

# TECHNICIAN

& Circuit Digests



# NEW



Here are wire wound power resistors designed for today's servicing requirements. New, rectangular design is more compact. Famous IRC element is sealed in ceramic case for complete insulation and protection. Axial leads are easily soldered and speed replacement. Clear, permanent markings give full identification.

- **2 SIZES**—PW-7 seven watts; PW-10 ten watts.
- **COST LESS**—new, low price for IRC Power Resistors.
- **FULL POWER**—Conservative ratings permit continuous operation at full power.
- **NEW VALUES**—in keeping with today's needs.

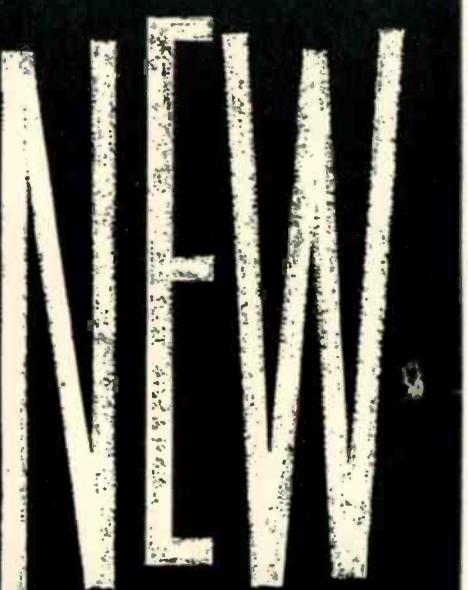
## WIRE WOUND POWER RESISTORS

*in handy Resist-O-Card Assortments*



IRC Resist-O-Cards are easier to buy, stock and use. Values are printed on each card—you always know what you have, and you always have what you need. Assortments are based on popular usage.

- **ASSORTMENT #19**—Twenty 7 watt resistors.  
Dealer Price \$6.20
- **ASSORTMENT #20**—Twenty 10 watt resistors.  
Dealer Price \$6.60
- **ORDER NOW**—From your  
IRC Distributor



INTERNATIONAL RESISTANCE COMPANY

401 N. BROAD STREET, PHILADELPHIA 8, PA.



Wherever the Circuit Says

# TECHNICIAN

## & Circuit Digests

TELEVISION • ELECTRONIC • RADIO • AUDIO • SERVICE

M. CLEMENTS O. H. CALDWELL  
Publisher Editorial Consultant

SIDNEY C. SILVER, Managing Editor

CREIGHTON M. MARCOTT, Assistant Editor

ANN O'ROURKE, Assistant Editor

ALBERT J. FORMAN, Consulting Editor

J. L. STOUTENBURGH, Consulting Editor

DR. A. F. MURRAY, Contributing Editor

CHARLES F. DREYER, Art Director

ELMER KETTERER, Circuit-Digest Production

GEORGE PUGLICI, Circuit Diagrams

### BUSINESS DEPARTMENT

M. H. NEWTON, Business Manager

H. A. REED, General Sales Manager

LEE GRAVES, Eastern Sales Manager

CHARLES S. ROEVER, District Manager

P. J. CARNESE, Sales Promotion Manager

N. McALLISTER, Asst. Business Manager

CAROL YOUNG, Production Manager

KATHLEEN CAFARO, Reader Service

JOHN J. BORGHI, Controller

W. W. SWIGERT, Credit Manager

ELMER DALTON, Circulation Manager

480 Lexington Ave., New York 17, N. Y.

Telephone Plaza 9-7880

S. M. GASKINS, Western Manager

JOHN D. LUPTON, District Manager

R. E. SCHULTZ, District Manager

201 N. Wells St., Chicago 6, Ill.

Telephone Randolph 6-9225

CHRIS DUNKLE & ASSOCIATES

California Representative

3257 W. 6th Street, Los Angeles 5, Calif.

Telephone DUNirk 7-6149

1651 Market Street, San Francisco 3

Telephone UNDERhill 3-5282



TECHNICIAN & CIRCUIT DIGESTS\* February 1955, Vol. 61, No. 2, \$5.50 a copy. Published monthly by Caldwell-Clements Inc., Publication Office, Emmett St., Bristol, Conn. Editorial, Advertising and Executive Offices, 480 Lexington Ave., New York 17, N. Y. Entered as second class matter at the Post Office at Bristol, Conn. June 10, 1954. M. Clements, President; M. H. Newton, Assistant to President; John J. Borghi, Vice President and Treasurer; M. B. Clements, Secretary. Subscription rates: United States and Canada, \$4.00 for one year; \$6.00 for two years; \$8.00 for three years. Pan-American and foreign countries, \$7.00 for one year; \$10.00 for two years; \$14.00 for three years. Printed in U.S.A.

Copyright by  
Caldwell-Clements, Inc., 1955

FEBRUARY, 1955

**FRONT COVER:** Tools represented in outline are fundamental ones—the minimum complement for any service shop. Without them, you couldn't do your job despite all the technical know-how in the world. Yet, if you are a typical technician, you take tools for granted. Take a "new look" at your old tools with us this month through some of the articles listed below.

<b>Stop Bypassing the Technician!—Extra Hands</b>	15
<b>"Tuning in the Picture"</b>	16
<b>Localizing Hard-to-Find Horizontal Sync Troubles</b> .. Harry Mileaf	18
<b>Alignment &amp; Adjustment of Color TV Receivers</b> Robert G. Middleton	20
<b>Tools—Extra Hands for the Service Technician</b> .. James Grafton	22
<b>Latest Transistor Receiver</b>	24
<b>New Uses for Standard Tools</b>	25
<b>"Tough Dog" Corner</b> .. C. R. Maduell, Jr., J. L. Mancini, H. A. Wahl	26
<b>Shops Hints</b>	28
<b>Hi-Fi and Audio Gear</b>	30
<b>New Test Instruments</b>	32
<b>Troubleshooting the TV Set Owner</b>	34
<b>Intercarrier Buzz</b>	38
<b>New Antennas and Tools</b>	40
<b>RCA Sponsors TV Servicemen's "Week"</b>	42
<b>Live Wires Made Harmless</b>	57
<b>Circuit Digests Cumulative Index</b>	62
<b>Circuit Digests</b>	65

ARVIN: Chassis "E"

CROSLEY: Chassis 434

MONTGOMERY WARD:

Model WG-5000A

PACKARD BELL: Chassis T-1

RCA (Color) Main Chassis

CTC2B, Convergence Chassis

CTC3A

### DEPARTMENTS

<b>Letters to the Editor</b>	6	<b>New Products</b>	48
<b>Calendar of Coming Events</b>	17	<b>Catalogs &amp; Bulletins</b>	52
<b>News of the Industry</b>	42	<b>New Books</b>	53
<b>Reps &amp; Distributors</b>	46	<b>Service Association Reports</b>	56

### CALDWELL-CLEMENTS, INC.

Publication Office, Bristol, Conn.

Editorial/Business Offices 480 Lexington Ave., New York 17, N. Y., Tel. Plaza 9-7880  
Publishers also of MART and TELF-TECH & ELECTRONIC INDUSTRIES

\*Reg. U. S. Patent Office

**Now  
EVERYBODY  
CAN HAVE A "QUICK-HOT"  
ELECTRONIC SOLDERING GUN**



120 V. A.C.  
60 CYCLE  
1.1 AMP. MAX.

WORKING HOT  
IN 2½ SECONDS

THE NEW **WEN**  
MODEL #199

**Costs Only \$7.95** RETAIL

and it's ideal for the work you do

It's smaller, lighter—slips readily into tool kit or pocket. Gives AMPLE heat—fast. Cools quickly too. Has wonderful balance. WEIGHS ONLY 1½ LBS. Easier to use accurately—less tiring. Its extra long narrow tips (replaceable) make it easy to reach tight spots. And they

are new type steel nose LIFETIME TIPS—practically indestructible in ordinary use. Built-in spotlight automatically illuminates work. Cherry red plastic handle and case are heat and shock resistant. Gun is well made throughout—fully guaranteed. And that price!

FOR HEAVY DUTY  
THERE'S THE FAMOUS  
**WEN** 250 WATT "QUICK-HOT"



OTHER POCKET PORTABLES  
YOU'LL WANT  
TO OWN

**WEN**

PRODUCTS, INC.

5808 NORTHWEST HIGHWAY  
CHICAGO 31, ILL.

(Export sales, Scheel International, Inc., Chicago)



**567 HOURS**  
CONTINUOUS OPERATION

Ideal for many production jobs, maintenance, repairs, intermittent soldering. Delivers more heat so can solder heavier metals. With special tip cuts plastic tile. Fully guaranteed.

RETAILS **\$12.95**

SUPER-POWER SANDER  
MODEL #303

Light (2½ lbs.)—compact, handy. 120 V. A.C. 60 cycle, 14,400 strokes P.M., straight line action. Kit is Sander, 12 Sandpapers, 2 Polishing Cloths.

SANDER-POLISHER  
MODEL #202

For fine finishing. 120 V. A.C. 60 cycle straight line action; no scratches, reaches corners. Also polishes car, etc. **\$13.95** only



RETAILS **\$16.95**  
COMPLETE KIT

# Not a single channel antenna! Not another all-channel antenna!



## WHAT IS THE COMBINATION NEEDED IN YOUR AREA?

CODE LETTER	CHANNEL	CODE NO.	CHANNEL
A	2	1	7
B	3	2	8
C	4	3	9
D	5	4	10
E	6	5	11
		6	12
		7	13

\*PATENT PENDING

But! A brand new type of antenna... an antenna that gives you...for the first time...peaked performance on the stations in your area!

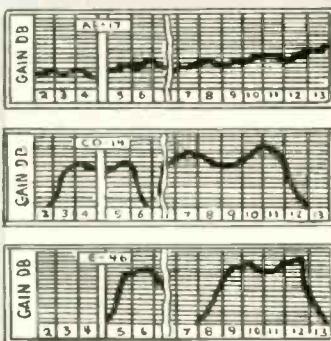
**It's the New  
WINEGARD  
*Combo***

Only the *Combo* gives you such extreme flexibility—

Can be used as a single channel antenna.  
Can be used as an all-channel antenna.  
Can be used as a combination yagi peaked to the channels in your area.  
Can be used as a stacked array—(stacking bars available for stacking 2 and 4 bays.)  
Can be used as a large screen array ("Full size" reflector screens available for such use.)

### Features—

Peaked to the channels in your area.  
Electro-lens Focusing.  
Light—compact—low wind resistance.  
Adaptable to any reception requirement—from close in to the most distant fringe areas.  
Quality—all weather construction—to withstand high winds and ice loading.



Note: Due to limited space on this page, it is not possible to explain in great detail all the technical operating details, applications, etc., of this amazing new antenna. So, for those who want all the facts, see your nearest jobber... or write directly to the Winegard factory.

(P.S. Send us the combination of channels that you receive in your area.)

See your jobber or write us for additional information about the *Combo*



**WINEGARD COMPANY**

3000 SCOTTEN BOULEVARD, BURLINGTON, IOWA

Winegard—America's most wanted line of TV antennas—designed to make installations quicker—easier—and more profitable

# One modern picture tube overshadows all others!

THE SYLVANIA

# "Silver Screen 85"

A complete package of promotion aids for your use, including window display and streamers, postal cards, bill inserts, radio spot announcements, and TV films.

Acclaimed by service industry—Dealers and servicemen everywhere acclaim the "Silver-Screen 85." Sylvania's revolutionary "Silver-Screen 85" is the *one* modern picture tube that overshadows all others.

**Super-performance plus**—Only Sylvania's "Silver-Screen 85" combines these three outstanding design advances: (1) Silver-activated screen (2) Super-aluminized reflector, and (3) Precision-focus electron gun. Together, they achieve a picture, so clear, so sharp, that only professional motion pictures can duplicate it.

**Overwhelming consumer reaction**—Already, TV set owners across the nation are asking for the Sylvania "Silver-Screen 85" by name. And the demand is pyramiding.



The "Silver-Screen 85" story is reaching millions of TV homes each week through Sylvania's top-rated TV show, "Beat the Clock."

**Silent salesmen work for TV service**—Thousands of the "Silver-Screen 85" consumer booklets are being read by TV set owners who have written to request them. An even greater number are requesting them

from progressive dealers and servicemen who display the Sylvania service sign. This is Sylvania's way of including you in its national advertising program. Leave a copy of the booklet on each new service call and experience the magic of national advertising right in your own business!



**Good way to build "good will"**—You can build customer confidence and repeat business by stocking and selling Sylvania's great "Silver-Screen 85" picture tube. You're assured of customer satisfaction because your customers are pre-sold on the "Silver-Screen 85." And Sylvania puts the name on the face for your double protection. "Silver-Screen 85" customers stay happy too, because they get better-than-ever performance from their old TV sets.

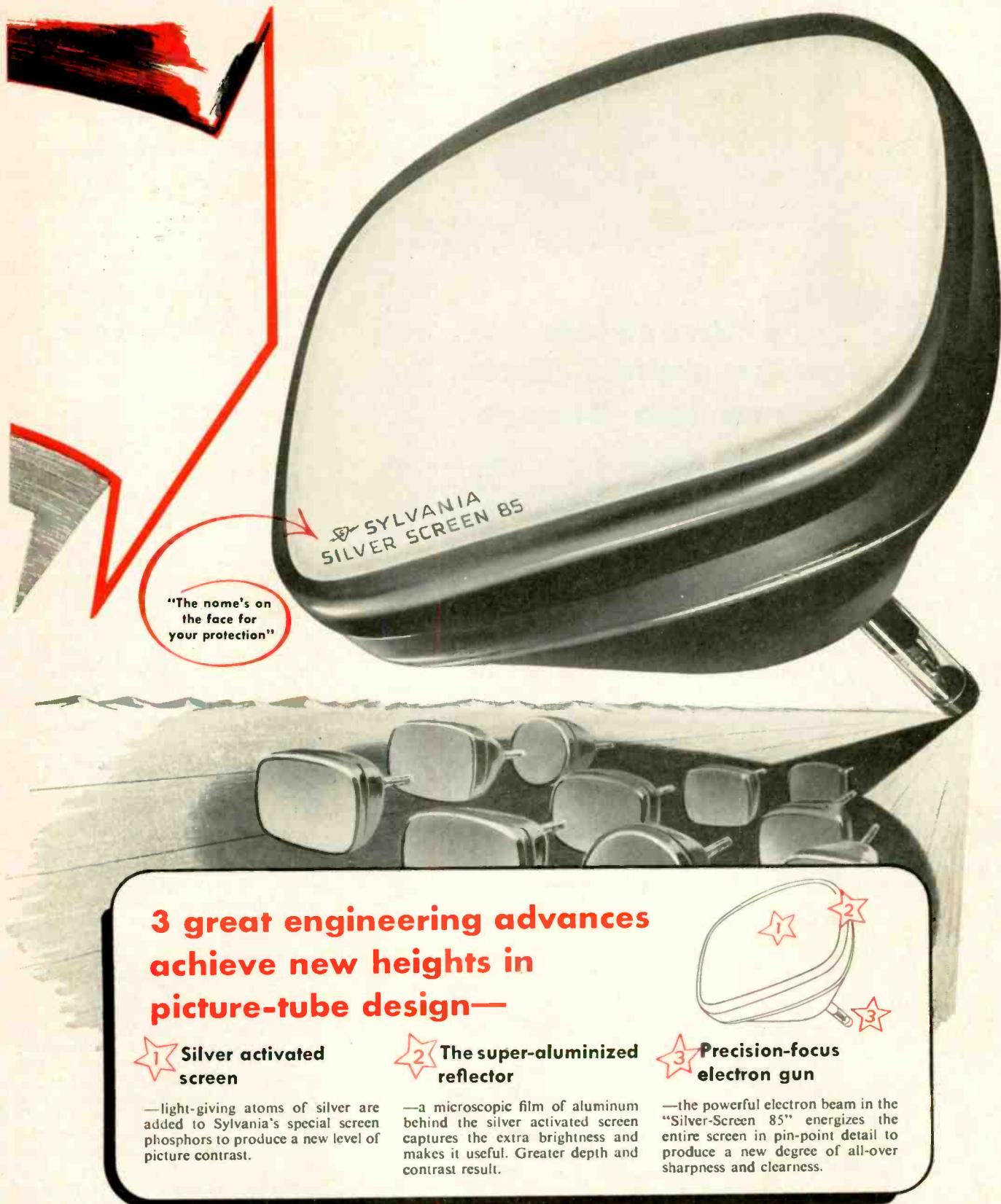
**A built-in profit bonus**—Every "Silver-Screen 85" you install means extra profit because you offer the finest performance money can buy. And there's a full line of "Silver-Screen 85" types in the most popular sizes. Start cashing in on America's demand for television's most modern picture tube. You just can't miss!

SYLVANIA ELECTRIC PRODUCTS INC.  
1740 Broadway, New York 19, N. Y.

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

LIGHTING • RADIO • ELECTRONICS  
TELEVISION • ATOMIC ENERGY





**3 great engineering advances  
achieve new heights in  
picture-tube design—**

**1 Silver activated  
screen**

—light-giving atoms of silver are added to Sylvania's special screen phosphors to produce a new level of picture contrast.

**2 The super-aluminized  
reflector**

—a microscopic film of aluminum behind the silver activated screen captures the extra brightness and makes it useful. Greater depth and contrast result.

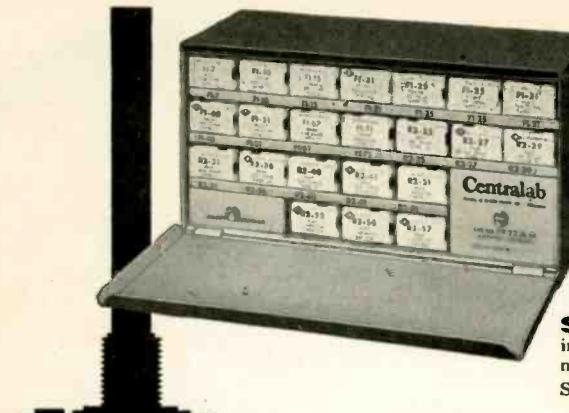


**3 Precision-focus  
electron gun**

—the powerful electron beam in the "Silver-Screen 85" energizes the entire screen in pin-point detail to produce a new degree of all-over sharpness and clearness.

**Keep your eye on**

**SYLVANIA**   
...fastest growing name in sight



**\$23.50**  
including sturdy  
metal cabinet  
Suggested net price

## New Centralab service kit saves time, saves job delays

Centralab's handy **Fastatch® FR-22A KIT** gives you a practical, working stock of carbon dual-concentric control replacements for all popular TV, radio, and auto sets

At your fingertips — everything you need to replace the carbon dual-concentric controls you run up against most often. You get 11 Fastatch front units, 11 Fastatch rear units, 4 Fastatch switches, and 2 auto-type adapter bushings — all 100% tested and guaranteed by Centralab.

The front and rear units snap together to give you 11 controls out of a possible 121 combinations of resistance and taper. So, now, you never have to be out of the right replacements for "hot" jobs.

See the FR-22A at your Centralab distributor. Or, send coupon for bulletin 42-223.

**It's a snap to get the right replacement for practically any dual control**

No loose parts! No lugs to bend! No tricky assembling!

**SNAP FRONT UNIT...**  
(with outer shaft cut to length)



**TO REAR UNIT...**  
(with blue shaft cut to length)



**SNAP ON SWITCH...**  
(from Fastatch KB series)



**ADD THE KNOBS**  
— and there's your custom dual



# Centralab



Junior  
Achievement  
Week  
Jan. 30-Feb. 5

A DIVISION OF GLOBE-UNION INC.

943B E. Keefe Ave., Milwaukee 1, Wis.  
The Fastatch FR-22A Kit sounds like a good deal.  
Send me bulletin 42-223 that describes it further.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

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

B-455

## LETTERS To the Editors

### Wholesale-Retail Jumble

EDITORS, TECHNICIAN:

We are enclosing a copy of a letter that has been forwarded to Brig. Gen. David E. Sarnoff, of the Radio Corporation of America. You will note that we invite Mr. Sarnoff's attention to a charge of unfair competition, via indiscriminate sales to the retail customer, plus a flagrant disregard to a local sales tax law.

FERDINAND J. LYNN, Pres.  
Radio TV Service Assn.  
Buffalo, N. Y.

• Excerpts from the letter referred to appear below:

DEAR GEN. SARNOFF:

Sir, your attention is invited to an ad by RCA-Victor Distributing Corp. that appeared in the radio page of the Buffalo Evening News. It did seem strange, because of the limited interest the radio page has to service dealers. (The ad, which called attention to address and business hours for sale of parts, also said "Attention, Repairmen & Dealers" and "Wholesale Only." —Ed.) The following week, the ad was repeated with a slight change in copy.

After the second display, we became concerned — was this ad inviting the consumers to avail themselves of replacement parts at wholesale prices? To determine the selling policy of your outlet, a shopping investigation was effected. Three purchases were made by individuals not affiliated with the electronic service profession. A wholesale discount was offered in the same amount that established accounts receive when making quantity purchases. Last, but most important, a violation of the Erie County Sales Tax regulations was made by not collecting and listing tax in lieu of exemption certificate number.

May I make a sincere suggestion? We are looking to RCA for leadership. Earn this leadership by setting up a franchise policy with your wholesale outlets, making it mandatory for them to sell and offer wholesale discounts only to those entitled to them.

FERDINAND J. LYNN, Pres.  
• Included with the quoted letters were reproductions of the invoices for the purchases mentioned and copies of the ads. The latter, as noted, were addressed to repairmen and dealers and marked "wholesale only." Further investigation by TECHNICIAN editors indicates that the policy of the parent company, RCA, does not sanction distributor sales to the public. For more detailed discussion of this widespread problem, see this month's editorial.—Ed.

### GET IT OFF YOUR CHEST

Do you have any gripes that fellow services might be interested in? Let us hear from you.



**9½ OUT OF EVERY 10 BONDED DEALERS\* SAY**



**THE RAYTHEON BONDED PROGRAM  
HELPS THEM MAKE MORE MONEY**

And chances are that the other half isn't half trying.

We say that because there's definite proof that wherever service dealers take full advantage of the Raytheon Bond — publicize the fact that their work and parts guarantee is bonded through one of America's largest insurance companies — they are making more money.

They tell customers about their bonded way of doing business with free displays, identification cards, ad mats, decals, etc. supplied by Raytheon — all de-

signed to create customer confidence in their shops and their men. And here's the most important fact of all. This Raytheon Bond that builds their business costs them *not one penny*.

If you can qualify for it, it won't cost you one cent, either. For further information on the Raytheon Bonded Electronic Technician Program, see your sponsoring Raytheon Tube Distributor or write direct to Department C, Raytheon Manufacturing Co., Receiving and Cathode Ray Tube Operations, 55 Chapel St., Newton 58, Mass.

\*Based on a recent survey



**RAYTHEON MANUFACTURING COMPANY**

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

Raytheon makes all these:

Receiving and Picture Tubes • Reliable Subminiature and Miniature Tubes  
Semiconductor Diodes and Transistors • Nucleonic Tubes • Microwave Tube



Excellence in Electronics

# "TV SERVICE MONTH"

Sponsored by General Electric to



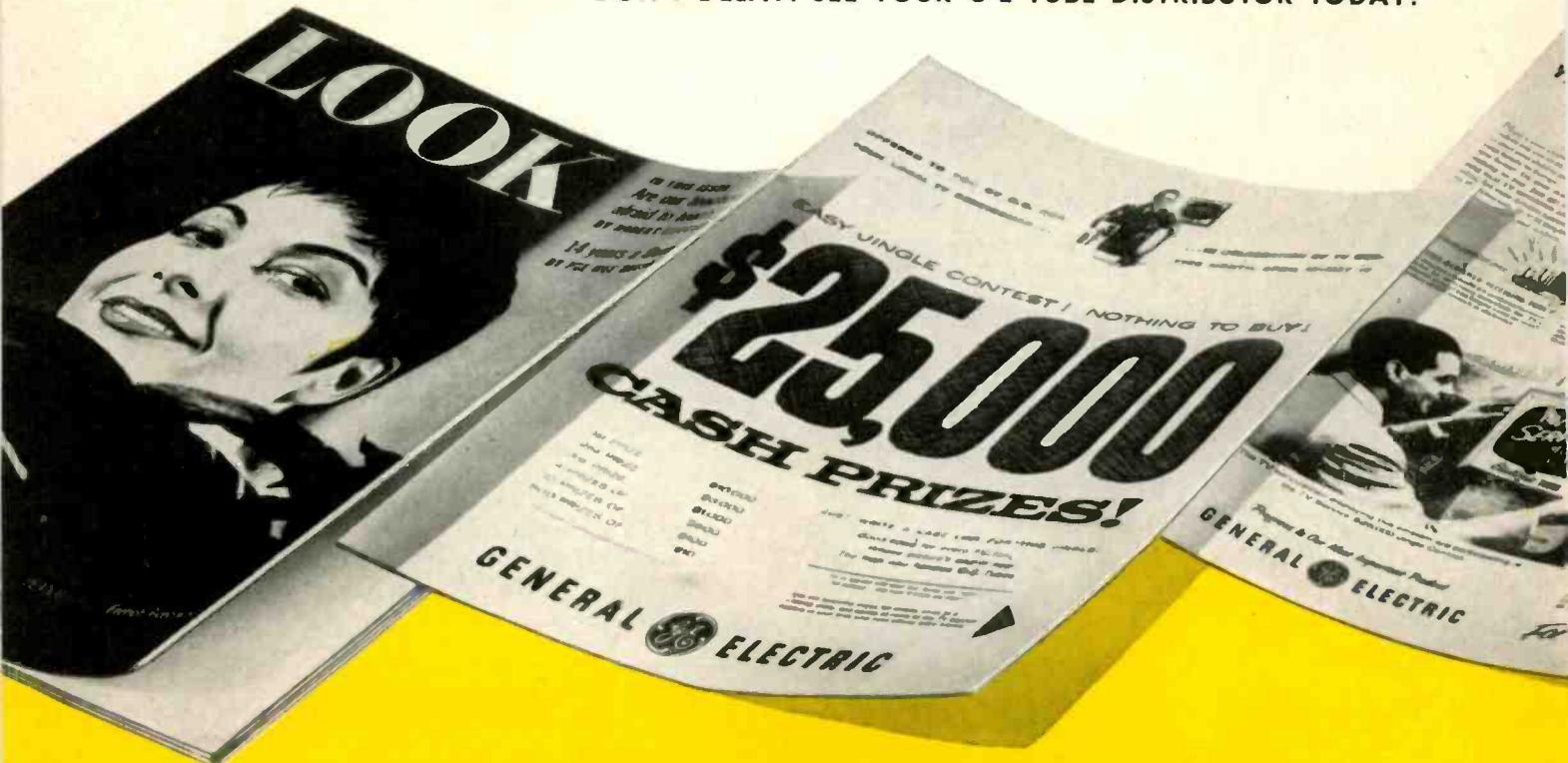
**HELPS IDENTIFY YOU AS  
A SOURCE FOR G-E TUBES.  
GIGANTIC CELEBRATION WILL FEATURE:**

\$25,000 in cash prizes for your customers.

Mammoth G-E ad in LOOK that builds recognition for your efforts. Your name and address can be listed.

Big kit of unique promotion items for your own TV Service Month.

DON'T DELAY! SEE YOUR G-E TUBE DISTRIBUTOR TODAY!



# STARTS APRIL 19TH!

## improve service business everywhere!

You will get the full benefit of TV Service Month! For 30 days new customers will visit your shop to get their entry blanks for the big G-E \$25,000 contest. \$10,000 first prize . . . plus 816 other cash prizes!

And here's sensational news! Your name and address can appear in G. E.'s announcement in LOOK—in subscribers' hands and on the newsstands April 19. You can be part of the industry's greatest public-relations program to date. 20,000,000 people see LOOK. It's read in homes all through your neighborhood.

See your G-E tube distributor immediately so your name may be included! In order to spark sales still more, your G-E distributor has ready for you a big kit of unique promotion items—each new, different, a winner. Read about some of them at right . . . then see or phone your distributor today! Tube Department, General Electric Company, Schenectady 5, New York.



A man in a suit is holding up the streamer. Below him, text reads: "You too can display this colorful window emblem! Pinpoints your shop as Contest and TV Service Month headquarters."



Large window streamer. Use it to announce a special attractive TV Service offer that will turn callers into buyers.

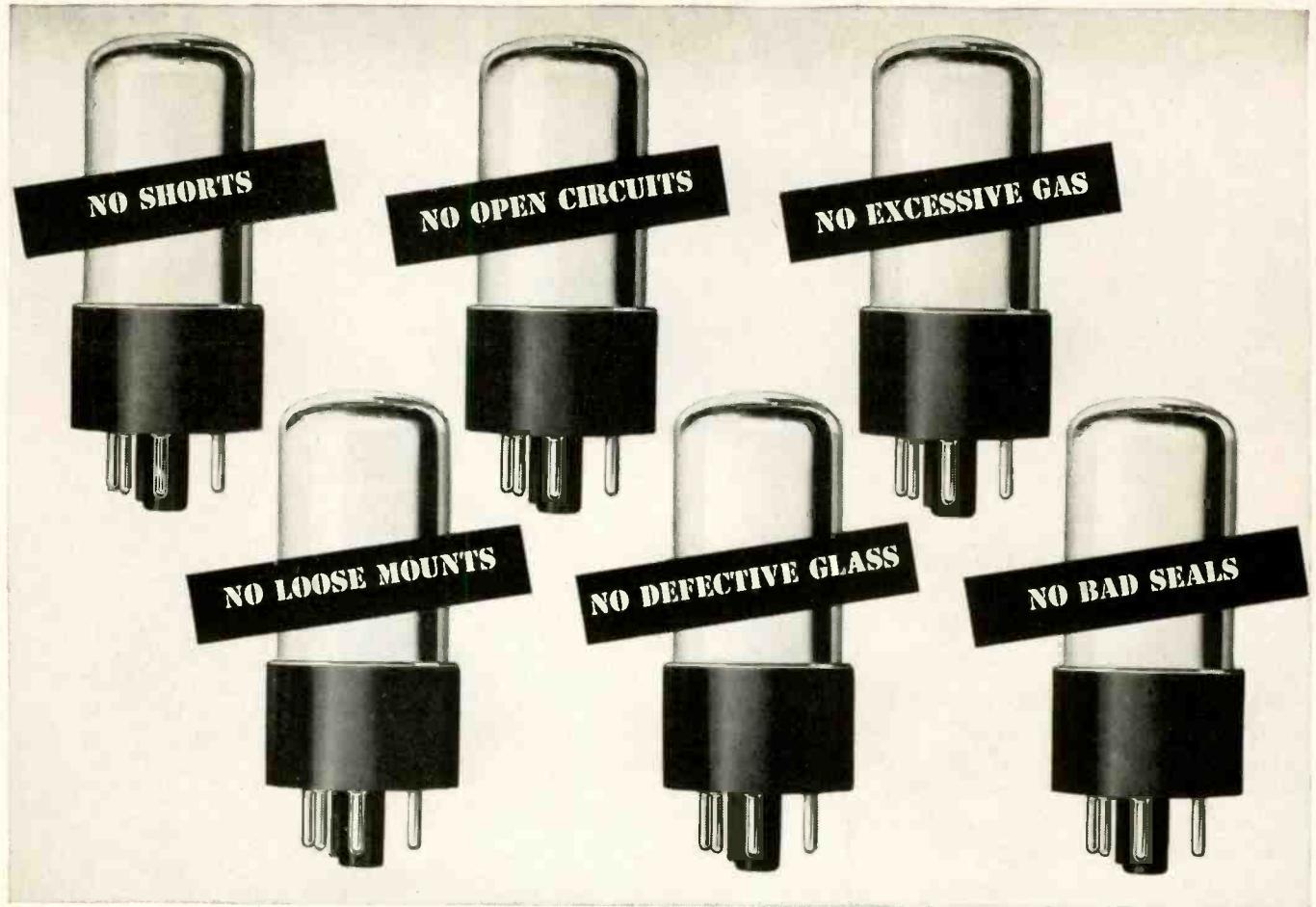


Footprints—plastic, self-stick—for sidewalk before your door. They invite customers in!



Talking postcard . . . brand-new, it's a record that actually plays on TV owners' phonographs! Also, regular advertising postcard. Both tell story of prize contest—help you promote TV Service Month profitably.

GENERAL  ELECTRIC



# WHY WESTINGHOUSE "PRE-SHIP" TEST ELIMINATES THESE CALL-BACK CAUSES

*Where should final testing of receiving tubes take place?* Not in the plant where they're made—not if they're going to be shipped any distance to a warehouse. Tubes can and do become defective in transit because of excessive and improper handling.

*How about testing at the warehouse?* Right! By testing at the warehouse, you eliminate from shipment those tubes that have become defective in transit, tubes that cause you call-back trouble. Westinghouse, therefore, gives tubes a final "pre-ship" test at its field warehouses.

And this testing isn't done months before your order is shipped. Just before Westinghouse ships tubes to your Westinghouse distributor, they are "pre-ship"

tested to make sure that every one will function properly, operate efficiently.

In effect, your tubes are tested by Westinghouse, one-by-one, just days before they reach your stock. This extra Westinghouse precaution against call-backs will save you money and time every month.

*Why put up with call-back complaints and extra handling of rejected defectives?* You don't have to! Provided you stock and use Westinghouse receiving tubes. Because the Westinghouse "pre-ship" test policy virtually eliminates those irritating field failures. Call-backs cost you hard cash. Don't let them rob you of any more profit. See your Westinghouse distributor and stock up on Westinghouse receiving tubes—the tubes "pre-ship" tested to guarantee dependability and top performance.

ET-95064

YOU CAN BE SURE.. IF IT'S  
**Westinghouse**

**RELIATRON® TUBES**

WESTINGHOUSE ELECTRIC CORPORATION, ELECTRONIC TUBE DIVISION, ELMIRA, N. Y.

**Fabulous.. Revolutionary  
.. Completely New..**

# MIGHTY MO\*

\*Pat. No. 2680196, others pending.

**the most powerful antenna  
ever built, featuring TESCON'S  
NEW exclusive DDP** (Double Diamond Phasing)

Tescon's miraculous Mighty Mo will make prime signal areas out of even the deepest fringe sections of the country.

Mighty Mo . . . complete with DDP, an entirely new and revolutionary concept of phasing, will trap even the weakest signal and perk it up to a clear, brilliantly sharp, deep-toned picture. Tescon absolutely guarantees that each and every Mighty Mo will perform where other antennas have actually failed!

Unshakeable proof, substantiated by exhaustive field tests, definitely shows that Mighty Mo does more than any other antenna manufacturer loudly claims his product will do. Theoretical ratings will never pay off. Rely on tested results . . . that's your real proof, that's your money in the bank.

#### Here's Mighty Mo's proof

...the results of ACTUAL

#### FIELD TESTS.

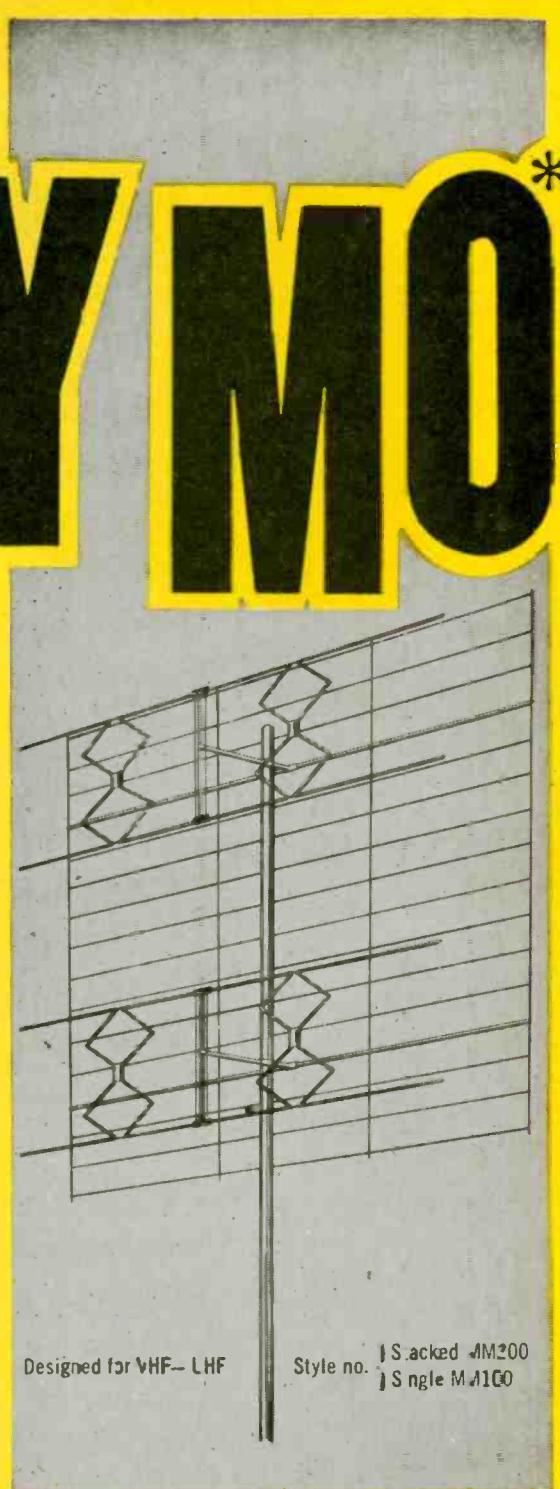
- On channels 2 to 13, Mighty Mo outperforms every other antenna manufactured today.
- Higher uniform gain over all channels. Does not vary more than  $1\frac{1}{2}$  D.B. on any channel across band. Perfect on color TV.
- Clearer, sharper, deeper pictures on all channels.
- Higher average gain than 6 of the most advertised antennas.

#### STOCK

this red-hot, fast moving,  
money-making antenna...right now!

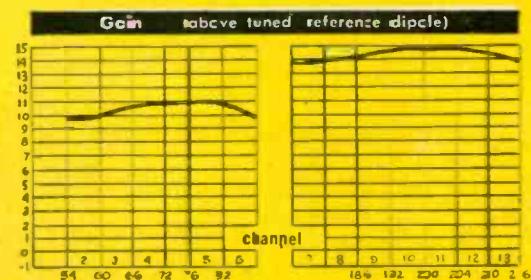
#### MIGHTY MO'S FEATURES

- DDP (Double Diamond Phasing) precision-timed phasing regulator enables the weakest of signals to be trapped and then boosted to a clear, magnificently sharp, photo-like picture.
- Flat response . . . a must for color reception.
- Largest screen area . . . over 70 sq. ft. Screen elements spaced less than 1/10 wave length apart for maximum reflector efficiency.
- Highest front to back ratio ever achieved.
- Absolutely no rear pick up or co-channel interference . . . no "Venetian blinds."
- $\frac{1}{2}$  wave element spacing on all channels for super-gain.
- Completely preassembled . . . not an erector set type antenna.
- Uniform gain response . . . no erratic audio and video patterns.
- Thoroughly tested for mechanical stress and strain . . . exceptionally rugged.
- Guaranteed to perform where other antennas fail.



Designed for VHF—LHF

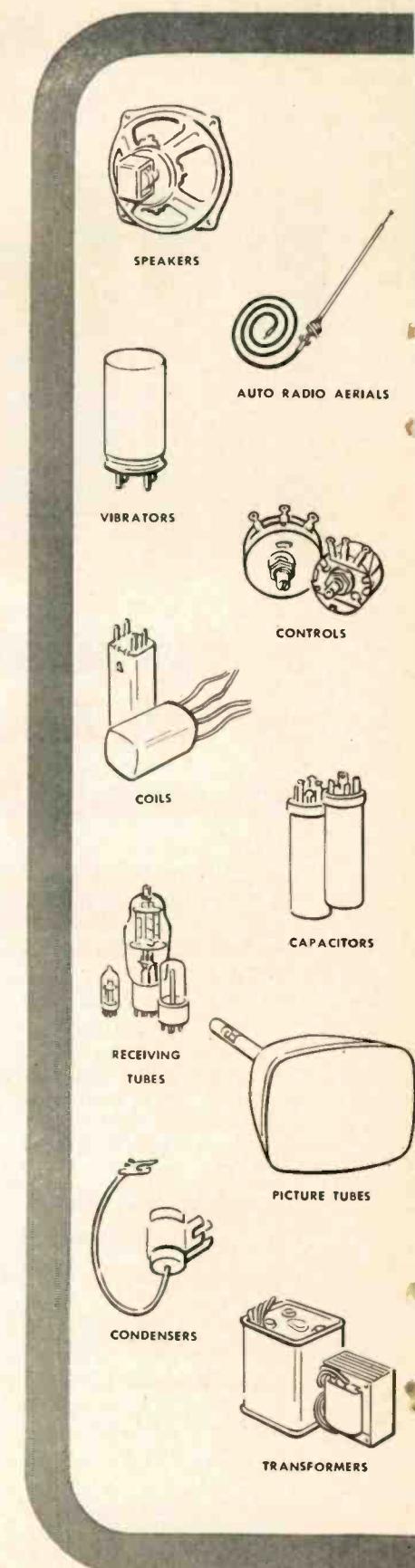
Style no. 1 Slanted AM200  
S Single MA100



Most uniform gain response ever recorded.  
Does not vary more than  $1\frac{1}{2}$  D.B. on any channel.  
Extremely important for quality color reception.

**TESCON TV PRODUCTS COMPANY**

SPRINGFIELD GARDENS 13, NEW YORK



# *Going Places*

## *and doing things for the electronics business*

You've got to be on your toes to keep pace with a business as modern and ever-changing as electronics. And that's where Delco and General Motors can help you.

In addition to a fine line of electronic parts, these two great names offer you many extra services and sales advantages that put you a step ahead in this fast-moving business.

Both Delco and General Motors have long been respected throughout the industry for quality parts, dependable service, business integrity and assistance to customers.

Delco is the sole source for special application parts used for original equipment replacement for a ready-made market of more than 13,500,000 Delco-manufactured auto radio sets, plus being the source for the most important universal replacement parts groups.

Delco's current bulletins and field schools play an important part in keeping the industry well posted on new developments.

These are but a few of the many exclusive advantages in handling Delco's fine line of electronic parts. See your Delco Electronics Distributor today and get all the details.

A GENERAL MOTORS PRODUCT



GENERAL  
MOTORS



A UNITED MOTORS LINE

PRODUCTION RATE

TV PICTURE TUBES

AS OF DEC. 1st = PLACES

CBS-HYTRON IN "BIG THREE"



Another demonstration  
of confidence  
in CBS-Hytron  
advanced-engineering



**CBS-HYTRON** Main Office: Danvers, Massachusetts  
A Division of Columbia Broadcasting System, Inc.

# TECHNICIAN

## & Circuit Digests

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

### Stop Bypassing the Technician!

Every time a distributor sells direct to the public, he is taking legitimate profit out of the pocket of his Number One customer, the TV-electronic technician. Despite some progress made in eliminating this evil, too many distributors continue to give technicians and dealers the same old bypass.

In most fields, the distrib means just what he says when he hangs out a "wholesale only" sign. He knows there are good reasons for maintaining the manufacturer-to-distributor-to-dealer and technician-to-public sequence of relationships. He appreciates the distinct function of each group.

The distributor plays the vital role of funneling into a community a staggering variety of products from many manufacturers. He seldom has the facilities, know-how or manpower to bring them to the entire consumer public. So he sells to dealers and technicians, whose many shops, training and numerical superiority enable them to reach the mass consumer market.

Most replacement business is handled through the orthodox distribution set-up. The small part that is bypassing the technician-dealer because unethical distribs are selling to the consumer is significant enough to do damage. Independent distributors seem to be the worst offenders. Factory-owned distribs, often guided by the

manufacturer's policy of no parts sales to the public, generally give less trouble, but have been known to stray when the home office slips up in its local policing.

Two thin alibis offered by the wholesale-retail hybrids are the difficulty involved in checking all customers and the necessity to meet competition. To the first excuse, we say that it doesn't take much time or trouble to check a business or registration card. Many wholesalers are doing that right now. As for the other excuse, Mr. Distributor, you're giving your competitor just as much cause for retail selling as he is giving you. One of you is going to have to stop first, thus taking the pressure off the other fellow. Ducking away from this attitude brings to mind the wartime gag, "Let's buy up all the coffee and sugar we can before the hoarders get it." Realistically speaking, a legitimate sell-to-trade-only policy, properly publicized, will strengthen your support from the technician-dealer, your most important customer.

As far as customer support is concerned, you, Mr. Technician, can do quite a bit to help yourself. Throw your weight around. Many of you are doing that right now, through your associations and on an individual basis. Needle the fellow who is taking money out of your pocket. Give preference to the one who pays attention to his own "wholesale only" sign.

### Extra Hands

The technician, whose very livelihood is the result of advances in science, is often content to live one part of his professional life in the pre-technological past.

He works on highly complex, very specialized pieces of equipment. In place of the guesswork of only two decades ago, he now has an expensive array of professional test instruments. Specialization has gone so far—that testers are being made and sold for use on a single type of component, such as flybacks or capacitors. The successful tech would no more forego these aids than he would use a horse-drawn wagon to take him on house calls in preference to a modern automotive wonder. Yet we have seen many a shop equipped up-to-the-minute in most respects, where long-nose pliers and diagonal cutters just about represent the full complement of hand tools.

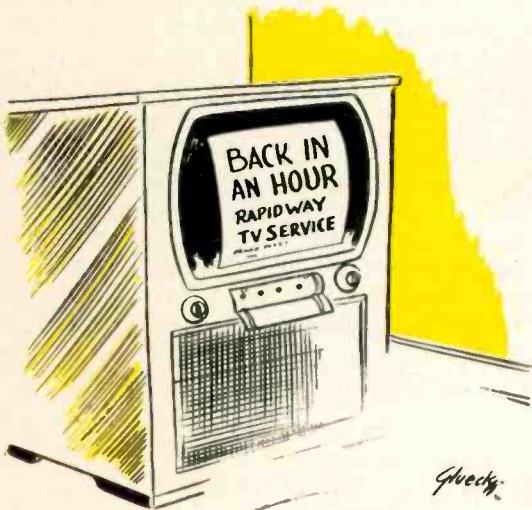
There are tools available that provide the grip—the needed third hand—for one-man soldering, 3-, 4-, 5- and 6-way multiple tools, tools streamlined to fit the service kit, specialized aids only for retrieving slugs in turret tuners or only to facilitate dial-cord stringing, tools for work on miniaturized assemblies, a variety of special-purpose soldering irons and guns in place of the single iron of the past—the list is endless.

As compared to the other expenses of doing business, the investment in a full complement of decent service tools—extra hands—is ridiculously small. Potential savings in time, money and temper are so great that there is no excuse for technological workers, of all people in this technological era, to go on placing full reliance on pliers, cutters and the ten groping fingers of only two hands.

# Tuning In the

**WHEN A CUSTOMER SAYS** "You just fixed this set and it's broken again," he's telling you in plain English that he expects you to put the receiver in operation again without charge. So once again here's a reason for proper record-keeping. That "just-fixed" phrase can cost you real dough. Be sure to (A) make guarantee terms register with folk, and (B) keep records that you can check whenever you start to talk about a come-back job with a customer.

**BETTER BUSINESS BUILDERS:** A Southwestern dealer "trains" all new servicers, even the experienced ones, and provides each with a brochure he's written entitled "What Every Young TV Technician Should Know" . . . Owner of a large TV-appliance store in a Midwestern city uses the "I'll-check-it-personally" line in building customer good will. And he does just that, making the first inspection of each receiver brought in because he loves the servicing business and likes to keep his hand in.



**SOME LAST-MINUTE GUESSTIMATES:** Color-TV sets to be sold in '55 to consumers 175,000; total production 220,000 . . . Increase in sales of radio batteries 15% over '54 . . . Increase in sales of phono needles, 30% over '54 . . . Sales of magnetic tape for non-commercial use should be at least 40% over last year.

**EAR-TO-THE-GROUND DEPARTMENT:** New TV set to hit market with a very famous brand-name on it? The maker is not in the electronic field now . . . Trend to open suburban branches by department stores in many localities will siphon off some service business from local outfits . . . Look for a new inventory plan on pix tubes by a large maker; also a most attractive offer by a battery manufacturer . . . And some economically priced playback instruments can help boost sales of pre-recorded tapes this year.

**DON'T BLOW YOUR FUSE UNNECESSARILY!** Your shop fuse, that is. Few shop owners realize that outside heat can decrease the capacity of fuses to carry their rated load and can cause premature blowing or overheating of adjacent electrical components. There is about a 10 percent loss of capacity of the fuse for every 10-degree rise in the adjoining temperature, says G. Berthel, of Jefferson Electrical Co., Bellwood, Ill. So locate your fuse box in a relatively cool spot, away from heat-generating equipment. The top limit of ambient temperature should be 90 degrees.

**MATCH THESE TRANSISTORS!** Now in commercial production by CBS-Hytron are transistors no bigger than the head of a wooden match. Designed for use in hearing aids, each is hermetically sealed in a cylindrical metal case that is about a quarter-inch long and an eighth-inch in diameter. Three of these, with a combined weight of less than a penny, are used in one hearing aid.

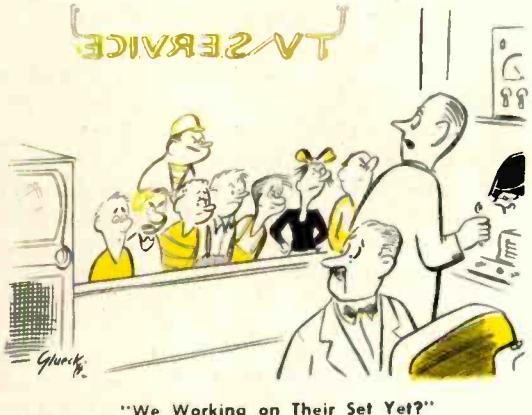
**GOLDEN WORRIES**—the kind you have when you're a big corporation with a \$1-million debt instead of a hole-in-the-wall outfit with no outstanding bills—are the subject of reflections by raconteur Charlie Golenpaul, Aerovox's articulate VP . . . like the true story about the fellow out West who moaned over having to erect a \$500,000 warehouse to handle inventory for the increased business he had picked up . . . or the one about the successful old-time shopkeeper who stopped his son (Harvard Business School, '54) from taking inventory of his gigantic stock with this explanation: "Listen, when I started in business 35 years ago all I had was a gross of pins, a gross of buttons, and two dozen spools of thread. Now look at the thousands of boxes full of goods. So far as I'm concerned, it's all profit."

**HUMOROUS (?) SIDELIGHT** to the recent N. Y. C. licensing hearings: After listening to one service tech's lengthy recital of his woes, one of the councilmen turned to a fellow council member and quipped, "Maybe we should license the consumers!"

**NOVEL WAY TO DRUM UP BUSINESS** used by a New York dealer, Electronic Mart, Far Rockaway, N. Y.: The firm distributed circulars offering home calls at a fixed fee. Attached to each circular was a perforated sticker carrying the outfit's name, address and phone number. Recipient was urged to paste sticker on back of TV, and was offered a free 10-point check-up "if our technician sees attached sticker on or near your TV set on his first visit."

**CR TUBE MESH!** Precision glass screens of 300 mesh (90,000 holes per sq. in.) are being made by Corning Glass Works for cathode-ray tubes, replacing parts that are usually made of copper by an electroplating process.

# Picture.....



**SOME "DON'TS" YOU MAY HAVE OVERLOOKED:** Never use furniture polish on customer's sets unless you're a cabinet expert . . . Be sure to remove all objects, such as lamps, vases and pictures from top of set before starting to work. Your firm is responsible for damage done in the home . . . Make certain that all "secondary" services are operating correctly on a set before you leave. These include AM and FM radios, phonos and so on. An Iowa technician made a 40-mile trip to a customer's home the day following repairs to a TV receiver. Seems he'd forgotten to re-insert a phono plug, and the owner called to say that "your man did something to the phonograph, and it won't work." An 80-mile ride was necessary—and no charge could be made.

**ELECTRONS KAYO MOTORCYCLES:** The greater effectiveness of radar speed detection devices over the conventional motorcycle cop is foreshadowing the disappearance of the latter. In New York City alone, 186 of the 336 vehicles in the motorcycle corps will be retired. Those remaining will be principally used for escort service and parking supervision, rather than in nailing speedy motorists.

**GET SET FOR A SPRING DRIVE FOR more service volume.** Some ideas: 1. Advertise via direct-mail, in newspaper ads and so on that this is the right time to install **LIGHTNING ARRESTORS**. 2. Offer to inspect antenna systems, roof-to-set. Point out that such systems have taken a beating during the winter. 3. Go after those old, inoperative sets in the home. Offer to fix 'em for use by owners or as gifts to orphanages, hospitals and other institutions.

**LOW POWER TV,** for small communities where operation would not otherwise be economically feasible, is under consideration by the FCC. Regulations may be relaxed to permit satellite TV stations in cities with population under 50,000. Minimum power requirements would be reduced for these operations.

**CLOSED-CIRCUIT TV:** Recent General Motors celebration of its 50 millionth car included nationwide coverage for business use over an extensive closed-circuit TV network. Thousands of people in 52 cities throughout the country were able to witness the event. In addition to 22 theater projection units, 30 newly developed mobile units designed specifically for hotel audiences were employed. Built by General Precision Lab, the mobile sets project images from 4x6 ft. to 9x12 ft. in size, suitable for audiences of from 50 to more than 500 people.

**"USING THE USER" IS A FAVORITE AND PROFITABLE** technique employed by merchants in all sorts of businesses, and it's a good bet for the service department, too. Suggestion: Launch a direct-mail campaign urging your satisfied customers to recommend others. Thank 'em for their patronage, and tell them that you'll appreciate service leads. You can offer a small gift to those who furnish names resulting in service work.

**TAPE BREAKS SOUND BARRIER.** During a Navy test flight of a Grumman Cougar Jet, a self-contained battery-operated tape recorder was sent aloft with the pilot to record on-the-spot reaction. It survived a super-sonic power dive over Long Island, N. Y., from an altitude of 40,000 feet. The recorder was Model 777-1, made by J. C. Warren Corp. of Freeport, L. I.

**COLLECTIONS SLOWED UP A BIT LAST MONTH** in many spots, **TECHNICIAN** editors learned during field calls. The reason: Heavy Xmas spending put the bite on many a householder's bank account. Generally, however, the credit picture isn't bad, though in some of the big cities plenty of sharp customers are out to rook the dealer. Some run up bills for repairs, refuse to pay on one pretext or another, then switch to other "victims" when the set goes haywire again. Favorite alibi of the sharpies is that the work wasn't performed satisfactorily. Still other chiselers, who are a bit more on the ethical side, battle over bills until they are able to make a compromise which just about always spells dead loss to the shop.

**HEAR ABOUT THE TWO TV ANTENNA MAKERS** who met on the street, and after shaking hands . . .? (No, you didn't!).

## CALENDAR OF COMING EVENTS

**Feb. 11-13:** Audio Fair—Los Angeles, Alexandria Hotel, Los Angeles, Calif. Sponsored by Los Angeles Section of Audio Engineering Society.

**Mar. 21-24:** 1955 Institute of Radio Engineers National Convention, Kingsbridge Armory, New York, N. Y.

**May 16-19:** The 1955 Electronic Parts Show, Conrad Hilton Hotel, Chicago, Ill. Sponsored by Assoc. of Electronic Parts & Equip., Mfrs., Radio-Electronic-Television Mfrs. Assoc., West Coast Electronic Mfrs. Assoc., National Electronic Distributors Assoc., Sales Managers Club (Eastern Group).

# Localizing Hard-to-Find

## How to Track Down Intermittent Synchronization,

By HARRY MILEAF

• One of the more complex troubles the TV technician encounters is loss of horizontal synchronization. This is so because the horizontal deflection circuit is used to control various other circuits in present-day television receivers, and misleading symptoms are often encountered as a result. There are four main faulty conditions that arise which are the most time-consuming and difficult to correct. They are: 1. Intermittent Sync 2. Instability 3. Delayed trouble 4. Slow drift.

**Intermittent Horizontal Sync.** When this condition is present, the set usually operates normally for a definite length of time, then falls out of horizontal sync for a couple of minutes, then works properly again. Since the condition is present for only a few minutes, there is usually not time enough to locate the faulty part. In the majority of the cases where such a condition exists, the serviceman finds that the set returns to normal operation while he is tracing the source of the trouble, making it necessary for him to go on to another set and wait for the trouble to recur.

**Horizontal Instability.** This type of trouble is difficult to locate because the horizontal sweep signal is actually locked into the correct frequency. The picture has a tendency to either rip or pull out of synchronization,

but actually doesn't, at least not all the way. Picture elements either quiver, become "hashy," or tear out momentarily. When this type of condition is present, the television receiver is really functioning properly except for very minute portions of time. When the service technician makes ac or dc voltage measurements in the horizontal sync section, there is every indication that the set is in proper working order.

**Delayed Trouble.** This type takes a few hours, sometimes days, to develop. When the receiver is on the bench, it usually plays perfectly. The set must remain in operation while the technician works on another set, waiting for the trouble to show. When the set finally does break down, it will generally remain bad only as long as the set is in operation. When the serviceman is making voltage and other tests to track down the source of the trouble, he comes to a point at which a resistance check is required. So he turns the receiver off to make the resistance measurement. When the set is turned on again, however, it is operating normally.

**Slow Drift.** This condition, which is probably the most time-consuming of all, is also a kind of delayed trouble, except that the set does not actually go bad; its horizontal frequency characteristics change. After the receiver has been in operation for a few hours (or even days) the

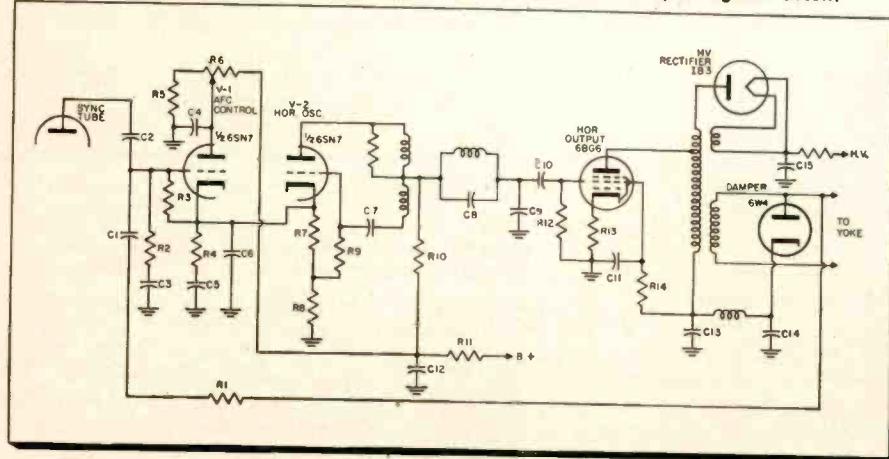
set goes out of horizontal sync. The bench man, in checking the set, finds that a simple horizontal adjustment brings the set back to normal operation. After a few hours (or days) the same condition recurs. Voltage and resistance measurements in the circuit, with the horizontal frequency in or out of sync, do not usually bring about any satisfactory results.

**Why These Conditions Occur.** Fig. 1 illustrates a popular type of horizontal oscillator and output circuit; it is employed by manufacturers at the present time. The afc system is a synchroguide or pulse-width type; a standard flyback output circuit is present. The synchroguide system operates on the principle of matching the phase of the horizontal oscillator, V-2. Control triode V-1's cathode bias is the same as the oscillator triode's. Whenever the oscillator has a tendency to shift its frequency, the phase relationship of the signals applied to the input of V-1 changes; the bias of the oscillator changes correspondingly, causing the oscillator to stay at its original frequency and phase.

With this method of controlling frequency, it can be seen that any defect that develops in the output portion of the horizontal section can also cause horizontal sync trouble. Naturally any one of the resistors or condensers in the horizontal circuits can cause horizontal sync trouble of some sort, but some components are more apt to break down than others. Resistors in dc current paths or in the high voltage circuit tend to introduce trouble most often.

R1 (Fig. 1) is the resistor most likely to break down and cause the different types of conditions discussed earlier. R1 is part of the network that feeds back the output pulse to be matched against the incoming sync pulse. This resistor is in a high voltage circuit and has a tendency to "carbonize." When such a condition develops, there are voltage arcs over portions of the resistor, and tearing in the picture is seen. A "carbonized" resistor can also cause a corona spray to develop; this makes the picture "hashy." Sources of such trouble may also

Fig. 1—Commonly-used horizontal deflection and afc circuit: synchroguide circuit.



# Horizontal Sync Troubles

## Instability, Delayed Defects and Slow Drift

lie in other portions of the high-voltage circuit. Corona spray can easily be detected because of the pronounced hissing that is characteristic of it; the effect is visible as a violet haze in a dark room.

R5, R6, R7 and R8 are the resistors that carry the current of control triode V-1; these resistors have a tendency to heat up. Any variation in the resistance of R5 or R6 will

across it is developed the horizontal sweep signal that is fed to the output tube. R10 has been known to change value intermittently, causing rippling or tearing in the picture.

The other resistors in the horizontal output section can also be the source of improper control-tube operation. If any of these resistors changes in value, or varies intermittently in value, the horizontal output signal changes with it, and the phase of the pulse that is taken off at the horizontal-output transformer and fed to the control tube changes, as well, causing a shift in oscillator frequency. This condition may be more readily identified by noting whether any change in the width of the picture takes place prior to the shift in frequency.

### Condenser Woes

The components that most commonly cause trouble in the horizontal section (excepting the tubes) are the condensers. Condensers in the B+ circuit of horizontal stages have a tendency to either break down entirely, or to develop leakage. It is also known that condensers are more easily affected by heat than other components in a television set. Although heat may only cause a relatively slight change in the capacitance of the condenser, this slight change may be responsible for a considerable change in oscillator frequency.

C1 is the biggest offender in the type of circuit we have been discussing. This condenser has a few thousand volts across it, and manifests a notable tendency to break down. Usually C1 arcs over at various intervals, producing a tearing condition. If the trouble is fairly consistent, R1 usually becomes charred.

When C2 breaks down, the leakage through it applies a positive voltage to the grid of V-1. This can cause the frequency of the horizontal oscillator to go so far off that the high voltage is lost entirely.

C3, C4, C5 and C6 are decoupling condensers that are used to keep the voltages at the cathode and the plate of the control tube V-1 constant, so

that spurious pulses will not affect the operation of the horizontal oscillator. When these condensers go bad, the picture will rip and tear in the presence of the slightest interference.

C7 is the oscillator coupling condenser, and has the most effect on the frequency of oscillation. When the capacitance of this condenser changes, due possibly to the heat developed in the television set over a period of time, the oscillator frequency will shift.

C8 shifts the phase of the horizontal waveform; a defect in it is most

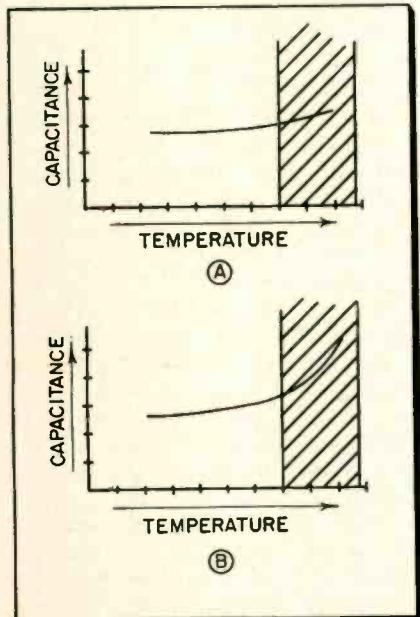


Fig. 2—Effect of heat on the capacitance of (A) a good condenser and (B) a bad one. The shaded area represents the temperature of the TV set after three hours of operation.

change the plate voltage applied to tube V-1, and thus change its characteristics; the horizontal frequency will shift as a result. Defects in R7 and R8 are more apt to affect the operation of the oscillator than the control tube, since they are in the current path of oscillator triode V-2.

R11 is the B+ decoupling resistor for the oscillator and control triodes; an increase in its value can lower the plate voltages applied to the triodes and shift the horizontal frequency. C12, the decoupling condenser, tends to nullify any effects produced.

The resistor that has the greatest effect on the operation of the horizontal oscillator is R10. R10 is the plate load resistor of tube V-2;

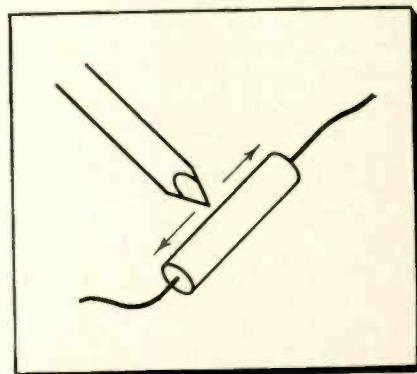


Fig. 3—Soldering Iron method of inducing condenser trouble. Tip of the iron is moved across the suspect condenser. It is safer not to let the iron contact the condenser.

often responsible for the shifty phase line that appears down the center of the crt.

**How to Locate the Trouble.** Considering information presented earlier in our discussion, we can see that normal troubleshooting procedures cannot be used to find the faulty part. When an intermittent, unstable, delayed or slow drift condition is present, the responsible part will almost invariably provide a normal resistance indication, while voltage measurements will prove difficult to interpret.

Intermittent and unstable horizontal sync conditions are often caused by bad internal connections in resistors, condensers, and even in the horizontal-oscillator coil. The standard practice employed when such troubles are being sought is

(Continued on page 60)

# Alignment and Adjustment

*The Circuits Themselves, As Well As the Test Instruments, Have*

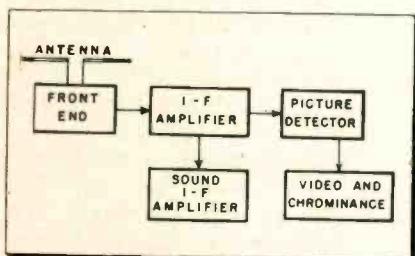
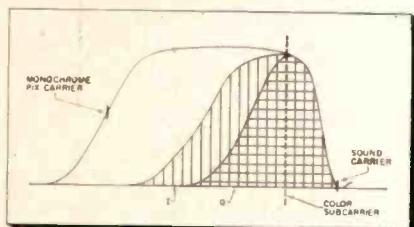


Fig. 1—Block diagram of color signal circuits.

Fig. 2—Bandpass requirements of the color i-f.



• A fundamental block diagram of a color TV receiver is shown in Fig. 1. The circuit arrangement is basically that of an intercarrier receiver, but the circuits are considerably more complex than those used in black-and-white reception, in order to avoid distortion of the color-signal voltage. The principal differences are found in the bandpass of the tuned circuits, number of traps, oscillator fine-tuning range, and details of the 4.5-mc sound i-f circuit.

Fig. 2 shows that the color subcarrier is located at the high frequency end of the i-f response curve, in the region toward the sound carrier. The Q-signal sidebands extend equally to the left and

ROBERT G. MIDDLETON  
SIMPSON ELECTRIC CO.

right of the color subcarrier frequency, while the I-signal sidebands extend past the Q limit in one direction. The I-signal sidebands extend to the same limit as the Q-signal sidebands in the direction of the sound carrier, but extend past the limit of the Q-signal sidebands in the direction of the monochrome picture carrier.

It is not difficult, in view of these facts, to understand why the pass band of the front end and i-f amplifier should be aligned with a flat-topped response and with a bandwidth somewhat in excess of 4 mc. These requirements may be compared with those of the signal circuits in a monochrome receiver, in which reception is often deemed satisfactory when the response curve

has a considerably rounded shape, and the bandwidth extends to 3 or 3.5 mc.

The stage gain of a color i-f stage is only about 70 percent of the stage gain observed in a monochrome i-f stage. The reason for this lower figure is the greater bandwidth of the color i-f stage, since the product of gain times bandwidth is a constant in any amplifier. To obtain the required output voltage from the picture detector, it is found necessary to use four of five i-f stages. It is interesting to note, however, that a certain amount of cost can be saved in manufacture of a color receiver by reducing the bandpass of the i-f amplifier somewhat, and utilizing a judicious amount of high-video peaking in the bandpass filter of the chrominance amplifier.

An ideal i-f response curve for a color receiver is shown in Fig. 3. In practice, it is attempted to duplicate the ideal response curve insofar as possible, because departures from specified curve shape which pass almost unnoticed in monochrome reception cause marked distortion in a color picture by causing cross-talk of the I and Q signals. The distortion is most evident at the edges of colored objects in the picture. The sound i-f signal must also be trapped cut to a much greater extent in color receivers than in monochrome receivers, because the 4.5-mc sound carrier will beat otherwise with the 3.58-mc color subcarrier, and produce a very objec-

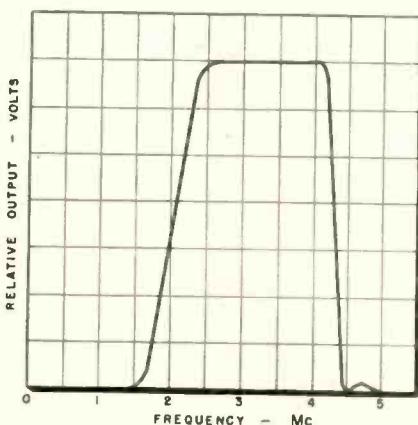


Fig. 4—Typical response of bandpass amplifier.

Fig. 5—Typical response of the I amplifier.

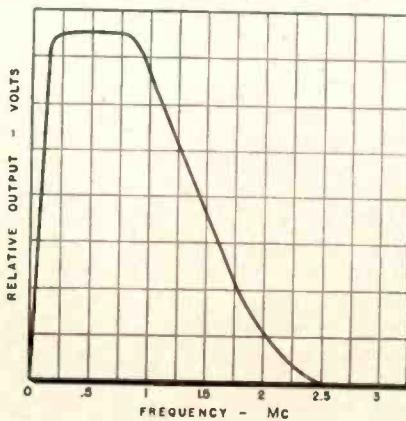


Fig. 6—Typical response of the Q amplifier.

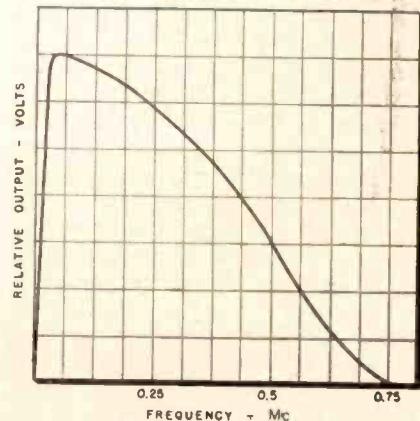
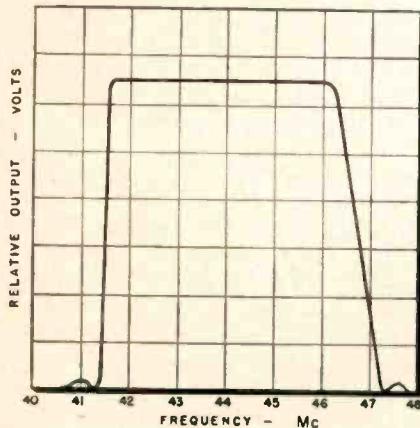


Fig. 3—Ideal i-f curve. Shape is critical.



# of Color TV Receivers

## Specialized Requirements Beyond Those of B & W TV

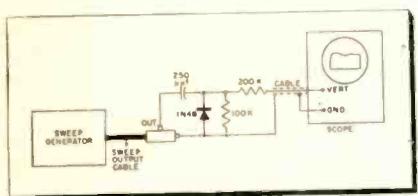


Fig. 7—Test for flatness of sweep generator.

tional 920-kc interference in the picture. While 26 db of sound rejection is a satisfactory standard in monochrome reception, this figure is increased to 40 db in the case of

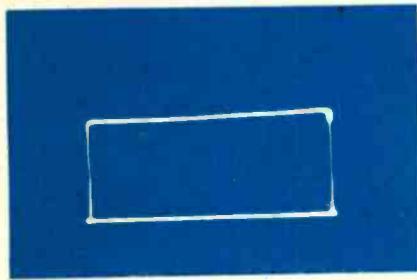
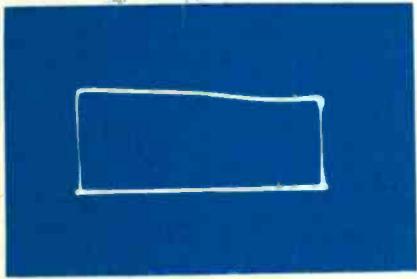
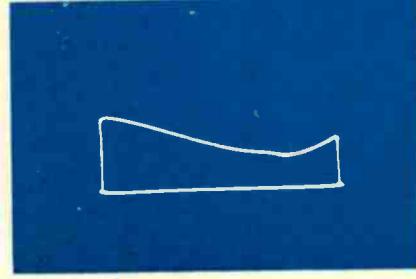
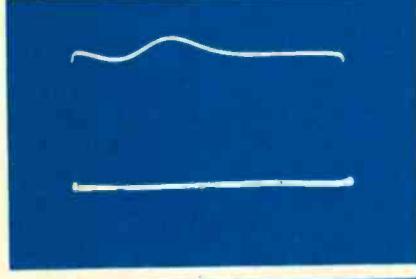


Fig. 8—Channel response curves of flat gen.

Fig. 9—Examples of nonlinear gen. response.



color i-f circuits. Hence, the sound signal is taken off prior to the picture detector in the color i-f arrangement.

The fine-tuning control of the local oscillator has a smaller range in the case of the color receiver, because appreciable latitude in setting is not permissible; unless the sound carrier is placed exactly in the bottom of the sound-trap dip, objectionable 920-kc interference appears in the picture.

The video circuits in a color TV receiver are more numerous than in the case of a monochrome receiver. The video preamplifier has a greater bandwidth than a monochrome video amplifier (approximately 4.2 mc), while the Q amplifier has a bandwidth of 0.5 mc, or somewhat less. Typical video-frequency response curves are shown in Figs. 4, 5, and 6. It is apparent that new marking problems make their appearance in these circuits.

Since the r-f and i-f response curves must be aligned to a greater degree of flatness than is required for satisfactory monochrome reception, the sweep generator which is used in color TV service must meet stricter requirements. Chief of these requirements is flatness of output, or, the uniformity of output voltage over the swept band. The output from a sweep generator is best tested by means of a demodulator probe, as shown in Fig. 7. However, there are certain precautions to be observed in making such tests.

Conventional demodulator or signal-tracing probes may not be found satisfactory, because of excessive length of ground lead, and the tendency to launch standing waves on the cable braid. Instead, a special test probe should be made up, using the approximate constants shown in Fig. 7, and the arrangement should be connected to the sweep-output terminals with very short leads. In case evidence of standing waves should still be found as shown by change of the swept trace when either the sweep-output cable or the scope-input cable is grasped, it will be advisable to place the sweep generator and scope on a large metal

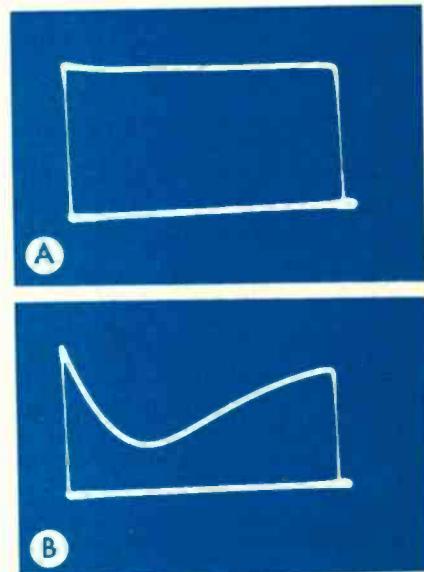
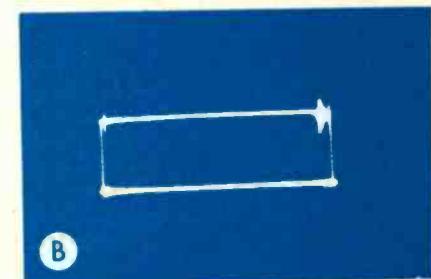
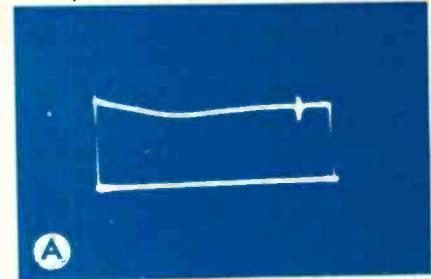


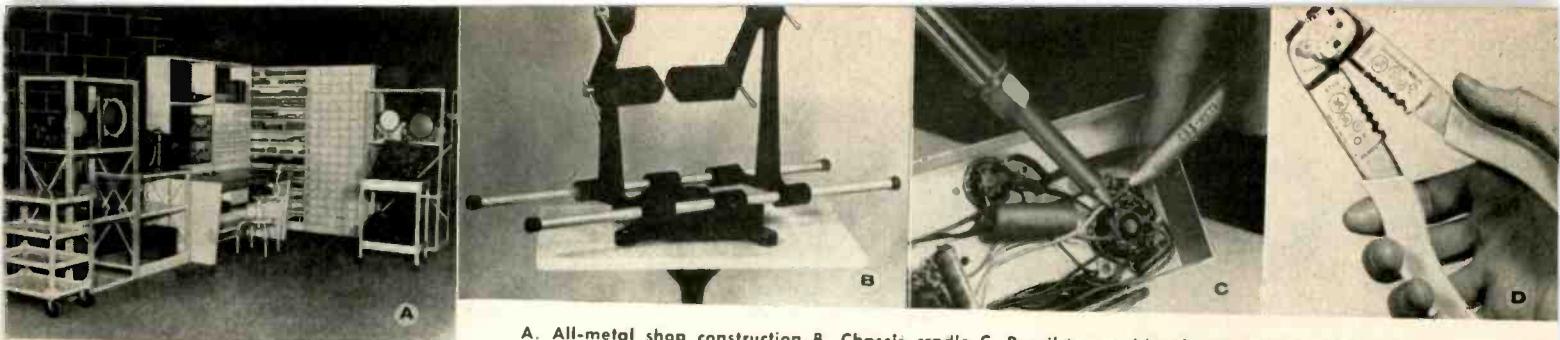
Fig. 10A—Response of line terminated with composition resistor. B—Response of same line when terminated with wirewound resistor.

Fig. 11A—Response with unterminated cable. B—Response with proper cable termination.



plate, to ground both cables to the plate, and to lay the cables closely against the surface of the plate. In this manner, any standing-wave voltage will be harmlessly dissipated, and the arrangement will be found quite "cold" insofar as hand capacitance is concerned.

Fig. 8 shows the typical results  
(Continued on page 58)



A. All-metal shop construction B. Chassis cradle C. Pencil-type solder dispenser D. 4-way tool

## Special Report

# Tools—Extra Hands for

## *Small Investments in These New Items of Equipment*

BY JAMES GRAFTON

TV-ELECTRONIC CONSULTANT

- Only a few short years ago, the different types of hand tools available to the technician could be counted on one hand. Today we have literally dozens of special-purpose and multi-purpose hand tools specifically designed for our use. They all serve one basic function; to help us do the job more quickly and more thoroughly.

The pictures on this page will give you some idea of the tools and equipment recently introduced to the market. A few of the articles shown have been available for some time; we have included these because they are still timely.

### Shop Equipment

When you are trying to squeeze every available inch of usable space out of a given shop area you must adopt means of cutting down your storage and bench space. In Figs. A and K are two versions which have considerable merit. The all-metal construction of racks, workbench and storage cabinets shown in Fig. A lends itself well to easy modification with the changing needs of the shop. And, of course, it has a durability matched by no other type of construction. Assembly is a simple matter requiring only a few hand tools.

The bench shown in Fig. K introduces a refreshingly new idea to

servicing. As shown, the center section of the bench is removable. This is a particularly attractive feature when we are faced with a "Cooker"—an intermittent—that we have to keep turned on and within reach, yet not so close that it clutters up the bench. Naturally, any number of center section can be purchased with the table, so we can wheel the intermittent aside, and insert a fresh section. Added features include: five double outlets mounted on the back apron, with a master switch and glow indicator to show that the table is turned on, two drawers for tools and a full length adjustable shelf at the back for test equipment. The tops are wood; the legs and frame are metal.

Another one of the more attractive space-saving items now getting the industry's attention is shown in Fig. L. It is of transparent plastic construction to simplify the identification of the parts. In addition to being available commercially, it is also used as a packaging bonus by one of the major capacitor manufacturers.<sup>1</sup>

Though chassis cradles are nothing new, a cradle on a turntable is something of an innovation. Here, in Fig. B, is a cradle of all aluminum construction which can flip the receiver to any position imaginable in a matter of seconds.

### Printed Circuits

Many technicians have learned already that you cannot service printed circuit receivers with a high-wattage soldering gun and conventional hand tools. This new approach

in manufacturing has also brought a new dimension to servicing. Today you need chemicals, solvents, lacquers—and silver print, to fill in broken connections. Add to that, also, a low-wattage iron and a couple of inexpensive hand tools and then you can consider yourself prepared to work on these chassis. Kits, such as shown in Fig. M, containing these chemicals and hand tools, are readily available.<sup>2</sup>

### Hand Tools

High on the list of multi-purpose tools are those shown in Figs. D and Q. Each combines 4 separate functions. The pliers shown in Fig. D will shear bolts and screws, crimp solderless terminals, cut and strip wire, and provide a quick gauge for stud, bolt and screw sizes.

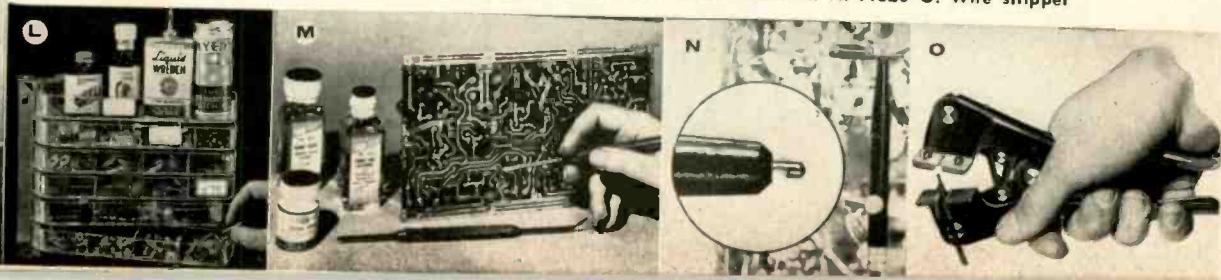
The 4-way tool in Fig. Q was designed expressly for removing and re-installing the backs of TV receivers. It combines 2 separate screwdrivers and 2 sizes of hex sockets to fit all the standard fastenings used by the major manufacturers. The small size makes it attractive as an addition to the service kit.

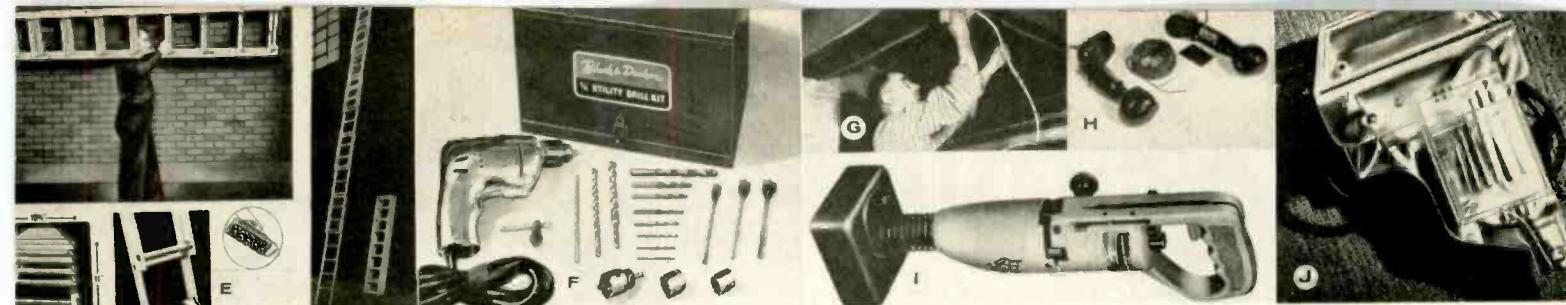
With every technician who has had to remove a TV chassis to retrieve the tuning slug on which he took one turn too many (and who hasn't?) the tool shown in Fig. P will find warm acceptance. It is a slug retriever. A push-button arrangement worked from the handle permits the tool to grip the slug and pull it back into position. It also serves as an r-f oscillator tuning aid.

Another unique special-purpose



K. Roll-away service bench L. Wall-mounting transparent rack M. Printed circuit kit N. Probe O. Wire stripper





E. 40 ft. sectional aluminum ladder F.  $\frac{3}{8}$ -in. utility drill G. Heavy duty stapler H. 2-way phones for antenna work I. Stud gun J. Drill holster

# the Service Technician

## *Will Bring You Rich Dividends in Added Efficiency*

tool recently introduced to the market is the wire cutter shown in Fig. R. This extra-long tool uses a rotary shearing action. It can find its way into places inaccessible to conventional diagonal cutters.

Also in the line of handy wire cutting tools is the dual-purpose long nose and side-cutting "electronic pliers." On this tool, the wire-cutting teeth are close to the tips of the long nose so that the wire can be alternately cut or gripped with only a slight motion of the hand.<sup>4,5</sup>

Completely new in design is the long-nose tool shown in Fig. U. These needle-nose pliers have a  $\frac{1}{4}$  in. jaw opening which is operated by a pushbutton in the handle. At the other end of the tool is a spade shaped probe and neon glow bulb for checking high voltage. The plastic casing lends an attractive shock-proof feature.

The Swiss-made chrome and nickel plated wrench of Fig. S is remarkable for its capacity. Ten different size sockets are included on the 2 heads.

The pin straightener is being marketed in various forms to fit the many conditions of use. In Fig. T the 7- and 9-prong pin straightener is combined with a tube tapper and tube puller to make a handy multi-purpose tool for the service kit. Extra rugged, stainless steel versions are also available. One recently introduced is designed specifically for mounting on the tube checker.<sup>6,7</sup>

Truly "extra hands" are the wide variety of self-supporting insulated clips and probes now on the market. In the probe shown in Fig. N the tip

is retractable—which makes it useful for clip-on use—and very short, to minimize the possibility of accidentally shorting elements in the set. Another popular self-supporting probe and test lead combines both the ground and center test lead in a single cable.<sup>10</sup> Even the long established alligator clip has taken on a new look. One version recently introduced is completely insulated except for the contacting surfaces on the teeth.<sup>11</sup>

### *Installation Equipment*

For 1-man antenna installations the aluminum sectional ladder shown in Fig. E will be of great value. It extends to 40 ft., yet measures only 8 ft. when collapsed. It can be managed easily by one man, and, equally important, it stores in a relatively small space.

If you are planning to invest in a drill for antenna installation work as well as utility drilling, the  $\frac{3}{8}$  in. models will probably give you the most mileage. They are relatively slow-turning (usually 1,000 rpm) which makes them suitable for use with carbide masonry drills, and yet fast enough for general applications. They have been available for some time in heavy duty models; now they are also being marketed in utility models similar to that shown in Fig. F.

Few service operations are more impressive to the TV set owner than watching his antenna being adjusted for best reception through a phone communication between a technician at the set and his partner on the roof. This puts a professional touch

to the job. Battery-powered phone sets such as the one shown in Fig. H will be a worthwhile investment for any shop doing installations. The rugged, low-cost units shown here were a bonus offer from one of the major tube manufacturers.<sup>8</sup>

### **Stud Gun**

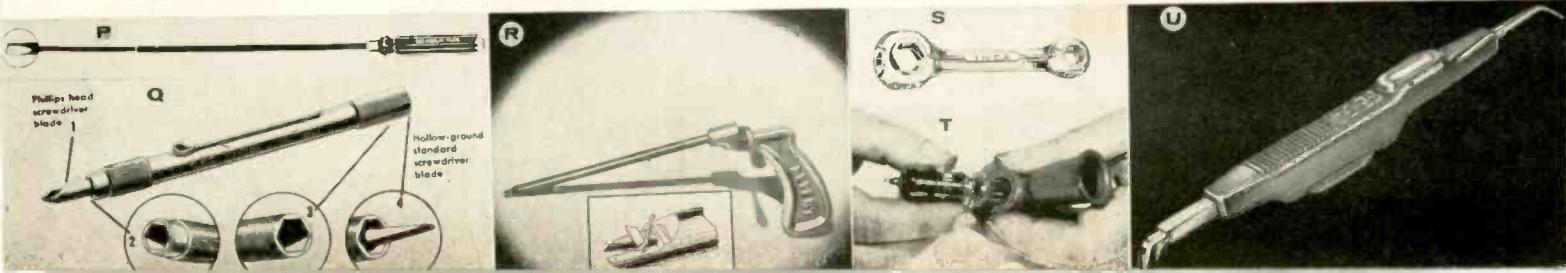
Something of a "sleeper" here is the stud gun shown in Fig. I. If antenna installations are a big part of your business you might investigate the possibilities for this tool. Antenna mounts can be installed in only a fraction of the time taken by conventional means, and no electric power is needed. The bolts are fired into the wall with a charge from the gun. Holding power is claimed to be superior to other masonry bolts. Cost for installing a single bolt—including the price of the cartridge—is approximately 20¢. Elaborate safety precautions make it impossible for the gun to be accidentally fired.

Drilling from a ladder can be simplified considerably by the drill holster shown in Fig. J. In addition to the space for the drill there are compartments to hold extra drills or other tools.

In the course of antenna repair work the technician often finds himself working with antenna mounts or masts which, though in good condition, are beginning to show signs of rust and corrosion. A new zinc-base coating recently introduced is reported to be suitable for painting right over these rust spots. A galvanic action takes place through the

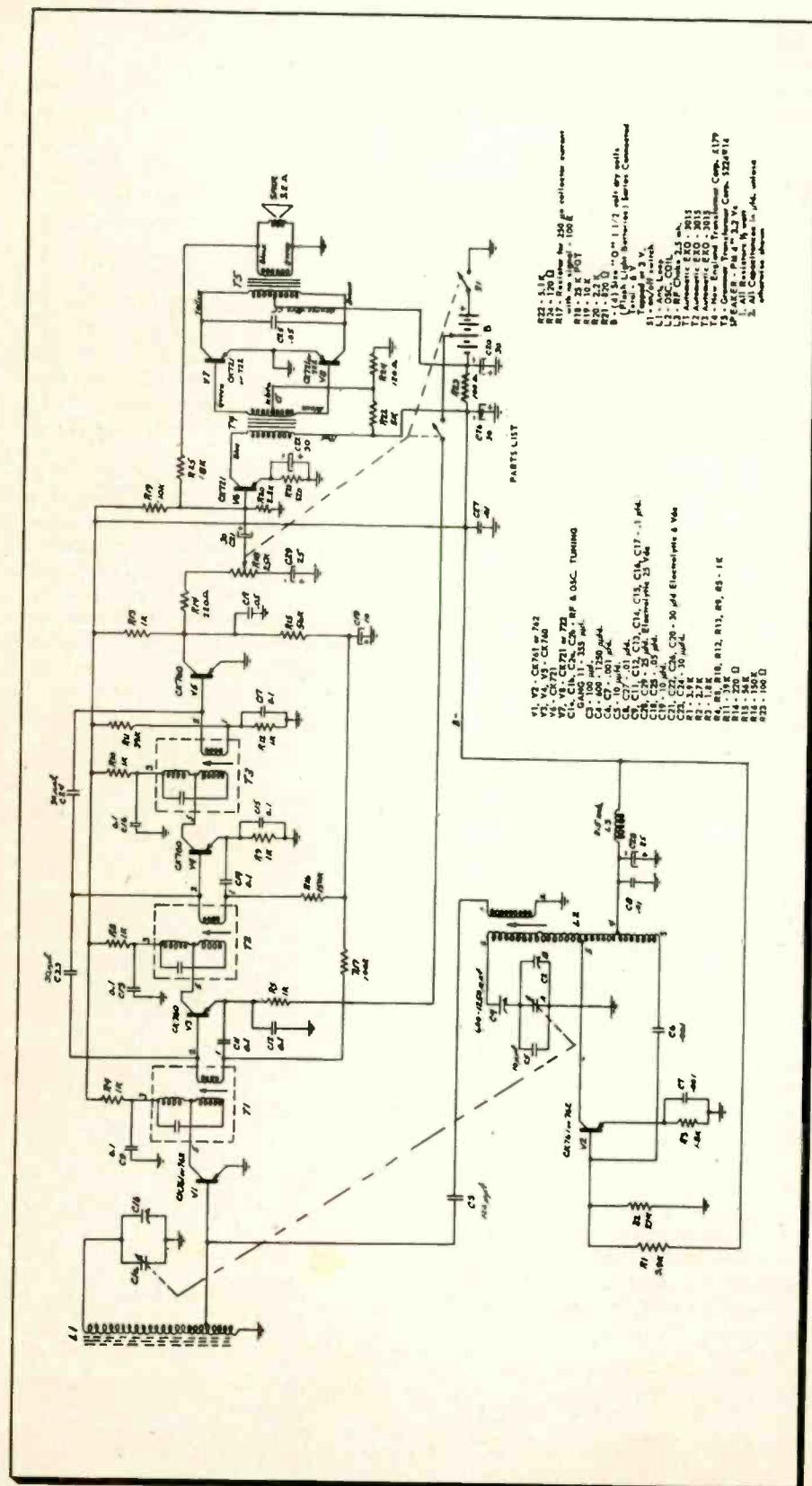
(Continued on page 59)

P. Slug retriever Q. 4-way driver R. Extra-long nose cutter S. 10-way wrench T. Tube puller, tapper and pin straightener U. Probe-pliers



# **Latest Transistor Receiver**

**Features Trouble-Free Life, Compactness and Economy Operation**



Traditional concepts in radio design are rapidly going out the window with the advent of workable, reasonably priced, commercial transistor radios. An 8-transistor tubeless wonder, to be placed on the market next month by Raytheon, is said to outperform most conventional AM radios although it is a very light and very compact portable. Features include:

**Small size:** The portable measures 2 $\frac{1}{2}$  by 6 $\frac{7}{16}$  by 9 $\frac{1}{16}$  in. With batteries, it weighs no more than 5 lbs.

**Economy operation:** Four conventional single-cell flashlight batteries will power the set for 500 hrs. of operation—approximately a full year's use. Operating cost is thus a very small fraction of that for a conventional battery portable and eliminates the necessity of designing a 3-way set that can also be operated from house current to save drain on expensive batteries.



**Long life:** Since transistor life is virtually limitless, and since other components are being operated at the very low voltages of transistor circuits, the receiver promises to be highly durable. In addition, all wiring is insulated with polyvinylite as protection against weather and handling.

**Shockproof construction:** Even when interior components are touched, the radio is said to be safe in bathrooms or when used by persons with wet hands.

(Continued on page 42)

Schematic (left) of the transistor radio is in latest developmental, pre-production status.

# New Uses for Standard Tools

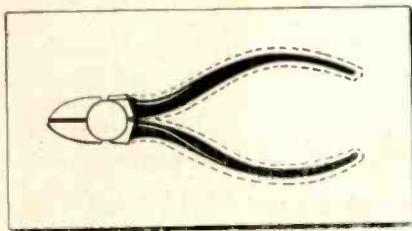
## Tips for Extending the Usefulness of Your Hand Tools

### Removing Chassis Rivets

Rivets holding down parts in the inaccessible parts of a chassis often have to be removed. In such tight places chisels or files cannot be used, so it is necessary to use an electric drill. Frequently, when drilling, the rivets turn with the drill. Then all cutting of the rivet stops. A quick solution to this problem is to solder around the rivet with a very hot iron. Put the solder on heavy. This will hold the rivet securely and the drilling can be quickly completed. A touch of the hot soldering iron will quickly remove all the excess solder when the rivet has been removed.—*Joseph Amorose, Richmond, Va.*

### Shock-Proofing Pliers

In working on intermittent troubles it is often necessary to cut condensers and resistors while the set is turned on. For this operation insulated tools are an absolute necessity. We found a cheap and easy way of shock-proofing our diagonal and



long nose pliers. Strips of  $\frac{1}{16}$ -in. polystyrene spaghetti, similar to those used over transmission line, are cut to length and slipped over the handles. Where the fit is particularly tight we sometimes have to use soap. About  $\frac{1}{2}$ -in. overlap is left on the end for extra insurance.—*John L. Mancini, Winthrop, Mass.*

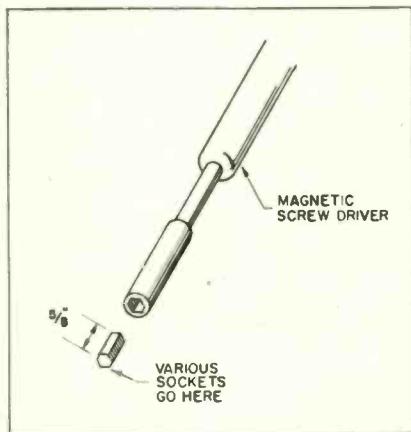
### Tool for Fine Work

A jeweler's saw blade, used out of its frame, is an excellent tool for disconnecting leads where more conventional means might disconnect fine wires at the same spot or damage other components. Peaking coils are a typical example. These are often soldered to the terminals with short leads which may tear out the lug proper, or unsolder, or even break the fine wire if diagonal pliers or even a conventional hack saw blade is employed. The cut made by

the jeweler's saw blade is so thin that the parts disconnected can be readily resoldered.—*James A. McRoberts, Brooklyn 15, N.Y.*

### Low Cost Socket Wrench

Like many other TV technicians we bought the new Sylvania Magnetic Screwdriver. It was already a handy gadget, but we discovered a way to improve it still further. At the local Western Auto store we bought a cheap  $\frac{1}{4}$ -in. hexagon shaped socket set for 69¢. About  $\frac{5}{8}$  in. was sawed off the hex shaped



handle (which is really a hex key wrench) and inserted in the tip of the magnetic screwdriver. The magnetic field of the screwdriver holds this and the various sized sockets which are placed on the other end. With this arrangement we have a magnetic screwdriver and a magnetic socket set, all in one, at little extra cost.—*Herbert A. Wahl, Redondo Beach, Calif.*

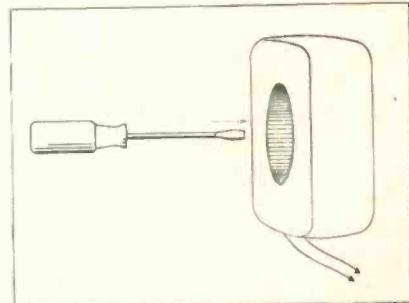
### Quick Insulating Solution

Painted with several coats of a solution made by dissolving some plastic filings or shavings in a bottle with an equal amount of acetone, the handles of pliers will be sufficiently insulated to guard against the voltages encountered in video repairing.—*Harry Mayover, Phila. 31, Pa.*

See **SHOP HINTS** and "**TOUGH DOGS**" for additional tips on easy servicing.

### Handy Magnetizing Unit

To magnetize my screwdrivers or other shop tools I pass them through the focus coil of a spare TV chassis that I have handy for test purposes. The focus pot is turned up to maxi-



mum to provide the strongest magnetic field. Passing the tool through the coil 3 or 4 times is usually sufficient.—*Fred Felli, Chicago 39, Ill.*

(Ed. Holding the tool steady in the field for a length of time will give you the same result.)

### Soldering to Chassis

It is often necessary to solder a ground wire directly to the chassis. This usually takes a long time, because the metal chassis is large and heavy, and it is therefore slow to heat. A large soldering iron which heats slowly is generally required, further delaying the operation. Worse still, it frequently happens that, in spite of all you can do, the ground wire just will not stick to the chassis. A quick, easy way to do the job is to run the ground wire to a hole in the chassis, and anchor it physically. Then, with a good hot soldering iron (even a soldering "pencil" will do this job) cover the wire with solder and fill the hole with solder as well, on both sides of the chassis. A sort of solder "rivet" is thus formed. This will make an exceedingly tight, trouble-free connection. Snip the wire off on the outside of the chassis, where it may show. Sandpaper the area around the hole bright and smooth before the soldering job, to eliminate the possibility of a troublesome, high-resistance connection at this point.—*J. Amorose, Richmond, Va.*

# "Tough Dog" Corner

## Difficult Service Jobs Described by Readers

### Mystery Pulses

The set in question is a Stromberg TV-12. The same circuit is used in the Crosley 9-407 and the Du Mont RA 103. The customer's complaint was that she had heard a loud "pop" immediately after which the set went black.

When the set was examined, variation of the setting of either the contrast or brightness control would cause the raster to blacken out on both sides, leaving a clean raster only in the center—but this would occur only when a signal was being received. The only semblance of video information noticed under this condition was a form of severe smearing. When no signal was being received, however, the raster was normal in every way and variation in brightness was also normal with rotation of the control.

The tuner and i-f circuits were checked first, while a signal was being received. A definite horizontal pulse was found on the plates of the i-f amplifiers. The pulse was also found to be riding on the B-plus line feeding the i-f tubes. The horizontal oscillator tube was then pulled out and the i-f plates were once more checked. The pulse was still there—and the picture tube was still lit with a perfect raster! The pulse would only disappear when the sawtooth maker (6SN7) and the horizontal output tube (6BG6) were

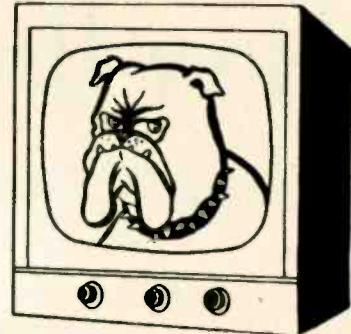
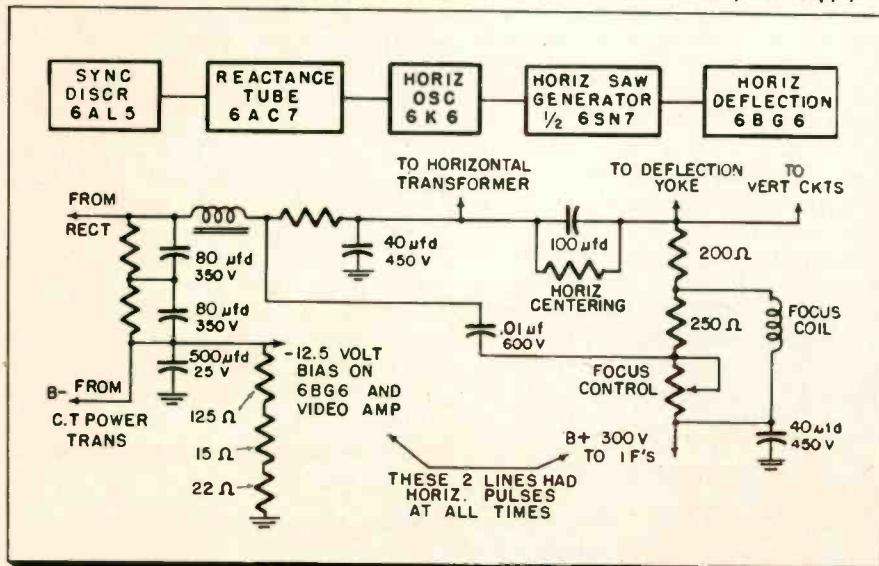
removed from the circuit.

A look at the circuit indicates, in the absence of a feedback loop, that improper filtering somewhere would have to be the cause of the trouble. Furthermore, this filtering would have to be common to both the horizontal and i-f systems. There are 12 different filter condensers in the set. In the course of changing them, the trouble cleared when the 40-mfd condenser on the 300-volt line from the focus coil was changed. A check showed the component to be open, a fault unusual in capacitors of this type.

Since the horizontal coils of the deflection yoke are returned (through some resistance) to this B-plus point, this accounted for the unfiltered pulses riding out on the 300-volt line. Also, when a signal was coming through, the pulses would pass through the video detector, into the video amplifier and, from the latter stage, into the 12½-volt line. Sure enough, when no signal was being received, no pulses could be found on the latter line. When the 6AC7 video amplifier is removed, this also eliminates pulses from the line even though signal is being received.

Mainly because of the many possibilities for being sidetracked, this was one of the toughest dogs we have ever encountered.—C. R. Maduell, Jr., New Orleans, La.

Partial schematic shows entry points of unfiltered horizontal pulses into power supply



### \$10 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., N. Y. 17, N. Y.

### Pix Tube Puzzler

The picture would bloom, and then return to normal. This would occur at a fast rate, and with changing brightness. Checking and substitution in the high-voltage section produced no improvement. A new 12LP4A crt was put in to check the possibility of an intermittent condition in the tube. Still no results.

When the crt socket was taken apart, it was clear that someone had done a good job of camouflaging a bad connection for the 1st anode, pin no. 10, with some liquid solder. At first glance, the connection looked good. A second glance showed that some glue had been poured under the solder, resulting in an intermittent B-plus connection. After this point was scraped and resoldered, the set worked fine.—John L. Mancini, Winthrop, Mass.

### Sound-Caused Video Fault

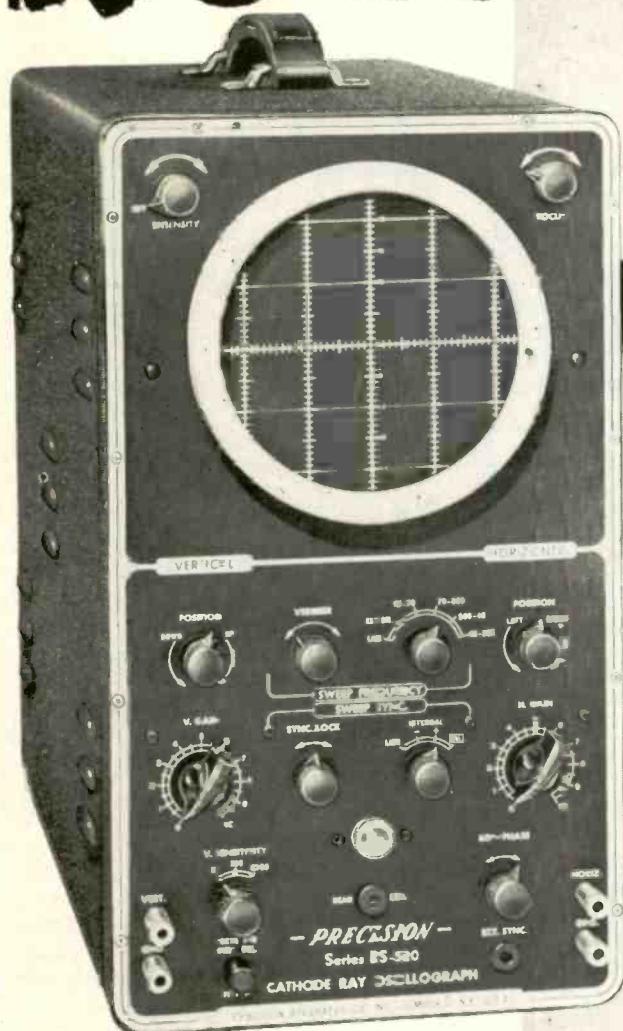
The complaint on this set was that the pix would distort, turning black, and a hum would be heard in the sound. Troubleshooting revealed the absence of an agc potential, and a check of the keyed agc tube followed. The negative plate voltage, of course, had disappeared. The cathode was 160 volts positive. Normally, the cathode should be about 130 volts.

Shutting the set off momentarily, then turning it on again, cleared up the fault. However, the condition would re-appear after about two minutes. The trouble was finally traced to the audio output tube. The cathode of the latter is the source for the 130 volts for the cathode of the agc tube. After the audio output tube had heated fully, it shorted, thus resulting in increased current through the tube and an increased cathode voltage. This increase to 160 volts cut off the agc tube.—Herbert A. Wahl, Redondo Beach, Calif.

# NOW AT LAST...

## A Reliable, General-Purpose 5" OSCILLOSCOPE

Priced  
at Only \$12750



## The NEW **PRECISION** MODEL **ES-520**

The new ES-520 is **PRECISION**-engineered in response to long and growing demand for a reliable, factory-made, general purpose 'scope at a price within reach of all to whom initial investment is of extreme importance.

The ES-520 conforms to every **PRECISION** standard of quality, workmanship and performance. It is a completely factory-engineered, factory-wired and factory-calibrated instrument . . . ready to go to work for you the moment you take it out of its carton!

### SPECIFICATIONS

- ★ Push-Pull vertical drive. 20 millivolts per inch sensitivity.
- ★ 3-Step, frequency-compensated, vertical input attenuator.
- ★ Vertical frequency response 20 cycles to 500 KC within 2 DB
- ★ 1 volt, peak-to-peak, built-in vertical voltage calibrator.
- ★ Excellent vertical square wave response from 20 cycles to 50 KC.
- ★ Push-pull horizontal drive. 50 millivolts per inch sensitivity.
- ★ 'H' frequency response 20 cps to 200 KC within 3 DB (at full gain).
- ★ Internal linear sweep 10 cycles to 30 KC. Neg. and pos. sweep synch.
- ★ Tube Complement: 12AU7 'V' cathode follower and amplifier, 6C4 phase-splitter, 12AZ7 push-pull 'V' drive. 6AB4 'H' amplifier, 12AZ7 push-pull 'H' drive. 12AU7 sweep oscillator. 6X4 rectifier, 1V2 high potential rectifier, NE-51 calibration regulator, 5UP1 CR tube.
- ★ Built-in 60 cycle sine-sweep phasing control.
- ★ Beam modulation input terminal at front of panel.
- ★ All 4 deflection plates directly accessible at rear.
- ★ Filter-type, removable, calibrated graph-screen.
- ★ Etched, anodized, heavy gauge aluminum panel.

...and STILL THE LEADER IN ITS FIELD  
for performance, versatility and value —  
the popular **PRECISION**

### **ES-500A** HIGH SENSITIVITY WIDE-RANGE 5" OSCILLOSCOPE

The famous ES-500A Incorporates advanced engineering features and refinements so necessary to meet the more critical needs of modern electronic circuit analysis, AM, FM and TV.



**SERIES ES-500A:** In louvered, black ripple-finished, heavy gauge steel case, 8 1/4 x 14 1/2 x 18". Complete with removable light shield, calibrating mask and detailed instruction manual. Net Price: \$173.70

**SERIES ES-520:** In black ripple finished, rugged steel cabinet, 8 1/4 x 14 1/2 x 16 1/2". Complete with all tubes, including 5UP1 CR tube. Comprehensive instruction manual. Code: Quest. Shipping weight: 30 lbs. Net Price: \$127.50.



**PRECISION APPARATUS COMPANY, INC.**

70-31 84TH STREET • GLENDALE 27, L. I., N. Y.

Export Division: 458 Broadway, New York 13, U.S.A. Cables: Morhanex  
Canada: Atlas Radio Corp., Ltd., 560 King Street W., Toronto 28

# Shop Hints to Speed Servicing

## Tips for Home and Bench Service Contributed by Readers

### Hi-Channel Dropout, RCA

Symptoms that sometimes occur on RCA sets using the KCS47 chassis are that reception is okay on the low-band channels, but that the set is completely dead on channels 7 to 13. A check can be made from the top of the set for probable cause. One grid of the 6J6 mixer-oscillator (pin 5) may show, upon checking, that an abnormal 150 volts is present. If this turns out to be the case, it means that the 270-mmf capacitor represented as C-13 in the schematic is shorted or leaking badly. Since this capacitor is switched out of the circuit on the low channels, the latter will come through okay. The capacitor is connected from the rear to the front deck on the channel selector switch.—M. G. Goldberg, St. Paul, Minn.

### Tuner Drift, V Chassis

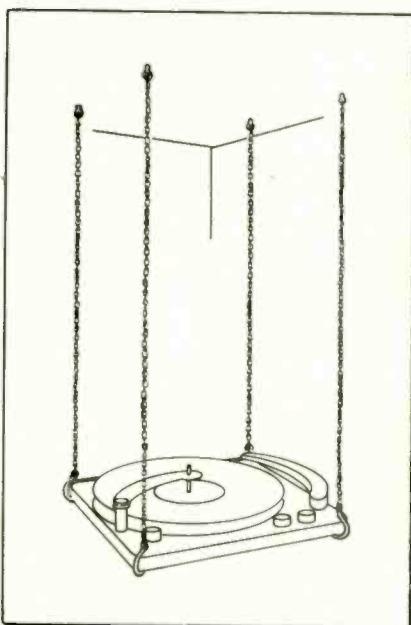
Difficulty with a Crosley Super V vertical chassis involved continued drift of the local oscillator, requiring frequent re-setting of the fine tuning control and often resulting in poor pix or no pix, particularly on the high-band channels. The 6J6 oscillator tube had been replaced several times, and all tuner slug adjustments had been made carefully, but this did not stop the trouble.

When the bonnet-type cabinet was pulled off, there were signs that wax had been dripping from a paper tubular filter condenser. This condenser is mounted above the tuner on the vertical chassis. Close inspection revealed that wax—and probably some electrolyte along with it—had dropped on the test point and on other portions of the turret-type tuner. I carefully removed the wax and cleaned the test point; then made a sheet metal baffle to divert further dropping to the space between the tuner shell and the vertical chassis. This time, the tuner slugs remained stable after they were readjusted. The cure was permanent.

This problem is not too uncommon, as I've had the same complaint several times since, and used the same solution with equally satisfactory results.—M. Kikkebusch, Springfield, Mo.

### Changer Repair Rig

A useful and inexpensive mount for working on record changers, where a chassis cradle is not available, can be made easily. Four eye hooks are screwed into the ceiling, in the shape of an approximate 14-in square, with one screw in each of the corners of the square. Four chains, one from each eye, are then suspended. The length of the chains depends on convenient work-



ing height, which varies from one technician to another. A hook is placed at the end of each chain. The changer to be worked on is mounted on the four hooks. The operation of the record player both above and below the baseplate can be observed without changing the position of the player. When no changer is being serviced, the chains can be hooked up out of the way, leaving clear unobstructed working space.—Ellisworth Bell, Anniston, Ala.

### SHOP HINTS WANTED

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

### Prevent Tube Breakage

Many times a technician will tap tubes in a set while the set is still running to check for trouble. When this test is used on shielded miniature tubes with the shields still left in place, the test can be quite misleading as the vibrations set up between the can and chassis may give false indications. The logical thing to do, of course, is to take the tubes out of the shield cans, but this can also be a source of trouble when the tubes are wedged in tight. The top glass stem often breaks off, ruining the tube.

The tube can be pushed out of the can without danger of breakage by placing the hollow shaft of a  $\frac{1}{4}$ -in open-end wrench over the stem and pushing the tube out pins first. This is the best method I have been able to devise to avoid this expensive and rather common evil.—John L. Mancini, Winthrop, Mass.

### Midget Chassis Service

When testing small portable radios, or any circuit where the parts are pretty well jammed together, I insulate my test lead prods up to the very tips with insulating tape. This eliminates possible troubles from accidental slipping and shorting against another component. By leaving just the tip points exposed for testing, I can check a set without apprehension. Before using this technique, I had some sad experiences in line with the possibilities mentioned.—S. Sandler, Providence, R. I.

### Tuner Defect Kills Raster

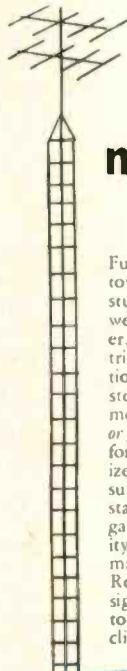
This trouble occurs on Hallicrafter TV receivers, model 1075. If there is no raster or sound and if the filaments fail to light on the 6SN7, 6AL5, 6C4, 6AH6, 6J6 and the picture tube, the trouble may be traced to a shorted 500-mmf ceramic capacitor in the tuner. This condenser is connected between the filament (pin 3) of the 6J6 and ground. For replacement, the tuner must be removed from the chassis.—Dee Bramlett, Jr., Greenbrier, Tenn.

For Additional Hints  
on Tools, See page 25

# Depend on the COMPLETE line of ROHN "SUPERIOR DESIGN" towers and accessories

for LARGER PROFITS MORE SATISFACTION GREATER EASE IN HANDLING

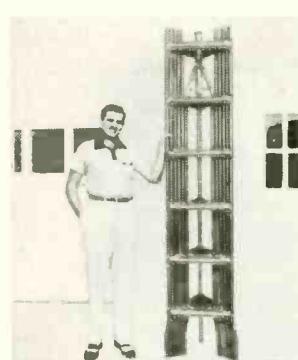
3 added towers to solve ALL your needs



## no. 6 tower

"All-Purpose" tower.

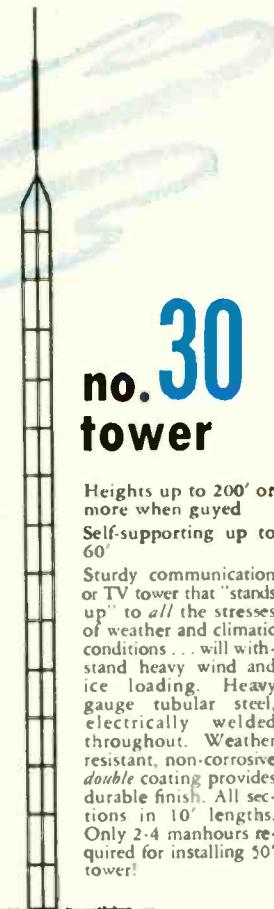
Fulfils 75% of your general tower needs—is structurally as sturdy—yet costs less than the well-known Rohn No. 10 Tower. Ideal for home and industrial installations, communication requirements... eliminates stocking many different tower models. Self-supporting to 50 ft. or guyed to 120 ft.! Easy to climb for fast, efficient servicing. Utilizes "Magic Triangle" which insures far greater strength and stability. Permanent hot-dipped galvanized coating. Dependability—a feature customers demand—is assured with the Rohn No. 6 Tower... designed to "stand up" for years to the rigors of weather and climatic conditions.



## Package Tower

"Space Saver"—cuts storage space 300% or more!

Popular PT-48 has almost 50' of sturdy tower within a compact 8' x 20' package! "Magic Triangle" design is adapted to a pyramid shape using a wide 19" base with progressively decreasing size upward. Decreases your overhead... easy to transport and assemble—cuts shipping costs. Galvanized throughout. Available in heights of 24, 32, 40, 48, 50 and 64 feet!

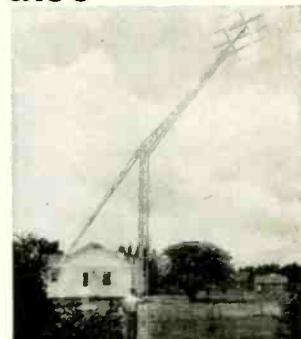


## no. 30 tower

Heights up to 200' or more when guyed  
Self-supporting up to 60'

Sturdy communication or TV tower that "stands up" to all the stresses of weather and climatic conditions... will withstand heavy wind and ice loading. Heavy gauge tubular steel, electrically welded throughout. Weather resistant, non-corrosive double coating provides durable finish. All sections in 10' lengths. Only 2-4 manhours required for installing 50' tower!

also



## ROHN Fold-over tower

For experimenters, TV service departments and retailers. Use this kit with regular Rohn tower sections. Simple and easy to use.

## ROHN Telescoping Masts

Heavy-duty hot-dipped galvanized steel tubing and rigid joints give extraordinary strength. Quick installation... mast attached to base—antenna fixed, then mast hoisted quickly to desired height. Utilizes special clamp and guy ring arrangement. Flanged interior section; crimped exterior section gives mast stability that can't be beat. Complete with guy rings and necessary erection parts. In 20, 30, 40 and 50 ft. sizes. Bases and ground mounts available.



and a complete line of ROHN accessories—all galvanized



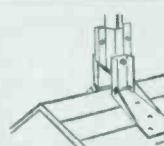
### PEAK ROOF MOUNT

Heavy duty for quick, secure mounting of tower to top of peak roof. Flanges hinged, fastened to roof with 2 lag screws in each flange.



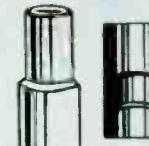
### FLAT ROOF MOUNT

For all types flat surfaces. 3-1" solid steel projections permit first section of tower to be mounted directly on roof mount by inserting usual  $\frac{1}{4}$ " bolts.



### MAST BASES

Complete line of telescoping mast bases for every requirement, accommodating masts from 1"-2 $\frac{1}{4}$ " diameter. Also available—drive-in mast bases.



### MAST 'N TV TUBING

Heavy-duty, hot-dipped galvanized steel tubing. Machined to perfection. Extra sturdy joints slotted for full, perfect coupling.



### PEAK and WALL MOUNTS

For mounting of mast or pole to roof or wall. Heavy-duty steel. Variable sizes. Models for most every need.



### DRIVE-IN BASE

Set on top of ground... 3-4" drive rods driven through base into ground. First tower section secured to rods with single bolt in each leg. Instant erection.



### SERVICE TABLE

Perfect answer for television servicing, display and storage. Truly one of the finest of its kind in economy price range.



### ALSO AVAILABLE

Rotator posts for mounting rotator to tower; House Brackets; Guying Brackets; UHF Side Arm Mounts; Mounts for Additional Antennae on a Tower; Erection Fixtures; Guy Rings; Installation Accessories; and dozens of other items!

For complete catalog and prices, see your authorized Rohn Representative or Distributor; or write or wire direct.

**ROHN**

**Manufacturing Company**

116 Limestone, Bellevue Peoria, Illinois

# Hi-Fi and Audio Gear

## Amplifiers, Speakers, Recording Accessories; Related Items

### TR TAPE RECORDER

Low priced magnetic tape recorder, the "Tri-Fy Dixieland," offers a frequency response to 7,500 cps, with flutter and wow less than 0.5%. Features include plug-in recording head, rugged mike, pre-emphasized amplifier and tape guide slotting device. The unit is dual-track, two-speed, and is housed in a two-tone carrying case. Die-cast construction is reported to provide close tolerances. List price is \$109.95. Tape Recorders Inc., 1501 W. Congress St., Chicago 7, Ill.—TECHNICIAN (Ask for No. 2-31)

### Quam SPEAKER

A new speaker, called the Little Four (Model 4A06), is a rugged four-inch unit of extremely shallow construction. Miniature magnet aids installation in radio and TV receivers where space is at a premium. This low-cost speaker has RETMA standard rim mounting holes and 0.58 Alnico V magnet with U-shaped pot. Maximum input power is 2.5 watts, and voice coil impedance is 3.2 ohms  $\pm$  10%. List price is \$2.95. Quam-Nichols Co., Marquette Rd. and Prairie Ave., Chicago 37, Ill.—TECHNICIAN (Ask for No. 2-32)

### Fleetwood TV PROJECTOR

Model FL-1001 TV projector is capable of projecting a bright, well-defined picture up to 9 ft. by 12 ft. The unit is mobile, and can be used in individual classrooms or auditoriums, conference rooms, etc. It is completely self-contained in a functional heavy duty metal cabinet; over all size is 24 x 36 x 48 in. Fleetwood Corp., 1037 Custer Drive, Toledo 12, O.—TECHNICIAN (Ask for No. 2-28)

### Bogen HI-FI SYSTEM

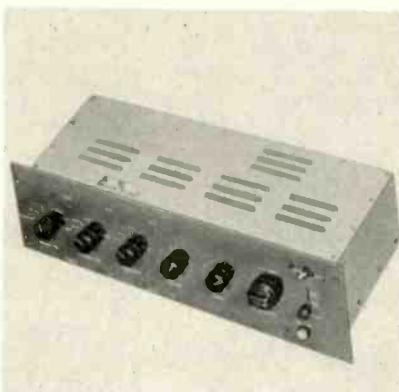
The Nassau, a complete high-fidelity system in attractive cabinet, includes a Bogen RR500-1AM-FM radio-phono chassis and Collaro three-speed intermix record changer equipped with variable reluctance cartridge. Speakers are a compression-horn tweeter and 8-in. woofer. Price is \$349.50 with dark mahogany finish, and \$357.50 for blonde Korina. David Bogen Co., Inc., 29 Ninth Ave., New York 14, N.Y.—TECHNICIAN (Ask for No. 2-39)

### Approved AM RECEIVER KIT

New V-5 broadcast receiver kit is recommended as one of the initial units for an individual binaural or hi-fi installation. Features of the unit are: self contained AC power supply; 5 $\mu$ V sensitivity, iron-core tuned coils throughout and tuned r-f stage. Dimensions are 9 $\frac{3}{4}$  x 5 x 5 $\frac{1}{2}$  in. \$24.50. Approved Electronic Instrument Corp., 928 Broadway, N.Y. 10.—TECHNICIAN (Ask for No. 2-55)

### Webster PREAMP-EQUALIZER

Model 97-0 preamplifier-equalizer unit for radio, TV, tape recorders or phonos controls tone and volume, and provides equalization for all phono records. It has two equalizer selectors, one each



for high frequency rolloff and low frequency turnover, which provide total of 25 combinations of settings. It has a six-position input selector, variable bass and treble controls with boost and cut of 15 db, master gain and loudness controls. Frequency response is 20 to 20,000 cps,  $\pm$  1 db. Filter control provides 5,000 and 7,000 cps cutoffs for old records. Size is 15 in. wide, 4 in. high and 8 in. deep. Sound Sales Div., Webster Electric Co., 1900 Clark St., Racine, Wis.—TECHNICIAN (Ask for No. 2-30)

### Fenton TAPE DECK

"Motek" tape deck has separate capstan, takeoff and takeup motors. Response with a suitable amplifier is better than 50 to 10,000 cps. Wow and flutter are less than 0.3%. Drive is provided by three individual motors. Fenton Co., 15 Moore St., New York 4, N.Y.—TECHNICIAN (Ask for No. 2-37)

### Jensen SPEAKERS

Miniature speaker type P275-Y for transistorized pocket radios is only 2 $\frac{3}{4}$  in. in dia., 1 $\frac{3}{4}$  in. deep, and weighs less than 2 $\frac{3}{4}$  oz. Nominal voice coil impedance at 1000 cps is 16 ohms. Other applications include miniature transceivers and paging units. Jensen Mfg. Co., 6601 S. Laramie, Chicago, Ill.—TECHNICIAN (Ask for No. 2-34)

### MORE TECHNICAL INFORMATION

describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 40.

### IEC AUDIO FELT

"Acoustical Felt" is designed for damping loud speaker enclosures. Its use is claimed to eliminate cabinet resonances, providing smoother reproduction. "Latex Impregnated Felt" is for float mounting record players. Provides positive elimination of any mechanical contact with the mounting board. "Acousti-Pad" is used as a supplemental pad for the record turntable. Ingalls Electronics Co., 30 W. Putnam Ave., Greenwich, Conn.—TECHNICIAN (Ask for No. 2-80)

### ATR INVERTERS

New "Mighty Midget" inverters are for use on 6- or 12-volt auto storage battery systems, by simply plugging into the cigarette lighter receptacle on the dashboard. They deliver 110 v/60 cps. with output as high as 100 watts. Ideal for operating dictating machines, small tape recorders and similar small electronic or electrical devices. American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—TECHNICIAN (Ask for No. 2-9)

### Recoton CARTRIDGE

The Model 500 magnetic cartridge for phono pickup is of the turnover type, using separate styli for 78's and 33's. Push-pull coil assembly cancels out hum originating in turntable motors and nearby appliances. Mu-metal shield around pole piece assembly also protects against hum. Frequency response is virtually flat from 20 to 16,000 cps. High compliance and low moving mass permit tracking at 6 to 7 grams. Recoton Corp., 147 W. 22 St., New York 11, N.Y.—TECHNICIAN (Ask for No. 2-33)

### Bozak ENCLOSURE

New speaker enclosure for infinite baffling of Bozak B-207A coax speaker provides clean response from 45 to beyond 16,000 cps. It has 5 cu. ft. of enclosed space with heavy acoustical damping. Measurements are 30 $\frac{1}{2}$  in. high, and 24 x 17 in. on floor. Finishes are mahogany, walnut and birch. Unit has no resonant characteristics of its own, and does not have to be tuned. R. T. Bozak Co., P. O. Box 966, Darien, Conn.—TECHNICIAN (Ask for No. 2-35)

### Flahan TAPE THREADER

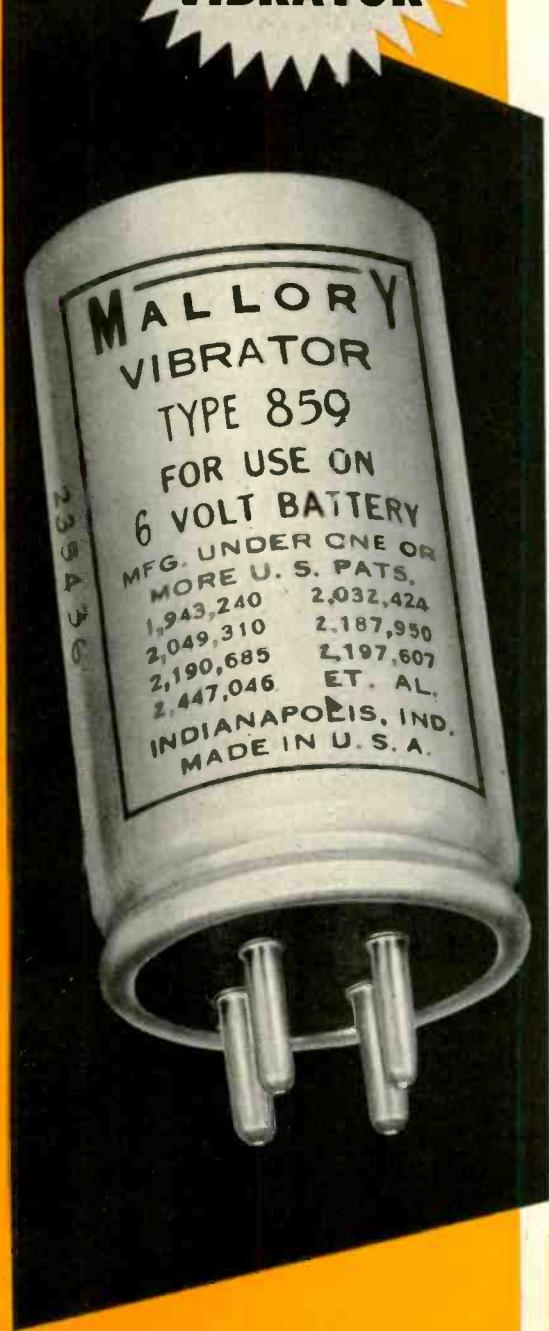
Handy metal device holds tape on reel for first few turns to get winding started, thereby eliminating usual fumbling while threading a tape recorder. Fits all machines and reels up to 7 in., and may be used as a reel crank. Price at retail is \$98. The Flahan Co., 7517 Pelham Dr., Cleveland 29, Ohio.—TECHNICIAN (Ask for No. 2-38)

PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

THE  
**MALLORY**  
25th  
Anniversary  
**VIBRATOR**



# Now hear this! (if you can)

The Mallory 25th Anniversary  
Vibrator is the quietest ever...

You've never heard a vibrator as silent as the new Mallory 25th Anniversary model. Mechanical hum and shake are reduced practically to zero... by a unique "floating" design\* that isolates the vibration of the reed element from the case. Hum is squelched to a level never before possible.

The experience of 25 years of pioneering development... and the manufacturing know-how gained by making more than 60 million vibrators... went into this latest Mallory model. Always the leader in performance, and in usage by service men and manufacturers alike, Mallory vibrators are now better than ever!

**NO EXTRA COST.** The new, ultra-quiet vibrators cost no more than previous models. They're a real bargain in performance.

**NO CHANGE IN PART NUMBERS.** Order by the same catalog numbers—and you'll automatically get the improved model.

Get ready to give your customers the best, by ordering your supply today from your nearby Mallory distributor.

\*Patent applied for

ON AUTO RADIO JOBS  
BE SURE TO USE... **MALLORY MIDGETROLS**

The fast, sure way to get tailor-made replacements for carbon volume controls. High stability resistance elements, with accurate tapers. A small stock equips you to replace practically any control. In single and dual concentric types.



PR MALLORY & CO INC  
**MALLORY**

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

APPROVED PRECISION PRODUCTS

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

PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

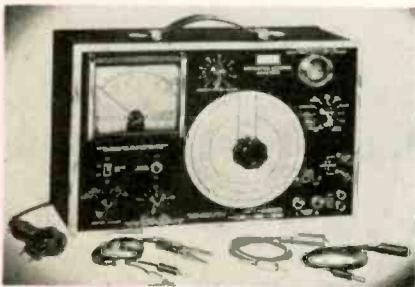
PR MALLORY & CO INC  
**MALLORY**  
APPROVED PRECISION PRODUCTS

# New Test Instruments

## CRT Checkers, Generators, R-C Substitution Boxes

### Pyramid COMPONENT ANALYZER

Model CRA-1 capacitor-resistor analyzer tests for shorts, opens and intermittents, as well as capacitance, resistance, power factor, leakage current and insulation resistance. Equipped with



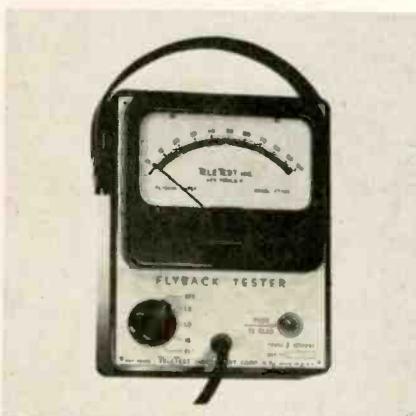
quick-charge switch to decrease the charging time constant when testing high capacity paper capacitors. Measures 14 x 9 x 7 in. Weight—11 lbs. Black crackle case with etched front panel. Pyramid Electric Co., 1445 Hudson Blvd., North Bergen, N.J.—TECHNICIAN (Ask for No. 2-19)

### Eico SUBSTITUTION BOX

Capacitance values from 100 mmfd. to .22 mfd. can be quickly inserted into circuits under test using the new Model 1120 capacitor substitution box. 18-position rotary switch allows rapid selection of the desired value. Silver mica and molded plastic tubular capacitors are used exclusively. Five-way, jack-top binding posts. Price—wired, \$9.95; kit—\$5.95. Electronic Instrument Co., Inc., 84 Withers St., Brooklyn, N.Y.—TECHNICIAN (Ask for No. 2-21)

### Tele-test CRT TESTER

New "Rejuva-Tester" both checks and rejuvenates cathode ray tubes. As a tester, it checks the crt for inter-ele-



ment shorts in both hot and cold conditions. It rejuvenates the tube by removing contaminations from cathode surfaces. \$49.95. Teletest Instrument Corp., 31-01 Linden Pl., Flushing, N.Y.—TECHNICIAN (Ask for No. 2-15)

### B&K CRT TESTER

Model CRT, "Cathode Rejuvenator Tester" checks picture tubes for emission, inter-element shorts, leakage, open circuits, grid cut-off, gas content, and



probable useful life; also restores emission, removes shorts and repairs open circuits, according to the mfr. Measures 11 x 7½ x 5 in. Weight—5 lbs. B & K Mfg. Co., 3731 N. Southport Ave., Chicago 13, Ill.—TECHNICIAN (Ask for No. 2-22)

### EPL POWER SUPPLY

Model EF dual range dc power supply provides voltages from 0 to 14 v., and 0 to 28 v., for all current loads from 0 to 5 a. Intermittent loads up to 10 a. can be obtained. Single control offers continuous voltage adjustments for different load conditions over the specified range. AC hum or ripple is said to be less than 1% at 5 a. \$84.50. Electro Products Laboratories, 4501 N. Ravenswood Ave., Chicago—TECHNICIAN (Ask for No. 2-26)

### Winston CIRCUIT ANALYZER

Designed to troubleshoot horizontal and vertical deflection circuits, the new Model 820 Dynamic Sweep Circuit Analyzer provides 60 cps vertical sawtooth, 15 kc horizontal sawtooth and deflection transformer drive for speedy signal substitution. In addition, the instrument uses an oscillating neon indicator in conjunction with a direct-coupled amplifier to give a positive test for flyback transformers and yokes. Winston Electronics Inc., 4312 Main St., Phila. 27, Pa.—TECHNICIAN (Ask for No. 2-24)

### MORE TECHNICAL INFORMATION

describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 40.

### IFS CAPACITOR CHECKER

"Cap-Check" permits checking condensers without removing them from the circuit. Includes a voltmeter and ohmmeter. All functions are controlled from single master switch. \$44.95. In-



struments for Service Inc., 96 S. Grand Ave., Baldwin, L.I., N.Y.—TECHNICIAN (Ask for No. 2-14)

### IDL CAPACITANCE BRIDGE

Latest in the line of Signa-Glow instruments is the Model C-10 capacitance bridge which features a newly designed null indicator. Two glow lamps are used to indicate both the degree and direction of the unbalance. Measures capacitance values from 10 mmfd. to 200 mfd. Voltage applied to capacitor never exceeds 18 acv. Designed for 115 v/60 cps operation. Industrial Development Labs. Inc., 17 Pollock Ave., Jersey City, N.J.—TECHNICIAN (Ask for No. 2-23)

### Kirby R-C BOX

Quick substitution unit, Model SU-109, consists of 12 resistors and 12 capacitors connected to a double wafer, 12-position rotary switch. Three test jacks, one common to both circuits, allows selection of either the capacitor or resistor group. Case measures 4 x 3 x 1¼ in. Kirby Products Corp., 20 E. Herman St., Phila.—TECHNICIAN (Ask for No. 2-20)

### Kay MARKER GENERATOR

Crystal-positioned UHF TV marker generator, the "Ultra-Marker," develops a highly accurate oscilloscope display marker signal at all UHF sound and pix frequencies. Switching system which eliminates all but every fourth set of channel markers permits the instrument to be used with less accurately calibrated sweep generators. Features include: calibrated r-f output attenuator, narrow pip-type markers—fed directly to the scope, and a sweeping signal input requirement of only 10 mv into its 70 ohm input circuit. Kay Electric Co., 14 Maple Ave., Pine Brook, N.J.—TECHNICIAN (Ask for No. 2-17)

**FOR A LIMITED TIME  
to introduce  
the first NEW design of selenium rectifiers  
in OVER 20 YEARS**

*Koold*  
pat. pend.  
**rectifiers**  
for the price of

Service equipment will be better than new when you  
replace with a Koolsel rectifier by Pyramid.

**No center mounting**

Full air ventilation between plates  
Light contact and constant assembly pressure

**No center hot spots**

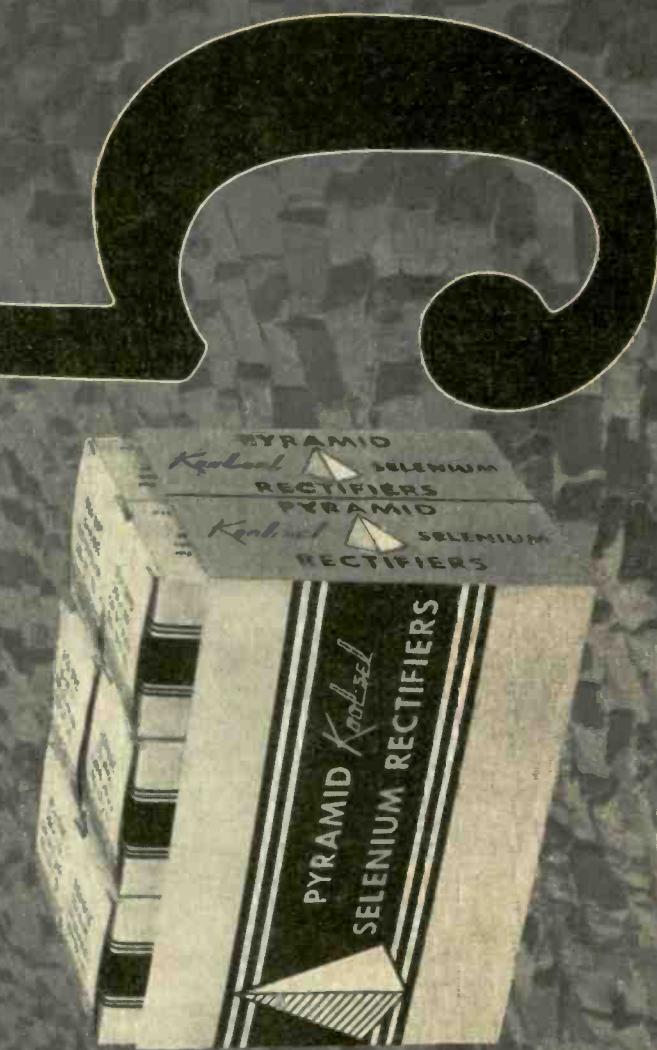
Lightest weight per unit of output power  
Lower initial forward resistance—better  
voltage regulation

Smaller overall size for each rating—cost  
no more

Better for all electrical and electronic  
equipment because of

- Improved convection cooling
- Simpler mounting
- Longer life and minimum aging
- Designed for more rugged service and  
rated for use in high ambient temperatures

In stock at your Pyramid jobber now.



**PYRAMID**

ELECTRIC COMPANY 145 Hudson Blvd., North Bergen, N. J.



By M. E. WIRT

• We've all heard of the surly, grouchy genius, who is a whiz at servicing, but is completely independent as to when he will descend to lend his touch to a service call, and who, nevertheless, is swamped with demands. According to reports, customers will stand for his insults and verbal abuse willingly, in order to have his magnificent skill brought to bear on their set. *This simply isn't true.* Many a technician with only fair skill is making a good living simply because he knows how to get along with people. And many an expert is wondering when things will pick up for him, without giving a thought to the question of why the customer always calls someone else the next time. Advertising plays an important role in securing a fair share of business, but the best advertisement possible is the technician himself.

It goes without saying that cleanliness, good manners, and courtesy are musts; no elaboration is necessary. However, although the technician is there to render a service, he is still in the position of a salesman, with only his future service to sell. Because of this, many of the rules of selling may be adapted to TV servicing in general.

Let's get down to facts and situations. When a service call is made, regardless of how explicit the service order may be as to the customer's complaint, *always* ask for symptoms. Listen carefully, look interested, and no matter how weird the explanation, don't make any disparaging remarks. Don't laugh at what the customer is saying, unless he is making an obvious attempt at humor. Don't say, "What's wrong with your set?" You're leaving yourself open for any one of several remarks such as,

# Troubleshooting

## You May be a Sensation with Sick Sets --

"That's what I called you for." Instead, ask, "How does the set act?"

The request for symptoms serves two purposes. First, it gives you the chance to make a tentative diagnosis before turning the set on, in case there is a short or an arc. The service order may be wrong, since in many cases, the call has been taken by a person who is no more familiar with the set than the customer. Second, and equally important from a psychological standpoint, it gives the customer a chance to unload all the pent-up gripe he has been harboring against the set for having gone out before, or during, his favorite program. Don't forget, too, if it's your first call on this particular customer, that he may have had previous service by another technician who left him with a feeling of dissatisfaction; and he'll probably say so. Don't make the same mistake as the other guy! Listen to the customer's comments. Don't make any derogatory remarks concerning work done before your call. The customer will be much easier to handle after he has "gotten it off his chest." Ever watch a doctor listen to a patient's symptoms?

### Show Confidence

Next, without being obvious about it, and while the customer is talking, visually locate the off-on switch, volume control, etc. With an unfamiliar set it makes a show of confidence much easier if you don't have to hunt for the various controls. When the trouble shows up, regardless of how uncertain you may feel, or how much it may look like a long, tough job, remove the back with speed and dispatch, and make your tube substitutions the same way. Don't break your neck, and possibly a tube, by trying to rush. Just don't waste any time.

Be crisp and professional, and put a snap into whatever you do. Act confident. Chances are the customer doesn't know what circuit the trouble is in, which could be true of you, too—but don't let him know it. If you try the wrong tube, let the new one work for a few seconds before replacing the original; and during the course of your checks you

might comment on how, in some respects, your work resembles a detective's, requiring, as it does, a process of elimination.

Be sure you have whatever tubes, tools, etc., you may need tucked away in your kit. Carry a quick-heat soldering gun in your car, or truck, and a few assorted condensers and resistors. Many sets use selenium rectifiers, so carry at least a couple for replacement on those jobs way out in the country, where the cost of a shop repair would be prohibitive. Bring along some video detector crystals for the same reason.

### Home Repair Headaches

The writer doesn't hold with the feeling that extensive repair work should be done in the home. Hot solder can burn a rug as well as make an electrical connection, and it's impossible to look dignified with the chassis on the floor and your caboose in the air.

Take elaborate pains with your tools, and placement of tubes and screws removed from the set; be careful of lamps or knick-knacks on top of the cabinet. Ask the customer to please remove them, adding a comment on the beauty or utility of one of the objects; but don't gush, or act as if you expect a "thank you."

If the trouble is an intermittent, and doesn't show up, try to duplicate the symptoms described by the customer, manipulating one or more



controls to get some understanding of the complaint. If the trouble fails to show within a reasonable length of time (20 minutes), make out your bill, adding a clearly visible notation to the effect that partial credit will be allowed for this visit on a future service call, when the set does break down. This is done, of course, to give the customer an incentive to ring you when the trouble shows up

# the TV Set OWNER

## But How Do You Rate on Handling People?

again. It will pay in the long run to be completely honest about the matter, too. Do whatever you said you'd do, without adding anything to the bill to make up for it.

You could, if the customer is a man, offer him a running explanation as to the cause of the trouble, and what you are doing to correct it, using terms that are as non-technical as possible. The inference is that he, being a brainy kind of guy, can readily understand what went wrong. The men often eat this up, look wise, and agree with anything you say. On the other hand, with a woman some statement like "Your trouble was caused by this tube" is usually sufficient. Don't try to "snow her under" with an exhibition of knowledge. She'll lose interest immediately.

In the majority of cases, your service call will be made while only the lady of the house is home. Probably 80% of the requests for service are made by a woman, and she is the one to whom your service and personality must appeal. By the same token, a woman is apt to be your best advertising medium in her neighborhood. Women appreciate a business-like attitude even more than the men, but a sincere compliment on furnishings, a vase or lamp, or the TV set itself, lets them know you approve of their taste, and they will remember you for it.

### Common Questions

Many questions are asked concerning TV reception, various troubles the customer has had or heard of, and the possibility of future trouble in the set. These questions must be answered. However, never make a statement that you may be called upon to back up with a free call, such as "You won't have any more trouble now." "Nothing can be predicted with certainty about any given TV set. New tubes installed may fail five minutes after you leave, or other components in the same circuit give up the ghost before you even get the chassis back in the cabinet, often with the same symptoms produced by the original fault. It's much wiser to tell the customer in advance that the cause of

"no light on the screen" may be the fault of other tubes, including the picture tube, besides the one you've just installed. The tube you put in, of course, carries your standard guarantee, but a failure of any of the other tubes will be charged for at your regular service rate, plus parts. Softening the blow ahead of time in this way has saved the writer some terrific headaches. In fact, it often happens that people sell *themselves* on the idea that future trouble is a thing to be expected, and they may as well be resigned to it.

Some of the explanations used in

answering the most frequently-asked questions are listed herewith. Variations, of course, may be used, and should be. Don't fall into the habit of making a pat answer to an often-heard question. It soon sounds mechanical and rehearsed, losing the effect intended.

**Q. Why does my picture look snowy?**

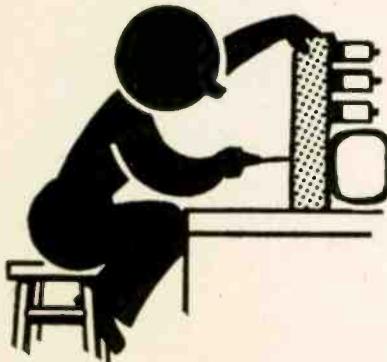
A. (We are assuming that a legitimate reason for the "snow"—a fringe-area signal—is present.) What we call "snow" in a picture is electrical noise that is seen, rather than heard. It is produced mostly in the set itself (and the converter or

TELEVISION SERVICE ORDER					
Name		Address		Date	Phone
C.O.D.	CHARGE	NO CHARGE	MAKE	MODEL	SERIAL NO.
X					
WARRANTY YES	BROUGHT IN NO	PICKED UP	CALL TAKEN BY	SERVICEMAN	RECEIPT NO.
No Raster	Low Brightness	PARTS USED AND SERVICE PERFORMED			PRICE
No Picture	No Sound				
Intermittent Pix X	Intermittent Sound	1- 6B87H Tube			3.50
Snowy Pix	Distorted Sound	1- 6CB6			2.15
Lacks Width	Lacks Height				
No Vert. Sync	No Hor. Sync				
No Vert. Sweep	Poor Focus				
SPECIAL INSTRUCTIONS: <i>Check for noisy volume control</i>					
<i>Analyze, replace intermittent RF amplifier tube, replace weak 3rd video IF amplifier, adjust horizontal centering, set vertical height and linearity controls, centre horizontal hold control action, remove saltily glass &amp; clear picture tube and glass, set AGC control, repair noisy volume control.</i>					
<i>Thank You</i>					
TERMS ARE CASH ON COMPLETION.		PARTS TOTAL	5.65		
		PARTS TAX	1.7		
		SERVICE CALL	5.00		
		LABOR			
		TOTAL	10.82		
SERVICE PERFORMED AND SET OPERATING SATISFACTORY.					
CUSTOMER'S SIGNATURE					
DATE					

booster, if used). This "snow" can only be hidden by a signal of sufficient strength. The more signal at the antenna, the less "snow" in the picture. If everything has been done to take advantage of every bit of signal available, and we still have "snow," the situation would be comparable to running an automobile on kerosene—the car will work, but it can't do its best.

**Q. Why do I have so much trouble with this set?** (They ask this one even when the set has required one call per year.)

A. The main cause of trouble in any TV set is "heat rise" in the set itself—in other words, high operating temperature. Sometimes, due to room arrangement, it's impossible to keep the receiver well-ventilated, and external heat contributes to high operating temperature. This may be



due to heating in the home, or high summer temperatures may be responsible. Such heating, added to the normal heat rise in the set, may cause parts or tubes to break down. The surprising part is not that receiver components develop trouble, but that they work as well as they do under these conditions.

**Q. I've only had this set 3 weeks (or 3 days, or 3 months). If it's giving trouble so soon, maybe I should get another set.**

A. A TV set, like an automobile, has a "break-in" period. During shipment, tubes are jarred; after installation, a tube may quit working if any element has been jarred out of line. It's perfectly normal for this to happen, and almost invariably a set will develop at least one trouble during the first months of its operation. That's why a set carries a guarantee. Changing sets will only prolong the "break-in" time.

**Q. Why did you put so many tubes in my set? It took only one to start it working again.**

A. Well, you might call it preventive maintenance. I'm trained to recognize some troubles before they start, so I try to prevent your set from giving you trouble in the

near future. This way you pay for only one call, instead of two or three.

The above questions cover a very small percentage of what you may be asked, but most of the others will bear some relationship to one or more of those listed. The main thing to remember and be guided by is that you want to instill a feeling of confidence and trust in yourself and your service.

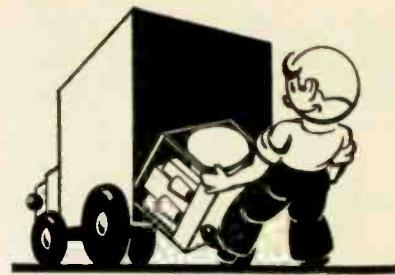
Now, assuming that you have repaired the set, let us use a little more service psychology. For instance, on sets that have a removable safety glass, remove it, and clean the picture tube and the glass. Do this with the set turned off, and have the glass back in place before turning it on again. Aside from the safety angle, the difference in picture clarity has a certain shock value that makes customers remember you.

Any screws left over should be dropped in your kit unobtrusively. Don't leave them about to arouse suspicion. Check for and tighten loose knobs. Re-adjust external controls wherever necessary; also touch up adjustments, if needed, like the ion trap, focus, fine tuning and oscillator slugs; center the external horizontal hold control to mid-range by using internal auxiliary controls. Then step back and admire the set. A comment on how well it works is not out of place. Make the owner feel that he or she has something special. There is always at least one thing you can sincerely admire, thus implying a compliment on the owner's taste or judgment in picking the set. As a final touch, wipe off any finger prints with your polishing cloth. If the set is on the dusty side, however, don't let your actions show that you have spotted this fact.

#### Collection Techniques

The roughest part of most calls is presenting the bill. A bill for services is always hard to pay because the customer has no new acquisition to show for the money. Therein lies the reason for the extras you have just performed. The writer has had printed up an invoice like the one accompanying this article. Nowadays, similar ones are available which require only your own imprint, at less cost than a full printing job.

The invoice should list all parts and tubes used with their prices and an explanation of work performed. *The more items you can list, the less will seem the total charge in proportion.* Don't list anything you



haven't done—but don't overlook minor adjustments and other details. Readjusting the horizontal oscillator, restoring a noisy control, setting height and linearity, refocusing, cleaning the pix tube and safety glass—all of these belong on the bill.

In listing replaced tubes and parts, be sure to identify the circuits in which they are located. Explain that many tubes and parts with identical numbers are used in the set, that this further identification is therefore needed for the benefit of all concerned. In case of premature failure, for example, you can guarantee the 6SN7 you just replaced, but not the other three in the set.

Any recommended repairs that the customer does not wish to authorize at the present time, should be noted plainly on the service order. The existence of weak selenium rectifiers, for example, that have caused the picture to shrink, should be noted. This can be a future reminder to the customer; it also takes you off the hook as far as later taking the blame for the condition is concerned.

The service order should also have a place for the customer's signature, above which should be a printed statement to the effect that the set is operating satisfactorily except as noted. Always have the order signed, even on C.O.D. calls. This protects you on later claims, and on callbacks. If the call is made on a charge basis—which sometimes cannot be avoided—the customer is at least bound by his own signature. Be sure you explain the guarantee, which must appear on the bill anyhow.

Finally, don't linger to discuss the ball game, the weather or how the fish are biting. This will spoil the impression that you are a busy professional man, with other calls to make, whose time is valuable, and that the customer was fortunate in securing your services.

It's much easier and more profitable to handle a customer who likes and trusts you. Building up the right attitude on his part is one of the important secrets—if it is a secret—to building up a successful business. •

# TOWER OF PROTECTION



**Insulating products  
that meet and  
exceed the standards  
of industry . . .**

# Dutch Brand

#### DUTCH BRAND PLASTIC ELECTRICAL TAPES

This, strong, flexible with unusual resistance to destructive elements.  
Three thicknesses: .007", .010", .020".

#### DUTCH BRAND VINYL COLOR TAPE

Nine colors, four widths for all insulating, coding, indexing, U. L. listed.

#### DUTCH BRAND RUBBER TAPE

The finest tape of its kind. Resists up to 18,000 volts through a single thickness. Fuses perfectly.

#### DUTCH BRAND FRICTION TAPE

An industry favorite for over 40 years. For perfect adhesion, for longest life choose Dutch Brand.

#### "DB" WIRE CONNECTORS

Get full insulation protection from these vibration-proof, weatherproof long skirt connectors.

Whatever the requirements of the job here is the product to meet the specifications. Wherever electrical work is done, the symbol of perfect insulation is the Dutch Brand trade mark. Electrical contractors, plant maintenance electricians, electronic technicians, and electrical manufacturers all agree Dutch Brand represents the finest. Friction Tape, Rubber Tape, Plastic Electrical Tape and "D.B." Wire Connectors. Only from Dutch Brand is this complete line available.



**Johns-Manville**  
**DUTCH BRAND**  
**PRODUCTS**

VAN CLEEF BROS., INC. DIVISION  
7800 WOODLAWN AVENUE CHICAGO 19 ILL.

**Write for descriptive literature  
and technical data.**

# Intercarrier Buzz

## How This Condition Arises, and What to Do About It

• A loud buzz may, at times, develop in intercarrier receivers. Rumor has it that intercarrier buzz has driven many service technicians to drink, and re-awakened consumer interest in radio. A properly designed TV receiver in good operating order should not produce buzz, provided that the transmitter is not responsible for generating it.

In Fig. 1, a circuit with a pronounced tendency to create buzz is

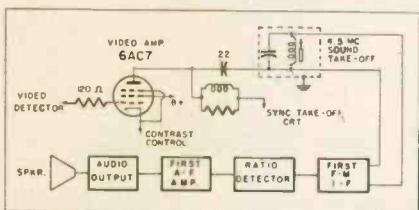


Fig. 1—Intercarrier circuit, with the signal removed at the video amplifier plate.

shown. The circuit is typical of medium to low-prices TV receivers. Note that only one 4.5 mc i-f stage is used. The need for a second one is avoided by taking the sound off at the video amplifier (instead of the video detector). Buzz is apt to be heard in the sound when the contrast control is advanced, especially in strong-signal areas. The buzz is the result of overloading in the video amplifier.

When an excessively large incoming signal drives the video amplifier to cutoff, saturation, or both, the

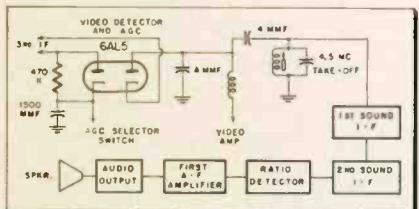


Fig. 2—Intercarrier circuit with the sound signal removed at the video detector.

amplifier is said to be overloaded. The plate current in the video amplifier is either zero or unchanging when cutoff or saturation is present; in either case, no signal exists in the plate circuit, since the plate current is either absent or dc in nature. The portions of the video signal that are most apt to overload the video amplifier are the vertical blanking and sync signals, since these are of high amplitude and long duration. The

BY IRVING SHULMAN AND SOL HELLER

sound signal is eliminated at these overload times. Since no video signals are present during these intervals (vertical retrace periods), the picture is not affected. The sound disappears, or has holes punched in it, at the vertical sync pulse rate. Inasmuch as this rate is 60 cycles, a buzzing noise becomes audible.

### Horiz. Pulse Action

The horizontal sync pulses, of course, will also overload the video amplifier when the incoming signal is excessive, tending to produce a 15,750-cycle whistle. The audio section of the TV receiver does not have a good enough high-frequency response, however, to effectively amplify this signal; it is therefore inaudible.

**Intercarrier Buzz Due to Circuit Trouble.** The ratio detector (FM detector most often used in intercarrier sets) is able to reject undesired AM signals to a certain extent. When the video amplifier is overloaded, however, the AM buzz that attaches itself to the sound signal (when the latter is taken off at the video amplifier plate) is too large in amplitude and too long in duration to be effectively eliminated by the ratio detector, or the limiter that may precede it; it is therefore audible in the sound.

### Overload

Buzz may be heard in intercarrier receivers whenever a stage which is common to both video and sound signals is overloaded—i.e., front-end or video i-f stages, or the video amplifier (if the sound is taken off at its output). Such overload may be due to inadequate bias, or excessive signal input. Overloading due to defective tubes or insufficient plate and screen voltages in these stages is also possible. In receivers employing a circuit similar to the one shown in Fig. 2, the AGC system employed is usually adequate to prevent r-f and i-f overload due to strong signal input.

Buzz may also develop in any intercarrier receiver when the FM de-

tector is improperly aligned. The ability of the ratio detector or discriminator to reject AM signals such as buzz depends on its being correctly aligned. A degree of misalignment (say 100 kc) that might pass unnoticed in a receiver with a split-carrier system, will produce very noticeable buzz in an intercarrier set. For this reason, a crystal-controlled signal generator, or one whose accuracy has been crystal-checked, should be used for alignment. When such a generator is unavailable, the transmitted signal may be used as the signal source in alignment (provided that the stages up to the point of sound signal takeoff are correctly aligned and functioning properly).

### I-F Misalignment

Improper video i-f alignment may be a cause of intercarrier buzz. If the sound carrier's normal position on the i-f response curve (point X in Fig. 3) rises appreciably, buzz will result. This occurs because the amplitude of the 4.5 mc sound beat note is independent of the picture

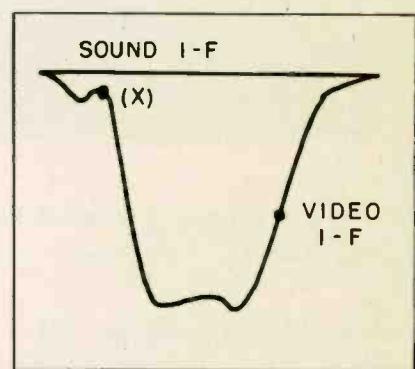
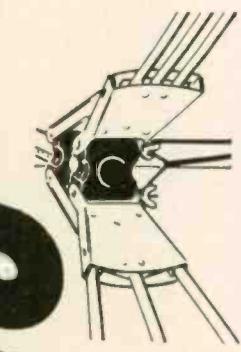


Fig. 3—Typical intercarrier i-f response

carrier amplitude only when the picture carrier is large compared to the sound signal. If the sound carrier amplitude increases (due to video i-f misalignment), decreasing the ratio of the two carriers, the large variations of picture carrier amplitude that occur during vertical sync pulse time will amplitude-modulate the 4.5 mc beat note. The resultant AM signal is too large to be rejected by the FM detector (or limiter), and therefore becomes audible as buzz. •

# TRIO

America's Top Quality Line . . .  
is the Best Buy for the Money!



#### Sensational "INSTA-LOK" CLAMP

(Good-Bye Nuts)  
Revolutionary TRIO Clamp  
employed in all TRIO units  
reduces parasitic ele-  
ments with instant flip-  
out assembly — perma-  
nent alignment and ultra-  
strength. Nothing stronger!  
Nothing faster!



#### New Mini-Up Conical Head

Superior strength — with  
the new modern riveted  
construction. No shedding  
of elements as with dowel-  
ed, friction held elements.



#### America's No. 1 Choice

Behind every TRIO antenna is the RESEARCH—ENGINEERING—EXPERIENCE and CRAFTSMANSHIP that has made TRIO the leader in antenna development.

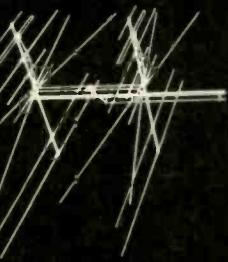
**TRIO — THE COMPLETE LINE**

- YAGIS
- CONICALS
- "VARI-CONS"
- COLINEAR ARRAYS
- CONICAL — YAGIS
- RADAR SCREEN TYPES
- UHF & REFLECTOR TYPES

#### NEWEST ADDITIONS TO THE TRIO LINE

#### The TRIO "88"

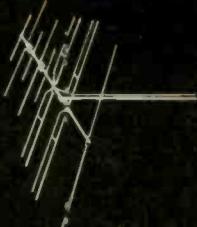
More DB gain per  
dollar cost. Completely  
pre-assembled, ready to  
unfold and install.



#### The TRIO "99"

CHANNELS 9-13

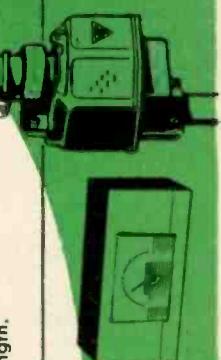
A well-known broad band Yagi type featuring sturdier construction, higher quality materials and faster assembly. Improved forward gain with reduced side and rear pick-up as a result of TRIO engineering and research. Uses famous "Insta-Lok" clamps and all sheeted construction at originally introduced by TRIO.



#### The TRIO "77"

CHANNELS 9-13

High gain, broad band type now greatly improved as a result of TRIO engineering. Highest quality Alcoa elements and boom. Exclusive "Insta-Lok" clamps for easy, fast assembly. Designed for low wind resistance and balanced for rotator operation.



**COMPARE THESE FEATURES!**

**Haviest Boom!**  
Thick-wall, extra sturdy  
1 1/4" diameter booms used  
on ALL low band Yagis.  
Highest grade Alcoa  
aluminum for added  
strength.



**THE TRIO "ARISTOCRAT"**  
America's Most Dependable Ro-  
tator Is Also America's Most  
Beautiful  
Control unit available in four glorious colors.

TRIO MANUFACTURING COMPANY • GRIGGSVILLE, ILLINOIS

Copyright 1955 by  
TRIO MANUFACTURING CO.

# New Antennas & Tools

## Indoor & Outdoor Antennas, Rotators; Hand Tools

### Alliance ROTATOR

The improved control head of the Model K-22 affords positive control of rotation. Fingertip control bar rotates the antenna in one direction when pressed on one end and in the opposite direction when pressed on the other end. An automatic center disk signal light indicates when limit of travel is reached. Rotator unit, which is mounted on the mast, is enclosed in a split die-cast zinc housing. Control unit is encased in modern plastic case. \$24.95. Alliance Mfg. Co., Alliance, O.—TECHNICIAN (Ask for No. 2-13)

### Walsco INDOOR ANTENNA

New design in indoor UHF-VHF antennas, the "Star," offers built-in electronic rotating and tuning control. Turning the control changes the directivity by automatically selecting the



correct combination of elements. Available in choice of three ceramic base colors; lime, green and sand. \$12.95. Walsco Electronics Corp., 3602 Gresham Blvd., Los Angeles 16—TECHNICIAN (Ask for No. 2-4)

### Vaco REAMER

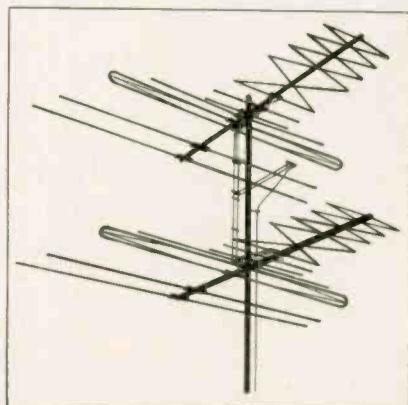
Extra-hard, tapered reamer, available with or without detachable handle, enlarges holes from  $\frac{1}{8}$ -in. to  $\frac{3}{8}$ -in. Shank is  $3\frac{1}{2}$  in. in length, tapering from  $\frac{3}{8}$  in. in diameter down to  $\frac{1}{8}$  in. Handle is of Ambery, with fluted grip. Price, with handle—\$2.50; reamer only—\$1.75. Vaco Products Co., 317 E. Ontario St., Chicago 11—TECHNICIAN (Ask for No. 2-60)

### Eveready FLASHLIGHT

Heavy-duty Model No. 1251A, 2-cell, and No. 1351A, 3-cell, flashlights feature a tube and bottom cap moulded of crack- and shatter-proof ethyl cellulose. Special lens-guard of polyethylene protects the lens and throws a powerful red safety-warning light. Extra-rugged, self-lubricating slide switch. Price: Model No. 1251A—\$2.50; Model No. 1351A—\$2.75. National Carbon Co., div. of Union Carbide and Carbon Corp., 30 E. 42nd St., N.Y.—TECHNICIAN (Ask for No. 2-3)

### JFD ANTENNA

Model SX 711 "Star-Helix Rainbow" has a flat plane microwave type helical section composed of individual non-linear additive collectors, each tuned separately for highest gain and sharpest



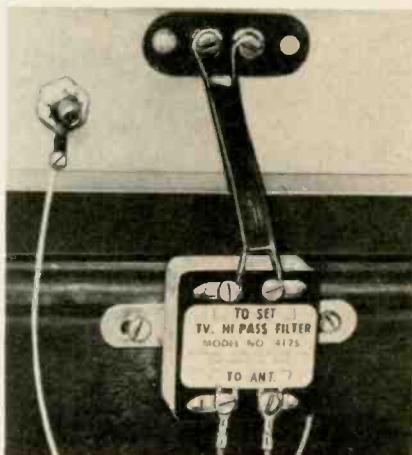
directivity on one high band channel. The Hi-Plex folded dipole design transforms the low band collector into 3 half-wave length antennas that develop highest in-phase current on the high band. Up to 25 db front-to-back ratio, and consistently flat gain across the TV spectrum. Price: single bay, SX 711—\$25.50; stacked, Model SX 711S—\$52.50. JFD Mfg. Co., 6101—16th Ave., Brooklyn 4, N.Y.—TECHNICIAN (Ask for No. 2-11)

### Jerrold DISTRIBUTION SYSTEM

Twenty or more receivers can be supplied from a single antenna with the new "Multi-Outlet System." Basis of the system is the ABD-1 distribution amplifier which provides 25 db amplification. The amplifier output is fed to a passive "splitter," which divides the signal. Coaxial cable carries the signal to the desired locations. "Line Tap" Impedance Matcher taps off the signal at each receiver. Jerrold Electronics Corp., 26th & Dickinson Sts., Phila.—TECHNICIAN (Ask for No. 2-12)

### Clippard INTERFERENCE TRAP

Compact high-pass-filter type TV interference eliminator, Model 4125, is designed for receivers having a 40 mc i-f channel. Designed to eliminate or reduce interference and reject or attenuate low frequency signals below 50 mc. Also reduces "snow" in pictures caused by "noise" picked up by the antenna at the i-f frequencies. For re-



ceivers using a 300-ohm balanced input system and 300-ohm lead. \$2.98. Clippard Instr. Lab. Inc., 7390 Colerain Rd., Cincinnati, 13—TECHNICIAN (Ask for No. 2-5)

### Crow ELECTRONICS KIT

With the Model 50-A educational kit, electronics can be taught by "visual experiment." A 275-page illustrated manual in worksheet form, "Experimental Electronics for the Beginner," is included with kit, as well as a full selection of parts necessary to conduct the experiments. The experiments include: capacitors, voltage dividers, frequency multipliers, low pass and high pass filters, frequency discriminators, meters, rectifiers. Crow Electri-Craft Corp., 1102 Shelby St., Vincennes, Ind.—TECHNICIAN (Ask for No. 2-2)

### FOR MORE TECHNICAL INFORMATION ON NEW PRODUCTS OR BULLETINS

use this convenient coupon. Enter below the reference numbers for all items desired.

New Products Editor

TECHNICIAN & Circuit Digests

480 Lexington Ave.  
New York 17, N. Y.

Please send me more information on the following items:

My company letterhead or business card is enclosed.

Name .....

Address .....

City .....

State .....

Firm .....

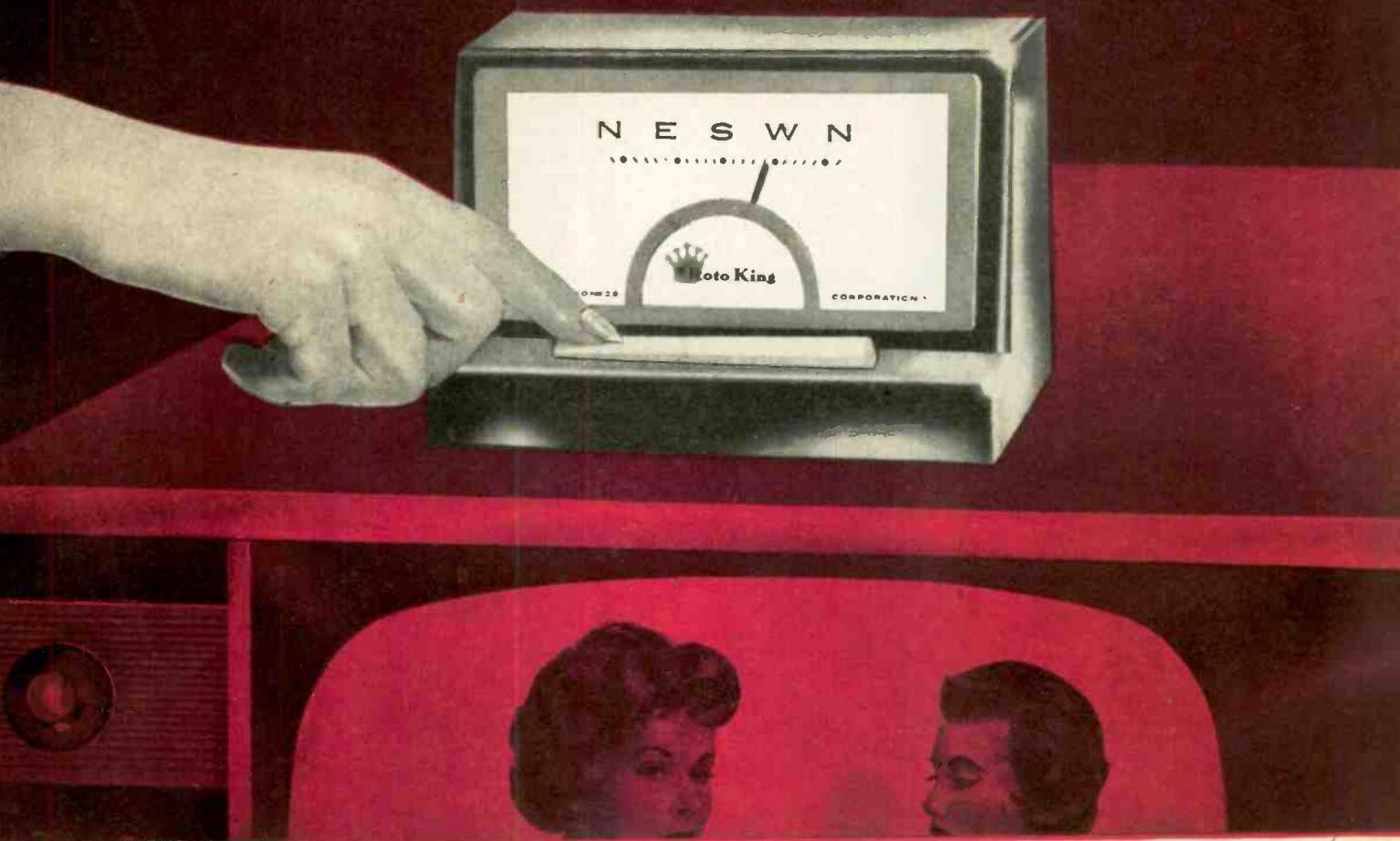
My position .....

Business address (if different from above) .....

STYLED FOR SALES



Roto King



### THE ONLY ROTATOR WITH THESE EXTRAS TO SELL!

#### SMARTLY STYLED CONSOLE WITH PIANO TUNING

The striking control console is designed for beauty of design as well as ease of operation. Actuates the rotator with the slightest touch. Available in mahogany or ivory cabinet.

#### STOP WATCH TUNING ACCURACY

Pinpoint control system is unsurpassed in consistent accuracy of indication. Stops antenna instantly within  $\frac{1}{2}$  degree of desired position. No drift or ambiguity.

#### POWERFUL INLINE DESIGN

Supports direct deadweight load of largest stacked array. Resists downthrust and bending moment. Built-in thrust bearings. No extra parts to buy. No breakable offset bearings.

#### REPLACEABLE FACTORY SEALED CARTRIDGE UNIT

Sealed power drive unit eliminates the former need of dismantling the antenna when servicing. Simply loosen 3 screws to remove the sealed unit.

#### BALANCED POWER

Close tolerance 3200:1 reverted gear drive (within .002 in. tolerance) efficiently transmits 100% of developed power. No inherently weak worm gears.

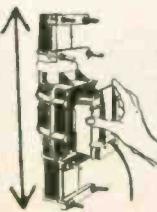


390 DEGREE ROTATION  
390 degrees—the broadest traverse range now in use—speeds and simplifies station selection beyond standard 360 degree revolution.



#### COLORFUL "CARRY-ALL" CARTON

Safely protects Roto-King en-route...eases on-the-job carrying of units...comes in handy in the shop or around the home. A JFD merchandising extra at no extra cost.



#### AUTOMATIC VOLTAGE COMPENSATION

Advanced circuitry achieves automatic voltage compensation for stability and exactness of indication despite line voltage fluctuations.

ROTO-KING IS LIKE A DIRECT LINE  
TO EVERY TV STATION IN YOUR AREA.

Write for 8-page  
Roto-King engineering  
brochure No. 288.

Model List  
**RT100-M \$44.95**  
Mahogany

**RT100-IV \$44.95**  
Ivory



Look to JFD for Engineering Leadership!

MANUFACTURING CO., INC.

6101 16th AVENUE, BROOKLYN 4, N. Y.

INTERNATIONAL DIVISION: 15 Moore Street, New York 4, U.S.A.



no matter  
how you look  
at it...

INTERNATIONAL'S  
*Replacement  
Rectifier...*

is the  
Replacement Rectifier  
that's Right!

all types available from  
your parts distributor

INTERNATIONAL  
RECTIFIER



El Segundo, Calif.

ORegon 8-6281

NEW YORK

CHICAGO

World's Largest Supplier of  
Quality Industrial Rectifiers

## RCA Sponsors TV Servicemen's "Week"

Saluting thousands of service dealers and technicians throughout the nation, "National Television Servicemen's Week," March 7 to 12, will be sponsored by the Radio Corporation of America. First recognition of its kind for electronic techs, the Week has been registered with the U. S. Chamber of Commerce.

RCA will mark the Week with an ad and promotion campaign designed to focus consumer and industry attention on the nation's servicemen. The campaign will include, according to v-p Douglas Y. Smith of the RCA Tube Division, the award of more than \$10,000 in prizes to radio-TV service dealers initiating the most effective promotions at the neighborhood level in behalf of the National Week. A complete set of 5 RCA test instruments for color TV service, each valued at \$1337, will be awarded in each of the company's 8 sales regions. Dealers can qualify by describing in 50 words or less their efforts to

promote the Week. Entries are acceptable up to midnight of April 30.

The Week has been established as a "long overdue gesture of appreciation to the skilled technicians who played so vital a role in the quick transformation of television from a laboratory development to a truly national service," Mr. Smith said concerning the inauguration of a special promotion at this time.

Symbolizing the event will be a statuette featuring a 14-in. figure of a man holding aloft an electronic symbol. The gold-finished figure stands on a black base which bears an RCA dedication to service techs. The figure, together with other display, promotion, and advertising matter, is available from the manufacturer's tube distributors. The figure will be featured in RCA's campaign in the press and on radio and TV. Advance announcements will be carried on the full-network "Sid Caesar Show" on February 14, 21 and 28.

### News of Industry

BRUCE E. VINKEMULDER has been appointed sales mgr. for the Electronics Div. of CARTER PARTS CO., Chicago, Ill. Mr. Vinkemulder formerly was associated with SANGAMO ELECTRIC CO., Capacitor Div. . . . EXPANSION OF THE SALES DIV. of ELECTRO-VOICE, INC., Buchanan, Mich., brought four new appointments: Cullen Macpherson, to asst. mgr. of reproducing components div., George R. Riley, asst. mgr. of distributor sales div., Lloyd W. Loring, sales engr., and Everett E. Leedom, adv. mgr.

SETTLEMENT OF LITIGATION between TELREX, INC. and CHANNEL MASTER CORP., has resulted in a licensing agreement on TELREX conical antennas, it was announced by Michael D. Ercolino, pres. of TELREX and Harold Harris, vice-pres. of CHANNEL MASTER. . . . A RAPIDLY EXPANDING TV ANTENNA MARKET was predicted by Ben Snyder, head of SNYDER MFG. CO., during a recent week-end sales meeting at the company's executive office and main plant in Phila. The entire organization has predicted a TV boom in 1955, especially regarding color TV.

PRODUCTION OF THE ONE MILLIONTH Westinghouse cathode-ray (television picture) tube was recently announced by R. T. Orth, vice-pres. of the Westinghouse electronic tube div.

TRAV-LER RADIO CORP. is planning to invade the Canadian TV market in 1955, JOE FRIEDMAN, Trav-ler

pres., disclosed recently at a dealer and distributor preview meeting in Chicago. Sets will sell for about \$200.

E. K. FOSTER, vice-pres. of BENDIX AVIATION CORP., has been named a group executive in charge of four divisions—Bendix Radio, Bendix TV and Broadcast Receiver, York, Pa., and Cincinnati.

(Continued on page 50)

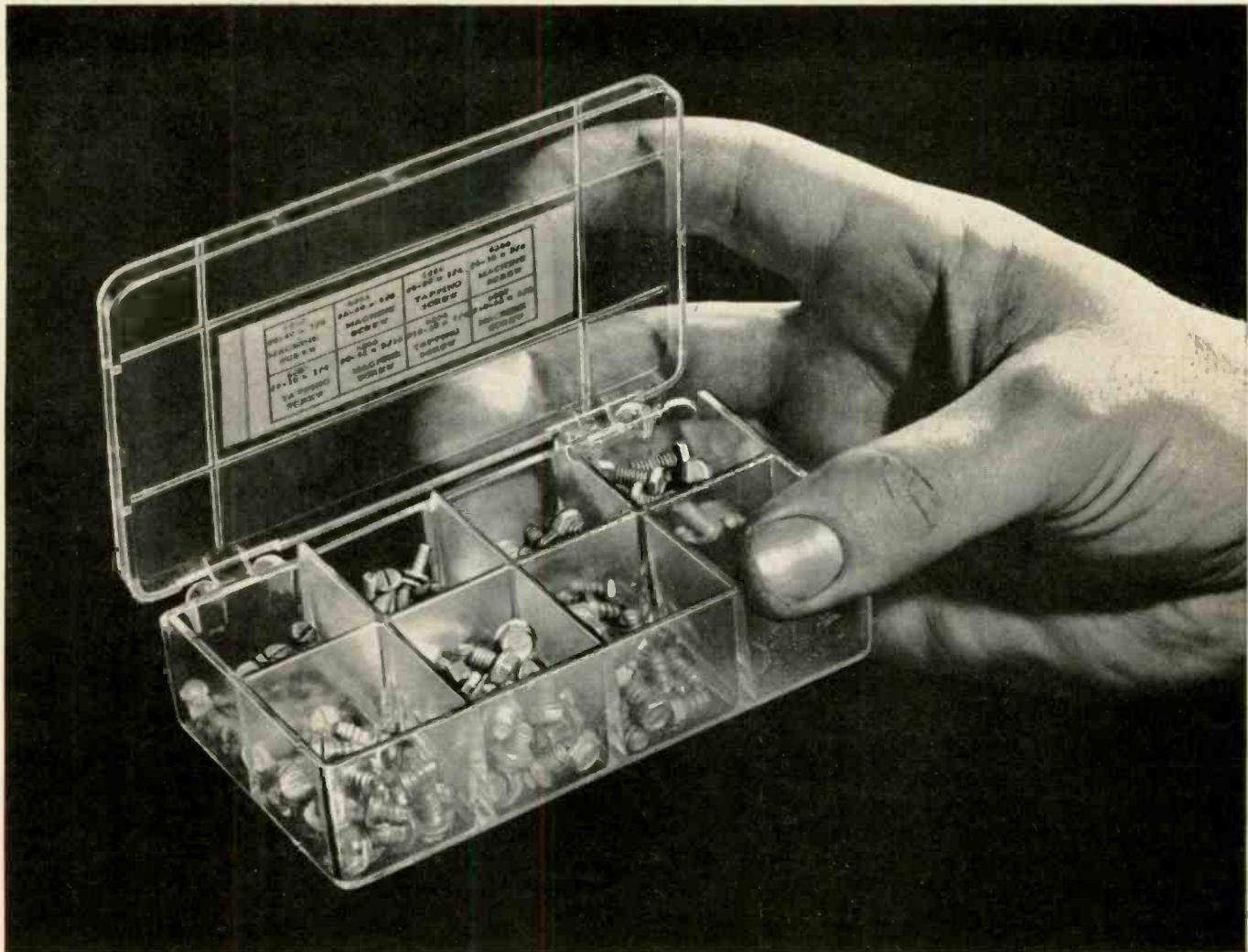
### Transistor Receiver

(Continued from page 24)

Quality audio output: One preamplifier transistor feeds a phase-inverter transformer, which feeds 2 transistors in push-pull. Though speaker diameter is only 3½ in., it is designed with a square shape and conical center, also uses an oversize magnet, for improved performance. These features, combined with an overall feedback loop, provides a frequency response range of 100 to 8000 cps, which is superior for AM.

Other technical specs: Sensitivity is 300 to 500 microvolts per meter. Special i-f core design has been used to eliminate tweets and squeals. Tuning range is from 535 to 1620 kc. Transistor complement is as follows: converter, oscillator, 1st i-f, 2nd i-f and high-gain detector (5-CK760, 1 each); audio preamplifier and push-pull audio output (3-CK722).

The receiver comes in a choice of leather-covered models, will retail for \$79.95.



**Now... Delco offers **POCKET-SIZE** kits that  
keep replacement hardware at your fingertips**

# A GREAT NEW CONVENIENCE FOR AUTO RADIO TECHNICIANS!

*For quicker, easier servicing* of Delco auto radios, a large assortment of replacement hardware—from tuner bearings to case screws—is now available in four clear polystyrene kits.

*There's no more fumbling* in a dark drawer when you need a hardware replacement part. You can see it immediately in these transparent kits. And each part fits your repair need exactly.

*A handy chart attached* to the inside cover of the box shows the contents of each of the eight compartments—a convenience when ordering refills for the compartments in plastic bags.

*You can obtain these* convenient pocket-size kits through your UMS Delco Electronics Parts Distributor today.

A GENERAL MOTORS PRODUCT GM  
UNITED MOTORS LINE  
DISTRIBUTED BY ELECTRONICS DISTRIBUTORS EVERYWHERE



## DELCO RADIO

DIVISION OF GENERAL MOTORS, KOKOMO, INDIANA

# How to contact and sell the

# ...with the MAY '55 TECHNICIAN & ELECTRONIC

—featuring the only directory of its kind in the service field

- ... a valuable where-to-buy source book for service dealers, technicians, and parts jobbers.
- ... lists over 1700 companies and the replacement products, accessories or instruments they make.

## USE LOCALIZER LISTINGS

**How they work.** Immediately under the firm name, listed free in the Alphabetical List of Manufacturers, the firm can purchase space @ \$20 per inch, to include executive and sales personnel, brand names, list of products, branch or regional offices, telephone numbers and local representatives and parts jobbers—all are arranged alphabetically by cities. Additional localizer listings are available in the Directory of Distributors to include at the end of each state a list of manufacturer's distributors in that state.

Distributors and Representatives can also purchase listings to show their personnel, lines carried, area served, etc. directly under their free editorial listing in their respective directory sections. (These paid listings are also available by the inch.)

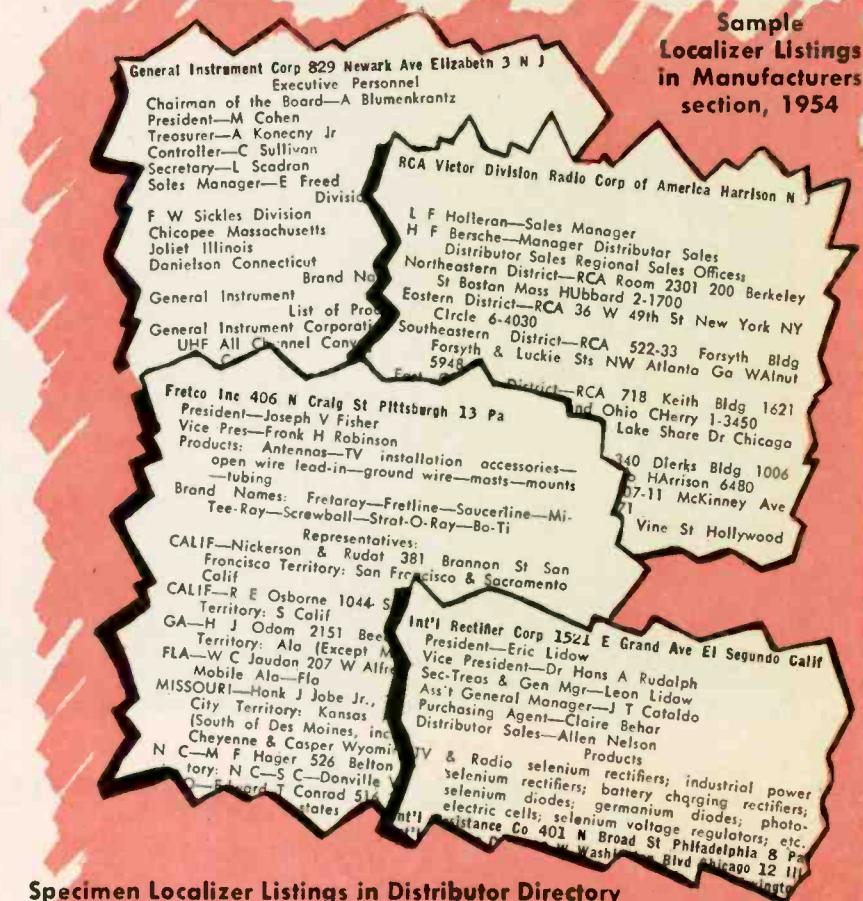
## RUN FLOATING LOGOTYPES

Manufacturers, distributors and representatives may use floating logotypes positioned at random on directory pages. Minimum order, ten (10) logos, total dimensions must not exceed  $\frac{3}{8}$ -inch depth and 13 picas width including half point rule all around. Distributors and "Reps" can use their own logos or manufacturers'. Where manufacturers' logotypes are used, in most cases the cost can be applied against the manufacturers' cooperative fund.

**CUT COSTS, INCREASE SALES, WITH LOCALIZER LISTINGS.** They minimize long distance telephone charges, reduce correspondence, boost inquiries, speed services, get new orders.

Paid listings are sold by the inch—\$20.00 per inch. Fractions of inches are billed as full inches. Paid listings are subject to agency commission.

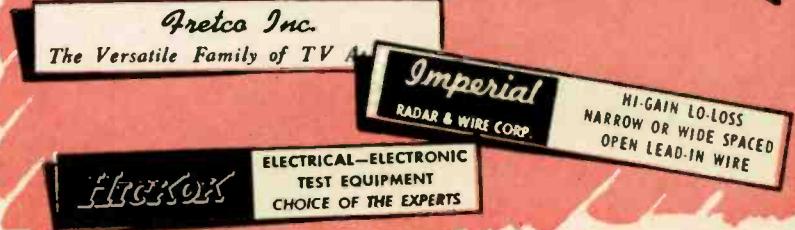
Sample Localizer Listings in Manufacturers section, 1954



Specimen Localizer Listings in Distributor Directory



Sample logotypes used on directory pages



**Caldwell-Clements, Inc.**  
480 Lexington Avenue, New York 17, N.Y.  
Telephone PLaza 9-7880

# TV-electronic service market

## BUYERS DIRECTORY PARTS SHOW ISSUE

Sample units of display advertising space available in the 1955 Directory

Chicago—201 N. Wells Street, RAndolph 6-9225  
Los Angeles—Chris Dunkle & Associates, 3257 W. 6 St. DUnkirk 7-6149  
San Francisco—Chris Dunkle & Associates, 1651 Market St. UNDERHILL 3-5282



### Get double sales impact

To further strengthen the tie-in between your editorial and Localizer Listings, TECHNICIAN'S BUYERS DIRECTORY offers you a direct route to increased sales in the TV-electronic service market. Display advertisements are available to manufacturers, distributors and "Reps", in the Directory of Distributors and Directory of Representatives, offering a great opportunity to present as many additional sales messages as desired. (See sample units of space at the left). Display ads, strategically placed, and perfectly timed will reach the greatest number of buyers in YOUR market when they are looking to buy! Your ads will sell for you throughout the year . . . as the TECHNICIAN BUYERS DIRECTORY will be kept and referred to all year long.

### Tie-in with '55 Parts Show

The spectacular May issue also focuses special attention on the Annual Electronic Parts Show . . . bringing TECHNICIAN's 50,000 readers in the service market a preview of the Show; its programs, exhibits, new products and developments in the field. It's timed for showtime selling to the thousands who will attend the Show . . . and the bulk of your market (technicians and service managers) who cannot attend except through the pages of TECHNICIAN. As an exhibitor or non-exhibitor, your advertising in this issue gains the extra sales impact on the industry that spells "higher sales volume".

### Plus values for YOU!

- 50,000 service circulation
- Distribution before Parts Show
- Extra Distribution at the Show
- Year 'round reference for sources of supply
- Consistent winner of surveys

**RESERVE SPACE TODAY!**

**Closing Date—April 10**



## WHEN CORROSION ATTACKS PERMA-TUBE STAYS CLEAN

... and so does your reputation

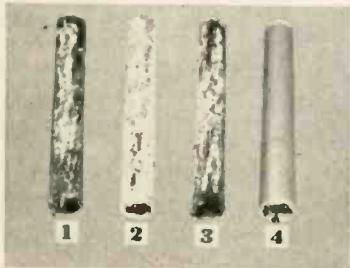


Look for this brand mark  
—only genuine Perma-Tube  
gives you this protection

### Here's why PERMA-TUBE backs up quality service:

1. PERMA-TUBE IS CORROSION-PROOF . . . it's treated with vinylite—then coated *inside and outside* with a metallic vinyl resin base. It's guaranteed to be free from rust in a salt spray test of 500 hours minimum to an American Society of Testing Materials Specification B117-49T. This assures long life.
2. PERMA-TUBE IS STURDY . . . it's made of special, high-strength J&L Steel.
3. PERMA-TUBE IS EASILY INSTALLED . . . it's the only mast with *both ends* of the joint machine fitted.

### Here's proof of how PERMA-TUBE resists corrosion:



Test samples after 1440 hours  
ASTM salt spray test

1. Coated Mechanical Tubing . . . note that galvanized coating is gone and underlying steel is severely corroded.
2. Coated Mechanical Tubing . . . note that paint coating is nearly destroyed and zinc coating is corroded.
3. Galvanized Mechanical Tubing . . . note zinc and steel are corroded.
4. PERMA-TUBE . . . note that Perma-Tube is relatively unharmed.

For further details on product and installation, write for a copy of the Perma-Tube booklet. Jones & Laughlin Steel Corporation, Dept. 495, 3 Gateway Center, Pittsburgh 30, Pa.

**Jones & Laughlin**  
STEEL CORPORATION — Pittsburgh



## Reps & Distributors

MARJORIE KENT has been appointed executive secretary in charge of the national office of "The REPS," 600 S. Michigan Ave., Chicago.

A. W. NASH CO., Los Angeles has just been appointed sales rep for Southern Calif. by THE WINSLOW CO., mfrs. of electrical instruments and test equip.

MARTY BETTAN has been named national sales rep for ROGERS ELECTRONIC CORP., New York City, mfrs. of flyback transformers, deflection yokes and linearity coils.

H. GEORGE SHEFLER CO., Phoenix is the new industrial and jobber rep in Ariz. and the Southwest for GENERAL CEMENT MFG. CO. of Rockford, Ill.

BAUME ELECTRONIC SALES CO., 164-10 Willets Pt. Blvd., White- stone, N. Y. has been named to represent HASTINGS PRODUCTS INC., Boston mfr., in the N. Y. metropolitan area.

WARREN-CONNOLLY CO., INC., 521 W. 57 St., New York City, has been named distributor for MOTOROLA INC. for greater New York City area.

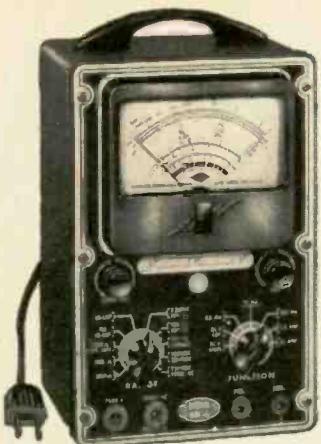
HARRY LEFKOWITZ and MAC GEIER have formed the firm of HAR- MAC ELECTRONICS DISTRIBUTING CORP., 243 Broadway, New York City. The organization has been formed exclusively to distribute the new "Remot-O-Matic" TV remote control unit.

W. N. POTTER, UNITED MOTORS general mgr., announced the formation of the UNITED MOTORS SERVICE DISTRIBUTORS COUNCIL. Its function is to effect closer and more effective two-way flow of information between UNITED MOTORS SERVICE and their distributors across the country.

AUDIO MARKETING SERVICES, a new firm of mfr.'s. reps specializing in sale of hi-fi components to S. Calif. Ariz. and Nevada distributors, has been formed by R. MARK MARKMAN. Offices are at 860 N. Vine St., Los Angeles.

AMPEREX ELECTRONIC CORP., Hicksville, L. I., N. Y. has appointed LOU SMITH as factory representative in the metropolitan areas of Chicago and Milwaukee.

IOWA-NEBRASKA Chapter of NA- TIONAL ELECTRONIC DISTRIBU- TORS ASSOC. was host recently in Des Moines to local distributors and members of neighboring chapters. Guests included Jack Fisher, RADIO SUPPLY CO., Wichita, Kans., and Louis B. Calamaras of NEDA.



Superior's new  
Model 670-A

# SUPER METER

A COMBINATION VOLT-OHM MILLIAMMETER PLUS  
CAPACITY REACTANCE INDUCTANCE AND DECIBEL MEASUREMENTS

**SPECIFICATIONS:**

D.C. VOLTS: 0 to 7.5/15/75/150/750/1,500/7,500 Volts  
A.C. VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts  
OUTPUT VOLTS: 0 to 15/30/150/300/1,500/3,000 Volts  
D.C. CURRENT: 0 to 1.5/15/150 Ma. 0 to 1.5/15 Amperes  
RESISTANCE: 0 to 1,000/100,000 Ohms 0 to 10 Megohms  
CAPACITY: .001 to 1 Mfd. 1 to 50 Mfd. (Good-Bad scale for checking quality of electrolytic condensers.)  
REACTANCE: 50 to 2,500 Ohms 2,500 Ohms to 2.5 Megohms  
INDUCTANCE: .15 to 7 Henries 7 to 7,000 Henries  
DECIBELS: -6 to +18 +14 to +38 +34 to +58

**ADDED FEATURE:**

Built-in ISOLATION TRANSFORMER reduces possibility of burning out meter through misuse.

The Model 670-A comes housed, in a rugged crackle-finish steel cabinet complete with test leads and operating instructions.

**\$28<sup>40</sup>  
NET**



Superior's new  
Model TV-11

# TUBE TESTER

- ★ Tests all tubes, including 4, 5, 6, 7, Octal, Lock-in, Peanut, Bantam, Hearing Aid, Thyratron Miniatures, Sub-miniatures, Navals, Sub-minors, Proximity fuse types, etc.
- ★ 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 elements 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.
- ★ The Model TV-11 does not use any 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.

**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.

- ★ Free-moving built-in roll chart provides complete data for all tubes.
- ★ Newly designed Line Voltage Control compensates for variation of any Line Voltage between 105 Volts and 130 Volts.
- ★ NOISE TEST: Phono-jack on front panel for plugging in either phones or external amplifier will detect microphonic tubes or noise due to faulty elements and loose internal connections.

The model TV-11 operates on 105-130 Volt 60 Cycles A.C. Comes housed in a beautiful hand-rubbed oak cabinet complete with portable cover

**\$47<sup>50</sup>  
NET**



THE NEW  
MODEL  
TV-50

# GENOMETER

A versatile all-inclusive GENERATOR which provides ALL the outputs for servicing: A.M. Radio • F.M. Radio • Amplifiers • Black and White TV • Color TV

7 Signal Generators in One!

- ✓ R. F. Signal Generator for A.M.
- ✓ R. F. Signal Generator for F.M.
- ✓ Audio Frequency Generator
- ✓ Bar Generator
- ✓ Cross Hatch Generator
- ✓ Color Dot Pattern Generator
- ✓ Marker Generator

**R. F. SIGNAL GENERATOR:** The Model TV-50 Genometer provides complete coverage for A.M. and F.M. alignment. Generates Radio Frequencies from 100 Kilocycles to 60 Megacycles on fundamentals and from 60 Megacycles to 180 Megacycles on powerful harmonics.

**VARIABLE AUDIO FREQUENCY GENERATOR:** In addition to a fixed 400 cycle sine-wave audio, the Model TV-50 Genometer provides a variable 300 cycles to 20,000 cycle peaked wave audio signal.

**BAR GENERATOR:** The Model TV-50 projects an actual Bar Pattern on any TV Receiver Screen. Pattern will consist of 4 to 16 horizontal bars or 7 to 20 vertical bars.

**CROSS HATCH GENERATOR:** The Model TV-50 Genometer will project a cross-hatch pattern on any TV picture tube. The pattern will consist of non-shifting, horizontal and vertical lines interlaced to provide a stable cross-hatch effect.

**DOT PATTERN GENERATOR (FOR COLOR TV):** Although you will be able to use most of your regular standard equipment for servicing Color TV, the one addition which is a "must" is a Dot Pattern Generator. The Dot Pattern projected on any color TV Receiver tube by the Model TV-50 will enable you to adjust for proper color convergence.

**MARKER GENERATOR:** The Model TV-50 includes all the most frequently needed marker points. The following markers are provided: 189 Ke., 263 Ke., 456 Ke., 600 Ke., 1000 Ke., 1400 Ke., 1800 Ke., 2000 Ke., 2500 Ke., 3870 Ke., 4.5 Me., 5 Mc., 10.7 Mc., (3570 Ke.) is the color burst frequency.)

**THE MODEL TV-50**  
comes absolutely complete with shielded leads and operating instructions. Only ...

**\$47<sup>50</sup>  
NET**

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

Try any of the above instruments for 10 days before you buy. If completely satisfied then send down payment and pay balance as indicated on coupon. No Interest or Finance Charges Added! If not completely satisfied return unit to us, no explanation necessary.

MOSS ELECTRONIC DISTRIBUTING CO., INC.

Dept. D-99, 3849 Tenth Ave., New York 34, N.Y.

Please send me the units checked. I agree to pay down payment within 10 days and to pay the monthly balance as shown. It is understood there will be no finance, interest or any other charge, provided I send my monthly payments when due. It is further understood that should I fail to make payment when due, the full unpaid balance shall become immediately due and payable.

Model 670-A ..... Total Price \$28.40  
\$7.40 within 10 days. Balance \$3.50 monthly for 6 months.

Model TV-11 ..... Total Price \$47.50  
\$11.50 within 10 days. Balance \$6.00 monthly for 6 months.

Model TV-50 ..... Total Price \$47.50  
\$11.50 within 10 days. Balance \$6.00 monthly for 6 months.

Name .....

Address .....

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

# TV-Electronic Technician

## Test Equipment, Tools, Parts; Items For Resale

### Probescope TEST UNIT

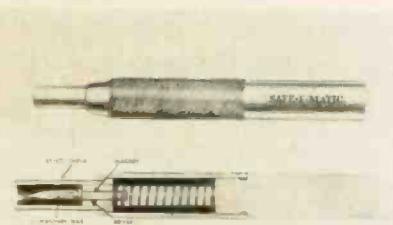
Portable combination probe and oscilloscope, Model PO-1, has a 1-in. mu-metal shielded crt incorporated in the probe. 3½-ft. shielded cable connects probe to control cabinet. Unit



takes up less than ½ sq. ft. bench space and weighs only 7½ lbs. Probescope Co., 44-05 30th Ave., L.I.C. 3, N.Y.—TECHNICIAN (Ask for No. 2-18)

### SNDC NAIL DRIVER

Driving masonry nails into concrete, cinder blocks, or light and medium gauge metals is simplified by the "Safe-T-Matic" Nail driver. This tool features a built-in permanent magnet which



holds the nail in the correct position, and a sliding safety shield which cuts working time by 80% and eliminates the danger of flying nails. Takes masonry nails of ½- to 1½-in. lengths. Safety Nail Driver Corp., Clifton, N.J.—TECHNICIAN (Ask for No. 2-27)

### Gard SPRAY

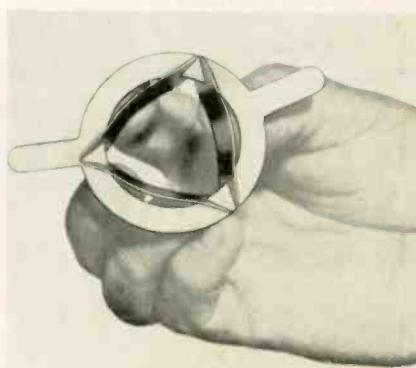
New rust proofing compound, in push-button container, has special silicones and polar compounds to prevent rust and corrosion in outdoor storage for a year and, in indoor storage, for five years. When applied directly to wet metal, it completely displaces all water present. \$1.25. Gard Industries Inc., 733 Green Bay Rd., Wilmette, Ill.—TECHNICIAN (Ask for No. 2-8)

### Telex SPEAKER-MIKE

Miniature speaker-microphone Model 100 may be used in dictating machines, portable radio transceivers and similar electronic equipment. It measures only 1 x 1 x ¾ in. Dept. KP, Telex, Inc., Telex Park, St. Paul 1, Minn.—TECHNICIAN (Ask for No. 2-36)

### Heppner CENTERING MAGNET

Time-saving centering device employs a unique tilt-open slip-on design. Gentle squeeze tilts open the device. Distortion-free beam is assured by uniformity of field; beam cannot be de-



focussed. Device is adjustable from 0 to 18 gauss. Heppner Mfg. Co., Round Lake, Ill.—TECHNICIAN (Ask for No. 2-10)

### CBC VOLTAGE REGULATOR

New "Regomatic" automatic voltage regulator, designed for use with TV receivers and similar equipment, is available in 2 models. Model 200 is a 200-watt unit for use with small and medium size receivers; Model 300 is a 300-watt unit for larger sets. Completely automatic; goes "on" and "off" with the receiver. CBC Electronics Co., Inc., 2601 N. Howard St., Phila. 33, Pa.—TECHNICIAN (Ask for No. 2-16)

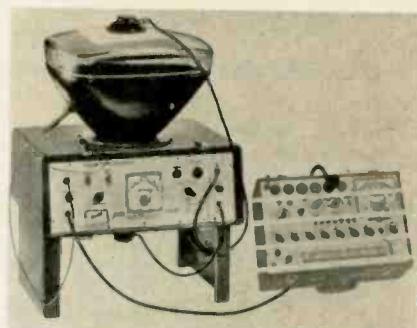
### Aerovox CAPACITORS

Ceramic-cased paper tubulars, type P84 CM or Duramics, provide exceptional protection against humidity through specially-developed end-sealing material. End-seals are firmly adhered to the ceramic tubing and will not soften or flow at any rated temperature. Terminal lead wires will not loosen or pull out with severe handling. Duramics are for operating temperatures from -55° C to +85° C. Life test is 1½ times rated voltage at 85° C for 250 hrs. Aerovox Corp., 740 Belleville, New Bedford, Mass.—TECHNICIAN (Ask for No. 2-7)

**MORE TECHNICAL INFORMATION**  
describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 40.

### Hickok CRT CHECKER

All phases of picture tube operation can be checked with the Model 590 picture tube tester. The tester applies a raster to the face of the tube and reads the light output through a photo electric



cell. The unit is designed for operation with the Hickok Dynamic Mutual Conductance Tube Tester. Indication is read on a 4-in. internal pivot meter which has a 175 µa sensitivity. Definite and accurate rejection limits are provided. Checks brilliance, condition of phosphor, ion burns, emission, shorts, gas content, leakage and grid control. Hickok Electrical Instrument Co., 10514 Dupont St., Cleveland 8—TECHNICIAN (Ask for No. 2-25)

### Cardwell PRINTED CIRCUIT

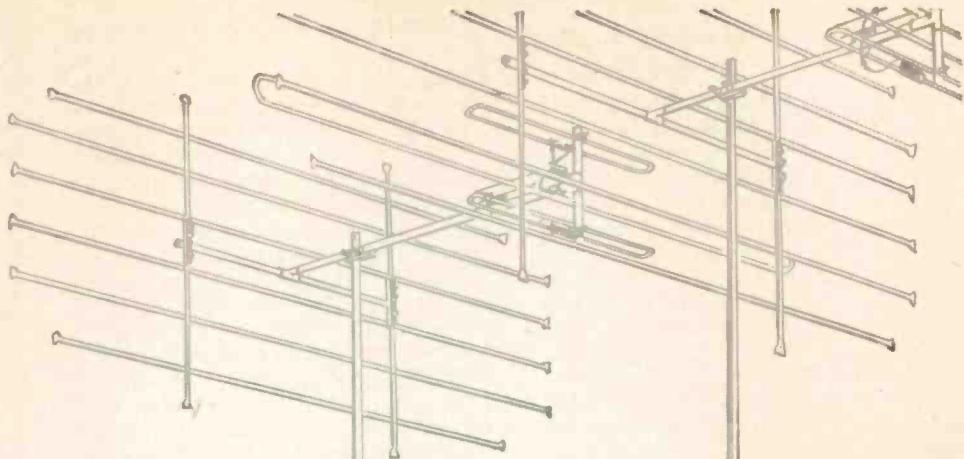
The PC-4 printed circuit i-f strip is designed for monochrome receivers employing 41.25 mc sound i-f and 45.75 mc pix i-f. Bandwidth is greater than 3.25 mc. Employs standard 150 v. plate and 6.3 v. filament supply. Six-point mounting. Dimensions—6¾ in. x 1⅞ in. Allen D. Cardwell Electronics Productions Corp., Plainville, Conn.—TECHNICIAN (Ask for No. 2-6)

### Fenton CHANGERS

The PE Rex line of German-made 3-speed changers consists of three models: the Rex A, with reversible dual crystal cartridge and 3-stage tone control; the Rex AM with two interchangeable magnetic cartridges, a linear frequency response from 30 to 18,000 cps for standard and microgroove records, and a 3-stage tone control; and the Rex A Special, with two magnetic cartridges, built-in pre-amplifier, 3-stage bass control, 3-stage noise suppressor and continuous variable speed regulation. All three models permit mixing of any standard or odd size records of the same speed. Fenton Co., 15 Moore St., New York 4, N. Y.—TECHNICIAN (Ask for No. 2-70)

**MORE NEW PRODUCTS  
ON PAGES 30, 32, 40**

the  
most  
complete  
line



## C·D·R ROTORS are BEST

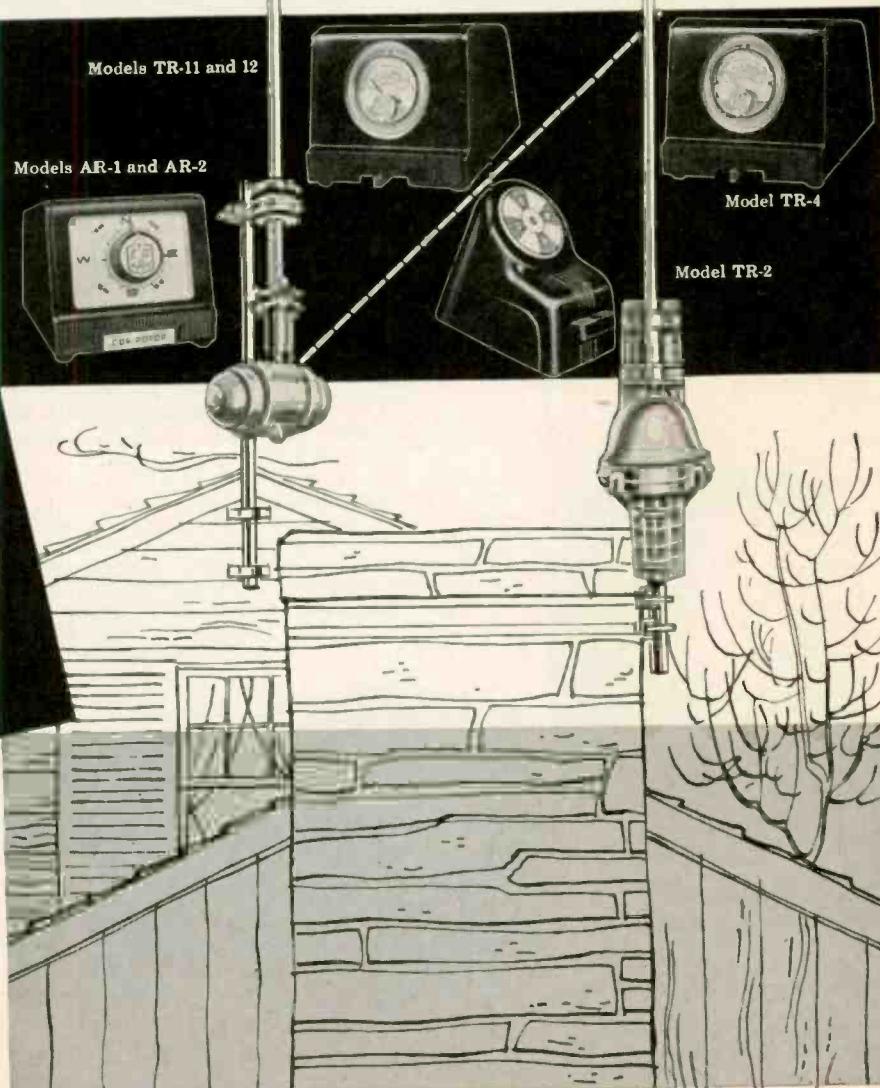
Most Powerful • Most Reliable • Sharpest Tuning

BEST...

*from the bottom up...  
inside out...*

because

C·D·R ROTORS  
have  
AXS 679\*



\*The highest grade premium die cast aluminum... so rugged and durable that it is used for aircraft landing gear.

PRE-SOLD to MILLIONS  
through spot announcements on television.

CORNELL-DUBILIER  
SOUTH PLAINFIELD, N.J.



THE RADIART CORP.  
CLEVELAND 13, OHIO

## News of the Industry

(Continued from page 42)

**THE HIGH FIDELITY INSTITUTE'S** plan to take the hi-fi story to the American public is receiving whole hearted industry response, according to Jerome J. Kahn, commissioner of the Institute. All persons participating in the program are volunteering their services.

**GENERAL ELECTRIC** introduced eight basic "fill-in" models to its 1955 line of TV sets at the Merchandise Mart in Chicago in connection with the Winter Furniture Market. The new sets will be displayed with the continuing models which go to make up the complete GE line.

**INTERCHANGEABLE NEON SIGNS** made by INSCO PRODUCTS CO., Piqua, Ohio, enable anyone to change advertising messages in a matter of seconds and permit five different colors to be used in the same word or message.

**CBS-COLUMBIA** is using a new color vinyl laminate-on-metal cabinet for its line of sweep tuning table model TV receivers. Called Dura-Clad by the set mfg. div. of CBS, the plastic-metal combination retains the strength of metal, yet adapts to full rich colors and will not chip, crack, peel, stain or scratch.

**STEWART-WARNER ELECTRIC DIV.** has decided to withdraw from the manufacture and sale, within the U. S., of home radio and television re-

ceivers and phonographs, it was announced by J. Russell Duncan, mgr. of radio & TV prods.

**AN ALL-METAL LITERATURE DISPLAY RACK**, the "Literature Bar," is being made available to distributors by CHANNEL MASTER CORP., Ellenville, N. Y. . . . **CONSTRUCTION OF A NEW PLANT** building, comprising 27,000 sq. ft., on their home site in North Bergen, N. J., has been announced by PYRAMID ELECTRIC CO. The new building will house the executive and general offices, engineering and research labs, jobber div. warehouse and shipping dept. . . . **YALE INDUSTRIES CORP.**, 82-09 251 St., Bellrose 26, N. Y., manufacturer of "Gibson Girl" tape splicers for magnetic recording tape, has changed its corporate name to ROBINS INDUSTRIES CORP.

**AN UNUSUAL DIRECT-MAIL EXPERIMENT** was conducted in New Jersey under the direction of Irving Sarlin, pres. of DU MONT NEW JERSEY, INC. on behalf of Du Mont TV receivers. One million and a quarter mail pieces, calling attention to a Du Mont give away offer of a famous Norman Rockwell painting, plus a coupon requesting the name of the customer's favorite Du Mont receiver, were mailed to every family living in the fourteen counties of the state serviced by the New Jersey distributor. Dealer reaction was excellent, declared Mr. Sarlin. . . .

**AUDIO FAIR-LOS ANGELES**—Final plans have been formulated for what is expected to be the largest Audio-Fair-Los Angeles in its three-year history, according to William L. Cara, mgr. of the event slated for February 11-13 in the Alexandria Hotel. Limited to mfrs. of audio components, the exposition will feature many innovations aimed at attracting greater numbers of hi-fi enthusiasts, Mr. Cara said, thus giving the trade a more ample opportunity to showcase its products.

**GENERAL INSTRUMENT CORP.**, Elizabeth, N. J., mfr. of TV, radio and electronic components, is now completing a five-point program of expansion for its Canadian operation, currently based at Kitchener, Ontario.

**PROGRAM FOR IMPROVING TRAINING OF TALENTED YOUTH**—The urgency of a national program for the development and conservation of "our most precious resource, the limited number of young people with high ability," was stressed by Alan T. Waterman, director of the NATIONAL SCIENCE FOUNDATION, before the House Subcommittee on Educational Activities of the Federal Government. Dr. Waterman also called attention to the efforts underway by the NATIONAL SCIENCE FOUNDATION to develop a U. S. program aimed at producing an adequate supply of competent scientists and engineers.

**EDWARD ALPERT** has been appointed applications engineer for RAYTHEON MFG. CO.'s line of communications equipment.

## HOTTEST IN THE FRINGES..NATION-WIDE! CLEAR BEAM'S BIG



Each a peak performer in its field . . . a triple threat to any fringe problem . . . with more dollar-for-dollar construction value!

The Tri-King TK1500 offers super fringe performance through better design features. Half wave electrical spacing between dipoles for higher gain on every channel. Positive "back up action" through the use of a full radar screen . . . acclaimed industry-wide as the finest reflector ever designed for ghost rejection and elimination of co-channel interference! Fully wind tunnel tested. Available in single bay (Model TK1000) and Super, wide spaced array (Model TK1800).

Clear Beam  
**BIG CHIEF**  
2 Bay Model BC 12-2

An advanced conical-Yagi with element diameters varied for precision tuning, matched sensitivity and peak performance on high and low bands!

Clear Beam  
**HUNTER**

2 Bay Model MYH 50-2

New wave trap principle gives extremely high gain, sharp directivity, in-phase tuning on all channels. New, flat design for low wind resistance!

**CLEAR BEAM ANTENNA CORP.**

Canoga Park, Calif. • Chicago, Ill.  
affiliated with TEMPO TV products

Warehouses in Seattle, Portland, San Francisco, Honolulu, Dallas, Kansas City, Chicago, Detroit, Baltimore

**EDWARD M. CAPPUCCI** has been appointed director of sales for RADIO MERCHANDISE SALES, INC., New York, N. Y.



Edward M. Cappucci



Herb Cornelius

**HERB CORNELIUS**, former asst. sales mgr. of LITTELFUSE, INC., has been named sales mgr.

**WILLIAM PLATT** has been appointed vice-pres. in charge of sales at WINSTON ELECTRONICS, INC., Philadelphia, Penna.

**CARL LUDWIG** has been appointed application and sales engineering representative for HAGGERTY WELLS CO., Ferndale, Mich.

**R. J. MILLER**, former sales mgr. of rectifier equipment div. of FEDERAL TELEPHONE & RADIO CORP., Clifton, N. J., has been promoted to manager of the same division.

**PHILIP J. McFARLAND** has been appointed asst. patent counsel for CBS-HYTRON, Danvers, Mass.

**E. GORDON BURLINGHAM** has been named to the new post of sales service manager of CBS-HYTRON, Danvers, Mass.

**PAUL L. KUCH** has been appointed to handle advertising and sales promotion activities of TOBE DEUTSCHMANN, Norwood, Mass.

**ALEXANDER KIDD**, formerly vice-pres. of M. W. KELLOGG CO., N. Y., has been elected vice-pres. of STEWART-WARNER CORP., Chicago.

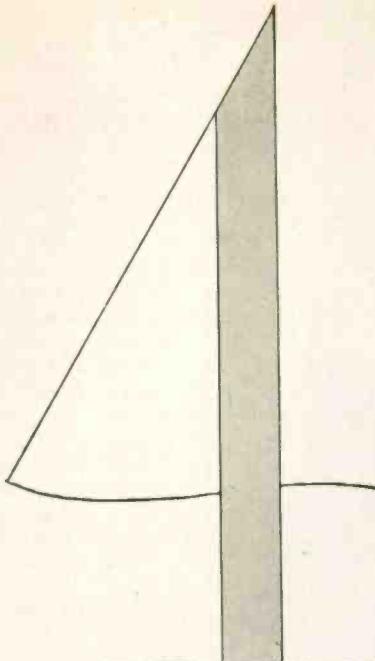
**LYNN C. WIMMER** has been promoted to vice-pres. at BURTON BROWNE ADVTG., Chicago.

**DAVID WADROW** of SHURE BROTHERS, INC., has been appointed membership chairman of the Chicago section of the American Society for Quality Control.

**A. E. KELEHER, JR.** has been named product mgr. of communications equipment div. of RAYTHEON MFG. CO., Waltham, Mass.

**WILLIAM G. KELLY CO.**, Burlington Ia., has been appointed manufacturer's rep. in Ia. and Neb. for S & A ELECTRONICS, Toledo, Ohio, mfrs. of "Target" antennas.

(News Continued on page 54)

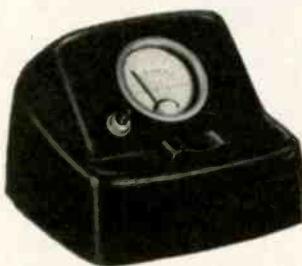
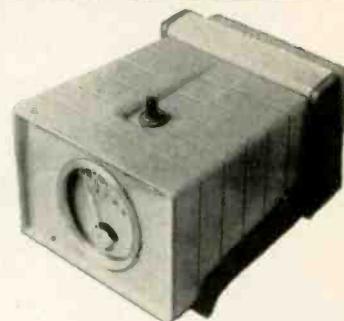


## REASONS WHY CROWN IS THE LINE FOR YOU

- Outstanding Consumer Acceptance
- Highest Profits in the TV Antenna Rotator Field
- Only 1.06% of Units Sold Required Service
- Two Beautiful Decorator-Styled Models

### TENN-A-LINER MODEL CAR6B

It's another Crown exclusive . . . and it's packed with feminine buy-appeal. Beautiful three tone color styling in an advanced design . . . perfect for any decorating scheme. Incorporated are all the famous easy-to-sell Crown features . . . finger-tip control . . . instant directional indication . . . convenient off-on switch . . . easy-to-read illuminated dial. It's the newest, the smartest in antenna controls on the market today.



### TENN-A-LINER MODEL CAR6A

Very popular and competitively priced, this dependable unit is available in rich mahogany bakelite. More conservatively styled, it offers the same outstanding Crown features as the Model CAR6B which has made it one of the most reliable and fastest selling units for dealers everywhere.

### AND DON'T OVERLOOK THESE OTHER OUTSTANDING TV ACCESSORIES by CROWN

CROWN TWO-SET COUPLER . . . operates two TV sets from the same antenna on any combination of channels with excellent signal response.

CROWN ROLLER-BEARING GUY RING . . . permits smooth, free rotation of FM and TV masts without loosening or resetting guy wires. Roller bearing equipped . . . protected by Crown's trouble-free "Weather-Guard" design.



**SELL with confidence**  
*sell* **CROWN®**

**CROWN® CONTROLS Co., Inc.**

NEW BREMEN,  
OHIO

Canadian Subsidiary Crown Controls Mfg. Ltd. Export Division, 15 Moore St., New York, N. Y., Cable—"Minthorne"

**"SATISFIED CUSTOMERS -  
NOT CALL BACKS."**



That's right. I rarely get a complaint callback when I've used Tung-Sol Tubes. That makes for a lot of happy customers. I've found Tung-Sol's regular line of tubes more uniform and more dependable than the so-called 'super' grades of tubes.

## **TUNG-SOL®** dependable **PICTURE TUBES**

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

### **MFRS' Catalogs & Bulletins**

**FLYBACKS:** Bulletin 498 lists exact replacement flybacks A-8249, A-8250 and A-8251 with their applications for Du Mont models and chassis. Available free of charge from any local Stancor distributor or from Chicago Standard Transformer Corp., Addison & Elston Aves., Chicago 18, Ill. (Ask for No. B2-15)

**INDUSTRIAL TUBE BOOKLET:** New industrial tube characteristics booklet lists over 450 industrial types, comprising 17 distinct tube classes ranging from reliable subminiature and miniature tubes to transistors. Over 20 pages of technical data and basing information. Available from Raytheon Mfg. Co., Receiving Tube Div., Newton 58, Mass. (Ask for No. B2-16)

**VIBRATORS:** Chart incorporates complete cross reference vibrator equivalent charts, vibrator specifications, base diagrams, and popular auto radio vibrator replacement types. Free. American Television & Radio Co., 300 E. 4 St., St. Paul 1, Minn. (Ask for No. B2-2)

**CERAMIC CAPACITORS:** A 20-page "Index CPX654" of recommended C-D replacements of "tinymike" ceramic capacitors for equivalent types of four other principal suppliers. Lists over 830 types of disc, tubular and high-voltage ceramic capacitors and printed circuit units. Free. Cornell-Dubilier Electric Corp., South Plainfield, N. J. (Ask for No. B2-3)

**MICROPHONES:** Complete data on eight different microphones, including special scientific condenser microphones for the measurement of high intensity sounds and newly developed heart microphone for cardiovascular research, are contained in this new catalog available from Altec Lansing jobber products dealers and from Altec Lansing Corp., 9356 Santa Monica Blvd., Beverly Hills, Calif. or 161 Sixth Ave., New York 13, N. Y. (Ask for No. B2-5)

**PULSE TRANSFORMERS:** Two new miniature pulse transformers are described in bulletin PT-301. One type is available in a series of metal case designs, with glass seal terminal header plates; the second is encapsulated in molded epoxy resin with several types of terminal connections. Available from Acme Electric Corp., 1375 W. Jefferson Blvd., Los Angeles, Calif. (Ask for No. B2-6)

**CAPACITOR MANUAL:** New 7th edition of the "TV Replacement Capacitor Manual," 65 pp., provides up-to-date capacitor replacement information on 4,664 models of 85 set manufacturers. Copies are available free from all Sprague distributors or by sending 10 cents for Manual K-101 to Sprague Products Co., 65 Marshall St., North Adams, Mass. (Ask for No. B2-7)

**PARTS DISTRIBUTION:** Report called "Unit Territory Plan" describes how the distribution of electronic parts could be improved, with consequent benefit to the public and all segments of the electronics industry. Copies are available from the Radio-Electronics-Television Mfrs. Assoc., 777-14th St., N.W., Washington 5, D. C. (Ask for No. B2-8)

**CRYSTAL DIODES:** The 2nd edition of CBS-Hytron's Reference Guide for crystal diodes lists 185 types of diodes, with all basic data; includes 18 dimensional diagrams. Free of charge from CBS-Hytron distributors. (Ask for No. B2-9)

**ALLIGATOR CLIPS:** Circular describes and illustrates uses for new insulated alligator test clips. Ask for sheet No. 168, from Mueller Electric Co., 1575Y E. 31 St., Cleveland 14, Ohio. (Ask for No. B2-13)

#### **OBTAI THE BULLETINS**

described here by writing on company letterhead to Bulletins Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N. Y., listings numbers given at end of each item of interest. Please mention title of position held. Use coupon on page 40.

## New Books

**RADIO-TELEVISION SERVICE PRICING GUIDE.** By Robert T. Oelrich and Harold Justice. Published by Oelrich Publications, 4135 N. Lawler Ave., Chicago 41, Ill. Hard loose-leaf binding. \$2.95

The purpose of the guide is to provide service techs and dealers with a convenient medium through which they can make their service prices available to set owners, especially where it is necessary to support a charge, explain the limits of certain services or guarantees, or just plain overcome suspicions with an authoritative, professional-appearing system of setting fees.

One complete set of pages gives prices which the publishers believe to be standard. Included is an extra set of pages in which prices are left blank, for insertion in individual cases where those provided are not acceptable. Provision is made for all flat-rate services such as: service calls, pick-up and delivery, pix-tube replacement, alignment, estimates, etc. Time-labor price charts are also provided for.

**TELEVISION AND RADAR ENCYCLOPEDIA.** 2nd Edition. Edited by W. MacLanachan. Published by Pitman Publishing Corp., 2 West 45th St., New York, N. Y. 216 pp. Hard cover. \$6.00

By confining themselves to only those segments of the electronic sciences contained in the title, the editor and his several authoritative associates have been able to do a capable, thorough and adequately cross-referenced job. As a dictionary, it does not fail to include any of the terms we have used to test it with; definitions are precise and usually complete enough to preclude the necessity of looking up additional terms. As an encyclopedia, there are many signed articles of considerable length. The editors have chosen with care those subjects which they consider merit full treatment.

**BASIC ELECTRICITY, VOLS. 1 to 5.** By Van Valkenburgh, Nooger & Neville, Inc. Published by John F. Rider, Publisher, Inc., 480 Canal St., New York 13, N. Y. 91 to 124 pp. ea. vol. Paperbound. \$2.00 ea., set of 5 for \$9.00

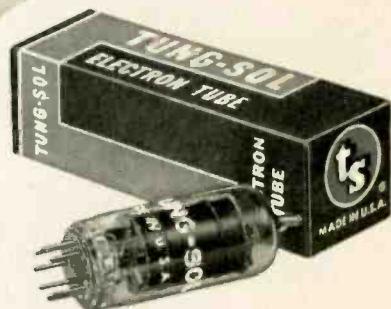
The excellent texts and training materials being used by our Armed Forces, which have been instrumental in turning out thousands of capable specialists, are at last being released for civilian use. This series of volumes, first to be released, covers the course in basic electricity as it is now being taught in Navy specialty schools. Since the course was initiated 2 years ago, it has produced outstanding results with over 25,000 trainees.

Completely basic and clearly presented, these volumes should suit the interested individual who has no previous background whatever. Nevertheless, the treatment is so thorough that the series stands up well as a reference and refresher course for the experienced tech. Contents of the volumes are as follows: Vol. 1: fundamental concepts including the nature and sources of electricity and magnetism; current, voltage and resistance. Vol. 2: dc circuits, power, Ohm's and Kirchhoff's laws. Vol. 3: ac circuits, including inductance, capacitance and reactance. Vol. 4: impedance, all types of resonant circuits, and transformers. Vol. 5: ac and dc generators and motors, power control devices.

**TELEVISION FOR RADIOMEN.** Revised Edition. By Edward M. Noll. Published by The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 778 pp. Hard cover. \$10.00

Assuming a basic knowledge of radio theory and circuits, this text presents a very thorough treatment of the TV signal and the systems through which it is processed. On the practical side, there are sections on antennas, installation and adjustment, alignment and troubleshooting. Also covered as a separate unit is the question of practical mathematics for TV. Added sections, not found in the original addition and accounting for a large portion of the present revision, bring the book up to date with material on UHF, transistors and color TV.

"SATISFIED? I SURE AM!"



I don't know anything about tubes, but I do know that the serviceman used Tung-Sol Tubes to fix my set and now it works as well as the day I got it.

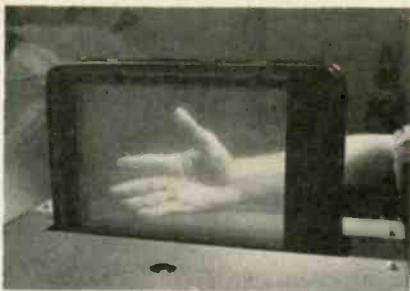
**TUNG-SOL®**  
dependable  
**TUBES-DIAL LAMPS**

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

## LATE FLASHES!!

THAT "FLAT" PICTURE TUBE is getting closer. The West Coast Electronics Div. of Willys Motors has come up with one version, shown here, that is only 3 in. deep and as large as a telephone book overall. As now designed for use on instrument panels in Navy aircraft, the tube is transparent so as not to interfere with the pilot's vision during flight.

Employing only electrostatic principles, the tube uses transparent deflection plates. High definition and brightness are said to be possible through superior focusing action. The elimination of costly, heavy magnetic and electro-



magnetic power required to operate the flat tube, hold out the promise of low initial cost and inexpensive operation for receivers using the tube. Although the illustrated version, used for demonstration, is only equivalent to a 15-in.

tube, Willys engineers have already built larger models.

**AS WE GO TO PRESS**, there are unofficial reports that two radically new electronic developments will soon be unveiled. First is the long-awaited electronic air conditioner, which eliminates most of the mechanical devices of conventional compressor-evaporator systems. Second is a music synthesizer which offers, among other things, the possibility of recreating original quality from old recordings. These pioneer devices point to new horizons for TV-electronic technicians. We'll publish specifications and servicing info as soon as the data is officially released.

**COLOR TUBE SITUATION** still unsettled as CBS-Hytron announces it has discontinued, on schedule, manufacture of its Colortron 205 3-gun tube. It is now sampling set manufacturers with its 22-in. rectangular color tube.

### TV's Grandpa Moses

At 91, Ole K. Bakken, an inventor from North Dakota, has started a course in television techniques and electronics at Northwest Radio & TV School in Chicago. (Up goes the average age for technicians!) This is Bakken's 3rd visit to the big city.



The first (1893) was to visit the World's Fair; the second (1926) to sell an invention. In commenting on changing civilization from his youth to the present, the inventor said, "Modern songs are too slow for dancing. All this shuffling around isn't dancing!" (True; but who cares?)

### 10 Years Ago This Month

There were rumors that the freeze on manufacturers of civilian goods was going to be lifted in time to permit new radios to hit the market before 1945 ended—for the first time since World War II began! . . . Pundits were advising servicers to ease off on stock of reconditioned radios. . . . New magnetic recorder using tape instead of wire was reported. We said, "New medium has recorder people greatly interested." . . .

*Your Ideal SECOND Soldering Tool*

for your service truck . . .  
service kit . . .  
extra bench tool

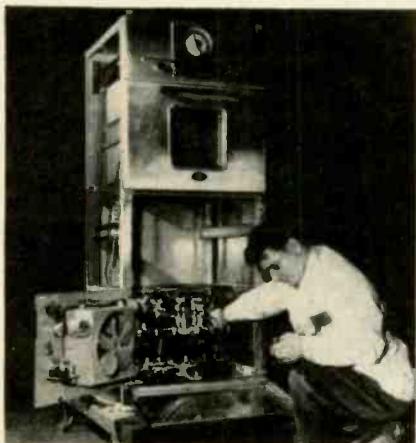
MODEL  
8100  
ONLY  
**\$795**  
LIST  
over 100 watts

This newest Weller Soldering Gun fills your need for an *extra* soldering tool. Its new, compact design includes *all* regular Weller Gun features, at a rating of over 100 watts. Its new, low price makes it as convenient to buy as it is to own!

SEE THE WELLER **Junior** AT YOUR DISTRIBUTOR NOW

**Weller Junior SOLDERING GUN**  
805 Packer Street, Easton, Pa.

## Easy Maintenance



Maintenance has been simplified in the new commercial model of Raytheon's "Radar-range" microwave oven (described in December TECHNICIAN) through improved circuitry, better accessibility, and an improved, long-lived magnetron which is air-cooled, eliminating installation problems and general design improvements.

## V-M Displays in Trailer



V-M products take to the road with a pulling assist from Leonard D. Allen, V-M rep. for New York State, in a new silver dome display trailer. Designed expressly for product display, the trailer features a series of sturdy, attractive plywood counters and shelves as well as a comfortable "order taking" corner for relaxation by customer and salesman.

### ARTICLES WANTED

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

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

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

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

Payment is excellent.

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

**MILLER REPLACEMENT NEEDLES** have bonus coupons worth cash. All dealers and servicemen are invited to save their bonus coupons and receive cash upon redemption through their jobbers or direct from the M. A. MILLER MFG. CO., Libertyville, Ill. Coupons are color coded to show value to you and values are determined by list price.

NEDA announces plans for the fourth regional seminar for radio-TV-electronic parts distributors to be held April 1 and 2 at the Paxton Hotel, Omaha, Neb.

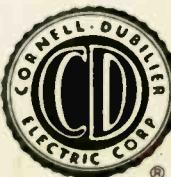
**UNITED CATALOG PUBLISHERS, INC.**, New York City announces the appointment of LEROY & MCGUIRE,

INC., R.D. 1, Phelps, N. Y. as their representatives for N. Y. State (except the N. Y. metropolitan area).

**JOHN H. VIER** was named sales representative for MARKEL ELECTRIC PRODS., INC., Buffalo. He will cover metropolitan N. Y., Northeast Penna. and Northern N. J.

**STEPHENS MFG. CORP.**, Culver City, Calif. has appointed three new sales representatives: MORHAN EXPORTING CORP., 485 Broadway, N. Y. C., as sales rep on a world-wide basis, excluding U. S. and Canada; ROLAND OLANDER & CO., 7225 Beverly Blvd., Los Angeles for Southern Calif., Ariz., and Las Vegas; and ARTHUR H. PETERSON, 3647 W. 62 St., Chicago for Ill., E. Iowa and lower Wisc.

NOW... C-D designs the finest TV Antenna... the first antenna with which you can actually SEE the difference! Perfectly synchronized for monochrome and COLOR TV. The most uniform gain response that does not vary more than 3 D.B. on any channel across the band. Other features include low voltage standing wave ratio... higher front-to-back ratio... speedy assembly... aluminum screen reflector... dipole and boom of heavy gauge, seamless tubing.

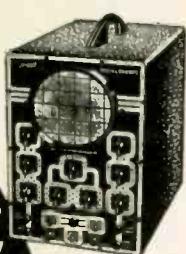


CAPACITORS • ANTENNAS • ROTORS • VIBRATORS • CONVERTERS



**EICO**SAVE 50% - BUILD  
EICO KITS!

Sig. Gen. \$19.95



5'' Scope \$44.95

**OVER ONE-HALF MILLION IN USE!**

EICO KITS are top-quality professional TV-radio-electronic test instruments — embody latest performance-proven design. Complete with all components, pre-punched chassis, deep-etched aluminum panel, rugged steel case. Easy-to-build with step-by-step instructions. Lifetime service guarantee.

Tube Tester \$34.95



VTVM \$25.95



See EICO's 38 Kits & 42 Wired Instruments in stock at your local jobber. Write for Catalog T-2.

Prices 5% higher on West Coast.

**EICO**84 WITHERS STREET,  
BROOKLYN 11, N. Y.

*"He goes into such ecstasies since we're using JENSEN NEEDLES, there's no holding him."*

## Service Ass'n. Reports

### New Officers Elected RATET, New York, N. Y.

The Radio & Television Electronic Technicians Assoc., 52 E. 19 St., N.Y.C., recently elected the following officers: Charles J. Vassalo, pres., Leon A. Sievers, vice-pres., George Saddler, exec. secy., Rudolph Stone, treas., Myron Rawluk, registrar, Wager Hill, inter-state affairs, Ray Calderon, sgt.-at-arms and George Steinberg, editor.

### Orlando Elected for '55 RTSA, St. Paul, Minn.

At their first annual banquet, the Radio-Television Service Assoc. of St. Paul, 635 S. Smith Ave., elected the following officers for 1955: Clyde Orlando, pres., Harry Winkler, vice-pres., Robert Rohweder, treas., Ross Hilker, secy., Joe Driscoll, asst. treas., Clarence Thoele, asst. secy., Jim Dorfsman, board member.

### Membership Drive RTTG, Boston, Mass.

"Have a part in deciding your own future, by being a part of the service industry," was the theme of a recent issue of the Radio Television Technicians' Guild News, 137 Federal St., Boston. An application form for membership requesting name, address, where employed, technical knowledge, schools attended and years in business are questions asked of new members. All RTTG meetings are held every second Tuesday of each month at the Hotel Beaconsfield, 1731 Beacon St., Brookline, Mass.

### Licensing, Code of Ethics TRAAC, Oakland, Calif.

The recent issue of "TV Flashes," published monthly by the Television Radio Assoc. of Alameda County, 4223 E. 14 St., Oakland, Calif., took up the question "Why Licensing?" Their answer, in part was: licensing would require shops and technicians to be bonded, carry insurance, have a minimum amount of shop equipment and business licenses.

Other points covered in the TRAAC code of ethics are: returning to the customer, when practicable, all defective parts that have been replaced; stating clearly when new, rebuilt, or used merchandise is sold or installed.

**LUDWIG HOMMEL CO.**, 72 First Ave., Pittsburgh has been franchised to distribute CBS-COLUMBIA TV and radio receivers in that area.

### IMPORTANT NOTICE TO SUBSCRIBERS

Changes of address require four weeks' notice. Notify your Postmaster and TECHNICIAN Circulation Department at the earliest possible moment.

When ordering change, please INCLUDE IMPRINTED WRAPPER showing exactly how magazine is now addressed. This will enable us to put the change into effect with a minimum of delay.

**1440 pgs.**

Fully cataloged  
Radio-TV.  
Electronic  
parts &  
equipments  
Tubes,  
Trans-  
mitters,  
Test Equip-  
ment, Comm.  
Receivers,  
Transformers,  
Capacitors,  
Antennas,  
Resistors,  
Colls & Relays,  
Recording &  
PA Systems,  
Hardware,  
Tools, etc., etc.  
**OFFICIAL BUYING  
GUIDE OF THE  
INDUSTRY**

### 1440 page MASTER for everything in Electronics

Make rapid selections from one industry-wide MASTER CATALOG complete with SPECIFICATIONS, ILLUSTRATIONS, DESCRIPTIONS, DIAGRAMS, PRICES on thousands of Radio-TV-Electronic parts and equipment.

#### NEW! 1955 BUYING GUIDE

List \$6.50

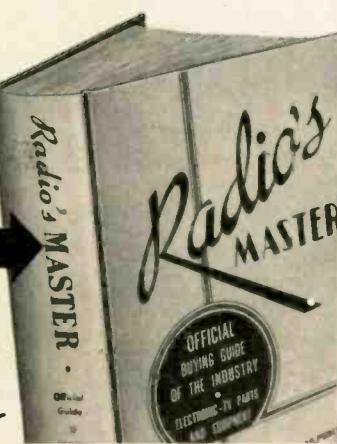
As low as  
**\$1.95**

- Over 85,000 • Fully indexed items
- Over 8,500 Illus.
- 8½" x 11"
- Weighs 6 lbs.

From leading parts distributors or write to:

UNITED CATALOG PUBLISHERS, INC.

110 Lafayette Street, New York 13, N. Y.



## Live Wires Made Harmless

By CHESTER A. MOORE

An answer to the dangers of accidental electrocution and property damage resulting from defective electrical wiring is claimed by an inventor in a Pennsylvania mining town.

Peter A. Sosnoski of Shamokin, Penna., says his "electrical life saver" makes live wires harmless. The device will allow anyone to contact such wires without adverse effects. Declining to explain the principle of the invention beyond the statement that it is "fairly simple," Sosnoski describes it as a box containing a transformer and wiring.



The accompanying illustration shows the inventor demonstrating his faith in the patented unit while in a bathtub partly filled with water. The exposed wire he holds in his right hand carries 500 volts. His left hand is touching the metal faucet.

The inventor's wife also got into the act, holding the hot side of a wire going into an electric range with one hand, while placing the other hand on a plate in the range. Sosnoski says the device can be installed in the average home for \$200 to \$250, with installation in industrial plants being proportionately more. He believes mass production would bring the unit cost to \$150.

**CHANNEL MASTER CORP.**, Ellenville, N. Y., announces the appointment of four new distributors to handle their line of TV antennas and accessories. They are C & O ELECTRONICS, 500 N. 3 St., Monroe, La., STANDARD ELECTRONICS DISTS., 523 W. Poplar St., Harrisburg, Ill., CENTRAL MO. DIST. CO., Coats & Clark Sts., Moberly, Mo., WABASH ELECTRONICS, 700 Plum St., Mt. Carmel, Ill.

# NEW! IMPROVED **DRAKE** 360 SOLDERING IRON

U.L.  
APPROVED

NOW WITH TWO  
TIPS!  $\frac{1}{8}$ " and  $\frac{3}{16}$ "

NEW!  
CORK  
INSULATION

NEW!

LONGER  
FORM-FITTING  
HANDLE

A FULL 35 WATTS—IDEAL FOR  
RADIO OR HOBBY WORK

Pee-Wee, the Mighty Mite, is back again with new and improved features that will put it high on your best-seller list. Designed to fit a tool kit, this Drake Soldering Iron is only 8" long, has two tips, baffle plates to keep handle cool. Complete with 5 ft. cord and stand.

PROFIT WITH THIS MOST POPULAR RADIO IRON

**DRAKE** 60 WATTS—The ideal industrial continuous duty iron for close work. Only 9" long with  $\frac{1}{4}$ " tip. Weighs 8 oz. Complete with stand. List Price \$6.50

New  
List Price, Only  
**\$5.30**

WRITE NOW  
FOR  
CATALOG  
AND PRICES

**DRAKE ELECTRIC WORKS, Inc.** 3656 Lincoln Avenue Chicago 13, Illinois

the

# 630

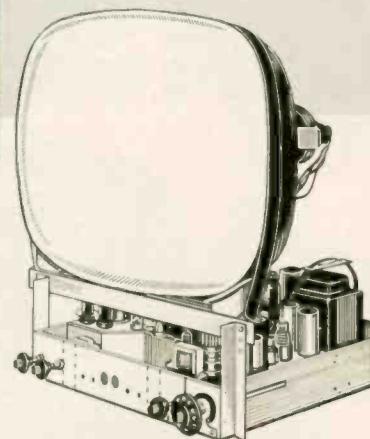
IS STILL THE FINEST  
TV CHASSIS EVER DESIGNED

...and there is no finer

630 chassis than the

**GOLD MEDAL**

by **TECH-MASTER**



...featuring a new and improved system of Picture-Sound synchronization which affords simple pin-point tuning with highest picture resolution and drift-free undistorted sound under all signal conditions... UHF or VHF.

**MODEL 2430:** For picture tubes up to 24" Audio connection for optional use of external amplifier.  
Net Price.....(Less Kine).....\$189.50

**MODEL 2431:** Same as 2430, but with true fidelity Push-Pull audio amplifier.  
Net Price.....(Less Kine).....\$199.50

**MODEL 2439:** For 90° Kinescopes up to 27" Net Price.....(Less Kine).....\$262.50

All Models Available UHF/VHF

Send For Literature



**TECH-MASTER** CORPORATION

TELEVISION and RADIO

75 FRONT STREET, BROOKLYN 1, NEW YORK

**TECH-MASTER TV Chassis**

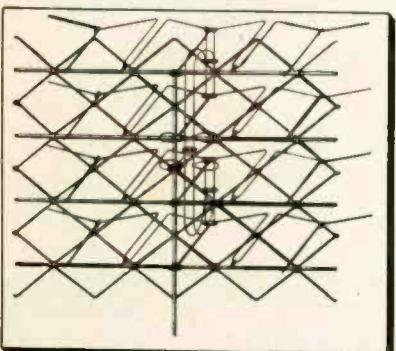
**TECH-MASTER TV Kits**

**TECH-MASTER Audio Equipment**

# Make Sure!



Demand  
the Finest



- All-channel performance
- Higher front-to-back ratio
- Higher average gain
- Higher uniform gain
- Permits the use of a single transmission line

## FRETARAY® Super Spectrum

**FRETCO INC.**  
MUSEUM 1-8116

406 N. CRAIG ST.  
PITTSBURGH 13, PA.

# KESTER



KESTER SOLDER COMPANY  
4264 Wrightwood Avenue • Chicago 39, Illinois  
Newark 5, New Jersey • Brantford, Canada

# SOLDER

## Alignment & Adjustment

(Continued from page 21)

of testing the output from a service sweep generator over a few VHF channels. Although some variation in output is in evidence the departure from linearity would not be considered excessive by the usual shop. These swept traces are displayed on a sweep width of 12 mc. By way of comparison, it is interesting to compare the swept traces from another service generator, shown in Fig. 9, in which the departure from flatness is considerably greater than in the first example.

Many factors are responsible for lack of flatness, one of which is improper termination of the sweep-output cable. It is generally recognized that a sweep-output cable must be terminated in its own characteristic impedance, to avoid the development of standing waves in the output system at higher operating frequencies. This requirement is illustrated in Fig. 10, which shows the impairment of flatness in sweeping channel 5, when a composition terminating resistor is replaced by a wire-wound resistor of the same dc ohmic value. Since wire-wound resistors are often indistinguishable from composition resistors on the basis of external appearance, it is well for the technician to make certain of this point.

Even at relatively low frequencies, proper cable termination is quite desirable. For example, Fig. 11 shows the result of operating an i-f sweep generator at 22 mc center frequency, with the output cable properly terminated, as compared with the output when the cable is operated open-ended (unterminated). •



"Nevermind, I just gave it a kick and it's working fine again."

# Mates, Weigh Anchor... AND COME UP WITH THE BEST!



LA 300

## anchorman LINE ADJUSTOR

- Dependable, trouble-free performance.
- Eliminates line loading difficulties.
- Corrects sync and oscillator drift.
- Restores full picture size and brightness.
- Full 10 volt boost in line voltage.
- 300 watt capacity. 2-position switch.



UB 160

## UNIVERSAL TV BRITENER

- For weak and low emission picture tubes.
- Simplify your stock problems — one unit for series or parallel wired filaments — electromagnetic or electrostatic CR tubes.
- Will also relieve cathode to filament shorts.

**anchorman products co.**  
ELECTRONIC COMPONENTS

2712 W. Montrose • Chicago 18, Ill.

## Tools—Extra Hands

(Continued from page 23)

rust so that the coating is comparable to "hot dip" galvanizing. The paint takes 1 hr. to dry.<sup>9</sup>

In this summary, we have tried to point out the high points of tool progress. If there is a moral, it is

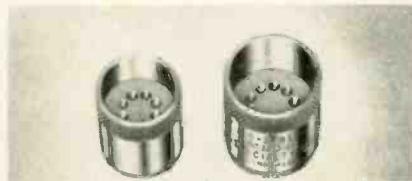


Fig. V—Wall mounting pin straightener.

this: the next time that your screwdriver breaks or you lose your pliers, do not just run out and buy another one exactly like the first. Look around. Perhaps your jobber has one in stock for a few cents more that will do the job better—or serve another purpose as well.

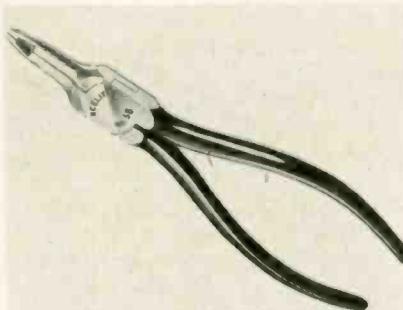


Fig. W—Electronic cutting pliers.

For more information on these products use the "New Products" coupon on p. 40 giving the photo designation or footnote number.

The manufacturers of these items are listed below.

Figs. A. Equipto Mfg. Co. B. Ken Miller Sales Co. C. CBS-Hytron. D. Aircraft Marine Prod. Inc. E. Scranton Alum. Mfg. Co. F. Black & Decker Mfg. Co. G. The Heller Co. H. Tube purchase bonus from Sylvania Electric Co. I. Remington Arms Co. J. Speedway Mfg. Co. K. Baumker Mfg. Co. L. Akro-Mils Inc. M. General Cement Mfg. Co. N. Mic-Con Inc. O. Crown Industrial Prods. Co. P. Hunter Tool Co. Q. CBS-Hytron. R. Alpert Mfg. Co. S. J.E.S. Co. T. General Cement Mfg. Co. U. Rytel Electronics. V. Duro Specialty Co. W. Xcelite Inc.

1. Astron Corp. 2. Admiral Corp. 3. General Cement Mfg. Co. 4. Utica Drop Forge & Tool Corp. 5. Xcelite Inc. 6. Ed-Berl Prods. Co. 7. Duro Specialty Co. 8. Sylvania. 9. "Zinktron"—Constad Laboratories. 10. "Klipzon"—United Technical Labs. 11. Mueller Electric Co.

MARSHANK SALES CO., 672 S. Lafayette Pk. Pl., Los Angeles announces the addition of JOHN R. DAILEY to their sales engineering staff.

The Finest  
.....  
UHF  
Converter  
.....  
Ever  
.....  
Designed



B-T  
LABS

**Ultravertex**  
OUTPERFORMS  
ALL OTHERS  
IN THE FIELD

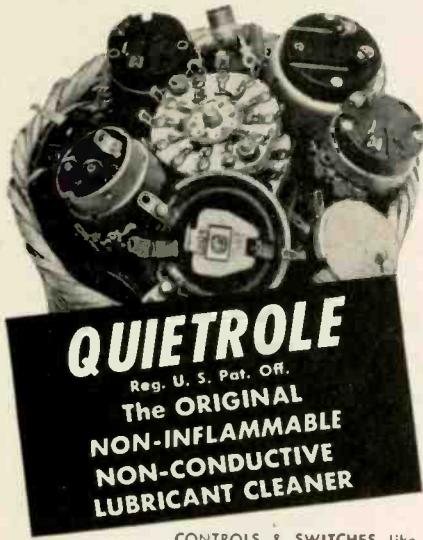
**\$39.95**

LIST

- ✓ Precise Impedance Match
- ✓ Higher Gain
- ✓ Lower Noise Factor
- ✓ Automatic 'on/off'
- ✓ Dual Speed Tuning

Check with your supplier today.  
Also ask about the Model '99'  
at \$19.95 . . . or write Dept. WB-18

BLONDER-TONGUE LABORATORIES, INC.  
Westfield, New Jersey



## QUIETROLE

Reg. U. S. Pat. Off.

The ORIGINAL  
NON-INFLAMMABLE  
NON-CONDUCTIVE  
LUBRICANT CLEANER

CONTROLS & SWITCHES like new by the BASKETFUL for only a few PENNIES . . . that's what QUIETROLE can do for you, and only QUIETROLE will give that long lasting smooth, quiet operation . . . even new controls last longer and operate quieter when treated with QUIETROLE . . . the original and most reliable product of its kind.

THE CHOICE OF BETTER SERVICEMEN "EVERYWHERE"  
Supplied in 2; 4; and 8 oz. sizes. Ask for it at your distributor.

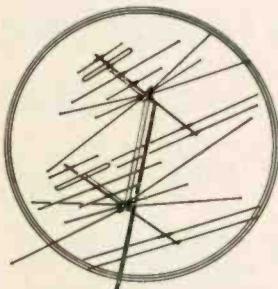
manufactured by

**QUIETROLE**  
COMPANY

Spartanburg, South Carolina



## Fringe Beam



### GET TOP PERFORMANCE IN DEEP FRINGE AREA WITH NEW LOW-COST "RAMROD"

Canonical elements quick rig. All elements click into place and lock automatically. No nuts to tighten. All aluminum construction.

Mail coupon below

**NEAL ELECTRONIC COMPANY, INC.**

1307 Hall St., Huntsville, Alabama

Send prices and other details.

Name . . . . .

City . . . . .

State . . . . .

Zone . . . . .

TN

## Horizontal Troubles

(Continued from page 19)

to tap suspect parts individually, noting when symptoms stop or become worse. It is advisable to perform the tapping very lightly, because the defective part may very easily be made to act up when another part is being tapped.

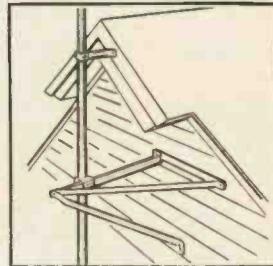
The most difficult parts to locate are the ones that break down or change value under heat. Most technicians do not want to let a set take up necessary space while they are waiting for a trouble to show. They also want to be able to shut the set off and take resistance measurements, without worrying about the trouble clearing up while they do so. Among the methods used in the past to quickly force intermittents into the open have been the following:

1. Placing a heavy blanket or something similar over the entire television chassis. The servicer would then leave the set in operation of an hour. This would ordinarily suffice to bring on the trouble, as well as increase the internal temperature of the receiver to the point where it could be turned off and a resistance check made, without the trouble clearing up. One of the disadvantages of this method is that although the trouble was brought on, it still took some more time to localize the defect. Sometimes the troubleshooting took too long, and the set cooled off. Sometimes a fire started under the blanket. In a busy shop, one hour is too long for a trouble to show.

2. In another method, a hot spotlight, focused on the bottom of the chassis was placed on the bench. This method cut the average time to approximately one-half hour. It was definitely an improvement over the blanket method in a number of ways. The method was faster, for one thing. The spotlight kept the receiver hot even when the set was off, and there was no danger of a fire starting unnoticed. There were also disadvantages, of course. Some troubles still took too long to develop; furthermore, it was tough working in the heat developed by the spotlight.

Both of the above methods left much to be desired with respect to the rapid location of the cause of intermittent and drift troubles. Servicemen are now starting to use a method that has eliminated the disadvantages of the ones just cited. In this method, a soldering iron is

## South River NEWS



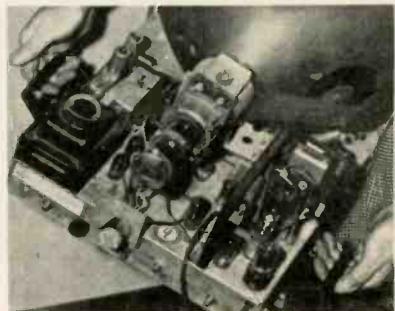
### COMBINATION STEEL ADJUSTABLE WALL BRACKET—Model ST3-18A

All steel construction; Hot-Dip galvanized to prevent corrosion. 18" lower bracket featuring embossed steel bracing leg, is adjustable for vertical mast mounting under eave. 3" embossed steel top bracket with "reversed" U bolt and clamp permits use of Spintite for nut tightening.

Write for 1955 Catalog  
IN CAN.: A.T.R. Armstrong Ltd., Toronto

**SOUTH RIVER METAL PRODUCTS CO., INC.**  
SOUTH RIVER, N. J.

PIONEER AND OUTSTANDING PRODUCER  
OF FINEST LINE OF ANTENNA MOUNTS



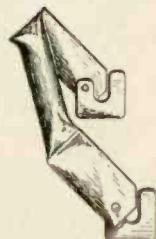
### AT LAST!

The TV Chassis Carrier

A pair of these Chassis Carriers will greatly facilitate the handling of awkward, sharp-edged, heavy TV chassis. Technicians welcome the elimination of cut fingers, damaged components, and lost time waiting for more help.

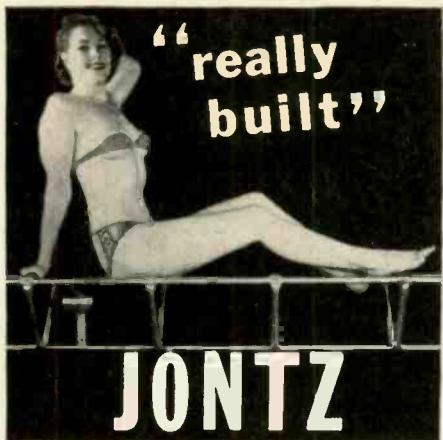
- ★ EASY-GRIP TUBULAR HANDLE
- ★ UNIQUE ECCENTRIC LOCKING DEVICE
- ★ POSITIVELY LOCKS ON EDGE OF CHASSIS
- ★ RUGGED COLD ROLLED STEEL CONSTRUCTION
- ★ BRIGHT, LONG LASTING ZINC-PLATE FINISH
- ★ HANDY, CONVENIENT TOOL KIT SIZE
- ★ FITS PRACTICALLY ALL MAKES AND MODELS OF TELEVISION CHASSIS

See your distributor

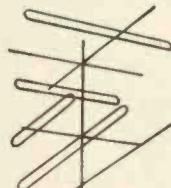


Manufactured by

**BARB CITY INDUSTRIES, Inc.**  
DeKalb • Illinois



# JONTZ TV TOWERS



- ✓ Safe
- ✓ Long Lasting
- ✓ Easy to Install

Carry and sell the line that is really built to do the job. JONTZ TOWERS have everything . . . fine 14 gauge tubular steel; simplicity of erecting; easier to climb; guarantee maximum safety; self-supporting; withstand wind load up to 100 m.p.h.

**Sell the line  
that is . . .  
"Really Built"  
to do the job.**

AVAILABLE  
at better jobbers . . .  
EVERYWHERE

**JONTZ**

MANUFACTURING  
COMPANY  
1101 East McKinley.  
Mishawaka, Indiana.

Model 400 . . .



used to apply heat to individual components in the horizontal circuit. The technician rubs the hot soldering tip across the part in question (see Fig. 3) for from ten to twenty seconds. (We can't go along with such a procedure—innocent components are apt to be damaged by it, we feel. A safer procedure, in our opinion, would be to hold the soldering iron *near* the suspect part, rather than touching it to the unit.—Ed.) If the part heated has been causing the trouble, symptoms will now appear. If the trouble does *not* appear, he applies the soldering iron to another part. The trouble will appear when the proper part is heated by the soldering iron.

The method outlined has reduced the troubleshooting time consumed to minutes. It also isolates the exact part responsible just when the trouble is brought on. No voltage or resistance measurements are necessary.

When using the method described to locate the cause of the intermittent, unstable, delayed or slow drift condition, it is important to note that:

1. Heat should not be applied too long to any part, else a good component may go bad.
2. Check the value of the part to be heated beforehand, in case its markings are obscured after heat has been applied.
3. Keep the soldering iron tip moving across the surface of the component from one end to the other; don't apply it at one spot. •

### Industrial Color TV

CBS-Columbia has entered the industrial TV field with closed-circuit color equipment. The Color Camera Chain used is the one developed by Dr. Peter Goldmark. It is the same chain demonstrated earlier in various medical and merchandising applications. The unit features a low-cost simplified color system, ease of operation, high color fidelity, small size and light weight.

### Contests for Home Recordists

Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y. is sponsoring a nation-wide contest for the best articles on the home use of magnetic tape recorders. Prizes include a V-M portable two-speed, dual-track tape recorder, \$450. in cash plus forty-five 1200-ft. reels of Audiotape. All entries should be mailed to the Contest Department of Audio Devices. Deadline is April 1, 1955.

**make  
time  
work  
for  
you!**



## USE RCA VICTOR Service Parts

**FACTORY-TAILORED**

**to fit right,  
to install fast!**

**Remember:** RCA Service Parts are the only genuine replacement parts for RCA Victor TV receivers, radios and phonographs.



**Streamline both your  
Business and Technical Work**

**RCA's SERVICE PARTS SELLING KIT**  
Includes:

- \*RCA TV Service Parts Guide
- \*RCA TV Tuner Parts Guide
- \*Dealer Price Schedule
- \*List Price Card (for the 54 most-used RCA Victor Service Parts)

Use this kit to improve your business methods. Use it as a quick technical reference. It's FREE from your local RCA Tube Distributor. (Form 3F508.)



**RADIO CORPORATION  
OF AMERICA**  
SERVICE PARTS HARRISON, N.J.

## Complete Index of

# ALL "CIRCUIT DIGESTS" TO DATE

Including Current Issue. CIRCUIT DIGEST NOS. 174 to 178 will be found in this issue of TECHNICIAN

### All Units Are TV Receivers Unless Otherwise Noted

	Circuit Digest No.
<b>ADMIRAL</b>	
Chassis 2242: Models 520M15, 520M16, 520M17.	
Chassis 22A2A: Models 520M11, 520M12. Chassis 22M1: Models 121M10, 121M11A, 121M12A, 121M11, 121M12, 121K15A, 121K16A, 121K17A, 121K15, 121K16, 121K17, 221K45A, 221K46A, 221K47A, 221K45, 221K46, 221K47. Chassis 22Y1: Models 321M25A, 321M26A, 321M27A, 321M25, 321M26, 321M27, 421M15A, 421M16A, 421M15, 421M16, 421M35, 421M36, 421M37, 521M15A, 521M16A, 521M17A, 521M15, 521M16, 521M17	
Chassis 19B1: Model 17DX10, 17DX11. Chassis 19C1: Model 121DX12, 121DX16, 221DX15, 221DX16, 221DX17, 221DX26, 221DX38. Chassis 19F1A: Model 121DX11. Chassis 19H1: Model 222DX15	15
Chassis 22A3, 22A3Z: Models 122DX12, 222DX15B, 222DX16B, 222DX17B, 222UDX15, 222UDX16, 222UDX17, 222DX27B, 322DX16A, 322UDX16	101
Chassis 20A2, 20A2Z, 20D2	111
Chassis 20L2: Models TA2216A, TA-2217A, CA2236A, FA2226	134
Chassis 21A3Z: Models T2311Z (Coral Gables), T2312Z (Bell-Aire), T2316Z (Beverly Hills), T2317Z (Bermuda), T2318Z (Bar Harbor), C2316Z (Catalina), C2317Z (Casablanca), C2326Z (Del-Monte), C2327Z (California), F2326Z (El Dorado), F2327Z (Riviera), F2328Z (Deauville)	142
Chassis 20AX5, 20AX5A, 20AX5CZ, 20AX5D, 20AX5EZ, 20AX5F: Models TA1831, TA1832, TA1842, CA2256, TA2212B, CA2306Z, CA2307Z, TA1812B	161
Chassis 17XP3: Models T1801 (Pasadena), T1802 (Palm Beach), T1806 (Palm Springs), T1807 (Palo Alto)	168

### ANDREA

Chassis VM21: Models T-VM21, C-VM21, 2C-VM21, CO-VM21	44
---	----

### ARVIN

Chassis TE331: Models 6175TM, 6179TM	13
Chassis 337-341: Models 7210, 7212, 7214, 7216, 7218, 7219	45
TV Dual Tuner, used in Chassis TE 330, 332, 340, 341	75
Chassis TE 359: 9200 series	100
Chassis TE 373-UHF: Model 9245	128
Chassis "D" 379-UHF, "D" 382-VHF: Models 21-550, 551, 552, 553	150
Chassis "E" 383-VHF: Models 21-544, 555, 557	174

### BENDIX

Chassis T14: Models 21K3, 21KD, 21T3, 21X3, OAK3	20
Chassis T17: Models KS21C, TS21C. Chassis T17-1: Model TS17C	50
Chassis T14-3: Models FM27C, HB27C. Chassis T14-10: Models TM24DS, TB24DS. Chassis T14-11: Models TM24DU, TB24DU	116
Chassis T14-15, T14-16	144

### CAPEHART

Chassis CX-36, RF-IF chassis coded R-3, Deflection chassis coded D-4: Models 1T172M, 2C172M, 3C212M, 32212B, 4H212M, B, 5F212M, 6F212M, B, 7F212M, 8F212B, 9F212M, 10F212M, 11W212M	17
Chassis CX-37: Models 1T172MA, 1T172BA, 3C212MA, 3C212MG, 3C212BA, 4H212MA, 4H212BA, 5F212MA, 6F212M, 7F212MA, 8F212BA, 9F212MA, 11W212MA, 1C213M, 2F213F, 3C213M, 4T213M, 5H213M, 8F213B	37
Chassis CX-37 and CX-37-1, 1955 series	151

### CBS-COLUMBIA

Chassis 817: Model 17T18, 17M18, 17C18. Chassis 820: Models 20T18, 20M18, 20M28	14
Chassis 1027: Models 27C11, 27C21	77
Chassis 750-3: Models 17M06, 22CO6, 22C38	95
Chassis 921-11: Models U22C05, U22C07, U22C07B, U22T09, U22T09B, U22T09EB, Chassis 921-13: Models U22T19, U22T19B. Chassis 921-14: Models 22C09, 22C09B, 22T19B	145
Models 205C1, 205C2 (Color Receiver)	167

### COLUMBIA RECORDS

360 Phono Amplifier	43
---------------------	----

### CROSLEY

	Circuit Digest No.	Circuit Digest No.
Chassis 380: Models EU-17COM, EU-17TOB, EU-17TOM. Chassis 381: Models EU-21CDB, EU-21CDM, EU-21CDN, EU-21COBA, EU-21COMA	2	Chassis RA-306, 307: Models Summit RA-306A1 & RA-307A1, Warren RA-306A2 & RA-307A2, Hampton RA-306A3 & RA-307A3, Bristol RA-306A4 & RA-307A4, Newport RA-306A5 & RA-307A5, Rutland RA-306A6 & RA-307A6, Hartford RA-306A7 & RA-307A7, Sheffield RA-306A8 & RA-307A8, Westbrook RA-306A9 & RA-307A9, Windsor RA-306A10 & RA-307A10, Bradford RA-306A11 & RA-307A11, Warwick RA-306A12 & RA-307A12
VHF Chassis 392: Models EU-COMUA, EU-COBUA, EU-CDMU, EU-CDBU, EU-CDNU (Chassis 392 is very similar to the 380—refer to Circuit Digest No. 2)	33	107
Chassis 388: Models EU-30COMU, EU-COBU	46	Chassis RA-301, 302: Models RA-301-A1, RA-301-A2, RA-301-A3, RA-302-A1, RA-302-A2, RA-302-A3
Chassis 393: Models EU-21TOLU, EU-21TOLBU, Chassis 394: Models EU-21COLU, EU-21COLBU	46	120
Chassis 402: Models F-17TOLH, F-17TOLBH; Chassis 403: Models F-21TOLH, F-21TOLBH; Chassis 404: Models F-21COLH, F-21COLBH, F-21CDLH, F-21CDLBH; Chassis 402-1: Models F-17TOLU, F-17TOLBU; Chassis 403-1: Models F-21TOLU, F-21TOLBU; Chassis 404-1: Models F-21COLU, F-21COLBU, F-21CDLU, F-21CDLBH	82	Chassis TA-312, 313: Models Barton, RA-312-A1, or RA-313-A1; Baylor, RA-312-A2 or RA-313-A2; Winsted, RA-312-A3 or RA-313-A3; Clifford, RA-312-A4 or RA-313-A4; Hamilton, RA-312-A5 or RA-313-A5; Dellwood, RA-312-A6 or RA-313-A6; Richfield, RA-312-A7 or RA-313-A7; Belvidere, RA-312-A8 or RA-313-A8; Bradley, RA-312-A9 or RA-313-A9
Chassis 411: Models F-24COLH, F-24COLBH; Chassis 411-1: Models F-24COLU, F-24COLBU	96	139
Chassis 412: Models F-24CDMH, F-24CDBH; Chassis 412-1: Models F-24CDMU, F-24CDBU; Chassis 416: Models F-27COMH, F-27COBU, Chassis 416-1: Models F-27COMU, F-27COBU	106	Chassis RA-321, 322: Model The Glendale
Chassis 426: Models G-17TOMH, G-17TOBU, G-17TOWN	126	170
Chassis 431-2: Models H-21COMH, H-21COBH, H-21COWH, H-21COSH, H-21COSBH, H-21HCBH, H-21HCBH, H-21HCBW, H-21HCMH, H-21HCMU, H-21HCMV	163	EMERSON
Chassis 434: Models H-21TOMH, H-21TOBH, H-21TOWH, H-21TOWB, H-21HCMH, H-21HCBH, H-21HCWH, H-21HCBH, H-21COBH, H-21COWH	176	Chassis 120166-D: Models 721D, 728D
DE WALD		10
Models ET-140R, DT-163R, DT-163A, ET-170, ET-171, ET-172, ET-191, DT-190D	69	Chassis 120168-D: Models 716F, 717F, 719F, 727D, Chassis 120169-B: Models 711F, 712F, 720D, 732B, 734B
DU MONT		31
Chassis RA-164: Model Clinton. Chassis RA-165: Models Beverly, Ridgewood, Shelbourne, Milford, Wakefield	3	Chassis 120174-B: Models 752A, 755A, 784A; Chassis 120198-D: Models 753F, 785C, 786E
Chassis RA-166/167, 170/171: Models 17T350, 21T327, 21T328, 21T329, 21T359, 21T366, 21T376, 21T377, 21T378	51	Chassis 120182-D: Models 741F, 757D, 758F, Chassis 120196-B: Model 781A. Chassis 120206-D: Models 792D, 781E. Chassis 120197-B: Models 784E, 784K. Chassis 120197-D: Model 784G. Chassis 120195-D: Model 785K. Chassis 120211-D: Model 784M
DELCO		121
Buick Selectronic Model 981551 (see main section of magazine)	149	Chassis 120220-D: Models 1030D, 1032D. Chassis 120239-D: Models 1058D, 1060D, 1062D, 1064D
DE MONT		152
Chassis RA-164: Model Clinton. Chassis RA-165: Models Beverly, Ridgewood, Shelbourne, Milford, Wakefield	3	Chassis 120233-D: Models 1066D, 1070D, 1072D, Chassis 120235-D: Models 1000H, 1002H, 1004H, 1006H, 1008H, 1010H, 1018H, 1022H, 1028H, 1040H, 1042H, 1044H, 1046D, 1048D, 1054D, 1086D, 1088D, 1090D, 1092D, Chassis 120234-D: Models 1067D, 1071D, Chassis 120236-D: Models 1009J, 1011J, 1075D, 1047D, 1049D. Chassis 120238-F: Models 1041F, 1045F, 1047F
DE WALD		162
UHF-TUNER Model UHF-103	52	ESPEY
"F" Chassis: Models 17C12, 21T14, 21C115, 21C116, 21C117, 21C119, 21C120, 21C121, 17T15, 21T10, 21T12, 21T4	84	513-C AM-FM Tuner
UHF Tuner, Model S-UHF-80	104	FADA
Chassis "EE": Models 21T7, 21T8, 21T20, 21T21, 21C225, 21C226, 21C227, 21C228, 21C229, 21C230, 21C231, 21C232, 21C233	113	The "Imperial" Series: Models 17T6, 17T9, 17C2, 17C4
Chassis "G" line: Models 17T20, 21T22, 21T23, 21T24, 21T25, 21C103 and 21C104	135	Models U2100C, U2150C, U2100T, UDL2100T, UH21T
Chassis "H" line: Models 21T26-T27, 21C240-C241	146	GENERAL ELECTRIC
GRANCO		"Stratopower" chassis: Models 17C125, 20C107, 21T1, 21C208, 21C201, 21C202, 21C214, 21C206
UHF Converter Model CTU	74	4
HALLICRAFTERS		UHF-TUNER Model UHF-103
Chassis A1200D, K1200D or W1200D: Models 1010P, 1012P. Chassis D1200D, L1200D or X1200D: Models 1021P, 1026P. Chassis F1200D: Model 1013C. Chassis G1200D: Models 1022C, 1027C. Chassis U1200D: Model 1051P, 1055C, 1056C, 1060C, 1061C. Chassis P1200D: Model 1052P. Chassis R1200D: Models 1053P, 1054P. Chassis Z1200D: Models 1057C, 1062C, 1063C. Chassis Z1200D: Model 1057U		
A1300D: Model 1075	21	Chassis A1300D: Model 1075
Model TW-1000 World-Wide 8-Band Portable Radio	38	Model TW-1000 World-Wide 8-Band Portable Radio
Chassis A1400D: Models 21K201B, 21K211M, 21K221B, 21K231M	49	Chassis A1400D: Models 21K201B, 21K211M, 21K221B, 21K231M
B1600D: Models 21T320W, 21T-320M, 21T320B, 21K330B, 21K330M	102	Chassis B1600D: Models 21T320W, 21T-320M, 21T320B, 21K330B, 21K330M
(Continued on page 64)	153	

# 2 NOTABLE ADVANCES in HI-FI



Major improvements in the acoustics of high fidelity audio systems are now made possible by the use of

## ACOUSTICAL FELT

for damping loud speaker chambers or enclosures to eliminate cabinet resonance and bring vastly superior tone quality. And . . .

## LATEX IMPREGNATED FELT

for "float mounting" of record players to get rid of transmitted vibration and resultant feedback.

**Remember**—the final test is **WHAT IS HEARD**. Correct mounting and damping of speaker, and correct mounting of record players, are **ALL-IMPORTANT**. Yet the method of application is easy for technicians, custom builders and others.

**Both felts**—Acoustical and Latex Impregnated—are produced by a century-old company noted for acoustical and piano felts.

Available through high fidelity equipment distributors. Send for prices and brochure.



## INGALLS ELECTRONICS COMPANY

30 West Putnam Avenue  
Greenwich, Conn.

## ADVERTISERS INDEX FEBRUARY, 1955

Anchor Products Co. ....	59
Barb City Industries ....	60
Blonder-Tongue Laboratories, Inc. ....	59
CBS-Hytron Div., Columbia Broadcasting System, Inc. ....	14
Caldwell-Clements, Inc. ....	44, 45
Centralab Div., Globe-Union, Inc. ....	6
Clear Beam Antenna Corp. ....	50
Cornell-Dubilier Electric Corp. ....	49, 55
Crown Controls Co., Inc. ....	51
Delco Radio Div., General Motors Corp. ....	43
Drake Electric Works, Inc. ....	57
EICO ....	56
Fretco, Inc. ....	58
General Electric Co. ....	8, 9
Ingalls Electronics Co. ....	63
International Rectifier Corp. ....	42
International Resistance Co. ....	Cover 2
Jensen Industries, Inc. ....	56
JFD Manufacturing Co., Inc. ....	41
Jones & Laughlin Steel Corp. ....	46
Jontz Manufacturing Co. ....	61
Kester Solder Co. ....	58
Mallory & Co., Inc., P. R. ....	31
Moss Electronic Distributing Co., Inc. ....	47
Neal Electronics Corp. ....	60
Precision Apparatus Co., Inc. ....	27
Pyramid Electric Co. ....	33
Quietrole Co. ....	60
Radiart Corp. ....	49
Radio Corporation of America ....	61, Cover 4
Raytheon Manufacturing Co. ....	7
Rider Publisher, Inc., John F. ....	63
Rohn Manufacturing Co. ....	29
South River Metal Products Co. ....	60
Sprague Electric Co. ....	Cover 3
Sylvania Electric Products Inc. ....	4, 5
Tech-Master Products Co. ....	57
Tescon TV Products ....	11
Trio Manufacturing Co. ....	39
Tung-Sol Electric, Inc. ....	52, 53
United Catalog Publishers Inc. ....	56
United Motors Service Div., General Motors Corp. ....	12, 13
Van Cleef Brothers, Inc. ....	37
Weller Electric Corp. ....	54
Wen Products, Inc. ....	2
Westinghouse Electric Corp. ....	10
Winegard Co. ....	3

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.

## BE A SERVICING AND INSTALLATION EXPERT!

### PICTURE BOOK OF TV TROUBLES

*by the Rider Laboratory Staff*

### JUST PUBLISHED: VOLUME 2

(Vertical Sweep-Deflection Circuits)

Here's the only book ever devoted exclusively to vertical sweep circuits! Rider's expert lab staff tells you about forty-six different kinds of vertical sweep circuit troubles . . . all based on actual troubleshooting done right in the Rider lab! To describe these troubles, they show you 96 "faulty" picture tube pattern illustrations and right next to each one, you see the "abnormal" waveforms they got while checking key points . . . the same waveforms you'd see on your scope screen if you'd done the checking! And here's a very special feature: the last 5 pages in the book form a handy pull-out section that shows you exactly what the **RIGHT** waveforms should look like! It takes just seconds to compare any "abnormal" waveform in the book with its "normal" version shown in this pull-out! There's no theory—no "maybe's"—this book tells and shows you how to diagnose TV receiver troubles by picture and waveform observation . . . how to do that servicing job better, faster, easier!

**CHAPTERS:** Blocking Oscillator Vertical Sweep Circuits—Multivibrator Vertical Sweep Circuits—Vertical Output Transformer Replacement—Vertical Retrace Blanking and Deflection Yoke Circuits—Rapid Trouble-shooting of Vertical Sweep System.

Cat. #168-2, 5 1/2" x 8 1/4", paper bound only \$1.80

**VOLUME 1** covers Horizontal AFC-Oscillator Circuits.

Cat. #168, 5 1/2" x 8 1/4", paper bound . . . only \$1.95

### OTHER VOLUMES COMING SOON!

### HOW TO INSTALL TV ANTENNAS

*by Samuel L. Marshall*

This book lives up to its title! It's completely practical—an illustrated "Antenna Bible" you'll refer to every time an installation job comes in! Tells you everything you need to know about installing TV antennas: safety precautions; putting up masts and towers; getting the best reception in fringe areas; wind and icing problems; types of antennas, and when to use them; rigging, roofing, and masonry work; in short—how to do the job **RIGHT** . . . quickly, safely, economically whether it's a 10-foot, chimney-attached mast or a 100-foot tower! 117 big illustrations, plus many practical charts and graphs make everything the author talks about picture clear! Sam Marshall has been in this business since 1923—he knows his subject, and he gives you the complete story! You'll use this book for years to come!

**CHAPTERS:** Antenna Fundamentals—VHF Antennas—Transmission Lines & Stubs—UHF Antennas—Installation Materials & Methods—High Masts & Towers—Installation Problems.

Cat. #172, 5 1/2" x 8 1/4", paper bound . . . only \$2.50

### RIDER'S SPECIALIZED TAPE RECODER MANUAL, VOL. 1

Servicing tape recorders is BIG business—and here's your opportunity to get your share of this profitable market! With this fact-filled 288-page manual, you'll be able to service every recorder put out by the 12 most prominent manufacturers during the 5 years from 1950 through 1954! Includes everything you need to know about operation, adjustments, trouble diagnosis, and repair of 88 different models! Here's the kind of servicing information you get on each model: amplifier schematics; voltage data; tube complement & layout; exploded views of mechanical assembly; troubleshooting charts (with instructions on electrical and mechanical organization); how to use tape recorders with other devices; electrical and mechanical parts lists.

**COVEBS ALL THE MOST PROMINENT BRANDS:** Bell & Howell (Stereovite)—Brush Devel. (Soundmirror)—Columbia Rec. (Columbia-Bell & Howell)—Crescent Ind. (Steno)—Daystrom (Crestwood)—Eicor, Inc. (Ector)—Pentron Corp. (Pentron)—Radio Corp. of Amer. (RCA)—Revere (Revere)—Three Dimension Co. (Stereotone)—V-M Corp. (Tape-O-Matic)—Webster Chicago (Webcor)—Webster Elec. (Ekotape)—Wilcox Gay (Recordio).

Cat. #5001 288 (8 1/2" x 11") pp., paper bound only \$4.50

### OTHER VOLUMES COMING SOON!

ORDER TODAY!

Rider books are sold by parts jobbers and book stores throughout the country. If YOUR dealer doesn't have these books, mail this coupon to us!

JOHN F. RIDER, PUBLISHER, INC.  
480 CANAL ST., NEW YORK, N.Y.

Please RUSH me:

PICTURE BOOK OF TV TROUBLES

Vol. 1 \$1.35  Vol. 2 \$1.80

HOW TO INSTALL TV ANTENNAS \$2.50

SPECIALIZED TAPE RECORDER MANUAL \$4.50

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & STATE \_\_\_\_\_

(Continued from page 62)

Circuit Digest No.		Circuit Digest No.
HOFFMAN		R-F Chassis R-201, Deflection Chassis D-201: Models 4308, 4110, 4108, 3104, 4008
Chassis 213: Models 21M903, 21B904, 21P905	32	89
Chassis 403-24: Models 24M725, 24B726, 24P727		R-F Chassis R-191, Deflection Chassis D-191, Code 140: Models 3002, 4002, 4004, 4102, 4106, 4109, 4150, 4802, 4804, 4306, 4307, 4005, 4007, 4107, 4112
Chassis 406-21: Models 21M160, 21B161, 21M333, 21B334	130	118
Chassis 407-21: Models 21M178, 21B179, 21P180, 21M345, 21B346	156	Chassis 350: Models 22C4016, 22C4016L, 22C- 4124, 22C4124L, 22C4126, 22C4312, 22C4412
Chassis 306-21: Models 21M175S, 21M175G2, 21B176S, 21B176C2, 21P177S, 21P177G2, 21M- 183, 21B184. Chassis 308-21: Models 21M183P, 21M183P2, 21B184P, 21B184P2, 21M357P, 21M357P2, 21B358P, 21B358P2	169	158
JACKSON		<b>PHILHARMONIC</b>
Chassis 317A, 320A, 321A, 324A: Models 277, 217, 221-T, 321-C, 217-T, 317-C, 221-C, 621	64	Models 54GM21, 54TW21
MAGNAVOX		172
Model J, K-105 Series: CT331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349	23	<b>RADIO CRAFTSMEN</b>
UHF Converter Tuner Model 700359	53	AM-FM Tuner C-800
107 Series: Chassis CT 358	65	28
UHF Converter Tuner 595461 (700359 Re- vised)	80	<b>RAYTHEON</b>
Chassis 108A series: Models CT, CU & CMU 401A; CT, CU & CMU 402A; CT, CU & CMU 403A; CT, CU & CMU 404A	112	Chassis 17T1: Model M1733A, C1735A, C1736A. Chassis 17T2: Model M-1734A. Chassis 21T1: Model M-2107A, C-2108A, C-2110A, C-2111A. Chassis 21T2: Model C-2109A
Series 106C: Models CT 381C, CU 381C & CMU 381C	129	16
Chassis 300 series: Models CTA, CUA & CMUA, 401B; CTA, CUA & CMUA 402B; CTA, CUA & CMUA 403B; CTA, CUA & CMUA 404B	136	UHF Tuner
Chassis 250 series: Models CTA-435AA, CMUA- 435AA, CTA436AA, CMUA436AA	157	54
MAJESTIC		Chassis 21T8: Models UM-2133, UM-2134, UM- 2135, UM-2136, UM-2139, UM-2141, UM-2142, UM-2144, UM-2145
Chassis Series 110-111: Models 21T20, 21T21, 21C30, 21C31, 21D50, 21D51, 21P60, 21P61, 21P62, 21P63, 21P70, 21P71	26	94
Chassis 112: Models 17T38, 17T40, 17T41, 17C42, 17C43; Chassis 113: Models 21T40, 21T41, 21C42, 21C43	76	Chassis 21T11: Models M-2131A, C-2137A and C-2138A
Chassis 115, 116 Series: Models 21T22, 21T23, 21C36, 21C37, 21P46, 21P47, 21D54, 21D55, 21D57, 21D58, 21D59, 21P64, 21P65, 21P72, 21P73, 21PR80, 21PR81	143	114
MALLORY		Chassis 24T3: Models C-2401A, C-2402A
TV-101 UHF Converter	58	125
MOTOROLA		Chassis 17T18 (Challenger series): Models M-1750A, M-1750C, M-1750K, M-1751D, M-1751F, M-1752E, M-1752L. Chassis 21T19 (Challenger series): Models M-2160A, M-2160C, M-2160K, M-2161D, M-2161F, M-2162E, M-2162L
Chassis TS-292: Models 21C1, 21C1B, 21F2, 21F2B, 21F3, 21F8B, 21K4, 21K4A, 21K4B, 21K4W, 21K5, 21K5B, 21K6, 21K7. Chassis TS-324: Models 21T4A, 21T4EA, 21T5A, 21T5BA	9	141
Models TC-101, TC-101B UHF Converters	59	<b>RCA VICTOR</b>
Auto Radio Mopar Models 610T	72	Chassis KCS72: Models 17T200, 17T201, 17T202, 17T211, 17T220
Chassis WTS-518 Series: Models 21T15, Y21T15.		6
Chassis TS-418 Series: Models 17T20, Y17T20, 17T20B, Y17T20B, 17T20E, Y17T20E, 17T20M, Y17T20M. Chassis TS-518 Series: Models 21T16, Y21T16, 21T16B, Y21T16B, 21T16E, Y21T16E, 21T17, Y21T17, 21T17B, Y21T17B, 21K19, Y21K19, 21K19B, Y21K19B	147	UHF Selector Chassis KCS70: Model U70
MUNTZ		Chassis KCS78 or KCS78B: Models 17-T-301, 17-T-301U, 17-T-302, 17-T-302U, 17-T-310, 17-T-310U
Chassis 17B1 or 17B2: Models 2053A, 2054-A, 2055-A, 2056-A. Chassis 17B2: Model 2055-B.		48
Chassis 17B3 or 17B4: Models 2457-A, 2461-A.		UHF Selector Model U2: Chassis KCS79
Chassis 17B5 or 17B6: Models 2158-A, 2159-A, 2162-A	39	55
OLYMPIC		Chassis KCS81: Models 21-D-305, 21-D-317, 21-D-326, 21-D-327, 21-D-328, 21-D-329, 21-D- 330; Chassis KCS81B: Models 21-D-305U, 21-D- 317U, 21-D-326U, 21-D-327U, 21-D-328U, 21-D- 329U, 21-D-330U
Chassis TK: Models 17T40, 17T48, 17C44, 17K41, 17K42, 17K50. Chassis TL: Models 20T46, 20T47, 20C45, 20C52, 20C53, 20D49, 20K43, 20K51	30	67
Chassis TMTN: Models 17T56, 17C57, 17K55, 21T58, 21T69, 21T70, 21T74, 21C65, 21C68, 21O72, 21C73, 21D60, 21D64, 21K61, 21K62, 21K63	68	Chassis KCS83C: Models 21-S-354, 21-S-362U; Chassis KCS83D: Models 21-S-354U, 21-S-362U
Chassis 14"-AD, 17"-AE: Models 14TD30, 14TD31, 17TE37, 17TE38	171	90
PACIFIC MERCURY		Chassis KCS77D, KCS77H: Models 27-D-382U, 27-D-383U, 27-D-384U
Chassis 201 Series	124	103
PACKARD-BELL		Chassis KCS84C: Models 24-T-420, 24-T-435; Chassis KCS84E: Models 24-T-420U, 24-T-435U
Chassis 2720: Models 2721, 2722. Chassis 2710: Models 2723, 2724	60	119
Chassis 2740: Models 2742, 2743, 2744, 2842, 2843, 2844	117	Chassis CTC2: Model CT-100 (color)
Chassis T-1: Models 21103, 21202, 21401	177	131
PHILCO		Chassis KCS88J: Models 21-S-503U (Arlen), 21-S-504U (Kent), 21-S-505U (Ellis), 21-S-506U (Rupert), 21-S-517U (Consolette), 21-S-519U (Radnor), 21-S-521U (Felton), 21-S-522U (Ben- son), 21-S-525U (Wister), 21-S-526U (Wister), 21-S-525U (Wister). Chassis KCS88L: Models 21-S-501U (Medalist), 21-S-502U (Lambert), 21-S-518U (Trafton). Chassis KCS88M: Model 21-S-537U (Bromley). Chassis KCS88N: Model 21-S-526U (Carroll). Chassis KCS88VA: Model 21-S-523U (Pickford)
RF Chassis 91, Deflection chassis J-1 used in 1953 Code 126: Models 2269, 2270, 2271, 2273, 1853, 1853L, 2127, 2266, 2268, 2286, 2287	5	140
RF Chassis 81, Deflection Chassis H-1: Models 1824, 1825, 1826, 1852L, 2125, 2125L, 2152, 2152L, 2226, 2227, 2262, 2272	22	Chassis KCS87: Models 17-S-450 (Trent), 17-S- 451 (Newton), 17-S-453 (Ashburn). Chassis KCS87A: Models 17-S-450U (Trent), 17-S-451U (Newton), 17-S-453U (Ashburn)
R-R chassis 97, Deflection chassis J-7: Model 2750	47	154
All-Speed Record Changer: Model M-24	29	Chassis KCS87C, KCS87D: Models 21-S-500, 21-S-500U
REGENCY		173
UHF Converter Model RC-600		Chassis Nos.—Main Chassis CTC2B—Conver- gence Chassis CTC3A: Model 21-CT-55 (Color)
SENTINEL		178
Chassis 118: Models 454, 1U-454, 455, 1U-455, 456, 1U-456, 457, 1U-457	18	<b>REGENT</b>
Models 1U-532, 1U-552, 1U-554	85	UHF Converter Model RC-600
Models 1U-581, 1U-582, 1U-584, 1U-585	108	73
Models: 1U-901, 1U-911, 1U-914, 1U-921, 1U-924, 1U-991	159	<b>SHERATON</b>
SHERATON		Chassis 205XL: Models T1750, T2150, T1755, T2120, T2155, C2125
Chassis 250XL: Models T1750, T2150, T1755,		81
SPARTON		Chassis 25D213: Models 5342, 5343, 5382, 5383, 5384, 5386, 5390, 5391
Chassis 27D213: Models 5342A, 5343A, 5384A, 5386A, 5382A, 5383A, 10352, 10353	40	24
Chassis 29U213: Models 22312, 22313, 23322, 23323	71	Chassis 27D214: Models 5344, 5345, 5385, 5386, 5387, 5388, 5392, 5393, 5394
Kingston UHF Converter		105
Chassis type 23U214: Models 14A204 (Cornell), 12A204 and 12A210 (Princeton), 11T210 (Stan- ford)		138
STANDARD COIL		Chassis 29U214: Models 5346, 5347, 5387, 5388, 5389, 5395, 5396, 5397, 5398, 5399
Tuner Models TV-1532, TV-2232		86
STEWART-WARNER		Chassis 29U215: Models 5348, 5349, 5389, 5390, 5391, 5392, 5393, 5394, 5395, 5396, 5397, 5398, 5399, 5390, 5391, 5392, 5393, 5394, 5395, 5396, 5397, 5398,

# capacitor replacements

FOR SETS OF THE MONTH

## ARVIN CHASSIS "E"

Symbol No.	Rating $\mu\text{F}$ @ WVDC	Arvin Part No.	Sprague Replacement
C1	20 @ 25	42724	TVA-1205
C2	40+10+10 @ 150/200 @ 35	42723	{ TVL-3665 TVA-1312
C3	150+150+150 @ 150	42722	R-1657
C411	.01 @ 1500	41135-103	20HKB-S1
C418	22 $\mu\text{F}$ @ 3000	40539-5	50GA-Q22

## MONTGOMERY WARD MODEL WG-5000A

Symbol No.	Rating $\mu\text{F}$ @ WVDC	M.W. Part No.	Sprague Replacement
C19	5 @ 25	45X378	TVA-1203
C27	10 @ 300/40 @ 50	45X410	<sup>1</sup> TVL-3749
C47	80 @ 300/100 @ 50	45X395	<sup>2</sup> TVL-3704
C49	80+60 @ 300	45X397	TVL-2584
C71	30 @ 400	45X393	TVA-1711
C72	5 @ 25	45X378	TVA-1203
C53, R68	Integrator Plate	76X7	V-1
C26, R26	Audia Coupling Plate	76X5	T-1
1 Omit one 10 $\mu\text{F}$ section.			
2 Omit 20 $\mu\text{F}$ section.			

## CROSLEY CHASSIS 434

Symbol No.	Rating $\mu\text{F}$ @ WVDC	Crosley Part No.	Sprague Replacement
C132	200+5 @ 150	157836-1	R-1645
C138	20 @ 450	157903-1	TVA-1709
C139	200 @ 200	158557-1	R-1646
C140	140+5 @ 300/200+30 @ 150	157838-3	R-1553
C129	Sync. Take-off Network	157813-1	102C17

## PACKARD-BELL CHASSIS T-1

Symbol No.	Rating $\mu\text{F}$ @ WVDC	Packard-Bell Part-No.	Sprague Replacement
—	100 @ 350/100 @ 50	—	TVL-3722
—	100+10 @ 350	—	<sup>1</sup> TVL-3672
—	10 @ 450/100 @ 350/ 5 @ 50/25 @ 25	—	TVL-4706

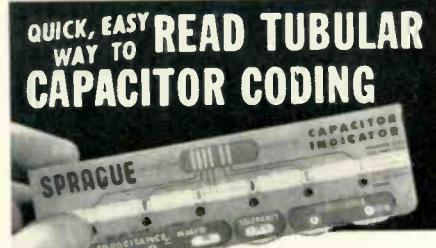
<sup>1</sup>Omit 20  $\mu\text{F}$  section.

Sprague makes more capacitors . . . in more types . . . in more ratings . . . than any other capacitor manufacturer. Send 10¢ for the 65-page giant seventh edition TV Replacement Manual to Sprague Products Co., 65 Marshall St., North Adams, Mass., or get it FREE from your Sprague distributor.

DON'T BE VAGUE...INSIST ON

# SPRAGUE

(Distributors' Div. of the Sprague Electric Co.)



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

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

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

**SPRAGUE PRODUCTS COMPANY**

Distributors' Division of the Sprague Electric Co.  
NORTH ADAMS, MASS.

**Millions of TV Owners  
Who Read LIFE will read about you...  
Their Television Serviceman...on March 7th**

## A TRIBUTE

RCA SALUTES YOUR NEIGHBORHOOD  
TELEVISION TECHNICIAN  
DURING NATIONAL TELEVISION  
SERVICEMEN'S WEEK MARCH 7-12

Have you ever thought how much your TV serviceman contributes to your home entertainment? He puts in long hours to keep ahead of a rapidly growing and increasingly complex business. He stands by for your calls. Thanks to his expert knowledge and friendly service, you and your family enjoy the miracle of television day in and day out. And, he merits your confidence by using products of unquestioned quality such as RCA Receiving Tubes and RCA Picture Tubes.

In the March 7th issue of LIFE magazine, readers all over America will see a special advertisement, sponsored by the RCA Tube Division, paying tribute to local television servicemen and dealers everywhere. This will mark the opening of the consumer phase of National Television Servicemen's Week—a perfect opportunity for you to tell your story to your community.

SEE your RCA Tube Distributor NOW

...for details about NATIONAL TELEVISION SERVICEMEN'S WEEK (March 7-12). Be ready to take full advantage of this big event planned by RCA—exclusively or YOU!



**RADIO CORPORATION  
OF AMERICA**  
ELECTRON TUBES HARRISON, N.J.