

ELECTRONIC TECHNICIAN

Including
SERVICE
Magazine

STEREO
STEREO
1961

50¢

September • 1960



Burton Browne advertising

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A fuse caddy for your tube caddy: 18 individual compartments for fingertip selection. The fuse caddy is complete with the 15 boxes of fuses required to service 93% of all TV sets. Three spare compartments are provided for additional fuses of your own selection.

LITTELFUSE Des Plaines, Ill.

ELECTRONIC TECHNICIAN

Including
SERVICE
Magazine

World's Largest Electronic Trade Circulation

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ROBERT TALL	Washington Editor
HENRY SCHWARTZ	Contributing Editor
C. F. DREYER	Consultant Art Director
M. FARRIS	Editorial Assistant

Address all mail to
480 Lexington Ave., New York 17, N. Y.
Telephone YUkon 6-4242

HOWARD A. REED Publisher

BUSINESS DEPARTMENT

C. HENNESSY New England Sales Manager
R. L. KIPP Regional Manager
N. McALLISTER Production Manager
M. RUBIN Circulation Manager
J. PREVET Asst. Circulation Manager
M. KANE Accounting Manager
A. MOYLAN Accounting Supervisor
P. H. DEMPERS JR. Regional Manager
10 E. Huron St., Chicago 11, Ill.
Telephone Michigan 2-4245

CHRIS DUNKLE & ASSOCIATES California Representative
740 S. Western Ave., Los Angeles 5, Calif.
Telephone DUnkirk 7-6149
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BERNIE EDSTROM Regional Manager
15605 Madison Ave., Cleveland 7, Ohio
Telephone LAkewood 1-7900

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420 Market St., San Francisco 11, Calif.
Telephone DOuglas 2-9183



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For more data, circle 9-C2-1 on coupon, p. 78

September, 1960



FRONT COVER Growth of stereo and sound equipment has been stimulated by numerous technical refinements, including—reverberation systems, speaker innovations, cartridge and tonearm developments, and tape, changer, turntable improvements. STEREO 1961 technical articles and Buyers Directory of Manufacturers & Products offer assistance to service dealers. STEREO 1961 starts on page 79.

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ANDREA: TV Chassis VRT-123 Series

ELECTROHOME, Canada: TV Models Breton, Breton "A", Burnaby

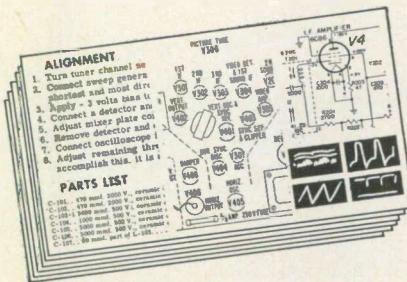
MOTOROLA: TV (Transistorized) TV Chassis TS-432

PHILCO: Transistor Portable Radio, Model T-66

RCA: TV Chassis KCS131 Series

TANDBERG: Tape Recorder, 4-track, Model 5

For more data, circle 9-3-1 on coupon, p. 78 ➤

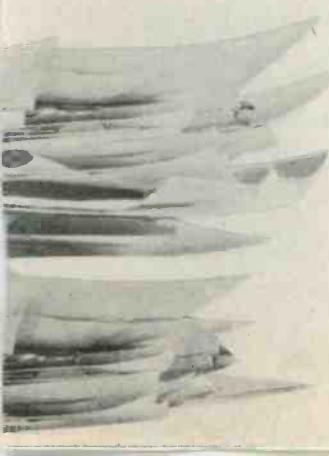


clear
as
a
"bell"...

CDE rotors get



the biggest customer reception!



CD Rotors have the power to end your service problems...because they are designed with a direct line of power that out performs them all. Even in the stormiest, snowiest areas, you can just install them and forget them. CD Rotors give clear-as-a-“bell” reception that's trouble-free, longer lasting, require no call-backs. So order your CD Rotors today...you'll shout their praises from the roof-tops! Write for Catalog #1630 to Cornell-Dubilier, South Plainfield, New Jersey.

**CORNELL-DUBILIER
ELECTRONICS DIVISION**
Federal Pacific Electric Company





Harry Greenberg, distinguished antenna authority, and Chief Engineer of Channel Master's Electronic Development Laboratories.

Mr. G., take a bow!

You've put more power into the most powerful of all fringe area antennas!

New 10-Element T-W Ingeniously combines 6 of Channel Master's famous T-W hairpin dipoles with 4 parasitic low band and co-linear high band elements. Reaches new highs in gain and front-to-back ratios.

Strongest Mechanical Construction Hundreds of thousands of installations over a four year period prove conclusively that the T-W is the strongest antenna ever made.

New Low Band Director and Reflector System Increases gain up to $2\frac{1}{2}$ db more than a 7-element T-W—a 78% power increase!

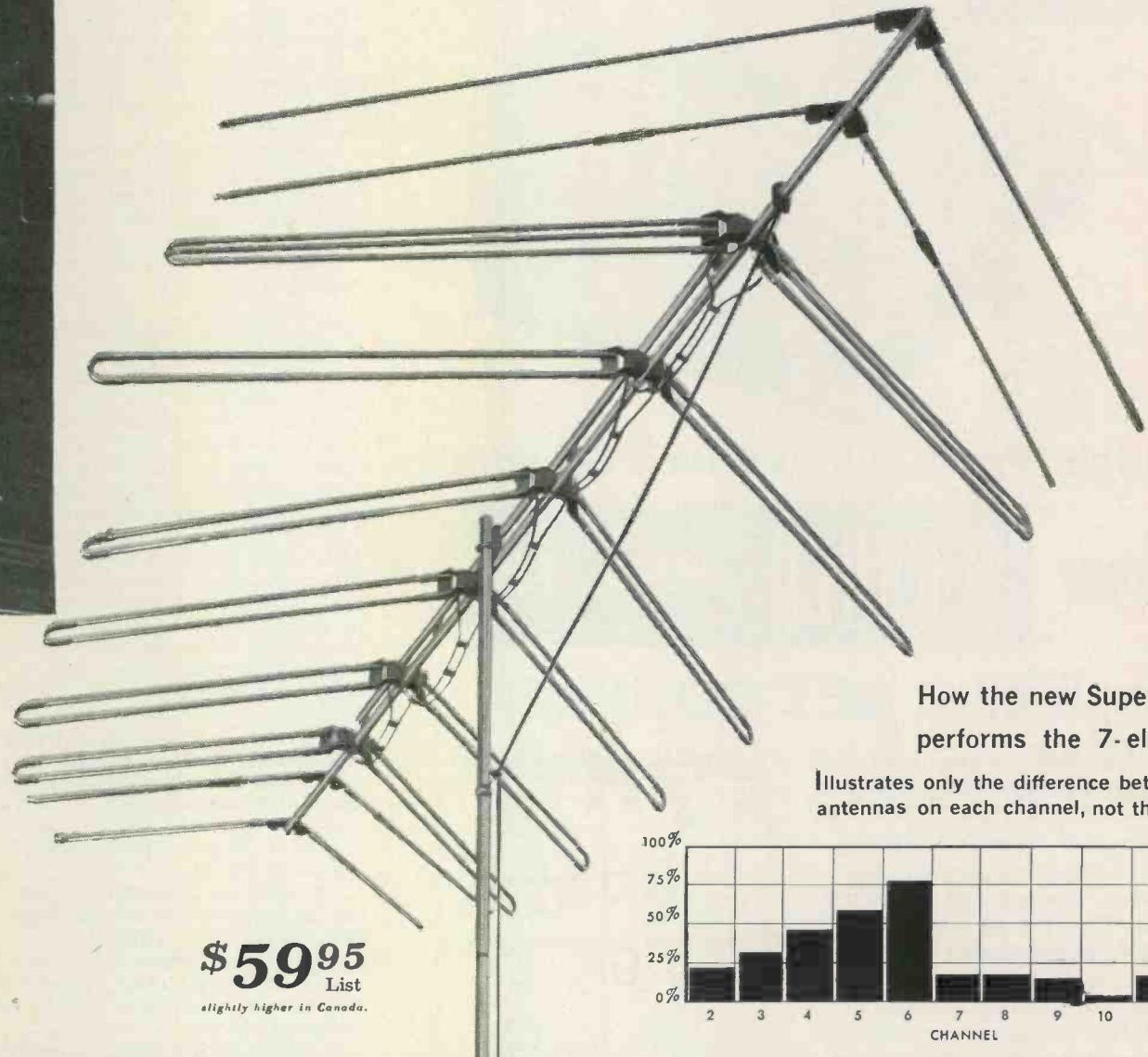
New High Band Co-Linear Elements Add 20% to the T-W's high band gain. The co-linear reflector and director are each actually 3 half-wave elements placed end to end.

Heavy-duty Weatherproof Harness Won't let rain or salt air impede reception.

**NEW 10-ELEMENT
CHANNEL MASTER®
SUPER T-W**

MODEL NO. 358

The new fringe area record-holder.



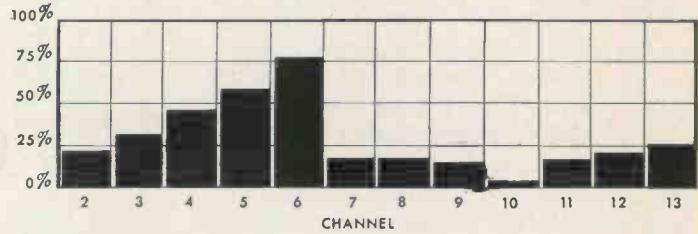
\$59.95

List

slightly higher in Canada.

How the new Super T-W out-
performs the 7-element T-W

Illustrates only the difference between the two
antennas on each channel, not their total gain.



NOW THERE ARE 4

For every problem...for every area...PICK A T-W!



3-Element T-W
Model No. 352



5-Element T-W
Model No. 351



7-Element T-W
Model No. 350



10-Element Super T-W
Model No. 358

See your Channel Master distributor for details on spectacular new promotion!



BRIGHT NEW VIEW

for Multi-set TV-FM
Home Operation...



...and a

Bright Profit Outlook for YOU with

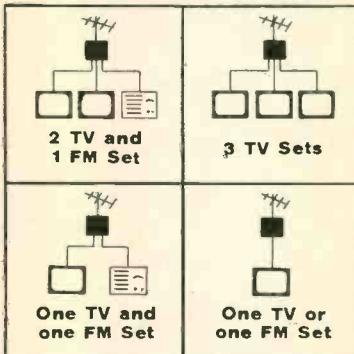
NEW JERROLD HSA-43

Amplified 3 SET COUPLER

Here's a new precision-perfected amplifier that provides 5 DB min. gain across all TV-FM channels on two outputs and no loss in the third output. Housed in a rugged, compact and handsome case. The HSA-43 features single tube operation (6DJ8), A.C. interlock and no-strip twin lead terminals. Its excellent isolation and match prevents set interaction and ghosting. IDEAL FOR FEEDING ONE FM AND TWO TV SETS FROM THE SAME ANTENNA.

\$29.95 list

TYPICAL APPLICATIONS



Write Jerrold today for full details on this new Profit Outlook!

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Export Representative: CBS International, New York 22, N.Y.

LEADER AND LARGEST MANUFACTURER OF TV DISTRIBUTION SYSTEM EQUIPMENT

For more data, circle 9-6-1 on coupon, p. 78

Editor's Memo



The legal eagles are at it again, dropping tidbits of advice on how consumers should protect themselves against predatory TV technicians.

In an article in the July 23rd issue of *TV Guide*, Louis J. Lefkowitz, Attorney General of New York State, advised TV set owners to protect themselves against group repair firms by following these six rules:

1. Don't permit your set to be taken from your home for repairs without receiving a written estimate of the cost of repairs.

2. Obtain written assurance that no additional repairs will be made unless you agree and that if you do not wish the "extra" repairs, the set will be returned immediately.

3. Never sign a contract without reading it carefully.

4. Never sign a repair contract which contains blank spaces. Hundreds are victimized in this way every day.

5. Never sign a statement that the work is done when it is not. You may have to pay for an unfinished job.

6. When dealing with an unknown repair service, check with your chamber of commerce, better business bureau, or repairmen's association.

What irritates me most is the first rule, which requires a written estimate before the set is taken from home to the shop. Of course, this can frequently be done. But how about the many, many times when the technician cannot be sure which component is defective? A shop examination is often necessary.

The story is told of three men on a boat which sank—a technician, an editor, and a lawyer. Floating in the water, they saw an island a short distance away, and started to swim toward it. They were intercepted by a school of sharks.

The first one to meet the sharks was the technician. He was gobbled up immediately. So was the editor.

Finally, the lawyer approached the school of sharks, and miraculously they opened a path for him to swim unharmed to shore.

A man on shore who witnessed the event excitedly asked the lawyer how come the sharks devoured the technician and the editor, but let the lawyer pass untouched.

The attorney looked at the man and said, "Professional courtesy, you know."

Al Forman

For more data, circle 9-7-1 on coupon, p. 78
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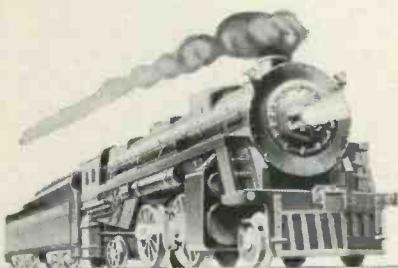


It's a 2-in-1 radio:

- Trim portable in smart "sling" case
- Home table model



new CHANNEL MASTER 8 transistor "super fringe"



**FREE Lionel
Electric Train Set**

Dealers:

Get a big 42-piece LIONEL Electric Train Set (worth \$75.00) with your order for only 10 assorted Channel Master radios at regular price. A fabulous pre-Christmas deal. Ask your Channel Master Distributor for full details about the "Main Line" promotion. Limited time only.

The most sensitive transistor radio ever made!

- R F amplification stage
- 3-gang tuning condenser
- New fringe area circuit
- Extra long built-in ferrite antenna
- Highest signal-to-noise ratio
- Easy, precise vernier tuning
- King-size 3½" speaker
- Plays for almost one year on a set of ordinary flashlight batteries (Based on average daily use)

The astonishing performance of this new radio is another reason why the dealer who features Channel Master gets ahead—and stays ahead—of his competition.

\$59.95
List

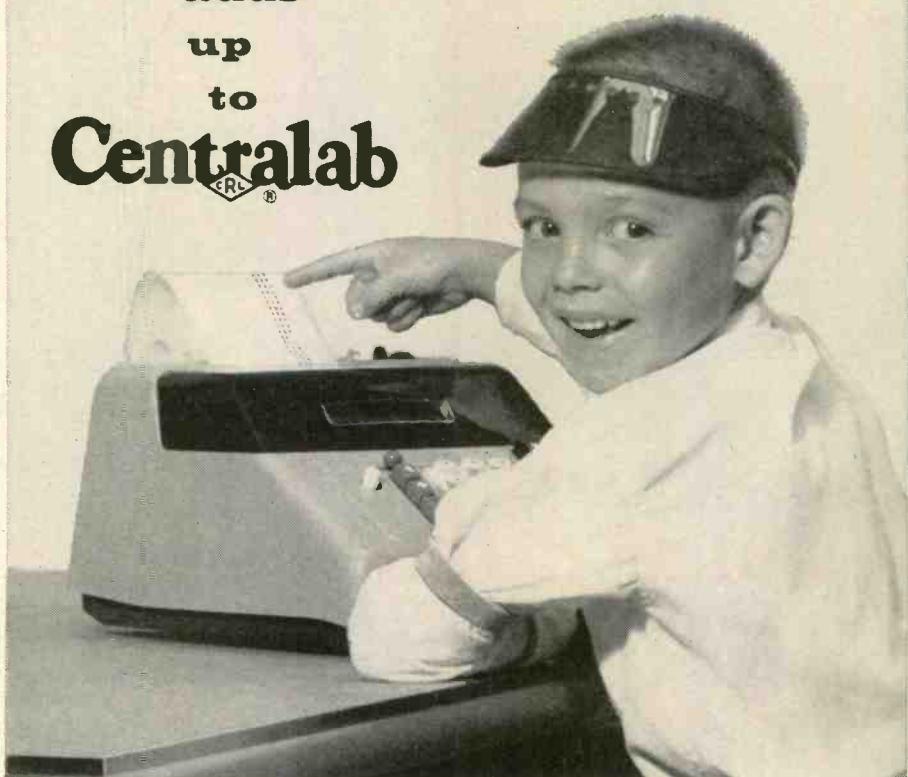
slightly higher in Canada.

CHANNEL MASTER works wonders in sight and sound

For Push-Pull AND Push-Push Switch Type Controls

it
all
adds
up
to

Centralab



Look at the figures—78% of the TV, radio and hi-fi sets now being produced utilize push-pull or push-push controls! Only CENTRALAB gives you a complete line of replacements for them—35 push-pulls, plus the *only* push-push units available! To multiply your choice, these CENTRALAB switch-type controls are divided into 4 types—Adashift, Universal Shaft, Fastatch or dual concentrics, and Twin types for stereo. Whatever kind you need, you can be sure your CENTRALAB distributor has it. For a complete accounting on these push-pull and push-push controls, ask your distributor for Bulletin 42-936 or write us for your free copy.

Centralab

B-6034



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PACKAGED ELECTRONIC CIRCUITS • ENGINEERED CERAMICS

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LETTERS To the Editor

Comments on Boosters

Editor, ELECTRONIC TECHNICIAN:

We would like to add a note of caution to the article, "Boosters for Ailing CRT's," in the July issue, by pointing out that the author's statement to the effect that no damage can result to the picture tube by installation of an incorrect booster, applies only to 6.3v, .600A heaters. Tubes with series string heaters of the controlled warm-up group, particularly the low voltage type, can be quickly destroyed, or acquire heater-cathode shorts, from an incorrect booster. As a further note, we question the practice of putting more than one booster on a TV set. Most booster transformers have a regulation characteristic such that there may result no greater output for two in cascade than with a single unit, since the load on the first booster, presented by the second, greatly exceeds the rated design load. This practice may even be dangerous due to overheating of the booster transformer.

RICHARD GOLDSTEIN,
Chief Engineer

Perma-Power Co.
Chicago, Ill.

. . . The article on CRT boosters is a pip. For this questionable cure, a customer pays a service charge, plus the price of the booster, sits down in front of his TV and tries to convince himself that he actually has a better picture. The picture tube *never* has the original brightness or contrast of a new CRT. It all takes me back to the era of reactivating 201A radio tubes which I always felt was for the birds. It's true that occasionally there is some change for the better, but I have found that at best this is temporary. The old picture tube, my friend, is just plain worn out. The customer would do a much wiser thing to put the \$8 or \$10 toward the price of a new tube. There is one glaring truth the world over, whether it be in electronics, shoes, clothing, or food—WE GET JUST EXACTLY WHAT WE PAY FOR.

HERBERT F. TAYLOR
Hazardville, Conn.

. . . Possibly because of space limitations, mention of the fact that in addition to Mr. Jarmolow's words (revamped): "Once the extra heat generated by the increased current through the heater melts away and breaks through this film of ionized gas and the electrons are released and (Continued on page 10)

For more data, circle 9-9-1 on coupon, p. 78 →
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They're so good, we bring them to you on a **Silver Platter** (a real one!)

Good News:

**Channel Master more than DOUBLES
its line of replacement tube types**

How would you best describe Channel Master tubes? Most dealers use the word "dependable". Dependable uniformity, dependable performance, dependable long life.

And now, with the addition of many new tube types, you can make Channel Master your first choice in *over 75% of all service calls!* Find out for yourself why Channel Master Premium Quality tubes have become America's fastest growing line.



FREE! Genuine Wm. Rogers Holloware Service

Luxurious, beautiful Silverplate... made by International Silver Company.

**Well & Tree Platter • 16" Round Tray
Chip 'N Dip Dish • Double Vegetable Dish**

Get the piece of your choice, free, with each purchase of only \$55.00 in Channel Master tubes, plus one Channel Master transistor radio. Tell your distributor how many holloware sets you'd like before Christmas.

(Continued from page 8)

picture detail is restored"—there should have been added—"The CRT booster should be removed—the way is cleared for better electron flow and should hold up very nicely; unless the pic tube has a "slow leakage" wherein the residual gas layer will eventually return to the cathode and bring about the same situation as above. If the CRT booster is not removed in the case of the "clear channel electron emission" the picture will blossom and bloom, the brightness, and contrast controls will have no ef-

fect on controlling the emissions (similarly to what occurs in the mercury rectifier when grid loses control). This is the sign the technician looks for to diagnose the tube condition.

One of two steps can be taken. Advise the customer when the "all clear" condition exists that his tube is leaky, charge them for a rejuvenation job, and advise that the pic tube will have to be replaced eventually as this is a continuing condition with possibility of becoming worse. Or sell a booster if they think they're "do-it-yourselfers" so that they may rejuvenate the tube (burn off the ionized residual gas

by installing the booster temporarily and turning the set on until the pic tube blossoms and blooms). This process takes but a few minutes. (Most techs would frown on this practice, but the call-backs would be no doubt hurting his financial condition, his built-up prestige, with the customer and in general become a headache.) Therefore, the solution could possibly consist of the installation of a built-in on/off switch within the booster—or the tech could install a DPDT switch himself on the perforated fiber board back panel so that the customer could cut in or out the booster whenever he feels the need for it . . . thus the switching keeps the customer's hands off the inside of the set (possibly saving his life) and give the "do-it-yourselfer" a feeling of truly "controlling" the whole situation.

NORM G. GIGNAC

'Lectric-Onics Workshop
Brooklyn, N. Y.

• Author Jarmolow replies: "Mr. Gignac is quite correct in that a booster could be removed in those cases where the only difficulty lies in the film of ionized gas covering the cathode. However, my personal experience has been that in most cases this difficulty arises in combination with other causes for lack of emission and that the booster can be safely left attached. I have made extensive tests on brand new CRT's with booster attached in order to plot the results of various voltages on the filaments. In no case have I noticed any lack of control of brightness or contrast. It is gratifying that a person of such evident technical competence as Mr. Gignac took the trouble to comment on our work."—Ed.

NOW!
one Britener
for ALL
series string
heaters

New Perma-Power[®] unit
guards against
picture tube
damage
caused by
excessive power
boost



MODEL C412 VU-BRITE
110° Button Base—Series
ALL Filament Voltages
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MODEL C311 UNIVERSAL
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\$2.98 net

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Perma-Power Distributor

®
Perma-Power COMPANY

3104 NORTH ELSTON AVENUE

• CHICAGO 18, ILLINOIS

For more data, circle 9-10-1 on coupon, p. 78

When you're trying to brighten a 110° button base picture tube, watch those series heaters! Many of the newer sets have controlled warm-up filaments with ratings of 2.34 and 2.68 volts. (Older sets are usually rated at 6.3 volts.)

These new tubes use finer heater wire and closer element spacings—which makes them more efficient, but more fragile. *Too much power boost will "blow" these low voltage filaments!*

On these newer tubes, you can not safely use a Britener made for older sets. But you can use the new Perma-Power Model C412 on these and older style tubes. For the first time, here's one Britener for all 110° button base series string heaters—the only Britener that works properly for 2.34, 2.68, 4.70, 6.3 and 8.4 volt filaments! No switching necessary—no adjustments required.

The Model C412 Vu-Brite is one of four new Perma-Power Briteners, all engineered to fit properly and work properly. Without excessive inventory, Perma-Power—and only Perma-Power—can now assure you of complete coverage—a Britener that's right for every picture tube in general use today.

More on Distributor Gulch

Editor, ELECTRONIC TECHNICIAN:

Regarding your May editorial, "Showdown at Distributor Gulch," and the postscript in July, in my opinion these are of a selfish and short-sighted nature. The only excuse that I can find for these editorials is that you are catering, for your own profit, to a group of people who cannot see beyond their cash registers. The TV and radio servicemen constitute a small part of the electronics industry. To legislate an artificial market and profit for them would be detrimental to all others and would have the effect of reducing the general interest in electronics. As I see it, there are many marginal operators who, through lack of technical or business ability, feel a need to blame some one other than themselves for their poor profit showing. You capitalize on this instead of offering the real help to these people which you are in a position to render. These service people whom you encourage to gripe about the wholesaler do everything they can to avoid paying retail prices for the

(Continued on page 18)

For more data, circle 9-11-1 on coupon, p. 78 →
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"BEST OF ALL CONTACT SPRAYS"

AS REPORTED BY INDEPENDENT PRODUCT-TESTING LABORATORY

	Shield	A	B	C	D	E	F	G	H	I
Lubrication After Rubbing For 90 Sec.	GOOD	Fair	Very Poor	Poor	Good	Poor	Very Poor	Good	Poor	Fair
Cleaning After Rubbing For 90 Sec.	GOOD	Good	Good	Good	Good	Fair	Poor	Good	Fair	Poor
Protection After 30 Sec. Exposure to H ₂ S Gas	GOOD	Fair	Fair	Good	Good	Fair	Very Poor	Good	Very Poor	Good
Protection After 2 Hours Exposure to H ₂ S Gas	BEST	—*	—*	2nd Best	5th Best	—*	—*	3rd Best	—*	4th Best
Flash Characteristics	None at 200°F.	—*	—*	Greatest tendency	Boils at 70°F. Tendency to ignite	—*	—*	Tendency to ignite	—*	Slight tendency to ignite
Attack On Plastic Material	NO	—*	—*	Yes**	Yes**	—*	—*	Yes**	—*	Yes**

*Not tested further following sub-standard performance in 30-second exposure test.

**Presence of solvents and chlorinated hydrocarbons.

Channel Master introduces the first triple-action spray!

Channel Master set out to provide a superior cleaner, lubricant, and protector for electrical contacts. Contact Shield was the result.

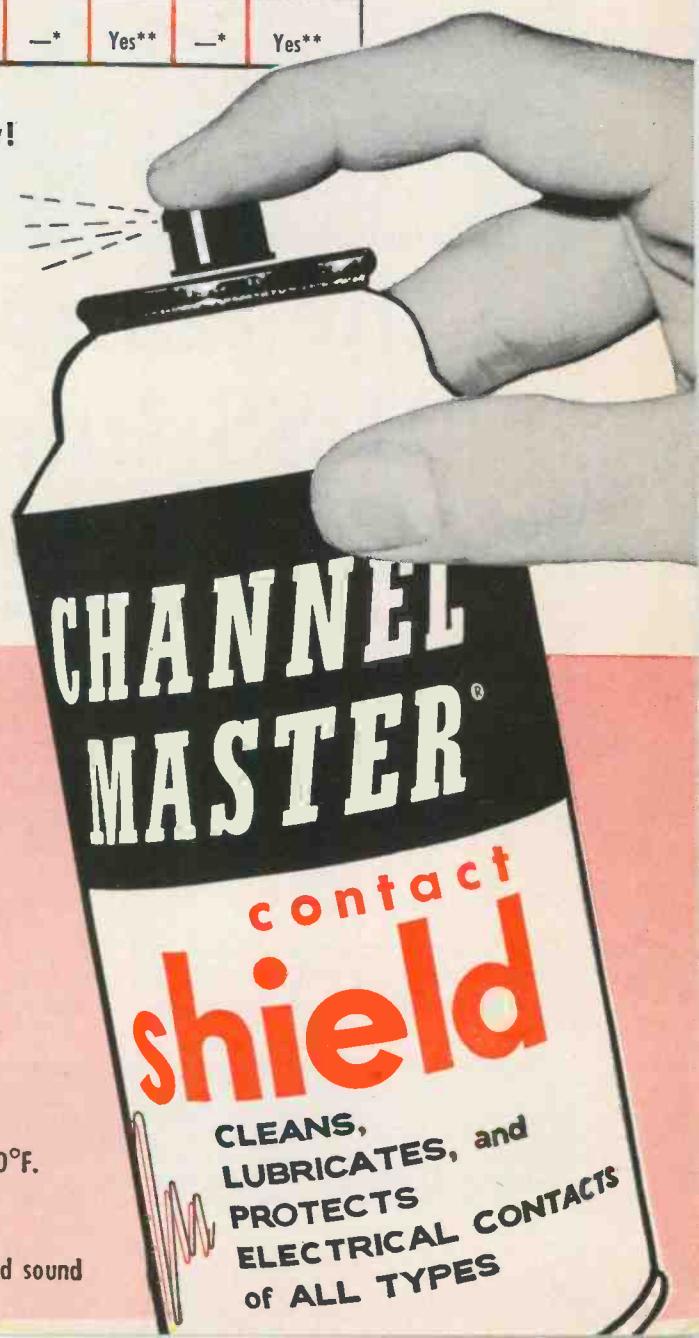
To verify our own estimates of the product's effectiveness, Contact Shield was submitted to a nationally known independent testing laboratory.

This famous testing organization made a thorough study of Contact Shield, as well as of nine similar products on the market. The above findings demonstrate conclusively that this new Channel Master product is the most reliable contact spray you can buy!

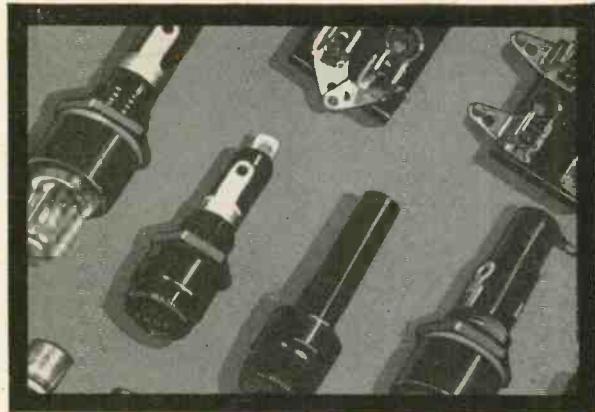
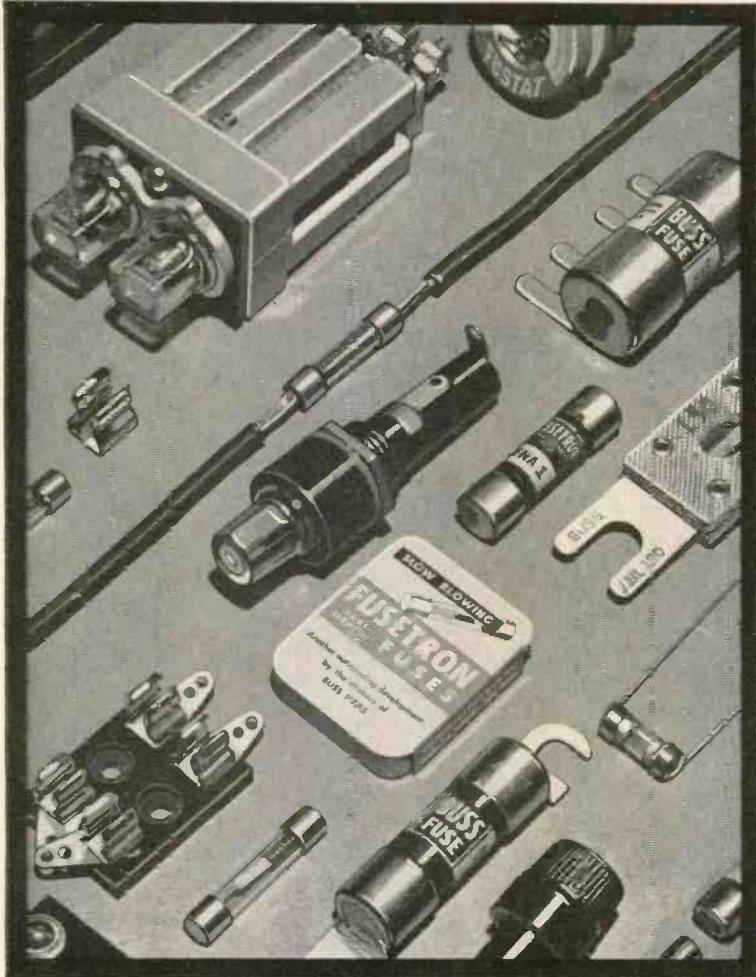


Here's why Contact Shield is best:

- provides the most long-lasting protection
- eliminates background and resistance noises
- is safer. Will not ignite, flash, or cause short circuits... propellant is actually a fire extinguisher
- contains no solvents to attack plastics
- performs at temperatures from -95°F. to +320°F.



CHANNEL MASTER works wonders in sight and sound
Ellenville, New York



In the *complete* BUSS line...

*you can quickly find the right fuse and
fuseholder to meet every demand!*

Dual-element "slow-blowing", single-element "quick-acting" and signal or visual indicating type fuses . . . plus a companion line of fuse clips, blocks and holders . . . are available from one source — BUSS. You'll save time and trouble by turning first to BUSS when you need fuses and fuseholders.

To safeguard against 'kicks' or complaints, every BUSS fuse is tested in a sensitive electronic de-

vice. Any fuse not correctly calibrated, properly constructed and right in all physical dimensions is automatically rejected to assure dependable protection under all service conditions.

Your customers know and prefer BUSS fuses. The universal trade and consumer acceptance of BUSS fuses is based on the millions upon millions of BUSS fuses used in homes, on farms and in industry over the past 46 years. Handling Known

brands, such as BUSS fuses, helps protect your reputation for service, — and the dependability of BUSS fuses safeguards you against costly, unnecessary call-backs.

For more information on BUSS and FUSETRON small dimension fuses and fuseholders . . . Write for bulletin SFB.

BUSSMANN MFG. DIVISION,
McGraw-Edison Co.
University at Jefferson, St. Louis 7, Mo.

BUSS fuses are made to protect - not to blow, needlessly.

BUSS makes a complete line of fuses for home, farm, commercial, electronic, electrical, automotive and industrial use.



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TURN OLD TUBES INTO CASH

See your
PHILCO
Distributor!

YES, turn your old,
burned out tubes into
cash by trading them
in on new Philco tubes
you use every day.

Last spring you
told us it was "one
humdinger of an
offer"—so now
it's back!

By popular
demand, "one
humdinger
of an offer"
is back!

We'll SMASH all old tubes you bring in

LIMITED TIME ONLY ... BUT no limit on the number of old tubes you can trade in

Round up your old tubes, and turn them into cash
on this "bigger than ever" trade-in offer. For years,
Philco has led the industry with **TUBE RACKET-
SMASHING CAMPAIGNS** to help knock out the
tube racketeers. Don't buy another tube until you
SEE YOUR PHILCO DISTRIBUTOR.

For more data, circle 9-13-1 on coupon, p. 78

The growth of the entire Electronic

in famous

PHILCO **Industry** **FIRSTS**

HOW MANY SERVICE TECHNICIANS REMEMBER THE WORLD'S FIRST BATTERY PORTABLE RADIO . . . introduced to the industry by Philco 22 years ago? It opened up a whole new business. Thirty million portables in use today represent a giant service market.

It's just one example of increased profit opportunities for you, resulting from Philco creative engineering through 30 years of electronic progress. Similarly, the proven reliability of Philco parts, tubes and accessories protects your profits, and builds good will.

For all your servicing needs, look to

PHILCO THE FIRST NAME IN ELECTRONICS
...THE LAST WORD IN **QUALITY**



SEE YOUR PHILCO DISTRIBUTOR

Service Business is reflected



1st Portable Battery Radio Introduced by Philco in 1938

The first self-powered Portable Battery Radio—invented by Philco—created a sensation when it was put on sale in 1938. It's shown above—the famous **Model 71T**. It was the same year that Philco invented and introduced—

- **1½ Volt Battery Farm Radio**
- **Wireless Remote Control**

—two more famous Philco Industry Firsts!

PHILCO Accessory Division

WORLD-WIDE DISTRIBUTION

Service Parts • Power-Packed Batteries • Universal Components • Long-Life Tubes • Heavy-Duty Rotors • Star-Bright 20/20 Picture Tubes • Long-Distance Antennas • Appliance Parts • Laundry Parts • Universal Parts and Accessories

PHILCO.
 Famous for Quality the World Over



**TV-RADIO
SERVICE**



tube

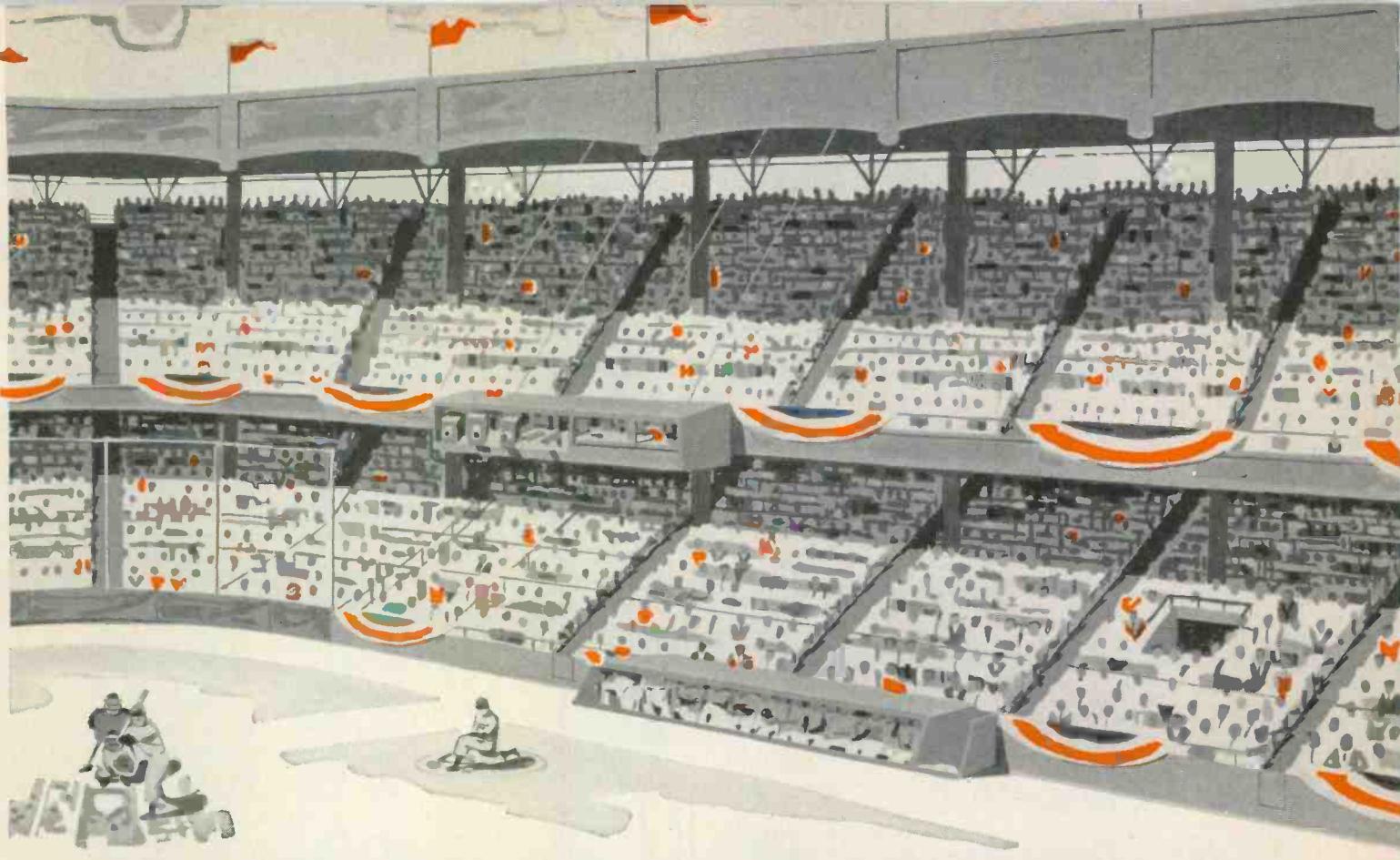
YOU WILL SCORE G-E WORLD SERIES

**Spotlights you for quality TV service right when
demand hits its peak! The year's top business,
profit-builder for technicians!**

All 55 million TV owners will want their sets to be in first-class condition when the umpire calls "Play ball!" The neighborhood technician whom owners know best will be the one to benefit. Don't miss this profit opportunity! General Electric is going all-out to help you—by telling World Series fans whom to call, where to go for fast, reliable TV check-up. *To the technician who installs G-E tubes! He's the best! And just around the corner!*

Long before the first day's pitchers have been named, G-E displays and promotions will be pulling customers into your shop. Once play starts, fans in most large cities will receive frequent radio reminders that you are ready to serve them fast and well. Go World Series with General Electric! Get ready for a B-I-G two weeks of business! See your G-E tube distributor! *Distributor Sales, Electronic Components Div., General Electric Company, Owensboro, Ky.*





IN EVERY INNING WITH PROGRAM!

GO WORLD SERIES
to ring up
service dollars!

Timely, high-impact display items like these will draw more customers to your shop, pay off in stepped-up income. General Electric has ready for you many other World Series displays, advertising helps, and novelties, all new and exciting. See them today at your General Electric tube distributor's!

Don't miss
a play
in the

**WORLD
SERIES**

call us for our **SPECIAL WORLD SERIES TUNE-UP**
use  **tubes** 

Progress Is Our Most Important Product

GENERAL  **ELECTRIC**

For more data, circle 9-17-1 on coupon, p. 78

311-403

SYLVANIA

SEMICONDUCTOR

DEVICES

...for high quality, low prices!

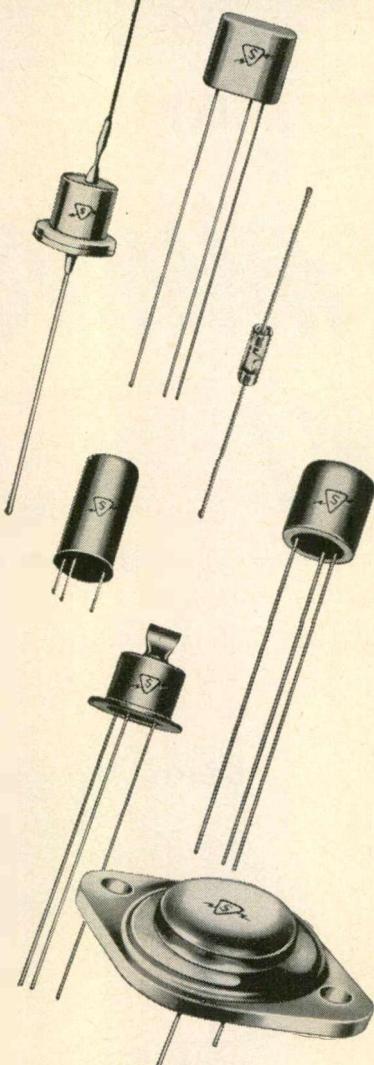
- *Silicon Rectifiers*
- *Power Transistors*
- *Diodes • Transistors*

Follow the leaders...the profit leaders in the electronic servicing field! When you have to replace a silicon rectifier or a power transistor, or any diode or transistor, you will find it in the Sylvania line. That's the way to save time, keep costs down and profits up.

For immediate delivery see
your **SYLVANIA**
SEMICONDUCTOR
DISTRIBUTOR

NEW service-dealer's "SEMICONDUCTOR COMPLEMENT MANUAL" — only 50¢. Now at your Sylvania Distributor's. A time-saving guide to semiconductor replacements. Gives set manufacturers' parts numbers with corresponding transistor-type numbers for cross-reference. Gives U. S. equivalents of foreign transistor types. Get your copy from your local Sylvania Distributor, or from Sylvania, P.O. Box 37, Buffalo 9, N.Y.

Check your stock and fill in with quality-assured Sylvania semiconductors. Sylvania Semiconductor Division, Woburn, Mass.



SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS** 

(Continued from page 10)

goods and services they consume. For example, in general they will do auto tune up work, paint their own shops and homes, and make repairs on their plumbing.

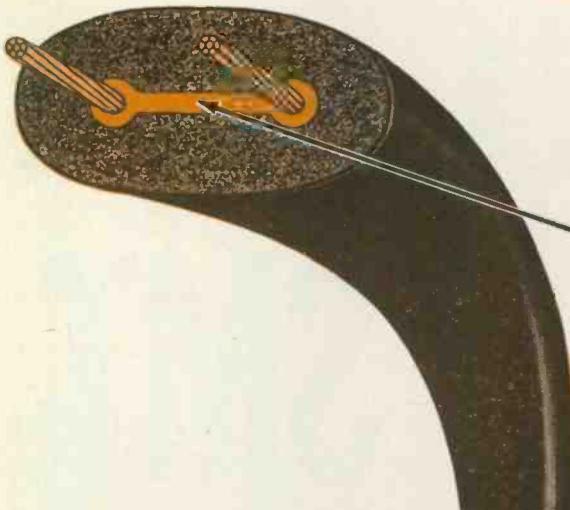
FRANK T. UPHAM
Orinda, Calif.

. . . I agree that it would be a wonderful thing if we could stop distributors from selling to anyone who walks in. I have often wondered how it could be done and your article gives me an idea. The only way it could be done is for the service technicians to organize and put it on the line to the distributors and let them know that unless they cease such sales, we will not patronize them. I think you will find it worse in the east where we have so many distributors. I was in the TV business in Colorado Springs for six years and there we only had two distributors. Never did a salesman call on the shop. If you called in, they would bring your order out. If you did not have a retail license in electronics, you did not buy anything wholesale because the distributors knew that their bread and butter came from us service dealers. The only exceptions were the hams and civil defense workers. The distributors and service organizations would give them 20% off list. So I just took it for granted. I did not realize how much that helped the service shops until I came back to N. C. this year and set up a service shop. Here I never have to leave the place of business to get an order. I have about a dozen distributors calling on me every week and every one of them, if I get out my invoices and show them, will beat the other one's price. Every one of them will sell to anyone that walks into their place. Some of them say they will only sell to the ones that have licenses, but they fail to state what kind of license. I am personally going to take your article and work on the service shops in this area. I believe I can get some results because I have been a member of the IBEW for 14 years and I know the importance of organizing. Please renew my subscription and keep up the good work.

TED MORTON
Granite Quarry Electronics
Granite Quarry, N. C.

. . . Our principal parts supplier is Lampley Radio Co. of Benton, Ill. We have been dealing with this firm for some ten years and have never known them to sell anything at wholesale price to anyone not a recognized member of the trade. They will, however, occasionally sell merchandise at retail to a customer and rebate the retail markup to the service dealer with whom the customer would normally do business! We have two other suppliers whose operations, while not particularly objectionable, are not

(Continued on page 20)



PERMOHM* means constant impedance . . . because its conductors are protected by encapsulation in cellular polyethylene.

for TV pictures that
stay strong, clear..

NEW Belden PERMOHM* lead-in wire

In spite of extremes of salt spray . . industrial contamination . . rain . . snow, PERMOHM lead-in wire delivers a stronger, clearer signal.

PERMOHM improves fringe area, UHF, and color TV reception, and eliminates the "salting out" problem in many coastal areas.

PERMOHM is easy to install . . no end sealing necessary.
300 Ohm UHF-VHF. Available in packaged lengths of 50', 75' and 100' with special merchandiser .. also 500' coils, 1000' spools.

ask your Belden Jobber

one wire source for everything electronic and electrical

Belden
WIREMAKER FOR INDUSTRY
SINCE 1902
CHICAGO

Power Supply Cords, Cord Sets and Portable Cordage •
Electrical Household Cords • Magnet Wire • Lead Wire
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BELDEN 3235 PERMOHM PLATE NO. 2782251

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Patent No. 2782251

8-1-9

NOW!
In stock at your distributor

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SUB-MINIATURES

ILLINOIS
CONDENSER COMPANY
1616 North Throop
Chicago 22, Illinois
Phone EV 4-1300

For more data, circle 9-20-1 on coupon, p. 78

(Continued from page 18)

quite as clean as the one mentioned above. Suppliers who play the game squarely will continue to get the lion's share of our orders and "mail order houses" are definitely out!

ROBERT C. MARSHALL,
Manager
Television Equipment Co.
West Salem, Ill.

• For distributor and service association comments, see the article, "Industry Dilemma—Distributor Retail Sales," in this issue.—Ed.

Now Hear This

Editor, ELECTRONIC TECHNICIAN:

We have sent an open letter to Louis J. Lefkowitz, Atty. General of the State of N. Y. In part our letter states: We as an organization read your article in "TV Guide" July 23-29, 1960, with considerable interest. Are you a technician? Are you qualified to be an expert in the TV field? First, about the Radarex-Tenna. TV repairmen did not manufacture this gadget and the manufacturer who did, should have tried same and known what he was foisting on the public. Why include this in your indictment of the TV repairmen? As for the repairman removing manufacturer's markings from inferior tubes and substituting the trademarks and labels of leading brand-name manufacturers, would you please tell us where we could get such labels and markings? A leading brand-name tube has its markings stamped on the plastic part of the picture tube. How do we fake that? You say, don't permit your set to be taken from your home for repairs without receiving a written estimate of the cost of repairs. We must have special training to become a good technician. If we could tell by looking at the set without using our equipment, we surely would not spend thousands of dollars to buy something we did not need.

We feel that the TV serviceman has a very tough row to hoe, and instead of fostering more distrust and ill will, why don't you tell the public that the TV men are doing a job to the best of their ability. We all make mistakes or err in judgment at times, but so does everyone else.

CLARENCE S. ECK,
President
Lehigh Valley Electronics
Allentown, Pa.

• See Editor's Memo in this issue.—Ed.

AFC Troublemaker

Editor, ELECTRONIC TECHNICIAN:

In regard to Ed Tromhauser's July Tough Dog on "AFC Resistors Kill High Voltage," the two 150K

(Continued on page 22)

BANISH CORROSION

with

South River

ANTENNA MOUNTS

Made with an
**EVERLASTING RUST-PROOF,
HOT-DIP GALVANIZED finish.**

Tired of "cheap" shoddy substitutes?
Try this superior Mount

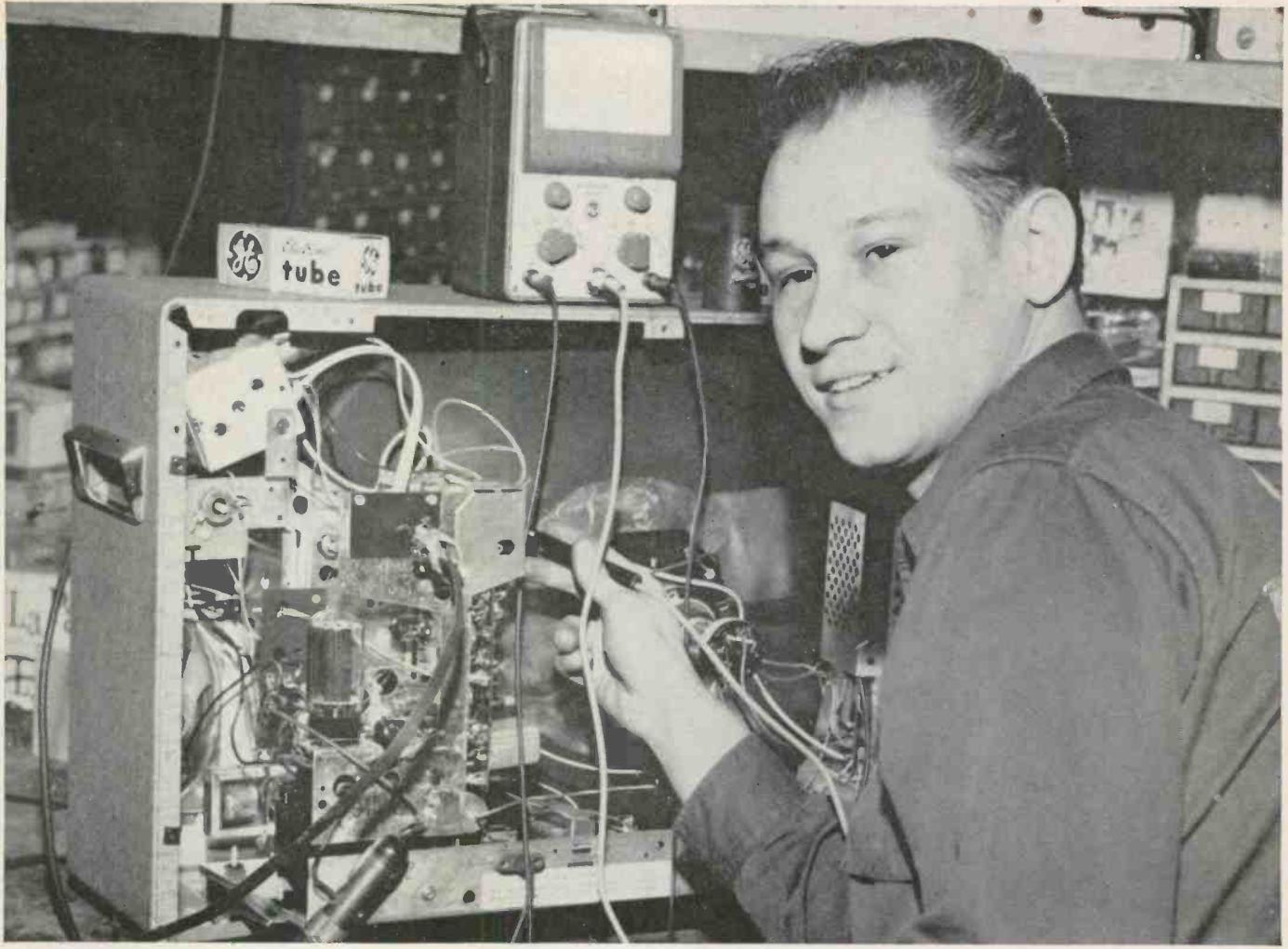
**COMBINATION STEEL ADJUSTABLE
WALL BRACKET—Model ST3-18A**

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.

the wise Installer insists upon **ANTENNA MOUNTS**
Made by
METAL PRODUCTS CO., INC., South River, N. J.
Pioneer and Outstanding Producer of the Finest Antenna Mountings

EXPORT: JOSEPH PLASENCIA, INC., N. Y. 13, N. Y.

For more data, circle 9-20-2 on coupon, p. 78



"The 'Designer' is the

LEAST TROUBLESONE SET

we have ever serviced,"

**says Bob Waughman of Bob's Television,
9518 Madison Street, Cleveland, Ohio.**

"Speaking of the General Electric 'Designer,'" says Bob Waughman of Bob's Television in Cleveland, Ohio, "there probably isn't an easier set on the market today to service."

"We can do 90% of shop work without removing the set from the cabinet, and we find that, because General Electric licked the heat dissipation problem, 'Designers' last longer and suffer less breakdown.

"We have very few service calls on 'Designers'. Those that we do have are easily corrected. This gives us lots of time to get in more calls per day and,

of course, it helps us to make more money, too."

"Designer" Tubes are directly replaceable, fuses accessible, and you easily get at the key check points. Another thing: the painted schematic on the boards helps you find your way around quickly. Again, more calls per day—and more money.

Precision Etched Circuitry is used in all "Designer" sets and is reliable and uniform so that when you have serviced one you will never have to puzzle over the next one.

"Designer" TV—called the easiest-to-service set in television! General Electric Company, Television Receiver Department, Syracuse 8, New York.

Progress Is Our Most Important Product

GENERAL  **ELECTRIC**



MORE PICTURE POWER

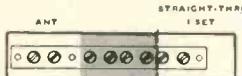
new
BLONDER-TONGUE
B-24
POW-R
BOOSTER



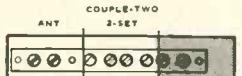
\$24⁹⁵
list

*it's a powerful booster
...or an amplified coupler!*

**provides sharp, clear TV pictures on
1, 2 or more TV sets with only 1 antenna**



'straight-thru' circuit provides up to 10 db gain as a powerful one-set booster



'couple-two' circuit provides up to 5 db gain (per set) as an amplified two-set coupler



'straight-thru' circuit and B-T 4-set coupler provide no-loss 4-set distribution system

Employs new frame-grid tube 6DJ8 new circuitry to achieve highest signal gain and "lower-than-cascode" noise factor. Provides full broadband amplification covering low and high VHF channels. May also be used as FM-TV coupler. Features "NO-STRIP" 300 ohm terminals for positive, electrical contact in seconds. Has "on/off" switch.

Improve TV reception today on 1, 2 or more TV sets with a single antenna.



Available at parts distributors. For details write: ET-9.

BLONDER-TONGUE LABORATORIES, INC.

9 Alling Street • Newark 2, N. J.

In Canada: Telequipment Mfg. Co., Ltd., London, Ont. Export: Morham Export Corp., N. Y. 13, N. Y.
hi-fi components • UHF converters • master TV systems • industrial TV cameras • FM-AM radios

For more data, circle 9-22-1 on coupon, p. 78

(Continued from page 20)

resistors in the AFC circuit of all the Motorolas made over a three or four year period were culprits. Included is the feedback capacitor. As a matter of fact, you had an article on this subject in one of your issues a year or so ago. Whenever I have a case of no raster or brightness, and I find the oscillator dead or way off frequency, the feedback AFC is one of my first suspects. By breaking the loop, you can quickly isolate the faulty stage. A lot of sets with selenium diodes for AFC can cause loss of raster only when a station is synced in if one of the diodes is defective. These are "first" suspects also. I have picked up many a shortcut from your magazine. Your articles on AGC problems have proven very helpful.

JOSEPH S. DORSCH
Pittsburgh, Pa.

Confidence With Transistors

Editor, ELECTRONIC TECHNICIAN:

I never fixed a transistor portable and I was afraid to tackle one. I remembered reading about one in your June 1960 issue, so following your instruction on how to repair them, I started. In no time I had one fixed, and now I have added this to my radio and TV business. Thank you.

THEODORE PETROSKI
Bethel, Conn.

Contest Winner

Editor, ELECTRONIC TECHNICIAN:

As a winner of the Tough Dog Contest, I will say that entering the contest was easy compared to deciding which books I want most of all the excellent ones to choose from. Be assured you could not have picked a more appreciative winner. As owner and operator of a small one-man shop in a small community, the money spent on all service literature is necessarily small. Circuit data for instance. We would like more expensive services, but thanks to your magazine and Circuit Digests, we are all right. You're the best thing to happen for servicemen since the vacuum tube.

F. C. HOFFMAN
Kewaunee, Wis.

Strobe Test Tape

Editor, ELECTRONIC TECHNICIAN:

In regard to your magazine of May 1960, on page 62 is shown the Techni-Parts Strobe Tape. We would like to know whom to contact to purchase these tapes.

WM. KENDRICK,
Service Manager
Montgomery Ward
Bakersfield, Calif.

• The address of Techni-Parts Co. is P.O. Box 336, Hempstead, L.I., New York.—Ed.

(Continued on page 24)



NOW

Make Money on Printed Circuit Repairs

... it's easier than you think with the new



DE-SOLDERING TIPLETS®

You pocket more profit on printed circuit repair jobs with these exclusive interchangeable Ungar De-Soldering Triplets. Specially shaped to remove 9 out of 10 components! No more improvising with make-shift tools!

Repairs are easier, safer and 70% faster because each triplet is designed to apply just the right amount of heat simultaneously to all soldered contacts without heat radiation damage. No more de-lamination problems! No more ruined printed boards!

Triplets shown at left are available individually...
List Price 75¢ each, or...



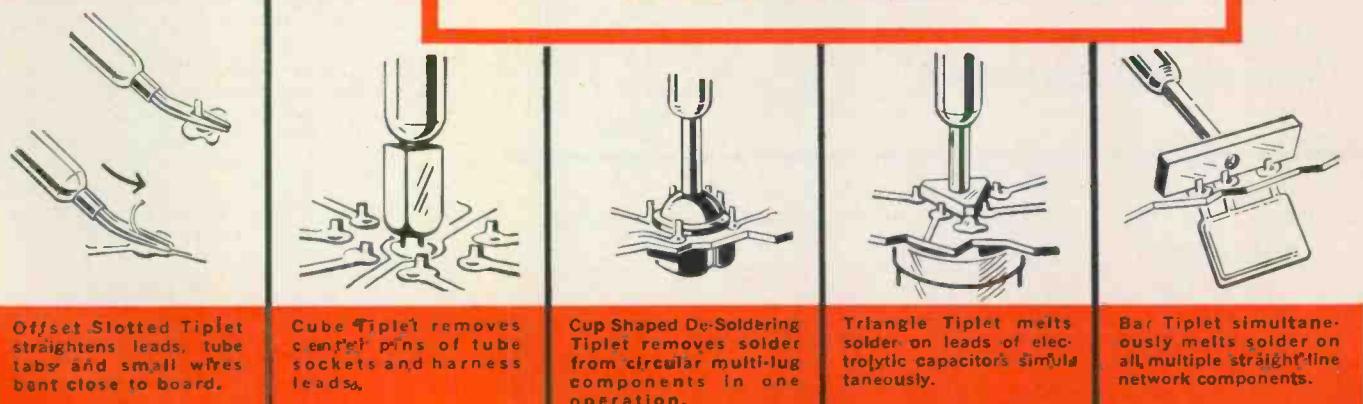
Special Introductory Kit

Lifetime Metal Case contains #776 Handle, Super Hi-Heat Unit, #857 Slotted Triplet, 3 cup Triplets and #858 Bar Triplet..... List \$7.95

Order from your
Electronic Parts Distributor now!

Ungar Electric Tools, Inc.

4101 Redwood Ave., Los Angeles 66, Calif.



Offset Slotted Triplet straightens leads, tube tabs and small wires bent close to board.

Cube Triplet removes center pins of tube sockets and harness leads.

Cup Shaped De-Soldering Triplet removes solder from circular multi-lug components in one operation.

Triangle Triplet melts solder on leads of electrolytic capacitors simultaneously.

Bar Triplet simultaneously melts solder on all multiple straight-line network components.

For more data, circle 9-23-1 on coupon, p. 78

**A NEW
Mercury
SERVICE AID**

The versatile **MULTI-PROBE**
DOES THE WORK OF 4 PROBES!

DC Probe

AC/Ohms Probe



RF Probe

Lo-Cap Probe

Model MP-1 \$975

Dealer Net

Can be used with your
VTVM,
SCOPE or
SIGNAL
TRACER

Save the
cost of
4 separate
probes!

Available only through parts distributors

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West Coast Office: 4306 W. Victory Blvd., Burbank, Calif.

For more data, circle 9-24-1 on coupon, p. 78

YOUR CUSTOMERS SPEND OVER \$2200 A YEAR ON AUTOMOBILE AERIALS

The figures show that the customer served by the average radio-television shop spent over \$2200.00 per year on automobile aerials. This is business that is getting away from most service shops. The same man who saw you a few days ago when you repaired his television set, is an automobile aerial customer. He is not a potential customer but is an actual customer. This market requires no additional selling on your part. **ARE YOU GETTING HIS AUTOMOBILE AERIAL BUSINESS?**

Why not? It's so easy. Installing an automobile aerial is one of the simplest things imaginable. Ward Products makes all their aerials so that they mount completely from the top through one hole. They need merely be plugged into the input jack of the auto radio.

THERE IS ALMOST NEVER A CALL BACK ON AN AERIAL INSTALLATION. Ward Products furnishes with each aerial an exclusive, life-time guarantee. No other manufacturer offers this warranty.*

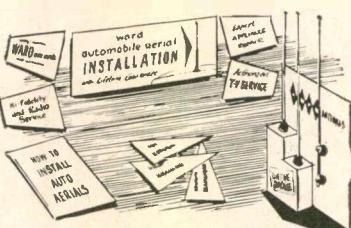
Now how do you get into the automobile aerial business? Simple; Ward Products will furnish you at no charge a complete merchandising kit including window banners, counter display, and folder "How to Install Auto Aerials" complete with illustrated photographs to show you the easiest and fastest way to install aerials.

Can you afford any longer to ignore the automatic profits your existing customers are giving to other dealers?

LIFETIME GUARANTEE

*Guaranteed in normal use against defective manufacturing, shorted leads, peeling of chrome, loose elements, etc.

For complete information
and a look at our
Merchandising Package —
Please fill in the coupon below



MAIL TO:

WARD PRODUCTS
CORPORATION

AMSTERDAM, NEW YORK

STORE NAME.....

NAME.....

STREET.....

CITY..... ZONE..... STATE.....

For more data, circle 9-24-2 on coupon, p. 78

(Continued from page 22)

More On Sears

Editor, ELECTRONIC TECHNICIAN:

Regarding your March Editor's Memo on Sears' (captive?) service, I have been in the Sears Service Dept. for 23 years. We have always cooperated with any independent serviceman needing any information or help we could give him. As for schematics, a folder containing an instruction book for the customer and a complete schematic including alignment info and parts list is shipped with each unit—TV or hi-fi. As for captive service, our service contracts—\$35.00 for first year and \$50.00 per year thereafter (on 21"; \$60.00 for 24") including unlimited service, parts, and tubes can't be beat! There are customers that have left us for the independent man but most of them come back and when they show me the bills they have been charged—wow! And the trouble had not been cured. I could go on but enough of that. I like your magazine and the schematics—not as complete as Sears but they help. Hi!

L. G. FRANKE

Milwaukee, Wisc.

Definition of "Electronic"

Editor, ELECTRONIC TECHNICIAN:

What makes a product "electronic"? We seek your authoritative assistance in helping us to clarify the use of this word in advertising, because it has been contended that it is being misapplied. Such dictionaries and encyclopedias that we have had referred to us seem in agreement that "electronic" applies to a system or device in which conduction by electrons takes place through a vacuum, gas, or semiconductor. Any amplification or interpretation of definitions you can provide us will be greatly appreciated.

K. B. WILLSON,
President

National Better Business Bureau
New York, N. Y.

• Mr. Willson is correct that the word electronic "applies to a system or device in which conduction by electrons takes place through a vacuum, gas, or semiconductor." Common usage does limit this definition to some extent. For example, a common fluorescent light utilizes ion and electron conduction in a gas, but it is not considered electronic per se. One other point is worth noting. Passive components, such as transformers, are considered electronic when used as part of an electronic system. However, they are not properly called electronic when used independent of the electronic system.—Ed.

(Continued on page 30)

Mercury offers you **MORE**
for your TEST EQUIPMENT DOLLAR!

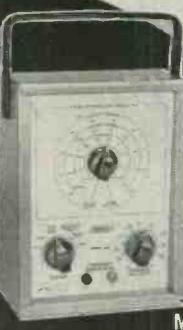
NEW

Model 700
TRANSISTOR TESTER
Dealer Net \$2425



NEW

Model 500
COMPONENT SUBSTITUTOR
Dealer Net \$2995



Model 400
VOM-CAPACITY TESTER
Dealer Net \$3995



Model 600 **IN-CIRCUIT
RECTIFIER TESTER**
Dealer Net \$2750



Model 700—Tests all transistors and diodes quickly and accurately • Checks all transistors (RF, IF, Audio, Power Output, Industrial) for leakage and gain • Checks all diodes for forward-reverse current ratio • No time consuming reference to data charts necessary • Positively cannot become obsolete as the Model 700 will accommodate new transistors as they are introduced • Sturdy hammertone finish steel case • Size, 5 $\frac{1}{2}$ x 7 $\frac{3}{4}$ x 3 $\frac{1}{2}$ ".

Model 500—Actually substitutes for 44 different values of resistors, condensers, electrolytics, power rectifiers, crystal diodes, power resistors and bias voltages. Substitutes: 20 values of resistors from 33 ohms to 10 megohms • 10 values of condensers .0001 mfd. to 5 mfd. • 10 values of electrolytics from 4 mfd. to 330 mfd. • Power rectifiers up to 500 ma. • Crystal diodes • Power resistance, continuously variable up to 5000 ohms • Voltages, continuously variable up to 15 volts either polarity • Sturdy hammertone finish steel case • Size, 5 $\frac{1}{2}$ x 7 $\frac{3}{4}$ x 3 $\frac{1}{2}$ ".

Model 400—A 20,000 ohms per volt VOM and an accurate capacity meter. DC VOLTAGE RANGES: 0 to 15/75/150/300/750/1500/3500 V. • AC VOLTAGE RANGES: 0 to 15/75/150/300/750/1500 V. • RESISTANCE RANGES: 0 to 1,000/100,000 ohms/0 to 10 megohms • RANGES: 0 to 75 microamps/.75 ma./75 ma./15 amps. • CAPACITY RANGE: .001 mfd. to 80 mfd. • Sturdy hammertone finish steel case • Size, 5 $\frac{1}{2}$ x 7 $\frac{3}{4}$ x 3 $\frac{1}{2}$ ".

Model 600—Checks all power rectifiers *in-circuit* (whether SELENIUM, GERMANIUM, SILICON, COPPER OXIDE, etc.) rated from 10 ma. to 500 ma. • Checks with 100% effectiveness for quality, fading, shorts, opens, arcing, life expectancy • Simple to use: just clip test leads across rectifier under test *without disconnecting rectifier from circuit*. Press test switch and get an instant indication on the 3-color metal scales • Checks all power rectifiers *out-of-circuit* with equal effectiveness • Sturdy hammertone finish steel case • Size, 5 $\frac{1}{2}$ x 7 $\frac{3}{4}$ x 3 $\frac{1}{2}$ ".

New Mercury design projects meter forward . . . metal handle swings back to serve as rest so that instrument can be used in tilted position

Model 300 **COMBINATION TESTER**



Model 101 **TUBE TESTER**



Model 800 **CRT TESTER-REACTIVATOR**



✓ A multiple-socket tube tester ✓ A CRT tester-reactivator ✓ A 20,000 ohms per volt VOM and capacity tester ALL COMBINED IN ONE COMPACT UNIT!

• AS A TUBE TESTER . . . will check emission, inter-element leakage and gas content of over 700 tube types • AS A CRT TESTER-REACTIVATOR . . . will test, repair and reactivate all black and white and all color picture tubes • AS A VOM AND CAPACITY TESTER . . . sensitivity is 20,000 ohms per volt/DC and 5000 ohms per volt/AC . . . Capacity range: .001 mfd. to 80 mfd. • Unbreakable mirror for TV adjustments inside detachable cover • Handsome wood carrying case • Size, 17 $\frac{1}{2}$ x 13 $\frac{1}{2}$ x 4 $\frac{1}{2}$ ".

Dealer Net \$9975

NOW also available in KIT form!

A versatile economy priced tube tester

• Checks quality (emission, shorts and gas) of over 700 tube types, including the newest series-string TV tubes, OZ4s, gas regulators, hi-fi and foreign tubes • Checks each section of multi-purpose tubes • Easy-to-read 3 color meter scales • 17 long lasting phosphor bronze tube sockets • Positively cannot become obsolete. New tube listing furnished periodically to all registered owners • Sturdy-gray hammer-tone steel case • Size: 9x 8 $\frac{1}{2}$ x 2 $\frac{3}{4}$ ".

KIT — Dealer Net \$3195 WIRED — Dealer Net \$3995

✓ TESTS ✓ REPAIRS ✓ REACTIVATES all BLACK and WHITE and all COLOR picture tubes

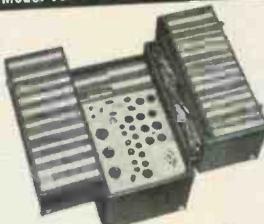
• TESTS . . . emission, inter-element leakage and life expectancy • REPAIRS . . . shorts and open elements • REACTIVATES . . . weak tubes with a controlled high voltage pulse (reactivation is seen and controlled on the meter as it takes place) • Tests the red, green and blue sections of color tubes separately • Also provides the newer 2.35 and 8.4 filament voltages • Unbreakable mirror for TV adjustments inside detachable cover • Handsome wood carrying case • Size 11 x 9 $\frac{1}{2}$ x 4 $\frac{1}{2}$ ".

Dealer Net \$4995

Model 102-P **TUBE TESTER**



Model 102-C **CADDY TUBE TESTER**



SELF-SERVICE TUBE TESTERS

Cannot become obsolete as new tube types are introduced!

Model 201-F (floor model)

Dealer Net \$15850

Model 201-C (counter model)

Dealer Net \$10950



SOLD ONLY THROUGH PARTS DISTRIBUTORS

FREE The instruction manual for any instrument shown is available upon request . . . use coupon below:

MERCURY ELECTRONICS CORP.

77 Searing Avenue, Mineola, N. Y.

T-9

Please send me instruction manuals of the test instruments I have checked.

Model 700 Model 101
 Model 500 Model 800
 Model 400 Model 102-P
 Model 600 Model 102-C
 Model 300 Model 201

Name

Address

City State

For more data, circle 9-25-1 on coupon, p. 78

TV·Radio·Hi-Fi shop owner ELMER MAUTER says:

"MALLORY quality replacements keep customers happy"

"Courtesy in handling customer service has been one factor responsible for our growth . . . that's why I chose the name Courtesy for my business. We have always used only quality replacement products . . . that's why I use Mallory components. I know that I can depend on Mallory quality. The Mallory label on replacement parts reassures my customers; it's a name they know they can rely on for top performance."

When electrolytics need replacement, Elmer Mauter, like thousands of other service technicians, knows that Mallory FP's will stand up at the high temperatures common in the small cabinets now being built for TV and hi-fi. Even when they're mounted next to a hot rectifier or

output tube, where ordinary replacement filters would wilt, the FP gives extra service. It's the original 85°C capacitor. Its combination of new shock-resistant construction with leakproof seal and etched cathodes, available without premium price only in the Mallory FP, assures long life and hum-free performance.

Whatever your component needs, Mallory supplies the widest line of quality products at sensible prices. See your Mallory distributor for a full selection of the parts you need.

Put an end to call-backs with these quality Mallory products . . .



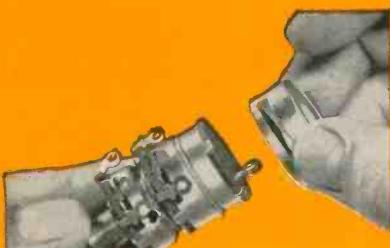
GEMS

5 rugged, moistureproof, Mallory "Gem" tubular capacitors in a handy dispenser that keeps your stock fresh and clean—easy to find—prevents kinks in lead wires. Uniqued for service in buffer, by-pass or coupling applications.

RMC DISCAPS®

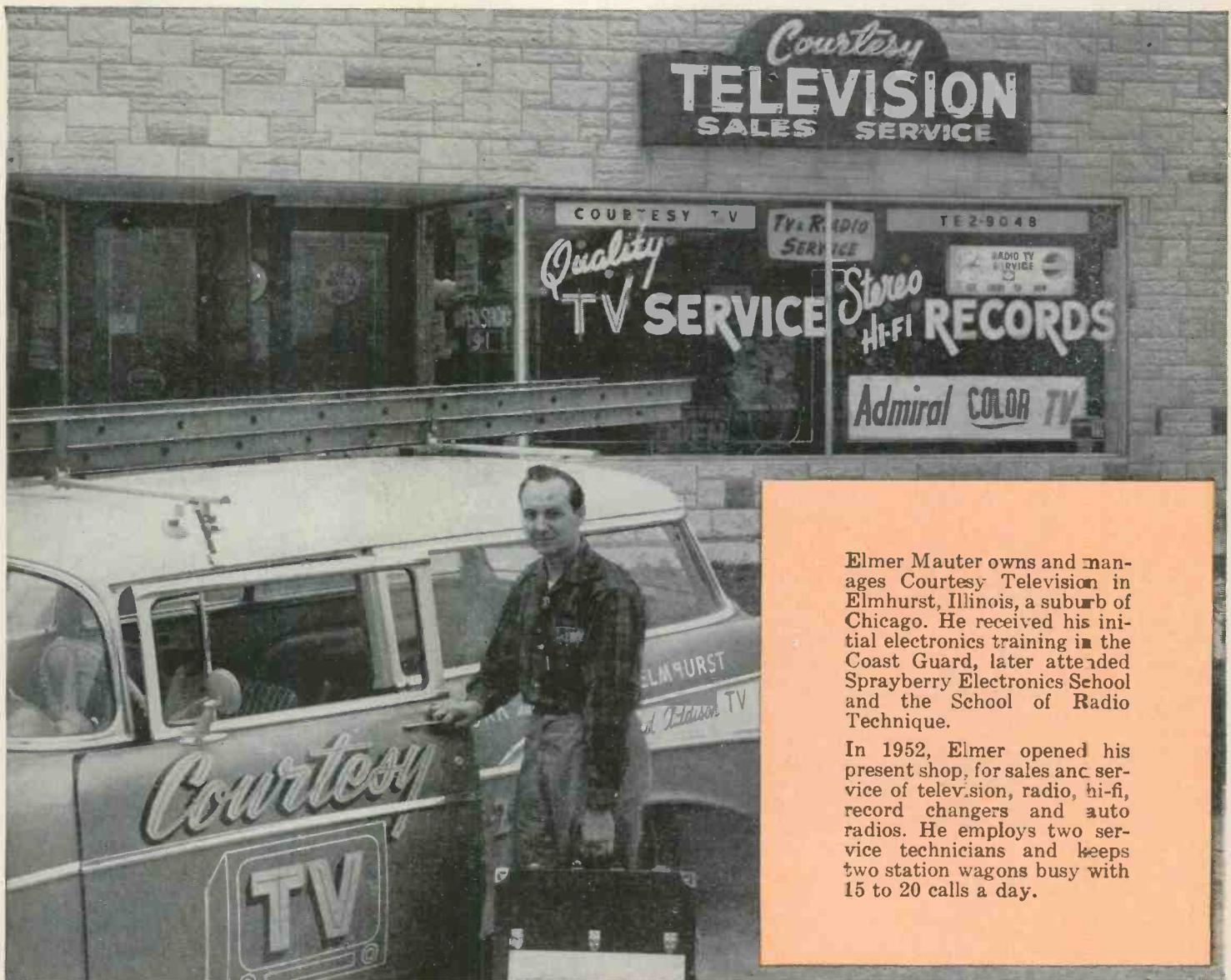
Made by the world's largest producer of ceramic disc capacitors . . . long the original equipment standard, they are available for replacement in a handy 3" x 5" file card package . . . easy to stock, simple to use.

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STA-LOC® CONTROLS

No more waiting for out-of-stock controls. Your distributor can custom build, in just 30 seconds, any of over 38,000 combinations. You can replace the line switch by itself, without unsoldering control connections.



Elmer Mauter owns and manages Courtesy Television in Elmhurst, Illinois, a suburb of Chicago. He received his initial electronics training in the Coast Guard, later attended Sprayberry Electronics School and the School of Radio Technique.

In 1952, Elmer opened his present shop, for sales and service of television, radio, hi-fi, record changers and auto radios. He employs two service technicians and keeps two station wagons busy with 15 to 20 calls a day.

Distributor Division

P.R. MALLORY & CO. Inc. MALLORY

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



GOLD LABEL® VIBRATORS

Sell the best in auto radio servicing; use Mallory Gold Label Vibrators every time. Exclusive buttonless contact design gives longest life, sure starts. The quietest vibrator ever made.



TC TUBULAR ELECTROLYTICS

Economically priced filter capacitors with a reputation for top performance. Proven in service and backed by years of Mallory experience. Also special TCX type available for -55°C.



MERCURY BATTERIES

Unequalled for long, fade-free life in transistor radios. Chosen as the "power package" in U. S. satellites. Virtually limitless shelf-life. Made by the world's largest manufacturer of mercury batteries.

For more data, circle 9-27-1 on coupon, p. 78

Why are more Service-Dealers Switching to **JFD**

**EXACT
REPLACEMENT
TV ANTENNAS?**



because

50 per cent of all TV sets made in the last 4 years are portables—sending *more* antenna replacement business to service-dealers every day.

because

with the JFD PA500 and PA515 Exact Replacement Kits, dealers are ready and able to service 90% of antenna replacements for portables and tote-ables.

because

as JFD Exact Replacement Specialists, service-dealers can get out of the unprofitable "rabbit-ear" business—earn a *profit* on the antenna *sale* (at full mark-up) *and* on the *installation*.

because

with JFD guides, streamers, and sales helps, service-dealers get the merchandising *know-how* that nets them a bigger slice of the 3,500,000 dollar portable antenna replacement market.

**NOW IS THE TIME TO WRITE JFD OR ASK YOUR JFD DISTRIBUTOR
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Only JFD keeps you up-dated with the 1960 Portable TV Antenna Guide covering every portable TV set made since 1956 (compiled and edited by Howard W. Sams & Co., Inc.)
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JFD

JFD ELECTRONICS CORPORATION BROOKLYN 4, NEW YORK

JFD International, 15 Moore Street, New York, New York • JFD Canada, Ltd., 51 McCormack Street, Toronto, Ont., Canada IN COMMAND OF THE MARKET

Why are more Service-Dealers Switching to **JFD** HI-FI TV ANTENNAS?



The Businessman in the Serviceman's suit knows five million TV antennas are in need of replacement. For his installations he relies on the superior performance and quality of JFD Hi-Fi Colorantennas to guarantee complete customer satisfaction...guard his reputation.

HI-FI HELIX HI-FI BANSHEE HI-FI FIREBALL

JFD
AUTHORIZED DEALER



because

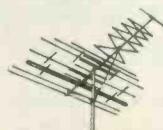
they know *5 million* antennas need replacement—that *JFD* HI-FI TV antennas assure them a *bigger* share of this profitable market.

because

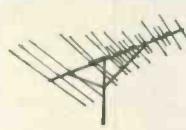
JFD all-out advertising *sells* for them in powerful national mass media—such as Look, TV Guide, Successful Farming, Farm Journal, Progressive Farmer.

HOW MUCH INSTALLATION BUSINESS ARE YOU LOSING BY NOT SWITCHING TO JFD? THE TV ANTENNA LINE AMERICA KNOWS BEST!

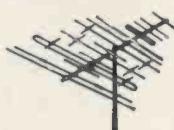
HI-FI HELIX
Silver or Gold Anodized



HI-FI BANSHEE
Silver or Gold Anodized



HI-FI FIREBALL
Silver or Gold Anodized



THE BRAND THAT PUTS YOU

JFD
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how often could you have used...

**an
Xcelite
“Seizer”?**

Handy as an extra hand or helper. Clamps lightly or tightly ... for moments or minutes.

Outreaches, out-holds needle-nose pliers. Hardly a spot too small for it. Approx. 6" long. Dozens of uses: Holds and positions wires for soldering ... retrieves small parts from inaccessible places ... it's a heat sink. Two-position snap-lock won't slip, yet releases with a twist of the fingers. All stainless steel — precision machined and tempered for smooth action and years of service.

2 Models: No. 43H curved nose and No. 42H straight — Ask your distributor to show you Xcelite Seizers today.

XCELITE®

XCELITE, INC. • ORCHARD PARK, N. Y.
Canada: Charles W. Pointon, Ltd., Toronto, Ont.

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30 ← For more data, circle 9-29-1 on coupon, p. 78

(Continued from page 24)

Steamed Up

Editor, ELECTRONIC TECHNICIAN:

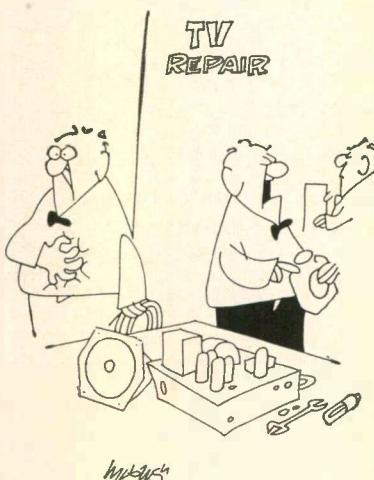
I very seldom get "steamed up," but a couple of letters in your July issue got me and here goes: If that is the train of thinking of TEAM (W. C. Pecht letter, July), I'm surprised anything they do is successful. I disagree that the "new" target of his has become the distributor, because it is easier. Personally, the thorn in my side has always been the distributor who, I believe, is the root of all evil. They helped take the prestige from the electronic technician when they sold consumers at wholesale prices and made us look like crooks instead of businessmen. The letter goes on, "due to mail order catalogs which whet the appetite of the consumer for 'wholesale' buying and (you) think it is preferable to sell them (consumers) in one's own city, where it will add to local volume of sales . . ." Pecht, how the heck is that helping you? and would your customers (if you have any left) wait a week or more to receive a 5U4 from the mail order house?

And while I'm boiling, I'd like to know where John H. Stoll gets his information about "Government contributes to the delinquency of our distribution systems," . . . and "are under pressure to (get) the voters to buy at lowest possible prices . . ."? Did you ever study the figures (of profits) after taxes that manufacturers of automobiles, appliances, drugs, etc. make?

TONY DE FRANCO,
Editor

The Vanguard
Tri State Council
Camden, N. J.

Correspondence from readers is always welcome. Name and address, which must accompany letters selected by the editor for publication, will be withheld on request. Anonymous letters go right into the wastepaper basket.



"Who took the condensers I put in this vitamin bottle?"



Field Engineers

For Univac Missile-Guidance Computers!

Field engineers are now being selected for maintenance assignments on ultra-reliable Univac missile-guidance computers and other military electronic data processing systems.

Openings involve maintenance of the Univac ICBM guidance computer, first of its size to be completely transistorized.

Applicants must have at least 2 years formal education in Electronics with 3 or more years in maintenance or maintenance-instruction. Experience should be associated with complex electronic equipment such as TV, radar, sonar or digital computing systems.

Before assignment, you will receive 2 to 6 months training at full pay in our St. Paul, Minnesota, laboratories. Benefits include company paid life insurance, hospitalization, medical and surgical benefits, relocation expenses and living allowances at field sites.

Openings also for qualified instructors with backgrounds similar to above.

Send complete resume of education and experience to:

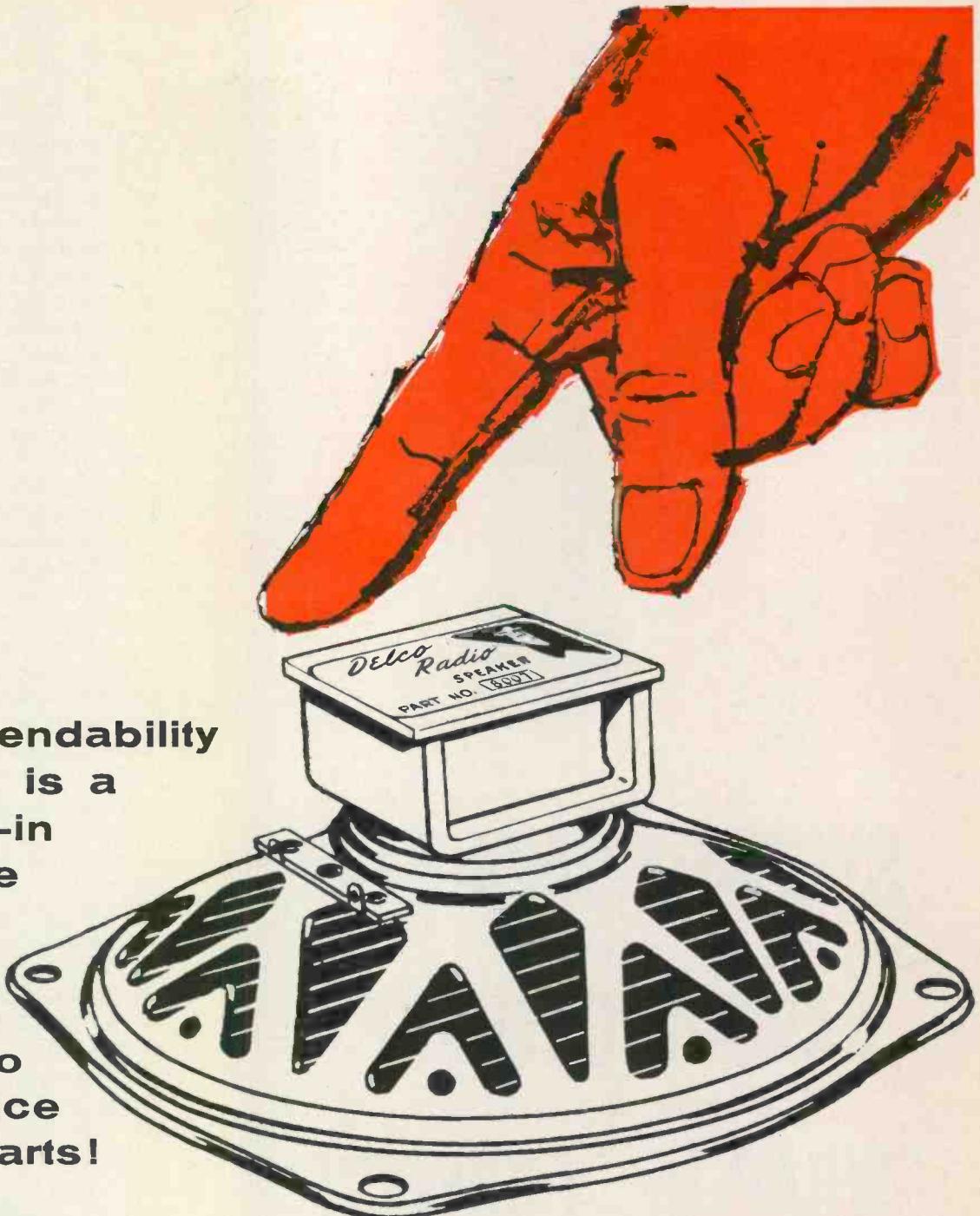
R. K. PATTERSON, Dept. J-9

**Remington Rand
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DIVISION OF SPERRY RAND CORPORATION
2750 W. Seventh St., St. Paul 16, Minn.

For more data, circle 9-30-2 on coupon, p. 78
ELECTRONIC TECHNICIAN • September, 1960

**Dependability
is a
built-in
feature
of
all
Delco
Radio
Service
Parts!**



Take speakers, for instance. Delco electronic speakers are built rugged for long life and resistance to extreme weather conditions. You can rely on them for exceptional power handling and rich distortion-free tone.

Delco's popular 8-inch "Hi-Fi" speaker, No. 8007, provides the most power and tonal range for the money. Designed for replacement use and high fidelity audio systems, it's a good, fast seller with price and quality appeal.

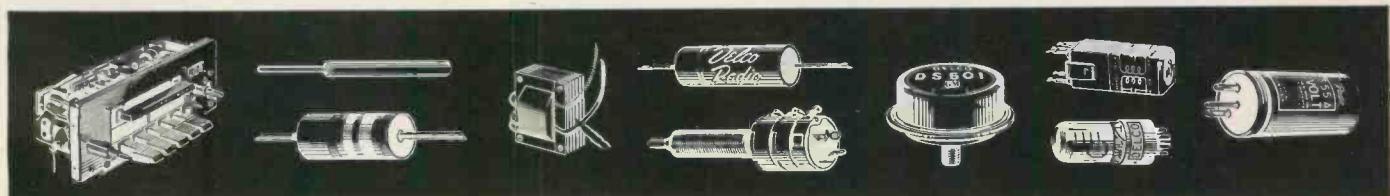
For speakers, transistors, transformers and other fine parts for Delco and other radios, see your Delco Electronic Parts Distributor. He carries the complete line. Other extras you get with Delco are • Wide selection of special application parts • Complete technical training program • Effective warranties • Dealer identification signs.

Stock with Delco Electronic Parts—more dependability and reliability for your customers, more profit for you.

DELCO
RADIO
DEPENDABILITY
RELIABILITY

Division of General Motors • Kokomo, Indiana

Available everywhere through
Electronic Distributors
associated with



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SYLVANIA-6AU4-GTA

WITH

SARONG CATHODE

HELPS YOU

"WRAP-UP" PROFITS!

New life-giving, profit-building features are built into every SYLVANIA-6AU4-GTA TV-damper tube. Consider, for one feature, the SYLVANIA SARONG CATHODE and how it adds dependability to tube life. SARONG provides uniform spacing between cathode and plate—reduces possibility of plate-to-cathode arc-over. SARONG prevents the build-up of "whiskers" inside the cathode sleeve that can develop during other types of coating processes—reduces possibilities of cathode-to-heater arc-over.

Consider, too, the "pigtail" heater in SYLVANIA-6AU4-GTA. Welded securely to the stem-lead, it reduces heater "hot spots" and the possibilities of heater burnout. More... rectangular top and bottom micas with exceptionally wide slots increase the resistance of dc leakage paths, further reduce the possibilities of internal arc-over and breakdown.

There's extra profit assurance, too, with SYLVANIA-6AU4-GTA. Every one of them is tested for shorts, emission and the ability to withstand arc-over at 5000-volts peak inverse on the anode.

So, "wrap up" the profits you make by putting a "damper" on callbacks. When you ask your distributor for 6AU4-GTA's, always specify SYLVANIA.

Electronic Tubes Division, Sylvania Electric Products Inc., 1740 Broadway, New York 19, New York.



SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**



ELECTRONIC TECHNICIAN

Including
SERVICE
Magazine

"STEREO 1961"

This month we offer our third annual roundup on stereophonic sound—STEREO 1961. In addition to articles on technical developments and commercial progress, this special section for the electronic trade includes a manufacturer/product directory listing makes and models of a wide variety of equipment.

Back in 1958 when we developed the first such stereo study in the field, monophonic sound was dominant. Sound-in-depth was in swaddling clothes. During the intervening years things have changed. A wide variety of equipment and recordings have become available. Single chassis designs are common. Stereo now rules, and has become available in everything from a \$49.95 portable

phono to a sky's-the-limit combination of components. One thing that has not changed is that there is plain stereo, and there is fine quality (hi-fi) stereo. Hi-Fi and stereo certainly are not words to be used loosely or interchangeably.

The electronic service dealer has a real stake in stereo. Some sell equipment outright. Some specialize in installation. Many do servicing. With 40 million mono record players ripe for modernization or replacement, technicians face a promising market.

By its very nature, stereo is a technical beast. Electronic specialists should be prepared to answer consumer questions and serve consumer needs. STEREO 1961 will help you do that.

Industry Dilemma

One of the industry's most oppressive problems is distributor sales to consumers at wholesale prices. In our May and July issues, this editorial page explored the situation and expressed frank opposition to the practice.

Our most sincere thanks to the many service dealers and distributors who wrote to us, supporting our stand almost unanimously. Based on these reactions and related observations, we've come to some interesting conclusions.

First, we are appalled at the timidity which guides so many influential industry leaders in dealing with vital, controversial issues. For example, publications serving the electronic service industry should not hesitate to be outspoken about the problems resulting from distributor consumer sales. Yet with the exception of association publications and ourselves, we have not seen one other magazine face this problem squarely.

Second, too many service dealers think justice is all on their side. They couldn't be wronger. When a

technician gives up a wholesale-only distributor for an extra few percent elsewhere, he's cutting his own throat. When he's slow pay, he's killing the golden-egged goose. When he uses up credit at one distributor after another, he doesn't deserve industry support. When he buys a tube at a time and carries little inventory, he's no businessman. Plenty of dealers need straightening up.

Third, before a dealer damns all distributors for the contempt of some, he'd better learn that there are plenty of distributors who do care and are the best friend a dealer can have. The article "Industry Dilemma—Distributor Retail Sales," in this issue, contains a number of letters from distributors who are sensitive to the dealer's viewpoint and are willing to sit down and discuss ways to better conditions.

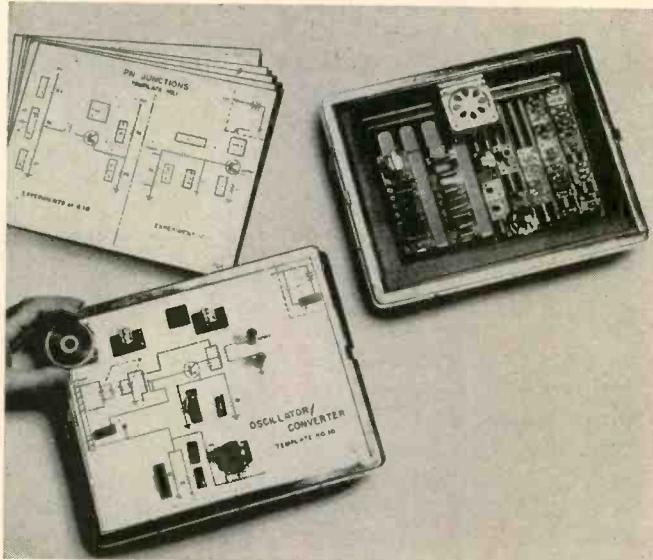
Work through your associations, establish good business practices, and meet with your local distributors to find a way out of the industry dilemma.

Tuning In the

NATIONAL CREDIT OFFICE reports that electronic parts distributors sales in 1959 totaled \$815,000,000 compared with \$740,000,000 in 1958. Competition continues to increase with 73 newcomers in 1959 and 16 new entries for the first 5 months of 1960. In 1958 there were but 38 new distributors. Initial starting capital ranged from \$1,800 to \$90,000 with an average of about \$19,000. \$35,000 is generally considered an adequate initial investment. Fourteen companies encountered financial difficulties in 1959 compared with 17 in 1958. However, the dollar amount of liabilities rose sharply to over \$2,000,000 from \$667,000 in 1958. Earnings remained steady at 2.4% of sales, while gross profit declined slightly to 23.3%. Working capital turnover declined from 5.7 to 5.5 times. Collections have recently become slower, ranging from 60 to 90 days in many cases.

TELEPHONE COMPANY has run out of numbers, and is changing from the exchange letters plus five digits system to a straight seven digit number by the early 1970's. All number calling (ANC) will become necessary because a considerable number of letter combinations, such as XJ or VL are impossible to use.

TECHNICIAN TRANSISTOR TRAINER



A compact training device, weighing four and a half pounds, has been developed by RCA to instruct technicians in the use of transistors. A diagram template is affixed to the unit's jackfield, and the student mounts solid state components at the indicated positions to complete an operating circuit, following the instructor's demonstration. The transistor trainer is designed to simplify instruction and speed up the training cycle.



"I got that one at a drugstore."

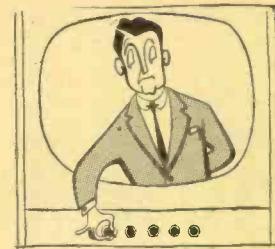
UHF PLAYS NEW YORK. Congress has approved a \$2,000,000 appropriation to set up two experimental UHF TV stations, one in the heart of New York City and the other 10 miles away. It will be operated under the direction of the FCC and will use 100 UHF receivers at strategic points to study UHF reception compared to VHF. At present, only 76 commercial and 14 educational UHF stations are operating, most of them in areas where there is no VHF competition. This study will see if UHF and VHF can live together in the same town.

NEW CALIFORNIA ELECTRONIC SHOWS are in the works. A western service association group from five western states plan a major electronics parts show for the consumer products service industry to be held in 1961. For the first time, 24 TV and radio manufacturers will participate in the program with convention exhibits. Los Angeles distributors are planning an industry show in February 1961.

REFLECTION-FREE viewing screens will be added to five 23-inch models in the 1960 TV line of Sylvania. These sets use specially treated safety glass, which is bonded permanently to the face of the picture tube traps and diffuses outside light and eliminates reflections from outside sources.

HIGHEST FREQUENCY TRANSISTOR commercially available, reports Philco, is being produced by the company's Lansdale Div. Called a coaxial micro-alloy diffused-base transistor, the device has a maximum frequency of oscillation of almost 4,000 megacycles.

Picture.....



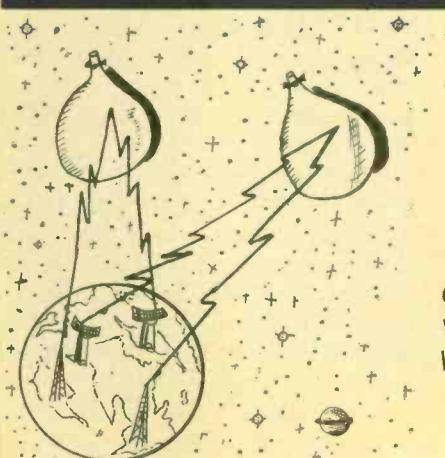
COMMUNITY TV SYSTEMS can distribute broadcast shows, according to a Montana court ruling. Helena Television, Inc., the cable company, was sued by Z Bar Net, a broadcasting company, and Television Montana, a subsidiary. Z Bar Net operates stations in Butte and Helena and permits a Great Falls station to rebroadcast its Butte programs. The judge ruled that Z Bar Net and Television Montana "have no property interest, by copyright or otherwise, in any programs broadcast by KXL-TV, Butte, or in any signals or programs received on the defendant's community antenna system and distributed to defendant's subscribers."

CLOSED CIRCUIT TV is finding still more applications. The Lincoln Tunnel connecting New York City and New Jersey, is using CC-TV to determine optimum traffic routing patterns. When vehicles are moving slowly, additional ventilation is provided. Another application is in training TV service technicians, reports General Electric. Students in an auditorium are provided with a bench-side view of a demonstration. A "Zoomar" lens would focus on meters, charts, and equipment, and the picture would show up on six 21" receivers, plus a 17" monitor. Still another application of CC-TV is an installation at 241 E. 76th St. in N.Y.C., a luxury apartment house. The camera, mounted atop the elevator and another one at the service entrance, pick up the scenes which are shown on a console in the lobby. The doorman and tenants can see if unauthorized and undesirable people have entered the building.

CALENDAR OF COMING EVENTS

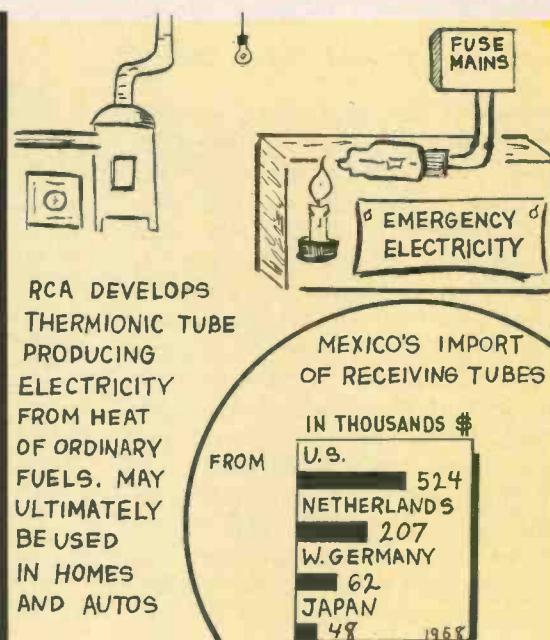
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|-----------------|--|
| Sept. | 15-16: Eighth Annual Eng'g Management Conference, Morrison Hotel, Chicago, Ill. |
| Sept. | 15-17: Upper Midwest Electronics Conference and Exhibit, Minneapolis Auditorium, Minneapolis, Minn. |
| Sept. | 21-22: Industrial Electronics Symposium, Manger Hotel, Cleveland, Ohio |
| Sept. | 26-29: American Welding Society Fall Meeting, Penn-Sheraton Hotel, Pittsburgh, Pa. |
| Sept. | 26-30: Instrument Society of America Conference, Exhibit and Fifteenth Annual Meeting, The Coliseum, New York, N. Y. |
| Oct. | 3-5: Sixth National Communications symposium, Hotel Utica, Utica, N. Y. |
| Oct. | 10-12: IRE National Electronic Conference, Hotel Sherman, Chicago, Ill. |
| Oct. | 24-26: East Coast Aeronautical and Navigational Electronics Conference, Lord Baltimore Hotel, Baltimore, Md. |
| Oct. | 26-27: Armour Research Foundation 1960 Computer Applications Symposium, Morrison Hotel, Chicago, Ill. |
| Oct. | 27-28: IRE 1960 Electron Devices Meeting, Shoreham Hotel, Washington, D.C. |
| Oct. 31-Nov. 2: | IRE 13th Annual Conference on Electronic Techniques in Medicine & Biology, Sheraton Park Hotel, Washington, D.C. |
| Oct. 31-Nov. 2: | IRE Radio Fall Meeting, Syracuse Hotel, Syracuse, N. Y. |
| Nov. | 14-16: Mid-America Electronics Convention MAECON), Hotel Muehlebach, Kansas City, Mo. |

RANDOM NOISE



BELL TELEPHONE SYSTEM IS EXPERIMENTING WITH BALLOON SATELLITES TO PROVIDE "BOUNCE" COMMUNICATIONS FOR VOICE AND POSSIBLY WORLDWIDE TV.

-LEN ROTTER-



How To Correct Manufacturers' Printed Wiring Defects

Fault Location & Repair Methods For Those Early TV Printed Circuits

JACK KALTERACKUS
Manager, Service Engineering
Allen B. Du Mont Laboratories, Inc.

• We need go back only a few production years to recall printed wiring boards that gave unusual servicing grief to radio-TV technicians. Currently manufactured printed circuits are emphatically improved; however, the fact that older printed circuit radio and TV receivers are still very much with us is unfortunately ignored.

Until these sets are obsolete service technicians' repair difficulties will continue. Since easy serviceability of early printed circuit chassis is not one of their favorable attributes, and since great numbers of these are still in use, it seems proper to analyze their production and repair techniques.

Printed Circuit Defects

One of the first basic systems employed, "Pin Type Printed Wiring," used a photographic process to form copper conductors on phenolic boards. Hollow brass bead chain pins, as shown in Fig. 1, served as through-connections between the two sides of the copper-coated phenolic boards. Components were placed on one side of the board, with their leads sticking into "pins." The pins were then fluxed and dipped into a solder pot.

The board itself never contacted the solder since this would blister it; or, the conductive coating would lose its bond to the board. Accordingly, the only fresh solder brought to the interfaces of the pin and

printed wiring conductors was that brought through the pin center by capillary action. This technique required exceptional attention to temperature conditions, solder, pins, etc.; in effect, too many factors to allow reasonable consistency.

An abnormal quantity of cracked joints was the result. In addition, external visual inspection often missed solder voids. The tendency of solder to draw across voids in the section cutting process which gave an appearance of solder—where none actually existed. Although

many inspection variations were tried, results were still unsatisfactory. It was evident that new processes had to be developed.

New developments in base materials and adhesives during the 1952-1956 period enabled complete immersion of the board into the solder pot, rather than just the pin bottoms. This permitted a more even flow of solder around the through-connections (a simple flange brass eyelet was used in place of the bead chain pin). The solder joints produced by this process were far superior to that of the pin process.

Reliability of this system was apparently excellent—but complaints on in-use boards became rampant, nevertheless. New examination techniques had to be developed. This was especially important since printed wiring was now being used in production quantities.

Examination of returned boards indicated microscopic cracks in solder fillets, similar to those found in the pin technique. The solder fillet around the rolled head of the eyelet did not extend beneath the head sufficiently, leaving a thin-walled fillet which would crack from expansion of the eyelet and board. See Fig. 2.

Since the connection faults were predominantly in the solder joints, a funnel type eyelet was tried, with the funnel on the dip side of the board, as shown in Fig. 3. This made it possible to build up large fillets of solder, able to withstand maximum temperature or flexing stresses. Tests indicated that this technique was acceptable—and is in dominant use today.

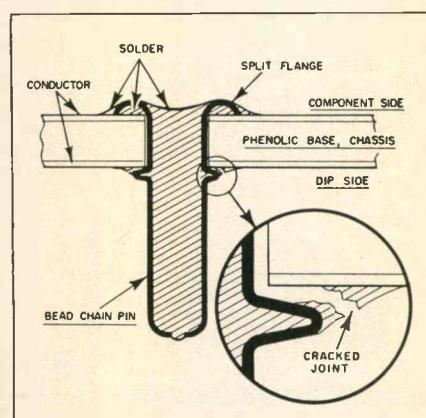
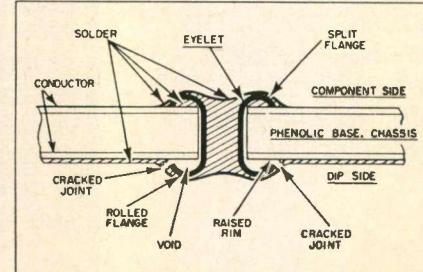


Fig. 1—Hollow brass bead chain pin used in early printed wiring frequently developed cracked joints because of solder voids.

Fig. 2—Rolled flange type eyelet which supplanted bead chain pin also developed cracked joints because of solder voids.



With this defect information as background, a suitable technique for repairing the printed circuitry could now be evolved. It was discovered that normal hand soldering or resoldering often produced the same type of joint that originally proved troublesome. The better the solder flow appears, the weaker the soldered joint will be. Therefore, many repairs had to be repeated.

Investigation revealed that by properly building up the size of the solder fillet, thus obtaining additional strength simply through thickness, a reliable repair could be made.

Printed wiring chassis with cracked solder joints, seen by visual inspection, open or intermittent connections, found by continuity tests, require resoldering. (The procedure described here refers to chassis using eyelet construction, as shown in Fig. 2.)

It is unusual to find an isolated cracked solder joint between a circuit conductor and eyelet. Invariably, if the condition exists at all, it probably encompasses a number of joints. Therefore, it becomes necessary to resolder all eyelets on such a chassis. That is, if you don't like rehash jobs.

Resoldering a printed wiring chassis requires service equipment that has certain characteristics. For best results, or at least to obtain known successful results, the fol-

lowing equipment characteristics are recommended.

A. Soldering Iron:

(1) Tip temperature should not rise above 600° F to maintain proper soldering control. Excessive heat

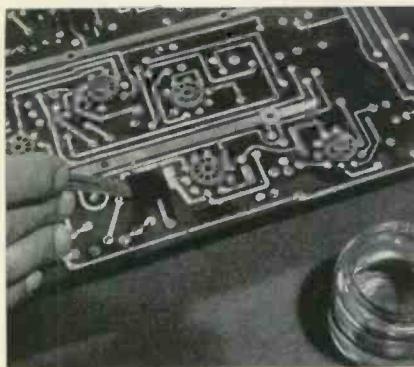


Fig. 5—Dip side of a PC chassis is well cleaned with a minimum solvent application before resoldering eyelet.

will cause solder to melt completely down through the eyelet, creating an unreliable connection on the chassis' component side. (*Professional opinions differ on minimum and maximum iron temperature needs. Many suggest lower temperatures, while just as many suggest higher temperatures applied for a shorter period of time.—Ed.*)

(2) Tip temperature must be above 500° F to assure adequate heat for proper fusion, and to permit making the repair rapidly enough to avoid over-heating materials adjacent to the eyelet (see previous Editor's note.) Such overheating may cause destruction of the copper conductor bond to the phenolic base. (3) Solder tips must be long enough to get to socket connections, between wire leads and components. Tip extension should be between two and two and one-half inches. The semi-chisel or screw driver shaped tip affords good conduction, and the least obstruction of the work area. (*Specially shaped tips are also available for specific component desoldering—Ed.*)

B. Solder:

(1) 63% tin 37% lead solder is an ideal alloy combination for printed circuit soldering. This combination has a low melting point, permitting the use of less heat (361° melting point.) (*Although 63-37 solder is ideal, 60-40 solder can be used successfully, also. Its melting point is only about 10° higher than 63-37 solder.—Ed.*)

(2) Although most commercial cored solders are supplied with approximately 3.5% flux, unless otherwise specified. 0.5% flux is adequate for complete fluxing—and it will not produce an unsightly ring of resin around each resoldering eyelet. A higher percentage of flux is not necessary except on badly oxidized or contaminated surfaces. (3) A $\frac{1}{16}$ " diameter solder is adequate for a good rate of operation and is small enough to maintain control of the amount of solder being applied. Larger or smaller sizes create various problems.

C. Cleaning And Inspection:

(1) Proper solvents should be used in cleaning the work prior to resoldering and for excessive flux removal. Acid type brushes or similar stiff bristle brushes are also used with solvents for cleaning and flux removal. A clean, absorbent cloth for blotting up solvents is helpful. (2) A watchmaker's loupe or large magnifier to inspect connections and aid in detecting the presence of cracked joints.

Preparation and Soldering

For cleaning and resoldering, both sides of a printed circuit chassis should be accessible. The chassis is positioned horizontally, supported firmly, and the working area adequately illuminated.

Resoldering should be confined to the dip side of a chassis, at all joints between eyelets and PW conductors, and between eyelets and tube socket tabs. Resoldering on the component side is only required where excessive heat has caused solder to flow through the eyelet while working on the dip side, or when electrical tests show evidence of open or intermittent connections.

Solder cracks are easily visible under 10X magnification, appearing as jagged dark lines on the solder fillet surrounding the eyelet head. The cracks may extend partially or completely around the joint, and are mainly confined to the dip side.

Eyelets that have been properly resoldered may be recognized by their similarity to the eyelet shown in Fig. 4. Solder build-up on the eyelet should be a round dome shape which completely covers the outline of the eyelet and flows completely

(Continued on page 74)

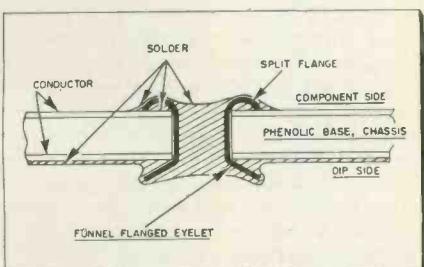


Fig. 3—Funnel flanged type eyelet used in most present day PC equipment, provides a thicker solder fillet and a stronger joint.

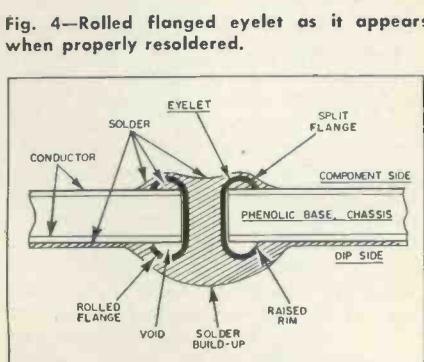


Fig. 4—Rolled flanged eyelet as it appears when properly resoldered.

Industry Dilemma— Distributor Retail Sales

*Selling to Consumers at Wholesale Prices Adversely Affects
Service Dealer Dollar Volume*

ALBERT J. FORMAN
Editor

• Perhaps the most serious complaint TV-electronic service dealers have against parts distributors is that many distributors sell parts and equipment to the general public at wholesale prices. The dealer sees this practice as a kind of double-cross—the very distributor he buys from bypassing him to sell direct to the dealer's own customers.

Distributors who sell to the trade only are usually inclined to agree with the dealers, but those distributors who sell to anyone see it differently. They say that under free enterprise a man should be able to sell to whomever he chooses. Besides, they point out, dealers frequently carry too small inventories to satisfy consumer needs.

Dealers counter that this is untrue, that the distributors are really dealers who get preferential discounts and go aggressively after retail sales.

And so it goes, charge and counter-charge, breeding antagonism, threats and boycotts when honest mutual understanding is really needed.

The fact is that in individual situations there is a germ of truth in almost all of these charges! Many distributors fail to support service dealer customers. Many dealers are undercapitalized and poorly managed.

But most important, many fine distributors and dealers are working together harmoniously. Therefore, it is certainly possible for

these two major segments of the industry to iron out their differences before they become irreconcilably opposed. At the very least, it is worth the effort to do so. We asked the National Electronic Distributors Association to work with us on this, but they didn't think our approach was the best way. We polled individual distributors across the country, and many of them thought it was a good idea to get together. Service associations showed great willingness to meet with distributors.

Certainly, sweeping the problem under the rug and making believe it is solved is no answer. We strongly advise dealers and distributors to take the initiative in their own trading areas to explore avenues of solution together.

Here is the letter Electronic Technician sent to distributors, and their replies:

Letter to Distributor

During the past year there has been increasing tension between electronic parts distributors and service dealers over the issue of distributor sales to the public at wholesale prices.

The result has been restrictive legislation in certain states, boycotts and recriminations. We believe it necessary to find a common ground of understanding lest these antagonisms become thoroughly destructive.

We have proposed that representatives of the service industry sit down with distributor groups to discuss the problems in good faith. It is hoped that constructive re-

sults can be evolved which will minimize the antagonism.

WOULD YOU OR YOUR LOCAL DISTRIBUTOR GROUP BE WILLING TO MEET WITH SERVICE DEALER REPRESENTATIVES?

In addition to your yes or no to the above, your comments and suggestions will be much appreciated.

ELECTRONIC TECHNICIAN

Distributor Replies to ET NATIONAL

... You must be aware, of course, that the problems you outline have been the subject of deep consideration and earnest study by all facets of the industry almost continuously and that many key figures both in distributing and servicing have devoted much time to the subject. May I be permitted to suggest that, while your interest in the problem is much appreciated, I can not see wherein the industry would benefit by rehashing its problems in print, much as I admire your editorial zeal in sponsoring such meetings. While "Showdown at Distributor Gulch" which appeared on page 31 of the May-1960 issue of your fine publication was cleverly written, it served only to aggravate the problem where it exists and to create dissension in areas where it does not exist. While I do not attribute to you any but the most noble motives in this matter, I must question in all candor whether you or your publication enjoys the stature and background in the Electronics Industry to inspire mutual confidence among those who might attend a "summit" meeting. Both Distributors and Servicemen are aware of their mutual relationships and, by and large, have lived together in harmony long before you or I came upon the scene. They have, for the most part, succeeded in settling their differences without the benefit of referees or peacemakers. NEDA shall continue in the future, as it has in the past, to meet with Service Groups and to urge its members to discuss problems of mutual interest with their customers. We feel that this can be done without publicized "summit" meetings or sponsored con-

ferences, whatever their origin or true purpose.

National Electronic
Distributors Association
Chicago, Ill.

CALIFORNIA

... The answer is yes. The Los Angeles local distributor group IS interested in meeting with service dealer representatives.

Kierulff Electronics
Los Angeles

... This is a serious local problem with us and we would be glad to meet with any representative at any time if in good faith.

Sampson Electronic Services, Inc.
San Bernardino

... We work very closely with our dealers and do not have any problems in selling retail at wholesale prices. We meet constantly with the Dealers Association and discuss our mutual problems. I will admit that many of our competitors have problems of this nature, but I suggest that they handle it themselves.

Dunlap Electronics
Stockton

CONNECTICUT

... Let me know what we can do to assist this worth while project.

Signal Center
Hartford

FLORIDA

... Yes.

Walder Radio & Appliance Co.
Miami

ILLINOIS

... We would suggest that you approach NEDA on this subject. A firm position taken by them would just about solve the problem. By taking this position NEDA would also enhance their position—membership-wise.

Mid-States Electronic Co.
Chicago

... Certainly—but we have not—do not and will not sell to John Q.

Cooper Supply Co.
Quincy

IOWA

... Yes, very much so! I can speak only for our own company, since we are not affiliated with NEDA. We try to restrict our sales to Electronic Appliance and Service Dealers. The biggest problem is: WHO IS A DEALER, AND WHO IS NOT? We believe that definitions and qualifications should come from a representative cross-section of the industry itself. Perhaps an "outside" agency, such as yours, could be most helpful in securing such mutual cooperation.

General Appliance Co. of Iowa
Des Moines

... We are cooperating with our local service associations and have ever since the present partnership has been in effect. This is absolutely necessary to maintain our dealers' goodwill and patronage.

A & B TV Supply
Mason City

KANSAS

... You are on the right track in regards to the distributor-dealer situation. Something should be done and be done right now. We cater strictly to dealer business, but we have talked with many of these dealers whose business is declining by the month and the answer they all come up with is that certain distributors are selling their customers direct at wholesale prices. I see no reason why any distributor has the right to sell direct or why any manufacturer has the right to sell his product to a distributor who he knows sells direct.

Radio Supply Company, Inc.
• Salina

... Our company will be happy to meet with any group to help improve industry relations.

Radio Supply Company, Inc.
Wichita

KENTUCKY

... Yes!

The Sutcliffe Co., Inc.
Louisville

LOUISIANA

... We have provided a sales policy that will eliminate some of the problems we have here which are very similar to the ones your readers are complaining about in the North. I might also add that we are a member of NEDA and have been for the past 16 years. I think all of the distributors are conscious of the fact that there are a few retailers slipping in and buying wholesale when they should not, and these happen to be employees of industrial firms. They apply the pressure to the counter clerks or the salesmen and get by unnoticed by the top management. We have always been very cautious to try to protect the service man, even though the service man beats one distributor against another in order to get cut-rate prices, and often tries to form a cooperative purchasing group in order to buy at distributors' cost. We are giving the service man a great service. We maintain a large inventory and have three branches in order to save them freight. We offer them quantity discounts making it profitable to stock items instead of going to a distributor just for their daily needs. It would be fine if you wrote an editorial about the technicians who go over to a distributor and tell him they can get a better price at Distributor B or C and will he beat it, and this same customer had in stock only what he needs for that particular day. Now, that is the reason we have different prices for single units and quantity purchases. I think more editorials on both subjects would be very enlightening to both the serviceman and the distributor, and the distributor certainly needs cooperation of the serviceman and the industrial accounts. I congratulate you on taking the initiative to publish this editorial.

Columbia Radio & Supply Co., Inc.
New Orleans

MASSACHUSETTS

... We, as one of the largest part jobbers in New England, would be extremely happy to meet with any group or indi-

viduals as outlined above. We also have many questions to ask. Questions which have been asked before but left unanswered. We welcome the opportunity to lay all of our cards—both sides—on the table faced upwards.

Del Padre Supply
Springfield

MINNESOTA

... We do not now, nor have we made a practice of selling to the public at any time —will be happy to talk with Service Dealer Representatives.

F. C. Hayer Co.
Minneapolis

MISSOURI

... We would be very happy to participate in a meeting of this kind.

Radonics
St. Louis

NEW HAMPSHIRE

... We realize this problem only too well and have always leaned over backward to keep things as "clean" as possible and believe that in comparison with some of our competition, we have done fairly well. We personally would be more than pleased to meet with local service dealer representatives at any time on this or any other industry problem.

Evans Radio, Inc.
Concord

NEW YORK

... The Albany parts jobbers have been meeting with the TSA servicemen's organization for the past 2 or 3 months, in fact we have another meeting scheduled for Wednesday, July 11th. We have made progress on the above subject and expect to make more.

E. E. Taylor Co., Inc.
Albany

... We realize the unethical inroads made by certain distributors in by-passing the dealer in counter sales and we're against that type of operation. We would be happy to sit in with any service industry group at any time to discuss mutual problems.

Green Tele-Radio Distributors
Brooklyn

... We are pleased to accept your invitation to meet with service dealer representatives to discuss the issue of distributor sales to the public at wholesale prices. I am sure that you and the Service Dealers are familiar with the True Wholesale Policy which has characterized our operations for the past 35 years—never a consumer sale, never a sale to any do-it-yourselfer, or Part-Timer. Because we are always willing to discuss any and all matters that hold promise of benefit to the Service Industry, feel free to call on us to meet at any time or place with any group of Service Dealers and Distributor groups. We applaud your effort to help solve the problem of restricting wholesale prices exclusively to the legitimate Dealer and Service Shop Trade. It is obvious that present abuses are detrimental to the Service Industry subjecting it to unfair practices that result in severe economic hardship.

H. L. Dalis, Inc.
Long Island City

(Continued on page 51)

Improve TV Performance With Trap Adjustments

Optimum Video-Sound Often Depends Upon Proper Trap Settings

HAROLD WEST

- Sound and picture traps are commonly ignored by many service technicians when servicing TV receivers. These traps do break down, however, or "fall" into misadjustment (by 'diddlers,' do-it-yourselfers, vibration, component aging, etc.) resulting in less-than-optimum picture, and/or sound quality.

The primary responsibility of traps in TV receivers is to eliminate or reduce unwanted signals. This generally means keeping beat signals and sound bars from the picture circuit. A 4.5 mc coil is used to "pick off" and vary the

proper amount of sound signal to the grid of the first sound tube in intercarrier TV sets. Although sometimes called a trap, this circuit serves as a sound "take-off" adjustment, a pass band for the required amount of 4.5 mc sound signal to the first sound tube grid in intercarrier TV sets. Basic trap circuits are illustrated in Fig. 1.

TV tuners are generally equipped with traps, also. These may be tuned to eliminate f-m broadcast station beat interference or may be tuned to the i-f frequency to eliminate any r-f harmonic interference falling into the TV's i-f band.

Trap Applications

The simplified schematic in Fig. 2 illustrates the use of three tuned circuits in one variation of a gated

beam type sound detector. The 4.5 mc sound signal and the video signal are split at the video output's plate, with the 4.5 mc signal going to the sound tube's grid. Only the video signal can pass to the CRT, since the trap in the output tube's plate circuit presents a high impedance to the 4.5 mc signal. The coil in the grid circuit is tuned to 4.5 mc, giving proper sound transfer to the 'BN6 grid. The sound tube also contains a quadrature type coil, normally tuned to give minimum distortion in the sound when adjusted coincident with a buzz or AM rejection control.

Other types of traps used in well designed TV sets include adjacent sound and picture traps, and accompanying sound traps. Adjacent sound and picture traps are not generally required in strong signal

Fig. 1—Three types of traps commonly employed in TV receivers.

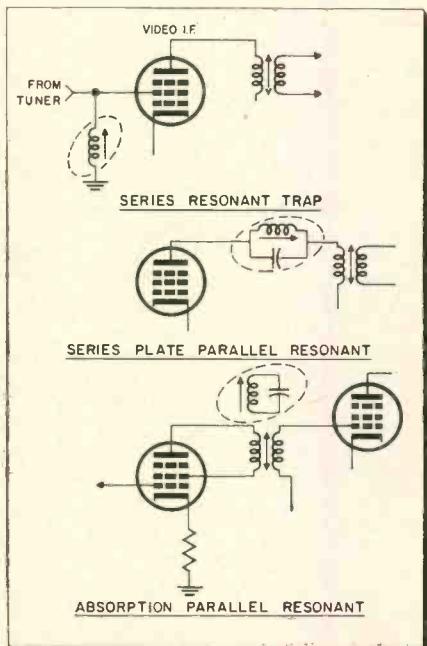
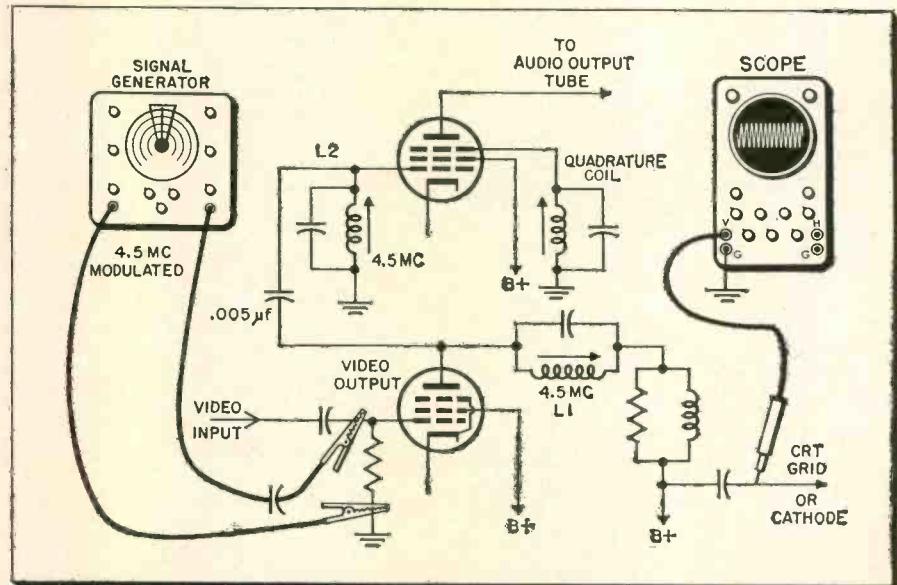


Fig. 2—Bench set-up for adjusting sound trap in plate circuit of video output tube.



areas since adjacent channels in an immediate area are not assigned by the FCC. In fringe or weak signal areas, however, these traps are frequently helpful or necessary to prevent interference from an adjacent channel operating in another area. A TV receiver may or may not include a trap for either accompanying or adjacent picture or sound, depending upon its design. Accompanying sound traps, when used, are inserted and adjusted to obtain the proper ratio between picture and sound levels in a video pass-band. All of these traps are effective only when properly adjusted.

Servicing

Checking a 4.5 mc sound trap defect is generally a relatively simple chore. If the defect symptom is sound bars in the picture (which may also be accompanied by audio buzz,) the easiest adjustment is a visual one. That is, adjust the fine tuning dial to exhibit the strongest sound bars and then slowly adjust the suspected sound trap until a point is reached where the sound bars appear weakest on the CRT. One precaution, though, be sure you're adjusting a sound trap and *not* an i-f transformer. If no change is apparent, check the sound trap coil and capacitor for possible defects.

There are a number of methods used for adjusting 4.5 mc coils. The test set-up in Fig. 2 clearly displays the generator-scope method. A modulated 4.5 mc signal is injected at the video output tube's grid. The scope is used as an indicating device. L-1 is adjusted to give minimum vertical deflection on the scope screen. L-2, of course, is adjusted to give maximum sound output in the set's speaker.

An improperly adjusted accompanying sound trap can upset the video pass-band, causing poor overall video performance. This is true because these traps interact with the video i-f tuning and are taken into consideration in design and over-all alignment.

A proper pass-band for optimum performance in a TV receiver varies from $3\frac{1}{2}$ to 4 mc. Fig. 3A shows an approximate oscilloscopic video pass-band response curve with accompanying sound

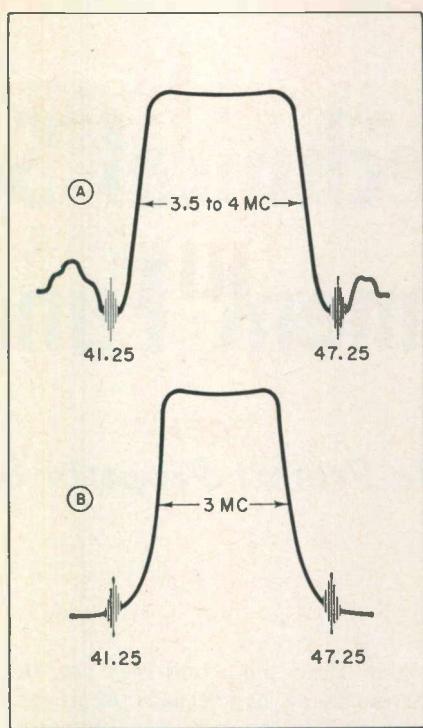


Fig. 3 (A)—When adjacent and accompanying sound traps are properly adjusted, video pass-band is maximum. (B)—When improperly adjusted the band is generally narrow and picture-sound level ratio is upset.

trap properly adjusted. An improperly adjusted trap will normally narrow the over-all response, as illustrated in Fig. 3B.

Scope Adjustment

By far the best method of adjusting adjacent and accompanying traps is by means of a regular alignment set-up. This method is shown in Fig. 4. Equipment in-

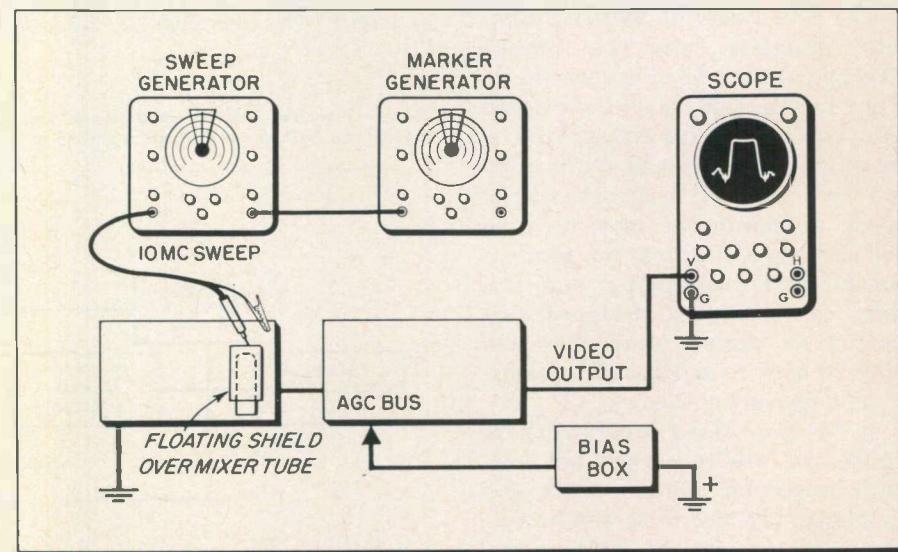
cludes a scope, sweep generator, and a marker generator. The scope should be connected at the video output and both sweep and marker signals should be injected through an ungrounded shield loosely fitting over the mixer tube in the tuner. To eliminate spurious signals the mixer tube used should have its grid pin clipped off at the tube's base.

Some sets may have a trap in the grid circuit of the first i-f tube and another one further on, as in the Hoffman chassis 359, for example, where two adjacent sound traps are employed. Other sets, like the GE "U4," 21C models, have one series tuned adjacent sound trap in the 1st i-f grid, a parallel tuned accompanying sound trap in the first i-f transformer, and an additional parallel tuned adjacent sound trap in the 2nd i-f transformer.

To check these traps an over-all video response curve is obtained, as shown on the scope screen in Fig. 4. The marker signals should be alternately set at 41.25 and 47.25 mc, and the individual traps adjusted so that the respective pips fall into the deepest valley centers, as shown. The sweep generator should be set to give at least a 10 mc sweep. In the event a marker pip is not observed at the proper edge of the response curve, increase the marker generator output.

If the TV is designed with 20 mc i-f's, associated sound traps will be
(Continued on page 77)

Fig. 4—Test set-up for visual adjustment of traps using scope, sweep and marker generator.



How Technical Security Equipment Functions

Basic Methods Used to Protect Property & Stock Electronically

LOUIS E. GARNER, JR.

● During times of active warfare or international stress, physical security becomes especially important and special techniques must be used to safeguard material, plant facilities, and information. Adequate security is also important in many peacetime manufacturing and commercial operations . . . to protect trade secrets, protect property against theft and vandalism, and to safeguard new products still in the developmental stage. Thus, knowledge of security techniques primarily based on electronic-mechanical devices, is of value to anyone engaged in research, engineering, development, manufacturing, or in warehouses, whether the products are destined for the commercial market or for highly classified military projects.

The broad field of physical security practices may be termed "Technical Security." As we see in Fig. 1, the field may be divided into two major sub-classes: *Safeguarding Property* and *Safeguarding Information*. Although special types of equipment may be used for each type of operation, there is considerable overlapping, and systems or techniques designed primarily to protect property often may be used to safeguard information or special knowledge.

In *Safeguarding Property*, for example, we are concerned not only with protection against theft and sabotage, but also with the protection of any special information

which may be contained in the property, as in the case of an experimental prototype, design model, or set of blueprints. Under this general class there is a further division into two smaller sub-classes: (a) devices used for actual physical protection, such as fences, walls, safes, vaults, locks, etc., and (b) equipment used to indicate the presence of a possible intruder, such as Burglar and Security Alarm systems.

In *Safeguarding Information*, we are concerned primarily with the protection of knowledge or data, where such knowledge does not necessarily require an actual transfer of physical property. An espionage agent, whether of a foreign power or an unethical competitor, who photographs a set of secret plans or a design model may do more damage, eventually, than the saboteur who destroys a valuable

machine tool or blows up a manufacturing facility.

Definitions

A number of special terms are encountered in Technical Security work. In some cases, their meaning is more or less obvious, but not always. In any case, a knowledge of the more common expressions used is helpful when discussing techniques.

To compromise a system or device is to render it ineffective or to defeat its purpose.

Forced Entry, as the name implies, is accomplished by actually "breaking in" a door or window.

Surreptitious Entry is entry to a protected area accomplished in such a manner that the Guard Staff or Security Officer is unaware that entry has taken place and security compromised.

Point Protection is protection afforded a single object, such as a safe or file cabinet containing classified data, an executive's desk, or a single entrance.

Fig. 1—Technical security subdivisions and structure of inter-related electro-mechanical, electronic, and human components involved in the integrated protective organization.

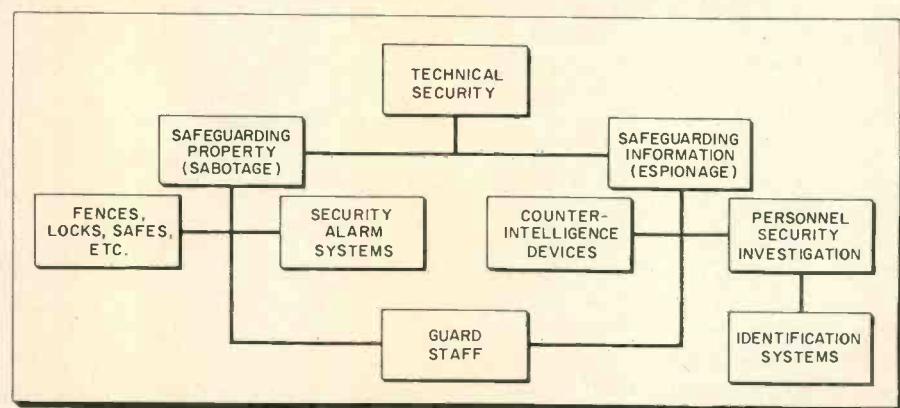


CHART I

Security Alarm Systems

Protection System	Type of System	Sensor	Master Control	Line	Guard Panel	Degree of Protect.	Relative Cost	
							Equipment	Installations
Point	Capacitance	Protected Object	Oscillator	Usual, Tel. Line	Yes *	Good	Low	Low
Door Announciators	Capacitance	Antenna on Door	Oscillator	"	Chimes, Bell, Light	Good	Low	Low
	Photo-Electric	Photo-Cell	Light-Source & Amp.	"	" " "	Fair	Low	Low
	Radiation	Antenna	Oscillator & Detector	"	" " "	Excellent	Low	Low
Perimeter	Tape Foil	Foil & Door Contacts	Sensitive Relay	"	Yes *	Fair	Low	Moderate
	Single Beam "Eye"	Photo-Cell	Detector & Amplifier	"	"	Fair	Moderate	Low
	Pulsed & Mod. Beam "Eye"	Photo-Cell	Detector & Amplifier	"	"	Good	Moderate	Low
	Light "Curtain"	Photo-Cell	Detector & Amplifier	"	"	Excellent	High	Low
	Capacitance	Antenna	Cap. Bridge Circuit	"	"	Excellent	Moderate	High
Area	Audio Monitoring **	Microphone	Amplifier	"	"	Good	Moderate	Low
	Ultrasonic (or Radio)	Transducers (Ant.)	Osc., Amp., Det.	"	"	Excellent	High	Low
	Photo-Electric	Photo-Cell	Detector & Amplifier	"	"	Good	Moderate	Low

*May be central station or "local" alarm.

**Generally used in conjunction with other systems.

Perimeter Protection is that used around a protected area, such as a single room, building, or outside area.

Area or Volume Protection is that used to guard the entire volume of a classified area, not only a protected area.

The **Local Alarm** is an alarm device or signal that sounds in the immediate vicinity of the protected area, as a siren, bell, or klaxon on an outside wall. It is distinguished from a **Remote Alarm** that sounds either in the Master Guard room (even if in the same building) or at a Central Station.

Master Control Unit is the general term applied to the electronic equipment of a Security Alarm system located near or in the protected area. The **Guard Panel**, on the other hand, is the remote alarm indicating panel of the system, and may be located in a building's Master Guard room or in a Central Station servicing a number of Security Alarm installations.

Most Security Alarm systems, like other industrial electronic equipment, is designed to *Fail Safe*. That is, any component or power failure which may render a system ineffective will show up as a signal on the guard panel.

To *Bug* a room is to secrete or *Plant* a listening device of some type . . . a simple microphone, a tap on a telephone, a hidden radio transmitter, or some similar device. A room or area is said to be *Clear* after it has been checked for the presence of such devices with appropriate detection instruments.

System Design

Regardless of the methods used for detecting an intruder, there are common factors that enter into the design of all Security Alarm systems. These factors must be familiar to the equipment design engineer, installation and maintenance technicians, and the Security Officer

responsible for selecting a protection system and supervising its operation.

The basic Security Alarm system may be resolved into four elemental components, as shown in Fig. 2. In some installations, two or more of the elements may be combined into a single device, but the separate functions are still present.

Some device must be used for actually detecting an intruder. This may be called the Sensor element of the system. The Master Control unit contains the necessary circuits to operate the sensor and to interpret the results obtained; if intrusion is indicated, it sends a signal along a line to an alarm indicating device. This may be a local alarm, but, more often, is a remote alarm on the Guard Panel. See Fig. 3.

Thus, the four elements comprising the complete system are: (a) Sensor, (b) Master Control, (c) Line-to-alarm device, and (d) Guard panel, local alarm, or both.

In a properly designed system, failure of any of the four elements should give an immediate indication to the guard. In addition, tamper switches should be provided so that any attempt to compromise

either the line connecting the Master Control with the Guard Panel or any of the equipment comprising the system will give an immediate alarm, whether or not the system is "in protection."

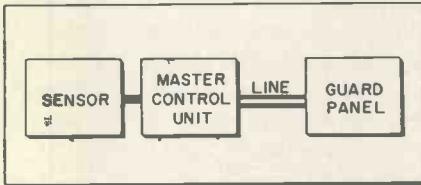
Most well-designed systems have provision for "DAY" and "NIGHT" protection. When set up for "DAY" protection, the sensor is not effective, but all equipment comprising the system as well as all connecting lines are protected against tampering. When set up for "NIGHT" protection, the sensor elements are activated and complete protection is afforded. The tamper protection circuits, of course, are left in operation in the "NIGHT" position.

If the system is battery-operated, provision should be made for a suitable signal should any battery become weak or defective during protected hours. If a-c operated, an alarm should be given if a power failure occurs. In more important installations, provision for emergency stand-by power may be made, but in less critical areas, common practice is to dispatch a guard for on-the-spot protection until power is restored or necessary repairs made.

If possible, there should be provision for testing the operation of the complete system before the protected area is left by the guard during the nightly "closing up" procedure.

The guard panel should be provided with both audible and visual signals, so there will be no chance of the guard(s) on duty failing to

Fig. 2—Basic electronic components in a technical security alarm system.



observe an alarm. In most commercial units, the visual alarm consists of a light, while the audible alarm is a buzzer, bell, or loudspeaker tone.

Physically, all components of the system should be designed for ease of servicing and spare parts should be readily available. Where possible, 24 hour emergency service should be available. To minimize maintenance, all component parts should be over-rated and the system should be checked out at regular monthly or bi-monthly intervals.

Typical Alarm Systems

Virtually all Security Alarm systems are electronic. In fact, a major part of the cost of all types of Technical Security devices is for electronic equipment. For discussion purposes, alarm systems may be classified into three major groups according to the type of protection obtained: (1) Point Protection, (2) Perimeter Protection, and (3) Area Protection. Let's examine each of these in turn.

POINT PROTECTION SYSTEMS—There are two types of protection systems that may legitimately be called "point protection" devices. One is the type used to protect a file cabinet, safe, vault, desk or similar isolated object. The other is a "door annunciator" used to announce the entry or exit of a person through a single door.

Most of the devices used to protect isolated objects are basically capacity operated relays. Two general circuits are popular. In one, a weak oscillator changes frequency or drops out of oscillation as the capacity (of the protected object to ground) increases due to an approaching body. This change is detected and used to operate an alarm relay. In the other, a regenerative circuit is on the verge of oscillation. When circuit capacity increases, the stage breaks into oscillation, with a corresponding change in circuit current. This change, in turn, operates a relay and actuates the alarm signal.

Door annunciators employ three general circuits. One type employs the capacitance detection principle in a fashion similar to that used in point protection equipment. Another utilizes a light beam (which may be filtered for invisible infra-

red light only) and a photo-relay circuit; breaking the beam sounds the alarm signal. The third type is based on the use of a low frequency radiation field established between antennas on opposite sides of the doorway. When a person passes through the door, energy is absorbed from the field. The drop in energy received by the pick-up antenna is detected and used to actuate the alarm signal.

PERIMETER PROTECTION SYSTEMS

The simplest of perim-

sisting of a multiple beam photoelectric installation will give excellent perimeter protection. Light beams (filtered for infra-red or ultra-violet) are spaced approximately nine inches apart along a six foot (or higher) rack. Breaking any one of the beams is sufficient to give an alarm. This type system is comparatively difficult to compromise with a substitute light source due to the difficulty of aligning a series of individual light beams. Cost of the system compares favorably with that of a high chain-link fence.

Capacitance systems are also used for perimeter protection. In such cases, the circuit is somewhat more complex than the simple oscillators used for point protection. In most, a modified bridge circuit is employed, permitting comparatively large total capacities to be connected to the equipment while, at the same time, detecting small changes in capacity. In addition, special temperature and humidity compensation circuits must be employed to prevent "false" alarms due to changing weather conditions.

AREA PROTECTION SYSTEMS—Perimeter protection systems are widely used and are excellent for guarding against external intrusion. However, they are of little value as protection against an intruder who secretes himself in a protected area during non-protected (working) hours. To guard against this type of espionage, a system must be employed which protects an entire "area," not just the outer entrances.

Photoelectric installations are sometimes used for a form of area protection by arranging a number of mirrors to obtain a criss-cross pattern within the protected area. Although a single beam may be used, the net effect is to divide the area into small odd-shaped parcels, each bound on all sides by invisible light beams. Breaking the beam at any point is sufficient to initiate an alarm.

An ultrasonic system may be used for area protection. In operation, the protected room is "filled" with ultrasonic vibrations at about 19 or 20 KC. These are radiated and picked up by suitable transducers. Any moving body within the protected area causes a dop-

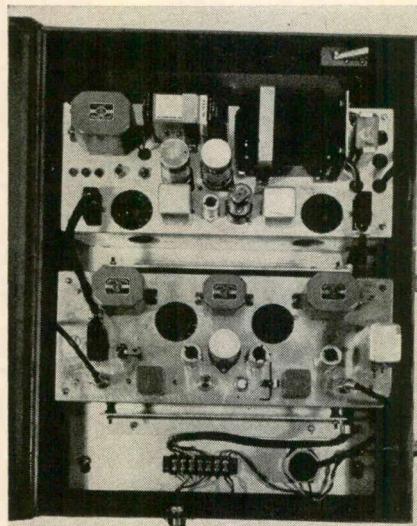


Fig. 3—ADT master control unit for an ultrasonic security alarm system contains oscillator, amplifier, power supply and relay circuits. Interlock switch (top rt.) prevents opening of cabinet without sounding alarm.

eter protection devices is that old stand-by used for Burglar Alarms . . . metal foil on windows coupled with door and window contacts. With such a system, a closed, supervised circuit is made up around windows and doors. Breaking the circuit at any point gives the necessary signal to operate an alarm.

The foil system, while excellent as a protection, is easily compromised by a skilled and experienced agent.

Photoelectric systems may also be used to good advantage for perimeter protection, but reasonable care must be taken in selecting the equipment and in its installation. Almost without exception, filtered light is employed (infra-red or ultra-violet). Even here, the system may be compromised if the agent uses a substitute light source.

An electronic "light curtain" con-

pler shift in the frequency of the picked up signal. This change is detected, amplified, and used to operate the alarm relay.

Similar to the ultrasonic system is a unit using high frequency radio waves radiated from a suitable antenna. Such an installation may be subject to interference from certain types of transmitters or electrical noise sources. Whether an ultrasonic or radio system is best suited to a specific installation depends on individual conditions.

Audio monitoring of the guarded room also gives a form of area protection. Microphones are located strategically within the area. Any sound adjacent to or within the protected area . . . and above a predetermined level . . . is detected and gives an alarm signal. The guard, simply by throwing a switch, can monitor the sounds over a loudspeaker and thus identify them either as "normal" or as an intruder within the area.

Another auxiliary system frequently used in extremely critical areas, although not an "alarm" system in a strict sense, is a closed circuit television installation. With cameras placed strategically and a

monitor in the guard room, a guard may "make his rounds" without ever leaving his central location.

A summary of the various general types of Security Alarms systems is given in Chart I. The basic elements making up the complete system are given in each case, as well as an indication of relative cost and the relative degree of protection achieved.

System Example

A plan layout of a "typical" electronics manufacturing plant engaged in the production of classified military items is illustrated in Fig. 4, along with suggested Security Alarm systems to achieve a high degree of protection. A complete system such as the one suggested would be quite expensive and could be justified only where the "tops" in security is desired. However, it serves as a theoretical example of what can be done.

The entire building is protected by a series of "light curtains," with four such systems used. In addition, a series of offices within the building itself are protected by a fifth "light curtain." Opening the door of any office of the group would

automatically break the light curtain, giving an alarm. A capacitance system is used to protect file cabinets in the main file room. In addition, the door to this room is provided with a tamper switch tied into the capacitance alarm system.

The private entrance to the General Manager's office is protected both by a tamper switch (which is "off" during the day) and a radiation type door annunciator. The door annunciator is switched into one of the alarm systems automatically during protected (night) hours, but during the day is used to permit the General Manager's private secretary to know when he leaves or arrives. The other doors to the General Manager's office are protected by tamper switches.

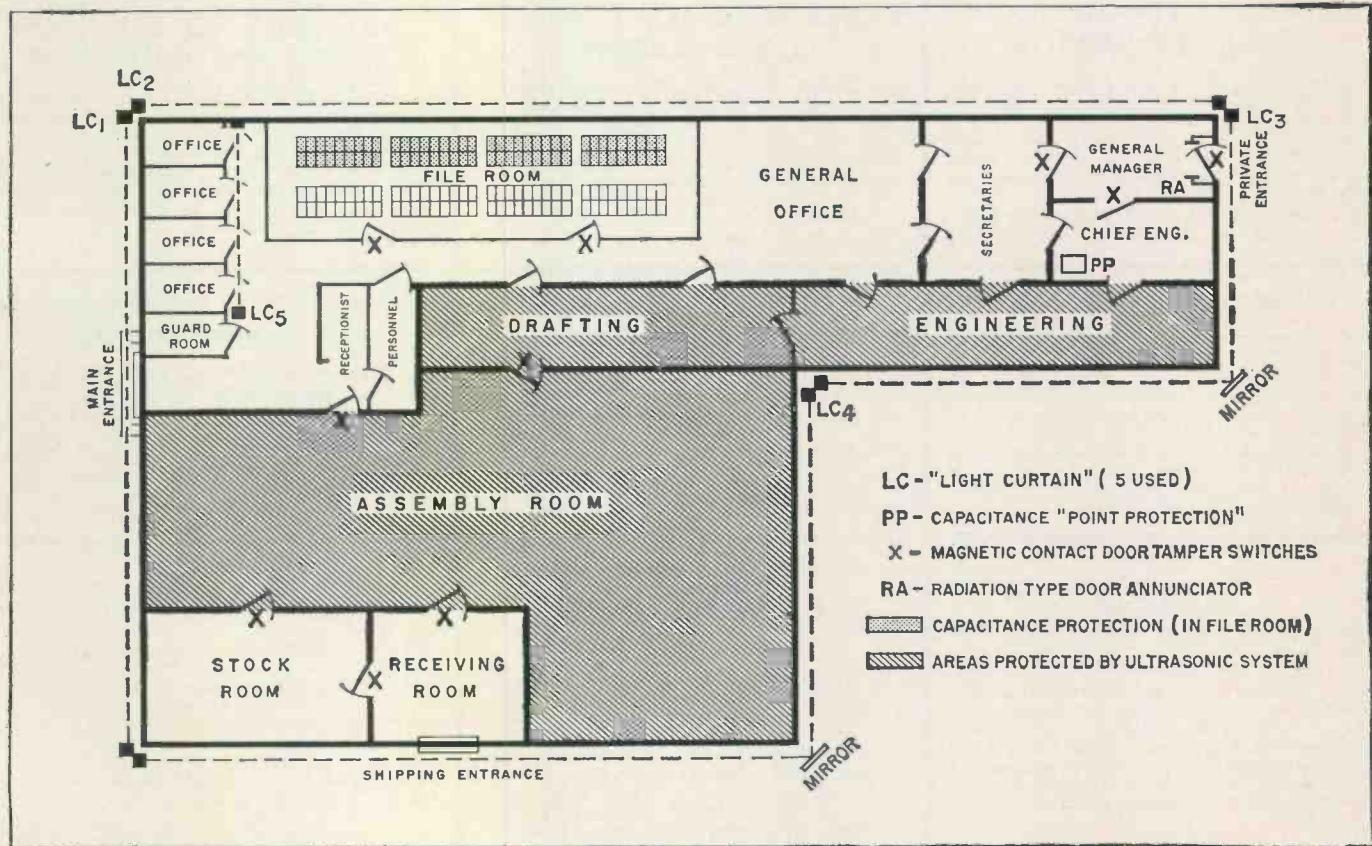
A file-safe in the Chief Engineer's office is protected by a capacitance "point protection" system. The Drafting, Engineering, and Assembly rooms are protected by individual ultrasonic systems, with audio monitoring provision on those systems covering the Drafting and Engineering areas.

Tamper switches are provided on doors into the Assembly and Stock

(Continued on page 77)

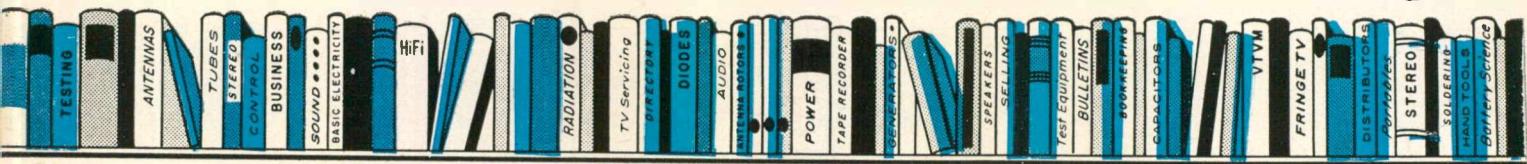
Fig. 4—A simplified lay-out of a typical electronics research, development and assembly plant showing how different critical plant areas

may be protected by employing various types of electronic devices. Major floor areas are guarded by an ultrasonic alarm system.



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TWO-WAY RADIO

By Allan Lytel. For the communications technician, and those interested in entering the field, this book covers mobile and fixed base stations. Theory is presented with a minimum of math. Antennas, selective calling, power supplies and test instrument chapters are included. Photos, drawings and charts are generously used. Hard cover, 304 pages. Price \$9.50.

INDUSTRIAL CONTROL CIRCUITS

By Sidney Platt. Excellent starting point for TV technician interested in learning about industrial electronics. Non-mathematical text explains circuitry and operation of power controls, relays, timers, photoelectric devices and instrumentation found in factories. Practical applications shown. Soft cover, 200 pages. Price \$3.90.

101 WAYS TO USE YOUR SIGNAL GENERATOR

By Robert G. Middleton. A fine collection of brief explanations on how to use the generator for various tests. Twenty-five equipment checks are presented, seven antenna tests, 27 AM-FM receiver tests, 28 TV tests, 10 component tests and four miscellaneous. Each description briefly lists the required equipment connections etc. Soft cover, 123 pages. Price \$2.00.

HOW TO USE METERS

By John F. Rider & Sol D. Prensky. Revised and brought up-to-date, this second edition includes such instruments as transistorized voltmeters and digital displays. Among the many meters covered are ohmmeters, voltmeters, milliammeters, wattmeters, panel meters, grid dip, VTVM, thermocouple meters and many others. Testers are pictured with circuit schematics. 216 pages. \$3.50.

BASICS OF INDUCTION HEATING

By Chester A. Tudbury. Volumes 1 & 2. Vol. 1: presents principles of induction heating equipment. How it works, efficiency factors, etc. Higher mathematics avoided. Vol. 2: analyzes induction heating equipment from a practical viewpoint. Covers generators. Well illustrated. Soft covers. 140 & 144 pages. \$3.90 ea; \$7.80.

BASICS OF DIGITAL COMPUTERS (3 vols.)

By John S. Murphy. Using the easy-to-learn picture book technique, these three volumes explain the theory and functions of digital computers. Very little mathematics. Covers counting systems, computer language, programming, memories, logic diagrams, flip-flops, clamping, input-output and data processing. Soft cover, 416 pages. Price \$8.40/set.

IMPEDANCE MATCHING

By Alexander Schure. Divided into five major sections, this informative book covers power transfer, impedance matching devices, matching at audio and r-f, and matching in transistor circuits. Complete with tables, schematics and computation examples. Soft cover, 128 pages. Price \$2.90.

RADIO OPERATOR'S LICENSE Q & A MANUAL

By Milton Kaufman. This sixth edition gives you the information you need to pass FCC license examinations. In question and answer form similar to actual FCC tests, all eight elements are covered, including law, radiotelephone, radiotelegraph, aircraft and ship radar. Abbreviations, code, etc. included. Hard cover, 736 pages. Price \$7.10.

HOW TO INSTALL & SERVICE AUTO RADIOS

By Jack Darr. This second edition contains much practical information of real use to technicians. In addition to service data on antennas, intermittents, noise suppression, speakers and troubleshooting, transistorized and hybrid radios are covered. 6-12 volt conversions are explained. Soft cover 160 pages. Price \$3.25.

INTERNATIONAL ELECTRONIC TUBE HANDBOOK

Published by De Muikerkring N.V. An unusual format is used by this American-Foreign tube manual: diodes, triodes, etc., are numerically grouped by different color bands. A schematic drawing of the specific tube socket with a commonly used circuit stage is illustrated, with volt-amp values listed next to the pin number. 402 pages. Vinyl cover. \$4.00.

2-WAY MOBILE RADIO HANDBOOK

By Jack Helmi. The fast growing mobile radio field is expertly covered in 10 illustrated chapters exploring mobile radio, including: basic systems, receivers, transmitters, antennas, and control systems. One chapter covers servicing and setting up the shop. 208 pages. Soft cover. \$3.95.

PIN POINT TRANSISTOR TROUBLES IN 12 MINUTES

By Louis E. Garner, Jr. This comprehensive source of troubleshooting and repair information for all types of transistorized equipment, directly referenced to recently manufactured transistorized radios, TVs, hearing aids, mobile receivers, preamplifiers; audio amplifiers, auto radios, both hybrid and fully transistorized. 473 pages, soft cover. \$5.95.

101 WAYS TO USE YOUR ★ AUDIO TEST EQUIPMENT

By Robert G. Middleton. The author-technician gives you the benefit of his practical experience in checking out audio gear. A typical one of the 101 items mentions test required, discusses the equipment, connections, procedures, and evaluation of results. A test hookup is illustrated. Soft cover. 136 pages. \$2.00.

OBTAINING & INTERPRETING TEST SCOPE TRACES

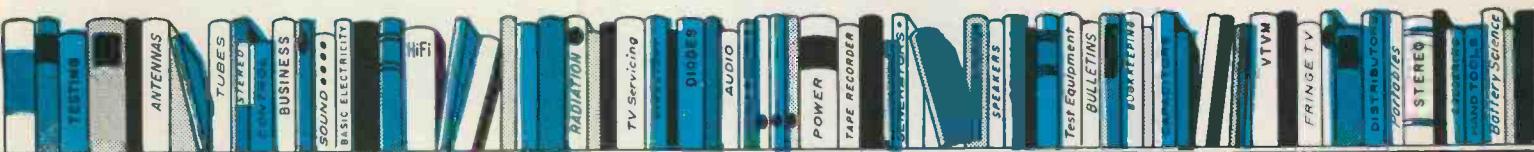
By John F. Rider. This handbook shows how to get the most out of your oscilloscope. Over 800 traces are shown, including sine, square, rectangular, trapezoid, sawtooth differentiated and integrated types. Explains scope connections, manipulating controls and test setups. Soft cover, 190 pages. Price \$3.00.

BASIC ULTRASONICS

By Cyrus Glickstein. This excellent book, replete with many illustrations, covers the subject of ultrasonics from the fundamentals of sound through the various types of equipment in use, to a wide variation of applications. Topics include ultrasonic generators, transducers, pulsed output and transistorized equipment. 144 pages. Soft cover. \$3.50.

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SERVICING TRANSISTOR RADIOS

By Leonard D'Airo. After a brief discussion of fundamentals, the text goes into radio circuits, servicing techniques, tests, measurements and dictionary of transistor terms. Interchangeability chart covers a variety of close replacements, including number and type. Soft cover, 224 pages. Price \$2.90.

HOW TO RUN A SMALL BUSINESS

By J. K. Lasser. Here is a basic business guidebook for service dealers and other operators of retail and small manufacturing firms. Covers record keeping, avoiding frauds, tax management, credit sales, insurance programs, how to buy an established business, financing and other important topics. Hard cover, 400 pages. Price \$4.95.

Books Described Previously

BASIC TELEVISION (5 vols.)	\$10.00
INTRODUCTION TO PRINTED CIRCUITS	\$ 2.70
BASIC ELECTRONICS (5 vols.)	\$10.00
CLOSED CIRCUIT & INDUSTRIAL TV	\$ 4.95
ELECTRONIC MUSICAL INSTRUMENT MANUAL	\$ 7.50
HANDBOOK OF BASIC CIRCUITS, TV, FM, AM	\$ 7.50
PINPOINT COLOR TV TROUBLES IN 15 MINUTES	\$ 5.95
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★ TUBE CADDY TUBE SUBSTITUTION GUIDE BOOK

By H. A. Middleton. A pocket size guide for caddy use, includes a list of foreign tube substitutions. It covers direct substitutions only and is divided into 4 sections. Sec. 1: lists substitutions with a "good" or "excellent" coding. Sec. 2: some ruggedized substitutions. Secs. 3 & 4: European-American substitutions. Soft Cover. 56 pages. \$0.90.

100 ELECTRONIC CIRCUITS

By Milton Aronson & Charles Kezer. Here is a useful basic circuit reference book covering a wide variety under eight major sections, including power supplies, amplifiers, oscillators, pulse circuits, test instruments, alarms, phototubes and miscellaneous. In addition to the schematic, a page or two of text accompanies each circuit, explaining the operation and characteristics. Soft cover, 180 pages. Price \$2.00.

Also See New Books on Page 72

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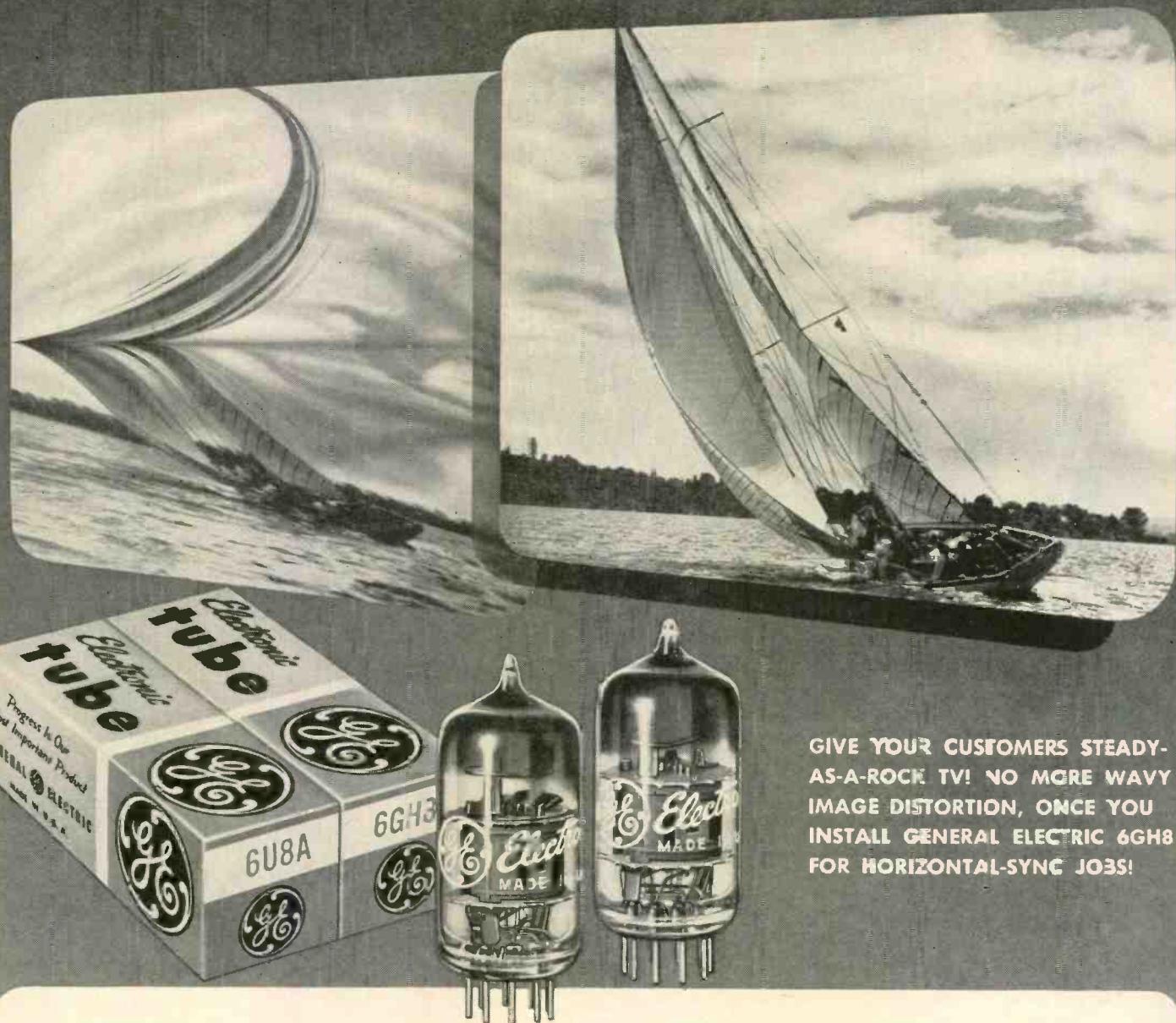
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311-3CE

(Continued from page 39)

NORTH CAROLINA

... Yes, we would be willing to meet with service dealer representatives. We think this is a good idea.

Freck Radio & Supply Co., Inc.
Asheville

OREGON

... Your letter pertaining to the increasing tension between electronic parts distributors and service dealers of unwaranted sales to consumers at wholesale prices, was most welcome and we would like to express our desire to meet with service dealer representatives. We make it a policy, as an associate member of all of the active service dealer associations in our area, to have a representative present at each and every meeting in order to keep abreast of the complaints of this nature the service dealers might have.

Lou Johnson Co.
Eugene

SOUTH DAKOTA

... The servicing dealers of Sioux Falls called in the distributors for a meeting for this specific purpose. They are disturbed that we as distributors are selling parts and supplies to part time servicemen, who hold other jobs and work in the evenings give competition to the legitimate service dealer. Servicemen propose that cards be issued to those people eligible to buy electronic parts from local distributors, but this idea went over like a lead balloon. We explained to the service dealer that we were sympathetic with his problem and none of the Sioux Falls distributors are interested in selling parts to anyone who is not doing legitimate service work. The meeting ended in harmony but nothing was actually accomplished. The problem really is that we're over staffed with service people in our town. However, there always seems to be a few servicing dealers who, because of good management and good business practices are making an excellent living. The boys who cry the hardest are usually the small time service shop, who himself started as a part time service shop and is still trying to run his business that way.

McKenzie Distributors, Inc.
Sioux Falls

TENNESSEE

... I would be glad to meet with service dealer representatives.

Clark Radio Supply
Bristol

TEXAS

... We would be glad to sit down with any group and discuss the problems of our industry; however, we consider it wrong for certain service groups to enter into conspiracies to try to prevent any newcomer from entering the service business, and we would not become a part of such a conspiracy. We would lend our support financially to a service organization dedicated to the upgrading of the television service man.

Alltronic Supply, Inc.
Amarillo

... You are right, there has been increasing tension between the service dealers and parts distributors and your assistance of-

fered is most commendable. We will be happy to work with you, your group, or any reasonable service-dealer representation to see if we can't work better together than by opposing each other. The distributor is NOT against the service dealer; he is for him. Since we are not carrying specific ham and industrial items, we do not have the problem some distributors have of selling the individual buyer, the industrial technician, the ham, for his own use. But we cannot blame the distributors that do sell them. Can the distributors say "We'll sell your company but we will not sell to you" and retain the industrials' business? Your help in getting all parties to understand the viewpoints and problems of the others is a step greatly needed in some quarters.

Electronic Headquarters
Austin

UTAH

... We would be very happy to meet with other distributors and service dealers to discuss common problems for the benefit of the industry. We do not have a local distributor association, but I am sure the other distributors realize the seriousness of conditions and would be agreeable to such a meeting.

Standard Supply Co.
Salt Lake City

VIRGINIA

... Our policy has been since our inception to deal strictly with service men and no over the counter sales. Our relations with our dealers are excellent. We would be willing to meet with service dealers any time.

Arlington Electronic Wholesalers, Inc.
Arlington

WASHINGTON

... Any distributor or manufacturer, including the "catalog house" is better off not selling to the public at either wholesale or retail prices. In other words, the wholesaler, no matter how small or large his operation, has a definite wholesale function to fulfill. The situation is entirely in the hands of the dealers, who can, as individuals, control it by not purchasing from those who sell to dealers' customers. Such meetings as you describe have taken place repeatedly in our area, and we cannot see that they have been in any way effective. They seem merely to provide a sounding board for the wholesaler who doesn't want to discontinue his retail sales.

W. A. Geiger Radio
Ellensburg

WISCONSIN

... Yes, the service dealer should have done this a long time ago.

Harris Radio Corp.
Fond du Lac

Association Statements

NATIONAL

... You can be sure that NATESA has always had the latch string out for any group within the overall industry that is willing to discuss mutual problems. We have on many occasions expressed our views on that subject. We are at this very moment in process of top level exploration

with NEDA of the possibility of a meeting on mutual problems. I expect that such a meeting may take place shortly because "many chickens are beginning to come home to roost."

Frank J. Moch, Executive Director
NATESA
Chicago, Ill.

ILLINOIS

... I plan to ask some of our members to have a meeting the next few weeks and discuss in detail your request for answers to the questions. We have some ideas and would like to finalize them jointly and submit to you our ideas on these questions which you have raised. As I mentioned in a previous letter, it was and still remains my main contention that the distribution problem is perhaps the greatest evil which the servicemen have had to contend with, and we tried by picture to bring this home to servicemen.

Howard Wolfson, Editor
Associated Radio & TV Servicemen
Chicago

KANSAS

... Certainly TESA of Kansas would welcome any such meeting and an open discussion on the subject above mentioned. We would also make some concrete suggestions covering business practices. Definitely we are opposed to any firm that represents themselves as Wholesalers selling to the public at either wholesale or retail. If a firm sets itself up as a wholesale outlet and expects the business of the retail dealer then they should abide by the choice they have made and so operate. If they wish to engage in retail selling then they should go into retail and not wholesale field. We would slowly but surely try to convince our members that they should carry and display an adequate stock of merchandise for sale to retail customers so that it would not be necessary for these retail buyers to wait for them to order from their supplier.

Earl H. Mullenax
TESA of Kansas
Wichita

MINNESOTA

... Our association has always been willing to meet with distributors to discuss our problems. We are proud of conditions as they exist in St. Paul today. Distributors and Factory Representatives are all considered honorary members of our Association and a good many of them regularly attend our monthly meetings. There is only one distributor that refused to cooperate with our group—consequently none of us make any purchases from him and he continues his past practices of selling retail to anyone calling at his store. We have had a local city licensing ordinance for TV repairs since 1955. This ordinance clearly states that anyone in the business of repairing TV or radios must have this said license. Our local distributors have agreed to sell only to licensed shops and the regular industrial trade. Our local distributors are convinced that their future depends on our future and are only too willing to do anything that will benefit the industry. Our local licensing ordinance was the start and is the foundation for all the good productive results we have ob-

tained in getting recognition from the Chamber of Commerce, Better Business Bureau, Minnesota State Department of Business Development, the local newspaper, phone company and the public at large. All shop owners throughout the good old U.S. should greatly appreciate your stand in this controversy.

Joe Driscoll,
Chairman, Civic Affairs
TESA of St. Paul
St. Paul

MISSOURI

... I am writing as a representative of TESA St. Louis (affiliate of NATESA). Our association would be more than willing to meet with distributors to discuss the problem. The six steps you have for combatting the problem in the July editorial do not leave much to be added, except that I believe that the service dealers should cooperate fully with any distributor who agrees to sell only to qualified servicers. No matter what his feelings have been in the past towards the distributor. Wholesale to everyone is undoubtedly our most serious problem today. I feel that you have made a giant step forward in attacking this. You have certainly gained a lot of respect with servicing dealers.

Gene Love, President
TESA St. Louis
St. Louis

NEW JERSEY

... Question 1. We, the Tri-State Council members as well as others (electronic technicians) in the Tri-State area have already, as you may know, met with our local distributor/jobbers to discuss the problems mentioned and we would do so again, if it will bring to us, *honest recognition* and a *better* understanding of the problem. Question 2. (a) At our recent successfully held Tri-State TELERAMA '60 in Atlantic City, N. J. on June 24, 25, 26th the following motion was adopted at the service industry forum (held on Sunday afternoon) to obtain better public relations. We, the Tri-State Council of TV Service Associations (Del., E. Pa., and N. J.) plan to establish "What are fair prices for TV repairs" by circulating questionnaires to all technicians in the Delaware Valley, concerning their current technical & operating charges and thereby coming to an average with which we can base what will be considered a "fair standard" (comparable to other technical professions). The "consumer" must then be educated, not to accept higher and higher prices, but to accept what shall be considered by each individual servicer, as fair technical and operating charges. I answer to Question 2. (b) Distributors selling to the public has been going on and seems to increase mainly because there are "too many" distributors trying to spread their tentacles in too many places. "8 (or 9 or 10 or 11 etc.) GREAT STORIES TO SERVICE YOU"—I'm sure they don't mean (to serve) me. Unfortunately they seem to have the attitude that the serviceman is a "necessary evil" or that he is unimportant. I think we have what might be considered as, "illegitimate part-time distributors" and the manufacturers should take cognizance of the "facts" or maybe they don't "give a hoot"! For years, I've

felt that the "distributor" was to blame for the loss of electronics technician "prestige." When they (the distributor/jobber) sold the consumer public at wholesale prices and made us look like "crooks" instead of businessmen. From this, stemmed the factory and captive service problems as a result. Manufacturers, distributors and service should unify their efforts to correct this—NOW! They (the manufacturers) should keep in mind—the legitimate technician (not the milkman, truck drivers, etc.) is the liaison between the "MAKER" and the "USER" of *all ELECTRONIC EQUIPMENT!* (Whew!) Tony De Franco, Editor

The Vanguard
Tri-State Council of TV Service
Associations
Camden

NEW YORK

... We have already held two monthly meetings with our local distributors. It is planned that we will continue such meetings after the hot weather has subsided. The most recent meeting was last month at which time we feel that some gains were made. Distributors have (last year) agreed to stop open type of mailings in which the net prices are in plain sight. All distributors in attendance agreed to obtain the names and addresses on all cash sales. Each agreed to attempt to discourage the retail trade from entering their stores. They also state that they will institute a sliding scale of discounts with the full time techs receiving the better break. One very important door has been opened. Heretofore, if we should confront a wholesaler with the fact that he may have sold a tube or part to one of our customers, he would laugh in our face. The last meeting saw a suggestion made by one of our local members, that we form a committee to whom any cases of sales to consumers by a distributor could be reported. This committee would then in turn, confront the distributor in question with the information. In this way, the owner of the distribution company would gain the facts first-handed instead of through the grapevine. This suggestion was made as a stab in the dark and to our surprise, the distributors represented agreed to abide with the suggestion. We might add that one particular distributor is partly responsible for the group's agreement. This party was the first to emphatically agree by saying it was a darn good idea. This same distributor was also the first one to decide to sell only to the recognized trade. He has been doing this for the past two or three months now and says he can see an improvement in his business. As for any concrete suggestions about business practices, I am not too sure that at this time anyone has the answers to this problem. We of service can help by not sending our customers to the wholesaler to pick-up parts. Once a customer finds out where our suppliers are, he will then go back again. We also can help by supporting our own local distributors. The distributors can help the most by not selling to the public *at all*.

Warren Baker, Secretary
TSA
Albany

... Yes!

Elmore L. Bement, Secretary
Western New York Electronics Guild
Buffalo

NORTH CAROLINA

... We surely appreciate your position and help in our problems. Our association has met with local distributors with little or no difference. One distributor flatly stated he intends to run his business the way he wants and for us to do the same. Needless to say the bulk of his trade is to the general public and part-timers of which we are overly (blessed?) with. We have a few part-timers who are well qualified but the majority are electronic butchers. Our attempts to expose these and the shady full time operators has only brought criticism.

Radio & TV Service Dealers Association
of Durham
Durham

OHIO

... I have been a full time shop owner for 31 years, have subscribed to many different Technical Magazines during these years. Never, and I do mean NEVER, have I come across a Technical Magazine, with the EXCEPTION of Electronic Technician, who was willing to go to battle for the technician. Electronic Technician through your fine editorials calling to the attention of the service industry the many problems of the service dealer and technician, has done much to assist in our fight against unfair practices. In your letter you ask for the answers to two questions: 1. Our state association and any of our local associations would be more than willing to meet with the distributors to discuss the problem of retail sales to the public at wholesale prices. 2. We would recommend the following business practices be followed by all technicians and service dealers: (a) Buy all parts from local parts distributors. (b) Pay all of your bills as soon as due. (c) Don't "chisel" your distributor, he also has to make a living. (d) Make no purchases from a distributor who sells your customer. We would recommend the following business practices be followed by all part distributors: (a) Give the best discount you can, and still make money for the business. (b) Don't sell to any one who cannot give you evidence of being in the service business. (c) Don't permit employees to purchase parts for their friends. (d) Don't permit your employees to service on the side. (e) Make a definite decision which is the most important for the future of your business: the occasional retail sale or the business of the service dealer month in and month out.

J. P. Graham, Secretary
TESA—Ohio
Columbus

... Most assuredly our association would be willing to meet distributors to discuss this problem. We have been working on concrete suggestions covering business
(Continued on page 66)

TUBES ARRIVE



SAME DAY!



Shipping parts or entire sound units? Remember, speedy shipment of delicate goods is a specialty of Greyhound Package Express. Shipments going hundreds of miles can arrive *the same day they're sent!*

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DOUBLES YOUR EFFECTIVE MANPOWER



Fix "Tough Dogs" Fast!

Save Half Your Time!

Step Up Your Profit!

B&K NEW
MODEL 1076

TELEVISION ANALYST

for Black & White and Color



Check all circuits—Pinpoint any TV trouble...in minutes

By Easy Point-to-Point Signal Injection,
You See the Trouble on the TV Screen and
Correct it—Twice as Fast and Easy!

There's no longer any need to "lose your shirt" (and customers)—and worry about the lost hours you never recover—on "tough dogs" or even intermittents. The remarkable B&K Analyst enables you to inject your own TV signal at any point and watch the resulting test pattern on the picture tube itself. Makes it quick and easy to isolate, pinpoint, and correct TV trouble in any stage throughout the video, audio, r.f., i.f., sync, and sweep sections of black & white and color television sets—including intermittents. Makes external scope or wave-form interpretation unnecessary. Most useful instrument in TV servicing! Its basic technique has been proved by thousands of successful servicemen the world over.

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Model 1076. Net, \$2995

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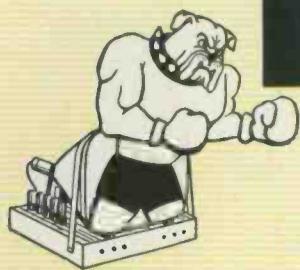


B & K MANUFACTURING CO.

1801 W. BELLE PLAINE AVE. • CHICAGO 13, ILL.

Canada: Atlas Radio Corp., 50 Wingold, Toronto 19, Ont.

Export: Empire Exporters, 277 Broadway, New York 7, U.S.A.



"Tough Dog"

Corner



Difficult Service Jobs Described by Readers

Misaligned Switch Wafer Weakens Reception

A General Electric Model 14T020 TV receiver was brought into the shop when tube replacements failed to correct its weak reception. The customer said that the set had always been weak, even when new, and that a new antenna had failed

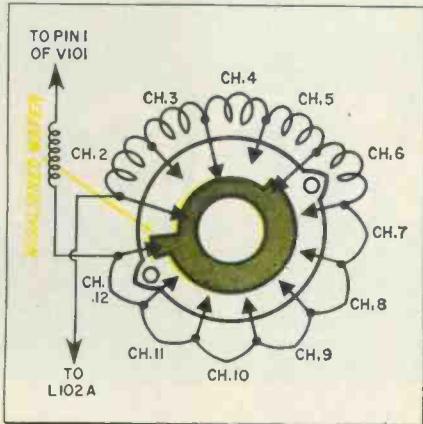


Fig. 1—A G-E tuner wafer was misaligned, resulting in weak reception on all channels.

to improve reception.

The i-f gain was checked and found normal. This indicated that the trouble was in the tuner. Voltage checks proved to be normal and several tubes were tried with little change in operation. (The tuner uses a neutralized tetrode for an r-f amplifier and some tubes perform better than others.) Next, resistance checks were made and the antenna coil checked, but all measurements were still normal.

This switch tuner had four wafer sections and I noted that the finger on the rotor of the third wafer, which feeds the converter grid, was

90 degrees out of alignment from the others (see Fig. 1). A quick check of the schematic showed that all the rotor fingers should be pointed in the same direction.

After disassembling the tuner and aligning the third wafer rotor with the others (the center shaft is square, permitting a 90° change in position), the set worked perfectly. Voltage and resistance readings were not affected because the coils on this wafer are isolated from the rest of the circuit, as far as d-c is concerned, by small-value capacitors.—Albert J. Krukowski, West Springfield, Mass.

Cable Contamination Causes Snow

What appeared to be a routine service call for a complaint of poor signals on the weaker channels, became an involved shop repair. The set in question was a Zenith 19A20.

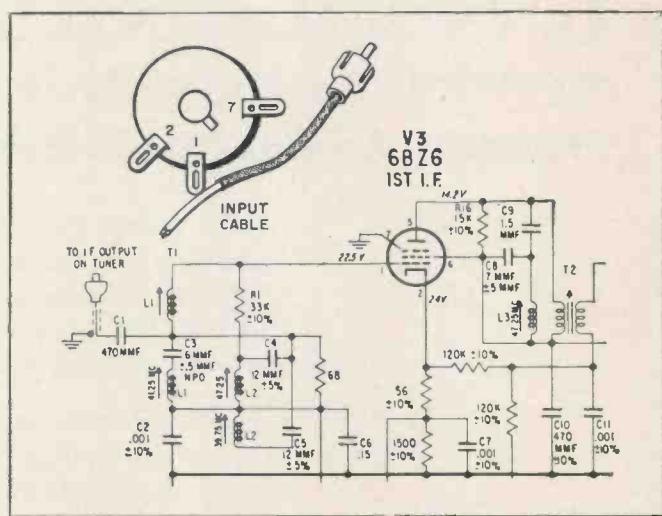
The customer complained that the strong channels were normal, but the distant ones were snowy, and the picture appeared "faded looking." After substituting the appropriate tubes and checking the antenna—the condition remained. Consequently, I informed my customer the set needed shop attention and he consented.

Voltage checks were made in the shop and a damaged B+ resistor in the 6BZ7 cascode r-f stage became suspect, (a common ailment in tuners employing cascode circuitry). A check of the tuner was made, revealing no defects. Next, I measured the i-f plate voltages, and found them to be normal. The agc voltage also appeared normal.

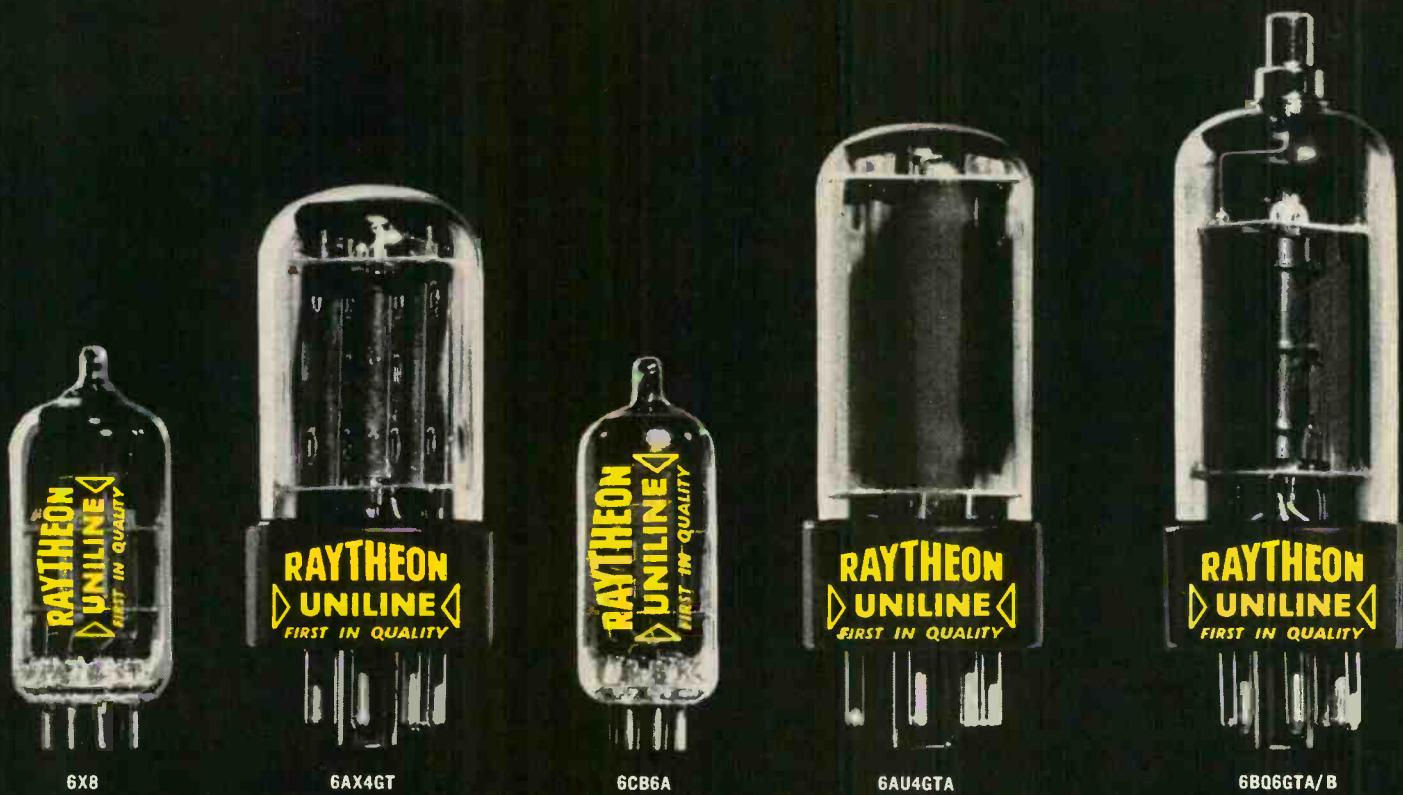
A more thorough check of the first video i-f voltages, as shown in Fig. 2, uncovered a discrepancy. The grid and cathode were about twenty volts

(Continued on page 76)

Fig. 2—A defective tuner cable with a 20,000 ohm short between the inner lead and grounded shield caused snow and poor video detail in a Zenith 19A20 TV set. Pressing against the 1st video i-f tube's grid socket pin, it created a partial grid-to-ground short.



Your votes made these Raytheon tubes



THE TEN MOST

UNILINE—Raytheon's new standard of receiving tube quality is the result of your votes in our Crusade Against Call-Backs.

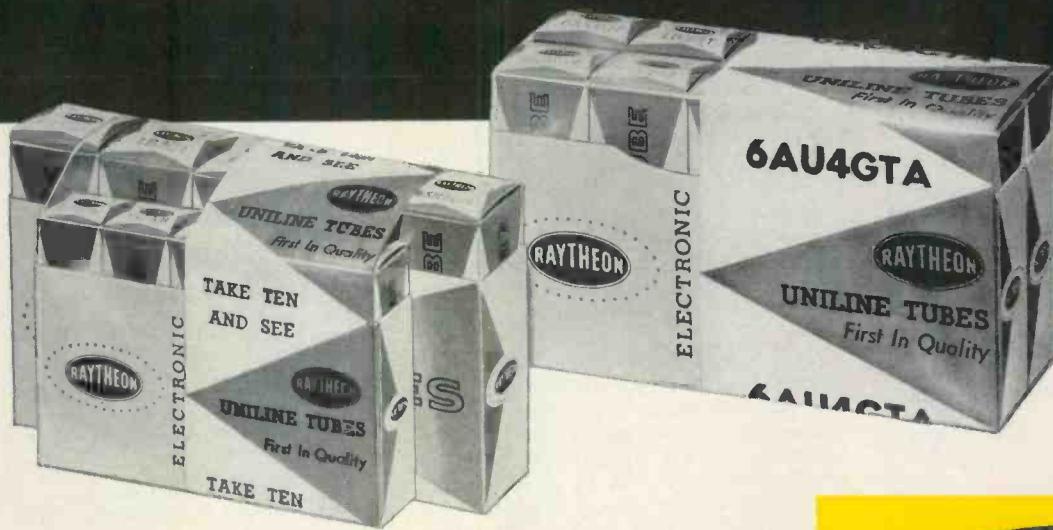
Raytheon took the ten tube types you voted to be the greatest troublemakers (regardless of brand) and made them the front-runners in our new line of tubes—UNILINE. With new improvements, new packaging, and a unique sampler "Ten-Pack," these tubes were introduced to the market only three months ago. Result? Tremendous acclaim from every section of the industry!

UNILINE receiving tubes give you trouble-free performance, highest quality in the industry, happy service customers . . . minimum call-backs.* You can prove UNILINE superiority to yourself . . . simply call your Raytheon distributor today!

*See your distributor for literature describing unique Uniline features.



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10
and
See"*

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In your own car or boat!

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For Demonstrating and
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TRANSISTOR OR VIBRATOR
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By every test ATR Auto-
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and feature Ceramic
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There is an ATR VIBRATOR for
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Ask your distributor for ATR's Low Priced type 1400,
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There is a trim plate
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ATR CUSTOMIZED KARADIO

Vibrator-Operated with Tone Control

ATR KARADIO . . . is
ideal for small import
cars or compact
American cars! Unit
is completely self-contained—extremely compact! Pow-
erful 8-tube performance provides remarkable freedom
from engine static, and road noise. The ATR
Customized Karadio comes complete with speaker and
ready to install. Can be mounted in-dash or under-dash
—wherever space permits! No polarity problems. Neutral
Gray-Tan, baked enamel finish. Overall size, 7" deep,
4" high, and 6½" wide. Shipping weight, radio set, 7 lbs.
Model K-1279—12 for 12V Dealer Net Price . . . \$33.57
Model K-1279—6 for 6V Dealer Net Price . . . \$33.57

Airplane Style Overhead
Mounting under Cab Roof

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ATR TRUCK KARADIO

Excellent Tone,
Volume, and Sensitivity!

Compact, yet powerful. Fits
all trucks, station wagons,
most cars and boats. Just drill a ½ inch hole in roof and
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in minutes. Watertight mounting assembly holds antenna
upright. Yoke-type bracket lets you tilt radio to
any angle.

Extra-sensitive radio has 6 tubes (2 double-purpose),
over-size Alnico 5 PM speaker for full, rich tone. Big,
easy-to-read illuminated dial. Fingertip tuning control.
Volume and tone controls. 33-in. stainless steel antenna.
Neutral gray-tan enameled metal cabinet, 7 x 6½ x 4 in.
high over-all. Shipping weight 10½ lbs.
Model TR-1279—12A for 12V Dealer Net Price \$41.96
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WRITE FACTORY FOR FREE LITERATURE . . .

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Quality Products Since 1931
SAINT PAUL 1, MINNESOTA—U.S.A.

For more data, circle 9-58-1 on coupon, p. 78
58

News of the Industry

MERCURY ELECTRONICS has
named ALVIN GRAD as National
Sales Mgr.

SWITCHCRAFT reports the ap-
pointment of CLYDE J. SCHULTZ
as Sales Promotion Mgr.

WELLER ELECTRIC has been
joined by JOSEPH J. BARRESE in
the post of Industrial Sales Mgr.

BRAND PRODUCTS has announced
the appointment of JERRY ZUCKER-
MAN as Product Sales Mgr.

INT'L. RESISTANCE has an-
nounced the election of GEORGE D.
BUTLER, Dir. of Marketing, as a Vice
Pres. of the firm.

CBS ELECTRONICS has named
THOMAS S. HURLEY to the new
post of Supervisor of Merchandising and
Advertising for semiconductor
operations.

STROMBERG-CARLSON announces
the appointment of JOE M.
TITUS to the post of Dist. Mgr., high
fidelity sales in the Pacific Northwest
territory.

INT'L. RECTIFIER Distributor
Sales Div. reports the appointment of
WALTER L. SCHOTT as Mgr. The
Selenium Products Div. has announced
the promotion of JOHN D. VICKREY
to Sales Mgr.

RAYTHEON Distributor Products
Div. announces the following two ap-
pointments: RALPH B. KNAPP, JR.,
Mgr. of Operations, a newly-created
post; and BOYD B. BARRICK, Gen-
eral Sales Mgr. of the division.

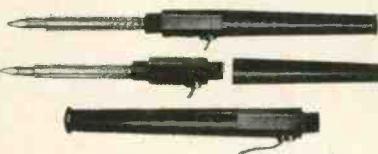
BLONDER-TONGUE Foundation
has awarded two grants to the MID-
WEST AIRBORNE TELEVISION
PROJECT called Stratovision: one
provides for instruction of teachers in
utilization of educational TV, and the
other is to equip a high school to re-
ceive programs televised on the pro-
ject.

RCA Electron Tube Div. is offering
independent TV service dealers four
new approaches to store improvement
and business development as the lat-
est phase of the "Set Up For Greater
Profits" program. An 11 lesson color-
TV home study course, prepared by
RCA INSTITUTES, also is offered as
part of the program. The Electronic
Tube Div. also announces the follow-
ing appointments: JOHN R. MEAG-
HER, Mgr. Electronic Instruments
Merchandising, Distributor Products
Dept.; and KENNETH B. SHAFFER,
Mgr., Distributor Sales.

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A Soldering Iron that Folds Up and
Tucks away in Your Pocket



Whether replacing a component that requires
30 seconds of soldering, or building Hi-Fi Amplifiers that require hours of continuous work,
you will find this unique Solder Pen less fatiguing
and more adaptable than any other soldering
iron that you have ever used. The shatter-proof
handle and cover is designed for durability, and the
Fast-Heating element packs 30 watts of useful power.
And when you are finished soldering,
you can unscrew the handle and use it to
cover the copper tip; you eliminate all chances
of burning yourself with a hot iron, and you
can put the iron into your tool case or pocket.
MODEL A 1000 List Price \$2.75

A complete line of Soldering Irons with the
Solder-Chief label is available at leading dis-
tributors. Or write to

L.I. ELECTRO-LABS, INC.

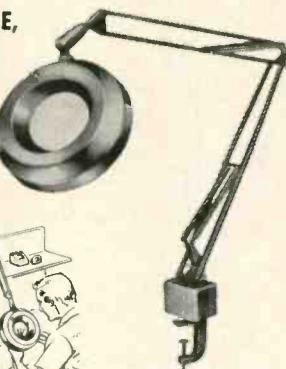
Dept. 502 AS

1186 Broadway Hewitt, N. Y.

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The LUXO MAGNIFIER IDEAL FOR VISUAL ACCURACY

ON SERVICE,
TEST AND
INSPEC-
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BENCHES.



The Luxo Illuminated Magnifier combines distortion-free magnification, cool, shadow-free fluorescent light and maneuverability into one versatile fixture.

The Luxo Magnifying Lamp reduces eyestrain
and fatigue and increases visual accuracy when
working with miniaturized circuits and assemblies,
reading parts numbers and making terminal
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Built into every Magnifier are the world-
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construction, flexibility, portability and service-
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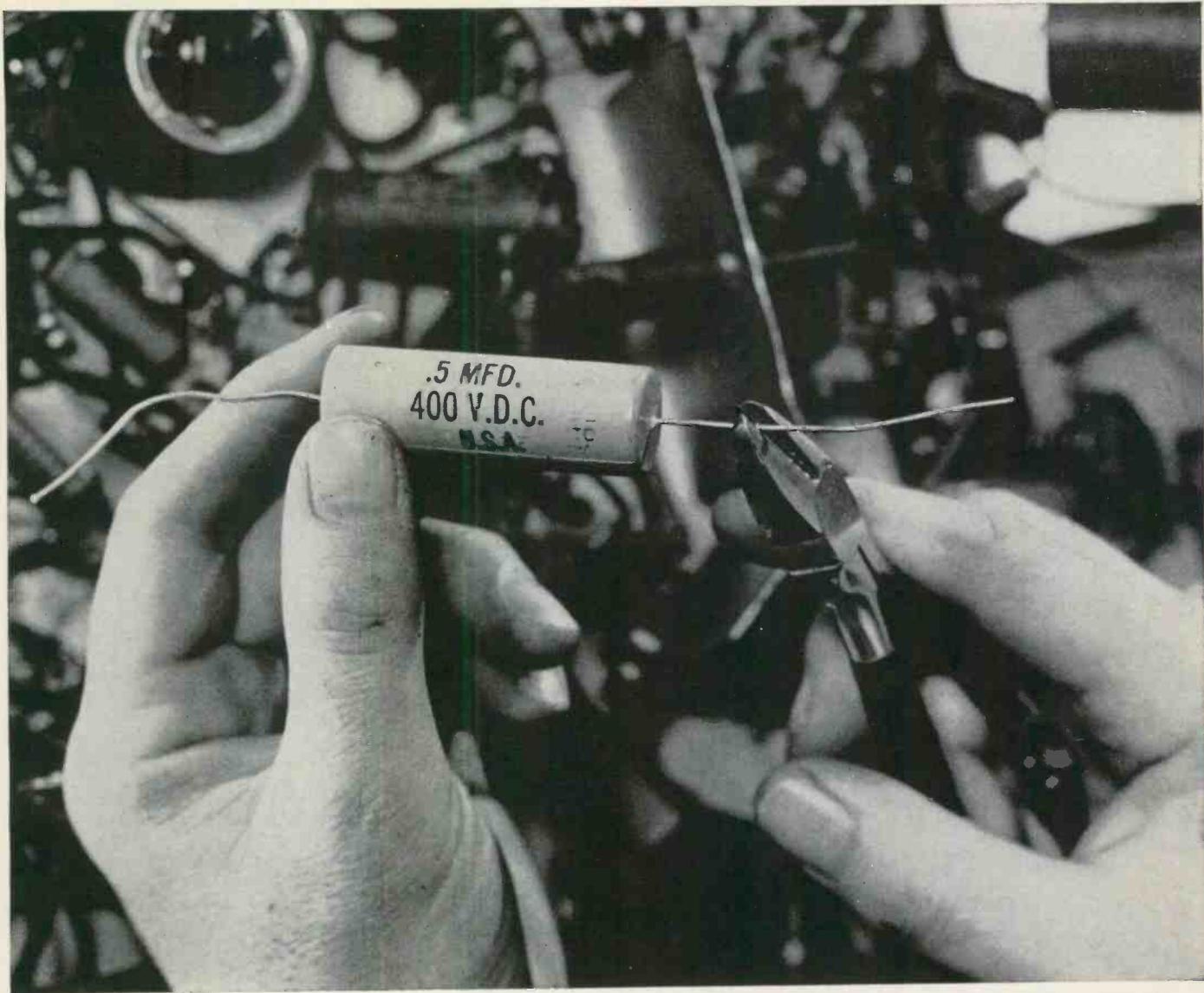
All UL approved.

Order from your supplier or write:

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For more data, circle 9-58-3 on coupon, p. 78
ELECTRONIC TECHNICIAN • September, 1960



This service man is installing insurance against costly call-backs...capacitors made with MYLAR®

You can save money by using capacitors insulated with "Mylar"® polyester film... eliminate wasted call-backs for failure of newly installed capacitors. "Mylar" means superior performance for four important reasons.

1. High dielectric strength . . . "Mylar" averages 4,000 volts per mil breakdown strength.

2. Long life . . . neither time, temperature nor highest humidities affect the stability of "Mylar".

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coupled with its great physical strength, permits its use in thinnest gauges. Smaller capacitors are ideal for hard-to-get-at jobs . . . save precious space.

4. Proven value . . . leading manufacturers make capacitors insulated with "Mylar" for critical military applications, missiles and sensitive electronic computers.

Next time you order, ask your distributor for the extra reliability, long life and economy of trouble-free capacitors made with "Mylar". And for test data that details the basic properties of "Mylar", write for Du Pont's free booklet. E. I. du Pont de Nemours & Co. (Inc.), Film Dept., Room #16, Wilmington 98, Delaware.



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BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

*"Mylar" is Du Pont's registered trademark for its polyester film.

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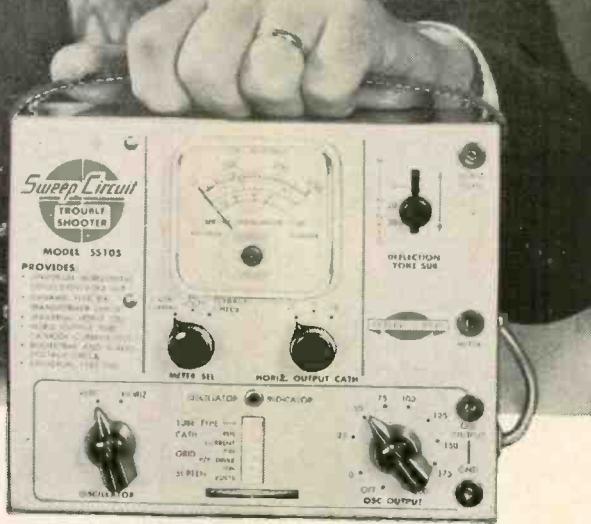
Pinpoint in Seconds...

HORIZONTAL & VERTICAL SWEEP TROUBLE SHOOTER

NEW

SENCORE

Time Saver



The missing link in TV service...

SENCORE SS105 SWEEP CIRCUIT TROUBLE SHOOTER

IT'S A...

UNIVERSAL HORIZONTAL OSCILLATOR. For direct substitution. No wires to disconnect in most cases. Traces trouble right down to the defective component. Variable output from 0-200 volts, peak-to-peak. Oscillator will sync to TV sync signal giving check on sync circuits.

HORIZONTAL OUTPUT CATHODE CURRENT CHECKER. A proven method that quickly checks the condition of the horizontal output tube and associated components. Adaptor socket prevents breaking wires. Easily replaceable Roll Chart gives all necessary pin, current and voltage data. New Roll Charts are Free.

UNIVERSAL DEFLECTION YOKE. A new, simple way to determine yoke failure accurately—without removing yoke from picture tube. Merely disconnect one yoke lead and substitute. If high voltage (also bright vertical line) is restored, TV yoke is defective.

DYNAMIC FLYBACK TRANSFORMER CHECKER. Merely flip switch to "Flyback Check" and meter will indicate condition of flyback transformer, in degrees of horizontal deflection. Extremely sensitive and accurate; even shows up one shorted turn on flyback.

VOLTMETER. For testing bootstrap, screen and other voltages. Direct-reading voltmeter, 0-1000 volts.

UNIVERSAL VERTICAL OSCILLATOR. Checks oscillator, output transformer and yoke. Merely touch lead to component and check picture on screen.

SS105 is completely self-contained, nothing else is needed. New Improved Circuit... DEALER NET 42⁹⁵



HORIZ. OSC.	VERT. OSC.
HORIZ. O.P. STAGE	VERT. O.P. STAGE
HORIZ. FLYBACK XFORMER	VERT. FLYBACK XFORMER
HORIZ. DEFLEC. YOKE	VERT. DEFLEC. YOKE

ALL PARTS

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ADDISON 2, ILLINOIS

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Vaco TERMINALS DISPLAY

"Cash Register Solderless Terminal Assortments," a new display in the form of a cash drawer, may be placed on the counter, hung on the wall or in front of the cash register. #5000 contains 1,000 non-insulated solderless terminals plus crimp tool. #4900 contains 500 insulated terminals plus special crimping tool. The display is free with the purchase of an assortment. 13 $\frac{1}{4}$ " wide, 9 $\frac{1}{4}$ " deep, 2" high; has 20 compartments for terminals and 1 compartment for tool. Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill.

For more data, circle 9-60-2 on coupon, p. 78



Reps & Distributors

SWITCHCRAFT has named WILFRED L. CALLAHAN as sales rep for the upper N. Y. State territory.

MORTON L. FRIEDMAN CO. has announced a move to new and larger quarters at 4751 N. Rockwell Ave., Chicago 25, Ill.

ELECTRONIC PUBLISHING announces publication of a 250 page catalog issued by FERGUSON ELECTRONICS, INC., including the products of 80 manufacturers.

SYLVANIA announces the appointment of SABINE SUPPLY CO. as franchised distributor of their TV sets, radios, and stereo phonos in the Dallas-Ft. Worth area.

MCLLOUD & RAYMOND reports that GEORGE A. BROWN has joined the staff to head the new offices at 4220 Mackay St., Salt Lake City, Utah.

SLATE & CO. has named LEONARD B. KELLERMAN to the post of Bronx Dist. Mgr.

STONE SALES CO. announces publication of "The Corner Stone," to reach distributor personnel not normally contacted by the representative. Currently being sent direct to over 600 distributor personnel in the Southern Calif. area, interested and qualified persons may receive the publication monthly by writing the company and submitting their names, home addresses, and name of their employers.

Catalogs & Bulletins

1961 ELECTRONICS CATALOG: 320 pages. Covers the firm's own equipment, in kit form and completely assembled. Also: latest stereo hi-fi components of major manufacturers; selections of radio & TV components and accessories; CB equipment, PA equipment and parts, etc. Lafayette Radio Electronics Corp., 165-08 Liberty Ave., Jamaica 33, N. Y. For more data, circle 9-60-3 on coupon, p. 78

TV COMPONENTS: Bulletin #569 covers: deflection yoke, DY35A, exact replacement for Philco #76-9173-13 and 76-9173-14; deflection yoke, DY36A, exact replacement for Emerson #708353. Both have extensive application in TV sets using 90° deflection tubes. Also covered: filter choke C-2343 with an inductance of 0.75 Henries at 300 d-c MA. Chicago Standard Transformer Corp., 3501 Addison St., Chicago 18, Ill.

For more data, circle 9-60-4 on coupon, p. 78

SOLDERING TOOLS: Catalog VG-250, 12 pages, contains latest prices, description and illustrations of soldering irons, soldering pencils, safety tool-holders, solder pots, wax pots, glue pots, and branding irons. Vulcan Electric Co., 88 Holten St., Danvers, Mass. For more data, circle 9-61-2 on coupon, p. 78

TRANSISTOR CHECKER: Technical bulletin covers new model 1003 transistor checker, which permits direct reading of the following d-c parameters: Beta, ICO, Inverted Beta, and IEO. Included are: description; method of operation; specifications; and prices. Dynatron Labs., 71 Glenn Dr., Camarillo, Calif. For more data, circle 9-61-3 on coupon, p. 78

CB 2-WAY RADIOS: A colorful, illustrated circular describes "CBD" citizens band two-way radios. Explanation of citizens band radio; licensing and operating information, description of the "CBD" models, specifications, prices, and listing of accessories are included. Pearce-Simpson, Inc., 2295 N.W. 14th St., Miami, Fla.

For more data, circle 9-61-4 on coupon, p. 78

WIRE SOLDER TOOL: Illustrated literature and parts list, quantity prices, etc., are available covering a new line of Kormat bayonet type probes, designed to provide effective universal simplification of soldering, particularly in hard-to-reach places. International Electronic Research Corp., 135 W. Magnolia Blvd., Burbank, Calif.

For more data, circle 9-61-5 on coupon, p. 78

TUBES & PARTS: A free Certificate, suitable for framing, stating that the dealer uses only brand new, first quality, nationally advertised, standard brand tubes and parts is offered to service dealers who purchase nationally advertised standard brand tubes, parts and components. Free price list also available. Universal Electronics Corp., 8 Gary Rd., Syosset, N.Y.

For more data, circle 9-61-6 on coupon, p. 78

PARTS, TUBES & ACCESSORIES: Twelve years of the firm's TV, plus radios, record players, and phono combinations are covered in an all-new, looseleaf, plastic-bound, manual. Twenty sections, with many cross references. Accessories, range from antennas and batteries to tubes, and wrenches. Electrical and mechanical specifications, over 375 pages. Available through Zenith distributors only, at a special introductory price. Zenith Sales Corp., 6001 W. Dickens Ave., Chicago 39, Ill.

PRINTED CIRCUITS: Printed Circuit Replacement Manual, K-352, 16 pages, lists ceramic-base printed electronic circuits used in radios and TV sets manufactured from Jan. 1950 through Jan. 1960. Also, tabulation of the firm's line of 179 replacement printed circuits with schematic drawings, ratings, prices, etc. Available without charge from the firm's distributors, or by sending 10¢ to Sprague Products Co., North Adams, Mass.



SENCORE "MIGHTY MITE" TUBE CHECKER

Answers the needs of the fast moving, profit minded serviceman who hates time consuming call backs. A "mite" to carry but a whale of a performer that spots bad tubes missed by large mutual conductance testers.

New unique "stethoscope" approach tests for grid emission and leakage as high as 100 megohms, yet checks cathode current at operating levels. Special short test checks for shorts between all elements. The MIGHTY MITE will test every radio and TV tube that you encounter (over 1300!) plus picture tubes, foreign, five star and auto radio tubes (without damage). As easy to set up as a "speedy tester" from easy to follow tube booklet. New tube charts free of charge.

AND check these added Sencore servicing features: • Meter glows in dark for easy reading behind TV set • Stainless steel mirror in cover for TV adjustments • Rugged, all steel carrying case and easy grip handle • Smallest complete tester made.

Model TC109.....DEALER NET 59⁵⁰

Ask your distributor for the "MIGHTY MITE" with the mirror in the cover

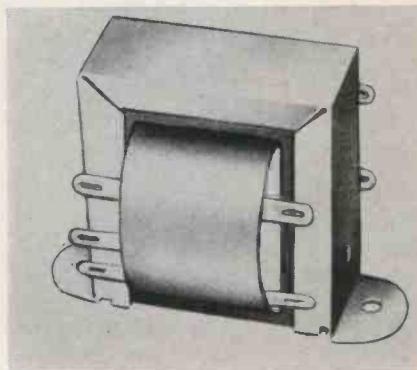


For more data, circle 9-61-1 on coupon, p. 78

Stancor PA TRANSFORMERS

Three new 70.7v line to voice coil transformers have been added to the firm's line of public address transformers. Each of the new units covers a 5 watt power range, by steps of 1 watt. A-8080 is 1 to 5 watts; A-8081 is 6 to 10 watts; and A-8082 is 11 to 15 watts. All units have primary impedances that are matched to the proper 70.7v line power steps and have secondary impedances of 8 and 16 ohms. Chicago Standard Transformer Corp., 3501 Addison, Chicago 18, Ill.

For more data, circle 9-61-7 on coupon, p. 78



SHOP HINTS



Tips for Home and Bench Service

Speaker Needs Ground Return

If you get a 1960 Pontiac, Chevrolet, Oldsmobile or Buick radio on the bench (or one of many earlier

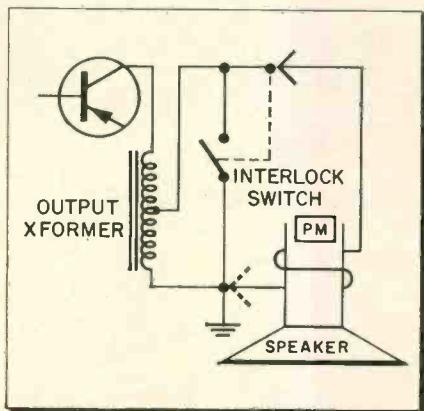


Fig. 1—When this auto radio speaker is plugged into the set while on the bench for repairs, the interlock switch is automatically opened. If a separate clip-lead ground connection is not made between speaker frame and chassis, the transistor can "pop." —Frank M. Dickinson, Stony Point, N. Y.

radios), don't assume the speaker is grounded to chassis. Ground the speaker to the radio chassis with a clip lead. If not, you can "pop" the output transistor.

Referring to the schematic in Fig. 1, note that the output stage has an interlock switch between the output transformer and the speaker. The purpose of this interlock switch is to ground the output transformer speaker tap in case the speaker is disconnected. This provides a load for the output at all times.

Suppose only the one speaker lead is connected to a radio on the bench and no ground return is used. In this case the interlock switch is open, the speaker is ungrounded, and there is no load on the output transformer. If the volume of the radio is now turned up, transient

spikes across the output transformer of 80 to 90 volts could be developed, exceeding the transistor limits.—General Motors Corp., Delco Radio Div., Kokomo, Indiana.

Substitute TV Control Shaft Covers

The plastic needle guard that accompanies every "Power Point" phono cartridge can perform another useful job—as TV control shaft covers. They are easily adapted to replace worn rubber control shaft covers found on many rear TV controls. The original equipment rubber covers crumble away over a period of years.

They can also be used to identify auxiliary operating controls at the rear of the receiver. This would minimize the chances of a customer disturbing the vertical linearity or height control, when he wants to increase brightness.—Frank M. Dickinson, Stony Point, N. Y.

Repairing Arcing Fly-Backs

The problem of eliminating corona discharge or high voltage arcing from a fly-back transformer, especially at the coil end of the H.V. rectifier plate lead, frequently arises. I have tried acrylic sprays and corona dope with only partial success.

When acrylic spray doesn't overcome the condition I strip the "wax" insulation coating from defective horizontal output transformers, melt some of this and allow it to flow to a substantial depth over the troubled area of the fly-back. I use my soldering gun to melt the material, letting it flow over the trouble area.—Stanley Block, Bronx, New York.

Eico Scope Improvement

The sweep vernier in Model 460 Eico oscilloscope is a 10 megohm

potentiometer. Its wide resistance range makes it difficult to obtain a stationary pattern at times, as users may already know.

By placing a 500K control in series with the original sweep vernier, as shown in Fig. 2, a less critical position can be easily found. The original sweep vernier is used

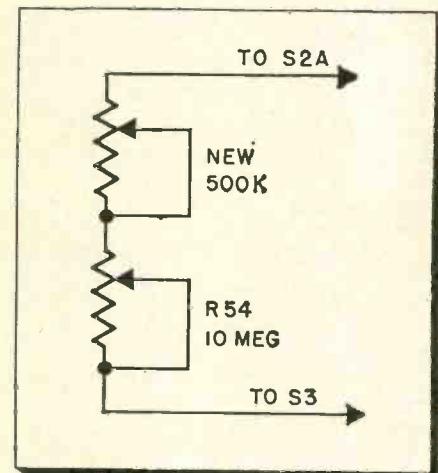


Fig. 2—Eico Model 460 scope can be modified to stabilize sync by installing a 500K pot in series with sweep vernier control. It acts as a "fine" frequency control.

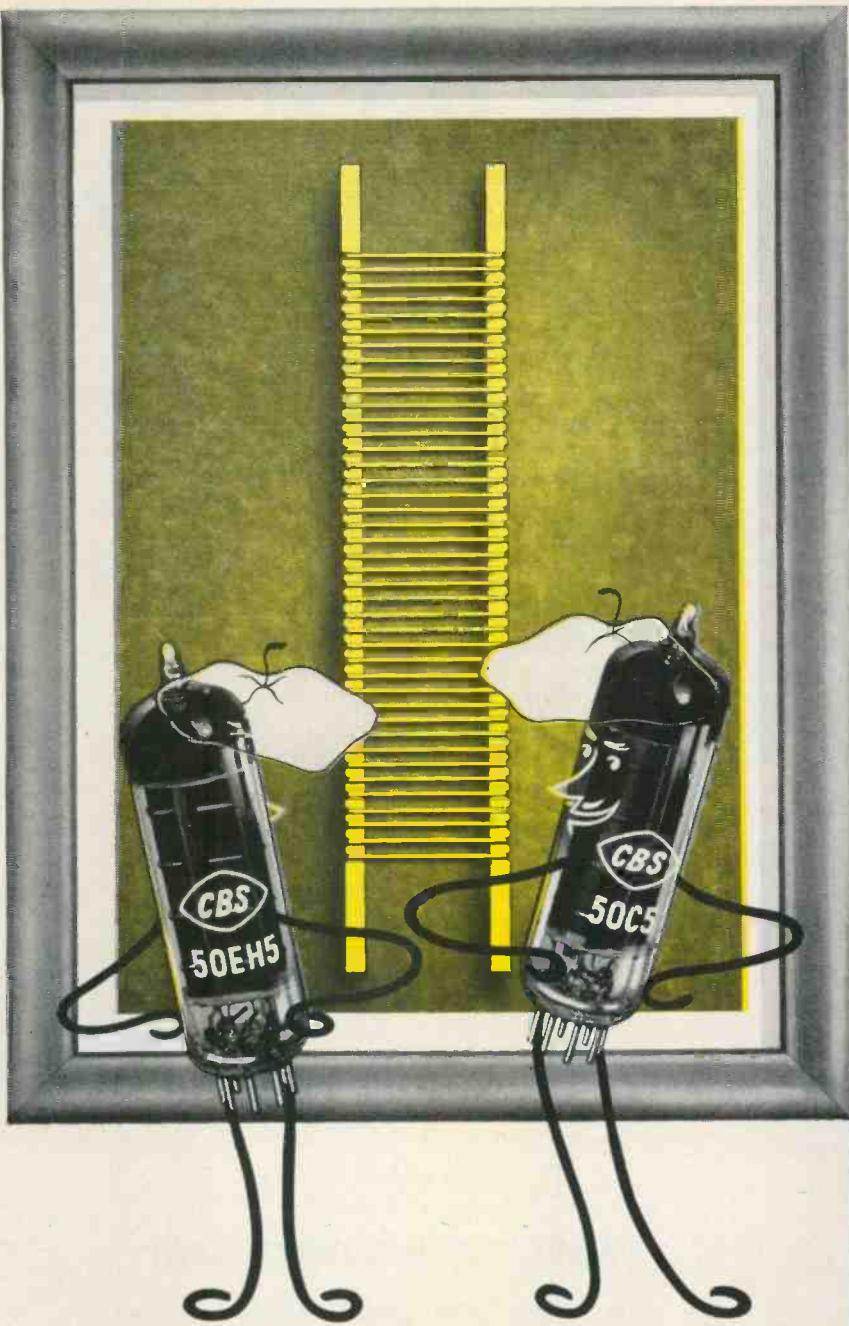
to obtain a close adjustment to the correct frequency; in effect a "coarse" control. The inserted potentiometer acts as a "fine" control, enabling the user to obtain a stationary pattern without any difficulty. The mounting for the new control can be made above and to the right of the standard sweep vernier.—M. E. West, Lenoir, N. C.

SHOP HINTS WANTED!

\$3 to \$10 for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Photos are desirable. Unacceptable items will be returned if accompanied by a stamped envelope. Send your entries to "Shop Hints" Editor, ELECTRONIC TECHNICIAN, 480 Lexington Ave., New York 17, N. Y.

we've
got
golden
grids!

(NO RUNAWAY PLATE
CURRENT FOR YOU)



"We're real proud of our expensive golden grids. Ordinary 50C5 and 50EH5 tubes just don't have them. We're proud because our golden grids kill secondary emission . . . wipe out distortion, runaway plate current, early failures and callbacks for you. (P.S. We've got short-proof and burnout-proof coil heaters too.)"

Yes, the new CBS 50C5 and 50EH5 offer you total reliability . . . proved in performance by leading radio set manufacturers. You, too, can profit from the total reliability of CBS tubes. Just make it a habit always to replace with CBS.



TUBES

CBS ELECTRONICS, Danvers, Mass.
A Division of Columbia Broadcasting System, Inc.

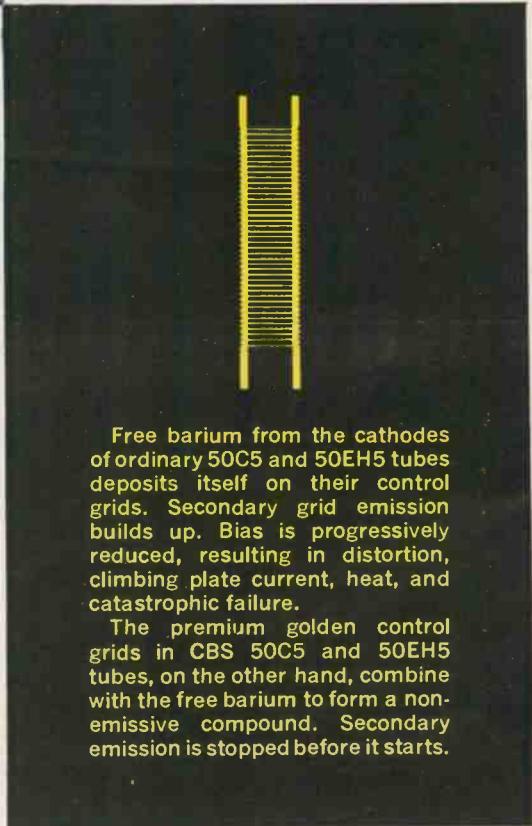
Receiving, industrial and picture tubes • transistors and diodes
audio components • and phonographs

For more data, circle 9-63-1 on coupon, p. 78

ELECTRONIC TECHNICIAN • September, 1960

Free barium from the cathodes of ordinary 50C5 and 50EH5 tubes deposits itself on their control grids. Secondary grid emission builds up. Bias is progressively reduced, resulting in distortion, climbing plate current, heat, and catastrophic failure.

The premium golden control grids in CBS 50C5 and 50EH5 tubes, on the other hand, combine with the free barium to form a non-emissive compound. Secondary emission is stopped before it starts.



SAVE \$ BY RENEWING NOW

PRICE TO BE INCREASED

During the past couple of years, every electronic magazine serving the maintenance industry has raised its subscription price—with one exception—Electronic Technician. Since its inception in 1953, ET has benefited its subscribers by holding the subscription rate down to its original introductory price.

Quite candidly, the economic realities of increasing postage, labor and material costs during the past seven years, coupled with the need for expanded reader services (more editors, more editorial pages, larger inquiry processing staff, etc.), make a price increase necessary.

Effective later this year, at a date to be announced, prices will go up about 8¢ per copy (or less for 2 & 3 year subscribers), which is a modest increase.

NEW RATES	CURRENT RATES
\$5	1 year \$4
\$8	2 years \$6
\$10	3 years \$8

The above rates are for U. S., possessions and Canada. New rates for all other locations will be \$9 (1 year), \$14 (2 years), and \$18 (3 years).

MONEY SAVING OPPORTUNITY

The reason for this advance notice to readers is to give you the opportunity to renew your subscription NOW at the lower old rates. Not only will you save money, but you will insure yourself against any interruption in service; you won't miss a single issue.

For example, if your present subscription expires in 1961, you can extend your subscription now for, say, 3 years, thereby assuring continuous service at the current price until 1964. Normally, renewals are not invited until a subscription is about to expire. However, you are being offered the chance to renew well in advance because we believe it to be a publication's obligation to protect its current subscribers as much as possible.

Here is all you need do to renew now. Simply cut out your address label from the cover of your last issue, paste it on the postage-free envelope facing this page, and fill in the appropriate blanks. Of course, be sure to enclose your check or money order.

ELECTRONIC TECHNICIAN

World's Largest Circulation Electronic Trade Publication
480 Lexington Avenue, New York 17, N. Y.

New Electronic Products

JFD ANTENNA MERCHANTISER

This display rack is shipped free with each JFD PA515 Exact Replacement Antenna Dealers Stocking Assortment of 13 newly released models. It tells customers and prospects where

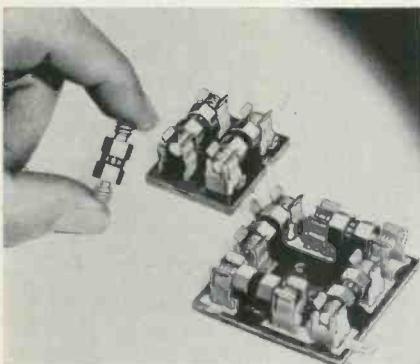


they can find factory-quality antenna replacements for their portable or toteable TV. Included is a 1960 Exact Replacement Antenna Reference Guide. Dealer cost is \$48.50 with rack and antennas. JFD Electronics Corp., 6101 Sixteenth Ave., Brooklyn 4, N. Y.

For more data, circle 9-65-1 on coupon, p. 78

Int'l Rectifier SILICON RECTIFIERS

Ruggedized, 500 ma rated silicon plug-in rectifiers reportedly utilize completely new diffusion techniques. Features include: low reverse current (200 μ A) at rated PRV; higher than average surge current rating (50 amps peak, 1 cycle); and low forward voltage drop (0.92v). The units may



be rapidly snapped into radio-TV, motor control, audio-amplifier, industrial power supply and other circuits utilizing clip-type rectifier holders. Types X5M2, X5M4, X5M5 and X5M6. Operating temperature range, -20°C to +130°C. Price, \$1.00 to \$1.70 (quantities 1-99). International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

For more data, circle 9-65-2 on coupon, p. 78

Motorola TRANSISTOR TESTER

A transistor test set being offered at \$17.95 features operating simplicity. Operating from built-in batteries, the transistor set checks all units, including power transistors, for gain, leak-



age, drift and other important characteristics. The test set performs its function by means of a simple audible indication. Current is drawn from the test set only during the actual test of a transistor. Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Ill.

For more data, circle 9-65-3 on coupon, p. 78

Waterman OSCILLOSCOPE

Model S-16-A TV & hi-fi Craftsscope is designed for use in radio, hi-fi, black-white and color TV, ship-to-shore radio, direction finders, mobile radio, etc. Size, $\frac{1}{2}$ cu. ft. Weight, less than 20 lbs. All controls and signal inputs are front panel mounted. Features include signal inversion, trace



expansion with parading, built-in calibration, edge-lighting, direct reading vertical scales and an escutcheon designed for camera mounting. Wide band d-c to 7 mc. Calibrated sensitivity 100mv/cm. Hi sensitivity 2.5 mv rms/cm. \$245.00. Waterman Products Co., 2445 Emerald St., Philadelphia 25, Pa.

For more data, circle 9-65-4 on coupon, p. 78

Pyramid CAPACITOR RACK

A new display rack, the Capac-o-mat, provides fast capacitor selection and simplified inventory control. It is designed to fit on parts distributors' standard shelving or hang on a wall.



It holds 54 electrolytic twist mount capacitors, labeled and packaged in transparent Vu-paks, finished in yellow and blue. The rack is sturdily constructed and dust-free. Pyramid Electric Co., 507 26th St., Union City, N. J.

For more data, circle 9-65-5 on coupon, p. 78

Mercury CRT TESTER-REACTIVATOR

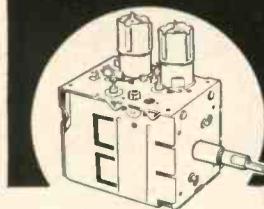
Model 800 is reported to employ a new circuit designed to test, repair and reactivate every black and white or color picture tube made, whether in the carton, out of the carton, or in the set. Will test for quality, inter-element shorts and leakage, and life



expectancy. Patented test head has a single cable plug-in. Special switch provides separate testing, repairing and reactivating each of the red, green and blue color guns. \$49.95. An interesting feature is that reactivation speed is indicated on meter. Filament voltages include new 2.35 and 8.4 v. Mercury Electronics Corp., 77 Searing Ave., Mineola, N. Y.

For more data, circle 9-65-6 on coupon, p. 78

TARZIAN Offers 48-Hour, Direct Factory Service on Tuner Repairs



only
\$8.50

Price Effective Jan. 1, 1960

That's right. Net, \$8.50 per unit and \$15 for UV combinations, including ALL replacement parts. 90-day warranty against defective workmanship and parts failure. Tuners repaired on approved, open accounts. Replacements offered at these prices* on tuners not repairable:

VHF 12 position tuner	\$22.00
VHF 13 or 16 position	23.00
VHF/UHF combination	25.00
UHF only	15.50

*Subject to change



Tarzian-made tuners are easily identified by this stamping on the unit.

When inquiring about service or replacements for other than Tarzian-made tuners, always give tube complement... shaft length... filament voltage... series or shunt heater... IF frequency, chassis identification and allow a little more time for service. Use this address for fast, 48-hour service:

SARKES TARZIAN, Inc.

Attn.: Service Mgr., Tuner Division
East Hillside Drive
Bloomington, Indiana

For more data, circle 9-66-1 on coupon, p. 78

The Model 88 . . . A New Combination

TRANSISTOR RADIO TESTER and DYNAMIC TRANSISTOR TESTER



AS A TRANSISTOR TESTER

The Model 88 will test all transistors including NPN and PNP, silicon, germanium and the new gallium arsenide types, without referring to characteristic data sheets. The time-saving advantage of this technique is self evident. A further benefit of this service is that it will enable you to test new transistors as they are released! The Model 88 will measure the two most important transistor characteristics needed for transistor servicing; leakage and gain (beta).

AS A TRANSISTOR RADIO TESTER

The Model 88 provides a new simplified rapid

Model 88 comes housed in a handsome portable case. Complete with a set of Clip-On Cables for Transistor Testing, an R.F. Diode Probe for R.F. and I.F. tracing; an Audio Probe for Amplifier Tracing and a Signal Injector Cable. Complete—nothing else to buy!

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

Try it for 10 days before you buy. If completely satisfied send \$8.50 and pay balance at rate of \$6.00 per month for 5 months. **No Interest or Finance Charges Added.** If not completely satisfied, return to us, no explanation necessary.

MOSS ELECTRONIC, INC.
Dept. D-816, 3849 Tenth Ave., New York 34, N. Y.
Please rush one Model 88. I agree to pay \$8.50 within 10 days after receipt and \$6.00 per month thereafter. Otherwise I may return cancelling all further obligation.
NAME
ADDRESS
CITY ZONE..... STATE.....
All prices net, F.O.B., N.Y.C.

For more data, circle 9-66-2 on coupon, p. 78

Industry Dilemma

(Continued from page 52)

practices which we recommend for service dealers and distributors to overcome the wholesale-to-the-public sales problem.

Paul G. L. Lecoy
Chairman of Board

TESA of Sandusky
Sandusky

As we go to press, news reaches us that NEDA officials will meet with the executive director of NATESA to "discuss ways and means whereby Independent Electronic Parts Distributors can better serve and supply their Service Dealer and Technician clientele."

OKLAHOMA

Considerable thought has been given to associations meeting with distributors, and I believe that if you could ever get the distributors to come to an agreement and stick to it, that this would be a big step in solving a great number of the problems we have. We have met with local distributors several times. However, all we could get from them were promises, and when they got back to their businesses they forgot the promises made. A number of things would be well worth considering along this

line—such as strict retail; no sales without tax permits or other permits, etc; also, a price bracket arrangement whereby the larger dealer would be entitled to a larger discount than the little fellow that perhaps purchased only a few tubes per month. This is to advise that anyone in this Association, or a committee from this Association would be happy to meet with these distributors at any time.

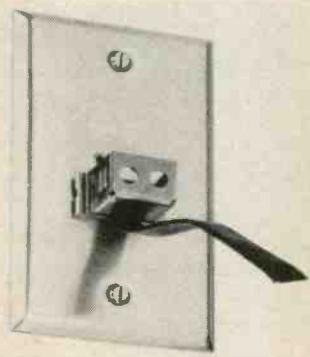
H. O. Eales, National Director

TESA

Oklahoma City

Winegard TV WALL OUTLETS

Announced, as an addition to the firm's antenna systems, is a line of 300 ohm TV wall outlets. They are flush mount metal wall plates, available also in surface mount type. They



come complete with antenna disconnect plugs with no-strip terminals. Flush mount: brass, \$3.50; chrome, \$2.30; and ivory, \$2.10. Surface mount: ivory only, \$3.00. Winegard Co., Burlington, Iowa.

For more data, circle 9-66-3 on coupon, p. 78

General Electric TUBE PIN STRAIGHTENER

Damage caused by bent pins in miniature electronic receiving tubes can be eliminated with a new 7- and 9-pin



straightener. The double-duty pin straightener is colored a vivid red-orange to permit easy location when carried in service case or tube tester. General Electric Co., Receiving Tube Div., Owensboro, Ky.

For more data, circle 9-66-4 on coupon, p. 78
ELECTRONIC TECHNICIAN • September, 1960



**Really dresses up
your service work**

Reliable Tung-Sol tubes add real class to every service job — radio, tv, or hi-fi. Made to set manufacturers most exacting specifications, Tung-Sol Tubes are best for all replacements. Reduce your callbacks to new lows and keep your profitable new business rolling in high style. Tung-Sol Electric Inc., Newark 4, N.J.

Tell your jobber you'd rather have



TUNG-SOL[®]

Blue Chip Quality TUBES • TRANSISTORS • DIODES

For more data, circle 9-67-1 on coupon, p. 78

Stancor. n. Synonym for quality and dependability in coils and transformers

It makes good sense for you to choose replacement parts from the manufacturer who is the world's largest supplier of electronic transformers to the original equipment market. The complete Stancor line includes the unit you need, at the fine performance level you expect. For quality and dependability in transformers and coils, always specify Stancor.

The Stancor TV Guide

gives you always up-to-date replacement information—through regular mailings of loose-leaf pages direct to you from Stancor. Register with your distributor to get the Stancor TV Guide.

STANCOR

CHICAGO STANDARD TRANSFORMER CORPORATION
3501 WEST ADDISON STREET • CHICAGO 18, ILLINOIS

For more data, circle 9-68-1 on coupon, p. 78



California

RTA, Santa Cruz, Santa Clara Valley, has announced a streamlined one year training course for experienced TV and radio service men. The course provides an opportunity to qualify for a State journeyman's certificate upon graduation. It is designed to give technicians with five years experience a chance to obtain a certificate without completing the full apprenticeship of four years. Classes will be held at San Jose City College, commencing with the fall term.

APA, Los Angeles, has instituted certification tests for all appliance service technicians. Tests were compiled by public education officials in cooperation with major appliance manufacturers. Tests include a general examination on laundry equipment, examination on each of the more popular brands of major appliances, and a psychological personality test prepared by UCLA. Grading of applicants will not be done by APA but by an impartial State official.

Techs & Distributors Meet

CSEA, Fresno, reported a recent meeting which was attended by distributor representatives to discuss mutual problems. While no definite action was taken at this meeting, it was mutually agreed that action must be taken to solve the major problems prevalent in the industry. Subjects under discussion included: Sales Tax abuses, captive service, receiver tube sales, credit and other problems facing the industry.

Iowa

TESA, Des Moines, has elected the following officers: Pres., Henry Gulliver; V.P., Bob Norman; Sec'y, Don Price; Treas., Ed Vilemek.

Ohio

TESA, Cleveland, elected new officers as follows: Pres., Joseph Phillips; V.P., Raymond Kasprzak; Rec-Sec'y, George Srdjak; Corres.-Sec'y, Gene Kotrba; Treas., Harry Bertak. The association also reports tentative introduction of a license ordinance which is scheduled for the City Council.

Missouri

TESA, St. Louis, has elected the following officers: Pres., Gene Love; V.P., Bill Frasure; Sec'y, June Alexander; Treas., Morton Singer.

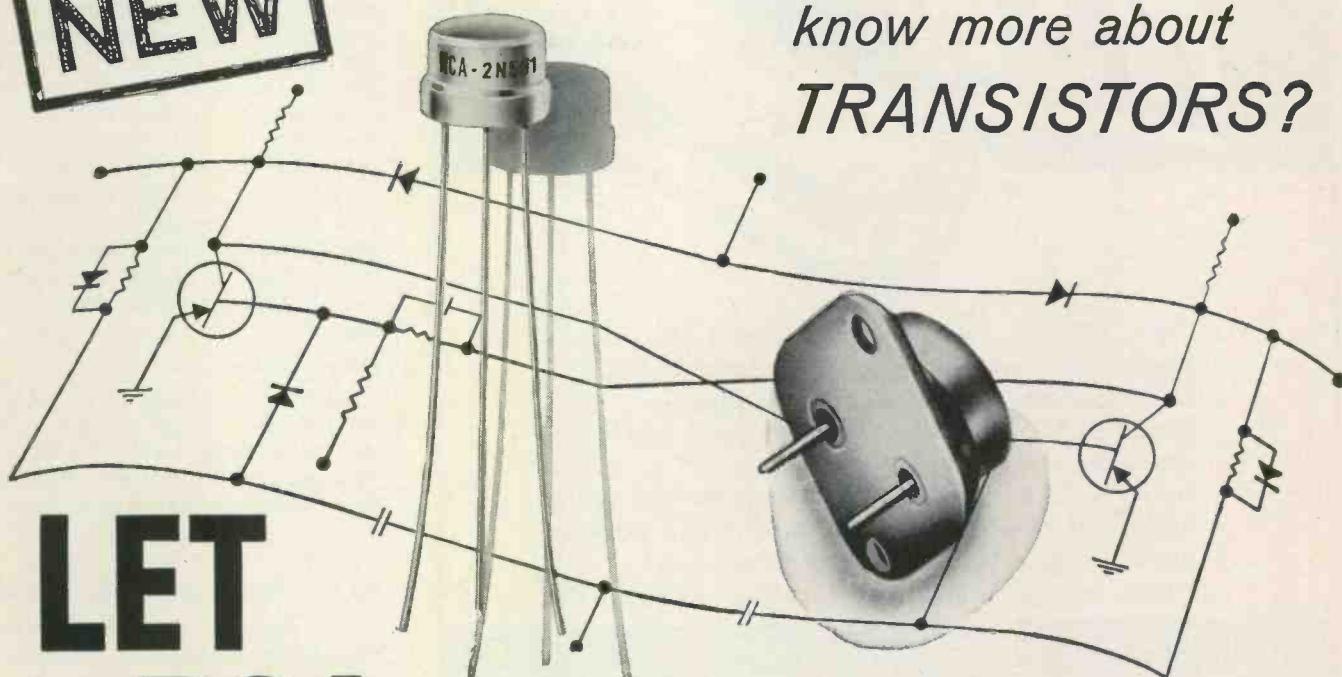
TEAM, St. Louis, reports there has been a reduction in the number of TV service complaints received by the Better Business Bureau. It was said that complaints dropped more than 600% between November 1959 and April 1960. According to John L. O'Brien, President of BBB, the decrease in complaints is a direct result of the revised Standards of Advertising and Business Ethics Code enacted last spring by the TV industry.

EA, Kansas City, has announced the formation of a new organization, the FM Broadcasters of Greater Kansas City, a division of The Electric Association. The group has elected Chris J. Stolfa, Commercial Manager of KCMO-FM, its Chairman. Primary objectives outlined by the organization include: A more informed public, better music programming, more tasteful commercial messages, and greater listener enjoyment.

(Continued on page 70)

NEW

*Need to
know more about
TRANSISTORS?*



LET RCA TRAIN YOU AT HOME

in semiconductor physics and transistor applications

RCA Institutes Home Study School now has a new course created for men and women in the field of electronics who realize the growing importance of semiconductor technology. The new course covers transistor characteristics and testing methods... prepares you to move up in your job as you increase your knowledge and skills.

RCA's liberal Pay-As-You-Learn Plan is the

most economical possible home study method because *you never pay for lessons that you do not receive!* You pay for your next study group only when you order it! Should you drop out at any time, you do not owe RCA Institutes one penny.

Courses also available in Electronic Fundamentals, TV Servicing, Color TV, and Electronics for Automation.

**SEND FOR THIS
FREE 64-PAGE
CAREER BOOK
TODAY!**



RCA INSTITUTES, INC.
A Service of Radio Corporation of America

The Most Trusted Name in Electronics

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RCA Institutes, Inc., Home Study School Dept. ET-90
350 West Fourth Street, New York 14, New York

Please rush me your FREE illustrated 64-page book "Your Career in Electronics", describing your home training programs, including complete information on the new Transistor course. No obligation. No salesman will call.

Name _____ Age _____

Address _____

City _____ Zone _____ State _____

Korean Vets: Enter discharge date.

CANADIANS—Take advantage of these same RCA Institutes courses at no additional cost. No postage, no customs, no delay. Send coupon to: RCA Victor Company, Ltd., 5581 Royalmount Ave., Montreal 9, Quebec

For more data, circle 9-69-1 on coupon, p. 78



Type "PCT" . . . constructed in strong red cardboard tubes, wax impregnated, one end closed, closed, printed circuit board terminals.

Type "PCTL" . . . has insulated lead out top providing for low voltage section.

For 65° C operation . . . recommended for table and clock radios . . . individually packaged . . . guaranteed for one year.

EXPORT—ROBURN AGENCIES, NEW YORK CITY

Write today for complete information.

PLANET SALES CORPORATION
225 Belleville Avenue
Bloomfield, N. J.

For more data, circle 9-70-1 on coupon, p. 78

TRUST YOUR TV TUNER
REPAIR and ALIGN to **JW**

24 HR SERVICE

VHF or UHF—ALL MAKES

VHF Tuners.....	\$9.50
UHF Tuners.....	net
UHF Converters.....	
UHF-VHF Combinations.....	\$17.95



These prices are for unmutilated units. Missing, broken and damaged parts, defective tubes charged extra at LOW net prices. We ship C.O.D.

10 STEPS IN OUR GUARANTEED SERVICE

1. All tuners mechanically and electronically inspected.
2. All necessary parts replaced.
3. Contact surfaces correctly cleaned and lubricated.
4. First test run for intermittents and drift indication.
5. Fine tuning range checked on all channels.
6. Local osc aligned to correct frequency all channels—XTAL controlled.
7. RF alignment—all channels—XTAL controlled.
8. AGC check, all channels—cut off of RF amp checked.
9. Overall response all channels, shield covers in position.
10. Quality control FINAL CHECK ALL UNITS, UHF-VHF.

IMPORTANT: Ship complete. Include all broken parts. State model and complaint. Package well to avoid transit damage.

JW ELECTRONICS 1538 W. Jarvis Avenue
CHICAGO 26, ILLINOIS Broadway 4-9757

For more data, circle 9-70-2 on coupon, p. 78

(Continued from page 68)

New KC Ordinance

TSE, Kansas City, reports the passing of a new ordinance to regulate the TV and radio service industry. Licenses fall into three categories: class one for TV and radio servicing, class two for TV only, and class three for radio only. License fees are \$25 for a service dealer and \$10 for an individual technician. The ordinance provides a \$500 fine, 60 days imprisonment or both if convicted of engaging in professional service work without a license.

New Jersey

AETA announces the following officers have been elected: Pres., Henry Simpkins; V.P., Anthony De Franco; Sec'y, Joseph Papovich; Treas., Joseph Eberhardt.

ESFETA Forum Discusses Licensing

The Empire State Federation of Electronic Technician Associations held a two hour forum on the subject of service technician licensing. The Buffalo meeting, attended by representatives from many parts of the state, was moderated by Al Forman, Editor of ELECTRONIC TECHNICIAN.

Local distributors, many of whom oppose licensing, were invited to attend and four of them reportedly said they would. None attended the forum.

The service technician representatives present were overwhelmingly in favor of a state licensing bill. Three basic reasons given were that such a bill would protect the public against incompetent technicians, against fraudulent operators, and against shock hazards. Speakers emphasized that TV servicing was different from many other unlicensed trades because the hazards to owners are greater. Previously unpublicized TV electrocutions were described. The grandfather clause required in laws was posed as an objection to licensing. However, this requirement which prevents legislating a man out of business was not considered vital in the long run, since the unethical are said to be operating anyway, and this law would provide eventual control. An informal poll was taken on the suggested composition of a board of examiners to regulate the service industry. Though some speakers were inclined to a board excluding distributors or composed entirely of technicians, the majority favored broader representation, with a sizeable minority on the board not be-

ing technicians.

The forum ended with the association members promising to work more strenuously than ever for passage of a licensing bill at the next session of the legislature.

RTG, Long Island, reports a State License Bill has been drafted. The organization plans to have the bill introduced in the State Senate by Senator Mosberg of Queens. It was said the primary purpose of the bill is to eliminate incompetent and fraudulent operators.

Tennessee

TESA, Memphis, reports the Better Business Bureau has formed a TV Service Dealers division. Purpose of the division is to draft a set of standards for service practices. According to BBB's manager, George V. Morse, Jr., only qualified firms will participate in the program and they must agree to abide by the bureau code and subsequent decisions of an arbitrary panel.

Raytheon TRANSISTOR DISPLAY

Ten transistors, in smartly styled clear plastic blister packs, are bonded to a cardboard merchandiser, "Unipack." The backboard is perforated between units so that transistors can be removed without disturbing their seals. It is hung up for display; folded



in half for shipment. The bright red, white and black background ties in with new tube cartons and cases. The packs have large type numbers and basing information. New package precludes substitution; assures end-use customers of factory-sealed merchandise. Raytheon Co., Distributor Products Div., Westwood, Mass.

For more data, circle 9-71-2 on coupon, p. 78

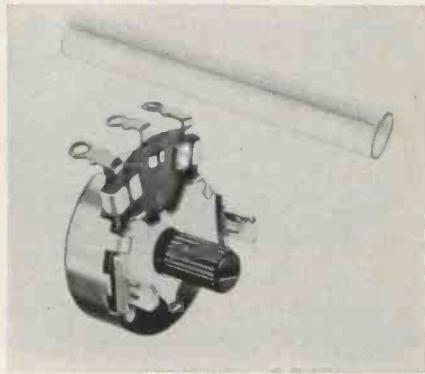
For More Information

Circle Code Numbers, p. 78

Centralab CONTROLS

Model TT, twist tab controls, designed to the minimum shaft length needed for TV set hidden controls, permit use where space is limited, without cutting the control. A 2" polyethylene shaft extension is packed with each unit for application where a longer shaft is needed. The units are available in 25 values from 200 ohms to 7.5 megohms, and are rated at $\frac{1}{2}$ watt. Size: 15/16" in diameter; 7/16" in depth. Centralab, 900 E. Keefe Ave., Milwaukee 1, Wis.

For more data, circle 9-71-3 on coupon, p. 78



NEW!

Only
Grid Circuit
Tube Tester
with Full TV
tube coverage!

SECO

GRID CIRCUIT TUBE TESTER

Introducing the new Seco GCT-9—the first and only Grid Circuit Tester that offers you complete coverage of all TV tube types—including voltage amplifiers, power output and heater-type diodes, hundreds of Foreign and Industrial types as well as types with Grid, Plate or Cathode caps. Quickly lets you test for Grid Emission, Leakage, Shorts and Gas in one operation—indicates results instantly, visually on a 6AF6 "Eye" Indicator. In addition to conventional tests, the GCT-9 also offers two exclusive new testing features not found on any other tester: 1. Cathode Continuity Check; and 2. Complete Inter-Element Short Test, with shorts identified to pin numbers.

The new Seco GCT-9 is available in a sturdy metal case with exposed panel (GCT-9S): or mounted in a compact, portable carrying case (GCT-9W)—complete with easy to read tube set-up data.

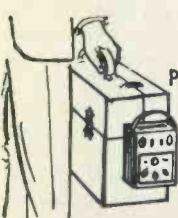
MODEL GCT-9S
Wired and Factory Tested \$3295 NET

MODEL GCT-9W
Wired and Factory Tested \$3495 NET

Fast, low-cost tester—complete TV tube coverage!
Checks all modern TV tubes and heater type radio tubes. With Seco Grid Circuit Test, Cathode Emission Test. In carrying case.
MODEL 78 \$69.50 NET

Check output tube cathode current, fast!

Safeguard against horizontal output tube overload! Place in circuit in seconds—no unsoldering. Front panel lists essential information. MODEL HC-6 \$12.95



NEW!

PIGGY-BACK ADAPTER

for tube caddies!

Developed by Seco to save you steps! Free with Seco tube testers or by enclosing 25¢ with coupon.

SECO

SECO ELECTRONICS, INC. T-7
5015 Penn Ave. So.—Minneapolis 19, Minn.

Please send free literature on all Seco Test Equipment.

I have enclosed _____ Please send _____
Seco "Piggy-Back" Adapters. (25¢ each.)

NAME _____

ADDRESS _____

CITY _____

ZONE _____ STATE _____

EAST CANADA: Daveco Agencies, Ltd., Montreal, Quebec

WEST CANADA: Ron Merritt Co., Vancouver 1, B.C.

For more data, circle 9-71-1 on coupon, p. 78

SPEND ONE HOUR A DAY WITH THESE RIDER BOOKS INCREASE YOUR INCOME

TV SERVICING

MASTER RECEIVING — PICTURE TUBE SUBSTITUTION GUIDEBOOK, H. A. Middleton, \$7.45
RECEIVING TUBE SUBSTITUTION GUIDEBOOK 4th suppl., H. A. Middleton, \$1.35
TUBE CADDY-TUBE SUBSTITUTION GUIDEBOOK, H. A. Middleton, 90c
HOW TO TROUBLESHOOT TV SYNC CIRCUITS, I. Remer, \$2.90
REPAIRING TELEVISION RECEIVERS, C. Glickstein, \$4.40
PICTURE BOOK OF TV TROUBLES, Rider Lab Staff. Fabulous series of definitive practical books that teach recognition of faults in TV receivers.
VOL. 1: HORIZONTAL AFC-OSCILLATOR CIRCUITS, \$1.35
VOL. 2: VERTICAL SWEEP-DEFLECTION CIRCUITS, \$1.80
VOL. 3: VIDEO I-F & VIDEO AMPLIFIER CIRCUITS, \$1.80
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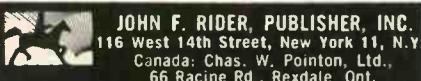
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72

New Books

Books marked with an asterisk (*) may be obtained prepaid from Electronic Marketers, Book Sales Division of Electronic Technician

MARINE RADIO AND ELECTRONICS. By Allen Lytel. Published by Cornell Maritime Press, Cambridge, Maryland. 256 pages, hard cover. \$7.00.

The author accurately describes the theme of this book in his preface, "... aimed at the equipment user to explain what these [marine] electronic devices are, what they do, and how to use them." The volume presents a surface description of marine electronic equipment, including: radiotelephone, direction finders, depth finders, depth sounders, citizen band, radar, loran, etc. In addition, various federal and local regulations are described in detail.

Written in the author's usual professional style, which is excellent, and adequately illustrated, the book is recommended to anyone interested in a light, non-technical discussion of available electronic equipment for on-the-water use.

***RADIO SERVICING: Theory and Practice**. 3rd Edition. By Abraham Marcus. Published by Prentice-Hall, Inc. 650 pages, hard cover. \$7.95

This is the latest, revised edition of a volume which has been, for more than a decade, one of the outstanding practical texts on radio receivers. All essential information necessary for a thorough understanding of radio theory and servicing is included. The first chapter deals simply but adequately with elements of electrical and radio theory, including current flow, units of measurement, Ohm's law, and time constant circuits. Components and parts are discussed in chapter 2. The next five chapters cover the electron tube as a rectifier, detector, amplifier, and oscillator, together with its use in many practical amplifier circuits. Other special tube types, including thyratrons and phototubes are examined. Transistors are considered. A separate chapter deals with control circuits—from avc through noise-suppression and search tuning. Power supplies, and AM, FM, tube and transistor receivers are described in two chapters. Each chapter discusses trouble symptoms and concludes with selected questions which can be used by the home study student. The last four chapters cover service instruments, service procedure and techniques, component replacement, and realignment. The author's style is that of a sincere writer who knows his subject well, and communicates the maximum amount of intelligence in the simplest and fewest possible words.

Adequately illustrated, the book is highly recommended to anyone desiring a one volume text on the subject.

***AUTO RADIO MANUAL**, Vol. 10. Published by Howard W. Sams & Co., Inc. 160 pages, soft cover. \$2.95.

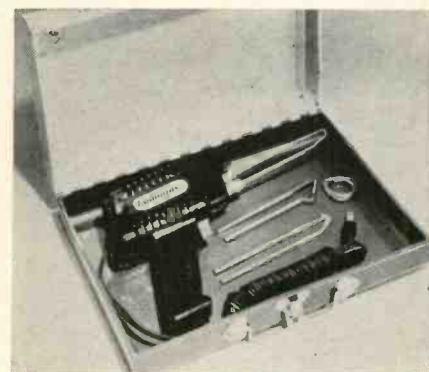
This manual is a continuation of service data for auto radios. 31 models produced in 1958-1959 are included. Information presented consists of schematics, parts lists and alignment instructions for the various models.

STEREO HIGH FIDELITY HANDBOOK. By Norman H. Crowhurst. Published by Crown Publishers, 419 Fourth Ave., N.Y.C. 184 pages, hard cover. \$5.95.

This new book is primarily a guide for selection of stereo equipment, whether components or package units. The author patiently explains how stereo works and analyzes each fundamental component (speaker, amplifier, tuner, record changer, etc.). In addition, chapters on converting to stereo, building your own equipment and troubleshooting (very limited) are provided. The numerous illustrations can serve admirably as a general directory of stereo hi-fi equipment. However redundant this book concept may seem, the author's lucid writing style may help answer many questions that are not adequately discussed in similar type texts. An interesting addition to this book is a list of nationwide dealers in stereo equipment, manufacturers' buying guide and a stereo glossary.

Cummins SOLDERGUNS

Heavy duty models, Single-Heat #490-02 and Dual-Heat #492-02, are equipped with an exclusive, durable, alloy tip that provides instantaneous heat, does not pit, and requires no filing. Retinning is done by wiping the heated tip with a dry cloth. The tip cools as quickly as it heats, so there



is no delay in tip changing which is accomplished by simply loosening two screws at base of the tip. Accessories available: a smoothing tip; and a cutting tip. Prices, with standard tip: #490-02, \$14.95; #492-02, \$16.95. Plus case and accessories: \$17.95 and \$19.95 respectively. Cummins Portable Tool Co., div. John Oster Mfg. Co., 5055 H. Lydell Ave., Milwaukee, Wis. For more data, circle 9-72-2 on coupon, p. 78

Printed Wiring

(Continued from page 37)

over the eyelet pad area. The newly added solder should not be sitting on the eyelet like a hat, but completely fused with the original solder and flowed down to the pad all around the eyelet. The rim of the rolled flange must no longer be discernible at any point. Where

component leads, wires or pins project through the eyelet, a smooth, ideal round surface of added solder will, naturally, not be attained.

The dip side of the chassis should be cleaned to remove any dust, wax, old flux or other soils that may prevent good results. (See Fig. 5.) Solvents are used sparingly and should not contact adjacent components such as carbon controls, resistors, etc.

Apply the soldering iron tip to the junction of the eyelet and pad—

or eyelet and tube socket tab, as illustrated in Fig. 6. Solder is applied simultaneously to the junction of the eyelet and the solder iron tip. By feeding solder to the eyelet in this manner, heat will be conducted into the eyelet through the molten solder as well as through the iron's tip. Feed enough solder to build up a deposit which will completely cover the eyelet and flow over the pad area, as previously shown in Fig. 4. Of course, the iron should not be allowed to come into contact with a printed conductor outside the pad area or with the phenolic board. The importance of

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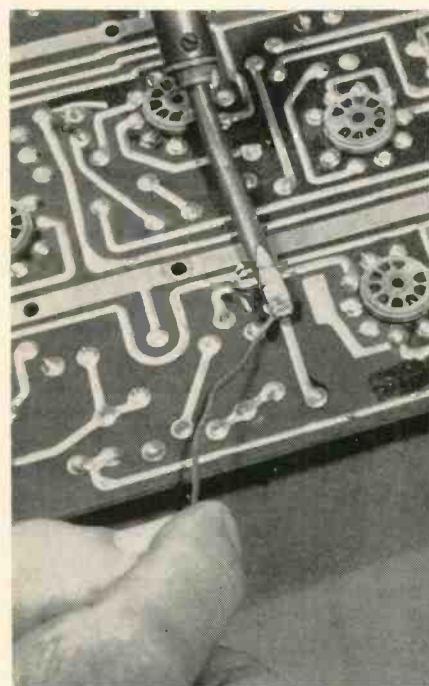


Fig. 6—Solder and iron tip are applied simultaneously to eyelet or tube socket tab.

producing a solder build-up in this manner cannot be over-emphasized.

A useful variation in feeding the solder is to lay the solder wire down on the eyelet and apply the iron tip to the solder wire itself with a rolling motion. A more uniform length of solder can be added to each eyelet by this method and the flow of heat will be faster. The technician may find further improvement in technique can be effected by bending the tip, so that the flat side of tip can be applied to the work area. Using an angled tip in this manner may also improve visibility of the work area.

The iron tip should be kept in contact with the work area only long enough to complete the build-

up process. Withdraw the iron immediately after solder flow around the eyelet is complete.

If excessive flux accumulates at a joint, allow the connection to solidify, brush the flux residue with solvent and wipe up the area with a cloth.

Precautions

1. There should be no bubbling of solder during application or after the iron has been withdrawn. Bubbling is caused by overheating and frequently results in one or more undesirable conditions as follows:
 - a. Movement of solder in the eyelet and adjacent areas at the time of freezing can result in a cold solder joint.
 - b. Complete melting of solder down through the eyelet can result in opening the connection on the component side of the chassis.
2. If bubbling or flow through of solder has occurred, the technician should:
 - a. Wait until the joint has cooled.
 - b. Examine the underside of the eyelet for fluxed solder. If excess solder has accumulated, remove it by draining with the iron and again allow the area to cool.
 - c. If flow through has occurred, resolder both sides of the eyelet, following the procedure described, allowing each side to cool after soldering.
 - d. If flow through has not occurred, do not disturb the underside of the eyelet.
3. Do not move or disturb component leads or wires within an eyelet before the solder has set. This movement will also cause "cold" solder connections, an ever present source of intermittent trouble. •

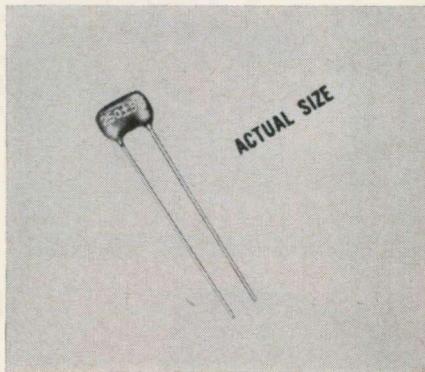
Sylvania RECEIVING TUBES

A wide variety of miniature receiving tubes for use in TV and radio receivers, mobile communications systems and other electronic equipment have been added to the firm's renewal line. Types: 6681/12AX7, high mu twin triode; 6680/12AU7, medium mu twin triode; 6679/12AT7, high mu triode electrically equivalent to 12AT7; 6678/6U8A, medium mu triode and sharp cutoff pentode; 6677/6CL8, power pentode, characteristics equivalent to 6CL6; 6669/6AQ5A, beam-power pentode, characteristics equivalent to 6AQ5A; 6663/6AL5, high permeance twin diode; 6662/6BJ6, remote cutoff-pentode, characteristics equivalent to 6BJ6; 6661/6BH6, sharp cutoff pentode, characteristics equivalent to 6BH6; and 6660/6BA6, remote-cutoff pentode, essentially equivalent to 6BA6. All of the 6000 series tubes listed above are capable of withstanding the on-off cycling demands of mobile communications equipment. Also, types: 6DJ8, sharp cutoff triode; and 6ES8, double triode. In addition to the subminiature tubes above are: types 17DQ6B and 12DQ6B beam power pentodes. Sylvania Electric Products, 730 3rd Ave., New York 17, N. Y.

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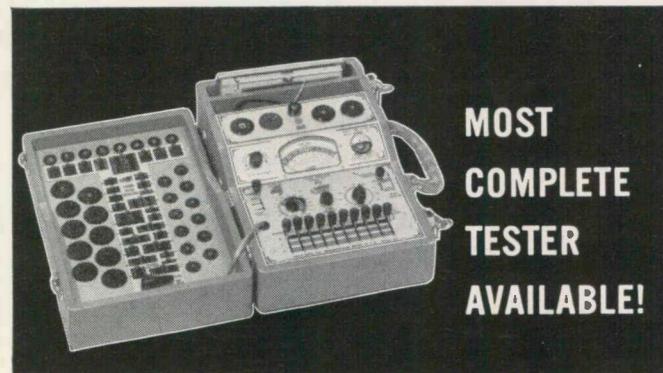
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76

Cable Contamination

(Continued from page 55)

lower than indicated on the schematic. Switching off the set and making a resistance check to ground from various points, a suspicious 20,000 ohms appearing on the grid attracted my attention.

This reading persisted when all connections to the grid pin were unsoldered!

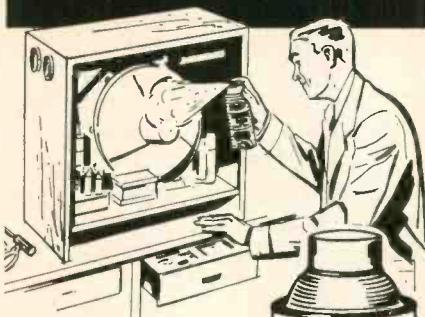
I was all set to get a new tube socket, when I happened to notice there was a reading on the meter when the probe was lifted clear of the pin and came into contact with the insulated tip of the shielded input cable from the tuner. This cable came through a hole in the chassis and connected to a terminal on the input transformer, but a length of its unshielded end touched the grid lug on the tube socket. As unlikely as it seemed, that's where the trouble was originating. The white braided "push back" insulation covering the central plastic core of this cable had become contaminated and was creating a high-resistance short from shield ground to the grid. I replaced the cable with a length of 72 ohm co-ax, resoldered all the connections and the set resumed normal operation.—Charles B. Randall, Randallstown, Md.

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Technical Security

(Continued from page 45)

rooms (classified items are not kept in the Stock room), with these connected into the ultrasonic system protecting the Assembly room.

Individual Guard Panels for each of the alarm systems are placed in the Guard Room, where three guards are on duty during protected hours. Provision has been made for remote testing of the ultrasonic systems. In addition, the Guard Panel for the five "light curtains" has provision for temporarily disabling any one of the systems to permit late workers to leave the building after hours . . . without giving an alarm. This is done at the discretion of the guards, of course, and without compromising the complete protection afforded by the other systems.

Finally, to insure proper monitoring, a signal is given in the Security officers's and General Manager's homes (over suitable leased telephone lines) should any system give an alarm. This permits a responsible individual to personally check on any alarm, either by telephoning the Guard office or by making a personal visit. •

Trap Adjustments

(Continued from page 41)

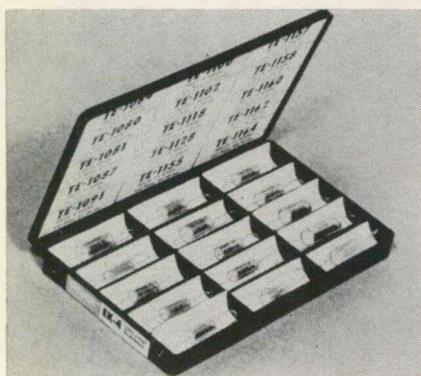
tuned to 21.25 mc and adjacent sound traps to 27.25 mc. While few sets made today incorporate adjacent picture traps, they are located at 19.75 and 39.75 mc respectively, for 20 mc and 40 mc i-f design. One set, for example, the Du Mont RA 340/343 series, employs a 39.75

mc adjacent picture trap in the 1st i-f grid.

Once the set is realigned it is a good idea to "dope" all the trap and i-f adjustment screws to prevent easy turning. Some technicians place the following notice on the back of all re-aligned sets: "This set has been aligned by (name of shop). Guarantee is void if any alignment adjustments are tampered with." This type of notice will often discourage further abortive attempts to adjust the set and the customer is notified that you will stand behind any work you perform. •

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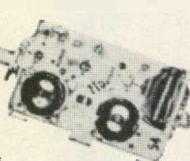
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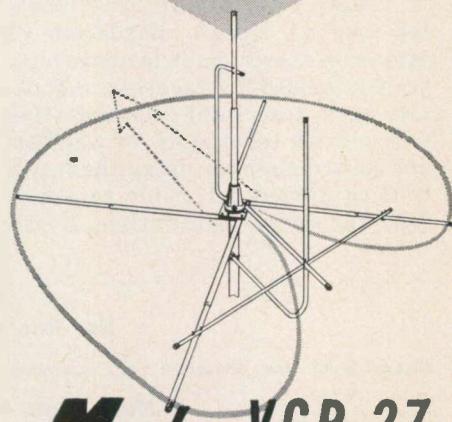
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2 TV Knobs: A new wall chart pictures 235 exact replacement TV knobs, claimed to take care of 98% of all replacements and to cover all major set manufacturers. Fully illustrated. GC Electronics Co.

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9-11-1	9-58-2	9-66-3	9-76-2	9-110-1	9-123-1
9-12-1	9-58-3	9-66-4	9-76-3	9-113-1	9-123-2
9-13-1	9-59-1	9-67-1	9-77-1	9-115-1	9-123-3
9-14-1	9-60-1	9-68-1	9-77-2	9-116-1	9-124-1
9-17-1	9-60-2	9-69-1	9-77-3	9-117-1	9-124-2
9-20-1	9-60-3	9-70-1	9-78-1	9-117-2	9-125-1
9-20-2	9-60-4	9-70-2	9-78-2	9-117-3	9-125-2
9-22-1	9-61-1	9-71-1	9-78-4	9-118-1	9-125-3
9-23-1	9-61-2	9-71-2	9-78-5	9-118-2	9-125-4
9-24-1	9-61-3	9-71-3	9-78-6	9-118-3	9-126-1
9-24-2	9-61-4	9-72-1	9-78-7	9-118-4	9-126-2
9-25-1	9-61-5	9-72-2	9-78-8	9-119-1	9-126-3
9-27-1	9-61-6	9-73-1	9-78-9	9-119-2	9-128-1
9-29-1	9-61-7	9-73-2	9-80-1	9-119-3	9-C2-1
9-30-1	9-63-1	9-73-3	9-83-1	9-119-4	9-C3-1
9-30-2	9-65-1	9-73-4	9-84-1	9-120-1	

Name Position

Firm Address

City Zone State