



# TECHNICIAN

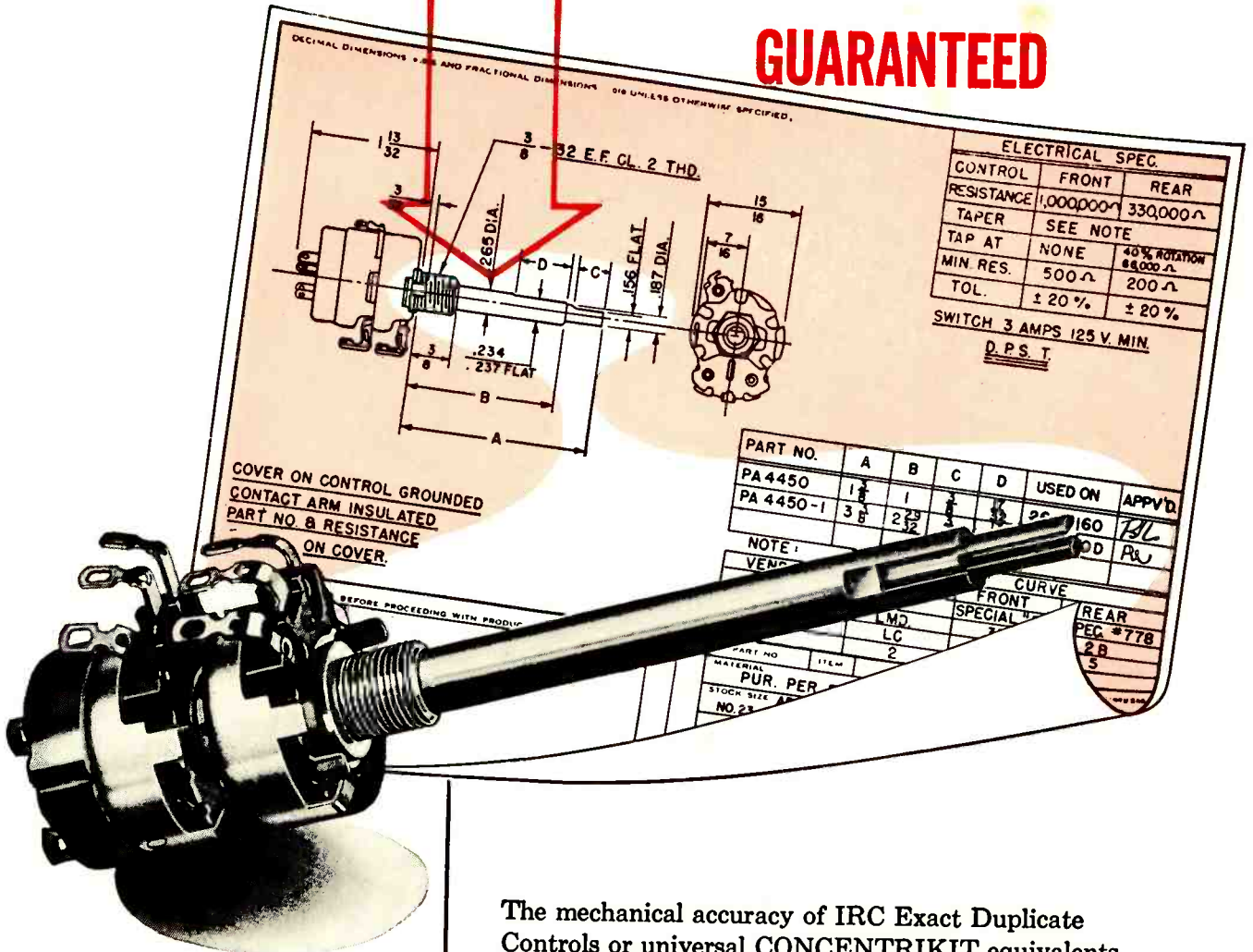
*& Circuit Digests*

*Hot Weather  
TV Troubles*

July • 1954

Caldwell-Clements, Inc.

# HERE'S **WHY** IRC EXACT DUPLICATES ARE DOUBLE-MONEY-BACK **GUARANTEED**



**ONLY IRC GUARANTEES  
SATISFACTORY MECHANICAL FIT  
AND ELECTRICAL OPERATION  
OR DOUBLE-YOUR-MONEY-BACK**

The typical manufacturer's specifications shown here are exactly duplicated by IRC QJ-180 control. CONCENTRIKIT assembly includes P1-229 and R1-312 shafts with B11-137 and B18-132X Base Elements, and 76-2 Switch.



Wherever the Circuit Says ~~~

The mechanical accuracy of IRC Exact Duplicate Controls or universal CONCENTRIKIT equivalents is based on set manufacturers' procurement prints. Specifications on those prints are closely followed.

Shaft lengths are *never less* than the set manufacturer's nominal length—*never more* than  $\frac{3}{32}$ " longer.

Shaft ends are precisely tooled for solid fit.

Inner shaft protrusion is accurately duplicated for perfect knob fit.

Alterations are never needed.

For Exact Duplicate Controls, specify IRC. Most Service Technicians do.

## INTERNATIONAL RESISTANCE CO.

425 N. Broad Street, Philadelphia 8, Pa.

In Canada: International Resistance Co., Ltd., Toronto, Licensee

# TECHNICIAN & Circuit Digests

TELEVISION • ELECTRONIC • RADIO • AUDIO • SERVICE

JULY, 1954

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## CIRCULATION

This issue 50,000, which includes 45,114 professional servicemen and service managers of retail stores, 2,006 parts distributors, plus manufacturers and miscellaneous.

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TECHNICIAN'S COVER is intended to point up the importance of weather to the TV-radio serviceman. This is the season to "sell" customers on lightning arrester installations. Are you getting your share of the business? Other links between weather and TV reception are described in *Arcing Troubles in TV Sets*.

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## CALDWELL-CLEMENTS, INC.

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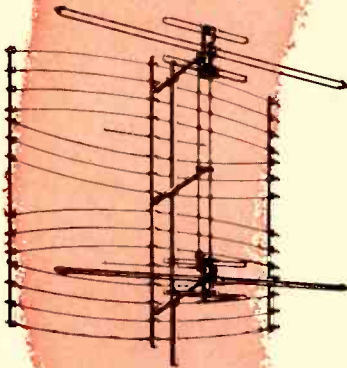
\*Reg. U. S. Patent Office

# SUPER-PERFORMANCE

...THAT COSTS NO MORE!

## MAKE THE SCREEN TEST!

1. Measure the space between reflector elements of any other big screen antenna.
2. Note that the TRI-KING has closer spacing between reflector elements for improved performance. The TRI-KING's element spacing is the proven maximum for a full  $1/10$  wave length.



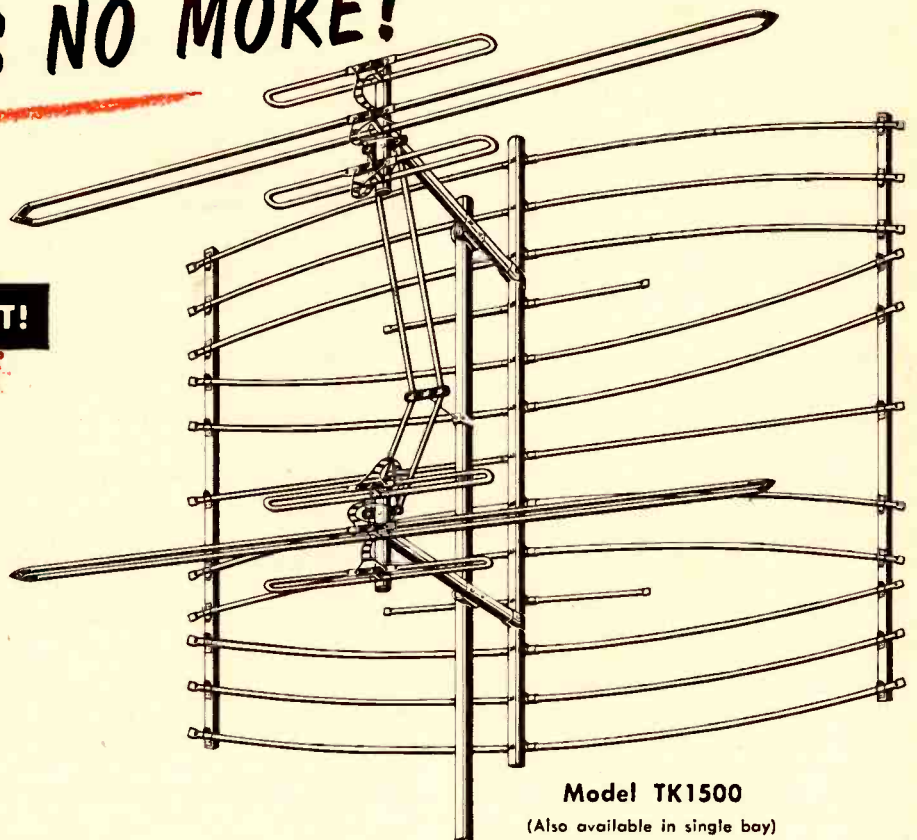
SUPER  
TRI-KING  
Model  
TK1800

**WIND TUNNEL TESTED** to exacting aircraft standards. Test results prove that a full size TRI-KING antenna can withstand 30% higher wind velocities than any other large screen antenna.

**ORDER NOW - IMMEDIATE DELIVERY!**

CLEAR BEAM PRICES

Model TRI-KING	List Price
TK1500	\$44.50
Super TK1800	\$52.95



Model TK1500  
(Also available in single bay)

## CLEAR BEAM'S TRI-KING

Patent Applied For

**POSITIVE GHOST REJECTION!** Clear Beam proudly announces the new TRI-KING, combining for the first time a Radar-type reflector screen with the improved TRI-KING dipole assembly. A real champion with many Clear Beam features including rugged, quality construction and Quik-Rig assembly that outsells all other big screen antennas. Sold on a money back guarantee.

WRITE FOR COMPLETE INFORMATION TODAY

**Clear Beam Antenna Corp.**



100 PROSPECT AVENUE • BURBANK, CALIFORNIA  
THornwall 2-4886 • Victoria 9-2141

WAREHOUSES IN: San Francisco • Portland • Seattle • Chicago • Kansas City • Detroit • Dallas • Baltimore

# Giving coils a high IQ\*



**DELCO RADIO CAREFULLY CONTROLS THE PRODUCTION  
OF ORIGINAL AND REPLACEMENT RF AND IF COILS**



*Each RF and IF coil is wound under the supervision of a skilled operator, and each is tested at several points along the production line. This painstaking care is what gives a high IQ to Delco Radio Coils.*



A GENERAL MOTORS PRODUCT   A UNITED MOTORS LINE

**\*INBUILT QUALITY.** The "Q" of a coil affects its performance in the circuit, and is of vital importance to the radio engineer. The "IQ" of all RF and IF coils used for servicing is of equal importance to you, and can mean real customer satisfaction. To assure high IQ, Delco Radio carefully controls the production of all RF and IF coils—both original equipment and replacement coils.

If you could visit the Delco Radio plant, you would see skilled operators sitting at expensive specially designed machines winding high-quality coils. On the production line, these coils are assembled with their powdered iron cores and shield cans. By controlling all steps of the production, Delco Radio gives its coils not only the required Q, but also the highest possible IQ—*Inbuilt Quality*. Delco Radio parts are available through your UMS Delco Electronics Distributor.

DISTRIBUTED BY ELECTRONICS WHOLESALERS EVERYWHERE

## DELCO RADIO

DIVISION OF GENERAL MOTORS CORPORATION, KOKOMO, INDIANA



# 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.

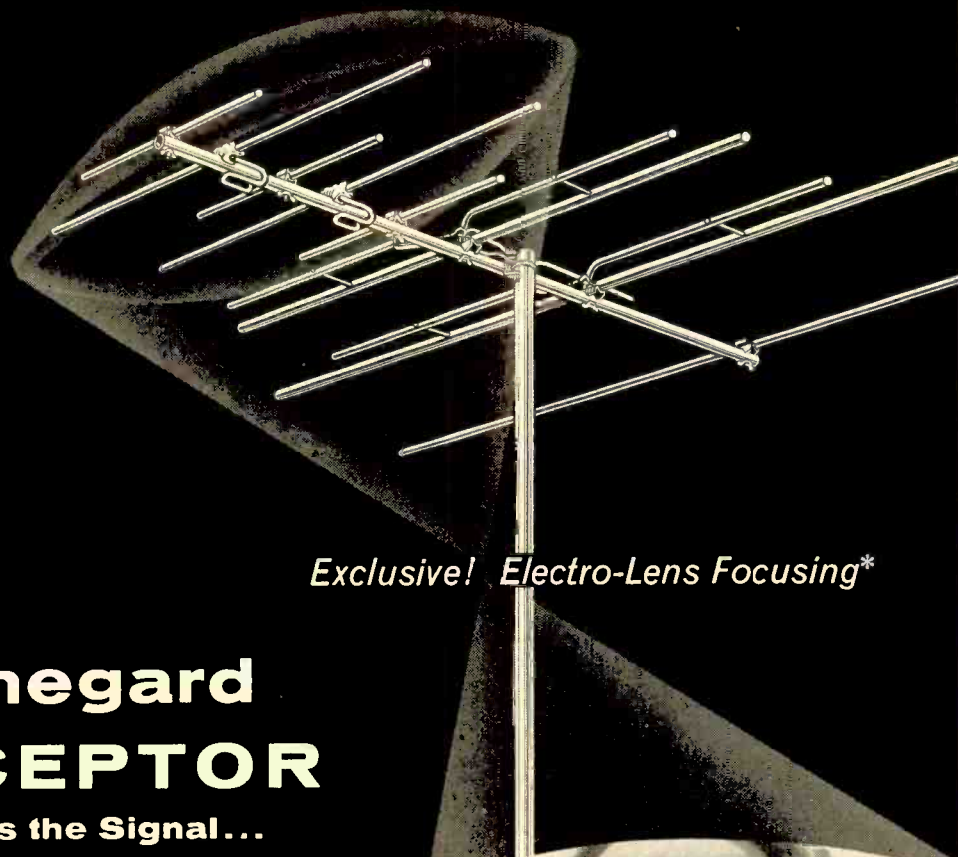
Free with all sizes from 3" to 6" Viking speakers new free, easy-mount combination transformer and chassis mount bracket.

# Jensen

MANUFACTURING COMPANY

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





*Exclusive! Electro-Lens Focusing\**

# New Winegard INTERCEPTOR

**Grabs and Boosts the Signal...  
Focuses It...like a Lens**

● Completely new in appearance. Completely new in electrical design. Sensational in results! The new INTERCEPTOR antenna now combines the famous Winegard Multi-Resonant Dipole with the most sensational electronic design of the decade . . . *Electro-Lens Focusing.\** This exclusive Winegard feature literally grabs the signal out of the air and focuses it on the driven element the same as an ordinary lens focuses light. The result . . . a picture gloriously brilliant . . . sharp and clear. A picture up until now unobtainable!

● Never before has one antenna incorporated so many outstanding and exclusive features. The INTERCEPTOR gives highest possible gain and still maintains rejection from the back and sides that really shuts out co-channel interference. Its *Electro-Lens Focusing* makes it an ideal fringe area antenna without the bulk required by present fringe antennas. Small, light-weight and compact, the INTERCEPTOR's neat appearance will be appreciated by owners of the finest homes.

Attention: Servicemen! You will notice we show no charts trying to establish fabulous claims. We suggest you order a Winegard INTERCEPTOR today. If your regular jobber does not have it, please contact us. Test it for yourself. The INTERCEPTOR is its own best salesman!

- A Winegard Exclusive . . . *Electro-Lens Focusing.*
- All channels (2-13).
- Light, rigid, quick to assemble, easy to install.
- Low wind resistance.
- Designed for color reception.

For complete information on the Winegard INTERCEPTOR VHF antenna with exclusive *Electro-Lens Focusing*, send for Bulletin No. L-4.



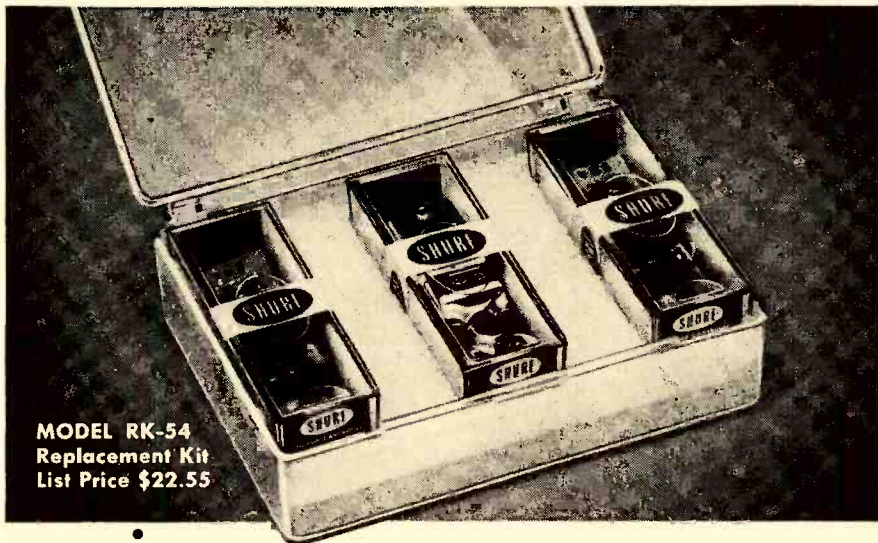
## WINEGARD COMPANY

3000 Scotten Boulevard, Burlington, Iowa

\*Patent Pending

# 3 SHURE CRYSTAL PICKUP CARTRIDGES replace the 192

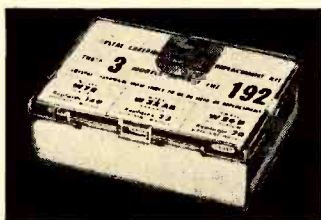
cartridges you are most likely to encounter  
in your service work!



MODEL RK-54  
Replacement Kit  
List Price \$22.55

- TECHNICAL DATA AND REPLACEMENT CHART IS ENCLOSED.
- Lists 192 Crystal Cartridges manufactured by
- five leading cartridge manufacturers.

**Lowest investment for broadest coverage!** The RK-54 is beyond all doubt the *most practical* Replacement Kit on the market! Proof? Simply this—you get the broadest coverage at the lowest investment—only \$22.55 list! Think of it—3 Crystal Cartridges replace 192 of those specific Cartridges most likely to be in need of replacement! Two of the Cartridges consistently have been “best sellers” in the Shure line—as established by actual sales to Servicemen! The Cartridges are: Model W22AB, 3-Speed, 2-Needle Cartridge—Model W26B, All-Purpose, Single-Needle Cartridge—Model W78, 78 RPM, Dual-Volt, Dual-Weight Cartridge. Model W78 is the new, versatile Cartridge that replaces 149 other Cartridges! This Cartridge alone will become a sensation overnight! Order a Replacement Kit from your Distributor today—once you have worked with this practical kit you will find that these three Cartridges are dependable replacements—will make your service work faster, easier and more profitable!



**TRANSPARENT PLASTIC BOX IS FREE!**

This Handy Box is 5" long, 3½" wide, 1¼" deep.

**SHURE** — The Mark of Quality

## LETTERS

To the Editors

### Complimentary Dilemma

EDITORS, TECHNICIAN:

Please send 2 giant blow-ups of “So Much for So Little.” The reason I did not use the coupon is that, on the other side, is the “Tough Dog Corner.” I could not afford to lose that valuable information. . . . Of all the radio-TV magazines I’ve read, **TECHNICIAN** is the best.

LEE N. DIXON

Chicago 12, Illinois

### Filing Circuit Digests

EDITORS, TECHNICIAN:

I would like to see you put out envelopes similar to the ones Sylvania puts out to fill 3-hole binders. I made one envelope for my first Circuit Digests, but it would look neater to have one made for the purpose.

R. F. JOHNSON

Springfield, Illinois

### Let the Public Know

EDITORS, TECHNICIAN:

We wish to compliment you on bringing before the public (the fact that) the services rendered by the television radio technician are one of the greatest bargains received by the public today. We hope that you will continue in this good work and thereby give both the public and serviceman more confidence in each other.

PAUL F. STEVENS

Miami, Florida

### Friend in Need

EDITORS, TECHNICIAN:

Any service outfit that doesn’t have **TECHNICIAN** must be nuts. . . . When somebody has a kick coming or feels they haven’t got a square deal, all you have to do is refer them to some part in **TECHNICIAN**; that fixes it up. I always have (it) handy.

F. BECKMAN

Oakland, California

### Hit, No Error

EDITORS, TECHNICIAN

Regarding the June 1954 issue of **TECHNICIAN**, the cover states, “Don’t Fumble the Ball.” How could that be possible? It looks like a home run.

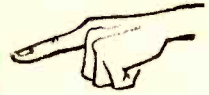
F. J. CONTINO

Philadelphia, Penna.

•The advice was not directed to the players, but rather to our spectator-readers, toward whom the sphere appears to be coming fast and hard. Sorry if this “face-saving” admonition got anyone balled up.—Ed.



GET OFF THE SPOT



AND  
INTO  
THE  
SPOTLIGHT



WITH THE



## BONDED ELECTRONIC TECHNICIAN PROGRAM

Once you gain the confidence of customers, you're on your way to increased volume and profits. The Raytheon *Bonded* Electronic Technician program is designed to help you do just that. The Raytheon Registered Bond Certificate, the Raytheon Creed Display Decal and Identification Cards, featuring your bonded status and the fine Raytheon "Code of Ethics", inspire customer confidence. And a recent survey proved that wherever Raytheon Bonded

Technicians took full advantage of their Bonded status — used it to inspire customer confidence — business improved *by at least ten per cent.*

Ask your Raytheon Tube Distributor if you can qualify for this important sales advantage. If you can, the bond is yours *at no cost to you* — it is *Raytheon's investment in your future.*



RAYTHEON MANUFACTURING COMPANY

Receiving Tube Division  
Newton, Mass., Chicago, Ill., Atlanta, Ga., Los Angeles, Cal.



*Excellence in Electronics*

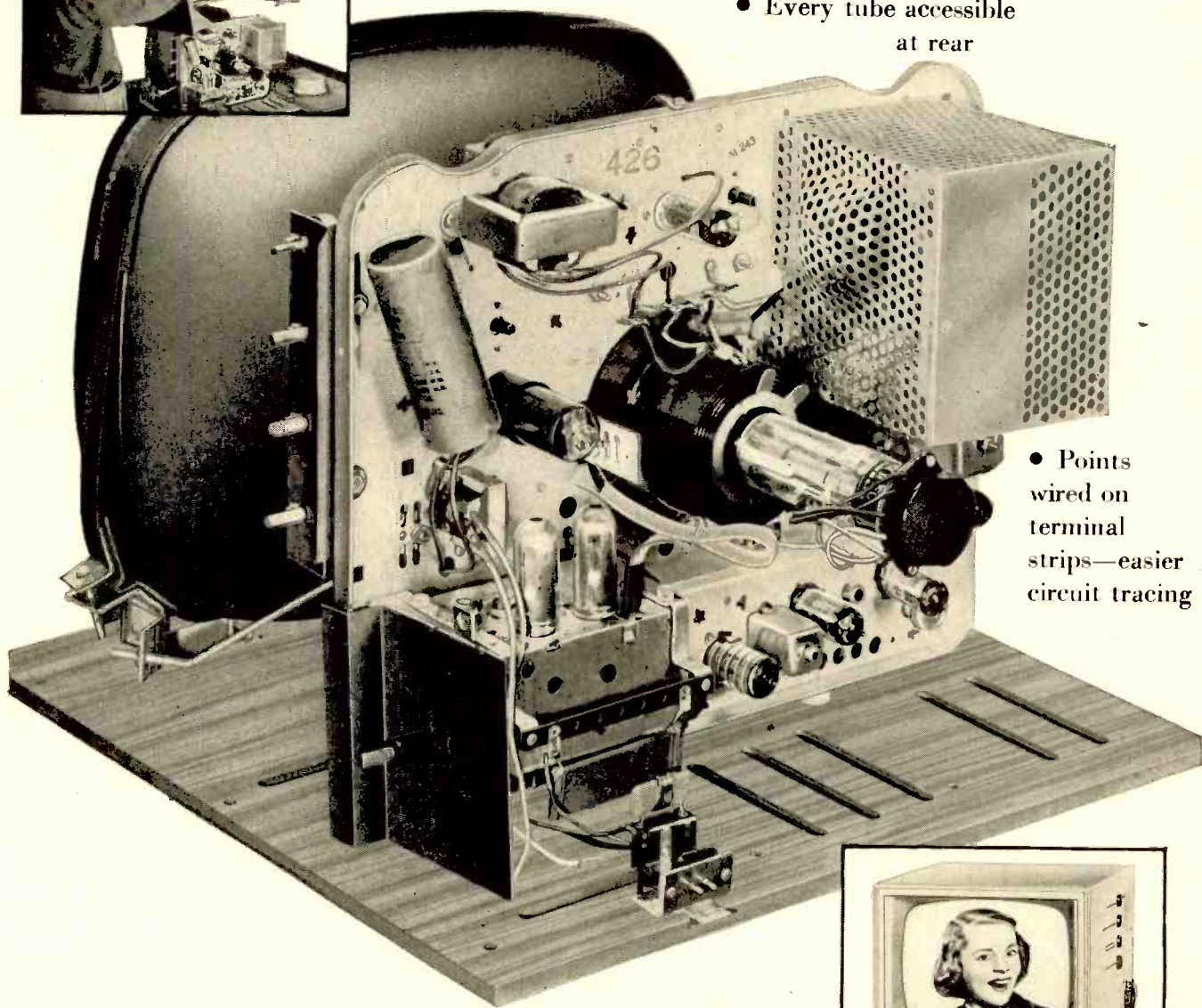
RAYTHEON MAKES ALL THESE:  
RECEIVING AND PICTURE TUBES • RELIABLE SUBMINIATURE AND MINIATURE TUBES • SEMICONDUCTOR DIODES AND TRANSISTORS • NUCLEONIC TUBES • MICROWAVE TUBES

A look inside will show you why—

# CROSLEY SUPER-V IS A SERVICE MAN'S DREAM



- Bonnet-type cabinet lifts right off
- No more chassis tugging
- Every tube accessible at rear



- Points wired on terminal strips—easier circuit tracing

Everything about this exciting new TV set was planned and built with you in mind! Crosley's own revolutionary vertical circuit makes checkups simpler than ever. Changing a tube takes only a few minutes (they're all at the back

in easy reach) and more complicated service requires only the loosening of 6 screws; lifting the entire cabinet off. Men who've serviced the Super-V call it the greatest forward step in TV chassis design.



Crosley Division  Cincinnati 25, Ohio

# BE SURE YOU USE... the right tool for every Alignment!

NOW... MORE THAN 70



**ALIGNMENT TOOLS**  
AVAILABLE FOR  
TV SERVICING



- C ALIGNMENT SCREWDRIVER**  
No. 100 1/4" dia., 6" long \$0.27 Net  
No. 188 7/32" dia., 6" long .27 Net
- C TV-FM ALIGNMENT TOOL**  
No. 5066 3/16" shaft dia., 2 1/2" long \$0.33 Net
- C TV ALIGNING WRENCH**  
No. 5080 7/32" shaft dia., 6" long \$0.51 Net
- C K-TRAN TOOL**  
No. 5097 5/32" fibre tip, 1/8" metal tip, 6" long \$0.51 Net
- C TV CHANNEL TUNING TOOL**  
No. 8195 1/8" shaft dia., 7 1/4" long \$0.54 Net
- G-C NYLON TV LONG-REACH ALIGNER**  
No. 8607 .195" shaft dia., 12 1/4" long \$1.08 Net

- G-C TV "X 57 PLASTIC LONG SLIM" SCREWDRIVER**

No.	Blade Length	
8987	7"	\$0.60 Net
8988	12"	.90 Net
8989	16"	1.20 Net

- G-C TV I.F. OSCILLATOR ALIGNER**  
No. 8272 1/4" tip dia., 6 1/2" long \$0.72 Net

- G-C TV ALL-PURPOSE ALIGNER**  
No. 8273 7/32" shaft dia., 8" long \$0.66 Net

- G-C TV CORE ALIGNER**  
No. 8279 7/32" shaft dia., 7 1/2" long \$0.66 Net

- G-C TV ZENITH UNIVERSAL ALIGNER**  
No. 8275 1/8" shaft dia., 1/4" handle, 5" long \$0.48 Net

- G-C RCA-ZENITH TV "SHORTY" ALIGNMENT TOOL**  
No. 9051 7/32" shaft dia., 2 1/2" long \$0.45 Net

- G-C RCA-ZENITH TV ALIGNMENT TOOL**  
No. 9050 .182" shaft dia., 3" long \$0.18 Net

- G-C LONG ARM TV TOOL**  
(7/32" shaft dia., 18" long)

No.	Type	
8821	Type A	\$0.90 Net
8896	Type B	.90 Net
8897	Type C	.90 Net

- G-C TV LONG REACH ALIGNER**  
No. 8274 1/8" shaft dia., 9" long \$0.72 Net

**MATCHED G-C ALIGNMENT TOOL KITS for Handy Home Servicing**

You save money when you buy a G-C Alignment Tool Kit... and the tools are always handy when you need them. Many types and sizes... like this new set

**G-C DELUXE TV ALIGNMENT TOOL KIT.** Durable roll type leatherette case with 16 matched tools (total value \$15.00).  
No. 8280 \$7.74 Net

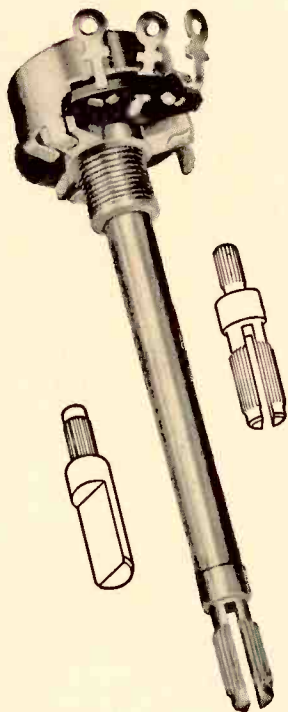
**IT'S FREE!** Your illustrated G-C Catalog 156. At your favorite jobber... or write direct.



**GENERAL CEMENT MFG. CO.**  
902 TAYLOR AVENUE • ROCKFORD, ILLINOIS

The easy way  
is the right way . . .

when you use *Mallory Midgetrols*®



*Easy*

because the round, tubular shaft of the Mallory Midgetrol can be cut accurately and quickly. Easily adapted to split-knurl, flatted, or set screw type knobs. And you save additional time because AC switches can be attached instantly without control disassembly.

*Right*

because Mallory Midgetrols are engineered to match the electrical characteristics of original equipment of any radio or TV set . . . give equal, often better, performance than the original control.

*For Jobs*

done right the easy way, always use Mallory Midgetrols. You'll save time and trouble. And, equally important, you can depend on Mallory Midgetrols for performance that makes satisfied customers.

*To make your auto radio repair work easier . . .*



The new Mallory Auto Radio Control Guide speeds selection of the proper control for every job that comes your way. Ask your Mallory Distributor for a copy . . . or write to P. O. Box 1558, Indianapolis, Ind.

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**MALLORY**

CAPACITORS • CONTROLS • VIBRATORS • SWITCHES • RESISTORS  
RECTIFIERS • POWER SUPPLIES • CONVERTERS • MERCURY BATTERIES  
**APPROVED PRECISION PRODUCTS**

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# Performance! Profits! Packages!

## GET THE BEST IN ALL 3 WITH THE NEW

# Federal S-C-S DIODES

SINGLE CRYSTAL STABILIZED

**Highest quality diodes for every replacement need...packed for economy buying...in the service industry's MOST USEFUL PACKAGE LINE!**

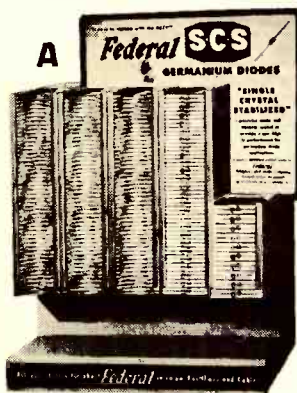
Servicemen! Federal's "S-C-S" Germanium Diode Packaging Program is the hottest news in diode purchasing!

You get top performance and attractive profits in handy packages you can use for many practical purposes.

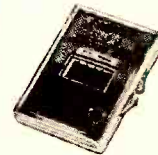
You can buy single units in cellophane-wrapped packages . . . you can buy 5-unit and 10-unit packages in the form of clear plastic cases with hinges and snap-lock. You can buy boxes of 50 single-unit packages . . . at a substantial saving!

**Look for "S-C-S" Diodes in Federal's Store Dispensers!**

When you're shopping at your Federal Distributor — look for these two types of dispensers: (A) counter dispenser with single-, five- and ten-unit packages; (B) wall dispenser with single-unit packages. Serve yourself . . . save time! Watch for them in stores . . . in golden yellow and brilliant red!



**10-UNIT PACKAGE**  
—economy-size clear plastic hinged utility case.



**5-UNIT PACKAGE**  
—clear plastic hinged utility case.



**SINGLE-UNIT PACKAGE**  
—cellophane-wrapped.



**50-UNIT PACKAGE**  
—large-economy-size, combination dispenser-container . . . a real money-saver!



**CHECK** the quality and performance features of Federal's new design achievement in diodes! You'll agree that Federal is your best bet for profitable, customer-satisfying diode servicing!

# Federal

Telephone and Radio Company

A Division of  
INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION  
COMPONENTS DIVISION, 100 KINGSLAND ROAD, CLIFTON, N. J.  
In Canada:  
Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.  
Export Distributors:  
International Standard Electric Corp., 67 Broad St., N. Y.

### Federal "S-C-S" Diodes ARE TOPS!

- SINGLE-CRYSTAL GERMANIUM**—the finest for reliable performance
- MOISTURE-PROOF**—vacuum-sealed, all-ceramic construction
- EVERY DIODE TESTED** for all characteristics
- COMPLETELY INSULATED CASE**
- POLARITY** clearly identified
- HEAT SINKS** protect during soldering
- SMALL SIZE** (—¼" diameter, ½" long)
- FLEXIBLE LEADS** for easy mounting
- NO FILAMENT**—no heater power drain or hum
- LOW SHUNT CAPACITY** (average 1 mmf.)
- SELF-HEALING** for temporary overloads
- NO CONTACT POTENTIAL**
- WITHSTAND** adverse temperature and humidity cycling
- INSURE** many thousands of hours of dependable performance

### PACKAGES YOU CAN USE!

Be sure to save Federal's 5-unit and 10-unit packages of clear plastic. They're hinged . . . they snap-lock . . . they open easily. Excellent for storing small parts . . . carrying in pocket or kit or filing in shop cabinets. They're a plus value you get with Federal quality-controlled "S-C-S" Diodes!

Ask your Federal Distributor or write to DEPT. R-354

# The BACKSTOP

**STOPS co-channel and adjacent-channel interference caused by rear signal pick-up!**

- Highest front-to-back ratio ever built into an antenna!
- No rear pick-up; eliminates "venetian blinds"!
- Largest screen area: 70 square feet!
- Very high all-channel gain. Incorporates basic Champion design, including Tri-Pole, with additional elements!
- Completely preassembled!

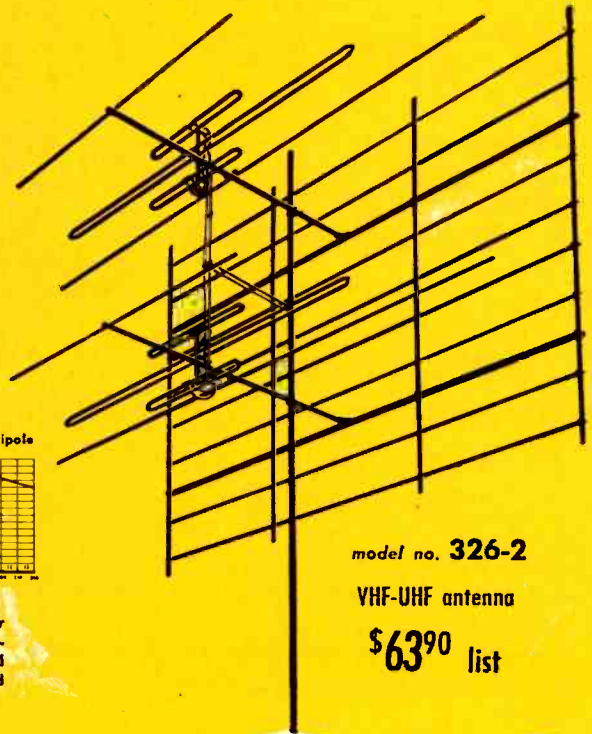
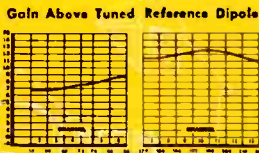
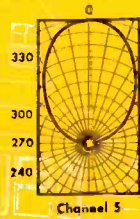


Table of Front-to-Back Ratios (Relative Voltage)

Channels	Front-to-Back Ratios
2	9:1
3	10:1
4	11:1
5	20:1
6	18:1

Only Low Band channels shown, since co-channel interference is not encountered on High Band channels.



**IMPORTANT** . . . don't be misled by polar patterns representing relative POWER. Remember, power is the square of voltage. All Channel Master polar patterns are presented in relative VOLTAGE.

model no. 326-2

VHF-UHF antenna

\$63<sup>90</sup> list

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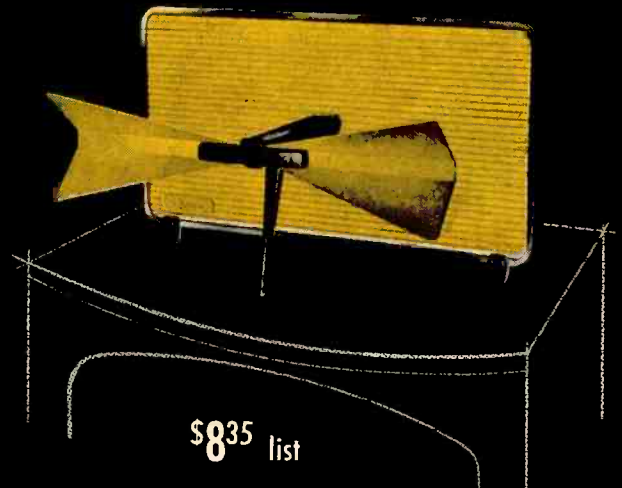
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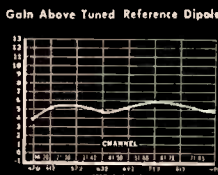
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# TECHNICIAN & Circuit Digests

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

## "Stripped" TV Sets Spell Trouble

Is quality being sacrificed in many current TV sets to make "low, low prices" possible?

Evidence says it is. The situation is disturbing to many technicians.

"Low-low" priced receivers mean that service charges on these sets have to be scaled *down*; at the same time, the amount of service work that will be needed will, in all probability, go *up*, since design corners have been cut in many of these sets, and more frequent development of trouble is very likely.

In some of the fine TV sets made in '47, you could cut out 4 or more bypass condensers, without appreciably affecting reception. These sets were generously "over-designed," to delay the onset of trouble, and minimize it when it occurred. Comparable safety factors are *not* being built into numbers of low-cost receivers currently reaching the market.

### *Poor Quality Means More Service Headaches, Less Profit*

What has forced quality down so low in many current sets? The obvious answer is, of course, the manufacturer's desire to reduce costs, in order to meet competitive prices.

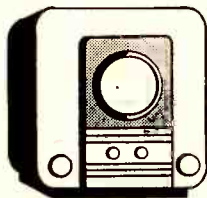
Pushed beyond reasonable limits, such a course initiates a vicious circle. Quality is reduced to cut prices below those set by the competitor; the competitor, in turn, reduces his prices, inevitably impairing quality control on his sets; and so it goes, round and round. Any temporary advantage obtained from a price reduction is soon nullified, and the competitors find themselves at the end in basically the same position, but with profit margins reduced, and receiver quality seriously impaired.

The technician suffers from the situation, in that he is forced to do in the shop, what should have been done in the factory: i.e., finish the set, ironing out performance "bugs." He can hardly turn such jobs down; the risk of losing all of the customer's business is too great. On the other hand, his recompense is too small to warrant the time, skill and headache such repairs call for.

Looked at from all sides, the policy of cutting quality to the bone to reduce costs, is not a good one. The customer will certainly be dissatisfied with his set's performance and his service bills; the benefits to the manufacturer, if present at all, will be highly temporary, and associated with many disadvantages. The technician, of course, will reap disadvantages without deriving even temporary advantages.

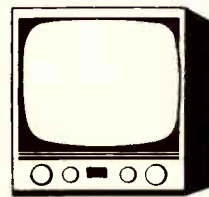
In behalf of the technician, our advice to the set manufacturer is: Put out sets that don't fall below minimum standards of quality—sets that will stand up in use for reasonable periods of time, and can be profitably serviced.

Finish your sets at the factory—the serviceman is too busy to do it for you.



1947 10-inch TV Set \$375  
\$5.95 per square inch

TV Receiver Prices  
Based on Screen Size  
**DOWN 87.5%**  
in Seven Years



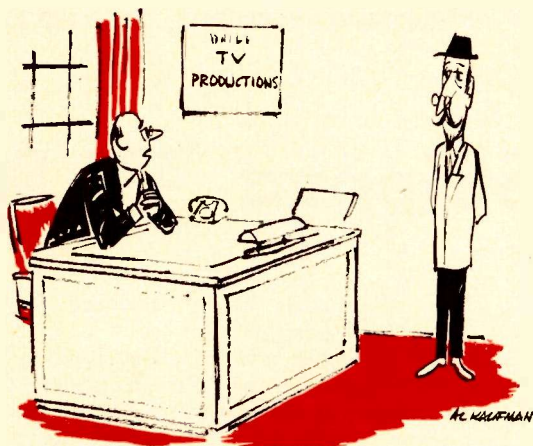
1954 21-inch TV Set \$180  
\$.74 per square inch

# Tuning In the

**"HEART-OF-HEARING" MEDICOS** should have their problems solved by Altec-Lansing's new medical mike. Incorporating the model M-16 Lipstik Hi-Fi microphone, the new unit accommodates a standard stethoscope head, may be sterilized without damage in heated air. Heart sounds may be picked up accurately, amplified and recorded. Now in use at Johns Hopkins and other hospitals for examinations and educational purposes, the system may open up a new era in cardiology. It is now possible for the patient to be examined in his own home through his own Hi-Fi unit. . . .

**HOW'S BUSINESS DEPARTMENT:** Set sales have been slow, but some dealers are ahead of last year, and profits are down at all levels of industry because of widespread price-cutting and the "specialization" in selling low-end models . . . Service volume is holding up fairly well in most areas, though collections are slow, and credit to dealers by suppliers is tight . . . Technicians are working on plenty of brand-new sets these days, in cases where consumers bought units "as is," or from outfits with poor service facilities. (One Eastern shop charged \$26 for repairing a set the customer had owned only two days, installing a couple of resistors, a coil, three tubes, and doing other work in the shop.) . . . Volume of repair work on portables has been fair thus far, but should pick up from now until vacation season is over . . . With costs up sharply in service departments, owners are experiencing difficulty in trying to service profitably old midgets, many pre-war, which sold at low prices.

**EUROPEAN TV: BRITISH BUS AND SUBWAY FARES** may rise because TV is growing. Fare increase would make up loss of revenue due to tail-off in riders during evening hours. The claim is that TV is keeping Londoners in their homes at night. . . . **FRANCE:** The national radio tax has been upped about half-a-buck a year to finance the building of nearly 40 TV stations in the next few years. . . . **U.S.S.R.:** The 8-in. Lenin-grad T-2, covered in February **TECHNICIAN**, has been superseded by a later model, using a tube equivalent to our 14-in. size, made to sell for more than \$550.



"You're a fine character actor, Basil—but the network's been getting too many complaints from people who think their picture's distorted . . ."

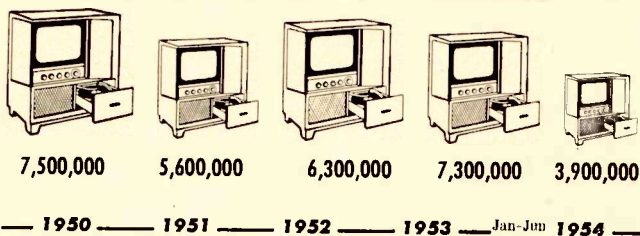
**SENATE SUBCOMMITTEE** set up to investigate UHF got a letter from H. Fogel, prexy of Granco Products, stating that UHF stations face unfair competitive practices. Nearby VHF transmitters are permitted to monopolize best programs, said Fogel, with "left-overs" going to UHF. Public is then reluctant to invest in converters, antennas and other special equipment needed. Also, says the writer, allocation of a VHF channel in a service area shortly after a UHF station has gone into operation doesn't give the latter a chance to get on its feet. Another factor: Increase in transmitting power by strong, established VHF set-ups lets them spill over into new UHF areas, killing off their young UHF competitors before the latter can get going.

**TV RECEIVER SALES** for first 2 months of '54 up nearly 8 percent over the same period last year . . . Guesstimators say that 90 percent of American homes will be TV-equipped in little more than 3 years from now. . . . Because of increased demand, the U. S. Information Agency is doubling its overseas TV broadcasts. Our video fare is gaining considerable popularity in Latin America.

**IN ADDITION TO HANDLING** the most efficient antennas possible, technicians should also make certain that the materials used are of top quality so that the outdoor jobs will stand up well under the severe weather conditions often encountered. Many antennas, masts and related equipment of inferior workmanship and material have cost shop owners customer good-will and unnecessary expense in replacing or repairing defective stuff.

**AS A RESULT OF SOLICITING** non-servicing dealers, the owner of a small shop in a Midwestern city is doing 80 percent of his volume in dealer work, with the balance being devoted to consumers' repairs. Two years ago he didn't have a single contract job.

## TELEVISION RECEIVER PRODUCTION

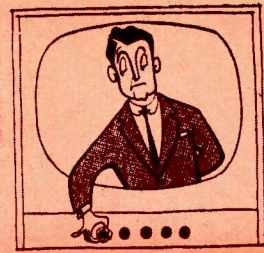


## RADIO RECEIVER PRODUCTION





# Picture .....



**HI-FI SALES MESS**, promoted by direct sales to consumers by jobbers and wholesale houses, rather than by normal retail outlets, may get cleared up if the popularity of Hi-Fi equipment for home use continues to rise. Some far-sighted manufacturers are willing to revise the distribution set-up, for the good of the industry, if sales go up enough. Until recently, they say, not enough home-system equipment was marketed to worry about mass selling. Some manufacturers are even planning courses in Hi-Fi servicing for dealers and dealers' technicians.

**TV MEMORY MIRROR:** Remember the early high-voltage power supplies, in the days before the flyback system became just about universal? One system used "brute-force" high voltage, developed from the ac line input through a step-up power transformer with a high turns ratio. Electrical hazard on these units was shocking. Then there was the r-f oscillator and associated hv supply, common to many ac-dc or projection-type receivers . . . How about the picture-shape problems the round-screen tubes brought with them? At first, a rectangular picture, which wasted nearly half the usable area on the screen, was the vogue. Then the "pumpkin-face" shape used more of the screen, but cut off the corners of the image. Some makers went as far as using all of the screen ("giant circle"), sacrificing nearly half the picture and stretching the raster vertically. Guess we'll never see so many tall, thin tables again.

**BIG STORE, IN NORFOLK, VA.**, operated by H. B. Price, Jr., employing as many as 25 servicers, pays technicians commissions on leads, and finds this practice pays in developing new business.

**RECORD-PLAYER SALES ARE UP** thanks to price reductions; tape recorder sales are up, too. Several sources are toying with the idea of producing inexpensive tape machines that may be plugged into the radio, TV set or Hi-Fi system, just as record players are. Non-recording playback-only units, comparable to the present non-recording player-only phonograph assemblies, look like a strong possibility.



**DID YOU KNOW THAT** the antenna business is the most highly competitive end of the component industry? . . . That antenna sales, together with hardware, rotors, masts and accessories are running at an annual rate of about \$115,000,000? . . . That there are still fringe areas where installation costs run higher than price of the new TV set?

**PUBLIC INTEREST IN COLOR-TV** is now at a new low, but the new art is probably closer to the technician than he realizes. Tremendous amount of lab work on tubes is bound to result in something startling and satisfactory before long. Just as soon as numbers of large-screen sets hit the market (possibly early next year) programming will be stepped up, and servicers in most communities will be working on the receivers that "pioneer" consumers will buy even at high prices.

**EUROPEAN TV NETWORK** went into operation last month linking Belgium, Denmark, England, France, Germany, Italy, the Netherlands and Switzerland. Appropriately enough, an international soccer match on June 6 was the "kick-off" program.

**ODD-BUT-TRUE DEPARTMENT:** Chicago TV technician is also a top-notch servicer on outboard motors, sold by his firm. . . . Service manager of a large TV contracting firm in an Eastern city is a woman. . . . N. Y. cop gave a speeding ticket to a technician; found out that the servicer was bound for the police officer's home to repair the latter's set. . . . Technician in Milwaukee called at a home to repair what customer described as a "clock-radio," only to find that the unit was a radio in a grandfather's clock case.

**MORE AND MORE TECHNICIANS WILL** be servicing tape recorders from here on. The big phono record makers are joining others in producing and experimenting with pre-recorded tape, an activity which is bound to create increased interest in these instruments. On the way, too, will be some "replacement" heads to convert standard recorders into "Hi-Fi" units.

## CALENDAR OF COMING EVENTS

- July 12-15: National Association of Music Merchants Trade Show, Palmer House, Chicago, Ill.
- July 24: Parts Distributors' Seminar, Sponsored by National Electronic Distributors Assoc. and Radio Parts & Electronic Equipment Shows, Washington Athletic Club, Seattle, Washington.
- Aug. 25-27: Western Electronic Show & Convention, Pan-Pacific Auditorium, Los Angeles (show) Ambassador Hotel, Los Angeles (convention hq.)
- Aug. 27-29: TV Service Clinic, Sponsored by the Texas Electronics Association, Adolphus Hotel, Dallas, Texas
- 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.

# Improper Tinting Troubles

By PETER ORNE  
and

SOL HELLER  
MANAGING EDITOR, TECHNICIAN

## Locating the Defective Section When

• If a color transmission is received in the wrong colors, an attempt should be made to correct the condition by adjusting the hue control, before going on to other procedures. The hue control, the reader will remember, regulates the phase of the local 3.58 mc oscillator with respect to the incoming burst signal. Since hue information is reported on by the phase of the subcarrier, putting the local 3.58 mc oscillator (which functions as the subcarrier) into the correct phase, will provide the proper hue in the picture (assuming no other trouble is present).

If adjustment of the hue control cannot provide the proper coloring, trouble in one of the color stages of

the receiver is indicated. The following possibilities must be considered in this case: 1—The hue control is not able to reach the proper phase. 2—The quadrature adjustment between the *I* and *Q* channels is not correct. 3—A defect in the *I* or *Q* channel is present.

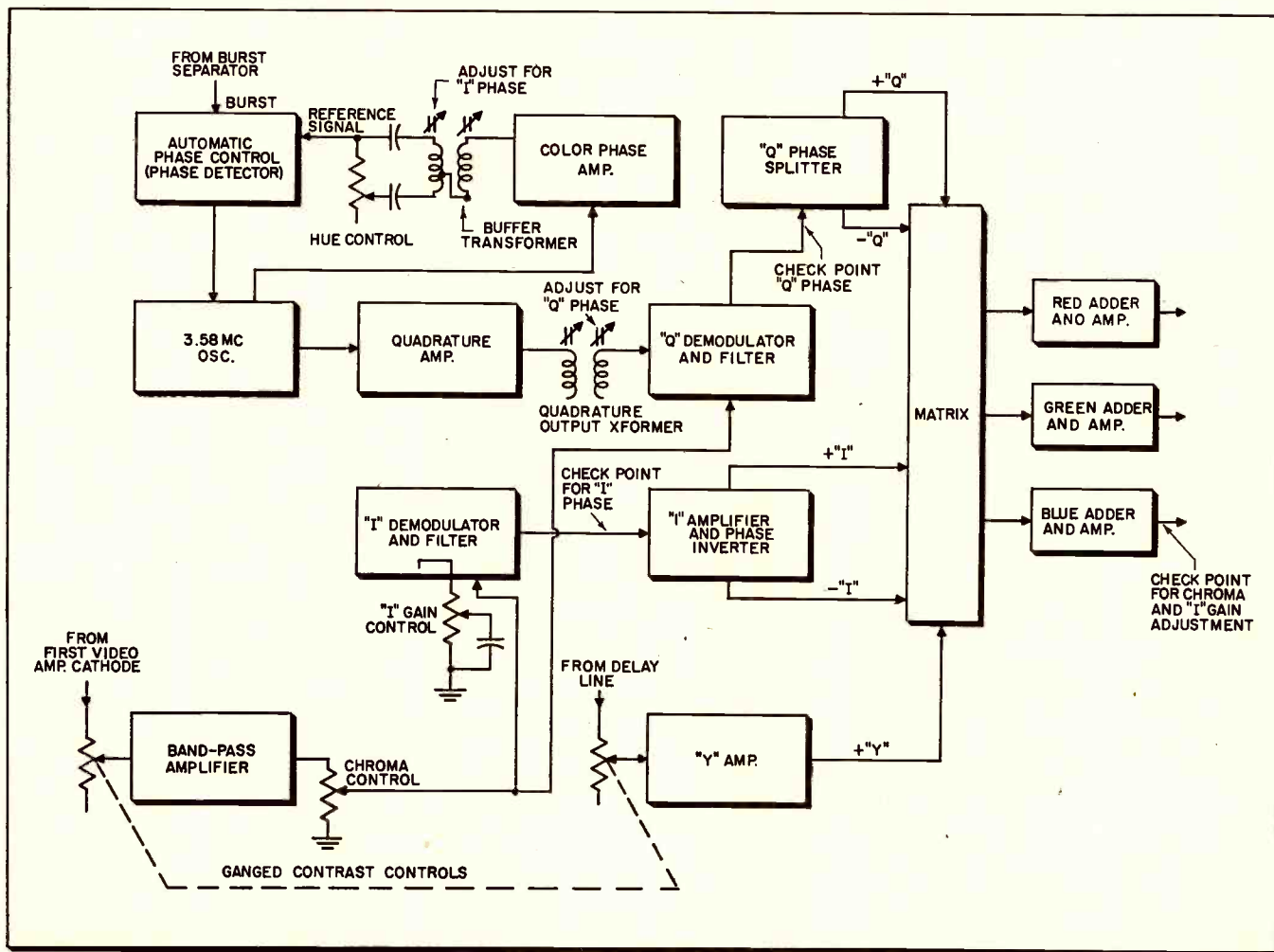
Let's discuss first, adjustments that are made on the receiver to provide correct coloring. (It is assumed that color synchronization is present—i.e., that color information is visible and stationary. Adjustment of the color apc system to provide such a stationary pix, when one isn't present, will be described in a later article.)

Now, in the receiver under discussion, the *I* channel obtains its 3.58 mc reference signal directly from

the oscillator. In order to obtain detection along the *I* axis, it is necessary to adjust the phase of the oscillator with respect to the incoming burst signal. Since by transmission standards, the burst and the  $+I$  signal are at a phase angle of 57 degrees, we can, by getting the burst signal correctly-phased with respect to the receiver's local oscillator, assure correct phasing between the oscillator and the *I* signal. The situation may be clarified by considering the 3 signals as wheels. If the oscillator wheel meshes with the burst wheel, it will also mesh with the *I* wheel, since the burst and *I* wheels mesh.

So then—it is necessary to adjust the phase of the oscillator with respect to the incoming burst. This can

Fig. 1—Block diagram of chrominance stages in the color receiver, showing adjustment and check points.



# in the Color TV Receiver

## Incorrect Hue is Visible in the Picture

be done, to some extent, by manipulating the hue control. When the proper oscillator phase cannot be obtained by hue control adjustment, another procedure becomes necessary. The serviceman can tell whether the adjustment just described has been successful by noting whether flesh colors in the picture seem correct, or by checking the colors delivered by a bar pattern generator.

When the proper oscillator phase cannot be obtained by manipulating the hue control, the transformer in the color phasing amplifier (refer to Fig. 1) should be adjusted, and results noted. That is, the secondary winding of this transformer should be re-tuned. The transformer feeds the oscillator reference signal to the phase detector. The adjustment is similar to the phase adjustment on the secondary of the oscillator in the RCA 630 Synchrolock system. It is best made when a bar pattern (Fig. 2) is being transmitted. Details of the procedure are as follows:

### "I" Demodulator Output

A scope is attached to the filtered output of the *I* demodulator. The signal seen on the scope at this point—with the bar pattern signal coming in—will have the appearance (see Fig. 2A) of a stationary automobile crankshaft. (When the color sync signal is absent, and the frequency of the receiver's local oscillator is close to the correct value, the bar illustrated in Fig. 2A appears to rotate, hence its name, *crankshaft*.)

Now, the bar pattern currently being used as a standard contains, in its top half section, colors in the order shown in Fig. 2. The bottom half section consists of reference bars suitable for alignment. In this bottom section there is a dark cyan bar (*-I*); a bluish-purple bar (*B-Y*); a magenta bar (*Q*); and one black and one white bar. With the scope connected at the output of the *I* demodulator, no output for the *Q* signal should be visible; i.e., the dotted line in Fig. 2A, representing the scope output for the different bars at the bottom of the bar pattern, should be at the zero level while the *Q* bar is being scanned. If it isn't,

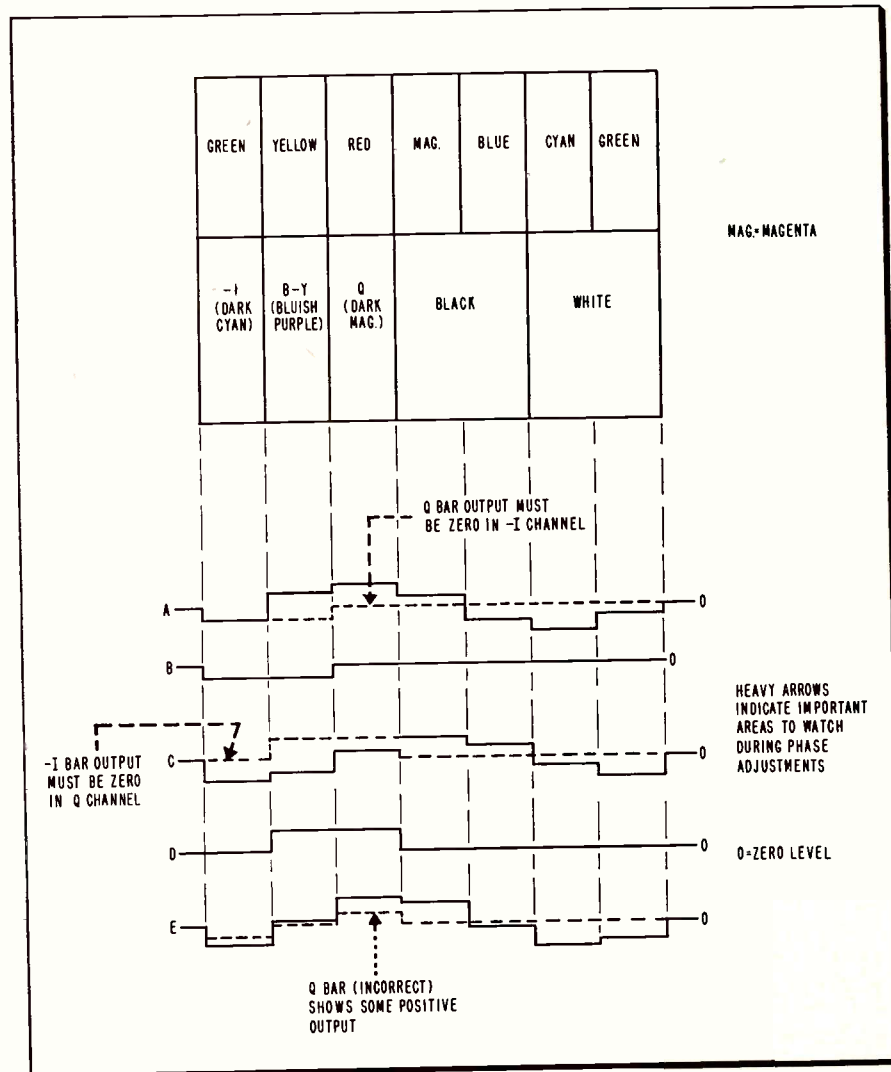
the hue control—and the secondary of the buffer transformer, if necessary—is adjusted until the *Q* bar output is zero. The white bar in the bar pattern is present for reference purposes; since there is no color signal output from the demodulators during the transmission of white, this bar establishes the zero reference level.

If an adjustment of the buffer transformer is found necessary, it should be kept in mind that the transformer should remain tuned as

closely as possible to resonance. When any resonant circuit is detuned *slightly*, the phase of its signal output is shifted; when the resonant circuit is *considerably* detuned, however, its gain is appreciably lowered. Limiting the buffer transformer adjustment to the point where appreciable detuning does not occur, insures that the reference signal going to the phase detectors will be large enough in amplitude to provide proper operation of the apc system.

When the *I* phasing adjustment has been correctly made, a *Q* phasing adjustment may be found necessary. This adjustment is intended to

Fig. 2—(Top) Bar pattern sent out by color TV stations. (Bottom) Scope waveshapes produced by bar pattern. In (A), the *I* channel output for the top half of the bar pattern is shown in solid lines; the *I* output for the bottom half of the pattern is shown in dotted lines. This bottom waveform is shown separately in (B). The *Q* channel output for the entire pattern is shown in (C). Dotted line shows output for bottom half of pattern. (D) shows separately the dotted-line waveform of (C). In (E), *I* channel output with misadjusted phase condition is illustrated.



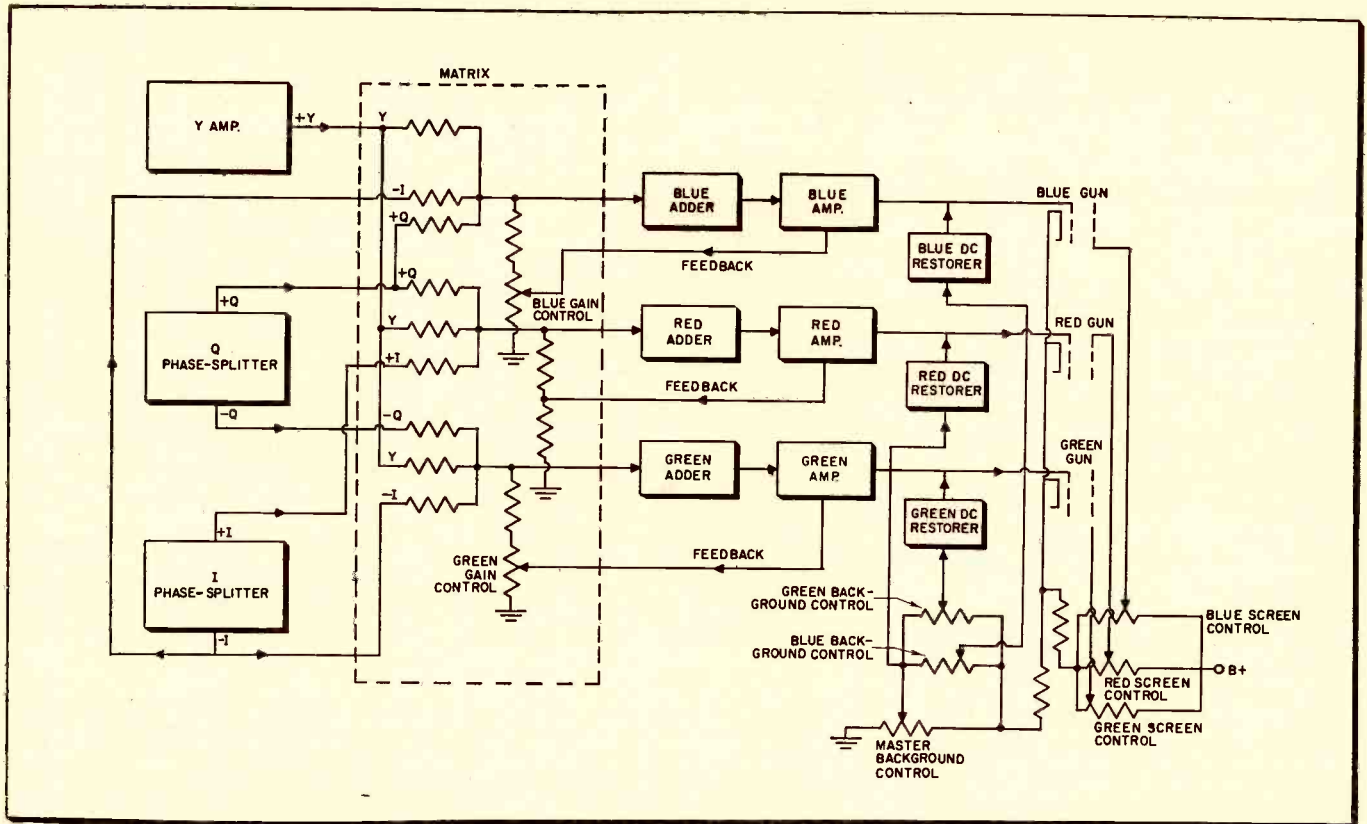


Fig. 3—Block diagram of matrix-adder section of color receiver. The matrixes are purely resistive networks in grid circuits of the adder stages.

make the phase of the 3.58 mc oscillator signal fed to the Q demodulator correct, assuring that the needed quadrature relationship between the Q and I signals will be present. A transformer in the output circuit of the quadrature amplifier (refer to Fig. 1) provides such an adjustment. In this case, the scope is connected to the output of the Q demodulator, and the secondary of the quadrature output transformer is adjusted until the output produced by the scanning of the I bar is zero (refer to Fig. 2C).

If the procedures described cannot be successfully performed, trouble in the section that can't be adjusted is indicated. If either demodulator, for instance, has no output, a defective tube may be responsible, or some other circuit trouble may be present.

Keep in mind that proper operation of the demodulators requires that the color sidebands of the transmitted signal, and the 3.58 mc oscillator signal, be applied to the appropriate grids of these tubes (color video signals are fed to the control grid, while the 3.58 mc oscillator signal is fed to the suppressor grid, in each demodulator). A scope with a sufficiently high frequency response (extending to 4 mc) may be used to check for the presence of these signals in the demodulator section of the receiver.

Suppose that the adjustments we described previously have been made; the output at the demodulators is normal (the Q channel demodulator should put out a signal with an amplitude of about 20 v peak-to-peak, while the I channel demodulator, due to its wider frequency response, may be expected to deliver a p.p. signal only 3 v in amplitude); the picture, however, is still not correct in its coloring. The defective circuit may, in this case, be found either by a scope check at the output of each of the phase splitters, or by careful analysis of the color bars (on the crt screen). Scope checks are made at the output of the phase splitters because these are the points where individual +I, -I, +Q and -Q signals may be examined with a minimum of disturbance to the circuits.

#### Bar Pattern Analysis

With respect to analyzing the bar pattern—let's consider an example. Suppose that the greens in the bar pattern are not as bright as the other colors, while the colors from which green is absent are desaturated—i.e., contain some white. These symptoms will indicate to the informed serviceman that insufficient color information is reaching the green gun. The reasoning behind

this may be outlined as follows.

Color information at the green gun serves two purposes: 1—It supplies the signal that turns the green gun on when green is being transmitted. 2—When green is not being transmitted, and other colors are, this color information cancels the Y information present at the green gun, cutting the gun off, as explained in our April article.

Insufficient color signal input to the green gun, thus, will result in greens of inadequate brightness in the picture; it will also cause a desaturation of other colors, because the green gun will have some output when it should actually be cut off, causing green to be mixed with the other colors.

A check on the signals applied to the green matrix (see Fig. 3) reveals that the trouble may lie either in the -I or -Q channel, since both signals feed into the green matrix. (Y signal also goes to the matrix, but the trouble cannot be attributed to this channel because desaturation is present. Such desaturation would not be associated with improper hue, if the Y signal input to the green gun was absent or inadequate.)

Now then—since the other two guns appear to be operating normally and since -I signal is also

(Continued on page 44)

# Your Test Equipment

## Part 3 Polarity Checks on Transformers. Low-Frequency Probe

By M. G. GOLDBERG

• Sometimes transformer windings are connected in series to obtain increased voltages; or in parallel for increased currents—for instance when two 6.3 v windings are connected in parallel to supply one heavy-duty circuit. Or, a separate heater transformer may have to be wired up, with the low-voltage winding in parallel with one already in the circuit, to supply additional current. In addition to quickly com-

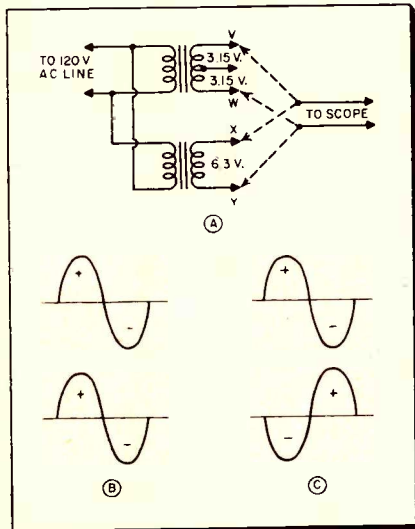


Fig. 1A—Test setup for comparing polarity of transformer windings. B—Waveforms in phase. C—Waveforms oppositely phased.

paring transformer output voltages, to determine whether they are approximately the same, a scope will quickly show which way to connect the leads from the separate windings. (It is better to use a scope than an ac voltmeter for such tests since errors in connections made when an ac meter is used can damage the latter. Example: unintentionally connecting meter to high-voltage transformer winding, when the range switch is on a low-voltage setting.)

The first step is to connect the (120-volt) primary windings in parallel, without regard to the polarity of either secondary (see Fig. 1A). Assume the two secondaries are to be connected in series to supply 12.6 v. Connect the scope leads first to X and Y, noting the waveshape

on the screen; then disconnect the leads from this winding and connect them to V and W instead. If identical polarities are observed (Fig. 1B), then to connect the windings in series, X and W would be tied together, making 12.6 v available between V and Y. If, on the other hand, the first waveform was *inverted* with respect to the second one (Fig. 1C), then Y and W would be tied together, and 12.6 v would be available between X and V.

If the two windings are to be connected in *parallel*, the same tests would be made. If, in the first test, the waveforms were as indicated in Fig. 1B, we would connect Y to W and X to V. If the results were as in 1C, Y would go to V and X to W.

When connecting windings in series, a slight difference in the output voltage of each winding is unimportant; for parallel operation, however, voltages should not vary by more than 3%, as a rule. Any difference in voltage will be readily apparent on the scope screen.

The reason why there shouldn't be more than a 3% voltage difference between the windings connected in parallel is that the higher-voltage winding will draw more current if there is, and its rating may consequently be exceeded. The

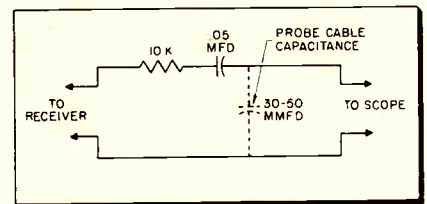


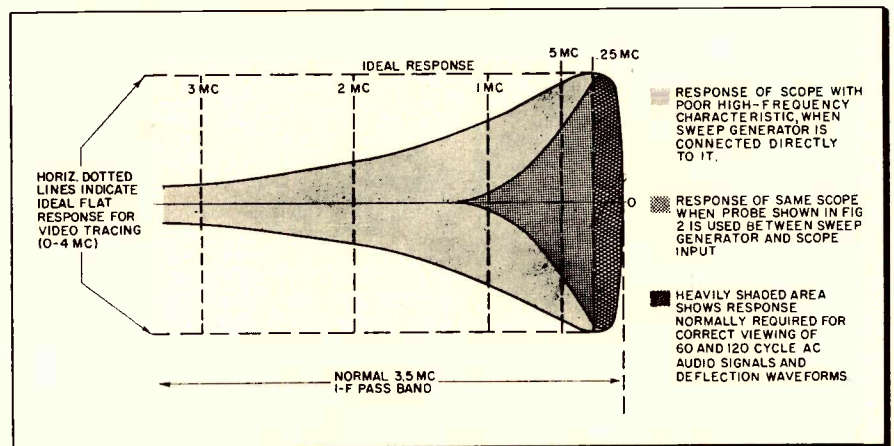
Fig. 2—Schematic of low-frequency probe.

higher-voltage winding will furnish current until its voltage drops to approximately the voltage of the lower-voltage winding. The condition is similar to the one present when a 6-v battery is connected across a 4-v battery, and charges the 4-volt battery, as well as feeds current to any external circuit present, while the 4-v battery "floats" on the line.

The tests just described have more applications than most technicians appreciate. Hardly a week goes by but what I use this trick for some purpose or other. When, for instance, a new vertical transformer is to be connected into a circuit, and the lead coloring is hard to identify, the method just described will be very helpful. I had a real dog here quite some time ago that was a headache of all headaches! Pix was fine but tone was miserable, and the thing just wouldn't align right, yet the discriminator transformer wind-

(Continued on page 41)

Fig. 3—Response curves of oscilloscope with and without low-frequency probe. The oscilloscope on which the tests were made had fixed input resistance of 2 meg, which is reasonably high.



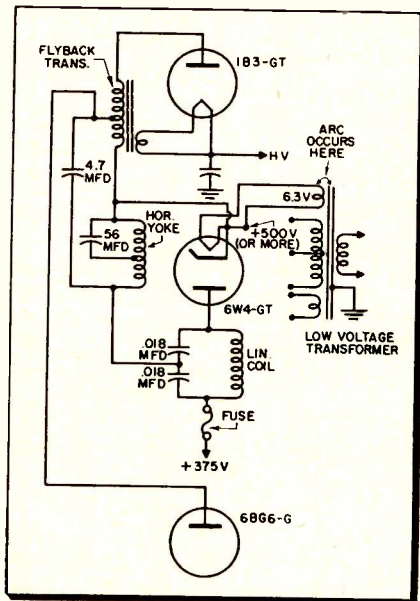
# Arcing Troubles in TV Sets

By MICHAEL CRAIG

• High-voltage or flyback transformers are likely sources of arcs and leaks. In many cases, there may be no visible signs of trouble, making the diagnosis much more difficult. Sometimes a problem arises in which both high and low voltage transformers play a part. Fig. 1 shows a portion of the schematic of a number of RCA models in which such trouble occurs. In these receivers, the 6W4-GT damper tube heater winding is at approximately 500 v dc to ground, because one side of the winding is tied to the damper cathode. The normal B-plus voltage at the fuse terminal is 375 v, but due to the boost voltage developed in the deflection and damper circuit, the voltage at the damper cathode is 500 v or more. Because the 6W4-GT heater winding is the one closest to the outer shell of the transformer, a number of cases of arc-over have occurred at the site indicated in Figs. 1 and 2.

Unless the arcing has been allowed to continue for some time, with a larger-sized fuse than the one recommended by the manufacturer present, this trouble can be easily corrected either in the home or in the shop. First remove the chassis from the cabinet. Next remove the four nuts holding the transformer to the chassis. Carefully

Fig. 1—Partial schematic of 1951 RCA direct-drive deflection circuit, indicating arc site.



pull the transformer half-shells far enough away from the windings; the spot where the arc-over or short occurred will be in plain sight when this is done. Slide an extra layer of varnished cambric or similar insulating material between the outer winding and the shell, as indicated in Fig. 2. This makes a permanent repair. The writer has never had a

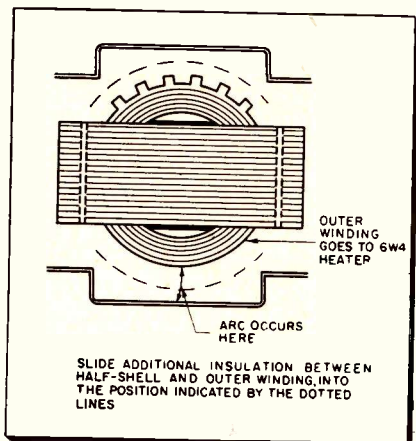


Fig. 2—Sketch of low-voltage transformer, showing location of arc referred to in text.

call-back for a similar complaint on a transformer doctored in this manner. It is not necessary to unsolder any wires to make the repair, which takes only a few minutes.

The schematic shown in Fig. 1, showing a section of the circuit used in 19-in. '51 RCA sets, has a 4.7 mmfd capacitor in the plate circuit of the 6BG6-G tube. Some of these capacitors tend to arc over internally, producing an interference pattern on the screen similar to that caused by Barkhausen oscillation (see Fig. 3A). In addition, the edges and borders of vertical objects in the picture will be somewhat serrated and jagged, like the teeth of a saw blade.

One point to keep in mind when tracking down interference caused by arcing somewhere in the receiver is this: If the arcing occurs in a part of the high-voltage section where r-f is present, one or more roughly-defined vertical bars or lines will be visible, usually on the left-hand side of the screen.

The width and intensity of the lines or bars will vary with the strength of the individual harmonics generated in the circuit. The source of these undesired signals

may be the horizontal output tube plate circuit, as in the case of the capacitor mentioned; a section of the flyback transformer in which arcing is taking place; or the linearity and damper circuits.

If the arcing or leaks occur in the dc high-voltage circuit, a series of fine, dark horizontal lines or streaks will be visible on the screen (Fig. 3B). Because some sort of filter is always associated with dc supplies in a TV receiver, the time constant of the circuit affected is much longer than in the case of the "r-f" or pulsed section (i.e., the frequency is lower). This will cause the frequency of interference developed in this circuit to be, in almost all cases, below 15,750 cycles. The trouble will manifest itself, in consequence, as horizontal lines; the lower the fre-

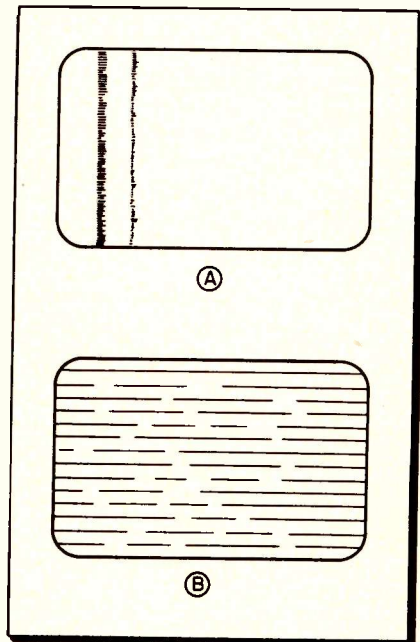


Fig. 3A—TVI produced by arcing in 4.7 mfd unit in plate circuit of 6BG6-G (refer to Fig. 1). B—Interference pattern that can be produced by arcing at the hv dc terminal.

quency of the disturbance, the fewer the number of lines on the screen.

Arcing due to poor contact at the point on the rim of metal picture tubes where the high voltage is clipped on, is a case in point. The smaller the gap, the greater the number of lines or interference streaks, and vice versa. The same applies also to poor contact at the

snap-in terminal on the side of glass picture tubes.

Intermittent arc-over, either externally or internally, of the high-voltage filter capacitor (usually a 0.0005 mfd unit) will give rise to a similar effect, except that the frequency of arc or "pop-over" is much less; the audible manifestations of the arcing, on the other hand, are much more evident. Turning down the brightness control so that the pix tube draws less current will cause the high voltage to rise, tending to promote the appearance of this intermittent fault.

### AC vs DC Arcing

Arcing or corona in the flyback transformer circuit will usually be heard as a hiss or sizzle, while any leak in the high-voltage dc circuit will give rise to crackling sounds, or sharp "pops." If the snap-in terminal on a glass pix tube is loose, spread its prongs slightly to improve the connection. If the rubber nipple is worn or cracked, cover the hv

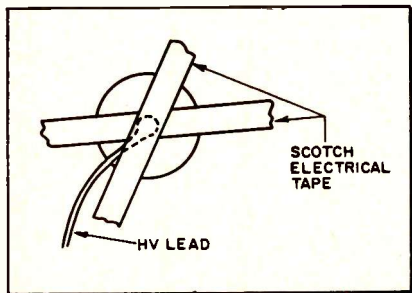


Fig. 4—Scotch tape placed as shown can be used to maintain firm contact at the hv terminal when suction cap is cracked or missing.

terminal with several short strips of good high-voltage tape (see Fig. 4), pressing the nipple firmly to the glass.

In some of the 19-in. RCA '51 models, arcing through the insulation between the "high" side of the horizontal yoke windings and the adjacent vertical yoke winding may be encountered. A few seconds after the arc starts, a short between these points results in a narrow keystone raster (see Fig. 5). These yokes can be disassembled rather easily. If the arcing hasn't damaged the coils, a couple of thin strips of high-voltage (heat-resistant) insulation can be carefully placed between the windings, the yoke then being reassembled. Such a repair is recommended only as an emergency one; it is the writer's experience that the same trouble will occur at some other spot in the yoke. Installation of a new

## Breakdowns in Transformers and Coils. Symptoms, Causes, Remedies. Corona Effects

yoke is the best and safest solution. When a temporary repair is made, however, do NOT use regular black high-voltage electrical tape for the insulating material, since the heat in the windings will cause it to de-

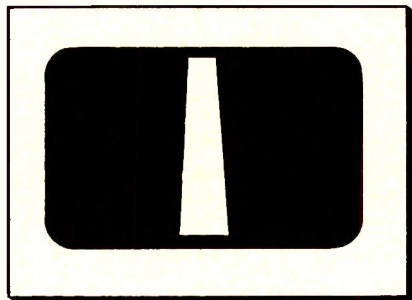


Fig. 5—Narrow keystone raster resulting from arc between horizontal and vertical deflection coils. Width of raster will vary with type of circuit, location and degree of short.

teriorate rapidly and break down.

In some RCA '50 models, intermittent arcing which causes the raster to shrink in size or disappear entirely may be due to pressure of the insulated wires against the sharp terminals within the yoke itself. This trouble can be easily located if the

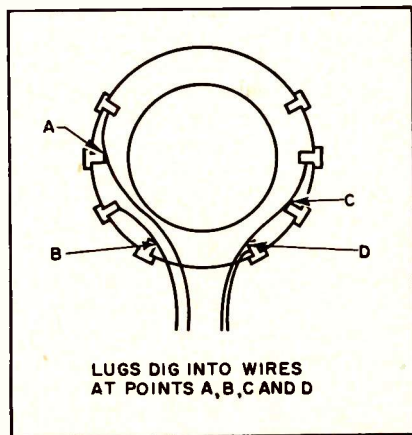


Fig. 6—Sketch of yoke terminal lugs (cover removed) indicating how wires can short.

technician, with the set on, moves the leads to the yoke, noting whether such movement or displacement of the wiring radically affects the raster shape or brightness, or causes arcing. If such effects are observed, the fault can be easily corrected by removing the yoke and wrapping a narrow layer of high-voltage tape around the wires at the points where they dig into the lugs—or rather, the points where the sharp edges of the lugs and the soldered ends of the

wires cut thru the insulation and short out one or both halves of the yoke (see Fig. 6). Cut off any protruding wire stubs close to the lugs, when this kind of trouble is being serviced.

A strip or two of high-voltage tape will correct the trouble which sometimes occurs in early 16-in. Zenith models, where the leads from the hv transformer winding feeding the 1B3 heater rub against the transformer core, and finally arc through to the latter. A simple cure is to use a strip or two of this tape

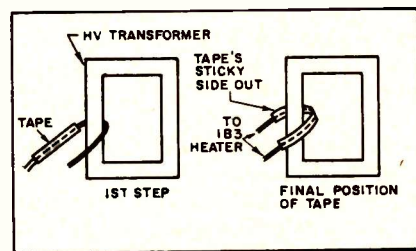
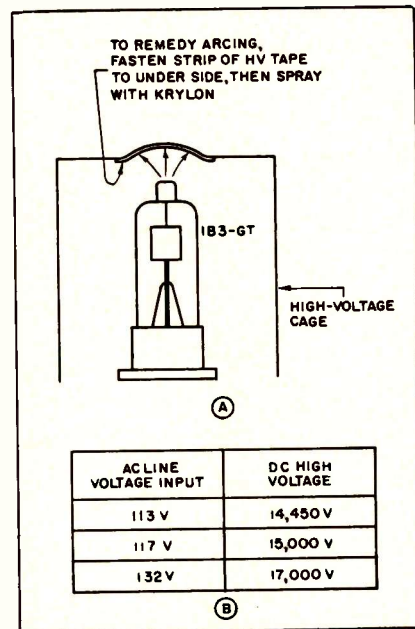


Fig. 7—How to add additional insulation between 1B3 heater winding and flyback core.

in reverse (sticky side outwards), wrapping it around the wire to form a sort of loose tube (see Fig. 7). This will permit the tape to be slid along the wire until it is between the core and the heater lead, providing additional insulation. The chassis will not even have to be removed from the cabinet for this repair.

Still another case where high-

Fig. 8A—Arrows indicate corona area and path of arc in Philco 21-inch '53 set. B—Changes in hv produced by line variations.



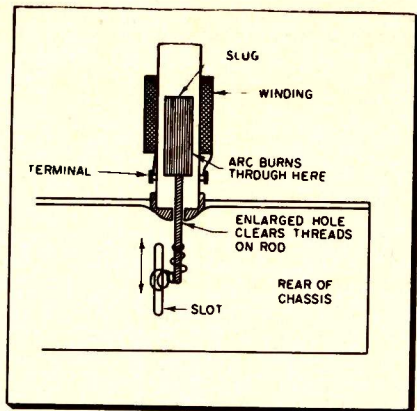


Fig. 9—Sketch of Raytheon linearity coil, showing where insulation breakdown occurs.

voltage tape can be used to advantage is under the dome of the high-voltage cage, above the 1B3-GT plate cap, in Philco '53 21-in. receivers. In spite of the  $\frac{3}{4}$ -in. spacing between the cap and the top of the cage, cases of flashover between these two points occasionally occur. The arc maintains itself, once the breakdown occurs, until the relatively expensive hv transformer burns out, unless the customer shuts the receiver off fairly soon. In every such case noted by the writer, the cause has been poor ac line regulation (in small communities a few miles from the city). In one case, to cite an example, the measured line voltage was 113 v, when the line was loaded down at night with lights, oil-burner, dishwasher and electric stove. In the daytime, when the trouble started, the line voltage was up to 133 volts, with a proportionate increase in the pulse voltage present at the 1B3 plate (see Fig. 8B). Fastening several thicknesses of high-voltage tape to the under side of the cage roof, as indicated in Fig. 8A, eliminated all trace of corona and flash-over.

### Arcs in Linearity Coils

Relatively little trouble is experienced with arcs and leaks to chassis ground with linearity coils, in spite of the fact that dc voltages between 500 and 550 v are generally present between such units and chassis. Two interesting cases recently came to the writer's notice, however, which may be worth describing.

In both instances, the linearity coil was mounted within the high-voltage cage near the width coil. The first case involved a Raytheon 20-in. receiver, in which the linearity coil was mounted upright at the extreme rear of the chassis, just inside the hv cage. Adjustment was made by means of the usual slug (see Fig. 9),

except that the slug was grounded to chassis through the push rod and coil spring, the latter sliding along a slot in the chassis; the slug was maintained in position through pressure of the spring on both sides of the slot.

Due in part to the fact that over 500 volts was present between the slug proper and the coil winding, gradual disintegration of the tubing wall took place over a period of time, and a flashover finally occurred, killing the high voltage. To allow the customer to use the receiver until a new coil was secured, the entire coil unit was lifted from the chassis (after removal of the spring) and taped up like an Egyptian mummy. Inasmuch as the path to ground had now been interrupted, the short was temporarily eliminated.

### Tubing Wall Defect

Another case involved a Radio Craftmen 20-in. receiver in which the linearity coil was held to the top of the hv cage by the usual metal snap-in cap (see Fig. 10). The adjustment slug fastens to a small bracket which slides up and down a slot in the cage wall, and is held in position by a thumb screw. Short-circuiting does not take place to chassis in this case, but occurs between the inner winding of the coil, through the tubing wall (where a weak spot has appeared), to the slug surface, and out the opposite side of the slug, to the opposite ter-

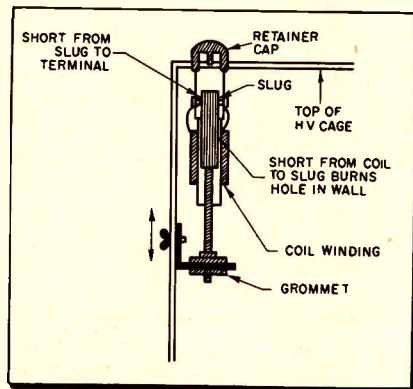


Fig. 10—Sketch of Radio Craftmen horizontal linearity coil, indicating short-circuit point.

minal lug. The reason no short to chassis exists here is that the threaded slug screw is set in a rubber grommet in the sliding bracket.

Shorts in a number of RCA KCS47 chassis occurred between chassis and the wires leading to the socket of the 6W4-GT tube, at the point where the wires make a sharp double bend in threading under-

neath the tube and passing through a hole in the chassis (see Fig. 11). The insulation on the wires had cracked, resulting in flashover. A quick and permanent repair was made by sliding a "tube" made of hv tape over the wires, at the point where they go through the hole in the chassis. (The "tube" is identical with the one described in the case of the Zenith transformer.) As an added precaution, a thin strip of high-voltage insulation (a piece of cardboard wrapped with electrical tape could also have been used) was slid under the wires where they rest on the chassis after emerging from the socket.

The repair just described can be made by removing the cage door

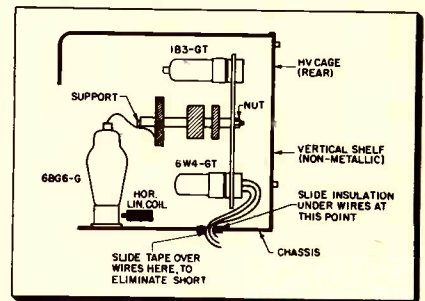


Fig. 11—Pictorial of section of RCA KCS-47A chassis. Short-circuit occurred at point X.

screws and lifting the door out of the way, without removing the chassis from the cabinet. If the wires, however, are badly burned, it will be advisable to pull the chassis, remove the rear cage plate and replace the two wires. These are only 6-8 inches long, and fasten to tie points beneath the chassis.

A somewhat baffling trouble occurred in an RCA 2T81 combo and other models using the same chassis. Arcing could be faintly heard as a subdued sizzle or hiss, with the volume control turned down. There was no smell or smoke, but the outlines of all figures showed what has come to be known as a "cog-wheel" effect, the size of the cog-wheel "teeth" varying with the intensity of the leak. Since the leak occurred (as was later discovered) within the insulating tubing of the flyback transformer, it could not be seen; even the sound of the arcing was deadened. The arc occurred between the coil terminal (see Fig. 12) and the bolt which runs clear through the coil form, and is used for mounting the transformer to the metal cage.

Since the coil itself was not damaged in any way, it was only necessary to cut away the burned coil tubing around the lug, insulate the

(Continued on page 33)



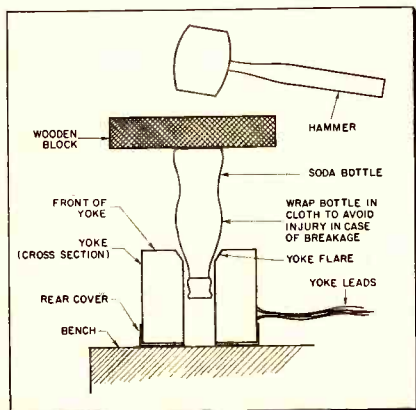
# Shop Hints to Speed Servicing

Tips for Home and Bench Service Contributed by Readers

## Neck Shadow Remedy

Occasionally a slight case of neck shadow is due to an inadequate flare angle in the yoke windings. To replace the yoke is the easiest procedure, but it is also the most expensive. Before resorting to replacement, try this simple expedient; it works fine in most cases:

Place the yoke on the bench with the rear portion, out of which the neck of the picture tube normally protrudes, face down. Also obtain a small soda bottle ("coke" type or similar), a soft rag, a small wooden block and a hammer. Arrange these items as shown in the drawing. The bottle—or that part of it which will be outside the yoke—is wrapped in the cloth to prevent personal injury in case of glass breakage. Tap the wooden block smartly with the hammer several times, to increase the angle of the yoke flare. Replace the yoke, making sure that it's as



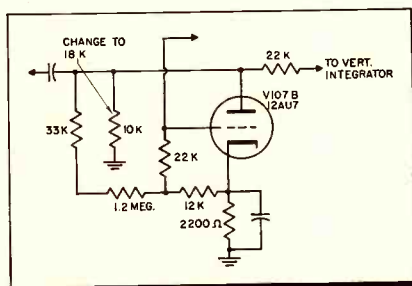
close to the picture tube bell as possible. You'll be surprised to find how often this gets rid of neck shadows.

Incidentally, I have never had a "coke" bottle break in the years I've used this method.—*B. O. Riis, Miami, Florida.*

## Critical Vertical Sync

On RCA models 2T51, 2T60 and 2T81, the vertical hold control appears to have plenty of range of operation when it is rotated. However, if the control knob is manipulated in the usual manner, the picture slides by just when it appears that it should be locking in place, unless the control is turned very slowly. At first the cause appears to be lack of

sync. However, a check will usually show that resistance of the control has gone up to 2 meg or more. Consequently, there is a very small angular rotation over which locking can take place, and adjustment becomes critical. Replace the faulty control with one of the correct value (1 meg) or, to effect an emergency repair, shunt the defective unit with a 1-meg fixed resistor.



If the control checks okay when the described symptom is present, replace the 10k resistor shown in the accompanying sketch with an 18k unit. The sets referred to use a comparatively small vertical sync pulse, and the suggested change will raise the pulse slightly.—*M. G. Goldberg, St. Paul, Minn.*

## Haste Makes Waste

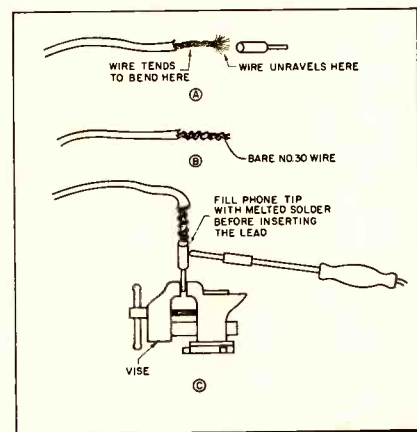
Sylvania chassis 1-509-1 uses paralleled horizontal output tubes (6BG6's) and paralleled damper tubes (6V3's). If you want to blow a tube, just substitute one 6BG6 at a time, and turn on the set while the other (parallel) 6BG6 is still warm. Maybe you will get away with such a procedure—but maybe you will blow a tube. At any rate, you will be trying hard to blow one. What happens is this: the already warm 6BG6 will start operating before the new one, thus drawing the major portion of the current. This will overload it. So, whenever you can, replace both tubes at one time in the case of all paralleled tubes. If you cannot do this, give the set a few more minutes to cool down prior to turning it on again, when only one of the tubes has been replaced. This will permit both tubes to start cold and to heat uniformly, drawing equal current, and thus preventing an overload on one of them.—*James A. McRoberts, Brooklyn, N.Y.*

## Convenient Probing Lamp

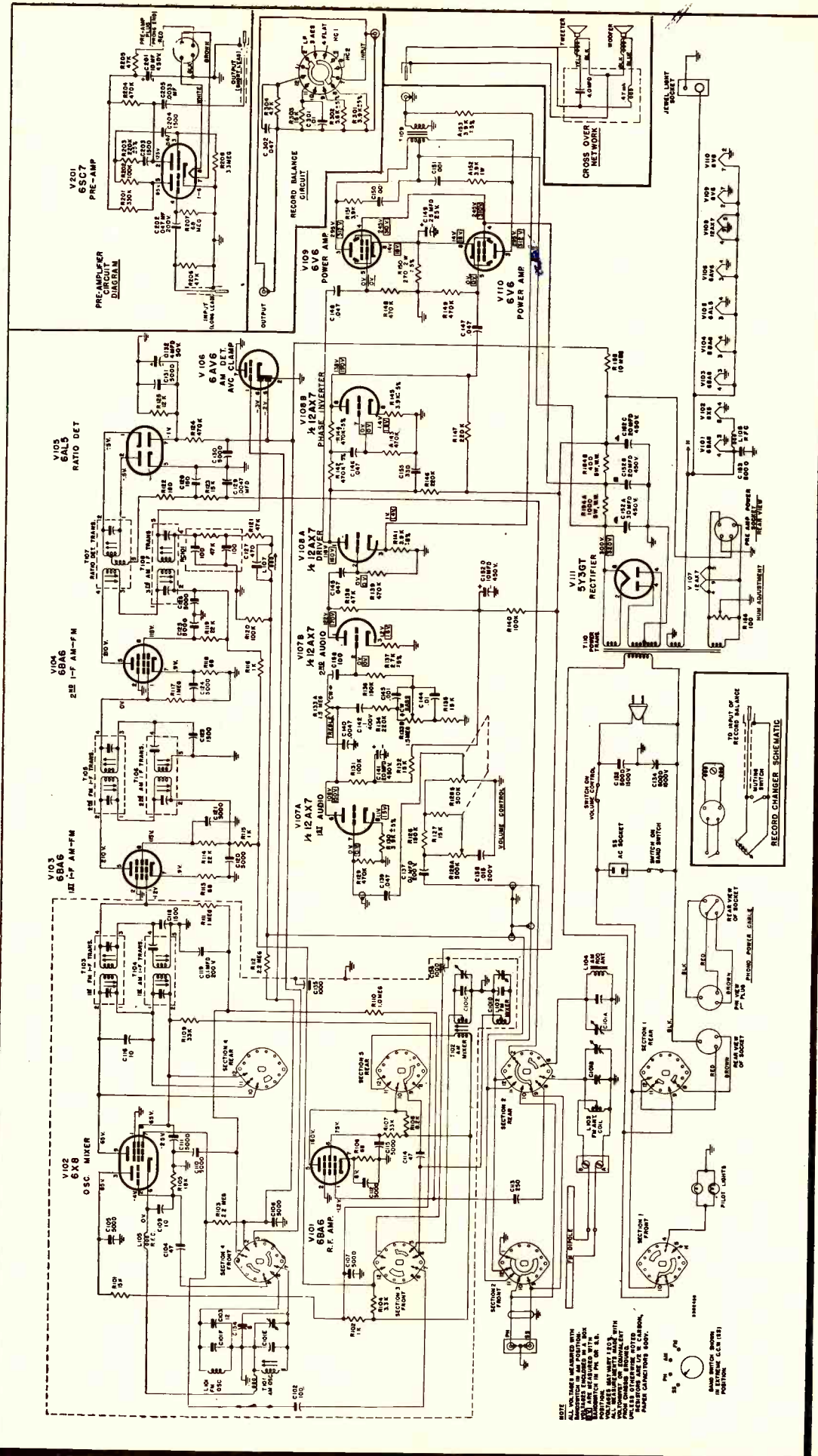
I find frequent need for using a pen-light in my bench work, but I have discovered that the life span of the tiny pen-light batteries is too short when the light is used fairly steadily. To solve this problem, I have eliminated the battery by running two leads from the pen-light and connecting the leads to a suitable voltage source. (I use the filament connections on a tube tester socket.) This provides a steady source of current without the nuisance of frequent battery replacement.—*S. Sandler, Providence, Rhode Island.*

## Resoldering Phone Tips

Frequently, because no new unit is at hand, it becomes necessary to repair a break that has developed in a much-needed test lead or phone cord. The wire in these cords is often delicate and hard to handle; it tends to fray and bend when an attempt is made to insert the wire into the phone tip, as indicated in sketch A. To avoid this difficulty, wind a piece of thin no. 30 bare wire in a spiral shape around the wire that is to be inserted into the phone tip (see B). This keeps the end of the wire stiff, holds the loose ends in shape and keeps them from fraying out. It now becomes very easy to insert the wire into the phone tip, which is held in a vise, and resolder it, as shown in sketch C. Tin the no. 30 wire lightly after it has been wound around the broken end of wire that is being worked on, and before the end is inserted in the tip.—*Joseph Amorose, Richmond, Va.*



# Schematic of Late Model Hi-Fi Receiver



**NOTE:** THE TUBES AND TRANSFORMERS INDICATED ARE THE LATEST TYPE AVAILABLE AND SHOULD BE USED AS SUCH. ALL OTHERS ARE INDICATED BY PART NUMBER AND SHOULD BE USED AS SUCH. ALL PARTS LISTED ARE AVAILABLE FROM THE MANUFACTURER OF THE RECEIVER OR FROM THE MANUFACTURER OF THE PARTS LISTED. THE PARTS LISTED ARE THE LATEST TYPE AVAILABLE AND SHOULD BE USED AS SUCH.

## GENERAL DESCRIPTION

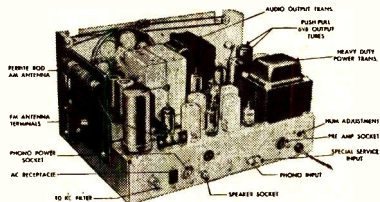
### Radio Chassis

The radio chassis used in this instrument is the new Capehart CR-129, an 11 tube high fidelity chassis. The tuner section of this chassis is a fairly conventional AM-FM receiver. However, the RF deck has been designed with particular attention to the radiation of the FM oscillator. This has been kept extremely low so as to comply with new FCC requirements. The ratio detector has been improved for easier tuning and low distortion. A 10 KC filter is employed in the AM detector circuit to eliminate beats between adjacent AM stations which can be so objectionable in a high fidelity receiver.

### Other Features

A 4-position band switch permits the user to select FM, AM, phonograph, or an auxiliary input jack which may be used for TV sound, a tape recorder, or some other sound source. The selected audio signal enters the audio section of the receiver through a compensated volume control which provides continuous compensation so that the proper overall tonal balance will be maintained regardless of the volume control setting. Following the volume control is a 12AX7 twin triode used as the first and second audio amplifier stages. Between these two stages is the tone control system. Two concentric controls provide either boost or cut-off of either the bass or the treble tones. The wide range and continuous action of these controls permits the user to alter the tonal balance to suit his taste. The normal operating position of these controls is in the

SINGLE CHASSIS AM-FM TUNER AND HI-FI AUDIO AMPLIFIER



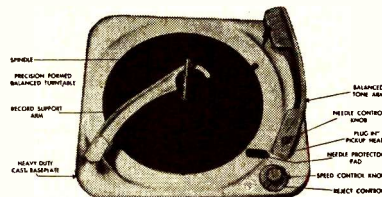
center or flat position. The second audio amplifier is followed by two driver stages, again a 12AX7 twin triode. The grid signal for the first driver is obtained from the second audio plate. The second driver receives its signal from a divider network between the two driver plates. The high gain of the 12AX7 and use of close tolerance resistors keeps the driving signals to the output grids well balanced. Approximately 16 db of inverse feedback from the sec-

ondary of the output transformer is applied to the cathode of the first driver stage. This reduces distortion to the point where it is undetectable at even high levels. The output stage is comprised of two 6V6's in push-pull coupled into a well designed output transformer. The resulting frequency response of the amplifier is from 20 to 20,000 cps plus or minus one db. The output stage will deliver a peak of approximately 14 watts. At 10 watts, the total harmonic distortion is less than one percent.

### Record Changer

The record changer used in this instrument is a new high fidelity changer made to fit Hi Fi "specs." While it contains the same basic change mechanism as earlier models, there have been several improvements made which puts it in the high fidelity quality field. The base plate of this changer is die cast, providing greater rigidity than the earlier stamped steel base plate. A new 4-pole, 4-coil motor with a dynamically balanced rotor is employed which keeps motor noise and pick-up hum to a minimum and insures constant speed. A new laminated

HIGH-FIDELITY RECORD CHANGER MODEL 400 HF



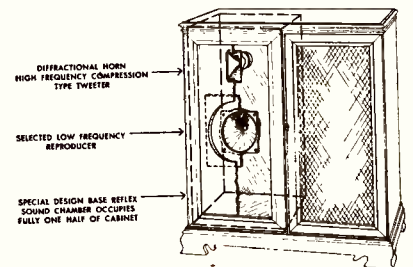
turntable is used which has been precisely formed to eliminate wow. The turntable thrust bearing is a selected three-ball bearing with mirror-finished surfaces, providing silent turntable operation. An aluminum die cast tone arm with plug-in pickup heads is used, enabling the use of several different cartridges as the user may desire. The pickup supplied with the instrument is the variable reluctance unit with the latest wide range dual sapphire stylus. The output of the pickup is silenced during the change cycles by a muting switch, assuring silent operation between records.

### Record Compensator

The output of the pickup cartridge is fed to the radio chassis through a record compensator and a preamplifier which provides the necessary compensation and gain for the variable reluctance cartridge. The record compensator is a five position switch located conveniently on the front of the record changer drawer and en-

ables the user to properly correct for the recording characteristic of the record being played. In the first position, compensation is provided for LP records using the Columbia modification of the NAB recording

HIGH-FIDELITY SPEAKER SYSTEM



curve. The second position provides the newly established Audio Engineering Society play-back compensation which has been adapted by many record manufacturers today. The third position is a flat position, providing compensation for the pick-up itself in the low frequency region, but maintaining a flat high frequency response. The fourth and fifth positions provide two degrees of high frequency cut-off, and are useful in eliminating surface noise when playing records with a poor or worn surface.

## REPLACING STYLUS ASSEMBLY

The needles used in this record changer are formed in a "dual stylus." The micro-groove (33-45) stylus is identified by its color, which is red; the standard (78) stylus is uncolored.

To replace the styli assembly:

(1) Remove the pickup head assembly from the tone arm. (2) Remove the needle control knob by pulling up on said knob. (3) Remove the two screws holding the cartridge in the head. (4) Press down on the exposed spring and remove the "C" washer. (5) Remove the spring by releasing the tension slowly. (6) Remove the flat washer the spring rests upon.

To replace the styli assembly, reverse the above procedure, making sure that pressure is applied only to center point at bottom of unit. When replacing the needle control knob, make certain that it is aligned properly. The direction of the arrow on the knob should indicate the numbers which correspond with the needle which is placed in the usable position. The shaft grooves are slightly off-center to insure proper replacement.

**MR. BOSS MAN:—Are You**

# Looking for More Help?



Give your "learners" a chance—don't marry 'em off permanently to a broom or a dustrag.

• The manpower situation has eased a bit so far as the TV-radio service department is concerned. There are more good men available now than at any other time since the war ended.

In view of the fact that the employment situation is better, dealers who take a far-sighted view realize that *now* is the time to latch on to good men. In tomorrow's color-TV era, it may be too late, since the advent of full-scale color commercially is more than likely to create an acute technician shortage of several years' duration.

Let's see what kind of men are available now; for purposes of discussion, let's throw them loosely into two groups.

One group—the most populated one—is composed of men who have little or no actual bench experience on home equipment. This group, mostly youngsters, includes "geniuses" who've obtained a smattering of knowledge by doing things themselves; those who have completed courses in any of the various schools, veterans who worked on electronic equipment in the armed forces, and others who have done more or less "stereotyped" assembly or inspection

## *The Manpower Market is Better, but Job Applicants Should Be Carefully Screened*

work in electronic factories.

Group 2 is composed of experienced technicians who know the work inside and out.

In Group 1 there are a great many promising men, and numbers of them are extremely eager to get into the field with both feet. In spite of the fact that dealers can hire such greenhorns or little-experienced men at very small salaries, few are doing so today. **TECHNICIAN** editors feel that any shop employing a staff of full-time servicers should explore the idea of taking on one or two bright youngsters for training.

With respect to hiring experienced technicians, it is now possible to be more selective, and check a prospective employee's qualifications carefully.

The fact that a man has been making big money with some large serv-

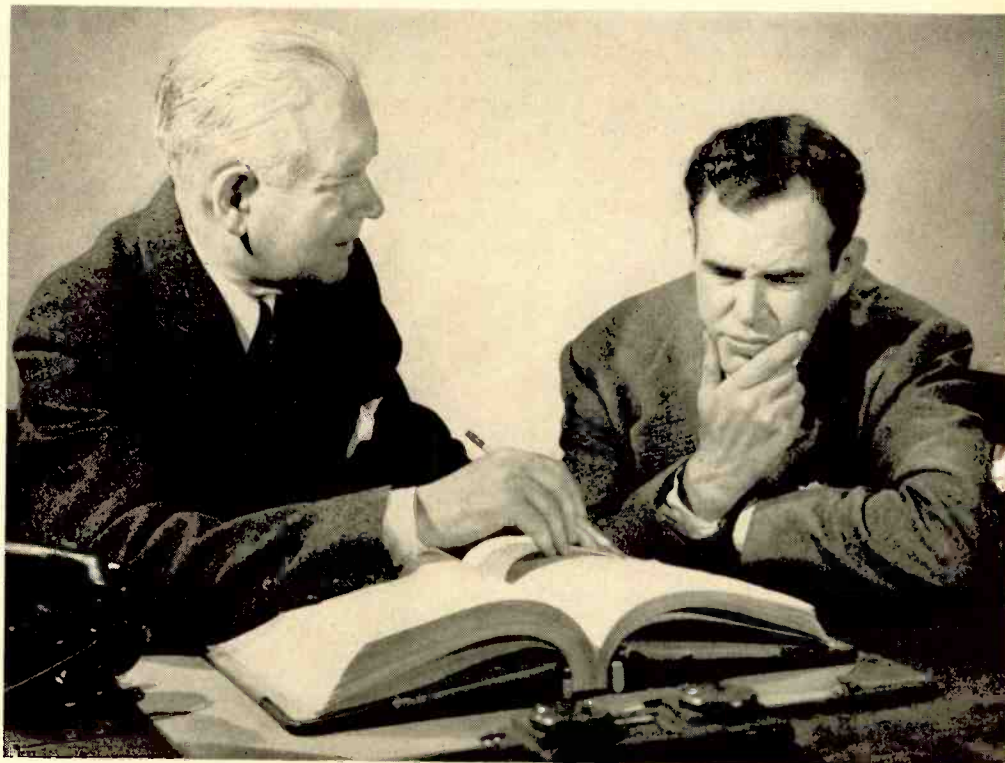
icing outfit should not lead the shop owner to hire him without first making a thorough investigation of the individual.

Here are the things to delve into when considering the application of an *experienced* servicer:

1. *Is his experience as extensive as it should be?* Check on this by asking the man a number of technical questions on a *variety* of products you service. Try to find out if he is *psychologically* adaptable to service anything you may turn over to him. (This will preclude the possibility of engaging a "specialist" who *likes this and hates that.*) Call his former employer, or one of his former associates, and inquire about his experience and versatility.

2. Check the man's employment record carefully, looking out for  
(Continued on page 44)

Find out in advance if this is the man for you. Sketchy hiring wastes time and money.

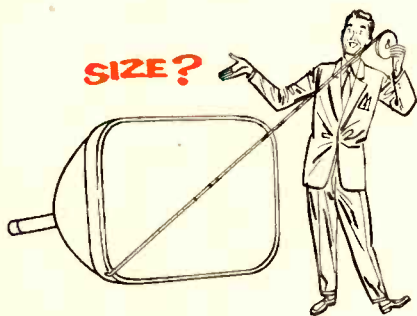




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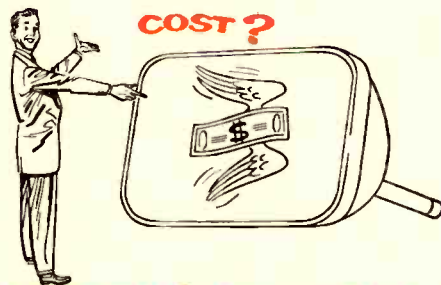


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# "Tough Dog" Corner

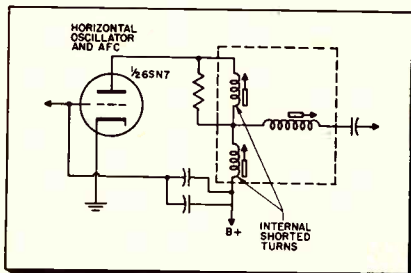
## Difficult Service Jobs Described by Readers

### Horizontal Drift

In an Olympic model 17T20 the horizontal oscillator would go out of sync several times during a program, and would eventually reach a point where it would stay out and couldn't be brought in until the set was turned off for a while.

Most often tubes in the horizontal circuits which are weak, develop a high resistance leak or are otherwise defective, cause such symptoms. Other common causes, in my experience, are leaky capacitors and plate loading resistors which change value as they heat up. Also, horizontal oscillator and phase misadjustment can cause sync instability.

I checked the horizontal oscillator and phase alignment, substituted tubes, checked for leaky capacitors, resistance changes, poor soldered connections, changes in voltages and resistance readings in coils and transformers in the horizontal circuits. The only thing that was not



okay according to the service information was the slight variation in the resistance readings of the horizontal oscillator and phase coils. The readings were somewhat low. This was at first overlooked, as coil resistance readings often are different from those given in service information, even though the units are normal. After much more fruitless searching throughout the horizontal circuit, just to be sure I decided to change this combination unit. Sure enough, the trouble was completely cured.

The cover was removed from the old coils to see if any defects could be noticed. The coils and all internal connections looked okay, but a faint burnt odor came from one of the coils. Apparently it had some internally shorted turns which, when plate current was flowing, would cause it to overheat. The heat would

apparently cause still more turns to short. Thus, the coil inductance would gradually change and the horizontal oscillator would drift further and further off frequency.—*Charles Garrett, New London, Conn.*

### Obscure Horizontal Pull

This trouble occurred in an 810 model GE, but could easily occur in other makes. A strong 60-cycle pull in the picture twisted the edges of the raster into an "S" shape although horizontal lock was good at all times. As a temporary test, I removed the plate supply of the horizontal oscillator (normally connected to the boosted B+) and hooked it to the 5U4 low-voltage supply. The picture became normal. The original plate connection was then restored. A scope test at the damper tube's heater-cathode showed an intense 60-cycle signal mixed with the usual signal for that point.

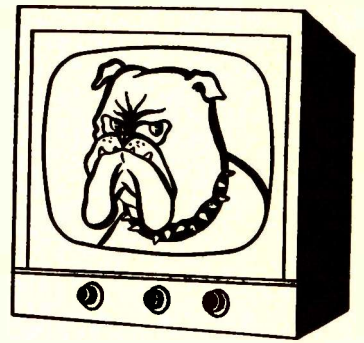
With the damper tube (5V4) still hot, I quickly disconnected one of its filament leads. Since it takes about 20 seconds for the filament to cool down, you can get rectification during this period with no filament voltage applied. During these 20 seconds, a normal picture was evident; also the 60-cycle ripple in the kick-back voltage, as viewed on the scope, disappeared. Replacing the damper with another 5V4 solved the problem.

Since the heater and cathode of the 5V4 are normally tied together internally, no short test can be made on a tube checker. It seems possible that a part of the cathode not normally touching the filament shorted to the latter, resulting in 60-cycle injection into the horizontal circuits.—*Edward N. Zibulka, Cincinnati, Ohio*

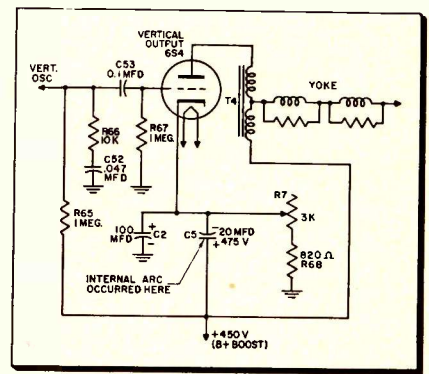
### Intermittent Raster

This Admiral stopped me for a while. It was a 19F1 chassis; the trouble was intermittent in nature. The set would operate normally for periods of time ranging up to an hour and a half. Then, with a loud crack or snap, the brightness would disappear, then reappear, and the set would resume normal operation.

At first the picture tube was sus-



pected, but when the trouble appeared, no flash appeared in the crt neck. The trouble persisted even with the high voltage lead and picture tube socket disconnected. Visual inspection of the chassis, yoke, and flyback transformer revealed no flash or arc.



Finally, after hours of fruitless investigation, I found that the symptoms became steady if I applied 130 volts to the set by means of a variac. Then, using an insulated screwdriver as a stethoscope, I traced the noise to C-5, a 20 mfd, 475 v decoupling condenser, connected from the vertical output tube plate return to its cathode. The condenser would arc internally and then heal itself. Since it is connected to the boost voltage from the damper circuit, it would kill the high voltage before vertical collapse occurred, thus covering a clue that would have pointed to the vertical circuit.—*Tommy Hublit, Imperial Beach, California*

### \$ 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.

When the profile of the Cadillac looked like this



It was understandable that the profile of a V.O.M. might look like this



But this is the profile of today's Cadillac



And if you buy a V.O.M. that is truly of today it will have a profile like this



## STREAMLINING signifies the difference!

In cars, streamlining symbolizes the tremendous advances in automotive engineering and performance. In fine test equipment, too, streamlining signifies the difference.

The flush switches, dials and jacks of the Smoothie make it easy to slip in your pocket, carrying case or tool kit, eliminate snag hazards on your bench.

But even more—the streamlining expresses externally the advanced internal design which makes the Triplet Model 630 as superior to the obsolete knobby bumpy-faced testers as the Cadillac of today is to the Cadillac of fifty years ago. These internal design features include such developments as selector switch of molded construction, completely enclosed; elimination of harness wiring, etc. Your most frequently used tester—your V.O.M.—should be the best—the one of which many thousands are in use in laboratories today—the Smoothie, Triplet Model 630 Volt-Ohm-Mil-Ammeter, \$39.50 net. Ask your parts jobber or write Triplet Electrical Instrument Company, Bluffton, Ohio.

Only Triplet offers you a ten day free trial on all test equipment.

# the SMOOTHIE

the only streamlined V.O.M. with a smooth face

TRIPLITT

630

Volt-Ohm-Mil-Ammeter



# COLOR SHORTS

## NEW ITEMS BOW AT PARTS SHOW

**LUCKY PRIZEWINNERS** at Sylvania's recent color TV clinic in Paterson, N.J., got their awards from Roxanne, lovely and popular TV star. Sylvania's Peter L. Langer explained the problems of color TV at the clinic. More than 400 technicians attended. Grand prize was Sylvania's new color dot generator, model 506. The prizewinners, shown



with Roxanne in the photo, are, from left to right: Howard Buckner (Paterson); Lester Pawlyk (Midland Park); Roxanne; Frank Carbone (Paterson); James Forzono (West Haverstraw); and grand prizewinner William Dunn (Westwood).

**THE KANSAS CITY-ST. LOUIS** area was the scene of a recently concluded color training program for technicians sponsored by the Hoffman Sales Corp., local distributors of Hoffman TV. The 14-lecture, one-night-a-week course attracted 800 students. An 8-page lesson was mailed to participating technicians prior to each lecture, giving them a chance to study the material in advance. A \$5.00 fee was charged for the course to cover printing, mailing and other expenses. An additional 900 students took the course by correspondence only.

**IMPROVED VERSION** of the Lawrence single-gun tube, designated the Chromatron PDF 21-3, was announced by Richard Hodgson, prexy of Chromatic Television Laboratories. Using a rectangular glass envelope instead of the earlier bell-shaped cone, the re-designed tube is said to permit a 20 percent reduction in cabinet size without changing picture size. The tube features a new Chromopac (color grid deflecting structure at the front of the tube), which is said to afford a reduction in possibly objectionable radiation.

**DU MONT'S 19-IN.** Chroma-Sync Teletron will be ready to be used in sets this fall according to Bill Scales, general sales mgr. of the manufacturer's CRT Division. Early deliveries will permit the tubes to go into sets marketed during the pre-Christmas selling season. This color crt was recently demonstrated to members of the FCC, along with the Multi-Scanner, discussed in this space last month.

**RMS ANTENNA COLOR FORUM** was conducted by Martin Bettan in Haledon, N.J. Pro-and-con discussion of various antenna types, and the role they will play when color TV looms big, lasted for 3½ hours. Because of the difficulties that may be caused even by slight ghosts, rotators may become necessary for pinpoint orientation even in strong-signal metropolitan areas, it was pointed out.

**AN ADMIRAL COLOR RECEIVER** has been purchased by the Chicago School of Television Service, 1538 W. 63rd Street, for use in a color training course. H. M. Rabin, the school's director, believes his school is the first in the Midwest to have a color set for this purpose. A second Admiral receiver is soon to be purchased. The six-lesson course, which extends over a three-week period, will be open to TV service personnel, as well as presently-enrolled students.

**THE RCA COLOR TV BOOK, Practical Color Television for the Service Industry**, though released last December, is in its 2nd edition. The enlarged text (80 pages) sells for the same \$2.00, but includes additional data on tests instruments and servicing techniques. Complete circuit diagrams have been incorporated for the manufacturer's CT-100 home color receiver. RCA is also offering a 9-lesson home-study course in color, at no charge, on a tube purchase deal. The promotional offer, which will be handled by RCA tube distributors, is open up to November 15, 1954.

Technical new products on pgs.  
32, 34, 38, 40, 42, 48

Just being felt, in many respects, is the impact of the Chicago Parts Show, which closed down little over a month ago. New items, new lines, new trends have started industry wheels turning in several new directions.

**A NEW HI-FI TAPE HEAD**, promising response from 20 to 20,000 cps at the 7.5-in. speed with increased dynamic range, decreased noise and decreased distortion, is said to yield performance on home-type recorders equivalent to that now achieved on professional equipment. Dynamu Magnetronics Corp., Maico Bldg., Minneapolis, Minn., maker of the heads, has conversion kits for various standard home recorders.

**LINE OF INTEGRATED TEST EQUIPMENT, THE WESTON 980 LINE**, includes calibrator, analyzer, sweep generator, scope, tube checker and vtvm, is planned to simplify and speed up service work. Designed to work with each other, these instruments may be used for a streamlined alignment procedure that eliminates multiple leads to the TV receiver. Calibrator introduces marker pips by intensity modulation of scope beam. New method is said to eliminate response-curve distortion. Weston Electrical Instr. Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

**FENTON CO.**, 15 Moore St., New York 4, N. Y., manufacturer of wires and cables, has entered other fields. One of its several new lines is a series of Fentone boosters and UHF converters intended to reverse the trend toward hiding these units inside or behind the TV set. Decorator-styled units may also act as lamp, aquarium or plant vase.

**NATIONAL CO., INC.**, 61 Sherman St., Malden, Mass., makes its bow in the Hi-Fi field with an AM-FM tuner, 2 Hi-Fi amplifiers and a separate preamp-control unit. Tuner permits simultaneous AM and FM output for pickup of binaural broadcasts. . . . **RAULAND-BORG CORP.**, 3515 W. Addison St., Chicago 18, Ill., also featured a new audio line. Their Green Gem sound systems, primarily for fixed and mobile PA set-ups, include amplifiers, speakers, enclosures, microphones, disc players and accessory items.

**VIDONAIR** indoor antenna is said to maintain peak VHF-UHF response from Channel 7 through Channel 83. In addition, replaceable Power-Coupler cartridges, which act like tuning strips in a front end, are inserted to peak response on any channel from 2 to 6, depending on local conditions. A broad-band cartridge, also available, is for use where entire low VHF band (2 to 6) is to be received. Introduced by Tunkl Industries, Inc., 3714 Montrose Ave., Chicago 18, Ill.

(Continued on page 39)



# Free! HEAVY-DUTY TOP-QUALITY PLIERS KIT

with 10 CBS-Hytron Pliers Kit Stamps

## LIMITED OFFER

From July 1 through August 31 . . . Your CBS-Hytron distributor will give you 1 Pliers Kit Stamp with your purchase of 25 CBS-Hytron receiving tubes.



A  
**\$10<sup>00</sup>**  
LIST VALUE

**PICK UP THESE FINE IMPORTED TOOLS.** Examine the beautiful finish of their drop-forged tool steel. Try their comfortable handle grips. Feel the precise balance . . . the powerful leverage. Go ahead! Cut some eight-penny nails. Like cutting cheese, wasn't it? And not a trace of a nick in the tough, carefully matched jaws.

You will be proud to own these husky, quality pliers. Tested . . . guaranteed . . . they can take it. And did you notice that two are unique? Nothing else just like them . . . they are "musts" for your tool kit. Yes sir, this free Pliers Kit (packed in an attractive, handy plastic case) is an offer you cannot afford to miss!



The **6½-Inch Diagonals** are husky, box-joint, fully polished side cutters with precisely matched jaws. Size is right: Compact, but big enough . . . with comfortable, full-fashioned, full-polished handles . . . to do repeated, tough cutting jobs with ease.



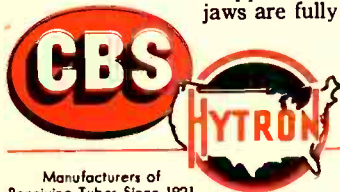
The **8-Inch Long-Nose** is unique. Extra-long (2¾ inches), spring-tempered jaws combine with extra-long, knurled handles for powerful leverage. Hand-honed cutting knives. Beautifully chrome-plated.



The **6-Inch All-Purpose** is also unique. Combines: Flat and round nose. Jaws shaped for positive gripping. Two wire strippers. Two side cutters. Finish of handles is gun-metal; jaws are fully polished. This tool has everything.



**Get This Pliers Kit Stamp Book . . .** and stamps from your CBS-Hytron distributor: One Pliers Kit Stamp for 25 CBS-Hytron receiving tubes. Each Stamp is imprinted with your CBS-Hytron distributor's code number. Redeem your Stamps with him. This offer is valid only in areas where such offers are legal . . . and it is limited: July 1 through August 31. Don't miss it. Be sure to get your free CBS-Hytron Pliers Kit. See it at your CBS-Hytron distributor's . . . today!



**CBS-HYTRON** Main Office: Danvers, Mass.

Manufacturers of  
Receiving Tubes Since 1921

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

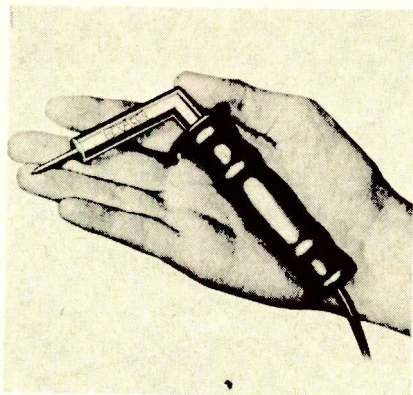
RECEIVING • TRANSMITTING • SPECIAL-PURPOSE • TV PICTURE TUBES • CRYSTAL DIODES AND TRANSISTORS  
TECHNICIAN • July, 1954

# New Shop Equipment

## Test Instruments, Tools, Adapters

### Hexacon **SOLDER IRON**

Small size, light weight and bent design permit more accurate control over close work with the Hatchet soldering iron. Efficient design is said



to result in performance comparable to irons with larger tips and higher wattage ratings. Available in 25 w. with 1/8-in. tip (cat. no. 25H) or in 30 w. with 3/16-in. tip (cat. no. 26H). Available for 110 or 220 v, ac or dc. List price, \$5.50. Hexacon Electric Co., 180 W. Clay Ave., Roselle Park, N. J.—TECHNICIAN

### EICO **SCOPE & METER PROBES**

3 probes for oscilloscopes and 2 for vtvm's have been added to the EICO line. Scope direct probe, model PD (kit, \$2.75; wired, \$3.95) is for TV waveform tracing in low-Z or low-frequency circuits. Eliminates stray pick-up and signal re-radiation. Scope low capacity probe, model PLC (kit, \$3.75; wired, \$5.75) is for TV waveform tracing in high-Z, high-frequency or wideband circuits. Eliminates distortion due to overloading or frequency discrimination. Scope demodulator probe, model PSD (kit, \$3.75; wired, \$5.75) permits the oscilloscope to be used as a waveform tracer and alignment indicator in TV and radio r-f and i-f stages. Demodulates carriers between 150 kc and 250 mc.

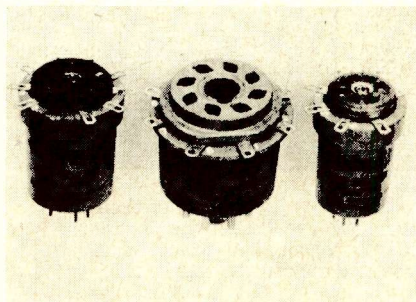
VTVM r-f probes, model PRF-11 or 25 (kit, \$3.75; wired, \$4.95) are for r-f measurements up to 250 mc. Accuracy  $\pm 10\%$ . Model PRF-11 or 25 is for a vtvm with an input of 11 or 25 megohms, respectively. Electronic Instrument Co., Inc., Brooklyn 11, N. Y.—TECHNICIAN

### Smith **DRILL ADAPTER KIT**

This kit permits drilling holes up to 1/2 in. with a 1/4 in. electric drill. Drills can be converted to accept 4 different sizes of bits. Two allen-head set screws on the adapter grip the drill bits for smooth operation. Kit contains adapters for drill bit sizes 1/16, 3/16, 1/8, and 1/2 in., packed in a re-usable partitioned lucite box. The complete kit with hex key for tightening allen screws sells for \$1.98. Herman H. Smith, Inc., 2326 Nostrand Ave., Brooklyn, 10, N. Y.—TECHNICIAN

### Pomona **SOCKET ADAPTER**

Inserted between the base of the tube and the tube's socket, these adapters facilitate voltage, resistance and other measurements from the top of chassis while the receiver unit under test is in operation. Available types include 8-pin octal



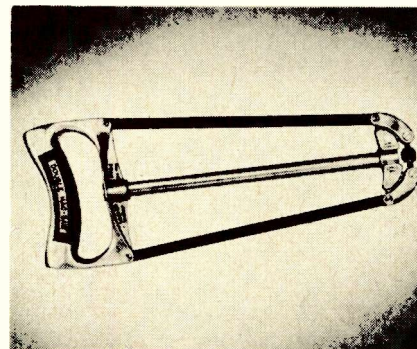
and 7- or 9-pin miniature adapters. All feature extended test tabs for use with alligator clips or test prods, low circuit losses or circuit loading, high insulation and phenolic construction. Pomona Electronics Co., 524 W. Fifth Ave., Pomona, Calif.—TECHNICIAN

### IRA **CRT TESTER-RESTORER**

Model D-60 is intended to restore the emission of TV picture tubes. Operating principle is based on technique used in originally activating new picture tubes after degassing and sealing. Unit also tests emission from cathode, measures restorability and tests for internal shorts and leakage. International Research Associates, Div. of IRESCO, Inc., 2221 Warwick Ave., Santa Monica, Calif.—TECHNICIAN

### Dreier **DOUBLE HACK SAW**

The frame of the "Double Hack Saw" mounts two 12-in. blades: One is fine-tooth for light work; the other is coarse-tooth for heavier



work. Each blade cuts a 5-in. diameter. A single turnbuckle tightens both blades at the same time. Tight blade tension, says the maker, increases cutting speed and accuracy, reduces blade breakage. Dreier Brothers, Inc., 5642 Lake Park Ave., Chicago 37, Ill.—TECHNICIAN

### Miller **CRT TESTER-RESTORER**

As a tester, model D-60 detects internal shorts and heater-cathode leakage, permits measurement of emission at normal operating voltages and checks restorability of the cathode. As a reactivator, the D-60 heats the cathode for a specified period with a controlled current, then seasons the cathode at higher temperature, also boiling off gases. This procedure is based on activation and seasoning techniques used for newly-manufactured tubes. Operating instructions provided. Dealer's net, \$89.50. Miller TV Co., 2840 Naomi, Burbank, Calif.—TECHNICIAN

### EICO **FLYBACK-YOKE TESTER**

Model 944 tests flybacks and yokes in or out of the TV set. Operating on the grid-dip principle, it is said to detect even one shorted turn. Separate calibration for air-core and iron-core flybacks. Can also test the continuity of other coils. Model 944-K, kit, \$23.95; factory-wired, \$34.95. Eico, 84 Withers St., Brooklyn 11, N. Y.—TECHNICIAN

## Arcing Troubles in TV Sets

(Continued from page 22)

bolt with several layers of high-voltage tape, and then reassemble the unit. This was easily done after the chassis had been removed from the cabinet, and the 4 self-threading screws holding the back to the rest of the cage taken off.

In some of these models a wire loop holds the high-voltage lead in position, as shown in Fig. 13. If no

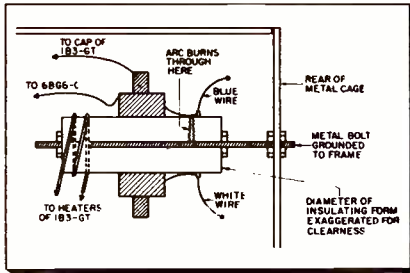


Fig. 12—Flyback transformer mounting, showing site of arcing to bolt referred to in text.

grommet is present in the loop, arcing through the wire to the grounded loop may occur, causing the full high voltage to be impressed on the 470K series resistor. The re-

sistor will overheat and arc over, under the circumstances. To correct the trouble, wrap a layer of tape around the wire where the arc occurred, place a grommet in the loop for insulation, and replace resistor.

During the long summer stretches of rainy weather, receivers in high-humidity areas are apt to develop corona troubles. The author has serviced a number of sets where the wood in front of the metal picture tube rims has absorbed moisture, with the result that, in the dark, hundreds of very fine corona streamers could be seen emanating from around the edge of the crt. Even though the hiss and sizzle from this corona effect could easily be heard throughout the room, no effect on picture or sound was evident in most cases. Smearing the wood around the rim of the tube with corona dope helped considerably to relieve the condition; in several cases, where the customer followed the suggestion that he operate his set an extra hour or so per

day, to keep the wood dried out as much as possible, the improvement was greater yet. When the rains stopped, and a dry spell followed, all trace of this corona disappeared of its own accord.

During the humid spell, not a single case of the kind just described

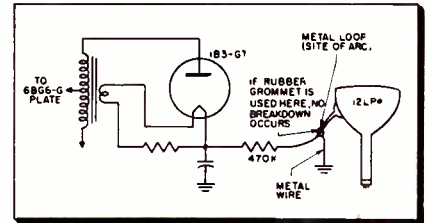
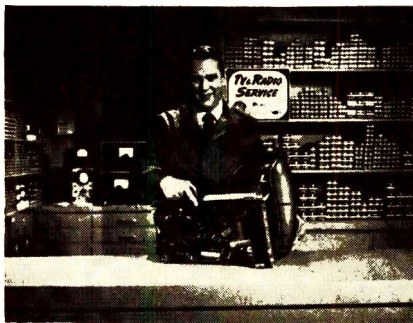


Fig. 13—Arcing between lead and metal wire loop can burn up the 470k hv filter resistor.

cropped up in sets using glass picture tubes, since the high-voltage anode in the latter clips into the bell of the tube (and the crt surface is thus not at a high potential to ground). Leaks which did occur with glass tubes were due to surface leakage, caused by an accumulation of moisture-absorbing dust. The trouble in such instances was easily corrected by cleaning the crt surface with a cloth dipped in a solution of "Tide," and then wiping this surface thoroughly dry.

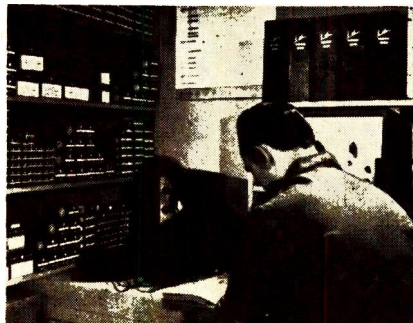
## SERVICEMEN BOOSTED ON TV

"Facts About TV Service", a film short made by G.E. that recently appeared on the Dave Garroway Show, gave the TV technician some much-needed favorable publicity. Some of the sequences in the film, as well as the associated (condensed) script, are presented below.



Your set has more than 500 different parts. A good serviceman . . .

. . . an investment of thousands of dollars for electronic testing equipment . . .



. . . must know what each one does . . . where each one is located . . .

. . . and another big investment in tubes and parts and trucks.



This requires intensive schooling, and plenty of practical experience . . .

Quick, economical TV repair calls for skill, knowledge and honest workmanship.

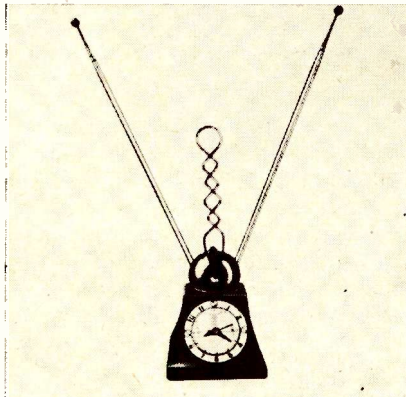


# Antennas & Related Products

*Indoor and Outdoor Types; Installation Accessories*

## RMS CLOCK-ANTENNA

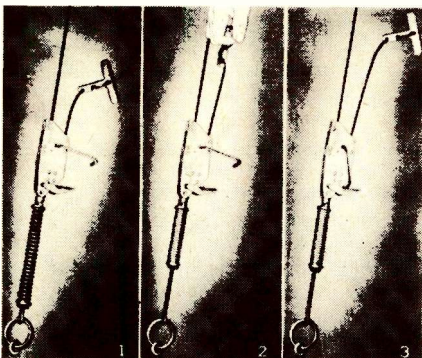
This RMS swivel-top UHF-VHF indoor antenna with 6-position switch includes in its base a clock similar to those used on clock-radio combinations, to turn the TV set on



automatically at a predetermined time. The C1-2 Clock-Tenna has a list price of \$19.95, and carries a double guarantee by RMS and the Sessions Clock Co. RMS, 2016 Bronxdale Ave., New York 62, N.Y.—TECHNICIAN

## ERC GUY-WIRE TIGHTENER

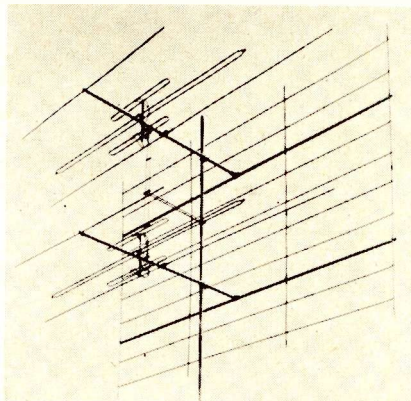
Simplified anchoring of guy wires and automatic control of tension, insuring uniform cable tightness, is said to be provided by the Tyzem guy-wire rig. The securing rig consists of the adjuster mechanism and the tension-controlling compression spring. The free end of a guy wire is passed through the locking mechanism (attached to the tensioning spring), pulled through until



the spring compresses, and secured by a locking lever. All parts are corrosion-resistant. Eastern Rotorcraft Corp., Box 110, Doylestown, Pa.—TECHNICIAN

## Channel Master ANTENNAS

The Backstop, model no. 326-2, is said to have no rear signal pick-up. It eliminates venetian-blind effects in areas which lie within the field of 2 different transmitters broadcasting on the same or adjacent channels. Front-to-back ratio is said to range from 9:1 on channel 2, to 18:1 on channel 6, reaching a peak of 20:1 on channel 5. Uni-directional performance is due to the large reflecting screen area, 70 square feet. Antenna incorporates Tripole design of the Champion antenna. List price (stacked), \$63.90.



The Econo-Bow, model no. 418, is an all-channel UHF antenna intended for the low-price market. The gain of a single bay runs from 4 to 7 db. The stacked antenna ranges from 7 to 12½ db. Preassembled. List price, single bay, \$2.91. Channel Master Corp., Ellenville, N.Y.—TECHNICIAN

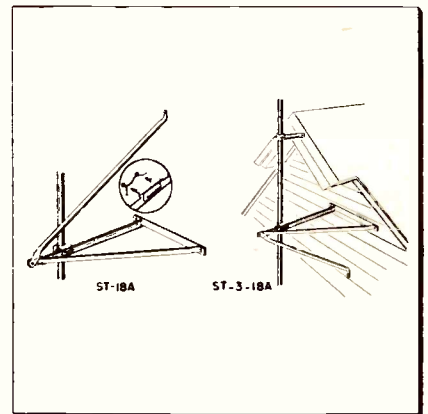
## Danforth ANTENNA MOUNTS

Built as single aluminum units with integral guy rods, Mightie Mounts are said to eliminate the need for special or additional roof mounts, masts, guy wires, guy rings or clamps and screw eyes. Designed for 1-man installations, the mounts come in three sizes: MM-4, 4 ft.; MM-6, 6 ft.; and MM-8, 8 ft. Danforth Mfg. Co., Monmouth, Ill.—TECHNICIAN

## S-R ANTENNA MOUNTS

Model ST-18A is an assembled adjustable wall bracket for side mounting antennas, made of galvanized embossed steel. Two 18-in. brackets have slotted tracks to permit horizontal adjustment of the

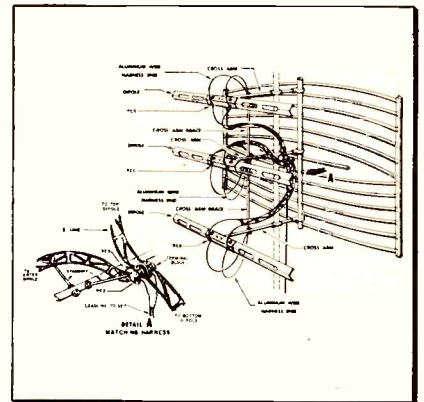
antenna mast for clearance of roof overhang. Model ST-3-18A combination bracket includes a 3-in. upper bracket which is set up directly under the peak of the eave



to provide additional support for tall masts. One 18-in. adjustable lower bracket is similar to that used in the ST-18A. South River Metal Products Co., Inc., 377-379 Turnpike, South River, N.J.—TECHNICIAN

## Davis EXTRA-DIPOLE KIT

The easy-to-install Third Dipole Kit, to improve reception of the manufacturer's Super-Vision antenna, is now available. The Super-Vision is normally equipped with 2 dipoles, which can be peaked for high or low channels by changing the spacing between them. The extra dipole provides increased gain, particularly on Channels 4, 5, 6 and 7.



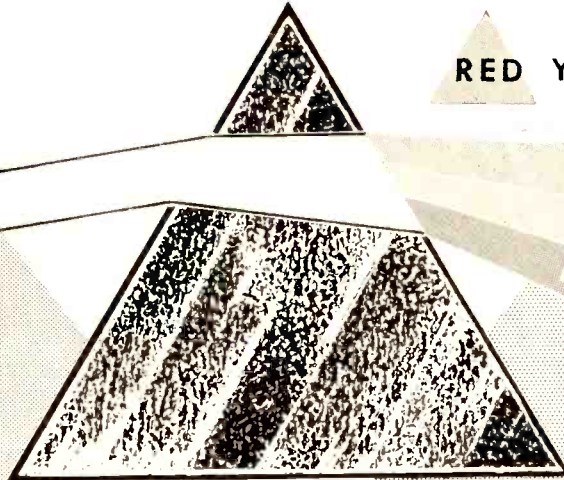
The kit contains the dipole, accessories and instructions. List price, \$9.75. Davis Electronics, P. O. Box 1247, Burbank, Calif.—TECHNICIAN

# Fretaray<sup>®</sup> SPECTRUM

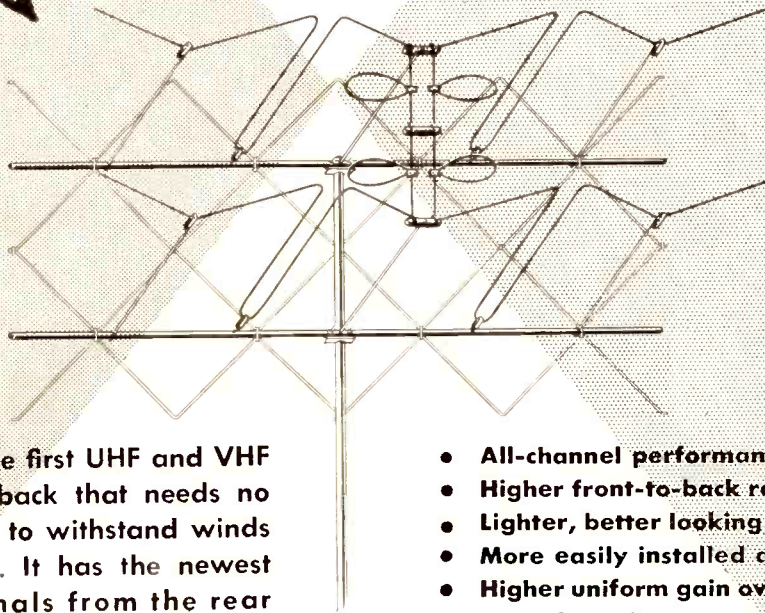
RED YELLOW BLUE

FEATURES

FRONT TO BACK RATIO  
VHF and UHF  
BLACK and WHITE & COLOR



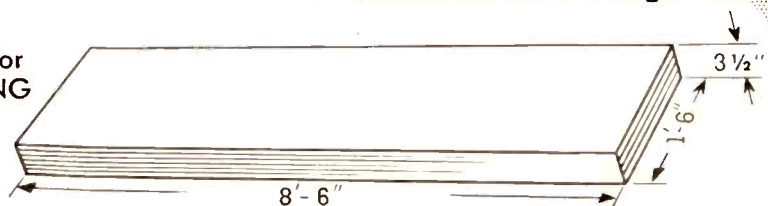
*Tops  
'em all!*



The Fretaray Spectrum is the first UHF and VHF antenna with a shielded back that needs no assembly. It is guaranteed to withstand winds up to 100 miles per hour. It has the newest method of shielding signals from the rear called SPECTROMATIC REFLECTION SHIELDING. The reflector is effective shielding against all angles of polarization, vertical, horizontal and angular.

- All-channel performance
- Higher front-to-back ratio
- Lighter, better looking
- More easily installed and stacked
- Higher uniform gain over all channels
- Ideal for primary, near fringe and fringe areas
- Higher average gain than other broadband antennas
- Permits the use of a single transmission line

Collapsible . . . for  
EASIER HANDLING



*Fretco*

INC.

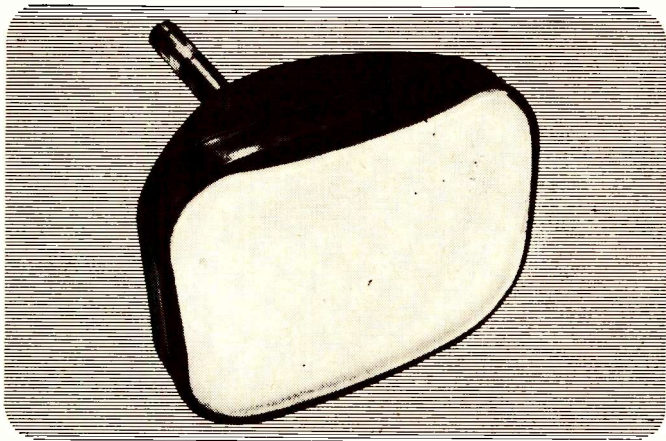
406 N. CRAIG STREET, PITTSBURGH 26, PA.

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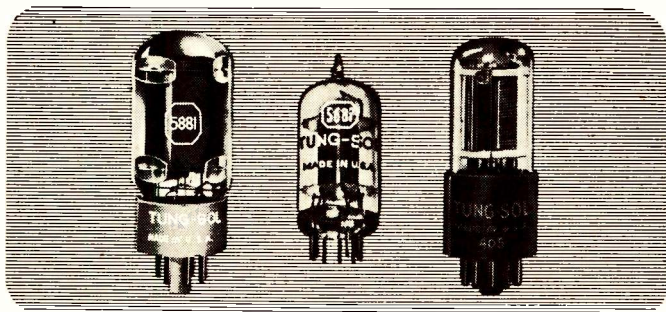
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OTHER PATENTS PENDING

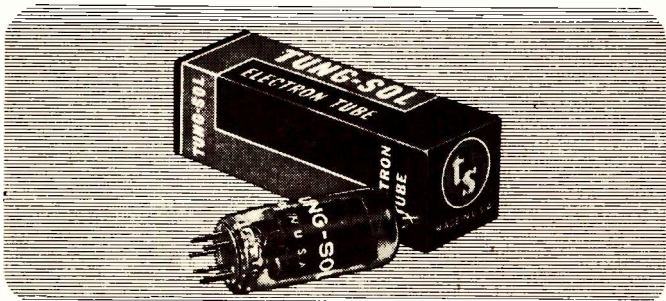
# TUNG-SOL TUBE QUALITY PAYS OFF IN SALES!



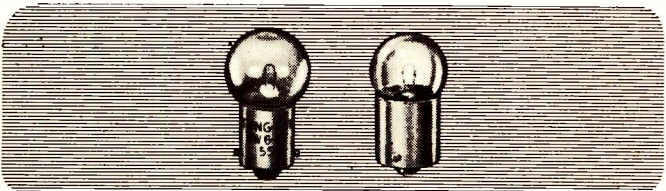
Black and White Picture Tubes



Special Purpose Tubes



Radio and TV Receiving Tubes



Dial Lamps

The performance quality of Tung-Sol Tubes will keep customers convinced that you're the best serviceman in the business. Tung-Sol Tubes meet highest set manufacturers' specs—protect you against call-backs. Tell your supplier you'd rather have Tung-Sol.

TUNG-SOL ELECTRIC INC., Newark 4, N. J.

Sales Offices: Atlanta, Chicago, Columbus, Culver City (Los Angeles), Dallas, Denver, Detroit, Newark, Seattle

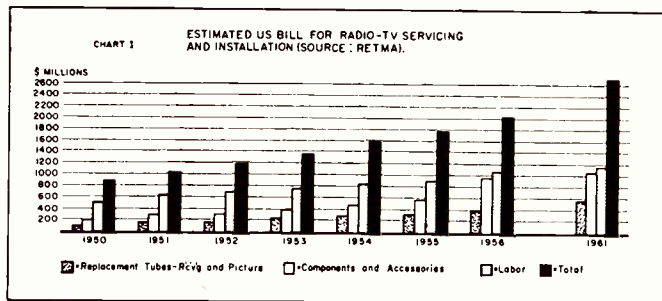
**TUNG-SOL**® *dependable*  
ELECTRON TUBES

# Outlook for

By ALBERT J. FORMAN

CONSULTING EDITOR, TECHNICIAN

The phenomenal growth of the electronic field has made the TV-radio technician a major factor in the nation's technological structure. The public has made TV and radio one of its prime sources for entertainment and information—and for good reason. For a relatively small pro rata investment in a receiver, 50¢ per week for TV



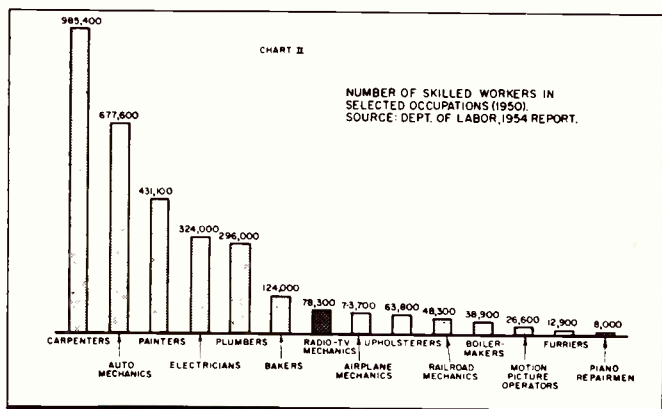
and 5¢ per week for radio, over the life of the set, \$1 billion worth of entertainment is made available every year.

Consumers now own some 125 million radios, 30 million TV sets, 29 million phonographs, plus a significant number of recorders, public address systems and other electronic units. Inherently, these devices require a good amount of maintenance by skilled personnel.

Today about 60,000 major service technician outlets and dealer service departments provide the necessary maintenance. The important role they play is indicated in Chart I, compiled by the Radio-Electronic-Television Manufacturers Association (RETMA). Note that for 1954, the bill for radio-TV servicing is close to \$1.6 billion. There is good reason to expect the bill for 1961 to come close to or even surpass, the RETMA estimate of over \$2.6 billion.

Some perspective of the radio-TV technician's position in relation to that of other crafts may be obtained by examining the following statistics from a comprehensive study made by the U. S. Department of Labor. These figures are published in the recently issued Technical Bulletin No. T-140, *The Skilled Labor Force*, and cover the years through 1950. Although present figures are somewhat higher, those for 1950 are quite enlightening.

As shown in Chart II, the 78,300 radio and TV mechanics are dwarfed by the carpenters and auto mechanics, but are numerically greater than the railroad



# Technicians

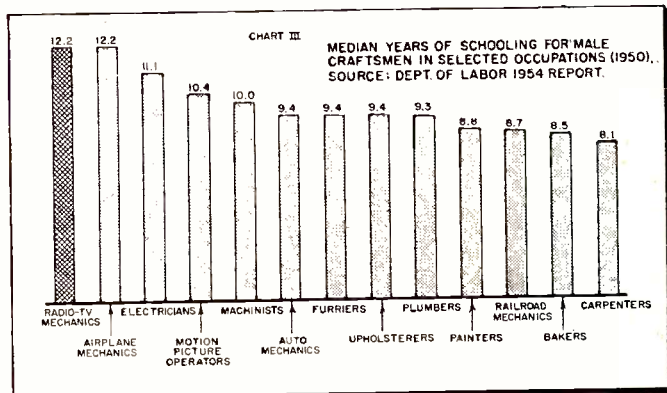
mechanics and furriers. Not indicated on the chart is the important fact that the relatively infant electronic art is growing at a much faster rate than other fields, and the demand for electronic technicians is rising proportionately.

Again using a selected number of occupations, the median years of schooling of male craftsmen is plotted in Chart III. These Department of Labor statistics show that radio and TV mechanics have the highest rating, 12.2 years, which is equaled only by airplane mechanics, 12.2 years, which is equaled only by airplane mechanics. Despite this relatively long period of schooling, findings indicate that the annual income of radio and TV mechanics is considerably lower than other trades—some 40% below airplane mechanics, and more than 15% under the earnings of the least educated group, the carpenters.

Two primary needs related to the growth of the technician present themselves: Training and public relations.

The growth of the civilian electronic market alone requires more technicians than are presently available. When the potential need of military mobilization is added, the demand is most imposing.

Not only do we need more TV-electronic technicians — we need better-trained ones to cope with the increasing complexity of equipment such as color TV. A good deal of this advanced training is obtained by the study of technical articles published in trade periodicals. Individual manufacturers have contributed much with their service clinics.

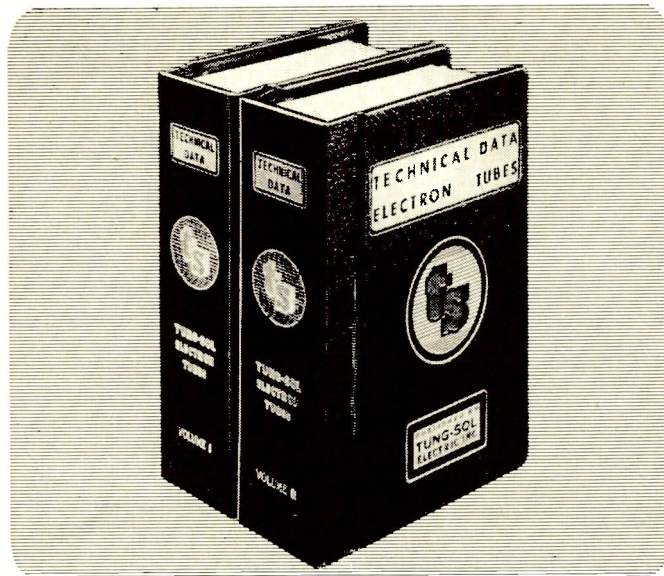


Like it or not, the TV technician occupies a sensitive position in the community. Psychologically, he meets the public at the wrong time; of necessity, a time when the TV set that has become such an integral part of our lives is not operating properly. The viewer is frustrated and annoyed. Furthermore, the technician must charge a reasonable fee commensurate with his effort, investment in instruments, and skill.

The first step needed is the education of the public to the fact that TV servicing fees are lower than those for other services, and that the TV medium makes available a tremendous volume of entertainment at an insignificant cost, compared to other media. Too little has been done in this direction to date. **TECHNICIAN's** contribution along these lines is its large display chart, "So Much for So Little." It clearly shows the public why the technician merits appreciation rather than slander.

Self-policing is a must for the service industry if the "gyp" label (which only a rare few deserve) and government regulation are to be avoided. Through various service associations, initial progress is being made in raising standards and elevating status; much, however, remains to be accomplished.

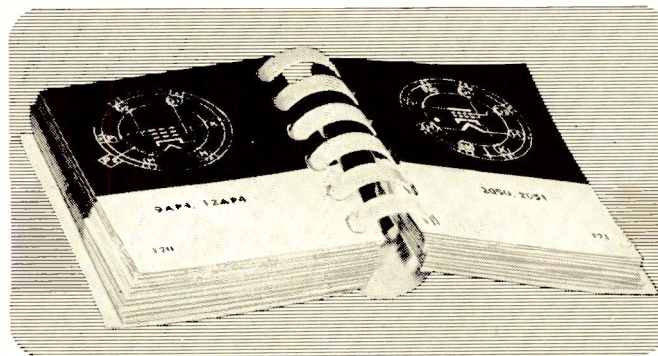
## TUNG-SOL TECHNICAL DATA PAYS OFF IN SERVICE!



T-58 700 pages—600 tube types



NEW! 1954 Edition! T-70 160 pages of data on CR tubes, receiving and special tubes, dial lamps



T-31 300 blueprint\* base diagrams for 1100 tube types

Here's the most practical set of tube reference books in the industry—all the information you need for everyday jobs! They're easy to read—easy to use (always lie flat when open.) You'll get work done faster with Tung-Sol Technical Data Books. Ask your tube supplier about them.



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

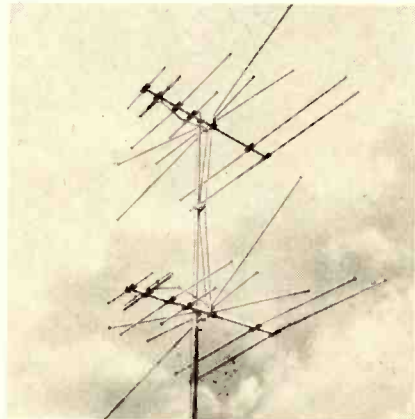
**TUNG-SOL®** *easy reference* TECHNICAL DATA

# More Antennas & Accessories

VHF, Auto Types; Mounts, Towers, Lightning Arrester

## JFD VHF YAGI-CONICALS

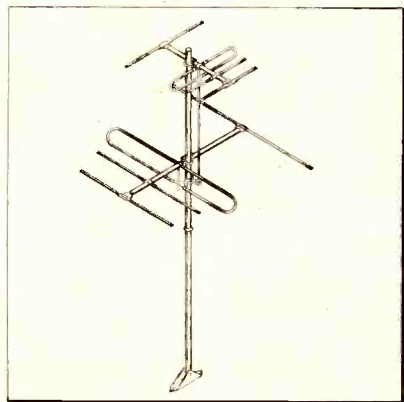
The use of half-wave stacking is said to improve gain by more than 2 db in this yagi-conical Super Power Jet, model Jet213S-5. List



price, \$39.95. Conversion kit for half-wave stacking of existing yagi-conicals, \$4.00 list. JFD Mfg. Co., 6101 16 Avenue, Brooklyn 4, N.Y.—TECHNICIAN

## Radelco ANTENNAS

The Topper broad-band yagi, model RM-213, is intended for areas where stations are not located in the same direction. This separately orienting yagi performs on all VHF channels. Pre-assembled for easy installation. Also available as separate arrays: Model RS-206, low band yagi array; model RS-713 high band yagi array.



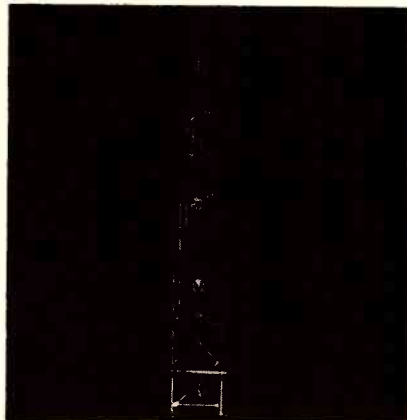
Model US-152, a UHF dual corner reflector with all-metal insulators, is said to work equally well in both wet or dry weather. Discriminates against unwanted, vertically polarized signal. Radelco Mfg. Co., Cleveland 25, Ohio.—TECHNICIAN

## Amphenol L'TN'G ARRESTER

For use on UHF as well as VHF, arrester 114-328 gives protection on both frequency bands with low measurable loss in signal strength. It is universal in that it handles flat, tubular or open-wire transmission lines with equal facility. Installation is quick and simple, as all lead-ins are inserted in a vertical position. American Phenolic Corp., Chicago 50, Ill.—TECHNICIAN

## Alpar EXTENSION TOWERS

Lightweight Crank-up towers are triangular in base shape. Aluminum tubing is used for upright, cross and diagonal members. New Alpar design automatically locks individual sections into position as they reach



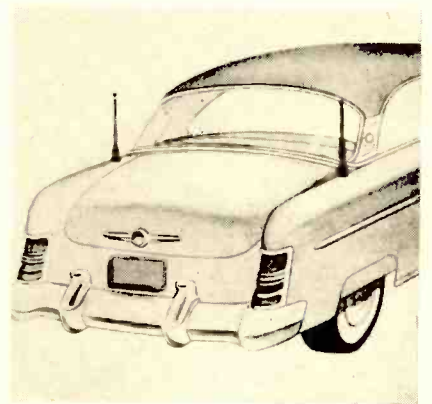
correct level. A cord-actuated release trips the lock on a key section after which entire tower may be lowered. This system avoids the possibility of uncontrolled telescoping during raising or lowering. Towers consist of four 24-ft. telescoping sections, may be raised to a height of 95 ft. Weight is less than 100 lbs. Other sizes available. Alpar Mfg. Corp., 2910 Spring St., Redwood City, Calif.—TECHNICIAN

## C-P ANTENNA MOUNTS

Designed for masts up to 1¾-in. in diameter, 3 wall brackets will hold masts 2½, 4 and 7-in. away from the wall, respectively. A vent pipe mount fits any size vent pipe and holds masts up to 1½-in. in diameter. All units are zinc-plated, heavy-gauge steel. Commercial Products, 417 Main St., Toledo, Ohio.—TECHNICIAN

## Snyder DUAL AUTO ANTENNA

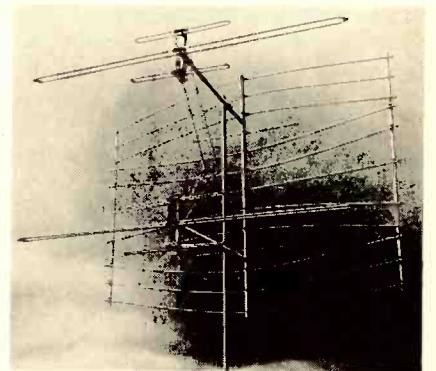
Dual mounting on the rear deck of the car permits unobstructed driving vision, better reception because antennas are away from the ignition system, and mounting on



accessible locations. The Dual Rear Deck auto antenna kits come in 2 types, a Swivel type and a Ball-and-Socket type. The former includes models RD-8 and RD-8B, with matched impedance Hi-Q transformer (booster); the Ball-and-Socket type includes the RD-9 and the RD-9B (with booster). All kits include 2 antenna staffs, cable and mounting hardware. Dick Morris, Snyder Mfg. Co., Philadelphia 40, Pa.—TECHNICIAN

## Clear Beam VHF ANTENNA

The Tri-King is available in 2 models, the TK1500 and the TK1800, with half-wave spacing, for fringe area reception. The antenna com-



bines the Tri-King dipole assembly with a quick-rig reflector screen. Clear Beam Antenna Corp., 100 Prospect Ave., Burbank, Calif.—TECHNICIAN



## Parts Show New Prods. (Cont.)

**NEW WALL FEED-THROUGH TUBE** for bringing antenna lead-in inside house features, in addition to wall socket for connecting wire to set, a built-in lightning arrestor on the end of the tube that is outside the house. Made by Television Hardware Mfg. Co., Rockford, Ill., Div. of General Cement Co. . . . **A SOLDER DISPENSER** accommodates all standard spools, works something like a scotch-tape dispenser. Desired length of solder is reeled off and severed by the unit's cutting edge. Replaceable steel file brush is built in to keep solder tips clean. 2 compartments permit storage of extra tips for guns and irons. Rytel Electronics Mfg. Co., 9820 Irwin Ave., Inglewood, Calif.

**HI-FI MAGNETIC CARTRIDGE, RECOTON 500**, uses 2 styli, for standard and fine-groove records, in a turnover arrangement similar to that employed on ordinary crystal pickups. Response is said to extend from 20 to 16,000 cps. Made to fit standard tone arms, the unit is featured by Recoton Corp., 147 W. 22 St., New York 11, N. Y. . . . **HUDSON LINE OF SMALL SPEAKERS**, intended for limited-space applications, features units from 2 to 5 in. in diameter, plus one oval speaker. Oxford Electric Corp., 3911 South Michigan Ave., Chicago 15, Ill., is putting out the low-priced line.

**UNIVERSITY COMPANION**, a novel item, incorporates a compact 2-speaker system (8-in. Diffusicone woofer, 4401 horn tweeter) plus a pre-set clock, integrated in the center of the unit, for turning sound system (or other appliances) on and off. Entire system is 2 ft. wide, 10 in. high, may be placed on shelf, on other furniture or mounted on wrought iron legs. Balance control for tweeter is included. The maker, University Loudspeakers, Inc., 80 So. Kensico Ave., White Plains, N. Y., also introduced a line of 8-, 12-, and 15-in. Hi-Fi triaxial reproducers.

**10-SET ANTENNA DISTRIBUTION SYSTEM** selling for \$89.50 list, the Ten-Tenna, is new item of Waldom Electronics, Inc., 4625 W. 53 St., Chicago 32, Ill. The distribution amplifier makes available all VHF channels, can also accommodate one UHF program. From a single antenna, it provides 300-ohm output for 1 to 10 sets . . . **JERROLD ELECTRONICS CORP.**, 26th & Dickinson Sts., Philadelphia 46, Penna., maker of master antenna systems, enters the home-installation field with an individual-consumer line of De-Snow antenna preamplifiers. The units operate from remote 24-volt source, are antenna mounted, have flat response for use with color receivers and provide gain of 25 db.

**CALIBRATED TUNABLE INDOOR ANTENNA** permits individual optimum impedance match to each channel. Adjustment points of tuning knob may be easily reset by referring to calibration numbers. The Spico Super 6, incorporating this feature, is made by Spirling Products Co., Inc., P. O. Box 411, Hicksville, N. Y.

**"ONE ASTATIC  
MODEL L-12-U IS  
LIKE A CASEFUL OF  
OTHER CARTRIDGES"**



Astatic Universal Model L-12-U Crystal Cartridge—output is low (1.2 volts) with removable condenser harness ON; it's high (4.0 volts) with harness OFF.

## THE ASTATIC MODEL L-12-U CRYSTAL CARTRIDGE

Astatic's dual-output, universal type crystal cartridge—the Model L-12-U—is a truly superior replacement in the great majority of 78 RPM installations encountered by servicemen today. No other cartridge is capable of broader application . . . yet, the Astatic L-12-U is guaranteed to provide performance equal to, or exceeding, the quality of the originals. It isn't a cure-all. But it is the closest thing to it that has so far been devised by electronic engineers. It is your best answer for simplification of inventory, for avoiding lost time and many problems of servicing. You'll be glad you got acquainted with the "handiest of all crystal cartridges," Astatic's L-12-U.

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

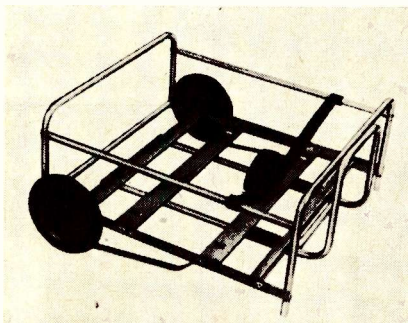
THE  
**Astatic**  
CORPORATION  
CONNEAUT, OHIO  
IN CANADA: CANADIAN ASTATIC  
LIMITED, TORONTO, ONT.

# Shop Equipment

## Test Instruments, Other Aids to Servicing

### Sylvania TV CARRIER

The Classy Chassis TV carrier is said to take the pain out of transferring TV sets from home to truck on service calls. Made of light-weight aluminum with ball-bearing



rubber wheels. Reported to be easier to grip, carry or wheel up and down steps; to wheel through doors and entrances and on sidewalks. Available to Sylvania distributors and dealers as part of order or sales deals. Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y.—TECHNICIAN

### Winston COLOR GENERATOR

Model 150 Rainbow Generator, a color TV pattern generator, produces from one to eight rainbows on the face of a color TV crt. Individual colors making up the rainbow may be identified for use in testing and alignment. This instrument can serve both as a color demonstrator for the sales department and a servicing tool for color TV alignment and troubleshooting. Provides modulated r-f output on channels 2 to 6, or chroma signal output at the same output terminals. Controls include channel tuning and rainbow color selector. Winston Electronics, Inc., 4312 Main St., Philadelphia, Penna.—TECHNICIAN

### Superex CONTACT CLEANER

Tuneraser contains a chemically treated material formed as an eraser for easy handling, is designed for removing tarnish and corrosion from turret contacts or other electrical contacts. It is applied by rubbing in a rotary motion on the contact or surface to be cleaned, without danger of abrasion. Net price, 98¢. Superex Electronics Corp., 23 Atherton St., Yonkers, N.Y.—TECHNICIAN

### RCP COMBINATION TESTER

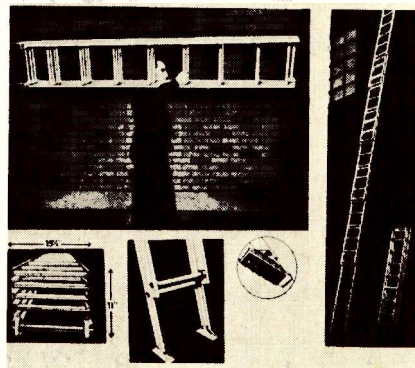
Model 657 Do-All combines a capacitance meter, low- and hi-range ohmmeter, vtm, peak-to-peak voltmeter, and may also be used as an inductance meter by reference to a measurement chart. Capacitance measurement range is from 1 mmfd to 1,000 mfd. Low ohmmeter range has 10 ohms at center scale, with highest range going to 10,000 meg. Voltages (ac and dc-rms) are direct-reading to 6,000 v. Zero center voltage setting. Handle serves as inclined rest. Pilot bulbs on selector switches illuminate switch position. Radio City Products Co., Inc., Easton, Penna.—TECHNICIAN

### EMC OSCILLOSCOPE

Some features of model 600 oscilloscope are: 5UP1 5-in. scope tube for sharp focusing and good intensity; retrace blanking amplifier; 2-step compensated attenuator input and 2-stage push-pull vertical amplifier with sensitivity of 0.02 v per in. Synchronization is also available on either positive or negative phase of input voltage. Price, \$99.50. Electronics Measurements Corp., 280 Lafayette St., New York 12, N. Y.—TECHNICIAN

### Scranton SECTIONAL LADDER

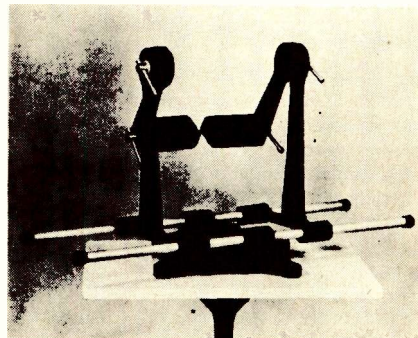
Designed for the TV service technician, this 40-ft. aluminum sectional ladder may be raised or lowered by one man, according to the



manufacturer. Ladder breaks down into 5 8-ft. sections, is 15½ in. wide, and stores in small space 11 in. high. Scranton Aluminum Mfg. Co., 419 S. Wyoming Ave., Scranton, Penna.—TECHNICIAN

### Miller CHASSIS CRADLE

Light aluminum construction, friction "L" clamps, adjustability to accommodate different chassis shapes and sizes and an integral



turntable are features of this technician's chassis service turntable. Sold on 10-day money-back guarantee. \$19.95. Ken Miller Sales, 627 E. Maumee St., Adrian, Mich.—TECHNICIAN

### ASD TV TUBE TESTER

The TV tube tester is an improved version of the TV-20 (February TECHNICIAN). The new unit has listings of all recently announced color TV tubes, increased sensitivity to internal leakage and gas, and a rugged leatherette case. Can test an entire set of tubes in a few minutes. Has no roll chart, practically no setup. Includes a positive gas detection circuit, dynamic conductance check, and automatic line compensation. American Scientific Development Co., P. O. Box 104, Fort Atkinson, Wisc.—TECHNICIAN

### Hickok NOISE GENERATOR

The manufacturer states that model 755 is the first noise generator completely self-contained with no additional equipment required. It indicates the amount of noise inherent in receivers to permit correction of this defect. Unit contains 2 indicating meters, is divided into a vtm section and a generator noise section. Meter readings to 5v in 4 scales, zero center feature, vtm is regulated. Frequency response is flat from 10 mc to 250 mc. Hickok Electrical Instr. Co., 10514 Dupont Ave., Cleveland 8, Ohio.—TECHNICIAN

## Make Most of Test Equip.

(Continued from page 19)

ings checked correct resistance, and the output from each half of the secondary was the same. Quite some time elapsed before I realized that the *polarity* of each half of the winding was the **SAME** instead of *opposite*. Somebody at the factory had crossed over the leads, and instead of being in *opposing* phase, the two windings were *in series*. And the set had left the factory and passed inspection this way!

When separate windings are present for feeding the grids of push-pull output stages in hi-fi amplifiers, this trick can be used for quickly checking for proper phasing, if markings present are poor or missing. Many other applications of the test could be cited.

Fig. 2 shows the schematic for a probe and cable used for low-frequency work around the shop. At low frequencies, the attenuation is relatively low, being determined mainly by the size of the coupling capacitor, which is 0.05 or 0.1 mfd. At higher frequencies, the combination of the 10k resistor and the scope probe wiring and cable capacitance effectively form a filter that causes a rapid attenuation, the attenuation becoming progressively greater as the frequency rises.

Fig. 3 indicates the response of the scope with and without the probe added to it. The lightly-shaded curve shows the response of a scope with an inadequate high-frequency characteristic, when a sweep generator is connected directly to it. The more heavily shaded curve shows the response of the same scope with the probe and cable of Fig. 2 attached between the sweep generator and the scope input. The rapid falling off of the output at the higher frequencies is due to the cable's capacitance. Note how rapidly the response drops off at about 0.15 mc.

This probe should not be used for checking in r-f or i-f circuits, unless the attenuation it introduces is always kept in mind, and results are interpreted accordingly. The response curves show the importance of using a scope cable with as low a capacitance as possible; it might be well for each technician to feed the output of a good sweep generator into his scope with and without the cable and probe attached, so that the relative response between 30 cycles and 4 mc can be determined, to be kept in mind subsequently.

In this day and age with almost everyone shouting that his product is best, we would like to say . . . quietly and confidently . . .



just try

# AEROVOX CAPACITORS

THE NEW MODEL TV-11

## TUBE TESTER



Operates on 105-130 Volt 60 Cycles A.C. Hand rubbed oak cabinet complete with portable cover . . . . . **\$47.50**

- Uses the new self-cleaning Lever Action Switches for individual element testing.
- Because all elements are numbered according to pin number in the RMA base numbering system, the user can instantly identify which element is under test.
- Tubes having tapped filaments and tubes with filaments terminating in more than one pin are truly tested with the Model TV-11 as any of the pins may be placed in the neutral position when necessary.
- Uses no combination type sockets. Instead individual sockets are used for each type of tube. Thus it is impossible to damage a tube by inserting it in the wrong socket.
- Free-moving, built-in roll chart provides complete data for all tubes.
- Phono jack on front panel for plugging in either phones or external amplifier detects microphonic tubes or noise due to faulty elements and loose external connections.

**EXTRA SERVICE**—The Model TV-11 may be used as an extremely sensitive Condenser Leakage Checker. A relaxation type oscillator incorporated in this model will detect leakages even when the frequency is one per minute.

### SHIPPED ON APPROVAL NO MONEY WITH ORDER — NO C. O. D.

Try it for 10 days before you buy. If completely satisfied send \$11.50 and pay balance at rate of \$6.00 per month for 6 months.—No Interest or Carrying Charges Added. If not completely satisfied, return to us, no explanation necessary.

**MOSS ELECTRONIC DISTRIBUTING CO., INC.**

Dept. D-47, 3849 Tenth Ave., New York 34, N. Y.

Please rush one Model TV-11. I agree to pay \$11.50 within 10 days after receipt and \$6.00 per month thereafter.

NAME .....  
ADDRESS .....  
CITY ..... ZONE ..... STATE .....

# TV-Electronic Technician

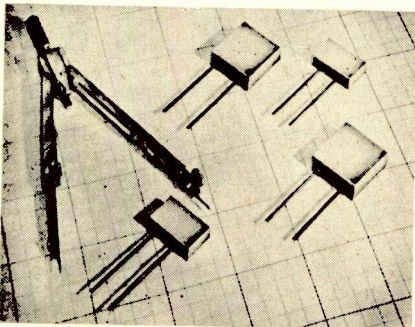
## Replacement Parts; Items for Sales and Service

### Master COIN-TIMER DEVICE

The "Entiser" is an automatic coin-meter mechanism with a built-in timer. Designed for coin operation of TV sets, it is said to be easily adaptable to other devices such as juke boxes, radios, air conditioners, etc. The Entiser attracts attention to itself by automatically turning on the TV set or other device for 4 free minutes every half hour, and by lighting up a sign. Insertion of a coin operates it for half an hour. Operation cycle may be preset during installation. Further details from Felleisen Associates, 5839 W. Montrose Ave., Chicago 34, Ill., representing Master Electronics, Libertyville, Ill.—TECHNICIAN

### C-D MIDGET CAPACITORS

The Super-Micadon encapsulated capacitors occupy about  $\frac{1}{3}$  the space formerly required for the same capacitance, but life expectancy has been increased. Moisture resistance is said to be nearly 20 times that of



conventional types. Super Micadons are designed with flat, clinched-wire leads for improved voltage breakdown safety and reduction of overall inductance. Available in values from 5 mfd to 0.02 mfd. Cornell-Dubilier Electric Corp., South Plainfield, N.J.—TECHNICIAN

### B-T UHF CONVERTER

Model 99 provides the following features: 300-ohm match at input and output, reduction of spurious responses, radiation suppression, single-knob tuning, converted output on Channel 4, 5 or 6, and drift-compensation of the oscillator. List price, \$19.95; dealer net, \$14.97. Blonder-Tongue Labs., Inc., 526 North Ave., Westfield, N.J.—TECHNICIAN

### GI UHF-VHF TUNER

The Model 80 combination VHF-UHF tuner is composed of a 13-position turret-type VHF tuner (Model 78) and a compact, continuously-tuned UHF unit (Model 79). The VHF section can be purchased and installed separately; the UHF section can be added in the field at low cost. Features include a tri-concentric shaft arrangement. In the 13th VHF position, the mechanism is switched internally to UHF. The 70 UHF stations are evenly spaced, eliminating "bunching." General Instrument Corp., 829 Newark Ave., Elizabeth 3, N. J.—TECHNICIAN

### Scotch ELECTRICAL TAPE

Scotch brand 33 "Three-Eighths,"  $\frac{3}{8}$ -in. wide, combines convenient size with good insulation and holding properties. Thin 7-mil backing and narrow width provide conformability permitting tight, neat-appearing splice wraps. Recommended for protecting connections from moisture, corrosion and abrasion. High dielectric strength (10,000 v) and resistance to water, oils, acids, alkalies, sunlight and weather. Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.—TECHNICIAN

### Alpha SOLDERS, WIRES

Seven fluxes and 6 types of bar solder especially designed for use on printed circuits and chassis of various types are available. The fluxes include activated and non-activated types, also quick-drying and minimum evaporation types. The bar solders include 2 tin-lead alloys and 3 silver-bearing alloys. The manufacturer will advise on specific applications for the various types.

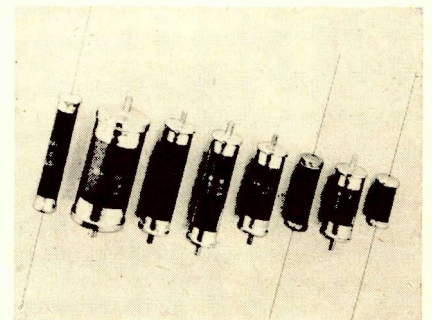
The Service Spool wire assortment is a standardized small-quantity selection of wires used in general electronic work, designed to provide a complete inventory in a single package. The assortment consists of 5 basic types—hook-up, test-lead, dial-cable, phono and tinned copper (bus bar) wires—with variety within each type. Alpha Wire Corp., 430 Broadway, New York, N.Y.—TECHNICIAN

### IE STANDOFFS

Line-Lok standoffs feature cam-type separator which keeps the insert firm against the stem; interlocking side-lips to prevent splitting and maintain constant pressure; and open-end drains that act as an outlet for dust and moisture. Of the hinge-type design, the Line-Lok clicks open, snaps shut, is adaptable for holding most UHF and VHF lines. Polyethylene insert results in low-loss performance. iE Mfg., 325 N. Hoyne Ave., Chicago 12, Ill.—TECHNICIAN

### Corson CAPACITORS

Glass tubular plastic dielectric capacitors, type G-6 Glascaps, feature light weight and compactness, and are particularly useful in high-volt-



age dc, and low frequency-low voltage ac applications. Glascaps are available in a range of ratings from 0.01 mfd at 600 v through 0.0015 mfd at 60,000 v. Corson Electric Mfg. Corp., 540 39 St., Union City, N.J.—TECHNICIAN

### Illinois ELECTROLYTICS

Miniature and sub-miniature electrolytic capacitors, designated as types MT and SMT, are low current drain capacitors especially designed for use with transistors, printed circuits and other applications where small size and light weight are required. Features include all aluminum construction with connecting leads of tinned brass for extra strength. They are hermetically sealed and range in value from  $\frac{1}{2}$  to 100 mfd, 3 to 75 vdc. Lengths range from  $\frac{1}{2}$  to  $\frac{1}{4}$  in. Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill.—TECHNICIAN

## Technician's Lighter Side

with Sol Heller

**TUNING IN THE TOOTH.** Lady who had just had some dental work done dropped in to see her radio serviceman. It turned out that two fillings made of dissimilar metals were functioning as a detector, causing the woman to receive radio stations through her teeth.

The radio man was sympathetic.

"Gee, that's tough," he said. "But why come to me? I can't help you. Why don't you go back to your dentist and have him do something about the fillings?"

"You don't understand," replied the woman. "I wasn't asking you how to eliminate the condition; I merely wanted to find out if you had a small built-in aerial I could put in my hair, to improve reception."

**HOW TO AVOID A SERVICE CALL.** It'll take this department a long time to forget the gentleman from Rochester, N. Y., who visited his favorite broadcast station and requested that the actors speak louder, because his set's volume was kinda low.

**TRADE SCHOOL STORY.** Lady who should have known better put her son into a radio trade school. The boy was hopelessly out of his element, did no homework, misbehaved, and acquired less knowledge of Ohm's law than an electron. One day the boy's mother came to visit his teacher. She heard the unfavorable report on his progress in silence. When it was finished, she said with a wan smile:

"Tell me, can't you say *one* good thing about Johnnie?"

The teacher thought a long time. "Well," he said at last, "Johnny doesn't set off fire crackers in class."

**FAMOUS LAST WORDS.** A scientist called on a TV serviceman one Sunday morning for emergency service on a 2,000-tube electronic brain he was using in his lab. "I don't think there's much wrong with it," the scientist remarked. "Only a loose wire, probably."

**DEPARTMENT OF VECTOR ANALYSIS.** Technician whose wife gave birth to a boy and a girl conveyed the info to a friend as follows:

"It was twins, 180 degrees out of phase."

**HEAR, HEAR.** A nervous technician who was asked to address an association meeting took courage from the friendly faces of the men and women looking up at him and said (before biting his tongue an instant later), "My friends—I will not address you as ladies and gentlemen, because I know you all too well."

# KESTER

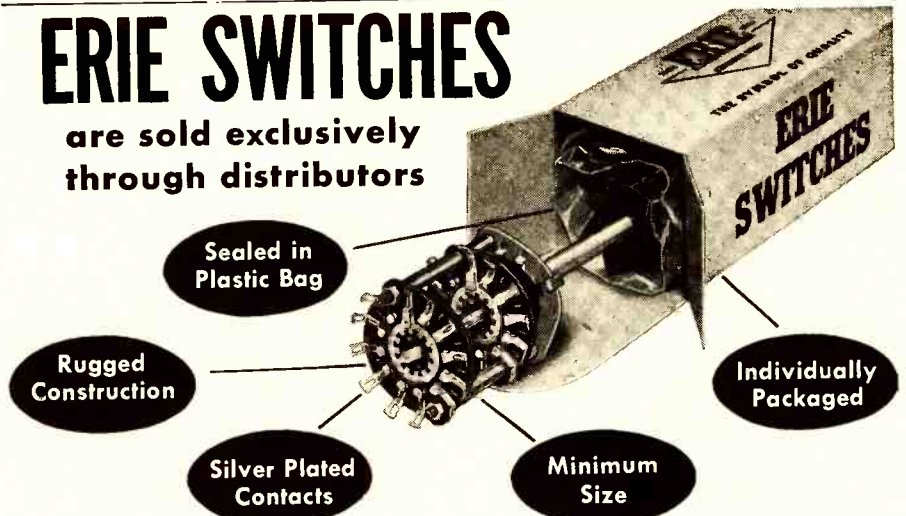
Since the most important single step in Radio-Television Servicing is soldering . . . it's just plain good sense to use the best — KESTER SOLDER . . . Key Name in Solder for More Than 50 Years.

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## Looking for More Help?

(Continued from page 26)

unexplained lengthy lapses in employment. If a man has jumped around a great deal, it's more likely than not that there's something wrong with his personality, temperament or ability. Keep in mind that frequent switches are sometimes due solely to a man's justified attempts to find a job that's "just right."

3. Do your best to "size up" the applicant as a man. Ask yourself these questions: (A) Do I think he will turn out to be a hard, efficient worker? (B) Do I consider him to be an honest, sincere person? (Be sure to check this latter point with previous employers.) (C) Does it seem likely that this man won't "mix" well with any other employees? For instance, does he have any obviously obnoxious or unpleasant mannerisms which wouldn't sit well with associates, and equally important, with customers in the home?

If the man is to make outside calls, consider his appearance. It's most important that an employer feels entirely satisfied that his outside men are neat, personable, and acceptable representatives of the firm.

Now, another thing regarding the hiring of experienced men. Many shop owners feel that a trial employment period—say three weeks—is desirable; a clear understanding exists that if either side isn't one hun-

Don't assume that any experienced man is the one for you. Check on him first to be sure.



Don't turn thumbs down automatically on the ambitious youngster with meager experience, who's trying to get his foot in the door.

dred percent satisfied at the end of this time, the deal can be called off. In fairness to the new man, make sure that you review his situation at the end of the agreed-upon time, and give him a report.

It goes without saying that in hiring "green" men, a similar check-up should be made, to determine whether the man is an apt candidate for the job.

Now and then dealers have made some real "finds" in youngsters who've been pounding on numerous and divers shop doors, for a chance to break into the "magical" TV-radio field.

In looking over likely "green" candidates, it's wise to cast aside prejudices regarding acceptable experience.

Too many shop owners, for instance, scoff at electronic work in the armed forces, etc. Now, such experience may not equip the individual for immediate bench work; it is, however, an asset.

### Enthusiasm Is an Asset

"I'm not running a school, Bub," is what a great many young hopefuls hear every day, as doors slam in their faces. Many of these youngsters are ambitious, though, and determined to get their foot in the door; their very enthusiasm makes them valuable timber.

A good many dealers have more work than they can handle these days. As a result, they are late in answering calls, and frequently lose customers (and good-will) over delays in servicing sets. Many shops could probably increase their service volume, if they had enough help.

To sum up: A thorough examination of the personnel situation is in

order. Experienced men are available to a greater extent nowadays. Some of the inexperienced ones can be trained quickly if given a break in the shop—meaning if they are given the opportunity to get their hands on equipment, as well as on brooms and dust rags.

Consider the possibility of expanding your force through adding good men, and getting after more business. Running a few "help wanted" ads will get results in most localities. And here's a tip: If you want to break in some learners, make sure that your ad for a TV or radio serviceman clearly specifies that only a minimum of experience is required.

In the service end of our business, there is entirely too much hiring being done on a sketchy basis. This is why the turnover of technicians is so great, and this is also one of the reasons why shop owners and service department managers consume large quantities of aspirin.

So take time to select your men, and try to weigh the potential value of those who are light on experience, but heavy in the direction of future can-do.

## Improper Tinting

(Continued from page 18)

supplied to the blue gun, while —Q signal is used nowhere else, the trouble is most likely to lie in the —Q channel.

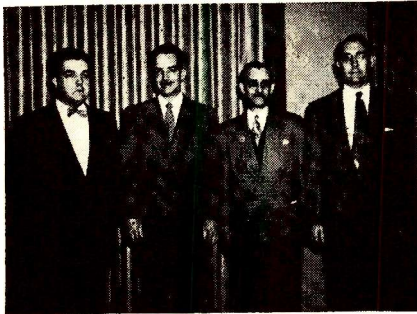
The foregoing analysis is intended to illustrate how a thorough knowledge of the components making up each color can be very helpful in pin-pointing trouble. It is possible, particularly when there is reason to believe that the various adjustments have not been tampered with and are correct, to find the defective section simply by a careful analysis of the incorrect colors seen on the crt screen.



# SERVICE ASS'N REPORTS

## ETSC: Report & By-Laws

The Eastern Television Service Conference, 211 Market St., Paterson, N.J. has recently issued a full report on the proceedings of its 2nd annual meetings in Philadelphia during April. In addition to minutes



ETSC officers (left to right): John G. Rader (Treas.), Reading, Penna.; Harold B. Rhodes (Chairman), Paterson, N. J.; Bert A. Bregenzler (Vice Chairman), Pittsburgh, Penna.; and Ferdinand J. Lynn (Secretary), Buffalo, N. Y.

of the sessions, the 26-page report includes copies of the constitution and by-laws, reports by special committees on public relations, manufacturers, factory service and distributors, and a directory of ETSC officers.

## IRTSA Elects Officers

The Indianhead Radio-TV Servicemen's Association reports through its secretary, C. W. Stiemke, 602 Water St., Eau Claire, Wisc., that it elected new officers at its recent annual election and banquet. New line-up consists of Vernon Townsend, president (Menomonee), Earl Kratch, vice-president (Bloomer), Upton St. Clair, treasurer (Bloomer) and C. W. Stiemke, secretary. The meeting was held in Chippewa Falls.

IRTSA likes its blow-up copy of *So Much for So Little*, is also pleased with *TECHNICIAN*.

## PRMSA on Unpaid Bills

An article in the monthly organ of the Philadelphia Radio Service Men's Association, 1307 W. Rockland

St., tackles the problem of customer refusal to pay bills when sets are delivered. According to Pennsylvania law, an artisan (the technician, in this case) may retain possession of personal property on which he has performed repairs until he has been paid.

In most parts of the country, the serviceman may not legally do this; the law leaves him pretty much out in the cold in dealing with welchers. Getting equitable legal protection for technicians is a matter that requires organized pressure. Have other associations attempted to approach this and other legal problems? *TECHNICIAN* would like to hear from those that have.

## CRTSA Public Rel. Program

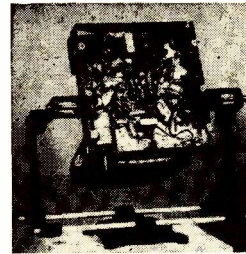
A 13-week TV series now in preparation will be co-sponsored by the Council of Radio and Television Service Associations, 1300 N. Third St., Philadelphia, Penna. CRTSA is working with co-sponsoring parts manufacturers in preparing and financing these 15-minute shows. Dave Krantz, chairman of the Council's Public Relations Committee, says the TV series is being designed to promote "public acceptance of the service industry as a profession and it will also answer the many . . . problems and questions that the set owner is . . . confronted with, due to misunderstanding concerning the product he purchased."

## TSE Purchase Plan

Parts jobbers, admitted as "associated members" to the Television Service Engineers, 307 Shukert Bldg., Kansas City, Mo., will be getting all the business of TSE members, if this organization's officers have any say in the matter. The plan is to establish cooperation and mutuality of interest between purchasing technicians and dealers, on the one hand, and distributors, on the other.

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480 Lexington Avenue, N.Y.C. 17, N.Y.

## MFRS' Catalogs & Bulletins

**IRC DIODE DATA:** Comprehensive data on type 1N series germanium diodes, including construction, dimensions, and interchangeability with standard types, is contained in *Bulletin N-1*. International Resistance Co., 401 N. Broad St., Philadelphia 8, Penna.

**UTC TRANSFORMER GUIDE:** *Catalog A* covers transformers, reactors and filters; contains engineering specs and design data. United Transformer Co., 150 Varick St., New York 13, N. Y.

**TRIAD HI-FI BROCHURE:** Four new amplifier kits for high-quality sound systems, ranging from 10 to 40 watts, are described in *Catalog TR-54*, available from Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif.

**TACO ANTENNA MANUAL:** Arranged to include only those antennas and accessories designed for the area served by the distributor and his dealers. Sheets are in binder-type cover. Available through local Taco distributors.

**ATR VIBRATOR CATALOG:** 67-page manual contains interchangeability chart for complete line of vibrators, in addition to servicing procedure on auto-radio vibrators and specifications. American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.

**RRCO TRANSISTOR MANUAL:** An 8-page catalog, fully illustrated with charts, voltage curves and diagrams, describes applications for germanium diodes and PNP junction transistors. Radio Receiver Co., Inc., Sales Dept., 251 W. 19th St., N. Y. 11.

**RMS ANTENNA SUPPLEMENT:** Supplementary issue to the annual RMS catalog, *Catalog 55-S* describes the latest antennas and accessories with list prices, weights and packaging information. Write to Mr. Clifford Shearer, Director of Advertising, RMS, 2016 Bronxdale Rd., New York 62, N. Y.

**PERMO CARTRIDGE REFERENCE:** A cross-reference guide, based on the cartridge manufacturer's needle part number, is a feature of *Catalog 104*, released by Permo Inc., 6415 N. Ravenswood Ave., Chicago 26, Ill.

**RECOTON GUIDE:** The new 1954-55 *Simplified Reference Guide*, for the service dealer, contains information on replacement needles, and a manufacturer's cross index. Write Recoton Corp., 147 W. 22nd St., New York 11, N. Y.

**LAFAYETTE CATALOG SUPPLEMENT:** Replacement parts, test instruments and Hi-Fi equipment are described in a 67-page catalog, No. 5-54, from Lafayette Radio, 100F Sixth Ave., New York 13, N. Y.

**TRU-OHM RESISTOR CATALOG:** 1954 version of annual release contains 20 pages of photos, charts and technical data on the manufacturer's full line of resistors and power rheostats. Available from Tru-Ohm Products, 2800 N. Milwaukee Ave., Chicago 18, Ill.

**TELEX HEADPHONE BROCHURE:** The Dynaset, an under-the-chin dynamic headphone, is described in a catalog sheet available upon request from Dept. KP, Telex, Inc., Telex Park, St. Paul 1, Minn.

**EFCON CAPACITOR DATA:** Specifications, dimensions, test data and other information on the new Type MH hermetically-sealed, tubular capacitors is contained in *Technical Bulletin 154*. Write Dept. F. Electronic Fabricators Inc., 682 Broadway, New York 12, N. Y.

**IRC HF RESISTOR BULLETIN:** Type HFR high-frequency miniature resistors, designed for use in circuits requiring flat frequency response over a wide band, are described in *Catalog Data Bulletin F-3* released by International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

**THOMAS CRT GUIDE:** Picture tubes from 10-in. to 27-in. in size are arranged in groups of similar types. Number code readily identifies directly interchangeable types. Electrical and physical characteristics are tabulated in the pocket-size *Thomas Phototron Picture Tube Replacement Guide*. Thomas Electronics Inc., 118 Ninth St., Passaic, N. J.

**CHANNEL MASTER ANTENNA MANUAL:** More than 125 items, including VHF and UHF antennas, masting, towers, mounts, inter-action filters and general accessories, are covered in an illustrated 18-page, large-sheet brochure, punched for loose-leaf mounting. Channel Master Corp., Ellenville, N. Y.

**MALLORY COMPONENTS HANDBOOK:** All of the manufacturer's electrical and electronic components, including batteries, capacitors, controls, resistors, rectifiers stacks, switches, vibrators, power supplies, TV components and test equipment, are listed, described and indexed in 61 pp. *Catalog 554*, P. R. Mallory & Co., Inc., Indianapolis 6, Ind.

## Industry Keyhole

**COOPERATIVE BUYING** is being seriously considered by the National Electronic Distributors Ass'n. A committee is now evaluating a buying program. Parts manufacturers have already begun to attack the proposal, claiming that such a plan will destroy the system of brand-name reliability and incentive to manufacturers to improve quality . . . **RIDER TV MANUALS** now run to 13 volumes. 13th manual, covering receivers from Sept. '53 to May '54, should be off press now . . . **L. M.**

**BRAUN** has been appointed sales mgr., Parts & Service Dept. of the New Jersey Div., Zenith Radio Corp.

**IMPROVED RADIO-TV SELENIUM RECTIFIERS** are being offered by Int'l Rectifier Corp. Bellows-type spring contactors between cells, affording longer life and lower forward voltage drop, are now being used. This type of construction was formerly found only in high-quality industrial stacks . . . **PETER BUTTACAVOLI**, formerly technical supervisor of the Teleset Service Dept., Du Mont Receiver Div., has been promoted. New post is that of mgr. of Field Technical Services . . . **CALDWELL-CLEMENTS, INC.**, publishers of **MART, TELE-TECH** and **TECHNICIAN**, have taken more space in Grand Central Palace, now occupy quarters on 5th, 6th, 8th and 9th floors. Expansion is result of 17% increase in biz for 1st ½ of '54.

**SPECIALLY BUILT TEST CHAMBER** is being used by Setchell-Carlson to check receivers taken off the production line. After 727 hours of continuous operation, one set was still going . . . **WARREN L. HASEMEIER**, old-timer in the field and formerly with Wilcox-Gay, is now operating as a manufacturers' rep. He's located at 128 Gulf Drive, Sarasota, Fla. . . **EXPLODED-VIEW PARTS DISPLAY**, using actual components with guide ribbons showing their location in the equipment, was featured at the Parts Show for all Webcor phonographs and recorders.

**RADIO'S OLD TIMERS'** annual cocktail party saw the newly elected slate of officers taking over. Charles Golenpaul of Aerovox is the new prey . . . **APPLICATIONS CONTEST** for selenium diodes is being sponsored by Int'l Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif. First prize is a Ford V-8 Tudor Sedan. 50 other prizes total \$1500. Last date for entries is Jan. 1, '55. Details and entry blanks available on request . . . **STROMBERG-CARLSON** is back in the radio field with a line of newly styled battery and 3-way portables.

**NEW FINANCE PLAN** to cover the dull months is being offered by Nat'l Union Radio Corp. Plan requires no cash payment until 2nd mo. after order and extends discount period over 5 mos. . . **AMPHENOL** (American Phenolic Corp.) of Chicago, U. S. A., will also operate in Canada. It returns to our northern neighbor as Amphenol Canada Ltd. . . **CHANNEL MASTER'S** TV Engineers' Award has been set up to acknowledge "outstanding contributions resulting in the betterment of TV transmission and reception." First recipient was Ray Rodgers, chief engineer of Pittsburgh's WDTV . . . **SAUL KOTCHOVER** has joined the sales staff of Parkside Wire Co., Francisco and Irving Park Rd., Chicago. Parkside makes all types of electrical and TV wire . . . **OXFORD ELECTRIC CORP.** appoints a new sales rep: Lowry-Dietrich Co. of Pittsburgh.



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While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.

RICHARD McQUEEN has been appointed Adv. & Promotion Mgr. for the National Company, Malden, Mass. Announcement was made by Lynn Eaton, vice-prexy in charge of sales . . .

COUNTER DISPLAY of the complete line of alignment and specialty tools made by Walsco Electronics Corp., Los Angeles, occupies only 2 sq. ft. of valuable counter space. The double-decker display is free with purchase of the tools . . . VOLUME PRODUCTION OF POWER TRANSISTORS is getting under way at the plant of Minneapolis-Honeywell Regulator Co. Just to prove that the transistor age is catching up with us, RCA has announced price reductions on 2 transistor types.

ALLERGY SUFFERERS may find welcome relief from room-sized air cleaners. Raytheon Mfg. Co., Waltham, Mass., says the cleaners use static electricity to filter microscopic particles of dust and pollen out of the air . . .

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		50A5 .49
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6AV6 .34	12AT7 .53	25L6GT .35
6BA6 .38	12AU7 .47	50L6GT .49
6BK7 .78	12BA6 .36	

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### Carter **CUSTOM CONVERTER**

Hi-Fi ac installations in areas where only dc power is available are facilitated by custom converter no. DR1025C5PK. This 500-watt unit is designed to avoid wide fluctuations in output voltage common to ordinary dc-ac converters. It also provides means for holding output frequency to 60 cps, so that accurate speed may be maintained for tape recorders and phonograph turntables. Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—Technician

### Pentron **AM-FM TUNER**

Model AFM incorporates a selector which includes a position marked "tape." This position permits tape recordings to be modified by the tuner's tone control system. The AFM permits simultaneous listening and tape recording during broadcast. Tape output is built-in. Other features: 5 microvolt sensitivity, Foster-Seeley discriminator, push-button afc, tone controls, magnetic cartridge preamp with 3-position equalization, cathode-follower output. \$85.95 net. Pentron Corp., 221 E. Cullerton St., Chicago 16, Ill.—TECHNICIAN

### Yale **TAPE SPLICER**

The TS-4 splicer for recording tape cuts two rounded indentations in the tape, giving the splice a Gibson-Girl shape. This leaves tape edges free of adhesive, and eliminates a frequent cause of wow and flutter. May be mounted directly on any tape recorder. Toggle-type fingers hold tape in position for splicing. Yale Industries Corp., 82-09 251 St., Bellerose, N.Y.—TECHNICIAN

### Lowell **SPEAKER BOXES**

New enclosures for sound-system installation have been added to the manufacturer's line of speaker enclosures, baffles and accessories. In the larger units, resonance is minimized by heavy undercoatings. Many models are available with adjustable plaster flanges. ¾ in. knockouts provide for PA and intercom wall and ceiling installation. Speaker boxes are constructed of 18 gauge steel. Depth range: 4 in.—9 in. Lowell Mfg. Co., 3030 Laclade Station Rd., St. Louis 17, Mo.—TECHNICIAN

### Cousino **TAPE REPEATER**

The Universal 300 Audio-Vendor, automatic repeating device, embodies an integrated reel and magazine of magnetic tape. Output of a radio or TV can be plugged into any tape recorder for continuous recording which preserves 10-minute segments before they are automatically wiped off. When it is desired to retain a passage, the recorder is



stopped after the number has been recorded, but before it is wiped off. The tape, which need never be re-wound, may be re-used indefinitely. Cousino, Inc., 3212 Madison Ave., Toledo 2, Ohio.—TECHNICIAN

### H-R **REMOTE VOL. CONTROL**

Soundoff, a chairside remote speaker control unit, permits continuous adjustment of sound-output level from the TV set or radio to which it is connected. Range is from whisper level to full speaker output. Unit comes complete with cable and illustrated instructions for connecting to speaker. Hollywood Riviera Co., P. O. Box 11635, Wagner Station, Los Angeles 47, Calif.—TECHNICIAN

### Stephens **SPEAKER CABINET**

The Cavalcade enclosure permits direct radiation from the loud-speaker and also employs a fully expanding dual exponential horn for rear loading. It has been created to house such Stephens Tru-Sonic speakers as the 15-inch coaxial 206AX, the 101FR or the 102FR. Blonde or mahogany finish. Net price, \$131.25. Stephens Mfg. Corp., 8538 Warner Dr., Culver City, Calif.—TECHNICIAN

### Masco **INTERCOMS**

The Multifone intermixed intercom systems include a five station master, model MF-5, which can be connected to a combination of up to 5 other masters and/or remotes, and model MF-10, which is similarly used with up to 10 other units. Model JS-6 remote station with 6-position master station selector switch and talk-listen switch can originate calls to one master only. Features include ac-dc operation, low power consumption, pilot light, and U/L approved construction. Mark Simpson Mfg. Co., Inc., 32-28 49th Street, Long Island City 3, N. Y.—TECHNICIAN

### E-V **FM BOOSTER**

Tune-O-Matic model 3005-FM booster is designed to make a good signal impervious to noise and make a weak signal usable. The booster increases signal strength over 10 times (20 db). Broad-band circuit amplifies the signal uniformly throughout the FM spectrum. No additional controls or manual tuning. Thermal relay is provided so that booster can be turned on or off by receiver. Can be concealed. List price, \$45.00; net, \$27.00. Electro-Voice, Inc., Buchanan, Michigan.—TECHNICIAN

### Rek-O-Kut **STROBE DISC**

Alternating pattern bands on this turntable test card are printed in red and black to prevent confusion during use. Instructions for use in checking turntable speeds at 33½, 45 and 78 rpm are printed on the Rek-O-Kut Stroboscopic Card. Available free. Avery Yudin, Rek-O-Kut Co., 38-01 Queens Blvd., Long Island City 1, N. Y.—TECHNICIAN

# capacitor replacements

## FOR SETS OF THE MONTH

### ADMIRAL CHASSIS 20 L 2

Symbol No.	Rating MF @ WVDC	Admiral Part No.	Sprague Replacement
C205	4 @ 50	67A4-9	TVA-1303
C207	60+40 @ 350/60 @ 200/ 20 @ 150	67D15-23	TVL-4609
C216	80 @ 350	67D15-64	TVL-1630
C409	80 @ 350/100 @ 50	67D15-22	TVL-3722
C410	20 @ 475	67A25-1	TVA-1804
C423	10 @ 300/10 @ 25	67D15-33	TVL-2565

### GENERAL ELECTRIC "G" LINE

Symbol No.	Rating MF @ WVDC	G.E. Part No.	Sprague Replacement
C235	20 @ 300	RCE-175	TVA-1608
C236	20 @ 300	RCE-175	TVA-1608
C308	5 @ 50	RCE-174	TVA-1303
C400	80+60+40+20 @ 350	RCE-173	TVA-3640 TVA-1716

### MAGNAVOX 300 SERIES CHASSIS

Symbol No.	Rating MF @ WVDC	Magnavox Part No.	Sprague Replacement
C106	4 @ 50	270027-10	TVA-1303
C110	20 @ 350	270027-20	TVA-1608
C215	2 @ 50	270027-22	TVA-1301
C413	10 @ 350SP	270027-23	R-1468
C501	70+40+10 @ 350/50 @ 50	270021-52	TVL-4659 TVA-1308
C502	20+10+5 @ 350/60 @ 200	270021-51	TVL-4620 TVA-1613
PC301	INTEGRATOR PLATE	250186-1	V-1

### TRAV-LER CHASSIS 46A3, 46B3


Symbol No.	Rating MFD @ WVDC	Trav-Ler Part No.	Sprague Replacement
EC-6	70 @ 10	TV-EC-6	TVA-1130
EC-16	40+40 @ 450	TV-EC-16	TVL-2764
EC-17	40 @ 450/50 @ 50	TV-EC-17	TVA-1713 TVA-1308
EC-20	10 @ 50	TV-EC-20	TVA-1304
EC-25	30 @ 450/50 @ 200	TV-EC-25	TVA-1711 TVA-1713
EC-27	100 @ 25	TV-EC-27	TVA-1207
C87 } R79 }	INTEGRATOR NETWORK	TV-FC-26	V-1

### SPARTON CHASSIS 23V214

Symbol No.	Rating MF @ WVDC	Sparton Part No.	Sprague Replacement
C48	2 @ 50	PA4303-14	TVA-1301
C63	60+40 @ 350/20 @ 200	PA4307-34	TVL-3640
C91	5 @ 50	PA4308-2	TVA-1303
C95	20 @ 450/20 @ 400/ 100+20 @ 50	PA4307-36	TVL-4740
C130	40+20+10 @ 450	PA4307-33	*TVA-4840
C151	40+40 @ 450/10 @ 350	PA4307-35	TVL-3785
C103	.002+.005+.005	PA4339-4	34C17

\* OMIT ONE 10MFD SECTION

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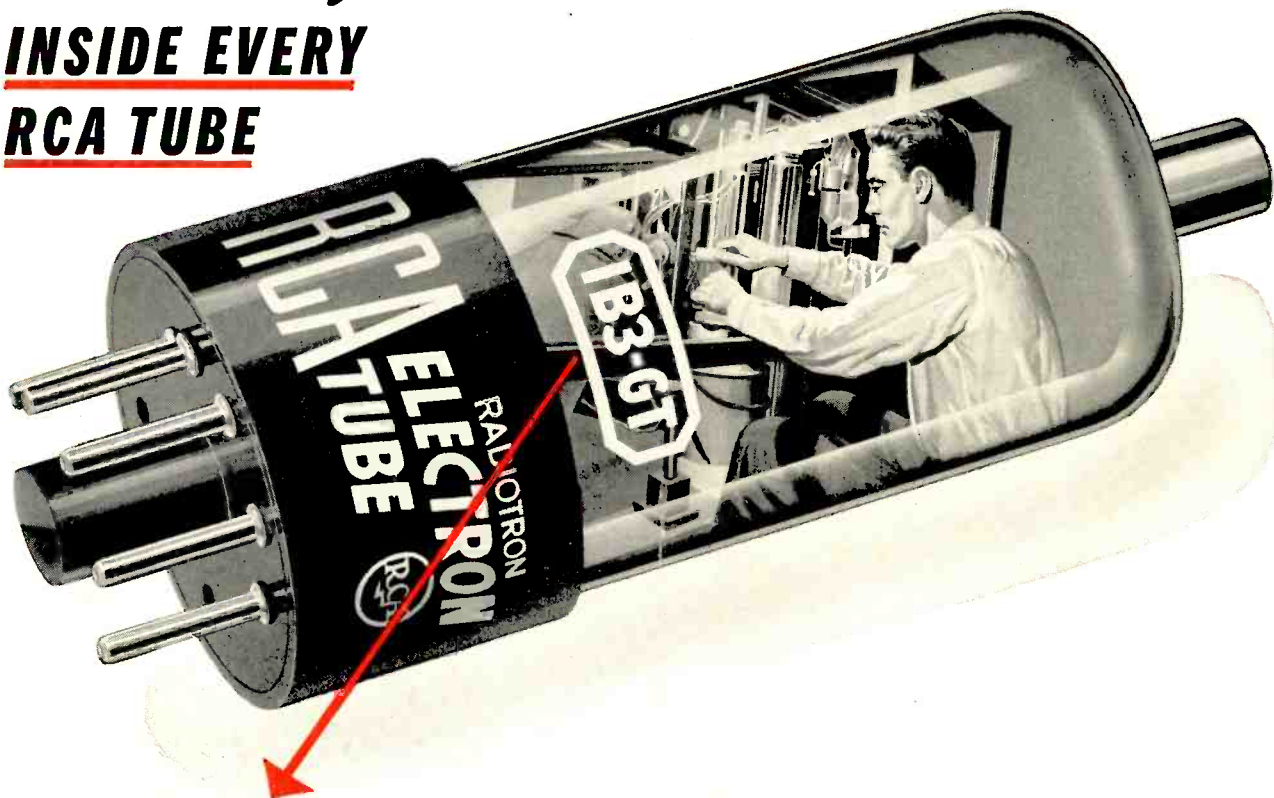
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