segments and is marked with its channel number. Segments for all channels from 2 to 83 carry the same list price of \$3.00, which is subject to full trade discounts. A customer in a 3-station area would buy only the segments he expects to receive. Dealers in the area would stock only those numbers. The channel units may be inserted consecutively and in any sequence, whether VHF or UHF. A total of 12 channels can be accommodated.

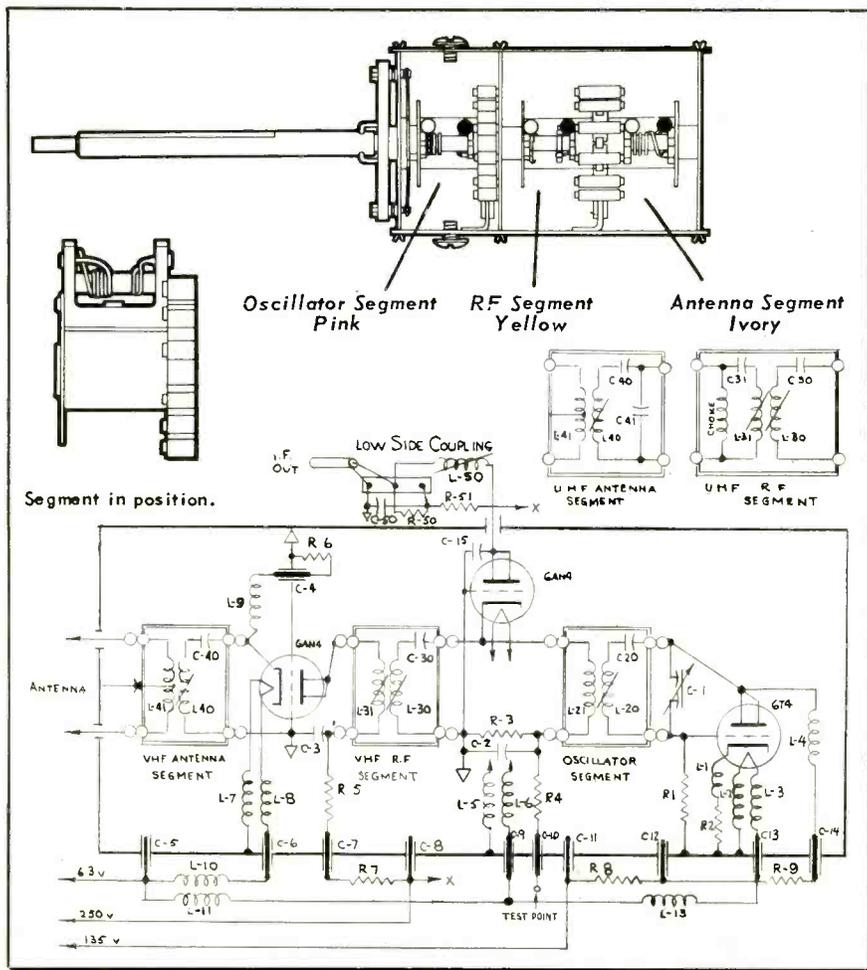
The Anchor tuner, without channel segments, has a list price of \$30.00, and carries full distributor and dealer discounts.

### Sarkes Tarzian Tuner

Sarkes Tarzian, Inc., Tuner Division, has brought out a new compact television tuner—the UV-13—covering the full UHF and VHF bands.

This tuner is actually two separate tuners, mounted coaxially and plugged together to make a single, compact unit no larger than the standard VHF tuners in use today. Logical, straight-line electrical sequence of compartmented circuits is the basic design feature. This provides greatest efficiency by eliminating regeneration, pickup of spurious signals, and other undesired effects due to stray capacitances and

Top: Pictorial view and schematic of segments used in Anchor TV 900. Bottom: Tuner schematic.



# UHF-VHF Channels

## UV-13 is Intended for Monochrome and Color Receivers

inductances. All signal paths, both VHF and UHF, are the shortest possible from antenna input to i-f output.

The two units combined measure  $3\frac{3}{16}$ -in. wide by  $3\frac{1}{4}$ -in. high by  $4\frac{3}{4}$ -in. deep. The complete tuner consists of a cascode VHF tuner, the V-13, and a capacitance-tuned, resonant coaxial-cavity UHF tuner, the U-13. The U-13 may be attached to the V-13 at the factory, or may be added later in the field. Installation requires only a few minutes, and consists of slipping the U-13 over the shaft of the V-13, tightening two screws, and attaching the proper knobs.

The new design features single-dial tuning of UHF stations, solderless pin connections on external terminals, 41 mc single superheterodyne conversion, and circuit stabilizing features such as Invar temperature compensation, which reduces drift due to temperature variations, and gain stabilization, which reduces detuning on high-strength signals without sacrifice of gain in fringe areas. The design and construction was intended to produce a highly sensitive, highly stable low-noise tuner, suited for use as original equipment in both color and monochrome sets, and as a replacement unit for older sets.

The basic electronic and mechanical unit is the V-13 VHF cascode

tuner, employing a 6BZ7 r-f amplifier and a 6U8 oscillator-mixer. The tuner, which covers channels 2 through 13, is of the channel-switching type, with the fine tuning control brought out concentrically and in front of the channel selector control. It is designed to operate into a standard 41 mc i-f tube such as a 6CB6, and is link-coupled to the output. When mounted in the chassis by the  $\frac{3}{32}$  screw holes provided, all connections, tubes and adjustments are readily accessible. The circuitry is exposed by removing the snap-on cover surrounding it. All power and antenna connections to the tuner are made through standard .093-in. diameter friction-type pin terminals—no soldering is required to install it. Power and output terminals are located at the back, and the 300-ohm balanced antenna input is near the 6BZ7.

### UHF Tuner Section

Designed as an integral, but mechanically separate part of the UV-13 is the U-13, a completely self-contained UHF tuner of the continuous type.

The U-13 is designed to slip coaxially over the shaft of the V-13 VHF tuner and plug into the front of it. The multi-pin plug carries the necessary power, as well as the output signal. No other electrical connec-

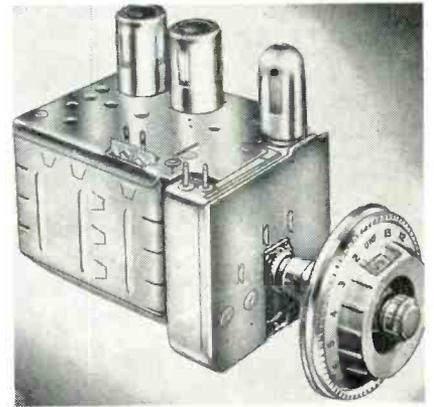
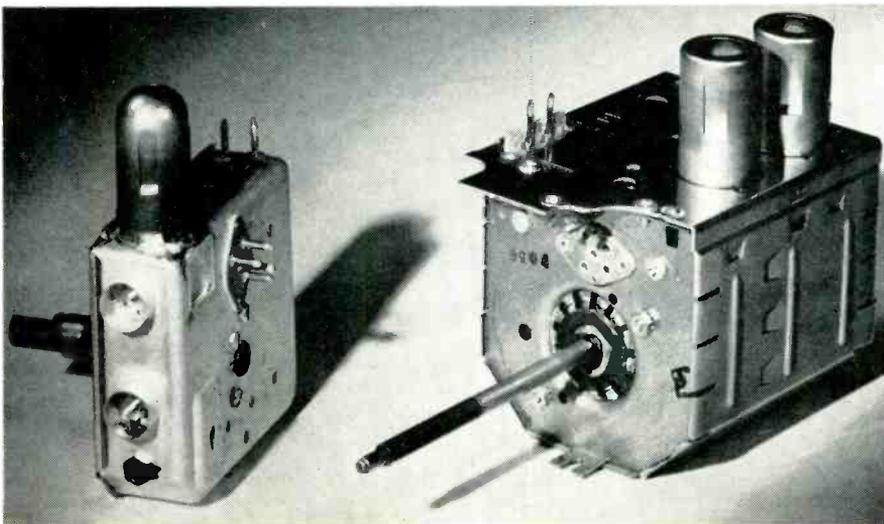


Photo showing the UHF and VHF sections of the Sarkes Tarzian tuner plugged into each other.

tions are required. The shaft design permits fast tuning and fine tuning to be accomplished with the same knob, but without sacrifice of speed of tuning, or of sensitivity of fine tuning. UHF stations are tuned by first rotating the tuning knob in the proper direction; when the signal is located, the same knob is rotated in the opposite direction to fine-tune. When the U-13 is combined with the V-13, all tuning may be accomplished by three concentric knobs directly attached to the tuning shafts, thus eliminating the necessity of two separate tuning controls or the use of additional belts, pulleys, or gears. In properly-designed bracketing to the receiver chassis, the VHF tuner need not be removed when the U-13 is installed.

Service work on the UV 13 is mainly limited to replacing tubes. At this time, touching up the low and high channel oscillator screws on the V13 may be necessary. The U13 has a cover on the front which may be removed for replacement of the crystal. The UHF unit also has oscillator adjustments on the side for low and high ends of the band. A word of caution: *Under no circumstances is the sealed nut and set screw at the outside end of the UHF rotor shaft to be tampered with.* Any adjustment of this, however slight, will result in very serious electrical misalignment. The V13 unit is of the conventional switch type and is serviced like other similar units.

Photo illustrating plug-in sections of Sarkes Tarzian UV-13. Right: VHF unit. Left: UHF section.



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# SILVER



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# COLOR SHORTS

## Industry Keyhole

**NATIONWIDE COLOR TRAINING PROGRAM** being launched by Du Mont includes inauguration of a special school for service personnel of the manufacturer's distributors and dealers. Course of instruction will last one week, but will be repeated on a weekly basis to accommodate as many people as possible. The size of each group, however, will be limited to permit concentrated training.

**CHROMATIC TV LABS** has signed a 10-yr. agreement with N. V. Philips of Holland covering worldwide manufacture of the Chromatron, the Lawrence single-gun color crt. The pact covers all markets except the United States and Canada.

**ADVANCED TRAINING** in color servicing right at the Motorola factory, to begin shortly after Labor Day, is available free to independent dealers and service associations who wish to send representatives to the manufacturer's plant. The program will involve lab and experimental work on live sets, and includes some book work. This school will be implemented by local color service lectures in color markets. The students' only expenses will be for travel and living costs. Tim Alexander, Motorola service director, has sent 180 invitations to associations; dealer invitations are in the hands of local company distributors. Variations in color pix tubes and circuits will be covered.

**A SERIES OF SEMINARS** on color service techniques is now under way at Western Television Institute of Los Angeles. A Westinghouse color receiver is being used for actual tests and measurements.

**IMPACT OF LARGE CRT's** on the color outlook may be judged by the recent RCA announcement of a price slash on its receiver using the 15-in. 3-gun tube. Originally listed at \$1000, this small-pix receiver is now available at \$495. Purchasers at the higher price will get rebates from the manufacturer to cover the difference. Reason for the move: to clear out inventories of the small-screen sets, make way for the manufacturer's forthcoming line, which will use a larger tube.

**JOHN F. RIDER** plans on publishing Bob Middleton's book on color servicing in the near future. The volume, intended to emphasize the practical rather than the theoretical, will incorporate much of the material developed during the Simpson-Middleton practical demonstrations.

**DON'T OVERLOOK PHILCO** in the battle of the color pix tubes. James H. Carmine, newly elected Philco prexy, reveals a 21-in. rectangular crt which, he believes, can be mass-produced at a comparatively low cost. Shadow masks and other complicated structures inside the tube are eliminated, and there are no practical limitations on tube size. A single gun is used. As for the availability of color receivers, this manufacturer does not intend to offer any for sale this year. Carmine doesn't think that color sets offered to the public so far are suited to mass production. Philco is being cautious because "color television is too big and too important to risk false starts."

**COLOR SETS IN USE BY 1957** will number 7½ million. By 1964, the figure will be 37½ million, in contrast with 30 million monochrome sets in use today. So says John T. Thompson, manager of distributor sales for the GE Tube Department. Development of larger color crt's now going on in all competing types, he believes, will lead to "some action" in color sales in '55, with volume business becoming a reality in '56.

**LOW-DRIFT CRYSTALS** for use in sub-carrier oscillator circuits of color receivers are now available from Standard Piezo Company, Carlisle, Penna. These 3.579545 mc crystals are being made to a tolerance of 0.003% over a wide temperature range. They are hermetically sealed in containers filled with dry nitrogen.

**SIMPSON LECTURES** and demonstrations, conducted by Bob Middleton, were recently held in the Denver-Utah area, are now touring elsewhere. Correct testing techniques for checking chrominance and other color circuits, along with the instruments used, are shown on an actual receiver. The theoretical approach is by-passed in favor of how-to-do-it demonstrations.

**"VENETIAN BLINDS"** in tv pix due to co-channel and adjacent-channel interference is a problem in more than 100 areas throughout the U. S., according to Channel Master Corp., antenna mfrs. The problem is still growing due to increase of stations transmitting at top power and growth of new stations

**INTERNATIONAL RECTIFIER CO.** announces the appointment of Darrel V. Jarvis as industrial sales engineer for the Chicago branch office . . . **BEN-DIX RADIO'S** Communications Div. has added the position of automotive products mgr. Filling the post is Lawrence W. Jones, former general sales mgr.

**JOHN F. RIDER** is launching a series of specialized study and review texts for electronics students. First in the series will cover RC/RL time constants . . . **TECH-MASTER CORP.**, formerly at 443 Bwy, N. Y. C., has moved to larger quarters in the same city at 75 front St., B'klyn, N. Y. . . . **ROBERT-SHAW-FULTON CONTROLS**, expanding in Canada, is opening a new plant in the Toronto area.

**FOREIGN DELEGATES** to the Int'l Electrotechnical Commission being held at the U. of Pennsylvania this month will get a good look at radio & tv in our country. RCA and Philco are sponsoring tours through their respective plants for the delegates . . . **PRO-RATA**

**WARRANTY PROGRAM** on replacement pix tubes is announced by RCA. Warranty begins at the time of installation, grants credit adjustments over 1 yr., depending on the tube's length of service . . . **PAUL FINKEL**, youngest son of Julius Finkel, founder and prexy of JFD Mfg., is the 5th of the president's sons to join the firm.

**PACKAGE PLAN** for crystal phono cartridges advanced by American Microphone Co. includes 5 most popular replacement types in a plastic box, along with a replacement chart and gummed labels for the servicer's name and phone number, to be placed on equipment . . . **LINWOOD LESSIG** has joined the New York office of the Al Paul Lefton Co., Inc., as Director of Technical Advertising.

**1954 TACO SCHOLARSHIP**, awarded each year to outstanding local student by Technical Appliance Corp., Sherburne, N. Y., went to Wayne F. Wales this year. Wales is an honor student in the Sherburne Central School District . . . **TOY TV SERVICE TRUCK** is part of a sales gimmick offered by Du Mont. The 20-in. trucks will be given to children whose parents purchase Du Mont receivers.

**ASTATIC CORP.**, Conneaut, O. announces a new gen. sales mgr., G. Leonard Werner. Werner previously held a similar post with the Mark Simpson Mfg. Co.



# LEADING TV SET MAKERS PICK "205" CBS-COLORTRON

## LEADING BIG-SCREEN COLOR TUBE

- ... for **Biggest Picture**
- ... for **Superior Performance**
- ... for **Delivery NOW!**

### HOW "205" ACHIEVES BIGGEST PICTURE

As its name implies, picture area of "205" is a big 205 square inches. The "205" achieves this maximum utilization of screen area: 1. By photographic printing of tricolor screen directly on inside of curved face. 2. By using a simple, light-weight shadow mask. 3. By positioning the three mask supports above and below the desired screen area . . . where the screen is masked off anyway by the set maker to obtain the desired 4 x 3 aspect ratio. This permits full lateral use of screen.



### IT'S CBS-HYTRON FOR NEW COLOR RECEIVING TUBES TOO

TYPE	DESCRIPTION
CBS-Hytron 3A3	Half-wave, high-voltage rectifier
CBS-Hytron 6AM8	Diode, sharp-cutoff pentode
CBS-Hytron 6AN8	Medium- $\mu$ triode, sharp-cutoff pentode
CBS-Hytron 6BD4A	Sharp-cutoff beam triode, high-voltage regulator
CBS-Hytron 6BD6	Sharp-cutoff r-f pentode color demodulator
CBS-Hytron 6BJ7	Triple-diode d-c restorer

The CBS-Colortron "205" is *today* traveling in freight cars and trucks to the nation's leading TV set manufacturers. It was chosen by them, because of: The "205's" larger 205-square-inch screen. The "205's" over-all superior performance. The "205's" easier circuit adjustments. The "205's" absence of "pincushioning" and other distortion. And the "205's" availability in production quantities now!

**BIG-SCREEN COLOR TV IS HERE . . . today . . . at CBS-Hytron.** Original . . . simple . . . functional . . . advanced design of the "205" made this possible: 1. With its curved screen-mask construction. 2. With its maximum use of the screen area. 3. With its electromagnetically converged three-beam electron-gun assembly. And CBS-Hytron's huge, new Kalamazoo plant stands ready to step up the "205's" availability when needed. Yes, you can look to CBS-Hytron as the leader . . . and major producer of big-screen color picture tubes.

### NEW . . . FREE "205" DATA

Keep abreast of big-screen color TV. Four-page sheet on CBS-Colortron "205," RETMA type 19VP22, contains complete data on: Construction . . . operation . . . application . . . installation . . . adjustment . . . electrical and mechanical characteristics. Write for Bulletin E-227 today!



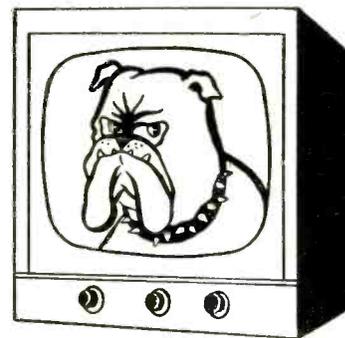
**CBS-HYTRON** Main Office: Danvers, Massachusetts

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# "Tough Dog" Corner

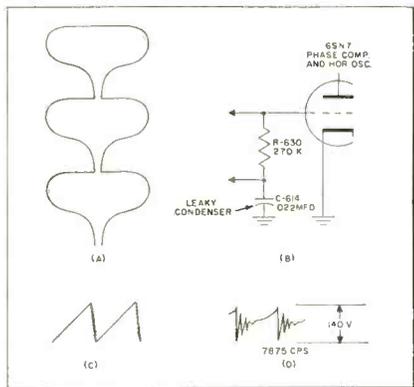
## Difficult Service Jobs Described by Readers



### "Atomic Bomb" Raster

A Philco 51-T1601 was brought into my shop by a fellow serviceman. He had worked on the set for two weeks, but couldn't locate the trouble. The raster on the picture tube gave the appearance (see illustration A) of three mushrooms, one atop the other, or of an atomic explosion. A check of the complete set with a vtvm showed all voltages to be within normal range.

Since the trouble present seemed to me to be due to some type of horizontal oscillation, I used my oscilloscope to check waveforms in the 6SN7 horizontal oscillator and phase comparator circuits (see sketch



B). The waveform at the grid was a normal-appearing sawtooth (see illustration C) with slight jaggedness on the retrace portion of the wave-shape. The defect in the waveform eluded me until I compared it with the correct grid waveform in the service data and schematic for the set (illustration D).

The clue thus provided led me to check further in the grid circuit. The .022 mfd condenser (C-614), I found, had developed high-resistance leakage (about 1 to 1.5 meg). Replacing this condenser with another one of the exact value restored the set to normal.—*Gelman, Philadelphia, Pennsylvania.*

### Laying It On The Line

This "Tough Dog" had me going around in circles. Symptom was a negative pix with triple image. The trouble only occurred on Channel 7. I tried various new tubes, and a new antenna. No soap. A new tuner was no help either. It didn't seem possible that the trouble was in the i-f's or

beyond because only one channel was affected, so I started to troubleshoot the transmission line from roof to set. I soon found a 1-inch strip of paint across the line at the point where it leaves the roof. Someone forgot to put a long standoff here, and when the painters worked on the building, they got a lead-content paint on the line. This was causing the trouble. I scraped the paint off, installed a stand-off and the set worked fine.—*John Mancini, Winthrop, Mass.*

### Damper Short Kills Signal

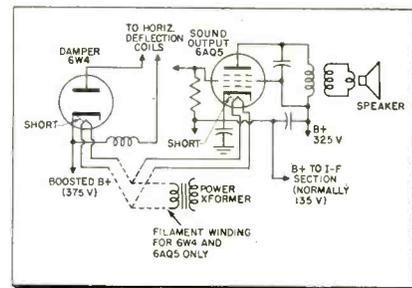
The set: Philco 50T-1404. The symptoms: good raster, no sound, no picture. The trouble seemed to be ordinary until the usual checks disclosed a rather odd thing. There were no defective parts in the tuner, i-f, or video sections, nor was there any apparent trouble in the audio circuits. A check of the i-f strip in the shop showed that available B+ for the section was 375 volts, although the schematic gives a value of 135 volts for this supply point. Conclusion: There must be a condenser between the 375 v point and the 135 v supply point which had shorted. A quick search of the diagram showed that no condenser was present between these points. The inspection also showed that the rectified B+ was not 375 v, but only 325 v. These findings led the author to feel that a short or leak between the boosted B+ (375 v) and the i-f B+ was present. Subsequent tests failed to reveal such a fault, however.

The set was shelved for a few days, then re-attacked. During a point-by-point check, signal from an audio oscillator was introduced at the grid

of the 1st audio tube. Sound was distorted. When the 6AQ5 audio output tube was replaced, not only did this symptom clear up, but the picture also returned. Measurements now showed the i-f plate voltages had returned to normal.

Returning to the 6AQ5, a check of voltages was made, and it was found that 375 v was present on the filaments. Looking at the circuit diagram persuaded me to replace the 6W4 damper as well!

Here's what had happened. The 6W4 and the 6AQ5 have a common filament supply from the power transformer. The filament of the 6W4 had apparently shorted to its cathode, placing 375 v on the heaters of the 6AQ5, which also shorted. This placed 375 v on the cathode of the audio output tube. Since this is where the i-f strip got its B+ supply voltage, the entire strip was affected. All tubes were apparently saturated, and therefore unable to pass signal.



A glance in the tube handbook shows why the 2-tube defect would occur. While the 6W4 has a maximum heater-cathode rating of 450 v when the heater is negative with respect to the cathode, this rating is only 100 v when the heater is positive with respect to the cathode. The 6AQ5, moreover, has a heater-cathode breakdown rating of only 90 volts. Therefore both tubes would break down if the damper tube were defective in this way.

Moral: There is some advantage after all in using a simple short test (via a tube checker) on all tubes in a TV set. (Editor's moral: Repair minor trouble if major one stumps you.)—*Charles R. Maduell, Jr., New Orleans, Louisiana.*

### \$ For Your "Tough Dog Story"

Have you tangled with a difficult or obscure service problem recently? Write it up, telling us how you licked it, and send it to "Tough Dog" Editor, **TECHNICIAN**, Caldwell-Clements, Inc., 480 Lexington Ave., New York 17, N.Y. \$10 will be paid for usable material. Unacceptable items will be returned to the contributor.

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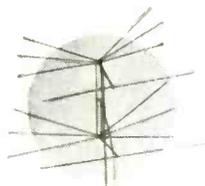
# TV

# ANTENNAS



# GUARANTEED TO OUTPERFORM ANY EQUIVALENT TYPE ANTENNA OR YOUR MONEY and LABOR COSTS BACK!

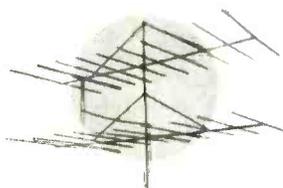
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PHILCO VHF  
SUPER CONICAL

## PHILCO TWO-BAY SUPER CONICAL ALL-CHANNEL ANTENNA

Strong signal pickup on VHF channels 2 through 13 . . . UHF channels 14 through 83 . . . ideal for fringe area reception . . . all-aluminum construction with dowelled elements: Part No. 45-3096-2. Rugged single bay design: Part No. 45-3096.



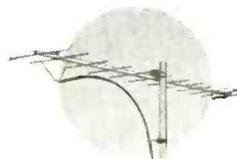
PHILCO VHF  
LOW BAND YAGI

## PHILCO TWO-BAY VHF LOW BAND YAGI ANTENNA

10 elements . . . all-aluminum . . . factory pre-assembled. Top performance on channels 2 through 6 . . . 13 db to 15 db gain on various channels. Single bay Part No. 45-3112-2 through 6. Stacked version harness Part No. 45-3267.

## PHILCO GOLDEN YAGI UHF ANTENNA

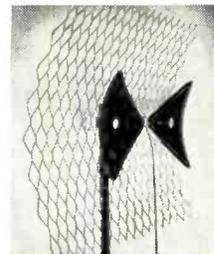
Designed for 300 ohm operation . . . all metal construction . . . 11 db to 12 db gain on various channels. "Cronak" coated components resist salt air . . . humidity. Six models cover entire UHF spectrum: Basic Part No. 45-1996.



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## PHILCO PARAFLECTOR ALL-CHANNEL UHF ANTENNA

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# Antenna "Spec" Chart

Over 750 Outdoor Types by 46 Manufacturers

Ratings are based on data supplied by the manufacturers. All antenna impedances are 300 ohms unless otherwise specified.

Code:

- |                      |                |   |
|----------------------|----------------|---|
| 1 — Conical          | S — Strong     | CSE — Cut separately for each channel or band.                        |
| 2 — Yagi             | M — Medium     | FCR — Designed for color reception.                                   |
| 3 — Dipole           | W — Weak       | HFB — High front-back ratio; reduces co-channel interference.         |
| 4 — Corner Reflector | VW — Very Weak | MWW — Mounts on outside wall or window.                               |
| 5 — Rhombic          |                | PRE — All or partly preassembled; fold out or snap-in construction.   |
| 6 — V Type           |                | SPC — Special constructional features for improved durability.        |
| 7 — Bow Tie          |                | STA — Stacked versions available at higher prices for increased gain. |
| 8 — Colinear         |                | SWI — Switch selects directivity pattern.                             |
| 9 — Special Design   |                | TUN — Tunable or adjustable in field for preferred channel or band.   |

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price					
<b>ADMIRAL CORP.</b> 3800 Cortland St., Chicago 47, Ill.						1007 to 1066						2	CSE, 2-13	VW	PRE	13.89-33.33
5A	1	2-13	M-W	Appx. 170 ohms	13.95	406	4	14-83	VW	2-bay	18.06					
7A	3	2-13	M-W		15.95	325	3, 9	2-83	VW	PRE	20.83					
8A	3	2-13	M-W		15.95	1173	2	7-13	VW	PRE	20.83					
3A	4	14-83	W	Appx. 70 ohms	19.50	1124	2	2-4	VW	PRE	40.97					
6E	1	2-13	W	Appx. 170 ohms	21.95	1125	2	2-5	VW	PRE	40.97					
<b>ADVANCE ELECTRONICS CO.</b> 8510 North End Ave., Oak Park 37, Mich.						1136						2	3-6	VW	PRE	40.97
12EL	1	2-13	VW	2-bay	18.50	1146	2	4-6	VW	PRE	40.97					
FDY	1, 3	2-13	VW	2-bay	24.95	1126	2	2-6	VW	PRE	40.97					
C283	1, 2, 3	2-83	VW	2-bay	41.50	325-2	3, 9	2-83	VW	PRE	42.36					
<b>ALLIANCE MFG. CO.</b> Alliance, Ohio						325-6						3, 9	2-83	VW	PRE	54.17
TC-1	8	2-13	S-VW			326-2	3, 9	2-83	VW	PRE, HFB	63.90					
TC-2	4, 8	2-83	S-VW			325-4	3, 9	2-83	VW	PRE	88.89					
TCU	4	14-83	S-VW			<b>CLEAR BEAM CORP.</b> 100 Prospect St., Burbank, Calif.										
<b>AMERICAN PHENOLIC CORP. (Amphenol)</b> 1830 S. 54th Ave., Chicago 50, Ill.						FDH7						3	7-13	S	PRE	2.50
114-054	2	14-83	VW		5.00	A	2	2-13	M	PRE	3.95-5.65					
114-062	4, 9	14-83	S		5.75	UF10	7	14-83	M	HFB	4.50					
114-059	6	2-83	S	PRE, TUN	9.75	UV	2	2-83	M		4.60					
114-068	1	2-13	S		12.50	C	1	2-13	M	PRE, SPC	5.10-6.54					
114-058	4	14-83	VW		12.50	R150	3, 5	2-13	M	PRE	5.53					
114-040	4, 9	2-13	S-M	FCR	13.50	FDL7	3	2-6	S	PRE	5.79					
114-060	5	14-83	VW	SPC	13.50	UA9	2	2-83	S	TUN	5.90					
114-029	4, 9	2-13	S		17.00	DC-5	1	2-13	M	PRE	6.98					
114-005	4, 9	2-13	S-M	FCR	19.50	YLSCH2 to										
114-077	1	2-13	W	2-bay	25.95	YLSCH13	2	CSE, 2-13	S	PRE, 5 elem.	6.98-14.08					
114-314	4, 9	2-13	W-VW		29.00	CL-6	1, 7	2-83	S		8.29					
114-075	1	2-13	VW	4-bay	54.95	FD-14	3	2-13	S	PRE	8.29					
<b>AMERICAN SCREEN PRODUCTS CO.</b> 807 N. W. 20th St., Miami 37, Fla.						UL-100						7	14-83	M	HFB	8.45
TW-30B	1, 9	2-83	M(VHF) VW(UHF)	65 ohms (VHF), HFB (UHF)	16.50	YSD10CH2 to										
<b>ANTENNA PRODUCTS</b> 3628 N. Lincoln Ave., Chicago 13, Ill.						YSD10CH13						2	CSE, 2-13	S	PRE, 10 elem.	13.41-28.75
BR310	7	14-83	M		4.45	UB	2	2-83	M		14.35					
EZV	6	2-13	M	PRE	5.30	BC-12	2	2-83	S	PRE	14.35					
EZX	1	2-13	M	PRE	5.85	UF-40	7	14-83	S		17.65					
Instantenna	3	2-13	M	PRE	7.65	MYH-50	2	2-83	S	PRE	19.20					
Duo Beam	3	2-13	M		8.60	R-1216	5	2-83	S		20.93					
UC-110	4	14-83	W-VW	SPC	10.50	TK1000	3	2-83	M	PRE, HFB	22.54					
Strato Beam	2	CSE	W-VW		from 11.00	RA1300	3	2-83	S	PRE, HFB	34.92					
BF2	3, 7	2-83	M		15.50	UF40-2	7	14-83	S	HFB	35.40					
Long Shot	3	2-13	W	SPC	31.00	LH4	2	2-83	S		44.45					
CA3	8	2-6	VW		32.00	TK1500	3	2-83	S	PRE, HFB	44.50					
<b>BRACH MFG. CORP.</b> 200 Central Ave., Newark 3, N. J.						TK1800						3	2-83	S	PRE, HFB	52.95
416B	1	2-13	M	FCR	10.00	<b>CORNELL-DUBILIER ELECTRIC CORP.</b> 333 Hamilton Blvd., South Plainfield, N. J.										
555	6	2-83	W	FCR	10.56	6YGU						2	14-83	W		4.77
437B	1	2-13	W	FCR	21.55	UBT-1	7	14-83	M		5.25					
556	6	2-83	W	FCR	22.62	UW-2	9	14-83	M	SPC	5.95					
450B	1	2-13	VW	FCR		U-4	3	14-83	M		7.50					
Rangefinder	9	2-83	VW			LZX-AA	1	2-13	M	All Aluminum Can Stack	8.30-17.75					
<b>CHANNEL MASTER CORP.</b> Ellenville, N. Y.						VV						6	2-83	S	STA	8.75
418	4	14-83	S, M		2.91	SL-4L	3	2-13	M		9.30					
719	1	2-13	M-S	PRE	5.00	UW-4	9	14-83	W	SPC	9.95					
718	1	2-13	M-S	PRE	5.42	UC-2	4	14-83	W		10.95					
400	2	CSE, UHF	VW	Up to 23 Channels	5.42	SL-4	3	2-13	M		12.75					
408	7	14-83	S-M		5.69	UC-1	4	14-83	W		12.95					
717	1	2-13	M-S	PRE	5.69	K-8	1	2-13	M	PRE, STA	16.95					
716	1	2-13	M-S	PRE	6.25	UW-8	9	14-83	VW	SPC	18.95					
410-2	7	14-83	M-W	2-bay	6.25	UM-213	3, 8	2-83	W	PRE, STA	19.95					
602 to 613	2	CSE, 2-13	W	PRE	7.65-17.65	V8	8	2-83	W		41.50					
420	2	CSE, UHF	VW	Up to 21 Channels	8.20	LZX Series	1	2-13	Varies	1, 2 or 4 bay	Varies					
409	4	14-83	M-W		9.03	HI-LO Series	3	2-13	M		Varies					
713	1	2-13	M-S	PRE	9.03	5-YG Series	2	CSE, 2-13	W	PRE, 5 elem.	Varies					
313	1	2-13	M-S	PRE	11.53	10-YG Series	2	CSE, 2-13	VW	PRE, 10 elem.	Varies					
<b>FINNEY CO.</b> 4612 St. Clair Ave., Cleveland 3, Ohio						DAVIS ELECTRONICS 4002 Burbank Blvd., Burbank, Calif.										
400A						SV-5						9	1-13	VW		39.95
						<b>DIATRON CO.</b> 3327 Dixie Dr., Houston 21, Texas										
						39						7	39 CSE	W		4.50
						X1						2	11 CSE	W		12.00

(Continued in next column)

(Continued on next page)

# Antenna "Spec" Chart

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
<b>(Finney Co. Continued)</b>					
400SA	8	2-83	VW	HFB	
200A	8	2-83	W		
200SA	8	2-83	W	HFB	
502A	8	14-35	W	HFB	
502B	8	29-52	W	HFB	
502C	8	47-83	W	HFB	
504A	8	14-35	VW		
504B	8	29-52	VW	HFB	
504C	8	47-83	VW	HFB	
<b>FRETCO INC.</b> 406 N. Craig St., Pittsburgh 13, Pa.					
BO-TI-C	4	14-83	W	PRE	3.95
V-2	6	2-83	M		5.45
UHF-6	2	CSE	VW	PRE, 6 elem.	5.75
F-44	1	2-13	M	STA	6.30
F-62	1	2-13	M	STA	6.50
UHF-12	2	CSE	VW	PRE, 12 elem.	7.25
MR-C	4	14-83	VW	2-bay	7.50
FA-2	8, 9	2-83	M		19.95
FA-5	9	2-83	VW	HFB	29.95
FA-1	8, 9	2-83	VW		39.95
FA-3	8, 9	2-83	VW	HFB	45.00
FA-4	9	2-83	VW		49.95
FA-6	9	2-83	VW		62.50
QTV-5	2	CSE	VW	5 elem.	Varies
QTV-8	2	CSE	VW	PRE, 8 elem.	Varies
QTV-10	2	CSE	VW	PRE, 10 elem.	Varies
ETV-5	2	CSE	VW	5 elem.	Varies
ETV-8	2	CSE	VW	PRE, 8 elem.	Varies
ETV-10	2	CSE	VW	PRE, 10 elem.	Varies
<b>GENERAL CEMENT CO. (Telco)</b> 919 Taylor Ave., Rockford, Ill.					
A-252	3	7-13	M		2.35
A-9003	7	14-83	S		3.50
A-260	6	2-83	M	STA	4.75
A-251	3	2-6	M		4.85
A-8965	7	14-83	M		4.95
A-100	1	2-13	M	STA	5.10
A-9017	6, 9	2-83	M		5.25
A-320	2	UHF-CSE	W	10 elem.	5.25
A-110	1	2-13	M	STA	5.75
8700-6S	1	14-83	M		5.90
A-9010	6, 9	2-83	M		5.95
A-120	1	2-13	M	STA	6.00
A-150	1	2-13	M	STA	6.25
8700-8S	1	14-83	M		6.50
A-352	6, 9	14-83	M		6.75
A-9004	7	14-83	M	2-bay	6.75
A-160	1	2-13	M	STA	6.75
8700	1	14-83	M	STA	7.00
A-302 to A-313	2	VHF-CSE	W	5 elem.	7.25-12.25
A-9050	7	14-83	S	MWW, 2-bay	7.25
A-170	1	2-13	M	STA	7.25
A-250	3	2-13	M		7.35
A-9002	4	14-83	W		7.45
A-210	1	2-13	M	PRE, STA	7.75
A-230	1	2-13	M	STA	7.85
A-220	1	2-13	M	STA	7.95
A-8984	4	14-83	W		8.95
A-9057	9	2-83	M	MWW	8.95
A-9058	9	14-83	M		8.95
A-9024	7	14-83	W	MWW, 2-bay	11.95
<b>HI-LO TV ANTENNA CORP.</b> 3540 N. Ravenswood, Chicago 13, Ill.					
101	9	2-13	All	MWW	9.95
202	9	2-83	All	MWW	9.95
<b>HY-LITE ANTENNA INC.</b> 242 E. 137th St., New York 51, N. Y.					
BHF	3	7-13	S	5 elem.	2.50
5 Y-14 (83)	2	CSE, 14-83	M	5 elem.	3.85
UFBT-	7	14-83	M		4.85
S070	3	2-6	S		4.90
5 YF #7 (13)	2	7-13	M	5 elem.	4.92
5030 #2 to 5030 #6	3	CSE, 2-6	S		4.96-6.35
10Y #14 (83)	2	CSE, 14-83	W	10 elem.	5.40
D. V. N.	6	2-13	M		5.48
5Y #7 (13)	2	7-13	W	5 elem.	5.55
X4-R2	1	2-13	M		6.00
UFVD	6	14-83	W	2-bay	6.00
X6H-R2	1	2-13	M		6.32
X6-R2	1	2-13	M		6.60
D. V.	6	2-13	M		6.92
S070-BHF	3	2-13	S		7.40
S030-BHF	3	2-13	S		8.00
S040	3	2-13	M		8.45
8Y #7 (13)	2	7-13	VW	8 elem.	8.95
S040-D	3	2-13	S		10.00
10Y #7 (13)	2	7-13	VW	10 elem.	10.50
5Y #2 to 5Y #6	2	CSE, 2-6	M	5 elem.	10.75-13.86
8Y #2 to 8Y #6	2	CSE, 2-6	VW	8 elem.	18.75-24.35
10Y #2 to 10Y #6	2	CSE, 2-6	VW	10 elem.	21.90-29.20
<b>JFD MFG. CO., INC.</b> 6101 16 Ave., Brooklyn 4, N. Y.					
QC10, QC12	3	7-13	S	PRE	1.95
QC1 to QC5	3	2-13	S	PRE	3.90-7.10
UHF352	2	CSE, 14-83	VW	12 elem.	4.20
UHF600	7	14-83	M	TUN	4.60
P670-6X2	1	2-13	M	STA	4.70
P800	6	2-83	M	PRE	4.85
5Y2 to 5Y13	2	CSE, 2-13	W	PRE, 5 elem.	5.00-13.20
P670	1	2-13	M	STA	5.30
Q800	6	2-13	M	STA	5.70
P770	1, 3	2-13	M	STA	6.95
5B2 to 5B13	2	CSE, 2-13	W	PRE, 5 elem.	6.95-17.60
QC150	3	2-13	M	PRE, STA	7.10
SR660	1	2-13	M	SPC, STA	7.65

(Continued in next column)

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
C670	1	2-13	M	STA	7.65
C119	1	2-13	S	MWW	8.95
UHF415	4	14-83	M	PRE, SPC	9.05
JET660	1	2-13	M	PRE, STA	9.05
UHF119	1	14-83	S	MWW	9.45
UHF204	7	14-83	M	STA, 4-bay	10.45
10Y2 to 10Y13	2	CSE, 2-13	VW	PRE, 10 elem.	11.10-27.80
JET160	1	2-13	M	PRE, STA	11.55
JET513	1, 2	2-83	W	PRE, STA	12.65
10B2 to 10B13	2	CSE, 2-13	VW	PRE, 10 elem.	13.95-30.55
JET454	1, 5	2-83	W	STA, FCR	16.50
10Y713	2	7-13	W	PRE	17.35
JET213	1, 2	2-83	W	PRE, STA	18.70
5Y26	2	2-6	W	PRE	18.75
10B713	2	7-13	VW	STA, 10 elem.	20.85
5B26	2	2-6	W	5 elem.	22.05
JET913	1, 9	2-83	W	FCR, STA	25.50
10Y26	2	2-6	W	PRE	35.00
C302S	3, 9	2-83	VW		35.40
JET213S-5	1, 2	2-83	VW	PRE, HFB, 4-bay	39.95
10B26	2	2-6	VW	STA, 10 elem.	40.95
JET664	1	2-13	W	4-bay	42.20
JET913S-5	1, 9	2-83	VW	FCR, HFB	55.00
<b>KAY-TOWNES ANTENNA CO.</b> 1511 Dean Ave., Rome, Ga.					
CS	1, 2	7-13	M	STA	7.25
BJ	1, 2	2-13	W	STA	12.50
SKDX	1, 2	2-13	VW	STA	18.36
<b>LA POINTE ELECTRONICS, INC. (VEE-D-X)</b> 155 W. Main St., Rockville, Conn.					
BT-U	7	14-83	S-M		2.90
UY-34-83	2	CSE, 34-83	W-VW		3.75
UY-14-33	2	CSE, 14-33	W-VW		4.20
C-42-2	1	2-13	M		5.55
5Y	2	CSE, 2-13	W	5 elem.	7.25-15.55
COR-U	4	14-83	W		8.25
AQT	9	2-13	S		8.25
QTC	1	2-13	M		9.00
SQTS	9	2-13	M		11.00
8Y	2	CSE, 2-13	W	8 elem.	11.65-27.75
QRCD	1	2-13	W		18.75
D-COR-U	4	14-83	VW		19.10
Chief	9	2-83	S(lo)		
			W-VW(hi)		19.95
SQTD	9	2-13	W		23.95
SP11	2	2-13	W		24.65
Chiefian	9	2-83	M-VW		24.95
Super-Chief	9	2-83	W-VW		29.95
SQTQ	9	2-13	VW		48.95
SP11D	2	2-13	VW		49.95
<b>MILLER TELEVISION CO.</b> 2840 Naomi, Burbank, Calif.					
FD-713	3	7-13	M	PRE	2.70
VVD	6	14-83	M		4.25
FADP	9	2-13	M	PRE	4.31
C-42	1	2-13	M		4.86
C-62	1	2-13	M		5.14
C-44	1	2-13	M		5.28
RAY	5	2-13	M	PRE	5.56
C-64	1	2-13	M		5.70
FD-26	3	2-6	M	PRE	6.12
C6P2P	1	2-13	M	PRE	6.12
C6P4P	1	2-13	M	PRE	6.25
FR-6	2	CSE	W		6.35
CR-200	4	14-83	M	PRE	7.50
CL-44	1	2-13	W		8.20
105 T	2	CSE	VW	PRE, 5 elem.	8.00-12.00
105Z	2	CSE	VW	PRE, 5 elem.	8.00-12.00
AY-526	2	CSE	VW	PRE, TUN	8.50
YC-100	1, 2	2-13	W	PRE	9.75
108T	2	CSE	VW	PRE, 8 elem.	11.00-18.00
108Z	2	CSE	VW	PRE, 8 elem.	12.00-18.00
YC-200	1, 2	2-13	W	PRE	12.50
110T	2	CSE	VW	PRE, 10 elem.	15.00-25.00
110Z	2	CSE	VW	PRE, 10 elem.	15.00-25.00
BF-200	9	2-13	W	PRE	26.95
BED-100	9	2-13	W	PRE	29.95
FRM-200	9	2-13	W	PRE	30.50
<b>NATIONAL ELECTRONIC PRODUCTS CORP.</b> 2 Gateway Center, Pittsburgh 22, Pa.					
BTR-1X	7	14-83	W	SPC	5.95
CON-4	1	14-83	W	SPC	9.50
GAR-1X	4	14-83	VW	SPC	12.50
<b>PHILCO CORP.</b> Philadelphia 34, Pa.					
45-3112-2 to					
45-3112-13	2	CSE	W-VW	PRE, 10 elem.	
45-3112-26	2	2-6	M-W	PRE, 10 elem.	
45-3112-456	2	4-6	W	PRE, 10 elem.	
45-3112-713	2	7-13	M-W	PRE, 10 elem.	
45-3096	1	2-13	M	200 ohms	
45-3096-2	1	2-13	M-W	2-bay, 200 ohms	
45-1996	2	14-24	Varies		
45-1996-1	2	24-34	Varies		
45-1996-2	2	34-46	Varies		
45-1996-3	2	46-58	Varies		
45-1996-4	2	58-70	Varies		
45-1996-5	2	70-83	Varies		
45-3071	4, 7	14-83	M-W		
45-3070	7	14-83	Varies		
45-1880	6	2-83	M	TUN	
<b>PHOENIX ELECTRONICS, INC.</b> 50 Island St., Lawrence, Mass.					
PAR-1	3	7-13	M	PRE, STA	
PAR-2	3	2-6	M	PRE, STA	

(Continued on next page)

# Antenna "Spec" Chart

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price						
<b>(Phoenix Continued)</b>						<b>SNYDER MFG. CO.</b> 22nd & Ontario Sts., Philadelphia 40, Pa.											
PAR-3	3	2-13	W	PRE	.....	UHF-5	7	14-83	W	.....	2.95						
PAR-6	3	2-13	W	PRE	.....	UHF-6	4	14-83	VW	.....	5.45						
PAR-5	3	2-13	VW	PRE, SPC, HFB	.....	AR-55	9	2-83	M	PRE	5.60						
YAGI-5	2	CSE, 2-13	W	PRE, 5 elem.	.....	AX-620	1	2-13	M	.....	7.25						
YAGI-10	2	CSE, 2-13	VW	PRE, SPC, 10 elem.	.....	RB7-13	2	2-13	VW	.....	9.25						
PAR-102	7	14-83	W	SPC, STA	.....	AR-58	9	2-83	W	SPC	10.45						
PAR-103	1, 7	2-83	VW	.....	.....	WX-04	1	2-13	M	MWW	10.95						
<b>D-LINE MFG. CORP.</b> 1562 61st St., Brooklyn 19, N. Y.						<b>SPECIAL INSTRUMENTS LAB., INC. (SPINLAB)</b> 312 W. Vine Ave., Knoxville, Tenn.											
UHF-345	7	14-83	S	MWW	3.45	152A	9	CSE, UHF	W	HFB	6.95						
UHF-751	7	14-83	M	PRE	3.95	152	9	CSE, UHF	W	HFB	9.95						
UHF-752	7	14-83	M	PRE	4.25	<b>SPIRLING PRODUCTS CO., INC.</b> P. O. Box 411, Hicksville, L. I., N. Y.											
U-100	7	14-83	M	PRE	5.45	904	9	ALL	VW	H <sub>3</sub> B	16.95						
U-100	6	2-83	M	PRE	5.95	<b>SUMMIT ENGINEERING CO.</b> 3324 Main St., Hartford, Conn.											
205	1	2-13	M	PRE	5.95	UTV-101	9	8-83	S	.....	.....						
C-500	6	2-83	M	PRE	5.95	UTV-102	9	8-83	M	.....	.....						
U-200	6	2-83	M	PRE	6.25	UTV-104	9	8-83	W	.....	.....						
UHF-125	4	14-83	M	PRE	6.95	UTV-104S	9	8-83	VW	.....	.....						
UHF-800	9	14-83	M	PRE	7.65	UTV-MTC	9	8-83	M	.....	.....						
CW-900	1	2-13	M	MWW	9.50	<b>TECHNICAL APPLIANCE CORP. (TACO)</b> Sherburne, N. Y.											
860	1	2-13	W	PRE	10.00	3031	7	14-83	S	STA	3.25						
UHF-251	4	14-83	W-VW	PRE	12.95	3015	2	56-83	W	10 elem.	6.25						
UHF-150	4	14-83	W	PRE	13.50	3015	2	41-63	W	10 elem.	6.25						
283	1, 2	2-13	VW	PRE	13.95	3015	2	30-50	W	10 elem.	6.25						
950	1, 2	2-83	VW	PRE	19.95	3015	2	21-36	W	10 elem.	6.25						
999	1, 2	2-83	VW	PRE	Varies	3015	2	14-29	W	10 elem.	6.75						
5-R Series	2	CSE, 2-83	VW	.....	Varies	1350	2	CSE, 7-13	W	PRE, 5 elem.	7.50-8.00						
5-W Series	2	CSE, 2-83	VW	.....	Varies	940	3	2-6	M	.....	9.00						
8-W Series	2	CSE, 2-83	VW	.....	Varies	1870	2	2-13	W	3 elem.	9.95						
10-W Series	2	CSE, 2-83	VW	.....	Varies	1001	1	2-13	M	.....	11.25						
<b>RAOELCO MFG. CO.</b> 7580 Garfield Blvd., Cleveland 25, Ohio						<b>TELCO (See General Cement Co.)</b>											
RT-51	3	7-13	M	.....	2.20	<b>TELEVISION PRODUCTS</b> Platte Center, Nebr.											
US-201	7	14-83	M-S	.....	3.95	1B-1	1	2-13	M	1-bay	8.95						
US-102	9	2-83	M-S	.....	4.35	2B-1	1	2-13	W	2-bay	14.95						
RS-52	3	2-6	M	.....	6.10	4B-1	1	2-13	VW	4-bay	27.95						
YS-502 to YS-513	2	CSE	W-VW	.....	7.15-12.30	<b>TELKOR INC.</b> Telegraph Rd., Elyria, Ohio											
US-151	4	14-83	M-W	.....	7.45	15283	1, 7	14-83	W	.....	8.50						
RS-751	1	2-13	M	.....	7.65	<b>TELREX, INC.</b> Asbury Park, N. J.											
RM-42	3	2-13	M	.....	9.15	71	7	14-83	M	1-bay	5.75						
BBH-11	2	7-13	M-W	.....	10.20	CLV	1	2-13	M	.....	5.95						
RM-40	9	2-13	M	.....	11.20	CH2X6	1, 9	2-13	M	.....	6.66						
RM-65	1	2-13	M	.....	12.05	Y6X	2	CSE-VHF	W	6 elem.	7.63-16.19						
RS-852	1	2-13	M-S	.....	13.05	U2X-TV	1, 9	2-13	M	.....	9.30						
YS-457	2	4, 5, 7	W-VW	.....	13.05	72	7	14-83	W	2-bay	10.75						
YS-457A	2	4, 5	W-VW	.....	13.05	420	1	2-83	M	2-bay	12.08						
YS-457B	2	5, 7	W-VW	.....	14.30	FBT	2	CSE-VHF	VW	10 elem.	13.35-33.50						
YS-458	2	CSE	W-VW	.....	14.30	CH4X12	1, 9	2-13	W	TUN	14.16						
YS-458A to K	2	CSE	W-VW	.....	16.15	79	7	14-83	W	.....	14.45						
RS-752	1	2-13	M	.....	19.70	DY6X1	2	4-5	W	.....	19.68						
RM-652	1	2-13	M	.....	34.95	U4XTV	1, 9	2-13	W	.....	19.94						
DN-2	8	2-83	W-VW	.....	35.85	74	7	14-83	VW	4-bay	19.95						
RS-754	1	2-13	W-VW	.....	.....	ME-4X	1, 9	2-13	W	PRE	25.21						
<b>RADIART CORP.</b> 3455 Vega Ave., Cleveland 13, Ohio						<b>TENNALAB</b> Quincy, Ill.											
6YGU	2	14-83	W	.....	4.77	SL-7CQ to SL-13CQ	2	CSE, 7-13	VW	.....	10.00						
UBT-1	7	14-83	M	SPC	5.25	S7 to S13	2, 9	CSE, 7-13	VW	SPC	50.00-90.00						
UW-2	9	14-83	M	.....	5.95	<b>TRIO MFG. CO.</b> Griggsville, Ill.											
U-4	3	14-83	M	All Aluminum Can Stack	7.50	FDH	3	7-13	S	.....	2.78						
LZX-AA	1	2-13	M	.....	8.30-17.75	UBT-1	7	14-83	W-VW	STA	4.45						
VV	6	2-83	S	STA	8.75	(Continued on next page)											
SL-4L	3	2-13	M	.....	9.30												
UW-4	4	14-83	W	SPC	9.95												
UC-2	4	14-83	W	.....	10.95												
SL-4	3	2-13	M	.....	12.75												
UC-1	4	14-83	W	.....	12.95												
K-8	1	2-13	M	PRE STA	16.95												
UW-8	9	14-83	VW	SPC	18.95												
UM-213	3, 8	2-83	W	PRE, STA	19.95												
V8	8	2-83	W	.....	41.50												
LZX Series	1	2-13	M	Varies	Varies												
HI-LO Series	3	2-13	M	Varies	Varies												
5-YG Series	2	CSE, 2-13	W	PRE, 5 elem.	Varies												
10-YG Series	2	CSE, 2-13	VW	PRE, 10 elem.	Varies												
<b>RADIO MERCHANDISE SALES INC.</b> 2016 Bronxdale Ave., Bronx 62, N. Y.						<b>TELCO (See General Cement Co.)</b>											
B-48	3	7-13	S	.....	2.31	<b>TELEVISION PRODUCTS</b> Platte Center, Nebr.											
EVA-100	9	2-83	S	PRE	5.40	1B-1	1	2-13	M	1-bay	8.95						
PRF1	1	2-13	S	PRE	6.00	2B-1	1	2-13	W	2-bay	14.95						
B-40	3	2-6	S	.....	6.24	4B-1	1	2-13	VW	4-bay	27.95						
B-45	3	2-13	S	.....	8.58	<b>TELKOR INC.</b> Telegraph Rd., Elyria, Ohio											
EVA-200	9	2-83	M	PRE, 2-bay	12.20	15283	1, 7	14-83	W	.....	8.50						
FA-1	1	2-13	S	.....	12.43	<b>TELREX, INC.</b> Asbury Park, N. J.											
COR-U	4	14-83	W	PRE	13.12	71	7	14-83	M	1-bay	5.75						
STYL 8 (2-13)	2	CSE-VHF	W	HFB, 8 elem.	13.12-24.69	CLV	1	2-13	M	.....	5.95						
CVA-500	1, 9	2-83	M	PRE	13.33	CH2X6	1, 9	2-13	M	.....	6.66						
PRF2	1	2-13	M	2-bay	13.43	Y6X	2	CSE-VHF	W	6 elem.	7.63-16.19						
STYL 10 (2-13)	2	CSE-VHF	VW	HFB, 10 elem.	14.81-30.86	U2X-TV	1, 9	2-13	M	.....	9.30						
CY-1	1, 2	2-13	W	PRE	15.43	72	7	14-83	W	2-bay	10.75						
FA-2	1	2-13	M	PRE, 2-bay	26.38	420	1	2-83	M	2-bay	12.08						
CVA2-500	1, 9	2-83	W	PRE, 2-bay	28.00	FBT	2	CSE-VHF	VW	10 elem.	13.35-33.50						
PRF-4	1	2-13	W	4-bay	28.40	CH4X12	1, 9	2-13	W	TUN	14.16						
EVA-400	9	2-83	W	PRE, 4-bay	28.70	79	7	14-83	W	.....	14.45						
CY-11	1, 2	2-13	VW	PRE, HFB, 2-bay	30.86	DY6X1	2	4-5	W	.....	19.68						
STY 1026	2	2-6	VW	PRE	40.95	U4XTV	1, 9	2-13	W	.....	19.94						
FA-4	1	2-13	W	4-bay	57.09	74	7	14-83	VW	4-bay	19.95						
CVA4-500	1, 9	2-83	VW	PRE, 4-bay	60.50	ME-4X	1, 9	2-13	W	PRE	25.21						
<b>SKYLINE MFG. CO.</b> 1652 Rockwell, Cleveland 14, Ohio						<b>TENNALAB</b> Quincy, Ill.											
701-CT	8	2-83	VW	HFB	27.50	SL-7CQ to SL-13CQ	2	CSE, 7-13	VW	.....	10.00						
<b>SKYSWEEPER, INC.</b> McHenry, Ill.						<b>TRIO MFG. CO.</b> Griggsville, Ill.											
350-2	6	2-83	M	SPC, PRE	5.95	FDH	3	7-13	S	.....	2.78						
302-42	1	2-13	W	SPC	14.95	UBT-1	7	14-83	W-VW	STA	4.45						
302-10	1	2-13	W	SPC	15.95	(Continued on next page)											
307-7	1	2-6	W	SPC	15.95												

# Antenna "Spec" Chart

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
<b>(Trio Continued)</b>						101	6	2-13	M-W		6.25
SV-2	6	2-83	S	STA	4.86	106	3	2-13	M-W	PRE	7.12
DRI	9	2-13	S	STA	5.84	103	1	2-13	M-W		11.65
C42	1	2-13	S-M	STA	5.98	203	1	2-13	M-W	PRE	14.25
FDL	3	2-6	S		6.26	5 elem. Yagi	2	CSE	M-W	PRE	Varies
52 to 513	2	CSE, 2-13	W		6.26-15.90	10 elem. Yagi	2	CSE	M-W	PRE	Varies
6713	2	7-13	M	STA	6.53	<b>WALSCO ELECTRONICS CORP.</b> 3602 Crenshaw Blvd., Los Angeles 16, Calif.					
SC42	1	2-13	S-M	STA	6.53	4400	9	14-83	M		3.50
C42D, C62	1	2-13	S-M	STA	6.67	4010	6	2-83	M		3.77
C44	1	2-13	S-M	STA	6.95	4030	1	2-13	M		5.85
SC44	1	2-13	S-M	STA	7.51	4040	1	2-13	W		6.50
C44D	1	2-13	S-M	STA	7.65	4100	6	2-83	W	TUN	7.50
C64	1	2-13	S-M	STA	7.78	4460	6	2-83	M		7.50
SQ1	4	14-83	M	STA	7.78	4300	2	CSE-UHF	VW		7.50
IL	3	2-13	M	STA	8.20	4060A	1	2-13	VW		9.25
C42B	1	2-83	S-M	STA	8.76	4090	1	2-13	W		9.25
VC-1	1	2-83	S	STA	8.76	4450	4	14-83	W		9.95
ILD	3	2-13	M	STA	9.04	4150	9	2-83	W	TUN	18.50
52D to 56D	2	CSE, 2-6	W		9.15-12.09	4452	4	14-83	VW		19.95
10713	2	7-13	W	STA	9.31	<b>WARD PRODUCTS CORP.</b> 1148 Euclid Ave., Cleveland 15, Ohio					
102 to 1013	2	CSE, 2-13	VW		9.31-26.41	TV-260	4	14-83	M-W	PRE	7.50
FDLH	3	2-13	S		9.45	TV-240	1	2-13	M	PRE	8.25
C62B	1	2-83	S-M	STA	9.45	TV-245	6	2-83	M	PRE	12.95
ILD	3	2-13	M		9.95	TV-132	6	2-83	M	PRE	15.95
1073	2	7-13	VW		12.50	TV-310	1	2-13	M		17.50
C62U	1	2-83	S-M	STA	12.51	TV-290	1, 2	2-13	W	PRE	17.50
88	1, 2	2-13	M	STA	12.51	TV-241	1	2-13	W	PRE	19.95
98	1, 5	2-83	S-M	STA	12.51	TV-285	3, 9	2-13	W	SPC	19.95
66	3	2-13	M	STA	17.65	TVS-246	6	2-83	W	PRE	26.95
Twin-Six	9	2-13	W-VW		22.95	TVS-142	6	2-83	W	PRE	34.95
726	2	2-6	VW		25.02	TVS-291	1, 2	2-13	VW	PRE	35.00
Z216H	9	7-13	VW		25.95	TVS-315	1	2-13	W		36.00
44	9	2-13	W-VW		33.22	TVS-286	3, 9	2-13	VW	SPC	39.95
22U	8	2-83	W-VW		38.78	TVS-292	1, 2	2-13	VW	PRE	40.00 apx.
Z212L	9	2-6	VW		39.95	TV-295	8	2-13	VW	PRE	49.95
<b>T-Y PRODUCTS CO.</b> 145-68 228 St., Springfield Gardens 13, N. Y.						TVS-287	3, 9	2-13	VW	SPC	50.00 apx.
702	7	14-83	S	PRE, TUN	4.50	TV-296	8	2-13	VW	PRE, HFB	60.00 apx.
AM-21	1	2-13	S	150 ohms	4.75	<b>WELCO MFG. CO.</b> 225 S. 3rd, Burlington, Iowa					
AM-21D	1	2-13	S	150 ohms	5.15	SABRE Jr.	2	2-13	S-M		8.75
706A	4	14-83	M-W	PRE, HFB	8.50	SABRE 100	2	2-13	S-M		14.95
Y-713-5	2	7-13	W	PRE, 5 elem.	11.00	SABRE Sr.	2	2-13	S-VW		19.95
Y-226-5	2	2-6	W	PRE, 5 elem.	17.65	<b>WINEGARD CO.</b> 3000 Scotten Blvd., Burlington, Iowa					
Y-713-10	2	7-13	VW	PRE, 10 elem.	17.95	HT	2	7-13	M		9.45
PRL-42	1	2-13	M-W	PRE, 150 ohms	18.15	L-7	2	7-13	W-VW		12.95
BJ-20	1, 2	2-83	VW	PRE, 10 elem.	32.95	L-5	1, 2	2-13	M		14.95
Y-226-10	2	2-6	VW	PRE, 10 elem.	32.95	K Series	2	CSE, 2-6	W		16.95
MM-200	9	2-83	VW	PRE, HFB	52.50	L-4	2	2-13	W-VW		24.95
Y-2 to Y-13	2	CSE, 2-13	W	PRE, 5 elem.	Varies	<b>VEE-D-X (See La Pointe Elec.)</b>					
Y-2-8 to Y-13-8	2	CSE, 2-13	W-VW	PRE, 8 elem.	Varies	<b>VIDEO INDUSTRIES CO.</b> 42 Palmer Pl., Port Chester, N. Y.					
Y-2-10 to Y-13-10	2	CSE, 2-13	VW	PRE, 10 elem.	Varies	105	9	2-13	M-W	PRE	4.70

(Continued in next column)

## NEW ANTENNA ACCESSORIES

### RCA DISTRIB. AMPLIFIER

This broadband amplifier engineered for master-antenna systems employing 50 or fewer receivers, the Antenaplex amplifier (MI-5185), is intended for small-chain installations in motels, hotels, showrooms, and department stores. It can also be used in community TV systems to extend distribution lines. Comes aligned for flat response on all VHF channels, 2 to 13. Can be cascaded for additional gain, used as a pre-amp for channelized strips, and adapted for 300-ohm input if required. The low and high bands may be combined for single output. Radio Corp. of America, 30 Rockefeller Plaza, New York 20, N. Y.—TECHNICIAN

### Shakespeare AUTO ANTENNA

The non-corroding Wonderrod, a fiberglass auto aerial, has high flexural and impact strength, weathers well and has insulation effective even at relatively high frequencies. Length, 60 to 90 in. List price, \$12.90.

Columbia Products Co., Div. of Shakespeare Co., P. O. Box 5207, Columbia, S.C.—TECHNICIAN

### Fenton GROUND ROD

Tuf Guy ground rods consist of a 3/8-in. steel core rod, rust-proofed with electrolytic copper covering, come in 4-, 6- and 8-ft. lengths. Non-removable ground-rod clamps are already mounted on the rods.

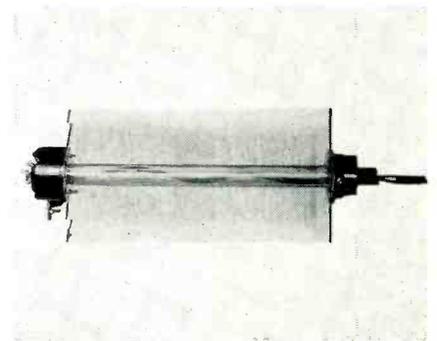
Also available: high-conductivity, flexible no. 8 aluminum ground wire in 1000-ft. continuous lengths. Fenton Co., 15 Moore St., New York 4, N. Y.—TECHNICIAN

### Skysweeper ROOF MOUNT

A tripod-type roof mount for antenna installations, providing a pre-assembled collapsible unit that is easily stored, is now available in 3 sizes. The tower mount opens up simply for installation. Angle-iron foot mounts pivot to allow for roof pitch. Can be used with any size masting up to two inches, available in 3 1/2, 5 and 10 ft. sizes. Skysweeper, Inc., P. O. Box 92, Mc Henry, Illinois.—TECHNICIAN

### Telco 2-WAY ANTENNA AID

Combination lead-in tube and lightning arrestor is an installation time saver that can be used on any wall (masonry, wood, or other material) up to 16 in. thick. A univer-



sal type lightning arrestor is on the outside end and a wall plug on the inside end. A 3/4-in. hole is drilled through the wall to accommodate the device. The combination tube, catalog no. 8641, lists at \$3.95. Television Hardware Mfg. Co. (Div. of General Cement Mfg. Co.), 919 Taylor Ave., Rockford, Ill.—TECHNICIAN

# TV Receiver Specifications

(A) also UHF-VHF higher priced; W=Wood, Z=Composition, M=Metal, PL=Plastic, T=Table, P=Portable, C=Console, CS=Consolette, CD=Console with doors, COM=Combination, S=Selenium Tube, N=No, Y=Yes, S.C.=Standard Coil, S.T.=Sarkes Tarzian, G.I.=General Instrument, M=Magnavox, P=Phileo, Z=Zenith, Δ=Various Mfrs., GE=General Electric, RCA=Radio Corp. of America, T=TeleKing.

MAKE AND MODEL NO.	LIST PRICE	TUBE SIZE	CABINET	TYPE	PHONO	SET RECEIVES	VHF-UHF	DHF EXTRA \$ \$	TOT. TUBES EXCL. RECT.	RECT. TUBES	SIZE SPEAKER	MAKE TUNER	VIDEO IF (MC)	MAKE AND MODEL NO.	LIST PRICE	TUBE SIZE	CABINET	TYPE	PHONO	SET RECEIVES	VHF-UHF	DHF EXTRA \$ \$	TOT. TUBES EXCL. RECT.	RECT. TUBES	SIZE SPEAKER	MAKE TUNER	VIDEO IF (MC)	
<b>ADMIRAL</b>														<b>EMERSON</b>														
T183(A)	149.95	17	PL	T	Z	FM			18	2	5	21	1060	129.95	17	W	T	Z					17	3	4	4	45.75	
T1842(A)	169.95	17	PL	T	Z	FM			18	2	5	21	1030	150.00	14	W	T	Z					17	3	4	4	45.75	
T2311Z(A)	199.95	21	W	T	Z	FM			19	2	5	21	1066(A)	159.95	17	W	T	Z					20	17	3	4	45.75	
C235(A)	199.95	21	W	T	Z	FM			18	2	5	21	1070(A)	179.95	17	W	T	Z					20	17	3	4	45.75	
T2316Z(A)	259.95	21	W	T	Z	FM			19	2	5	21	1074(A)	179.95	21	W	T	Z					20	17	3	4	45.75	
C2316Z(A)	279.95	21	W	T	Z	FM			19	2	5	21	1084(A)	199.95	21	W	T	Z					20	17	3	4	45.75	
K2250(A)	299.95	21	W	T	Z	FM, AM			20	2	5	21	1040(A)	229.95	21	W	T	Z					20	18	3	4	45.75	
C2326Z(A)	329.95	21	W	T	Z	FM			19	2	5	21	1040(A)	229.95	21	W	T	Z					20	18	3	4	45.75	
F2320Z(A)	349.95	21	W	T	Z	FM			19	2	5	21	1092(A)	239.95	21	W	T	Z					20	17	3	4	45.75	
C2826Z(A)	399.95	27	W	T	Z	FM			22	2	10	21	1086(A)	229.95	21	W	T	Z					20	17	3	4	45.75	
L2326Z(A)	489.95	27	W	T	Z	FM, AM			22	2	10	21	1088(A)	229.95	21	W	T	Z					20	17	3	4	45.75	
													1018(A)	249.95	21	W	T	Z					20	17	3	4	45.75	
													1050(A)	249.95	21	W	T	Z					20	17	3	4	45.75	
<b>ANDREA</b>													1048(A)	269.95	21	W	T	Z					20	17	3	4	45.75	
TVN21	299.95	21	W	T	Z			50	18	3	7	G.I.	45.75	1048(A)	269.95	21	W	T	Z				20	17	3	4	45.75	
CVN21	369.95	21	W	T	Z			50	18	3	12	G.I.	45.75	740(A)	279.95	21	W	T	Z					20	17	3	4	45.75
CVM21	394.95	21	W	T	Z	AM		50	22	3	12	G.I.	45.75	1044(A)	299.95	21	W	T	Z					20	17	3	4	45.75
2CVN21	449.95	21	W	T	Z			50	18	3	12	G.I.	45.75	1054(A)	349.95	21	W	T	Z					20	17	3	4	45.75
2CVM21	449.95	21	W	T	Z	AM		50	22	3	12	G.I.	45.75	773(A)	429.95	21	W	T	Z					20	17	3	4	45.75
47CVN21	474.95	21	W	T	Z	AM		50	22	3	12	G.I.	45.75	777(A)	500.00	27	W	T	Z					20	17	3	4	45.75
COVM21	585.50	21	W	T	Z	AM		50	22	3	12	G.I.	45.75	775(A)	549.95	21	W	T	Z					20	17	3	4	45.75
													797(A)	600.00	27	W	T	Z					20	17	3	4	45.75	
<b>ARVIN</b>														<b>FADA</b>														
555TM(A)	149.95	21	M	T	Z			20	14	1-18	4	S.T.	45.75	1712(A)	169.95	17	W	T	Z				30.00	13	3	4	21	
557G(A)	159.95	21	M	T	Z			20	14	1-18	4	S.T.	45.75	2111(A)	179.95	21	W	T	Z					30.00	13	3	4	21
557TM(A)	169.95	21	W	T	Z			20	14	1-18	4	S.T.	45.75	2111(A)	179.95	21	W	T	Z					30.00	13	3	4	21
554KM(A)	179.95	21	W	T	Z			20	14	1-18	6	S.T.	45.75	21KA(A)	225.95	21	W	T	Z					34.95	13	3	4	21
551TM(A)	219.95	21	W	T	Z			20	19	1-28	6	S.T.	45.75	DX2(A)	229.95	21	W	T	Z					30.00	17	3	4	21
553TM(A)	219.95	21	W	T	Z			20	19	1-28	8	S.T.	45.75	DX2(A)	229.95	21	W	T	Z					30.00	17	3	4	21
553TM(A)	289.95	21	W	T	Z			20	19	1-28	8	S.T.	45.75	DX2(A)	229.95	21	W	T	Z					30.00	17	3	4	21
552KM(A)	329.95	21	W	T	Z			20	19	1-28	10-5	S.T.	45.75	17KD(A)	249.95	17	W	T	Z					35.00	13	3	4	21
9245CM-U	389.95	24	W	T	Z			20	19	3	6x9	S.T.	45.75	21K1(A)	249.95	21	W	T	Z					35.05	13	3	4	21
9210M-U	449.95	21	W	T	Z			20	21	3	10	S.T.	45.75	DX21K(A)	289.95	21	W	T	Z					35.05	17	3	4	21
9210M-U	499.95	21	W	T	Z			20	21	3	10	S.T.	45.75	21C	379.95	21	W	T	Z					35.05	17	3	4	21
9218CB-U	519.95	21	W	T	Z			20	21	3	10	S.T.	45.75	DX21(A)	429.95	21	W	T	Z					35.05	18	3	4	21
9212CFP-U	529.95	21	W	T	Z			20	21	3	10	S.T.	45.75	Y21CD	389.95	21	W	T	Z					35.05	18	3	4	21
													V2100C	415.00	21	W	T	Z					35.05	18	3	4	21	
													DX27T(A)	459.95	27	W	T	Z					35.05	18	4	8	21	
<b>BENDIX</b>														<b>GENERAL ELECTRIC</b>														
TS17DS(A)	179.95	17	W	T	Z			20	16	5	6	S.T.	41.25	17T14(A)	149.95	17	M	T	Z				20	15	2	4	45.75	
HTS1G(A)	189.95	17	W	T	Z			20	16	5	6	S.T.	41.25	17T17(A)	169.95	17	PL	T	Z					20	16	2	4	45.75
SKM17C	199.95	17	W	T	Z			20	16	5	6	S.T.	41.25	17T20(A)	169.95	17	PL	T	Z					20	15	2	4	45.75
TS21C(A)	199.95	21	W	T	Z			20	16	5	6	S.T.	41.25	17T21(A)	179.95	21	W	T	Z					20	16	2	4	45.75
TM17E	199.95	17	W	T	Z			20	16	5	6	S.T.	41.25	21T22(A)	199.95	21	PL	T	Z					20	16	2	4	45.75
TM17E	229.95	21	W	T	Z			20	16	5	6	S.T.	41.25	21T23(A)	229.95	21	PL	T	Z					20	16	2	4	45.75
KN21C(A)	229.95	21	W	T	Z			20	16	5	6	S.T.	41.25	21T23(A)	229.95	21	PL	T	Z					20	16	2	4	45.75
TM21E(A)	269.95	21	W	T	Z			20	18	5	4x6	S.T.	41.25	21T24(A)	259.95	21	W	T	Z					20	16	2	4	45.75
TM21DS	279.95	24	W	T	Z			20	19	7	6	S.T.	41.25	21C103(A)	289.95	21	W	T	Z					20	16	2	4	45.75
KN21E(A)	299.95	21	W	T	Z			20	19	5	10	S.T.	41.25	21C103(A)	289.95	21	W	T	Z					20	16	2	4	45.75
FM21C(A)	299.95	21	W	T	Z			20	19	5	10	S.T.	41.25	21C103(A)	289.95	21	W	T	Z					20	16	2	4	45.75
FM21C(A)	319.95	21	W	T	Z			20	19	5	10	S.T.	41.25	21C103(A)	289.95	21	W	T	Z					20	16	2	4	45.75
FM21C(A)	339.95	21	W	T	Z			20	19	5	10	S.T.	41.25	21C240(A)	369.95	21	W	T	Z					20	17	3	4	45.75
KMT21E(A)	349.95	21	W	T	Z			20	18	5	10	S.T.</																



# New Test Instruments

## Measuring Equipment & Testers, Probes & Hand Tools

### Norma OHMMETER

A resistance measuring instrument that combines the accuracy of a Wheatstone bridge with the regular features of an ohmmeter is Normameter model 185R. Range, 0.05 to



50,000 ohms. Accuracy on 3 scales (0.5—50, 5—500, and 50—5,000 ohms) is  $\pm 0.5\%$ ; on the 0.05—5 ohms scale,  $\pm 2\%$ ; on the 500—50,000 ohms scale  $\pm 5\%$ . Uses null indicating galvanometer, operates on a replaceable 4.5-battery, an external source of 4 v, or (with adapter) on 115 v. Price, \$61.00. United Optical Mfg. Corp., 202-4 East 19th St., New York 3, N. Y.—TECHNICIAN

### B & B CRT TESTER

This picture tube and TV receiver tester dynamically tests b & w or color crt's under actual receiving conditions. The socket is disconnected from the base of the crt and inserted into the model 701 tester with a cabled adapter cord. A second cord connects between meter and picture tube. With receiver on, measurements are made of current and voltage applied to any tube element. Also tests: grid-cathode, heater-cathode, and grid-screen leakage; grid-cathode voltage from receiver; receiver; dc screen and video-signal output voltages; beam current at 2nd anode; grid control of beam current; effect of receiver contrast and brightness controls. All tests made by turning an 8-position switch. In addition, a 600-v dc range is included for other receiver checks. Boland & Boyce, Inc., 236 Washington Ave., Belleville 9, N. J.—TECHNICIAN

### Simpson EQUIPMENT

A new 40,000 volt high-voltage probe is available as an accessory for Simpson model 262 volt-ohm-milliammeter and Simpson model 269 volt-ohm-microammeter. Price of probe for either meter is \$12.50.

New tube chart for the model 1000 Plate Conductance Tube Tester shows all of tubes produced since the last tube chart was introduced in 1953. Ample space is provided for the addition of new tube data. Price, \$2.00. Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill.—TECHNICIAN

### RCA COLOR INSTRUMENTS

Color-bar generator WR-61A produces 10 bars of different colors for adjusting phasing and matrixing circuits and overall check of color receivers. Suggested net price, \$247.50.

Portable dot-bar generator WR-36A produces white rectangular dots for checking convergence. Suggested net price, \$147.50.

Five-inch dual-bandwidth oscilloscope WO-78A, flat to 4.5 mc, is useful for measuring color-burst signals and checking operation of color or monochrome circuits. Suggested net price, \$425.

Video MultiMarker WG-295A, for use with sweep generator, produces 5 pre-set markers for accurate alignment of response in color circuits. Absorption-type markers are set to frequencies for Q filter, I filter, band-pass filter, color sub-carrier and sound trap. Suggested price, \$24.95. Radio Corp. of America, Harrison, N. J.—TECHNICIAN

### R-1 ALIGNMENT TOOL

The Peaker, a light-weight screw-driver with composition handle and hardened ceramic blade, uses rubber shock mounting so that the blade is self-aligning, permitting the tip to find adjusting slots easily. The blade is made of AlSiMag 491 material. This ceramic blade, resistant to chipping and corrosion, is extremely hard, features a reversible tip for double production life. Radio Industries, Inc., 5225 N. Ravenswood Ave., Chicago 40, Ill.—TECHNICIAN

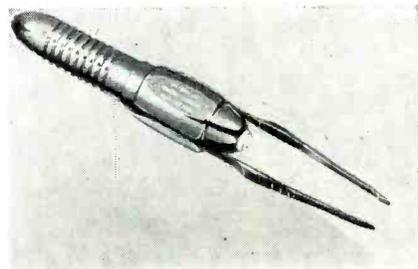
COMING IN OCTOBER—MORE  
TEST EQUIPMENT "SPECS"

### RCP H-V PROBE

High-voltage multiplier probe, model HVMP-C, is intended for use with all makes and ranges of vt voltmeters and high-sensitivity multi-testers, has been rated at 30,000 volts and tests satisfactorily at 70,000 volts. It is designed for safety: the voltage drop occurs in the multiplier at the lower end of the prod so that the lead wire and handling section are "cold." Radio City Products, 101 W. 31 St., New York 1, N. Y.—TECHNICIAN

### Top Line TWEEZER-LIGHT

The Tweezer-Lite is a set of precision-ground tweezers with a built-in, battery-operated light which focuses directly on the object to be



handled. Permits grip at any angle. Light is provided by turning the threaded rear portion of the body. Can be disattached for replacement of battery or bulb. Retail price, \$1.98. Top-Line Sales Co., 2098 E. Villa St., Pasadena 8, Calif.—TECHNICIAN

### Triplett V-O-M/VTVM

A new tester combines a volt-ohm-millammeter and a vacuum-tube voltmeter in a single unit, model 631. Features include 34 ranges as follows: V-O-M: 10 ac-dc volts; 6 direct current; resistance from 0.1 ohm to 150 meg; db and output readings. VTVM: 4 including 1.2-v range for grid voltage and accurate discriminator alignment (first division mark at 0.02 v.). Sensitivity: V-O-M: 20,000 ohms per volt on dc; 500 ohms per volt on ac. VTVM: 11 megohms. One switch selects all ranges. VTVM stability is improved by battery-operated design. Batteries are easily replaced, may be checked without opening case. Net price, \$59.50. Triplett Electrical Instr. Co., Bluffton, Ohio.—TECHNICIAN

# New Hi-Fi Equipment

## Audio Amplifiers, Tuners and Speaker Enclosures

### Newcomb AMPLIFIER

Combining simplicity of installation with ease of operation, the 10-watt Compact 10 is ready for use as is. Principal features: distortion below 1% at 10 w, response 20 to 20,000 cps  $\pm$  1 db, built-in rumble filter. Controls include bass tone, treble tone, record crossover, input selector and loudness. Output impedances are 8 and 16 ohms. Net price, \$79.50. Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—TECHNICIAN

### UTC AMPLIFIER KIT

MLF amplifier kit provides 36 db of feedback on a multiple-loop basis. Rated power output is 20 watts with low distortion (0.07% intermodulation distortion at 1 w, 1% at 20 w). Frequency response is controlled for 1 db from 20 to 20,000 cycles. Use of printed-circuit construction simplifies completion of the kit. United Transformer Co., 150 Varick St., New York 13, N. Y.—TECHNICIAN

### Jensen SPEAKER SYSTEMS

The TP-200 series consists of a 3-way reproducer system in a BL-250 back-loading cabinet. The series includes the ST-909 (mahogany) for \$312 and the ST-908 (blonde) for \$316. Input impedance, 16 ohms; power rating, 35 maximum. 2 balance controls are included. Model BL-250 cabinet for 15-in. speaker also available without systems for \$128 (mahogany) and \$130.90 (blonde). Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill.—TECHNICIAN

### Tele-Matic XTRA SPEAKER

The Tele-Pal, an external speaker unit that can be placed at the viewer's chairside, permits remote-controlled personalized listening. The unit incorporates a volume control and switch, which permits the viewer to shift from Tele-Pal to TV speaker listening, or vice versa, without leaving his chair; can also be used to remote-control the sound coming directly from the receiver's speaker. Model TR-91. List price, \$11.95. Tele-Matic Industries, Inc., 1 Joralemon St., B'klyn 2, N. Y.—TECHNICIAN

### Pilot HI-FI UNITS

New audio-system components include model AA-420 combination preamp-amplifier (15 w) based on Williamson circuit. Controls include dual tone, dual phono equalization, loudness and input selector (4 posi-



tions). Also available as model AA-410, same basic amplifier without preamp-control circuit. Model AF-860 is an AM-FM tuner combining preamp-control set-up similar to that used on model AA-420 with 1.5-microvolt FM sensitivity, adjustable afc, broad or sharp AM bandwidth and Foster-Seeley FM detector.

Prices: model AA-420, \$99.50; model AA-410, \$49.50; model AF-860, \$179.50. Pilot Radio Corp., Long Island City, N. Y.—TECHNICIAN

### Vocatrol SPEECH CUT-OUT

Automatic suppression of unwanted speech is provided by a 5-tube electronic unit that permits only musical signals to be heard. The Vocatrol comes in a separate small cabinet, operates from house current and includes an adapter plug for connecting to radio or TV set. Control knob permits adjustment to pass any type of music, including music with vocals, while ordinary speech is blacked out. Vocatrol Corp., Cambridge, Mass.—TECHNICIAN

### NEW PRODUCTS IN THIS ISSUE

APPEAR ON PGS. 36, 39, 40, 41, 42, 44, 47, 48, 54, 56, 58

### Freed HI-FI AM-FM TUNER

AM and FM circuits on tuner model 750 are designed for high gain at low noise, with afc on FM terminating in a Foster-Seeley discriminator. Controls include record compensation and bass and treble boost, eliminating the need for a separate preamplifier-control unit. Freed-Eisemann, 200 Hudson St., New York 13, N. Y.—TECHNICIAN

### R-J Wharfedale SPKR. UNIT

Compact, 2-ft. "bookshelf" unit, comprising an R-J enclosure and an 8-in. Wharfedale speaker especially designed to match the enclosure, yields performance comparable to many larger assemblies. Good response from 50-15,000 cps is featured, with the system reaching full efficiency at normal room listening levels. Priced at \$54.50 (mahogany) and \$57.50 (blond). Dept. RJW, R-J Audio Products (British Industries Group), 164 Duane St., New York 13, N. Y.—TECHNICIAN

### G & H CORNER HORN

The KR-5, a 20-in. Klipsch-designed corner horn speaker enclosure, may be wall-mounted, corner-hung, placed on a shelf or a table; is designed for smooth response in the middle bass without boominess. Equipped with a handle for portability and a bracket for wall mounting. Available in unfinished or finished models to house either 8 or 12-in. speakers. G & H Wood Products Co., 75 N. 11th St., Brooklyn 11, N. Y.—TECHNICIAN

### Stephens SPEAKER SYSTEMS

Three enclosures designed for seasonal outdoor use in home patios and gardens can also be used indoors. Model 600 employs the Tru-Sonic 112FR 12-in. speaker in a bass-reflex enclosure. List price with speaker is \$90. Model 602, a rear horn-loaded enclosure, lists at \$120 with the 112FR speaker and \$150 with the 122AX co-axial speaker. Model 603, similar to 602, houses 15-in. speakers. List price: with 206AX speaker, \$244; with 102FR, \$172; with 101FR, \$156. Stephens Mfg. Corp., 8538 Warner Dr., Culver City, Calif.—TECHNICIAN

# Antennas & Related Items

## Indoor, Auto & FM Types; Installation Accessories

### Royal HOOKED GUY WIRE

To save installation time, Jifferoo, a pre-cut guy wire, incorporates a built-in hook. Just insert hook in



guy ring hole and close with pliers. Pre-cut length saves time and trouble, is made of 6/20 galvanized stranded wire. Coil unrolls easily without kinking. Royal Television Mfg. & Supply Co., Modesto, Calif.—TECHNICIAN

### Brach AUTO AERIALS

Two Universal auto aerials, model 473, Speedmount, and model 501, Fendermount, feature speed and ease of installation. Each unit has a 3-section chrome-plated brass mast, automatic ground connection, and a



rugged, adjustable insulator. Brach Mfg. Corp., Div. of General Bronze Corp., 200 Central Ave., Newark 3, N. J.—TECHNICIAN

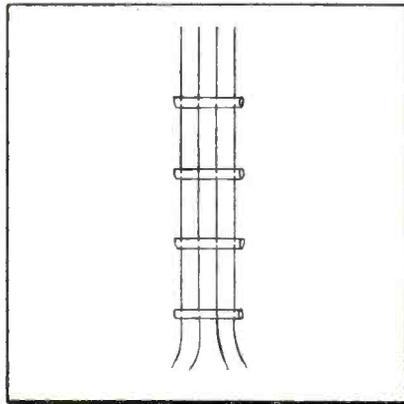
### Copperweld GUY WIRE

No. 18 Copperweld guy strand wire for antenna mast supports is available in an octagon-shaped carton that provides easier-handling benefits for dealers and service

technicians. Since the carton lies flat, it can't slip or roll away. On one side of the carton is a removable, circular panel, 6 inches in diameter, through which the strand pays out without kinking as needed. Each carton contains a 500 or 1,000 ft. coil of wire. Special Products Dept., Copperweld Steel Co., Glassport, Penna.—TECHNICIAN

### Imperial 4-CONDUCTOR WIRE

Installations where more than one antenna is used may be simplified by this 4-conductor open lead-in wire, cat. no. 4 DA. Extra pair of leads may also be used for distribution systems or other set-ups where 24 v feed is necessary. Wires are embedded in polystyrene insulators spaced 5 in. apart. Available in



spools of 100, 250 or 500 feet. Imperial Radar & Wire Corp., 820 E. 233 St., New York 66, N.Y.—TECHNICIAN

### Air-E-O INDOOR ANTENNA

Similar to outdoor types but designed for indoor use, model U-201 Butterfly Bow-Tie provides peak performance in the UHF band, may also be used for VHF. List price, \$8.95. Air-E-O Electronics Corp., 374 N. 27th St., Milwaukee 8, Wisc.—TECHNICIAN

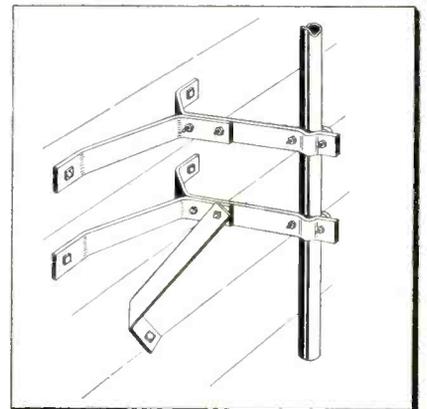
### Astatic UHF CONVERTER

Features of model "UHF" include a shielded tuner, affording reduced oscillator radiation; two-stage pre-selector, providing rejection of images and interference; and continuous vernier tuning, at approximately 20 to 1 ratio, to facilitate fine tuning. The converter can operate into TV receiver Channel 2, 3, 4, 5,

or 6. Input and output impedances are 300 ohms. No adjustments are required during installation. The converter can be used with a low-noise VHF booster for added gain. Astatic Corp., Conneaut, Ohio.—TECHNICIAN

### Rohn WALL MOUNTS

WML and WMY brackets are made of heavy duty steel and protected with a permanent coating.



The Y type mount is recommended when greater strength is required for a heavier installation. Rohn Mfg. Co., 116 Limestone, Bellevue, Peoria, Ill.—TECHNICIAN

### CSP FM ANTENNAS

FM receiving antennas for the shop or audiophile come with lead-in wire and installation hardware. Types available are folded



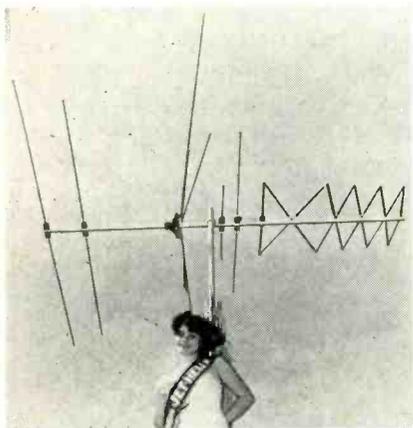
dipole, non-directional duo dipole for reception without orienting and folded dipole with reflector for fringe areas. Custom Sound Products, 689 Florida St., San Francisco, Calif.—TECHNICIAN

# New Antennas

## High-Gain Outdoor Types for VHF, UHF

### JFD VHF ANTENNA

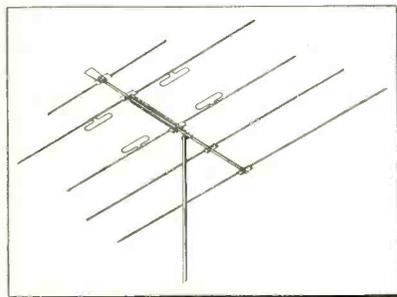
The Jet-Helix combines a flat-plane conical with a newly designed helical section, similar in principal to those used in microwave applications. This combination is said to



give superior results with respect to gain, directivity, front-back ratio, constant impedance match and signal-noise ratio. List prices: model JET913, \$25.50; stacked model JET-193S, \$52.50. JFD Mfg. Co., 6101 16th Ave., Brooklyn 4, N. Y.—TECHNICIAN

### Clear Beam ANTENNAS

The Hunter, an inline-type unit for channels 2 to 13, features wave-trap design and snap-open assembly for quick installation. Yagi performance and directivity are provided in

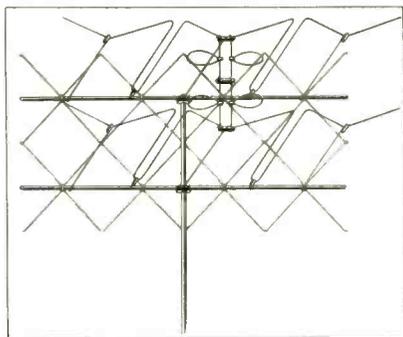


a flat design for lower wind resistance.

The Big Chief combines a giant conical with a yagi for high gain coverage of channels 2 to 13. Snap-open construction provides easy assembly. May be stacked. Clear Beam Antenna Corp., 100 Prospect Ave., Burbank, Calif.—TECHNICIAN

### Fretco VHF-UHF ANTENNA

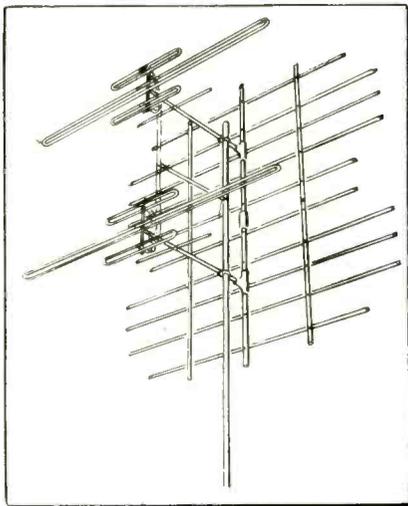
The Fretaray Spectrum all-channel antenna, with a shielded back, needs no assembly. Gain is said to average 13 db on channels 2 to 6,



and 13.5 on channels 7 to 13; front-back ratio is 35 to 1. The Spectrum features weather-resistant insulators. Fretco Inc., 406 N. Craig St., Pittsburgh 13, Pa.—TECHNICIAN

### RMS VHF ANTENNA

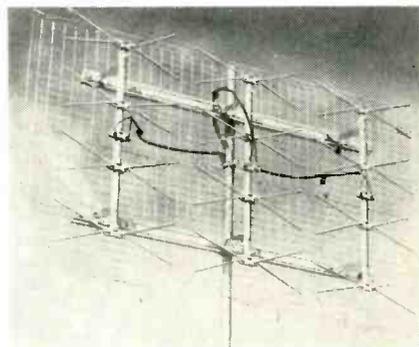
The Phantom line is for optimum gain and ghost-free pictures in strong, medium and weak signal areas. All three models (single-bay, stacked and half-wave stacked arrays) are quick-rigged for conven-



ient installation. All include parasitic reflector for additional high-band gain. List prices are as follows: DX-213, single bay, \$17.75; DX-2213, stacked, \$36.50; DX-3213, 1/2 wave stacked, \$47.50. RMS, 2016 Bronxdale Ave., New York 62, N. Y.—TECHNICIAN

### TACO UHF ANTENNA

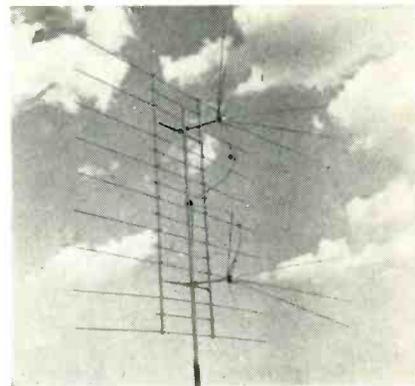
Large capture area is provided by 12 open-bowtie driven elements plus a large-screen reflector in Super 12 (catalog no. 3040). Quick assembly,



rigidity and ruggedness are featured. Unit is said to have high gain, sharp directivity and high front-back ratio. Technical Appliance Corp. Sherburne, N. Y.—TECHNICIAN

### Telrex VHF ANTENNA

The King Pin 2-bay Conical-V-Beam screen array is said to have measured gain on the low VHF channels of 7 1/2 to 8 1/2 db, and 15 to 17 db on the upper VHF channels. Performance is also obtained on

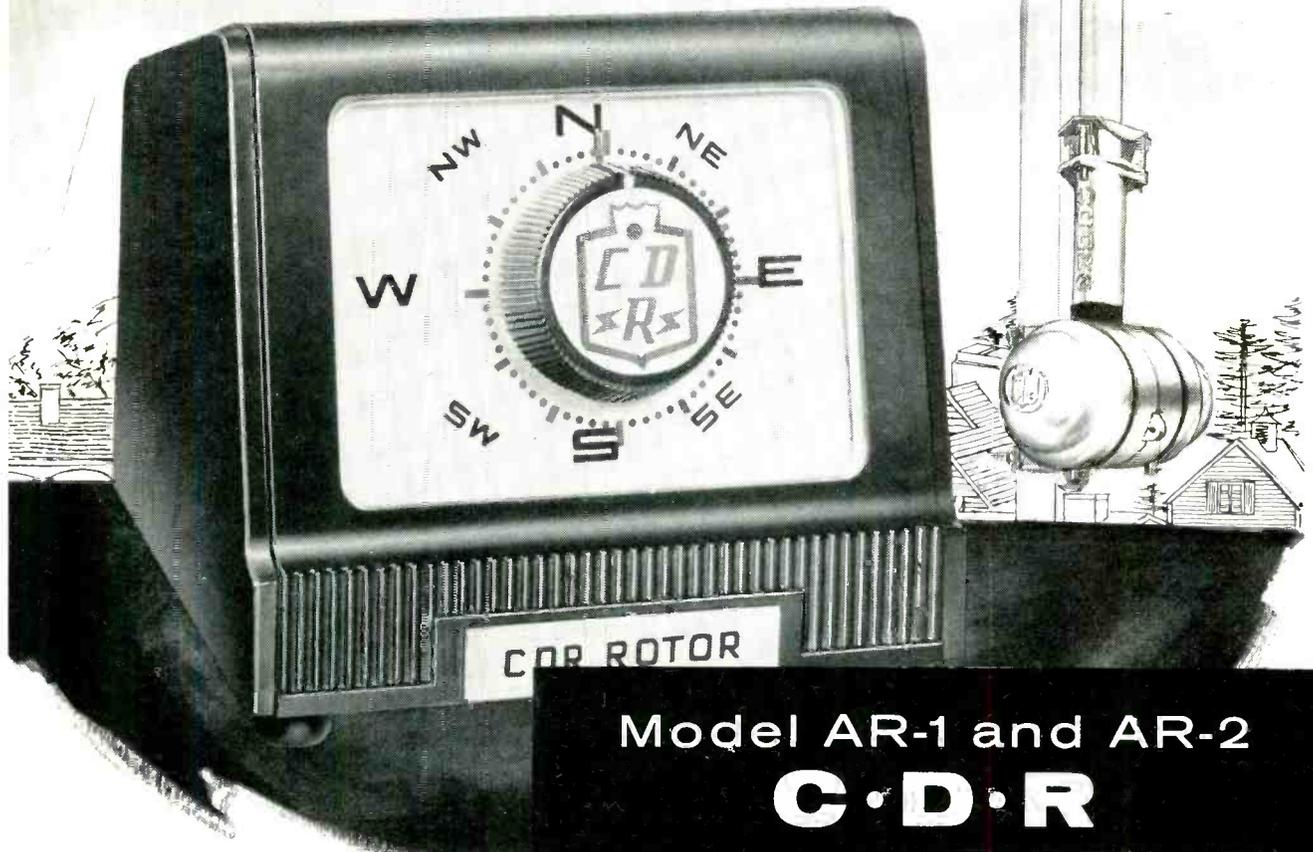


UHF without modification. A single-bay version is available. The 2-bay array, model 202, was designed for fringe area reception where high sensitivity plus freedom from co-channel interference is important. List prices: model 201, 1-bay, \$26.50; model 202, stacked, \$57.00. Telrex, Inc., Asbury Park, N. J.—TECHNICIAN

More Antennas on page 56

# 40% Sharper Tuning

than any other AUTOMATIC ROTOR



## Model AR-1 and AR-2 **C·D·R** automatic ROTOR

★ Here is EVERYTHING that ANYONE could ask for in a rotor! Powerful enough to turn any TV antenna . . . sturdy construction . . . and a handsome modern design plastic cabinet that AUTOMATICALLY turns the antenna to any position . . . AND ACCURACY that presents 40% SHARPER TUNING than any other automatic rotor!

... AND THEY ARE PRE-SOLD to consumers in every leading rotor market area with saturation TV SPOT ANNOUNCEMENTS!

Model AR-2 . . . complete AUTOMATIC rotor with thrust bearing . . . and handsome modern design cabinet, uses 4 wire cable

Model AR-1 . . . same as AR-2 without thrust bearing

Field Tested  
For Years

& Tried  
& Tested  
& Proven



**CORNELL-DUBILIER**  
SOUTH PLAINFIELD, N. J.



**THE RADIART CORP.**  
CLEVELAND 13, OHIO

# Hi-Fi & Audio Products

*Tuners, Speakers, Mikes, Amplifiers & Recorders; Combinations*

## Astatic MIKES

The Gold Standard has a self-supporting easel which recesses into the back of the metal case, converting the microphone from desk-stand to hand use; is available in both crystal and ceramic versions. Response: model M302, crystal, 30 to 10,000 cps, flat; model M301, ceramic, 30 to 8,000 cps, with slightly rising characteristics in the medium range. Output with the crystal element is -47 db; the ceramic model has an output of -54 db. List price: M301, \$10.00; M302, \$10.50.



Ceramic model M101 and crystal model M102 hand microphones are compact units housed in plastic cases, designed for prolonged stability. Output of the crystal M102 is -46 db and that of the ceramic M101 is -53 db. Frequency range of the former is 30 to 10,000 cps with flat response, while range of the M101 is 30 to 8000, with slightly rising characteristics in the high range. The M102 lists at \$7.25; the M101 at \$7.00. Astatic Corp., Conneaut, Ohio.—TECHNICIAN

## Regency HI-FI TUNER

FM-AM tuner AF-250 uses an Armstrong FM circuit with 2 limiters, has separate FM and AM circuits from antenna to output. AFC on FM insures stability. Response is 20-40,000 cps  $\pm$  1 db on FM, up to 6,000 cps on AM. Sensitivity on both bands is high. Net price, \$250. Regency (Div. of I.D.E.A., Inc.), 7900 Pendleton Pike, Indianapolis 26, Ind.—TECHNICIAN

## Stephens SPEAKER

An improved model of the 103LX low-frequency reproducer uses 4½ lbs. of Alnico V magnet. Cone resonance is 35 cps; power capacity, 25 watts; list price, \$90.00. Stephens Mfg. Corp.—TECHNICIAN

## Altec AMPLIFIER-SPEAKER

The Melodist unit combines quality, small size, and simplicity of installation and operation. The loud-speaker can fit on a record shelf, is guaranteed for a range of 90 to 22,000 cps  $\pm$  2½ db, or better. It uses a 10-in. woofer and a tweeter. The 10-w amplifier has 3 inputs, crossover selection, separate bass and treble tone controls, and a loudness control. Its response is 20-20,000 cps. Available in mahogany or blond. Fair traded price, \$228. Altec Lansing Corp., 161 Sixth Ave., New York 13, N. Y.—TECHNICIAN

## Motorola XTRA SPEAKER

Companion piece to hi-fi table model 54HF1, this unit features an independent volume control and a 30-ft. extension that connects to a speaker jack built into the main unit. Its 6-in. speaker is matched with the 8-in. woofer and 6-in. tweeter in the set. The portable unit may be hung on a wall or placed on a table or on the floor; permits listening in several rooms. Price, \$13.95. Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.—TECHNICIAN

## Jensen SPEAKER UNITS

Three new reproducers include the RS-100, a laboratory reference system intended for critical studio applications or quality home installations. The 3-way unit uses horn loading for the bass and mid-range sections, along with a supertweeter and a balance control. Each unit is individually tested, comes with a signed certificate and guarantee of performance. The Concerto 2-way system, model CT-100, uses a 12-in. woofer in a bass-reflex cabinet along with a tweeter and a hi-freq. balance control, is designed for home use. The corridor Speech Master, model RK-61, provides 2-direction sound coverage for corridors, offices, stockrooms; is also useful in paging and intercom systems.

Prices are as follows: net for model RS-100 (ST-920), \$468; net for model CT-100, \$168; list for model RK-61 (St-850), \$12.60. Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill.—TECHNICIAN

## Fenton TAPE-AMPL. COMBO

The Vortexion is a 2-speed tape recorder combined with a Hi-Fi amplifier. Plug-in sockets for record changer, tuner, microphone, and external speaker allow use in a hi-fi system independently of the tape deck. Headphones may be plugged in for monitoring when recording. Sufficient power is available for disc recording, directly or from the tape, without additional amplifiers. Installed in a carrying case with detachable lid, the Vortexion will operate in any position. Fenton Co., 15 Moor St., New York 4, N. Y.—TECHNICIAN

## Espey AMPLIFIER-SPEAKER

The Hi-Fi "Overture" consists of an acoustically baffled cabinet with a 5-tube amplifier and three speakers. Any standard record changer or



AM-FM tuner can be used with the unit, which is operated with knob adjustments right on the face of the table-top cabinet. Price is \$59.95. Espey Mfg. Co., Inc., 528 E. 72nd St., New York 21, N. Y.—TECHNICIAN

## Bozak CO-AX SPEAKER

The B-207A, comprising one B-199A woofer, one B-200X dual tweeter, and a 4-mfd crossover filter, will fit behind cutouts for either 12 or 15-in. loud-speakers. Response is flat from 40 to 16,000 cps, useful beyond 20,000. Impedance is 8 ohms, power rating, 15 watts. The recommended housing is a totally-enclosed box of 9 cu. ft. R. T. Bozak Co., Stamford, Conn.—TECHNICIAN

More Audio New Products—Pg. 58

# Now, TV set owners can understand benefits of Aluminized Tubes!



These three advertisements will appear in **POST** this fall.

## THESE ADVERTISEMENTS IN **Post** EXPLAIN THAT:

1. IN MAGAZINES, the pictures you see (when magnified) are made by a series of tiny dots applied to the paper *mechanically*.

ON YOUR TV SCREEN, the pictures are also made by a series of dots (which appear as lines) applied *electronically*. These dots, in both cases, create a variety of tones including black, a range of grays, and white. BUT, it is the LENGTH of this "Black-to-White Range" (the gray scale) that makes the picture excellent, good, fair, or poor.



ARTHUR GODFREY famous CBS star



TRUE BLACK

SHORT  
"BLACK-TO-WHITE RANGE"

TRUE WHITE



LONG  
"BLACK-TO-WHITE RANGE"

2. ORDINARY PICTURE TUBES used in most TV sets made before 1953 produce a *short* "Black-to-White Range." While the picture is good, the picture tube cannot develop enough *light output* for a long "Black-to-White Range."

3. CBS-HYTRON MIRROR-BACK TUBES produce up to *twice the light output* of ordinary picture tubes. Like the silver backing on a mirror, the *shiny* aluminum backing on a Mirror-Back tube reflects to the viewer *all the light* on the screen. The resulting increased brightness and reduced halation (unwanted spreading of light from one dot to another) is *essential* to give you a long "Black-to-White Range." The full range you *must* have for the clearest, sharpest, brightest pictures that are a joy to watch.

TALK LONG "BLACK-TO-WHITE RANGE" PICTURES  
...SELL BIGGER-PROFIT

## CBS-HYTRON MIRROR-BACK PICTURE TUBES

Talk . . . demonstrate . . . and sell "Long-Black-to-White-Range" clearer, sharper, brighter pictures. It's easier to sell premium-grade, brand-new CBS-Hytron Mirror-Backs . . . with their controlled quality and dependable full-year guarantee. Profit more. Tie in with POST. Get this Mirror-Back Promotion Kit . . . from your CBS-Hytron distributor, or mail coupon.



CBS-HYTRON Main Office: Danvers, Massachusetts

A Division of Columbia Broadcasting System, Inc.

A member of the CBS family: CBS Radio  
CBS Television • Columbia Records, Inc.

CBS Laboratories • CBS-Columbia • CBS International • and CBS-Hytron



CBS-HYTRON, Danvers, Mass.

I want all the material to identify me as a *Certified Quality Service* dealer who sells Mirror-Back tubes. Please rush me CBS-Hytron Mirror-Back Promotion Kit containing:

1. 22 x 28-inch Advertised-in-POST window poster.
  2. 25 consumer self-mailers. "How You Can Have Clearer, Sharper, Brighter TV Pictures."
  3. *Certified Quality Service* decalomania.
- I enclose 25¢ for postage and handling.  
I want . . . more consumer self-mailers at 1¢ each, for which I enclose an additional \$ . . .

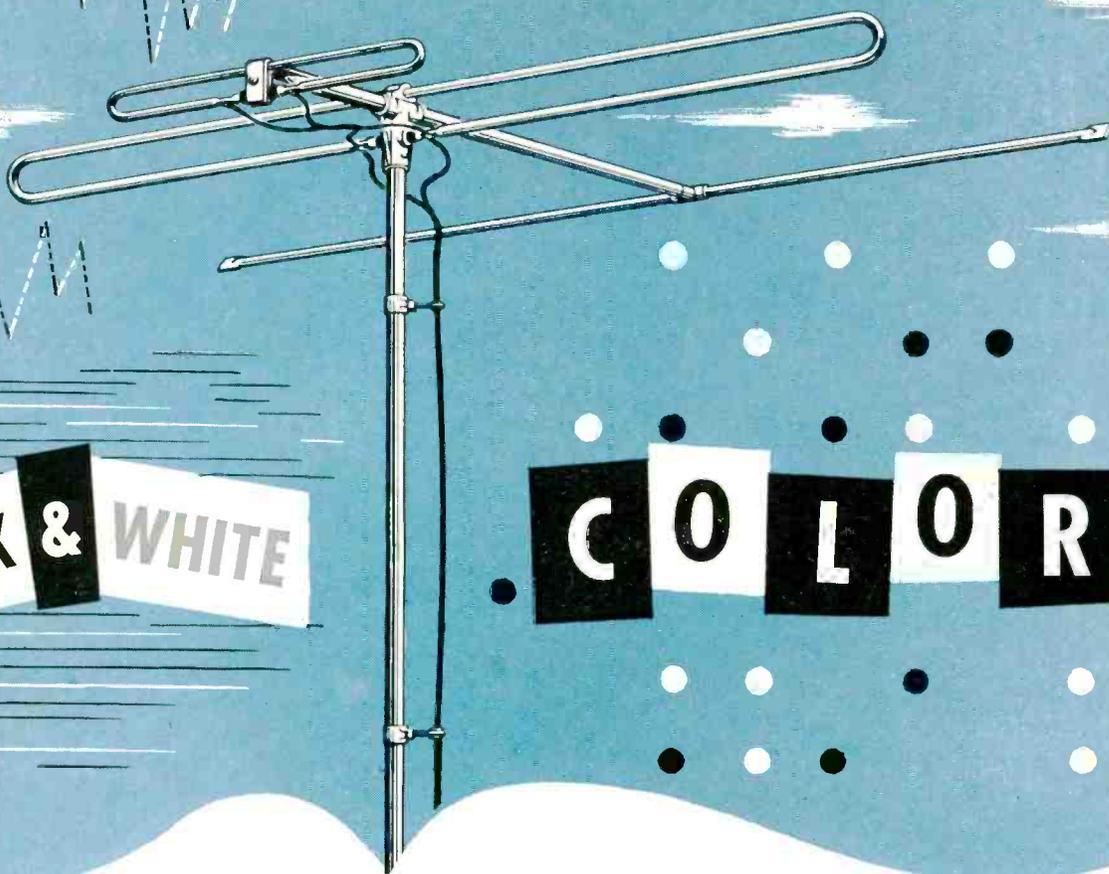
Name . . . . . (please print)

Street . . . . .

City . . . . . State . . . . .

**BLACK & WHITE**

**COLOR**



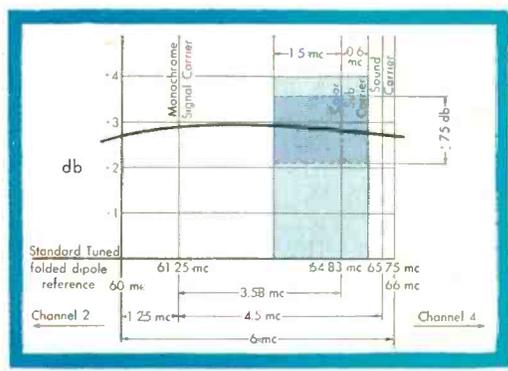
the **INLINE\*** is best!

\*Reissue U.S. Pat. No. 23,273

Are you overlooking the sales potential of the color-designed AMPHENOL INLINE antenna? Set owners have their color television antenna *right now* if they buy an AMPHENOL INLINE! In terms of present black & white tv set sales, this puts a tremendous sales weapon into every dealer's hands. Their assurance to customers that there will be *no antenna replacement* when they convert to color can be the important inducement to present sales of black & white sets.

**facts on Color TV Reception**

For *fidelity* color reception the antenna must have these characteristics: • Antenna gain must be flat, no gain or loss greater than 1.50 db within 1.5 mc below and 0.6 mc above the color sub-carrier. *The INLINE gain (see charts at right) fully meets this condition.* • Antenna gain must be held down across the FM frequencies, 88 mc to 108 mc. *The INLINE gain has been engineered for a sharp cutoff at the end of Channel 6— for rejection of FM signals.*



Gain chart showing  $\pm 0.06$  db variation over color modulation band for INLINE, Channel 3

Gain variation over the color modulation band for each VHF channel should not exceed  $\pm 0.75$  db; the following table gives figures for the INLINE on all channels.

Channel	Gain Variation/db	Channel	Gain Variation/db
2	$\pm 0.40$	8	$\pm 0.08$
3	$\pm 0.06$	9	$\pm 0.04$
4	$\pm 0.12$	10	$\pm 0.03$
5	$\pm 0.27$	11	$\pm 0.20$
6	$\pm 0.20$	12	$\pm 0.30$
7	$\pm 0.20$	13	$\pm 0.30$



AMERICAN PHENOLIC CORPORATION

Chicago 50, Illinois

In Canada: AMPHENOL CANADA LIMITED

# TV-Electronic Technician

*New Products for Sales, Service & Replacement*

## **ATR INVERTER**

The family auto can be equipped with an inverter which makes it possible to dictate reports or other material on the tape recorder, wire recorder, or other type of dictation



machine. The ATR Tape Recorder Inverter operates from the 6 or 12-volt storage battery system and provides 110 volts. Available with mounting brackets for under-dash or trunk mounting. American Television and Radio Co., 300 E. 4th St., St. Paul, Minn.—TECHNICIAN

## **B-T UHF CONVERTER**

Ultraverter model BTU-2 features dual-speed dual-knob tuning for fast or fine UHF channel selection. Compensated for frequency stability, the converter is turned on and off automatically by a relay controlled from the TV set power switch. Other features: 300-ohm match throughout, high sensitivity with low noise factor. List price, \$39.95. Blonder-Tongue Labs., Inc., 526-536 North Ave., Westfield, N. J.—TECHNICIAN

## **Aerovox SEALED RESISTORS**

Designated as Type CPC, new Carbofilm units are housed in a ceramic tube with metalized ceramic end-seals for complete hermetic sealing. There is no capacitance effect between element and casing; the resistor can be squeezed in among other components and against metal surfaces without electrical complications. Tolerance of  $\pm 1\%$ . Available in  $\frac{1}{2}$ , 1 and 2 watt sizes. Hi-Q Div., Aerovox Corp., Olean, N. Y.—TECHNICIAN

## **Remot-O-Matic TV CONTROL**

Two models provide different degrees of control of the TV receiver from the viewer's chair. The regular unit (2 controls) provides for remote adjustment of volume and channel switching. The deluxe version (4 controls) permits on-off switching as well as regulation of volume, brightness, contrast and channel selection. Either unit is compact enough to be held in the hand. Easily installed. Regular, \$19.95; deluxe, \$39.95. Remot-O-Matic Sales, Inc., 8743 Sunset Blvd., Los Angeles 46, Calif.—TECHNICIAN

## **Rex UHF CONVERTER**

No loss in the input circuit, oscillator stability and low oscillator radiation are features of the Elgin UHF Converter. Operates into TV receiver on Channel 5 or 6; includes all-channel UHF tuning dial and on-off switch. Rex Engineering & Mfg. Co., Box 13, Bluffton, Ind.—TECHNICIAN

## **Powerstat VARI-XFORMERS**

Types 136 and 236 are new in design, ratings and performance; replace the old line of Powerstat types 1126 and 1226. Available in several types for different current ratings, for 1- and 3-phase use, for input voltages from 120-480 v. Regulated output is adjustable from zero to maximum rating. Superior Electric Co., Bristol, Conn.—TECHNICIAN

## **Cardwell I-F STRIP**

This 40-mc printed i-f strip for monochrome TV receivers using intercarrier sound systems uses a new laminate on both the base and transformers. The laminate has the required electrical characteristics and mechanical rigidity without brittleness. Transformer windings are etched on both sides of the laminate and aluminum discs are threaded into center-tipped nylon inserts. A design feature of the insert prevents shorting of turns. The 3-stage strip, which uses "in-line" design, features high gain and full bandpass response, is prealigned and tested. Allen D. Cardwell Electronics Productions Corp., Plainville, Conn.—TECHNICIAN

## **Regency VOLTAGE BOOSTER**

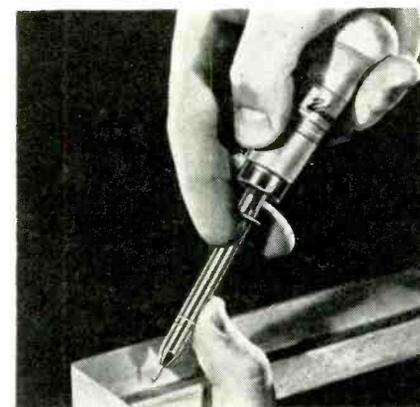
Full-size TV pictures in areas where low line voltage shrinks picture size are possible with the VB-1 booster transformer. Maintains 117-volt supply with input of 90 to 130 v. Rated up to 350 watts. May also be used to decrease high line voltage. List price, \$19.95. Regency Div. I.D.E.A., 7900 Pendleton Pike, Indianapolis 26, Ind.—TECHNICIAN

## **Halldorson FLYBACK**

A specific flyback replacement is available for Crosley and Hall-crafter vertical-chassis TV sets. The new unit, FB417, incorporates the h-v rectifier socket and mounting to replace Crosley part no. 15720-5-1 and Hallcrafters part no. 550251. The flyback uses a non-hygroscopic plastic-coated h-v coil with superior dielectric properties to guard against flash-overs and break-downs. Hall-dorson Transformer Co., 2734 N. Pulaski Road, Chicago, Ill.—TECHNICIAN

## **Unsinger BRAD DRIVER**

The Unason brad driver and setter facilitates the job of inserting  $\frac{1}{2}$ -in. long brads into hard-to-get-at places. When the flange of the barrel is pulled back to the handle, the



tip of the magnetic core is pushed out flush with the end of the barrel, and magnetically picks up the head of the brad. Then the point of the brad can be directed at any angle desired and inserted in most woods or soft metals by pressure with the palm of the hand. Retail price, \$1.69. Philip Unsinger & Son, 637 Ohio Ave., Fremont, Ohio—TECHNICIAN

# Shop Equipment

## Testers, Instruments & Other Service Aids

### Precision OSCILLOSCOPE

General-purpose 5-in. scope, model ES-520, is a factory-wired and factory-calibrated instrument that is ready to go to work on delivery. Specifications include: Push-pull vertical and horizontal drive; 20 millivolts-per-in. vertical sensitivity; 3-step, frequency-compensated vertical input attenuator; vertical response 20 cps to 500 kc within 2 db; good vertical square-wave response from 20 cps to 50 kc; built-in voltage calibrator (peak-to-peak); negative and positive sweep sync selection; internal 60-cycle phasing; and beam modulation input. \$127.50 net. G. N. Goldberger, Precision Apparatus Co., Inc., 92-27 Horace Harding Blvd, Elmhurst 5, N. Y.—TECHNICIAN

### EICO ELECTRONIC SWITCH

Model 488 permits the simultaneous observation of 2 separate traces on the screen of 1 scope; also serves as a square-wave generator over its range of switching frequencies. It offers a means of comparing amplitude, waveform, and phase of two signals, checking phase shift and waveform distortion, gain, or frequency response of an entire amplifier or a single stage. Continuously variable switching rates in 3 ranges from less than 10 to over 2000 cps. Kits are \$24.95; factory wired, \$39.95. EICO, 84 Withers St., Brooklyn 11, N. Y.—TECHNICIAN

### Raytronic CRT RESTORER

The Cathode Beamer, cat. no. CB-54A, functions as both pix tube tester and restorer. Test functions include location of open elements, leakage between elements, open, weak or shorted filaments; measurement of beam current, grid cut-off, emission, contrast and picture quality; detection of gas. Wheatstone bridge leakage balance test measures shorts from direct short to 20-meg leakage. Repair functions include renewal of emission, restoration of cathode contact by welding cathode tab, and clearing of shorts. Accessories and connectors are included. Net price, \$279. Raytronic Laboratories, Cincinnati 15, Ohio.—TECHNICIAN

### Transvision 6-IN-1 TESTER

Model 100, improved TV component tester has 2 important functions added so that it does the following things: tests flyback transformers and yokes, even for one shorted turn; tests picture tubes in or out of the set for emission, shorts or leakage; is a picture tube reactor, renewing emission; checks condensers for capacity, shorts or open; and checks continuity. Price, \$49.95. Transvision, 11 Cedar St., New Rochelle, N. Y.—TECHNICIAN

### Vis-U-All TUBE CHECKER

Designed to test over 300 radio and TV tubes, including battery types, this portable emission tester is built into a carrying case. Simplicity of operation is featured, permitting



testing of tubes by non-technical clerical help when the checker is used on the counter. Only 5 sockets are used. Tube types are printed on 12-position selector switch; only 2 other controls must be adjusted. Tests for emission, interelectrode shorts or leakage, and gas. Price, \$99.50. Television Engineers, Inc., 311 East 79th Street, Chicago 19, Ill.—TECHNICIAN

### Eby BINDING POST

Convenient multi-type binding post for simple rapid connection, no. 55-1 will accommodate the ordinary .080 type of phono tip instead of the usual banana type plug. It is rated at 30 amps—1000 v and is supplied in either red or black bakelite. Eby Sales Co., 130 Lafayette St., New York 13, N. Y.—TECHNICIAN

### Shasta VTVM

Frequency range from 20 cps to 2 mc, and full-scale ranges from .001 to 300 v in 12 steps, are featured in model 202 voltmeter. Input impedance of 10 meg shunted by 15 mmf (4 mmf on the lower ranges) minimizes errors due to loading. Accuracy is  $\pm 3\%$  to 100 kc and  $\pm 5\%$  to 2 mc. Separate terminals are brought out from the input and output of the amplifier section of the instrument, permitting its use as a separate amplifier with maximum gain of 50 db. Calibrated to read both in volts and db. Shasta Div., Beckman Instruments, Inc., P. O. Box 296, Station A, Richmond, Calif.—TECHNICIAN

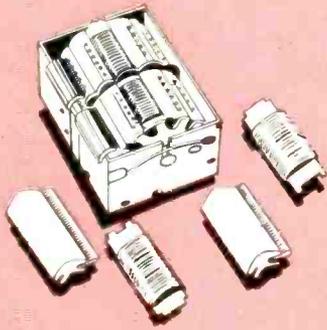
### Scala 2-MARKER INJECTOR

A second marker on the response curve for easier TV alignment is provided by the Dual Marker Injector which is used in conjunction with a regular marker generator. One mark appears on the picture carrier (the frequency of the marker generator) and the other on the sound carrier (built into the injector). The device uses a crystal-controlled 4.5 mc oscillator. Marking of other critical frequencies is accomplished by replacing the crystal with one of the desired frequency. May be used for checking marker generator calibration. Scala Radio Co., 2814 19th St., San Francisco, Calif.—TECHNICIAN

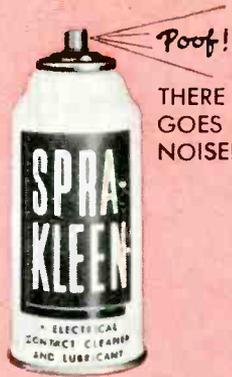
### Du Mont SCOPE PROBES

Three test probes are available for use with general-purpose oscillographs. Type 2607 is a passive probe with flat response from dc to 10 mc, for use where negligible loading of a high impedance circuit is important, provides 20:1 attenuation. Type 2608 test probe (cathode-follower type) is useful when signal amplitudes are low, but output impedances high; has high input impedance, low shunting capacity, low loss, useful response from 5 cps to 20 mc (essentially flat to 14 mc). Type 2609 detector probe will operate over a carrier range of 250 mc to 400 mc (flat within 1 db over any 6-mc band in this range). Allen B. Du Mont Laboratories, Inc., 760 Bloomfield Ave., Clifton, N. J.—TECHNICIAN

See Antenna "Spec" Chart—Pg. 33



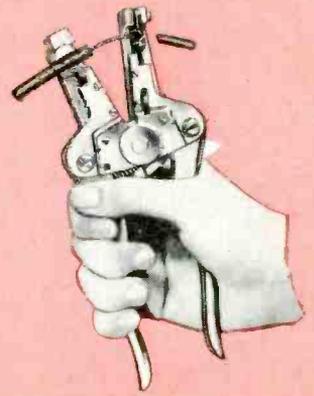
**G-C TUNER-KLEEN'R** For every Standard Coil tuner. Cleans both stationary and rotary contacts at every twist of the channel selector. Easy to install, means extra profit, better reception.  
No. 9132.....Net \$1.00



**G-C SPRA-KLEEN** The original power spray electrical contact cleaner and lubricant. Eliminates noises in TV tuners, contacts, controls, relays and switches. No waste, no need to remove parts.  
No. 8665 6 oz. can.....Net \$1.00



**G-C PORTABLE WIRE REEL** New, convenient way to handle wire coiled on spools. Just slip spool onto reel and pull out what you need. No more twisted or tangled wire when you go out on a job!  
No. 9111.....Net \$2.40



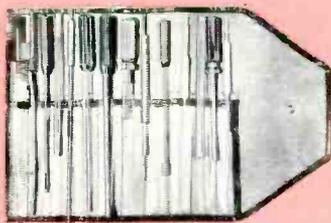
**G-C SPEEDEX WIRE STRIPPERS** New automatic "766" series has delayed return action to prevent crushing of fine stranded wires. Easy to use, with easy-grip handles for easy operation. Interchangeable blades. Specify wire size.  
Series 766 (12 models).....Net \$4.95

Save time... Save money... Speed up your service work!



# with SERVICE AIDS

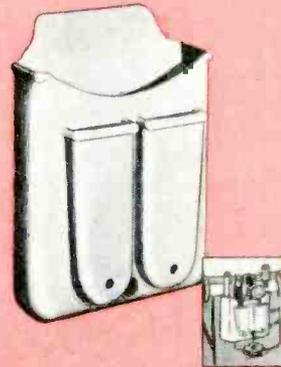
AT LEADING PARTS DISTRIBUTORS EVERYWHERE



**G-C DELUXE ALIGNMENT TOOL KIT** Handy roll type case with 16 most-used tools. Tool tips are extra thin, of best grade hardened spring steel for long useful service. Value of tools sold separately \$15.00.  
No. 8280.....Net \$7.74



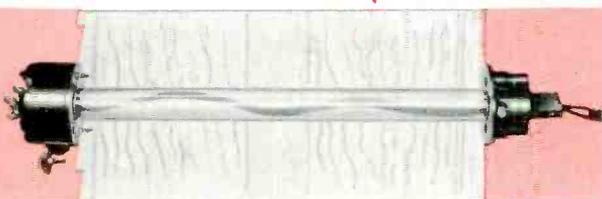
**G-C GENERAL SCRATCH STIK** Easy to use, in handy carry-with-you case. Removes scratches on walnut, mahogany, oak—all shades and colors. Avoid embarrassment on the job... wipe Scratch Stik on that accidental scratch!  
No. 909.....Net \$0.30



**G-C "TUX" TOOL KIT** Made of remarkable new "Alathon" polyethylene. Flexible, tough, will not lose shape. Keep your tools with you, your tape on a chain. Lightweight.  
No. 8943.....Net \$2.37



**G-C ILLUMINATED INSPECTION MIRROR** Penlight batteries make this tool independent of cords or connections. Adjustable 1" hinged mirror mounted to 6" transparent lucite rod. No shock. On-off switch. Length 12 1/4". Bulb, less batteries.  
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Add These Two New  
RCA Test Instruments  
to Your Present  
B & W Equipment

The RCA WR-61A Color-Bar Generator and RCA WR-36A Dot-Bar Generator plus proper test facilities for servicing b & w receivers give you complete test equipment for servicing color receivers.



**\$247.50**  
(Suggested User Price)

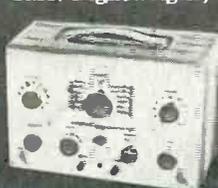
### RCA WR-61A COLOR-BAR GENERATOR

Generates signals for producing 10 bars of different colors simultaneously (without manual switching), including bars corresponding to the R-Y, B-Y, G-Y, I, and Q signals, for checking and adjusting phasing and matrixing in all makes of color sets. Crystal-controlled oscillators (color sub-carrier, picture carrier, sound carrier, bar frequency, and horizontal sync) ensure accuracy and stability. Luminance signals at bar edges for checking color "fit" or registration. Adjustable sub-carrier amplitude for checking color sync action. Lightweight and compact.



**\$147.50**  
(Suggested User Price)

**RCA WR-36A DOT-BAR GENERATOR.** Provides pattern of optimum-size dots for adjusting convergence in color receivers. H- and V-Bar patterns for adjusting linearity in both color and b & w sets. RF output on channels 2-6. High-impedance video output (plus and minus polarities). Choice of internal 30-cps vertical sync, or external sync. Number of dots and bars is adjustable, 8 to 15 horizontal bars, 10 to 13 vertical bars. Lightweight, compact for home and shop use.



**RCA WO-88A (5" and WO-56A (7") Oscilloscopes**

—essentially flat response to 500 Kc—excellent for most color servicing. For certain applications, such as measurement of 3.58-Mc signals, the new WO-78A wideband scope is recommended.

**RCA WR-89A Crystal Calibrator**

provides the accuracy essential for color work. Continuous frequency coverage from 19 to 260 Mc with built-in 2.5-Mc crystal calibrator and 4.5-Mc crystal oscillator.

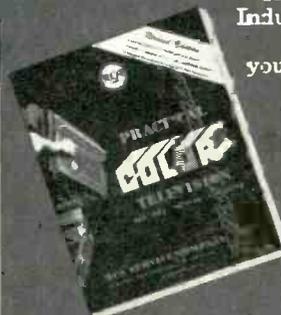
**WR-59C Sweep Generator**

includes the essential video sweep range down to 30 Kc for checking and adjusting video and chrominance circuits and band-pass filters. The new accessory W3-235A Video Multi-Marker provides 5 simultaneous markers with finger-touch identification.

**RCA VoltOhmysts\***

with high-impedance inputs and isolating probes are tops for color. Accessory high-voltage probes extend range to 50,000 volts. Accessory demodulator probe extends frequency range to 250 Mc.

Now off the press—RCA's new enlarged, 2nd edition of "Practical Color Television for the Service Industry." Price: \$2.00—from your RCA Tube Distributor.



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Let the Kay-Townes **SUPER-KATY**  
prove its superiority over  
**ALL** other TV antennas  
on the market today!



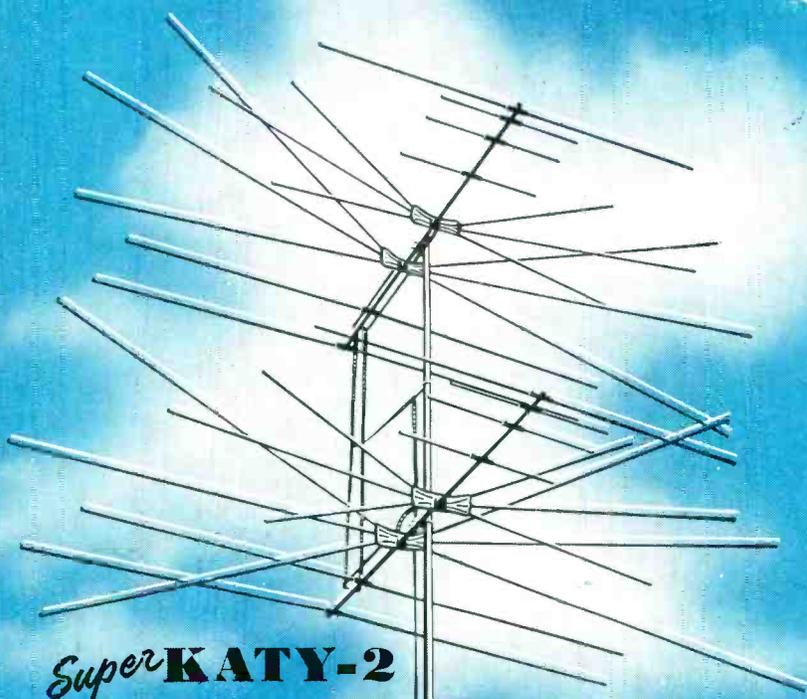
Here's why the famous  
**KAY-TOWNES**

*Super* **KATY**

wins in every case!

- **FAR REACHING** Reception!
- **New MOLDED, RIBBED INSULATOR** for low water absorption!
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- **LESS DEPTH** on mast!
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Super Katy has been proved the best antenna for fine color reception by actual field tests.

Every Super Katy installed  
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*Super* **KATY-2**

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**The long reach, long profit antenna**

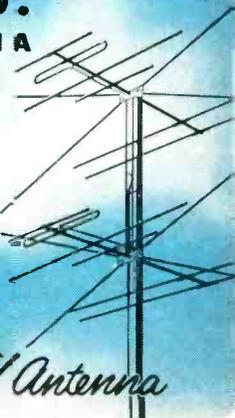
"Fringe area" dealer-servicemen in every part of the country are reporting outstanding sales and service stories... and, mounting TV consumer demand! The new, revolutionary Super "KATYS" have now convincingly proved every quality and performance claim attributed to them.

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ANTENNA CO.  
ROME • GEORGIA**

*Originators of*  
the **BIG-JACK**  
*the world's most Copied TV Antenna*



# Recent Delco Auto Radio

## Buick Selectronic Model 981551 with Automatic Signal Seeker

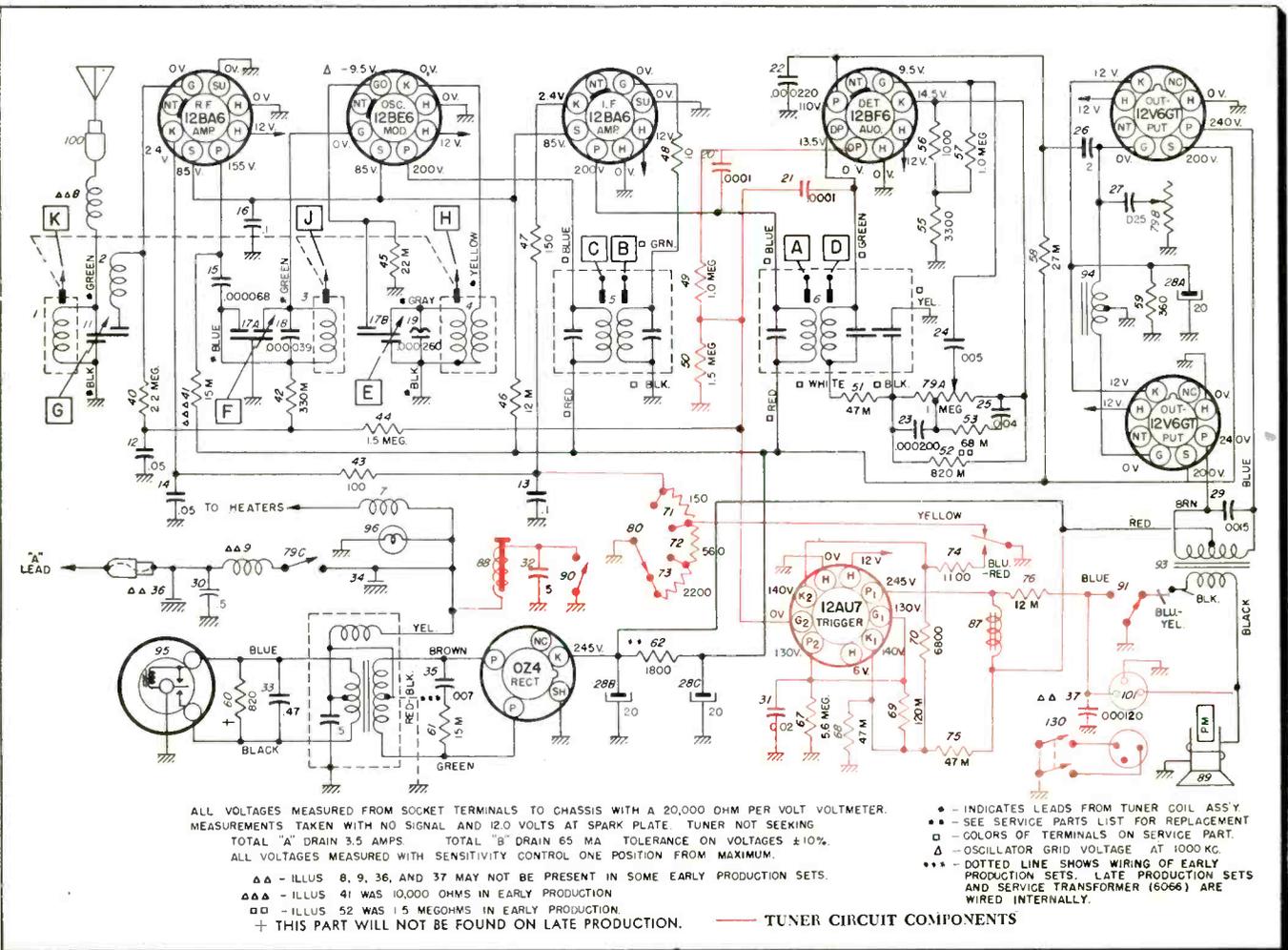
**The Signal Seeking Tuner:** Instead of using a series of push buttons for station selection, Selectronic models employ a single station-selector bar. The trigger circuit causes the tuning mechanism to stop automatically on signal. No push-button set-up is necessary. However, the number of stations on which the tuner will stop can be controlled through adjustment of the sensitivity control.

**Signal Seeking Tuner Alignment Procedure:** When aligning this type of radio, be sure to use a vtvm and to follow the alignment sequence given. Note, for example, that the primary of the 2nd i-f is aligned first. Basic set-up is as follows: vtvm connection—from avc line to chassis; generator return—to chassis; dummy antenna—in series with generator; vol. control—to max.; tone control—treble. Generator output not to exceed 2 v.

Step	Dummy Antenna	Connect Signal Generator To	Signal Generator Frequency	Tune Receiver To	Adjust in Sequence For Output Indicated
1	0.1 Mfd	12BE6 Grid (Pin 8)	262 KC	*High Frequency Stop	A, B, C (Max.)
2	0.1 Mfd	12BE6 Grid (Pin 7)	262 KC	High Frequency Stop	D (Min.)
3	.000082 Mfd	Antenna Connector	1615 KC	High Frequency Stop	E, F, G (Max.)
4	.000082 Mfd	Antenna Connector	600 KC	Signal Generator Signal	J, K (Max.)
5	.000082 Mfd	Antenna Connector	1615 KC	Signal Generator Signal	F, G (Max.)
6	.000082 Mfd	Antenna Connector	1000 KC	Signal Generator Signal	**L

\*To tune to high frequency, put a 0.070" feeler gauge (or bare #13 wire) in slot against the high frequency stop. Depress selector bar and allow planetary arm to

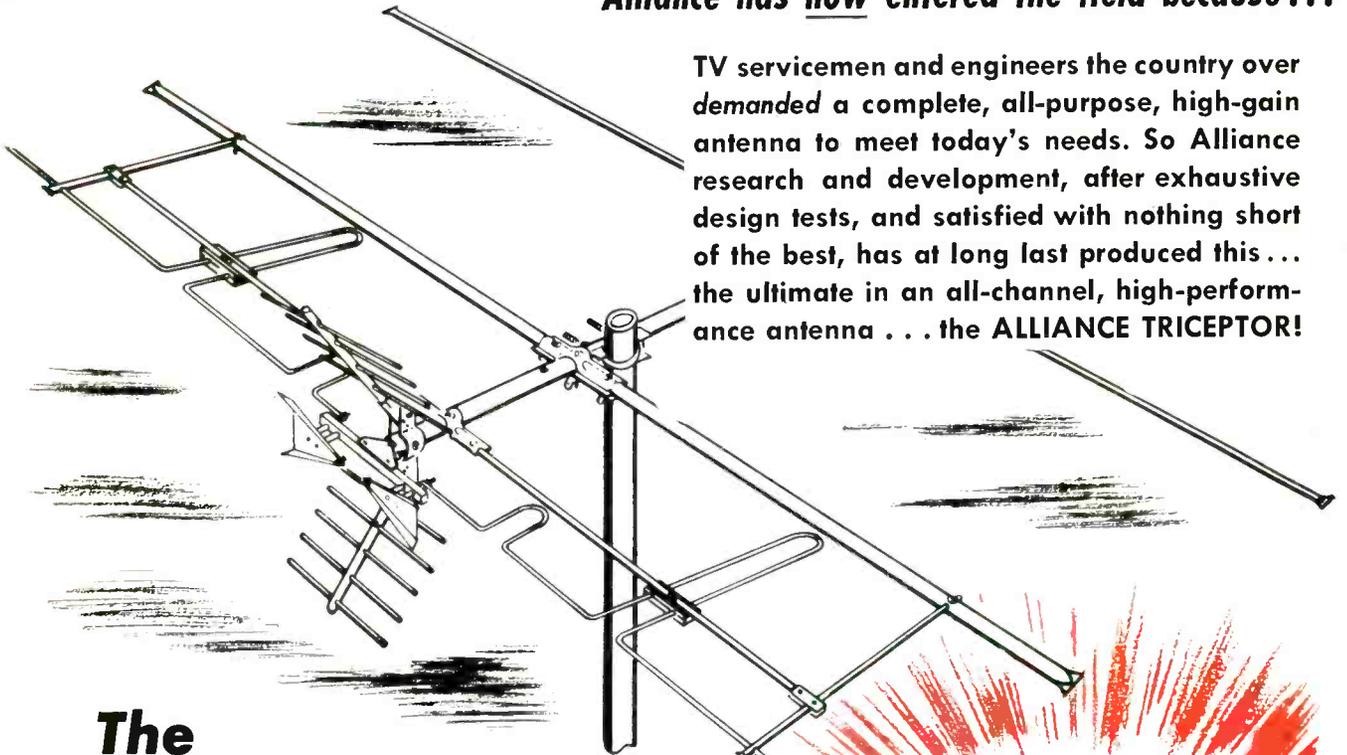
run against feeler gauge. Turn radio off, then back on. \*\*\*"L" is the pointer adjustment screw on the end of the core guide bar—adjust so pointer reads 1000 KC.



**HERE'S WHY!**

# **ALLIANCE develops and markets NEW OUTSTANDING ANTENNA**

*After staying out of the antenna business these many years...  
Alliance has now entered the field because...*



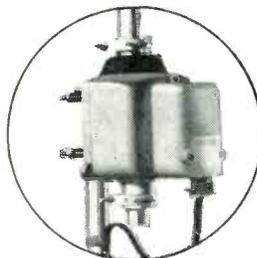
TV servicemen and engineers the country over demanded a complete, all-purpose, high-gain antenna to meet today's needs. So Alliance research and development, after exhaustive design tests, and satisfied with nothing short of the best, has at long last produced this... the ultimate in an all-channel, high-performance antenna... the **ALLIANCE TRICEPTOR!**

## **The ALLIANCE TRICEPTOR**

*The Antenna you asked for—  
**ALL VHF UHF CHANNELS**  
A Revolution in Design!*

A totally new and different UHF-VHF all channel antenna. Adds gain of VHF antenna to UHF antenna for unusually high, uniform gain and top performance on all channels!

*Where the ultimate in directivity is required, especially in fringe, multiple station and overlapping areas, the famous Alliance Tenna-Rotor used as an accessory with the Alliance Triceptor, makes the ideal combination for 'peak' reception.*



**HIGH UNIFORM GAIN** on all UHF-VHF channels. No dropouts—no channels sacrificed to improve others.  
**MINIMIZES OR ELIMINATES INTERFERENCE.** Co-channel interference, ghosts, airplane flutter, auto ignition, neon, etc., greatly reduced or eliminated!

**HIGH DIRECTIVITY** with a **MONOLOBE** pattern.  
**PRE-ASSEMBLED "SNAP-OUT" DESIGN** units for fast easy installations.

**NO SPARE PARTS BAG!**

**ALL-WEATHER CONSTRUCTION**—structurally sound, rigid, sturdy, compact and lasting. Wind tested, light weight, no tying needed.

*Meet the changes in Television with Alliance Triceptor antennas.*

THE  
*Monolobe*

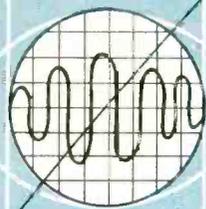
(Model TC-2 single bay UHF-VHF)

New Alliance Antenna designed for all channel reception.

Price **\$22<sup>95</sup>**

**THE ALLIANCE MANUFACTURING CO., Alliance, Ohio**  
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**FULL VIEW FULL VALUE**



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**HYCON  
OSCILLOSCOPE  
MODEL 617**



**\$269.50**

SHARP UNDISTORTED TRACE EDGE TO EDGE

You get more for your scope dollar in a Model 617 Oscilloscope, because Hycon's special flat face 3-inch tube eliminates fringe distortion. You pay for a 3-inch scope—you get 3 inches of sharp, usable trace.

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## New Components & Tools

### Centralab H-V CAPACITORS

Designed for use in h-v circuits, these disc capacitors are flash tested at twice rated working voltage for maximum safety factor. Type DD30, 3000 vdcw disc units, are available in capacities from 4.7 to 3000 mmf. Type DD60, 6000 vdcw capacitors, range from 4.7 to 1500 mmf. Tolerance of all units is  $\pm 20\%$ . Packaged 5 per envelope, 25 per carton. Centralab, 900 E. Keefe Ave., Dept. H-43, Milwaukee 1, Wisc.—TECHNICIAN

### Merit REPL. FLYBACKS

Seven h-v horizontal-deflection transformers, models HVO-15 through HVO-21, are designed as exact replacements for Philco units. Three flybacks, models HVO-22 through HVO-24, are exact replacements for Admiral units. Merit Coil and Transformer Corp., 4427 N. Clark St., Chicago 40, Ill.—TECHNICIAN

### Vidaire FILTERS

LF series of line filters are low-pass devices designed to pass all frequencies below 10 kc and attenuate all frequencies above. Available in 4 models: LF1, LF2, LF3, LF4, these filters are shielded to prevent stray pick-up. No tuning adjustments necessary. Vidaire Electronics Mfg. Co., Lynbrook, N.Y.—TECHNICIAN

### CBS PLIERS KIT

New pliers kit is available free to servicers with the purchase of CBS-Hytron receiving tubes until August 31. The kit consists of 3 pliers of drop-forged tool steel in a plastic carrying case. The pliers are: 6½-in. diagonal side-cutter; 8-in. long-nose; and 6-in. all-purpose. Combining flat and round nose, jaws shaped for positive gripping, two wire strippers, and two side cutters; these pliers have gun-metal handles and polished jaws. CBS-Hytron, Danvers, Mass.—TECHNICIAN

### Drake SOLDER IRON

Model 403 heats in 60 seconds, is designed to be carried in a tool kit while still hot, and comes with an asbestos and metal-lined container. The iron is rated at 80 watts, has a 7/32-in. tip, weighs only 8 oz. Drake Electric Works, Inc., 3656 Lincoln Ave., Chicago 13, Ill.—TECHNICIAN

**MORE NEW PRODUCTS  
ON PAGE 56, 58**

A service record unmatched  
in the history of television!

# CROSLEY SUPER-V

*is a service man's dream!*

"No more groping and twisting"

"Entire chassis accessible for service"

*Just look at what  
service men say!*

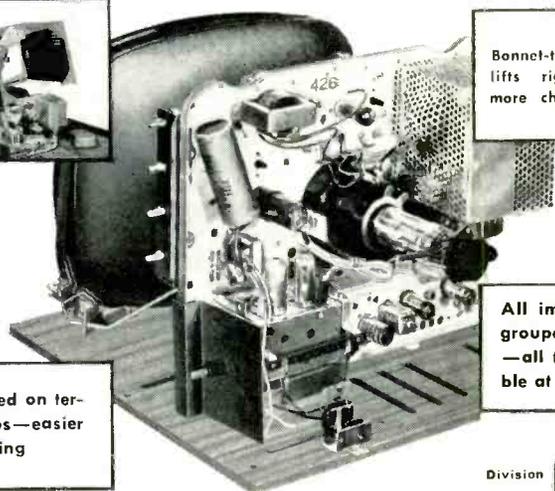
"By removing the cabinet back, every tube is right in front of one's eyes. No more groping and twisting to relocate tube-socket pins. The separate diagram showing the actual filament wiring makes the search for an open filament a matter of seconds."  
**L. B. Hallberg, Hardware Products Co., Sterling, Ill.**

"The Crosley Super-V is a service man's dream; the new vertical chassis allows the changing of tubes in a few minutes. When service of a more complicated nature is required, the cabinet can be removed by loosening 6 screws; this leaves the entire chassis accessible for service."  
**Roy R. Thompson, Saginaw Distributors, Inc., Saginaw, Mich.**

*Just look inside  
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Points wired on terminal strips—easier circuit tracing



Bonnet-type cabinet lifts right off — no more chassis tugging

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- Most complete remote control!
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With this unit, you can control the sound, turn the set on or off, change channels, control the brightness, control contrast, take the control from the set to the hand unit or back to the set . . . as you choose. **\$39<sup>95</sup>**  
This DeLuxe model retails for only.....

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With this unit you completely control the sound and have a perfect channel changer. The Regular retails for only..... **\$19<sup>95</sup>**

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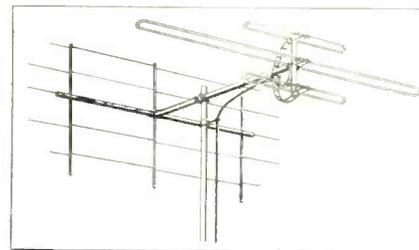


DE LUXE  
**\$39<sup>95</sup>**

REGULAR  
**\$19<sup>95</sup>**

**Ward VHF ANTENNAS**

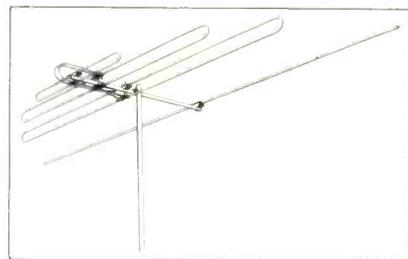
The Fringemaster uses the trap-bolt type of fold-up construction to form a rigid assembly, provides low wind resistance. It is available in the



following models: single bay (TV-285); one-quarter wave stack (TVS-286); one-half wave stack (TVS-287). Ward Products Corp., 1148 Euclid Ave., Cleveland 15, Ohio—TECHNICIAN

**Welco VHF ANTENNA**

The Sabre model 100 antenna, with a special phasing element, allows the low band dipole to function with proper gain and pattern response in



the high band, thus permitting reduced physical size in a high-gain antenna. The Sabre has uniform low band coverage (2-6) and improved high-band gain (7-13). The high front-to-back ratio cuts co-channel interference. Welco Mfg. Co., Burlington, Iowa—TECHNICIAN

**ITI UHF CONVERTERS**

Designed for low-cost efficient UHF conversion, model IT-150R Ultra-Tuner features direct-drive tuning with no sliding contacts, precision capacitors and conservative design for long tube life. Circuit is said to provide good selectivity and rejection of interference. Ultra-Tuner line includes models IT-150R, \$18.95 list; IT-180R, \$24.95 list, and IT-170R, \$34.95 list. Industrial Television, Inc., 369 Lexington Ave., Clifton, N.J.—TECHNICIAN

**Circuit Digests Again**

EDITORS, TECHNICIAN:

Hardly a day goes by that we do not refer to our Circuit Digests for the valuable info contained therein. We at Tel-Land Appliances sure appreciate this terrific service you are giving us.

JOSEPH WAGNER

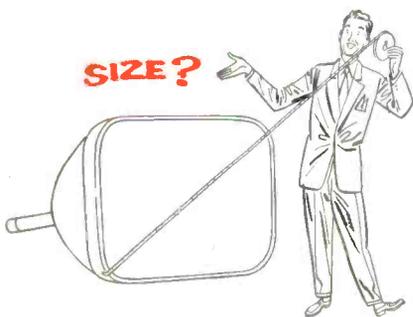
St. Paul, Minn.



**SYLVANIA**  
*Aluminized  
 Picture Tubes*  
**ARE PACKED  
 WITH PROFITS!**

**Make old sets like new... have more satisfied customers!**

**SIZE?**



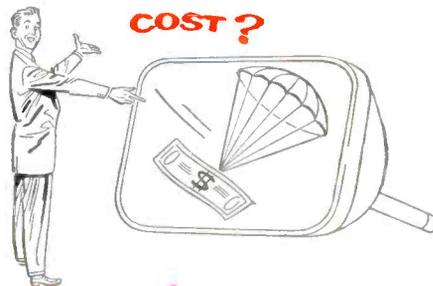
Interested in new sales records? You'll be heading in that direction when you replace old picture tubes with new Sylvania Aluminized Tubes.

Sylvania Aluminized Picture Tubes give terrific performance. They make old sets better and brighter than new by providing whiter whites—blacker blacks... a 6-times better picture contrast.

Sylvania Aluminized Picture Tubes are now available in most sizes for all popular TV sets. In other words, with Sylvania Aluminized Picture Tubes, you give your customers the best possible buy *and* the best possible service, including a full one-year warranty.

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**COST?**



**PERFORMANCE?**



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DON'T JUST REPLACE—

# MODERNIZE

with wide-range, high-compliance

# SONOTONE

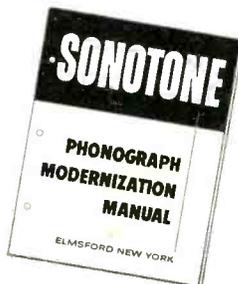
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CERAMIC CARTRIDGES



Always install a Sonotone, the original ceramic cartridge—your customers will love you for it. It will start them on the road to high-fidelity—and additional new business for you!

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## New Tape Recorders & Audio Equipment

### Magnemite TAPE RECORDERS

Portable 4-speed tape recorders operate from set of flashlight-type batteries for 100 hours, weigh 15 lbs. including batteries. Tape speeds for model 610 EM: 3¾ in. per sec. to 15 ips; for model 610 DM; 15/16 ips to 7½ ips. Constant tape speed, low flutter and wide frequency response meet NARTB standards. Motors are spring-wound. Amplifier Corp. of America, 398 Bwy, New York 13, N. Y.—TECHNICIAN

### Ferrograph TAPE RECORDER

Three independent drive motors, wide frequency response, high signal sensitivity, automatic cut-off in unattended operation, separate bass and treble adjustments and metered input control are some features of the Ferrograph tape recorder. Operates at either 3.75 or 7.5 in. per second, and is capable of double-track recording and playing. Net price, \$349.50. Distributed in the United States by Hudson Radio & Television Corp., 48 W. 48th St., New York 36, N.Y.—TECHNICIAN

### L. E. E. SPEAKER SYSTEM

The Catenoid, a 3-way reproducer in a folded corner horn, provides wide-range Hi-Fi reproduction by designing the horn around a catenary curve, instead of using a simpler, partial horn. The horn flares from the speaker to a mouth 15 ft. across. Available in choice of wood finishes, \$295. Laboratory of Electronic Engineering, Inc., 413 L St., NW, Washington 1, D. C.—TECHNICIAN

### Califone PHONOGRAPHS

The 1955 line of 15 portable phonographs, transcription players and sound systems emphasizes high fidelity and features such innovations as 4-speed nylon-driven turntables combined with variable speed motors; a built-in stroboscope for timing; adjustable-pressure pickups with either dual-needle ceramic or variable reluctance cartridges and separate treble and bass controls. Wide range amplifiers and improved loudspeakers are being used with no increase in weight. Califone Corp., 1041 N. Sycamore Ave., Hollywood 38, Calif.—TECHNICIAN

### CORRECTION NOTICE

Page 15, col. 1 August Issue: The item on the extension of GE warranties to cover labor charges applies only to radio products, not to TV sets.

# NEW!



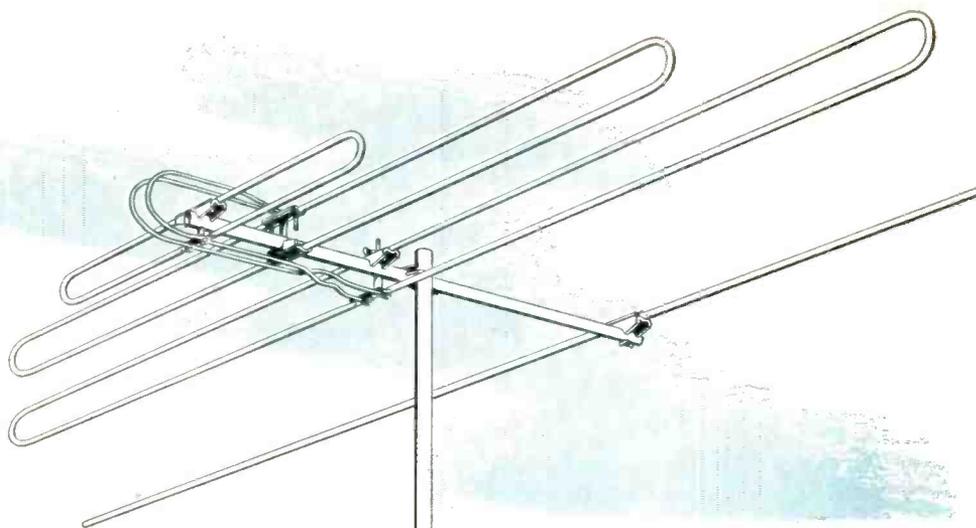
# SABRE

with

# model 100

# Miracle Phase\*

Patent Applied For



## look at these outstanding sales features

- Compact size—makes it easy to handle—to stock—and safe to install
- A sturdy streamlined design that will stand up under extreme weather and icing conditions
- Completely pre-assembled — with fold out construction
- Sealed element ends eliminate wind noise
- Ideal with rotor either singly or stacked
- Uniform low band coverage (2-6) and excellent high band gain (7-13)
- High front to back ratio cuts co-channel interference
- Sharp directivity and ultra linear response for excellent black and white and color reception
- 300 ohm match
- Only the Welco Sabre has Miracle Phase\*

One Antenna that fills your VHF needs close in — to extreme fringe and UHF

## Miracle Phase

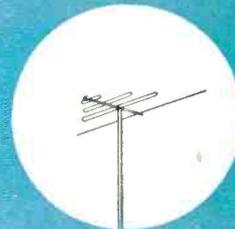
Miracle Phase effectively isolates the undesirable interaction and loading of Phased elements. As used with a bi-philler broadening and phase inverting element, it allows the low band dipole to function with proper gain and pattern response in the high band. This unique coupling of working elements makes it possible to feed the received signal to the set so satisfactorily that the need for many additional elements is eliminated — greatly reducing the physical size of high gain antennas — thus allowing one antenna to fill many requirements — and become the first choice of servicemen.

*watch the Sabre create a new standard in antenna design and appearance*

## introduces a New Look in all channel antenna design



ORDINARY ANTENNA



SABRE 100

## Compare Sabre 100 performance, size and price with other antennas

The Welco SABRE cannot be compared with any other antenna design—because electrically it works different—physically it appears different. The SABRE is compact, streamlined and its new phasing system gives it added distinction. All this at a price that will amaze the most discriminating people, thus making the SABRE a tremendous sales getter.

**THERE'S A SABRE MODEL FOR EVERY AREA FOR TODAY'S NEEDS AS WELL AS TOMORROW'S!**

Distributor Inquiries Invited—Territories for the New Sabre Line Now Open Write, wire or phone—

## WELCO MFG. CO.

Leaders in Electronic Design

225 S. Third Street

P.O. Box 110

Burlington, Iowa

## News of the Industry

### RCA Contest Results

More than 22,000 dealers entered RCA's "Tell and Sell" Contest, which offered \$50,000 in 400 prizes for the best reasons for using and selling RCA tubes. Top winners were: G. Lee Hurlburt, Lakewood, N. J., who won 1st prize, a 1954 De Soto hard-top convertible; E. Frank Roberts, Cleveland, Ohio, who took the 2nd prize, a \$1000 U. S. Savings Bond; and Allan J. Holmes,

Orange Electronics, Orange, N. J., who won an RCA deluxe TV-radio-phono console combination, the 3rd prize. Other prizes included air conditioners, electric ranges, radios, movie cameras and wrist watches.

Distributor salesmen who assisted the 3 top winners were, respectively, Robert Bursley (Krich-New Jersey, Newark, N. J.), L. Fromwiller (Main Line Cleveland, of Cleveland), and Bruce Douglas, also of Krich-New Jersey.

### CREI Grants Degrees

The District of Columbia Board of Education has authorized Capitol

Radio Engineering Institute to confer the degree of Associate in Applied Science to residence school graduates. The course for which the degree is granted includes studies in the humanities as well as in engineering subjects.

### RCA Alumni Group

Alumni Association of RCA Institutes, with headquarters at the school's address, 350 W. 4th St., New York 14, N. Y., announces results of its recent election of officers: President, Stanley Schiffman; Vice President, Reginald Collins; Recording Secy., John Mustillo; Treas. Budd Meyer; Corresp. Secy., Patsy Genduso. The group meets the 3rd Thursday of each month, publishes its own newspaper.

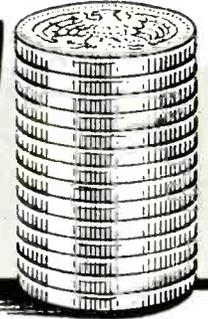
### New Philco Officers

James T. Buckley, former Chairman of the Board, declined re-election after 42 years active service with Philco, and was succeeded by William Balderston, president for the past 6 years. James H. Carmine, exec. vice-pres. for the past 5 years, succeeded to the presidency. His former position goes to John M. Otter. The changes were made public at the company's recent national distributors' convention in New York.

## Put Your Microphone Dollar on the

# Gold Standard

NEW GOLD-FINISHED ASTATIC MICROPHONE WITH SELF-SUPPORTING STANDARD RECESSED IN BACK



CRYSTAL  
Model 302  
List Price \$10.50  
—47 db with 8' cable



CERAMIC  
Model 301  
List Price \$10.00  
—54 db with 8' cable

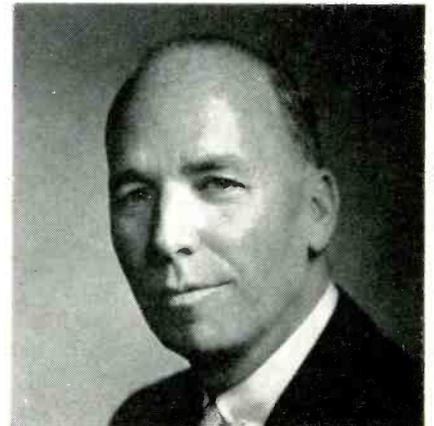
The Astatic Gold Standard leans on its hinged standard for desk use.

In closed position, the metal standard with protective plastic foot is recessed. Fits flush with the microphone housing for maximum convenience in hand use.

This exclusive, new Astatic microphone design—with metal standard which hinges in and out of its recess in back—sets a new standard for convenience of use as well as for performance quality. You will be amazed at the rich, full trueness of tone . . . actually unprecedented in the Gold Standard's price range. Only Astatic engineering and Astatic precision mass production could make possible so much quality of microphone design and construction for so little. By any comparison, you can't do better than to put your microphone dollar on Astatic's new Gold Standard. Write for complete performance data, Catalog S-430.



EXPORT REPRESENTATIVE  
401 Broadway, New York, N. Y.  
Cable: Astatic, New York.



James H. Carmine, new Pres. of Philco Corp.

At the same convention, Philco introduced its new TV and Hi-Fi lines. The TV receivers feature finger-tip tuning on recessed controls. The Hi-Fi units feature the manufacturer's new electrostatic high-frequency tweeters, which are said to reproduce sound beyond the upper limit of human hearing with wide dispersion and free of distortion. New feature on the TV receivers is a snap-on UHF tuner that may be connected to the VHF receiver, when needed, with little difficulty. An actual installation was clocked at 65 seconds.

(News continued on page 62)

# FINCO\* introduces

# 3 SENSATIONAL

# New Antennas

Patent No's. 2,566,287 2,630,531 2,655,599 other patents applied for.

## FINCO 400-SA

FEATURING "FRO-BAC"\* FULL DIMENSIONAL SCREEN

The engineering masterpiece of the antenna industry! The sensational, new Finco 400-SA eliminates rear signal interference (adjacent and co-channel), ghosts and electronic noise — delivers famous Finco high gain for clear, sharp pictures in the SUPER fringe area on all channels, UHF and VHF. The special electronic FRO-BAC screen has 80 sq. ft. of highest efficiency, FULL LENGTH reflector surface. Pre-assembled for quick installation.

## FINCO 200-A

The ideal antenna for "in-between areas" . . . (too far out to use "Local" type antenna, too close to warrant use of a super-fringe antenna). The new Finco 200-A combines basic, double CO-LATERAL\* design with exclusive Finco electronic patents to deliver unbeatable gain and performance in the Semi-Fringe area on all channels, UHF and VHF. Completely pre-assembled.

## FINCO 200-SA

The Finco 200-SA was engineered specifically for the "in-between", semi-fringe areas where a FRONT-TO-BACK problem exists. The special FRO-BAC full dimensional screen eliminates rear signal interference, ghosts and electronic noise. This antenna delivers reception power that cannot be matched by ordinary antennas. Completely pre-assembled.

\*Trade marks of the Finney Company.  
Registration No's. 559,104 575,345

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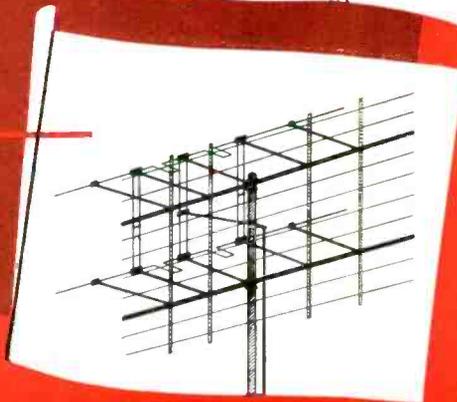
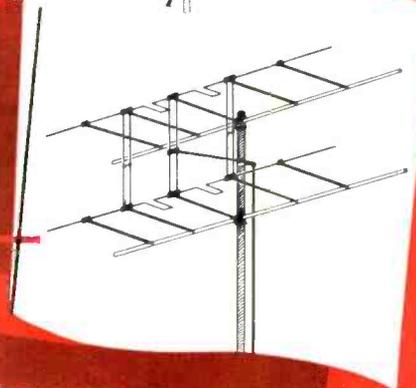
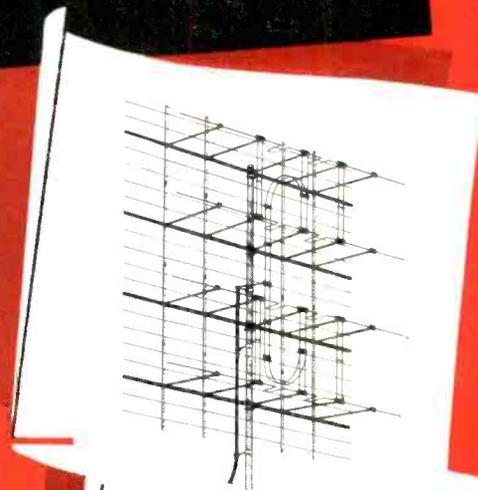
**The FINNEY  
Company**

4612 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

## MODEL 14-S CONVERSION KIT

**FRONT-TO-BACK PROBLEM IN  
YOUR AREA??? MANY FINCO  
400-A INSTALLATIONS???**

This kit contains special electronic FRO-BAC screen and stainless steel hardware for quick conversion of models 400-A and 400 to model 400-SA.



Speculating on the home TV receiver of the future, GE scientists envision a picture screen so thin that it will be able to hang on the wall of the room in a picture frame. The use of printed wiring and advanced miniaturized components would make it possible to build the associated receiver circuit into the frame. Controls would be incorporated in a small unit that could be located elsewhere in the room.

The prediction, at least 10 years away from fulfillment, is based on research involved in a complex proj-

ect, now underway, to speed the plotting of aircraft. This plotting, essential to the successful intervention of enemy planes, is now being done manually after the planes are picked up and followed by radar operators. The immediate object of the present research is to make the plotting completely automatic.

**ICS Offers Scholarships**

Sixty-four complete scholarships valued at more than \$15,000 will be awarded by International Correspondence Schools, Scranton 9, Penna., to persons unable to attend college. The announcement came

from Lawrence W. Tice, ICS president. The 1954 awards will go to young men and women in the U. S. and Canada on a geographical basis. Local non-sectarian, non-political organizations will be authorized to select candidates by ICS. For further information and rules, contact John C. Villaume, Dean of the Faculty.

**Westinghouse Contest News**

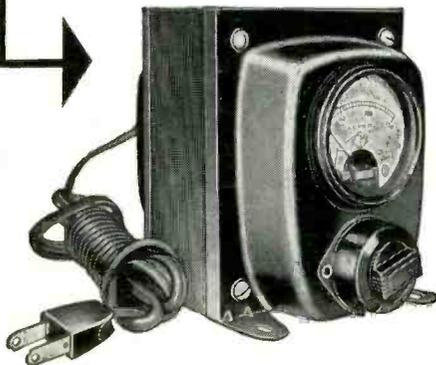
Cash and merchandise totalling \$9100—\$8000 to dealers and \$1100 to distributors—were awarded in the recently concluded contest conducted by the Westinghouse Electronic Tube Division. Grand prize for dealers, \$1000, went to Ferd W. Meyer of the Hanenkamp Appliance Co., St. Louis. R. H. Normandy of Normandy TV, Willoughby, Ohio, got \$700 in merchandise as runner

**INADEQUATE WIRING  
A MAJOR PROBLEM  
AFFECTING TV PERFORMANCE**

One of the greatest problems of the electrical industry is that of inadequate distribution and insufficient wiring. Systems that are planned to standards that existed years ago when the average residential load was only 25% or less of today's demand are inadequate to main-

tain the capacity and maintain the voltage necessary for the proper performance of all the usual appliances and equipment available in the average American home. The extreme sensitivity of a TV receiver is instantly effected in performance by a low voltage condition. This problem

**CAN BE SOLVED WITH THE  
ACME ELECTRIC  
T-8394M VOLTAGE ADJUSTOR**



The T-8394M Voltage Adjustor can be used by the service man to reproduce the operating condition about which the customer complains by turning tap switch to the voltage which simulates such condition. For example, customer complains that evening program pictures flicker and shrink. When service man calls next day all operation appears normal — voltage tests out properly. But, by adjusting voltage to 97 volts the condition about which the complaint was made is reproduced. This indicates low voltage condition during evening that can be corrected with a T-8394M Voltage Adjustor.

ORDER FROM YOUR JOBBER

**ACME ELECTRIC CORPORATION**  
**MAIN PLANT: 889 Water Street • Cuba, N. Y.**  
 West Coast Engineering Laboratories: 1375 W. Jefferson Blvd. • Los Angeles, Calif.  
 In Canada: ACME ELECTRIC CORP. LTD. • 50 Northline Road • Toronto, Ont.



Stan Musial and Westinghouse winners R. H. Normandy, E. Bennett and F. W. Meyer.

up, with 3rd and 4th prizes (\$400 and \$300 in merchandise) going to Harry Kratz (Kratz Electric, Baltimore, Md.) and Bruce Burroughs (Radio-activity, Danbury, Conn.) respectively. Top distrib. prizewinner was Edwin Bennett, employe of Euclid Radio & Parts Service, Cleveland, Ohio, who received \$500 in cash.

Flown to New York for a round of sight-seeing, the top winners witnessed a Giant-Cardinal baseball contest, were introduced to diamond star Stan Musial, and received their awards from him in a ceremony at the Stork Club later. M. Clements, publisher of **TECHNICIAN**, was one of the 3 judges who evaluated contest entries.

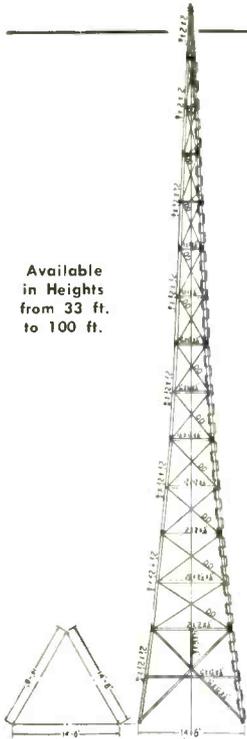
**Low-Priced Transistors**

Mass production of transistors, in the millions, is expected to get under way after completion of tooling up in GE's Electronics Division at Syracuse. GE vice-president W. R. G. Baker said that development of a new "rate-grown" method of producing essential transistor elements makes quantity output possible. As a result of the new process, it is believed that transistors will become competitive with vacuum tubes in price.

(News continued on page 68)

## NEW SUPER POST TOWERS FOR TELEVISION ANTENNAS IN FRINGE AREAS

Available in Heights from 33 ft. to 100 ft.



### TOWERS OF STRENGTH TO LAST A LIFETIME

Self-supporting tower built up of galvanized steel sections. No guy wires necessary. Easy to erect. Safe and resistant to high wind. Available in heights 33 ft., 47 ft., 60 ft., 73 ft., 87 ft., and 100 ft., with bases in proportion.

### FRINGE AREA TV BUYERS MUST HAVE SPECIALLY BUILT TOWERS FOR CLEAR RECEPTION

Tower and the TV set go hand in hand as a package sale to rural TV buyers. Provides an extra sale and profit to dealers. An excellent fast selling accessory for jobbers and dealers.

### TERRITORIES OPEN FOR JOBBER DEALER FRANCHISE

Write for complete structural details, packing, prices, discounts, and territorial assignment.

MANUFACTURED BY

## AERMOTOR CO.

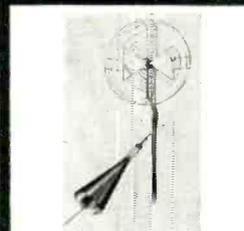
Dept. 6609, 2500 Roosevelt Road, Chicago 8, Illinois  
BUILDERS OF STEEL TOWERS SINCE 1888

new Bogen UHF Design  
traditional Bogen efficiency

## NEW 'UCT-1' UHF CONVERTER



- better than competitive converters by a 6 db signal-to-noise ratio
- 6 db reduction in noise level means corresponding 6 db increase in signal level from antenna—clearer viewing
- maximum performance in *all* signal areas—often permits simpler antenna
- connects to any VHF set
- single-knob tuning runs entire UHF range, channels 14 to 83 inclusive
- complete with tubes, 4' of 300-ohm twin lead, instruction sheet... list \$42.50



"G-Line," UHF Transmission line, list \$43.75 (kit includes: 2 launchers, 150 feet of special insulated wire, 2 stand-off brackets)

"UHB,"  
UHF  
Booster,  
list \$41.00



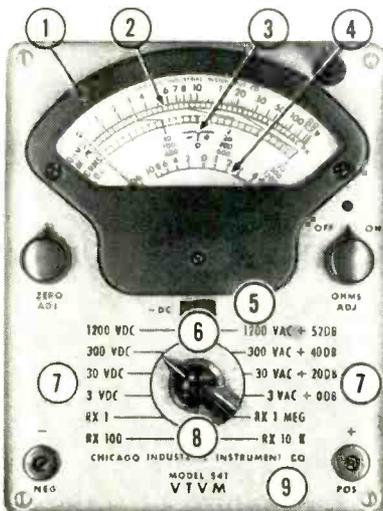
# Bogen

See your distributor or write  
DAVID BOGEN CO., INC.  
29 Ninth Avenue, New York 14, N. Y.

# HI-FI RADIO TV

MODEL 541 VTVM

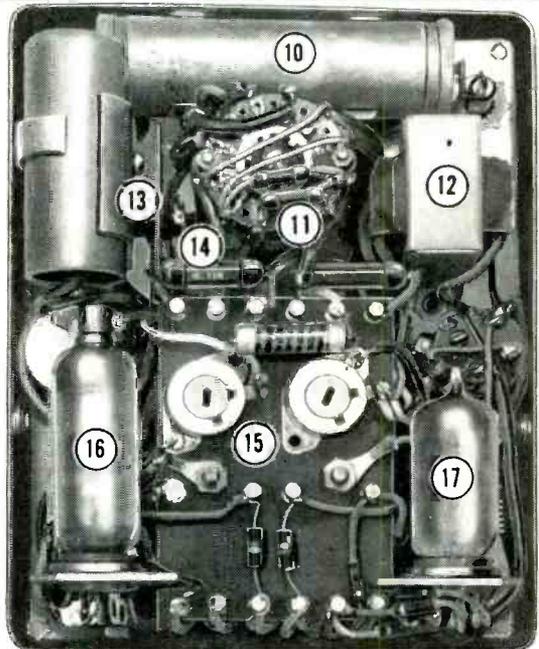
- 1—High-torque meter, cupped jewels. No sluggish pointer. No tapping. Electronic burnout protection.
- 2—Peak volts scale for audio, saw-tooths, square waves. (Not peak-peak)
- 3—TV sound and FM radio alignment with center zero.



5 1/4 by 6 3/4 by 3 1/2 inches.  
Weighs only 3 1/2 pounds.

- 4—Decibels. Range ratios on panel.
- 5—Polarity reverse for d-c volts.
- 6—One selector knob for all ranges, all functions. No mix-ups.
- 7—Voltage ranges, both DC and AC. Zero to 3—30—300—1200 volts.
- 8—Omhs. 1/2 ohm to 1000 megohms.
- 9—Bakelite case. Aluminum panel. No shorts to bench or chassis.
- 10—AC volts unaffected by DC in same circuit. 2 1/2 kv input capacitor.
- 11—DC input 11 megs. AC 8 megs and 60 mmf. All range resistors 1%.
- 12—No overheating if left on all day. Less than 7 watts from line.
- 13—No battery to run down. Rectifier-filter for all ohms ranges.
- 14—Long time constant. 96 1/2% of peak amplitude at 15 cycles/sec.
- 15—Accessible test points and adjusters. All service data supplied.
- 16—TV type rectifier. 18 kv peak.
- 17—TV type twin triode in bridge circuit. Good frequency response.

Factory built, tested, calibrated.  
Priced in the range of kits.  
\$30.00 net.



See the "541" at your distributor's. For the story of VTVM's and what they can do, write to

CHICAGO INDUSTRIAL INSTRUMENT CO.

536 West Elm St.

Chicago 10, Ill.

I'D RATHER USE TUNG-SOL TUBES



There's every reason why servicemen feel this way. Tubes they need they can get. Quality is always uniform—always up to set manufacturers' specs. Callbacks are rare. It's more profitable for servicemen to use Tung-Sol Tubes.

# TUNG-SOL<sup>®</sup>

dependable  
PICTURE TUBES



TUNG-SOL ELECTRIC INC., Newark 4, N. J.  
Sales Offices: Atlanta, Chicago, Columbus,  
Culver City (Los Angeles), Dallas, Denver,  
Detroit, Newark, Seattle.

## Making the Most of Your Test Equipment

MICHAEL CRAIG

High-voltage transformers, such as those used in photo-flash work (strobos), small transmitters, diathermy, electronic heating, and similar devices can be readily checked for voltage by means of a scope, using the simple set-up shown in Fig. 1. (This procedure will be helpful in those cases where the technician has no high-range ac voltmeter, or when the one he has is being used in another bench job.) Only two 2-watt resistors are required to do an accurate job. The loading on the transformer will be much less than when an ordinary ac voltmeter is employed. The scope measures 1/10th of the transformer voltage.

A description of the procedure follows: Connect the scope input terminals to the ac line. (We are assuming that the line voltage is 120 v, and that a transformer is

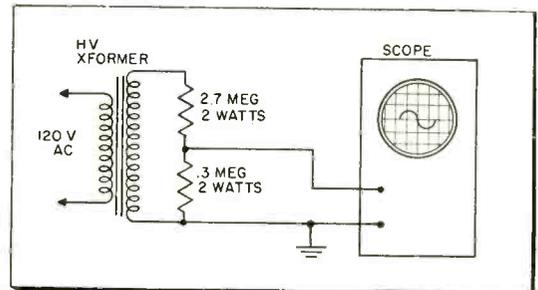


Fig. 1—Test setup for checking industrial-type power transformer. Voltages between 1000 and 5000 v rms (1,400 to 7,000 peak) may be measured with the aid of the voltage-divider shown.

being used; in the case of an ac-dc chassis using no isolation transformer, make sure the scope isn't grounded.) Adjust the deflection on the scope screen so that the waveform present covers 10 small squares. This is our calibrating voltage.

Now connect the scope leads across the .3 meg resistor, and read the voltage present here. (We are assuming that the high voltage across the secondary of an industrial-type power transformer is to be measured.) The (rms) voltage present across the entire secondary will be 120 x the number of squares deflection. For instance, if the deflection measures 27 squares high, the transformer rms voltage will be 120 x 27 or 3240 v. (Since we have chosen a 10 to 1 step-down by means of the two resistors, and 10 squares represent 120 volts, each square stands for 12 v x 10 (step-up ratio) or 120 v rms.) For good accuracy choose 2% resistors for the divider, and know what the line voltage is, also within 2%.

If desired, a low-range ac voltmeter can be connected across the line, when adjusting for the 10 squares deflection as previously described. Since the line voltage in most shops will not vary more than 1 or two volts except in isolated regions or in heavily-loaded areas, several readings can be taken during the day, and the average used as reference for future tests of the kind previously described.

When adjusting for the 10 square, 120-v calibrating deflection, make certain that the "hot" ac line lead goes to the "high" terminal on the scope. This will eliminate any possibility of an erroneous reading being introduced because of the bypassing to chassis of the "hot" ac line input to the scope.

## Using Scope to Test High Voltages. Low-Capacitance Tester

### Low-Capacitance Checker

A useful little piece of test equipment for testing low values of capacitance may be quickly constructed by the serviceman. Fig. 2 indicates the principles involved. The ac line—120 v rms, or app. 170 v peak—is applied to the vertical input terminals of the scope through a 10 mmfd capacitor. At 60 cycles, the reactance of this capacitor is app. 265 megs. Assuming that the impedance across the scope's vertical input terminals is one-half meg (this is average), it is obvious that most of the applied voltage will be dissipated across the 10 mmfd capacitor, while app.  $500,000 / 265,000,000 \times 170$ , or .32 v, will appear across the scope input terminals. This small voltage is large enough to produce a reasonably good deflection on most scopes.

Now, if we adjust the scope's vertical gain control for exactly ten divisions (with the line voltage applied through the 10 mmfd condenser), each division will represent 1 mmfd of capacitance with only a small error. Some hum voltage is always introduced due to lead pick-up, and must be allowed for. So we remove the capacitor and check for the amplitude of this hum voltage.

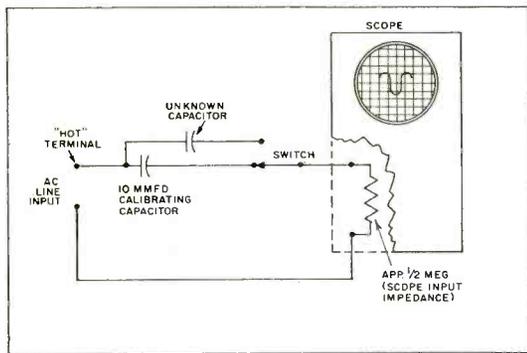


Fig. 2—Sketch illustrating principle underlying capacitance test of an unknown condenser. Deflection on scope screen produced by known capacitor is compared with that of the unknown one.

Assume it is two divisions high on the screen. We add these two divisions to the 10 divisions desired for true line voltage deflection, and adjust the vertical gain control to produce a twelve-division deflection on the scope screen. With the 10 mmfd capacitor connected, 12 divisions will represent 10 mmfd. If a capacitor of unknown value produces a deflection of 11 divisions, its capacitance will equal 9 mmfd; if the deflection produced is 10 divisions, the unknown capacitance will be 8 mmfd, and so on, two divisions being subtracted for hum voltage each time (we are assuming this is the value of the hum voltage actually present, as determined by the previously-described test). A capacitance as low as 1 or 2 mmfd may be read in this way, with less than 10% error.

A 100-mmfd capacitor can be used in the same way as the 10 mmfd unit to check for larger values of capacitance. The scope's vertical gain control can be adjusted to produce, say, 20 divisions of deflection with the line voltage applied to the scope input; adding two divisions for hum voltage, the total becomes 22 divisions. Each division will now represent 5 mmfd (after two divisions are deducted from the total deflection produced with a condenser of unknown value, as in the previously-described case). The error here will still be less than 10%.

I'D RATHER YOU WOULD



Customer confidence in local servicemen is due in large measure to the dependability of the products they use. Tung-Sol maintains quality standards that build up the local serviceman in his community.

## TUNG-SOL<sup>®</sup> dependable TUBES—DIAL LAMPS

TUNG-SOL makes All-Glass Sealed Beam Lamps, Miniature Lamps, Signal Flashers, Picture Tubes, Radio, TV and Special Purpose Electron Tubes and Semiconductor Products.



THE ONLY  
**Jam Proof**

**RECORD  
CHANGER**

For True  
High Fidelity



**Collaro**  
for 7, 10 and 12-inch Records  
**Fully Automatic  
3-Speeds**

When making an original hi-fi installation or replacing an obsolete record changer, you have more to gain with a COLLARO.

For Example:

**CUSTOMER SATISFACTION** — The Collaro gives smooth, quiet operation . . . no perceptible rumble, wow, or flutter . . . a 4-pole motor for constant speed and minimum hum pickup . . . and loads of other important features far top quality record reproduction.

**NO SERVICE CALL-BACKS** — The Collaro defies mistreatment . . . you can actually hold the tone arm while the mechanism goes through the changing cycle . . . it will never jam.

**... AND AS FOR PROFIT** — The Collaro is the only Record Changer consumer-advertised at List Price . . . to allow for a fair service margin.

For FREE Installation and Service Manual, write Dept. 0J-8

**ROCKBAR CORPORATION**  
215 East 37th St., New York 16, N. Y.

# SERVICE ASS'N REPORTS

## NATESA Convention

Fifth annual convention of the National Alliance of Television & Electronic Service Associations, 5908 S. Troy St., Chicago, Ill., takes place this month. Time and place: Sept. 24-26, Morrison Hotel, Chicago. The affair is open to all service personnel including non-members. Exhibits, banquets and seminars will feature latest data on color TV and other developments, newest business methods, fun and fellowship.

In an open letter to pix-tube manufacturers, NATESA pleads for sufficient industry-wide standardization of color crt's to permit interchangeability of one type with another. The idea is advanced to avoid a serious replacement problem for independent service. A similar plea for standardization was voiced by M. Clements, **TECHNICIAN** publisher, in a telegram sent to Glen McDaniel, RETMA prexy, 2 months ago, with copies going to other industry leaders.

## LIETA Queries Emerson

Newspaper ad pushing Emerson's manufacturer-subsidized service outlets has drawn a reaction from the Long Island Electronic Technicians Assoc., 88 Fourth St., Oceanside, N.Y. LIETA has presented a plan to Emerson for allocating service work to existing responsible independents. The wholesale-retail dilemma is presented from the distributor's point of view in a letter to *LIETA News* by Max Barnett of Island Radio Distributors, Hempstead, N.Y. Barnett asks for a method of arriving at true distinctions between technicians, dealers, part-time operators, hams, etc., in order to formulate a basis of retail-wholesale policy. He asks cooperation from service technicians and organizations in arriving at a policy, lays much of the confusion to the rapid growth in electronics.

## FRSAP Studies Pricing

A survey of service-rate schedules in Wilkes-Barre, Penna., is being conducted by the Federation of Radio Servicemen's Associations of Penna., Box 61, Carbondale, Penna. The delegation from the affiliated Radio Servicemen's Association of Luzerne County was appointed as a committee to report on the survey.

## RTGLI Checklist

The Radio Television Guild of Long Island, Box 87, Bethpage, N.Y., featured an unusual technician's self-test checklist in a recent issue of *The Guild News*. The 20 questions which comprise the list are based on the most frequently voiced complaints against technicians by their customers. Sample questions: "Do you interrupt a customer or contradict his analysis of the trouble?" "Are you always neatly dressed . . . clean shaven?" "Do you knock the last 'screwdriver mechanic' who, in your estimation, 'queered' the job?" "Do you keep promising you make to customers?"

Other Guild doings: Distributors must sign a pledge of fair wholesale practice before their advertising is accepted in the *News*. Also, Guild shoppers check on distributors by posing as laymen and attempting to make over-the-counter purchases at a discount. When they are successful, a shopping report is made out on the distributor.

## RTGLI-ESFETA Program

The role of associations and their members is analyzed by John Wheaton, 138 Jerome Ave., Mineola, N. Y., pres. of Empire State Federation of Electronic Technicians Associations. The study will appear in the *Guild News*, published by ESF ETA's affiliated Radio Television Guild of Long Island. Wheaton defines some goals common to all such organizations: good relations with the consumer public, protection

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Address .....

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Mail to: **Associations Editor, TECHNICIAN,**  
480 Lexington Avenue, N.Y.C. 17, N.Y.

rather than competition by manufacturers of components and equipment, keeping membership abreast of technical developments, and keeping up with legislation that affects the service business.

The program proposes a coordinated system of affiliation for local, state and national service associations to define and carry out these goals without conflict or duplication of purpose. Examples: general consumer education and policy on education to be set by national groups, possibly including national advertising, with tie-in programs executed on the local level; relations with manufacturers and information exchange to be handled on a national level; the distributor problem to be handled on the local level; and legal problems to be handled on all three levels depending on whether legislation involved is national, statewide or local.

#### SARATA Inspects Studios

Recent meeting of the San Antonio Radio and Television Association consisted of an inspection tour of the studios and other facilities of KIWV, the local station. News of the tour comes to us from Ora G. Fretz, SARATA secy., 1922 W. Ashby Pl., San Antonio, Tex.

#### ARTSD Picnic

This summer marked the ninth annual picnic of the Associated Radio-TV Service Dealers, 2552 N. High St., Columbus, Ohio. ARTSD News runs a listing in each issue of members who have not attended recent meetings. Members who miss 4 consecutive gatherings are no longer in good standing . . . ARTSD reports, with satisfaction, that a local wholesale radio house has discontinued retail sale of Hi-Fi equipment, making room for the service technician to move into this field . . . ARTSD also complains about lack of cooperation from local TV stations. During recent transmission difficulties, no announcements were made by the stations during or after the breakdowns, despite calls requesting such announcements. As a result, phones of local servicers were tied up for over 40 minutes with unnecessary service calls.

#### ARTSD Wants Dignity

"Please stop referring to the TV Technician as a Serviceman," says Associated Radio-Television Service Dealers, 2552 N. High St., Columbus, Ohio, in a note to publishers. ARTSD feels the preferred term does greater justice to skilled workers in the electronic field.

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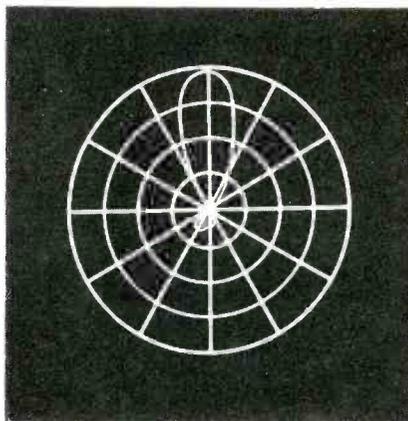
**DAVIS SUPER-VISION ANTENNAS**

**JFD Antenna Rating System**

A system for evaluating and numerically rating antenna performance has been developed by JFD Mfg. Co., Brooklyn, N. Y., which will be applied to all of its future antennas. Known as the Signal-to-Noise Figure of Merit Rating, the figure takes account of 5 basic antenna characteristics—horizontal polar pattern, front-back and side ratio, impedance, gain, and vertical pattern. A theoretically perfect antenna is defined by a 100% rating, which consists of five 20% maximum ratings, one for each of the five basic characteristics. A brochure describing the rating system, Form 287, is available free from the manufacturer.

**Antenna Pattern Recorder**

Newest development of The Finney Co., Cleveland, Ohio, is the Finco Antenna-Scope, a device for displaying the polar pattern and



Antenna-Scope display: typical field pattern.

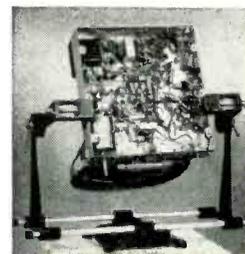
gain of an antenna on an oscilloscope screen. The pattern is traced on a polar scope as the antenna rotates at 30 to 60 rpm.

**MFRS' Catalogs & Bulletins**

**ASTRON CAPACITORS:** Three folders give technical data on capacitors. Meteor subminiature paper types are covered in folder AB-18A; Hy-Met Metalite (metallized paper) capacitors are described and listed in folder AB19A; Bluepoint molded condensers are the subject of folder AB-20B. Brochures available without charge to TECHNICIAN readers from Astron Corp., 255 Grant Ave., E. Newark, N. J.

**TUNG-SOL TUBE CHARACTERISTICS MANUAL:** More than 200 pp. of data on electron tubes and semiconductors, in 8 sections. Different sections are printed on different color paper for convenient refer-

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ence. Dial lamps, premium-type and obsolete tubes, a tube substitution chart and color codes for components are also included. \$0.75. Tung-Sol Electric Inc., 95 8th Ave., Newark 4, N. J.

**CREST PRODUCTS BROCHURE:** Included in the line of 8 products described are booster and replacement transformers, crt rejuvenator, bar generators, a UHF converter and adjustable-inductance replacement coils. Crest Laboratories, Inc., 84-11 Rockaway Beach Blvd., Rockaway Beach 93, N. Y.

**RAM REPLACEMENT TV COMPONENTS:** Over 150,000 cross-reference listings of TV sweep components appear in the 62-page 1955 *Ram TV Components Service Manual*. Other servicing and technical data relative to sweep systems are included. Ram Electronic Sales Co., Irvington, N. Y.

**NEWCOMB HI-FI BOOKLET:** Intended primarily for the layman or Hi-Fi novice, the 32-page *Hi-Fi is for Everybody!* discusses the various links in the chain of Hi-Fi components, gives advice on choosing and setting up systems, includes common questions and answers and a Hi-Fi glossary. \$0.25, from Newcomb, 6824 Lexington Ave., Hollywood 38, Calif.

**REON PIX TUBE REPLACEMENT CHART:** Replacement crt's and substitutions, together with any changes needed for the latter, are presented in quick-reference tabular form on this 4-page fold-out chart. Free to TECHNICIAN readers by writing to Reon Tube Corp., 58-15 57th Dr. Maspeth, L. I., N. Y. Include name and address of your local jobber.

**IRC STRIP & DISC RESISTORS:** Comprehensive technical data and ratings on resistance strips and concentric disc resistors are presented in 4 pp., *Catalog Data Bulletin T-1*. TECHNICIAN readers write to Int'l Resistance Co., 401 N. Broad St., Philadelphia 8, Penna.

**JENSEN SPEAKER DATA:** Quality line of loudspeakers is the subject of *Catalog 1040*, including general-purpose and commercial types as well as housings. *Data Sheet 164* separately describes the line of Weathermaster drive-in theater speakers; *Data Sheet 165* lists all Hi-Fi equipment. Write to Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill.

**E-V PRODUCTS CATALOG:** Condensed catalog of the full Electro-Voice line, including mikes, speakers, enclosures, phono pickups, boosters, and PA equipment, is covered in *Condensed Catalog No. 119*. Free to TECHNICIAN readers from Electro-Voice, Inc., Buchanan, Mich.

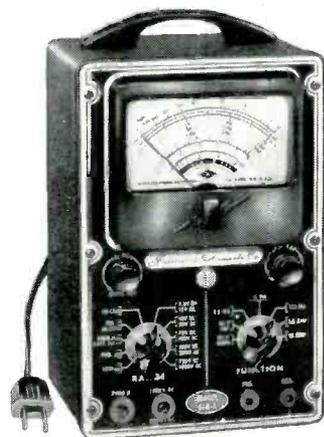
**KESTER SOLDER BOOK:** Dr. Clifford L. Barber, the mfr's research director, attempts to rectify basic inadequacies in the literature on solder and to provide the user with a study of applications and usage. Charts, tables, and photographs are included. *Solder, Its Fundamentals and Applications*. 80 pp. Write to Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.



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**NEW BOOKS**

**HOW TO SERVICE TAPE RECORDERS.** By C. A. Tuthill. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. 160 pages; \$2.90, paperbound.

Technicians looking for introductory material on the tape mechanisms which seem to be heading for the mass market—and which will be needing service—will find this volume useful. The greater portion of the book is devoted to theory and circuitry involved in tape recording, with many examples taken from currently popular models, as well as to a consideration of the mechanical systems involved. Since the latter systems are relatively new to the technician, attention is devoted to terminology as well as to operation, with examples illustrated. There is also a section on maintenance and repair techniques, and an appendix giving a tabular breakdown of characteristics of the well-known brands.

**PRACTICAL COLOR TELEVISION FOR THE SERVICE INDUSTRY, 2nd EDITION.** Prepared and published by RCA Service Co., Inc., Camden, N. J. 84 pages; \$2.00, paperbound.

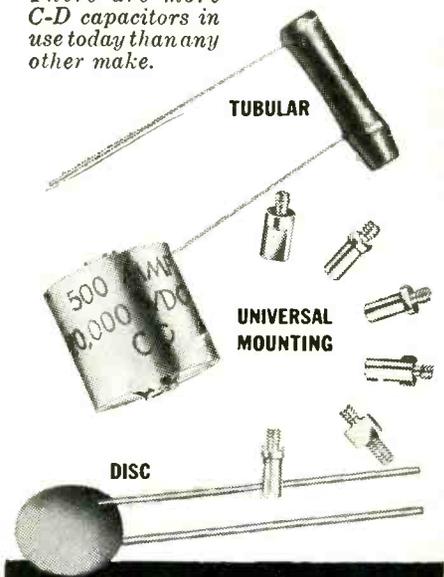
The first of three sections in this well illustrated book deals with basic color principles, the color TV signal and the tricolor kinescope. The second examines receiver circuitry. Practical installation and servicing information is offered in the third, with emphasis on set-up procedure, interpreting what is seen on the screen, alignment and test equipment requirements. This expanded edition runs to 20 pages more than the 1st edition, released half a year ago.

**ADVANCED TELEVISION SERVICING TECHNIQUES.** Prepared by the Pilot Training Course Teaching Staff (Paul B. Zbar and Sidney Schildkraut) of the Radio-Electronics-Television Manufacturers Association. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. 176 pages; \$3.60, paperbound. Laboratory Workbook, 32 pages; 95¢, paperbound.

Prepared especially for practising TV technicians, the main volume is intended to teach a systematic organized, industry-approved troubleshooting procedure using the most efficient techniques and modern equipment. The practical, clearly written book covers receiver servicing section-by-section with recommended checks and actual set-ups, concludes with a chapter on customer relations.

The lab workbook consists of detachable, fill-in job sheets for recording data extracted by the student from actual bench set-ups. This companion volume parallels the pattern of the main text. Taken together, these books are intended for use as a complete practical course in trade and technical schools. Also available is another companion volume, a 52-page Instructor's Guide in setting up and preparing labs, lectures and demonstrations in connection with the course.

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1LC6	.49	6AX4GT	.60	6SL7GT	.60	12SK7	.45
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1Y4	.51	6BA7	.58	6U8	.76	19T8	.71
1U4	.51	6BE6	.46	6V3	.80	25B06GT	.82
1U5	.43	6BF5	.48	6V6GT	.48	25L6GT	.41
2A3	.35	6BF6	.48	6W4GT	.43	25W4GT	.43
2A7	.35	6B6GG	1.18	6W6GT	.53	25Z5	.55
304	.53	6BH6	.51	6X4	.37	25Z6GT	.36
305GT	.61	6B16	.51	6X5GT	.38	28K7	.48
3S4	.48	6BK5	.75	6Y8	.80	35C5	.48
3V4	.48	6BK7	.78	7F8	.49	35W4	.33
5U4G	.43	6BL7GT	.78	7N7	.49	35Y4	.42
5V4G	.49	6BN6	.90	12AL5	.43	35Z5GT	.33
5Y3GT	.30	6B06GT	.83	12AT6	.37	50A5	.49
5Y4G	.40	6B07	.85	12AT7	.71	50B5	.48
6A8	.40	6BY5G	.60	12AU6	.43	50C5	.48
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6AH4GT	.65	6CU6	.95	12AX7	.61	117Z6GT	.65
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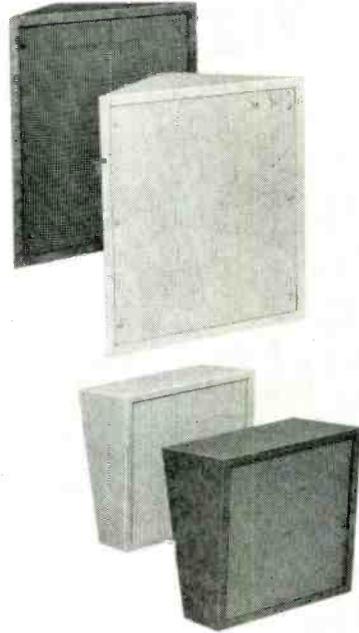
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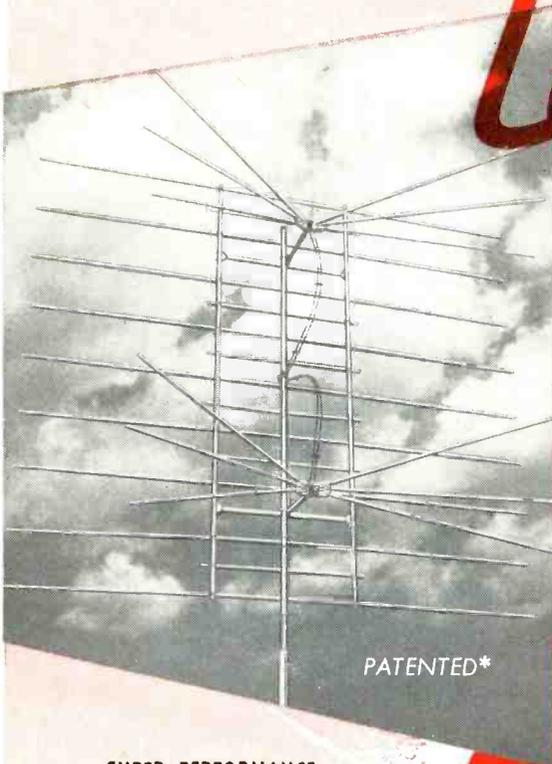
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spurious lobes, no phase shift  
— best for B&W or Color TV**

The best S/W/R, S/N/R and H-E plane pattern TV Array ever devised. Utilizes the Patented "Conical-V-Beam" theory to perfection. "Conical-V-Beam" dipoles provide true broad-band characteristics with maximum gain and signal to noise ratio with NO PHASE SHIFT. New transmission line and spline back provide the perfect pattern on all channels. If you've tried the rest — Now! Try the best!

**\*\*"Conical-V-Beams" are produced under U. S. Patent No. 23,346, Canadian Patent No. 500,436 and British Patent No. 691,485 — other patents pending. Sold only through authorized distributors.**

# capacitor replacements

## FOR SETS OF THE MONTH

### BENDIX CHASSIS T14-15, T14-16

Symbol No.	Rating MF @ WVDC	Bendix Part No.	Sprague Replacement
C35	10 @ 50	267024-26	TVA-1304
C41	100+40+10 @ 200/100 @ 50	267005-14	TVL-4516
C42	80+40+10 @ 450	267005-8	TVL-3792
C43	2 @ 50	267024-27	TVA-1301
C81	10 @ 200	267024-14	TVA-1504
C85	10 @ 50	267024-16	TVA-1304

### MOTOROLA CHASSIS TS-418, TS-518, WTS-518

Symbol No.	Rating MF @ WVDC	Motorola Part No.	Sprague Replacement
C39	100+10 @ 300/200+30 @ 150	23B712068	TVL-4561
C54	10 @ 50	23A90205	TVA-1304
C59	10 @ 50	23A90205	TVA-1304
C74	10 @ 450	23A702450	TVA-1705
C94	200 @ 150	23B84097	TVL-1431
C95	200+5 @ 150	23B710941	TVL-2444

### CBS-COLUMBIA CHASSIS 921-11, -13, -14

Symbol No.	Rating MF @ WVDC	CBS Part No.	Sprague Replacement
C125	1 @ 100	21000521	TVA-1701
C131	50 @ 25	21000531	TVA-1206
C134	10+10 @ 350/100 @ 50	21000851	TVA-2722 TVA-1310 TVA-2740 TVA-2730
C201	40+40+20+20 @ 350	21000861	TVA-1604 TVA-1604
C217	5 @ 350NP	21000481	TVA-1204
C310	10 @ 25	21000251	TVA-1204

\* Note—Connect two TVA-1604 in series tying two negative leads together.

### WESTINGHOUSE CHASSIS V-2313, V-2323

Symbol No.	Rating MF @ WVDC	Westinghouse Part No.	Sprague Replacement
C213B C409B C410B C419B	30 @ 500/10 @ 450/ 150+30 @ 50	V-11535-1	*
C216A C436A C502A C503A	40+40 @ 450/ 30+30 @ 350	V-9891	TVL-4720
C411 Z400	4 @ 450 Integrator Plate	V-4885 V-11192-1	TVA-1702 V-2

\* Note—Special exact duplicate replacement part. Order as Part No. R-1488.

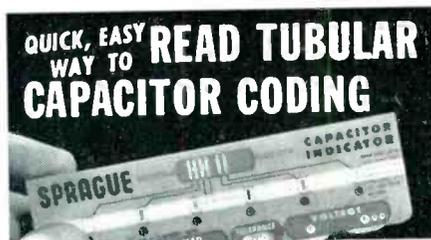
### DELCO BUICK SELECTRONIC AUTO RADIO MODEL 981551

Symbol No.	Rating MF @ WVDC	Buick Part No.	Sprague Replacement
28	20+20 @ 400/20 @ 25	724-0724	TVL-3678

### GENERAL ELECTRIC MODELS 21T26, 21T27, 21C240, 21C241

Symbol No.	Rating MF @ WVDC	G.E. Part No.	Sprague Replacement
C309	10 @ 25	RCE-192	TVA-1204
C401	90+30+5 @ 350/100 @ 75	RCE-163	TVL-4625
C402	40+40+30 @ 350/10 @ 25	RCE-161	TVL-4622
C404	10 @ 350	RCE-188	TVA-1604

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Having trouble deciphering the color coding on tubular molded capacitors in new TV and Radio sets? There's no need to consult complicated wall charts or tables!

The Sprague Capacitor Indicator gives you the needed data in a jiffy. Just flick the dials to the color bands and read the capacitance, tolerance, and voltage directly.

This slick plastic service help fits your pocket. Always on hand, it saves time and avoids mistakes . . . and it's only 15c. Ask for one at your Sprague distributor today!

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# COLOR-TV IS HERE

*... where are you?*

## TV Color Course FREE of extra charge with your RCA Tube purchases

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The RCA Home Study Course in Color TV has been planned and prepared by instructors at the RCA Institutes, with the close cooperation of engineers and training specialists of RCA. By studying at home, under the guidance of these experts, you can learn the facts about Color TV Theory, Receivers, and Servicing—quickly . . . clearly . . . thoroughly! The RCA Institutes' Color TV course is a practical, down-to-earth home-study plan that covers the facts you will need to install and service color sets successfully.

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### Nine Easy-to-Follow Lessons: COLOR-TV THEORY

1. Introduction to Color TV
2. Principles of two-phase modulation and colorimetry
3. Principles of Color TV receivers

### COLOR-TV RECEIVERS

4. Tricolor Kinescopes
5. The color television system
6. Color TV receiver circuits

### COLOR-TV SERVICING

7. Set-up and adjustment of color
8. Servicing and alignment
9. Test equipment for Color TV servicing

### DO YOU KNOW THESE COLOR-TV TERMS?

- |                       |                         |                           |
|-----------------------|-------------------------|---------------------------|
| ★ dynamic convergence | ★ saturation            | ★ beam-positioning magnet |
| ★ shadow mask         | ★ chroma                | ★ burst                   |
| ★ three-beam gun      | ★ dynamic-phase control | ★ gamma corrector         |
| ★ purity              |                         |                           |
| ★ matrix              |                         |                           |



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