

Burton Browning Advertising

## THERE'S ONLY ONE RIGHT WAY

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

**LITTELFUSE** Des Plaines, Ill.

... for more details circle 42 on last page

RCA—PIONEER OF COLOR TV—BRINGS YOU

ALL YOU  
NEED FOR

# COLOR-TV SERVICING



## RCA Color-Bar/Dot/ Crosshatch Generator

Low-cost, lightweight, portable instrument that provides all essential Color-TV test patterns. Simple to operate: only 3 controls. RF output leads connect directly to antenna terminals of receiver; no external sync leads required. Crystal-controlled signals assure rock-steady patterns, free from "jitter" and "crawl." Extra-wide-range chroma control. Generates:

- Color-bar pattern: ten bars of color, including R-Y, B-Y, G-Y, I and Q signals spaced at 30° phase intervals for checking phase and matrixing, and for automatic frequency and phase alignment. Permits accurate alignment of the "X" and "Z" demodulators which are used extensively in RCA Victor and many other makes of color TV receivers
- Crosshatch pattern: a grid-like pattern of thin sharp lines for adjusting vertical and horizontal linearity, raster size, and overscan
- Dot pattern: a pattern of small sized dots facilitating accurate color convergence adjustments

\$189.50\* with output cables.

## RCA 5-Inch Oscilloscope for Color-TV

A wideband scope excellent for checking colorburst signals and general troubleshooting of wideband color circuits and other electronic equipment. Multiscale calibrated graph screen makes measurement of peak-to-peak voltage as easy as with a VTVM.

- New 2-stage sync separator assures stable horizontal sweep lock-in on composite TV signals
  - Dual bandwidth: 4.5 Mc at 0.053 volt rms/in. sensitivity. 1.5 Mc at 0.018 volt rms/in. sensitivity
  - Continuously adjustable sweep frequency range: 10 cps to 100 Kc
  - 3-to-1 voltage-calibrated, frequency-compensated step attenuator for "V" amplifier
  - Simplified, semi-automatic voltage calibration for simultaneous voltage measurement and wave-shape display
  - Vertical-polarity reversal switch for "upright" or "inverted" trace display
- \$249.50\*, including direct/low capacitance probe and cable, ground cable, and insulated clip.

## RCA Television FM Sweep Generator

Specifically designed for visual alignment and troubleshooting of color and black-and-white TV receivers, and FM receivers. The RCA WR-69A has pre-set switch positions for all VHF TV channels, FM broadcast band, and TV video, chrominance, and IF frequencies. The WR-69A has these important features:

- IF/Video output frequency continuously tunable from 50 Kc to 50 Mc
  - Sweep-frequency bandwidth continuously adjustable from 50 Kc to 20 Mc on IF/Video and FM; 12 Mc on TV channels
  - Output level—0.1 volt or more
  - Attenuation range: TV channels, 60 db IF/Video, 70 db FM, 60 db
  - Return-trace blanking
  - Two adjustable bias voltages on front panel
- \$295.00\* including all necessary cables.

## RCA RF/VF/IF Marker Adder

Designed for use with a marker generator (such as RCA's WR-99A) and a sweep generator (such as RCA's WR-69A), this instrument is used for RF, IF, and VF sweep alignment in both color and black-and-white TV receivers. In visual alignment techniques, it eliminates distortion of sweep response pattern.

Important features:

- Choice of four different marker shapes provided by front panel switch for different types of sweep-response curves and for positive and negative sweep traces
- Provides very high-Q markers of high-amplitude and narrow bandwidth
- Complete front panel control of marker shape, marker amplitude, marker polarity, sweep amplitude, and sweep-trace polarity

\$74.50\* complete with cables.

## RCA Crystal-Calibrated Marker Generator

Supplies a fundamental frequency RF carrier of crystal accuracy for aligning and troubleshooting color and B&W TV receivers, FM receivers and other electronic equipment in the 19-260 Mc range. Combines functions of multiple-marker generator, re-broadcast transmitter, and heterodyne frequency meter.

- Highly stable output
- May be calibrated at 240 separate crystal check points—accurate calibration provided at 1-Mc and 10-Mc intervals
- Matched-impedance pad-type attenuator and double shielding of the oscillator provide effective attenuation of all frequencies
- Most-used IF and RF frequencies are specially indicated on the dial scale
- Sound and picture carrier markers available simultaneously

\$242.50\* complete with output cable and phone tip.

RCA ELECTRON TUBE DIVISION, Harrison, N. J.



The Most Trusted Name in Electronics

\*User Price (Optional)

**"Now Pitching for New York, No. 33..."**

*"The Savoy Lounge proudly presents..."*

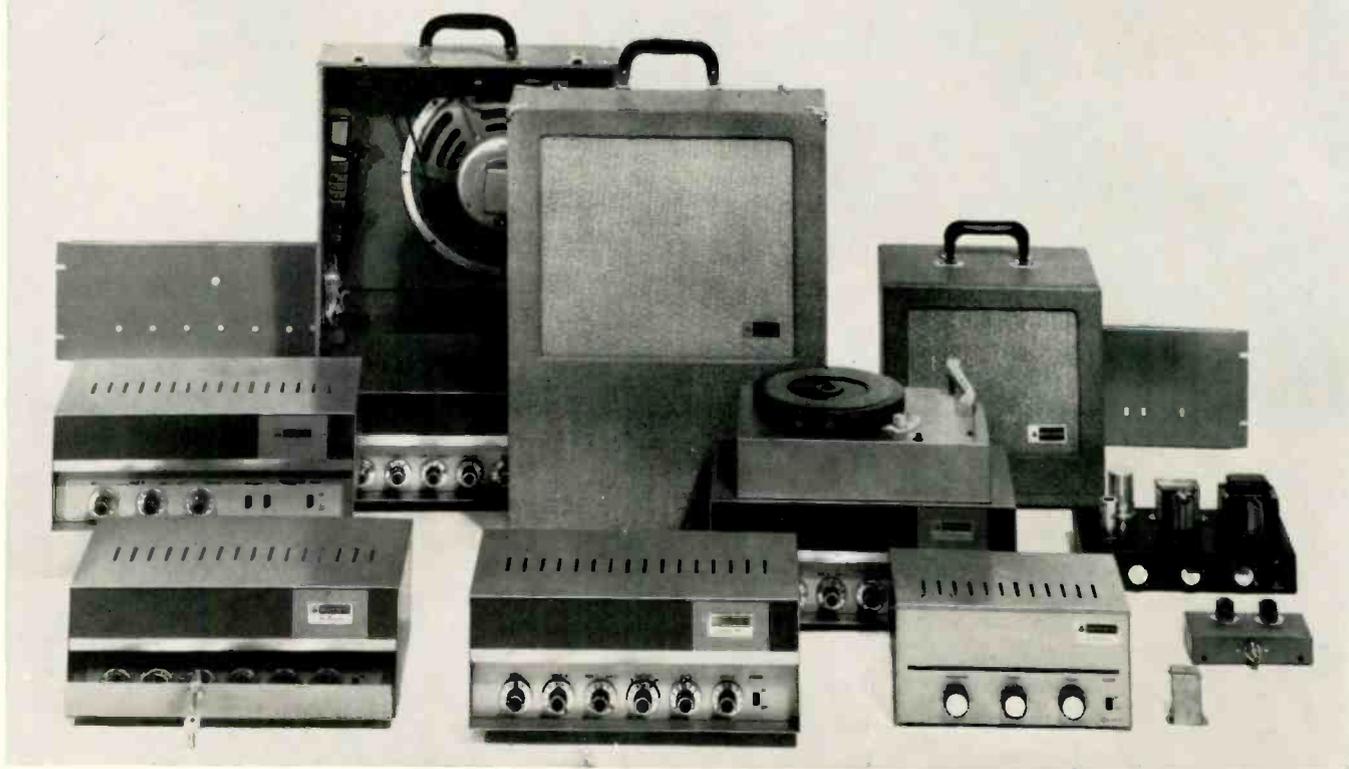


"My sermon for this morning deals with..."

**"WILL THE OWNER OF CAR 7Z-463 PLEASE..."**

*"FLIGHT 702 NOW LOADING AT GATE..."*

**"10...9...8...7...6..."**



## the Sounds of the Sixties Sound Best thru New Bogen Challenger "CHB" P.A. Systems

Versatility. Whether you need P.A. to function above a stadium roar... or in the neighborhood recreation hall, there's a new CHB to fit your need. Ranging in power from 10 to 100 watts, CHB amplifiers are adaptable for indoor, outdoor, portable or mobile use. **Features and Accessories:** 4-speed phono, fastens to amplifier top • tamper-proof, front locking plate • continuous-duty circuitry • remote controller • circuit protection against accidental speaker-line shorting... and many more, previously featured in the exclusive BOGEN Flex-Pak line. **Reliability.** BOGEN's 30-year leadership in sound craftsmanship is your extra guarantee of rugged, dependable performance with minimum maintenance. In business, industry or government... most P.A. is by BOGEN—pioneer of the most significant developments in P.A. Write for CHB Catalog #311.

**BOGEN-PRESTO**   
Desk ET-5 Paramus, N.J.—A Division of The Siegler Corporation

... for more details circle 17 on page 86

ELECTRONIC TECHNICIAN

# ELECTRONIC TECHNICIAN

WORLD'S LARGEST ELECTRONIC TRADE CIRCULATION

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May • 1962

Vol. 75 • No. 5

**FRONT COVER** The nation's electronic manufacturers will show their latest parts and equipment at the annual Electronic Parts Distributors Show this month (see p. 28). Also ET's annual directory lists names and addresses of manufacturers, schools, service associations, and technical societies in the electronic industry (see p. 58).

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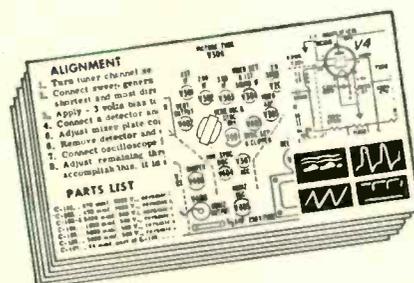


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## CIRCUIT DIGESTS



## PRECEDING BACK COVER

### IN THIS ISSUE

Complete Index of all "Circuit Digests" to date

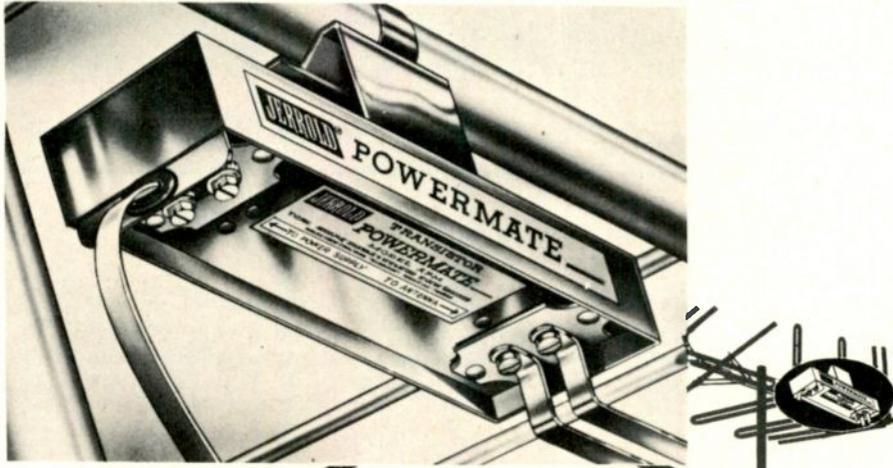
DELCO PONTIAC: Auto Radio Model 983687

DUMONT: TV Chassis 120591A, 120592B, 120593A

PHILCO: Transistor Radio Model T-63

RCA: Color TV CTC11

# Outperforms them all! Outsells them all!



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## TRANSISTOR POWERMATE PREAMPLIFIER

BY FAR THE BEST antenna preamplifier in the business—that's POWERMATE! On black-and-white, and where it *really counts*—on color TV—POWERMATE's superiority shows up across the country.

The better VSWR (impedance match), flat response, ultra-high gain, special broad-band neutralizing transformer, and better power-supply filtering—all add up to an outstanding product. No polarity problems . . . no call-backs . . . transistor protected from lightning-coupled surges . . . remote a-c power supply feeds 2 sets.

Step up to POWERMATE, and step up to a tremendous new profit opportunity. See your Jerrold distributor now.

Model APM-101 \$39.95 list, complete

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--- for more details circle 40 on page 86

### EDITOR'S MEMO



All is not well with FM stereo broadcasting. First of all, when a station starts broadcasting multiplex, power is greatly reduced for each channel. A station which may have been reaching out 60 miles with a solid signal, may find its prime range cut down to 30 miles. A weak signal, particularly one which has been bounced hither, thither and yon, can't help but produce distorted sound at the speaker.

If FM stereo broadcasting does not want a bad reputation, those front line electronic soldiers — hi-fi technicians and dealers — had better start moving.

The hi-fi dealer who sells multiplex equipment had better level with the customer. A good antenna capable of receiving FM is vitally necessary. And it must be installed according to local conditions. A random length of zip cord tucked behind the cabinet is hardly an answer.

An enticing, but misleading solution is to hook the FM set into the TV antenna line. This might work, but there are two big "ifs." It might work if that particular TV antenna has good response in the FM band. Some do. Some don't.

Then there is the directional problem. If the FM broadcast tower is in the same direction as the TV tower, or if there is a rotator in use, all may be well.

You can't count on such ideal conditions. In New York City, for example, all the TV broadcast antennas are in one place, atop the Empire State Building. However, the few FM stations in the area broadcasting stereo multiplex, are scattered about. So people living near New York City may not have too much of a signal strength problem, but they do have a tricky directional problem.

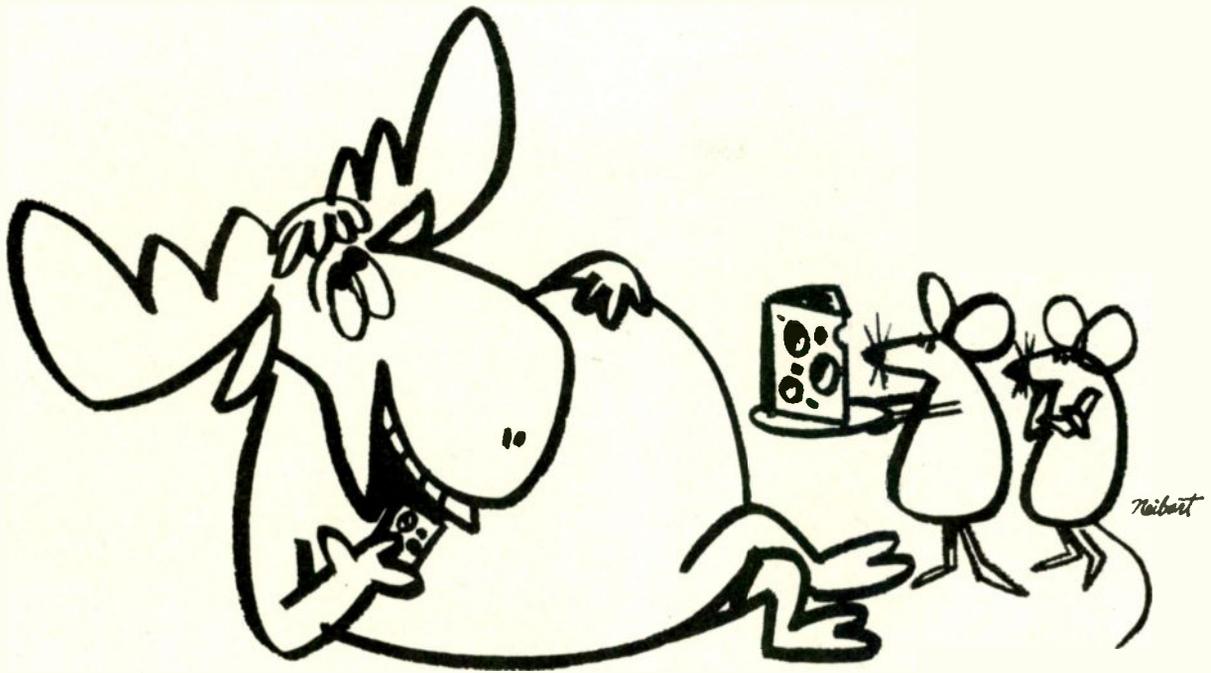
There are 67 FM stations now broadcasting stereo, and in a year, the total should climb to about 250 to 300.

You will recall how for want of a nail a war was lost. Well, for want of a good antenna system, decent stereo reception can also be lost.

The solution: a good high gain directional FM antenna, broadbanded to cover 88 to 108 mc. In some cases a rotator may be required. In other situations a mast-mounted or set-mounted booster may be needed for decent reception.

*Al Forman*

ELECTRONIC TECHNICIAN



## The Moose and The Mice

(A fable for Service Technicians)

ONCE upon a time, there was a Moose who liked cheese.

But, being a Moose, he had a hard time getting it. A Moose can't sneak into houses, or stores, or cheese factories. So the poor Moose went cheese-hungry until, one day, he had a brilliant idea.

"Mice can get cheese with the greatest of ease," he said to himself. "Perhaps I can get some mice to help me." So off he went to the nearest Mouse colony.

"Look, Mice," he said. "I've come to do you a favor. I want to be your protector against cats and foxes and any other varmints that trouble you."

The Mice were interested. "But what do you want in return?" they asked.

"Cheese!" said the Moose. "You can pay for my services in cheese."

"Cheese! That's a breeze!" cried the Mice. "Go ahead; start protecting." So the Moose did.

He hung around the Mouse colony and whenever a cat or a fox or a weasel appeared, the Moose ran him half-way out of the county. The Mice were grateful and happy, and they paid off

the Moose with huge quantities of the finest Cheddar and Roquefort and Gorgonzola. The Moose ate and ate, and grew and grew, and before long he was so fat and lazy that all he wanted to do was to eat and sleep. Naturally, his protecting went to pot.

The Mice began to complain. "We're your customers," they protested, "but you treat us like bill collectors. Get on the job and give us some service!"

The Moose snorted disdainfully. "You need me," he told them. "I'm the Big Wheel in these woods. You're lucky to be my customers!"

"Oh, yeah!" cried the Mice. "Don't try to be a big deal when you're full of cheese. We're taking our business elsewhere!"

So the Moose was left without a market. To get cheese, he had to take employment with a cheese merchant, who sawed off his antlers to make him look like a horse and put him to work pulling a cheese wagon. And, instead of getting prime ripe cheese, he had to be satisfied with the rinds and scrapings of cheeses that had spoiled.

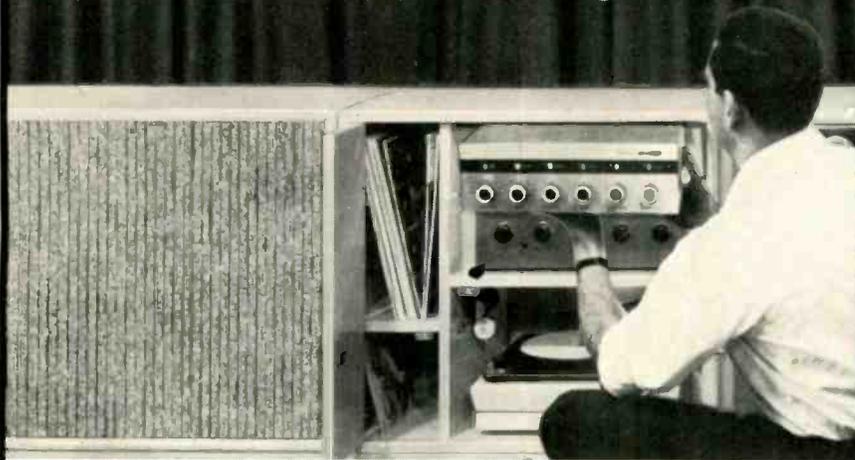
MORAL: It's all right to grow big provided your head doesn't!

In today's complex electronics industry, a company must be big! For only bigness—in research, production, and distribution—can bring you the technical services you need. But bigness hasn't gone to our heads. We haven't lost the personal touch that helped us grow. Close attention to your needs is still primary with us.



WORLD'S LARGEST MANUFACTURER OF CAPACITORS

# For Big Profits Doing This...



## ...Use These:

Whether it's hi-fi in the home, or CB in car, boat, truck, or taxi, custom installation jobs jump into the big-profit category when you deliver high quality at low cost.

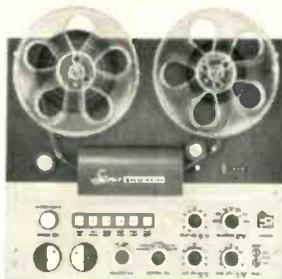
And especially with EICO kits, which average 40% less than our own, low, wired prices. Wire 'em up yourself and pocket the difference—with your customer's blessing, because if you build the components yourself, it's custom-made all the way through!

But kit or wired, EICO's all-out, no-compromise engineering, EICO's strikingly dramatic beauty, and EICO's fantastically low prices provide all the ingredients necessary for big profits on custom jobs. To put it simply: *You Profit from EICO Excellence.*



Deluxe Citizens Band Transceivers

	Kit	Wired
# 770: 117 VAC only	\$79.95	\$109.95
# 771: 117 VAC and 6 VDC	89.95	119.95
# 772: 117 VAC and 12 VDC	89.95	119.95



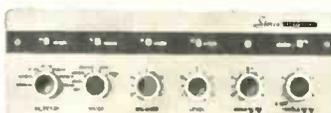
**NEW TRANSISTORIZED  
STEREO/MONO 4-TRACK  
TAPE DECK RP100**

Semikit \$299.95    Wired \$399.95  
Luggage-type Carrying Case \$29.95  
Standard 19-inch Rack Mount \$9.95  
(An exclusive EICO product, designed and manufactured in U.S.A. Pat. Pend.)



**FM/AM STEREO TUNER ST96**

Kit \$89.95    Wired \$129.95  
Inc. FET



**70-WATT INTEGRATED  
STEREO AMPLIFIER ST70**

Kit \$94.95    Wired \$149.95

**40-WATT INTEGRATED  
STEREO AMPLIFIER ST40**

Kit \$79.95    Wired \$129.95

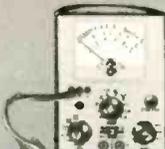


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AUTODAPTOR  
MX99 (Pat. Pend.)**  
Kit \$39.95  
Wired \$64.95  
Cover Optional

Rely on EICO Excellence for your test equipment too:



**AC VTVM &  
AMPLIFIER  
#250**  
Kit \$49.95  
Wired \$79.95



**TRANSISTOR  
AND CIRCUIT  
TESTER #680**  
Kit \$25.95  
Wired \$39.95



**IN-CIRCUIT  
CAPACITOR  
TESTER #955**  
Kit \$19.95  
Wired \$39.95

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ADD 5% IN THE WEST

For complete catalog of over 106 EICO kits and wired units—hi-fi, test equipment, citizens radio, ham gear—plus name of nearest distributor, write to dept. ET-5, Elco Electronic Instrument Co., Inc., 3300 N. Blvd., L.I.C. 1, N.Y. Export Dept. Roburn Agencies Inc., 431 Greenwich St., New York 13, N.Y.

... for more details circle 25 on page 86

## LETTERS TO THE EDITOR

### Phantom Model Radio

Editor, ELECTRONIC TECHNICIAN:

I read with interest your article under shop hints entitled "Prevent Locking of Clock Radio Dial" on page 42 of your January 1962 issue. This article mentions a General Electric clock radio Model F-22-100. We have never manufactured a Model F-22-100. From what Mr. Davidson said, and the information obtained from the picture, this condition happened to our Model C415. Instructions which we issued March 20, 1958 stated that the problem encountered with this Model could be solved by winding Permacel #P64 black tape tightly around the fishpaper holder, approximately 1/2 inch below pilot light receptacle.

R. J. deLAUBELL

Technical Publications  
Product Service  
General Electric  
Bridgeport, Conn.

### Back Patter

Editor, ELECTRONIC TECHNICIAN:

Our entire group commends you on your excellent publication. Your articles are followed regularly. The schematics are well appreciated and the format of getting specialized information on products is right down our alley.

JOSEPH J. PAPOVICH

Allied Electronic Technicians Assn.  
Gloucester, N. J.

### Need Press Stretcher

Editor, ELECTRONIC TECHNICIAN:

What is happening to the size of ELECTRONIC TECHNICIAN? My copy of the November 1961 issue was 1/4 inch shorter in the vertical dimension... My February 1962 issue is also shorter than the norm...

HORACE D. WESTBROOKS

Griffin, Ga.

• We regret the 1/4 inch smaller size but we are printing on a different press which requires a smaller size.—Ed.

### Circuit Digests

Editor, ELECTRONIC TECHNICIAN:

I have been a subscriber to ELECTRONIC TECHNICIAN for several years and have

ELECTRONIC TECHNICIAN

**MORE SERVICE MEN  
USE CLAROSTAT  
WIRE-WOUND CONTROLS  
THAN ALL OTHERS  
COMBINED BECAUSE...**



It's a fact . . . More Clarostat wire-wound controls are used by servicemen than all others combined! For over forty years the built-in quality of Clarostat wire-wound controls has proved itself to the satisfaction of servicemen and their customers alike.

Join the crowd. When you need a wire-wound control replacement, insist on Clarostat in the green box—your assurance that you're getting the control that works best.

**QUALITY  
COMES  
FIRST  
WITH**

- ★ Series A43 and A43S 2-watt controls. With or without switch. Pick-A-Shaft convenience.
- ★ Series A58 and A58S 3-watt controls. With or without switch. Pick-A-Shaft convenience.
- ★ Series A10 and A10S 4-watt controls. With or without switch. Pick-A-Shaft convenience.
- ★ Series 39 2-watt "Humdinger" for screwdriver adjustment.

DISTRIBUTOR SALES DIVISION

 **CLAROSTAT**

CLAROSTAT MFG. CO., INC. DOVER, NEW HAMPSHIRE

--- for more details circle 22 on page 86



**STOCK**—Hang it on the wall, stand it on a shelf, slip it into your caddy. Cartridge model number is always visible for quick identification.

**SAVE**—Save money on purchase of any 6 SONOTONE cartridges—save time by always having the right replacements.

**SERVICE**—You always have the right replacement to service virtually every record player on the market.

**SELL**—In your shop, an eye-compelling display (unique bonnet fits over 6-Pak to remind your walk-in customers to modernize their record players). In your caddy—a variety of cartridges for nearly every replacement.

Every time you buy 6 SONOTONE cartridges from your distributor, they come in the new attractive 6-Pak cartridge sleeve. You can select any 6 SONOTONE cartridges, or one of three pre-selected 6-Paks which include the most needed cartridges for the most often faced replacement situations.

- **STEREO 6-PAK**—covers nearly every stereo replacement or conversion. Six stereo cartridges from the audiophile's favorite, the 9T, to the budget-priced stereo crystal cartridge, the 12T. Consists of models: 9T, 8T-A, 16T, 18T, 10T and 12T.
- **STEREO/MONO 6-PAK**—covers most stereo or mono replacement needs. Consists of 3 stereo ceramics models 8T-A, 9T, 16T; and 3 mono ceramics: 1P, 2T, 3T.
- **MONOPHONIC 6-PAK**—covers virtually all most called for monophonic replacements. "LB" denotes "less bracket" for slim tonearms. Consists of; 1P, two 2T's, 2T-LB, 3T and 3T-LB.

The 6-Pak is just another way that SONOTONE simplifies your inventory and makes it easier to sell cartridges. Order a SONOTONE 6-Pak today at your parts distributor.

**FREE:** The new SONOTONE cartridge cross-reference chart catalog is available at your distributor, or write: Dept. ET-5.

**SONOTONE® CORPORATION** ELMSFORD, NEW YORK  
ELECTRONIC APPLICATIONS DIVISION In Canada: Atlas Radio Corp., Ltd. Toronto  
Cartridges • Speakers • Tape Heads • Mikes • Electronic Tubes • Batteries • Hearing Aids

## LETTERS TO THE EDITOR

found valuable material within its covers. Of special interest are the circuit digests included in each issue. I have a complete series of these digests except for numbers 137 through 424. Would it be possible to obtain these missing numbers without purchasing the magazines in which they were enclosed? If so, what would be the cost . . . ? Would appreciate your assistance . . .

L. L. VAUGHN

Torrance, Calif.

• *Back numbers are available for 50 cents per section as published in any month. Order the Circuits you require from Herb Hoene, Circulation Manager, ELECTRONIC TECHNICIAN, 1 East First Street, Duluth 2, Minnesota.—Ed.*

### On Louisiana Report

Editor, ELECTRONIC TECHNICIAN:

The report of Louisiana Licensing in the February issue is very good. Even though the 20 percent response is nearly balanced and in favor of licensing, it probably represents mainly both extremes of opinion. The response was somewhat above normal for a survey and does reveal three great truths that should shock the 80 percent silent "voters" out of their apathy.

The three truths are: first, the lack of concern that so many show on a subject of vital importance to their livelihood. Second, how poorly informed many are as revealed by the contrary-to-fact sample statements. Third, it shows the magnitude of the task our board and the associations have ahead of them before the majority of technicians achieve competent status as true professionals.

We request your written authorization to mention the survey report in an article that may be published in our TESA of the South news.

I appreciate and enjoy with profit your publication, of which I have been a subscriber for a long time. It is hoped that it will continue to serve our branch of the electronics industry in a professional manner, and never reduce to a novice publication.

HERBERT EDELEN, JR.

NATESA Director, TESA  
Shreveport, La.

• *If you plan to reprint a sizeable portion of the study, you have our permission to do so provided the following standard credit line accompanies the reprint: Reprinted from ELECTRONIC TECHNICIAN, February 1962. Copyright, Ojibway Press, Inc., 1 East First Street, Duluth 2, Minnesota.—Ed.*

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# **NEW POWER**

**in Westinghouse  
tubes!**



**NEW PROFITS TOO, TURN PAGE FOR DETAILS**

**PEEL OFF  
THE MOST  
EXCITING  
IDEA IN   
PICTURE TUBE  
PROTECTION!**

**GLAS-GARD**

**Scratch  
Protection**

*Exclusive with...*

**Westinghouse<sup>®</sup>**

**GOLD \* STAR**

**PICTURE TUBES**

GLAS-GARD

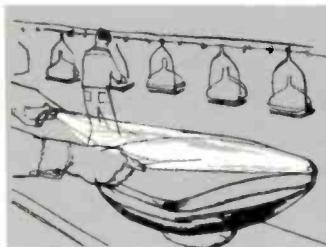
Scratch  
Protection

Exclusive with...

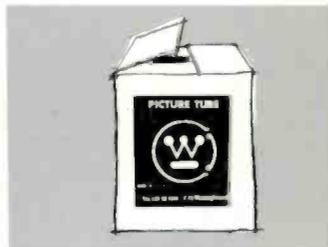
Westinghouse<sup>™</sup>

GOLD \* STAR

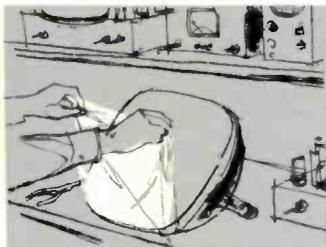
PICTURE TUBES



Glas-Gard Film, the industry's biggest selling plus, goes on at the factory. It's a sales story no other tube can match. Make the most of it. Here's what it does:



Glas-Gard, a tough film, protects the tube from being scratched in shipment, shields it from the chemical action sometimes caused by packing materials.



Glas-Gard keeps the tube factory-fresh to the moment of installation. For more on innovations offered in the 1962 Westinghouse Marketing Program, turn page.



Westinghouse

# The New Westinghouse

# MARKETING CONCEPT

## for electronic tubes

which has recently been inaugurated takes on new elements, greater vitality, more benefits in 1962. It is based on sound business principles and a mutually profitable manufacturer-distributor relationship. Some of the major features and services of the new marketing concept are:

### 1. Outstanding Products.

As the culmination of an intensified product development program over the last several years, Westinghouse offers new products and highest quality products in all types: power tubes, cathode ray, and entertainment tubes.

### 2. Highest profit margins.

Westinghouse tube production facilities have no peer in craftsmanship and manufacturing skill. This results in exceptionally fine product quality—and, together with competitive product cost ratios—affords the highest distributor profit margins on a continuing basis. This is the basic value distributors will find in the Westinghouse franchise.

### 3. New packaging.

The bold, modern design of Westinghouse tube cartons has tremendous visual impact. Worked out in black, gold and white, it symbolizes the advanced engineering and careful quality control that produced the fine tube inside.

### 4. The ultimate in financing plans.

Here, at last, is a plan that recognizes the distributor's independence as well as his need for support. With it, a financially responsible distributor can buy Westinghouse tubes on a flexible line of credit, get the help he wants—and still keep control of all his business affairs.

### 5. Expert marketing counsel.

To help solve distributor problems related to distribution patterns, inventory problems, promotion and merchandising, Westinghouse offers the services of a team of experienced marketing executives. A key member of this team is our advertising agency, McCann-Erickson, Inc., with its nation-wide facilities.

### 6. Exclusive financial counsel.

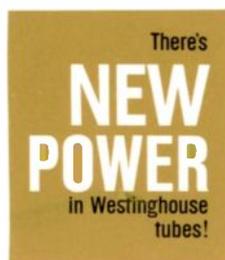
For problems in credit control, cash flow, inventory turnover and operating ratios, Westinghouse offers the counsel of financial experts. Their services are available—on request—to all Westinghouse franchise distributors. These fiscal "trouble shooters" are full-time Westinghouse corporate officials based in offices all over the country.

### 7. Merchandising innovations.

Westinghouse is constantly creating new ways to package and merchandise electronic tubes. For example, new Glas-Gard Film that provides scratch protection for picture tubes.

### 8. New Profit Sharing Program.

Now—you share in the profits! With the new Westinghouse Profit Sharing Plan you get a bonus on every tube you sell. Each tube comes with a Golden Profitab good for many valuable gifts.



Distributors who are interested in this new business concept, and who would like to find out about obtaining a Westinghouse franchise are invited to write: F. H. O'Kelley, Jr., Manager, Distributor Product Sales, Westinghouse Electric Corporation, Elmira, N. Y. *You can be sure... if it's* **Westinghouse**



# How to test a stereo kit for top performance:



**Simply look for this name.**

You don't even have to open the box. If it's a Fisher StrataKit, you already have better proof of performance than if you had built any other manufacturer's kit and tested it in one of the world's most elaborately equipped audio laboratories.

How can Fisher make this claim? Very logically. Fisher has one of the world's most elaborately equipped audio laboratories. Fisher did build and test everyone else's kits before the StrataKit engineering program was finalized. The task then set for Fisher engineers was to outclass in every way what they had found in other designs. Which they did. They drew on all the knowledge accumulated in the course of 24 years in high fidelity and the results are in the box. StrataKits are easier to build than others, the StrataKit instruction manuals are clearer than others, the completed StrataKits have more advanced features and perform better than others. And we have yet to hear of someone who could not complete his StrataKit successfully and with the greatest of ease.

The Fisher StrataKits now at your dealer are the KX-200 80-watt stereo control-amplifier and the KM-60 FM Stereo Multiplex wide-band tuner. Both sell for \$169.50. Both are the world's finest in their class. The proof is simply in their name.

USE THIS COUPON  
FOR FURTHER INFORMATION

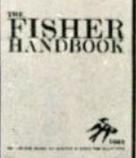
Fisher Radio Corporation  
21-24 44th Drive  
Long Island City 1, N. Y.

Please send me without charge the  
complete Fisher StrataKit catalog.

Name \_\_\_\_\_

Address \_\_\_\_\_

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



ET-511

--- for more details circle 30 on page 86

# TUNING IN

**DIELECTRIC FILM** so thin that a pound of material will cover an area approximating two football fields has been developed for capacitors by Du Pont. The film is said to be the thinnest unsupported plastic ever produced commercially. The new film made from "Mylar" polyester material, is only .00015 inch thick (15 gage). Previously, 25 gage was the thinnest film obtainable. Although the film is extremely thin, it can be readily handled. In laboratory wound capacitors, the film withstood a potential as high as 800 volts. The new film, known as 15XM555, was introduced at the IRE show in New York.

**PRINTED CIRCUIT BOARDS** are guaranteed on all 1962 Westinghouse TV sets. The guarantee makes it possible for the set owner to obtain a completely new set in the event of a basic failure of the "deep-etched" circuit board. The guarantee also provides for 90 day labor-free servicing of any 1962 Westinghouse TV. A listing of local Westinghouse dealers is available to set owners by dialing Western Union's operator 25.

## HEAT CONVERTER



A thermoelectric generator is embraced by Maureen O'Donnell, while gazing at a nuvistor. Both devices were displayed at the annual IRE show in New York. The generator is under development by Atomics International for the Atomic Energy Commission. The device will use modules made from a new RCA thermoelectric alloy.



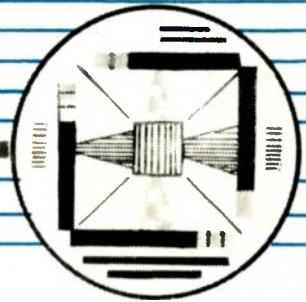
"Then I got tired of being a mechanic so I took up TV repair."

**TUBE & SEMICONDUCTOR SALES** for 1962 are expected to rise slightly above estimated business for 1961, according to the Electronic Industries Association. In 1962 shipments will hold to about \$1.4 billion due to continued pressures on prices and increasing foreign competition, it was said. Although 1962 semiconductor sales are not expected to surpass the \$525 million mark, sales of electronic tubes are estimated to reach about \$850 million next year. Tubes probably will outsell transistors by about 30 percent.

**CITIZENS BAND** radio is used by American Airlines in New York to solve problems caused by passengers arriving late at the ticket counters. Interstate Commerce regulations require that airlines must hold the plane to allow ticket purchasers time to board. To minimize the time required to notify dispatchers of late arrivals, American uses one base station and several hand held units for the dispatchers. Trial use of the CB equipment is reported to be very satisfactory.

**KOREAN TV MARKET** is seen for U. S. manufacturers. Formerly Japanese competition made U. S. sales virtually impossible in Korea. The country has been a buyer of U. S. radio broadcast equipment for some time, but when its only TV station was installed, TV imports from Japan were cheaper with faster de-

# THE PICTURE

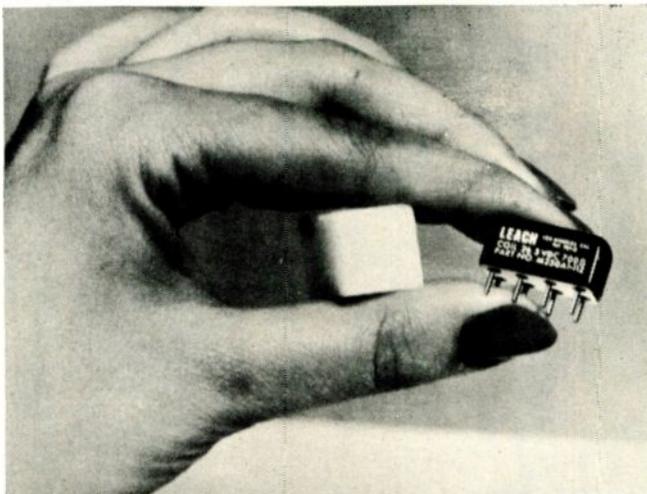


livery. The Korean government has chosen two manufacturers from each country to be represented by Korean agents. RCA and Westinghouse were selected for the United States; Mitsubishi Shoji Kaisa Ltd. and Sanyo Electric Co. Ltd. for Japan. The sale of U. S. brand sets was expected to be good although delivery times for these sets are 1½ to 2 times (longer than) Japanese deliveries. It is reported that countries were selected by competitive bidding.

**ELECTRONIC PAINKILLERS** are being used throughout the country to suppress or eliminate pain caused by dental drilling. The devices generate a "white noise" which sounds like "frying bacon before a waterfall." The noise is connected through earphones to the patient who controls the noise level. The system has also been used successfully to alleviate pain of childbirth. The principle will probably be used in future ambulances to ease pain and possibly prevent many shock cases prior to obtaining a doctor's services. The system is simple to operate and can be applied by laymen.

1961 **EDISON AWARD** has been given to a radio amateur now residing in Burbank, California. He is

## SUB-OUNCE RELAY



A relay shown by Leach at the IRE show in New York is compared to a cube of sugar. The relay occupies only .128 cubic inch of space and is less sensitive to vibration than conventional relays. The unit was designed for use on printed circuits for missiles and satellites as well as ground equipment. The low center of gravity makes it ideal for use in space vehicles.

## CALENDAR OF COMING EVENTS

- May 21-24: 1962 Electronic Parts Distributors Show, Conrad Hilton Hotel, Chicago, Ill.
- May 23-25: 38th Annual EIA Convention, Pick-Congress Hotel, Chicago, Ill.
- May 23-26: Annual Meeting, Acoustical Society of America, (AIP), Hotel New Yorker, New York, N. Y.
- June 18-19: Chicago Spring Conference on Broadcast and TV Receivers, (PGBTR) Chicago Section, O'Hare Inn, Chicago, Ill.
- June 24-28: 1962 Music Industry Trade Show, National Association of Music Merchants, New York Trade Show Bldg., New York, N. Y.
- June 24-28: 4th National Symposium on Radio Frequency Interference, (PGRFI), Town House Hotel, San Francisco, Calif.

*William G. Welsh, credited with having voluntarily taught electronics to 2,800 people over the past 10 years. While teaching a course at M. I. T. he used the money to buy tape reproducing equipment for his courses. Among these were eight, 1,800 foot code recordings which have been shipped all over the country. Welsh also prepared a 70-page instructor's manual to help others teach electronics. Over 75 percent of enrolled students graduated from his courses.*

**WORLD-WIDE TV** may be possible earlier than previously expected. A senate subcommittee foresees the satellite communications system operational in 1965 or earlier. Though the system would not be an ultimate one, it is believed that it would provide a good propaganda margin over the Soviets. The satellite ring around the earth would allow world-wide broadcasts of TV and radio. TV standards in other countries would make TV viewing impractical at present, however. The system would be shared by all people of the world.

**MICRO-ELECTRONIC CIRCUITS** one-third the size of aspirin tablets can perform all electronic functions from signal amplification to computer switching according to Dr. Alan M. Glover of RCA. The circuits, incorporating both active and passive materials, are one hundred times smaller and potentially less expensive than equivalent conventional circuits for control, computer, and communication systems, he said. The components lend themselves to mass production by assembly-line techniques. Dr. Glover said that pilot production of the units will begin before the end of 1962.

# Sylvania

...completeness that assures  
...quality that



Never say "Tubes"—say "Sylvania"!

# Tubes

delivery!  
assures profits!

## SILVER SCREEN 85 PICTURE TUBES

Sylvania was a pioneer in the manufacture of commercially produced picture tubes. That kind of experience builds profit protection into every 1962 SILVER SCREEN 85—top performance, maximum assurance against callback. And, when you specify Sylvania for that replacement job, you are sure to get delivery...because SYLVANIA has the *comprehensive* line... SYLVANIA DISTRIBUTORS are wherever there is TV!

Bonded Shield • anti-reflection Bonded Shield • non-Bonded Shield • single and multiple branded • long and short necks • metal and glass envelopes • 50° to 114° deflection • magnetic and electrostatic focus • ion trap and non-ion trap types • rectangular and round faceplates • 2.35-v to 6.3-v and 450-mA to 600-mA heaters • 5" (50°-70°) and 8" (90°-114°) universal bench-test tubes.

Plus "universal" 17-, 21- and 24-inch picture tubes!

Plus color TV picture tubes!

## SYLVANIA RECEIVING TUBES

...for Color TV...Sylvania continues to prove its capabilities...in the production of tubes especially for color TV replacement. Since your customers are buying "performance"—not technical data—tubes at SYLVANIA are performance-tested continuously in actual color TV sets. Go with quality—go with Sylvania tubes for color TV: 6BK4 • IV2 • 3A3 • 6DQ5 • 6CB5A • 6AU4GTA • 6CG7 • 6AW8 • 12BY7 • 6AQ5 • 6AV5 • 6EM7.

...for Black & White TV...Sophisticated manufacturing techniques and processes have made Sylvania a preferred supplier of tubes for TV. Developments such as Sarong Cathode and Strap Frame Grid *plus* extensive automation in production assure that replacement tubes are...in every way...as good as the original.

...for TV Tuners...Sylvania-originated, the 6GK5 brings new advances to the state of the electron tube art. This new tube type, as manufactured by Sylvania, features Strap Frame Grid constructions and high Gm, provides high gain and low noise in rf amplifier-service in TV front-ends. When replacing a 5GK5, specify *Sylvania*—universally accepted by manufacturers of TV sets. Sylvania 6GK5 also replaces the popular 6FQ5, 6FQ5A and the 6FY5.

...for AM-FM Radio...Whether servicing an AC-DC table radio, a fine Hi-Fi tuner or one of the latest Multiplex units, make Sylvania your number one choice. Take, for examples of outstanding quality, the new 17C9 and 6JK8. Both are Sylvania-originated and provide superior performance in standard tuner and in multiplex circuitry.

...for Hi-Fi and Phono...One of the pioneers in tubes for audio amplifier service, Sylvania has led with old faithfuls like the 6L6, 6V6 and 6AQ5 and the new high-performance Sylvania 6GM5 and Sylvania 7591. Automated production techniques and final test procedures maintain precision, assure high quality. A Sylvania replacement tube is the best way to make old equipment perform like new again. Electronic Tubes Division, Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

Sylvania Tubes—available wherever there is TV!

# SYLVANIA

SUBSIDIARY OF

GENERAL TELEPHONE & ELECTRONICS



# TV MANUFACTURERS TECHNICAL DIGEST

## AIRLINE

TV Chassis Models WG-4235A and WG-4335A — Oscillator Coil Adjustment

The following procedure should be used to adjust the horizontal oscillator coil in these sets: Short the sync separator plate to either ground or B+. Place a short across the horizontal oscillator coil terminals. Adjust the horizontal hold control until the blanking bar drifts slowly across the screen. Remove the short from the coil and adjust the coil's slug until the picture moves slowly across the screen. When the short is removed from the sync separator plate, the picture should lock-in. No further adjustments to the coil should be necessary.

## DUMONT

TV, Chassis 120604-A, Arc Suppression Capacitor

Arcing across the on-off switch contacts will occur in this chassis when an attempt is made to service it with the remote control receiver removed. This results in rapid switch failure. To prevent this failure a .022  $\mu$ f 600 v capacitor should be installed between pins 3 and 4 of the power supply socket, S-2 on the power supply chassis. The factory recommends this modification for all chassis encountered in the field.

## ELECTROHOME

TV Chassis 19, 21 and 23 in. models — Focus Adjustments

CRT replacement in some of these sets requires special focus adjustments for the new tube. When a new CRT is installed, the orange wire from the CRT socket should be moved to each of the five taps and left in the tap which gives optimum focus. On some models, a beam alignment magnet, which resembles an ion trap, is also located on the neck of the CRT. This magnet should be positioned for the best edge focus on the CRT screen.

## EMERSON

TV Models 1626 Through 1678 — Size Adjustment

If unusually low line voltage is encountered in these sets, resistor R-80 (3300 ohms, 1 w) may be shorted out to increase the picture width. This resistor is mounted on a terminal strip to the right of the horizontal output tube and can be jumped without removing the chassis from the cabinet.

## GENERAL ELECTRIC

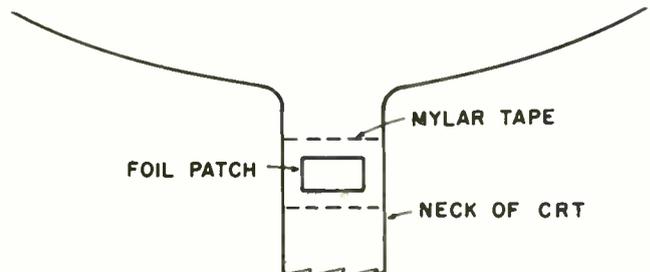
TV Chassis M571 — Drive Line Elimination

Right side compression accompanied by a drive line on the right side of the screen may be encountered in some of these sets. The condition usually develops after ½ hour of operation. The trouble has been traced to capacitor C-410, in the discharge tube grid circuit. To correct this trouble dress C-410 as far away as possible from R-408, a 10 k ohm, 1 w resistor.

## HOFFMAN

TV Model 9003 — Linearity on Replacement CRTs

When replacing the CRT in this receiver, the foil patch fastened to the neck of the original CRT should be secured to the new tube in the same relative position.



Hoffman sets which use a foil patch on the CRT must have this patch replaced on new CRT when installing replacement.

The foil is held on the tube with Mylar tape which may be used on the replacement CRT. This tape has the required high voltage breakdown. Proper linearity cannot be obtained without the foil patch on the CRT neck.

## MAGNAVOX

Hi-Fi Models 15T274, 15T278 and 25T274 — Filament Connections for F-M Multiplex Adaptor

Early models of these sets incorporated the 86-01-00 or 86-01-10 amplifiers. These amplifiers were not wired for filament voltage at the multiplex adapter socket. When installing the KO597 multiplexer kit it will be necessary to add connector contacts (Part No. 180628-1) to positions 8 and 4 of the amplok socket on the amplifier. These contacts should then be wired to points X and Y of the power transformer. These terminals are accessible on the top side of the chassis.

An alternate connection method suggested is to remove the blue and green leads from the multiplex

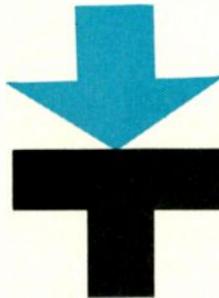
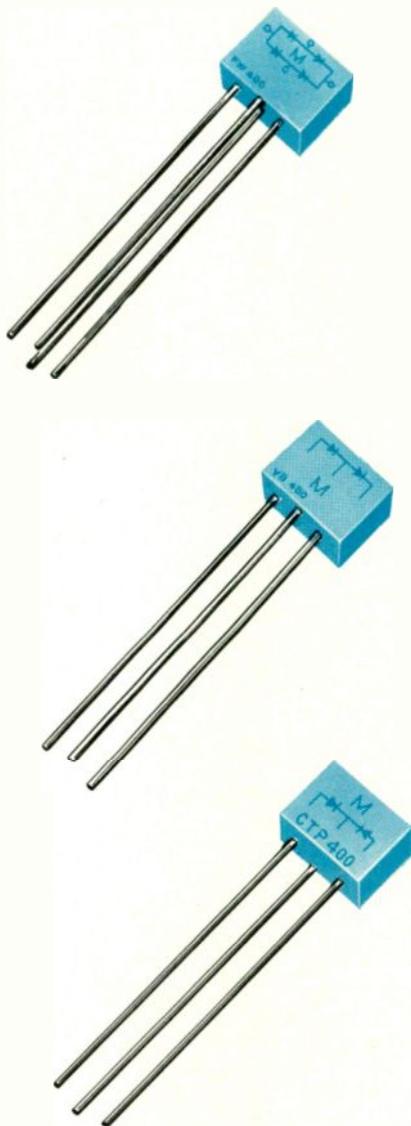


P. R. MALLORY & CO. Inc.  
**MALLORY**

## Tips for Technicians

Distributor Division, P. R. Mallory & Co. Inc.  
P. O. Box 1558, Indianapolis 6, Indiana

# Rectifier "packages" save time and space



When you're putting together a DC power supply, these little Mallory packaged rectifier circuits can spark a lot of time-saving, space-squeezing ideas.

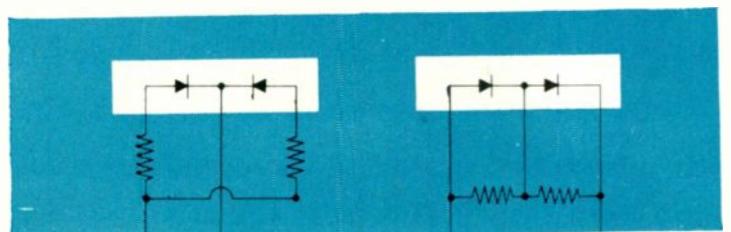
Each package is a complete rectifier circuit . . . bridge, doubler or center-tap . . . that does the job of two or four separate rectifiers. So you've only got *one* component to wire in place. The individual rectifier cells are factory-connected in the package.

You can get the exact rectifier you want in this compact form. And we mean compact. Less than  $\frac{3}{4}$ " by  $\frac{1}{2}$ ", and  $\frac{1}{4}$ " thick. Cold case design, too; you can mount 'em anywhere without worrying about case-to-ground shorts.

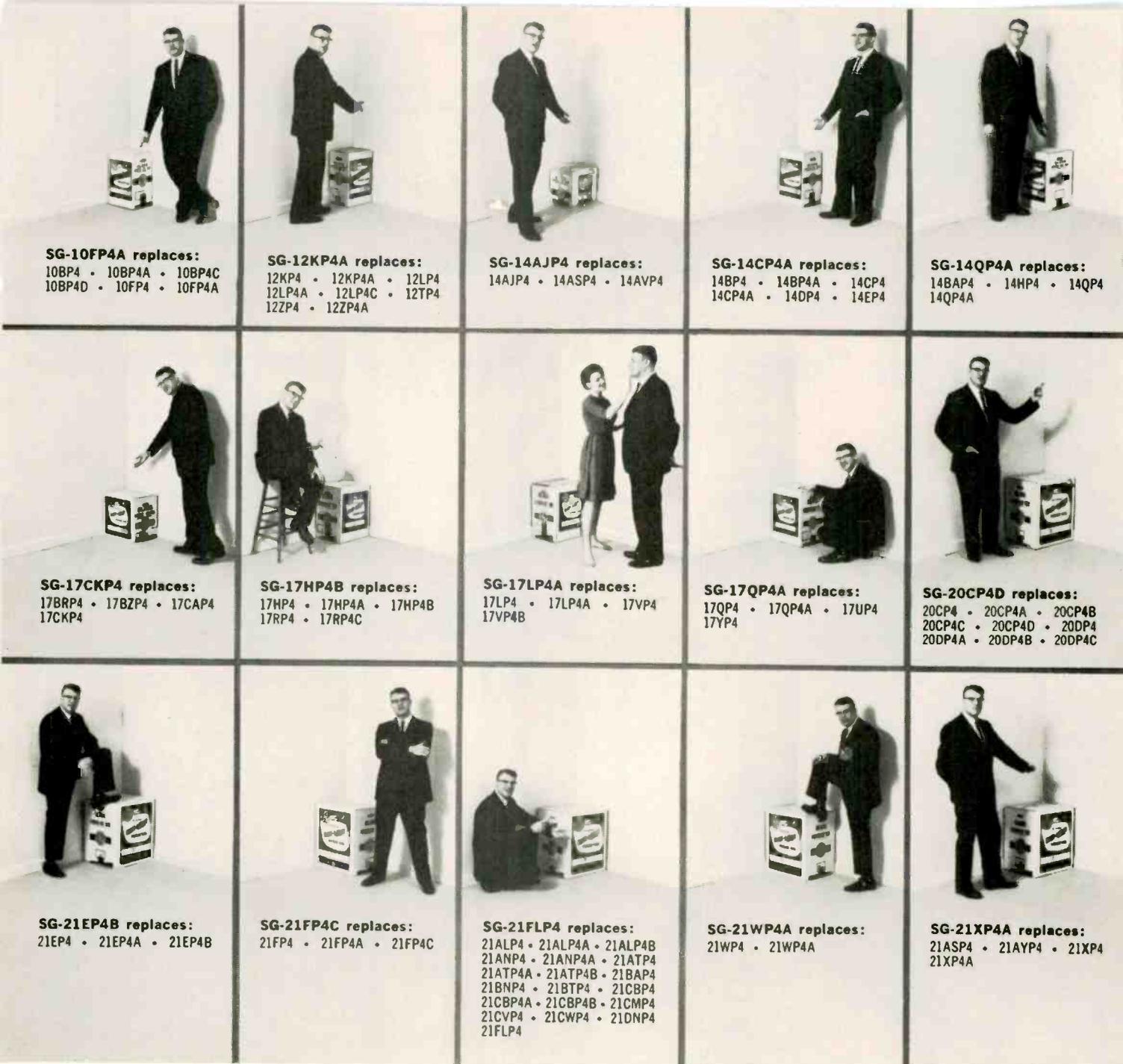
PRV ratings on all three types go as high as 600 volts. And there's plenty of current capacity. The FW full wave bridge models are rated 1.5 amps. DC at 50°C. ambient, 1.0 amp. at 100°C. Doubler Type VB and center tap Type CT are rated 0.75 amp. at 50°C., 0.5 amp. at 100°C.

If you need more current rating, you can parallel the two sides of the type CT package, using 0.5-ohm equalizing resistors in series with each leg. And you can get a high PRV unit at low cost by using a type VB double package as a series-connected half-wave rectifier, connecting a one-megohm resistor across each cell for voltage equalization.

As if all this weren't enough, you save money, too, because our packaged circuits cost less than individual rectifiers. Get them from your Mallory Franchised Distributor. He's a good man to call on for Mallory capacitors, switches, controls, batteries, resistors and vibrators . . . and for any other components you need.



... for more details circle 43 on page 86



**SG-10FP4A replaces:**  
10BP4 • 10BP4A • 10BP4C  
10BP4D • 10FP4 • 10FP4A

**SG-12KP4A replaces:**  
12KP4 • 12KP4A • 12LP4  
12LP4A • 12LP4C • 12TP4  
12ZP4 • 12ZP4A

**SG-14AJP4 replaces:**  
14AJP4 • 14ASP4 • 14AVP4

**SG-14CP4A replaces:**  
14BP4 • 14BP4A • 14CP4  
14CP4A • 14DP4 • 14EP4

**SG-14QP4A replaces:**  
14BAP4 • 14HP4 • 14QP4  
14QP4A

**SG-17CKP4 replaces:**  
17BRP4 • 17BZP4 • 17CAP4  
17CKP4

**SG-17HP4B replaces:**  
17HP4 • 17HP4A • 17HP4B  
17RP4 • 17RP4C

**SG-17LP4A replaces:**  
17LP4 • 17LP4A • 17VP4  
17VP4B

**SG-17QP4A replaces:**  
17QP4 • 17QP4A • 17UP4  
17YP4

**SG-20CP4D replaces:**  
20CP4 • 20CP4A • 20CP4B  
20CP4C • 20CP4D • 20DP4  
20DP4A • 20DP4B • 20DP4C

**SG-21EP4B replaces:**  
21EP4 • 21EP4A • 21EP4B

**SG-21FP4C replaces:**  
21FP4 • 21FP4A • 21FP4C

**SG-21FLP4 replaces:**  
21ALP4 • 21ALP4A • 21ALP4B  
21ANP4 • 21ANP4A • 21ATP4  
21ATP4A • 21ATP4B • 21BAP4  
21BNP4 • 21BTP4 • 21CBP4  
21CBP4A • 21CBP4B • 21CMP4  
21CVP4 • 21CWP4 • 21DNP4  
21FLP4

**SG-21WP4A replaces:**  
21WP4 • 21WP4A

**SG-21XP4A replaces:**  
21ASP4 • 21AYP4 • 21XP4  
21XP4A

G-E reporter, Roland Kempton, shows 30 "universal" picture tubes

## 30 SERVICE-DESIGNED "SG"

### ALUMINIZED TUBES FEATURE NEW STRAIGHT GUN, REQUIRE NO ION TRAP

Each of these Service-Designed "SG" tubes features General Electric's new straight line high-resolution gun. This means you don't have to install an ion trap. Save time. Less chance of call-back. Replace either bent gun or straight gun tubes and give your customers the best picture their sets can deliver.

Pick a number from 10BP4 to 27RP4 . . . or any of 167 tube types in between (see above). From just 30 G-E Service-Designed "SG" picture tubes choose a replacement. Chances are, you'll have it right in your shop, because now it makes sense to carry a minimum inventory for commonly replaced picture tubes. These picture tubes move! . . . give you a big advantage in prompt availability, faster customer service, fewer emergency pick-ups, simpler ordering.

**SG-14WP4 replaces:**

14NP4 • 14NP4A • 14RP4  
14RP4A • 14SP4 • 14WP4  
14ZP4

**SG-16KP4A replaces:**

16KP4 • 16KP4A • 16QP4  
16RP4 • 16RP4A • 16TP4  
16UP4 • 16XP4

**SG-17BP4B replaces:**

17AP4 • 17BP4 • 17BP4A  
17BP4B • 17BP4C • 17JP4

**SG-17BJP4 replaces:**

17ATP4 • 17ATP4A • 17AVP4  
17AVP4A • 17BJP4, 17BUP4  
17CBP4 • 17CLP4

**SG-17BWP4 replaces:**

17BVP4 • 17BWP4 • 17CSP4

**SG-20HP4D replaces:**

20HP4 • 20HP4A • 20HP4B  
20HP4C • 20HP4D • 20LP4  
20MP4

**SG-21ACP4A replaces:**

21ACP4 • 21ACP4A • 21AMP4  
21AMP4A • 21AMP23A • 21AQP4  
21AQP4A • 21BSP4 • 21CUP4

**SG-21AUP4B replaces:**

21AUP4 • 21AUP4A • 21AUP4B  
21AVP4 • 21AVP4A • 21AVP4B  
21BDP4

**SG-21AWP4 replaces:**

21AWP4

**SG-21DEP4A replaces:**

21CZP4 • 21DAP4 • 21DEP4  
21DEP4A

**SG-21YP4A replaces:**

21AFP4 • 21BCP4 • 21YP4  
21YP4A

**SG-21ZP4B replaces:**

21ZP4 • 21ZP4A • 21ZP4B

**SG-24AEP4 replaces:**

24AEP4 • 24ANP4 • 24DP4  
24DP4A • 24YP4 • 24ZP4

**SG-24CP4A replaces:**

24ADP4 • 24CP4 • 24CP4A  
24QP4 • 24TP4 • 24VP4  
24VP4A • 24XP4

**SG-27RP4 replaces:**

27EP4 • 27GP4 • 27NP4  
27RP4

# picture tubes replace 169 types

In addition to the unique straight gun design, each of these Service-Designed picture tubes is aluminumized and employs General Electric's high temperature phosphor screen. They provide the bright, clear pictures your customers want—up to 40 per cent brighter. Get your new interchangeability chart, plus full details on General Electric Service-Designed "SG" picture tubes from your General Electric tube distributor.

General Electric Company, Distributor Sales, Electronic Components Division, Room 1709, Owensboro, Kentucky.

Tubes listed contain all new material and parts in reused envelope.

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**



**RAD-TEL SELLS  
DIRECT TO YOU...  
AT LOW PRICES  
RAD-TEL'S QUALITY  
BRAND-NEW TUBES  
NOW { OVER 500 TYPES  
UP/TO 75% OFF**

**1-YEAR GUARANTEE • 1-DAY SERVICE**

**FREE**

SEND FOR NEW  
TUBE & PARTS  
CATALOG

SEND FOR  
TROUBLE SHOOTING  
GUIDE

**SAMPLE OF RAD-TEL'S AVAILABILITY**  
• NOT AFFILIATED WITH ANY OTHER MAIL ORDER TUBE COMPANY •

Qty.	Type	Price	Qty.	Type	Price	Qty.	Type	Price
---	1B3	.79	---	6AL5	.47	---	6BZ6	.55
---	1X2B	.82	---	6AU6	.52	---	6CB6	.55
---	3CB6	.54	---	6AX4	.66	---	6CG7	.61
---	4BQ7	1.01	---	6BQ6	1.05	---	6SN7GT	.65
---	5U4	.60	---	6BQ7	1.00	---	6U8	.83
---			---			---	12AU7	.60
---			---			---	12BH7	.77
---			---			---	35W4	.42
---			---			---	35Z5	.60
---			---			---	50C5	.53



**RAD-TEL TUBE CO.**

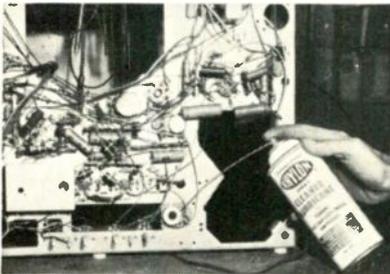
Dept. ETS 55 CHAMBERS ST., NEWARK 5, NEW JERSEY

TERMS: 25% deposit must accompany all orders, balance COD. Orders under \$5 add \$1 handling charge plus postage. Orders over \$5 plus postage. Approx. 8 tubes per 1 lb. Subject to prior sale. No COD's outside continental USA.

... for more details, circle 48 on page 86

## NEW KRYLON CLEANER LUBRICANT SPRAY

To service  
volume controls,  
tuners,  
switches



Cleans away dirt and gummy deposits. Provides a nondrying lubricating film on contact surfaces. Gives long-lasting protection against corrosion. Comes with 5-in. flexible plastic hose for controlled spraying in hard-to-reach places.

### KRYLON CRYSTAL-CLEAR ACRYLIC SPRAY



Protects electronic parts. Use on TV, radio, hi-fi, transmitting or test equipment. Protects against humidity, dust, corrosion and leakage currents. Long lasting. High dielectric strength.

### KRYLON SPRAY PAINTS

Choice of 24 standard colors and 7 glowing fluorescent spray paints. Use for touchup, color coding, safety, or repainting cabinets and enclosures. DRY IN MINUTES.



**KRYLON**

If you prize it... KRYLON-ize it!  
Contact your Radio-TV jobber or write for  
Krylon's new industrial products catalog  
**KRYLON, INC., NORRISTOWN, PA.**

... for more details, circle 41 on page 86

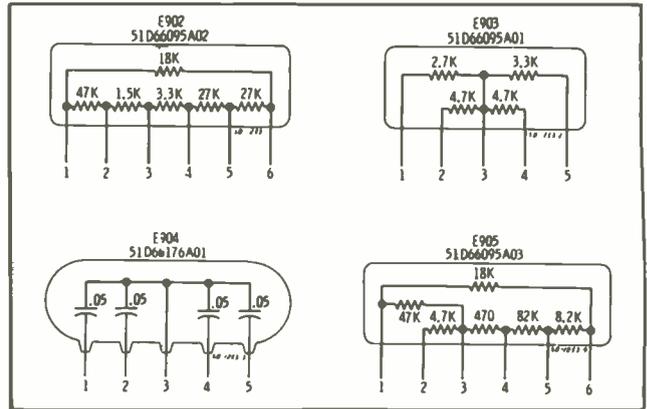
## TV MANUFACTURERS TECHNICAL DIGEST

cable plug, and connect them directly to the pilot light connections.

### MOTOROLA

TV Remote Receiver, Model TRR-1 — RES-PAC and CAP-PAC Repair

Repairs on RES-PAC and CAP-PAC modules in these Motorola receivers can be performed externally if the module is not available. Schematics for these



Motorola's module diagrams for circuitry used in remote TV control receiver. All components can be replaced externally.

units are shown in the accompanying drawing. When an external component is connected into the module circuit, the defective component should be completely removed from the circuit by clipping a lead. This prevents the possibility of future intermittent operation.

### RCA

Tape Recorder Model 1-YB-11 — Head Magnetization

Early production models of this recorder did not incorporate circuit changes which prevent magnetization of the record/play head. If this problem is encountered, the following changes should be made: 1. Change the lead from C-10 to terminal 2 of S-1 from S-1 to ground (chassis). 2. Change the lead from R-24 and R-35 to S-1, terminal 3 to terminal 2 of S-1.

### WEBCOR

Tape Recorder Model 2208 — Loose Transport Keys

Loose transport keys on model 2208 tape recorders may be corrected by installing a new type pushbutton screw. When this trouble is encountered, the pushbutton should be replaced with a 26P1665 screw which is 1/8 in. longer. Prior to replacement, all grease and foreign matter should be removed. If new pushbuttons are required, the new screw should also be obtained for them. If only one pushbutton is defective, all three screws should be replaced to prevent future trouble.



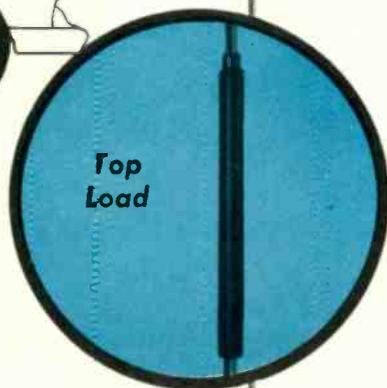
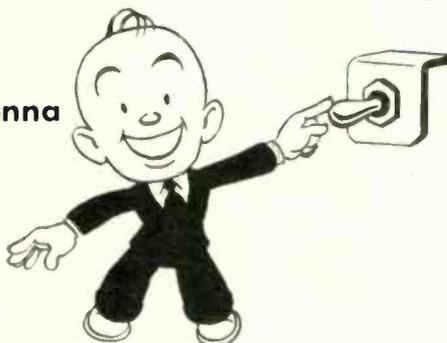
**NOW** YOU DON'T NEED

**2** AERIALS

**This is**

# C-BAM

A new modern *DUAL-PURPOSE* antenna that replaces all others.



C-BAM . . . a revolutionary concept in pushbutton electric antennas that accommodates *BOTH* CB and AM auto radios.

- Completely Automatic
- Top Loaded Coil not exposed when collapsed — completely disappears into antenna
- Extends to 60" — collapses to 15"
- Mounts easily on most conventional aerial locations
- Exceptional Performance
- Eliminates extra holes — Gutter Clips — Rusted Springs — Bent Whips
- Sturdy, Compact, Rust Resistant for Longer Life
- Designed for all 12 Volt Systems



Extends to 60"

Collapses to 15"

**TENNA MFG. CO.**  
CLEVELAND 25, OHIO

Come and see this Revolutionary Aerial in SUITE 605-607  
MAY 22-24 • CONRAD HILTON HOTEL

--- for more details circle 60 on page 86

*Developed in the field*

*to pay off in performance down the road*



**NEW**  
**CB-3A** *littlefone*

dual conversion,  
8-channel citizens band

**TRANSMITTER/RECEIVER**

**\$159<sup>95</sup>** (S-meter optional extra)



During a recent seven-month period, the Hallicrafters Company conducted a most unusual field test of its CB-3 citizens band transmitter. Through every conceivable condition of terrain, and weather, with almost completely continuous operation, the CB-3 was punished unmercifully and methodically . . . evaluated from every angle with the engineer's fine needle. Our purpose was not to prove something but to learn something. And in learning, to improve. Result: the new CB-3A "Littlefone"—solid and versatile expression of Hallicrafters' dedication to "THE NEW IDEAS IN COMMUNICATIONS."

**EXTREME CONDITIONS WERE THE RULE**

Early in July, 1961, test vehicles equipped with CB-3's were dispatched from Chicago northward into Wisconsin and Minnesota. A limited geographic area was picked, with no pre-planned route. Each short range destination was a "target of opportunity"—chosen to take advantage of the *worst possible conditions* as they occurred.

On D-day the temperature was 95°, and it ranged down to -20° before the test was completed. Identical and controlled transmission tests were conducted in both hilly and flat terrain, in cities and woodlands.

The CB-3 was operated on a continuous basis for periods ranging from four to twelve hours. More than 30,000 miles of mobile operation in the test vehicle were logged, plus unrecorded periods in trucks, boats—even an airplane.

**TESTS WERE VARIED AND THOROUGH**



All tests were conducted on both an objective and competitive basis. At various times, standard equipment of the five most popular transceivers were employed in the same or directly comparable situations. Relative range, modulation, channel interference and heterodyne were measured.

Base units also were interchanged, and four different basic antenna systems rotated both in base and mobile installations. In all, more than 150 antenna installation modifications were made.

**WHAT WE FOUND OUT**

Range and speech quality were exceptional. The CB-3 under "normal" conditions (average of hilly and flat terrain, moderate weather conditions) produced 10-2 copy at 20 miles . . . up to 40 miles in the lake region of Wisconsin . . . as low as 8 miles in the lead and zinc mining regions southwest.

Average performance over the entire seven-month period was a *minimum of 7%* and a *maximum of 12%* greater range of intelligible speech than the five other units tested.



In the major metropolitan areas visited, some adjacent-channel interference was experienced on all units during peak traffic periods.

**Reliability:** in over 1,600 hours of operation, not a single major failure was experienced. Total parts replacement—two panel bulbs, one vibrator, two tubes. No visible deterioration of automotive electrical system. A microphone cord was broken due to carelessness.

**Antennas:** Major deterrent to good communications was observed to be faulty antenna installation throughout the test areas. Of more than 90 existing base stations co-operating in the tests, most were using improper or unmatched antennas. Range was increased (all brands) from a *minimum of 50% to 70%* with corrective measures.

**General observations:** Mechanical design and exclusive drop-down chassis construction of the CB-3 permitted far easier access for crystal changing and removal of unit for base use.

External S-meter was required during tests; observers with technical background felt a need for S-meter provision in the CB-3.

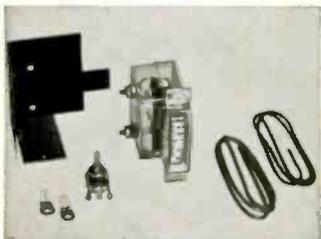
Eight-channel flexibility and crystal controlled operation on both transmit and receive functions were distinctly superior to competitive systems, particularly in mobile and heavily populated areas.

**Result—the new CB-3A with field-tested improvements!**

- 8-channel, crystal-controlled convenience
- Maximum adjacent-channel rejection without loss of sensitivity through new type dual conversion.
- Removable panels for S-meter, future accessories.
- Built-in accessory jack (external speaker, etc.)
- FCC Type-Accepted.

**Transmitter:** 100% modulation on positive peaks; output amp. adjustable for maximum legal input; matches 50 ohm antenna systems; series-tuned 2nd harmonic trap for excellent TV suppression.

**Receiver:** Dual conversion—adjacent channel rejection 40 db. minimum; sensitivity less than 1 microvolt for 10 db. signal to noise ratio; 6 kc. selectivity; electronic squelch operates on less than 6 db. change; audio output over 2 watts.



**Hallicrafters S-meter kit,**  
optional at \$8.95

the new ideas  
in communications  
are born at . . .



# hallicrafters

Dealers: A limited number of Authorized Hallicrafters Dealerships are available. See your Hallicrafters distributor, or write to: The Hallicrafters Co., 5th and Kostner Aves., Chicago 24, Ill.

--- for more details circle 35 on page 86

# 34¢

per 100

EACH  
**ELECTRONIC MARKET**  
1 YEAR GUARANTEED RADIO-TV TUBES

# 25¢

per tube

When purchasing lots of 50 or more same type tube Applies to tubes below only

AN tubes not necessarily new, but may be electronically perfect factory 2nds or used. Each clearly marked. ELECTRONIC MARKET will replace FREE any tube that becomes defective in use within 1 year from date of purchase. All tubes individually boxed and 1 marked. Partial Listing Only — Thousands More Tubes in Stock!

02A	SA18	GAX5GT	0CN6	0CL5	0SR7	12BH7
1A7GT	SA24	688	0CL5	0SR7	12BH7	12BQ6
1B3GT	SC69	68A8	0CM7	0SR7	12CA5	12BR7
1H5GT	SC6	68C5	0CM7	0T4	12D4	12C45
153	570	68C8	0CM7	0T4	12D4	12D4
174	5M4	68D6	0CB8	0T8	12F8	12K3
1U5	5A0	68E6	0CB8	0U5	0V6GT	12K7
1V2	5V4G	68E6	0CS7	0V6GT	12L6	12L6
1X2	5V6GT	68F5	0CU5	0V6GT	12L6	12R7
2A74	3Z5	68H6	0CU6	0Z4	12R5	12R5
2B4A	5Y3	68J6	0D6	0X8	12SA7	12SA7
2C7S	6AB4	68K5	0CE8	0Y68	12S7	12S7
3AL5	6AH4GT	68L7	0D6GT	12A8	12S7	12S7
3BC5	6AH6	68L7GT	0D6	12A8	12S7GT	12S7GT
3B86	6AL5	68M6	0F6	12A8	12S7	12S7
3B26	6AN6	68M6GT	0G6	12A8	12S7GT	12S7GT
3BC6	6AQ6	68M7	0G6	12A8	12S7GT	12S7GT
354	6AG7	68R8	0J7	12A8	12S7	12S7
3V4	6AR3	68S8	68SGT	12A7	12A7	12A7
4B27A	6AS3	68T96	68T	12A7	12A7	12A7
4B58	6AT8	68T96	68T	12A7	12A7	12A7
4B27	6A4GT	68Z8	68ZGT	12A7	12A7	12A7
4C85	6A95GT	0C4	0C4	0S75	12D6	12D6
5AM6	6A86	0C4	0C4	0S75	12D6	12D6
5AN6	6AY5GT	0C4	0C4	0S75	12D6	12D6
5AT6	6AY6	0C4	0C4	0S75	12D6	12D6
	6AX4GT	0CF6	0S7	12R6	12R6	12R6

ORDER SHIPPED SAME DAY RECEIVED  
SHIPPING INSTRUCTIONS. ELECTRONIC MARKET PAYS YOUR POSTAGE on orders of \$10 or more in U.S.A. and Territories. Send approx. postage on Canadian and foreign orders. Any order less than \$10 requires 75c handling and postage charge. Send 25¢ on C.O.D.'s.  
ANY RECEIVER TUBE NOT LISTED ALSO AVAILABLE AT 34¢ EACH!

0SH7	1L4	12AX7	12CH6	0J6	50C5	6EB8	12AT7	12B77	0W4
0AX4	1R5	0A85	12B8B	0R7	6AW8	6A88	0C88	088	0AF4
0A14	0S4	0C87	12S87	0R7		12A17	0AR5	6AC7	6AB5

# 74¢

per 100

**SILICON RECTIFIERS**  
ALL PURPOSE  
Epoxy construction

500 MA - 'TOP HAT'

**COMPLETE LINE OF INDUSTRIAL TUBES**  
ONE OF THE LARGEST INVENTORIES IN THE COUNTRY

**ELECTRONIC MARKET**  
3750 E. 10th CT., HIALEAH, FLORIDA  
Phone: OXford 1-5331

--- for more details circle 26 on page 86

# SO SAFE!



won't damage glass tubing  
let alone wire or cable!

**ARROW STAPLE GUNS** can't damage wire or cable because driving blade automatically stops staple at right height! That's why Arrow Staple Guns are proved safer on jobs all over the country. And Arrow staples have tremendous holding power because they're rosin-coated, have diverging points that lock into wood.

T-25 (shown) for wires up to 1/4" in diameter. (Hi-Fi wire, radiant heating, bell, thermostat, telephone, inter-com, etc.) tapered striking edge gets into tight corners. Uses 9/32", 3/8", 7/16", 9/16" List \$15  
T-25B For burglar alarm wiring. Drives staples flush .....List \$15  
T-75 For non-metallic sheathed cable, Romex cable or any other object (such as copper tubing) up to 1/2" in diameter. Uses 9/16", 3/8", and 7/8" Arrow staples ..... List \$18

**ARROW FASTENER COMPANY, INC.**  
1 Junius St., Brooklyn 12, N. Y.

# 1962

## Parts Show Preview

### Latest Products Go On Display

For the 24th consecutive year the annual Electronic Parts Distributors Show will serve as the annual place for manufacturers to show their wares to distributors from all parts of the country. These distributors will carry product data from 290 exhibitors back to their offices, informing service technician customers of the latest components and equipment.

The Parts Show will be held in Chicago's Conrad Hilton Hotel, May 21-24. Registration is in advance of the Show, and admission is by badge only, issued in the following categories:

Commercial Sound, High-Fidelity, Sales Reps, Government Personnel, Advertising and Export Agency Personnel and Electronic Parts Distributors.

### Show Sponsors

The five trade associations sponsoring the non-profit operator of the Show, the Electronic Industry Show Corp., are: Western Electronic Manufacturers Association (WEMA) National Electronic Distributors Association (NEDA) Association of Electronic Parts and Equipment Manufacturers, Inc. (EP&EM)

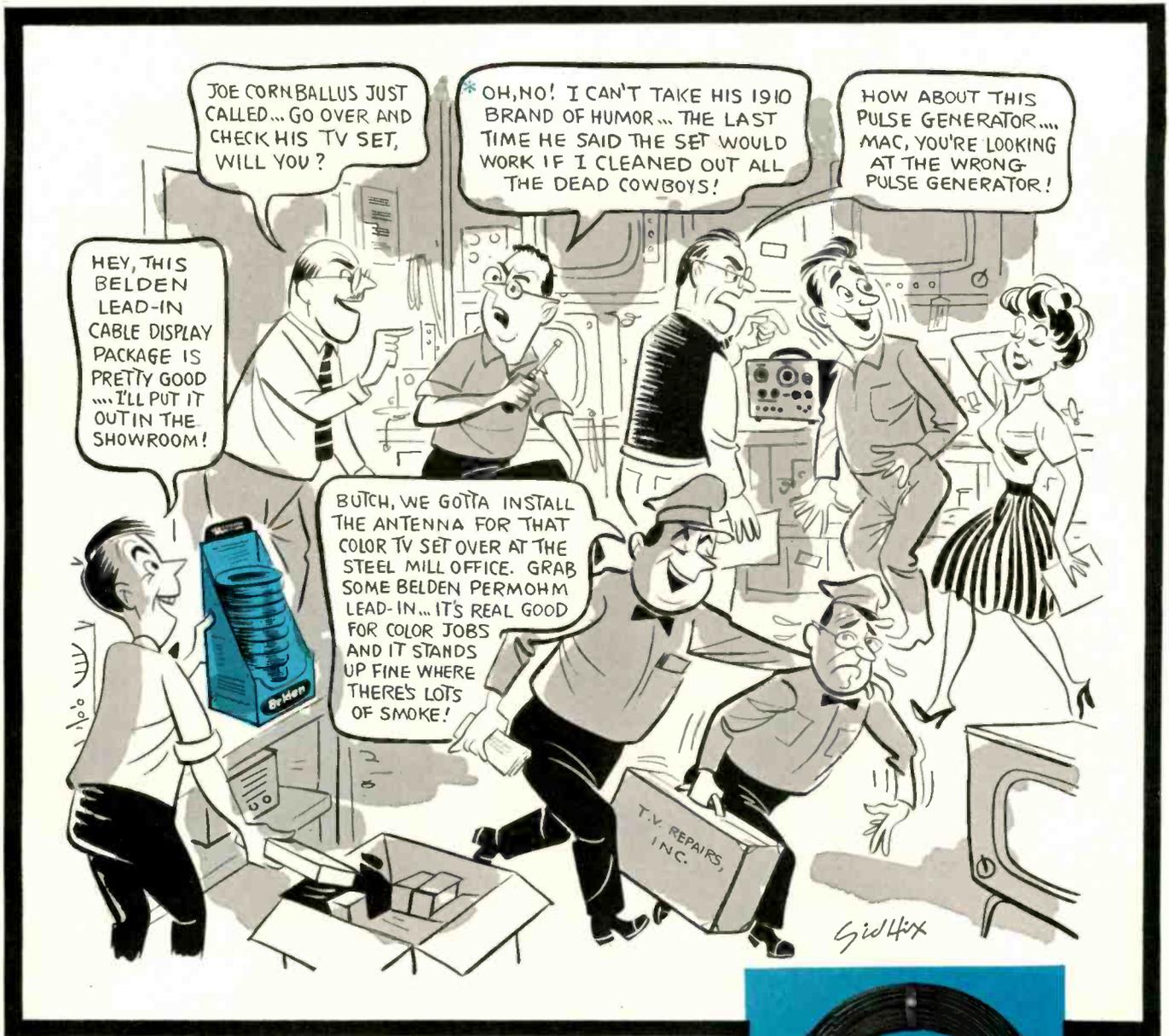
Producers of Associated Components for Electronics (PACE)

Electronic Industries Association (EIA)  
Innovations for the 1962 Show include a plastic inquiry card to facilitate literature requests from those attending and stress on executive conferences.

### LIST OF EXHIBITORS

Company	Booth	Room
ATR Electronics Inc.....	E-121	
Acoustic Research, Inc.....		504A
Acoustone Division.....	G-101	
Aerovox Corp.....	E-109	
Akro-Mils, Inc.....	C-117	
All Channel Products Corp.....	D-114	
Alliance Mfg. Co.....	C-125	
Alpha Wire Corp.....	F-107	U-105
American Gelosa Electronics.....		521A
American Microphone Mfg. Co.....	A-115/117	
American Radio Relay League.....		620
Amperex Electronic Corp.....		S-101
Amperite Co., Inc.....	B-117	
Amplex Corp.....		634A/635A
Amphenol Borg Electronics.....		V-114/116
Antenna Design, Inc.....		549
Antenna Specialists Co.....	A-112/114	
Approved Products Mfg.....	K-107	
Arco Electronics, Inc.....	F-105	
Argos Products Co. Inc.....		513A
Astatic Corp.....	D-109	616/617
Astron Corp.....		T-110
Atlas Sound Corp.....	D-110	
Audio Devices, Inc.....	C-102	
B&K Mfg. Co.....	B-111	521
Belden Mfg. Co.....	F-101/103	
Bell Sound Division.....		617A/619A
Birnback Radio Co. Inc.....	D-117	
Blonder-Tongue Laboratories.....	C-105	
Bogen-Presto Division.....		659A/661A
British Industries Corp.....		557A
Bud Radio, Inc.....		U-100/102
Burgess Battery Co.....	D-121/123	
Bussmann Mfg.....	D-103	
CBC Electronics.....		629
Cadre Industries Corp.....	J-116	
Calcon Mfg. Co.....		653
Campro Products Inc.....	B-114	
Cannon Electric Co.....		T-101
Centralab.....	E-118/120	
Channel Master.....		509A
Chemtronics, Inc.....	K-103	
Cinch-Jones Sales.....		V-106
Clarostat Mfg. Co.....	E-107	
Clear Beam Antenna.....	K-115	
Clegg Laboratories.....		520
Cleveland Electronics, Inc.....	C-110	
Columbia Products Co.....	A-107	
Columbia Wire & Supply Co.....	E-106	
Comfort Lines, Inc.....	C-112	
Consolidated Wire & Associated Cos.....	D-100	
Continental Electronics & Sound.....		623/624
Cornell-Dubilier Electric Corp.....	D-116	
Cowan Publishing.....		501

Continued on page 31



## Permohm<sup>®</sup> lead-in wire ... Better Signals!

*in spite of industrial contamination and salt spray*

Yes, Slat and Butch are right. Permohm is the finest lead-in cable you can use for color TV . . . and you can really tell the difference in areas where you run into industrial contamination and salt spray. Permohm is easy to install . . . no end sealing necessary. Packaged lengths . . . 50', 75', and 100'.

Your Belden jobber carries Permohm and the complete line of Belden Lead-in Cables . . . Weldohm<sup>†</sup>, Celluline<sup>✓</sup>, standard 300-ohm line, and the popular ivory colored decorator lead-in.



Be a Cartoon  
Gag Writer  
Win a \$25.00  
Savings Bond

Send us your gag ideas for future cartoons. For each of your gag ideas used, we'll send you a \$25.00 Savings Bond. Write Belden Manufacturing Company, Attn: Mrs. Madelsa Allison, 415 S. Kilpatrick Ave., Chicago 80.

\*This month's winner! Joseph J. Glannini, Joe's Radio & TV Service, Bronx, N.Y. (see asterisk in cartoon)

power supply cords • cord sets and portable cordage • electrical household cords • magnet wire • lead wire

<sup>✓</sup>Belden Trademarks and Patents . . . U.S. Patent No. 2782251 and 2814666

<sup>†</sup>Belden Trademark—Reg. U.S. Pat. Off.

**Belden**  
WIREMAKER FOR INDUSTRY  
SINCE 1902 — CHICAGO

8-3-2

# STANDOFF!



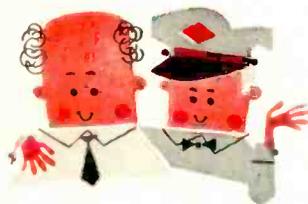
Most people think Standoff means "keep your distance" as a gadget to hold the lead-in away from the house. Any good Service technician knows a Standoff So... ?

Just this. Philco talks your language, Mr. Serviceman. We practically eat and sleep parts and service day in, day out—just like you! We know your problems intimately. We know that unless you make a profit, this Philco operation can never make a profit, either. Everything we offer must be of value to you.

This Standoff, for instance. It has been tested for heat . . . for cold. It is hot galvanized to be rust resistant, tested for tensile strength, for shear . . .

dozens of individual tests and inspections. It's typical of the pains that are taken to insure the quality of every part Philco makes or sells.

Look to Philco for Sales helps, Training aids, Programs, to help keep you the expert in your field. And look to Philco for parts that replace quickly and stay replaced. This means Quality! Your profits will follow as day follows night—and so will ours! Standoffs, anyone?



YOUR PHILCO DISTRIBUTOR has a complete selection of Philco tubes, Philco and universal capacitors, batteries, parts and accessories . . . for every service need. See him today!

PARTS & SERVICE OPERATIONS  
**PHILCO**  
A SUBSIDIARY OF *Ford Motor Company*

--- for more details circle 44 on page 86

## 1962 PARTS SHOW

Continued from page 28

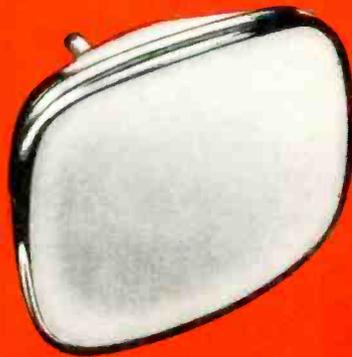
Delco Radio Division.....	F-111	T-105
Diamond Tool & Horseshoe.....	K-119	
DuKane Corp.....		623A
DuMont Labs., Allen B.....	K-100	
Duotone Co.....		609A/611A
Dynaco, Inc.....		537A
Eastern Jewel Corp.....	A-104	
Eby Sales Co.....	F-117	
Elco Sales Co.....		U-113
Electra Mfg. Co.....		S-118
Electro Acoustic Products.....	J-109	
Electro-Mechanical.....	J-107	
Electronic Instrument Co.....	F-109	602A
Electronic Periodicals Inc.....	H-100	
Electronic Products Corp.....		560A
Electronic Publishing Co.....		618-618

Visit **ELECTRONIC TECHNICIAN**  
at the Parts Show Booth E-103

Electro Products Co.....	E-116	628
Electrovert Co.....		624A
Electro-Voice, Inc.....		526A
Elgin Electronics.....	F-121	533
Empire Scientific Corp.....		
Energy Components.....		
Equipto.....	H106	
Ercona Corp.....		551A
Eric Electronics Corp.....	A-116	
Erie Resistor Co.....		K-116
Fanon-Masco.....		553A
Federated Industries, Inc.....	B-118	
Ferrodynamics Corp.....		646A/647A
Fidelitone Microwave, Inc.....	B-124	
Finney Co.....		659/661
Fisher Radio Corp.....		637A
G-C Electronics.....	G-123/125	
General Dynamics/Electronics.....		657A/658A
General Electric Co.....	G-127/128	V-110
General Industries Co.....		613-614
General Instrument Corp.....	J-101	
Glaser-Steers Co.....		613A
Globe Electronics.....	B-119/121	
Gonset Division.....		604
Gramer-Halldorson.....	D-125	
Grayhill, Inc.....		509
Great Eastern Mfg. Co.....		652
Greentree Electronics Corp.....	J-118	
Guardian Electric Mfg. Co.....	D-119	
Gurian & Co., Edward E.....	C-115	
H.I.S. Industries.....	A-108	
Hallcrafters Co.....		512
Hammarlund Mfg. Co.....		545
Hardwick, Hindle, Inc.....		U-121
Harman-Kardon, Inc.....		605A/607A
Hickok Electrical Instrument.....	C-120	
Hi-Lo Mfg. Co.....	C-111	
Hunter Tools.....	B-116	
Hurst Mfg. Co.....	K-106	
Hy-Gain Antenna Products.....	B-120/122	
IE Mfg. Co.....	G-121	
IH Mfg. Co.....		611
ITT Distributor Products.....	C-121/123	
Illumintron Eng'g Corp.....	K-117	
Industrial Electronic Publications.....	E-103	
Injectorall.....	J-112	
International Electronics Corp.....	D-118	
International Radio & Electronics.....		616A
International Rectifier Corp.....	K-111	
International Resistance Co.....	G-107	
J-B-T Instruments, Inc.....	D-107	
JFD Electronics Corp.....	D-106	T-118
Jackson Electrical Instrument.....	B-123	
James Electronics, Inc.....	A-102	539
Jensen Industries, Inc.....	E-112	629A/631A
Jensen Mfg. Co.....		
Jerrold Electronics Corp.....	H-102	655
Jersey Specialty Co.....		522
Johnson Co., E. F.....	A-101	
Kester Solder Co.....	C-119	
Koss Electronic, Inc.....		561A
Kraeuter & Co.....	J-105	
Kurman Electric Co.....		T-106
Lance Antenna Corp.....	C-118	
Lansing Sound, James B.....		544A
Lesa of America.....		548A
Licon Division.....		T-114
Littelfuse, Inc.....	C-103	
Lowell Mfg. Co.....		535A/536A
Lumite Div. Chicopee Mills.....	F-108	
Luxo Lamp Corp.....	B-109	
Magnecord Sales Dept.....		633A
Majestic International.....	K-113	664A/666A

Continued on page 98

# PHILCO. MEANS QUALITY



**PHILCO**  
Star Bright 20/20  
Picture Tube

Everything that goes into a Philco Star Bright picture tube is new... to make TV sets sit up and act like new. New Electron gun, phosphor coating, filaments, cathode, focusing anodes... even new Aquadag Shell Coating.

## PHILCO

### Quality Tested Receiving Tubes

Just like the quality tubes in a brand new Philco television receiver. Safe, sure and sensible for every replacement and they're engineered for long life.



4" Stereophonic  
Extension Speakers

Streamlined beige finished cabinet. 8 ohm voice coil impedance, .68 oz. Alnico magnet. Coaxial connector socket, cable connection plug included. With volume control (Part No. 326-5029-1) or without (Part No. 326-5029).

FREE 2 display cards with each dozen speakers.

For Over 30 Years... Providing a Better Future for America's Service Technicians

Philco product data mailings—direct to you every month! Tangible benefits including low cost group insurance. Practical business building ideas. These advantages are yours when you enroll in the Philco Factory-Supervised Service Association. Ask your Distributor.



PARTS & SERVICE OPERATIONS

# PHILCO

A SUBSIDIARY OF Ford Motor Company

MAIL THIS COUPON TODAY TO:

PHILCO Parts & Service Operation, Dept. B-5  
"C" and Westmoreland Sts., Philo. 34, Pa.

Please send me FREE, the Philco Calculator. (Saves you hours of time figuring out net costs and selling prices.)

Name \_\_\_\_\_

Address \_\_\_\_\_

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

Service only  Retailer with Service Dept.

# LET'S GET THE RECORD STRAIGHT

A JFD competitor is currently circulating the "unbiased" antenna amplifier comparison chart shown on the right. This enlightening analysis (not surprisingly) claims the competitor's amplifier superior in every respect.

However, my competitor overlooked (?) one important detail.

### HE CONVENIENTLY OMITTED THE JFD TRANSIS-TENNA AMPLIFIER.

I am not surprised, but I am disappointed at my competitor's oversight.

Just for the record, only the JFD transistorized amplifier has the unique and desirable feature of mounting directly on the dipole terminals at the point of lowest noise level. It is available as a built-in part of 16 JFD Transis-tenna antennas. It is also used as an "add-on" amplifier that is universally adaptable to any other antenna be it inline Yagi, conical or otherwise. In my opinion, this versatility makes the Transis-tenna the best of the "add-on" amplifiers.

I had believed that the members of the antenna industry had outgrown the need for such so-called "authentic" comparison charts. At this point, however, I feel that every distributor and dealer is entitled to know the complete story. So with apologies to our competitors, we are reproducing the data from his chart with the JFD features added.

I invite your review of the now complete analysis. Judge for yourself which is truly the best "add-on" antenna amplifier in value and performance.

JFD ELECTRONICS CORPORATION

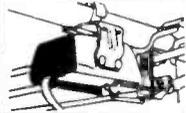
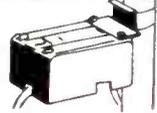
*Edward Finkel*

Edward Finkel,  
Vice President - Sales

Open this flap for the complete  
"add-on" amplifier story... >

# HERE IS THE ANTENNA AMPLIFIER COMPARISON CHART

...WITH THE JFD SPECIFICATIONS  
THAT COMPETITION FORGOT(?)

ANTENNA AMPLIFIER COMPARISON CHART	THIS IS THE ANTENNA AMPLIFIER MANUFACTURER WHO MADE THIS TEST	COMPETITOR A List \$29.95 plus Batt.	COMPETITOR B List \$44.95	COMPETITOR C List \$39.95	JFD TRANSIS-TENNA \$36.95-AC and \$34.95-DC List
<b>PERFORMANCE FEATURES</b>					
1. Average gain, low band	18 db	13 db	4 db	17.2 db	18 db
2. Average gain, high band	14 db	7 db	9.5 db	13.5 db	15 db
3. Average VSWR, input	1:1.5	1:2	1:2.5	1:2	1:1.4
4. Average VSWR, output	1:1.5	1:2	1:3	1:2.5	1:1.4
5. Balanced input & output ferrite transformer	YES	NO (INPUT ONLY)	NO (INPUT ONLY)	YES	NO
6. High pass input filter	YES	NO	NO	NO	YES
7. Channels where amplifier phase shift hurts picture quality	NONE	CH. 2, 3, 4	Ch. 2, 3	CH. 2, 6	NONE
8. Uses MADT 4-lead (VHF) transistor with high gain, low noise figure	YES	NO	NO	NO	NO
9. Designed with enough power to drive up to 6 TV or FM sets	YES	NO	NO	YES	YES
10. Two section power supply filter	YES	NO	YES	NO	NO
11. Circuit stability (won't oscillate)	EXCELLENT	FAIR	POOR	GOOD	EXCELLENT
<b>CONVENIENCE &amp; SERVICE FEATURES</b>					
1. AC receptacle on Power Supply for plugging in TV	YES	NO	NO	NO	NO
2. Polarity and Gain Control switch	YES	NO	NO	NO	NO
3. 3-way amplifier mounting bracket that is easily mounted anyplace from antenna boom to TV set	YES	NO	YES (NOT EASILY INSTALLED WHEN AMPLIFIER IS REMOVED FROM ANTENNA)	YES	NO
4. Rectifier, filter condenser and power transformer in power unit instead of up on antenna amplifier	YES	BATTERY TYPE POWER SUPPLY	YES	NO	YES
5. Electric Power Supply with AC isolation transformer	YES	NO	YES	YES	YES
6. No-strip terminals on both input and output of amplifier and power supply	YES	YES	OUTPUT OF AMPLIFIER ONLY	YES	NO
7. Number of set outputs on power supply	2	4	4	2	4
<b>SELLING FEATURES</b>					
1. List price	34.95	29.95 + BATT.	44.95	39.95	\$36.95-AC and \$34.95-DC List
2. Dealer net price	20.97	19.00 + BATT.	28.77	26.63	As low as \$22.70 for AC. As low as \$21.47 for DC.
3. Compact, set-up display carton	YES	NO	NO	NO	YES
4. Nationally advertised to your customers	YES	NO	NO	NO	YES
5. Cost per year to operate	27¢	AT LEAST \$2.00 BATT. REPLACEM.	27¢	27¢	27¢

## JFD transis- tenna AMPLIFIER

Ferrite transformer is used in JFD amplifier input only. Not needed in output because the output circuit has been designed for 300 ohm balanced operation.

MADT denotes "micro-alloy diffusion transistor" production technique. JFD uses FADT denoting "post-alloy diffusion transistor" production technique. Both types are 4-lead VHF transistors with high gain, low noise figures.

JFD power supply is designed to provide more than adequate filtering under standard load. Why use two filters when one better filter will do as well? With the bonus of fewer parts that minimize servicing needs.

Why add something not really needed? Almost all AC outlets are duplex types nowadays. Besides, power supply and amplifier will always remain "on" if TV set is plugged into built-in AC receptacle. JFD "sensible" engineering provides you with "on-off" switch so amplifier can be turned off when TV is not being used.

No gain control is needed in JFD amplifier since it is designed and tuned for maximum gain on all channels at all times. Moreover, if a local signal is strong enough to require attenuation, why penalize all the other channels by turning down the gain control? Instead, JFD engineers recommend that the serviceman pad the offending channel only, leaving all the others to come in with maximum gain.

Neither is a polarity switch needed. Polarity is set at time of installation. Why offer the TV viewer a useless polarity switch? If he or one of the family should accidentally reset the switch, it means a needless callback at the serviceman's time and expense.

It's common sense to provide a minimum of necessary operating controls for the use of the consumer. The fewer the controls the smaller is the possibility of trouble with consumer handling of unit. This is part of JFD engineering philosophy.

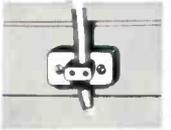
Because the best place for the amplifier is at the antenna terminals. Why defeat the very purpose of an amplifier by attaching it any place but the right place? — at the point of highest signal-to-noise ratio — the antenna's take-off points. Be it single-driven, twin-driven, stacked-conical, Yagi or any other antenna design, that's where the JFD amplifier goes.

No-strip terminals are used only on output of JFD amplifier and JFD power supply. The input to JFD amplifier is effected through indestructible heavy gauge solid aluminum busbars which attach directly to antenna terminals. (One less potentially troublesome twin lead connection.)

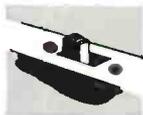
Reprints of the above chart are available on request. JFD will be pleased to send you also its Transis-tenna brochure which shows you how to convert its many consumer benefits into profits.

...AND HERE ARE SOME MORE EXCLUSIVE **transis-tenna** AMPLIFIER FEATURES OUR COMPETITION NEGLECTED TO MENTION!

**1** JFD supplies 300 ohm male and female twin lead connectors for 4-set operation or to provide four different locations where set(s) can be used.



**2** JFD power supply employs on-off switch for viewer's convenience and use when set is shut off. (Also used by competitor A.)



**3** JFD multi-set distribution system uses low-loss ferrite core transformer circuit... not lossy resistor design such as that of our competitor's.



**4** JFD amplifier is corrosion-resistant. It is constructed of aluminum busbars, butyrate housing and an iridized steel terminal plate.



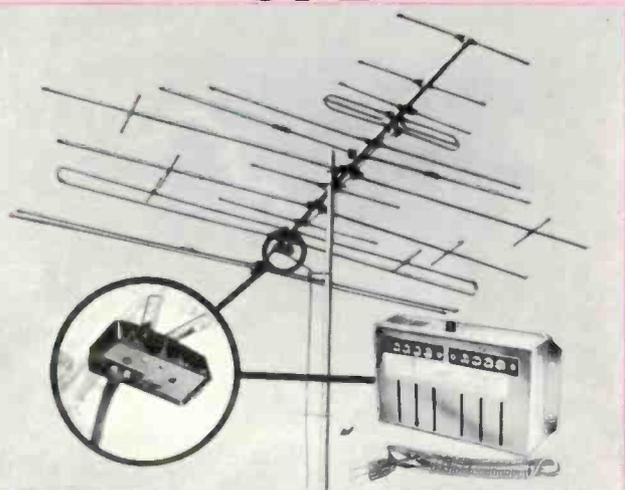
**5** Only JFD offers choice of AC or DC operated amplifier (excellent for accessible attic installations).



**6** Only JFD provides you with the widest selection of electronic Transis-tenna antenna-amplifier-distribution systems that helps you make every antenna sale a profitable Transis-tenna sale.



Only the **JFD** transis-tenna amplifier *integrates* itself into your antenna system

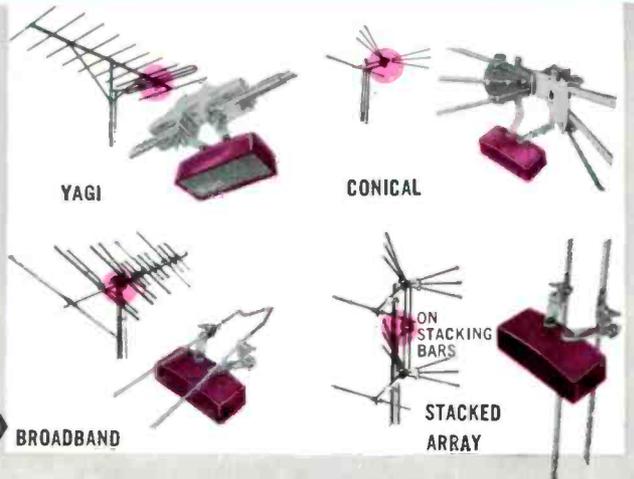


The Transis-tenna is the only amplifier designed to be an electrical and mechanical built-in part of the antenna.

JFD mounts its amplifier at the point of highest signal-to-noise ratio. You do not attach it to the mast, or the crossarm, or at the set—but at only one place, the right place—directly to the antenna take-off points. That is why you get no makeshift straps, clamps or brackets with the Transis-tenna. And for all-new antenna installations, JFD offers you the choice of 16 different Transis-tenna systems complete with integrated amplifier, antenna, power supply and set-coupling units. You pick the right electronic antenna package, perfectly matched to the location.

Only the **transis-tenna** amplifier converts *any* antenna type into a truly *electronic* antenna system!

The Transis-tenna amplifier mounts directly to the take-off points of any antenna in 30 seconds.



NOW . . . PROVE THE TRANSIS-TENNA'S SUPERIOR PERFORMANCE TO YOURSELF!

JFD invites your on-the-job comparison of the design and performance advantages of the Transis-tenna. See for yourself why more quality-conscious, performance-conscious, profit-conscious service-dealers are switching to the JFD Transis-tenna amplifier.

Call YOUR JFD DISTRIBUTOR TODAY FOR **transis-tenna**

**JFD**

THE BRAND THAT PUTS YOU IN COMMAND OF THE MARKET

**JFD ELECTRONICS CORPORATION**

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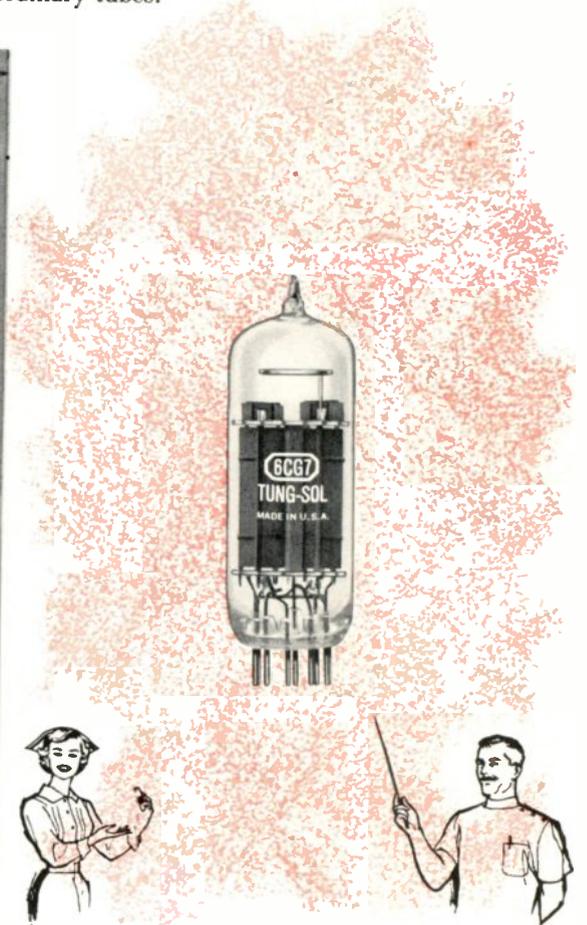
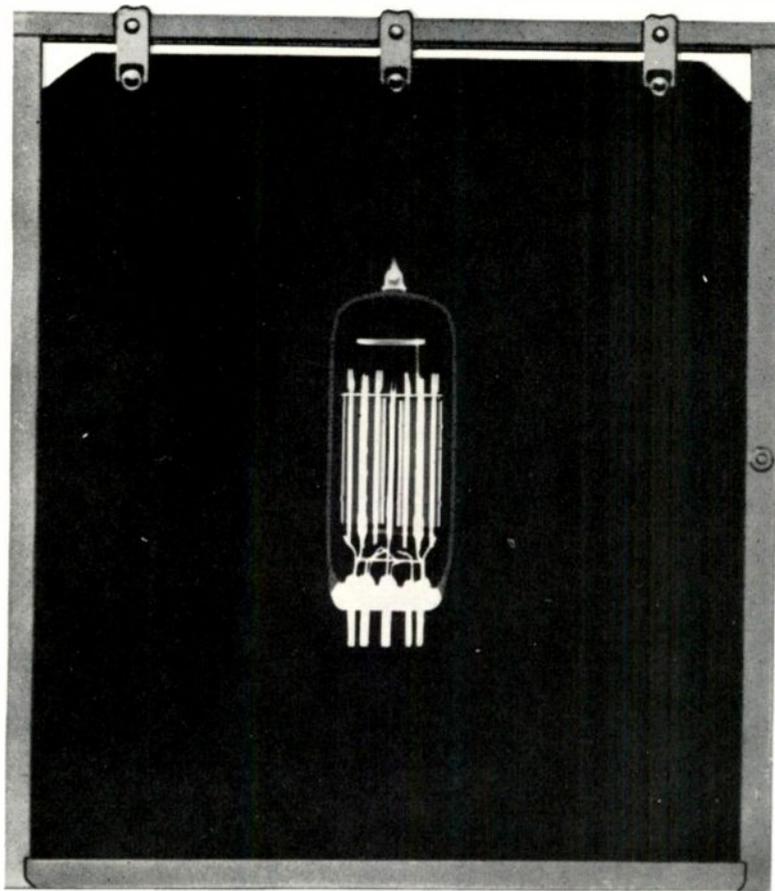
JFD Electronics-Southern, Inc., Oxford, North Carolina

JFD International, 15 Moore Street, New York, N. Y.

JFD Canada, Ltd., 51 McCormack Street, Toronto, Ontario, Canada

## Controlled heater explains greater life expectancy of Tung-Sol series-string tubes

Prognosis—*excellent!* Examination of Tung-Sol series-string TV tubes reveals advanced design of heater and cathode structure, making possible *controlled warm-up time*. This explains the good health and longevity of Tung-Sol series-string tubes. Tung-Sol was a pioneer producer of 600 ma series-string tubes. But, not content merely to be among the first, Tung-Sol expanded this group to cover many applications and then added 450 and 300 ma series-string tubes for sets of more sophisticated circuitry. Time has proved Tung-Sol's diagnosis to be correct; the series-string principle radically improves tube life expectancy while retaining youthful vigor. Consultants on TV service agree that the family of Tung-Sol series-string tubes are far more immune to malfunctions of all kinds. Sets equipped with Tung-Sol series-string tubes require fewer visits and less hospitalization than sets with ordinary tubes.



### Rx FOR A HEALTHY TV SERVICE BUSINESS

To avoid sluggish customer attitude, low profit levels and other complications symptomatic of poor components selection, always rely on Tung-Sol. Choose from more than 100 Tung-Sol series-string tubes to fill your prescriptions.



the first name to ask for when ordering



**TUNG-SOL®**  
**SERIES-STRING TUBES**

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

... for more details circle 63 on last page

ELECTRONIC TECHNICIAN

## The Meaning of Free Trade

Free trade is in the headlines. At this writing, Congress is considering the passage of the Administration-Proposed Trade Expansion Act of 1962. This is not just another piece of legislation. It is crucial. Whether or not it becomes law, and how it will be implemented if it does become law, will vitally affect the economic welfare of our country.

This is a bitter partisan issue between free trade advocates and high tariff protectionists. Neither side has always been completely accurate in mustering arguments and statistics to support its cause. The fact is that there are persuasive arguments on both sides.

What we propose to do is to describe briefly the pending legislation. Then we will explain why a freer trade structure is needed, and note the perils which accompany a low tariff program. We will explore why certain areas of industry still need protection, irrespective of the over-all trade plan. And finally, we would like to puncture some of the myths and misconceptions believed by too many people.

### Proposed Legislation

The Trade Expansion Act of 1962 is intended to replace the expiring Reciprocal Trade Agreements Act, first passed in 1934. The old act allowed the President to bargain with other countries for reduced tariffs on an item by item basis. During the 28 years of its existence, average tariffs have been reduced over 75 percent. Tariff cutting authority is almost exhausted.

The new act, if it becomes law, would authorize reductions of up to 50 percent in U. S. tariffs over the next five years and permit tariffs to be cut on an industry-wide basis. Furthermore, if a cut is not made in any year, it can be added to the cuts instituted in subsequent years. Also, the President is seeking authority to remove tariffs completely on about 30 categories of products, which will be in increasing demand in the expanding markets of the future.

In anticipation of domestic injury to jobs and businesses as a result of the tariff reductions, the new Act provides tax benefits, loans and technical assistance to injured companies. Workers out of jobs would become eligible for re-adjustment allowances of 65 percent of their average wage for a period of 52 weeks. In addition, the workers would receive vocational training in new skills and, perhaps, financial aid to move to communities with better job opportunities.

### Why Cut Tariffs at All

There are some potent arguments for major tariff reductions. One of the strongest is the increasing impact of the European Economic Community, popularly known as the Common Market. Here, Western European countries have banded together to reduce tariffs in trading with one another. Their internal trade grew about 15 percent last year, while their imports from outside countries grew about 5 percent. However, in the previous year, imports from the outside world grew 19 percent in the Common Market. Unless an outside country negotiates mutual tariff reductions with the Common Market, it can logically be expected to be frozen out of Common Market trade. Certainly the industrialized European nations can fill the product void which would result in high tariffs, slow trading between the United States and the Common Market.

So the question is, just how important is the Common Market to us? The answer is, extremely important. Approximately 20 percent of all U. S. exports go to the Common Market. The 1961 total was in excess of 4 billion dollars, a 6 percent rise over the previous year. In 1959, it was only 2.65 billion dollars. In return, the United States imports not much over 2 billion dollars from the Common Market, so we have a vital and favorable balance of approximately 2 billion dollars per year. To lose this favorable balance would be a serious blow to the U. S. economy.

Japanese imports of some 1.9 billion dollars from the United States provides a 400 million dollar balance of trade in our favor.

Despite an apparent over-all favorable balance of trade (approximately 58 percent exported to 42 percent imported), the fact is that we have had a continual outpouring of gold from our treasury to foreign countries. Because of military and foreign aid programs, as well as U. S. tourists and business investments going abroad, our gold supply has decreased from 22.695 billion dollars in 1951 to 16.890 billion dollars in 1961. There is every reason to expect that 1962 will see further depletion of our gold. The soundness of the American dollar could be placed in jeopardy with further gold loss, which is an imperative reason to do something to reverse the trend. An improved balance

*Continued on page 100*

# COLOR TV

## Installation Guide

Upgrade your image and obtain 'stay-sold' results by checking antenna, making proper service adjustments, and by explaining front control operations to owner

*by L. C. Powell*



Technician explains operation of newly installed color TV. Customer is reminded that the lamp should always be located at the side of the set when viewing programs.

■ Many technicians now installing color TV sets are experiencing problems never encountered in black and white installations. A color TV sale and new installation involves more than just connecting the antenna, plugging in the a-c cord, and watching "living color."

For example, signal strength acceptable for black and white receivers is frequently inadequate for color reception, and a new antenna may be required. Even a new electrical outlet may be necessary, since the average color receiver consumes about 500 watts—about four times more than a typical black and white set.

Viewing habits of the owner must also be considered. Is the TV observed more at night or in the daytime? Is the room well lighted while the set is being viewed or is subdued light used more often? These and other conditions must be considered to determine proper set placement in a room.

#### Set Location

If full enjoyment is to be obtained from color TV, it should be viewed in subdued light. Draperies or shades should be closed for daytime viewing. The set should be placed so that no direct light shines on it while being viewed day or night. Strong light tends to "wash out" color. Also, present day color kinescopes have a lower light output than regular CRTs.

A convenient power outlet is another consideration in determining set location. If an extension cord is required to reach an outlet it should be capable of handling 500 watts with ease.

The most comfortable viewing distance from a color receiver is largely determined by the customer. The furniture and receiver should be arranged, however, so that the set may be viewed at distances from 6 to 12 feet.

#### Signal Requirements

Antennas with narrow band response which give good reception on black and white sets are definitely not acceptable for color reception. Regular yagi antennas

should not be used because of their narrow bandwidth. Generally, a broadbanded antenna with reasonable gain and directional characteristics is best. Many existing installations use conical type antennas. If ghosts do not pose a problem, and the antenna is in good condition, the conical may be satisfactory. The "in-line" and most other multi-channel types are generally adequate, too.

When using an existing antenna installation, the lead-in should be checked and replaced if signs of deterioration are found. Particular attention should also be given to the stand-off insulators. They should be of top quality and used in sufficient number to hold the feed-line taut.

Indoor antennas are not recommended for color installations; and outdoor antennas should be used with a resistive attenuator in strong signal areas. In any case, the existing antenna or a new antenna should be oriented for optimum reception during a color program for each station which transmits color. An antenna rotator may be necessary. An improperly oriented antenna may give good black and

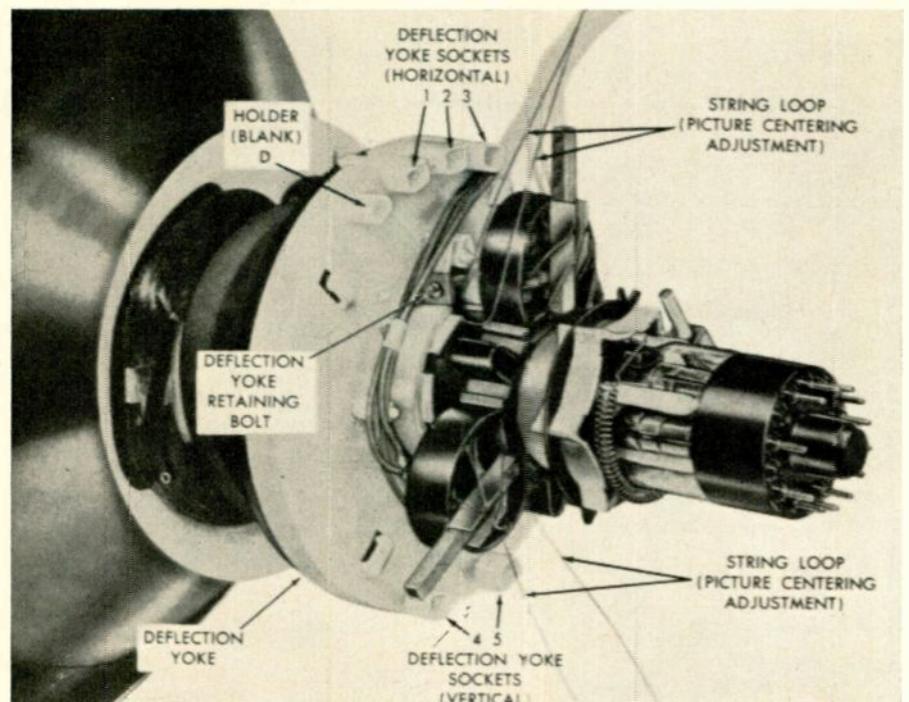
white pictures but no color reception at all!

A signal booster may be required in semi-fringe areas. Since some boosters have a narrow bandwidth, care should be taken to select one with sufficient bandwidth. In those fringe areas where black and white reception is poor, obviously a good color picture cannot be received.

Standing waves on the feed-line may not cause black and white reception trouble, but will cause considerable deterioration to color quality. The presence of standing waves can be checked by wrapping a piece of aluminum foil around the feed-line, near the set, and sliding the foil back and forth along the line. If standing waves are present, considerable change in the picture will be noticed. Tape the foil to the lead-in at the point where the best picture is obtained.

#### Color Installation Adjustments

Adjustments which are normally made in a black and white receiver should also be checked in a color set: Size, linearity, gain, focus, etc. In addition, the color TV will require purity, color killer, gray-



Arrangement of adjustable components on the neck of a typical color CRT. This particular set uses a mechanical centering device controlled by string loops.

tracking adjustments, and perhaps d-c convergence adjustments.

The set should first be positioned at its permanent location in the room. Before any adjustments are made, the picture tube should be "degaussed" with a coil made for this purpose. Magnetization of the picture tube and associated parts often occurs in transit from the factory or to the owner's home. Failure to demagnetize the set first may result in considerable time lost making unnecessary adjustments. If alignments or adjustments are required after degaussing, the manufacturer's recommendations should then be followed. If a touch-up of size or centering controls is made, d-c convergence adjustments may be necessary.

It's difficult to obtain perfect convergence in the tri-gun kinescope. The viewer will usually not object to some color fringing on the picture edges caused by imperfect convergence. Degraded purity, or inadequate gray-tracking, however, will usually bring a customer complaint. These adjustments should be made as nearly perfect as possible.

If the set is always to be viewed under the same conditions, either light or dark, the TV should be ad-

justed under those conditions. When the set is to be viewed under both light and dark conditions, the blue and green screen controls should be reset. This is done as follows: With a black and white picture on in a darkened room, decrease the blue and green screen controls until a very slight brown tint is noticed. This will prevent the more objectionable blue or green tones, often associated with color TV, from showing up under brighter conditions.

### Green Stripe Test Signal

An installation must frequently be made without benefit of a color broadcast. To help you under these conditions, many TV stations transmit a "green stripe" test signal during black and white shows. The green stripe may be used to determine if the set can receive color, to check color sync, and for positioning the antenna. The stripe is not normally visible on either black and white or color sets.

To view the stripe on color receivers, the horizontal sync pulse must be delayed. This can be accomplished in many receivers by turning the horizontal hold control slightly off frequency while maintaining sync. On other sets, it is

necessary to "delay" the sync by shunting the horizontal sync output stage with a .005  $\mu$ f capacitor. This actually lengthens the horizontal sync pulse rise time, causing an effective delay. Insufficient delay may cause the test stripe to have unstable color or lose color completely. Although it is possible to see the stripe at either side of the screen, a delay in the sync will always cause the stripe to appear at the right. If the stripe can be viewed by adjusting the hold control, it can be made to appear at either side of the screen. Horizontal centering can not be used to make the stripe easier to observe.

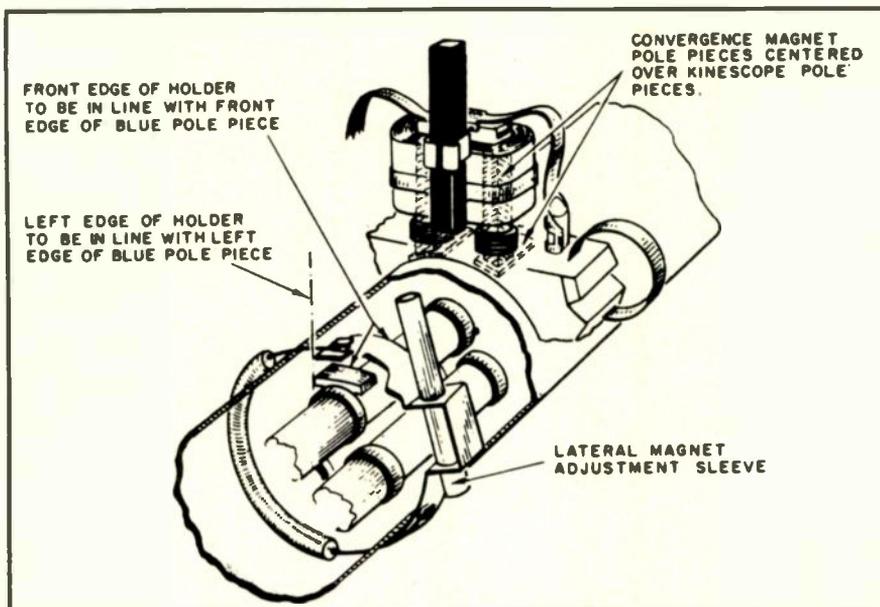
The test stripe is less than an inch wide on most receivers, and runs from the top to the bottom of the screen. If the hue is adjusted using the stripe, it should be set to give a greenish-yellow stripe.

### Instructing the Owner

Your job is not complete until you have instructed the set's owner to use the receiver's "customer controls" properly. Proper operation of each control should be thoroughly explained and the action of each demonstrated. The similarity between black and white and color controls should be pointed out wherever they exist: "hold" controls, brightness, contrast, sound volume, and others which may be peculiar to a particular set.

In your explanation of control operation it may be helpful if self-explanatory names are given to each control in place of those usually given. For instance, the color control may be called "intensity," and the hue control may be termed "shade" or "tone." Many manufacturers have recognized this problem and have changed designations on some color controls.

Brightness and contrast controls are usually adjusted with the color off, or when a black and white program is on. When switching to a color program, the color control is usually pulled out or turned and advanced until color is present on the screen. The owner should be informed that proper adjustment of the hue control is best determined



Location of convergence and lateral beam magnets should be carefully checked after receiver is delivered. Failure to check these magnets may result in complications causing poor picture.

*Continued on page 84*

# F-M Tuner Specifications

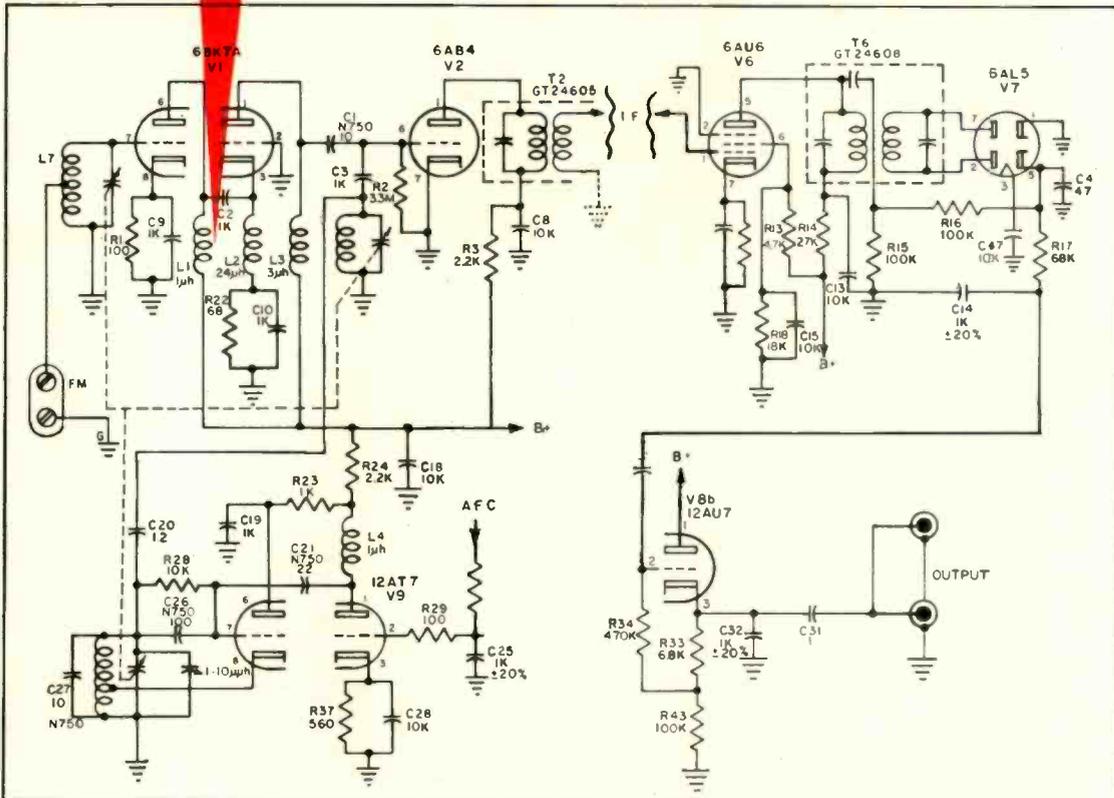
What technicians need to know about specifications for selling and servicing f-m tuners

by E. M. Frickert

■ If technicians are to intelligently troubleshoot and check f-m tuners, an understanding of certain specifications for f-m are based on measurements and terminology which differ from that used in relation to other hi-fi equipment. Customers planning tuner purchases are confused by this terminology, and may call on you to explain these specifications in lay terms.

With the increase in f-m tuner sales, you can expect more and more tuners to be brought into your shop for repair and performance checks. Customers will probably ask about the differences between a-m and f-m tuners. Some technicians may not normally think of these differences, and as a result find it difficult to explain them.

Unlike the a-m tuner or receiver, f-m tuners are very critical in every



F-M section of Harman-Kardon a-m/f-m tuner. Specifications given for this receiver include sensitivity, 1.8  $\mu$ v for 30 db quieting and drift of 20 kc without afc, 2 1/2 kc with afc.

# F-M Tuner Specifications

respect. This is reflected in the component quality and more exacting tolerances found in f-m equipment. The primary reason for these high component standards is the high frequency operation of the f-m tuner. While the standard a-m broadcast band occupies only about 1100 kc, the f-m band is 20 mc wide. The present f-m band is situated between television channels 6 and 7 from 88 mc to 108 mc. The average i-f frequency in a-m receivers is about 455 kc; f-m i-f's are usually 10.7 mc. Components with narrow tolerance, and some with negative or positive temperature coefficients, are necessary to maintain drift-free and stable operation at these frequencies.

With this in mind, we can see that f-m tuners cannot be repaired or aligned in a roughshod manner. A change in lead dress can affect dial calibration drastically, or cause a loss in sensitivity, decreasing the tuner's signal-to-noise ratio. Repairing any of these sensitive circuits, therefore, usually involves re-alignment of r-f or i-f stages.

## Sensitivity

Sensitivity of f-m tuners is usually rated by the signal output in relation to internally generated noise for a specific input. In other words,

a typical specification might be 3  $\mu\text{V}$  (input) for 30 db quieting. In this case, a modulated 3  $\mu\text{V}$  signal applied to the tuner would cause the tuner audio output to be 30 db above the output noise level. Some manufacturers give sensitivity specifications for 20 db quieting; others use different levels of quieting to rate their tuners.

Specifications of tuner sensitivity are frequently listed simply in microvolts. Standard methods of measuring equipment specifications have been set up by the Institute of High Fidelity Manufacturers. Under these standards, a sensitivity rating is given in microvolts, and is always for 30 db quieting and 100 percent input signal modulation. Maximum modulation in f-m broadcasting is equivalent to 30 percent of the maximum allowable deviation of 75 kc.

Internally generated noise does not include hum in the tuner, hence is not considered in the tuner's sensitivity rating. The modern f-m receiver has a hum level much lower than can be heard even without an input signal. Hum measurement is frequently as low as -80 db.

The interfering noise is usually generated in the r-f section of the tuner. Careful selection of a "quite"

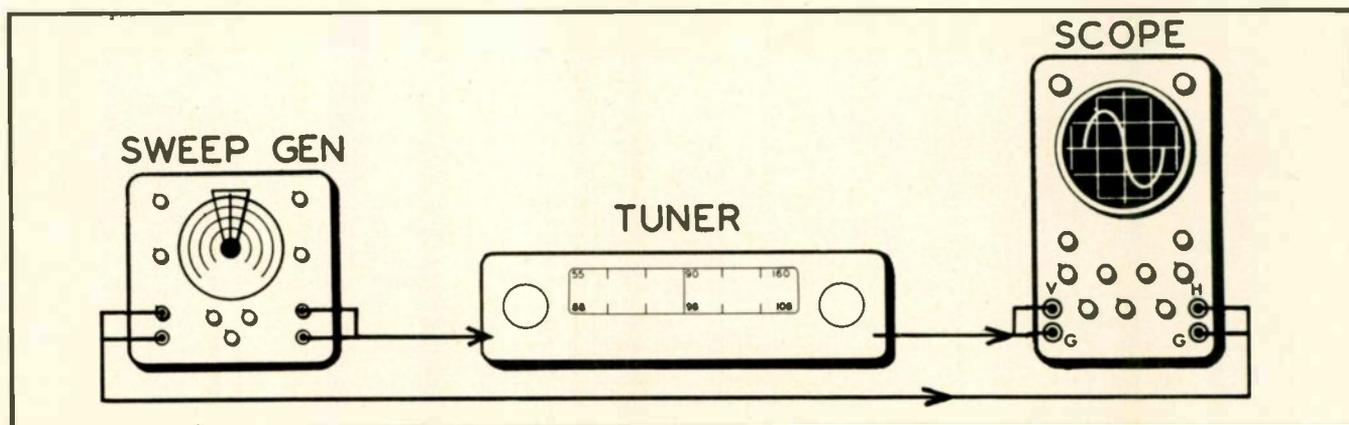
r-f amplifier tube can often improve the signal-to-noise ratio greatly. A high-gain antenna with a mast-mounted preamplifier will also bring borderline or weak stations out of the noise.

## Frequency Response

Frequency response is an over-all specification which indicates the relative amplification of a range of frequencies throughout the audio spectrum. Amplification of all audio frequencies, of course, should be as nearly the same as possible. A typical response might be 10 to 20,000 cps  $\pm 2$  db. The response is primarily dependent upon the design and alignment of the discriminator circuit, and proper i-f alignment.

Tuners with good response specifications in the audible region of the audio spectrum should be carefully investigated. As examples, a specification may be 20 to 15,000 cycles  $\pm .5$  db. A much better specification would be 10 to 50,000 cycles  $\pm 2$  db. Although the over-all variation in frequency is greater, it is understood that there are no serious changes immediately outside the audible range. Some manufacturers include both wide and narrow band responses. In fact the aforementioned specifications could both be from the same tuner.

The tuner's i-f can also have an effect on the audio response curve. Most hi-fi manufacturers strive for an i-f bandwidth of 200 kc. The



Set-up for frequency response check is similar to sweep check in television receivers. For an over-all response check the sweep generator should be modulated to at least 200 kc total deviation. The signal is fed into the antenna terminals with the generator's center frequency set at the same point as the f-m tuner dial.

i-f response is also given in terms of decibel variation from some set point. This wide bandwidth for a relatively small band of audio frequencies is necessary because of the "deviation" in the frequency modulated carrier. This deviation is detected and becomes the amplitude modulated audio signal which is amplified.

Several methods can be used to obtain the required bandwidth for the i-f amplifiers: Standard i-f transformers can be broadened considerably by shunting each side of the transformer with a resistor. A more complex method is to stagger tune the i-f or to tune each transformer to a different frequency. Increasing the bandwidth of the tuner understandably requires many stages to obtain sufficient amplification and is used less frequently.

#### AFC Pull-In Range

Some afc circuits are more efficient than others; good results are possible with most. The purpose of afc circuitry is to control. It "locks" the tuner to the signal being received. That is, oscillator drift caused by component changes during warm-up is overridden by the afc to keep the local oscillator on a constant frequency.

Many tuners have an "afc in out" switch, so that the station may be more easily tuned in before turning on the afc circuitry. The afc operation may be observed on tuners incorporating this afc switch by turn-

ing the tuning dial slightly off the station. When the afc is turned on the station will be "pulled-in." The range in which this "pull-in" is effective is called afc pull-in range or simply "pull-in range." Manufacturers' specifications on afc pull-in vary widely up to 15 kc or more.

Note that the pull-in of the afc circuitry does not mean that stations within that range will be completely pulled-in. The total effect is largely dependent on the signal strength.

Operation of afc circuitry is dependent on the detector error which is present with a detuned station. An error is present because the i-f output will be off somewhat from 10.7 mc. The d-c error from the detector is usually fed to an afc triode grid. The afc triode is in turn connected across the local oscillator tank circuit. An increasing voltage on the afc triode grid increases the capacitance of the afc tube, changing the tank resonance. A positive or negative error voltage then, corrects the frequency drift in the oscillator.

#### Distortion

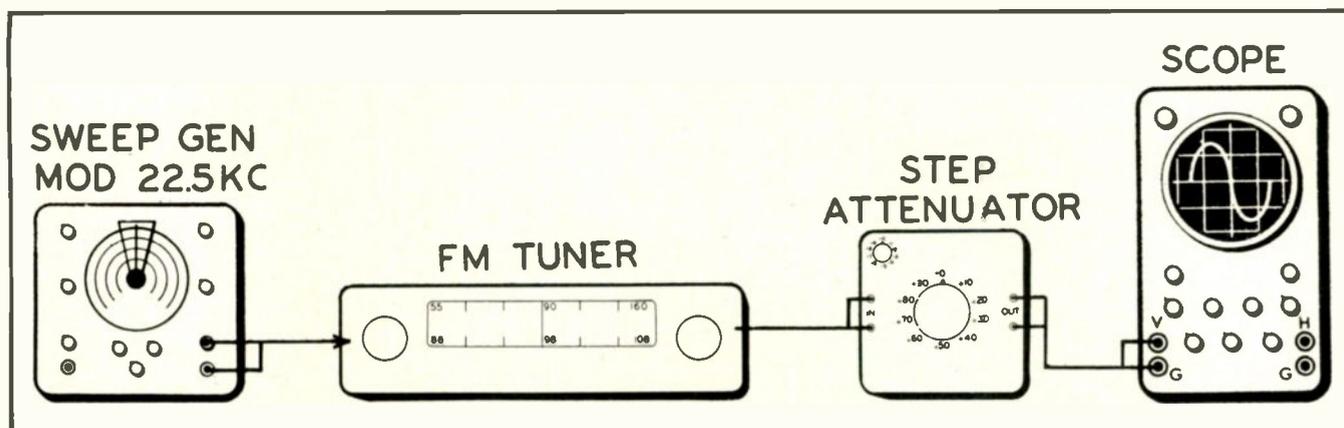
Now, let's go on to the most perplexing specification. Two types of distortions are commonly listed in manufacturers' literature: IM (intermodulation) and harmonic distortion. What these distortions mean to the tuner's owner is largely dependent on how much tolerance he has to them. Although this is

certainly true in other specifications too, a wider variation of tolerances are found in distortion. This is true in part because the listener's musical training or background plays a part in his ability to discern between the music as it was played and that which has been added by the hi-fi equipment.

The most disturbing of the two forms of distortion is IM distortion. This distortion is similar to r-f heterodyning. IM takes place between two or more sound modulated frequencies in the tuner and causes the addition of frequencies which may be the sum or difference of two or more input frequencies.

Harmonic distortion, on the other hand, can be created by a single input frequency. For instance, a 1000 cycle tone input may have a 1000 and a 2000 cycle tone output when processed in a tuner with a measurable amount of harmonic distortion. Harmonic distortion is measured in percent of amplitude against the desired signal, which the harmonic reaches. Amplifiers having poor distortion figures could conceivably develop several tones with one input.

Many other specifications are often included in manufacturers' literature. Few of them, however, deserve the attention of the technician or prospective buyer. Modern hi-fi amplifiers are capable of amplifying virtually all usable broadcast signals from the tuner and usually need little consideration. ■



Sensitivity is determined by measuring signal amplitude and comparing it to noise amplitude. Noise is measured with the antenna terminals shorted. The generator is set for  $\pm 22.5$  kc deviation. The sensitivity is the minimum signal required to provide a 30 db separation between the signal and noise at the tuner output.



## CONFESSIONS OF A

*by William J. Lynott*

■ Like any other red-blooded American husband, I am supremely confident of my native ability for handling emergency household repairs. I sometimes wonder just how wives could possibly get by without the deft hand of a skilled husband to handle situations such as leaky faucets, tops of mayonnaise jars that won't come loose, and broken lamp cords.

I suppose it's not their fault, really. Women just aren't biologically equipped to remain collected and think clearly in the face of emergency situations. Take, for example, a recent Friday night.

When I arrived home from the office, I found the family in a condition bordering on hysteria. It seems the television set had just collapsed into a state of malfunction; and since the mishap took place right in the middle of "Huckleberry Hound," our three children fell completely into a state of disorganized confusion. Naturally, my wife was of no help whatever. All she could think to do was to pace the floor and mutter, "Wait till Daddy comes home. He'll know what to do."

My first reaction, of course, was to size up the situation calmly and decide on a suitable course of action. After a somewhat hectic dinner, I changed my clothes and returned armed with my enviable collection of home handyman tools.

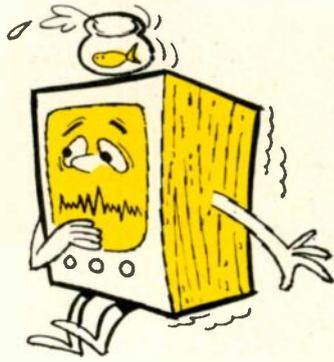
At once, the family was impressed as I skillfully laid out my equipment on the living room rug and

moved the set into the middle of the room. I detected a gleam in my oldest son's eyes that seemed to say, "I want to be smart like you when I grow up, Daddy."

After carefully appraising the mechanical aspects of the task before me, I decided that my first step should be to remove the back of the set to allow me access to its innards. This I accomplished with relative ease, but it was at this point that I suffered my first temporary setback.

When I removed the back, I was dismayed to find that the power cord came off with it. This presented a problem. With the back off the set, I could not supply it with power; with the back on, I was unable to reach inside to conduct my examination. I am not easily fooled, however, and quickly recognized this device as a trick used by manufacturers to discourage home repairs. It occurred to me that television repairmen must use a secret cord to overcome this obstacle in supplying power to sets being repaired. After cautioning the family about disturbing my equipment, I set out for our local repair shop.

Surprisingly enough, I encountered very little resistance in my attempt to purchase one of these cords. As a matter of fact, the gentleman seemed quite happy to sell me one. This required an investment of only one dollar and I felt that I was now fully equipped to do the job.



Expert TV owner reveals techniques for obtaining painful and costly repairs

## "DO-IT-YOURSELFER"

### Buys Do-It-Yourself Book

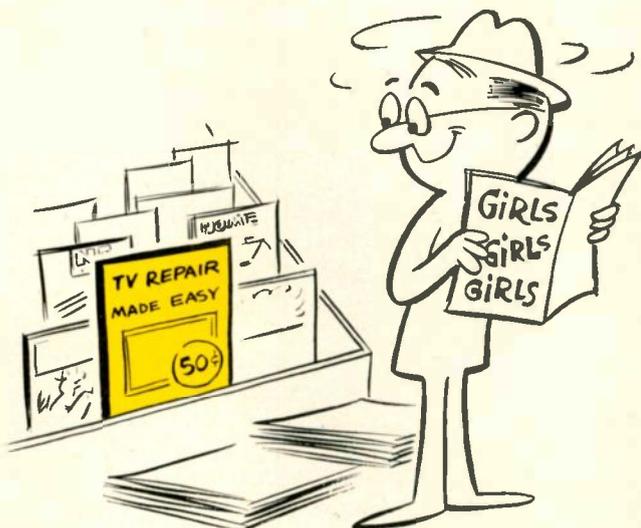
On my way home, I stopped off at the newstand for a pack of cigarettes and it was there that I made a most amazing discovery. I found that for 50 cents I could purchase a little manual that would, in 1 hour, tell me precisely what was wrong with my set and exactly how to go about repairing it. Obviously, this

was a worthwhile investment, so I bought one. My total expenditures were still only \$1.50.

Upon arriving home, I decided to approach the problem intelligently by first reading my new manual from cover to cover. This required about 2 hours, but it was well worth the time, since I was now infinitely more familiar with the problems to be encountered.

According to the instructions, the first step was to find the picture in the manual that most nearly corresponded with the symptoms appearing on the screen of my set. My set had no picture, but had a thin vertical line, with little flashes, running down the center of the screen. Unfortunately, I was unable to locate any picture like this in my manual; but I did find one with a thin horizontal line across the screen. By simply turning the book sideways, I had the picture I needed. The caption under this picture identified the defect as "vertical deflection" trouble. I therefore deduced that since my line was vertical, I must have "horizontal deflection" trouble. This fact I authoritatively announced to my family as the nature of our difficulty. My wife was obviously impressed with my technical jargon.

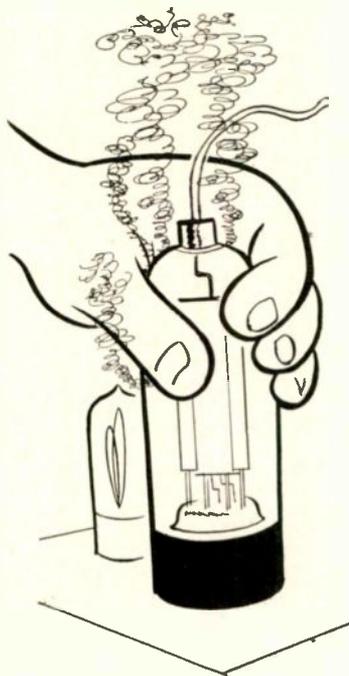
At this point, the directions became somewhat confusing. I did, however, discover a little metal cage referred to in the manual. It was sitting on top of the chassis and this I quickly identified as the high-voltage



# Confessions of a "DO-IT-YOURSELFER"

cage. I had no difficulty in removing the cover from the cage and upon seeing that there were three tubes located inside, I decided to use the cold-tube method of testing as described in the manual. This method consists of turning the power off the set and feeling each tube to see if it is warm or cold. Tubes that are cold are obviously not working properly.

Inside the "cage" was a very large and impressive



looking tube with a metal cap on top. This, I decided, should be my first objective. After first turning off the set, as per the instructions, I wrapped my fingers firmly around the object in question.

A sharp searing pain followed. I quickly withdrew my hand; but not soon enough to avoid leaving two layers of skin firmly attached to the surface of the tube. Later examination of my palm revealed a red, blistered outline of the tube's shape solidly branded into my hand.

I remained calm and collected through this exigency. However, my wife is not blessed with my poise and, as a result, she became so upset that she couldn't remember where she kept the salve and bandages. A visit to my next door neighbor quickly solved this prob-

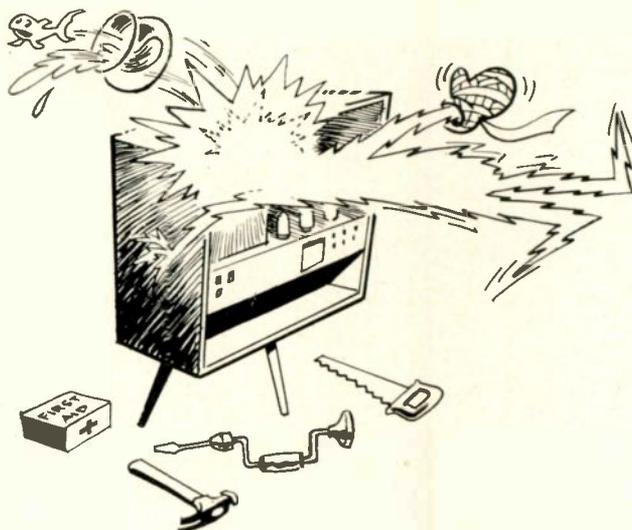
lem. After he had thoroughly medicated my injury, he remarked as how he hated to bother me, but would I lend him \$5. Glancing at my neatly bandaged hand, I reached into my wallet to oblige. It occurred to me at this time that my investment had now reached \$6.50.

Re-reading the manual more carefully, I discovered a small paragraph advising caution when feeling certain tubes since some of them get extremely hot in normal operation. Silly of me to have missed that. Anyway, I decided to drop the "cold-tube" method temporarily and check for unlit filaments.

Every tube seemed to be lit; but the label on the cabinet indicated that there were three tubes located directly in front of the high voltage cage. I couldn't see them because the cage blocked my view. It occurred to me, that if I could squeeze my head inside the cabinet, I would be able to see them.

It was a tight fit, but I was making it. Closer and closer, until suddenly there was a loud sizzling noise, and a bright blue streak that looked like lightning, leaped up and stabbed me on the end of the nose. Later examination revealed a small, blackish spot on the very tip of my nose. That wasn't too bad; but the bump on my head, received as it bounced off the cabinet when my head jerked from the shock, was much more painful.

It was quite a little while before I could check my



manual again because I had to clean up the mess caused when the fishbowl fell off the television during the confusion.

Perhaps, I thought, the cold-tube method would be more satisfactory, after all. Once again, I turned off the set. This time, luck was with me. The very first tube I touched, cautiously at first, was not the slightest bit warm. I had known all along that I could do it. "I'll be right back," I told my wife, who was by now sulking in the kitchen. "I have to go out and buy a 1B3 tube."

Shifting gears with my bandaged hand was a bit difficult, but I finally made it back to the repair shop. The gentleman behind the counter seemed happy to see me again. He didn't seem the least bit perturbed when I announced the fact that I only wanted to buy a tube for my set. I declared, sagely, that I was fixing it myself. He did try to tell me that 1B3 tubes never get hot, but I know that he was just chagrined at my success. The tube cost me only \$2.50, and this figure brought my total evening's investment to only \$9; or rather, \$14, since I had to replace my wife's aquarium.

Imagine my disappointment when I installed the new tube and found the trouble still there. I must admit that, at this point, I was beginning to feel a bit apprehensive. Nevertheless, undaunted, I set about to complete the project.

Around midnight, I could see that I wouldn't be able to finish the job that night. Since it was Friday, I decided to retire for the night and attack the job with a fresh start in the morning. I spent a rather restless night, but I awoke with a stimulating idea; Why not remove all of the tubes from the set and take the lot of them to the repair shop for testing. Why hadn't I thought of that before?

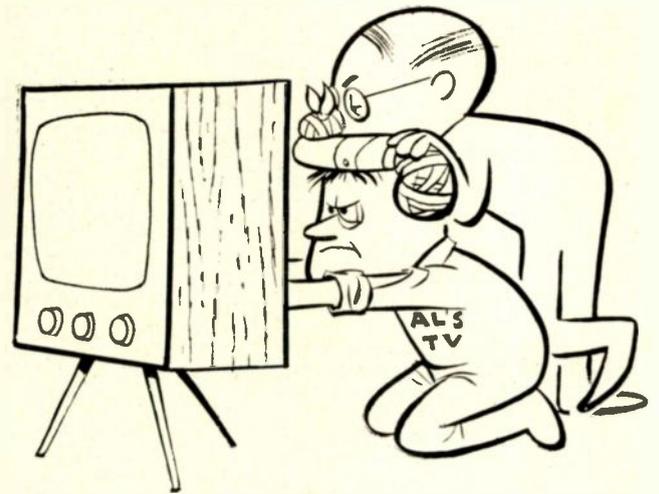
## The Next Day

The repair man told me that three of the tubes checked weak, but he said that he doubted that any of them could cause the kind of trouble that I had described. He wasn't fooling me! I know that he was baiting me to say, "O.K., c'mon over and fix it."

"I'll take the three tubes," I said, coldly. The tubes came to a bit more than I expected; \$8.50, to be exact. But, of course, it would be well worth \$22.50 for the satisfaction of having done the job myself.

When I re-installed all of the tubes, including the new ones, and the set still refused to work; my wife became uncontrollably upset. I tried my best to reason with her, but she had completely lost control of herself. Solely for the purpose of appeasing her, I agreed to call in the repairman.

When he arrived, I was quick to have him understand that I was well aware of the chicanery and unscrupulous methods practiced by members of his profession. I know that this information had made an im-



pression, because I could hear him mumbling to himself while he worked.

I kept a sharp eye on him to make certain that he did not remove any parts from my set to sell to someone else. I was prepared for a long vigil, but surprisingly enough, he announced that he was finished almost before he had started. The trouble, he told me, was nothing but a loose wire in a plug leading to the "deflection yoke." Warily, I inquired about the charges. When he presented me with a bill for \$5.50, I let him know that I felt that was outrageous for connecting a loose wire. He went into a long story about overhead, expenses, transportation, equipment etc., but I cut him short and showed him to the door.

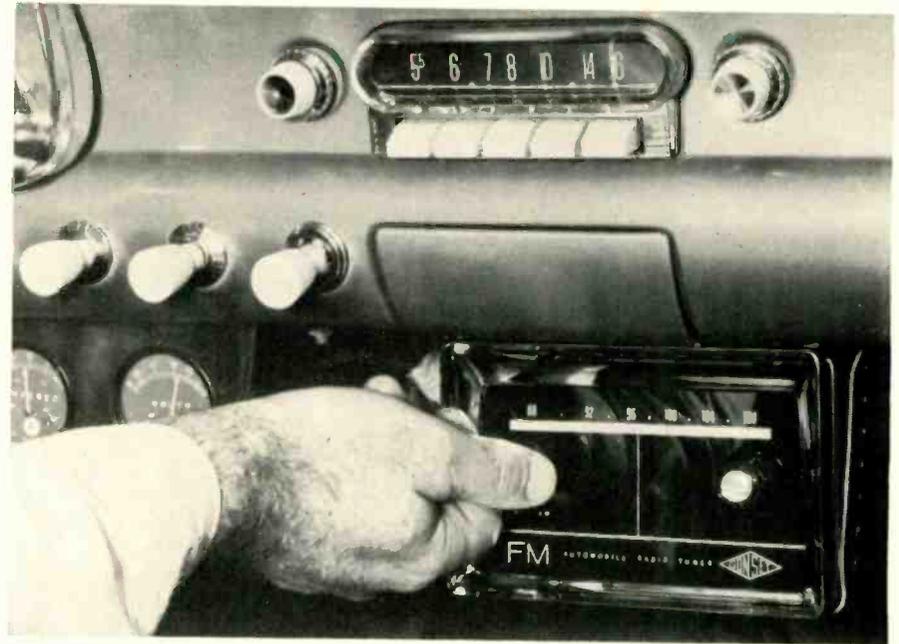
Now that I think back, I realize that it cost me \$28 to have my set fixed; not to mention a burned hand and a nasty bump on the head. Believe me, I'll not stand for that sort of thing in the future! The next time my set goes bad, one of the first things I'm going to look for will be loose wires. ■



# How To Install F-M Auto Converters

Easy under-dash  
mounting promotes  
sales and service

*by Len Buckwalter*



F-m auto converter seen mounted under center area of dashboard.

■ With nearly 1,000 f-m stations operating across the country, f-m listening in cars is on the rise. Some half-dozen manufacturers are marketing converter units which provide f-m reception through the car's a-m radio.

What can an f-m converter offer a customer? It can provide him with quality programs, relative noise-free reception, and wider frequency response (within limits of the a-m radio, of course). Additionally, customers can have the f-m converter removed for installation in a new auto without depreciating the value of their old autos since it would still contain a standard a-m radio. Thus, a strong sales story may be developed for f-m converter-sales — which leads to installation work.

Installation of these under-dash units, when performed with normal care, should present few problems to the service technician. Several factors common to all converters should be known before an installation is made. Most important is the

d-c voltage supply of the car; it must be 12 volts with the negative battery terminal grounded. Converter circuits use 12-volt tubes.

Noise suppression is another consideration. The auto manufacturer installs noise-reducing devices solely for the standard broadcast band. These often prove inadequate for satisfactory f-m reception, especially beyond a station's primary service area.

Otherwise, all f-m converters are compatible with the typical a-m radio. They have matching antenna plugs and power cables. In some instances (described later) the installer will have to provide an extra mounting bracket—a minor item not always supplied in the converter package

## Preparation

Bench checking a new f-m converter before installation is at the option of the installer. If the unit proves defective after mounting in the car, the results are not as cata-

strophic as with the in-dash radio—the converter can be dropped out easily. The test procedure is simple; 12-volt d-c connections are made and the output of the unit coupled to the antenna input of an a-m radio. The a-m dial is set to approximately 800 kc, or the nominal frequency for the converter under test. Use a standard f-m antenna into the converter for signal pickup.

Several of the converters contain a small dry cell which serves as a reference for the afc diode. No current is drawn from the cell. If you suspect that the new converter has been on the shelf for some time, however, it might be a good idea to check the cell.

Some persons may assume that a converter will provide audio quality comparable to a home hi-fi installation. Of course, this is not true — the a-m radio's audio range is limited. It should be explained to customers prior to the sale that limitations exist, since f-m audio is processed in the a-m amplifiers.

## Installation

The next step is to determine the converter's mounting position. The favored location is at the dash-board center, as shown in the photo. Two factors are important: The tuning dial must be within arm's length of the driver, and the unit must not "bark" center passengers' knees. Another mounting possibility is left of the steering column if space permits. Most converters have an output lead for connecting to the a-m radio. This piece of coaxial cable should not be cut or extended. Its fixed length naturally influences the converter's final mounting location.

Perforated straps are included with most converters for securing the case to the under-lip of the dash (see photo). Before drilling any holes, check this area carefully. The car manufacturer frequently punches several holes for mounting accessories. If these match up with holes in the strap, they can save a drilling step. Extreme care must be exercised to avoid drilling into wiring which usually runs inside the lower edge of the dash. A #31 drill-bit is the usual size for the job.

Although the single bracket will hold the converter in place, a more secure mount is obtained by attaching an additional strap between the case rear and the car firewall. (The strap is a hardware store item.) It prevents annoying vibration of the case.

Place lockwashers under all mounting nuts. Not only will they

counter the effects of vibration, but they insure a good case ground. Actually, the case is automatically grounded when the cables are plugged in — but these additional points might help reduce noise pickup.

## Electrical Connections

Most late-model cars are equipped with an accessory terminal on the rear of the ignition switch. This affords a convenient pickup point for the 12-volt hot lead. It allows the converter to be operated while the engine is off, but offers the protective feature of requiring the ignition key to remain in the lock.

On older cars, without the accessory terminal, a choice can be presented to the customer. If he desires to listen while the engine is off, power must be tapped from an unswitched hot terminal. It should be explained that if the unit is inadvertently left on overnight the battery might be fully discharged. Most f-m converters draw significant current. An alternative connection is the switched ignition terminal; the converter is always disabled when the key is removed. Many customers prefer the latter choice.

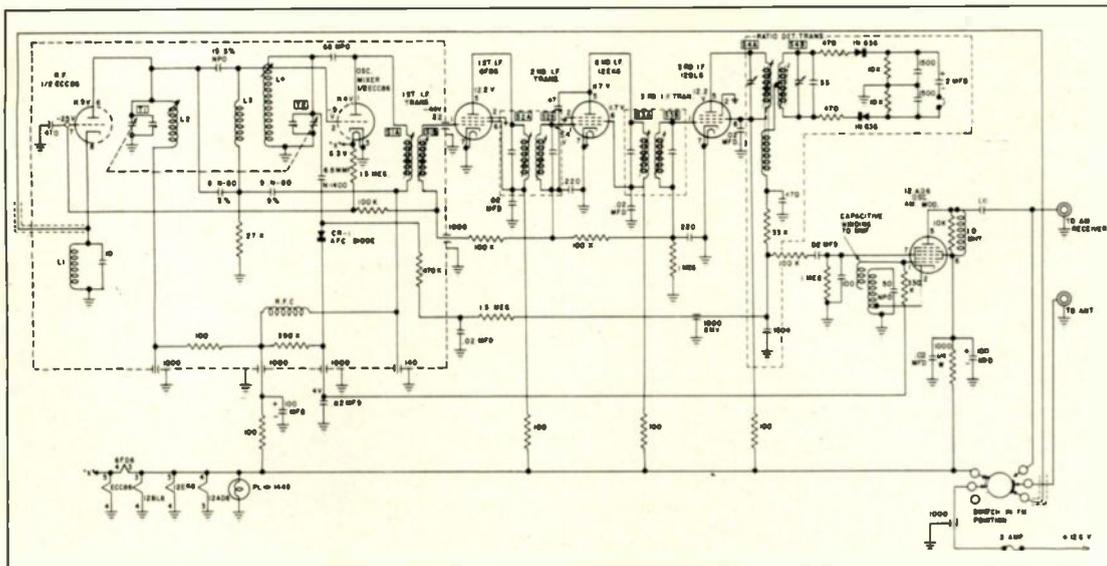
The a-m antenna plug is removed from the regular receiver and inserted into the matching receptacle on the converter. The converter output is then plugged into the a-m radio antenna input. All necessary switching of the outside antenna is performed by an "a-m/f-m" switch on the converter's front panel.

Before the installed system is operated, the a-m radio's antenna trimmer should be peaked. Its original setting will probably be thrown off because of the added converter cable and antenna switch capacitance. This is done in the customary manner; a weak a-m station at the upper end of the dial is tuned in and peaked.

Next, find the converter's output frequency on the a-m band. The instruction sheet packed with each converter states the unit's frequency, usually near 800 kc. The precise setting is easily identified by ear—a strong hiss pops in at the correct frequency. The a-m dial can be touched up for optimum audio quality while receiving an f-m station. A convenient method is to

*Continued on page 83*

Mfr.	Model	Retail Price
Automatic	FM-92	\$59.95
Eric	FM-100	69.95
Gonset	3311	79.50
Granco	ARC-60	49.50
Kinematix	Skylark	89.95
Motorola	FM C-62	69.95



Schematic of ARC-60 f-m converter made by Granco division, Emerson Radio, Inc.

Modular construction permits technician to mail PC boards to factory for service

## A Technician's View of a

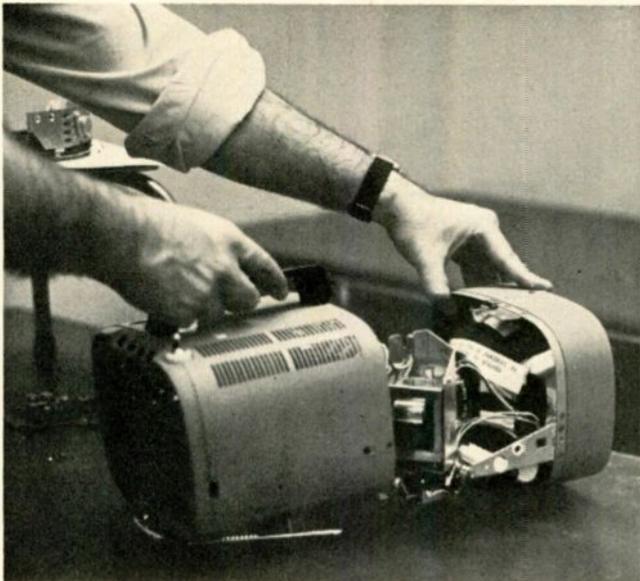
■ Sony's new modular-designed TV is the most compact portable to hit the market so far. In addition to stacking the circuitry, compactness is gained by locating the speaker on the cabinet bottom and by using a special CRT. All customer controls are located on the set's top side except for "ac-dc-off" buttons which are located at the bottom-front. Two jacks are mounted on the front of the cabinet for private earphone lis-

tening. A unique visor can be moved in or out to prevent strong light from "washing out" the picture.

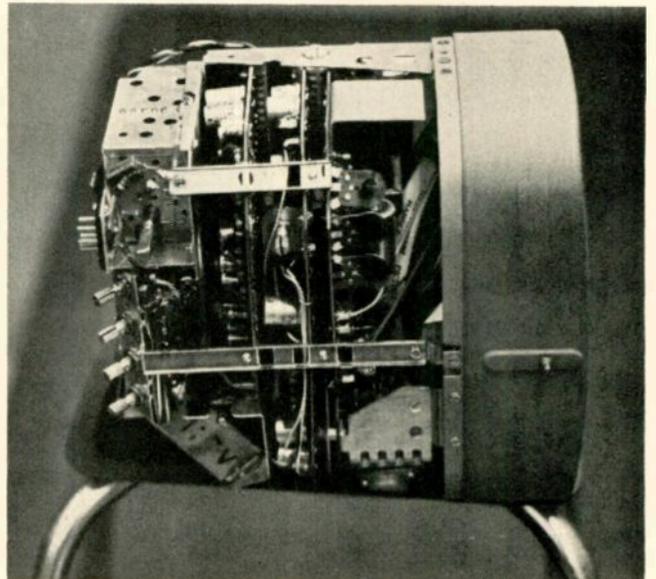
All of the set's transistor circuitry is mounted on three plug-in PC boards. The jack wiring, speaker, tuner and CRT are mounted on the "chassis." The circuitry should present no unusual problems to anyone who has a working knowledge of TV transistor circuitry.

Each of the three PC boards contain circuitry associated with a particular portion of the set. One board contains the video and i-f detector; another, the video amplifier, sync circuits and sound sections; the third board contains all of the sweep circuitry.

Disassembling the set is easy for a portable of this type. After the visor is detached the set can be turned face down for easy removal



After screws and knobs are removed the case comes apart to reveal the printed circuit modules on the inside.



Two metal strips on topside of set prevent PC boards from slipping out. Tuner and back-of-set controls appear at left.

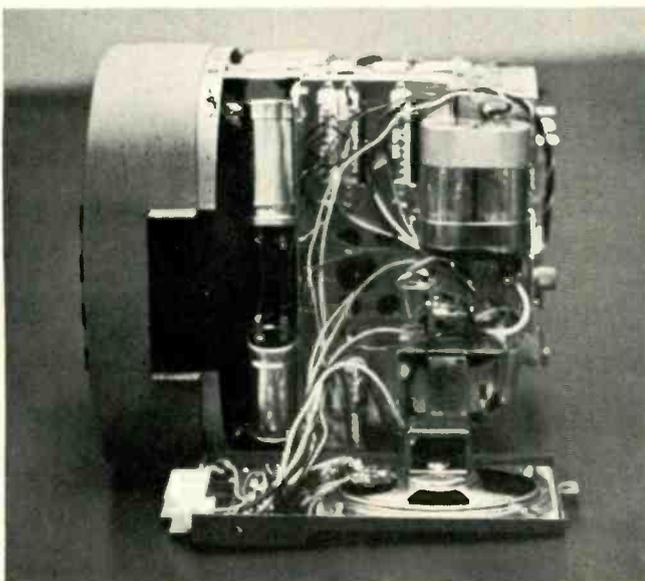
# Transistor TV

of the nine screws which secure the cover. Screws near the antenna terminal and one below the vertical hold control are not removed. Of course, the knobs must be pulled off before the cover can be taken off.

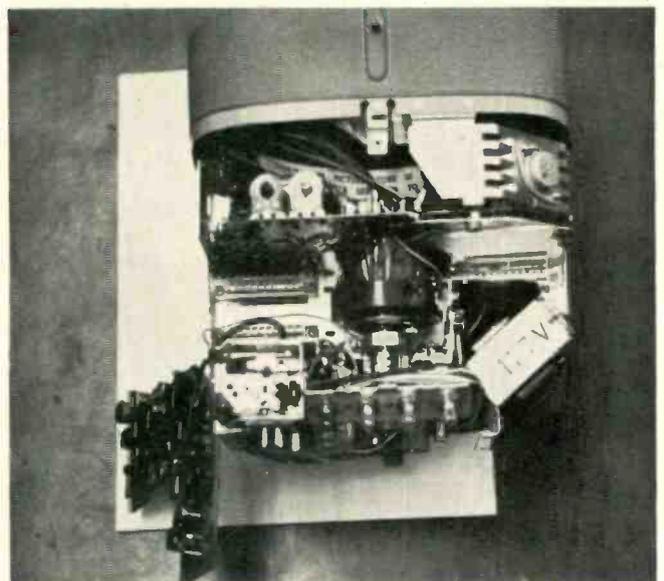
Inside the set, three screws holding two metal strips are removed to allow the PC boards to be unplugged. The smallest board, located nearest to the tuner, is the video i-f and video detector board.



Sony's newest model portable TV weighs less than 14 pounds and only 17 pounds with battery pack. Its over-all dimensions are only 8½ x 7 x 9 inches.



Underside view of "bantam" portable TV showing speaker-switch panel removed and placed in foreground.



Middle PC board removed with video i-f board still connected to tuner output in left foreground.

## A Technician's view of a Transistor TV

The video amplifier and sync circuits are located on the middle board nearest the front holds the sweep circuit components. All parts are easily accessible by removal of the PC boards.

Two conventional HV rectifier diodes in a voltage doubler circuit develop 6000 volts for the CRT—the only other tube in the set.

The set is transformer powered from the a-c line. It can also be

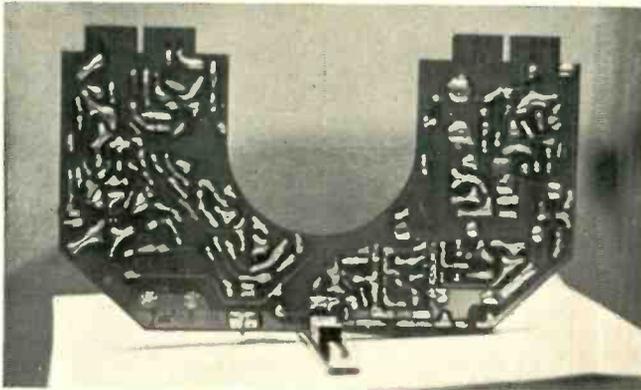
battery-operated; the battery is recharged by plugging the a-c cord into an outlet and pushing the a-c and off buttons at the same time. The battery charging should be continued for three times the discharge time, if the battery pack is used. If operation of the set from an auto battery is desired, an optional 16-foot cord can be plugged into the car's cigarette lighter socket.

The TV may also be operated in

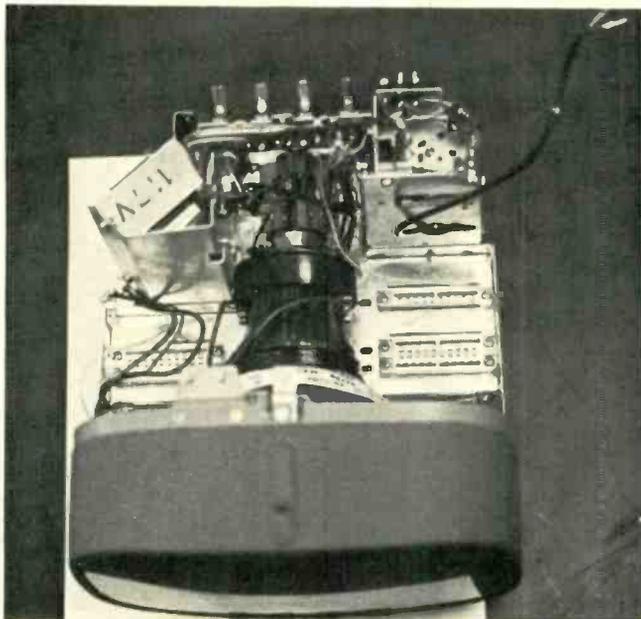
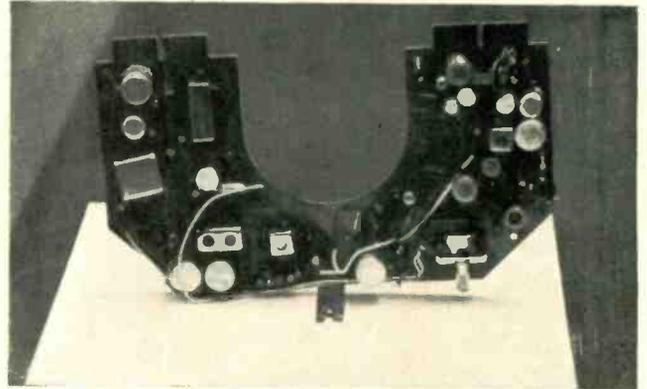
a boat or other remote place when connected into any 12 volt d-c supply which has at least a three ampere hour capacity.

The monopole antenna gives a good picture on all but the weakest signals. The monopole will provide signal pickup comparable to that obtained with "rabbit ears." The set is rated at 30 v sensitivity for a usable picture.

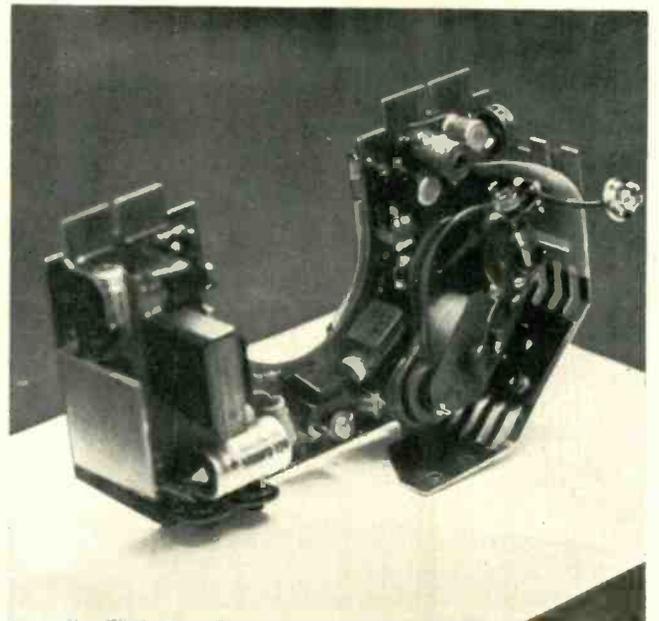
For shops equipped to do transistor servicing, the company offers a factory service. This seems very practical, since a faulty PC board can be sent first class mail at little cost. ■



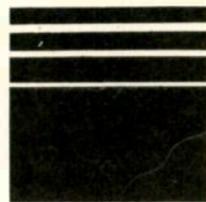
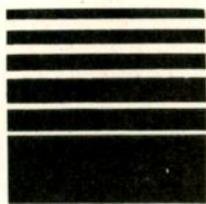
Wiring and component sides of middle PC board. Good construction was found throughout the set.



Top of chassis with all PC boards removed. Yoke leads are provided with slip-on connectors and are color coded to assure correct hook-up.



Sweep and HV PC board. Flyback transformer and one high voltage rectifier appear at right.



# REPAIRING

## Vertical Hold Defects

Locate drift, 'soft-hold' and out-of-range faults the easy way

*by Frank Salerno*

■ Vertical roll can be an extremely annoying problem for the TV owner. This is true because the owner will frequently get up from his comfortable chair many times to make adjustments while viewing a program—rather than call a technician. Since this is a problem the customer is inclined to live with, it may become doubly annoying to the technician, especially if the condition is allowed to prevail for an extended length of time.

A vertically slipping picture can be classified into two categories: (a) vertical drift and (b) soft vertical hold. In the former case the vertical lock is very positive, but as the set warms up the vertical frequency gradually drifts, requiring periodic readjustment of the hold control.

When the vertical lock is very soft, the picture rolls slowly downward and upward and the hold control can do no more than gently ease the picture back into place. In this case any change in picture content will knock the picture out of

sync and frequent resetting of the hold control may be necessary.

### Eliminating Drift

Solving a drift problem is comparatively easy since the most frequent causes can be narrowed down to a few components. Usually drift can be attributed to a faulty capacitor. Capacitors which cause trouble as the set warms up usually change in value as they become heated. As this value changes so does the normal frequency of the oscillator. By readjusting the hold control we return the oscillator to its proper frequency. More heat causes the capacitor to drift further and the circuit runs off frequency again.

One of the best tools for locating this type of trouble is a hot soldering iron. By placing the iron close to the suspected components the picture will fall out of sync as the faulty one is heated. Those capacitors that commonly cause vertical drift are illustrated in Fig. 1. Components connected with the oscilla-

tor grid should be examined closely because the oscillator's frequency is extremely sensitive to changes in the grid circuit.

Resistors, of course, can cause drift trouble and though rather uncommon, should not be ignored. Tubes should also be considered, but again it's an exception rather than a rule.

### Troubleshooting 'Soft-Hold'

A soft vertical hold is a bit more difficult to service because there are many more areas to investigate. The problem itself is simple—there is little or no vertical sync pulse reaching the oscillator tube. The oscillator is running at its own resonant frequency without the benefit of a strong sync pulse. Without sync to trigger and hold it in place, it will roll in both directions and the picture will seldom hold.

Here is where the oscilloscope is indispensable. The scope at the sync output should give us a waveform similar to Fig. 2A. Absence of sync pulse, or low vertical sync pulse

amplitude, indicates trouble before the output stage. If the sync pulse has proper amplitude at the sync output, the integrator circuit should be checked (see Fig. 3). A shorted or leaky C-1, C-2, or C-3 or a partially open or leaky C-4 will cause poor vertical lock.

If the vertical sync pulse is missing at the sync output, it is wise to

look at the video detector output. The vertical pulse should be clearly distinguishable above or below the composite video signal. Absence or compression of the vertical pulse indicates trouble in the r-f, i-f or agc circuits. Gassy tubes can cause the pulse to be clipped off before detection. Poor age filtering can cause degenerative feedback with the same

clipping action as with gassy tubes.

If the vertical pulse is normal at the detector output, we must then isolate the exact area where the pulse is being lost or compressed. By following the signal through the video amplifier, into the first sync amplifier and through the last sync stages we can determine precisely where the defect is located.

Check the grid and plate voltages of the isolated stage. Compare these against those listed by the manufacturer. Control grids generally should have negative voltages because of grid leak action. Slightly positive voltages should immediately throw suspicion on the coupling capacitors. If a grid becomes positive the tube is forced to operate on an incorrect portion of its curve and the sync pulse tips are clipped off.

#### A Color Case

This method of troubleshooting was used recently on an RCA color receiver, model CTC-5. The first service call revealed that the vertical lock was very soft on all channels and nonexistent on channel 4. To avoid dismantling the receiver, a scope and VTVM was brought into the home.

A scope check was made at the sync output tube's plate. The vertical sync pulse was missing. Next, we checked the detector output. The pulse was good. We moved to the

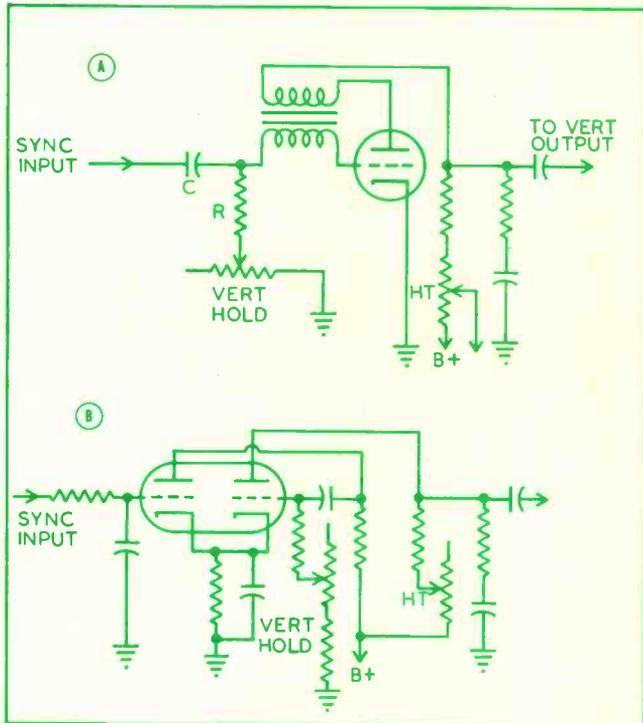


Fig. 1 (A) — Typical vertical blocking oscillator, and (B) — typical vertical multivibrator. Coupling capacitors (C) are the most frequent cause of vertical drift.

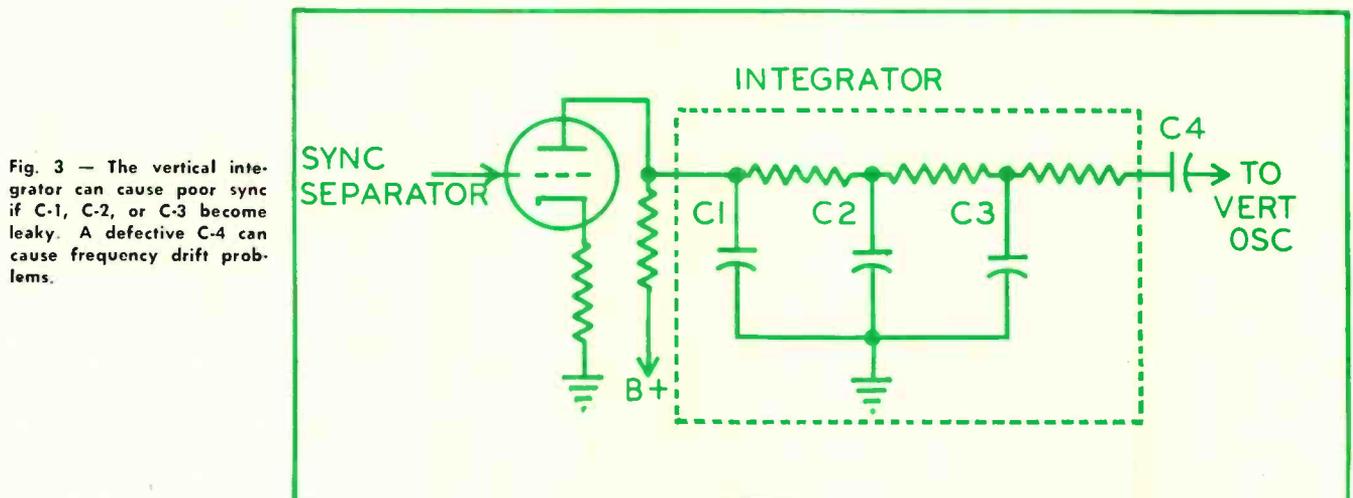


Fig. 3 — The vertical integrator can cause poor sync if C-1, C-2, or C-3 become leaky. A defective C-4 can cause frequency drift problems.

first sync amplifier grid and the pulse was still good. The pulse was missing at the plate so it seemed that the loss was taking place in the first sync amplifier. The VTVM probe was clipped to the amplifier's plate and the reading was 20 volts low. Next, the 1-megohm plate load resistor was measured and found to be over 3-megs. We split the resistor with diagonals and soldered a new one in place. The vertical pulse now came through good and strong. The CTC-5 circuit is shown in Fig. 4.

The most satisfying thing about the job was that the chassis was never removed from the cabinet, since all checks and repairs were made topside.

The last vertical roll trouble-category is that of the control locking-in at the end of its range. This fault can frequently become one of the most difficult vertical repair problems. When this condition exists, variations in signal strength, or drift caused by heat, or when the transmitting station shifts from programs to commercials, a loss of sync will usually occur. Small value changes are sometimes at fault; though more often the fault is caused by a leaky coupling capacitor.

Careful component and waveform checking is the key to rapid solution of vertical drift problems. ■

Author uses VTVM to locate a sync problem without removing the chassis from cabinet. The repair can often be made more efficiently in this manner.

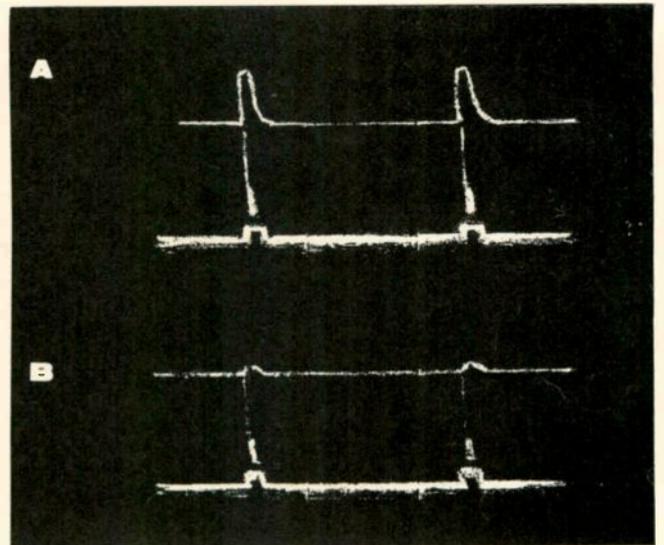
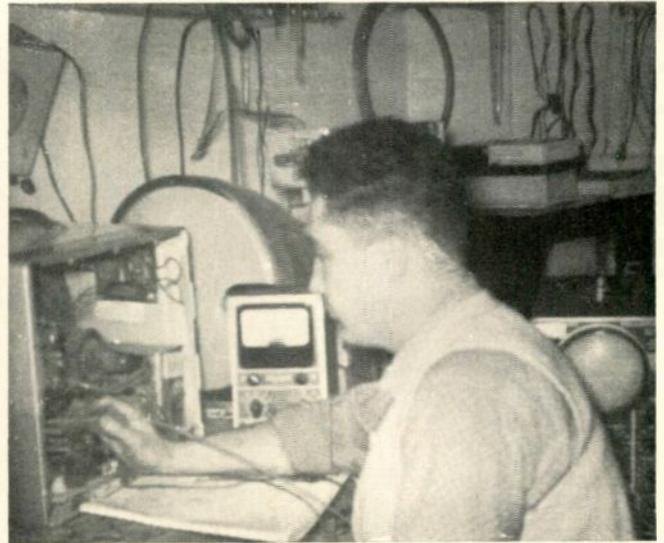


Fig. 2 (A) — Normal vertical sync pulse, and (B) — compressed pulse. Sync tips can be compressed or clipped in video amplifiers because of poor coupling or gassy tubes.

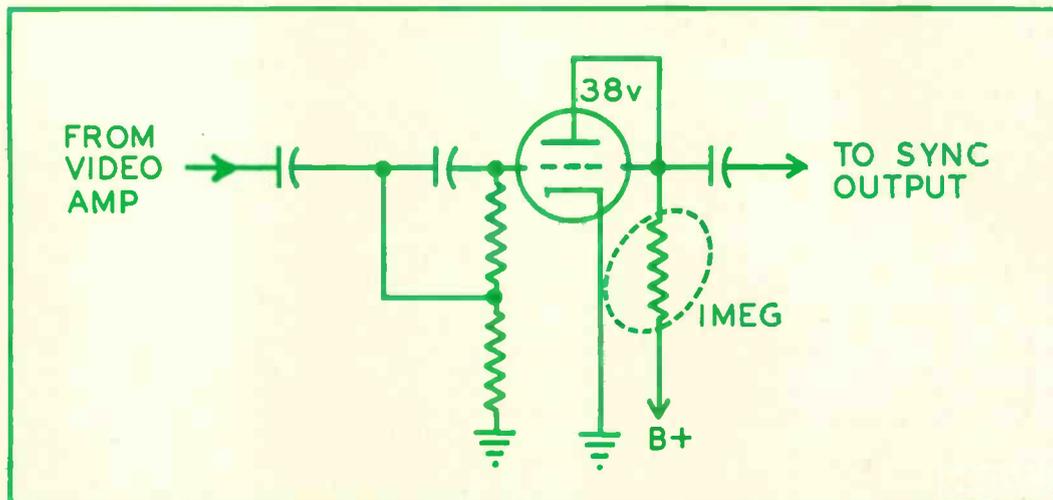


Fig. 4 — 1 meg plate load resistor in CTC-5 color set increased to 3 meg causing almost complete loss of sync. Only 18 volts appeared on sync amplifier plate.

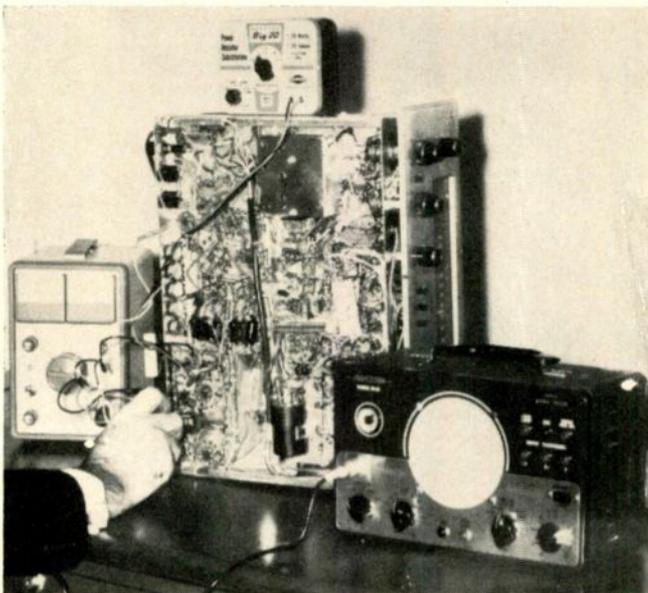
## New Test Instruments

# for BENCH and CADDY

### OSCILLOSCOPE

**Heath Company, Oscilloscope, Model 10-21 Kit at \$49.95** — This 3 inch scope looks like a good addition to the service bench or for use as a second scope on house calls. The unit weighs only twelve pounds and can easily be handled in small quarters. Vertical and hori-

zontal amplifiers are nearly identical, and are direct-coupled for maximum low frequency response; the vertical amplifier has provisions for direct coupling to the CRT. Shielding of the CRT, frequently found only in more expensive scopes, prevents magnetic fields from affecting the waveforms. Although the scope is lightweight, it is transformer powered and has a full-wave B+ supply. The scope should prove very valuable for the crowded service bench, and should handle most TV and radio work without any problem. The frequency response is from 20 cps to 200 k cps  $\pm 2$  db.; sensitivity is .25 volts for 1 in. of p-p vertical deflection. Instruction manual supplied with the scope gives tips on using the scope and information on interpreting Lissajous patterns in service work.



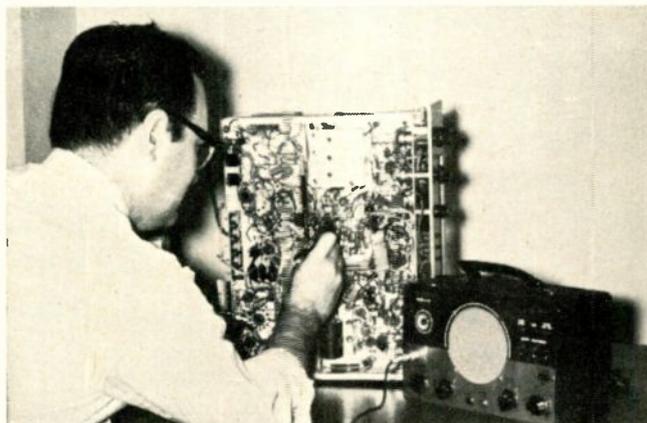
Sencore's resistance substitution box is used to determine the correct power resistor required in a circuit after the overheated original unit's value could not be determined by sight.

### SUBSTITUTION BOX

**Sencore Power Resistor Substitution Box Model PR111 at \$12.75** — Replacing burned-out power resistors is often a problem because a resistor's value is obliterated from overheating or other causes. Substitution can be a time consuming job. The Sencore unit incorporates 20 different value 20 watt resistors which can be rapidly selected by two switches. One switch selects a resistance, another is a multiplier switch. The valve switch is marked 2.5, 5, 7.5, 10 and 15. The other switch multiplies those resistances by 1, 10, 100, and 1000. Two permanent test leads are provided with the unit. This looks like a very good time saver for any shop.

## SIGNAL TRACER

**Precision Audio-R-F Signal Tracer, Model ST-22 at \$59.95** — Many technicians have never owned a signal tracer, expressing doubt about any advantage the device may offer over "finger tip injection" techniques. For those still in doubt, we believe the signal tracer which we recently tried is worth investigating. Audio circuitry in both radio and TV can be checked with the unit. Defective radio stages from the antenna to the voice coil are quickly isolated by substitution. In addition, the signal tracer doubles as an audio amplifier—if necessary a low power P. A.—and serves also as a wattmeter. Microphones, crystal phono pickups, tuners, and photo cells can also be checked. Both coarse and fine controls for amplifier gain are incorporated. A single switch turns the tracer on, and selects all functions. A probe which is provided is used for i-f and r-f signals. Output jacks are featured



An ET editor uses Precision's signal tracer on hi-fi chassis. The unit was found to be helpful in locating faulty stages in all types of audio circuits.

so the signal being checked may be measured simultaneously with external test equipment. The wattmeter handles loads up to 500 watts and is used in conjunction with the tuning eye on the tester. The unit is well constructed, with a transformer powered full wave power supply, a 5-inch speaker and center tapped output transformer. A complete instruction manual gives many hints for using the tracer in applications usually not associated with a single tracer.

## SPEEDPROBE

**Speedprobe, Model VOM at \$9.95**—This probe is designed for high speed testing with any 20,000 ohm/volt meter which has a 2.5 volt scale. The probe has five built-in switches which allow the technician to change the meter range by the thumb switches on the probe. Unlike many "function" probes, the speedprobe is easy to handle and gets into tight spots easily. The tip of the probe is 2 inches long and tapered to a point. Insulation on the probe tip allows easy access through crowded bare wires to the test point. The probe is equipped with a banana type plug for meter connection. Resistors used in the unit are 1 percent for maximum accuracy with all meters. The biggest timesaving with the meter is obtained in circuits with unknown voltages. The probe can be applied to the test point with switch #1 depressed, equivalent to the 1000 volt scale, buttons 4, 3, 2, and 1 can then be de-



Speedprobe shown connected to meter. With the meter function switch set to 2.5 volts, the probe will measure voltages on scales equivalent to 2.5, 10, 150, 250, and 1000 volts by probe button selection.

pressed for ranges of 250v, 50v, 10v, and 2.5v. With only a little practice, the switching becomes familiar and easier than reaching for the meter range switch. We think the probe would be especially good for the caddy where small meters with hard-to-turn switches are often carried.



## Difficult Service Jobs Described by Readers

### Video Capacitor Upsets Vertical Sync

A Canadian GE TV chassis, Model M525, was brought in for a horizontal output transformer replacement. While the set was "cooking," after replacement of the flyback, I noticed the picture would roll rapidly for a short time and suddenly stop without being adjusted. It could be locked by adjusting the vertical hold, but the control range was very narrow. I substituted a number of tubes, including vertical oscillator, output, sync and video amplifier, but this did not help the vertical hold. Whenever I attempted to check voltages and waveforms at various test points, the picture would lock-in perfectly and readings would be normal. A thorough visual inspection of components, resistance checks and voltage readings failed to reveal any fault or defective component.

Finally, I connected a scope to the video amplifier tube's grid. The picture began to roll again. I noticed that the p-p voltage at the video amplifier was about 10 per-

cent low. But on the detector side of the .015  $\mu\text{f}$  coupling capacitor the voltage was normal. I replaced this capacitor and the set worked normal with plenty of vertical hold range.

The defective capacitor was obviously causing poor low frequency response, hence degraded vertical sync.—*James E. Searson, Windsor, Ontario, Canada.*

### Height Control Causes Bends

A TV set came into the shop with a case of bends. Without an antenna connected the raster appeared perfectly normal. However, when signal was applied the picture was "S" shaped. The set was a Philco model A-T2230.

Grounding the horizontal oscillator grid caused the picture to lose sync but it didn't change the bending effect. Therefore, it wasn't afc trouble. My next thought was leakage between sections of a filter capacitor (one section was located in the horizontal oscillator circuit), as I have found this component caused bends

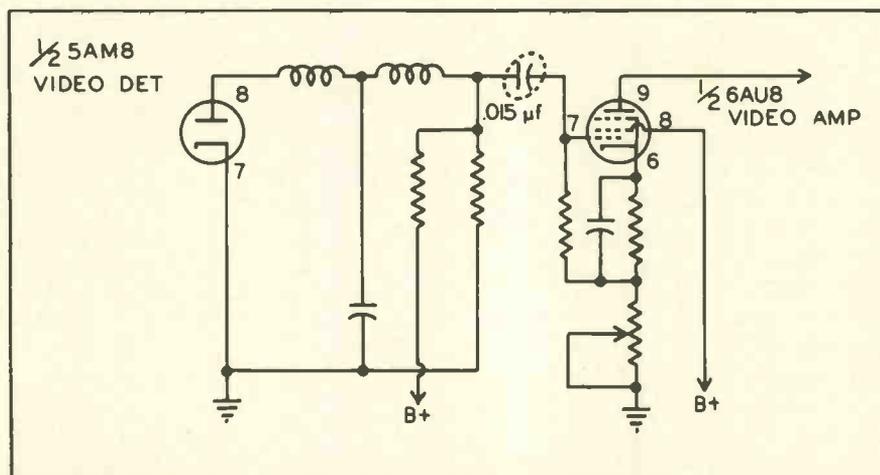
in other sets of this model. Substituting this component did not help.

While planning my next troubleshooting move, I turned the height control, decreasing picture size. At about half normal size the bend disappeared and picture straightened upright.

A study of the manufacturer's schematic diagram indicated how this could happen. Since the vertical linearity, height and width controls are mounted on the same insulated chassis plate, a defect in the height control circuit could upset the horizontal sweep circuit. The height and width controls both feed from the 240 B+ line.

A VOM check revealed the height control was shorted to its shaft over part of its rotation area. This permitted vertical sweep signal to enter the horizontal sweep section, causing the bends when the control was adjusted for a full raster. Replacing the defective control eliminated the bending.—*Albert J. Bergbauer, Florence, Ala.*

• Often a clue to a malfunction will be uncovered if all the controls on the TV set are checked and the effect they have on the set's operation is noted. Controls which would at first seem to have no logical association with a problem, such as Mr. Bergbauer's, may help you turn a "Tough Dog" into a routine job.—Ed.



Video coupling capacitor caused poor low frequency response with a resultant loss of vertical sync.

### TOUGH DOGS WANTED

\$10.00 paid for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Photographs are desirable. Unacceptable items will be returned if accompanied by a stamped envelope. Send your entries to "Tough Dog" Editor, ELECTRONIC TECHNICIAN, 1 East First St., Duluth 2, Minn.

# New TRANSISTOR RADIO ANALYST

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**B&K** Model 960

TRANSISTOR RADIO ANALYST

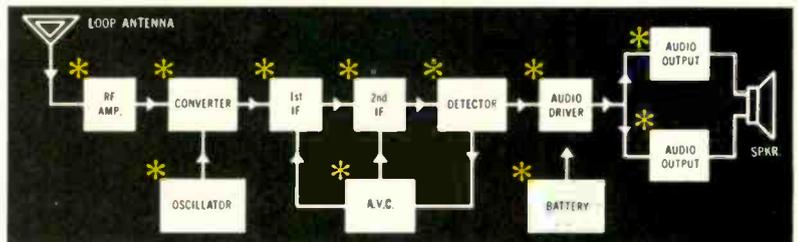
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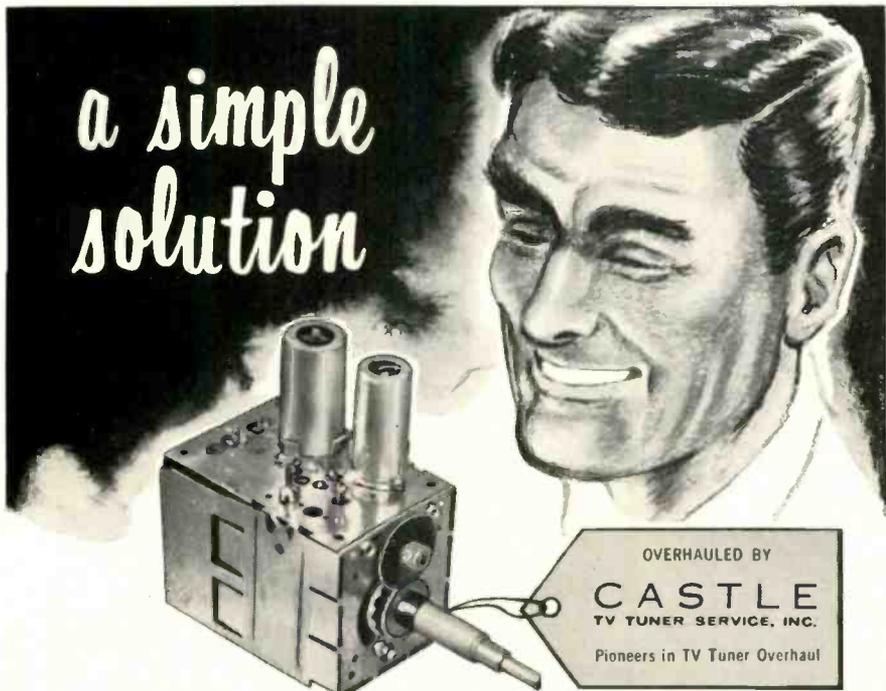
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a simple solution

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 TV TUNER SERVICE, INC.  
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Ask yourself

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- ... do you have all the expensive instruments and equipment to complete the alignment so essential after each tuner repair or replacement?
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A Castle Overhaul eliminates every one of these problems. Castle replaces all defective parts, (tubes and major parts are extra at net prices) and then aligns your tuner to the exact, original specifications. Simply send us your defective tuner complete; include tubes, shield cover and any damaged parts with model number and complaint.

Send for FREE Mailing Kit and complete details.

ONE PRICE  
**9<sup>95</sup>**  
 ALL MAKES

VHF TUNERS  
 UHF TUNERS  
 UV COMBINATIONS\*

\*UV combination tuner must be of one piece construction. Separate UHF and VHF tuners with cord or gear drives must be dismantled and the defective unit sent in.

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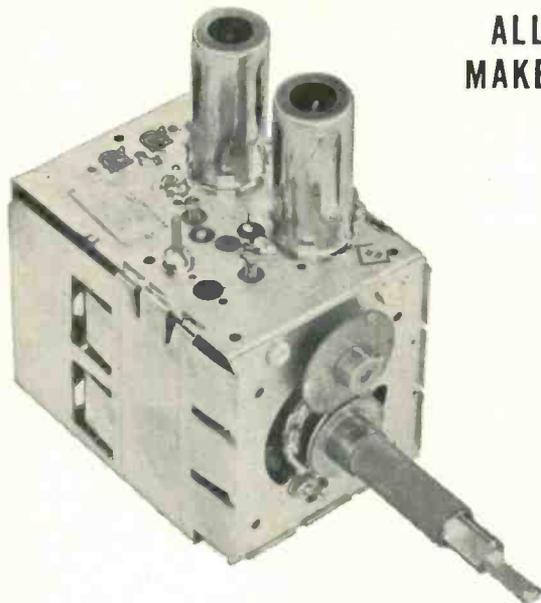
**CASTLE** Pioneers in TV Tuner Overhauling  
 TV TUNER SERVICE, INC.

5710 N. Western Ave., Chicago 45, Illinois • 653 Palisade Ave., Cliffside Park, New Jersey  
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--- for more details circle 19 on page 86

Tarzian offers

# FAST, DEPENDABLE TUNER REPAIR SERVICE



ALL  
MAKES

It just makes sense that a manufacturer of tuners should be better-qualified, better-equipped to offer the most dependable tuner repair and overhaul service.

Sarkes Tarzian, Inc., pioneer in the tuner business, maintains a complete, well-equipped Factory Service Dept.—assisted by Engineering personnel—and staffed by specialized technicians who handle **ONLY** tuner repairs . . . on **ALL** makes and models.

Tarzian-made tuners received one day will be fixed and shipped out the next. Cost is only \$8.50 and \$15 for UV combinations. That includes **ALL** parts (except tubes which are furnished at our cost) and labor, and a 6-month guarantee against defective workmanship and parts failure due to normal usage. Replacements available at low cost on tuners beyond practical repair.

Tarzian-made tuners are identified by this stamping. When inquiring about service on other tuners, always give tube complement . . . shaft length . . . filament . . . voltage . . . series or shunt heater . . . IF frequency . . . chassis identification. All tuners repaired on approved, open accounts. Check with your local distributor for Sarkes Tarzian replacement tuners, replacement parts, or repair service.

SERVICE MANAGER • TUNER DIVISION • DEPT. 3A



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INCLUDING

## ALL PARTS and LABOR

## 24-HOUR SERVICE 6-MONTH WARRANTY

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--- for more details circle 51 on page 86

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Power input: 100 MW • Receiver  
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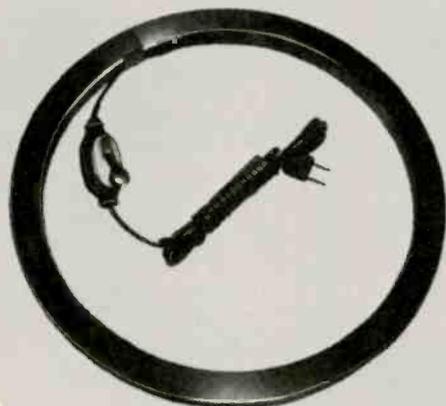
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--- for more details circle 36 on page 86

ARE YOU READY TO SERVICE

# COLOR TV?

Walsco Repair Kit no. 2599x puts you in business... *For Only \$21<sup>90</sup>*



2590



2596



2595



2548



2589

Save \$4<sup>60</sup>  
Reg. \$26.50

The 5 essential Service Tools all in one kit...

CAT. NO.	TOOL	USE
2590	Degaussing Coil	eliminates stray magnetic fields for easy purity adjustment
2595	Grid Grounding Box	grounds kinescope control grids... each switch and cord color coded for quick connection
2548	Interlock Cheater	protects you from shock hazard... permits insertion of a voltage probe
2589	Alignment Tool	two-in-one tool for alignment of concentric controls... saves time
2596	Color Viewer	three viewing filters simplify phase and matrix adjustments, let you handle many service calls in-the-home



## COLOR TV TUBE MICROSCOPE

Precision pocket-size scope that magnifies dots 25 times for SIMPLE and ACCURATE adjustment of purity magnet, yoke, and rlm magnets.

CATALOG NO. 2594  
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and **FREE!** useful Color TV service book included with each kit



Zenith, and other leading color TV set manufacturers, recommend using Walsco Degaussing Coils and Color TV Accessory Tools in equipment servicing. And only Walsco is ready now to outfit you with all the tools you need!

For more information, write for Specification FR3554.



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*communications equipment*

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# NEW! "680 BASECOM"

FOR VHF-FM TWO WAY  
MOBILE RADIO

*the new 680 series offers*  
**HIGH PERFORMANCE at  
 MODERATE COST with  
 LOW MAINTENANCE!**



## "680" FEATURES AND OPTIONS:

- ★ **PROVEN PERFORMANCE**... all the outstanding features of the popular "580" series, plus the following.
- ★ **HIGH POWER**... 100 watts output 25 to 50 mc, 75 watts 144 to 174 mc, both base and mobile.
- ★ **TONE SQUELCH**... two way tone squelch compatible with other systems to EIA standards.
- ★ Meets all FCC and OCDM requirements.
- ★ **SIMULTANEOUS RECEPTION**... dual front end receiver for monitoring two frequencies anywhere in the band.
- ★ **TRANSMITTER FILAMENT SWITCH**... reduces battery drain when on "stand-by".
- ★ **MONITORS REMOTE CONTROL**... base station monitors remote transmissions. Intercom provided. All functions available at remote position.



## "680 FLEETCOM" COMBINATION

- MOBILE CONTROL HEAD
- SPEAKER
- TRANSISTOR POWER SUPPLY

**ATTENTION DEALERS!**  
*Write for available territories.*



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FOUNDED 1938 CORAL GABLES MIAMI 34, FLORIDA

--- for more details circle 23 on page 86

## F

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as easy to use as a voltmeter

- A new 3 inch Extended View Portable Scope with New Features and Performance Unmatched by even the most Costly 5 inch Oscilloscopes



# NEW

## SENCORE PS120 PROFESSIONAL WIDE BAND OSCILLOSCOPE

Lowest priced Wide Band 3 inch Scope anywhere. All hand wired.

Only 124<sup>50</sup> net

Here it is, the scope that technicians, engineers and servicemen from coast to coast have been demanding. A portable wide band scope that can be used on the job anywhere, yet has the highest laboratory specifications for shop or lab. Cumbersome color TV sets, remote audio and organ installations and computers are just a few of the jobs that make owning a scope of this type so essential. Why consider a narrow band scope, when for only a few dollars more, this professional wide band sensitive scope equips you for any job.

- The PS120 provides features never before offered. Only two major controls make the PS120 as easy to use as a voltmeter. Even its smart good looks were designed for functional efficiency. New forward thrust design, creating its own shadow mask, and full width calibrated graph increase sharpness of wave form patterns. A permanent chromed steel carrying handle instead of untidy leather strap and a concealed compartment under panel for leads, jacks and AC line cord make the

PS120 the first truly portable scope combining neatness with top efficiency.

- Electrical specifications and operational ease will surpass your fondest expectations. Imagine a wide band scope that accurately reproduces any waveform from 20 cycles to 12 megacycles. And the PS120 is as sensitive as narrow band scopes... all the way. Vertical amplifier sensitivity is .035 volts RMS. The PS120 has no narrow band positions which cause other scopes to register erroneous waveforms unexpectedly. Another Sencore first is the Automatic Range Indication on Vertical Input Control which enables the direct reading of peak-to-peak voltages. Simply adjust to one inch height and read P-to-P volts present. Standby position on power switch, another first, adds hours of life to CRT and other tubes. A sensitive wide band oscilloscope like the PS120 has become an absolute necessity for trouble shooting Color TV and other modern circuits and no other scope is as fast or easy to use.

### SPECIFICATIONS

#### WIDE FREQUENCY RESPONSE:

**Vertical Amplifier**—flat within 1/2 DB from 20 cycles to 5.5 MC, down—3 DB at 7.5 MC, usable up to 12 MC.  
**Horizontal Amplifier**—flat within —3 DB from 45 cycles to 330 KC, flat within —6 DB from 20 cycles to 500 KC.

#### HIGH DEFLECTION SENSITIVITY:

	RMS	P/P
<b>Vertical Amplifier</b> —Vert. input cable	.035V/IN.	0.1V/IN.
Aux. vert. jack	.035V/IN.	0.1V/IN.
Through Lo-Cap. probe	.35V/IN.	1.0V/IN.
<b>Horizontal Amplifier</b> —	.51V/IN.	1.44V/IN.

#### HIGH INPUT RESISTANCE AND LOW CAPACITY:

Vert. input cable	2.7 Meg. shunted by approx. 99 MMF
Aux. vert. input jack	2.7 Meg. shunted by approx. 25 MMF
Through low cap. probe	27 Meg. shunted by 9 MMF
Horiz. input jack	330 K to 4 Meg.

#### HORIZONTAL SWEEP OSCILLATOR:

Frequency range—	4 ranges, 15 cycles—150 KC
Sync Range—	15 cycles to 8 MC—usable to 12 MC

#### MAXIMUM AC INPUT VOLTAGE:

Vertical input cable—	} 1000 VPP (in presence of 600 VDC)
Aux. vert. jack—	
Lo-Cap probe—	} approx. 15 VPP (In presence of 400 VDC)
Horiz. input jack—	

#### POWER REQUIREMENTS:

Voltage—	105-125 volts, 50-60 cycle
Power consumption—	On pos. 82 watts
	Stby. pos. 10 watts

**SIZE:** 7" wide x 9" high x 11 1/4" deep—weight 12 lbs.

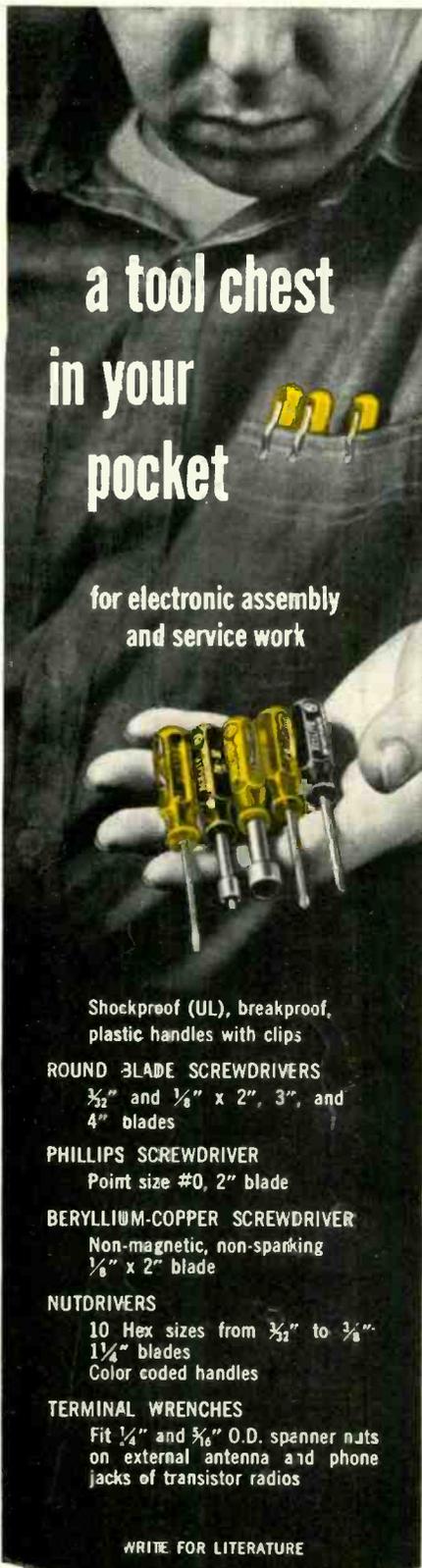
The PS120 is a must for color TV servicing. For example, with its extended vertical amplifier frequency response, 3.58 MC signals can be seen individually.



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a tool chest  
in your  
pocket

for electronic assembly  
and service work

Shockproof (UL), breakproof,  
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3/32" and 1/8" x 2", 3", and  
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Point size #0, 2" blade

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Non-magnetic, non-sparking  
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Fit 1/4" and 3/8" O.D. spanner nuts  
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Fluke Mfg John PO Box 7161 Seattle Wash  
Forway Industries 122 Green Ave Woodbury NJ  
Foto-Video Labs 36 Commerce Rd Cedar Grove NJ  
Fourjay Industries 2801 Ontario Ave Dayton O  
Foxboro Co Newponset Ave Foxboro Mass  
Freed Transformer 1718 Weirfield St Brooklyn NY  
FXR Div Amphenol-Borg 25-26 50 St Woodwide NY

**G**

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Garde Mfg 53 John St Cumberland RI  
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Garrard Sales 80 Shore Rd Port Washington NY  
Gaylord Products 1918 Prairie Ave Chicago III  
GC Electronics 400 S Wyman St Rockford III  
Geo-Lar Mfg 418 S Wyman St Rockford III  
Gem Electric 239 37 St Brooklyn NY  
General Cement Mfg 400 S Wyman St Rockford III  
General Controls 8062 McCormick Blvd Skokie III  
General Dynamics/Electronics 1407 N Goodman St Rochester NY  
General Electric Appratus Div Schenectady NY  
General Electric Audio Products Div Decatur III  
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General Electric Communications Products Div Lynchburg Va  
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General Precision GPL Div Mt Kisco NY  
General Radio West Concord Mass  
General RF Fittings 702 Beacon Boston Mass  
General Techniques 1270 Bdwy New York NY  
General Time Torrington Conn  
General Transistor 92-15 172 St Jamaica NY  
Genistron Inc 6320 W Arizona Circle Los Angeles  
Gerbet Hairspring Thomaston Conn  
Gernsback Library 154 W 14 St New York NY  
Gertsch Products 3211 S LaCienega Blvd Los Angeles  
Girard-Hapkins 1000 40 Ave Oakland Calif  
Gits Moulding 4600 W Huron Chicago III  
Glaser-Steers Corp 155 Oraton St Newark NJ  
Glas-Line Co 2751 Nostrand Ave Brooklyn NY  
Globe Electronics 400 S Wyman St Rockford III  
Gold Products 500 S Westgate Dr Addison III  
Gonset Div Young Spring & Wire 801 S Main St Burbank Calif  
Gordos Corp 250 Glenwood Ave Bloomfield NJ  
Gorn Electric 845 Main St Stamford Conn  
Good-All Electric 112 W 1 St Ogallala Nebr  
Gotham Audio 2 W 46 St New York NY  
Grado Labs 4614 7 Ave Brooklyn NY  
Graham Research 666 22nd Ave NE Minneapolis Minn  
Gramercy Sound 175 S Ave New York NY  
Gramer-Halldorsen 2734 N Pulaski Rd Chicago III  
Granco Products 80-30 Kew Gardens Rd Kew Gardens NY  
Grant Pulley & Hdw 43 High St W Nyack NY  
Graphic Controls 189 Van Rensselear Buffalo NY  
Graphic Systems Yanceyville NC  
Grayhill Inc 361 Hillgrove Ave LaGrange III  
Gray Mfg 16 Arbor St Hartford Conn  
Gray Radio W Palm Beach Fla  
Great Eastern Mfg 165 Remsen Brooklyn NY  
Green Instrument 295 Vassar Cambridge Mass  
Greenfield Components 184 Shelburne Rd Greenfield Mass  
Greenlee Tool Rockford III  
Greentree Electronics 1122 S LaCienega Blvd Los Angeles Calif  
Griebach Instruments 315 North Ave New Rochelle NY  
Gremar Mfg Co 7 North Ave Wakefield Mass  
Greyhound Package Express 140 S Dearborn St Chicago III  
Greylock Electronics 438 Central Ave Albany NY  
Grommes Div Precision Electronics 9101 King Ave Franklin Park III  
Grove Electronic 4103 W Belmont Chicago III

Guardian Electric 1550 W Carroll Ave Chicago III  
Gudeman Co 340 W Huron St Chicago III  
Guide Lamp Div GMC 2919 Pendleton Ave Addison Ind  
Gulton Industries 212 Durham Ave Metuchen NJ  
Gurlan Edward E 2211 S State St Chicago III  
GV Controls Ockner Pkwy Livingston NJ  
Gyra Electronics La Grange III

**H**

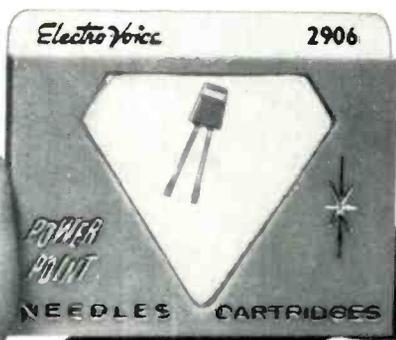
Haddam Mfg Haddam Conn  
Hagan Chemical & Controls Hagan Center Pittsburgh Pa  
Hallamore Electronics 714 N Brookhurst St Anaheim Calif  
Hallcrafters Co 4401 W 5 Ave Chicago III  
Hallmark Electronics 436 N 31 St Philadelphia Pa  
Hamilton-Hall 227 N Water St Milwaukee Wis  
Hamlin Inc 423 10 St Wilmette III  
Hammarlund Mfg 53 W 23 St New York NY  
Handicraft Tools 48-41 Van Dam Long Island NY  
Handley Inc 12960 Panama St Los Angeles Calif  
Hardwick Hindle 40 Hermon St Newark NJ  
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Harrison Labs Berkeley Heights NJ  
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Hartley Products 521 E 162 St Bronx NY  
Harvey Wells 14 Huron Dr Natick Mass  
Hatfield Wire & Cable Hillside NJ  
Hathaway Instrument 5800 E Jewell Ave Denver Colo  
Haydon Co A W 232 N Elm St Waterbury Conn  
Haydon Div General Time Corp Torrington Conn  
Heath Co Benton Harbor Mich  
Heiland Div Minneapolis-Honeywell 5200 E Evans Denver Colo  
Heinemen Electric 634 Magnetic Dr Trenton NJ  
Helipot Div Beckman Instruments 2500 Fullerton Rd Fullerton Calif  
Heppo 74 Varick St New York NY  
Heppner Mfg PO Box 612 Round Lake III  
Hexacon Electric 180 W Clay Ave Roselle Park NJ  
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Hi-Lo Mfg 1122 Newport St Chicago III  
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Hoffman Electronics Consumer Prods Div 3761 S Hill St Los Angeles Calif  
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Holloway Electronics Broward County Int'l Airport Ft Lauderdale Fla  
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Hopkins Engineering 12900 Foothill Blvd San Fernando Calif  
Houston Instrument PO Box 22234 Houston Texas  
Howe Precision Prods Royersford Pa  
Howell Instruments 3479 W Vickery Blvd Ft Worth Texas  
Hoyt Electrical Instrument 42 Carleton St Cambridge Mass  
Hudson Wire Magnetic Wire Div Winsted Conn  
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Hughes Aircraft Products Div Culver City Calif  
Hughes Aircraft Semiconductor Div Int'l Airport Station Los Angeles Calif  
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Hurst Mfg Princeton Ind  
H-V Assoc 28 E Sunrise Hwy Lindenhurst LI NY  
Hycon Electronics 1030 S Arroyo Pkwy Pasadena Calif  
Hy-Gain Antenna 1135 North 22 Lincoln Neb  
Hymac Corp 1717 N Potrero S El Monte Calif

**I**

Ideal Industries Sycamore III  
IE Mfg 3039 W Carroll Ave Chicago III  
IH Mfg 121 Greene St New York NY  
Iliffe & Sons Dorset House Stamford St London SE England  
Illinois Condenser 1616 N Throop St Chicago III  
Illinois Testing Labs 420 N LaSalle St Chicago III  
Illumitronic Eng'g 680 E Taylor St Sunnyvale Calif  
Indikon Co 76 Coolidge Hill Rd Watertown Mass  
Industrial Condenser 3243 N Calif Ave Chicago III  
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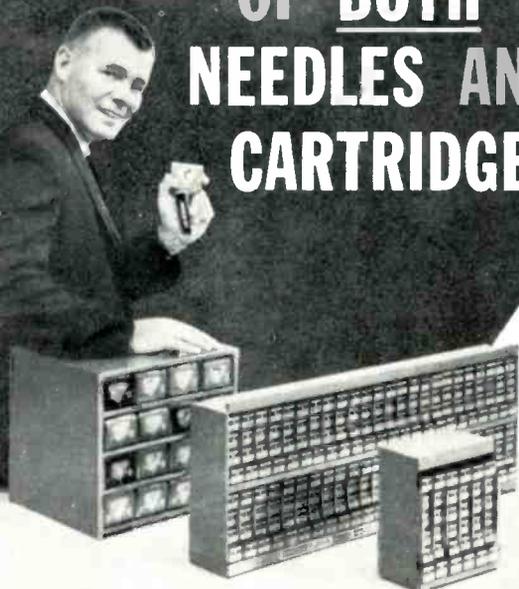
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 Interelectronics Corp 2432 Grand Concourse Bronx NY  
 Interlab Inc 116 Kraft Ave Bronxville NY  
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 Int'l Products 1289 S LaBrea Ave Los Angeles  
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 Int'l Resistance 401 N Broad Philadelphia Pa  
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 Jones Div Cinch Mfg 1026 S. Homan Chicago Ill  
 Jordan Electronics PO Box 2047 Alhambra Calif  
 Julie Research 603 W 130 St New York NY  
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 Kapner Inc 1924 Washington New York NY  
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 Kedman Co Box 267 Salt Lake City Utah  
 Keithley Instr 12415 Euclid Cleveland O  
 Kellogg Switchboard 6650 S Cicero Chicago Ill  
 Kemel Co Div Union Carbide 11901 Madison Ave Cleveland O  
 Kentucky Electronics 2208 W 2 St Owensboro Ky  
 Kenwood Eng'g 265 Colfax Ave Kenilworth NJ  
 Kepco Inc 131-38 Sanford Ave Flushing NY  
 Kester Solder 4201 Wrightwood Chicago Ill  
 Kierulff & Co 6303 Corsair St, Los Angeles Calif  
 Kilvult Corp 2 Manor House Sq Yonkers NY  
 Kimberly Int'l 346 W 44 St New York NY  
 Kimeratic Inc 1616 N Damen Ave Chicago Ill  
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 Kin-Tel Div Cohu Electronics 5725 Kearny Villa Rd San Diego Calif  
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 Klein & Sons Mathias 7200 McCormick Rd Chicago Ill  
 KLH Research & Devel 30 Cross St Cambridge Mass  
 Klipsch & Assoc PO Box 96 Hope Ark  
 Knob Corp of America 469 Jericho Tpk Mineola NY  
 Koss Inc 2227 N 31 St Milwaukee Wis  
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 Krohn-Hite 580 Mass Ave Cambridge Mass  
 Krylon Inc 18 W Airy Norristown Pa  
 KTV Tower & Comm Equip Co PO Box 294 Sullivan Ill  
 Kulka Electric 633 S Fulton St Mt Vernon NY  
 Kupfrian Mfg Div Robinson Technical Prods PO Box 714 Binghamton NY  
 Kurman Electric 191 Newell Brooklyn NY  
 Kwikheat Mfg 3732 San Fernando Rd Glendale Calif

L

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 Lafayette Radio Electronics 165-08 Liberty Jamaica NY  
 LaGrange Welding & Machine Pleasant Valley NY  
 Lake Mfg 2323 Chestnut Oakland Calif  
 Lambda Electronics 515 Broad Hollow Huntington NY  
 Laminated Shim Co. 5711 Union St Glenbrook Conn  
 Lampkin Labs Bradenton Fla  
 Lance Antenna 1730 1 Ave San Fernando Calif  
 Landis & Gyr 45 W 45 St New York NY  
 Langevin Div Sonotec 503 E Grand Santa Ana Calif  
 Lansing Sound James B 3249 Casitas Ave Los Angeles  
 Lavoie Labs Morganville NJ  
 Lawrence Mfg 922 McCarter Hwy Newark NJ  
 Lawrence Inc Box 5106 Seven Oaks Sta Detroit Mich  
 Leach Corp 18435 Susana Rd Compton Calif  
 Lexed Inc 123 Webster Dayton O  
 LEE Inc 625 New York Ave NW Washington DC  
 Leeds & Northrup 4907 Stenton Philadelphia Pa  
 Leemath Inc Oak Dr Syosset NY  
 Lehigh Valley Electronics Allentown Pa  
 Lektron Inc 242 Everett Chelsea Mass  
 LEL Inc 75 Akron St, Copiague LI NY  
 Lenk Mfg Franklin Ky  
 Lenz Electric 1751 N Western Chicago Ill  
 Lerc Electronics 501 S Varney Burbank Calif  
 Lesa of America 11 W 42 St New York NY  
 Lexington Mfg c/o A P Toce Sales 1925 Main St Newington Conn  
 Librascope Inc 808 Western Ave Glendale Calif  
 Licon Div Illinois Tool 6606 W Dakin Chicago  
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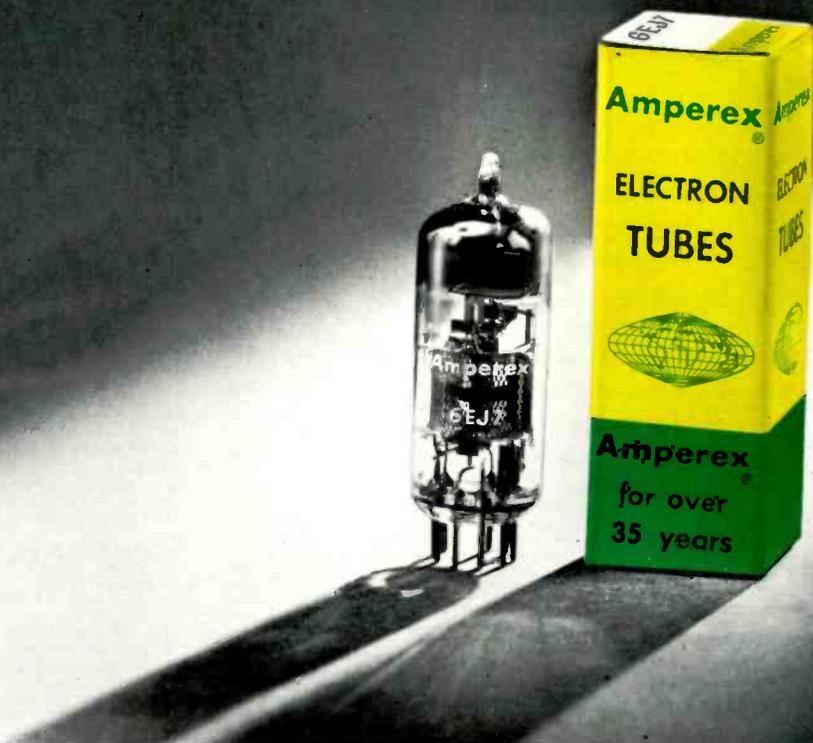
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# are you replacing top quality tubes with identical top quality tubes?



Now you can. You can carry the identical tubes that you find in most of the quality TV sets you service! These sets were designed around tubes originated, in many cases, by Amperex. When it's time to replace tubes, replace with Amperex.

Let us tell you frankly: there is not an Amperex tube for every single socket. But there is an Amperex tube for most sockets—and matchless Amperex quality has gained so much recognition that more and more service technicians are finding Amperex to be THE line essential to carry.

Quality? Take Amperex "Ampliframes" for example. Engineers had long recognized the advantages of frame grid design. Amperex was the first to mass produce them and is today the largest manufacturer of frame grid tubes in America. Most of the popular frame grid types have been originated and introduced by Amperex. Quality-minded set manufacturers today are using many "Ampliframes" tubes and are designing still more types into tomorrow's sets. You will need more Amperex "Ampliframes" in your caddy.

Compare "Ampliframe" performance with conventional IF tubes. "Ampliframes" provide 55% higher gain-bandwidth; increase TV set reliability by simplifying circuits; and make

servicing easier because their extraordinary uniformity virtually eliminates re-alignment when changing tubes.

These are a few of the reasons why the Amperex frame grid 6EJ7, for example, is fast becoming the standard IF tube of the industry. Look over this list—get acquainted with Amperex, the quality brand.

"AMPLIFRAME" TUBES INTRODUCED BY AMPEREX currently being used by major TV set makers:

2GK5	4GK5	6GK5	6EH7
2ER5	4EH7	6ES8	6EJ7
3GK5	4EJ7	6ER5	6HG8
3EH7	4ES8	6FY5	7HG8

OTHER QUALITY ENTERTAINMENT TUBES INTRODUCED BY AMPEREX currently being used by major TV set makers:

6AL3	6BQ5	9A8	16AQ3
6BL8	6FY5	15CW5	27GB5

Ask your Amperex distributor about "Ampliframe" tubes for TV and other entertainment replacement applications. AMPEREX ELECTRONIC CORPORATION, 230 Duffy Avenue, Hicksville, L. I., N. Y.

In Canada: Philips Electron Devices Ltd., 116 Vanderhoof Ave., Toronto 16, Ont.

Ask  Amperex

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Lionel Industrial Electronic Div Irvington NJ  
Littelfuse Inc Des Plaines Ill  
Litton Industries 5873 Rodeo Rd Beverley Hills Calif  
Litton Industries Electron Tube Div 960 Industrial Rd San Carlos Calif  
Livingston Audio Products 147 Roseland Caldwell NJ  
Lockheed Electronics 6201 E Randolph Los Angeles London Records 539 W 25 St New York NY  
Long Island Electro Labs 1186 Bdwy Hewlett LI NY  
Lord's Electronics 10 E Kinzie Chicago Ill  
Los Angeles Tuner Exchange 4611 W Jefferson Los Angeles  
Lowell Mfg 3030 Laclade Sta Rd St Louis Mo  
L&R Mfg 577 Elm St Kearny NJ  
Lumatron Electronics 116 County Court House Rd New Hyde Park LI NY  
Luminite Div Chicopee Mills 47 Worth St. New York NY  
Luxo Lamp Dock St Port Chester NY

## M

McCabe-Powers 5900 N Bdwy St Louis Mo  
McCoy Electronics Mt Holly Springs Pa  
McDowell Electronics 105 Forrest St Metuchen NJ  
McGee Radio 1901 McGee St Kansas City Mo  
McGraw-Hill Book Co 330 W 42 St New York NY  
McIntosh Labs 2 Chambers St Binghamton NY  
McKee Door 85 Hanks St Aurora Ill  
McLean Eng'g 70 Washington Rd Princeton NJ  
Macdonald & Co 714 E Calif Glendale Calif  
Machlett Labs Springdale Conn  
MacLeod Instrument 4250 NW 10 Ave Ft Lauderdale Fla  
Macmillan Co 60 5 Ave New York NY  
Mac Panel Co High Point NC  
Magnaflex Corp 7301 W Ainslie Chicago Ill  
Magnavox Co 2131 Bueter Rd Ft Wayne Ind  
Magnecord Div Midwestern Instrument PO Box 7186 Tulsa Okla  
Magnecraft Electric 3352 W Grand Chicago Ill  
Magnetic Amplifiers 632 Tinton Ave New York NY  
Magnetic Devices 712 East St Frederick Md  
Magnetic Metals Hayes at 21 St Camden NJ  
Magnetics Inc Butler Pa  
Maico Electronics 21 N 3 St Minneapolis Minn  
Maier Co Wellington O  
Majestic Int'l 743 N Lasalle St Chicago Ill  
Malco Mfg 4033 W Lake St Chicago Ill  
Mallory & Co PR 3029 E Washington Indianapolis Ind  
Manson Labs 375 Fairfield Stamford Conn  
Marantz 25-14 Bdwy Long Island City NY  
Marconi Instruments 111 Cedar Lane Englewood NJ  
Marina Communications 10328 Venice Blvd Culver City Calif  
Marjo Technical Products 1148 E Henry Linden NJ  
Mark Products 5439 W Fargo Skokie Ill  
Markel & Sons L Frank Norristown Pa  
Mars Div Miratel Inc 1903 Davenport Sturgis SD  
Masco (see Fanon-Masco)  
Massa Div Cohu Electronics 280 Lincoln St Hingham Mass  
Mastra Co 2104 Superior Ave Cleveland O  
Masterview Electronics 443 W 50 St New York NY  
Matthews Labs 3344 Ft Independence St New York NY  
Maxson Instruments 475 10 Ave New York NY  
Measurement Control Devices PO Box 505 Camden NJ  
Measurements Corp PO Box 180 Boonton NJ  
Mellotone Inc 1220 Bdwy New York NY  
Melody Master Mfg 2149 W Roscoe St Chicago Ill  
Melo-sonics Corp 249 E 49 St New York NY  
Merco Inc 35 Abbott Ave Morristown NJ  
Merck & Co Electronic Chemicals Div Rahway NJ  
Mercury Electronics 4306 W Victory Burbank Calif  
Mercury Electronics 111 Roosevelt Ave Mineola NY  
Mercury Records 35 E Wacker Dr Chicago Ill  
Mercury TV Tuner Service 890 River Ave Bronx NY  
Metal Works 9th & Jefferson Hermann Mo  
Methode Mfg 7447 W Wilson Ave Chicago Ill  
Meriam Instrument 10920 Madison Cleveland O  
Merit Coil & Transformer Merit Plaza Hollywood Fla  
Merix Chemical 2234 E 75 St Chicago Ill  
Mettrex Co 519 Hendrix St Brooklyn NY  
Metron Instrument Littleton Colo  
Metropolitan Supply 1133 Bdwy New York NY  
MGM Records 1540 Bdwy New York NY  
Micamold Electronics 65 Gouverneur St Newark NJ  
Michigan Magnetics Vermontville Mich  
Microdot Inc 200 Pasadena Ave S Pasadena Calif  
Microtran Co 145 E Mineola Valley Stream NY  
Microwave Assoc Northwest Industrial Park Burlington Mass  
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Midland Mfg 3155 Fiberglass Rd Kansas City Kan  
Midwestern Instrument PO Box 7186 Tulsa Okla  
Milgray/NY 136 Liberty St New York NY  
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Miller Co JW 5917 S Main Los Angeles Calif  
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Minneapolis-Honeywell Industrial Systems Div 19721 Hanna St Beltsville Md  
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Minneapolis-Honeywell Micro Switch Div Freeport Ill  
Minneapolis-Honeywell Rubicon Instrument Div Ridge & 35 St Philadelphia Pa  
Minneapolis-Honeywell Semiconductor Div 1015 S 6 St Minneapolis Minn  
Minnesota Mining & Mfg Electrical Products Div 900 Bush Ave St. Paul Minn  
Minnesota Mining & Mfg Magnetic Products Div 900 Bush Ave St. Paul Minn  
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Mohawk Wire & Cable 320 River St. Fitchburg Mass  
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Mullard (see Int'l Electronics New York NY)  
Multicore Div British Industries 80 Shore Rd Port Washington NY  
Muzak Co 220 4 Ave New York NY  
Musik-Pak Inc 103 E Hawthorne Valley Stream NY

## N

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Nat'l Carbon 270 Park Ave New York NY  
Nat'l Cash Register Main & K Sts Dayton O  
Nat'l Cathode 317 E 34 St New York NY  
Nat'l Electronics 628 North St Geneva Ill  
Nat'l Radio 37 Wash.ington St Melrose Mass  
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Nat'l Resistance Walter St Pearl River NY  
Nat'l Technical Research 6416 S Western Ave Whittier Calif  
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Neshaminy Electronics Neshaminy Pa  
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Newark Electronic 223 W Madison Chicago Ill  
Newcastle Fabrics 75 N 11 St Brooklyn NY  
Newcomb Electronics 6824 Lexington Ave Hollywood Calif  
New London Instrument 82 Union New London Conn  
Newman Corp MM 79 Clifton Ave Marblehead Mass  
New-Tronics Corp 3445 Vega Cleveland O  
Niagara Electrical Instr 45 Allen St Buffalo NY  
Nielsen Inc EV 575 Hope St Stamford Conn  
NJE Corp 20 Bright Ave Kenilworth NJ  
Non-Linear Systems Del Mar Airport Del Mar Calif  
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North Atlantic Industries Plainville LI NY  
North Electric Co 553 S Market Galion O  
North Shore Nameplate 1270 NW 165 St N Miami Beach Fla  
Nortronics Co 1015 S 6 St Minneapolis Minn  
Nuclear Corp CEM Div 2 Richwood PI Denville NJ

Nucleonic Corp of America 196 DeGraw St Brooklyn NY  
Nu-Line Industries 1015 6 St Minneapolis Minn

## O

Oak Mfg Co Crystal Lake Ill  
Oaktron Industries 17368 S 68 St Tinley Park Ill  
Oelrich Publications 4308 Milwaukee Ave Chicago  
Ogura Jewel Bearing Stone Mfg 3-68 Iriarai Ohta-Ku Tokyo Japan  
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Ohmite Mfg 3673 Howard St Skokie Ill  
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Olympic Radio & TV 34-01 38 Ave Long Island City NY  
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Oster Mfg John 1 Main St Racine Wis  
Oxford Components 556 W Monroe Chicago Ill  
Oxford Electric 3911 Michigan Blvd Chicago Ill  
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Pacific Coast Electronics 2457 Chico Blvd S El Monte Calif  
Pacotronics Inc 70-31 84 St Glendale LI NY  
Panoramic Electronics 570 S Fulton Ave Mt Vernon NY  
Parker Metal Goods 220 5 Ave New York NY  
Par Products 602 Colorado Ave Santa Monica Calif  
Partridge Transformers 258 Bdwy New York NY  
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PCA Electronics 16799 Schoenborn St Sepulveda Calif  
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Peerless Electrical Products Div Altex 1515 S Manchester Ave Anaheim Calif  
Peerless Products 812 N Pulaski Rd Chicago  
Peerless Radio 92-32 Merrick Rd Jamaica LI NY  
Pencor Electronics 410 Sherman St Palo Alto Calif  
Pentron Corp 777 S Tripp Ave Chicago Ill  
Perfection Mica 1322 N Elston Ave Chicago Ill  
Performance Measurements 15120 3 Ave Detroit  
Perkin Electronics 345 Kansas El Segundo Calif  
Perkin-Elmer Vernistat Div Norwalk Conn  
Permacel Tape US Hwy #1 New Brunswick NJ  
Permadyne Div Melody Master 2149 W Roscoe Chicago Ill  
Permaflux Products 4101 San Fernando Rd Glendale Calif  
Pergam Corp 88-06 Van Wyck Expressway Jamaica NY  
Perma-Power 3100 N Elston Ave Chicago Ill  
Permo Inc 6415 Ravenswood Ave Chicago Ill  
Peschel Electronics Patterson NY  
Pfanstiel Chemical 104 Lake View Waukegan Ill  
P&H Electronics 424 Columbia Lafayette Ind  
Phaotron Instrument & Electronics 151 Pasadena Ave South Pasadena Calif  
Phalo Plastics 530 Boston Tpk Shrewsbury Mass  
Phelps Dodge Inca Div Fort Wayne Ind  
Philbrick Researches 285 Columbus Boston Mass  
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Philco Corp Tioga & C Sts Philadelphia Pa  
Philharmonic Radio & TV 235 Jersey Ave New Brunswick NJ  
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Polytran Industries 1010 Howard Ave San Mateo Calif  
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Pomona Electronics 1500 E 9 St Pomona Calif  
Portable Electronic Tools 1200 E State St Geneva Ill  
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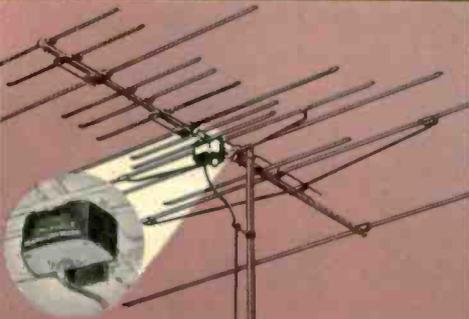


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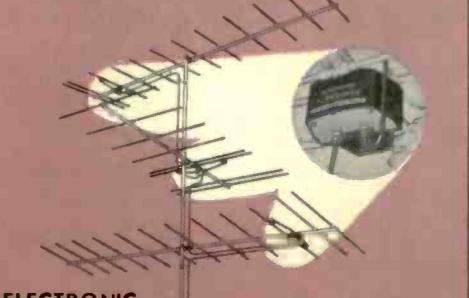
**WINEGARD ELECTRONIC STEROTRON FM ANTENNAS.** For the ultimate in long distance FM and STEREO, Stereotron is world's most powerful FM antenna. Comes with power supply and built-in transistor amplifier. Guaranteed to bring in 85% of all FM stations in a 200 mile radius over normal terrain with rotor. Has minimum gain of 26 DB over folded dipole. Recommended for use where signals are from 1 to 20,000 microvolts. GOLD ANODIZED. Model PF 8 (300 ohm) or PF 8C (75 ohm), \$64.25 list.



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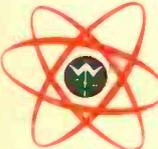
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 Precision Equipment 4409 Ravenswood Chicago  
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 Precision Tuner Service PO Box 272 Bloomington  
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 Premier Instruments 33 New Broad Port Chester  
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 Premier Metal Prods 337 Manida St New York NY  
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 Product Management PO Box 6077 San Diego  
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 Progress Webster Electronics 182 Ave D Roch-  
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 Protection Controls 7317 N Lawndale Skokie Ill  
 Proto-Tex Reel Band 2108 Payne Cleveland O  
 Proto Tool 2209 S Santa Fe Los Angeles Calif  
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 Pyrometer Instrument Bergenfield NJ

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 Quan-Tech Labs 60 Parsippany Blvd Boonton NJ  
 Quick-Mount Mfg 481 Sterling Pl Brooklyn NY  
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 den NJ  
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 5 St Harrison NJ  
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 Div Somerville NJ  
 Radio Corp of America 30 Rockefeller Plaza New  
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 Rauland Corp 4245 N Knox Chicago Ill  
 Raven Electronics 2130 W Carroll Ave Chicago Ill  
 Rawson Electrical Instrument 110 Potter St Cam-  
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 RayData Corp 1078 E Grandville Columbus O  
 Ray-O-Vac Co 212 E Washington St Madison Wis  
 Ray-Par Inc 7810 W Addison St Chicago Ill  
 Raytheon Commercial Apparatus & Systems Div  
 Norwood Mass  
 Raytheon Distributor Products Div 411 Providence  
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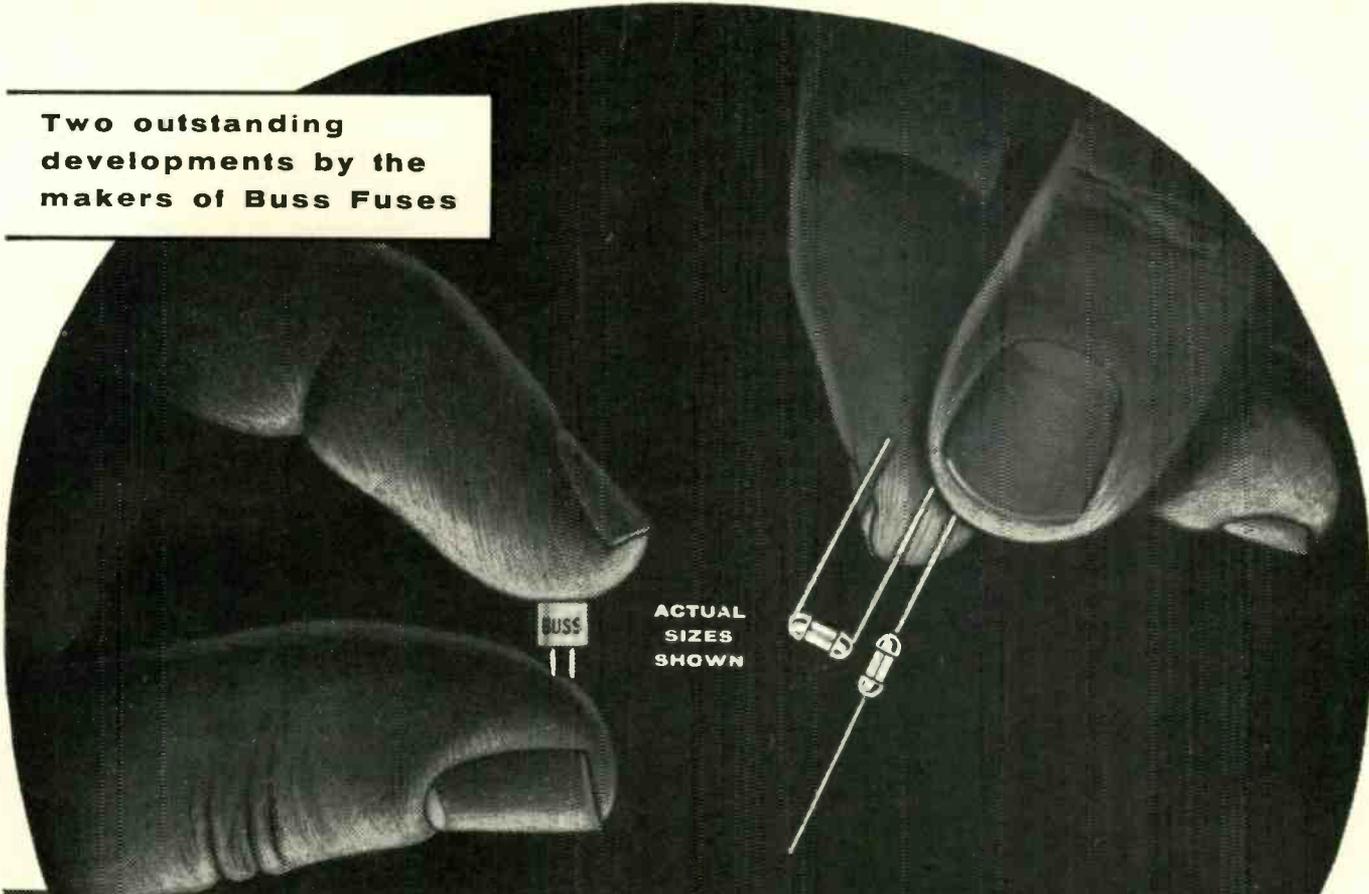
Raytheon Industrial Components Div 55 Chapel  
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 Raytheon Semiconductor Div 215 1 Ave Needham  
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 R-Columbia Products 2208 St Johns Highland Park  
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 Sherwood Electronic Labs 4300 N Calif Ave Chi-  
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Transistor Electronics Bennington Vt  
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Telux/Aemco Div Telux Inc Mankato Minn  
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Teltron Electric 428 Harrison Ave Harrison NJ  
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United Audio Prods 12 W 18 St New York NY  
United Catalog Publishers 60 Madison Ave Hempstead NY  
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United Electric Controls 85 School St Watertown Mass  
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Up-Right Towers 1013 Pardoe St Berkeley Calif  
US Components 454 E 148 St New York NY  
US Electronic Publishing 480 Lexington Ave New York NY  
US Gasket 600 N 10 St Camden NJ  
US Recording 1347 S Capitol St Washington DC  
US Relay-Electronics 717 N Coney Ave Azusa Calif  
US Semcor (see US Semiconductor Products)  
US Semiconductor Products Div United Industrial Corp 3540 W Osborn Rd Phoenix Ariz  
US Steel 525 Wm Penn Place Pittsburgh Pa  
US Transistor 149 Eileen Way Syosset LI NY  
Utah Electronics 1123 E Franklin St Huntington Ind  
U-Test-M Mfg 4325 W Lincoln Milwaukee Wis  
Utica Drop Forge & Tool 2415 Whitesboro Utica NY  
Utica Electronic Communications 1834 W Foster Ave Chicago Ill  
UXL Corp 819 Blake Ave Brooklyn NY

## V

Vaco Products 317 E Ontario St Chicago Ill  
Vacudyne Assoc 397 7 Ave Brooklyn NY  
Valpey Crystals 1244 Highland St Holliston Mass  
Van Norman Industries 186 Granite St Manchester NH  
Van Nostrand Co D 120 Alexander St Princeton NJ  
Vapor Heating 6444 W Howard St Chicago Ill  
Vari Corp 2825 Cedar Ave Minneapolis Minn  
Varo Inc 2201 Walnut St Garland Texas  
Varian Assoc 611 Hansen Way Palo Alto Calif  
Vector Electronic 1100 Fowler St Glendale Calif  
Vector Mfg Keystone Rd Southampton Pa  
Veeder-Root Inc 70 Sargeant St Hartford Conn  
Vega Electronics 1071 N Hwy 9 Cupertino Calif  
Vernistat Div Perkin-Elmer Emerald St Norwalk Conn  
Vernitron Corp 136 Church St New York NY  
Vibro Ceramic Div Gulton Industries 212 Durham Ave Metuchen NJ  
Vickers Inc 1815 Locust St St Louis Mo  
Victor Electric Wire & Cable 618 Main St West Warwick RI  
Victoreen Instrument 5806 Hough Ave Cleveland O  
Victory Electronics 50 Bond St Westbury LI NY  
Victory Eng'g Springfield Rd Union NJ  
Vidaire Electronics 365 Babylon Tpk Roosevelt LI NY  
Video Accessories PO Box 223 Tulsa Okla  
Video Instruments 3002 Penna Ave Santa Monica Calif

Videon Electronics 902 E Michigan St Indianapolis Ind  
Viking Industries 21343 Roscoe Blvd Canoga Park Calif  
Viking of Minn 9600 Aldrich St Minneapolis Minn  
Vis-U-All Products Hampshire Ill  
Vitramon Inc Box 544 Bridgeport Conn  
Vitrex Inc PO Box 10 N Miami Beach Fla  
V-M Corp 4th & Park Sts Benton Harbor Mich  
Vocaline Co of America 133 Coulter St Old Saybrook Conn  
Voisham Electronics 13259 Sherman Way N Hollywood Calif  
Vokar Products 201 E Catherine St Ann Arbor Mich  
Volkswagen of America 476 Hudson Terrace Elglwood Cliffs NJ  
Volt-Air Twins Mfg Co 6716 Park Ave Allen Park Mich  
Voltron Prods 1020 S Arroyo Pkwy Pasadena Calif  
Voycall Div Lake Mfg 2323 Chestnut Oakland Calif  
Vulcan Electric 88 Holton Danvers Mass

## W

Waber Electronics Hancock & Somerset Sts Philadelphia Pa  
Wacline Inc 35 S St Claire St Dayton O  
Wakefield Eng'g Wakefield Mass  
Walco Electronics 60 Franklin St East Orange NJ  
Wald Inc 119 Prospect Ave Burbank Calif  
Waldom Electronics 4625 W 53 St Chicago Ill  
Walker Pacific PO Box 2242 La Puente Calif  
Wall Mfg Co P Grove City Pa  
Wallace Talades (see HV Associates)  
Walasco Electronics 100 W Green St Rockford Ill  
Ward Leonard Electric 115 McQueston Pkwy Mt Vernon NY  
Ward Products Edson St Amsterdam NY  
Wassco Electric Prods 2032 2 Ave South St Petersburg Fla  
Waterman Prods 2445 Emerald St Philadelphia Pa  
Waters Conley 17 E Chestnut Chicago Ill  
Waters Mfg Boston Post Rd Wayland Mass  
Waveforms Inc 333 6 Ave New York NY  
Wayne Kerr 1633 Race St Philadelphia Pa  
Weatherford Co RV Glendale Calif  
Weathers Industries 66 E Gloucester Pike Barrington NJ  
Webcor Inc 5626 Bloomingdale Ave Chicago Ill  
Webster Electric 1900 Clark St Racine Wis  
Webster Mfg 317 Roebeling Rd South San Francisco Calif  
Webster Productomatic 182 Ave D Rochester NY  
Weirton Steel Co Weirton W Va  
Weiss Assoc 346 W 44 St New York NY  
Wellcor Inc 1214 N Walls St Chicago Ill  
Weller Electric 601 Stone Crossing Rd Easton Pa  
Wells Electronics 1701 S Main St South Bend Ind  
Wells-Gardner 2701 N Kildare Ave Chicago Ill  
Wen Products 5810 Northwest Hwy Chicago Ill  
Wendell Plastic Fabrics 1220 Bdwy New York NY  
Westbury Electronics 300 Shames Dr Westbury NY  
West Instrument 4363 W Montrose Ave Chicago Ill  
Western Electric Mfg & Supply Laurelale Pa  
Western Semiconductors 605 Alton St Santa Ana Calif  
Westinghouse Electric Corp PO Box 746 Baltimore Md  
Westinghouse Electric Radio-TV Dept Metuchen NJ  
Westinghouse Systems Control Dept 4454 Genesee Buffalo NY  
Westinghouse Electronic Tube Div Box 284 Elmira NY  
Westinghouse Industrial Products Div PO Box 2278 Gateway Center Pittsburgh Pa  
Westinghouse Semiconductor Dept Youngwood Pa  
Westinghouse Micarta Div Hampton SC  
Weston Instruments 614 Frelinghuysen Ave Newark NJ  
Warfedale (see British Industries)  
Wheeler Electronic Div Sperry Rand 150 E Aurora St Waterbury Conn  
Wheelco Industrial Instruments Div Barber-Colman Co Rockford Ill  
Whitaker Cable 1301 Burlington St N Kansas City Mo  
White Eng'g 238 Grand Ave Rutherford NJ  
Wiancko Eng'g 255 N Halstead Pasadena Calif  
Wilcox-Gay Corp Charlotte Mich  
Wiley & Sons John 440 Park Ave S New York NY  
Wilson & Co GC Huntington W Va  
Wincharger Corp E 7th & Division Sts Sioux City Iowa  
Wind Turbine Co Penna RR Station West Chester Pa  
Winegard Co 3019-28 Kirkwood Burlington Iowa  
Winpower Mfg 1207 1 Ave E Newton Iowa  
Wire Prods Co 1215 South Ave Syracuse NY  
Winslow Co 701 Lehigh Ave Union NJ  
Winston Electronics 4000 NW 28 St Miami Fla  
Wintriss Controls 20-25 Vandam St New York NY  
Wollensak Optical 320 E 21 St Chicago Ill  
Wood Electric 244 Broad St Lynn Mass  
Workman TV Inc Box 5397 Sarasota Fla  
World Radio Labs 3415 W Bdwy Council Bluffs Iowa  
Worner Electronic Rankin Ill  
Wright Steel & Wire GF 243 Stafford St Worcester Mass

ANOTHER **PRECISION**  
SERVICE TIP FOR YOU.

# PRECISION PETE

"A CASE OF  
DOUBLE TROUBLE!"

'EVENING, MISS DORA.  
HELLO, MISS FLORA.  
WHAT SEEMS TO BE  
THE TROUBLE?

THE PICTURE ON  
MY PORTABLE IS SO  
DARK, I CAN'T TELL  
THE COWBOYS  
FROM THE  
INDIANS!

AND ON  
MY COLOR  
SET, THE  
PICTURE  
IS DIM,  
TOO.

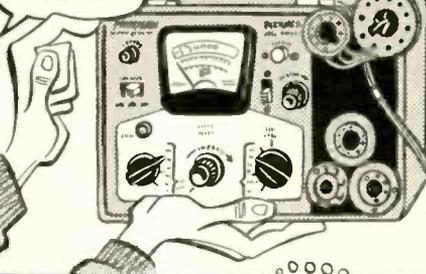
MMM...THE METER ON  
THE **CR-60** READS **BAD**.  
A BOOSTER MAY HELP.  
WITH THE **CR-60**,  
I CAN INCREASE  
AC HEATER  
VOLTAGE TO  
SIMULATE A  
BOOSTER

I'M SORRY, THE METER  
STILL READS "BAD" AND  
EVEN TRYING TO REJUVENATE  
DOESN'T HELP. YOU'LL NEED  
A NEW PICTURE TUBE.

OH, DEAR!  
ARE YOU  
SURE?

YES, YOU SEE, THE **PRECISION CR-60** IS  
THE ONLY TESTER OF ITS KIND TODAY  
THAT NOT ONLY TELLS ME IF A "BOOSTER"  
WILL SOLVE THE PROBLEM, BUT ALSO  
LETS ME CHECK FOR TUBE BRIGHTNESS  
UNDER HIGH OR LOW LINE-VOLTAGE  
CONDITIONS.

PETE,  
WHAT ABOUT  
THE DIM PICTURE  
ON MY COLOR  
SET?



OH, PETE!  
YOU'RE  
WONDERFUL!  
WE'LL SEE YOU  
TOMORROW.

THAT'S ONE CALL-  
BACK I'M GOING TO  
ENJOY, THANKS TO  
**PRECISION'S CR-60**  
CRT TESTER AND  
REJUVENATOR.



WELL, THE PICTURE TUBE IS FINE, SO THIS DIMNESS  
MUST BE DUE TO SOME OTHER CONDITION. PROBABLY IN  
THE CHASSIS. WHEN I COME BACK TO-  
MORROW WITH YOUR NEW TUBE, DORA,  
I'LL BRING MY **PRECISION** COLOR TEST  
EQUIPMENT TO FIND  
THE TROUBLE.



**SERVICEMEN:** QUICKER SERVICE WITH THE **CR-60**  
ELIMINATES MANY CALL-BACKS, SAVES TIME AND EARNS YOU  
MORE PROFIT. FOR MORE SERVICE TIPS WITH THE **CR-60**  
(DEALER NET \$64.95), WRITE FOR BULLETIN #100. IT'S FREE!

## PRECISION APPARATUS CO., INC.

70-31 84th STREET—GLENDALE 27, N.Y.

ALL PRECISION TEST EQUIPMENT IS GUARANTEED  
FOR ONE FULL YEAR AND BACKED BY OVER  
30 YEARS OF ELECTRONIC EXPERIENCE.



--- for more details circle 46 on page 86

Wright-Zimmerman Inc 330 5 Ave New Brighton  
Minn  
Wuerth Tube-Saver Corp PO Box 66 Hollandale  
Fla  
Wurlitzer Co N Tonawanda NY  
Wyco Metal Prods 6918 Beck Ave North Holly-  
wood Calif

Xcelite Inc Thorne Ave & Bank St Orchard Park  
NY

Yellow Springs Instrument Yellow Springs O

X  
X-Acto Inc 48-41 Van Dam St Long Island City NY

Y  
Yardney Electric 40-50 Leonard St New York NY  
Yashica Co 234 5 Ave New York NY  
Yeats Appliance Dolly 2124 N 12 St Milwaukee  
Wis

Z  
Zalytron Tube Corp 220 W 42 St New York NY  
Zenith Electric 152 W Walton St Chicago Ill  
Zenith Radio 6001 Dickens Ave Chicago Ill  
Ziff-Davis Publishing 1 Park Ave New York NY

# Technician Associations--1962 Roster

List of groups which have verified their current activities by 1962 questionnaire, with name of secretary unless otherwise noted

## NATIONAL

CHICAGO ILLINOIS--(NATESA) National Alliance of TV & Electronic Service Associations 5908 S Troy St--Frank J Moch Exec Director

## ARIZONA

PHOENIX--Better Electronic Service Technicians 4041 1/2 W 15 Ave--D J Gordon Exec Secy

## ARKANSAS

FT SMITH--TESA Ft Smith Station "B" Box 127 --Rance Rhodes  
N LITTLE ROCK--TESA-GLR P O Box 542--Merrill Breeze

## CALIFORNIA

GLENDALE--CSEA Glendale-Burbank Chapter P O Box 4012 N Glendale Station--R S Singleton  
LARKSPUR--TEAM of Marin 25 Ward St--Oakley Dexter  
LOS ANGELES--Appliance Profession Assn 5107 W First St--Rollie Grider  
OXNARD--CSEA Ventura County Chapter 1824 Saviers Rd--Bill Maxwell  
PASADENA--CSEA Pasadena Area Chapter Main P O Box 1143--Dan Davitt  
SACRAMENTO--CSEA--Calif State Electronics Assn 3300 Watt Ave--Keith Kirstein Exec Dir  
SALINAS--Salinas Valley Radio TV Dealers Assn 830 S Main--Wm Packwood  
SAN FRANCISCO--San Francisco TV Service Assn 703 Market St--Earl Crocker  
SAN JOSE--CSEA Santa Clara Valley & Santa Cruz Chapter 467A Porter Bldg--Clyde McCool  
SAN MATEO--TV Service Dealers Assn 18 Second Ave--Francis McCarty  
SOUTH GATE--RTA San Antonio Chapter P O Box 626--Andrew Goodwin  
VAN NUYS--Society of Radio & TV Technicians P O Box 126--A J Meyer

## CONNECTICUT

MERIDEN--TELSA of Conn Box 444--Peter Lucas Pres  
SPRINGDALE--TV Service Guild Woodbrook Drive --B Smolin

## DISTRICT OF COLUMBIA

WASHINGTON--TESA Greater Washington D C 6226 3rd St N W--Earl McGrew

## FLORIDA

MIAMI--TESA Miami 120 S W 57 Ave--Samuel Kessler Pres  
ST PETERSBURG--TV Service Dealers Assn 2008 4th St N--Bud Fox

## GEORGIA

ATLANTA--RTSA Greater Atlanta 638 Lindberg Drive N E--J P Mull Jr

## ILLINOIS

CHICAGO--Associated Radio & TV Servicemen (ARTS) 433 S Wabash Ave H J Wolfson  
CHICAGO--Electronic Service Guild 55 E Washington Blvd--L T Green  
CHICAGO--(NATESA) National Alliance of TV & Electronic Service Assns 5908 S Troy St--J H Stefanski General Secy  
CHICAGO--TESA-TV Electronic Service Assn of Chicagoland 5908 S Troy St--Angelo Chryso-gelos  
JOLIET--TESA of Will County 240 E Washington St--Ann McAllister  
LOMBARD--DuPage TV Service Assn 11 N Main St--Frank Gaskey  
N CHICAGO--TESA Lake County 1717 22 St--John Gardner

PEORIA--ARTS Peoria 706 Wayne St--J F Stoll  
ROCKFORD--Rockford Appliance Dealers Assn 1100 11 St--Fritz Asproath

## INDIANA

BEDFORD--Lawrence County Electronic Technicians Assn 2001-12 St Chester Hart  
CHURUBUSCO--RTSEA Whitley County I C Ohl-wine  
ELKHART--IESA Indiana Electronic Service Assn 1017 S Main St--Clyde Smeltzer  
ELKHART--TV Bureau of Elkhart 1017 S Main St--D R Mock  
EVANSVILLE--RTSA Evansville 1520 N Ruston Ave --J K Sweeney  
FORT WAYNE--Bureau of Professional Technicians 808 E Jefferson C Hostettler  
FORT WAYNE--Fort Wayne Indiana Electronic Service Assn 808 E Jefferson--Harvey Yoder  
FORT WAYNE--IESA Indiana Electronic Service Assn 2312 Goshen Rd Clyde Smeltzer  
INDIANAPOLIS--Indianapolis Electronic Technicians Assn 2403 Prospect--Richard Glass  
INDIANAPOLIS--ITTA Indianapolis TV Technicians Assn P O Box 23125 Leon Howland  
KOKOMO--RTSEA Kokomo 108 W Elm St R F Cripe  
LOGANSPORT--RTSEA Logansport 2221 Spear St --Jack Hill  
NEW CASTLE--ESTA Henry County 124 S 7 St--G L Koons  
SOUTH BEND--ARTS St Joseph Valley 1901 Miami St--Russ Bills  
VINCENNES--TESA Vincennes 408 N 7 St--J R Davis

## IOWA

AMES--TESA Ames 108 Lincoln Way--Gene Harris  
CEDAR RAPIDS--TESA Cedar Rapids 404 12 St S E--James Dorlan  
DAVENPORT--TESA Quint Cities 532 Brady St--L A Gregson  
DES MOINES--TESA Des Moines 1300 55--W L Grommon  
MANCHESTER--TESA-WAMAC 107 W Main--Bob Mascher  
MARSHALLTOWN--TESA Central Iowa 1022 S 9 Ave--H W Bonar  
WATERLOO--TESA Iowa 4014 Falls Ave--Don Price

## KANSAS

ELKHART--TESA Southwest Chapter--Bill Mahaney  
ELLINWOOD--TESA E A Redmon Sgt at Arms  
HUTCHINSON--TESA Hutchinson 605 W 15 St--Don Albert  
LAWRENCE--TESA Lawrence 1200 New York St --O B Bedman  
LEAVENWORTH--TESA Leavenworth 1000 N 7 St --Ralph Moore  
LIBERAL--TESA Keith Knos  
MCPHERSON--TESA c/o Crabbs Town & Country --Lauren Matson  
NEWTON--TESA Newton 107 Southeast 14th St --Wm Bolte  
PITTSBURGH--TESA 2112 N Broadway--J J Skelton Dir  
PRATT--TESA Pratt 710 S Taylor St--Francis Bailey  
SALINA--TESA Salina 1859 S 9th St--M M Wallis  
SCOTT CITY--TESA West Central Chapter--Dean Hager  
TOPEKA--TESA Topeka 1801 Moundview--Mike Guidry  
WICHITA--TESA Wichita 1901 E First--Jack Durbin

## LOUISIANA

BATON ROUGE--TESA Baton Rouge 806 Govern-ment St--Stanley Brohn  
LAFAYETTE--TESA Lafayette P O Box 2835--J H Prejean  
LAKE CHARLES--TESA Calcasieu 3428 Hodges St--G H Texada  
NEW ORLEANS--TESA South 4337 Randolph St--Mrs. E C Waelde

SHREVEPORT--TESA Shreveport-Bossier P O Box 3304--J W Goodwin  
TICKFAW--TESA Florida Parishes Box 194--W B Comish

## MAINE

PORTLAND--Electronic Technicians Service Assn 42 O'Brien St--P S Davis

## MARYLAND

BALTIMORE--Maryland Electronic & TV Assn 3724 Ellerslie Ave--Edward Kernan

## MASSACHUSETTS

BROCTON--ETG of Mass-Brocton Chapter 12 Reed St--Harold Bonney  
DRACUT--ETG of Mass--Lowell Chapter 26 Orchard St--Robert Hudon  
EVERETT ETC of Mass--Mystic Valley Chapter 299 Main St--Pat Parziale  
NEW BEDFORD--Radio & TV Technicians Guild--Greater New Bedford 110 Topham St--J L Shapley  
N WESTPORT--ETG of Mass-Fall River Chapter 378 Briggs Rd--Phil Simon  
QUINCY--ETG of Mass-South Shore Chapter 1603 Hancock St--Domenic Taglieri  
WALTHAM--ETG of Mass-Suburban Chapter 45 Upland Rd--Russell Dunkel  
WOBURN--ETG of Mass-Boston Chapter 236 Main St--J H Kelley  
WORCESTER--Worcester County Assn of TV Technicians P O Box 1155 P V Messier

## MICHIGAN

BIRMINGHAM--TESA-Oakland County 887 E Maple--Jim Sharrow  
DETROIT--TESA-Wayne County 8510 McGraw--J F McCulloch  
DETROIT--TV Service Assn of Michigan 8225 Woodward Ave--T J Goode  
FLINT--TESA-Genesee County 1612 W Pasadena--Randy Kelly  
GRAND RAPIDS--Michigan TESA 49 40th St S W--Harold Larsen  
GRAND RAPIDS--TESA-Kent County 49 40th St S W--Lawrence Wall  
KALAMAZOO--TESA-Kalamazoo County 5802 Monticello--Ted Shilts  
MOUNT CLEMENS--Macomb Electronic Assn 225 Mt Clemens Saving Bank Bldg--E E Ballentine  
MUSKEGON--TESA-Muskegon County 757 W Hackley Ave--Charles Ashley  
NILES--TESA-Berrien County 13 E Main--Clay-ton Hill  
OAK PARK--South Oakland County TV Assn 22135 Coolidge--Jean Lash  
SAGINAW--TESA-Saginaw County 550 S River Rd--Kenneth Ackley Pres

## MINNESOTA

HIBBING--Range TV Service Assn P O Box 782 --Alfred Schmidt  
MINNEAPOLIS--TESA-Minneapolis 6613 50th Ave N--J A Farmer  
ST PAUL--TESA-St Paul 485 S Griggs--Jim Benike

## MISSOURI

CRYSTAL CITY--TESA-Mineral Area 304 Bailey Rd--H O Dowell  
GREENFIELD--TESA-Southwest Mo--Wayne Ester-line  
KANSAS CITY--Electric Assn of Kansas City 2201 Grand Ave--J S McDermott  
KANSAS CITY--National Appliance Service Assn 2201 Grand Ave--J S McDermott  
KANSAS CITY--TESA-Greater Kansas 2114 East 39--King Camden  
JEFFERSON CITY --TESA of Central Mo 710 Jefferson St--Lewis Taylor  
MOREHOUSE--TESA-Southeast Mo--Alton Bohan-non

# Utah Thin-Drive Speaker: the first major breakthrough in speaker design in 25 years

**A** radically new kind of speaker has been designed by Utah Electronics Corporation. We call it the Thin-Drive Speaker.

Thinner in profile and lighter in weight, this new Thin-Drive Speaker is also far more powerful and faithful in sound reproduction than any speaker now being produced in comparable sizes.

#### **A new magnetic material**

The Thin-Drive Speaker design was made possible by using a newly discovered magnetic material called Lodex. Developed by General Electric, Lodex uses iron-cobalt in a lead matrix. Working with the General Electric people, we tested this material.

We soon determined that a wafer-thin Lodex magnet, radially magnetized and precision formed, was the ideal approach to small speaker construction and proceeded to develop the revolutionary Thin-Drive Speaker.

#### **New thin silhouette**

Look at the illustration on this page. This actual-size drawing of our 2" miniature speaker shows the full depth of the speaker. Notice there's no need for a bulky pot. The model illustrated has a total depth of only  $\frac{1}{2}$  inch. Thin-Drive Speakers in other sizes present equally dramatic reductions in overall depth.



#### **New lightweight design**

Reducing the bulky, conventional pot assembly to a one-piece part, gave us a featherweight speaker. Even though the total weight is less, Utah Thin-Drive Speakers provide far more drive per ounce.

#### **Uniform performance**

Sound fidelity of Utah Thin-Drive Speakers often exceeds that of original equipment. And with such a simple assembly, Utah can guarantee precision performance from speaker to speaker and from run to run.

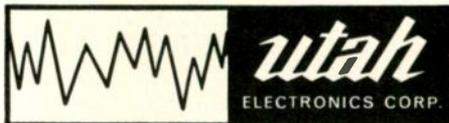
This new Lodex radial magnet resists interference from stray magnetic fields, and it gives more stable operation over long periods of use than conventional speaker magnets. It has also proved to be highly resistant to changes in temperature and humidity.

#### **Universal application**

Obviously, such a superthin, lightweight high-performance speaker simplifies replacement problems. Select the proper diameter and impedance and you needn't worry about space or weight of the Thin-Drive Speaker.

#### **The shape of future speakers?**

We at Utah believe that most replacement speakers will be built this new and better way a few years from now. Unquestionably, the new Utah Thin-Drive Speaker is an important advancement — perhaps the most important in 25 years.



*Write for details, specifications and prices.*

**UTAH ELECTRONICS CORP.**

Huntington, Indiana

**MOUNTAIN GROVE**—TESA-South Central Mo P O Box 31—W A Fryer  
**O'FALLON**—ESA-St Charles Area 215 S Main—Gilbert Prize  
**ST JOSEPH**—TESA-Northwest Mo PO Box 103 Inza Station—Bill Childs  
**ST LOUIS**—TEAM-Electronic Assn of Mo 2063 Wedgewood—H J Wolf  
**ST LOUIS**—TESA-St Louis 2804 Chippewa—Bill Towell  
**SPRINGFIELD**—TESA-Ozarks 2425 S Campbell—T A Leftwich

#### MONTANA

**BUTTE**—ESA-Electronic Service Assn P O Box 422—Raymond G Tuszyński Corres Secy

#### NEW JERSEY

**GLOUCESTER**—Allied Electronic Technicians of N J Box 15—J J Papovich  
**TRENTON**—Radio Servicemen's Assn 343 William St—M E Toth  
**WEST ORANGE**—Electronic Guild of N J 583 Valley Rd—A D Cosmo

#### NEW MEXICO

**ALBUQUERQUE**—Albuquerque TV Assn 5001 Menual NE—Phil Virgil

#### NEW YORK

**ALBANY**—TSA-Northeastern N Y 514 2 St—R J Wells  
**BROOKLYN**—Associated Radio & TV Servicemen of N Y (ARTS) 1197 Flatbush Ave—Marcus Schwartz  
**BUFFALO**—Radio Technicians Assn 694 Broadway—R A Wutz  
**BUFFALO**—TV & Electronic Servicemen's Assn Box 1182 Station E—Raymond Schmaltz  
**BUFFALO**—Western N Y Electronics Guild 2326 Main St—Jack McDonough  
**CANTON**—St Lawrence County Electronic Servicemen's Assn 109 Main St—Lyal Newvine  
**JAMESTOWN**—TESA-Jamestown-19 W Cowden Pl—Gordon Atkins  
**KENMORE**—Empire State Federation of Electronic Technicians Assn 2967 Elmwood Ave—Warren Baker  
**KINGSTON**—Ulster Electronic Technicians Assn 94 Furnace St—C A Kohl  
**NEW YORK**—Alumni Assn of RCA Institutes 350 W 4 St—Frank Salica  
**NEW YORK**—Certified Electronic Technicians Assn 312 E 67 St—Sol Fields  
**NEW YORK**—Electronic Technicians Assn 125 E 46 St  
**NEW YORK MILLS**—Mohawk Valley Radio TV Technician Guild 203 Main St—S J Miemiec  
**PEARL RIVER**—Rockland Assn of TV & Electronic Services 55 E Central Ave—Larry Critchlow  
**PORTRVILLE**—Tri-County Electronic Technicians Assn 28 S Main St—Jack Golden

#### NORTH CAROLINA

**DURHAM**—Piedmont Electronic Service Assn Box 222 E Durham—Bobby Goss  
**FAYETTEVILLE**—Cumberland County Radio & TV Assn 3920 Bragg Blvd—E F Barbour Jr  
**HIGH POINT**—NC Federation of Electronic Assn 1228 Montlieu Ave—Joseph Warren

#### OHIO

**AKRON**—TESA-Summit County 885 E Market St—Julius Klusty  
**CANTON**—TESA-Stark County 518 McKinley Ave NW—Harold Frutsky  
**CINCINNATI**—TESA-Cincinnati 1404 First National Bank Bldg—Vic Dehorenzo  
**CLEVELAND**—TESA-Greater Cleveland area P O Box 62 Cleveland 12—Joe Phillips Pres  
**COLUMBUS**—Associated Radio-TV Service Dealers 2552 N High St—W E Driscoll  
**COLUMBUS**—TESA-Ohio 2552 N High St—Joseph Phillips  
**MANSFIELD**—TESA-Mansfield Box 667—S J Hersch  
**MIDDLETOWN**—TESA-Middletown 2916 Yankee Rd—William Stepp  
**PORTSMOUTH**—Scioto Valley Electronic Assn 1329 Galena Pk—Henry Tabor  
**SANDUSKY**—TESA-Sandusky P O Box 811—M E Williams  
**SPRINGFIELD**—TESA-Springfield P O Box 851—Roy Henderson  
**TOLEDO**—TESA-Toledo 1952 Sylvania Ave—Vern La Plante

#### OKLAHOMA

**OKLAHOMA CITY**—TESA-Okla 2908 N W 23rd—B F Coats

#### OREGON

**McMINNVILLE**—TESA-Yamhill County 210 N Evans St—Bob Summers  
**PENDLETON**—TESA-Umatilla County 435 S W Frazier St—Courtland Brock  
**PORTLAND**—TESA-Portland 5513 S E 72 Ave—Rox Wiens  
**ROSEBURG**—TESA-Umpqua 516 S E Jackson St—Bruce Steiner  
**SPRINGFIELD**—TESA-Springfield 632 North "A" St—Ray Bainbridge  
**TIGARD**—TESA-Washington County 12545 Main St—Frank Schumacher

#### PENNSYLVANIA

**ALLENTOWN**—Lehigh Valley Electronics Assn 116 N 9 St—G H Beisel  
**HARRISBURG**—Mid-State Electronic Service Dealers Assn 17 & Herr Sts—Charles Ross III  
**PHILADELPHIA**—Philadelphia Radio Service Men's Assn 631 S 60 St—Wm Humes  
**PHILADELPHIA**—TSA of Delaware County 4710 York Rd—Stewart Kersting  
**PITTSBURGH**—Electronic Service Dealers Assn (ESDA of W Pa) 6026 Station St—J S Doyle  
**PITTSBURGH**—Radio & TV Servicemen's Assn 3239 Ashlyn St—Thomas Ging

**STATE COLLEGE**—TV Service of Centre County 232 S Allen St—C H Smith

#### RHODE ISLAND

**RIVERSIDE**—Rhode Island Radiomen's Business Assn 425 Willett Ave—E J Oliver

#### TENNESSEE

**DYER**—West Tennessee TESA Main & South Sts—Clark King Jr

#### TEXAS

**FORT WORTH**—Texas Electronics Assn 1513 W 7 St—Don Chambers  
**TEXARKANA**—TV & Electronic Service Assn 2410 New Boston Rd—Bob Litterman

#### VIRGINIA

**LYNCHBURG**—Virginia Electronics Assn 2 Denver Ave—T B Hudson  
**NORFOLK**—Virginia Electronics Assn P O Box 13001—Frank Barbera

#### WASHINGTON

**LONGVIEW**—Electronic Service Dealers Assn of Cowlitz County 2251 Cedar Pl—Fred Boaglio  
**LONGVIEW**—Washington State Electronics Council 1228 12 Ave—A V Heckman  
**SEATTLE**—Northwest Appliance & TV Assn 512 1 Ave N—D M Lombardo  
**SEATTLE**—TESA-King County 500 East Pine St—J O Humphrey

#### WEST VIRGINIA

**MARTINSBURG**—Shenandoah Electronic Technicians Assn P O Box 512—P H Mercer

#### WISCONSIN

**CHIPPEWA FALLS**—Indianhead Radio TV Servicemen's Assn 5 W Spruce St—K G Wheeler  
**GREEN BAY**—TESA-Green Bay 1200 Crooks St—Oliver Davis  
**MILWAUKEE**—TESA-Milwaukee 710 N Plankinton Ave—Frank Schroeder  
**RACINE**—TESA-Racine P O Box 303—R E Dubuque  
**SHEBOYGAN**—TESA-Sheboygan County P O Box 231—E J Dunn

#### CANADA

**BURNABY BRITISH COLUMBIA**—Radio Electronic Technicians Assn 113 N Holdom Ave—D W Gentry  
**WINNIPEG MANITOBA**—Radio Electronic Technician Assn P O Box 391—Christian Harder  
**HAMILTON ONTARIO**—RETA of Ontario 40 Westminster Ave—Gerry Leeks  
**MONTREAL QUEBEC**—Professional Assn of Independent Electronic Technicians 6855a St Andre—L Bilanger

# Technician Associations

List of Groups which are in current ET records, but have not verified their activities by 1962 questionnaire

#### COLORADO

**DENVER**—TESA 1313 W Alameda—O W Andrews Dir

#### FLORIDA

**FORT PIERCE**—TESA 734 Orange Ave—Jim Sowinski Dir

#### GEORGIA

**MACON**—TEAM 130 W Ridge Circle—G C Hitchcock Pres

#### IDAHO

**NAMPA**—TESA Canyon 104 Garland—B R Jones

#### ILLINOIS

**AURORA**—TESA Kane County 130 Downer Place—Bob Holmes  
**GRANITE CITY**—TESA Quad Cities 2011 Delmar—M E Converse Dir

#### INDIANA

**HAMMOND**—RTSA Calumet 7430 Calumet Ave—George Hall Dir

#### IOWA

**FORT DODGE**—TESA NW Iowa 1708 S Ave N—Eldon Groth Dir  
**MUSCATINE**—TESA Muscatine 1424 Park Ave—Wes Hunter Pres  
**OTTUMWA**—TSA Ottumwa 610 S Madison—J R Jackson Dir

#### KANSAS

**GREAT BEND**—TESA 802 Washington—Harold Riedle Pres

#### LOUISIANA

**ALEXANDRIA**—TESA Central La 1401 Lee St—Herbert Stark Dir  
**BOGALUSA**—TESA Bogalusa 209 Louisiana St—W A Rhodes Dir  
**MONROE**—TESA NE La 102 S 2 St—Jerry Grayson Dir  
**MORGAN CITY**—TESA St Mary PO Box 365—J J Johanson  
**NEW IBERIA**—TESA New Iberia 711 Compton St—H C Smith Dir  
**NEW ORLEANS**—TESA La 930 Bordeaux—E Ritzmann Dir  
**OPELOUSAS**—TESA Evangeline 615 S Market—Clifford Hilliard Dir  
**THIBODAUX**—RETA-SC La Box 594 RFD #2—L A Martin Dir

#### MICHIGAN

**BERKELEY**—SOCTA 3990 W Twelve Mile—Mike Mosier Dir  
**PONTIAC**—TESA Oakland 45 E Walton—T E Johnson Dir

#### MISSISSIPPI

**KREOLE**—AQTT PO Box 81—L O Graff Jr

#### NEBRASKA

**OMAHA**—TESA Omaha 4831 Leavenworth—Ralph Reeves Dir

#### NEW YORK

**LAURELTON**—Radio TV Guild (RTG of LI) 230-08 S Conduit Ave—R A Larson  
**ROCHESTER**—TESA Rochester 1585 Dewey Ave—F Stoefel Dir  
**SYRACUSE**—STTA 742 Butternut St—Don Roberts

#### NORTH CAROLINA

**CHARLOTTE**—RTSA 2601 Rozzells Ferry Rd—Howell Dir

#### OHIO

**DAYTON**—TESA Dayton 2027 E 5 St—G E Hayes Dir  
**LORAIN**—TESA Lorain 1755 Oberlin—Jack Fain Dir  
**REESEVILLE**—TESA c/o Walker TV Service—R E Walker Dir  
**WARREN**—WREA 8024 E Market St—Richard Lip-tak Dir  
**YOUNGSTOWN**—MVTSDA 416 Almyra—Carl Hepp Dir

#### OKLAHOMA

**TULSA**—TESA 3024 E 15 St—C S Crawford Dir

#### PENNSYLVANIA

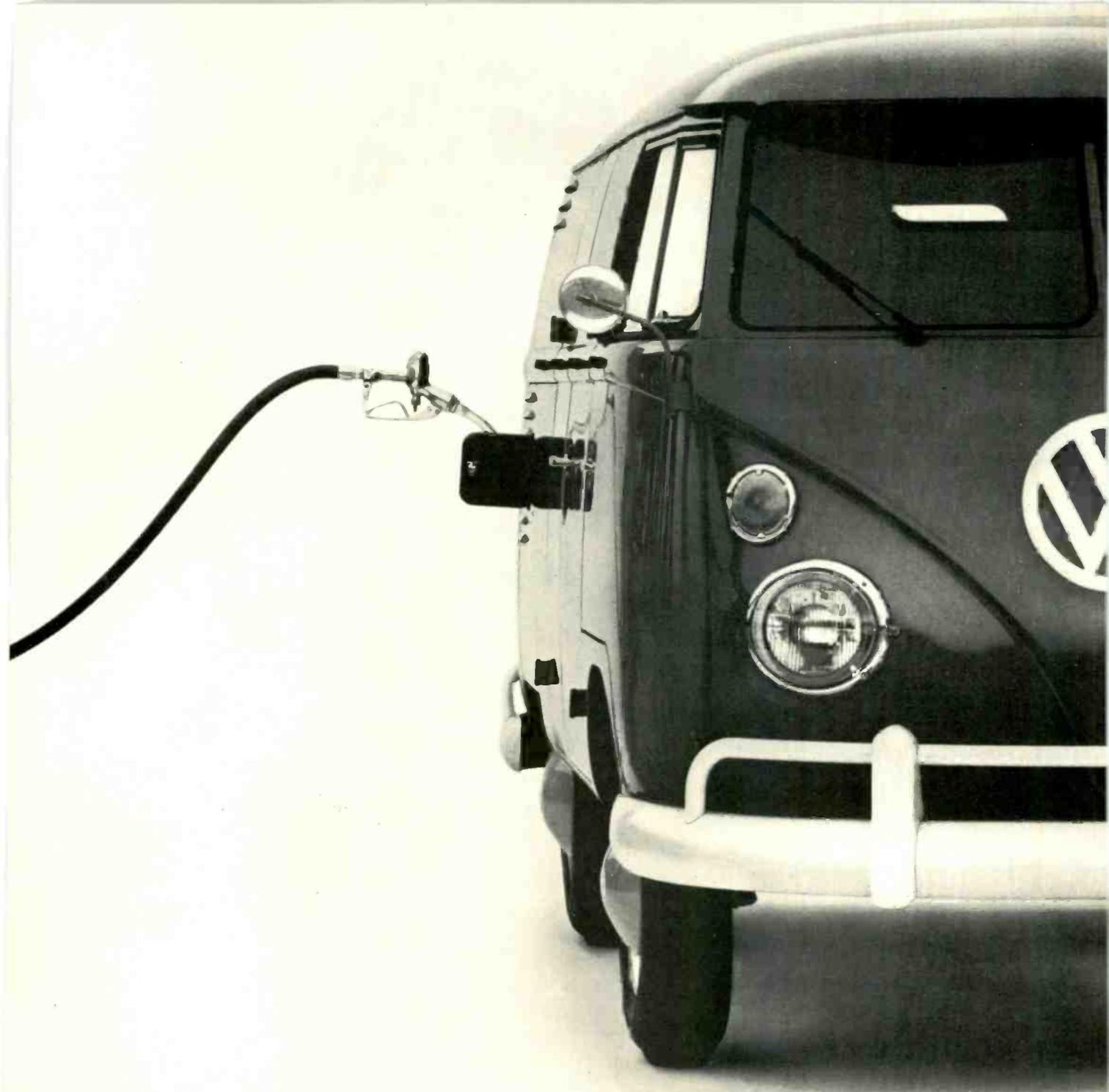
**CHESTER**—TSDA Delaware County 2827 W 3 St—W Y Morrow Dir

#### TENNESSEE

**MEMPHIS**—TESA Memphis 1469 Florida St—Russ Hellen Pres  
**NASHVILLE**—TESA Nashville 3001 Gallatin Rd—Hubert Baker Dir

#### TEXAS

**BEAUMONT**—TEA-GT P O Box 2603—W E Johnson  
**BORGER**—TESA Borger 400 Union St—R F Dietz  
**HOUSTON**—TESA Houston 1324 Berry Rd—J Domino Pres



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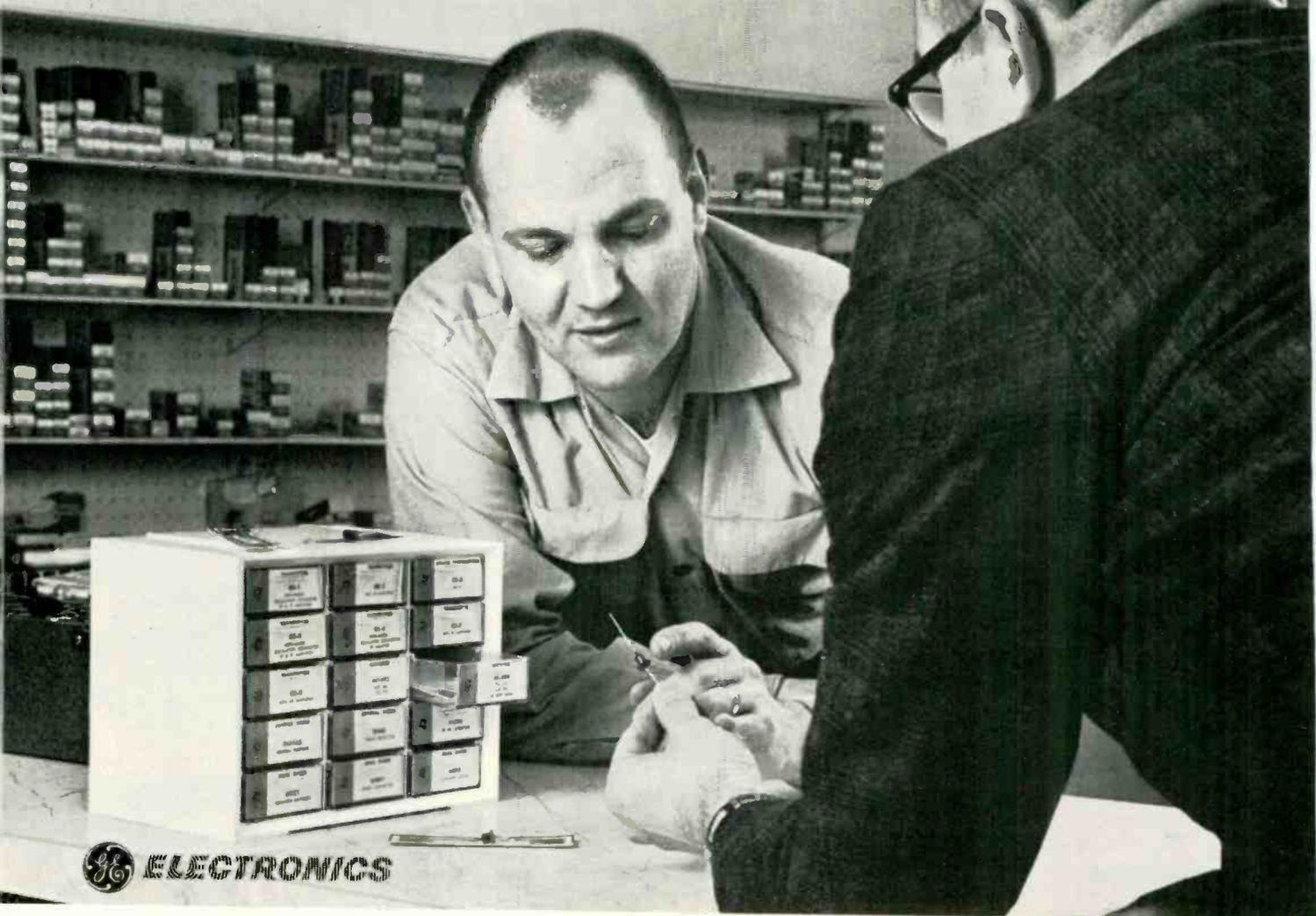
Our truck's only \$1,895\* to begin with.

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--- for more details circle 66 on page 86

G. E. reporter, Roland Kempton, reports on General Electric's new line of entertainment semiconductors



## Marvin Kleine figures he can fill 80% of his replacement needs from new G-E *SERVICE-DESIGNED* entertainment semiconductor kit

We gave Marvin Kleine, manager of ROGERS HORNSBY TV SERVICE, St. Louis, a preview of General Electric's new line of Service-Designed entertainment semiconductors. He saw several immediate advantages: "One of the main things in this business is *one time on the bench*—being able to put a set on the bench, check it out, fix it and get it out with a minimum of handling. These Service-Designed semiconductors will help because in about 80 percent of the cases I'll have the replacement right here in the shop. Should speed up our service and save a lot of shopping around for exact replacements. The blister-pack on cards makes a lot of sense, too, and I'm glad to see you've included interchangeability data. Saves us the trouble of looking it up."

If you still have to shop around for entertainment semiconductor replacements, it will pay you to check G.E.'s expanded new Service-Designed line, including:

**GE-504 "Universal" Silicon TV Rectifier**—a universal replacement for all silicon, germanium and selenium rectifiers used in TV receivers. It features a 45 amp. max. surge rating

which eliminates the need for a limiting resistor as is necessary with ordinary silicon rectifiers. 750 ma DC output; 400 PIV.

**8 "Universal" Transistor Types**—including 2 power transistors for auto radios—Service-Designed to replace over 600 types used in original equipment.

**4 Crystal Diodes**—Service-Designed to replace approximately 98% of all diodes used in entertainment applications.

A Replacement Guide and Catalog of entertainment semiconductors is available at your G-E distributor. Ask for ETR-2982 or write to: General Electric Company, Distributor Sales, Electronic Components Division, Room 1710, Owensboro, Kentucky.

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**WASHINGTON**

**ABERDEEN-GHATESA** 111 W Heron St—Geo Batinovich Pres  
**SPOKANE-TSA** N 1707 Howard St—O J Ohde Dir  
**YAKIMA-RTSA** Yakima 713 W Yakima—Dean Thompson Dir

**WISCONSIN**

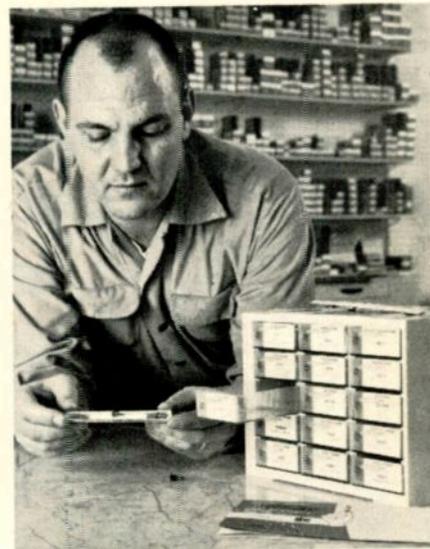
**APPLETON-TESA-FRV** 531 W College—Ted Gabor-ek Dir  
**WATERTOWN-TESA** 402 Main St—C H Becker Dir

# Technical Societies & Industry Associations

with name of secretary unless otherwise noted

Acoustical Society of America 335 E 45 St New York 17 N Y—Wallace Waterfall  
 Aerospace Electrical Society 3540 Wilshire Blvd Los Angeles 5 Calif—L T Isaacs  
 Aerospace Industries Assn of America Inc 610 Shoreham Bldg Washington 5 DC—S L Wright  
 Air Traffic Control Assn 528 Barr Bldg Washington 6 DC—R. L. Grayson  
 Airways Engineering Society 6395 Camp Bowie Blvd Fort Worth 16 Texas—Chris Lample Exec Dir  
 American Institute of Electrical Engineers 345 E 47 St New York 17 NY—N S Hibshman  
 American Institute of Physics 335 E 45 St New York 17 NY—Wallace Waterfall  
 American Management Assn 1515 Broadway New York 36 NY—Philip Jones  
 American Physical Society 538 W 120 St New York 27 NY—K K Darrow  
 American Production & Inventory Control Society 330 S Wells St Chicago III—R S Mayer  
 American Radio Importers Assn 276 Park Ave South New York 10 NY—Samuel Frankel  
 American Radio Relay League Inc 38 LaSalle Rd West Hartford 7 Conn—John Huntoon Genl Mgr  
 American Society for Quality Control 161 W Wisconsin Ave Milwaukee 3 Wis—W P Young-claus Jr Adm Secy  
 American Society for Testing & Materials 1916 Race St Philadelphia 3 Pa—T A Marshall Jr Exec Secy  
 American Society of Mechanical Engineers United Engineering Center 345 E 47 St New York 17 NY—O B Schier II  
 American Standards Assn 10 E 40 St New York 16 NY—R E Gay Managing Director & Secy  
 American Welding Society 345 E 47 St New York 17 NY—F L Plummer  
 Armed Forces Communications & Electronics Assn 1624 Eye St NW Washington 6 DC—Col F T Ostenberg USA (Ret)  
 Associated Public-Safety Communications Officers 51 Government St Mobile Ala—H P Black  
 Association for Computing Machinery 14 E 69 St New York 21 NY—Mrs Irene Hollister Exec Secy  
 Association of Electronic Parts & Equipment Mfrs Suite 1710 100 S Wacker Dr Chicago 6 III—K C Prince  
 Audio Engineering Society P O Box 12 Old Chelsea Station New York 11 NY—C J LeBel  
 Electrical Apparatus Service Assn 7730 Carondelet Ave St Louis 5 Mo—George Larsen  
 Electronic Engineering Assn 11 Green St Mayfair London W 1 England—H E F Taylor  
 Electronic Representatives Assn 600 S Michigan Chicago 5 III—Harry Halinton  
 Electronic Sales Managers Assn PO Box 1 Bellerose LI NY—Alex White Exec Dir  
 Electronic Industries Assn 1721 De Sales St NW Washington 6 DC—J D Secrest  
 Greater Washington Educational TV Assn 1001 Vermont Ave NW Washington 5 D C—Miss Patricia Oliver  
 Institute of the Aerospace Sciences 2 E 64 St New York 21 N Y—R R Dexter  
 Institute of High Fidelity Mfrs 516 5 Ave New York 36 NY—S B Marantz  
 Institute of Printed Circuits 27 E Monroe St Chicago 3 III—R E Pritchard  
 Institute of Radio Engineers 1 E 79 St New York

21 NY—Dr George W Bailey Exec Secy  
 Instrument Society of America Penn-Sheraton Hotel Pittsburgh 19 Pa—W H Kushnick  
 International Municipal Signal Assn 130 W 42 St New York 36 NY—Irvin Shulsinger  
 Joint Technical Advisory Committee 1 E 79 St New York 21 NY—L G Cumming  
 Long Island Electronics Mfrs Council PO Box 453 Mineola NY—John Cammarata  
 Metal Finishing Assn of Southern Calif 4386 Lankershim Blvd North Hollywood Calif—Harvey Stowers  
 National Appliance & Radio-TV Dealers Assn 1141 Merchandise Mart Chicago 54 III—J P Fulford  
 National Assn of Broadcasters 1771 N St N W Washington 6 DC—Everett Revercomb  
 National Assn of Electrical Distributors 290 Madison Ave New York 17 NY—A W Hooper Exec Dir  
 National Assn of Music Merchants 222 W Adams Chicago 6 III—W R Gard Exec Secy  
 National Assn of Relay Mfrs PO Box 1 Bellerose 26 LI NY—P Garnick  
 National Audio-Visual Assn 1201 Spring St Fairfax Va—Don White Exec Vice Pres  
 National Community TV Assn 535 Transportation Bldg Washington 6 DC—Frank Thompson  
 National Electrical Mfrs Assn 155 E 44 St New York 17 NY—J F Miller Managing Dir  
 National Electronic Distributors Assn 343 S Dearborn St Chicago 4 III—G S Carter  
 National Electronics Conference 228 N LaSalle St Chicago 1 III—Dr E W Ernst  
 Phonograph Mfrs Assn 37 W 53 St New York 19 NY—A D Adams  
 Precision Potentiometer Mfrs Assn 27 E Monroe St Chicago 3 III—R E Pritchard  
 Producers of Associated Components for Electronic (PACE) 261 Broadway New York 7 NY—Walter Jablon  
 Purchasing Agents of the Radio-TV & Electronic Industry PO Box 62 Rosedale 22 NY—B Trimboli  
 Radio Club of America 11 W 42 St New York 36 NY—James Morelock  
 Radio Technical Commission for Aeronautics (RTCA) Room 1072 Bldg T-5 Washington 25 DC—L M Sherer  
 Radio Technical Commission for Marine Services c/o Federal Communications Commission Washington 25 DC—G R McLeod  
 Scientific Apparatus Makers Assn 20 N Wacker Dr Chicago 6 III—Kenneth Andersen  
 Society for Nondestructive Testing 914 Chicago Ave Evanston III—P D Johnson  
 Society of Motion Picture & TV Engineers 55 W 42 St New York 36 NY—H E Farmer  
 Society of Plastics Engineers 65 Prospect St Stamford Conn—Colin Campbell  
 Special Industrial Radio Service Assn 711 14 St N W Washington 5 D C—G K Adams  
 Standards Engineers Society 170 Livingston Ave New Providence N J—K W Truhn Pres  
 Ultrasonic Mfrs Assn 271 North Ave New Rochelle N Y—J R Fisher Pres  
 Western Electronic Mfrs Assn 1435 S La Cienega Blvd Los Angeles 35 Calif—W H Heflin



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Why shop for semiconductor replacements? Stock them! Now you can—with this handy 23-item inventory of 15 entertainment semiconductor types in a space-saving 15-drawer kit that takes just 10" x 6" of space:

TYPE	QUANTITY
GE-1 "Universal" Transistor	1
GE-2 "Universal" Transistor	1
GE-3 "Universal" Power Transistor (25 watts)	1
GE-5 "Universal" Transistor	1
GE-6 "Universal" Transistor	1
GE-7 "Universal" Transistor	1
GE-8 "Universal" Transistor	1
1N1692 Rectifier (100 PIV, 600 MA)	2
GE-504 "Universal" TV Rectifier	2
1N34AS Crystal Diode	3
1N60 Crystal Diode	2
1N295 Crystal Diode	2
6GC1 Dual Diode	2
6GD1 Dual Diode	2
6GX1 Dual Diode	1

A regular \$33.22 value! You pay only for the semiconductors. No additional charge for the kit (K-915). Get it from your General Electric distributor. General Electric Company, Distributor Sales, Electronic Components Division, Room 1710, Owensboro, Kentucky.

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**GENERAL ELECTRIC**

... for more details circle 34 on page 86

## Electronic Schools

- Basic TV-Radio Servicing ..... 1
  - Advanced TV-radio servicing ..... 2
  - Color TV servicing ..... 3
  - Communications, FCC licenses ..... 4
  - Industrial electronics ..... 5
  - Hi-Fi & Audio ..... 6
  - Military electronics ..... 7
  - Appliance servicing ..... 8
  - Business Management ..... 9
  - Electronic Engineering Technology ..... 10
- All have both Correspondence and Resident Courses, except those followed by R for Resident Courses or C for Correspondence Courses.

**ARIZONA**

PHOENIX—Middleton Institute of Electronics 2937 E McDowell Rd-1-2-3-4-5-10-R

**CALIFORNIA**

ANAHEIM—Coast Electronics Institute 501 S Brookhurst Ave-1-2-3-4-5-6-7-R  
 HOLLYWOOD—Hollywood Radio and TV Institute 7078 Hollywood Blvd-1-2-C  
 HOLLYWOOD—Pacific Int'l College of Arts & Sciences 5719 Santa Monica Blvd-6-9-10  
 INGLEWOOD—Electronic Technical Institute 970 W Manchester Ave-10  
 INGLEWOOD—Northrop Institute of Technology 1155 W Arbor Vitae St-10  
 LOS ANGELES—Grantham Schools 1505 N Western Ave-4

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**International Electronic Research Corporation**  
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heat-dissipating tube shields for miniature, subminiature, octal and power electron tubes  
... for more details circle 21 on page 86

LOS ANGELES—National Technical Schools 4000 S  
Figueroa St—1-2-3-4-5-6-7-8-10  
LOS ANGELES—Radio-TV Training School 815 E  
Rosecrans Ave—1-2-3-5-C  
LOS ANGELES—RCA Institutes 610 S Main St—  
1-2-3-4-5-7-10  
SAN DIEGO—Electronic Technical Institute 4863  
El Cajon Blvd—10

#### CONNECTICUT

HARTFORD—New England Technical Institute of  
Conn Inc 56 Union Place—1-2-3-4-5-6-8-10  
HARTFORD—Ward School of Electronics 44 Niles  
St—5-10

#### DISTRICT OF COLUMBIA

WASHINGTON—Capitol Radio Engineering Insti-  
tute 3224 16 St NW—5-9-10  
WASHINGTON—Grantham School of Electronics  
821 19 St NW—4  
WASHINGTON—National Radio Institute 3939 Wis-  
consin Ave NW—1-2-4-5-7-8-C

#### ILLINOIS

CHICAGO—Christy Trades School 3214 W Law-  
rence Ave—1-2-3-5-6-7-8-C  
CHICAGO—Commercial Trades Institute 1400 W  
Greenleaf Ave—1-2-3-5-C  
CHICAGO—Coyno Electrical School 1501 W  
Congress Pkwy—1-2-3-5-6-7-8  
CHICAGO—DeVry Technical Institute 4141 Bel-  
mont Ave—1-2-3-4-5-6-7-8-10  
CHICAGO—Industrial Training Institute 2150 W  
Lawrence Ave—1-2-5-8-C  
CHICAGO—Motorola Training Institute 4501 W  
Augusta Blvd—4-C

#### INDIANA

ANGOLA—Tri-State College—1-2-3-4-5-6-9-10-R  
INDIANAPOLIS—Indianapolis Electronic School 633  
N Pennsylvania St—1-2-3-4-5-6-10-R  
VALPARAISO—Valparaiso Technical Institute Box  
490—1-2-3-4-5-10-R

#### KENTUCKY

LOUISVILLE—United Electronics Institute 3947  
Park Drive—1-2-3-4-5-6-7-10

#### MARYLAND

BALTIMORE—Baltimore Technical Institute 1425  
Eutaw Place—1-2-3-4-5-R

#### MICHIGAN

DETROIT—Radio Electronic & TV Schools 1625 E  
Grand Blvd—1-2-3-4-5-6-9-10-R

#### MINNESOTA

MINNEAPOLIS—Brown Institute of Electronics 3123  
E Lake St—1-4-5-7-R  
MINNEAPOLIS—Chicago Vocational Training 3330  
University Ave SE—1-2-3-5-6  
MINNEAPOLIS—Northwestern TV & Electronics In-  
stitute 3800 Minnehaha Ave—1-2-3-4-5-6-R

#### MISSOURI

KANSAS CITY—Central Technical Institute 1644  
Wyandotte—1-2-3-4-5-6-7-8-10  
KANSAS CITY—Grantham School of Electronics  
3123 Gillham Rd—4

#### NEW JERSEY

PENNSAUKEN—Electronics Training Center 7300  
Crescent Blvd—1-2-3-4-5-6-10-R

#### NEW YORK

BROOKLYN—New York City Community College  
300 Pearl St—4-5-10-R  
NEW YORK—Board of Education of the City of  
New York Manhattan Trades Center 45 Rivington  
St—1-2-3-4-8-R  
NEW YORK—Delehanty Radio & TV School 117  
E 11 St—1-2-3-4-R  
NEW YORK—Electronic Development Institute 125  
E 46 St—1-2-3-4-5-6-7-10  
NEW YORK—Lincoln School of Radio & TV 127  
Columbus Ave—1-2-3-4-5-R  
NEW YORK—Radio TV Training of America 52 E  
19 St—1-2-3-9-C  
NEW YORK—RCA Institutes 350 W 4 St—1-2-3-4-10  
NEW YORK—Voorhees Technical Institute 304 E  
67 St—5-10

#### OHIO

CLEVELAND—Cleveland Institute of Electronics  
1776 E 17 St—4-5-7-10-C

#### PENNSYLVANIA

ALLENTOWN—Electronics Training Center 29-31  
N 7 St—1-2-3-6-R  
PHILADELPHIA—Electronics Training Center 4013  
Germantown Ave—1-2-3-5-6-10-R  
PHILADELPHIA—Philadelphia Wireless Technical  
Institute 1533 Pine St—4-5-10-R  
PHILADELPHIA—Philco Technological Center C and  
Ontario Sts Post Office Box 4730—5  
PITTSBURGH—Penn Technical Institute 5440 Penn  
Ave—1-4-5-10-R  
SCRANTON—International Correspondence Schools'  
School of Electronics Oak and Pawnee—1-3-4-  
5-6-8-9-10-C

#### RHODE ISLAND

PROVIDENCE—New England Technical Institute of R I Inc 184 Early St—1-2-3-4-5-6-8-10  
 PROVIDENCE—Rhode Island Radio & Electronics School 45 Mathewson St—1-2-3-4-10-R

#### TEXAS

PORT ARTHUR—Port Arthur College 1500 Procter—1-2-4-5-R

#### WASHINGTON

SEATTLE—Grantham School of Electronics 408 Marion St—4

#### WISCONSIN

MILWAUKEE—Milwaukee School of Engineering 1025 N Milwaukee St—5-10-R

#### CANADA

TORONTO ONTARIO—DeVry Technical Institute 970 Lawrence Ave W—1-2-3-4-5-6-8-10

## AUTO CONVERTERS

*Continued from page 47*

assign a pushbutton to f-m if the radio is a pushbutton type.

### Antennas

Virtually all manufacturers of f-m car radios agree that the existing whip for a-m reception is satisfactory for f-m reception. With proper adjustment of the whip's sliding sections it can work as a quarter wave vertical, resonant in the f-m band.

This is important since wide signal strength changes can take place on f-m frequencies as the car moves over the road.

The whip antenna can be adjusted for maximum signal pick-up at the center of the f-m band simply by tuning in a station nearest to 98 mc and adjusting the antenna for maximum signal. Adjust the antenna first to a height of about 28 to 30 inches. Then move it up and down within a two inch area for the strongest signal. Remove your hand from the antenna when observing signal strength.

### Ignition Interference

Ignition noise can be most disturbing to f-m reception outside of strong signal areas. Standard suppression techniques for a-m radios do not suffice for f-m. Suppression devices now installed by auto manufacturers are intended primarily for a-m noise suppression. All bypass capacitors used for ignition noise suppression on f-m frequencies should be coaxial or "feed-thru" types. Key points for these capacitors are: armature terminal of the generator, battery and armature of the voltage regulator, and the primary terminal (battery) of the ignition coil. ■



Tarzian 400 and 600 volt F and H series units are available in handy Ten-Paks, in Doubler Replacement Kits, and in bulk; M150 and M500 units are available in Conversion Kits and in bulk. Nine standard tube replacement rectifiers replace over 95% of all popular

vacuum tube rectifiers; S5347 replaces 6BW4 or 12BW4 in Citizen's Band radios; your 50 to 500 ma requirements are covered by four "condensed stack" selenium rectifiers, which Sarkes Tarzian has made more efficient—and smaller—than before.

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**...the preferred\* silicon rectifiers that mean fewer call-backs**

*\*by service technicians—again in '62*

■ Tarzian silicon rectifier dependability virtually eliminates call-backs that waste your time and profits. Units are available immediately from distributors throughout the country... in the shapes, sizes, and specifications you need to do your work quickly and easily.

Tarzian's industry-wide reputation for high quality at a pace-setting low price is a basic reason why technicians like yourself prefer Sarkes Tarzian rectifiers by nearly as many votes as the next two brands combined.

That statement is based on the results of 1961 and 1962 mailings by Brand Name Survey, an independent research organization, to 23,000 service technicians in all major market areas of the United States, covering 36 states. You're in good company—and lots of it—when you make Tarzian rectifiers your first choice for replacement applications.

Free Tarzian "Distributor Line" Catalog is available now as your guide to replacement rectifier quality. Ask your nearest Tarzian distributor for your copy.



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... for more details circle 50 on page 86

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When you invest in dependable FANON-MASCO amplifiers and sound systems you get so much more for your sound dollar! Features you'd find in other amplifiers costing much more are merely standard equipment at FANON-MASCO.

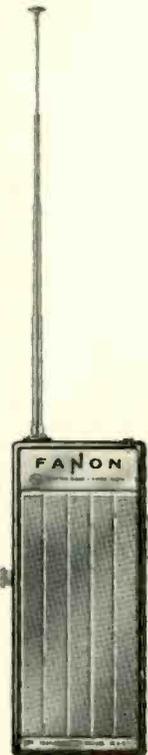
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Special Offer! Ask your distributor about the colorful counter display deal to help you sell more intercoms. See us in Room 553A at the Show.



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SEE US AT THE MAY PARTS SHOW — ROOM 553A

--- for more details circle 29 on page 86

**COLOR TV**

*Continued from page 38*

by observing flesh tones. All other colors will then be true. After the hue is set, the color or level control can be adjusted for proper intensity. To obtain good color reproduction it may be necessary at times to alternately adjust the hue and color controls.

During black and white telecasts, color noise may appear in the picture. This can be eliminated by turning the color control off.

**Picture Quality Variations**

Normal quality variations in different broadcasts should also be made clear to the owner. Why some telecasts are clearer than others is a common question. Live studio shows will usually have the highest color quality. Outdoor shows in sunlight can be the best or the poorest since control of lighting is not feasible. Picture quality may also be degraded on film and video tape. Minute shifts of certain colors on both film and tape cause colors to appear in slightly different shades than the real-life colors.

Poor service rendered during the installation won't leave the color TV owner anxious to call you for future service. The proper time and place to begin a successful color TV service business, then, is when the set is first installed and adjusted in the customer's home. ■

*Illustration Credit: R.C.A., Indianapolis; Zenith Radio Corp., Chicago.*



"... and which general practitioner referred you to us?"

## REPS AND DISTRIBUTORS

**Olympic Radio & Television-Div., The Siegler Corp.**—has named ARTHUR M. CARRINGTON of Indianapolis, Ind., as Midwestern District rep. Carrington will be responsible for midwest sales under the supervision of DAN MCKINNON, Olympic's Midwestern regional sales manager.

**Hi-Q Div. Aerovox Corp.**—has made GENE ROOT, Pittsburgh, Pa. sales rep for Western Pennsylvania (west of a north-south line joining Harrisburg and Sunbury, Pa.) and in the entire state of West Virginia. JOSEPH COSTELLO, Orlando, Fla., has been appointed sales rep for all Hi-Q products in the state of Miss., in addition to his present sales territory of Fla., Ala., Ga., S. C., and Tenn. Also named were IBL ENGINEERING and SALES INC., Dallas, Tex., for the states of La. and Ark. This is in addition to IBL's present sales territory of Tex. and Okla.

**Centralab The Electronics Div. of Globe-Union Inc.**—expansion of distributor activities has led to establishment of a new headquarters building for the Distributor Div. The new facilities will house all sales, administrative, and stocking operations. The expanded warehousing facilities will permit shipment of distributor orders on a same-day (24 hour) basis, to keep pace with the expanding needs of electronic parts distributors and the rapid increase in their activities in the industrial equipment market, according to a company spokesman.

**Electro-Voice, Inc.** — announced the appointment of JERRY J. MCGUIRE as Eastern Regional Field sales manager. "The addition of McGuire makes it possible for us to give our eastern distributors maximum merchandising and management assistance to accompany the most aggressive sales program in our history," stated Lawrence LeKashman, vice president of the firm's sales division.

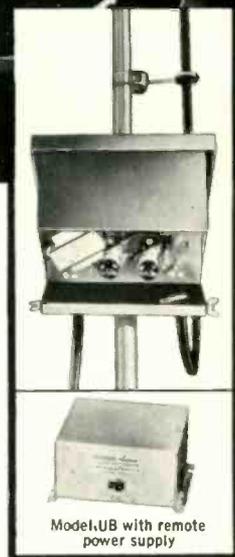
**American Concertone** — GENE T. CLEARS, manufacturers' rep, has been named first prize winner of the firm's 1961 Representatives' Sales Contest. The prize was a 1962 Fiat automobile. Each one of the Concertone reps was a winner in the recent contest. Prizes ranged from executive brief cases and luggage to color television sets.

**Electronic Representatives Assn.** — confirming prevailing rumors, WILLIAM C. WEBER, JR., executive director, officially announced his resignation, effective May 1st. Weber, who has held the office since 1958, will join the newly-formed COMPAR CORP., an integrated marketing organization for precision electronic components, where he will serve as executive vice president & general manager.

superb UHF pictures where other methods fail



# BLONDER-TONGUE MAST-MOUNTED UHF BOOSTER / 5 models cover specific uhf channels from 14 to 83



The original Blonder-Tongue Ultra-booster covered only channels 70 to 83. When it was introduced in the MPATI and translator areas, it was so dramatically effective that installers throughout the country demanded units for their particular UHF channels. There are now five standard models, each covering a specific portion of the UHF spectrum: (1) UB 14 thru 29; (2) UB 25 thru 40; (3) UB 41 thru 55; (4) UB 56 thru 69 and (5) the original UB for 70 thru 83. In addition, other frequency ranges are available on a custom basis.

There's nothing like the Blonder-Tongue UB on the market today. Mast-mounted to take advantage of the maximum signal-to-noise ratio available at the antenna, it increases signal voltage by at least 14db. The UB uses two low-noise frame grid tubes. The remote power

supply sends a 'safe' 24 volts of AC power to the mast-mounted UB amplifier on the same downlead which carries the signal. The UB is enclosed in a weatherproof housing with swing-down chassis for easy servicing. The standard UB has 300 ohm inputs and outputs. It is available on a custom basis with 75 or 50 ohm inputs and outputs.

The UB may be used in master TV installations and for single sets in schools and homes. It delivers sharp, clear pictures in 'impossible' areas. Model UB lists at \$88.00.

The Blonder-Tongue UB and either of the Blonder-Tongue UHF converters, models BTC-99r and BTU-2s, are the perfect team for superior UHF — anywhere. Today, contact the world's most experienced manufacturer of UHF products. For free 16-page Quick Reference Manual of TV Systems, write Dept. ET-5.

engineered and manufactured by

**BLONDER-TONGUE**  
9 Ailing St., Newark, N. J.

Canadian Div: Benco Television Assoc., Ltd., Tor., Ont. Export: Rocke Int'l. Corp., N. Y. 16—CABLES: ARLAB  
home TV accessories • closed circuit TV systems • UHF converters • master TV systems

— for more details circle 16 on page 86

# FREE LITERATURE

To receive the literature below without charge, simply circle the number on the coupon

## COMPONENTS

A 40-page "Service Selector" catalog describes a complete line of capacitors, vibrators, rotors, decades, test instruments and other standard line components. Selection data include design features, temperature ranges, material construction, application and price. Cornell-Dubilier Electronics Div., Federal Pacific Electric Co.

--- for more details, circle 300 below

## FILM RESISTORS

This catalog describes a line of film resistors mounted on ceramic cores. The units feature standard resistance tolerance of  $\pm 1\%$  and employs the firm's special "Metalloy" carbon resistance film. Wilrite Products Inc., subsidiary of Globe-Union Inc.

--- for more details, circle 301 below

## SEMICONDUCTOR HOUSING

These 95% High Alumina semiconductor housings have an inner diameter of 0.030 in. and an outer diameter of

0.050 in. and can be supplied in lengths from 0.015 to 0.090 in  $\pm 0.002$ . Larger diameters can also be supplied. Ceramic Dept., Centralab, The Electronics Div. of Globe-Union Inc.

--- for more details, circle 302 below

## CONTROLS

This catalog lists in detail various carbon element and wire wound controls for radio, television and sound systems, as well as the upgraded C-Line controls for more critical applications, and fixed wire-wound resistors. Clarostat Mfg. Co.

--- for more details, circle 303 below

## AUTOMATIC DF

A fully automatic radio direction finder that can "lock" on a signal from a radio beacon, an ordinary broadcasting station or a radio signal from another vessel is described. The electronic navigator finds the "null," insures that its bearing is correct and not a reciprocal, and then continuously displays

the proper bearing. Raytheon Co., Marine Products Dept.

--- for more details, circle 304 below

## NEEDLE REFERENCE

The 1962 Wall Reference Chart lists replacement needles by manufacturer's cartridge number, shows an illustration of needle replacement, the record speed, and the needle number in either diamond, jewel, or osmium. List price for each is also shown. Duotone Co.

--- for more details, circle 305 below

## COILS

Five new exact replacement television coils and two new radio replacement loop antennas are described in Bulletin 608. The new coils include exact replacements for Admiral and RCA horizontal oscillators, for Crosley and Hallcrafters second sound I. F. coils, and for an Admiral Sound Take-off coil. Stancor Electronics, Inc.

--- for more details, circle 306 below

CUT HERE

5-62

Cut out and mail to **ELECTRONIC TECHNICIAN, 1 East First Street, Duluth 2, Minn.**

Use this coupon, or your letterhead, before **June 20, 1962**

Please send me literature of companies whose code numbers I have circled below (includes editorial and advertised items):

### ADVERTISED PRODUCTS

10	25	40	55
11	26	41	56
12	27	42	57
13	28	43	58
14	29	44	59
15	30	45	60
16	31	46	61
17	32	47	62
18	33	48	63
19	34	49	64
20	35	50	65
21	36	51	66
22	37	52	67
23	38	53	68
24	39	54	69
			70

### NEW PRODUCTS

200	206	212	218
201	207	213	219
202	208	214	220
203	209	215	221
204	210	216	222
205	211	217	

### FREE LITERATURE, CATALOGS, BULLETINS

300	302	304	306
301	303	305	

Name..... Position.....

Firm..... Address.....

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

Note: If you have given your residence address, please enter your company name and address on this line:.....

## New Heavy Duty RFI Suppression Kit For Mobile Radio



**R**ADIO HAMs, fleet owners, and CB operators can now enjoy clearer, more readable, less tiring mobile communications at longer effective ranges.

Sprague's new Type SK-1 SUPPRESSIKIT provides effective R-F Interference suppression—at moderate cost—up through 400 megacycles. Designed for easy installation on automobile, truck, or boat engines with either 6-volt or 12-volt generators, the Suppressikit makes possible high frequency interference control by means of Sprague's new, extended range, Thru-pass® capacitors.

The components in the SK-1 Suppressikit are neatly marked and packaged, complete with easy-to-follow installation instructions. All capacitors are especially designed for quick, simple installation.

The generator capacitor is a heavy-duty unit rated at 60 amperes, and will operate at temperatures to 125°C (257°F). This means you'll have no trouble with an SK-1 installation in the terrific temperatures found "under the hood" on a hot summer's day. There's no chance of generator failures from capacitor "short outs," as with general purpose capacitors. The Thru-pass capacitors for use on voltage regulators are also rated at a full 60 amperes.

The Deluxe Suppressikit is furnished complete with an 8-foot shielded lead on the generator capacitor which can be trimmed to necessary length for any car or small truck, preventing R-F radiation from armature and field leads.

Containing only 5 easy-to-install capacitors, the Deluxe Suppressikit is truly a "do-it-yourself" kit. The net price of \$17.85 is a little higher than that of many thrown-together kits, but it saves you so much time and aggravation it's well worth the slight extra cost.

If the SK-1 Suppressikit is not available at your Sprague Electronic Parts Distributor, send your order to Sprague Products Company, 65 Marshall St., North Adams, Mass.

## Sprague TWIST-LOK® Capacitors give you 2 tremendous advantages over all other twist-prong electrolytics



# 1

**The right size, the right rating, for EVERY replacement job**

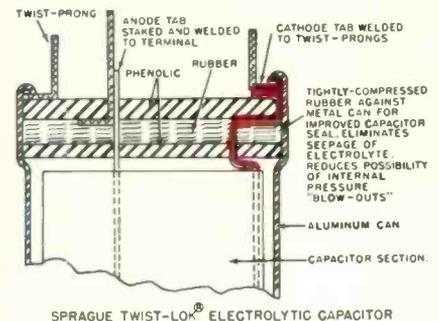
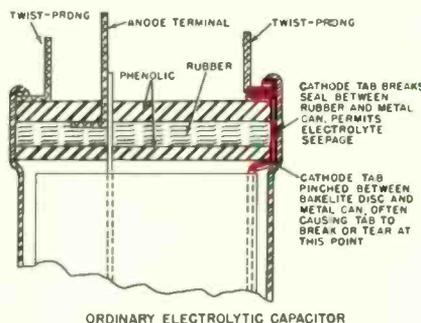
No need to compromise or improvise...the TWIST-LOK Line includes over 1690 different capacitors . . . It's the industry's most complete selection of twist-prong type capacitors, bar none!

# 2

**Exclusive, improved cover design for greater dependability**

Type TVL Twist-Lok Capacitors are now more dependable than ever! Sprague's new cover design provides a truly leak-proof seal and permits capacitors to withstand higher ripple currents.

### Compare internal construction of TWIST-LOK to ordinary 'lytic!



Complete listings are shown in handy Wall Catalog C-457. Get your copy from any Sprague Distributor, or write to Sprague Products Company, 65 Marshall St., North Adams, Mass.

WORLD'S LARGEST  
MANUFACTURER OF CAPACITORS

**SPRAGUE**  
THE MARK OF RELIABILITY

... for more details circle 56 on page 86

# ATR

## PRODUCTS FOR MODERN LIVING



**ATR PLUG-IN TYPE PORTABLE INVERTERS\***

A.C. Household Electricity Anywhere... In your own car, boat or plane Operated Standard A.C.

- Record Players
- Dictating Machines
- Small Radios
- Electric Shavers
- Heating Pads, etc.

MODELS  
6-RMF (6 volts) 60 to 80 watts Shipping weight 12 lbs. DEALER NET PRICE \$33.00  
12T-RME (12 volts) 90 to 125 watts Shipping weight 12 lbs. DEALER NET PRICE \$33.00  
\*Additional Models Available



**ATR "A" BATTERY ELIMINATOR**

For Demonstrating and Testing Auto Radios—TRANSISTOR or VIBRATOR OPERATED!

Designed for testing D.C. Electrical Apparatus on Regular A.C. Lines—Equipped with Full-Wave Dry Disc-Type Rectifier, assuring noiseless, interference-free operation and extreme long life and reliability.

MAY ALSO BE USED AS A BATTERY CHARGER  
MODEL 610C-ELIF... 6 volts at 10 amps. or 12 volts at 6 amps. Shipping weight 22 lbs. DEALER NET PRICE \$49.95  
MODEL 620C-ELIT... 6 volts at 20 amps. or 12 volts at 10 amps. Shipping weight 33 lbs. DEALER NET PRICE \$66.95

**AUTO-RADIO VIBRATORS**

**ATR**

By every test ATR Auto-Radio Vibrators are best!... and feature Ceramic Stack Spacers, Instant Starting, Large Oversized Tungsten Contacts, Perforated Reed, plus Highest Precision Construction and Workmanship and Quiet Operation!



There is an ATR VIBRATOR for every make of car!  
Ask your distributor for ATR's Low Priced type 1400, 6 volt 4-prong Vibrator; and 1843, 12 volt 3-prong; or 1840, 12 volt 4-prong Vibrator. THE WORLD'S FINEST!

There is a trim plate kit for YOUR CAR!

**ATR**

**CUSTOMIZED KARADIO**



Vibrator-Operated with Tone Control

ATR KARADIO... is ideal for small import cars or compact American cars! Unit is completely self-contained—extremely compact! Powerful 8-tube performance provides remarkable freedom from engine, static, and road noises. The ATR Customized Karadio comes complete with speaker and ready to install. Can be mounted in-dash or under-dash—wherever space permits! No polarity problem. Neutral Gray-Tan, baked enamel finish. Overall size, 7" deep, 4" high, and 6 1/2" wide. Shipping weight, radio set, 7 lbs. Model K-1279—12 for 12V Dealer Net Price. \$33.57  
Model K-1279—6 for 6V Dealer Net Price. \$33.57

Alplane Style Overhead Mounting under Cab Roof

NO PRINTED CIRCUITRY

**ATR TRUCK KARADIO**



Excellent Tone, Volume, and Sensitivity!

Compact, yet powerful. Fits all trucks, station wagons, most cars and boats. Just drill a 1/4 inch hole in roof and suspend the one-piece unit (aerial, chassis and speaker) in minutes. Watertight mounting assembly holds antenna upright. Yoke-type bracket lets you tilt radio to any angle.

Extra-sensitive radio has 6 tubes (2 double-purpose), over-size Alnico 5 PM speaker for full, rich tone. Big, easy-to-read illuminated dial. Fingertip tuning control. Volume and tone controls. 33-in. stainless steel antenna. Neutral gray-tan enameled metal cabinet, 7 x 6 1/2 x 4 in. high over-all. Shipping weight 10 1/2 lbs.  
Model TR-1279—12 A for 12V Dealer Net Price \$41.96  
Model TR-1279—6 A for 6V Dealer Net Price \$41.96

SEE YOUR ELECTRONIC PARTS DISTRIBUTOR WRITE FACTORY FOR FREE LITERATURE...

**ATR ELECTRONICS, INC.**

Formerly American Television & Radio Co.

**ATR**

Quality Products Since 1931

ST. PAUL 1, MINNESOTA—U.S.A.

... for more details circle 13 on page 86



Theis

Also appointed to new positions in the organization were KENNETH W. CON-



Connor

NOR, vice president, national sales and GEORGE P. LYON, vice president, marketing service.



Lyon

**Adler Electronics**—has licensed SEL-ENIA, S.P.A. of Rome, Italy, to manufacture and sell Adler-designed UHF TV translators in Europe, Asia and Africa. Selenia, a major manufacturer of communications equipment, is owned by RAYTHEON, SOCIETA EDISON and FINMECCANICA. An initial order for translators being produced under the licensing agreement has been received from R.A.I.—the government-operated broadcasting system in Italy.

**Tung-Sol Electric** — GEORGE W. KEOWN, vice president for marketing, has been elected to the company's board of directors. Mr. Keown became Tung-Sol's vice president for marketing in 1955. He was general sales manager, 1950-55, and manager of original equipment sales for the four prior years.

**RCA Service Co. and Executone Inc.**—jointly announced a working arrangement designed to provide the nation's hospitals with the most modern concepts in communications and television. Under the plan hospitals now are offered in one package, television systems and the latest communications equipment, including audio-visual nurse call, radio, and doctors' paging and register systems. The unique plan is said to eliminate dual control installations making the costs more attractive to hospital administrators.

**General Electric Television Receiver Dept.** — unsolicited testimonials will be used in a series of national advertisements designed to continue its "reliability" promotion program launched last September. Phase One of the program reported the service experience of one of the largest independent TV service organizations in New York City as the basis for the claim "General Electric Television Is More Reliable Than Other Leading Brands." Phase Two is a direct result. Following the appearance of the ads, letters began coming in reporting unusual torture tests which G.E. TV sets had survived.

**Electro-Voice Inc.**—announced that the move to the new Buchanan plant addition has now been completed. The 28,000 square foot addition which houses finished goods and allows added shipping facilities enables E-V to expand production facilities and bring the engineering and manufacturing of the Electro-Voice organ line under one roof for increased efficiency and economy.

**Triad Distributor Div.**—RAY OXMAN has been named sales service engineer of the recently-formed division. Oxman, who will headquarter at the Western regional warehouse and sales office in Venice, Calif., will coordinate engineering services on all stock transformers and conduct service seminars throughout the United States.



Oxman



Pike

**Hallamore Electronics Div., Siegler Corp.**—FRANK R. PIKE has been appointed North Eastern Regional Manager. The North Eastern Regional office will be located at Somerville, N. J. Mr. Pike's experience includes airborne, missile-borne and slow-scan Video Systems, Advanced Communications, and Ground Support and Instrumentation equipment.

**Philco Corp.**—A national parts distribution center for electric home appliances, room air conditioners and laundry equipment, and an air conditioner and refrigeration compressor rebuilding operation will be opened in Bedford, Ind. The move will consolidate all replacement parts in one location and is part of an over-all program to speed up de-

livery of parts to the firm's distributor organization.

**Sencore, Inc.**—R. H. BOWDEN, president, was the guest speaker at the 1962 Annual Banquet of the California State Electronics Assn. He spoke on "The Importance of the Independent Serviceman—Today and Tomorrow." The talk not only portrayed his deep feeling and conviction that the future can be bright if the servicemen will not only keep abreast of the newest developments in testing methods, but also concentrate on very sound business principles and improved public and customer relations.



Bowden



Horstmann

**Stancor Electronics, Inc.** — has appointed ROY HORSTMANN engineering representative for the company. The post is new at Stancor and carries responsibility for technical liaison between the firm's engineering department and its customers.

**General Electric Receiving Tube Dept.** —has announced the appointment of W. M. KRON as manager of the Owensboro Tube Plant and of JAMES E. CAMPBELL as manager of the Tell City, Ind., Tube Plant. Both appointments are to be effective April 1.

**Volkswagen of America** — Promotion of RENDEL W. SMITH to manager of the sales organization department has been announced. Mr. Smith joined the firm as assistant to the vice president in January last year.

**University Loudspeakers Div., Ling-Temco-Vought, Inc.**—ROBERT R. SHERWOOD, assistant to the president, appeared in another forum on Career Development in Sales and Marketing at Long Island University. In the interests of furthering the company's contribution to executive career development, Mr. Sherwood has previously appeared at Queens College and several New York high schools, where the forums have proved a success.

**Globe Electronics Co.**—formerly of Council Bluffs, Iowa has merged with G. C. ELECTRONICS CO., Rockford, Ill., maker of electronics service equipment, parts, chemicals, sprays, antennas, test equipment, and microphones. Mr. S. B. VALIULIS, president of G. C. stated "The acquisition of the Globe Co. puts GC squarely into the amateur and citizens band radio field, and gives us an opportunity to expand our markets and offer more complete product facilities." Merger negotiations started last year.



## FREE ROLLER SKATES



with each Centralab ACK-100

## AUTO RADIO CONTROL KIT

YOU GET:

24 of today's fastest movers

PLUS

- free sturdy steel cabinet

PLUS

- auto-radio control cross reference

PLUS

- free roller skates

ONLY \$49<sup>95</sup> THE PRICE OF THE CONTROLS ALONE!

See your distributor now!—Offer will be withdrawn when supplies are exhausted. Centralab controls are listed in Sams' TV & Auto-Radio Control Replacement Guide.

# Centralab

THE ELECTRONICS DIVISION OF GLOBE-UNION INC.  
902E EAST KEEFE AVENUE • MILWAUKEE 1, WISCONSIN  
In Canada: Centralab Canada Ltd., P.O. Box 400, Ajax, Ontario

B-6227S

--- for more details circle 12 on page 86

# ASSOCIATION NEWS

## California

TSDA, San Mateo County, plans an antenna drive sponsored by Channel Master and three local distributors. The campaign will consist of up to 40 spot announcements each week over KTVU TV, channel 2. The announcements will stress the importance of a good antenna installation.

## District of Columbia

TESA, Washington, is a new organization resulting from a merger between TSA and MATS. Officers elected were Pres., Jerry Peake; V. P., Bill Hanrahan; Sec'y, Earl McGrew; Treas., Bob Peters. Carl Johnson was elected as NATESA director.

## Florida

TESA, Miami, reported the election of officers as follows: Pres., Samuel Kessler; 1st V. P., Robert Seymour; 2nd V. P. Joseph Merlin; Rec.-Sec'y., Charles Azar; Corres.-Sec'y, George James Clair; and Treas., Charles W. Minter.

## Indiana

**State's First City License Law Passed**  
After more than four years of ef-

fort, South Bend has passed an ordinance requiring TV service technicians and antenna installers to be licensed and controlled by a newly created Division of TV inspection. The Chief TV Inspector who is charged with enforcing the law and inspecting complaints registered with the board, must have at least five years' experience. The Examining Board is composed of two technicians appointed by the Mayor; one antenna installer, one person in the business of selling TV receivers, and one layman, these last appointed by the City Council. A Grandfather Clause enables anyone doing this work in the city or one year prior to enactment of the law to obtain a license without examination, provided he is of good character and habits. Excluded from control are: hams, while functioning as authorized by the FCC government and industrial equipment and set owners repairing their own equipment for their own use. Up to \$500 fines are provided for violations.

TVB, Elkhart, elects: Pres., Wayne L. Clem; V. P. Arden Gaerte; Sec'y, Dean R. Mock; Treas., Hubert McAllister.

RTSA, Muncie, has voted to join IESA. This is the second new affiliate in two months.

RTSEA, Kokomo, elected officers for the association as follows: Pres., Ernest H. Golieb; V. P., Joe Martin; Sec'y, Robert F. Cripe; Treas., Harold Crume.

RTSA, Evansville, voted the following members in office at their installation banquet: Pres., Charles F. Wilhelm; V. P., Gerald Joe Julian; Sec'y, Jerrold K. Sweeney; and Treas., Don Wurtz.

RTSEA, Logansport, announces the following officers were elected: Pres., Bill Boller; V. P., Frank Pickens; Sec'y, John E. Hill; and Treas., Glenn Ogle.

## Michigan

TSA, Detroit, reported 75 technicians turned out for a color service meeting sponsored by the local RCA distributor. The meeting was directed away from circuitry and more towards a "setside manner" for increased sales. The importance of properly instructing the customer in the use of front panel adjustments was also stressed. At another meeting, conducted by B&K, over 200 technicians were present. The meeting was held at Glendale Electronics. Speakers described methods of troubleshooting transistor circuitry and presented a program for servicing B W receivers and setting up color sets with B&K test equipment.

## Ohio

ACTSA, Ashtabula, elected the following officers: Pres., Edward Cimorelli; V. P., Nick Notter; Sec'y, Jack Stranahan; Treas., Frank Abbott; Sgt.-at-Arms, John Campagne. The ACTSA has in-

stituted a plan of action to upgrade local technicians.

## Pennsylvania

ESDA, Pittsburgh, reports that all members of their organization except their secretary, received a letter from NATESA informing them of the withdrawal of ESDA recognition by NATESA. The NATESA letter stated that the action was necessary because of irregularities caused by actions of ESDA's secretary, Joseph S. Doyle. NATESA said these actions were contrary to the interests of the national organization. The officers and executive staff of ESDA replied that these charges were based on false premises, and challenged NATESA and its members to specify and prove their accusations. Most of the charges by ESDA were levied at Mr. Moch, executive director for NATESA. ESDA said the feud is a result of Moch's desire to sign up the Pittsburgh area parts distributed in NATESA, and that Doyle stood in his way. NATESA has offered membership to all ESDA members except Doyle.

### Magistrate Threatens Servicers

TSA-DV, Philadelphia, President Herman Shore, alleged in a letter to James H. T. Tate, mayor of Philadelphia, that:

"On February 15, 1962 at the 18th Police District, 55th & Pine, a member of our association, Francis X. Finn of Finn's T. V. Service appeared before Magistrate Ellick due to a litter summons that was issued to his store manager, Allen Taylor.

"Magistrate Ellick upon being told by Mr. Finn that he was engaged in the television repair business made the following statements, to him, before a crowded courtroom . . .

"All the television servicemen are a bunch of gyps, who take peoples' sets away for two or three months and gyp them out of their money. Someday I am going to bring the whole five thousand of them in and fine them all a couple of thousand dollars."

"As an organization representing the service industry in the metropolitan Philadelphia area, we are vitally interested in the welfare and public relations of our members. This association represents legitimate businessmen.

"The Television Service Association of Delaware Valley demands that Magistrate Ellick produce proof for his statements and that an investigation be made of the television service industry . . . and if not proven that a public retraction and apology be made by him of these vicious statements immediately."

## YOUR ADDRESS IF YOU CHANGE

Notify us at 1 East First Street, Duluth 2, Minn. Please include the address label from a recent issue and allow 30 days for the change.

Turn ON the QUIET  
Turn OFF the NOISE

with **QUIETROLE...**

The quality, proved lubricant for effective silencing of noisy controls and switches on TV, radio and electronics instruments. And the FREE EXTENDER TUBE makes those once pesky places easy to reach. Put quality QUIETROLE in your repair kit and see how quickly and easily you satisfy more of your customers.

6 Oz. SPRAY PACK CAN  
(with FREE Extender Tube)

2, 4, 8 oz. Bottles  
(with Dropper)

Product of  
**QUIETROLE COMPANY**  
Spartanburg, South Carolina  
in Canada: CROSS CANADA ELECTRONICS  
12 Laurel Street, Waterloo, Ontario

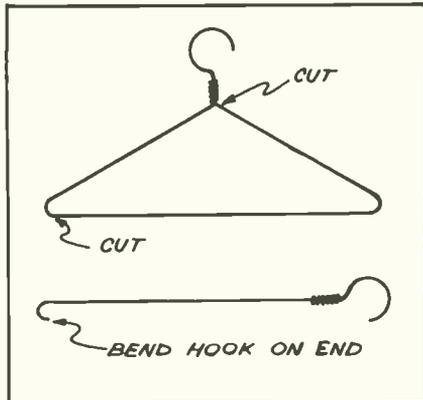
... for more details circle 47 on page 86

# SHOP HINTS

TIPS FOR HOME AND BENCH SERVICE

## Wire Hook Helps Remove CRTs

Picture tube mounting harness made with heavy wire and strong springs can be difficult to remove.

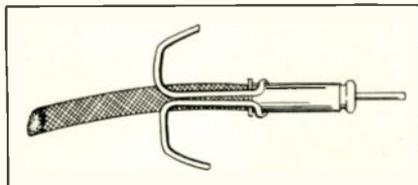


Wire hook made from clothes hanger helps remove spring mounted CRTs. Hanger is cut so that hook and one side of hanger remain intact.

A handy aid for removing springs and preventing skinned knuckles can be easily constructed from a clothes hanger. The hanger should be cut so that one side and the hook remain intact. An additional smaller hook can be bent on the end of the straight side with heavy pliers. To remove CRT springs, simply hook the small loop around the spring end, grasp the large hook with two or three fingers, and pull the spring free. The springs can be replaced by reversing the procedure.—*Leon C. Blechman, Coatsville, Pa.*

## Handle for Coax Plugs

Plugs used on most car radios and similar coaxial connectors can be easily damaged when they are removed as frequently as they are on the test bench. To ease the job of removing these plugs and pre-



Handle for various coaxial plugs is formed from heavy gage wire and soldered to the connector.

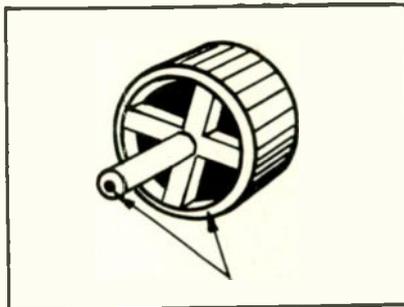
vent damage to the coaxial cable, a piece of heavy wire can be soldered to the plug to form a handle.—*P. Horvath, Port Alberni, B. C.*

## Match Starts Small Screws

Small screws can be started in hard-to-get-at places with the aid of a large wooden (kitchen) match. Simply shave the end of the match until it fits snugly in the slot of the screw head. The match can then be used to start the screw.—*John Hildreth, Phelps, N. Y.*

## Preventing Shock Through Knobs

Some TV receivers have knobs which are coated with conductive paint. A mild shock is possible on



Preventing shock from TV knobs coated with conductive paint can be simplified by removing paint from the rear edges of the knob.

series string chassis. To remedy this danger, the paint can be scraped or ground from the back of the knob where it will not be noticed but will cause a break in the continuity of the paint surface.—*Charles Hartley, Medford, Ore.*

## Rosin Aids Dial Restringing

Dial cords can be threaded more easily with the help of a rosin stick made to prevent dial cord slippage. The stick should be rubbed on the first six inches before attempting to thread it. The string will then hold its shape and be easier to pull through the pulleys and guides.—*E. B. Kastelberg, Hampton, Va.*

## Terminal Board Numbering

Are you aware of the numbering sequence of terminal strips employed in various types of equipment? Normally, this sequence is done in the following manner: View the board with the mounting foot down and pointing toward you. Terminal identification numbering starts with the left-hand terminal and proceeds to the right.—*RCA Sales Corporation, Indianapolis, Ind.*

## Tuning Drum Slips

In many of the DuMont RA 500/501 chassis I have encountered a condition where the Perma-Tune fine tuning drum slips on the channel selector shaft. Apparently this is caused by the points of the set screws not being hard enough to prevent flattening when tightened up. To remedy this, replace the set screws with hardened Allen head screws which will pierce the shaft when tightened.—*Frank M. Dickin-son, Stony Point, New York.*

## Rabbit-Ears Strain Relief

Lead-in wire on rabbit ears frequently breaks off at the crimped connectors at the base of the antenna. Since it is inevitable that the antenna will be rotated for best reception from time to time, a rubber band may be pulled over the antenna base and the lead-in, forming a short loop in the lead-in to act as a strain relief.—*Gordon E. Gregory, St. Louis, Mo.*

## SHOP HINTS WANTED!

\$3 to \$10 for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Photos are desirable. Unacceptable items will be returned if accompanied by a stamped envelope. Send your entries to Shop Hints Editor, ELECTRONIC TECHNICIAN, 1 East First St., Duluth 2, Minn.

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by Jack Strong

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by H. A. Middleton

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This guidebook will... save you time... eliminate carrying needless tube types... enable you to select the best substitution... minimize sales losses because you don't have the right tube.

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you can depend upon any of the direct substitutions in

## INTERNATIONAL TRANSISTOR SUBSTITUTION GUIDEBOOK

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Satisfaction guaranteed, or I can return within 10-days of purchase for full refund.

... for more details circle 49 on page 86

## NEW BOOKS

### RADIO CONTROL HANDBOOK.

By Howard G. McEntee. Published by Gernsback Library Inc. 304 pages, soft cover. \$4.95.

Here is a complete handbook for the radio control enthusiast. Both simple and complex set-ups for operating all kinds of models are contained in the one volume. Construction details for both electronic and mechanical parts of the model are included. The 14 chapters include simple control systems, complex control systems, simple receivers, complex receivers, simple transmitters, complex transmitters and complete control systems. The book is intended for people with a modest knowledge of electronics but who have little or no knowledge of radio control. Transistor converter and actuator circuits are also included. The book is adequately illustrated with photos, schematic and drawings.

### ELECTRONIC EQUIPMENT MADE EASY FOR THE BOAT OWNER.

By John D. Lenk. Published by John F. Rider Publisher, Inc. 194 pages, hard cover. \$5.95.

This book is an excellent primer in electronic equipment for marine use. It is intended primarily for the boat owner, though technicians not familiar with this type of equipment should find it interesting. The book is packed with ten chapters on principles and the operation of marine radio, radar, direction finders, depth sounders, auto-pilots, fuel vapor detectors and other equipment. A non-technical chapter on emergency equipment repairs is also included. Though it is not intended to make the boat owner a technician, it will enable him to make many temporary repairs. Prevention of electrolysis is also discussed. The book is illustrated with photos and drawings for virtually every type of equipment. The appendix contains a list of radio stations near the lake and ocean shores with the frequency, longitude and latitude of each. A glossary of terms used for shipboard electronic equipment is also included.

### 101 MORE WAYS TO USE YOUR VOM AND VTVM.

By Robert G. Middleton Published by Howard W. Sams & Co. Inc. 128 pages, soft cover. \$2.50.

This book can show the pro and the amateur alike new ways to use the VOM and VTVM. 101 ways to apply these instruments for new tests on components circuits and measurements usually associated with an oscilloscope are listed. Each check described has an illustration of the test set-up. The book is well indexed, and divided into sections: Testing Household Devices, Special Uses, Test Equipment Checks, Circuit Tests, and Component Tests. The TV technician should find this book a helpful timesaver.



Send for NEW FREE CATALOG #961 with oscillator circuits

## Citizen Band Class "D" Crystals

CITIZEN BAND CLASS "D" CRYSTALS 3rd overtone — .005% tolerance — to meet all FCC requirements. Hermetically sealed HC6/U holders. 1/2" pin spacing. .050 pins. (Add 15c per crystal for .093 pins).

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AM 22 megacycle frequencies in stock: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225.

Matched crystal sets for ALL CB units (Specify equipment make and model numbers) ..... \$5.90 per set

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.486 pin spacing — .050 diameter — .005% tolerance

15 to 30 MC .....	\$3.85 ea.
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Specify frequency. .05 pins spaced 1/2"  
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All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed!

Supplied in:

FT-243 holders Pin spacing 1/2" Pin diameter .093	MC-7 holders Pin spacing 1/2" Pin diameter .125
CRIA/AR holders Pin spacing 1/2" Pin diameter .125	FT-171 holders Pin spacing 1/2" Banana pins

MADE TO ORDER CRYSTALS... Specify holder wanted

1001 KC to 1800 KC: .005% tolerance .....	\$4.80 ea.
1801 KC to 2800 KC: .005% tolerance .....	\$2.75 ea.
2801 KC to 9000 KC: .005% tolerance .....	\$2.50 ea.
9001 KC to 11,000 KC: .005% tolerance .....	\$3.00 ea.

### Amateur, Novice, Technician Band Crystals

.01% Tolerance... \$1.50 ea. — 80 meters (3701-3749 KC) 40 meters (7152-7198 KC), 15 meters (7034-7082 KC), 6 meters (8335-8650 KC) within 1 KC FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC) — 50c ea. Pin spacing 1/2" Pin diameter .093

Matched pairs — 15 cycles .....	\$2.50 per pair
200 KC Crystals .....	\$2.00 ea.
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Socket for FT-243 Crystal .....	15c ea.
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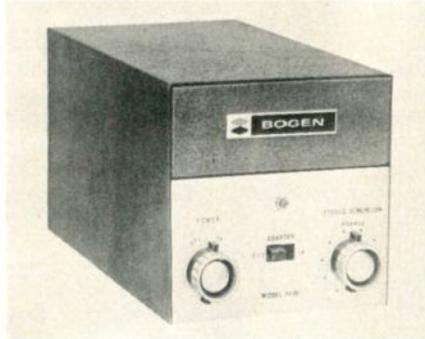
... for more details circle 61 on page 86

ELECTRONIC TECHNICIAN

# NEW PRODUCTS

## Multiplex Adapter

A multiplex adapter, the Model PX 60, employs four tubes and a germanium diode, performing eight tube func-



tions. The unit is claimed to provide full frequency performance even in fringe areas with a plus or minus 3 db deviation from 50 to 15,000 cps. All necessary filtering is built in to suppress interference from commercial multiplex signals. Distortion is rated at less than 1% and hum level at 60 db. Patch cord connections are provided for installation of the PX 60 in seconds without tools or wiring. Front panel controls include an "adapter in-out" switch and a stereo separation control to compensate for differences between transmitting stations or reception conditions. It stands 4½ in. high, 4½ in. long, 9 in. deep and weighs only 7½ pounds. Price \$69.50. Slightly higher in the West. Bogen-Presto Div. of The Siegler Corp.

--- For more details circle 200 on page 86

## Interference Suppressors

The Type SK-1 Suppressikit is said to provide effective radio frequency interference suppression in mobile and marine

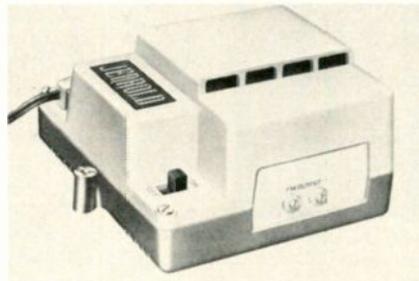


radio installations. The kit contains 5 basic components, is easy to install, and is designed for use with citizens band, amateur, public service and commercial mobile radio equipment, according to the manufacturer. The SK-1 contains new, extended-range "Thru-Pass" capacitors which are said to permit effective suppression of radio frequency interfer-

ence up to and beyond 400 Mc. Dealer net price is \$17.85. Sprague Products Co. --- for more details circle 201 on page 86

## Antenna Amplifier

A new f-m antenna amplifier is claimed to double the primary reception range of f-m tuners and radios. The FMX reportedly provides reception of additional stations and adds characteristics of high fidelity sound even to inexpensive tuners. Displaying a gain of 20 db minimum over the entire f-m band, the new one-tube antenna amplifier eliminates background noise and "drifting" of signal, according to the manufacturer. Designed for indoor installation anywhere in the home between the antenna and the f-m tuner or radio, the range extender may be



mounted in an attic, closet, or on any convenient wall or flat surface where a 117 v 60 cps outlet is available. Price: \$29.95. Jerrold Electronics Corp.

--- for more details circle 202 on page 86

## UHF Antenna

A UHF antenna, designed for top-of-the-set use is designated the Sonata Model TA149. Easy-to-follow instructions on the 3-color carton make this antenna especially appropriate for the "do-it-yourself" trade, according to the manufacturer. The Sonata features a wire grid reflector with electronically-matched tri-angled two-bay solid bow-



tie dipoles. The result is claimed to be sharper directivity, higher gain and higher front-to-back ratios on channels 14 to 83 than that found in conventional UHF indoor antennas. The reflector is plated entirely in brass and embodies a G-clef design that contrasts with the satin ebony finished dipole assembly. Golden colored 300 ohm twin lead is included. List price: \$8.95. JFD Electronics Corp.

--- for more details circle 203 on page 86

## Transistor Stereo

A solid-state stereo tuner-amplifier is described by a company spokesman as "The first stereo system engineered with the precision and reliability of a missile guidance system." Designated the "ASTRO," the new unit is a complete stereo source-amplification system packaged in a single chassis and employing transistor circuits to permit continuous operation free of heat problems. The unit contains a-m and f-m tuners, f-m Multiplex, dual pre-amplifiers, and dual amplifiers, plus a comprehensive group of control elements. The entire system is housed in a cabinet measuring only 6 x 15 x 13½ in. Specifications include: 55 w power, a response of 1 db from 20 to 20,000 cps, distortion of less than 1% THD at 20 w and multi-



plexer channel separation of 30 db over the entire audio spectrum. Altec Lansing Corp.

--- for more details circle 204 on page 86

## Subminiature Pentodes

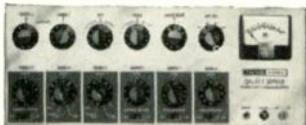
Designated types 8210 and 8211, two new pentodes feature strap frame grid construction. In contrast to the conventional grid, the strap frame design incorporates a rigid, self-supporting frame that is obtained by welding straps across the siderods. In addition, the greater strength of the frame grid is said to permit the grid to be placed closer to the cathode, and provides for tube designs of much higher transconductance with resultant higher performance in application. Type 8210 features a top lead connection for the control grid which substantially reduces grid plate capacities and increases maximum usable gain, consistent with the high Gm, ac-

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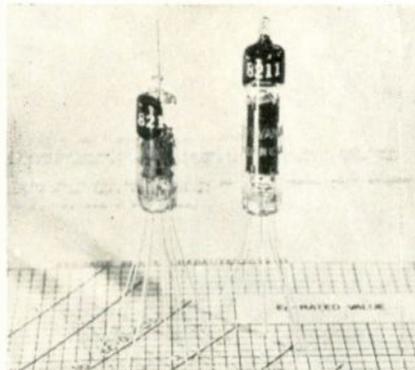
Address \_\_\_\_\_

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

**harman kardon**

... for more details circle 37 on page 86

**NEW PRODUCTS**



According to the manufacturer. Transconductance (Gm) is rated at 8500  $\mu$ mhos. Tube type 8211 is a video power pentode with a transconductance (Gm) of 13,500  $\mu$ mhos, and sharp cutoff. Sylvania Electric Products, Inc.

... for more details, circle 205 on page 86

**Screwdriver Sets**



Called a "Silver Anniversary Special," this set consists of a set of 4 screwdrivers. The tools are mounted on a colorful 10 x 6 1/4 in. rack display card and include a 3/16 x 4 in. Round Blade,

a 1/4 x 4 in. Round Blade, a No. 2 Phillips screwdriver and a "midget" only 2 3/4 in. long. All of these tools are said to be unconditionally guaranteed. The handles are made of plastic, form fit and fluted for non-slip grip; while the blades are made of tempered chrome vanadium steel. Retail price is \$1.98, claimed to be a saving of over \$1. Vaco Products Co.

... for more details circle 206 on page 86

**Multiplex Tuner**

The LT-300 f-m Multiplex tuner is claimed to be of wide band design with transistor circuitry which eliminates



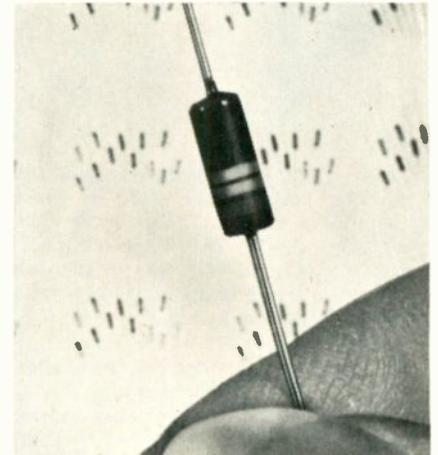
hum, heat and microphonics. Specifications include 1.8  $\mu$ v sensitivity for 20 db quieting; i-f bandwidth of 270 kc and peak-to-peak discrimination separation of 1 Mc. Noise level is 66 db below 100% modulation. Built-in Multiplex section is completely automatic in operation. Synchronous-gate separation of channels from composite signal reproduces 20-20,000 cps  $\pm$  1 db. Also included are AFC, signal strength meter

and interstation muting. The unit employs 20 transistors and 9 diodes. Power consumption is only 4 w. Price: \$149.95. Lafayette Radio.

... for more details, circle 207 on page 86

**Universal Diode**

A "universal" diode reportedly can replace more than 80 general purpose and high voltage silicon diodes. Priced competitively with the diodes it replaces, the RD250 has even higher reliability with a wider safety margin on reverse characteristics, the most critical diode parameters for reliability designs, according to the manufacturer. Maximum ratings at 25° C include a peak rectified current of 63 ma, average rectified current of 200 ma, one-second surge current of 1000 ma, and power dissipation of 250 mw. The new diode is claimed to meet all tests and specifications of units including: 1N456,

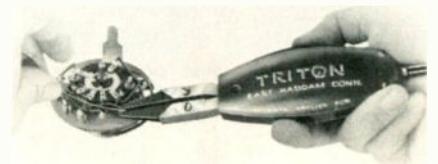


through 1N459A, 1N461 through 1N464A, 1N482, through 1N488, 1N676, 1N678, 1N681, 1N683, 1N685, 1N687, 1N850, 1N851, 1N861, 1N862, 1N872, 1N873, 1N883, 1N884, 1N846 through 1N849, 1N857 through 1N860, 1N868 through 1N871, and 1N879 through 1N882. Price: \$1.48 in quantities of 1 to 99. Raytheon Co., Semiconductor Div.

... for more details, circle 208 on page 86

**Soldering Tool**

This "Plier Action" Soldering Tool reportedly grips with its tips in order to let you grip the pieces to be soldered, apply instant soldering heat, and hold the joint tight till the solder sets. Simply pressing the handle actuating lever lets you control all three of these basic soldering operations with this tool which is claimed to provide a faster, easier way to solder than with conventional soldering guns or irons. Maximum rating of



the dual heat unit is 250 w. Triton Mfg. Co.

... for more details, circle 209 on page 86

it's NEW, it's E-Z WAY



## Towers for TV-CB 2 Way

**EXTRA STRONG**  
40% stronger

55,000 PSI HIGH TENSILE STEEL FOR MAXIMUM STRENGTH!

**LIGHTWEIGHT**

10 FT. SECTIONS WEIGH ONLY 29 LBS.

**HOT DIPPED GALVANIZED**

HOT DIPPED GALVANIZED AFTER FABRICATION. Over 2 oz. zinc per sq. ft.

E-Z Way's "G-10" is all NEW! Here is the Tower designed to take it, with durability built-in every inch of its superb construction. 55,000 PSI steel ... X-Type bracing ... Light weight, 10 ft. sections weigh only 29 lbs. These are only a few outstanding features that make this tower the strongest of its kind in the field. Fast, easy erection, up to 280 ft. guyed, or 40 ft. self-supporting. Completely electric arc welded and hot dipped galvanized after fabrication. Famous E-Z Way design is your assurance of satisfaction with every sale. Insist on E-Z Way ... your customers dat

10 ft. Sect.  
G-10

Write for Free Literature on all E-Z Way Towers or see local distributor.

**E-Z WAY TOWERS, Inc.**

P.O. BOX 5767

TAMPA 5, FLORIDA

... for more details circle 28 on page 86

### Wrench Set

A tool set, OE-5, consists of five tiny offset open end wrenches and a chuck-type, knurled steel, swivel top



handle. Eight wrench sizes, fitting all sizes of tiny nuts found in electrical, automotive, aeronautical and other small mechanical devices, are available in two set-combinations as follows: 5/64, 3/32, 7/64, 1/8 and 5/32 in. in the first kit and 1/8, 5/32, 3/16, 1/4 and 5/16 in. in the second. All wrenches are heat-treated steel and use an interchangeable chuck-type handle. Moody Machine Products Co. Inc.

... for more details, circle 210 on page 86

### Replacement CRTs

Three "Universal" picture tube types, designated 21CBP4A, 24AEP4, and 17DKP4, can replace 20 popular types now in use. It was said the "Universal" tube line will replace nearly 25 percent of all replacement tubes sold, resulting in storage space savings for both distributors and dealers. The new "Universal" picture tubes do not require an ion-trap magnet. When substituted for an original type which incorporated an ion-trap, the magnet assembly should be discarded. Sylvania Electric Products Inc.

... for more details, circle 211 on page 86

### Transistor Tester

Dynamic Beta Transistor Tester, Model 1880, is said to be suitable for testing either silicon or germanium transistors. It measures a-c beta, d-c beta, leakage, and many other transistor characteristics. A roll chart lists data for beta and leakage tests on more than 1550 transistors. Transistor manufacturer's specification sheets are the basis of other tests. Accuracy is rated at  $\pm 3\%$ . Seven leakage

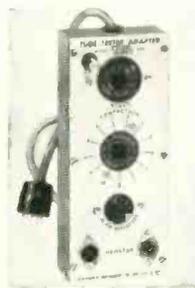


ranges cover from 0-0.5  $\mu$ a full scale to 0-25 ma full scale. A chopper and high-gain amplifier aid in leakage current measurement on the low-current

scales. R D Instruments Div. Hickok Electrical Instrument Co.

... for more details, circle 212 on page 86

### Tube Tester Adapter



The Model 610 Tube Tester Adapter adapts the manufacturers Emission Type Tube Tester and Dynamic Conductance Tube Tester for testing the following new construction tube types: nuvistor, 5-pin; nuvistor, 7-pin; novar; 10-pin miniature; compactron, 12-pin. The supplied adapter cable plugs into the 9-pin socket

## RCA BATTERIES

Sales Aids To Help You Move More Stock

2 More Good Reasons for Contacting Your Authorized RCA Distributor



RCA COUNTER MERCHANDISER (1P1094) Compact, durable, efficient, attractive. Permits stocking of complete line of transistor radio batteries in one square foot of counter space. Pilfer-proof accommodation for your radio types. Top shelf offers perfect spot to display inexpensive flashlight or photoflash batteries.

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Attention-getting motion display. Battery-operated, naturally. Novel flip-flop action of rotating center disc increases eye appeal. Ideal show-piece for your store window.

RCA BATTERIES



RCA ELECTRON TUBE DIVISION, HARRISON, N. J.



The Most Trusted Name in Electronics

# NEW PRODUCTS

er for connecting a grid cap lead from the tube tester. Kit—\$5.95, wired—\$11.95. EICO Electronic Instrument Co. --- for more details, circle 213 on page 86

## CB Crystal 'Switcher'

A crystal switching device, model CS-6, provides push button crystal se-

lection, and increases the available transmitting channels from two to six on Regency Model CB-27 citizen band transceivers. The need to switch through other channels to reach a desired frequency is eliminated. The unit attaches readily to either fixed or mobile Regency transceiver. The unit may be used with any other CB transceiver to add crystal controlled receiving channels, even for devices other than CB radio. Case measures 6¼ in. W x 3 in. D x 1¼ in. H with satin nickel plate finish. \$19.95 (less crystals). Regency Electronics Inc. --- for more details, circle 214 on page 86

## Microphones

Hand-held mobile communication microphone, the 714SR, in beige case of Cicolac plastic is comfortable to the



touch regardless of temperatures and fits snugly in the hand. A two-inch generating element, peaked in voice range, delivers —55 db output. A DPST switch shorts the microphone element in "off" position and completes relay circuit in the "on" position. EIA sensitivity rating, —155 db. Frequency response, 60-7,000 cps. Complete with 10 in., 3-conductor coiled cord that extends to 5 feet, \$16.50. Also, not shown, models 633 and 634 PA dynamic microphones. Suited for fixed-station applications. Non-directional, becoming directional at high frequencies. Output level, —57 db. Frequency response, 70-10,000 cps. Available in either Hi-Z or 150 ohm impedance. Electro-Voice, Inc., Buchanan, Mich. --- for more details, circle 215 on page 86

## Wireless Intercoms

Announced is a new 12-station selective system in which as many as six separate 2-way conversations can be held simultaneously. Selective wireless staff stations, push button channel selector and selective paging with reply are featured in the new model. The wireless staffs are designed to operate



in combination with the Talk-A-Phone selective wireless masters including T-LCM-8912 and T-LCM-8906, and can be used separately as well as in groups of two or more stations to provide individual wireless systems. The system

# For your custom stereo installations



## THE FISHER 800-B

### Three of the world's finest components on one chassis

**1** AM-FM-Stereo Multiplex Tuner: separate tuning indicators for FM and AM; exclusive Fisher STEREO BEAM automatically shows whether an FM station is broadcasting in stereo.

**2** High-Power Stereo Amplifier: 65 watts music power; special center-channel output connection for third speaker.

**3** Master Audio Control-Preamplifier: complete, easy-to-use control system assures total flexibility; provisions for every type of input. Price \$429.50\*

\*Walnut or Mahogany cabinet \$24.95; prices slightly higher in the Far West

### USE THIS COUPON FOR DETAILED INFORMATION

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Please rush the following FREE literature:

- Complete specifications on the Fisher 800-B Receiver.
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ET 5-01

--- for more details, circle 31 on page 86

# Now... Tomorrow and for years to come!

## Sonar CITIZENS BAND RADIO

- 8 Channels, crystal controlled transmitter and receiver
- Tunable receiver for 22 channels
- Transmitter 100% Class B modulated
- Adjustable squelch
- Automatic noise limiter
- R. F. Power indicator
- 1 Year guarantee
- Easy to install. Ideal for home, boat, car or business. Weighs only 9 lbs. . . 4¾ x 9½ x 11¼
- FCC Type accepted\*

\*in preference to only certification

with 1 pair of crystals, microphone and power cables

**\$179.50**



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Please send me complete information on Model "E" CB Radio.  
Dept. # 120

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

--- for more details, circle 53 on page 86



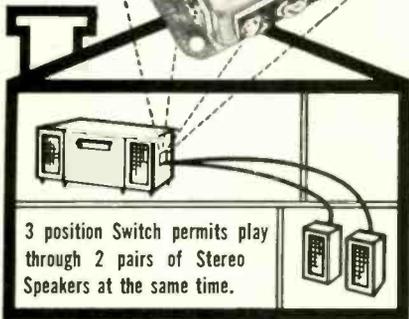
# TIME FROM DUOTONE FREE!

Take your choice of a stunning, matching Ladies' or Men's wrist-watch. They're beautifully styled, in handsome gold tone slim-line cases. You can get your watch just by purchasing Duotone phonograph needles at regular prices, the quality needles your customers want. Hurry! Get the details from your Duotone Distributor. Don't miss out on this gift offer! Offer ends July 31, 1962



KEYPORT, NEW JERSEY. COlfax 4-2200  
See us in Room 609A and 611A at Parts Show  
- - - for more details circle 24 on page 86

## NEW STEREO SPEAKER SELECTOR SWITCH



3 position Switch permits play through 2 pairs of Stereo Speakers at the same time.

Now you can listen to Stereo in any room in your home. Quality top switch permits selection of main speakers, remote speakers or both sets at the same time.

Simple installation. Mounts on wall or cabinet. Screw terminals.

Part No. 670. U.S.A. List Price \$6.25  
Write for Catalog A-401



5583 N. Elston Ave., Chicago 30, Ill.

- - - for more details circle 59 on page 86

provides instant and direct communication (without cable) over present electric-current lines. Talk-A-Phone Co.  
- - - for more details, circle 16 on page 86

### Power Supplies

Announced is a lightweight regulated power supply, the P-330A, for technicians working with transistorized circuitry, hybrid tubes, etc. It furnishes



0-15 volts d-c at up to 3 amps. Designed for continuous duty, output is regulated to remain within .1% of indicated voltage with input varying from 105 to 125 volts. Filter circuitry is full wave, series shunt regulated, with 4 power transistors. Ripple factor is 10 mv RMS at 50% load, and 30 mv RMS at full load. All components are short circuit protected. Weight, 5 1/4 lbs. Size, 8 3/8 in. x 6 7/8 in. x 5 3/8 in. \$89.50. George Harmon Co., Inc.

- - - for more details, circle 17 on page 86

### Tube Testers

A tester that checks all the new 12 prong (Compactron), Nuovistor, Novar and 10 prong types. in addition to octal,



loctal, miniature, and 9 prong tubes. has been announced. The instrument checks for shorts, leakage, intermittents, as well as for quality. Tube quality is indicated directly on a three color metal dial. Each section of a multi-purpose tube is checked separately. Magic eye. Voltage Regulator and HI-FI tubes are also tested. The tester comes complete with instructions and tube charts in ring bound manual. Supplementary tube listings supplied periodically at no cost. Model 213P in wood carrying case \$32.25, kit \$21.90. Electronic Measurements Corp.

- - - for more details, circle 18 on page 86

### Portable Phono/Radios

A miniature battery operated stereo-phonograph and two band transistor



radio, designed into a package smaller than a cigar box, has been announced.

## RCA BATTERIES

### Sales Aids To Help You Move More Stock

2 More Good Reasons for Contacting Your Authorized RCA Distributor

#### RCA COUNTER MERCHANDISER (1P1094)

Rear view of merchandiser shows its large capacity. Holds two unit packs of a dozen or more popular battery types. Permits stocking by unit packs rather than loose batteries. Yet takes but a square foot of counter space.



DEALER "ESSENTIALS" KIT (1P1099) Here in one convenient kit is a combination of handy battery reference material and colorful in-store promotion items. Lets your customers know you're really in the battery business.

RCA ELECTRON TUBE DIVISION, HARRISON, N. J.



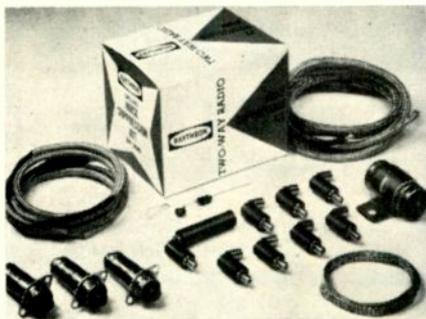
The Most Trusted Name in Electronics

# NEW PRODUCTS

Called the Mini Stereophone, model KP716, the combination uses four ordinary flashlight batteries to power the phono motor, amplifiers and radio receiver. The phonograph plays 33 1/3 rpm monaural or stereo albums and 45 rpm records. Both speaker and earphones are provided. The radio covers the conventional broadcast band and shortwave frequencies between 3.9 and 12 mc. Regular house current can be used when battery operation is not required. Price \$79.95. Hoffman Electronics Corp., Consumer Products Dept.

--- for more details, circle 219 on page 86

## Noise Suppressors

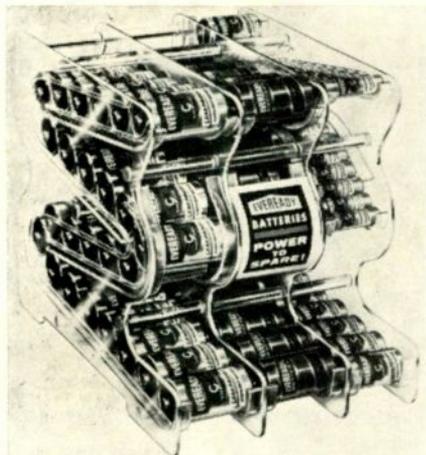


These "do-it-yourself" kits are designed to reduce electrical noises that sometimes interfere with Citizens Band radio operation. They also increase the effective range of CB equipment by lowering the threshold of back-

ground noise. Offered in a standard and deluxe form, the kits are easily installed on any brand of 27-megacycle transceiver. For ordinary engine noise the standard kit provides generator and spark coil capacitors and distributor and spark plug suppressors along with necessary mounting hardware and complete instructions. The deluxe kit, for more complete noise suppression, includes two additional capacitors, an RC network and shielded generator wires. The standard kit is priced at \$10.95 and the deluxe kit \$24.95. Dist. Products Div., Raytheon Co.

--- for more details, circle 220 on page 86

## Battery Merchandiser



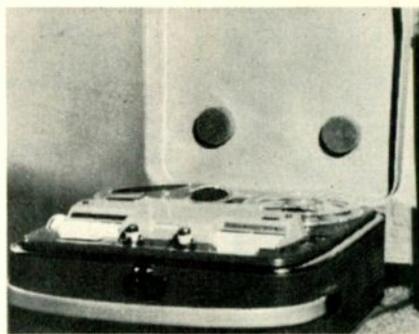
The triple track "Roll Rack" displays 24 each of the standard "D" size batteries, 24 of the smaller flashlight "C" size and 24 of the penlight "AA" size. It is for counter or shelf display and occupies less than one square foot of space (8 in. x 9 1/4 in. x 10 3/4 in.). The new merchandiser is constructed of clear polystyrene for maximum product

visibility and greater impulse sales. Union Carbide Consumer Products Co., Div. of Union Carbide Corp.

--- for more details, circle 221 on page 86

## Tape Recorder

The TK-40 tape recorder records and plays back in monaural at three speeds offering up to 16 hr of taped music, voice or sound. Tape enthusiasts who want to give their recordings that "something extra," need only push a 'trick' button on the unit for superimposition of voices over music or similar dual sound



effects. In addition to controlling start, stop, superimposition and four track recording functions, push buttons also operate a lockable temporary stop and a tape cleaner. Suggested retail price: \$299.95. Grundig-Majestic.

--- for more details, circle 222 on page 86

## 1962 PARTS SHOW

Continued from page 31

Mallory & Co., P. R.	G-117/119	U-104/106
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Mercury Electronics Corp.	B-104	604A
Merit Coil & Transformer	D-101	
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Miller Co., J. W.	D-108	
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Parker Metal Goods Co.	A-119	
Pertron Electronics Corp.		500
Perma-Power Co.	E-114	
Philco Corp., Parts-Accessories	A-103	
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Polytronic Laboratories	A-109/111	
Potter & Brumfield	E-100	
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Rauland-Borg Corp.		528A/530A
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Ravenswood Corp.		620A
Ray-O-Vac Co.	K-105	
Raytheon Co.	C-122/124	T-117
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Reeves Soundcraft Corp.		601
Rego Insulated Wire Corp.	H-108	
Rek-O-Kut Co.		550A
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Robins Industries		614A/615A
Rockbar Corp.		515A
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Sains & Co. Inc., Howard W.	E-111/113	
Sangamo Electric Co.		U-101
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Semitronics Corp.	F-110	
Sencore, Inc.		633
Shell Electronic Mfg. Corp.	C-109	
Sherwood Electronics Labs.		517A
Shure Brothers, Inc.		630A
Sightmaster Corp.	C-114	547
Sigma Instruments, Inc.		

### IF YOU CHANGE YOUR ADDRESS

Notify us at 1 East First Street, Duluth 2, Minn. Please include the address label from a recent issue and allow 30 days for the change.

Simpson Electric Co.....	D-112
Smith Inc., Herman H.....	
Sola Electric.....	
Sonar Radio Corp.....	J-104
Sonotone Corp.....	G-103/105
Soundolier, Inc.....	C-108
South River Metal Products.....	D-113
Spaulding Products Co.....	
Spirling Products Co.....	H-114
Sprague Products Co.....	B-101/103
Stancor Electronics, Inc.....	E-119
Standard Kolsman Industries.....	F-119
Sterling Mfg. Co.....	
Stuart & Co., Matthew.....	
Superelex Electronics Co.....	
Swing-O-Lite, Inc.....	A-116
Switchcraft, Inc.....	E-101
Sylvania Electric Products.....	H-110/112
TV Development Corp.....	A-106
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Tandberg of America.....	
Tape-Athon Corp.....	
Tech-Master Corp.....	
Technical Appliance Corp.....	H-104
Telex, Inc.....	D-120
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Tenna Mfg. Co.....	
Terado Co.....	G-111
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Texas Instruments, Inc.....	
Thomas & Betts Co.....	J-103
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Transvision Electronics.....	K-110
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Trimm, Inc.....	A-120
Trio Mfg. Co.....	J-110
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Triton Electronics, Inc.....	
Tru-Ohm Products Division.....	A 100
Tung-Sol Electric, Inc.....	C-104/106
Turner Microphone Co.....	E-105
U. S. Components, Inc.....	J-102
Union Carbide Consumer Products.....	H-116/118
United Catalog Publishers.....	F-106
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United Transformer Corp.....	F-115
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Utica Communications Corp.....	J-100
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Walco Electronics Mfg.....	E-123/125
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Weathers Industries.....	546A
Webcor Sales Co.....	542A
Webster Mfg. Co.....	D-104
Weller Electric Corp.....	A-105
Wen Products, Inc.....	D-102
Westinghouse Electric Co.....	E-104
Winegard Co.....	B-100/102
Worner Electronic Devices.....	B-106
X-Acto Precision Tools, Inc.....	B-110
Xcelite, Inc.....	B-105
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**1962  
PARTS SHOW**

Date:  
**May 21-24**

Time:  
**9 a.m. to 6 p.m.**

Place:  
**Conrad Hilton  
Chicago**

# SOUND WAYS TO EXTRA PROFITS

Get into the all-year-round commercial sound trade and do away with seasonal repair work slumps! This steady-profit business—sales, installation and service—is available right in your own neighborhood! Factories, restaurants, schools, offices, bowling alleys... outdoors, athletic fields, swimming pools, etc... all are prospects for you.

Atlas Sound products, built to quality standards and backed by over 25 years of "know-how", are insurance for your reputation. Your Atlas Distributor can supply you with a complete line of performance-proven job-rated equipment: speakers, mike stands and related accessories for a professional sound installation.



Write for latest catalog and names of Atlas Distributors.  
**ATLAS SOUND DIVISION**  
American Trading and Production Corporation  
1419-51 39th Street, Brooklyn 18, New York  
In Canada: Atlas Radio Corporation, Toronto

## RCA BATTERIES

### Sales Aids To Help You Move More Stock

2 More Good Reasons for Contacting  
Your Authorized RCA Distributor

**RCA BATTERY CENTER.** Here are all your battery needs in organized fashion: stock, display, testing facilities, and customer literature. All you've done is to combine the RCA Battery Tester Display and the RCA Counter Merchandiser.

**DEALER  
GIVEAWAYS  
(1P1098)**

Ring up goodwill with every sale by offering your customers handy litterbags... an item wanted by every car owner. Your supply comes complete with handy dispenser for wall or counter use.

RCA ELECTRON TUBE DIVISION, HARRISON, N. J.

The Most Trusted Name  
in Electronics

- - - for more details circle 12 on page 86

Continued from page 35

of trade will bring gold into the country.

If one grants that the world political situation requires the continued commitment of military and economic effort around the world, then we must open opportunities for expanded trade. A fortress America concept, whereby we isolate ourselves from the rest of the world, is an unrealistic thought in this missile age. Few tariff protectionists would oppose our efforts to establish world leadership. This costs money and requires international trade cooperation.

As production and wages continue to rise abroad, there will be a growing market for U. S. goods and services. If we fail to take advantage of it, other industrialized nations will do so. In Japan, wages have risen 150 percent in the last 10 years. In the Common Market, whose population is almost as large as that of the United States, their gross national product is only about 190 billion dollars, compared with

our 521 billion. Here is an opportunity for our exports.

**The Need for Protection**

If all tariff protection were removed, our industries and workers would be faced with a serious challenge. Since a foreign worker earns anywhere from a little less to a great deal less than an American worker, unrestricted trade could either close down many of our industries, or else force us to work at the same low standard of living as foreign competitors.

Consider this statement by financial writer Sylvia Porter, who states that the new trade bill is worth trying: "If the tariff walls which protect our industries and workers from the competition of foreign imports are slashed or even erased in coming years, it is a certainty that millions of businessmen and jobholders, the nation over, will be at least temporarily hurt by the resulting upswing in imports."

It is not enough to show that over-all trade is balanced in our favor, or even that an entire industry is in a favorable position. This can very easily mask the fact that

a segment of the industry is being destroyed by foreign competition. National pride and great faith in our productivity induce many people to think that even with high labor costs per dollar of product, the United States can still compete in world markets. A study prepared by Libby Owens Ford disproves this. With only a few exceptions, it is shown that the character of our exports has changed. We have registered large gains in the share of market in raw materials and manufactured products with relatively low labor content. We have shown great losses in exports with relatively high labor content. Furthermore, total export figures are being padded with figures which are not true exports. For example, 181 million dollars of goods paid by private charity is not a real export. Nor are the sales of agricultural products sold at a loss (6¢ per pound for cotton, resulting in a 1960 loss of 234 million dollars) to support domestic prices. Government giveaways are not real exports. Nor are the exports for which we accept payment in soft foreign currencies not convertible to gold.

# 1-YR. GUARANTEED RADIO & TV TUBES

## NEW LOW PRICE

**\$30**  
per 100 TUBES

33¢

Factory Used or Factory Second Tubes! TRU-VAC will replace FREE only tube that becomes defective in use within 1 year from date of purchase! ALL TUBES INDIVIDUALLY BOXED! CODE DATED & BRANDED "TRU-VAC"

Partial Listing Only . . . Thousands More Tubes in Stock!

SPECIAL 6CB6		30A		6CQ5		30A	
024	354	6AC7	6AT6	6CF6	6G7	6V6GT	7F8
074	304	6AF4	6AUG	6CCT	6K6GT	6W4GT	7C7
1A7GT	3V4	6AG5	6AU4GT	6CGB	6M7	6W6GT	7M7
1B3GT	4BQ7A	6AH4GT	6AUSGT	6CH8	6N7	6X4	7M7
1B5GT	4B5B	6AH6	6AUS	6CL6	6Q7	6X5GT	7Q7
1L4	4B27	6AK5	6AV5GT	6CM6	6S4	6X8	737
1L6	4CB6	6ALS	6AV6	6CM7	6S7	6Y6G	7K6
1NSGT	5AN8	6AM8	6AWS	6CN7	6S8GT	7A5	7X7
IRS	5AN8	6AN8	6AX4GT		6S47	7A6	7Y4
1S5	5AT8	6AQ5	6AX5GT	6CR6	6SCT	7A7	7Z4
1T4	5AV8	6AQ6	6BK5	6CS6	6SOTGT	7A8	12A8
1U4	5AZ4	6AQ7	6BK7	6CS7	6SF5	7B4	12AB5
1U5	5BR8	6AR5	6BL7GT	6CUS	6SF7	7B5	12AD6
1V2	5CC8	6AU7	6BM8	6CUG	6SCT	7B6	12AF6
1X2	5J6	6B8	6BQGT	6D6	6SM7	7B7	12AQ5
2AF4	5R4	6BA6	6BQ7	6DE6	6SJ7	7B8	12AT6
2B4	5TB	6BC5	6BR8	6DG6GT	6SK7	7C4	12AT7
2CY5	5U4	6BC8	6BS8	6DF6	6SL7	7C5	12AUB
3A5	5U8	6BD6	6BSQ	6E3	6SN7GT	7C6	12AU7
3AUG	5V6GT	6BE6	6BZ6	6F5	6SQ7	7C7	12AV6
3BC5	5X8	6BQ6	6C4	6H6	6T4	7E6	12AX4GT
3B8	5Y3	6BH6	6CAB	6J4	6T8	7A4/XXL	12AX7
3BZ6	6A6	6BJ6	6CS	6JS	6US	7E7	12AZ7
3CB6	6AB4	6AS5	6CD6G	6J6	6UB	7F7	12B4

FREE BONUS! Plastic Universal Alignment Tool (\$96 regular value) with every order of \$5.00 or more.

1-YEAR GUARANTEED TV PICTURE TUBES. These tubes are made only from new parts and materials, except for the envelope which is re-used. Below Listed prices do not include dud Add Additional \$5.00 Deposit on tube sizes to 20"; on 21" and 24" tubes—\$7.50. Dep. refunded when dud is returned prepaid. Aluminized tubes—\$4.00 extra. Picture tubes shipped only to continental USA and Canada—F.O.B., Harrison, N.J.

10BP4	8.95	16GP4	16.95	17BP4	10.95	21ALP4	23.95	21EP4	16.95	21XP4	21.95
12LP4	9.95	16KP4	9.95	17CP4	18.95	21AMP4	22.95	21FP4	17.95	21ZP4	23.95
14BP4	10.95	16LP4	10.95	17DP4	18.95	21AP4	23.95	21MP4	27.95	24AP4	36.95
18AP4	13.95	16RP4	9.95	20HP4	17.95	21AVP4	23.95	21VP4	24.95	24CP4	27.95
18DP4	10.95	17AVP4	15.95	21AP4	27.95	21AWP4	23.95	21WP4	20.95	24DP4	28.95

**ATTENTION QUANTITY USERS!** Big Discounts Are Yours . . . Call or Write For Our 1000 Tube "Private Label" Special! Attention Branding Dept. MGR. Money Cheerfully Refunded Within Five (5) Days, if not Completely Satisfied!

**TRU-VAC (R) PAYS YOUR POSTAGE**—On orders of \$5 or more in USA and Territories. Send approximate postage on Canadian and foreign orders. Any order less than \$5 requires 25¢ handling charge. Send 25¢ on C.O.D.'s. All orders subject to prior sale. Complying with Federal regulations, the following statement appears in all TRU-VAC advertising: Tubes in this ad may be FACTORY SECONDS or USED tubes and are clearly marked.

Sensational Offer!  
"Self Service"  
**TUBE CHECKERS**

**\$37.95** FOB Our Warehouse

Let your customers test their own tubes! These re-usable, reconditioned 22-lamp tube checkers will socket tube investment in one week or less with little or no effort on your part! Handsome, field-tested console models COMPLETE WITH KEY FOR BOTTOM DOOR AND NEON-LIGHTED HEAD!

**LOOK! 1,000 USED TV'S**  
Contly. famous make console models with little or no tube re-placement! Require only minor adjustment. Per- your own second set! 16", 17" and 19" screens . . . none smaller! FOB, Harrison, N.J.  
**\$16.95** As is  
SPECIAL TV Console 10", 12", 14" while they last, \$8.95, as is.

# TRU-VAC

Dept. ET5  
Harrison Avenue • Box 107 • Harrison, N. J. HUmboldt 4-9770

100 - - - for more details, circle 62 on page 86  
ELECTRONIC TECHNICIAN

Let's look at some specific products. We gained 43.2 percent in the export of raw hides, lost 32.5 percent in leather manufactures. We gained 32.1 percent in the export of crude rubber, lost 42.6 percent in rubber manufactures. We gained 1 percent in the export of raw cotton, lost 36.2 in cotton manufactures. All percentages are in terms of share of the market, with the sum of all exports and imports equal to 100 percent. This means that although total exports may have increased in dollars, the balance has shifted against us if our share of exports declines.

We have registered declines in practically all machinery except aircraft and agricultural. We have improved our position for the most part only in those areas where invention and technological progress have given us the edge.

In the electronic field, between 1951 and 1960, electronic parts exports increased 2,100 percent, and TV sets even more. However, where the technology did not advance rapidly, we showed declines. Battery exports dropped 56 percent, and radio receiving sets

dropped 81 percent. In contrast, imports of radio sets and parts increased 1,900 percent. Nor does this reflect the fact that certain of these increased parts imports have placed some American manufacturers in a most precarious position.

Some of the propaganda by the administration has been misleading. For example, the Department of Commerce claimed that 56.2 percent of the manufacturing employees in Connecticut are dependent on foreign trade for their jobs. This unrealistically high figure was based on any firm with at least \$25,000 worth of foreign trade. However, no recognition was made as to whether 1 percent or 100 percent of the firm's production went into foreign trade.

#### Future Outlook

There appears to be sufficient support in Congress for some version of the new trade bill. Such diverse groups as the U. S. Chamber of Commerce, the American Bankers' Assn. and the AFL-CIO have expressed support for the program in principle, but have not committed themselves on details.

Apparently the arguments in favor of tariff reduction are more compelling than those opposed.

However, there will be enough loopholes for the President in the national interest to back out of any mutual tariff reduction which places an industry or the country in jeopardy. It is a point of real concern that aid to workers and industries will have to come after the damage is done, which can easily be a problem of too little and too late.

Certain industries are critical for

**R** FOR "DOCTORS OF SERVICING"



THE PROFESSIONAL SERVICE MAN'S CLEANER

## cleans contacts CLEANER!

Want total cleaning power that helps you do a better servicing operation 3 ways? Spray electrical contacts and switches with triple action Contact Shield. Cleans, lubricates, and safeguards, like no other cleaner can! Gives lasting protection in seconds . . . thanks to Silicone base. Independent laboratory tests prove it! Technicians approve it! Write for handy guidebook to more efficient servicing . . . Channel Master Corp., Ellenville, N.Y.

© 1962 CMC

for more details circle 21 on page 86

## RCA BATTERIES

### Sales Aids To Help You Move More Stock

2 More Good Reasons for Contacting Your Authorized RCA Distributor



**RCA BATTERY TESTER (1P1093)** Gets the customer into the act. Lets him convince himself he needs new batteries and that he's getting fresh ones. Tester has eleven ranges for testing radio batteries, plus an extra 1.5-volt range for photoflash types.

#### BATTERY TESTER DISPLAY

Increases in-store display value of your tester. Accommodates the Battery Tester and holds supply of hand-out folders explaining advantages of the three basic battery systems: Zinc-Carbon, Alkaline and Mercury. Display and folders are provided with your RCA Battery Tester.



RCA ELECTRON TUBE DIVISION, HARRISON, N. J.



The Most Trusted Name in Electronics

the national security, and we mean directly critical, not by remote association. Electronics is a prime example. We think it important that electronic representatives press for certain protective considerations. For example, there could be mandatory recognition of financial plight at an early stage. Furthermore, many of the voluntary restrictions which the Japanese have placed on their exports could be written into the law as a further safeguard.

We should not forget that pressure by the textile industry forced a number of protective considerations from the administration. Where the need is great, electronic companies can do likewise.

It is also of interest to note that when President Kennedy was in Congress his vote in favor of extending the trade act was always tempered with votes against those amendments which would have eliminated protectionist and escape clauses.

It appears most likely that there will be reduced tariff provisions in any new law. At the same time, there will still be some version of the peril point concept to allow

protective action in case of economic emergency.

Needless to say, the Electronic Industries Assn. has looked into the proposed legislation. EIA passed a resolution which embodied recommendations of the Electronic Imports and Legislative Policy Committees and the EIA Parts Division. The resolution records the Association's recognition of the need for world trade expansion and its support of the President's legislative objectives in this respect. But it also proposes such revisions as:

(a) Limitation to tariff adjustments to 50 percent, spread over five years, and deletion of authority to eliminate tariffs on products in which the United States and the European Common Market account for 80 percent or more of international trade.

(b) Strict definitions and provisions guaranteeing true restrictions as well as tariffs; also provisions that tariff reductions be made on the same class of products in such agreements.

(c) Emphasis on and provisions for voluntary international agreements whenever imports threaten

the stability of a domestic market or industry to permit that industry to adjust for greater foreign competition over a period of years.

(d) Elimination of the "most favored nation" clause of H. R. 9900 and the present Trade Agreements Act whereby all nations, except the Communist bloc, benefit from any U. S. Tariff reductions negotiated with other nations or the European Common Market. Voluntary agreements with these nations separately is proposed as a substitute.

(e) Some limitation on the President's authority as proposed in H. R. 9900 through the reorganization and strengthening of the U. S. Tariff Commission and provision that certain actions by the President are subject to veto by Congress.

(f) Modernization of the anti-dumping act to provide more prompt and effective measures to protect American industry from the sale of foreign goods in the United States at prices below those prevailing in the country of origin.

Free trade can mean great opportunities for us, but they do present serious risks which should be anticipated in any law.

**NOW . . . AT LAST YOU CAN SAVE ON FAMOUS MAKE TUBES!**

# BRAND NEW FAMOUS MAKE

## Radio & TV

# TUBES

65% To

# 90%

OFF LIST

GE  
RCA  
CBS  
SYLVANIA  
RAYTHEON  
WESTINGHOUSE  
PHILCO  
HYTRON

FREE  
Famous Make  
TUBE  
(of our choice) (List  
price up to \$10) With  
every 10 TUBES pur-  
chased!

**SPECIAL OFFER**  
For Limited Time Only!  
**FREE SPARKING NEW**  
**SILVER DOLLAR**  
With Order of \$25 or More!

ALL TUBES . . .  
\*FACTORY BOXED  
\*IMMEDIATE DELIVERY  
\*CODE DATED  
\*STANDARD R.M.A. A  
GUARANTEE (90 Days)

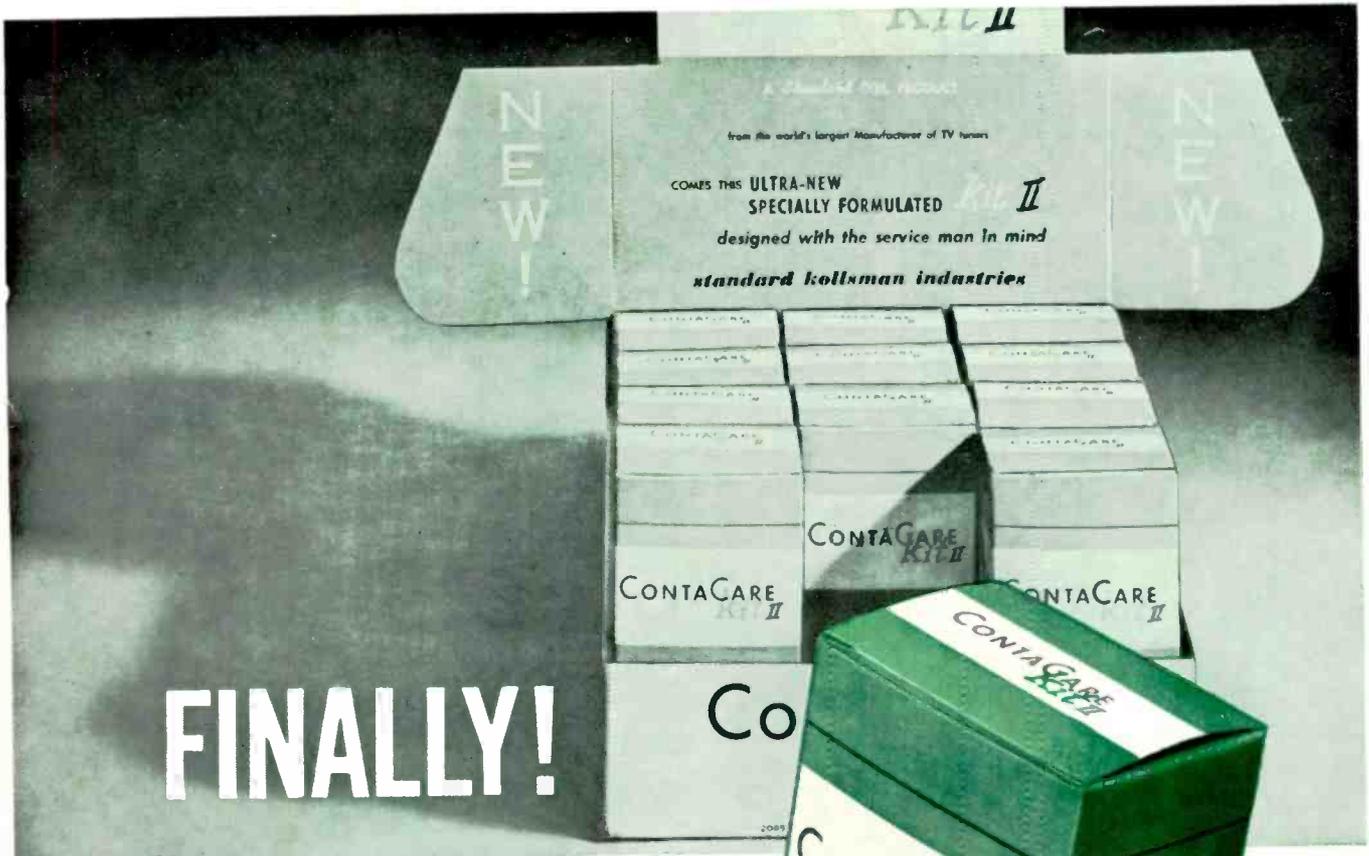
**Part Listing . . . Almost Every Famous Make Tube in Stock!**

TYPE	PRICE	TYPE	PRICE	TYPE	PRICE	TYPE	PRICE	TYPE	PRICE	TYPE	PRICE	TYPE	PRICE	TYPE	PRICE
DZ4	.70	5AM8	1.15	6AN8	1.30	6BR8A	1.22	6ER5	1.19	7AU7	.90	12AV6	.55	14A7	1.99
1A7GT	.89	5AN8	1.19	6AQ5A	.69	6B58	1.29	6E25	1.25	7B5	.89	12AX4GT	.89	14B6	1.96
1G5/1B3GT	.99	5AQ5	.75	6AQ8/EC5	.98	6B08	.98	6E28	1.33	7B7	2.83	12AX7A	.85	14N7	.99
1NSGT	.89	5AS4A	.90	65	1.10	6B5GA	1.59	6E5GT	.35	7C5	1.19	12BA6	.99	14Q7	1.99
1UH4	1.49	5AT8	1.13	6A55	.85	6B26	.78	6F8R	1.25	7C6	2.49	12BA6	.57	17AX4GT	.94
1UN5	1.49	5BR8	1.15	6A58	1.17	6B27	1.40	6GHR	1.10	7F7q	.69	12BE6	.59	17D4	.95
1NSGT	.89	5C8B	1.10	6AT8A	1.15	6C4	.64	6M6	.55	7F8	2.99	12BH7A	1.05	17DQ8B	1.47
1R5	.95	5CL8A	1.10	6AU6A	.69	6C85	2.59	6J5GT	.49	7H7	1.99	12B0AGTA	1.49	19AU4	1.19
1S5	.93	5CM8	.89	6AU8A	1.19	6C86	.78	6J8A	.95	7H7	2.49	12B4A	1.09	19B8G8A	2.19
1T4	.87	5C25	1.05	6AV5GA	1.39	6CD0GA	1.99	6K6GT	.85	7X6	.99	12C5/12	.99	19T8	1.17
1U4	.87	5FV8	1.10	6AV6	.57	6C7	.85	6K7GT	.69	7Z4	1.99	CUS 80	258K5	1.27	
1U5	.75	5J6	.95	6AW8A	1.30	6C88	1.35	6L6B	1.25	8AW8A	1.27	12CU6	1.49	25CD0G	1.99
1X28	1.05	5T8	1.15	6AX4GTR	.90	6CL8	1.25	65A4	.77	8B8B	1.19	12D4	.96	25L6GT	.79
2AF4A	1.25	5U4G8	.59	6A80	.69	6CL8A	1.10	65A7GT	1.25	8C7	.87	12DL8	1.39	25W4GT	.94
2CY5	.95	5U8	1.15	6A82A	1.30	6CM7	1.10	65C7	1.25	8CM7	.95	12DS7	1.19	32E5T5	.77
2A2	1.25	5V3	1.25	6B8C	1.39	6CN7	.59	65R7GT	1.19	8CX8	1.29	12ER6	.89	35C5	.75
2A3	1.15	5V4GA	1.22	6B8E	.77	6C8B	1.30	65L7GT	1.10	8E8B	1.19	12F8	.95	35L6GT	.84
2A15	.65	5R8	1.10	6B8G8A	1.99	6C57	.95	65Q7GT	.90	8E77	1.36	12FX8	1.33	35W4	.39
2AU6	.75	5Y3GT	.44	6B86	.94	6C86	1.49	6T4	1.89	9AU7	.95	12JFGT	.85	35Z5	.59
2AV6	.50	6ARGT	.99	6B8B	1.19	6C88	1.19	6T8A	1.15	9U8A	1.15	12J8	1.15	50A5	1.99
3B86	.99	6A84	.75	6B8A	.91	6DA4A	.82	6U8A	.99	10DE7	.99	12L6GT	.87	50C5	.75
3B26	.75	6AC5GT	.89	6B8K4	2.49	6DE4	.98	6V3A	1.59	11CY7	1.05	12R5	.90	50DC4	.52
3C86	.70	6AC7	1.49	6B8K5	1.29	6DE6	.85	6V6GT	.75	12A85	.85	12S47	1.10	75	.75
3D66	.98	6AF4A	1.40	6B8Z8	1.15	6DR6	.90	6W4GT	.89	12A6A	.69	12SK7GT	1.19	80	.90
3Q4	.60	6AG5	.95	6B8L4	2.25	6DN6	1.19	6W6GT	.98	12AF6	.79	12SN7GT	.94	117L7GT	2.99
3V4	.85	6AM4GT	1.15	6B8L7GTA	1.45	6DQ8B	1.39	6X4	.55	12AR8	1.39	12SO7GT	.99	117Z3	.85
4RC5	.82	6AM6	1.60	6B8N6	1.10	6DT6A	.79	6X8	1.09	12AT6	.57	12V6GT	.75	7199	1.15
4BQ7A	1.40	6AK5	1.39	6BQ5	.79	6E47	1.19	7A7	.59	12A17	.99	12R4	.65		
4B26A	.75	6AL5	.64	6BQ8GTA	1.39	6E48	.89	7A8	2.75	12AU6	.75	13D67	1.03		
4EH7	1.33	6AM8A	1.10	6BQ7A	1.39	6E8Z	1.69	7AG7	.89	12A17A	.85	12D8Z	1.03		

MONEY CHEERFULLY REFUNDED WITHIN FIVE (5) DAYS IF NOT COMPLETELY SATISFIED!  
**FREE POSTAGE ON ORDERS OF \$5 OR MORE IN USA AND TERRITORIES**  
 25¢ Handling Charge required on any order less than \$5. Send 25¢ deposit on C.O.D.'s. Send approximate postage with Canadian and foreign orders.  
**NO MINIMUM PURCHASE REQUIRED . . . YOU GET THESE LOW PRICES ON ANY QUANTITY YOU BUY!**

# STANDARD BRANDS TUBE COMPANY

ROMANO BUILDING    HARRISON, NEW JERSEY    HU. 4-9848    Dept. ET-5



**FINALLY!**

# A SUPERIOR LIQUID CONTACT CLEANER

**Ultra-New CONTA-CARE KIT II**



**\$1.25**

**Cleans Almost Instantly with Minimum Rubbing**

After years of painstaking research, Standard Kollman for the first time can honestly recommend a liquid contact cleaner. You'll find it in the new Contacare Kit II. You'll also find a soft tough cloth—lint-free to avoid fouling . . . and a tube of non-evaporating grease for permanent channel lubrication and contact protection. Instruction sheet is clear, brief, and complete. Kit is compact and sturdy. Try it soon . . . and save your elbow grease for jobs that need it.

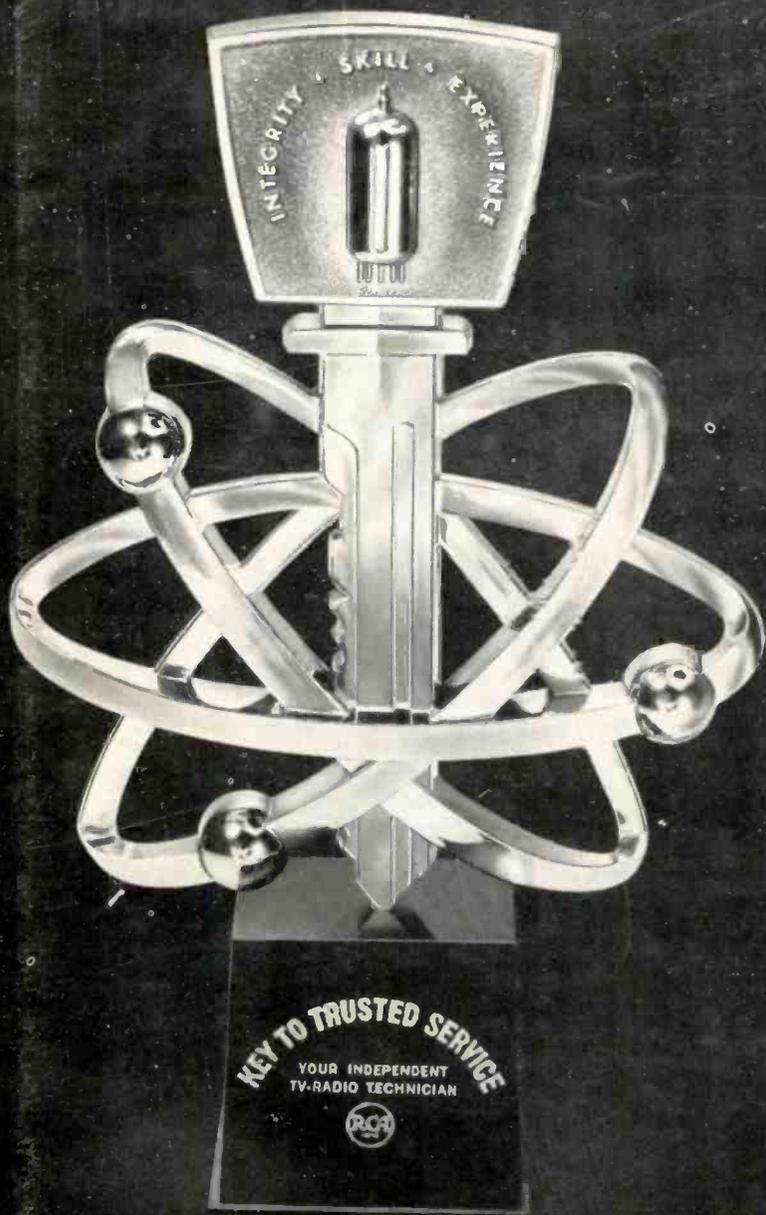
*INSIST ON THE GENUINE CONTA-CARE KIT II*

- NO RESIDUE
- NO SUBSEQUENT CORROSION
- NON-FLAMMABLE
- NON-CONDUCTIVE

**standard kollsman<sup>®</sup> INDUSTRIES, INC.**

FORMERLY STANDARO COIL PRODUCTS CO., INC., MELROSE PARK, ILLINOIS

**WORLD'S LARGEST MANUFACTURER OF TELEVISION TUNERS**



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Each day you see more and more of these *Key to Trusted Service* symbols displayed in radio-TV-HiFi service shops all over the country.

This symbol is the focal point of a major RCA promotional program to identify and "boost" outstanding service dealers in each community.

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