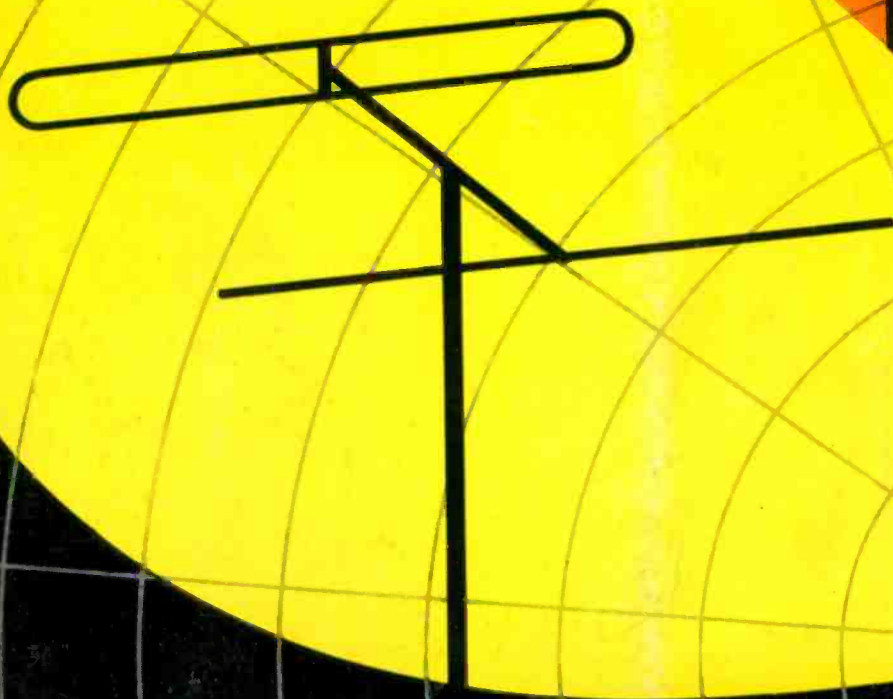


TECHNICIAN

& *Circuit Digests*



TV ANTENNA SPECIFICATIONS

September • 1955

Caldwell-Clements, Inc.

20 7 WATT RESISTORS

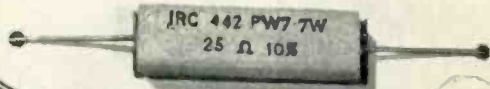
SELECTED POPULAR VALUES



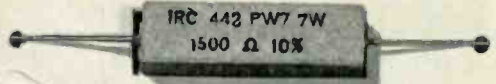
RESIST-O-CARD

NEW TYPE PW-7 WIRE WOUND POWER RESISTORS • FULL 7 WATT RATING

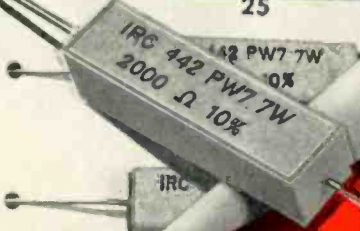
\$6.20
NET



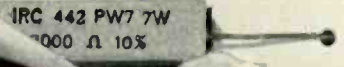
25



1500



IRC 442 PW7 7W
2000 Ω 10%



IRC 442 PW7 7W
1000 Ω 10%

TRY

these modern power resistors

Servicemen everywhere are finding IRC's unique approach to wire wound power resistors is ideal for today's service requirements. Try them yourself, and benefit by these exclusive IRC features:

- **COMPACT, RECTANGULAR DESIGN** for easier assembly in tight circuits
- **AXIAL LEADS** for easier, faster soldering
- **CLEAR, PERMANENT MARKINGS** for full identification
- **CONSERVATIVE RATINGS** permit continuous operation at full power
- **FAMOUS IRC ELEMENT** sealed in ceramic case for complete insulation and protection
- **2 SIZES**—PW-7, full seven watts and PW-10, full 10 watts
- **FULL COVERAGE OF RESISTANCE VALUES** for today's service needs

BUY

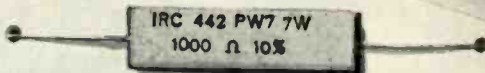
handy Resist-O-Card assortments

Your IRC Distributor has these new power resistors in 2 convenient assortments of popular values. The values are printed on each card... you always know what you have, and you always have what you need.

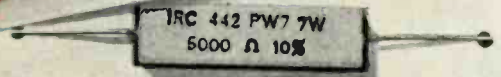
RESIST-O-CARD # 19. 7 Watt assortment of 20 popular values—\$6.20 net

RESIST-O-CARD # 20. 10 Watt assortment of 20 popular values—\$6.60 net

1000



1000



5000



INTERNATIONAL RESISTANCE CO.

Philadelphia, Penna.

FOR 10 WATT POWER RESISTOR REQUIREMENTS SPECIFY IRC ASSORTMENT #20. ASSORTMENT #20 INCLUDES 20 PW-10 RESISTORS IN SELECTED VALUES—\$6.60 NET.

TECHNICIAN & Circuit Digests

TELEVISION • ELECTRONIC • RADIO • AUDIO • SERVICE

M. CLEMENTS *Publisher*
 O. H. CALDWELL *Editorial Consultant*
 ALBERT J. FORMAN *Editor*
 SIDNEY C. SILVER *Managing Editor*
 ANN O'ROURKE *Assistant Editor*
 J. L. STOUTENBURGH *Contributing Editor*
 DR. A. F. MURRAY *Contributing Editor*
 B. F. OSBAHR *Contributing Editor*
 CHARLES F. DREYER *Art Director*
 ELMER KETTERER *Circuit-Digest Production*
 GEORGE PUGLICI *Circuit Diagrams*

BUSINESS DEPARTMENT

H. A. REED V.P. & *General Sales Manager*
 BERNARD BLOCK *District Manager*
 MARSHALL FAILLACE *District Manager*
 P. J. CARNESE *Sales Promotion Manager*
 N. McALLISTER *Asst. Business Manager*
 MARTHA USDIN *Production Manager*
 A. H. POND *Controller*
 W. W. SWIGERT *Credit Manager*
 ELMER DALTON *Circulation Manager*
 480 Lexington Ave., New York 17, N. Y.
 Telephone PLaza 9-7880
 P. H. DEMPERS *District Manager*
 201 N. Wells St., Chicago 6, Ill.
 Telephone RAndolph 6-9225
 CHRIS DUNKLE & ASSOCIATES
California Representative
 3257 W. 6th Street, Los Angeles 5, Calif.
 Telephone DUmkirk 7-6149



TECHNICIAN & CIRCUIT DIGESTS, Sept. 1955, Vol. 62, No. 3, \$.50 a copy. Published monthly by Caldwell-Clements, Inc. Publishers also of MART including Price-Fax, and TELE-TECH & ELECTRONIC INDUSTRIES. Publication office, Emmett St., Bristol, Conn. Editorial, advertising and executive offices, 480 Lexington Avenue, New York 17. Telephone PLaza 9-7880. M. Clements, President; M. H. Newton, Assistant to President; John J. Borghi, Vice President and Treasurer; M. B. Clements, Secretary.

Entered as second class matter at the Post Office at Bristol, Conn., June 10, 1954. Subscription rates: United States and Canada, \$4.00 for one year, \$6.00 for two years; \$8.00 for three years. Pan-American and foreign countries: \$7.00 for one year; \$10.00 for two years; \$14.00 for three years. Copyright 1955 by Caldwell-Clements, Inc. Title registered in U. S. Patent Office. Reproduction or reprinting prohibited except by authorization. Printed in U.S.A. by Hildreth Press, Inc., Bristol, Conn.

SEPTEMBER, 1955

FRONT COVER

The difference between good and bad reception, in many cases, may be the difference between a marginal antenna and a modern array of more appropriate design. A relatively simple antenna, together with its broad sensitivity pattern, is contrasted with a sharper, more sensitive unit. For Antenna "Specs", see page 46.

FEATURES AND ARTICLES

Editorials	27
<i>Happy New Year... Now</i>	
<i>Nature's Quirks Aid Antenna Sales</i>	
<i>A Test Instrument for Your Thoughts</i>	
<i>"Tuning in the Picture"</i>	28
<i>Tube Characteristics: Analysis for Technicians</i>	Sol Heller 30
<i>Sunspot Activity & TV Reception Problems</i>	J. Richard Johnson 32
<i>"Tough Dog" Corner</i>	34
<i>Super V Heater Puzzler</i>	G. A. Boyog
<i>Sync Elusive</i>	B. C. Hulson
<i>You and the Law</i>	Floyd Wilkins, Jr. 35
<i>Composite Dipole Design</i>	John F. Guernsey 36
<i>Shop Hints</i>	37
<i>Small Coil Making</i>	H. J. Miller
<i>A Musical Slant</i>	E. Townsend
<i>Neat Solder Dispenser</i>	L. H. Wilson
<i>Binding in Dual Controls</i>	R. D. Jarvis
<i>Tube Removal from Shield</i>	C. E. Gregg
<i>Technician Test Equipment Contest</i>	38
<i>Latest Tubes & Components</i>	41
<i>New Test Instruments</i>	42
<i>New Antenna Developments</i>	44

1955 OUTDOOR ANTENNA SPECIFICATIONS

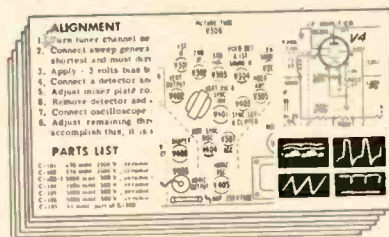
<i>New Pix Tubes Eliminate Ion Traps</i>	58
<i>High Fidelity Notes</i>	59
<i>Tube Racket: FTC Rules</i>	61

DEPARTMENTS

Letters to the Editors	8	News of the Industry	60
Editor's Memo	18	Reps & Distributors	62
Calendar of Coming Events	29	Association News	64
New Products	40	Catalogs & Bulletins	66
		New Books	67

CIRCUIT DIGESTS

73



IN THIS ISSUE

EMERSON: TV Chassis 120220-D, etc.
 GE: TV Chassis "M" series
 SETCHELL CARLSON: TV chassis C100
 SPARTON: TV Chassis 15V215
 WESTINGHOUSE: TV Chassis V2342
 ZENITH: TV Chassis 19X22

the **BIGGEST**

TV Spot Campaign

is going to

pre-selling...

C·D·R·R·o·t

TV
antenna

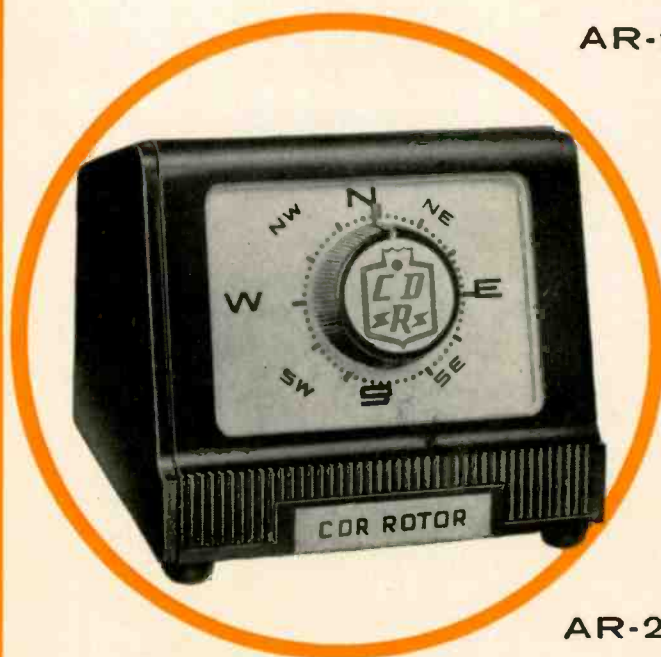
the complete line... a model

TR-4 the heavy duty rotor complete with handsome modern cabinet with METER control dial, uses 4 wire cable.

TR-2 the heavy duty rotor with plastic cabinet featuring "compass control" illuminated perfect pattern dial, uses 8 wire cable.

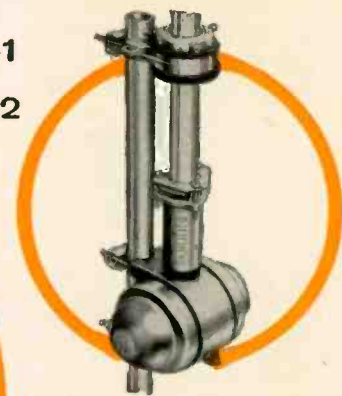
TR-12 a special combination value consisting of complete rotor, including thrust bearing. Handsome new modern cabinet with meter control dial, uses 4 wire cable.

TR-11 same as TR-12 without thrust bearing.

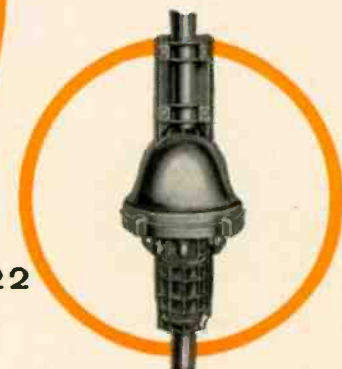


AR-1

AR-2



AR-22



CORNELL-DUBILIER
SOUTH PLAINFIELD, N. J.

in Our History
work for you

ors...
for every need

featuring

C·D·R

automatic

ROTORS


An outstanding group of rotors... three
proven and tested models... ALL 40%
SHARPER TUNING than ANY other automatic
rotor. Handsome cabinet... dependable
performance... proven and tested by thousands
and thousands of satisfied users.

to
millions of
TV viewers
every week

We are going to make this the BIGGEST rotor
year you've ever had! The CDR ROTOR line is
COMPLETE in every detail... featuring SEVEN
MODELS... A TYPE FOR EVERY NEED! And
backing up this is the BIGGEST and most ex-
tensive consumer campaign in all our history!
Millions of TV viewers will see the CDR rotor
announcements on TV, pre-selling them for
you. And a complete promotional kit of deal-
er aids to help you sell and feature CDR
ROTORS! Plan now... for the BIGGEST CDR
ROTOR year ever!



THE RADIART CORP.
CLEVELAND 13, OHIO



TWIN-SCREEN
HI-LITE
Picture-Tubes

Every one is bright and sharp!

It's no accident that Du Mont's new Twin-Screen Hi-Lite picture tubes provide richer contrasts and sharper focus. They feature the sharp focus of the Hi-R gun design plus the extra brightness of an aluminized screen. Furthermore, *each* Twin-Screen Hi-Lite is purposely put through the same stringent tests to assure only the best of quality in outgoing products.

These outstanding uniform qualities are your guarantee that you always get a better picture tube when you specify Du Mont Twin-Screen Hi-Lite — And they cost no more than ordinary aluminized replacement types!

Ask your distributor for Du Mont "Twin-Screen Hi-Lite" the next time you buy picture tubes.

DU MONT

Cathode-ray Tube Division, Replacement Sales, Allen B. Du Mont Laboratories, Inc., Clifton, N. J.

DU MONT
HI-R ELECTRON GUN

Exclusive with Du Mont! Recognized
by customers and competitors alike as
the finest gun available today.



NEW!

NOISELESS!

ELECTRONIC!



Thompson Products

Automatic

Superotor®



INTERCHANGEABLE ROTORS

Famous time-proved Superotor models "100" and "500" have both been adapted for automatic operation!



World's only *silent* automatic antenna rotator! No gears, no click, no clatter. Electronic fingertip VP* tuning. Antenna rotation and control is smooth, not in "steps" like ordinary automatics — provides a new standard of tuning accuracy for Fringe, UHF and Color reception. Write today for specifications.

*VP (Vernier Precision)

**OTHER THOMPSON PRODUCTS
ELECTRONIC AFFILIATES**

• Bell Sound Systems • Dage
Television • Ramo-Woolridge
Corp. • Pacific Semi-Conductors, Inc.

ELECTRONICS DIVISION

Thompson Products, Inc.



2196 CLARKWOOD ROAD • CLEVELAND 3, OHIO

Available in Canada thru Atlas Radio Corp., Ltd., 50 Wingold Ave., Toronto

TV CAPACITOR SERVICING DATA

For Every Manufacturer from A to Z

FREE FROM SPRAGUE

These two pocket-size manuals are the hottest radio-TV servicing guides ever produced. Both contain the most complete—and the most up-to-date—capacitor replacement information available ANYWHERE!

Keep them both handy and you'll never have to thrash around for the right capacitor replacement information. Sprague makes them all, Sprague lists them all, and Sprague distributors know them all—all to help you handle every capacitor job right every time.

What's more, you don't have to pay a red cent for these valuable, expensive-to-prepare, expensive to keep up-to-date manuals. You can get them both FREE from Sprague distributors located in every sales area in the United States. We'll be glad to send you the name of the one nearest you. Or, for 10c to cover postage and mailing, we'll gladly send you the manuals direct from Sprague Products Co., 65 Marshall St., N. Adams, Mass.

DON'T BE VAGUE...INSIST ON

SPRAGUE®

WORLD'S LARGEST CAPACITOR MANUFACTURER

Sprague Products Co. is the Distributors' Division of the Sprague Electric Co.

SPRAGUE TV REPLACEMENT CAPACITOR MANUAL



YOUR SPRAGUE DISTRIBUTOR

SPRAGUE PRODUCTS COMPANY • North Adams, Massachusetts
Distributors Division of the Sprague Electric Co.

FREE!

TV REPLACEMENT CAPACITOR MANUAL K-101

Here is the latest capacitor replacement information for every capacitor in 4,664 model TV sets made by 85 set manufacturers. Every manufacturer is listed alphabetically, with Sprague replacement capacitors—available everywhere—fully described and cross-referenced to the original part numbers. The manual also shows the number of models each capacitor is used in—a valuable guide for stocking popular ratings. Handy... convenient... pocket-size—for use in the shop or from your tool kit. Make sure you have the newest one. Ask your distributor for the 7th Edition.

FREE!

CERAMIC CAPACITOR REPLACEMENT MANUAL K-200

This handy little guide is the most informative, the most complete manual of its kind ever published. Pocket-size, like Sprague's TV replacement Capacitor Manual K-101, it lists every conceivable ceramic capacitor and printed circuit replacement... for every television set made... during the past five years. All told, more ceramic capacitor values than can be found in any other manufacturer's line, including discs and tubulars. And each capacitor or printed circuit listed is one you can depend on for a no-call-back replacement. Ask your distributor for it today. It's new!

SPRAGUE TV REPLACEMENT CERAMIC CAPACITOR MANUAL

YOUR SPRAGUE DISTRIBUTOR

**HAVE YOU HEARD WHY THEY'RE
PLUGGING THEM IN ?**



All
Sarkes Tarzian
Replacement
Rectifiers
plug into
Conversion
Chassis CC1.

See your distributor.

Smart
servicemen are
making more
money by
modernizing
current TV sets
with Sarkes
Tarzian Plug-In
Rectifiers
and
conversion
chassis CC-1

**... and
it's so easy**



Dept. T-1 415 North College Avenue, Bloomington, Indiana

In Canada: 700 Weston Rd., Toronto 9, Tel. Murray 7535

Export: Ad Auriema, Inc., New York City

LETTERS

To the Editors

Tube Racket

EDITORS, TECHNICIAN:

The article "Reprocessed Tube Racket" (July 1955 issue) covers the situation thoroughly. As Chairman of the Tube Div. of RETMA, I had occasion to appoint a committee to study ways of combatting this racket. D. W. Gunn of Sylvania is Chairman of this committee. At the RETMA annual convention in June, Richard Orth of Westinghouse was elected Chairman of the Tube Div. I know that he is quite interested in the problem.

JOHN Q. ADAMS
Vice President—Sales

CBS-Hytron
Danvers, Mass.

EDITORS, TECHNICIAN:

We are appraising our New York branch of your (tube racket) complaint, and it is expected that a representative of that office will call on you shortly for additional information. You may be assured that when all relevant data are made available, the matter will receive our careful study and consideration.

SAMUEL L. WILLIAMS
Acting Chief Project Attorney
Bureau of Investigation
Federal Trade Commission
Washington 25, D. C.

EDITORS, TECHNICIAN:

Two years ago I purchased a lot of tubes from an Eastern Jersey outfit, and all were very good. My second shipment was the same. But in the third, I found 6 out of 20 that were defective. I am staying with three standard brands.

CLIFFORD LESSIG
Radio-TV Service
Milford, N. J.

EDITORS, TECHNICIAN:

In all fairness, gentlemen, are your skirts clean? You allowed your publication to carry advertising from companies serving these reclaimed tubes, and as long as their money was available, you readily accepted it. I am one of the many servicemen who, because you saw fit to advertise their ads, bought into this racket.

HOMER H. NEWMAN
Heating & Appliance Co.
Marshall, Ill.

• Yes, our skirts—or trousers, to be more exact—are quite clean. All ads were accepted in good faith. If technicians, including reader Newman, had reported their experiences, the investigation would have been started sooner. Furthermore, many thousands of dollars in questionable tube advertising is
(Continued on page 16)

Now

YOUR TV PICTURE TUBE INSTALLATIONS FINANCED BY GENERAL ELECTRIC

YOU can sell G-E picture tubes to your service customers on the *instalment plan!* First national tube credit program to be handled direct by a leading manufacturer!

- You tie up no capital—endorse no notes. You are reimbursed immediately for the full amount of your bill covering tubes, parts, and labor.

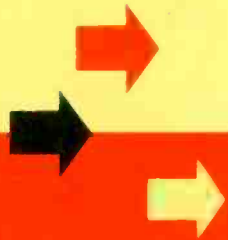
- You sell high-profit tubes and

service where cash isn't available to your customers. You open the door wide to new business—more business! And those repaired TV sets piling up on your shelves which customers can't pay for, now will move out from your shop *FAST.*

- You have no collections or record-keeping to worry about. Credit arrangements with your customers are made quickly and easily.

GENERAL  ELECTRIC

101-184



It's easy as 1-2-3

to sell new G-E picture tube installations on credit

1.



You find that your customer hasn't the cash on hand to pay for the new G-E picture tube that's needed, plus other General Electric tubes, also parts and labor. So . . .

2.



You explain G.E.'s easy payment terms. The customer welcomes the opportunity to sign the contract. You then proceed to make the installation, and put your customer's TV in tip-top shape.

One call to your G-E tube distributor will bring full



Next day you turn over the contract to your G-E tube distributor, who reimburses you for the complete installation job, including labor.

READ HOW YOU CAN USE THIS GREAT NEW GENERAL ELECTRIC CREDIT PLAN!

OFTEN the price of a new picture tube keeps customers from having their TV sets serviced properly. They are forced to get along with an inferior picture, or no picture at all, while you lose a profitable repair job.

Now G.E. gives you a way to turn these lost jobs into service dollars. No longer need your customers pay cash in full. You can give them as long as six months to pay out of income, with a down payment as low as \$5.

Yet you get reimbursed immediately by your G-E tube distributor. Furthermore, you endorse no notes, have no collections to make. That part is handled by the General Electric Credit Corporation in cooperation with your distributor.

Act today! Ask your G-E tube distributor to show you how to obtain . . . on easy credit terms . . . picture tube installation jobs you've never been able to sell before! *Tube Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL  ELECTRIC

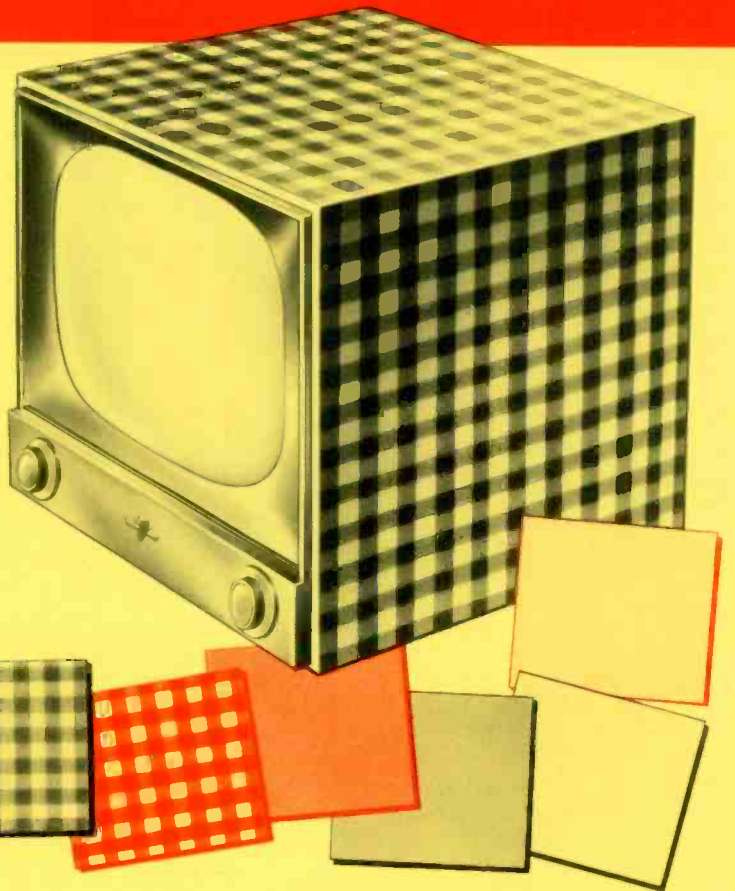
AND BE THE FIRST TO OFFER...

instructions, forms, and advertising-promotion helps!

A New Look FOR OLD TV's

Choice of 10 decorator colors and patterns

"STIX" is its name, and it works wonders on old TV receivers. Your customers can quickly and easily change cabinets to blonde, or to 9 other desired colors or patterns. That TV receiver which has outgrown its living-room usefulness, can be made over into a second set that matches the decoration of den, rumpus-room, or nursery. "Stix"—made of Firestone Velon, and available from your General Electric tube distributor—is another big reason why your customers will want to have their television sets repaired . . . by you, who offer them new TV appearance along with new and better performance—a new set inside and out!



NINE OUT OF TEN TV OWNERS right in your neighborhood will read about the sensational new G-E picture tube credit plan—and about the new decorator coverings for old TV's

. . . in every Sunday newspaper supplement—
and TV Guide—reaching 46,500,000 homes.

. . . in colorful posters, displays, and other promotion
material G.E. is providing for your local use.



GENERAL  ELECTRIC

Packed with
PIDQ



New!

Model U-98—fully automatic—it's built for the future! —incorporates 32 distinct improvements (15 engineering, 17 design and mechanical)—eliminates all arcing and consequent picture distortion—points directly, positively, instantly to target station—"just set it and forget it!"
List Price **\$39.95**

New, Improved ALLIANCE TENNA-ROTORS

Performance

perfect synchronization,
perfect alignment.

Design

years-ahead styling,
harmonizes anywhere.

Quality

precision manufacture,
strictest production control.



New!



Model T-12 (formerly T-10)—many major improvements in this popular unit—needle stays in position—you always know where antenna points—highly accurate . . . List Price **\$29.95**

Model K-22—"economy" model. Product of the same famous Alliance precision manufacture. Neat, compact, modern design. Finger-touch control. Unequalled value . . . List Price **\$19.95**



Model BY-90—the recognized quality converter built for top performance, long, trouble-free service. Superior reception . . . List Price **\$29.95**

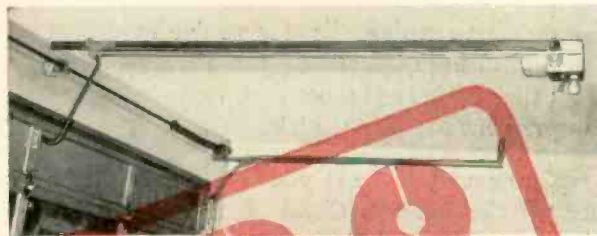
ALLIANCE UHF CONVERTERS



Model UC-2—practically automatic! Single, simple control provides continuous tuning. Modern decorator styling. List Price **\$24.95**



Model UC-1—"hideaway" model—mounts out of sight on back of set. Only slide rule tuning dial shows slightly. List Price **\$18.95**

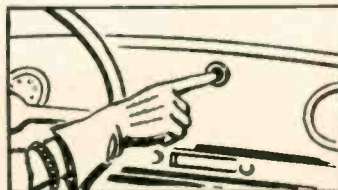


Alliance Genie

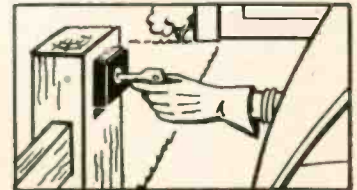
AUTOMATIC GARAGE DOOR OPERATORS

A "natural" for TV-dealer sales! Watch customers gleam when you tell them how inexpensive "push-button operation" really is! The Alliance GENIE Lift-A-Dor is the first, low-cost, quality, automatic operator. Opens, closes, locks, unlocks garage door, turns lights on or off! Long-life, trouble-free, comes pre-assembled, factory-tested. Many exclusive features. List Price from **\$69.95** to **\$219.95** plus installation.

PUSH ALLIANCE PRODUCTS
"known in every TV home"
FOR PDQ PROFITS



Radio Control—operates from push-button on car dash.



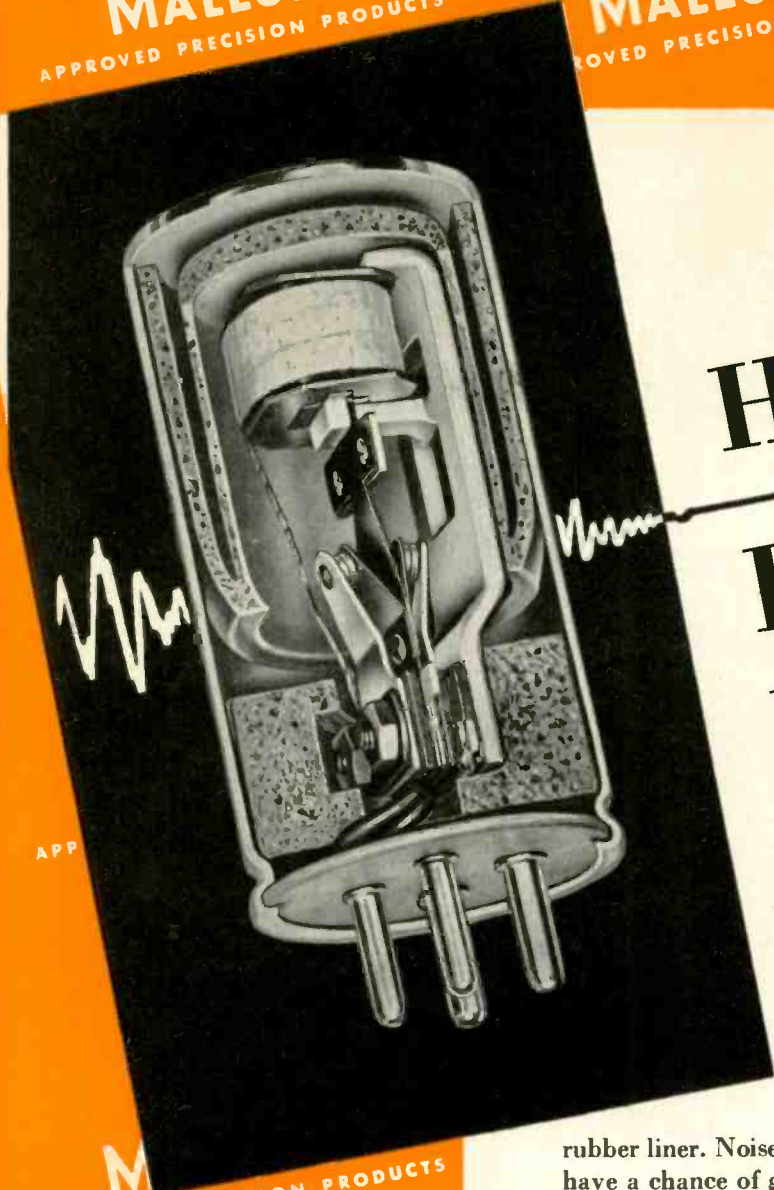
Key-Switch Control—operates from driver-level box.

ALLIANCE MANUFACTURING COMPANY • Alliance, Ohio

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS



HUM HUSHING DESIGN

*makes Mallory's
"25th Anniversary" model
the quietest vibrator ever*

TAKE a look inside the Mallory 25th Anniversary Vibrator*—and you'll see why it's so free of mechanical hum. The vibrator mechanism "floats" in a bell-shaped rubber liner. Noise produced by the vibrating element just doesn't have a chance of getting to the case or mounting plug.

That's not all. The rubber cup at the plug end also "floats" in place . . . never touches the can at more than one point. Even the leads are designed to minimize transmitted noise.

The net result is the quietest-running vibrator you've ever seen . . . or heard. Its mechanical hum is actually less than the electrical noise emitted by the speakers of most auto radio sets. And it costs no more than previous Mallory models.

On every vibrator replacement job, treat your customers to the quietest performance on the market. Check your stock today . . . and call your local Mallory distributor for quick delivery.

*Pat. Pending

P. R. MALLORY & CO. INC.
MALLORY

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

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

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS

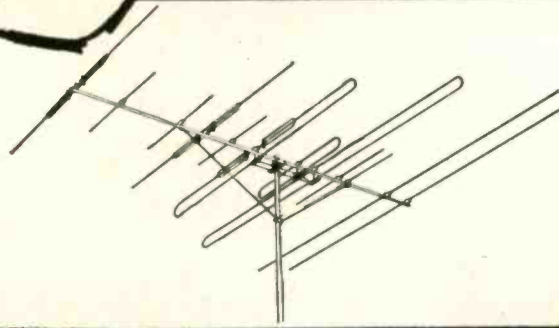
P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS

P. R. MALLORY & CO. INC.
MALLORY
APPROVED PRECISION PRODUCTS



make the ZEE-BEAM test!



SUPER ZEE-BEAM ALL-CHANNEL VHF YAGI

Model 440

For extreme fringe areas. Features two pairs of dual reflectors and exclusive ZEE-X Electronic Element. List \$32.95

See Why **WELCO** Says:

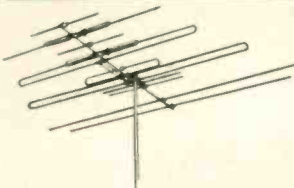
Best Performance of Any Comparable Antenna... or Your Money Back!

----- Low Band Pattern
----- High Band Pattern

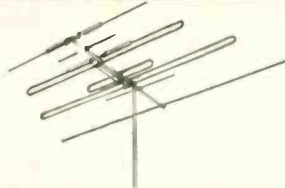


ZEE-X Electronic Element

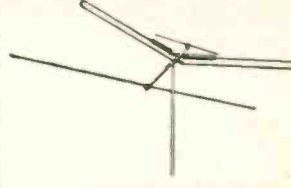
... a basic Welco development that makes possible many new outstanding antenna designs. The first element to function with true half-wave dipole characteristics and full efficiency on both VHF bands. Patent pending.



ZEE-BEAM ALL-CHANNEL VHF YAGI Model 220
For far fringe areas. Also features ZEE-X Element, exclusive with Welco. List \$24.95



ZEE-BEAM ALL-CHANNEL VHF YAGI Model 110
For fringe areas. Includes ZEE-X Element, a remarkable antenna for the price. List \$18.75



CONICAL ZEE-BEAM ALL-CHANNEL VHF Model 50
For primary signal areas. ZEE-X Element. Single bay style. (2-bay style available also). List \$8.95

Send This Coupon in Today!

Prove to your own satisfaction... see why we say the ZEE-BEAM Antenna gives you the best performance of any in its price range now on the market! Order your ZEE-BEAM Antenna now; shipped freight prepaid.

BE THE LEADING ANTENNA INSTALLER IN YOUR AREA!

WELCO MFG. CO.

Burlington, Iowa

WELCO MFG. CO., 225 South 3rd Street, Burlington, Iowa

Please rush freight prepaid my ZEE-BEAM Antenna order for test. I understand this is a 30-day money-back guarantee offer.

<input type="checkbox"/> Model 440	Dealer Net \$19.77	<input type="checkbox"/> Model 50	Dealer Net \$5.37
<input type="checkbox"/> Model 220	14.97	<input type="checkbox"/> Model S-2 Stacking Kit	.96
<input type="checkbox"/> Model 110	11.25	<input type="checkbox"/> Technical Material	NC
<input type="checkbox"/> CHECK ENCLOSED FOR \$ _____		<input type="checkbox"/> MONEY ORDER ENCLOSED FOR \$ _____	

Name of Jobber _____

His Address _____

NOTE: You must enclose your jobber's name and address in order to take advantage of this special offer, so he will receive credit for your order.

Your Name _____

Name of Authorized Dealer _____

Address _____

City _____

Zone _____

State _____

QUESTION:

Why buy TWO when ONE will do?

ANSWER:

Insist on **AEROVOX** TWIST-PRONG ELECTROLYTICS



Here's the reason: A popular TV replacement calls for a 4-section unit rated at 20-20/450, 60/150, 100/25. In the absence of such a number, some capacitor lines recommend TWO units in combination — 20-20/450 60/350, list price \$5.05, plus a tubular electrolytic 100/25, list price \$1.35, for a total of \$6.40.

By contrast, AEROVOX offers the identical part number — an AFH-105-30, rated at 20-20/450, 60/150, 100/25, list price \$4.25

Why buy TWO when ONE will do? Why \$6.40 list when you can get a single-unit replacement for \$4.25 — and cut your labor by half? Lastly, you avoid trouble in TV chassis where tight fits are a problem.

With more extensive listings (actually 290 to 345 more numbers than those of any one of five competing brands*), AEROVOX Type AFH Twist-Prong Electrolytic Capacitors meet more requirements with single, economical units in place of multiple-unit makeshifts.

Consult AEROVOX Listings!

Take full advantage of those more extensive listings of ALL types of capacitors. Ask your AEROVOX distributor — or write us.

**Details on written request.*



AEROVOX CORPORATION

DISTRIBUTOR SALES DIVISION,
NEW BEDFORD, MASS.

In Canada: AEROVOX CANADA, LTD., Hamilton, Ont.
Export: Ad. Auriema, 89 Broad St., New York, N. Y. • Cable: Auriema, N. Y.

Letters to the Editors

(Continued from page 8)

still available, but **TECHNICIAN** is not accepting it. Our stringent policy is that the ad must state exactly what the buyer will get.—Ed.

EDITORS, **TECHNICIAN**:

I want to congratulate you on this type of investigation. Could you give me the names of these firms? I deal with some of them and have never found them to be as such, but after reading your story I have discovered symptoms like scorched mica, etc. What can be done to get my money back on these tubes?

STEPHEN M. SKOVVAN

Skovvan Radio Service
Pittsburgh 12, Pa.

• Pending final disposition by the authorities, we are not prepared to release the names of the companies we investigated. This will help catch the gypps, and at the same time protect any lone innocent who might have been involved. Our experience is that the companies make refunds on tubes returned to them with invoice. The philosophy seems to be: Why quibble and provoke trouble? There's profit enough anyway.—Ed.

EDITORS, **TECHNICIAN**:

There are legitimate sources for bargain tubes, and there are shady sources. The buyer frequently has no way to distinguish the "fast buck" boys from the legitimate operators.

If ALL servicemen would make it a policy to clip one pin from ALL defective tubes, one source for the re-branding buys would dry up. When I was making service calls, it was always my policy to do this, and leave the tubes and parts with the customer to be thrown away. If a pin was not clipped, the tubes frequently got back in the set.

One of the largest sources for defective tubes is the TV set manufacturer or distributor; they get them back in large quantities, and often sell this junk when they should destroy it. Clipping off one pin would stop this.

LYMAN E. GREENLEE

G & G TV Supply
Anderson, Ind.

EDITORS, **TECHNICIAN**:

Service association should use every means to discourage its membership from falling prey to the dubious practice of handling this type of merchandise. Here in the Province of Ontario this Association has not had this type of thing brought to its attention as yet, but **TECHNICIAN**'s timely warning will serve to keep us on the alert for the appearance of such merchandise.

J. M. FORDE
President

Radio Electronic Technicians
Assoc. of Ontario, Inc.
Brantford, Ontario

CROWN ...your best buy in antenna rotation



FOR STYLE • FOR ACCEPTANCE • FOR PROFITS



● EASY TO READ DIAL

Compass indicating dial, illuminated for easy reading even in darkened room... needle never fluctuates... instant and accurate directional indication without activating the motor.



● RUGGED MOTOR DRIVE

Lifetime lubricated capacitor motor operates on 115 volts. Built-in roller thrust bearing with 175 lbs. weight capacity. Smooth, constant, dependable operation under all conditions... 365° rotation... automatic brake prevents coasting or wind-milling. Protected by Crown's exclusive "Weather-Guard" design. UL and Canadian Standards Association listed.

Crown CAR6B Tenn-A-Liner Rotator, shown here with the exclusive Crown Tenn-A-Liner Planter, is your best buy for the highest profits in the TV antenna rotator field. It's also your customers' best buy because Crown's ruggedness, dependability and ease of operation assure long, trouble-free service. In fact, of all the Crown Tenn-A-Liners sold, only 1.06% required service. Crown Tenn-A-Liners are guaranteed and carry Crown's exclusive replacement policy (not a repair policy) that protects your customer and you.

The CAR6B Tenn-A-Liner is decorator designed in handsome three tone modern styling for greater sales appeal... and may be sold with or without the Tenn-A-Liner Planter.

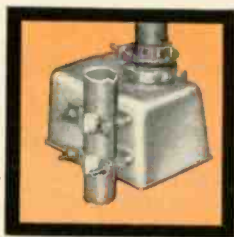
Act now! Don't miss your chance to build bigger profits with Crown! Get the full story on Crown Tenn-A-Liners, the highest profit line in the TV antenna rotator field.

SELL WITH CONFIDENCE... SELL CROWN!

 CROWN® CONTROLS Co., Inc. NEW BREMEN, OHIO

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

Here's a pair
You can bet on!



ROTOR QUEEN

ANTENNA ROTATORS



Exclusive! Signal Pilot Light
(ON during operation,
DIMS near end of rotation)

Model **R-55** **1995** LIST
LOWEST PRICE
QUALITY ROTATOR ON
THE MARKET TODAY!

Model **M-55** **2665** LIST
SAME SUPERIOR QUALITY AS
R-55 WITH ADDED DELUXE
• Directional Meter Indicator

OPTIONAL!
Model TB-2
Universal
Thrust Bearing
\$4.95 List

DEAL YOURSELF... NEW CUSTOMERS... FASTER SALES... BIGGER PROFITS

with this winning pair of Rotor Queens. Both models feature the latest engineering advances, and are designed to satisfy the most demanding requirements of ALL your customers. They assure the sharpest, clearest pictures on every TV channel for every home.

ONLY the RMS ROTOR QUEEN gives you all these quality features!

- Instant braking action
- Full 370 degree rotation, right or left
- Direct gear drive for high torque—no worm gears
- Step-down transformer . . . safe 24 volts to drive unit
- Lifetime oilite bronze side thrust bearing
- Die-cast zinc weather sealed housing
- Flagpole type base for easy installation
- Guy wire supports • All parts rustproof
- Full 1 year RMS guarantee against defective workmanship and materials.

POWERFUL RMS
CONSUMER ADVERTISING
WORKS FOR YOU!
FREE mats
on request.



**RADIO
MERCHANDISE
SALES, Inc.**

New York 62, N. Y.

ORDER TODAY and watch the chips roll in!

LOOK for the RMS man for your best buy in
Outdoor Antennas • Indoor Antennas • Rotors • Intercoms • TV Antenna Accessories.

Editor's Memo

While visiting various TV service shops recently, the conversation turned to the question of judging bargains. When is a sale a real inventory clearance, and when is it a dumped load of inferior merchandise?

With some products, it's not too difficult to tell. For example, I'd hesitate to buy a regular \$2.00 tube for 80¢. (See "Reprocessed Tube Racket" in July TECHNICIAN.) People just don't give away something for nothing in business.

There are other products, however, which are more difficult to evaluate. These may include such items as capacitors without company markings, bulk packed speakers, nameless antennas, etc.—and even magazines. When in doubt about big bargains in these products, let's recall what the Romans said: *caveat emptor*, let the buyer beware.

Of course, there are laws against fraudulent bargains, but they seldom help the fellow who has already been stung, as thousands have by reprocessed tubes. Besides, there is a comfortable margin for unethical operation within the law.

If you have the time and facilities to test an unknown low-cost product, and it turns out good, then grab the bargain. If you're not set up for product testing, it's a good idea to stick with the name brands, since most of the well established firms are reluctant to risk their reputations on an outright junk product. Not so with the fly-by-nighters. If some of their questionable bargains catch up with them, they can change their names—but not their integrity—in a flash.

A basic yardstick to remember about bargains is highlighted in a humorous story going the rounds. It goes something like this.

Joe Doakes has a stiff neck. He goes to the doctor, but finds only the medic's lovely nurse in the office. Joe tells her his trouble, and she undertakes to give him a gentle massage, which relieves the stiff neck after an hour of rubbing. The nurse charges Joe \$10. Next week, Joe Doakes gets another stiff neck, and goes to see the doctor. This time the doc is in. He examines Joe's neck, takes a heavy medical encyclopedia and slams it against the neck. Joe shudders, opens his eyes, and finds the stiffness is gone. The doc charges \$3. Joe pays him, and comments, "You know, cheap is cheap."

And so it is, the subtle difference between a job well done and improperly done meaning satisfaction or displeasure. Cheap inferior replacements can mean troublesome callbacks, meaningless warranty, and unhappy customers. After all, cheap is cheap.

Al Foman

TUNG-SOL "Magic Mirror"

ALUMINIZED

PICTURE TUBE

**BRIGHTER-SHARPER
MORE DETAIL
MORE CONTRAST**

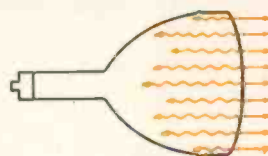


The "Magic-Mirror" Aluminized Picture Tube creates the brightest, most realistic TV picture you can bring into the homes of your customers. The "Magic-Mirror" tube effectively utilizes *all* the light generated by the phosphor screen.

Tung-Sol has developed a unique "fogging" method of backing up the phosphor screen with a mirror-like aluminum reflector. This reflector prevents light radiating uselessly back into the tube. It brings out all the detail of which the receiver circuit is capable. So smooth and true is the Tung-Sol aluminum reflector that mottling, streaks, swirls, "blue-edge", "yellow-center" and other objectionable irregularities are eliminated.

Tung-Sol pin-point-focused electron gun assures a steady, brilliant picture—free from alternate fading and overlighting. Tung-Sol's exacting standards of quality control, manufacture and testing further guarantee the high uniformity and maximum performance of the "Magic-Mirror" TV Picture Tube.

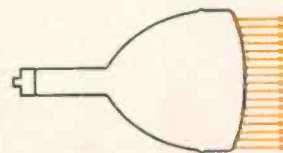
For further details, including Tung-Sol's sales aids and advertising support, call your Tung-Sol supplier today.



ORDINARY TUBE—Only *half* the light produced by the phosphor screen is utilized in the picture. Other half radiates wastefully back into tube.



RESULT—A light background within the tube which reduces picture contrast.



MAGIC-MIRROR ALUMINIZED TUBE — Aluminized reflector allows electron beam through. Blocks wasted light from backing up into tube. Reflects *all* the light into picture.



RESULT—Pronounced increase in contrast to make a bright, clear, more realistic picture.

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

Sales Offices: Atlanta, Chicago, Columbus, Culver City (Los Angeles), Dallas, Denver, Detroit, Montreal (Canada), Newark, Seattle.
Tung-Sol makes All-Glass Sealed Beam Lamps, Miniature Lamps, Signal Flashers, Aluminized Picture Tubes, Radio, TV and Special Purpose Electron Tubes and Semiconductor Products.

TRIO®

**Will Not Sacrifice Quality
FOR PRICE!**



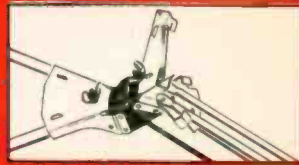
TRIO
Model 742

Sharpshooter

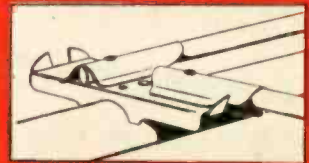
CONICAL

\$3.95
LIST

14
POPULAR MODELS
—ALL COMPLETELY
PRE-ASSEMBLED



Insta-Lok Head—216% more
resistance to vibration and
breakage. Flip out elements
—they're locked in place.



Insta-Lok Clamp—Swing ele-
ments into position—that's all!

Quality materials plus advanced TRIO automa-
tion give you the finest conicals ever built.

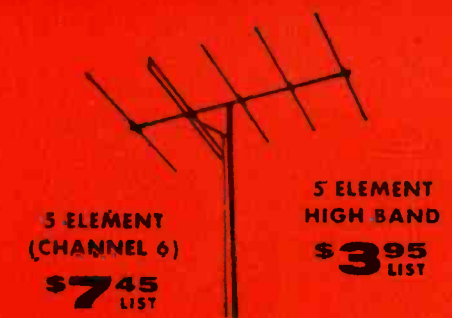
*Sharpshooter's Quality Features
Obsolete Un-assembled Antennas*

TRIO *Sharpshooter*
YAGI

DRAW A BEAD ON QUALITY



Only TRIO SHARPSHOOTER
Yagis Have These
Quality Features



5 ELEMENT
(CHANNEL 6)

\$7.45
LIST

5 ELEMENT
HIGH BAND

\$3.95
LIST



10 ELEMENT
(CHANNEL 6)

\$13.65
LIST

10 ELEMENT
HIGH BAND

\$6.88
LIST

INSTA-LOK CLAMPS—Perfect alignment, positive lock, superior strength, lessened vibration and breakage. No finer yagis regardless of price!

EFFICIENT ELECTRICAL DESIGN—TRIO high channel models use a ratio type dipole for better impedance match, higher gain, sharper directivity.

RIVETED CONSTRUCTION—Introduced by TRIO for faster assembly, better picture quality.

BETTER VALUE—Because TRIO produces practically every part used in their products, including their own aluminum tubing.

Ask your distributor for complete literature on the new SHARPSHOOTER Conicals and Yagis.



TRIO® Manufacturing Company
GRIGGSVILLE, ILLINOIS

COPYRIGHT 1955—TRIO MANUFACTURING COMPANY

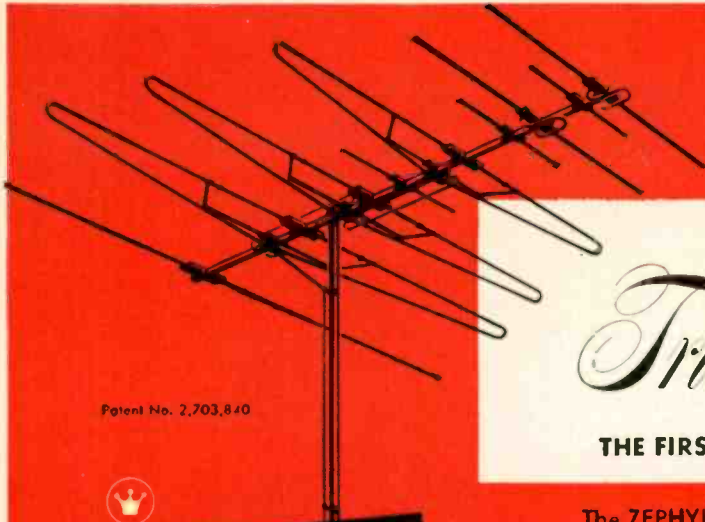
EXPORT SALES DIV., SCHEEL INTERNATIONAL INC., 4237 N. Lincoln Ave., Chicago, U.S.A. Cable Address: HARSCHEEL



ANNOUNCING THE

Trio Zephyr Royal

THE FIRST STAGGER-TUNED TELEVISION ANTENNA



Patent No. 2,703,840



*What Hi-Fi brings to Audio
Stagger-tuning
brings to TV Antennas!*



Pre-Assembled—Uses TRIO's famous Insta-Lok Clamps. Sturdy—Rugged—Compact and it's patented too!



MODEL ZR-1
\$34⁹⁵ LIST

The ZEPHYR ROYAL employs three "wing" dipoles, stagger-tuned, to provide even higher and more uniform gain, absolute flat response on all channels 2-13—a necessity for color TV. It is tuned on six predetermined frequencies in the same way that stagger-tuned circuits are used in I.F. stages in TV receivers.

The ZEPHYR ROYAL is not just an addition to the famous TRIO ZEPHYR, but is a completely new electrical design. Parasitic elements are used ONLY where they contribute to the efficiency of the antenna's electrical design—not just for promotional purposes.

A new phasing method provides increased directivity—and functions equally well on the highs as well as the lows.

The elimination of minor lobes, to an extent never before realized in an all-channel antenna, finally banishes all co-channel interference. All of the gain is packed into one efficient forward lobe.

Try a new TRIO ZEPHYR ROYAL. You'll find that in gain and directivity it's the best all-channel TV antenna ever produced for color or black and white.

America's New Favorite

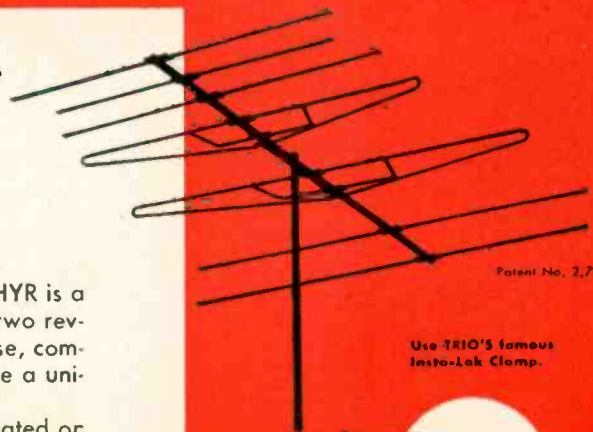
the Trio Zephyr

The antenna everyone's talking about! The ZEPHYR is a high performance, single lobe antenna, employing two revolutionary "wing" dipoles. Three half waves in phase, combined with an integrated director makes each dipole a unidirectional antenna on the high channels.

The ZEPHYR uses two "wing" dipoles, one resonated on the low ends of channels 2-6, and 7-13, the other on the high end of these channels. These composite dipoles, both driven, together with fully functional parasitic elements, produce the high performance to size ratio never before achieved in antenna design.

There's sharp directivity too, on all channels—comparable to a yagi.

TRIO believes that with the introduction of the ZEPHYR and the ZEPHYR ROYAL, the need for stacked arrays is eliminated.



Patent No. 2,703,840

Use TRIO'S famous Insta-Lok Clamp.



It's Efficient!



It's Compact!



It's Patented, too!



TRIO Manufacturing Company
GRIGGSVILLE, ILLINOIS

COPYRIGHT 1955—TRIO MANUFACTURING COMPANY

MODEL Z-1 \$27⁹⁵ LIST

EXPORT SALES DIV., SCHEEL INTERNATIONAL, INC., 4237 N. Lincoln Ave., Chicago, U.S.A. Cable Address: HARSHEEL.

**How to
hand
yourself
more
business**

Whenever you replace a tube, it's smart to hand the lady the CBS carton . . . and yourself more business.

It's smart because CBS tubes are advertised to *women* in Life, Good Housekeeping and on Arthur Godfrey's Talent Scouts.

And it's good business for you because *women* have greater confidence in CBS tubes . . . the tubes with the Good Housekeeping Guaranty Seal.

There are no better tubes made than CBS tubes.



CBS-HYTRON, Danvers, Massachusetts
A DIVISION OF COLUMBIA BROADCASTING SYSTEM, INC.





G-C CRT DUO-DECAL TEST SOCKET ADAPTER
For top-of-chassis tests.
No. 9251 NET \$1.95



G-C GRILLE CLOTH ASSORTMENT
Various sizes and patterns.
No. 9114 NET \$0.99



G-C HIGH-VOLT TEST LEADS
Heavy duty TV leads; phone tips.
No. 9100 NET \$3.00



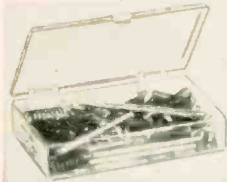
G-C POCKET HEX KEY WRENCH SET
Seven sizes .050" to 3/16"; case.
No. 9124 NET \$1.65



G-C PRINT-KOTE SILICONE RESIN
Protects printed circuit repairs.
No. 14-2 NET \$1.17



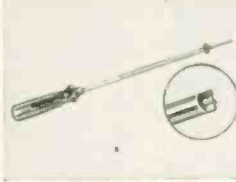
G-C "99" RUBBER GROMMET ASSORTMENT
Many types & sizes, plastic box.
No. 9121 NET \$0.99



G-C "99" SPRING ASSORTMENT
Styles and sizes for all repairs.
No. 9118 NET \$0.99



G-C "99" WASHER ASSORTMENT
Metal & fiber washers, all types.
No. 9119 NET \$0.99



G-C SCREW-STARTER SCREW DRIVER
Starts screws in tight spots.
No. 9148 NET \$2.10



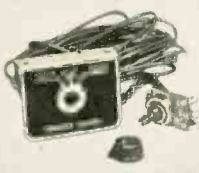
G-C SPRAY-KOTE TUBE-KOTE
Touchup scratched picture tubes.
No. 49-12 NET \$2.17



G-C K-27 PRINT-KOTE
Pressure-spray silicone resin.
No. 14-6 NET \$2.17



G-C SPRAY-KOTE HAMMER-KOTE
Brown hammer finish, air dries.
No. 83-12 NET \$1.83



G-C DUAL SPEAKER SWITCH ASSEMBLY KIT
Wired, ready to use.
No. 9188 NET \$1.17

GENERAL



Ask For These

RADIO-TV SERVICE AIDS

CEMENT

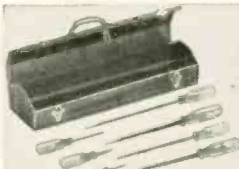
... at Your Jobber



G-C SPRAY-KOTE APPLIANCE WHITE
Snow white finish for ranges, etc.
No. 9113 NET \$1.30



G-C PHONE DUPLEX JACK AND PLUG
For hi-fi and audio, ready-wired.
No. 9226 NET \$0.90



G-C ALL-STEEL SERVICEMAN'S KIT
Large, roomy kit with 7 tools.
No. 9052 NET \$8.10



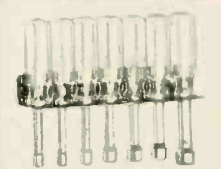
G-C KLEEN-TEX CLEANER
Safe, slow-burning, inexpensive.
No. 11-G NET \$2.10



G-C HORIZONTAL BAR GENERATOR
Simple, accurate TV alignment.
No. 9149 NET \$1.95



G-C NUT & HEXHEAD SCREW STARTER
For 1/4" & 3/16" hex nuts, screws.
No. 9147 NET \$1.50



G-C 7-PIECE NUT DRIVER SET
Sizes 3/16" to 1/2", wall rack
No. 9208 NET \$3.60



G-C TV PICTURE TUBE BOOSTER
5-wire type, half-moon socket.
No. 9136 NET \$1.50



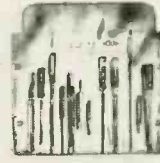
G-C PRINT-KOTE SOLVENT
Solvent for silicone resin.
No. 13-2 NET \$0.33



G-C TV-RADIO IRON CORE KIT
7 types, for 90% replacements.
No. 9141 NET \$0.57



G-C STANDARD TUNER SLUGS
Envelope of 3 replacements.
No. 9095-E NET \$0.30



G-C DELUXE TV ALIGNMENT TOOL KIT
Roll-type case with 16 tools.
No. 8280 NET \$7.74



G-C 7-PIN MIN. TEST SOCKET ADAPTER
Saves time on chassis tests.
No. 9247 NET \$1.65



G-C 9-PIN MIN. TEST SOCKET ADAPTER
Use with alligator clips or prods.
No. 9249 NET \$1.85



G-C MOTOROLA TV DIAL BELT
Genuine replacement for tuners.
No. 196 NET \$0.30



FREE!

Complete, illustrated G-C Catalog. New service aids. Send postcard today.



GENERAL CEMENT MFG. CO.

902 TAYLOR AVENUE • ROCKFORD, ILLINOIS



WIN NEW CUSTOMERS WEEK AFTER WEEK!

10 NEW PRIZES - EVERY WEEK
NEW WINNERS - EVERY WEEK

It's easy for you to take part—

- Window Displays,
- Streamers,
- Counter Cards,
- and Entry Blanks—

Identify you with Sylvania's big, new business-building prize promotion.
 "See your Sylvania Distributor."



OFFER THEM A CHANCE TO
WIN VALUABLE
"BEAT THE CLOCK"
PRIZES AT HOME

**It's easy for your customers to win...nothing to write
nothing to buy...but every entry
blank must be endorsed by you**

**Weekly
CONTEST
PRIZES
for home viewers
include:**

**TV CONSOLES
TV TABLE MODELS
HI FI PHONOGRAPHS
CLOCK RADIOS
TABLE RADIOS**

Nothing to write—nothing to buy—and everything to win. Sylvania's big, new "Beat the Clock" prize contest for home viewers is as easy as that. Every week, week after week you can create new contacts with the TV families in your community who want to play "Beat the Clock" at home and win one of 10 valuable prizes given away each week. How do you do it? Just see that they get an official entry blank endorsed by you.

It's the greatest business-building opportunity you've ever had. Make it work two ways for you. Bring new customers to your shop by displaying "Beat the Clock" prize promotion material. Tie in window and counter displays with the Sylvania products you sell.

Bring your service into new customers' homes by mailing entry blanks to your TV community. Tie in the "Silver Screen 85" consumer booklet and other Sylvania direct mail material with your TV service.

Remember, never before has the TV Service Dealer had such a concrete part in a national TV program. Make Sylvania's "Beat the Clock" prize contest click for you. See your Sylvania Distributor for your promotion package.

SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 10, N. Y.
In Canada: Sylvania Electric (Canada) Ltd.,
University Tower Bldg., Montreal

 **SYLVANIA**[®]

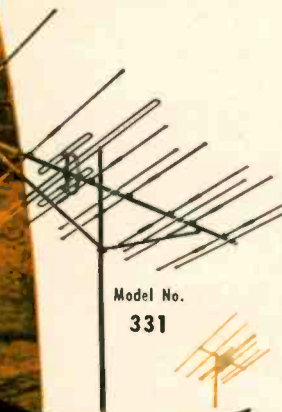
LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

KINGS of the TV FRONTIER!



Unmatched for power and performance!

This extraordinary fringe-area powerhouse is still the most sensitive all-channel antenna made today—bar none! The SUPER RAINBOW's many "years-ahead" engineering features include the triple-powered Tri-Pole, separate high and low band operation, 100% aluminum construction, and "Snap-Lock" pre-assembly. Also in great demand . . .
The RAINBOW, Model No. 330.

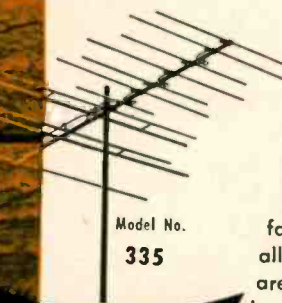


Model No.
331

SUPER RAINBOW

Extra elements, extra performance!

There may be antennas that resemble our TRAILBLAZER, but none can top its blazing performance. The TRAILBLAZER features *extra* High and Low Band directors, and *full-wave* directors on the High Band. It installs faster than any similar antenna, and—it's all aluminum! Especially recommended for areas with front-to-back interference problems, particularly on the Low Band. Count the elements . . . then compare the prices!



Model No.
335

TRAILBLAZER

Advanced design — and "Super-Sembled"

Look to the LANCERS for Channel Master "extras": extra elements and extra gain — at no extra cost. Completely "Super-Sembled." The SUPER LANCER gives 1½ db more gain on both the Low Band and the High Band than similar types. **The LANCER, Model No. 333,** has an extra director that provides 1½ db more Low Band gain. Count the elements . . . then compare the prices!



Model No.
334

SUPER LANCER

CHANNEL MASTER®

All-Channel Yagis

Unrivalled for power, popularity and price!

Servicemen everywhere are discovering an entirely new answer to the problem of multi-channel fringe-area reception: *Channel Master all-channel yagis.* These are the antennas that have what it takes to bring top TV performance to the most distant, isolated locations. And, they're ready for color, too!

Today's leading all-channel yagis are designed — and improved — in the Channel Master Antenna Development Laboratories. Isn't it logical to use Channel Master's famous engineering skill to solve your reception problems?



CHANNEL MASTER CORP. ELLENVILLE, N. C.
 The World's Largest Manufacturer of TV Antennas and Accessories

Copyright 1955, Channel Master Corp.
 ® Trade Mark Reg. U.S. Pat. Off.

TECHNICIAN

& Circuit Digests

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

Happy New Year....Now

The business cycle in the TV-electronic servicing industry, as well as other industries, starts its new year in September. A very happy new year is in prospect so far as annual dollar volume is concerned . . . a whopping \$1.8 billion. This record figure breaks down into \$975 million for parts and \$825 million for labor.

Not only will the 1955-56 season be the biggest yet, but we can anticipate still more business growth in the coming years. There are two reasons for such an optimistic forecast. First, the TV-electronic industry is constantly expanding. Second, servicing, unlike production, is a cumulative function, the amount of business increasing with the number of devices in use.

The rise in servicing volume means extra income . . . if you direct your efforts in the right direction. Making (and carrying out) the following resolutions will be a giant step toward harvesting more lucrative rewards.

1. I resolve to promote more business through active selling of my services. This means direct mail, eye-catching displays, tie-in with manufacturers' campaigns, and personal offers on house calls.

2. I resolve to sharpen my public relations. This includes cleaning up the shop, making a clean-cut appearance, and having more patience with troublesome customers.

3. I resolve to give my association enthusiastic support by participating in its activities.

4. I resolve that I will not patronize distributors who sell wholesale to the public.

5. I resolve to keep myself well informed on new industry developments.

6. I resolve to improve my servicing efficiency by maintaining a handy reference library, an adequate parts inventory and up-to-date instruments.

Nature's Quirks Aid Antenna Sales

We're all familiar with the effect of wind and ice on antenna installations. Sometimes even the strongest antennas must bow to Mother Nature's fury, and only replacement can soothe her wrath.

Now another natural phenomenon is starting to play havoc with TV reception in many areas. The first cycle

of sunspot activity since TV became popular has begun to give trouble, and is expected to increase in the next few years. One general solution to the interference problem is to replace marginal antennas with good high-gain directive types. For a full explanation, don't miss the article "Sunspots and TV" in this issue.

A Test Instrument for Your Thoughts

An unusual feature in this month's issue is the big, easy-to-enter Test Equipment Contest . . . no boxtops, no gimmicks. Many valuable and useful instruments will be awarded as prizes.

There is a very important reason for this contest. Modern test equipment is the foundation of efficient servicing, often distinguishing the professional from the tube replacer. If you could only let the instrument

manufacturers know what features you want and need that are not readily available today! Well, you can. Your suggestions will be turned over to all interested manufacturers so that these features can be made generally available wherever practical.

Make your voice heard and win a fine prize in the bargain. Fill in the entry form on page 39 and send it in today!

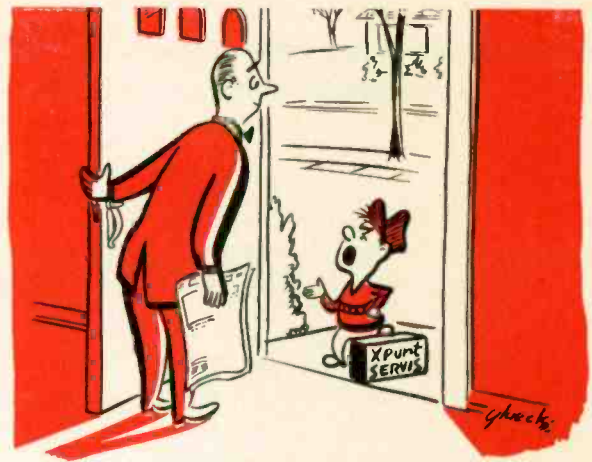
Tuning In the

ATOMIC AGE NOTE: There is 23 times more energy in the earth's nuclear fuel reserve than in all other conventional fuels combined, report Westinghouse atomic scientists. One pound of processed uranium contains the energy value of 1,300 tons of coal or 230,000 gallons of fuel oil. Incidentally, marketing experts of the same company predict that an average of 8 new electrical appliances per American home will be bought during the next 5 years . . . Oh, that bugbear of inadequate home wiring!

TRANSISTOR USE IN CAR RADIOS is sure to be the first widespread application in consumer equipment, industry seers believe. The reasoning is sound. While the still higher cost of these tube equivalents prices most equipment using them above that of competitive vacuum-tube designs, there are equalizing factors in the case of the car radio. Aside from eliminating the cost of the vibrator, power transformer, rectifier tube, power-output tube, and electrolytic condensers, transistor receivers will occupy less space on a crowded dashboard; reduce drain on the car battery to such a negligible point that continued use of the radio while the car is not in operation becomes feasible; and stand up better under the shock of driving conditions than tube sets.

PAYMENT PLAN FOR TEST EQUIPMENT is being tried out by Sylvania in a promotion of its line of instruments. Service technicians can buy anything from a single oscilloscope to a full bench complement of modern instruments for 10 percent down, with 12 months to pay as they earn. If other manufacturers pick up this promising plan, there will be no excuse for an inadequately equipped service installation. Offer includes a 10-day free trial.

TV DESIGN TRENDS: Though television has not yet reached the stage where the set itself has stopped undergoing steady development, manufacturers are already using extra features as gimmicks to put across their merchandise, as is the case with other appliances. Automatic clock timers, which have become important factors in radio sales, are now being incorporated in some GE TV models. One 14-in portable uses the same clock employed in their convertible clock-portable radio, built into the handle of the TV set. Another clock is built into the control panel of a console. Controls select the time at which the set goes into automatic operation and length of time before it turns itself off. Indicator windows show these times. Sylvania's Halolight feature is, of course, well established. Compact portability, including a carrying handle, is being featured by many companies. Another GE feature is the use of the set's metal cabinet as part of the antenna system. The principle, based on the cavity resonator used in radar, is said to provide improved pickup without adding to the interference radiation problem.



"Want your TV set tuned in—? I'll turn it on and adjust the picture for only 25¢"

BRITISH TV: The first commercial TV station in England is scheduled to go on the air on the 22nd of this month. The transmitter, located in a London suburb, will cover an area estimated to include about 10 million viewers. Two more commercial units are due to be in operation by March, at which time about 60 percent of the population in the United Kingdom will have access to privately sponsored TV.

WOMEN AND TECHNOLOGY: Popular notion that women look for exterior values only, such as styling, when they shop for appliances is being repudiated by reports from dealers who sell to them. In buying clock radios, for example, they will show as much interest in such features as an automatic "sleep" switch, dimmer light and buzzer timed to go off after the radio comes on, as they do in color and shape of the cabinet. In TV, they will ask questions about aluminized tubes, local-distant switches, uhf adaptability, etc. In autos they're as likely to ask about horsepower as interior trim.

SEPTEMBER 1955 NETWORK COLOR TV SCHEDULE

TUESDAY, THURSDAYS September 1, 6, 8 7:30—7:45 PM (EDT)	NBC	"Vaughn Monroe Show" (Live)
SUNDAY, September 11 7:30—9:30 PM (EDT)	NBC	"Skin of Our Teeth" (Live) (Color Spread)
MONDAYS through FRIDAYS September 12-16, 19-23, 26-30 5:30—6:00 PM (EDT)	NBC	"Howdy Doody" (Live)
SATURDAY, September 17 3:30—6:00 PM (EDT)	NBC	"NCAA Football Game" (Live) (Miami vs. Georgia Tech)
MONDAY, September 19 8:00—9:30 PM (EDT)	NBC	"Our Town" (Live) (Producers' Showcase)
SATURDAY, September 24 9:30—11:00 PM (EDT)	CBS	"Ford Star Jubilee" (Live) (Judy Garland)
TUESDAY, September 27 8:00—9:00 PM (EDT)	NBC	"Milton Berle Show" (Live)

Picture



RADIO-TV SERVICE BILL for the past 12 months is estimated to exceed \$1.5 billion, according to H. J. Schulman of the RETMA Service Committee. This is big business. How big a cut of this pie are you getting? Gross income from the service of home receivers exceeds that from the sale of new instruments.

ION BURN ON 5AXP4 PIX TUBES is causing many technicians a lot of unnecessary grief. These small "universal" test substitute picture tubes, growing quite popular with the service fraternity, have not been designed to work with ion traps. This increases the speed and ease with which they can be used. While an ion spot can make a regular crt useless for entertainment purposes in the home TV set, the purpose of the 5AXP4 is testing, not entertainment. The presence of the burn spot will not impair the utility of the tube—nor will it shorten its life. Just go right ahead and use the tube, ignoring the spot altogether. It's easier than fooling around with ion traps . . . However, one does wonder why manufacturers haven't tried aluminizing the tube to eliminate the burn.

TRANSISTORS IN TV: According to unofficial reports, Emerson now has a set on the drawing boards that will contain several of the tiny devices. This would mark their first use in home video receivers. RCA has already incorporated a transistor stage as the phono preamplifier in its newest line of Hi-Fi instruments.

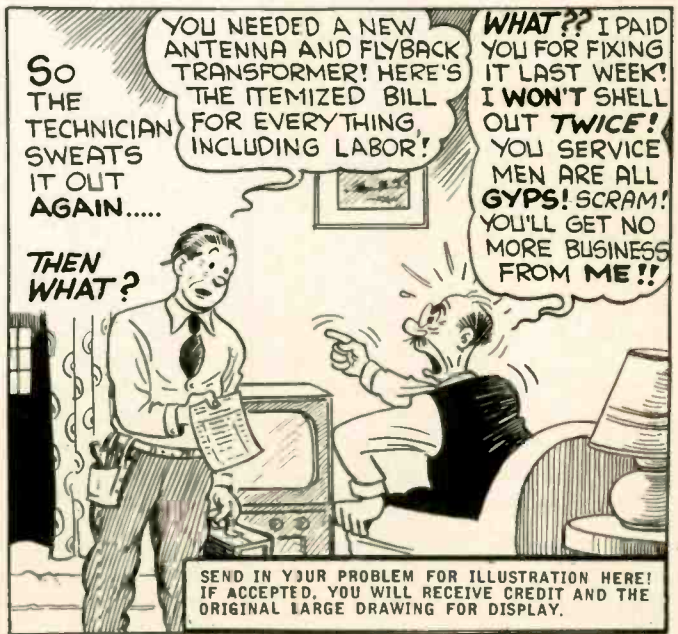
PRINTED CIRCUITS assembled by automation have eliminated hand soldering formerly required for 425 connections, reports Admiral Corp., in data concerning its line of printed-circuit TV receivers.

CALENDAR OF COMING EVENTS

- Sept. 18-24: National Radio & Television Week. Sponsored by RETMA, NARTB, NARDA, NAED.
- Sept. 30- Oct. 2: 1955 Hi-Fidelity Show, Palmer House, Chicago, Ill.
- Sept. 30- Oct. 2: Third Annual High Fidelity Audio Show, sponsored by Northern California Audio Shows, Inc., Sheraton-Palace Hotel, San Francisco, Calif.
- Oct. 3-5: Eleventh National Electronics Conference, Hotel Sherman, Chicago, Ill.
- Oct. 12-15: 1955 Convention, Audio Engineering Society, Hotel New Yorker, New York, N. Y.

TV MEMORY MIRROR: Remember the odd picture shapes that were the product of the old-style round pix tubes? In an attempt to make full use of the tube's screen area, some manufacturers distorted the picture by pulling it up vertically to yield a "giant circle" image. Circles looked like eggs, and all performers were tall and thin . . . And what happened to the need for drawing the blinds in the daytime in order to see what was on the screen? Dim light output on screens of early sets made them difficult to view in any sort of surrounding light. Seers were sure that TV would remain a night-time entertainment strictly.

YES, SHE'S STILL AT IT: The TDGF, that is—Technician's Dumb Girl Friend. She figures most of our progress in nuclear physics is centered in the New England area—around North Atoms, Mass. The boy friend had laryngitis a few weeks ago. She told friends he probably got it while working on a TV set when he got caught in a sound trap.



Tube Characteristics:

When Troubleshooting Involves Tubes—as It Always Does—You

SOL HELLER

• The subject of tube characteristics is a vast, uncharted region for many service technicians. It is generally regarded as the province of the engineer, and comparatively few others poach in this territory. Yet there are important benefits to be derived from knowing something about these characteristics, since they not infrequently have a bearing on the serviceman's work.

This article attempts to clarify a number of not-too-well understood vacuum-tube characteristics. Some suggestions regarding their links with servicing are also offered.

Plate and Screen Dissipation. When electrons strike the plate or screen of a tube, heat is generated. The amount of heat developed depends on the current flowing through the plate or screen. Tubes have maximum plate and screen dissipation ratings which should not be exceeded. When a technician, for instance, increases the screen voltage of a horizontal amplifier to boost picture width in a TV set, he must take care that the resultant increase in plate and screen current does not go beyond the permissible limits (as listed in a tube manual).

Maximum Peak Plate Current in a rectifier is the largest current the rectifier can safely pass under steady-state conditions. This peak

Fig. 1—When input filter capacitance is increased, a resistor should be added in series with rectifier plate(s) to protect the tube.

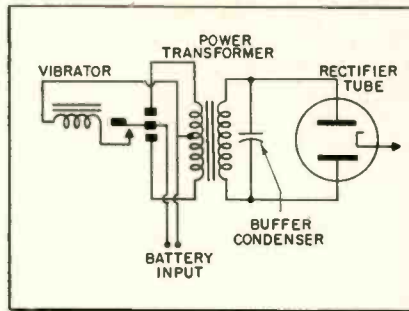
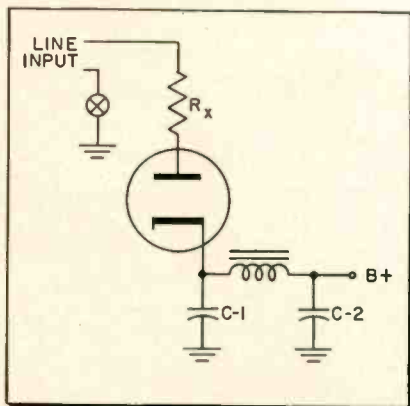


Fig. 2—Typical vibrator power supply circuit as used in auto radio shows buffer condenser.

current depends to a large extent on the size of the input filter condenser. The larger the capacitance of the condenser, the lower is its reactance, and the smaller the opposition it offers to ac current flow, particularly when it is completely or partly discharged. Filter condensers are sometimes replaced with units of larger capacitance, to boost the dc output voltage of the rectifier. When this is done without using a small resistor in series with the rectifier plate, the rectifier's life is apt to be shortened (see Fig. 1).

Maximum Peak Inverse Voltage in a rectifier is the largest reverse voltage that the tube can withstand without breaking down. In the negative part of the ac cycle, the rectifier plate becomes negative to cathode. A tendency is present at this time for the electron flow to reverse, and go from plate to cathode. This will actually take place if the inverse voltage between the two elements becomes large enough. Arcing in an auto radio rectifier tube is not infrequently due to the excessive inverse voltage developed when a buffer condenser open-circuits (see Fig. 2). These condensers have a damping function, and reduce inverse voltage peaks. When the peak inverse voltage is excessive, and a breakdown occurs, current flows through the rectifier during both halves of the cycle, causing the current rating of the tube to be exceeded; damage to the tube for other reasons occurs as well.

Amplification Factor vs. Mutual Conductance. Servicemen often make tube substitutions to improve the performance of a TV set. Often tube types with more "hop" are used in place of original ones; less frequently, better performance is obtained with tubes that provide less gain. Sometimes a tube is in scarce supply, and must be replaced with another type. When preliminary comparisons of tubes are made by checking on their characteristics in a tube manual, the terms *amplification factor* and *transconductance* (or *mutual conductance*) are apt to prove puzzling. Which term is a better measure of a tube's ability to amplify in a given circuit? A definition and explanation of the terms

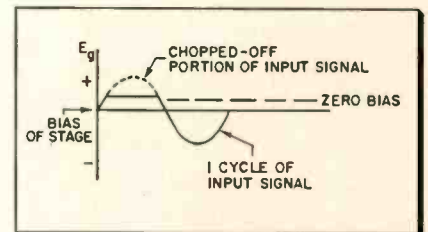


Fig. 3—Effect of limiting due to grid current flow on sinusoidal input signal shape.

may prove helpful in clearing up the problem.

The amplification factor of a tube, or its μ (pronounced mu), is the ratio of a given change in plate voltage that will produce a given change in plate current, to the smaller change in grid voltage that will produce the same change in plate current. (Actually this is not the precise way in which amplification factor is defined by tube engineers—but the author's approach is considerably easier to follow. Engineers start out with a fixed value of plate current. If plate voltage is changed in one direction, then a smaller change of grid voltage in the opposite direction will maintain the fixed value of plate current. Amplification factor is considered to be the ratio between these two changes.—Ed.)

The amplification factor of a tube is a theoretical approximation of the

Analysis for Technicians

Don't Have to Be an Engineer to Understand What's Going On

maximum voltage amplification the tube is capable of providing. It is basically a function of the tube's construction—the size of the tube elements, the spacing between them, etc. The *actual* gain provided by an amplifier may approach, but can never equal, the amplification factor, due to signal losses across the plate resistance of the tube.

The mutual conductance of a tube (g_m), or its transconductance (more strictly, its grid-to-plate transconductance), is the ratio of a small change in plate current, to the small change in grid voltage that produced it. (The plate voltage is held constant, to eliminate it as a variable.) The mutual conductance is a measure of the effectiveness that changes in grid voltage have in producing changes in plate current. A tube's g_m is an approximate index of its ability to amplify. Mutual conductance is not a fixed value; it depends on the voltages of the plate and grid (with respect to the cathode). Since $g_m = \mu/r_p$ (where r_p is the plate resistance of the tube), the amplification factor is taken into consideration in determining mutual conductance. G_m is the characteristic, therefore, that should be used in comparing the amplifying abilities of two similar tubes.

Grid Current. The amount of current that is flowing in the cathode-to-grid circuit of any tube being operated as a voltage amplifier (in radios and TV sets) is normally negligible. When the bias of such a tube is too low, or the incoming signal is too large, the positive swings of the signal drive the grid positive with respect to the cathode (see Fig. 3). Electrons in substantial amounts now flow from cathode to grid.

This current produces a voltage that is opposite in polarity to the incoming signal voltage; the signal voltage is therefore bucked. If the signal swing wants to go 2 v positive, for instance, the grid current tends to develop a counter voltage of app. -2 v. The result is that the input signal is prevented from developing its positive swing; limiting or clipping results. When the signal

voltage swing falls to a level where the grid is no longer made positive with respect to cathode, the tube stops acting as a limiter, and resumes business as an amplifier.

Grid current flow can make the bias of an amplifier more negative

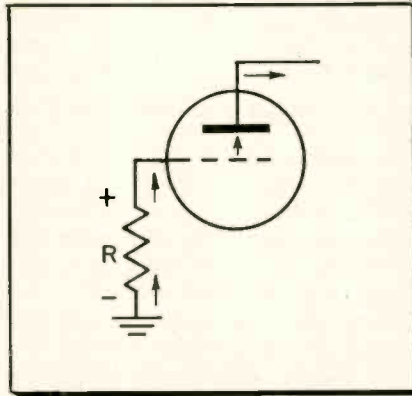


Fig. 4—Electron flow due to grid emission (see arrows) makes top of R positive with respect to ground; reduces grid-cathode voltage.

than usual, decreasing the output of the stage. In other instances, the positive grid voltage that causes grid current is so substantial that the counter voltage produced by grid current flow does not overcome it. The bias of the stage will be less negative than normal in these instances, causing an increase in (distorted) signal output. The author has seen cases where a shorted coupler between video amplifier and crt caused excessive brightness that could not be reduced to zero, due to the positive crt bias present. In other cases, a leaky coupler resulted in the build-up of such a large negative voltage (due to grid current flow) that the screen was completely dark at maximum setting of the brightness control.

Grid emission is a destroyer of tubes; for this reason alone, it is worth study by the service technician. It develops as follows: Some of the emitting coating of a tube cathode may evaporate, then condense on the grid; or perhaps the grid is splashed with cathode coating material during manufacture of the tube. If the grid subsequently be-

comes hot enough, it will begin to function like a cathode, and emit electrons to the plate. The resultant current (see Fig. 4) tends to produce a positive voltage between grid and cathode. This voltage reduces the tube's bias and increases its plate current. The plate, bombarded by more electrons, radiates more heat, causing the grid to get hotter and emit more electrons. The cycle repeats, and grid emission gets greater and greater.

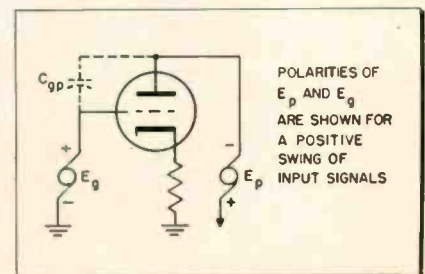
The increasing temperature of the plate causes it to release, in continually increasing amounts, gases that it absorbed during manufacture; the vacuum of the tube is thus impaired, and finally destroyed. The tube may be put out of commission in a very short time by the destructive cycle just described.

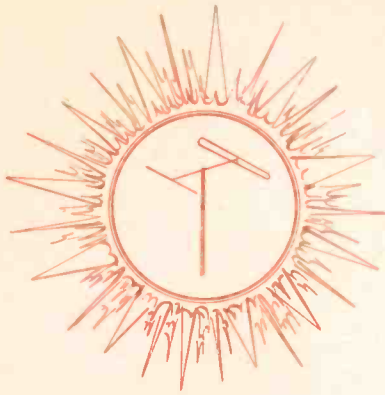
Excessive grid resistance promotes grid emission, since it permits the buildup of a large positive voltage between grid and ground. Reducing the value of grid resistance present, on the other hand, may eliminate grid emission. Technicians sometimes "repair" a grid-emitting (distorting) 50L6 or similar-type tube by reducing the value of its grid resistance. We don't recommend such a "repair," but merely cite it to illustrate the relation between grid resistance and grid emission.

Grid emission is primarily a problem in high-current tubes, such as audio or other power amplifiers, vertical or horizontal output tubes,

(Continued on page 68)

Fig. 5—Signal current in amplifier divides at plate circuit. Some goes through plate load to produce voltage E_p ; some feeds back to grid through capacitance C_{gp} . E_g and E_p may be looked upon as a pair of generators.





Sunspot Activity and

First Big Cycle of Modern TV Era, on Its

J. RICHARD JOHNSON

Author and co-author of many successful books on radio and TV service, Dick Johnson has also been a "ham" for many years. His experiences with the problem he analyzes, in the course of his amateur activities, make him exceptionally qualified to evaluate this new bugbear in the life of the service technician.

- The already complicated life of the TV technician promises to become even more complicated soon. The reason? "Old Sol," whose "spot cycle" shows promise of producing some queer effects on TV reception which neither the set owner nor the technician will appreciate.

Sunspots influence the ionosphere, which in turn reflects TV signals all over the place from distant stations right onto your (or your customer's) favorite local channel. If your phone has already been ringing occasionally as a result of these propagation problems, reliable scientific predictions and previous propagation experience indicate you should be ready for lots more ringing in the next few months and years.

How do we explain to the cus-

tomers why there are suddenly venetian blinds on his favorite program, or why a boxing match keeps fading into a fashion show? Each of us will have his own way of phrasing the actual explanations, but I know these explanations are bound to be the most understandable after we ourselves have reviewed the how and why of the whole thing.

Direct and Ground Waves

The wave paths important in normal reception are of several types. Direct waves go via the line-of-sight path, and are of course the strongest and most desirable. The direct wave may be reflected from a building, mountain, or ground, sometimes with good effect but more often to plague us with ghosts. The surface wave "creeps" along the earth, or over obstructions on the earth, but is attenuated rapidly at TV channel frequencies and is important only within several miles of the transmitter. The direct wave is extended to a useful range beyond the horizon by *refraction*; such areas are the "fringe areas" of normal reception.

Much has been written about normal reception paths and their practical effects on antenna installations. We shall therefore not dwell on these paths but proceed to a discussion of unusual inter-area interference effects.

The refracted direct wave, which extends the direct wave beyond the horizon normally, is extended even further at times by *temperature inversions*. Cool air, which is ordinarily nearer the earth than warm air, sometimes gets trapped in layers above warm areas. The difference in propagation velocity between air layers of different temperatures causes bending of the TV waves going through them, just as with light waves going through a glass prism. More bending means greater range.

Temperature inversions usually involve stations from 60 to 200 miles away. They can happen any time, but are most frequent on cool evenings after a hot day. They are not related to the ionosphere or the sunspot cycle and their rate of occurrence is about the same for each year. They can usually be distinguished from ionospheric phenomena by the fact that they affect most channels, instead of just the lower ones.

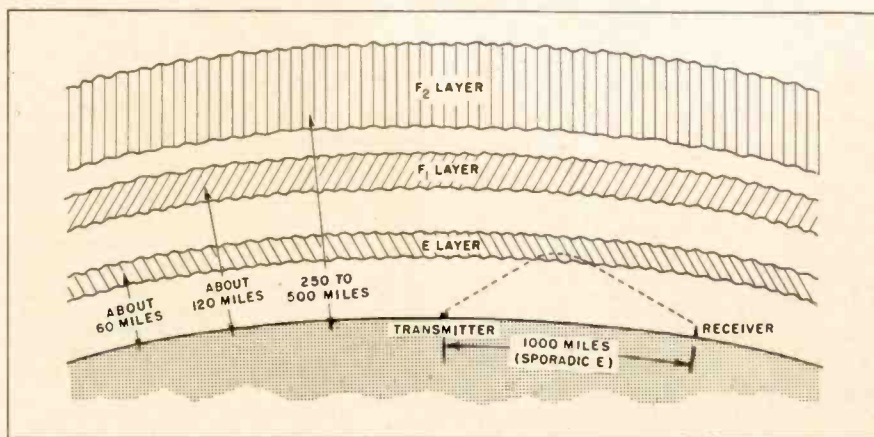
The Ionosphere

The ionosphere is a combination of three layers of *ionized air*, which have the property of refracting and reflecting radio waves back to earth at great distances. It is the agency through which worldwide communications on "short waves" (2-30 mc) is possible. The relative positions of the three ionospheric layers, E, F₁ and F₂, and their approximate height above earth are shown in Fig. 1.

The height and refractive index of the ionosphere varies. This is why short wave reception over a given path may be excellent at one time and non-existent at another. It also explains why distant stations can be heard on the AM broadcast band at night but not in the daytime, and better in the winter than in the summer.

TV channel frequencies were purposely chosen over 50 mc because—normally—ionospheric reflections are rare above that frequency. The highest frequency at which regular direct ionospheric propagation is possible at any given

Fig. 1—Ionospheric layers that refract transmissions. E layer can bounce low-band VHF.



TV Reception Problems

Way, Will Baffle Many. Improved Antennas May Help



Fig. 2—"Sporadic E" starting to build up on a low-band channel (signal normally good) near New York. Interfering transmitter was operating on the same channel in Missouri.

time is generally referred to as the MUF (maximum usable frequency). The term "usable" refers to long-distance short wave communication. The MUF at present writing is reaching about a 15-mc peak each day; its average is even lower (about 10 mc).

However, because of the sunspot cycle, the MUF had been gradually falling since the last maximum in April 1947. Scientific observations and records indicate that the MUF reached its minimum in the fall of 1954 and has started to rise again. Its rise is usually much more rapid than its descent, and it may reach its peak in as little as two years.

The interesting thing to the service technician is that, on its last peak in 1947, the MUF on several occasions went as high as 70 mc! Thus the frequencies of channels 2, 3 and 4 were wide open for country-wide and even international reception. It is significant that this peak occurred just before commercial TV receivers (or transmitters) became really widely distributed; that is why a new ionospheric peak would be something novel in TV.

Sporadic E

The F_2 layer in the ionosphere (Fig. 1) figures most importantly in regular sky-wave propagation, and its properties closely follow the sunspot cycle. It is largely responsible for the antics of the MUF. It must not be inferred that such propagation is anything but a very rare

occurrence but, when it does occur, it can be terrific! However, the E layer of the ionosphere can cause more frequent troubles. It quite often contains "clouds" of ionized air having definite boundaries; these clouds move above and assume temporary positions. The result in some cases is propagation called "sporadic E."

Because of the lower level of the E layer, sporadic E reception occurs at distances somewhat less than those in regular F-layer stuff. Typical effects are over paths about 1,000 miles long. For example, in the New York area, Missouri is one of the most frequently received states by this means. Sporadic E reception becomes more frequent as the sunspot cycle rises toward its peak, and

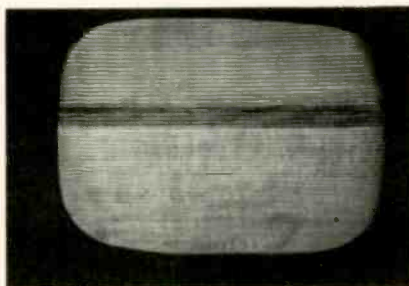


Fig. 3—Minutes after Fig. 1, the picture is gone; vertical sync is partially lost.

there have already been several occasions this year on which TV stations from the middle west, for example, have caused serious interference to local station reception in the New York area.

The abnormal effects described are sometimes expressed as "skip interference" (because there is a skipped area between the end of the normal local coverage and the beginning of the interfering area) or as "sky-wave interference."

Most skip conditions come on rather slowly, sometimes taking as long as an hour to get into full swing. Some just start and never do get serious. On the other hand, there have been some which appeared so suddenly that a received program switched to that of an interfering

station before the viewer became aware of it!

In the early stages of an "opening," a typical effect is that of dark horizontal lines moving up or down the screen, or very closely-spaced bright horizontal lines and what looks like loss of interlace or "line pairing." Some co-channel stations operate on the same nominal frequencies, and these are the ones which experience the dark horizontal line effect. Others are required by FCC to offset their frequencies 10 kc from the nominal values; these stations produce the bright fine-line interference, due to the 10-kc or 20-kc (offsets in opposite directions) beat signal.

An example of such a condition in its early development stage is shown in Fig. 2. This photo was taken in a good signal area 35 miles west of New York City in May, 1955. The interfering transmitter on the same channel was later identified as being in Missouri.

As the interference builds up, the local signal starts to lose sync. It may start to jump and "jiggle" or move back and forth horizontally. Outlines of the interfering picture may become temporarily visible at this stage. Sometimes the whole screen becomes a jumble, as in Figs. 3 and 4.

The final stage, of course, is that in which the interfering picture completely replaces the picture from the local station. How long the "swap" continues is of course un-

(Continued on page 69)

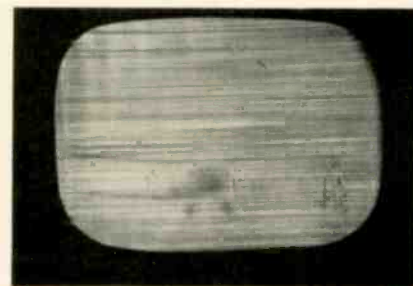


Fig. 4—Condition just before interfering station "took over." Antenna orientation was 180 degrees away from unwanted signal.

"Tough Dog" Corner

Difficult Service Jobs Described by Readers

Super V Heater Puzzler

Here is a tough dog hidden under many a bed busily chewing up the master's best bedroom slippers unnoticed. The trouble appears in many guises on the Crosley 426 series, their first vertical chassis. Only a few weeks ago did we come across the simple source of our grief, and then almost by accident.

Feeling that there was an apparent deterioration in performance in serviced sets, as compared to sets never yet serviced, we had a serviced set placed on the bench for closer inspection. It was a heater voltage check that indicated the trouble; there was little sign of heat and the break in the resistors referred to would have gone unnoticed in visual inspection.

Since these sets were designed before the advent of series-designed tubes, 43-ohm, 2-watt resistors are shunted across the heaters of the low-current 6AN8, 6AM8, and 6U8 (sync clipper, video amplifier, 3rd pix i-f, video detector, sync amplifier and sound i-f) to compensate for the heavier current requirements of other tubes in the series string. If the filament in any of these tubes opens, its shunt resistor burns open. The hairline break is not readily visible. In addition, when a service technician in the field makes a call to replace what is apparently just a burned out tube, he does not disassemble the case to inspect circuit wiring.

Watch out! Tube replacement will

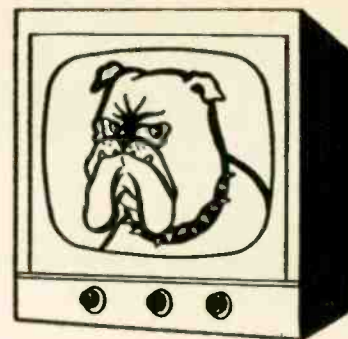
restore the set—but not to normal operation. A partial list of ailments due to this trouble includes: rapid deterioration of the newly replaced tube (one of those mentioned); vertical instability with or without a small compressed area, stationary or slowing rolling with applied signal; vertical linearity and/or height not satisfactory, or achieved at maximum control settings; poor interlace; horizontal tear at top of picture; apparent filter hum at minimum volume-control setting; critical fine tuning; and sound bars in the picture except at critical setting of fine tuner.

Subsequent models use a single 126-ohm (10-watt) resistor to shunt all three tubes. Since this eliminates the problem, we have been making the change whenever resistor burn-out occurs. Since the first case, we have gone through our service calls and, in about 40 rechecks made, about 20 showed this trouble.

This should save some unsuspecting souls from using the false alibi that the set uses a stripped-down chassis and can't be expected to do much. The set works well when operating as designed.—George A. Boyog, Jersey Shore, Pennsylvania.

Sync Elusive

The greater portion of two days was spent on this Admiral 22C2 chassis checking voltages, resistance and components, but the trouble was elusive. Symptoms were



\$10 For Your "Tough Dog Story"

Have you tangled with a difficult or obscure service problem recently? Write it up, telling us how you licked it. Use drawings to illustrate your explanations wherever necessary. A rough sketch will do as long as it can be followed. Send it to "Tough Dog" Editor, TECHNICIAN, Caldwell-Clements, Inc., 480 Lexington Ave., N. Y. 17, N. Y.

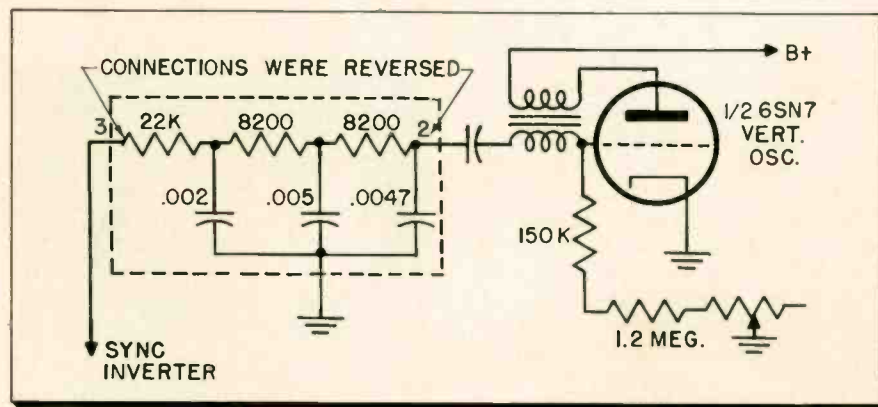
as follows: When the studio camera changed scenes, both horizontal and vertical sync would be lost for 30 seconds or so. You could induce the same effect by turning the contrast or fine tuning control rapidly back and forth. The trouble appeared to be in the sync inverter or discriminator stage, but all parts checked okay.

Waveform examination showed that one side of the discriminator (6AL5, pin 7) did not resemble the waveform at the other side (pin 5). Substitution of new tubes and new parts in an attempt to find the cause for the difference did not help.

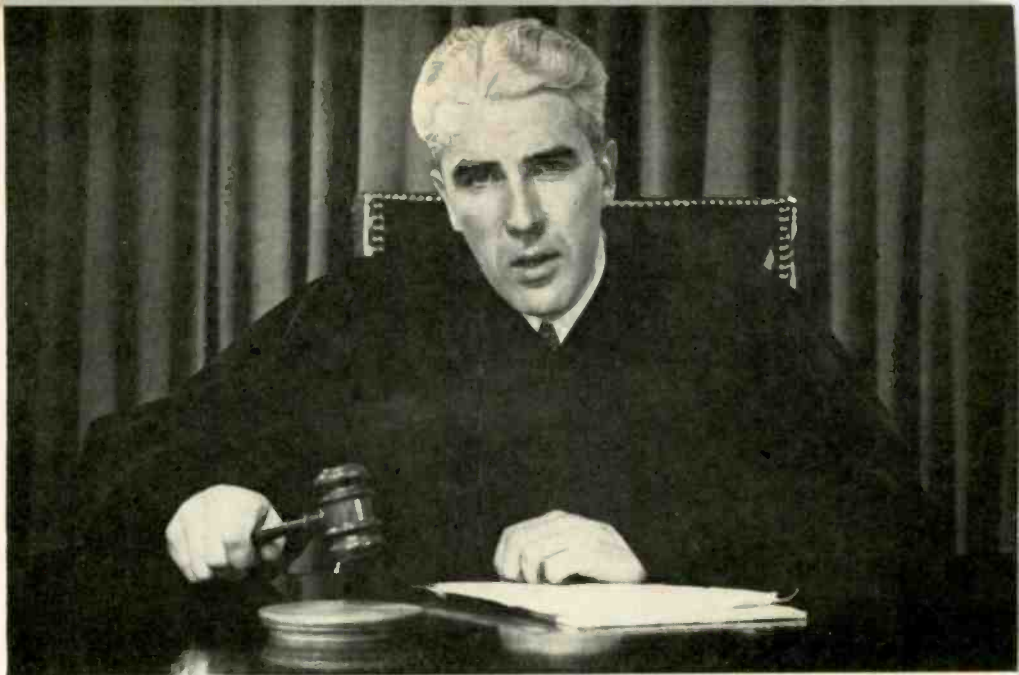
The technician working on the set was asked whether he had checked the vertical integrator couplate, between the vertical oscillator grid and the sync inverter. He said he hadn't, because it was not a likely cause of trouble. Sure enough, when the network was clipped loose from the inverter, normal waveforms were then found on both sides of the discriminator. A closer examination showed that network connections 2 and 3 (shown correctly in the accompanying sketch) had been reversed, either by a technician who had worked on the set earlier or at the factory. Hooking them up correctly cleared the trouble.—B. C. Hutson, North Little Rock, Arkansas.

(With connections reversed, the 0.0047-mfd capacitor is effectively in the circuit of the sync inverter. Since it will bypass more sync information, both horizontal and vertical, to ground than will the 0.002-mfd unit, both horizontal and vertical sync sections suffer.—Ed)

Reversed connections of the vertical integrator network degraded both horiz. and vert. pulses.



YOU and the LAW



Know the Risks in Dealing with Legal "Infants"

FLOYD WILKINS, JR.
MEMBER, NEW YORK BAR

• It is quite possible and can be most unfortunate to be confronted with this type of situation: You are called to a young couple's home to fix the television set. You check in a workmanlike manner, find the trouble, and, let us say, after much work and a trip or so to the shop you install a new picture tube and other parts and make the necessary adjustments. Everyone is pleased with the results. The bill for labor and parts amounts to \$65 and is paid.

Several weeks later the husband calls again and requests you to return his \$65. Why, you ask. The set is wrecked, he says. You won't return his money. Moreover, you learn that the set, including the parts you installed, is so badly damaged that it is not even worth cannibalizing if returned to you. You are then told that neither this young man nor his wife is an adult; they are what the law calls infants, that is, less than 21 years old. What is more you find that they have been reading their legal history, have brought an ancient right of infants into the modern world of electronics, and have applied it to you.

Since the year 1292 a person who was under 21 at the time of the transaction may elect to disaffirm his contract, whether or not it has been performed by one or both sides. If this couple had not paid you, they need only let you know that they intend not to go through

with the deal. This an infant may do simply by saying so, by returning the parts you installed, or by pleading his disaffirmance when you try to collect. The infant can even wait until you sue and plead his disaffirmance. He does not have to disaffirm until a "reasonable time" after he reaches 21. What is a reasonable time depends upon the facts of the particular case and, according to the courts' decisions, may vary from less than a month to 29 years.

What can you do to force a decision affirming the contract? Nothing until the infant reaches 21. Up to that time an affirmation is not binding, unless the youth comes within one exception to the rule or you are in a state with statutes of the types discussed below. However, you will at least know where you stand if the infant disaffirms. He can't change his mind after he disaffirms.

Exception to the Rule

The exception to this rule that minors may avoid their contracts completely does not appear to hold out much hope as a solution to our problem, except among your wealthier customers. This exception is that a minor must pay the actual value (not necessarily the price he agreed to pay you) for goods and services which are "necessaries." But are television and radio sets necessities? No court has yet decided the question as to television. However in several instances a radio was held

not to be a necessary where the purchaser already owned two.

If, as some states say, the answer depends upon the infant's station in life, you might succeed, but the automobile, although needed for transportation, usually has been held not to be a necessary. Even if the set or services were used in the infant's business, they do not thereby become necessities. Hence, the conclusion is that the minor probably will not be bound to pay, as a necessary, the reasonable value of a set, parts or services, even though the necessities rule has been adopted in 34 states by statute and in others by the courts.

When the minor properly disaffirms the contract, where do you stand? In every state the disaffirming infant gets back something of what he paid. The problems are, how much does he get and what happens to what you sold him. There are three possible answers, depending on the state in which you do business.

One is that most states require that the minor be repaid in full and that, if the minor still has part or all of what you sold him, he must restore that to you. Of course, since services cannot be returned, you lose to that extent. You also lose if the minor no longer has the set or parts or their proceeds, if sold, cannot be traced into other property in the minor's possession. This rule applies in Connecticut, Rhode Island, Kentucky, Florida, Nebraska and

(Continued on page 70)

Composite Dipole Design

JOHN F. GUERNSEY, TRIO MFG. CO.

• Recent trends in VHF antenna design have shown increasing use of a *composite dipole*—that is, one whose horizontal pattern on its third harmonic does not show a multi-lobed curve. For use in a complete antenna, this dipole must show other characteristics—gain equal to a resonant dipole on its fundamental; high enough impedance to allow the use of other elements; sturdiness and compact size.

Since Channels 2-6 cover the frequency range of 54-88 mc and Channels 7-13 cover 174-216 mc, it is possible to use the third harmonic on some low channels for the resonance necessary on Channels 7-13. A simple dipole, resonant on a low channel, will have a polar pattern and current distribution on that channel as shown in Fig. 1A. This same dipole has the polar pattern and current distribution shown in Fig. 1B on its third harmonic. This multi-lobed pattern, caused by the out-of-phase current existing in the

center half-wave section as compared with the two outer half-wave sections, shows decreased gain in the desired direction on the higher frequencies.

To produce desired pattern and gain on the third harmonic, all in-phase current distribution is necessary on all three half-wave sections. This may be done by inserting phase reversing loops between half-wave sections, or to cancel the out-of-phase section with a fourth section. The first of these two methods results in very low impedance on the fundamental; the second reduces efficiency as a result of cancellation. To overcome these defects, a development project was undertaken.

"End-Fire" Principle

Starting point was an end-fire array. Such arrays have in common a number of parallel elements, with primary sensitivity along the axis of these "ladder-arranged" elements.

Fig. 2A shows the basic end-fire type chosen, with two sections fed 180 degrees out of phase. It produces a desirable pattern, with three half-waves on lower channels and six in the high band. Since this arrangement tends to show high efficiency on a single channel, the elements were decoupled to improve bandwidth. This arrangement, with only one section now directly driven, is shown in Fig. 2B.

When experimentation showed that more improvement in both pattern and gain on the high channels could be obtained by more decoupling, the half-wave sections of the undriven portion were then separated, with the resulting configuration shown in Fig. 3A. Portions marked *D* are directly driven; *d* indicates a director; *R* identifies reflectors.

Element Size, Spacing

These various sections were experimentally cut to different lengths and spacings to obtain the most favorable combination of gain, pattern and bandwidth. On the low band, gain equals that of individual tuned dipoles; on Channels 7-13 gain is 7-8 db.

As shown, impedance of the array is above 300 ohms in the high band, but low in the low band. The final

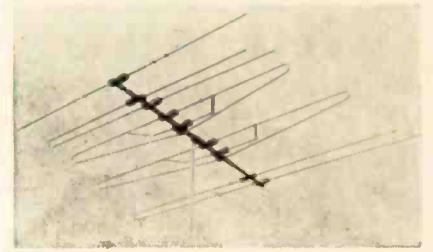


Fig. 4—Dipole used in commercial antenna.

design, shown in Fig. 3B, increased low-band impedance without material effects on the high band; maintained high gain, good bandwidth and good pattern; and permitted mechanical strength and compactness.

The earlier dipole has been converted into a folded dipole with a slight forward V on the low band by the addition of Part A.

A complete antenna using this principle is the Zephyr (Trio Mfg. Co.), shown in Fig. 4. Two of the composite dipole elements are used and directly driven, with other directors and reflectors as in yagi design. A patented phasing device connecting the two driven portions increases directivity and front-back ratio.

Each of the two driven portions is resonated at two different frequencies, making a total of four (Channels 3, 8, 12, and the video end of 6). On the low band, the complete array acts as a high-efficiency, broadband, 5-element yagi with two driven elements. On the high band, operation is that of three 5-element yagis stacked side-by-side. •

YOU CAN SOLDER GLASS

Soldering metals to glass or ceramic surfaces is possible with new indium solder. This fusible alloy contains 50% tin and 50% indium, and melts at 243° to 260° F.

The glass surface is first chemically cleaned, then the indium solder is laid on, forming a foundation for the metal to be attached. When properly done, the bond will be as strong as, or stronger than, the solder itself.

The solder which also has low resistivity, is available from Federated Metals Div., American Smelting and Refining Co., 120 Broadway, N.Y. 5. as Asarco Lo 243.

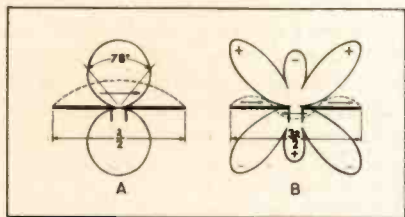


Fig. 1A—Sensitivity pattern of tuned dipole. B—Pattern obtained on the third harmonic.

Fig. 2A—Two-section end-fire design. B—One section decoupled (not directly driven.)

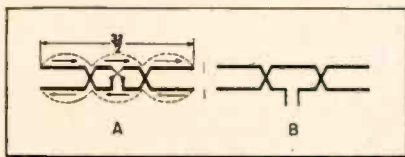
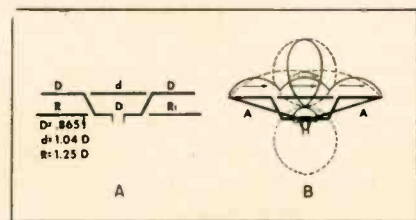


Fig. 3A—Further decoupling in undriven section. B—Final evolution, composite dipole.



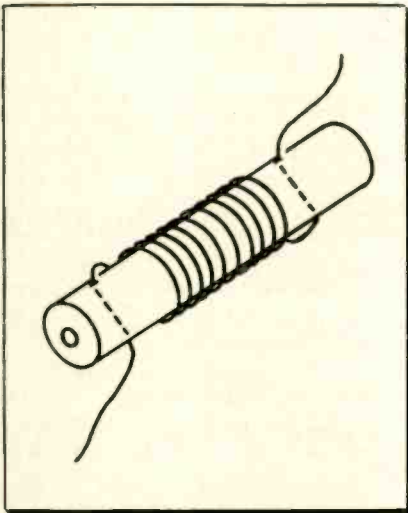
Shop Hints to Speed Servicing

Tips for Home and Bench Service Contributed by Readers

Small Coil Making

Often a small coil is needed of an odd value not readily obtainable. In such cases, a home-made coil can be quickly fabricated by using a small length of insulation from a piece of coaxial cable as the core.

Cut off the required length of cable; pull the core out from the shielding; and then extract the copper wire through the center. With the soldering iron, heat one end of



Simple hand-wound coil from cable insulation.

the wire that will be used to wind the coil, and quickly poke this heated end through the plastic insulation (see the figure). Wrap on the required number of turns and cut the wire to size. Then heat this other end of the wire with the soldering iron and plunge it through the other end of the insulation. You now have a good, low-loss coil, as shown in the illustration.—Harry J. Miller, Sarasota, Florida.

A Musical Slant

A handy accessory that we have been using around the shop for the past two years is an ordinary music stand. We use it as a stand for holding circuit diagrams. It helps provide more bench elbow room; it can be adjusted to a comfortable viewing level; and it is light enough to be moved out of the way without difficulty when it is not in use.—Pat E. McGee, Monmouth, Illinois.

Noisy RCA Tuners

Many of the older RCA front ends have the habit of developing noisy fine tuning action. Many service technicians ignore them, because of the parts problem, but doing this may mar an otherwise fine repair job.

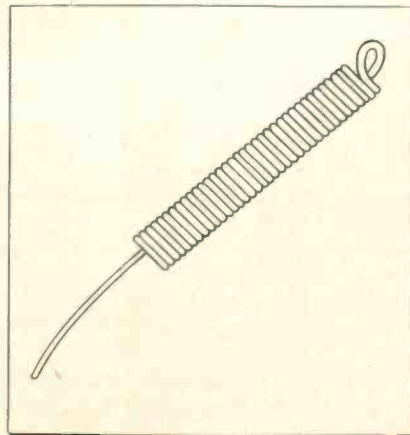
The problem can be corrected as follows: First remove the brass plunger that is the moving plate of the fine tuning condenser. Wash it well in a solvent. Then dip it in a clear plastic cement and shake off the excess. Hang it to dry with the plunger straight up so that it will harden with an even coat all the way around.

After it has dried, apply a coat of tuner lubricant and reassemble. If this is done, all noise should be eliminated from the fine tuner. Like a clean picture-tube screen, you have added a touch that will leave favorable impressions in the minds of your customers.—Ed Townsend, Worth, Illinois.

Neat Solder Dispenser

Odd lengths of solder used to be a nuisance on the bench until this handy trick was discovered. A length of solder is rolled around an ordinary pencil, to the shape shown in the illustration, and the pencil is removed. One end of the solder can then be pulled out through the "handle" as needed, and used down to the last inch without getting tangled or cluttered. I have found that a 6-foot length of solder (no. 18 size) makes the most convenient

Handy solder dispenser prevents loose scraps.



dispenser, with a 3-in. grip, and lasts more than a week. It appears as shown in the illustration. To summarize: Roll solder on pencil; remove pencil; push last six inches back through roll; pull out as needed.—L. H. Wilson, Miami Springs, Florida.

Binding in Dual Controls

When two TV control knobs are mounted one in front of the other on concentric shafts, there is always the danger of their sticking together. It seems that, if the hole on the outer (more forward) knob is deep enough, people adjusting their sets invariably manage to push this front knob against the inner one—thus making it impossible to turn one of them without having the other also move.

Since the cause is excessive depth of the hole in the outer knob, this trouble can be prevented by using little pieces of solder to fill the hole until its depth has been reduced by a satisfactory amount. With the right amount of filler, the outer knob cannot be jammed against the inner one. Solder is the recommended material because it is easily mashed into the proper shape, and is thus prevented from falling out.—Richard E. Jarvis, Merriam, Kansas.

Tube Removal from Shield

Some months ago, Mr. John Mancini gave his method for removing glass tubes that are stuck in their shields with an open-end wrench. I use another method that may be even safer. Start with a round piece of medium-stiff rubber of a size that will go through the hole in the top of the shield. Make a small hole in the end of the rubber to accommodate the tube tip. This way, there is no danger of slipping and breakage. I have used this method since small tubes and their shields came into use. To date, I have never broken a tube.—C. E. Gregg, Ontario, California.

SHOP HINTS WANTED

TECHNICIAN will pay \$5 for acceptable shop hints. Unacceptable items will be returned. Use drawings to illustrate your explanations wherever necessary. A rough sketch will do as long as it can be followed. Send your hints to "Shop Hints" Editors, TECHNICIAN, Caldwell-Clements, Inc., 480 Lexington Ave., N. Y. 17, N. Y.

TECHNICIAN TEST EQUIPMENT CONTEST

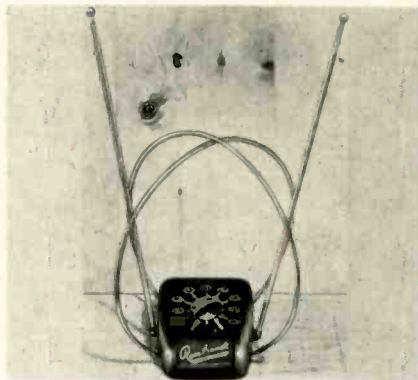
Over \$2400 in instrument prizes will be given away to 106 winners!

Prize No.	Value	Instrument	Performance
1 st	\$348.00	HICKOK Model 650C Signal Tracer	Universal video generator for monochrome & color provides modulated r-f carrier for receiver injection; checks linearity and operation of video stages. Also produces white dots for color TV adjustment.
2 nd	\$329.50	WESTON Model 983 5" Oscilloscope	4.5 mc bandwidth; rise time 0.1 μ sec; deflection sensitivity 15 mv/in; phase shift between H & V amps, 0° to 100 kc, 2° to 1 mc; calibrating voltages 0.5, 5, 50, 500; Z-axis modulation input; sweep freq. 10-500,000 cps variable.
3 rd	\$269.50	HYCON Model 617 3" Oscilloscope	4.5 mc bandwidth; V-amp sensitivity 0.1 v/in; sweep ranges 15 cps to 100 kc; TV V & H freq. 60 cps, variable phase; calibrating voltages 0.05, 0.15, 0.5, 1.5, 5.0, 15, 50, 150; H amp sensitivity 0.075 v/in.
4 th	\$139.85	TELETEST FT100 Flyback Tester, RT203 Rejuv-Tester, CT355 Capacitester	FT100 (\$44.95) Tests flybacks under full operating voltage, tests yokes and coils for shorted turns. RT203 (\$49.95) tests and reactivates crt. CT355 (\$44.95) tests for leakage, measures capacity from 10 μ f to 50 μ f.
5 th	\$126.50	SUPREME Model 655 5" Oscilloscope	V amp freq. response 20 cps to 100 kc; deflection sensitivity 0.3 v/in. H. amp freq. response 20 cps to 75 kc; sensitivity 0.3 v/in. Will handle 60 cps square wave. Sweep oscillator range 20 to 30,000 cps.
6 th	\$120.00	CLOUGH-BRENGLE Model 411 Audio Oscillator	20 cps to 1000 kc in five ranges; accuracy 2% plus 1 cycle from 20 cps to 200 kc, 3% 200-1000 kc; output 10 v open circuit; distortion under 1%; output hum less than 5 mv @ max. output, 0.1 mv on Lo.
7 th	\$104.70	JACKSON Model 49 Tube Tester & Accessories	Tester (\$49.95) has 5" meter. Accessories include plug-in kit (\$2.95), high resistance shorts tester (\$6.95), filament current tester (\$14.95), selenium rectifier tester (\$17.95), auxiliary tube socket kit (\$11.95).
8 th	\$99.95	AUTHORIZED Model 204 Intermittent Analyzer	Input ac or dc either polarity; range monitored 0.5 to 575 v; % voltage change for actuation, adjustable 5 to 65%; response time 0.02 sec; indication is pilot and/or buzzer; 4 1/2 in. meter; self-balancing.
9 th	\$99.50	TELEVISION ENGINEERS Model V1000A Tube Checker	"Vis-U-All" tester lists over 300 popular tubes on chart; filament voltage 1.5 to 117 v; five tube sockets; interelement leakage test for less than 3.5 meg; weight 10 lbs.
10 th	\$97.50	RADION Model FSM500 Field Strength Meter	VHF-UHF battery portable covers channels 2 through 83, including FM bands. Relative and direct readings in μ v. Measures radiation, lead-in SWR; locates interference.
11 th	\$89.50	RAYTRONIC Model CB-77N "Beamer"	Portable unit tests crt's for element continuity, shorts, leakage, emission, gas content. Repairs crt's by cathode sweeping, burning off interelement shorts, expanding aperture. Weight 12 lbs.
12 th	\$69.50	ELECTRONIC TEST INSTR. "Vitameter"	Portable unit tests crt's for continuity, shorts, beam current, gas content. Repairs crt's shorts, vitalize cathode, welds open filaments and cathodes. Weight 10 lbs.
13 th	\$68.90	SECO FB-4 Flyback and GCT5 Tube Testers	FB-4 (\$38.95) measures flyback retrace time interval; also tests yokes, transformers. GCT5 (\$29.95) grid circuit tube tester checks control grid emission, gas, shorts.
14 th	\$68.00	SHASTA Model 201 VTVM	DC: 11 meg input; 7 ranges to 1500 volts; accuracy 3% full scale. AC: input to 1.5 meg; 7 ranges to 4000 v; accuracy 5%; 7 resistance ranges to 1000 meg.
15 th	\$50.35	RADIO CITY Models 480 & 453 Multitesters	Model 480 (\$14.85) ac & dc to 1000v; 1000 ma dc; ohms to 10 meg; db —8 to 55. Model 453 (\$35.50) 20,000 ohms/v; dc to 5 kv; 100 μ a; to 500 ma. 20 meg; 1 kv ac; db —12 to 55.
16 th	\$29.95	SIMPSON Model 355 "Midgetester"	Dimensions 2-2/3 x 4-1/2 x 1 in. AC & DC voltages to 1200 v in 5 ranges @ 10,000 ohms/v; resistance to 10 meg in 4 ranges. Accuracy 3% dc, 5% ac. Weight 7 oz.
17 th	\$25.00	VIDAIRE Model FT-100 Wave Trap Meter	Unit quickly determines type of filter or trap to use in any TV installation by switching filter into ac or antenna circuits simultaneously.
18 th	\$24.50	HEATH Model V-7 VTVM Kit	7 dc voltage ranges to 1500 v; 7 ac ranges to 4000 v ac; ohms x 1 meg in 7 steps; 4 1/2 in., 200 μ a meter; 11 meg input impedance; dc polarity reversing switch.
19 th	\$19.95	CENTURY Model 201 Condenser-Resistor Analyzer	Tests condensers from 50 μ f to 150 μ f for leakage to 10 meg; shorts, opens, intermittents; resistors from 1500 ohms to 10 meg; coupling condensers without disconnect.
20 th	\$19.95	RADIO KITS Model M-3C Multitester Kit	Volts ac-dc to 1500 v in 5 ranges; ma dc to 150 in 3 ranges; ohms to 200,000 in 3 ranges. 1000 ohms/v sensitivity, 3" meter.
21 st	\$19.95	TELEMATIC Model WT606 TVI Analyzer	Calibrated condenser tuning identifies interfering frequencies. Wave traps and filters operate singly or in combination.
22 nd	\$18.28	POMONA Socket Kits & Meter Switch	"Socket saver," test adapter, surface breadboard socket kits for 7, 8, 9 pin tubes. MS-1 meter reversing polarity switch.
23 rd	\$15.85	SUPERIOR Model 770A VOM	AC voltage to 3 kv in 6 ranges. DC voltage to 1500 v in 6 ranges. Resistance to 1 meg in 2 ranges. Current to 15 a in 3 ranges.
24 th	\$14.90	ELECTRONIC MEASUREMENTS Model 102 Multitester	EMC "Volometer" measures ac & dc voltages to 3 kv in 5 ranges; current to 600 ma in 3 ranges ac, to 1.2 a dc in 4 ranges. Resistance to 1 meg.
25 th	\$9.95	BERKSHIRE Model 18 "Labstrobe"	Provides 60 flashes/sec operating from 60 cps power line. For measuring motor and turntable rotation.
26 th	\$8.50	ALCO Model R20 Resistor Substitution Box	Rapid substitution of resistors from 10 ohms to 10 meg in multiples of 10, 27 and 47 ohms.
27-31 st	\$3.95 ea.	SUPEREX CRT Adapter	CRT tube tester adapter permits measurement of pix tubes with present tube testers.
32-56 th		GENERAL ELECTRIC Series Heater Checkers	Checks pix tube heaters and 7, 9 and octal base tubes in series string receivers with no external connections.
57-81 st		RCA "Multicords"	All-In-one power cord with two types of cheater receptacles, power outlet, clamp-on work light.
82-106 th		CBS-HYTRON Four-Way Tools	Tool with Phillips and standard screwdrivers and 2 hex sockets aids removal of setbacks.

New Antennas

All Channel ANTENNA →

The "Rembrandt", patented indoor antenna, selectively directs circularly polarized, electro-magnetic loops and couples them to resonant dipoles. The company guarantees that the antenna will equal the performance of roof antennas in metropolitan areas. A 9-position, orientation switch is featured. Available in gold, \$19.95 list; ebony and gold, \$14.95; and mottled mahogany, \$14.95. All Channel Antenna Corp., 47-39 49th St., Woodside 77, N.Y.—TECHNICIAN (Ask for No. 9-2)



Tenna AUTO ANTENNA

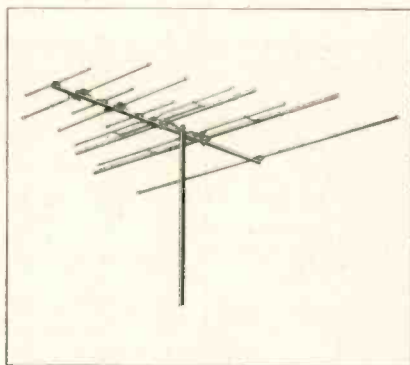
New auto antenna, the Nautilus, mounts either at the front or rear of the car and is adjustable 0-25° to match different mounting locations. Model NT-3 is for front installation and is equipped with a 4-ft. cable. Model NT3-15 is for rear mounting and is equipped with a 15-ft. cable. Tear-drop mounting base. Tenna Mfg. Co., 7580 Garfield Blvd., Cleveland 25, Ohio—TECHNICIAN (Ask for No. 9-5)

Tentenna INDOOR ANTENNA

"Twin Ogyro" indoor antenna uses twin dipoles of "Ceroc", claimed to be a specially processed wire of unusual characteristics and gain. Each dipole is wound on a rubber moulded combination spool and suction cup, slightly less than 1 in. high and wide. Both dipole spools take up no more room than two thumbtacks. Dipoles attach by suction to baseboard moulding, window pane or sill. \$1.00. Tentenna, Inc., 122 E. 42nd St., New York 17, N. Y.—TECHNICIAN (Ask for No. 9-6)

Winegard ANTENNAS →

New colored "Interceptor" and "Super Ceptor" TV antennas with "Electro-Lens" focusing feature anodized aluminum coloring in bright metallic blue, copper, gold, magenta, green, black and silver. The patented Lumalite anodizing process that produces the rich colors makes the antenna corrosion resistant and impervious to salt air, dampness, dust and natural atmospheric gasses. The anodizing is part of the aluminum, will not crack or peel. Winegard Co., 3000 Scotten Blvd., Burlington, Iowa.—TECHNICIAN (Ask for No. 9-3)



Crown TV PLANTER →

China planter specially designed to be used with the Crown CAR6B Tenn-A-Liner Antenna Rotator provides an attractive TV center piece in place of a solitary rotator control unit. Styled with clean modern lines, the planter is made of attractive forest green and chocolate brown china to blend with the color combination of the Crown Tenn-A-Liner and either blond or mahogany TV cabinetry. The rotator fits into space between the two sections of the planter. Crown Controls Co., Inc., New Bremen, Ohio—TECHNICIAN (Ask for No. 9-1)



Tescon TV ANTENNAS

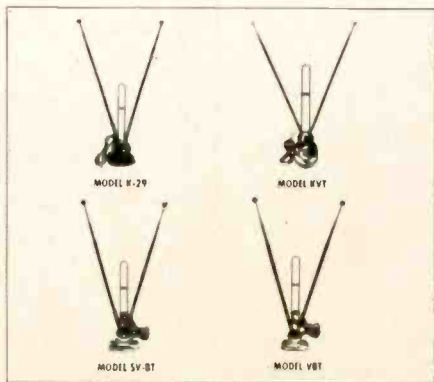
Model C-1 Constellation, and model C-2 Super-Constellation are both high-gain, broadband, all-channel VHF in-line-yagi type antennas. Designed for deep-fringe reception, the "Connie" and "Super-Connie" both feature diamond phasing loops that multiply director element functions. Special stacking harnesses are available for emphasis on low VHF response, high VHF, or all-VHF. C-1 lists for \$22.50 and C-2, \$29.00. Tescon, TV Products Co., Springfield Gardens, N.Y.—TECHNICIAN (Ask for No. 9-7)

South River GUY WIRE

Corrosion resistant aluminum cable for the guying of TV antennas, special "Alclad" 7 strand, 17 gauge has a breaking strength of 500 lbs. (approx.) and is equivalent in strength to $\frac{9}{16}$ steel wire. 1,000 ft. of the new Alclad cable weighs only 13 $\frac{3}{4}$ lbs. Tight twist; will not "birdcage" when bent and is much more resistant to ice loading during inclement weather. Outer shield is resistant to salt air, and industrial smoke. The inner core is made of high strength 56S alloy. Available in 100 ft. boxes, 100 ft. coils and 100 ft. interconnected coils. South River Metal Products Co., Inc., South River, N. J.—TECHNICIAN (Ask for No. 9-8)

RMS INDOOR ANTENNAS →

A new series of 4 "Varioscopic" indoor antennas features the "Tune-a-Slide" adjustment bar for 300-ohm impedance matching. The series feature 3-section telescoping brass dipoles, "Neva-Tip" base and 5 feet of twin lead. Models K-29 and KVT listing for \$9.95 incorporate a 6-position switch plus the adjustment bar. Model SV-BT features the adjustment bar for 300-ohms and lists for \$9.95. Model VBY lists at \$8.50. All are suited for UHF and VHF. Radio Merchandise Sales, Inc., 2016 Bronxdale Ave., New York 62, N.Y.—TECHNICIAN (Ask for No. 9-4)

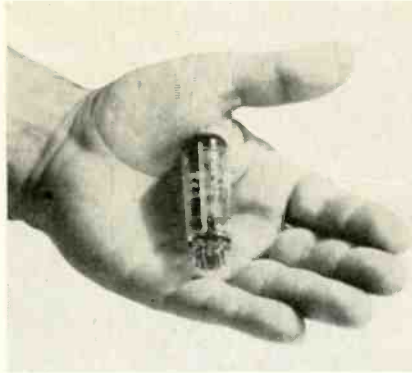


For more technical information on new products, use inquiry card on page 42

Latest Tubes & Components

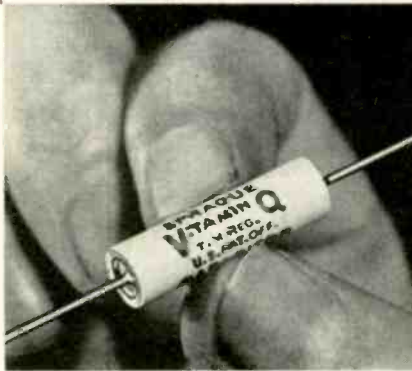
Tung-Sol TUBE

Newly developed audio power amplifier designed specifically for car radio service, the 12AB5, is intended to be used either singly or in push-pull for power output stages. Ratings are directed toward use in 12-volt automotive systems. Using the nine-pin all glass miniature envelope, the 12AB5 reportedly provides a wider margin of safety than previously found in the smaller seven-pin types 6AQ5 and 12AQ5. Tung-Sol Electric Inc., 95 Eighth Ave., Newark 4, N.J.—TECHNICIAN (Ask for No. 9-35)



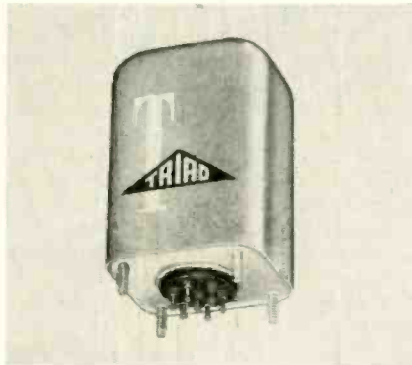
Sprague CAPACITORS

New hermetically sealed, Vitamin Q impregnated ceramic case capacitors for operation at temperatures up to 125°C use a ceramic shell instead of a metal one on the new "Pacer" series. With glass-to-metal solder seals, it provides excellent resistance to the effects of humidity and temperature, and extreme stability under all operating conditions. Smaller sized Pacer capacitors with stabilized wax impregnation available for 85°C operation. Sprague Electric Co., North Adams, Mass.—TECHNICIAN (Ask for No. 9-34)



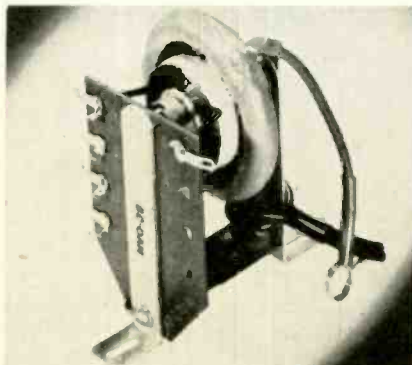
Triad HI-FI TRANSFORMERS

Recognizing the increasing demand for quality audio circuit components, this new group of high fidelity output transformers with screen taps in the primary, provide extended operating range and increased power for modern audio amplifier circuits. Designations for these ruggedly constructed and easily mounted units are HA-181, HS-186, S-142 and S-146. Complete specifications on these new items shown in Catalog TR-55. Triad Transformer Corp., 4055 Redwood A., Venice, Calif.—TECHNICIAN (Ask for No. 9-33)



Merit TRANSFORMERS

New exact replacement horiz and HV output transformers are HVO-38 (illus) and HVO-54 for Admiral; HVO-40 for Silvertone; HVO-37 for Silvertone, Sentinel, Hallicrafters, and Crosley "Super V." HVO-38 replaces Admiral parts 79C60-1, 79C60-5, 79C60-7, HVO-54 for Admiral 79C60-2, 79C60-3, 79C60-4. Units replace many other parts. List price for HVO-38, HVO-54 and HVO-40 is \$10. HVO-37 is \$8.50. Merit Coil & Transformer Corp., 4427 North Clark St., Chicago 40, Ill.—TECHNICIAN (Ask for No. 9-32)



DuMont PIX TUBES

Line of all-glass, aluminized picture tubes in round and rectangular screen sizes 16, 17, 20, 21 and 24 inches is called the "Twin-Screen Hi-Lite" line. Sharp focus and maximum brightness are among features. Cathode-Ray Tube Div., Allen B. DuMont Labs., 750 Bloomfield Ave., Clifton, N.J.—TECHNICIAN (Ask for No. 9-66)

RCA RECEIVING TUBE

New vacuum rectifier tube, RCA 3B2, is designed for the rectification of the high-voltage pulses produced in the scanning systems of black-and-white and color television receivers. It is a double-ended, glass-octal type of half-wave rectifier utilizing an indirectly heated cathode, and rated to withstand a maximum peak inverse plate voltage of 35,000 volts (absolute). RCA Tube Div., Harrison, N. J.—TECHNICIAN (Ask for No. 9-67)

Aerovox CAPACITORS

Higher-temperature operation and extra-ruggedness is claimed for Aero-film Mylar dielectric capacitors. In the form of metal-cased, glass sealed, hermetically-sealed tubulars, these capacitors utilize high insulation resistance and low dielectric absorption. With satisfactory operation at temperatures up to 150°C., they are especially desirable for coupling circuits, time-delay and computer assemblies, and aircraft equipment. Aerovox Corp., New Bedford, Mass.—TECHNICIAN (Ask for No. 9-31)

Erie "CERAMICONS"

New line of small size, high capacity Ceramicons are rectangular, have a phenolic dipped coating, and are made in three sizes; Style 892-.34" x .34", Style 893-.58" x .43", and Style 896-.75" x .56". Other specifications show Life Test—400 volts dc 1000 hours at 85°C, Flash Test—600 volts dc. These Ceramicons are designed especially for use in transistor and other miniaturized circuitry. They have a value range from 0.0022 to 0.1 and a 200 volt rating. Erie Resistor Corp., Erie, Pa.—TECHNICIAN (Ask for No. 9-30)

More New Products
on pgs. 42, 44, 61, 63

For more technical information on new products, use inquiry card on page 42

New Test Instruments

Philco COLOR GENERATOR

Universal Color-Bar and Dot-Bar Generator Model 7100, at \$269.50, provides signals for checking; static and dynamic convergence; white balance, frequency of color oscillator; phase of demodulators; matrix circuits; color



and b-w linearity. Two crystals control picture and sound carriers. Two additional crystals control internally generated color signals and horizontal sync pulses. It contains fully regulated power supply. Philco Corp., Accessory Div., Tioga & C Sts., Philadelphia 34, Pa.—TECHNICIAN (Ask for No. 9-40)

Seco TUBE TESTER

GCT-5 tube tester detects positive grid condition in amplifier tubes where the circuit application incorporates high value of grid return resistance. Tubes in the agc, rf, if and sync circuits fall into this category. The unit checks grid emission and its high sensitivity indicator locates leakage, gaseous conditions, and shorts without the usual bank of selector switches. One filament selector accommodates all of the latest TV and industrial tube types. "Eye Indicator" speeds location of "hard to find" faulty tubes. A preheater socket and a convenient ac outlet are provided. Seco Mfg. Co., 5015 Penn Ave. So., Minneapolis, Minn.—TECHNICIAN (Ask for No. 9-43)

Heath GENERATOR

Model LP-1 linearity pattern generator kit for adjusting monochrome or color TV receivers covers channels 2 to 13. LP-1 functions to produce vertical or horizontal bar patterns, a cross-hatch pattern or a white dot pattern



on the receiver under test. Individual horizontal and vertical frequency controls are provided to allow synchronizing and for establishing aspect ratio. It will produce 6 to 12 vertical bars or 4 to 7 horizontal bars. Heath Co., Benton Harbor, Mich.—TECHNICIAN (Ask for No. 9-41)

Precise OSCILLOSCOPE

Economy 5" oscilloscope for general radio and TV applications, Model 315, features frequency compensated vertical and horizontal attenuators along with identical vertical and horizontal amplifiers. Both the horizontal and vertical sections are cathode follower input type and are ac coupled. The vertical and horizontal amplifiers are within ± 6 db through 500 kc. Basic sensitivity is approximately 250 mv/in. A standby switch is used to turn off CRT filaments when the instrument is not in use. Model 315 is available as a kit at \$49.95, or factory wired at \$84.95. Precise Development Corp., Oceanside, L. I., N. Y.—TECHNICIAN (Ask for No. 9-44)

Simpson LINE TESTER

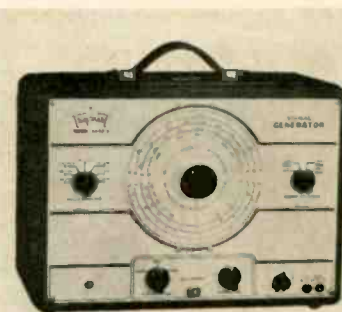
A new instrument for testing the adequacy—or inadequacy—of a 115 volt power line to furnish any value of motor starting current from 13 to 50 amperes is the Line Current-Capacity Tester Model 397. It can check



line quality before the unit in question is put into the circuit. Dealer's net price is \$29.95. Applications include testing for line capacity prior to adding appliances such as refrigerators, washing machines and air conditioning. Simpson Electric, 5200 W. Kinzie St., Chicago 44, Ill.—TECHNICIAN (Ask for No. 9-73)

Triplet SIGNAL GENERATOR

New signal generator, model 3432-A has complete frequency coverage from 160 kc to 110 mc with no skips in frequency for AM-FM radio, monochrome or color TV servicing. R-F circuits are double shielded with copper steel shields, and a cathode follower output provides good stability by acting as a buffer to the oscillator. Jacks are provided for either internal modulation or



audio output, and both are controlled by audio control to provide variable modulation or A.F. output. Model 3432-A has a large, easily read etched aluminum dial, as well as a smooth planetary drive dial for ease and accuracy in adjustment. Seven directly calibrated 160° scales. \$99.50. Triplet Electrical Instr. Co., Harmon Rd., Bluffton, Ohio—TECHNICIAN (Ask for No. 9-74)

FOR MORE TECHNICAL INFORMATION ON NEW PRODUCTS OR BULLETINS

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

New Products Editor
TECHNICIAN & Circuit Digests
 480 Lexington Ave.
 New York 17, N. Y.

Please send me more information on the following items:

My company letterhead or business card is enclosed.

Name

Address

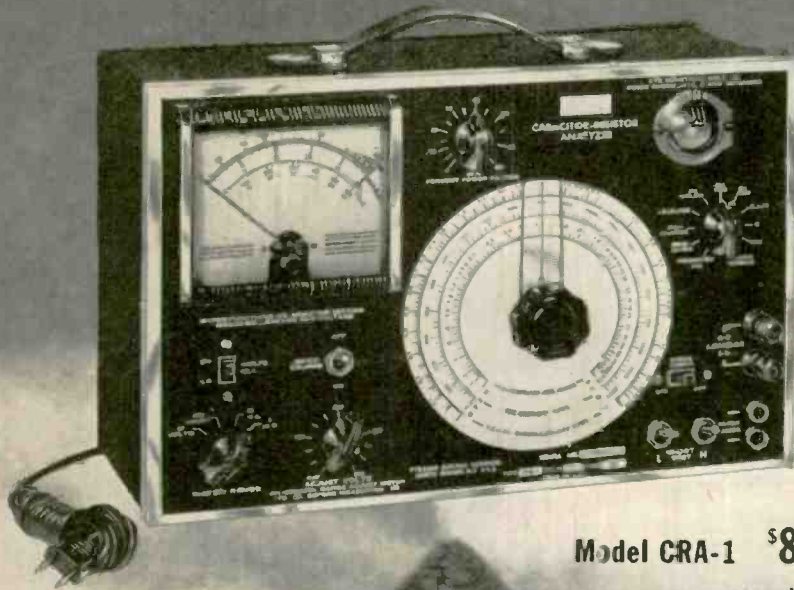
Firm My position

City State

Business address (if different from above)

NEW Capacitor Resistor-Analyzer AND Quick Capacitor Checker

another
Pyramid
first



Model CRA-1 \$82⁹⁵

User net price

This fine double duty instrument provides you not only with the complete setup for checking and analyzing all types of capacitors and resistors, but also the "Quick Check" feature enables you to test capacitors while they are wired in a set.

With the Pyramid analyzer there is no need to remove capacitors from the circuit to determine if they are open, shorted or intermittent.

This new development that saves time in servicing and production testing serves the function that required two instruments previously, actually costs less than the older type analyzer plus a separate "quick" capacitor checker.

PYRAMID ELECTRIC CO.

1445 Hudson Blvd., North Bergen, N. J.

2 in 1

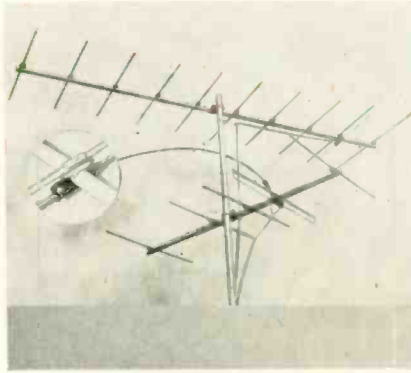
BURTON BROWNE ADVERTISING

PYRAMID

New Antenna Developments

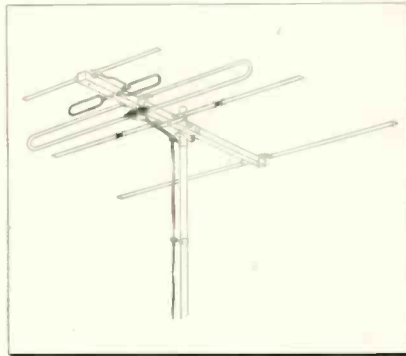
Taco "MONO-LOCK" →

Antenna failures aggravated by windstorms have been given attention in design of mounting brackets and assembly procedures. New design is known as the Mono-Lock bracket. The first of many antennas which will utilize this new assembly method is the Highlander Series of high band five element and ten element single channel yagis. Each element is easily flipped into position where it is accurately positioned and positively locked. Technical Appliance Corp., Sherburne, N.Y.—TECHNICIAN (Ask for No. 9-14)



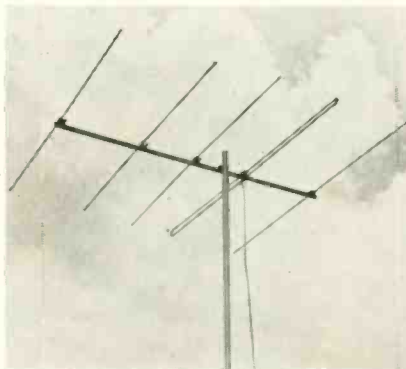
Finco TV ANTENNAS →

Three antennas included in the new "Geomatic" series of five broadband VHF antennas are Models B1, B2 and B3. These preassembled antennas are of boom-type construction. B1 is for metropolitan and suburban areas; B2 for suburban and semi-fringe; B3 (illustrated) for suburban-fringe of 75 miles or more. "Fidelity Phasing" stub eliminates need for phase-reversing matching harness, delivers high & low bands. Finney Co., 4612 St. Clair Ave., Cleveland 3, Ohio—TECHNICIAN (Ask for No. 9-13)



Channel Master YAGIS →

New line of 5 and 10-element single-channel Yagis have been added to the low-priced "Maverick" series. Low band Maverick Yagis do not require tightening. High band models require tightening on only two elements. The 5-element Maverick Yagis (series 5300) list at \$4.03 for high band models, and from \$7.50 for low band. The 10-element Maverick Yagis (series 1300) list at \$6.94 for high band antennas, and from \$13.75 for low band models. Channel Master Corp., Ellenville, N.Y.—TECHNICIAN (Ask for No. 9-16)



Welco COLOR CONICALS →

"Conicals in Color" is the way the manufacturer describes its new Zee-Beam all-channel VHF antennas. Colored anodized elements give a non-corrosive coating to aluminum. Zee-X element helps receive all VHF channels with same high efficiency. Furnished in both 1-bay (Model 50) and 2-bay (Model 50-2) styles. List prices in color are \$12.95 and \$25.90 respectively; in natural, they list for \$8.95 and \$17.90 respectively. Welco Mfg. Co., Burlington, Iowa—TECHNICIAN (Ask for No. 9-15)



Fretco ANTENNA

High gain all channel VHF antenna, the "Dimension," features "Foto Phased" element which makes possible the broad banding of Yagis. It is claimed that until this time, the use of phasing stubs, loops and coils has not been completely effective because they depend on inductive coupling or phasing which often becomes dirty or wet across the points, the results being a loss of signal. With Foto Phased element this shorting out is reportedly impossible because it is supported in the middle of the element, leaving the ends in free space, at the point of low voltage and high current. Fretco Inc., 406 N. Craig St., Pittsburg 13, Pa.—TECHNICIAN (Ask for No. 9-11)

Vee-D-X "RO TENNA"

An indoor antenna of outdoor design for attic installation, with a built-in rotator, the Rotenna, is available in two types, Model RO-283 for all channel UHF/VHF, and Model RO-213 for VHF only. Both units feature a reversible 24-volt rotator motor built into the boom. Model RO-213 utilizes a five-element single-bay broadband inline antenna array. List price is \$29.95. Model RO-283 features a combination of an inline antenna for VHF and a Corner Reflector for UHF. List price is \$34.95. Both units are sold as a complete kit. LaPointe Electronics Inc., Rockville, Conn.—TECHNICIAN (Ask for No. 9-12)

Hy-Lite FRINGE ANTENNA

A broadband antenna designed for fringe area TV reception reportedly offers the gain of at least a five-element yagi. Snap pressure bracket allows quick assembly. Known as the model VJ or Vector Jay—which refers to the special match and phasing network—the antenna provides high front-to-back ratio and compact appearance. Hy-Lite Antennae Inc., 242 E. 137 St., New York 51, N.Y.—TECHNICIAN (Ask for No. 9-71)

Rohn INSULATOR

Recently devised section permits the Rohn No. 30 Tower to be used as guyed "series fed" vertical radiators. The new unit may be installed in a concrete base or between regular No. 30 Sections at some distance up the tower. Individual insulators are rated at 7.5 kv; wet flashover voltage 40 kv. Insulator section 6½ ft. in length. Rohn Mfg. Co., 116 Limestone, Bellevue, Peoria, Ill.—TECHNICIAN (Ask for No. 9-72)

For more technical information on new products, use Inquiry card on page 42



QUALITY CONTROL MANAGER of Leading Set Maker: "In a recent life test, every Raytheon Cathode Ray Tube tested passed the 1000 hour test with colors flying".



HEAD OF A LEADING ELECTRONICS DISTRIBUTION CO. Demand for Raytheon Aluminized Picture Tubes is increasing daily. Their superb quality and performance is rapidly making Raytheon first choice. We carry more Raytheons than any other brand".



BOSS OF TV-RADIO SERVICE SHOP "My men prefer to replace with Raytheons. They know that Raytheon Picture Tubes will make them look good".



Everyone's putting in a good word for

ALUMINIZED PICTURE TUBES

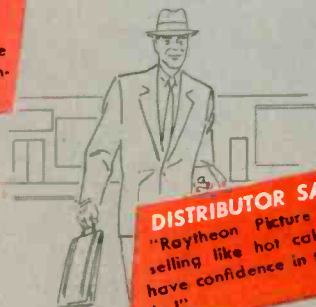
with **LUMILAC***



TV SET MANUFACTURERS INSPECTION EXPERT: "Raytheon Picture Tubes have lowest line returns in the industry".



SET OWNER: "My TV set is better than new, since the service man put in a new Raytheon Picture Tube".



DISTRIBUTOR SALESMAN: "Raytheon Picture Tubes are selling like hot cakes. Dealers have confidence in them and so do I".



LIFE TEST ENGINEER: "Since the introduction of LUMILAC, Raytheon Aluminized Tubes have outperformed all others for brightness and life".

Excerpts from correspondence in Raytheon's files.

*LUMILAC — a lacquer especially blended and used exclusively by Raytheon — is the secret of the superiority of Raytheon Aluminized Picture Tubes. It produces a smooth unbroken surface for the pure aluminum coating, yet leaves no gas-producing residues which could impair cathode emission and shorten tube life.



Excellence in Electronics

RAYTHEON MANUFACTURING COMPANY

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

RAYTHEON MAKES ALL THESE:

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

Outdoor TV Antenna Specifications

- TYPE**
- 1—Conical
 - 2—Yagi
 - 3—Dipole
 - 4—Rhombic
 - 5—Double-V (flat plane)
 - 6—Stacked V
 - 7—Collinear
 - 8—Corner Reflector
 - 9—Bow Tie
 - 10—Special Design

- SIGNALS INTENDED FOR**
- S —Strong
 - M —Medium
 - W —Weak
 - VW—Very Weak

- SPECIAL FEATURES**
- CSE —Cut separately for each channel or band
 - HFB —High front-to-back ratio
 - HFS —High front-to-side ratio
 - MWW—Mounts on outside wall or window
 - PRE —All or partly preassembled; fold out or snap-in construction
 - SPC —Specially constructed for improved durability
 - STA —Stacked versions available
 - SWI —Switch selects directivity pattern
 - TUN —Tunable or adjustable individually for preferred channel, band or impedance

Ratings are based on data supplied by the manufacturers. If antenna impedance is not approximately 300 ohms, impedance is specified in Special Features column.

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
ADVANCE ELECTRONICS CO. 8510 North End Ave., Oak Park 37, Mich.						552-556 2 CSE 2-6 M W PRE STA 10.00-12.50					
P5 10 2-13 VW PRE Stacked 29.95						313 Super Fan 1 2-13 S M W PRE STA 10.42					
FDY 10 2-13 VW PRE Stacked 29.95						315 5 2-13 S PRE STA 10.55					
C283 Comet 10 2-83 VW PRE Stacked 41.50						1507-1513 2 CSE 7-13 W VW PRE STA 11.11					
ALL CHANNEL ANTENNA CORP., 47-39 49 St., Woodside 77, N. Y.						410-4 9 14-83 W PRE 11.11					
Metropolitan Kit 10 2-83 S HFB HFS PRE SPC SWI TUN MWW 18.50						406 Twin Corner 8 14-83 VW PRE STA 11.65					
Suburban Kit 10 2-83 M HFB HFS PRE SPC SWI TUN MWW 21.50						321A 1,2 2-13 W PRE STA 12.64					
New Super 60 10 2-83 W HFB HFS PRE SPC SWI TUN MWW 29.75						536 2 CSE 3 & 6 M W PRE STA 13.75					
Riviera 10 2-83 VW HFB HFS PRE SPC SWI TUN MWW 36.75						545 2 CSE 4 & 5 M W PRE STA 13.75					
AMERICAN PHENOLIC CORP. (Amphenol) 1830 S. 54 Ave., Chicago 50, Ill.						1007-1013 Big 10 2 CSE 7-13 VW PRE STA 13.89					
114-062 9 14-83 S 5.75						1573 2 CSE 7-13 M W PRE STA 14.58					
114-059 6 2-83 S PRE TUN 9.75						602-606 2 CSE 2-6 W PRE STA 16.67-17.65					
114-093 8 14-83 W PRE 9.85						324 10 2-13 W VW PRE STA 17.35					
114-058 8 14-83 VW 12.50						332 2,10 2-13 W VW PRE STA 18.06					
114-040 10 2-13 S M 13.50						333 Lancer 2 2-13 W VW PRE STA 18.20					
114-005 10 2-13 S M 19.50						1522-1566 2 CSE 2-6 W VW PRE STA 19.44-25.00					
114-026 10 2-13 S 19.50						325 Champion 10 2-83 W VW PRE STA 20.83					
114-314 10 2-13 W VW 29.00						1173 Futuramic 2 CSE 7-13 VW PRE STA 20.83					
ANTENNA PRODUCTS 3628 N. Lincoln, Chicago 13, Ill.						410-8 9 14-83 VW PRE 20.83					
UBR-310 9 14-83 M HFB STA PRE 4.85						626 2 CSE 2-6 M W PRE STA 22.08					
EZV 5 2-13 M STA PRE 5.10						646 2 CSE 4,5,6 M W PRE 22.08					
StratoBeam 2 CSE 2-13 W VW HFB HFS STA PRE From 7.20						335 Trailblazer 2 2-13 W VW PRE STA 22.22					
DuoBeam 3 2-13 M HFS STA PRE 8.65						330 Rainbow 2,10 2-83 W VW PRE STA 23.60					
DX 62 1 2-13 W HFS PRE STA 8.85						1526 2 CSE 2-6 M W PRE STA 25.00					
DiBand Souper 3 2-13 W HFS STA PRE 8.90						1022-1066 Big 10 2 CSE 2-6 VW PRE STA 27.08-33.33					
UC 110 8 14-83 W HFB STA PRE 10.50						334 Super Lancer 2 2-13 W VW PRE STA 32.50					
UB 4-100 9 14-83 VW HFB HFS PRE 10.75						331 Super Rainbow 2,10 2-83 W VW PRE STA 37.50					
SuperCon 10 2-13 W HFS STA PRE 13.75,27.50						1124 Futuramic 2 CSE 2-4 VW PRE STA 40.97					
BF 2 10 2-83 M STA PRE 15.55						1125 Futuramic 2 CSE 2-5 VW PRE STA 40.97					
Double feed Strato Beam 2 2-13 W HFB HFS STA PRE From 20.95						1126 Futuramic 2 CSE 2-6 VW PRE STA 40.97					
Long Shot 10 2-13 W HFB HFS STA PRE 31.10						1136 Futuramic 2 CSE 3-6 VW PRE STA 40.97					
CA-3 Collinear 10 2-6 VW HFS PRE 31.70						1146 Futuramic 2 CSE 4-6 VW PRE STA 40.97					
Comet 10 2-13 W HFS STA PRE 31.95						325-6 Super Champ 10 2-83 VW PRE 54.17					
CHANNEL MASTER CORP., Ellenville, N. Y.						326-2 Backstop 10 2-13 W VW PRE HFB 63.90					
222 3 2-6 S PRE 1.94						CLEAR BEAM ANTENNA CORP., 21341 Roscoe Blvd., Conogo Park, Calif.					
418 9 14-83 S PRE 2.91						FDH7 3 7-13 S PRE 2.50					
419 6 2-83 S M W PRE 3.47						A 2 2-13 M PRE 3.95-5.65					
341-345 1 2-13 S M STA 3.50 - 4.31						UF10 7 14-83 M HFB 4.50					
123 3 2-6 S PRE 3.89						UV 2 2-83 M 4.60					
301-306 1 2-13 S M PRE STA 4.17 - 5.56						C 1 2-13 M PRE SPC 5.10-6.54					
122 3 2-6 S PRE 4.86						R150 3,5 2-13 M PRE 5.53					
408 Bow Flector 9 14-83 M W PRE STA 5.14						FDL7 3 2-6 S PRE 5.79					
400 Delta Weld 2 CSE UHF W VW PRE CSE up to 23 ch 5.42						UA9 2 2-83 S TUN 5.90					
507-513 2 CSE 7-13 M W PRE STA 5.55						DC5 1 2-13 M PRE 6.98					
409 8 14-83 W PRE STA 5.83						YLSCH2 to YLSCH13 2 CSE 2-13 S W PRE 5 elem. 6.98-14.08					
327 3 2-13 S PRE 6.11						CL6 1,2 2-83 S 8.29					
410-2 9 14-83 M PRE 6.25						FD14 3 2-13 S PRE 8.29					
673 2 CSE 7-13 W YW PRE STA 6.53						UC100 7 14-83 M HFB 8.45					
322 3 2-13 S PRE 7.08						YSD10CH2 to YSD10CH13 2 CSE 2-13 W PRE 10 elem. 13.41-28.75					
607-613 2 CSE 7-13 W W PRE STA 7.65						UB 2 2-83 M 14.35					
713 1 2-13 S M W PRE STA 8.19						BC12 2 2-83 W PRE 14.35					
420 Sweet 16 2 CSE UHF VW PRE CSE up to 21 ch 8.20						UF40 7 14-83 W 17.65					
1673 2 CSE 7-13 M W PRE STA 9.31						MYH50 2 2-83 W PRE 19.20					
346 1,2 2-13 W PRE STA 9.44						\$B660 10 2-13 W PRE HFB 20.20					
310 3 2-13 S PRE STA 10.00						R1216 5 2-83 W 20.93					
						TK1000 3 2-83 M PRE HFB 22.54					
						MY580 10 2-13 VW PRE HFB 23.50					
						7150 10 2-83 M Trailer Antenna 24.95					
						SB662 10 2-13 VW PRE HFB 31.60					
						RA1300 3 2-83 VW PRE HFB 34.92					
						UF40-2 7 14-83 VW HFB 35.40					
						LH4 2 2-83 VW 44.45					
						TK1500 3 2-83 VW PRE HFB 44.50					
						TK1800 3 2-83 VW PRE HFB 52.95					

(Continued on page 50)

INTRODUCING THE

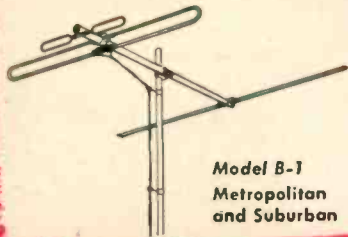
New **GEOMATIC** TV ANTENNAS

(pat. pend.)

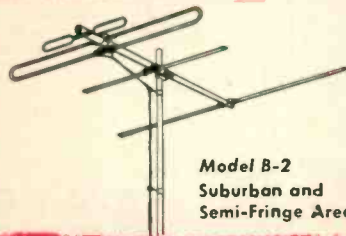
BY **FINCO**®

with exclusive **Fidelity Phasing***

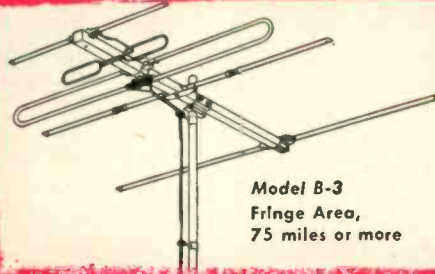
* Dictionary: the highest degree of accuracy in the reproduction of a signal



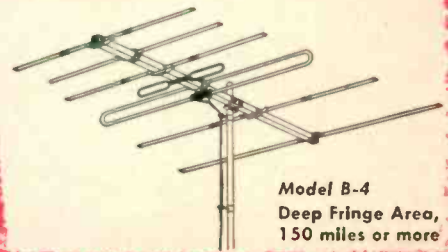
Model B-1
Metropolitan
and Suburban



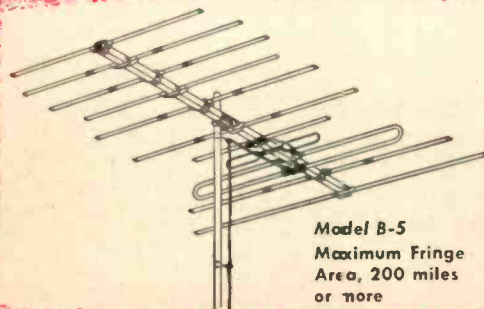
Model B-2
Suburban and
Semi-Fringe Area



Model B-3
Fringe Area,
75 miles or more



Model B-4
Deep Fringe Area,
150 miles or more



Model B-5
Maximum Fringe
Area, 200 miles
or more

Here are the antennas they said could never be developed — combining the finest features of an impedance matching, driven folded dipole on low-band with super-gain of a 3-element colinear on high-band (without the use of matching harness) to produce the — **GREATEST BROAD-BAND ANTENNAS EVER BUILT!** In addition, the new **GEOMATIC** Series features extremely high **FRONT - TO - BACK RATIO!** Models range from "in-town" types to super-fringe area antennas.

GEOMATIC means
customized for your locality

Now For The First Time —

Regardless of channels, distance from station, or terrain **FINCO** can deliver a model that is perfectly suited for your area — at no extra cost!

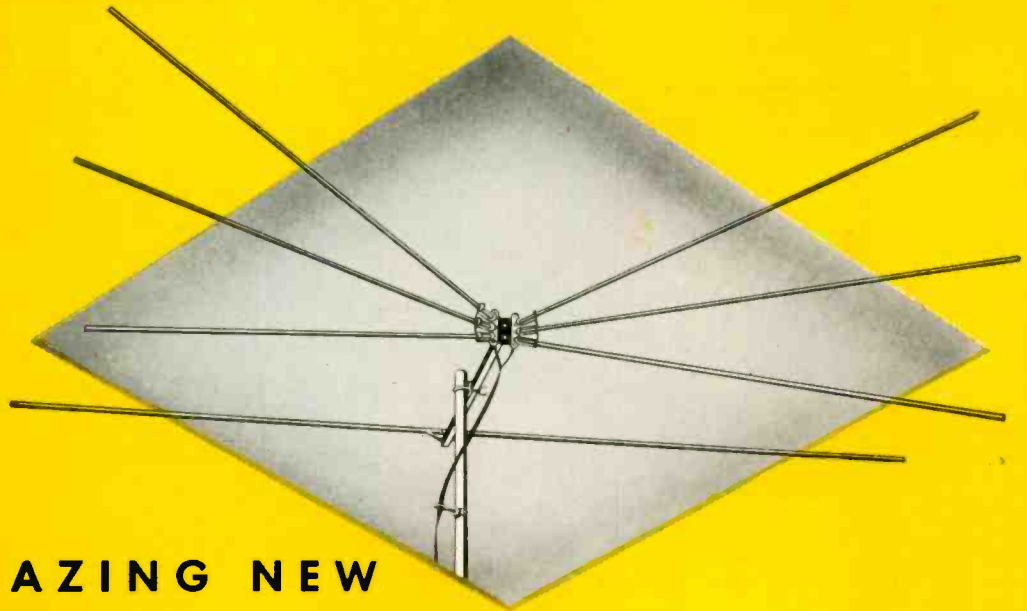
Write, wire or phone

The FINNEY Company

HENDERSON, 2-2150 4612 ST. CLAIR AVENUE
Dept. T-95 CLEVELAND 3, OHIO

Copyright, 1955
The Finney Company

PHILCO *Announces*

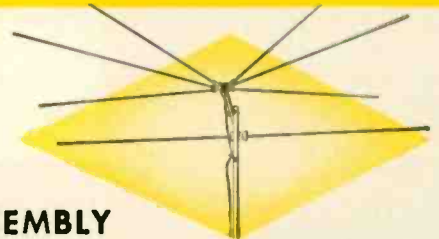
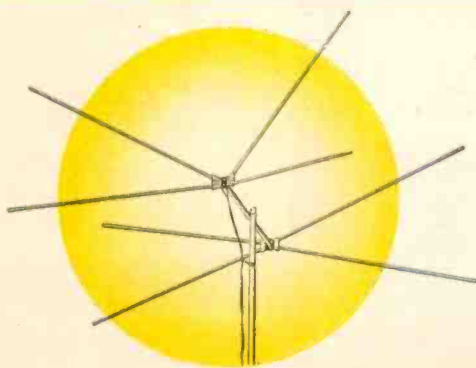
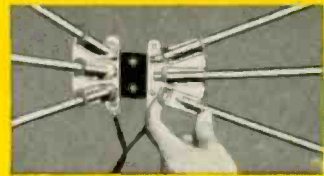


AMAZING NEW

FAST LOCK

ANTENNA

Insert elements in clip mounting on cross arm . . . release pressure . . . presto! That's it! No screws to loosen or lose. Dowelled aluminum elements are held firmly for a life time of super performance. Part No. 426-0009. Stacked array Part No. 426-0009-2.



2-WAY ASSEMBLY

A versatile, sensitive, low-priced kit that may be assembled as a 6 x 2 or 4 x 4 unit. Enables you to give your customers super performance in unusual locations. Dowelled aluminum elements. Part No. 426-0008. Stacked array Part No. 426-0008-2.

PHILCO TUBES
IMPROVE THE
PERFORMANCE OF
ANY TV OR
RADIO RECEIVER

PHILCO CORPORATION

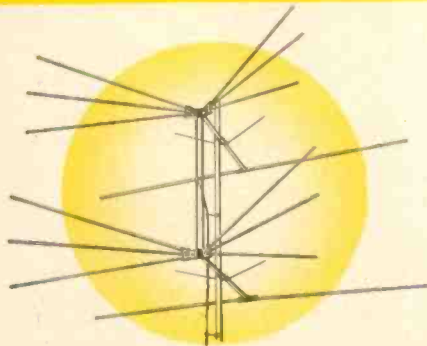
PHILADELPHIA 34,

a Complete New Line of

SUPER CONICAL TV ANTENNAS

**Laboratory Designs are fully Field Tested
Ideal for Replacements or New Installation**

New scientific design plus exhausting field tests in winds of hurricane velocity, salt spray and widely varying temperatures prove that new Philco Super Conical TV Antennas can "take it"! Here's the antenna that out performs any equivalent type . . . meets all reception requirements for *both* color or black and white . . . regardless of location. Give your customers complete satisfaction. Recommend a Philco Super Conical! See them . . . order them today, at your Philco Distributor.



NEW! PRE-ASSEMBLED QUICK RIG

A 6 x 2 stacked antenna package with auxiliary "V" element for vastly improved reception on high channels. Easy to erect and durable. Top fringe area performance. Solid aluminum elements—factory assembled for quick on-the-spot rigging. Stacked array package. Part No. 426-0010-2.

NOW! For the first time . . .

**YOU EARN YOUR CHOICE OF VALUABLE PREMIUMS
THROUGH PHILCO'S DEALER'S CHOICE**

Yes, you can't lose in this fabulous new Philco Parts and Accessories opportunity! It's the greatest bonus bonanza ever offered to dealers. You earn your choice of valuable FREE parts and accessory merchandise or top quality prizes for your family or home . . . simply by concentrating your purchases on Philco tubes, batteries, parts and accessories. Nobody loses . . . everybody wins . . . hands down! See your Philco Distributor for details . . . today!

Accessory Division
PENNSYLVANIA



Outdoor TV Antenna Specifications

(Continued from page 46)

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
CORNELL-DUBILIER ELECTRIC CORP. 333 Hamilton Blvd., S. Plainfield, N. J.											
UBT1	7	14-83	M		3.45	A-9010	6,9	2-83	M		5.95
6YGU	2	14-83	W		4.77	A-120	1	2-13	M	STA	6.00
S6	1	2-13	S	STA	5.80	A-150	1	2-13	M	STA	6.25
UW2	9	14-83	M	SPC	5.95	8700-85	1	14-83	M		6.50
U4	3	14-83	M		6.40	A-352	6,9	14-83	M		6.75
UC2	4	14-83	W		6.80	A-9004	7	14-83	M	2-bay	6.75
UV56	1	2-83	S		7.50	A-160	1	2-13	M	STA	6.75
SL4L	3	2-13	M		7.95	8700	1	14-83	M	STA	7.00
VU1	1	2-83	M	PRE	8.22	A-302 to A-313	2	CSE 2-13	W	5 elem.	7.25-12.25
LZX-AA	1	2-13	M	Can Stack	8.30-17.75	A-9050	7	14-83	S	MW 2-bay	7.25
VV	6	2-83	S	STA	8.75	A-170	1	2-13	M	STA	7.25
UW4	9	14-83	W	SPC	9.95	A-250	3	2-13	M		7.35
SL4	3	2-13	M		10.30	A-9002	4	14-83	W		7.45
UC1	4	14-83	W		11.70	A-210	1	2-13	M	PRE STA	7.75
KB	1	2-13	M	PRE STA	12.70	A-230	1	2-13	M	STA	7.85
UW8	9	14-83	VW	SPC	18.95	A-220	1	2-13	M	STA	7.95
UM213	3,8	2-83	W	PRE STA	19.95	A-8984	4	14-83	W		8.95
V8	8	2-83	W		41.50	A-9057	9	2-83	M	MW	8.95
LZX Series	1	2-13	Varies	1, 2 or 4 bay	Varies	A-9058	9	14-83	M		8.95
Hi-LO Series	3	2-13	M		Varies	A-9024	7	14-83	W	MW 2-bay	11.95
5-YG Series	2	CSE 2-13	W	PRE 5 elem.	Varies	GONSET CO. 801 S. Main St., Burbank, Calif.					
10-YG Series	2	CSE 2-13	VW	PRE 10 elem.	Varies	Double V	5	2-13	S M	PRE STA	5.50
FINNEY CO. 4612 St. Clair Ave., Cleveland 3, Ohio						Conical	1	2-13	S M	STA	6.00
B1	3,7,10	2-13	M	HFB HFS PRE SPC STA TUN	7.50	Rocket	10	2-13	S M	PRE STA	6.45
S02C	7,10	CSE 47-83	VW	HFB HFS PRE SPC STA TUN	8.00	Gamma Ray	10	2-83	S M	PRE STA	6.45
B2	3,7,10	2-13	M W	HFB HFS PRE SPC STA TUN	8.75	Corner Reflector	8	14-83	S M	HFB HFS PRE SPC STA	7.25
S02B	7,10	CSE 29-52	VW	HFB HFS PRE SPC STA TUN	9.00	Yagi 5 Element	2	CSE 2-13	VW	HFB HFS PRE SPC STA	8.00-16.50
S02A	7,10	CSE 14-35	VW	HFB HFS PRE SPC STA TUN	10.00	4-5-7	10	CSE 2-13	W	HFB HFS PRE SPC STA	9.00
B3	3,7,10	2-13	M W	HFB HFS PRE SPC STA TUN	13.50	Rhombic	4	14-83	W	PRE STA	9.95
B4	3,7,10	2-13	VW	HFB HFS PRE SPC STA TUN	17.50	Stacked Double V	6	2-13	W	PRE	11.10
Z00	7	2-13	W	PRE SPC STA	21.00	Stacked Conical	1	2-13	W		12.10
Z00A	7,10	2-83	W	PRE SPC STA	21.00	Stacked Rocket	10	2-13	W	PRE	13.00
F2D	3,7,10	2-13	W	HFS PRE SPC STA	23.00	Yagi 10 Element	2	CSE 2-13	VW	HFB HFS PRE SPC STA	16.00-37.50
Z00S	7,10	2-13	W	HFB PRE SPC STA HFS	27.25	Radarray	10	2-13	W VW	HFB HFS PRE SPC STA	42.50
Z00SA	7,10	2-83	W	HFB PRE SPC STA HFS	27.25	Broad Band Yagi 2-6	2	CSE 2-13	W VW	PRE HFB HFS SPC STA	43.20
B5	3,7,10	2-13	M VW	HFB HFS PRE SPC STA TUN	32.00	HI-LO TV ANTENNA CORP. 3540 N. Ravenswood, Chicago 13, Ill.					
400	7	2-13	W	PRE SPC STA	42.00	101	9	2-13	All	MW	9.95
400A	7,10	2-83	VW	PRE SPC STA	42.00	202	9	2-83	All	MW	9.95
F4	3,7,10	2-13	VW	HFS PRE SPC STA	46.00	HI-PAR PRODUCTS CO. 347 Lunenburg St., Fitchburg, Mass.					
400S	7,10	2-13	VW	HFB HFS PRE SPC STA	54.50	ZL	3	CSE 2-13	M W	PRE SPC	3.00-9.50
400SA	7,10	2-83	VW	HFB HFS PRE SPC STA	54.50	5L	2	CSE 2-13	W VW	PRE SPC	7.00-17.00
FRETCO, INC. 406 N. Craig St., Pittsburgh 13, Pa.						T	10	2-13	M W	PRE SPC	7.50
BO-TI-C	4	14-83	W	PRE	3.95	IN	10	2-13	M W	PRE SPC	9.00
V2	6	2-83	M		5.45	8L	2	CSE 2-13	W VW	PRE SPC	11.50-24.00
UHF6	2	CSE	VW	PRE 6 elem.	5.75	402CB	10	2-13	W VW	PRE SPC	15.00
F44	1	2-13	M	STA	6.30	J	1	2-13	M W	PRE SPC STA	18.00
F62	1	2-13	M	STA	6.50	BTD	10	2-13	W VW	PRE SPC STA	18.00
UHF12	2	CSE	VW	PRE 12 elem.	7.25	HOLLOWAY ELECTRONICS CORP. Broward County International Airport, Fort Lauderdale, Fla.					
MR-C	4	14-83	VW	2 bay	7.50	EXPO	10	All		EXPONENTIAL	
FA2	8,9	2-83	M		19.95	HY-LITE ANTENNAE INC. 242 E. 137 St., New York 51, N. Y.					
FAS	9	2-83	VW	HFB	29.95	BHF	3	7-13	S	5 elem.	2.50
Dimension	10	2-13	VW	HFB	29.95	5 Y14 (83)	2	CSE 14-83	M	5 elem.	3.85
Fretary Spectrum	7,10	2-83	VW	Shielded Array	29.95	PWV (Pee Wee Vee)	10	2-13	M	HFB PRE SPC	3.90
FA1	8,9	2-83	VW		39.95	S070	3	2-6	S		4.90
Super Looper	10	2-13	VW	HFB	39.95	5 YF #7 (13)	2	7-13	M	5 elem.	4.92
Fretary	7	2-83	VW	Array	39.95	S030 #2 to S030 #6	3	CSE 2-6	S		4.96-6.35
FA3	8,9	2-83	VW	HFB	45.00	10Y #14 (83)	2	CSE 14-83	W	10 elem.	5.40
FA4	9	2-83	VW		49.95	DVN	6	2-13	M		5.48
Fretary Victoria	7,10	2-83	VW	Phased	49.95	5Y #7 (13)	2	7-13	W	5 elem.	5.55
Fretary Super Spectrum	7,10	2-83	VW	Shielded stacked Array	62.50	X4-R2	1	2-13	M		6.00
FA6	9	2-83	VW		62.50	UFDV	6	14-83	W	2 bay	6.00
QTV5	2	CSE	VW	5 elem.	Varies	X6H-R2	1	2-13	M		6.32
QTV8	2	CSE	VW	PRE 8 elem.	Varies	X6-R2	1	2-13	M		6.60
QTV10	2	CSE	VW	PRE 10 elem.	Varies	DV	6	2-13	M		6.92
ETV5	2	CSE	VW	5 elem.	Varies	S070-BHF	3	2-13	S		7.40
ETV8	2	CSE	VW	PRE 8 elem.	Varies	S030-BHF	3	2-13	S		8.00
ETV10	2	CSE	VW	PRE 10 elem.	Varies	S040	3	2-13	M		8.45
GENERAL CEMENT MFG CO. (Telco) 919 Taylor Ave., Rockford, Ill.						8Y #7 (13)	2	CSE 7-13	VW	8 elem.	8.95
A-252	3	7-13	M		2.35	S040-D	3	2-13	S		10.00
A-9003	7	14-83	S		3.50	10Y #7 (13)	2	CSE 7-13	VW	10 elem.	10.50
A-260	6	2-83	M	STA	4.75	5Y #2 to 5Y #6	2	CSE 2-6	M	5 elem.	10.75-13.86
A-251	3	2-6	M		4.85	VJ (Vector Jay)	10	2-83	VW	HFB PRE SPC STA	16.65
A-8965	7	14-83	M		4.95	8Y #2 to 8Y #6	2	CSE 2-6	VW	8 elem.	18.75-24.35
A-100	1	2-13	M	STA	5.10	10Y #2 to 10Y #6	2	CSE 2-6	VW	10 elem.	21.90-29.20
A-9017	6,9	2-83	M		5.25						
A-320	2	CSE 14-83	W	10 elem.	6.25						
A-110	1	2-13	M	STA	5.75						
8700-65	1	14-83	M		5.90						

(Continued on page 52)

FIELD REPORT NO. 5

Jack Livesay
Livesay's Music Co.
Roanoke Rapids, N. C.



We have an eighty-five foot test tower located at our Store for the purpose of comparing the different types of antennas on the market today. The reason we have selected the JFD Star-Helix all channel antenna above all others is that it has the best frequency response and highest gain on channels 2 through 13. Since the birth of the JFD Star-Helix we have installed over 600 Star-Helix and have never had a call back due to the fault of the antenna.

Paul Morrone
Morrone TV
Creston, Ia.



Most of my customers are out in the fringe area. We need a lot of gain to pull in the signal, most of all on channel 13. I used every new antenna that came out that was a fringe antenna, but nothing worked until I used the Super-Star Helix made by JFD. The Super-Star Helix is for me now. It's made me a lot of new customers.

Oliver Ewbank
Plaza Television
Topeka, Kan.



When the Star-Helix came out, we checked its performance as we do with all new antennas. The exceptional results of those tests have since been verified many times by users who are getting the sharpest, cleanest pictures possible. We know of numerous instances where the Star-Helix delivered excellent pictures at locations where three or four other antennas had failed.

Sam M. Patrick
Patrick TV & Radio Inc.
Orlando, Fla.



The JFD Star-Helix is the best antenna I've tried—and I've tried them all—that pulls in clear pictures on channels 8 and 13 from Tampa over 100 miles away. Also channel 4 from Jacksonville which is over 150 miles away. I also know that my Star-Helix customers are ready for Top-notch color reception when it comes their way.

Harry H. Rogers
Rogers Radio & TV
Lenox, Ia.



Channel 13 from Des Moines has been a big problem out my way. The other channels came in good but 13 was nothing but ghosts and interference. JFD made the Super-Star Helix and I tried it and now 13 comes in as bright as all the other channels. Now I'm using it in all of my installations.

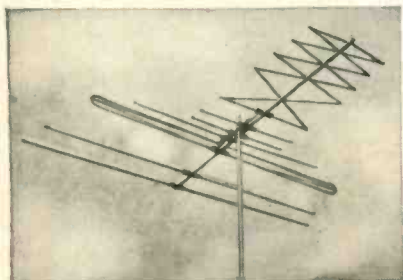
John D. Sorrentino
East New York Appliance
Brooklyn, N. Y.



It sure surprised me. It's the first time I ever got compliments on the looks of my antenna installation. That trim inline build of the JFD Fire-Ball sure looks as good as it works. I don't have to worry about break-down from high winds or ice-loading either. It's got my vote.

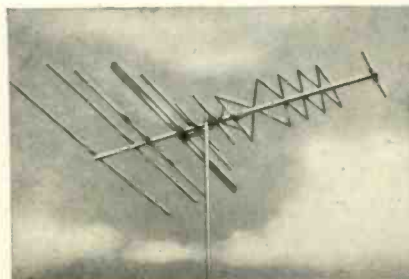
Across the U. S. A. TV Dealers Acclaim these Antennas...

Whether you buy the ultra-sensitive Star-Helix or the new Super-Star Helix or the remarkable Fire-Ball, you know the JFD antenna you install protects your reputation.



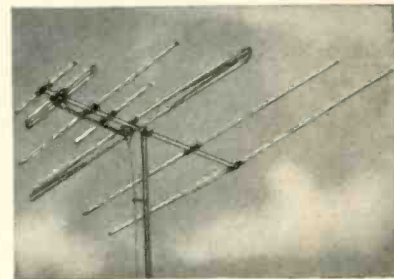
JFD STAR-HELIX

SX711	single	\$25.50
SX711S	stacked	\$52.50
SX711S-96*	96" stacked	\$55.00



JFD SUPER-STAR HELIX

SX13	single	\$35.00
SX13S	stacked	\$72.50



JFD FIRE-BALL

FB500	single	\$17.35
FB500S	stacked	\$36.65
FB500S-68†	68" wide stacked	\$36.65
FB500S-96*	96" wide stacked	\$38.60



"Go Forward with JFD Engineering."
MANUFACTURING Co. Inc., BROOKLYN 4, N. Y.
INTERNATIONAL DIVISION, 15 MOORE ST., N. Y.



†for areas with co-channel and cross-channel interference
*for added channel 2-6 gain

Outdoor TV Antenna Specifications

(Continued from page 50)

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
JFD MFG. CO.					
6101 16 Ave., Brooklyn 4, N. Y.					
QC10, QC12	3	7-13	S	PRE	1.95
QC1 to QC5	3	2-13	S	PRE	3.90-7.10
Zip 1-621	1	2-13	S	PRE SPC STA	4.03-11.81
UHF352	2	CSE 14-83	VW	12 elem.	4.20
UHF600	7	14-83	M	TU'H	4.60
P670-6X2	1	2-13	M	STA	4.70
P800	6	2-83	M	PRE	4.85
5Y2 to 5Y13	2	CSE 2-13	W	PRE 5 elem.	5.00-13.20
P670	1	2-13	M	STA	5.30
Q800	6	2-13	M	STA	5.70
P770	1,3	2-13	M	STA	6.95
5B2 to 5B13	2	CSE 2-13	W	PRE 5 elem.	6.95-17.60
QC150	3	2-13	M	PRE STA	7.10
SR660	1	2-13	M	SPC STA	7.65
C670	1	2-13	W	STA	7.65
CI19	1	2-13	S	MW	8.95
UHF415	4	14-83	M	PRE SPC	9.05
JET660	1	2-13	M	PRE STA	9.05
UHF119	1	14-83	S	MW	9.45
UHF204	7	14-83	M	STA 4 bay	10.45
10Y2 to 10Y13	2	CSE 2-13	VW	PRE 10 elem.	11.10-27.80
JET160	1	2-13	M	PRE STA	11.55
JET513	1,2	2-83	W	PRE STA	12.65
YH713	10	2-13	W	PRE HFB STA	12.95
10B2 to 10B13	2	CSE 2-13	VW	PRE 10 elem.	13.95-30.55
FB500	10	2-83	W	HFB HFS STA PRE	16.25
JET454	1,5	2-83	W	STA	16.50
10Y713	2	7-13	W	PRE	17.35
JET213	1,2	2-83	W	PRE STA	18.70
5Y26	2	2-6	W	PRE	18.75
10B713	2	7-13	VW	STA 10 elem.	20.85
5B26	2	2-6	W	5 elem.	22.05
JET913	1,9	2-83	W	STA	25.50
SX711	10	2-13	VW	HFB HFS PRE STA	25.50
SX13	10	2-13	VW	HFB HFS PRE STA	35.00
10Y26	2	2-6	W	PRE	35.00
C3025	3,9	2-83	VW	PRE HFB 4 bay	35.40
JET2135-5	1,2	2-83	VW	STA 10 elem.	39.95
10B26	2	2-6	VW	STA 10 elem.	40.95
JET664	1	2-13	W	4 bay	42.20
JET9135-5	1,9	2-83	VW	HFB	55.00

LA POINTE ELECTRONICS INC., (VEE-D-X)
155 W. Main St., Rockville, Conn.

Bow Tie	9	14-83	S W	HFB PRE STA	2.90
UY (12 el.)	2	CSE 14-83	VW	HFB HFS PRE STA	5.30
Cor-U & DCDR-U	8	14-83	W VW	HFB GFS PRE SPC	5.95-19.10
Super JC (5 el.)	2	CSE 2-13	W	HFS PRE STA SPC	6.10-13.89
CA-2 meter	7	14-148	VW	GFB GFS STA	7.95-11.45
Super Q-Tee	3,7,10	2-13	M W	HFS PRE STA SPC	11.00
CAU400 & 800	7	CSE 14-83	VW	GFB HFS PRE STA 4 bay 8 bay	11.80-24.60
Super LJ (8 el.)	7	CSE 2-13	VW	HFB HFS PRE STA SPC	11.80-29.85
LaPointier	7	2-13	M W	PRE STA	17.35
Chief	7,8,10	*2-83	W	HFB HFS PRE STA	19.95
SPII	2,10	2-13	M VW	HFB HFS PRE STA SPC	23.35
Chettan	3,7,8,10	*2-83	M W	HFB HFS PRE STA	24.95
BBFM	2,10	88-108	VW	HFB HFS PRE STA SPC	27.48-57.50
Super Chief	2,7,8,10	*2-83	W	HFB HFS PRE STA	29.95
Rotenna (VHF)	3,7,10	2-13	S M	GFB GFS PRE attic rotator	29.95
VEE-D-Xer	2,7,10	2-13	VW	HFB HFS PRE STA	34.75
Rotenna (VHF-UHF)	3,7,8,10	*2-83	S M	GFB GFS PRE attic rotator	34.95

* Requires signal separator at set for VHF-UHF separation.

MEDAL MFG. CO.,
Sharon, Pa.

Captain	10	All		Variable kit covers channels in area	Varies
---------	----	-----	--	--------------------------------------	--------

MILLER ELECTRONICS CO.
2840 Naomi, Burbank, Calif.

FD-713	3	7-13	M	PRE	2.70
VVD	6	14-83	M		4.25
FADP	9	2-13	M	PRE	4.31
C-42	1	2-13	M		4.86
C-62	1	2-13	M		5.14
C-44	1	2-13	M		5.28
RAY	5	2-13	M	PRE	5.56
C-64	1	2-13	M		5.70
FD-26	3	2-6	M	PRE	6.12

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
C6P2P	1	2-13	M	PRE	6.12
C6P4P	1	2-13	M	PRE	6.25
FR-6	2	CSE	W		6.35
CR-200	4	14-83	M	PRE	7.50
CL-44	1	2-13	W		8.20
105 T	2	CSE	VW	PRE 5 elem.	8.00-12.00
105 Z	2	CSE	VW	PRE 5 elem.	8.00-12.00
AY-526	2	CSE	VW	PRE TU'H	8.50
YC-100	1,2	2-13	W	PRE	9.75
108T	2	CSE	VW	PRE 8 elem.	11.00-18.00
108Z	2	CSE	VW	PRE 8 elem.	12.00-18.00
YC-200	1,2	2-13	W	PRE	12.50
110T	2	CSE	VW	PRE 10 elem.	15.00-25.00
110Z	2	CSE	VW	PRE 10 elem.	15.00-25.00
BF-200	9	2-13	W	PRE	26.95
BED-100	9	2-13	W	PRE	29.95
FRM-200	9	2-13	W	PRE	30.50

PHILCO CORP.,
A St. & Allegheny Ave., Philadelphia 34, Pa.

45-3069	9	14-83	S	HFS PRE SPC STA	3.95
45-3070	9,10	14-83	M	HFC PRE SPC STA	5.95
426-0008	1	2-13	M W	HFB SPC STA	6.50
426-0009	1	2-13	M W	HFB PRE SPC STA	7.50
45-1996-1	2	14-24	M W VW	HFB HFS PRE SPC STA	7.50
45-1996-2	2	24-34	M W VW	HFB HFS PRE SPC STA	7.50
45-1996-3	2	34-46	M W VW	HFB HFS PRE SPC STA	7.50
45-1996-4	2	46-58	M W VW	HFB HFS PRE SPC STA	7.50
45-1996-5	2	58-70	M W VW	HFB HFS PRE SPC STA	7.50
45-1996-6	2	70-83	M W VW	HFB HFS PRE SPC STA	7.50
45-3071	10	14-83	M W	HFB HFS PRE SPC	9.95
45-1881	5	2-13	M	PRE STA TUN	10.15
45-1880	6	2-83	M	PRE STA TUN	12.95
45-3112-2 to 13	2	CSE	W VW	HFB HFS PRE SPC STA	13.95-35.00
426-0008-2	1	2-13	M W	HFB SPC 2 Stack	14.00
426-0009-2	1	2-13	M W	HFB SPC 2 Stack	16.40
45-3112-713	2,10	7-13	M W VW	HFB HFS PRE SPC STA	20.85
426-0010-2	1	2-13	M W	HFB PRE SPC 2 Stack	25.29
45-3112-26	2,10	2-6	M W VW	HFB HFS PRE SPC STA	39.95
45-3112-456	2,10	4-6	W VW	HFB HFS PRE SPC STA	39.95

PHILSON MFG. CO.,
60 Sackett St., Brooklyn 31, N. Y.

4H2	1	2-13	S M W VW	STA HFS HFB 6 elem.	4.65
6H2*	1	2-13	S M W VW	STA HFS HFB 8 elem.	5.25
4H4	1	2-13	S M W VW	STA HFS HFB 8 elem.	5.25
2V1	1	2-13	S M W VW	SPC STA HFS HFB 6 elem.	5.35
300	5	2-13	S M	STA HFS	5.55
6H4*	1	2-13	S M W VW	STA HFS HFB 10 elem.	5.80
(Ch. No.) S5	1,2	CSE 2-13	M W	HFB PRE STA 5 elem.	5.83-13.60
3V1*	1	2-13	S M W VW	SPC STA HFS HFB 8 elem.	5.85
33	3	2-13	S M	HFS PRE 72	6.10
43	3	2-13	S M	HFS PRE	6.10
6H6*	1	2-13	S M W VW	STA HFS HFB 12 elem.	6.35
(Ch. No.) SY5	1,2	CSE 2-13	M W	HFB PRE STA SPC 5 elem.	6.50-16.95
2V2	1	2-13	S M W VW	SPC STA HFS HFB 8 elem.	6.85
UHF6	10	14-83	S M	HFB SPC PRE Stacked	6.95
34	3	2-13	S M	HFS PRE	7.10
3V2*	1	2-13	S M W VW	SPC STA HFS HFB 10 elem.	7.40
3V3*	1	2-13	S M W VW	SPC STA HFS HFB 12 elem.	7.90
(Ch. No.) S8	1,2	CSE 2-13	W VW	HFB PRE STA 8 elem.	8.05-20.16
(Ch. No.) DYS	1,2	CSE 2-13	W	HFB PRE STA SPC Double dipole	8.05-20.40
(Ch. No.) D5	1,2	CSE 2-13	W	HFB PRE STA Double dipole	8.27-18.08
330	3	2-13	S M	HFS SPC PRE 72	8.60
430	3	2-13	S M	HFS SPC PRE	8.60
(Ch. No.) S10	1,2	CSE 2-13	VW	HFB PRE STA 10 elem.	9.16-23.10
(Ch. No.) SY8	1,2	CSE 2-13	W VW	HFB PRE STA SPC 8 elem.	9.30-26.40
340	3	2-13	S M	HFS SPC PRE	9.85
540	3	2-13	S M	HFS SPC PRE HFB	10.15
101	1	2-13	S M W VW	SPC STA HFS HFB 8 elem.	10.40
(Ch. No.) SY10	1,2	CSE 2-13	VW	HFB PRE STA SPC 10 elem.	10.70-31.10

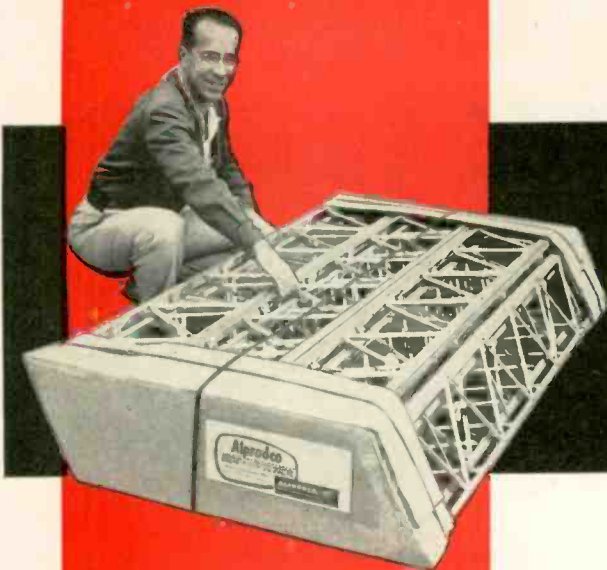
* Available with high frequency center stubs.

RADIART CORP.
3455 Vego Ave., Cleveland 13, Ohio

6YGU	2	14-83	W		4.77
UBT-1	7	14-83	M		5.25
UW-2	9	14-83	M	SPC	5.95
U-4	3	14-83	M		7.50
LZX-AA	1	2-13	M	Can Stack	8.30-17.75

(Continued on page 55)

Here's the **ONLY** one-man TV tower!



Alprodco's **POP-UP TOWER** with **"MAGIC ELBOW" ACTION**

ONE-PACKAGE TOWER

A single compact unit includes all necessary parts.

It takes just one man and a few minutes to install ALPRODCO'S pop-up tower. Assemble the tower—install the base—and the "magic elbow" simply jack-knives the top half into position.

ALPRODCO'S pop-up tower is pre-assembled, easy to store. And it's unconditionally *guaranteed to withstand winds of 90 m.p.h.*



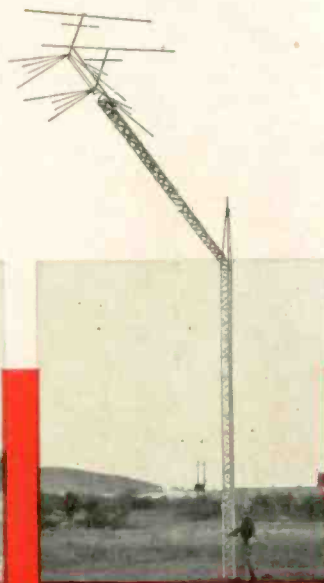
FIRST THE PUSH

Pick up the assembled tower at the "elbow" and work back on top half as tower swings up.



THEN THE POP-UP

Attach rotator and antenna, pull antenna away from base for winch leverage. Crank.



UP IT GOES

"Magic elbow" does the rest. Easiest possible assembly and erection. Just as simple to lower, when necessary.



Sell and recommend the **ALPRODCO POP-UP TOWER** with confidence

Alprodco, Inc.

Kempton, Ind.

Mineral Wells, Tex.

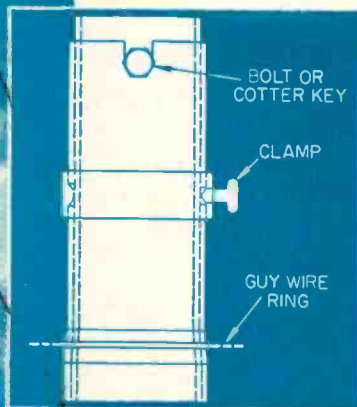
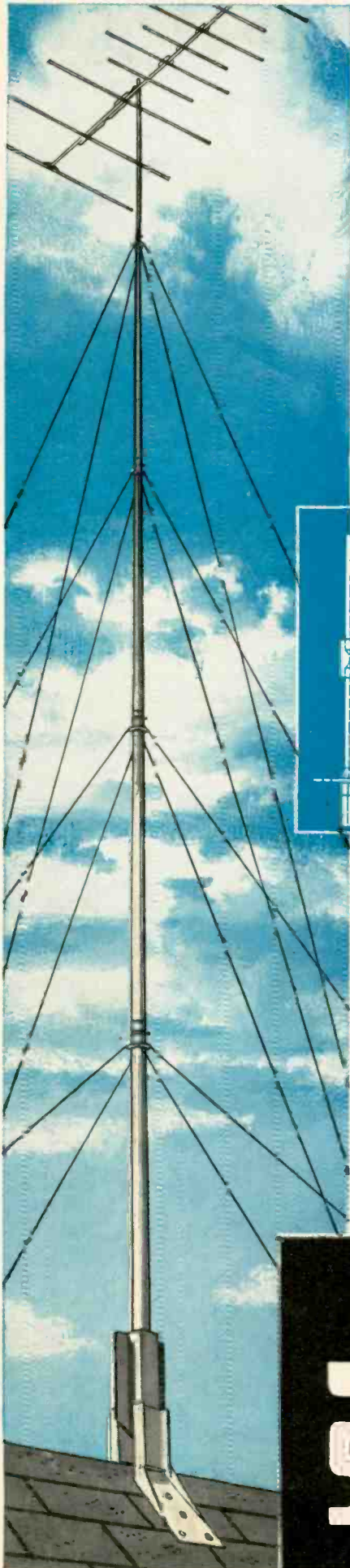
Dublin, Ga.

Specialists in ALUMINUM TOWERS • SLIP-UP MASTS • ROTATORS • ANTENNAS • ACCESSORIES

New concept in telescoping TV masting
... utilizes J & L Perma-Tube

REDUCE YOUR TV MAST COST OVER 20%

Use high-strength, corrosion-proof J & L Perma-Tube 10-foot telescoping sections to easily construct 30 to 50-foot masts



Only J&L Telescoping Perma-Tube offers:

- Joint design which provides instant field assembly
- Machine-fitted joints that insure close tolerance for high strength and rigidity
- Guy wire ring position that eliminates all binding and guy wire interference

No longer is it necessary to buy expensive, ready-made masts. Now you can "tailor-make" your own with standard 10-foot lengths of 16-gage J&L Perma-Tube—and save money.

It's available in cartons from your local distributor in five diameters. The largest base section OD is 2¼ inches and each telescoping section is ¼-inch smaller, the smallest section having an OD of 1¼ inches.

J&L Perma-Tube in the 1¼-inch size can be used interchangeably as a fitted-joint section for smaller masts or as the smallest and topmost piece of longer telescoping masts.

Corrosion-proof J&L Perma-Tube is treated with Vinsynite—then coated both inside and outside with a metallic vinyl resin base. It successfully passes ASTM's 500-hour-minimum salt spray test—which guarantees Perma-Tube's longer life on the job.

Sturdy J&L Perma-Tube is made of a special, high-strength, J&L-produced steel. A 10-foot section of 1¼-inch diameter by 16 gage can support a weight at its center point of 200 pounds with a minimum of deflection and permanent set.

Order these new telescoping sections along with your regular 1¼-inch J&L Perma-Tube. Hardware—cotter keys or bolts, clamps and guy rings—may also be secured from your local distributor. For more information write J&L direct.

J&L STEEL

Jones & Laughlin
STEEL CORPORATION — Pittsburgh

Outdoor TV Antenna Specifications

(Continued from page 52)

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
Radtart Corp. Continued						AX-620	1	2-13	M	PRE	7.25
VV	6	2-83	S	STA	8.75	RB7-13	2	2-13	VW		9.25
SL-4L	3	2-13	M		9.30	AR-58	9	2-83	M	SPC	10.45
UM-4	9	14-83	W	SPC	9.95	WX-04	1	2-13	M	MWW	10.95
UC-2	4	14-83	W		10.95	TX-A	1	2-13	M	SPC	11.25
SL-4	3	2-13	M		12.75	AX-670	1,2	2-13	VW		14.75
UC-1	4	14-83	W		12.95	AX-622	1	2-13	W		14.95
K-8	1	2-13	M	PRE STA	16.95	AX-56	9	2-83	M	SWI	15.75
UM-8	9	14-83	VW	SPC	18.95	RB2-6	2	2-13	VW	HFB	17.75
UM-213	3,8	2-83	W	PRE STA	19.95	AX-599	9	2-83	MW	SWI	18.50
V8	8	2-83	W		41.50	TX-2	1	2-13	W	SPC	25.50
LZX Series	1	2-13	Varies	1, 2 or 4 bay	Varies	AX-524	9	2-83	W	SWI	67.50
HI-LO Series	3	2-13	M		Varies	AX-548	9	2-83	VW	SWI	87.50
5-YG Series	2	CSE, 2-13	W	PRE 5 elem.	Varies	SPECIAL INSTRUMENTS LAB. INC. (SpInLab) 312 W. Vine Ave., Knoxville, Tenn.					
10-YG Series	2	CSE, 2-13	VW	PRE 10 elem.	Varies	Domino 152	9	CSE 14-83	W	HFB	9.95
RADIO MERCHANDISE SALES INC. 2016 Bronxdale Ave., New York 62, N. Y.						SPICO ELECTRONICS, INC. div of Spirling Products Co., Henrietta St. & Duffy Ave., Hicksville, L.I., N. Y.					
B-46	3	7-13	S		2.31	904K E-Z-Bee	10	2-13	VW	HFB PRE SPC STA Kit with wire	16.95
EVA-100	9	2-83	S	PRE	5.40	TECHNICAL APPLIANCE CORP (TACO) 1 Taco Ave., Sherburne, N. Y.					
PRF1	1	2-13	S	PRE	6.00	4090	3	7-13	W	PRE 2 elem.	2.40
B-40	3	2-6	S		6.24	3015A	2,10	14-83	W	STA PRE 10 elem.	5.35-5.85
FLIP (2-13)	2	CSE	M	PRE HFB HFS	6.48-14.66	1355	2	CSE 7-13	W	PRE STA 5 elem.	5.65-6.00
BLIP 180	1	2-13	S	PRE	7.25	3025	2,10	14-83	VW	PRE HFB STA 12 elem.	6.45-6.95
B-45	3	2-13	S		8.58	4060	3	2-6	M	PRE 2 elem.	7.00
FLIP 8 (2-13)	2	CSE	W	PRE HFB HFS	9.25-24.38	624L	10	FM	W	Omni-Directional	7.15
FLIP 10 (2-13)	2	CSE	VW	PRE HFB HFS	10.83-27.77	1350A	2	CSE 7-13	W	PRE STA 5 elem.	7.50-8.00
EVA-200	9	2-83	M	PRE 2-bay	12.20	1855	2	CSE 7-13	VW	PRE STA 10 elem.	9.00-9.50
FA-1	1	2-13	S		12.43	1360	2,10	CSE 7-13	W	PRE HFB 5 elem.	9.25
COR-U	4	13-83	W	PRE	13.12	1870B	2,7,10	2-13	M	PRE STA HFB SPC	9.95
STYL 8 (2-13)	2	CSE-VHF	W	HFB 8 elem.	13.12-24.69	3034C	9,10	14-83	W	PRE HFB 4 bay	10.75
CVA 500	1,9	2-83	M	PRE	13.33	3006C	9,10	14-83	W	PRE HFB 4 bay	11.50
PRF2	1	2-13	M	2-bay	13.43	1325B	2	CSE 2-6	W	STA HFB PRE 5 elem.	12.00-16.00
STYL 10 (2-13)	2	CSE-VHF	VW	HFB 10 elem.	14.81-30.86	1850A	2	CSE 7-13	VW	PRE HFB STA 10 elem.	12.50
BLIP 260	1	2-13	M	PRE HFB	15.27	953B	1	2-13	M	PRE SPC STA	12.75
CY 1	1,2	2-13	W	PRE	15.43	1860A	2,10	7-13	VW	PRE HFB STA 10 elem.	14.50
810	10	2-13	M	PRE HFB HFS	18.35	1410B	2,10	3-6	W	SPC HFB 5 elem.	15.00
FA-2	1	2-13	M	PRE 2-bay	26-38	1410B	2,10	4-5	W	SPC HFB 5 elem.	15.00
CVA2-500	1,9	2-83	W	PRE 2-bay	28.00	1840B	2,10	2-6	VW	PRE HFB STA 7 elem.	15.00
PRF-4	1	2-13	W	4-bay	28.40	1880	7,2,10	2-13	W	PRE STA HFB SPC	18.20
EVA-400	9	2-83	W	PRE 4-bay	28.70	1845B	2,10	2-13	W	PRE STA HFB 7 elem.	18.20
840	10	2-13	W	PRE HFB HFS	30.70	1420B	2	4-6	W	PRE STA 6 elem.	19.75
CY-11	1,2	2-13	VW	PRE HFB 2-bay	30.86	1310B	2	CSE 2-6	VW	STA HFB	21.50-30.50
820	10	2-13	W	PRE HFB HFS	40.00	1836B	2	3-6	W	PRE 6 elem.	24.50
STY 1026	2	2-6	VW	PRE	40.95	1800B	2	CSE 2-6	VW	PRE HFB 10 elem.	26.25-35.00
FA-4	1	2-13	W	4-bay	57.09	3040	9,10	14-83	VW	SPC HFB PRE	31.50
CVA4-500	1,9	2-83	VW	PRE 4-bay	60.50	1890	7,2,10	2-13	VW	PRE STA HFB SPC	32.50
880	10	2-14	VW	PRE HFB HFS	67.75	5005	2,10	CSE 50-250MC	W	SPC STA 5 elem.	Varies
SCALA RADIO CO. 2814 19th St., San Francisco 10, Calif.						5010	2,10	CSE 50-250MC	VW	SPC STA 10 elem.	Varies
HDCA (aluminum & HDCS (steel)	2	CSE	S M W VW	SPC STA (300 72 52) for Master systems	12.00-90.00	TELCO (See General Cement Mfg. Co.)					
SCHOTT CO., WALTER L., 3225 Exposition Pl., Los Angeles 18, Calif.						TELETENNA CO. 1033 Indiana Ave., LaPorte, Ind.					
4400	9	14-83	M	PRE STA HFB	3.50	Telecon 401-1	1,10	2-13	M	PRE SPC STA	8.35
4010	5	2-83	M	PRE STA TUN	3.77	Ultra Telecon U-204	2,3,10	14-83	W	HFB HFS PRE SPC STA	9.95
4030	1	2-13	M	PRE HFB STA	4.95	Telecon 303-1	1,10	2-13	M	PRE SPC STA	17.15
4035	1	2-13	M	PRE HFB STA	5.50	TELEX, INC., Asbury Park, N. J.					
4040	1	2-13	M	PRE HFB STA	5.50	71	7	14-83	M	1 bay	5.75
4045	1	2-13	M	PRE HFB STA	5.50	CLV	1	2-13	M		5.95
4130	10	2-83	M	HFB PRE STA	5.85	CH2X6	1,9	2-13	M		6.66
4414	9	14-83	W	PRE STA HFS	6.25	Y6X	2	CSE 2-13	W	6 elem.	7.63-16.19
4460	6	2-83	M	PRE STA HFB	7.50	U2X-TV	1,9	2-13	M		9.30
4300	2	CSE 14-83	VW	PRE STA HFB HFS	7.50	72	7	14-83	W	2 bay	10.75
4100	5	2-83	W	PRE STA TUN HFS	7.50	420	1	2-83	M	2 bay	12.08
4090	1	2-13	W	HFB STA HFS	9.25	FBT	2	CSE 2-13	VW	10 elem.	13.35-33.50
4060	1	2-13	VW	HFB PRE SPC STA HFS	9.25	CH4X12	1,9	2-13	W	TUN	14.16
4120	10	2-83	M	HFB PRE STA	9.40	79	7	14-83	W		14.45
4450	8	14-83	W	PRE STA HFS HFB	9.95	84	9	14-83	VW	4 bay	14.95
4170	2	CSE 2-6	W	PRE STA HFB HFS	13.50	T130	2	2-13	W	PRE	16.55
4110	10	2-13	VW	HFB PRE STA HFS	13.75	T110	2	2-13	W	PRE	17.75
4160	2	CSE 2-13	VW	PRE STA TUN HFB HFS	14.95	DY6X1	2	4-5	W		19.68
4150	10	2-83	W	PRE STA TUN HFB HFS	15.95	U4XTV	1,9	2-13	W		19.94
4175	2	7-13	VW	PRE STA HFB HFS	18.50	T100	2	2-13	W	PRE	23.60
4452	8	14-83	VW	PRE STA HFS HFB	19.95	T120	2	2-13	W	PRE	23.60
4180	2	CSE 2-13	VW	PRE STA HFB HFS	27.75-28.95	ME-4X	1,9	2-13	W	PRE	25.21
4165	2	2-6	VW	PRE STA HFB HFS	39.75	440	1	2-83	W	2 bay	25.50
SNYDER MFG. CO 22nd & Ontario Sts., Philadelphia 40, Pa.						CH8X24	1,9	2-13	VW		31.80
UHF-5	7	14-83	W		2.95	DFT-1	2	4-5	VW		33.50
UHF-6	4	14-83	VW		5.45	U8XYV	1,9	2-13	VW		43.89
AR-55	9	2-83	M		5.60	480	1	2-83	W VW	2 bay	55.00

(Continued on page 56)

Outdoor TV Antenna Specifications

(Continued from page 55)

Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price	Model Name or No.	Type	Channel Coverage	Signals Intended For	Special Features	List Price
TENNALAB Quincy, Ill.						T.V. PRODUCTS CO. 145-68 228 St., Springfield Gardens 13, N. Y.					
5L2CQ to 5L13CQ	2	CSE	VW	SPC	10.00-30.00	703	6	2-83	MW	PRE SPC STA TUN	4.45
C213	7	2-13	W	Extra high channel gain	29.95	702	9	14-83	S	HFB HFS PRE SPC STA TUN	4.50
CB2X13	7	2-13	W		42.50	AM21	1	2-13	S	SPC STA	4.75
ST2 to ST13	2	CSE	VW	(72) for Community Systems	50.00-95.00	AMS21	1	2-13	S	SPC STA	5.00
TENNA MFG. CO. 7580 Garfield Blvd., Cleveland 25, Ohio						VIDEO INDUSTRIES CO. 42 Palmer Pl., Port Chester, N. Y.					
RT-51	3	7-13	M		2.20	AM21D	1	2-13	S	SPC STA	5.10
US-201	7	14-83	M S		3.95	AML21	1	2-13	S	SPC STA	5.35
US-102	9	2-83	M S		7.35	PRS21	1	2-13	S	PRE SPC STA	6.40
RS-52	3	2-6	M		6.10	PRL21	1	2-13	S	PRE SPC STA	7.10
YS-502 to YS-513	2	CSE	W VW		7.15-12.30	706A	8	14-83	MW	HFB HFS PRE SPC STA	8.50
US-151	4	14-83	MW		7.45	5Y713	2	7-13	M	HFS PRE SPC STA	10.15
RS-751	1	2-13	M		7.65	SJ10A	1,2	2-13	M	HFB HFS PRE SPC STA	12.50
RM-42	3	2-13	M		9.15	SJ10	1,2	2-13	M	HFB HFS PRE SPC STA	13.35
RM-40	9	2-13	M		11.20	10Y713	2	7-13	W	HFB HFS PRE SPC STA	15.40
RM-65	1	2-13	M		11.20	C3	10	2-13	M	PRE SPC STA	16.10
RS-852	1	2-13	M S		12.05	5Y226	2	2-6	M	HFS PRE SPC STA	17.65
YS-457	2	4, 5, 7	W VW		13.05	C1	10	2-13	W	HFB HFS SPC STA	22.50
YS-457A	2	4, 5	W VW		13.05	MM100	7	2-13	W	HFB HFS PRE SPC STA	28.35
YS-457B	2	5, 7	W VW		13.05	C2	10	2-13	W	HFB HFS SPC STA	29.00
RS-752	1	2-13	MW		16.15	10Y226	2	2-6	W	HFB HFS PRE SPC STA	30.55
RM-652	1	2-13	M		19.70	5XV2-5XY13	2	CSE 2-13	M	HFS PRE SPC STA	Vanes
DN-2	8	2-83	W VW		34.95	5Y2-5Y13	2	CSE 2-13	M	HFS PRE SPC STA	Vanes
TRICRAFT PRODUCTS CO. 1535 N. Ashland Ave., Chicago 22, Ill.						VEE-D-X (See La Pointe Elec.)					
M4000	5	2-13	W	PRE	7.10	VIDEO INDUSTRIES CO. 42 Palmer Pl., Port Chester, N. Y.					
M6000	1	2-13	W	PRE 8 elem.	11.75	105	9	2-13	MW	PRE	4.70
M2650	3	2-13	W	PRE	12.30	101	6	2-13	MW		6.25
M3650	3	2-13	W		13.10	106	3	2-13	MW	PRE	7.12
MP238	2	2-13	VW	PRE SPC	41.75	103	1	2-13	MW		11.65
TRIO MFG CO. Griggsville, Ill.						WAYCO INC. P. O. Box 115, Waynesboro, Tenn.					
FDH	3	7-13	S		2.78	5 WB 2 to 13	2	CSE 2-13	W VW	PRE	4.95-18.25
5S 2 to 13	2	CSE 2-13	M		3.95-9.12	Double Diamond D.D.	10	2-13	S	PRE MW	4.99
742 & 744 series	1	2-13	S M		3.95-11.44	DD 1	10	2-13	S M	PRE	5.25
UBT-1	7	14-83	W VW	STA	4.45	CR	8	UHF	M W VW	PRE	5.50
SV-2	6	2-83	S	STA	4.86	8 WB 2 to 13	2	CSE 2-13	W VW	PRE	8.50-24.95
DR1	9	2-13	S	STA	5.84	DDF	10	2-13	S M	PRE all directional	9.95
C42	1	2-13	S M	STA	5.98	10WB 2 to 13	2	CSE 2-13	VW	PRE	10.95-34.50
FDL	3	2-6	S		6.26	12WB 2 to 13	2	CSE 2-13	VW	PRE	11.95-37.50
52 to 513	2	CSE 2-13	W		6.26-15.90	DD2	10	2-13	MW	PRE	12.95
6713	2	7-13	M	STA	6.53	DDF2	10	2-13	MW	PRE all directional	19.95
SC42	1	2-13	S M	STA	6.53	5, 10 & 12 WC series	2	CSE 2-13	VW	For community systems	20.50-72.50
C42D, C62	1	2-13	S M	STA	6.67	5 Star General	7 & 10	2-13	M W VW	PRE	24.95
10S 2 to 13	2	CSE 2-13	VW		6.88-16.98	DD Co Ch. King	10	2-13	W VW	PRE screened for co Channel	27.50
C44	1	2-13	S M	STA	6.95	3200H	7	CSE UHF	VW	PRE	29.95
SC44	1	2-13	S M	STA	7.51	DD 4	10	2-13	W VW	PRE	37.50
C44D	1	2-13	S M	STA	7.65	WELCO MFG. CO. 225 S. 3rd St., Burlington, Iowa					
C64	1	2-13	S M	STA	7.78	Sabre Jr.	2	2-13	S M	PRE STA	8.75
SQ1	4	14-83	M	STA	7.78	Conical Zee-Beam 50	10	2-13	S M	PRE STA	8.95
IL	3	2-13	M	STA	8.20	HB	2	7-13	S VW	HFB HFS PRE STA	9.50
C42B	1	2-83	S M	STA	8.76	Sabre 100	2	2-13	S M	PRE STA	14.95
VC-1	1	2-83	S	STA	8.76	Zee-Beam 110	2	2-13	S W	HFB HFS PRE STA	18.75
ILD	3	2-13	M	STA	9.04	Zee-Beam 220	2	2-13	S VW	HFB HFS PRE STA	24.95
520 to 560	2	CSE 2-6	W		9.15-12.09	Super Zee-Beam 440	2	2-13	S VW	HFB HFS PRE STA	34.95
10713	2	7-18	W	STA	9.31	WINEGARD CO. 3000 Scotten Blvd., Burlington, Iowa					
102 to 1013	2	CSE 2-13	VW		9.31-26.41	H-T	2	7-13	W VW	HFB HFS PRE STA	6.50
FDLH	3	2-13	S		9.45	Pixie Pal P5	10	2-13	S M	PRE STA	8.85
C62B	1	2-83	S M	STA	9.45	Imp L-7	2,10	7-13	W VW	HFB HFS PRE STA	9.95
ILD	3	2-13	M		9.95	Pixie Princess L5	2,10	2-13	M W	PRE STA	13.65
1073	2	7-13	VW		12.50	Powerhouse LPS	2,10	2-13	W VW	HFB HFS PRE STA	19.95
C62U	1	2-83	S M	STA	12.51	Interceptor L4D	2,10	2-13	W VW	HFB HFS PRE STA	24.95
88	1,2	2-13	M	STA	12.51	L4DA	2,10	2-13	W VW	HFB HFS PRE STA SPC Anodized in color	29.95
98	1,5	2-83	S M	STA	12.51	Super "Ceptor SL4D	2,10	2-13	VW	HFB HFS PRE STA	34.95
66	3	2-13	M	STA	17.65	SL4DA	2,10	2-13	VW	HFB HFS PRE STA SPC Anodized in color	41.95
Zombi	2	2-13	M	"Super" version for weak signals	18.20-32.50						
Twin-Six	9	2-13	W VW		22.95						
Sunrise, Sunray	2	2-13	M	"Super" version for weak signals	23.60-37.50						
726	2	2-6	VW		25.02						
ZZ16H	9	7-13	VW		25.95						
Zephyr	10	2-13	W	HFB HFS "Royal" version for very weak signals	27.95-34.95						
44	9	2-13	W VW		33.22						
22U	8	2-83	W VW		38.78						
ZZ12L	9	2-6	VW		39.95						

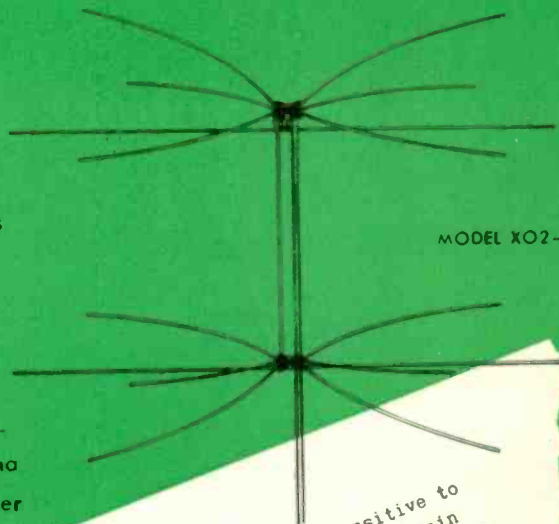
EXPO

Have you ever seen
or heard of the
Exponential Antenna?
You have not, for until
now it was unknown to
the engineering world.

WHAT IS EXPO?

EXPO, the exponential antenna, represents an historical technical advance that eliminates the crippling frequency limitations of all known antennas by the use of exponentially curved elements.

The ultimate in antenna design! One antenna for all 83 channels with gains progressively increasing with increase of frequency. This principle recently discovered* is the basic answer to the limited bandwidth problem. There is no need for multiple antenna installations or other expedients to gain slightly wider bandwidth operation.



MODEL XO2—2 BAYS

Higher gains

- one antenna
- one transmission line
- one installation.

That is EXPO.

Servicemen will appreciate the ease and speed of installing EXPO:

occupies less space — pleasing appearance — supreme performance. Its performance sells it for you.

Will you be among the first to see it perform? Consult your distributor, or for further information, write:

* Patent applied for.

Here is an antenna that is insensitive to frequency variations — except that gain increases as you go higher in the spectrum, reaching astounding gains in the upper VHF and throughout the UHF regions. Where wide bandwidth operation is necessary as in T.V., EXPO ushers in a new era in antenna design, wiping out the frequency restrictions of straight element antennas.

EXPO comes in 1, 2 and 4 bays in the standard and deluxe models. The standard models use a single parasitic reflector while the deluxe models employ a screen-type reflector for areas in which the ultimate in back attenuation and increased forward gain is desired.

EXPO

HOLLOWAY ELECTRONICS CORP.

Fort Lauderdale, Florida

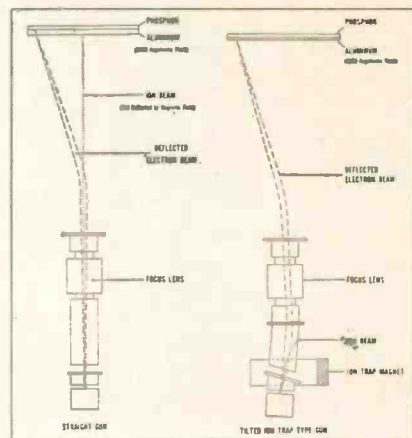
New Pix Tubes Eliminate Ion Traps

• TV picture tubes which require no external ion traps now are commercially available. This has been made possible by a newly-designed straight electron gun and a special aluminization control process developed by the General Electric Tube Dept. The new gun is being built into four new 21-in. tubes (21BAP4, 21BCP4, 21BDP4, and 21BNP4) and a new 24-in. tube (24ZP4). Elimination of the necessity for the external magnet not only will mean a degree

of production simplification for the equipment manufacturer, but also will reportedly simplify installing and servicing.

Operation of high-voltage-anode tubes without the use of external magnets is made possible by the new straight gun and an improved processing technique controlling the thickness of the aluminum coating (2300 angstrom units or 9×10^{-6} in.) inside the tube face. The aluminum is thin enough to permit the electrons

to penetrate and activate the phosphor, yet thick enough to stop the heavier ions and thus prevent phosphor burn.

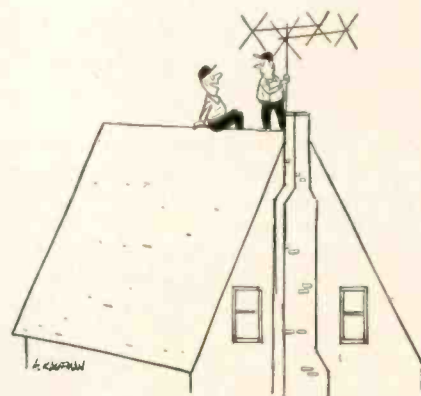


Straight Gun: Negative ions in electron beam travel to face of tube, undeflected by the yoke, and strike center area of screen. Thickness of the aluminum coating screens out ions without interrupting flow of electrons to phosphor.

Conventional Bent Gun: Ions in beam are separated from electrons by action of the combined electrostatic and magnetic fields between grid #2 and anode, and are trapped on the walls of anode cylinder. Counter action of ion trap magnetic field redirects the electron beam through focusing lens to screen.

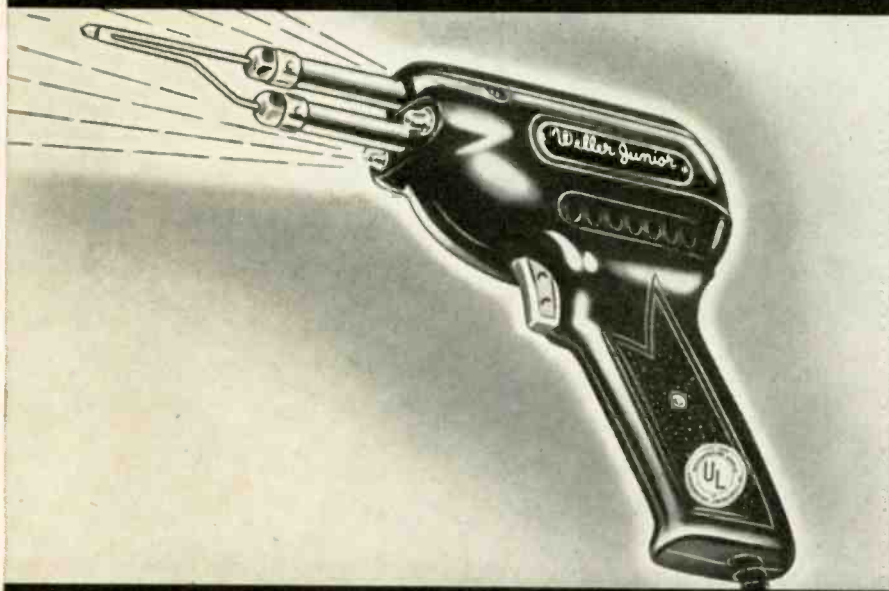
Inter-electrode arcing is minimized as a result of a reduction in the number of gun parts. Fewer parts not only mean fewer welds but also permit increased spacing between the focus electrode and the anode, and between the supports holding the electrodes to the glass beading.

Picture tubes with straight guns and no ion traps were introduced successfully years ago, after the development of aluminization techniques. Such types as the 12KP4 and 12JP4 were representative. However, these earlier versions were smaller tubes with round rather than rectangular screens. •



"My kid's taking physics at school. Did you know that if you missed your step you'd be traveling 60 miles an hour when you hit the ground?"

**OVER 1/2 MILLION
WELLER SOLDERING GUNS**
*have been bought by
radio and TV servicemen*



Weller... first to design and patent a soldering gun

Weller... first in performance and features

Weller... first in value — models as low as \$7.95

Weller

ask your distributor for a demonstration

ELECTRIC CORP. 805 Packer Street
Easton, Pa.

HIGH FIDELITY NOTES

Phoney Gems: Look out for bargain diamond styli from questionable sources, warn the Hi-Fi experts of Cook Laboratories, Stamford, Conn. Only an expert can tell the difference between a true diamond of the size used in a phono needle and a sapphire. Some hustlers have been active lately selling so-called diamond-point needles at prices considerably less than you'd expect to pay legitimately. What you actually get is a sapphire tip—at considerably more than you'd expect to pay legitimately. Safest procedure is to stick to reliable sources, shun "bargains" from unknown suppliers.

Foreign loudspeakers: New entrants among Hi-Fi imports are moderately priced coaxial speakers from Japan for which quality performance is claimed. They may do fine on music reproduction, but will English-language speech material come through with a Japanese accent?

Pre-recorded Tape: Pentron has joined the growing ranks of companies marketing recorded tapes in competition with discs. They are following the most recent trend toward taping popular music for the wider market, rather than classical material for the relatively few. Their first reel is a 15-min., 7½ ips, dual-track item including "Stardust," "Begin the Beguine," and four other standard favorites, by Larry Paige and his Orch. Price is \$3.50.

Tape Recorders: Story out of Chicago is that Webcor is working on a tape recorder that will feature 4 speeds, other unusual features, at a popular price... Keystone Camera Co. of Boston is the latest manufacturer of photographic equipment to enter the tape-recorder market. First unit features 3 speakers, 8-watt amplifier and the ability to handle magazine-loaded prerecorded tape without adapters.

Juke Boxes: Technicians who used to make some income out of servicing coin-operated phonographs, when these machines were going strong, will be pleased to learn that juke box sales are on the rise again. In a decline for a few years, these devices were caught between the low fee per play (a nickel) and the growing demand, resulting from Hi-Fi awareness, for better reproduction (involving bigger investments in the machines). The swing toward the 10-cent fee per play is encouraging better, more expensive units. Some models now feature multiple speaker systems with large woofers, also improved amplifiers and pickups.

STANDARD BRAND TUBES

AT SENSIBLE PRICES

Only the 5 Top-Quality Brands Shipped

- Individually boxed.
- Only 1st quality.
- Latest Dating.
- Standard RTMA Guarantee.
- No private label, electrical or mechanical rejects.
- No rebrands or rewashed "bargains."

Write for Free 1955 New Air-Mail Handy-Order Blank.

- Lists ALL Popular TV & Radio Types.
- Makes Mail-Order a Pleasure.
- All Tube Orders Over \$25.00 (with full remittance) Postpaid in U. S. A. Overnight Shipment.

Tube Type	Unit Price	Tube Type	Unit Price	Tube Type	Unit Price	Tube Type	Unit Price	Tube Type	Unit Price	Tube Type	Unit Price
0A2	.85	3S4	.80	6AS7G	3.75	6L6GA	1.30	7N7	.95	148E	.85
0B2	.85	3V4	.85	6AS8	1.20	6L6M	1.50	7Q7	1.00	14C7	1.00
0B3/VR-90	.85			6AT6	.55	6L7	1.15	7R7	1.30	14E7	1.20
0C3/VR-105	.90	4BQ7A	1.30	6AT8	1.10	6M7	1.15	7V7	1.30	14F7	1.30
0D3/VR-150	.90	4BZ7	1.35	6AU4GT	1.00	6Q7	.95	7W7	1.30	14F7	1.00
0Z4	.50	5AM8	1.05	6AU5GT	1.10	6S4	.65	7X7	1.00	14F8	1.30
0Z4G	.65	5AN8	1.10	6AU6	.60	6S8GT	1.10	7Y4	.70	14H7	1.00
1A5GT	.80	5AQ5	.75	6AU7	.90	6SA7GT	.65	7Z4	.70	14H7	1.00
1A7GT	1.00	5AS8	1.10	6AV5GT	1.20	6SC7	.75			14I7	.95
1AD4	1.25	5AT8	1.10	6AV6	.55	6SF5	.75	12A4	.85	14R7	1.30
1AE4	1.00	5AY8	1.15	6AX4GT	.85	6SF7	.90	12A15	.70	14S7	1.25
1AG4	1.25	5AW4	1.15	6AX5GT	.75	6SG7	.75	12A05	.75	14W7	1.35
1AX2	1.00	5AZ4	.60	6B4G	1.25	6SH7	.80	12A76	.55	198G6G	2.00
1B3GT	.90	5J6	.90	6BA6	.65	6S17M	.70	12A77	.95	1978	1.20
1H5GT	.75	5R4GY	1.55	6BA7	.90	6SK7GT	.65	12A16	.60	25AV5GT	1.30
1L4	.85	5T4	1.75	6BC4	1.60	6SL7GT	.80	12A17	.80	25AX4GT	1.10
1L6	1.10	5U4G	.60	6BE5	.70	6SN7GT/B	.80	12AV6	.55	25BK5	1.00
1L4A	1.00	5U4GB	.60	6BT7	1.25	6SQ7GT	.60	12A7V	1.00	25B06GTB	1.35
1L4G	1.00	5U8	.70	6BD5	1.40	6SR7	.70	12AW6	1.00	25CD6GA	1.75
1L8A	1.00	5V4G	.95	6BD6	.75	6SS7	.85	12AX4GT	.90	25CO6	1.35
1L8C	1.00	5V6GT	.70	6BE6	.70	6ST7	1.15	12AX7	.80	25L6GT	.65
1L8D	1.00	5W4GT	.70	6BF5	.85	6T8	1.05	12A7V	1.75	25W4GT	.75
1L8E	1.00	5X4G	.80	6BF6	.70	6U5	.90	12A27	.90	25Z5	.70
1L8F	1.00	5X8	1.05	6BG6G	1.80	6U8	1.00	12B4A	.85	25Z6GT	.65
1L8G	1.00	5Y3GT	.45	6BH6	.80	6V3A	1.30	12B4G	.65	35A5	.70
1L8H	1.00	5Y4G	.65	6BJ6	.70	6V6GT	.65	12B4T	.95	35B5	.70
1L8J	1.00	5Z3	.80	6BK5	.90	6V6M	1.30	12BD6	.75	35C5	.70
1N5GT	.90	5Z4	1.25	6BK7A	1.10	6W4GT	.60	12BE6	.70	35L6GT	.65
1Q5GT	1.15			6BL7GT	1.15	6X6GT	.80	12B7A	.95	35W4	.45
1R4	1.00	6A7	1.00	6BM6	1.15	6X8GT	.95	12BK5	1.00	35Y4	.70
1R5	.85	6A8M	1.00	6BNGTA	1.20	6X8	.95	12B06GTB	1.40	35Z5	.45
1S4	.90	6A8GT	1.00	6B07A	1.20	6Y6G	.95	12B7A	.95	41	.75
1S5	.70	6A8A	.65	6B8XGT	1.25			12BZ7	1.00	42	.75
1T4	.80	6A87	1.35	6B95G	1.30	7A4	.80	12CU6	1.40	43	.80
1T5GT	1.05	6AC5GT	1.15	6BZ7	1.25	7A5	.95	12J5GT	.70	50A5	.70
1U4	.75	6AC7	1.10	6C4	.50	7A6	.80	12K7GT	.90	50B5	.70
1U5	.70	6AD7G	1.45	6C5	.80	7A7	.80	12K8	1.10	50C5	.70
1V	.95	6AF4	1.30	6C85	4.50	7A8	.80	12Q7GT	.80	50L6GT	.65
1V2	.70	6AF6G	1.20	6C86	.70	7AD7	1.75	12SA7GT	.65	50X6GT	.90
1X2B	.90	6AG5	.75	6D06G	1.75	7AF7	.95	12SC7	.80	50Y6GT	.80
		6AG7	1.10	6CF6	.90	7AG7	1.00	12SG7	.90	50Z6GT	.80
2A3	1.30	6AH4GT	.85	6CG7	.85	7AH7	1.00	12SH7	.95	70L7GT	1.55
2AF4A	1.40	6AH6V	1.00	6CL6	1.15	7A7	.90	12S17	.70	81	1.90
2D21	1.00	6A15	1.75	6CM6	.85	7B4	.80	12SK7GT	.65	83V	1.00
2X2	.50	6AK5	.75	6CS6	.85	7B5	.70	12SL7GT	1.00	83	1.00
3A3	1.10	6AL5	.60	6C0C	.95	7B6	.75	12SN7GT	.80	83V	1.00
3A4	.55	6AL7GT	1.40	6E5	.80	7B7	.80	12SQ7GT	.60	117L7GT	2.50
3A5	.75	6AM4	1.55	6F5	.85	7B8	.90	12V6GT	.75	117N7GT	1.95
3A15	.65	6AM8	1.15	6F6M	1.00	7C5	.80	12W6GT	.90	117P7GT	1.95
3A16	.70	6AN4	1.50	6F6G	.80	7C6	.70	14A4	1.00	117Z3	.70
3AV6	.60	6AN5	3.50	6H4	.50	7C7	.85	14A5	1.50	117Z4GT	1.15
3BC5	.80	6AN8	1.20	6I4	3.95	7E7	1.20	14A7	.85	117Z6GT	1.00
3BN6	1.05	6AQ5	.70	6I5	.50	7F7	.90	14AF7	1.00	5642	1.00
3BY6	.75	6A06	.60	6J6	.75	7F8	1.20				
3CB6	.80	6A07GT	1.20	6I7	.95	7G7	1.15				
3CF6	.85	6AR5	.75	6K6GT	.60	7H7	.75				
3LF4	1.20	6AR6	2.25	6K7	.70	7I7	1.35				
3Q4	.85	6AS5	.75	6K8	1.20	7K7	1.20				
3Q5GT	1.00	6AS6	2.25	6L6G	1.15	7L7	1.15				

PICTURE TUBES DROP — SHIPPED DIRECT FROM CBS FACTORY. WRITE FOR PRICES.

You May Include Types Not Listed. We Stock Over 2,000 Types Including Diodes, Transistors, Transmitting and Special Purpose Types

TWO-COLORED TUBE CARTONS, with new Safety Partitions. Prevents Tube Breakage. This Super-Gloss Red and Black Carton is the Most Distinctive Box Available Today! Minimum: 100 any one size. Case Lot Quantity Price on Request. Boxes F.O.B., N.Y., N.Y.

SIZE	FOR TYPES SUCH AS	EACH
Miniature	(6AU6, 6AL5, etc.)	1¢
GT	(6SN7, 6W4, etc.)	1½¢
LARGE GT	(1B3, 6BQ6GT, etc.)	1½¢
LARGE G	(5U4G, 6BG6G, etc.)	2¢

NEW! Same tube cartons as above, but in glossy white... Same prices apply. Specify white...

BARRY ELECTRONICS

CORPORATION

Terms: 25% with order, balance C.O.D. All merchandise guaranteed. F.O.B., N.Y.C.

512 BROADWAY, DEPT. T • New York 12, N. Y. • WALKER 5-7000

NEEDLE STORAGE CABINET



Combination needle storage and display cabinet by Jensen Industries, guaranteed to simplify selling and restocking of phono needles. One needle can be removed without touching any other or without readjusting index tab. Red leatherette with gold lettering, it holds a maximum of 360 needles.

TACO AWARDS \$10,000 IN SCHOLARSHIPS. Four scholarships, each valued at \$2,500, have been awarded by TECHNICAL APPLIANCE CORP. to four central New York students selected for outstanding high school work.

CENTRALAB presented SAMUEL BERGER of Little Silver, N. J., a new Evinrude 3 hp. outboard motor for his winning entry in the second CENTRALAB ELECTRONI-KWIZ.

C. A. SWANSON has been named gen. sales mgr. and **ODEN F. JESTER** has been appointed asst. gen. sales mgr. of STANDARD COIL PRODUCTS CO., INC.

VOLKSWAGEN GOES ELECTRONIC



Leonard D. Allen, mfrs. rep, has equipped a Volkswagen with products made by his accounts and allows distributors who handle Allen products to use "wagen" for two-week period in demonstrating products under ideal conditions.

For the Old Timers!

In his 25 years with the distributor sales division of Aerovox, vice-pres. Charley Golenpaul has made it a point to contact personally all the jobbers across the country. Fortunately for the trade, he also made a habit of taking along his camera. The result of this 25 years of picture-taking has been gathered together in a booklet, "A Trip Down Memory Lane," being made available by Aerovox. Featured in the booklet are informal snapshots of jobbers across the country, with intimate comments and brief snatches of history.

News of the Industry

JOHN BENTIA was elected to the presidency of ALLIANCE MFG. CO. by officers of Consolidated Electronics Industries Corp., new owners of ALLIANCE.

DR. BENJAMIN H. ALEXANDER has been appointed mgr. of semiconductor operations for CBS-HYTRON.

LOUIS MARTIN has been appointed general sales mgr. of WESTINGHOUSE ELECTRONIC TUBE DIV. Mr. Martin was formerly general sales mgr. of STANDARD COIL PRODS.

CHICAGO STANDARD TRANSFORMER CORP. announces that **LARRY S. RACINE**, pres., has taken an indefinite leave of absence because of ill health and **WILLIAM J. SHEA**, who has been chairman of the board, will assume the office of pres.

BARRON W. CHANDLER has been appointed dist. sales mgr. for P. R. MALLORY & CO., INC. in the company's Indianapolis district.

JAMES P. CODY, formerly executive vice-pres. of BURTON BROWNE ADVTG., announces the formation of his own agency, CODY ADVTG., 30 W. Washington, Chicago.

HARRY KALKER, as the newly elected vice-pres. of the Berkshire County Sales Executive Club, recently attended the International Marketing Conference sponsored by the National Sales Executive Club and held at the Waldorf-Astoria Hotel in New York City.

B. B. BAUER, vice-pres. and director of research of SHURE BROTHERS, INC., was the recipient of the first Professional Group on Audio "Achievement Award" during the Spring National Convention of the Institute of Radio Engineers.

NEW LOOK FOR OLD TVs



A television set covering to give the old cabinet a "new look" is now available through GE tube distributors. Dealers offer rolls of the covering to set owners in four solid colors, three plaids and three wood grains. Plastic covering is easy to apply, as it sticks to any surface without paste, water or tools.

No Antenna Problem Here!
(it came as original equipment)

YOUR antenna problems however may not be so easily solved. That's where we come in—specializing in antennas for automotive and mobile communications uses. Proof of our quality workmanship—such fine accounts as Motorola, Zenith, Lear, RCA, GE, Bendix, and Crosley. Whatever your needs, The Antenna Specialists Company will be pleased to serve you.

Our latest sensation — the Telescopic Auto "Baseball" Antenna in triple chrome, or 6 baked-on automotive colors. Also, the "Double Header" Twin-tail antennas in chrome or color. In self-displaying units, these QUALITY antennas are a SELLING sensation.

Write today for catalog sheets on communication, automotive or special antenno requirements.



the
**antenna
specialists
co.**

12435 Euclid Ave., Cleveland 6, Ohio

TUBE RACKET: FTC RULES

"TRADE PRACTICE RULES FOR THE RADIO AND TELEVISION INDUSTRY," promulgated by the Federal Trade Commission on June 28, 1955, includes the following regulations which are applicable to the reprocessed tube racket revealed in July **TECHNICIAN**:

RULE 1: Misbranding, misrepresentation and deceptive selling methods. It is an unfair trade practice for any member of the industry to use any marks, depictions, advertisements or representations of any kind which, directly or by implication, are false, misleading or deceptive to the purchasing public.

RULE 5: Alteration of identifying names or marks. It is an unfair trade practice to remove or deface the name, trade name or trademark of any manufacturer appearing on any industry product when such removal has the tendency or effect of deceiving prospective purchasers.

RULE 12: Deception as to being "new." In the sale of TV sets, cathode-ray tubes or other industry products, it is an unfair trade practice to conceal the fact that such products have been used.

RULE 13: Deception as to identity of manufacturer when products are reconditioned by other than the original manufacturer. Whenever an industry member obtains used or defective products and has repaired or reconditioned them, it is an unfair trade practice to sell such products without clear disclosure that they have been repaired or reconditioned.

TUNING CONTROL: Automatic tuning of frequency-shift code receivers is provided by new control unit. Model TL-1 TRAK tuning lock includes a control chassis and a separate electrically-controlled capacitor connected to the tuning circuit of the receiver. The lock, when attached to an inherently unstable receiver permits operating convenience equivalent to a highly stabilized crystal-controlled receiver. C. G. S. Laboratories, 391 Ludlow St., Stamford, Conn.—**TECHNICIAN** (Ask for No. 9-63)

SILVER SOLDER POT: New silver solder pot, model 201, features small size, portability and a replaceable ceramic crucible. The ceramic crucible has an inside diameter $\frac{3}{4}$ in. and depth of 2 in. The operating temperature is variable with the rheostat over a range of approximately 1700° to 1200° F. Power is 110 v, 200 watts. Dee Electric Co., 1101 N. Paulina St., Chicago 22, Ill.—**TECHNICIAN** (Ask for No. 9-69)

NOW 2 **B&K** CRT Money-Makers

TEST and REPAIR TV PICTURE TUBES

NEW DELUXE CRT 400 with 4½" Plastic Meter

This portable Cathode Rejuvenator Tester quickly locates and corrects picture tube troubles in a few minutes, right in the home, without removing tube from set! Restores emission, stops leakage, repairs inter-element shorts and open circuits. Life-test checks gas content and predicts remaining useful tube life. Grid Cut-Off reading indicates picture quality customer can expect. Earns servicing dollars in minutes. Cuts operating costs, eliminates tube transportation. Saves money on TV set trade-in reconditioning. Pays its way from the very first day.

Weights only 5 lbs. mounted in rugged, luggage style, carrying case covered with handsome, durable leatherette. Size: 11 x 7½ x 5".

Model 400. Net \$5495



Over 20,000 CRT'S
NOW IN DAILY USE
ACROSS THE NATION



NEW ECONOMY CRT 200

A quick profit maker priced low enough for every serviceman to cash in on picture tube repairs. Performs most of the functions of the CRT 400. Has 3" meter. In leatherette carrying case. Size: 11 x 7½ x 5". Weighs 5 lbs.

Model 200. Net \$3995



Send for Bulletin 104T

B & K MANUFACTURING CO.
3726 N. Southport Ave. • Chicago 13, Illinois



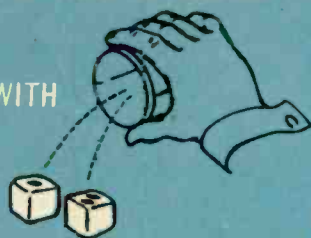
Management Trainee Needed

BY BIG COMPONENT MANUFACTURER

Our nationally known and respected client needs a pleasant, bright young man with good TV background to prepare for top position in company management. First assignment will be to travel across the country getting the service technician's viewpoint on electronic components; later giving talks to groups of them; and finally, after ability proved, taking a management position in home plant located in one of most desirable residential areas. Give complete details of education and experience in first letter. Single men 21 to 28 preferred. Write Harry P. Bridge Advertising, ATTN. W. J. Werbos, Vice Pres, 1201 Chestnut Street, Philadelphia 7, Penna.

Don't Gamble

WITH



Your Profits



be **SURE** with **AMPHENOL**

As a dealer you may be gambling with present profits and with future business growth—and for only 30¢! 30¢ is the price difference between quality AMPHENOL Twin-Lead and any low-priced, inferior twin-lead in an average 50 feet installation.

Here are the figures:

AMPHENOL 14-056 Twin-Lead, dealer net . . .	\$16.25 M Ft.*
Low-priced twin-lead, approximate dealer net	10.00 M Ft.
Difference per foot006¢
Difference per 50 feet installation30¢

Here are a dealer's gains with AMPHENOL:

1. Every foot of AMPHENOL Twin-Lead is unconditionally guaranteed for quality and best performance.
2. Finest materials: virgin polyethylene, top-grade copper conductors.

Here are a dealer's losses with inferior, low-priced twin-leads:

1. Poor raw material, including reclaimed polyethylene, means that a dealer may have to go back two or three times on an installation to replace lead-in which has pulled apart, or has snapped conductors, or has suffered material deterioration. No profits there!
2. Customer criticism causing loss of valuable word of mouth advertising and business reputation. No profits there!

Be sure, don't gamble. Install with genuine AMPHENOL Twin-Lead.

*In 5000 foot quantities



It will be to your advantage to check the reasons for the difference in twin-lead prices. Obtain the free booklet "Don't Gamble with Your Profits" and the Vest Pocket Guide to Twin-Leads from your AMPHENOL Distributor.

see your authorized AMPHENOL Distributor! . . .
AMERICAN PHENOLIC CORPORATION

Reps and Distributors

INSULINE CORP. OF AMERICA announces the appointment of JOHN J. KOPPLE ASSOC., Mt. Vernon, N. Y., as sales reps for upper New York State.

SNYDER MFG. CO. announces that DAVE EVANS, executive sales rep in the mid-West, will expand his coverage in that area.

MERIT COIL & TRANSFORMER CORP. names ART CERF & CO., Newark, upper New York State reps.

JENSEN MFG. CO. names QUINN CUNNINGHAM & ASSOC., Indianapolis, as new industrial reps for the firm.

PYRAMID ELECTRIC CO. appoints new jobber reps in three states—KENNETH REINHARDT will handle Ind. and Ky., and TRI-ONIC SALES CO. will sell in Mich.

RAULAND-BORG CORP. appoints ELECTRONICS UNLIMITED, Los Angeles, their exclusive reps in the Southern Calif. area.

WALLY SHULAN & CO., mfrs. reps, have taken new expanded office space in the Bergen Square Bldg., Jersey City, N. J.

PERMA-POWER CO. appoints WILLIAM ENGELBRETSON CO., St. Paul, Minn., as rep in Minn., N. & S. Dakota and Western Wisc.

OLSON RADIO WAREHOUSE, INC. announces the opening of a new store in Buffalo, N. Y.

CBS-HYTRON announces the appointment of RUCKER ELECTRONIC PRODS. CO., Washington, D. C., as distributor for CBS tubes.

SYLVANIA distributor for New Jersey, SAMUEL SCHULTZ, won the Cadillac for being the "Distributor of the Year" of SYLVANIA ELEC. PRODS.

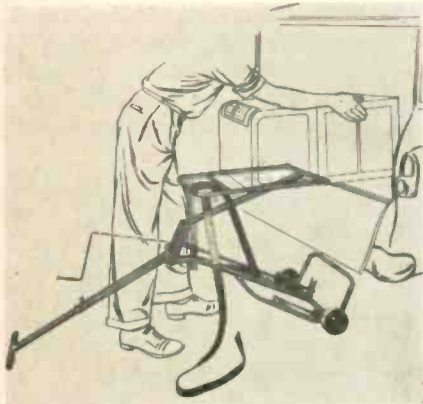
STEPHENS MFG. CORP. announces the appointment of two new reps—WOLFE-MARSEY SALES CO. will handle all of New York, except Long Island, NYC, Westchester Co. and Peekskill; ROBERT W. DANSBY CO. will cover Texas, Okla., Ark. and La.

CLEAR BEAM ANTENNA CORP. has made the following sales territory appointments: FRED A. ROSENWASSER to handle state of Ohio, JACK RATHSBURG to cover Mich., JACK GEARTNER CO. will handle Fla., FRANCISCO FERNANDEZ to cover Cuba and NORMAN A. CHEZAK will cover upstate New York.

FEDERAL RADIO & TELEPHONE CO. has appointed BRANUM SALES, INC., Dallas, as rep in the southwest and WILLIAM J. DOYLE CO., Chicago, to handle Ill. and Wisc.

**Unique 1-Man Hand Truck
For Appliance Deliveries**

The backbreaking labor attached to delivering and installing room air conditioners and other heavy appliances is eliminated by a new unique elevating, stair-climbing hand truck. Designed for one-man operation, the unit will lower the air conditioner from the delivery truck to the ground, and then will elevate to any level up to 43 in. above the floor to enable the air



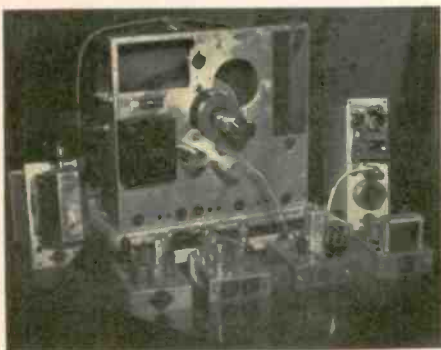
conditioner to be slid into the window frame. The stair-climbing feature is provided by a succession of frictionless rubber rockers.

When not in use, the "Appliance Elevating Truck, Model No. A-2" folds into a package 32½ x 22½ x 13 in., and weighs 49 lbs. The handle of the unit can be telescoped into the frame, reducing the length from 63 in. to 51 in. to facilitate moving around small landings.

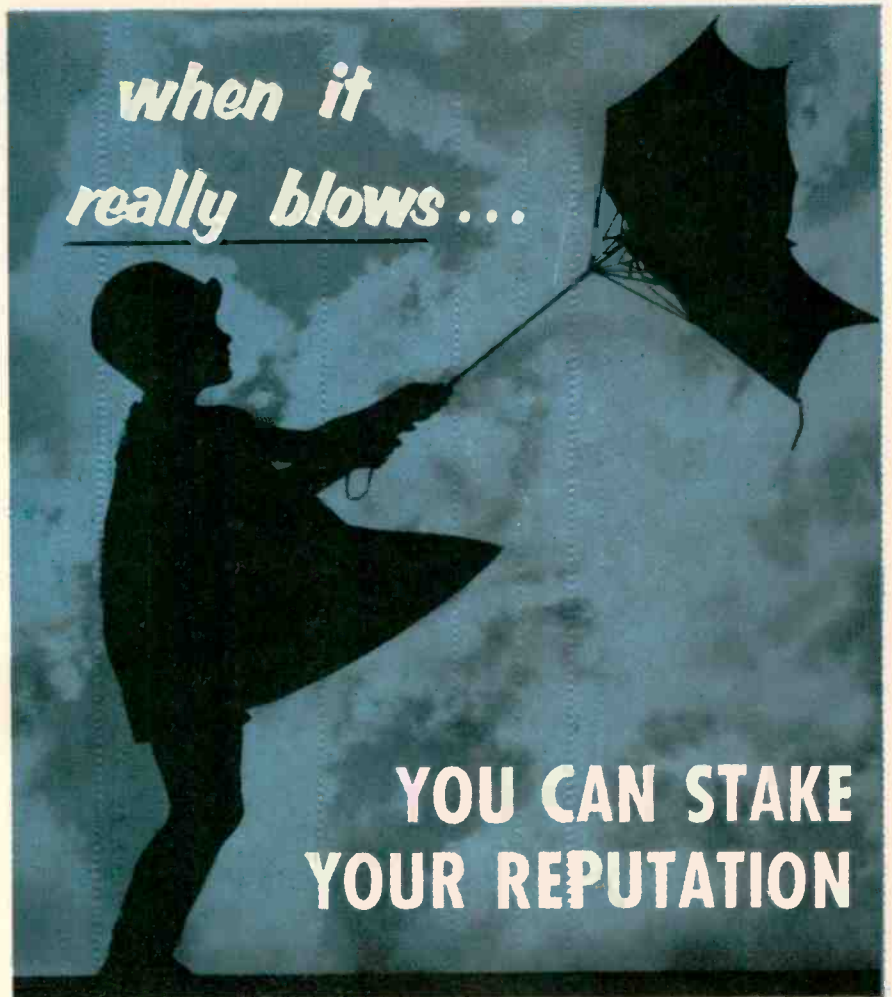
The unit which sells for \$74.50, is manufactured by the Fairbanks Co., 393 Lafayette St., N.Y. (Ask for No. 9-66)

WILFRED L. LARSON, pres. of SWITCHCRAFT, INC., was elected chairman of the Association of Electronic Parts and Equipment Manufacturers.

PLUG-IN TV RECEIVER



Plug-in units of the Warren TV receiver have individual indicator lamps to indicate proper operation of each unit. In case of trouble, technician will replace complete unit.

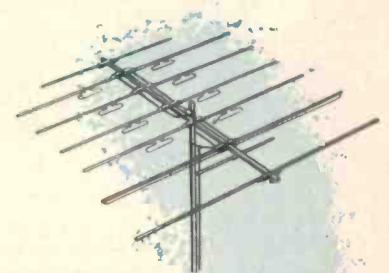


on a **TACO** antenna!

For Color as well as Black and White

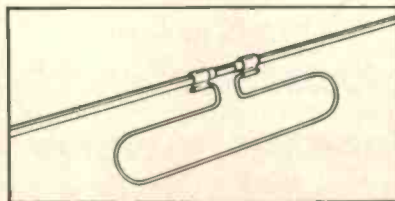
Proved in hurricanes Carol, Edna and Hazel along the East Coast and in many storm areas last year, the Taco spring-loaded assembly is recognized by the trade as the most rugged construction employed in any antenna — at any price! Both Trapper and Super Trapper are high-gain, broad-band antennas, unexcelled in gain across the entire VHF band. These antennas provide phenomenal picture clarity — combined with the most compact and streamlined design.

Get the facts on these two great antennas today. Write or see your Taco distributor.

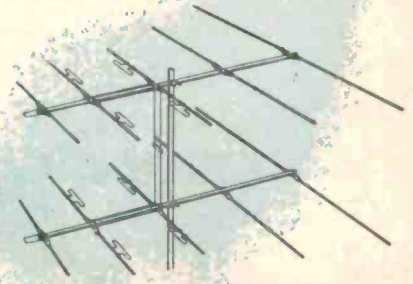


Super TRAPPER®

**WORLD LEADER IN
TV ANTENNA DESIGN**



The Taco trap® provides the means whereby streamlined Trappers outperform bedspring type antennas.



TRAPPER

© 1955 U.S. Pat. No. 2,705,283 ®

TECHNICAL APPLIANCE CORPORATION • SHERBURNE, N. Y.

the VITAMETER

AN INSTRUMENT DESIGNED TO MAINTAIN, IMPROVE and VITALIZE OPERATION OF CATHODE RAY TUBES

OVER 20,000 IN USE

IT'S PORTABLE

WEIGHT ONLY 10 LBS.



Unique reactivator function is accomplished by dynamic sweep between cathode and grid . . . removing gas ions and stale emitting material from surface of cathode tube.

the VITAMETER

- analyzes performance characteristics
 - locate and remove inter-element shorts
 - repairs open elements
 - welds open filaments
 - restores or improves emission quality
 - estimates tube life expectancy
- At your Distributor or write for Bulletin.

only \$6995

The VITAMETER is handsomely designed and housed in rugged steel case to insure long and dependable service. It is light, compact, portable and therefore can be used on picture tube while it is still in the cabinet. Just plug in and attach instrument socket to C.R. Tube . . . easy to read indicators tells the whole accurate story at a glance. VITAMETER repairs tubes right-on-the-spot.

13224 LIVERNOIS AVENUE
DETROIT 38, MICHIGAN

ELECTRONIC TEST INSTRUMENT CORP.

Association News

Pittsburgh "Unity" Meet

Representatives of local, state, and rival national service associations expressed approval, on August 7, of the formation of a single "umbrella" type of agency to deal with certain problems facing service technicians nation-wide. Present at the Pittsburgh gathering were members of NATESA, NETSDA, NARDA and many organizations on the state and local levels whether affiliated with any of these national groups or not.

The proposal, advanced by Max Liebowitz, NETSDA president, took into account the impracticality at the present time of reconciling all differences in policy and purpose to the degree that a single national organization, acceptable to all technicians and groups, can emerge. Instead, the notion of a unit "like the United Nations" was advanced, which would permit participating members to retain full independence and control over their own policies.

The proposed unit, which would be under a rotating chairmanship that would give all participating groups a turn, would not be empowered to determine policy for member organizations. It would simply be a clearing house for information and ideas, and would also provide a single responsible agency when the service industry requires unified representation on the national level in areas where all groups, regardless of other differences, are agreed.

In a letter announcing the meeting John A. Wheaton president of ESFETA, one of the participating organizations, enclosed a copy of a strong plea for unified action. Entitled "The Electronic Service Industry Is Missing the Boat," it points out the pitfalls of rival, duplicate effort and cites successful examples of united activities in other fields.

RTA (Ohio) Incorporates

In existence since 1948, the Radio Television Association of Springfield and Vicinity, Ohio, has been granted a charter as a non-profit corporation. The unit hopes to inaugurate a stable licensing program this fall. The local organization is made up of 40 men in the Springfield area, representing about 60 percent of the dealers and servicers in the community.



free

324-PAGE 1956 ALLIED ELECTRONIC SUPPLY GUIDE

For Service Technicians and Engineers
Get the up-to-date 1956 ALLIED Catalog. Packed with the world's largest selection of TV and radio parts and accessories, test instruments, Hi-Fi systems and components, P.A. systems, tubes, tools—everything for service work and industrial electronic application. Save time and money—depend on ALLIED for everything in Electronic Supplies.

FREE

Send for 324-Page Catalog Today

ALLIED RADIO CORP., Dept. 25-J-5
100 N. Western Ave., Chicago 80, Ill.

Send FREE 1956 Catalog

Name _____

Address _____

City _____ Zone _____ State _____

TUBES

- BRAND NEW
- NEVER USED
- NAME BRANDS

We recently acquired at an exceptionally favorable price, many thousands of brand new receiving tubes originally destined for use in new equipment. These tubes are being offered to radio-TV technicians at savings of more than 50% off distributors' price. Most of these tubes carry date codes within the warranty period. All are sold with a

ONE YEAR GUARANTEE

6A67	.59	6H6	.34
6AK5	.82	6SL7	.63
6AS7	.98	6V6G	.42
6BE6	.44	6V6	.58
6BJ6	.44	12AT7	.61
6BN6	.55	12AU6	.44
6C4	.43	12SN7GTA	.48
6CB6	.42	25L6	.44

No Order Too Small

Tubes shipped within 24 hours of receipt of order. 25% deposit required with order.

FEDERATED TELEVISION MART, INC.

513 Rogers Ave.
Brooklyn 25, N.Y.

at your fingertips...

CLEAR BEAM'S

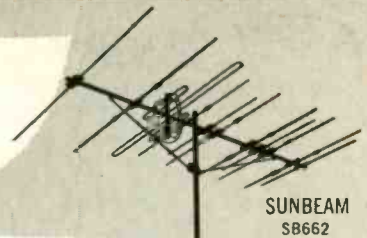
5

**"EASY WAY" ANSWERS
FOR TOUGH FRINGE
INSTALLATIONS!**

**B CLEAR ANTENNA CORP.
BEAM**

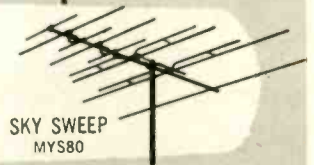
CANOGA PARK, CALIF. • CHICAGO, ILL.

Your Clear Beam distributor has all 5 antennas — contact him today!



SUNBEAM
SB662

It's an established fact (and you know it, too) that no one antenna can lick every fringe area problem.



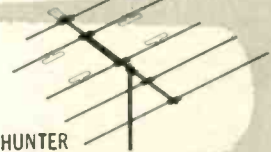
SKY SWEEP
MYS80

In view of this, Clear Beam manufactures five different types of fringe antennas — each tops in its field!



BIG CHIEF
BC12

All five Clear Beam fringe antennas provide easy installation, improved picture quality and happy customers.



HUNTER
MYH50

One of the five is the tailor-made answer to your installation headaches — and a faster way to higher profits!



TRI-KING
TK1500



"Oh, Honey. Relax. He's obviously overjoyed about our JENSEN NEEDLE."

EXCLUSIVE FEATURES!

- SINGLE KNOB CONTROL
- COMPACT • 90% ACCURATE



IT'S A TESTER • Checks CRT for inter-element shorts in both hot and cold conditions.

IT'S A REJUVENATOR • Removes contamination from surface of the cathode • Corrects gassy (soft) picture tubes • Reactivates cathode • Restores normal CRT performance in 90% of cases.

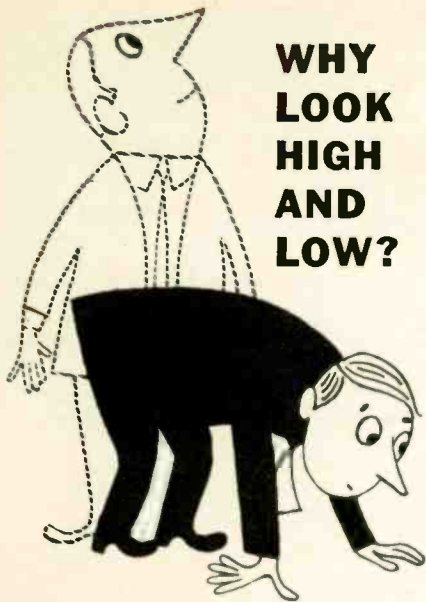
RT 203
\$4995

THE SMALLEST, MOST COMPACT INSTRUMENT OF ITS KIND! It has an easy-to-read giant 4 1/2" meter (larger than on any other similar unit). Its professional appearance makes it the only instrument of its kind which inspires customer's confidence. **HI-SPEED RESULTS:** Single knob control for all functions makes it simplest and fastest operating unit of any instrument of its kind. Extra deep-etched 2-color "lifetime" panel.



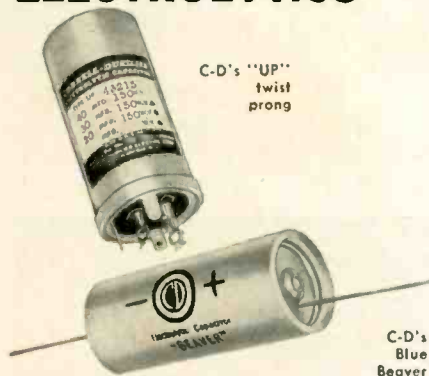
See the RejuvaTester, Fly-back Tester and TeleTest's other service instruments at your jobber.

31-01 Linden Place, Flushing, N. Y.



**WHY
LOOK
HIGH
AND
LOW?**

**C-D IS THE ONLY
COMPLETE LINE OF
ELECTROLYTICS**



C-D's "UP"
twist
prong

C-D's
Blue
Beaver

No matter what you need in electrolytic capacitors — C-D has it. Every type, shape and rating... all of consistent high quality proven by outstanding field performance. C-D capacitors are always reliable... and readily available — because Distributors *who know*, carry the complete Cornell-Dubilier line.

Free! TV Capacitor "Replacement Guide" — and C-D Twist Prong Cross Index from your C-D Distributor. He's listed in your local Telephone Directory.

CONSISTENTLY
**CORNELL-
DUBILIER**
DEPENDABLE
CAPACITORS



THERE ARE MORE C-D
CAPACITORS IN USE TODAY
THAN ANY OTHER MAKE.

PLANTS IN SD., PLAINFIELD, N. J.; NEW BEDFORD, WORCESTER AND
CAMBRIDGE, MASS.; PROVIDENCE AND HOPE VALLEY, R. I.; INDIANAPOLIS,
IND.; SANFORD AND FUGUAY SPRINGS, N. C.; SUBSIDIARY, RADIART
CORP., CLEVELAND, OHIO.

Catalogs & Bulletins

ALIGNMENT EQUIPMENT: 8-page booklet covering TV alignment equipment including equipment compatible for black and white or color. Available from Hickok Electrical Instrument Co., 10550 Dupont Ave., Cleveland 8, Ohio. (Ask for B9-1)

TRANSFORMER REPLACEMENT GUIDE: Six new Correct Replacement Flyback Transformers are interchangeable with the manufacturer's original equipment. Designed for use in leading receivers. Write for Triad Television Replacement Guide TV-55. Triad Transformer Corp., 4055 Redwood Ave., Venice, Calif. (Ask for No. B9-2)

TV ACCESSORIES: Bulletin describes signal accessories built with weather-proof, radiation - resistant cases equipped with bracket and metal strap. Send a layout of any prospect for a master TV system and request a system layout diagram utilizing "Masterline" units. Write to Blonder-Tongue Labs., Inc., 526-536 North Ave., Westfield, N.J. (Ask for B9-3)

INDOOR ANTENNAS: New bulletin on indoor antennas. Includes an antenna combined with a clock, a gold-anodized aluminum loop, and an antenna with a phasing bar and a 6-position switch. Distributed on request by Radio Merchandise Sales Inc., New York 62, N.Y. (Ask for B9-4)

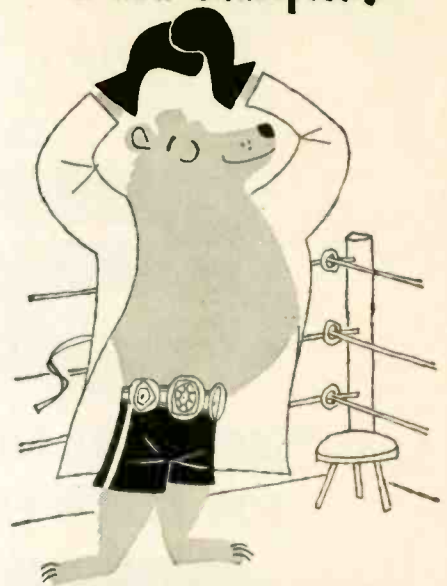
CARBON RESISTORS: Comprehensive data on characteristics, applications, etc. of 1/2 watt molded deposited carbon resistors is available by writing for Catalog Data Bulletin B-9 to International Resistance Co., 401 North Broad St., Philadelphia 8, Pa. (Ask for No. B9-5)

AUTO RADIO REPLACEMENT GUIDE: New catalog lists replacements for all model cars including 1955. It also features vibrator transformers, speaker outputs, and IF and RF transformers. Write for Guide No. 3 to the Merit Coil and Transformer Corp., 4427 North Clark St., Chicago, Ill. (Ask for No. B9-6)

PARTS AND ACCESSORIES: Catalog containing part and accessory descriptions, ordering and price information, technical data and display material. Catalog holders will receive supplements containing price changes. Copies are available through local Philco distributors. (Ask for No. B9-7)

RESISTANCE - NETWORK REPLACEMENTS: Standard resistors are recommended to replace just the section of defective resistance network or multi-section power resistors in which the failure has occurred. To select the proper resistance value, data sheets are available by writing to Clarostat Mfg. Co., Inc., Dover, N.H. (Ask for B9-8)

a new champion!



C-D's Cub

**tops in the
field of
molded tubular
capacitors**



- ★ Outperforms all other molded tubulars in humidity tests!
- ★ Stands up under temperatures up to 100°C.
- ★ You get more for your dollar with this premium tubular designed especially for replacement needs, with "better-than-the-original" performance!
- ★ Ask your C-D jobber about the special "Cub-Kit"!

For the name of your C-D distributor, see the yellow pages of your phone book. Write for Catalog to: Dept. S854, Cornell-Dubilier Electric Corp., South Plainfield, N. J.

CONSISTENTLY DEPENDABLE
**CORNELL-
DUBILIER**
CAPACITORS



There are more
C-D capacitors in
use today than any
other make.

PLANTS IN SD., PLAINFIELD, N. J.; NEW BEDFORD, WORCESTER
AND CAMBRIDGE, MASS.; PROVIDENCE AND HOPE VALLEY,
R. I.; INDIANAPOLIS, IND.; SANFORD AND FUGUAY SPRINGS,
N. C. SUBSIDIARY, RADIART CORP., CLEVELAND, OHIO

New Books

INTRODUCTION TO PHYSICS. By Frank M. Durbin. Published by Prentice-Hall, Inc., 70 Fifth Avenue, New York, N. Y. 780 pp Hard cover.

Departing somewhat from the usual order of things in a book of this type, the author has attempted to adapt the volume for more than one use. Although it is primarily intended as an introductory college-level course, there has been some adjustment in the presentation of mathematical considerations. Where trigonometry is used, it appears in the appendix. The main text attempts to treat its subjects fully without difficulty for the trigonometrically uninitiated. The first two chapters, in fact, consider mathematics, including some algebra, as it is applied to physics for the benefit of readers who do not feel entirely at home in this area. A good book for alert technicians who are curious about the broader background that lies behind the specific area of electronics.

PROBES. By Bruno Zucconi and Martin Clifford. Published by Gernsback Publications, Inc., 25 West Broadway, New York 7, N.Y. 224 pages. Paper cover. \$2.50.

The use of probes has become an integral part of test equipment techniques, extending the usefulness of various instruments. This book describes the construction of different types, methods for using them in measuring practical circuit functions, and how to interpret resulting meter and scope readings.

Ten chapters are devoted to the following probe types: crystal demodulator, voltage-doubler, balanced, low capacitance, high-voltage, isolation, direct, specialized (such as audio tracer, capacitor tester, hum), chromatic and vacuum-tube. A separate section covers TV waveforms.

THE ARRL ANTENNA BOOK. 7th Edition. Prepared and published by the American Radio Relay League, West Hartford 7, Conn. 344 pages. Paper cover. \$2.00.

Over 400 illustrations and tables are included in this compilation of theoretical and practical data on antennas and related items. Although some of the text is specifically directed at the needs of radio amateurs, most of the book's information should be quite helpful to TV-electronic technicians.

SPECIALIZED AUTO RADIO MANUAL. Vol. 6-A. Prepared and published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N.Y. 212 pages. Paper cover. \$3.00

This sixth in the series dealing with auto radios covers Motorola sets made from 1948 through 1955. Detailed drawings and servicing information is given for models installed in some 15 different makes of vehicles.

SAVE

WITH THE NEW



ERIE

DISC and GP CERAMICON

Kits

HERE'S WHAT YOU GET

- ① 100 High Stability ERIE Disc or Tubular Ceramicons
- ② 18 Popular Values
- ③ Handy, Convenient 18 Section Plastic Storage Case
- ④ Exceptional Value

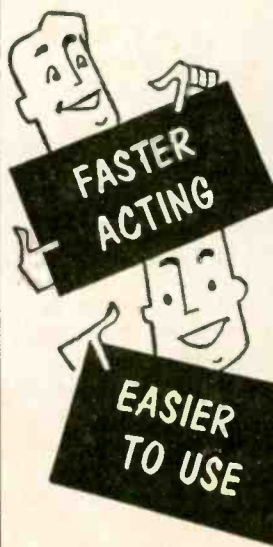
HERE'S WHAT YOU SAVE

	REGULAR PRICE
100 ERIE Disc or Tubular Ceramicons . . .	\$15.00
18 Section Plastic Case . . .	1.75
Total Value	\$16.75
YOU PAY	\$10.65
YOU SAVE	\$ 6.10

ORDER NOW
From Your
ERIE
DISTRIBUTOR

ERIE ELECTRONICS DISTRIBUTOR DIVISION
ERIE RESISTOR CORPORATION
Main Offices: ERIE, PA.
Factories: ERIE, PA. • LONDON, ENGLAND • TRENTON, ONTARIO

KESTER



Absolutely non-corrosive and non-conductive, KESTER "RESIN-FIVE" CORE SOLDER contains an activated type of resin that gives you that fast, positive action on all your jobs . . . including the most difficult.



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

SOLDER

INTERNATIONAL'S

NEW

**TV RECTIFIER
REPLACEMENT**

**BONUS
PACK!**



FREE!

NYLON TV TOOL

With every pack of 4 TV
Selenium Replacement Rectifiers...
A PAIR and a SPARE PAIR!

You can't miss with International's New "BONUS PACK"! You'll get the *best* in TV replacement rectifiers. Each BONUS PACK contains a pair for immediate use, and a spare pair for your next job—PLUS a Nylon TV Alignment Tool worth \$1.00—ABSOLUTELY FREE!

SPECIFY INTERNATIONAL RECTIFIERS for long, dependable performance—the Widest Range in the Industry! Best for you... Best for your service customers!



Ask your distributor
for details about
"Bonus Pack" today!

**International
Rectifier**

CORPORATION

1521 East Grand Avenue, El Segundo, California • DRegion 8-6281
IN CANADA: Atlas Radio Corp., 50 Wingold Ave. W., Toronto, Ontario

**WORLD'S LARGEST SUPPLIER
OF INDUSTRIAL METALLIC RECTIFIERS**

Tube Characteristics

(Continued from page 31)

etc. It can be stimulated by poor chassis ventilation; increase in grid resistance; and excessive filament voltage.

Input Capacitance

Technicians who have tried to align video i-f stages in some of the earlier-make TV receivers will no doubt remember how disconcerted they were when the response curve changed with the contrast control setting. (Reference is made to sets where the contrast control was in the video i-f stages.) The reason for such changes is that the input capacitance of an amplifier alters when its gain or transconductance is varied. This capacitance is made up in part of the interelectrode, stray and other capacitance present in the input circuit. When it changes, the tuning of the circuit changes with it.

We can start our explanation of this effect by considering Fig. 5. Let's call the signal voltage applied to the grid of the tube E_g ; the amplified signal voltage developed in the plate circuit is E_p . The polarity of E_p and E_g are opposite, due to the inverting action of the tube.

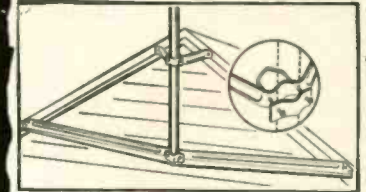
Look at C_{gp} . This is the grid-to-plate capacitance. Note that plate signal current feeds back through C_{gp} , as well as passing through the plate load. Both E_g and E_p feed current through C_{gp} . As far as C_{gp} is concerned, E_g and E_p act like two generators in series.

We are concerned with the capacitance of the input circuit, or the reactance offered by this capacitance. This reactance—let's call it X_g —is equal to the grid voltage, E_g , divided by I_g , the current that flows through the grid circuit; or $X_g = E_g/I_g$ (just as $R = E/I$). The amplitude of I_g depends on the amount of plate signal current flowing in the tube, since this current divides between the plate and grid circuits. Now, as I_g becomes larger, X_g will become smaller. In other words, the input capacitive reactance will go down, as the signal current goes up. Effectively then, the input capacitance goes up (since the smaller the capacitive reactance present, the larger is the capacitance responsible for it).

The effect just described is known as the *Miller Effect*. It explains why
(Continued on page 70)

ask the
"Man-on-the-Roof"
why he prefers

South River



EAVE MOUNT Model EM-48

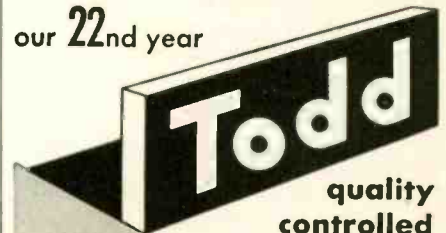
One piece construction of heavy gauge, embossed steel. Hot-Dip galvanized to prevent corrosion. Unique design of lower bracket gives extra strength and rigidity. Extended lip supports mast during installation. 48" spread permits generous spacing between brackets for excellent mechanical mast support. Both 3" embossed steel upper bracket and lower bracket have new "reversed" U bolt and clamp feature for Spintite fastening. Also available with 60" spreads: EM-60.

Write for 1955 Catalog

SOUTH RIVER
METAL PRODUCTS CO., INC.
South River, New Jersey

pioneer &
outstanding
producer of
finest line
of antenna
mounts

our 22nd year



quality
controlled

**REPLACEMENTS
FOR TELEVISION**

all makes and models

YOKES

FLYBACKS

TRANSFORMERS

authentic

**RCA AND
MOTOROLA**

new - complete
replacement parts

TODD-TRAN CORP.
MOUNT VERNON, NEW YORK

Sunspot Activity

(Continued from page 33)

predictable. Experience to date shows it may be from a few seconds to many hours. When the interfering station does start to die away, the whole process repeats itself in reverse. The interference usually recedes faster than it comes, but not always.

What Can Be Done?

When the TV set owner sees interference like this he of course thinks there is something wrong with his receiver. He calls you and expects action. How much can be done depends upon the location, the nature of the opening, and the details of the installation.

In any event, no matter how much can be done physically, the technician should explain that it is Mother Nature who is primarily responsible and, even if the effects can be minimized in this case, there is always a chance of similar interference which cannot be eliminated but must be "waited out."

The next thing is to consider the directions of the normally-received stations and the interfering stations, and the relative directivity of the receiving antenna. If the normal and interfering stations are in different directions, increase in sharpness of directivity of the antenna will help. Unfortunately, skip signals, especially sporadic E and F signals, come in at such a high angle that they can sometimes come in over reflectors. Large screen-reflectors are best. Naturally, the improvement possible depends on what kind of antenna is already being used. Simple dipoles and indoor "rabbit ears" have such little directivity that considerable improvement can be effected.

Other Benefits

Except for the obvious cases of antenna improvement, it is questionable whether much time should be spent on elaborate systems to eliminate interference of this nature. The skip condition may be over by the time you finish and the customer might be unhappy thinking about the cost during the length of time before the next similar "opening" occurs. However, the other benefits of a better antenna system might combine with the advantage in this respect to sell a good

installation. It is certainly a valid additional argument in those many cases where the customer is just about getting by with an antenna several years old, which should be replaced with a more up-to-date and sturdier unit in any case. •

While antenna manufacturers frequently publicize high front-to-back or front-to-side ratios and sharply directive horizontal sensitivity patterns—all important in helping to overcome "sunspot" interference—there are many antennas that also have excellent vertical

sensitivity characteristics. If sporadic E interference becomes a serious problem over the next few months and years, it would be helpful to see more of the vertical patterns in manufacturers' data sheets. As the author suggests, these "skip" waves are generally not in the form of standard, horizontally polarized TV signals. Incidentally the editor, whose home is located in a primary-reception metropolitan area, had the best part of a favorite TV show on a low-band channel ruined by sporadic E only a couple of weeks ago! —Ed.



WINEGARD
Pixies **MEAN**
Profits **FOR YOU!**

TODAY'S TOP ANTENNA VALUE . . . BY FAR!
3 great WINEGARD PIXIE models. Pixie POWERHOUSE (Illustrated) perfect for weak signal areas. Pixie PRINCESS designed for normal fringe areas and Pixie PAL for close-in suburbanites.

NEW TWIN-LOCK HARDWARE with STAINLESS STEEL SNAPS



Here it is! The finest, lightest and yet strongest hardware you'll find on any TV antenna, regardless of price. No nuts or bolts to tighten—elements simply lock in place automatically.

FABULOUS NEW DICON ELEMENT! Another WINEGARD Original! A composite of the best features of both the conical and folded dipole in one simple element! The Dicon is one element mechanically . . . three elements electrically!

ULTRA-SENSITIVE ELECTRO-LENS FOCUSING* Both Pixie POWERHOUSE and PRINCESS antennas have exclusive Winegard Electro-Lens Focusing! It absorbs the full signal, intensifies it and focuses it on the driven element for brilliant, clear-as-life pictures.

*Patent No. 2700105

Originals by WINEGARD
List prices: POWERHOUSE (LP-5) \$19.95; PRINCESS (L-5) \$13.65; PAL (P-5) \$8.85.

Special PIXIE PROMOTION PROGRAM until Jan. 1. FREE PIXIE BUCKS.

ASK YOUR JOBBER OR MAIL COUPON TODAY

WINEGARD COMPANY
3000 Scotten Boulevard, Burlington, Iowa

Please Rush Detailed Technical Information On Operation Of Dicon Element

Please Send Information On How I Can Get Pixie Bucks

FIRM NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

SIGNATURE _____

NEW!

A more durable
easier-to-use
SERVICEMAN'S
CARRYING CASE

- more durable
- more compact

TNT
TUBE'N TOOL
TOTE BOX



Holds As Many As 250 Tubes and a Complete Set of Tools!

"Terrific", say radio-TV servicemen. "Best-designed carrier ever made!" Extra rugged, extra roomy — holds all your tools and up to 250 tubes, standing upright for easy identification. Removable tray with compartment and side pockets keep everything in view. A real time and temper saver, built by men in the know, and priced to save you money. Model 455. 19 3/4" x 9 3/4" x 14 1/4".



Really Rugged!

- Supports 350 lbs.
- Tough 1/4" plywood throughout
- Leatherette lined and covered
- Tough, top-grain cowhide corners
- Metal bottom studs
- Lifetime handle
- Positive draw bolt lock and key

Manufacturers of
LEATHER GOODS
Since 1926

Write for information, prices, catalog sheets on complete line of TNT Tote Boxes.

MASTRA COMPANY
2032 Euclid Ave., Cleveland 15, Ohio

Tube Characteristics

(Continued from page 68)

the input capacitance of a tube increases when its amplification goes up, increasing the plate signal current.

An unbypassed cathode resistor is inserted in one or more video i-f stages, to counteract the changes in input capacitance produced by the Miller Effect. This resistor, by introducing degeneration, reduces the signal current fed back from plate to grid, and thus increases X_g (in the formula $X_g = E_g / I_g$.) The input capacitance is thus effectively reduced, decreasing the effect of variations in this capacitance on the tuned circuit with which it is in parallel.

You and the Law

(Continued from page 35)

Massachusetts, among others.

The second answer is a reaction to the extremes of the first and is found in New York, Oregon and Tennessee. Again you are obliged to return to the minor everything he paid, but against that the minor is charged with the reasonable value of the use and depreciation of the article while he had it.

(Part 2 will appear in a forthcoming issue.)

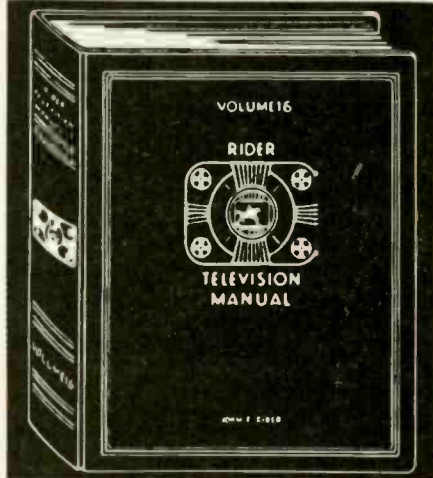
Jensen TV SPEAKER

"TV Duette" two-way hi-fi speaker replaces side mounted speaker resulting in improved realism because the sound coming now from the front appears to be "picture centered." DU-500, with compression-driver horn-loaded "tweeter" and special 6 x 9 oval



"woofer," retails at \$82.50 or \$85.50. DU-400, at \$49.50, has a direct radiator "tweeter." Both models will accommodate virtually all table sets on the market. Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.—TECHNICIAN (Ask for No. 9-10)

COMING IN SEPTEMBER



RIDER'S TV 16!

COMPLETELY CURRENT
WITH RECEIVER PRODUCTION
... INCLUDING LATEST
21" COLOR TVI

LIMITED PRINTING—

tell your jobber to
reserve your copy now!

only \$24.

COMING IN SEPTEMBER

RIDER'S AUTO RADIO MANUAL, VOL. 1

Includes all factory-installed auto radios and custom built auto radios made between 1948 and 1955 for installation and replacement on all cars and trucks. Complete with schematics, voltages, alignment, pictorial views, dial stringing, noise suppression, tube layout, parts lists, etc.

only \$21.50

QUANTITY LIMITED—ORDER NOW!

INTRODUCING YOUR NEW PROFIT MAKER

SAVE SERVICE TIME SELL MORE TUBES

MODEL GCT-5

SECO

GRID CIRCUIT TUBE TESTER

\$29.95 Slightly higher West

Now quickly and accurately detect "positive grid" conditions in amplifier tubes used in circuits employing a high value of grid return resistance. EXCLUSIVE!



"HARD TO FIND" TV TUBE FAULTS LOCATED FAST!

- Poor picture contrast
- Grainy picture
- Twisting, bending or pulling of the picture
- AGC, RF, IF and Sync. Group tube faults
- Vertical jitter or bounce
- Sync. Buzz in the sound
- Any or all symptoms caused by sync. pulse compression.

Stop guessing and substitution checking, test and sell tubes with conviction on the first call, avoid embarrassing and costly callbacks.

Filament Selector Switch accommodates all the latest tubes for TV and INDUSTRIAL uses.



Another Seco Exclusive!
FLY BACK INTERVAL & INDUCTANCE ANALYZER

Checks horizontal circuits without disconnecting!

For specialized applications to meet your specific need, contact:



SECO MFG. CO.
5015 Penn Ave. So.
Minneapolis, Minn.

**ADVERTISERS INDEX
SEPTEMBER 1955**

Aerovox Corporation	16
Alliance Manufacturing Co.	13
Allied Radio Corporation	64
Alproco, Inc.	53
American Phenolic Corp.	62
Antenna Specialists Co.	60
B&K Manufacturing Co.	61
Barry Electronics Corp.	59
C.B.S.-Hytron, Div. of Columbia Broadcasting System, Inc.	22
Centralab, A Div. of Globe-Union, Inc.	71
Channel Master Corp.	26
Clear Beam Antenna Corp.	65
Cornell-Dubilier Electric Corp.	2, 3, 66
Crown Controls Co., Inc.	17
DuMont Laboratories, Inc., Allen B.	4
Electronic Test Instrument Corp.	64
Erie Resistor Corp.	67
Federated T.V. Mart	64
Finney Co.	47
General Cement Mfg. Co.	23
General Electric Co.	9-12
Holloway Electronics Corp.	57
International Rectifier Corp.	68
International Resistance Co.	Cover 2
J.F.D. Manufacturing Co.	51
Jensen Industries, Inc.	65
Jensen Mfg. Co.	72
Jones & Laughlin Steel Corp.	54
Kester Solder Co.	67
Mallory & Co., Inc., P. R.	14
Mastra Co.	70
Philco Corp., Accessory Div.	48, 49
Pyramid Electric Co.	43
Radiart Corp.	2, 3
Radio Corp. of America	Cover 4
Radio Merchandise Sales, Inc.	18
Raytheon Mfg. Co.	45
Rider Publications	70
Sarkes Tarzian Inc. Rectifier Div.	8
Seco Mfg. Co.	71
South River Metal Products Co. Inc.	68
Sprague Products Co.	6, 7, Cover 3
Sylvania Electric Products, Inc.	24, 25
Technical Appliante Corp.	63
Tele-Test Instrument Corp.	65
Thompson Products Inc.	5
Todd-Tran Corp.	68
Trilo Mfg. Co.	20, 21
Tung-Sol Electric Inc.	19
Welco Mfg. Co.	15
Weller Electric Corp.	58
Winegard Co.	69

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

CIRCUIT DIGEST cumulative index will be published in a forthcoming issue. Last index begins on p. 44 of Aug.

Pay less

for the radio and TV controls you use most often

...get Centralab's extra quality



Centralab Blue Shaft Radiohms

Models B-60 and B-70 —popular 1/2- and 1-meg. audio taper units

only \$1 each
(with DPST switch \$1.50)
suggested list price

Smooth, moisture-resistant, phenolic-base resistor elements. Electronically checked for accuracy and minimum noise.

Phosphor-bronze, double-wiping contacts. Controlled mechanical pressure and positive contact insure long life, noiseless operation.

Universal, fluted-mill, full-length shafts, 3" from end of bushing.

Packaged singly and in kits of 5, 12, and 22 controls.

Let Centralab's low price save you money. Let Centralab's exacting quality standards help eliminate call-backs. Stock up on B-60 and B-70 Blue Shaft Controls at your Centralab distributor.

Send coupon for free Centralab Catalog No. 29.

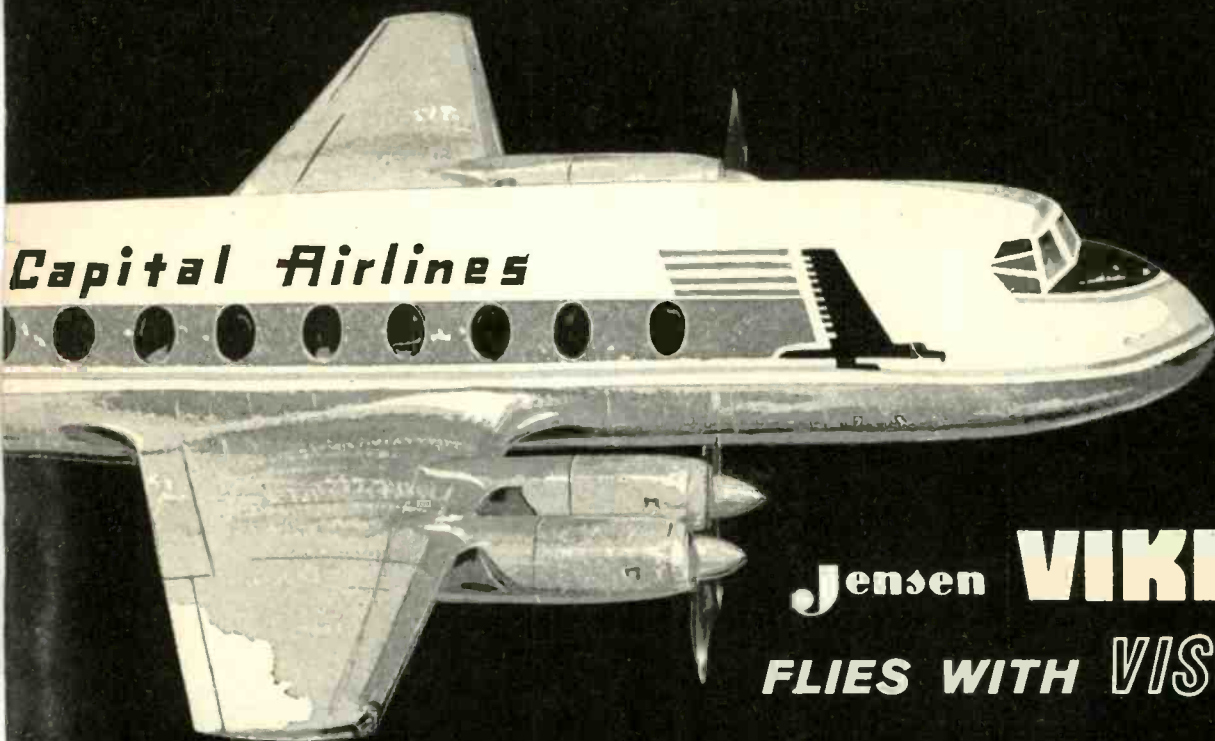
Centralab

Centralab
A Division of Globe-Union Inc.
9021 E. Keefe Avenue,
Milwaukee 1, Wisconsin

Send me Centralab Catalog No 29.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

B-4354



Jensen **VIKING**
FLIES WITH VISCOUNT

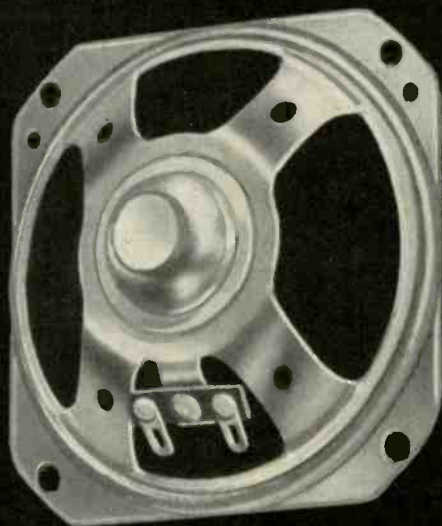
AN OUTSTANDING AVIATION ACHIEVEMENT!

With the purchase of forty Vickers Viscounts, Capital Airlines culminates an extended search for the type of aircraft to best serve its millions of loyal passengers. These outstanding four propeller turbine engine aircraft will add new and important pages to aviation history.

AN OUTSTANDING SPEAKER ACHIEVEMENT!

Jensen Manufacturing Company is proud of Capital's selection of Viking Speakers for the audio system of this new modern aircraft. This system makes use of 22 Jensen Viking 4J6 type speakers mounted in the train cabin walls between the windows on both sides of the cabin.

Leading parts distributors and service dealers know VIKING by Jensen as a stand-out economical replacement speaker line with compactness and efficient performance that universally qualifies VIKING for all radio and TV speaker replacements. And when you sell or install a VIKING, you get the same locked-in alignment, the same precision construction and the same dependability that led Capital to specify them for their Viscount fleet.



Jensen

MANUFACTURING COMPANY • 6601 S. Laramie • Chicago 38, Ill.

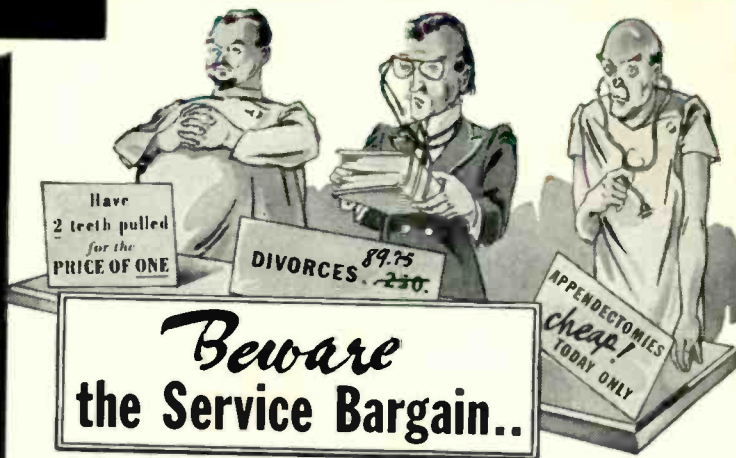
Division of the Muter Company

IN CANADA: Copper Wire Products, Ltd. Licensee

WORLD'S QUALITY STANDARD FOR MORE THAN A QUARTER CENTURY

capacitor replacements

FOR SETS OF THE MONTH



EMERSON CHASSIS 120220-D, 120239-D, F, 120251-D, 120254-D

Symbol Number	Rating μF@VVDC	Emerson Part No.	Sprague Replacement
C-62	250@150	9252581	R-2108
C-71	20@450/120@300/40@250/100@50	925256	R-2015
C-72	120+40+40@300/10@250	925259	R-2018

¹ Alternate part 925279 rated 120@150. Sprague replacement TVA-1422

GENERAL ELECTRIC CHASSIS "M" SERIES

Symbol Number	Rating μF@VVDC	General Electric Part Number	Sprague Replacement
C-401	300@150	RCE-218	R-1164
C-402	60@300/200+30@150	RCE-219	R-2110

SETCHELL-CARLSON MODEL P61

Symbol Number	Rating μF@VVDC	Setchell-Carlson Part Number	Sprague Replacement
C-30	5@150	—	TVA-1402
C-67	120+40+40@350	—	R-2111
C-80	100@50	—	TVA-1310

SPARTON CHASSIS 15V215

Symbol Number	Rating μF@VVDC	Sparton Part No.	Sprague Replacement
C-57	10@450/10@250/50@50	PA-4300-12	TVL-3749
C-81	5@50	PA4308-2	TVA-1303
C-130	200@200	PB40644-1	R-1646
C-131	140+10@300/200@150	PB40644-4	R-2112
C-132	200@150	PB40644-2	R-1646

WESTINGHOUSE CHASSIS

V2342, V2343, V2352, V2353

Symbol Number	Rating μF@VVDC	Westinghouse Part No.	Sprague Replacement
C-403A	160@350/60+10+4@300	V-15884-1	R-2113
C-421A			
C-507A			
C-511A			
C-409B	150+30+30@300/150@50	V-15885-1	R-2114
C-508B			
C-509B			
C-510B			
C-506	160@200	V-15329-1	R-2115

ZENITH CHASSIS 19X21, 19X22, 19X22Q

Symbol Number	Rating μF@VVDC	Zenith Part No.	Sprague Replacement
C-22	10@475/4@350/100@50	22-2546	R-2116
C-32	80+40+10@400/20@25	22-2547	R-2117

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

You'll never see your doctor advertise a special sale on appendectomies . . .
 You'll never see your lawyer announce cut-rates for divorce cases . . .
 You'll never see your dentist hold a "2-for-1" sale on extractions . . .
AND You'll never see the day when you can take your TV set in for a service "bargain" and be sure you're getting a square deal!

"Bargains" in home electronic service are as scarce as the proverbial hen's teeth! Here's why—

The expert service technician, just like other professional people, must undergo years of study and apprenticeship to learn the fundamentals of his skill. And a minimum investment of from \$3000 to \$6000 per shop technician is required for the necessary equipment to test today's highly complex sets. Finally, through manufacturer's training courses and his own technical journals, he must keep up with changes that are developing as fast as they ever did in medicine, law, or dentistry. Those best equipped to apply modern scientific methods are almost certain to be

most economical for you and definitely more satisfactory in the long run.

Unfortunately, as in any business, there will always be a few fly-by-night operators. But patients, clients, and TV set owners who recognize that you get only what you pay for, will never get gypped. "There just ARE no service bargains" . . . but there is GOOD SERVICE awaiting you at FAIR PRICES!

Harry Nathan
PRESIDENT

SPRAGUE PRODUCTS COMPANY
North Adams, Mass.

THIS FAMOUS SPRAGUE REPRINT AGAIN AVAILABLE!

Blank space on the bottom for your imprint.

- 1,000 only \$3 postpaid
- 10,000 or more only \$25 per 10,000 postpaid.

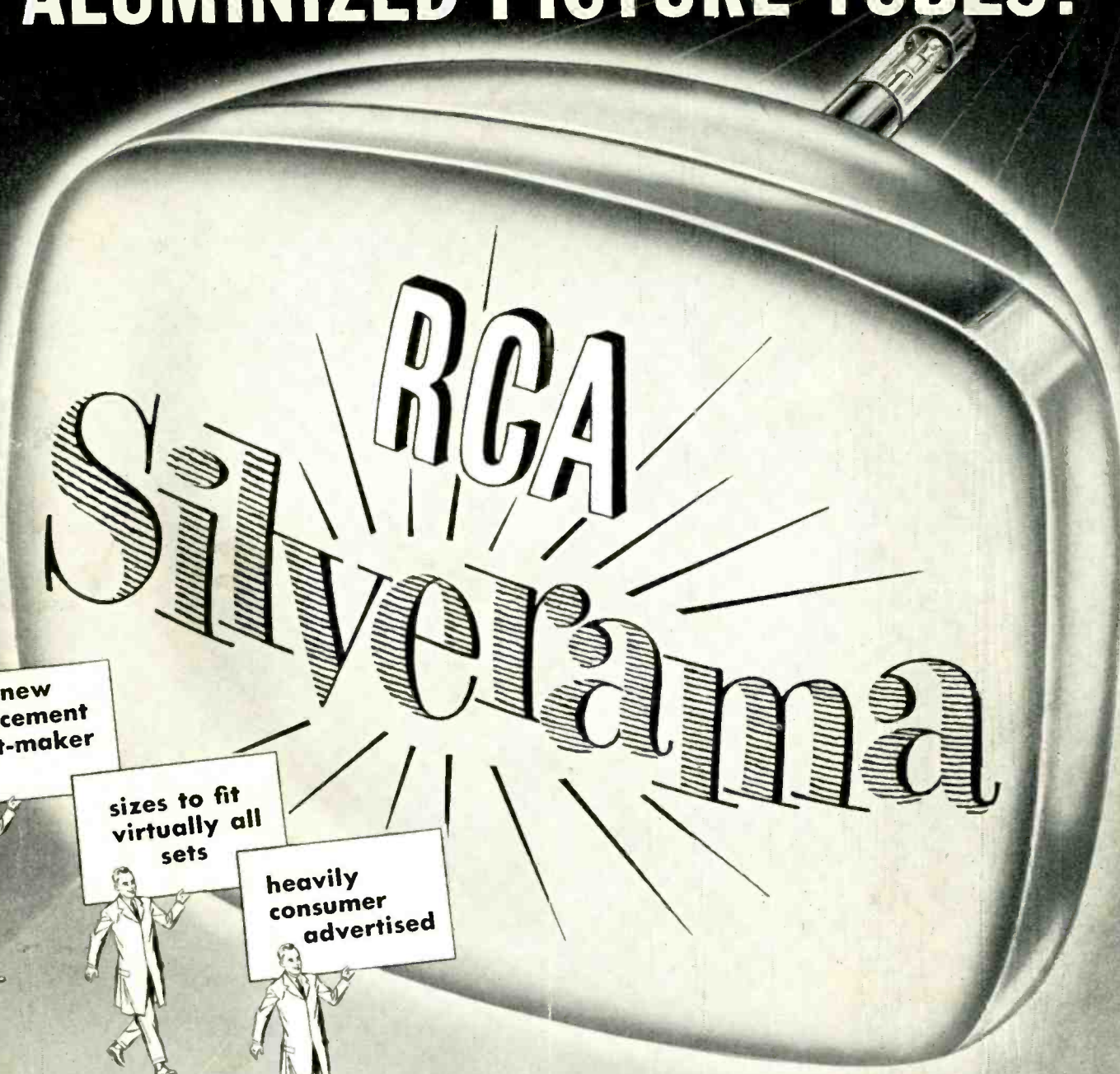
For immediate delivery on any quantity, send us your check or money order today!

DON'T BE VAGUE. . . INSIST ON

SPRAGUE

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

THE GREAT NEW NAME IN ALUMINIZED PICTURE TUBES!



RCA
Silverama

your new
replacement
profit-maker

sizes to fit
virtually all
sets

heavily
consumer
advertised

RCA "SILVERAMA" MEANS BRIGHTER, CLEARER, SHARPER TV PICTURES FOR YOUR CUSTOMERS—MORE REPLACEMENT BUSINESS, SALES AND PROFITS FOR YOU!

It's the great, new replacement line of RCA aluminized picture tubes and RCA is telling the world, your city and neighborhood about it. Radio & TV announcements, national magazines, direct mail, posters, streamers, counter cards and other powerful sales aids will bring the remarkable story of RCA "SILVERAMA" right into your customers' homes—bring customers into your store! Order RCA "Silverama" Aluminized Picture Tubes now. Your customers will ask for them. Get on board this new profit-maker!

SEE YOUR RCA TUBE DISTRIBUTOR TODAY FOR FULL DETAILS ON THE EXCITING RCA SILVERAMA WINDOW DISPLAY CONTEST FOR SERVICE DEALERS!



RADIO CORPORATION of AMERICA
TUBE DIVISION

HARRISON, N. J.

