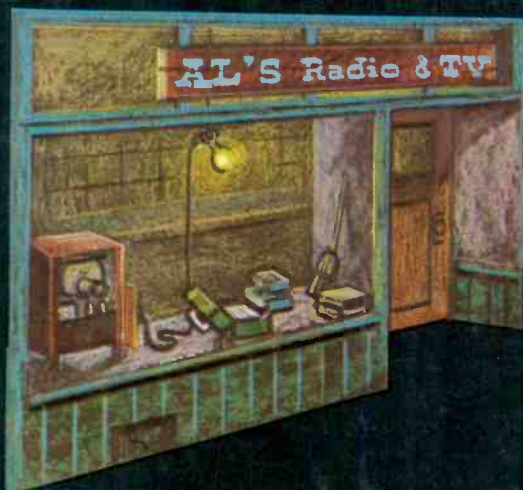
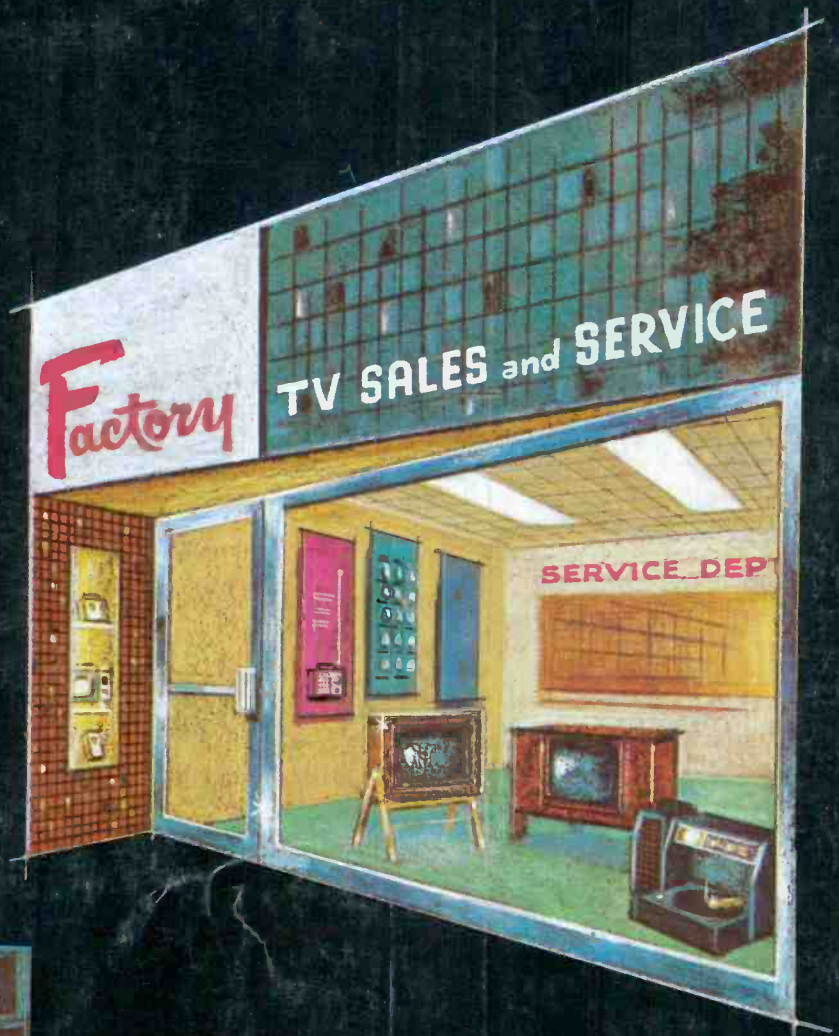


# ELECTRONIC TECHNICIAN



- **SELLING UHF**
- **GOVERNMENT LOANS**
- **TRADING STAMPS -- PRO AND CON**

JULY 1963



Note display of escutcheons mounted on walnut facing, with control switches below

## **COMPATIBLE COMPONENTS DISPLAY DEMONSTRATION CENTER OFFERS MORE WAYS TO Make MORE Sales... BIGGER Sales**

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**ORDER TODAY!**

*Your V·M distributor can provide full details.*

**THE VOICE  OF MUSIC®**

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# New BUSS VISUAL·PAK

*With the clear plastic box,  
there's no need to open  
to see how many fuses are in it.*

The new BUSS fuse 'Visual-Pak' originated by BUSS holds five fuses and is an outstanding development in fuse packaging.

The box doesn't have to be opened to see the number of fuses in it. This is a real help when taking inventory—and it also guards against running short on fuses.

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The new BUSS 'Visual-Pak' fits display stands and channels—it has the same dimensions as the BUSS metal box.

Many sizes of BUSS fuses are now being shipped in the 'Visual-Pak', and shortly all sizes will be shipped in this modern package.

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BUSSMANN MFG. DIVISION

**MAKERS OF THE COMPLETE LINE OF  
FUSES OF UNQUESTIONED HIGH QUALITY**

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ELECTRONIC TECHNICIAN

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ELECTRONIC TRADE  
CIRCULATION**

# ELECTRONIC TECHNICIAN

**JULY • 1963**

**Vol. 78 • No. 1**

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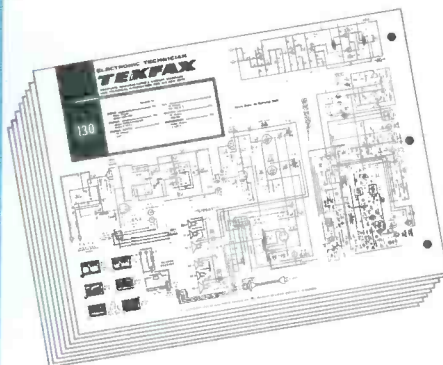
**CLEVELAND:** Arnold T. Suhart, 6207 Norman Lane, Cleveland, Ohio YE 2-6666

**LOS ANGELES:** Boyd B. Garrigan, 1145 W. Sixth St., Los Angeles 17, Calif. HU 2-2838



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**TEKFAX..... 16 PAGES OF LATEST SCHEMATICS**



- DELCO:** Oldsmobile Model 9821137
- EMERSON:** TV Chassis 120692A
- GENERAL ELECTRIC:** Radio-Intercom Model W360A
- MAGNAVOX:** AM-FM Tuner Model 77-01
- PERMA-POWER:** Remote Control System Model G-500 & RC-200
- RCA:** Radio Chassis RC-1214A
- WESTINGHOUSE:** TV Chassis V-2444-1, -2, -3, -5, -6, -9, -10



**ITT BATTERIES**



**ITT TUBES**

**GET EXTRA PROFIT MARGIN AND**  
**FULL CONSUMER ACCEPTANCE**  
**WITH THESE FOUR ITT LINES**



## ITT WIRE & CABLE



## ITT TRANSISTOR RADIOS



"To remain competitive today, dealers must have access to worldwide sources of manufacture of many lines," says L. J. Battaglia, president of ITT Distributor Products Division.

You no longer have to make the choice between an extra profit margin and a brand name respected by your customers when buying tubes, batteries, wire and cable, and transistor radios.

Now, the worldwide facilities of ITT and your ITT Distributor bring you these four complete lines...each carrying the nationally-known ITT label...each priced to give you extra profit margin.

Each product line contains the *right* models and types and the *right* prices to give you maximum profit.

*Tubes:* comprehensive receiving tube line for entertainment use. *Batteries:* penlites, C, D, and 9-volt miniatures, poly-packed in display box and pegboard assortments. *Wire and cable:* a com-

plete line of wire and cable including twin-lead, coax, multi-conductor cable as well as most popular commercial and MIL-spec types from ITT-Royal and ITT-Surprenant facilities.

*Transistor Radios:* a full line from 6-transistor shirt pocket to AM-FM-SW long range models in regular step-ups.

Other ITT product lines—ITT capacitors, semiconductors, speakers, intercoms—also available. Still more will soon be added from ITT worldwide facilities and divisions and subsidiaries recently acquired in the United States.

Contact your ITT Distributor or write for full details. ITT Distributor Products Division, International Telephone and Telegraph Corporation, Box 99, Lodi, New Jersey.

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# ITT

## Now...the ultimate TV/FM outlet for motels, hotels, apartment houses



### JERROLD *ULTRA-TAP*

Now, from the world's leading manufacturer of master antenna systems, comes this simple, attractive, durable all-purpose tap-off unit for TV/FM—the new Jerrord ULTRA-TAP. Smart-design flush-mounting cover plates, in a variety of decorator colors and finishes, blend perfectly with any room decor.

The versatile ULTRA-TAP can handle TV and/or FM signals. It can be conveniently mounted together with an a-c power outlet under one cover plate.

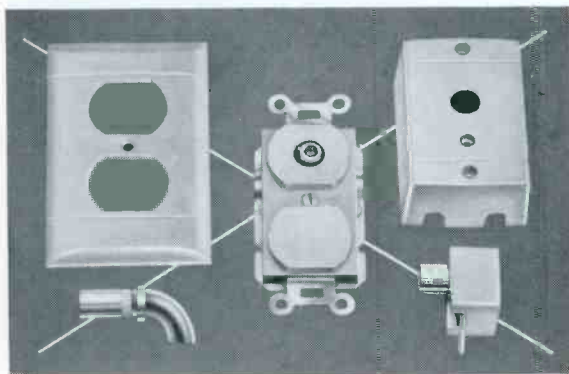


Illustration at left shows the basic outlet, which adapts to flush or surface mounting and accepts either 75- or 300-ohm solderless plug-in connectors. ULTRA-TAP is compatible with any TV signal-distribution system. Write for complete information on Jerrord's wide line of antennas and antenna systems.



A subsidiary of THE JERROLD CORPORATION

Distributor Sales Division, Philadelphia 32, Pa.

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## LETTERS TO THE EDITOR

### Service Charges

I read about charging enough for service in your Feb. 1963 issue of ET with great concern. I am interested in finding a list price I may charge for shop repairs. I would be very grateful for any information you can send me.

PETER DIEHL

Elmont, L. I., N. Y.

• *Check with local servicemen to see if standards have been set for your area. Also at least two pricing guides are available from your distributor. — Ed.*

### Japanese Schematics

I have tried to find a schematic for a Hitachi model No. WH-720 with no success. I wonder if any of the readers would know where I can find one.

I enjoy your magazine very much. Would like to see more on color.

ROBERT E. ALDRICH

Jasper, Mich.

• *See the April issue for a contact on Hitachi information. And see the forthcoming August issue devoted primarily to color TV. — Ed.*

### Needs Hickok Manual

I have a Hickok Sweep Generator Model No. 610-A. I would like to have a manual for it. If you or anyone could tell me where to obtain one I would be grateful. If I could borrow one for a short time that would help. Thanks for your wonderful magazine. I especially enjoy the "Tough Dog Corner."

MAX FARLTON

Monroe, N.C.

• *Try the Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland, Ohio. — Ed.*

### Ratioformer

Your April 1963 issue has a Query by C. L. Nichols, regarding a test device for making ratio tests on transformers. A device known as T.T.R. (transformer turns ratio) is sold by James G. Biddle Co. Philadelphia, Pa. I am sure they will



# the HIDDEN 600\*

PRESENT 

## 5 WORLD FAMOUS PERFORMERS 5

\*The "Hidden 600" are Sprague's behind-the-scenes staff of 600 experienced researchers who man the largest research organization in the electronic component industry and who back up the efforts of some 8,500 Sprague employees in 26 plants.

### DIFILM® BLACK BEAUTY® MOLDED TUBULAR CAPACITORS



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### DIFILM ORANGE DROP® DIPPED TUBULAR CAPACITORS

Especially made for exact, original replacement of radial-lead tubulars. Ideally suited for printed wiring boards. Dual dielectric combines the best features of both polyester film and special capacitor tissue. Exclusive HCX® solid impregnant—no oil to leak, no wax to drip. Double dipped in bright orange epoxy resin to beat heat and humidity.



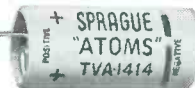
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ELECTROLYTIC CAPACITORS

The most dependable capacitors of their type. Built to "take it" under torrid 185°F (85°C) temperatures—in crowded TV chassis, sizzling auto radios, portable and ac-dc table radios, radio-phono combinations, etc. Hermetically sealed in aluminum cases for exceptionally long life. Withstand high surge voltages. Ideal for high ripple selenium rectifier circuits.

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Tiny, tough, dependable in practically every application. Low self-inductance of silvered flat-plate design gives improved by-pass action in TV r-f circuits. Higher self-resonant frequency than tubular ceramics or micas. Tough moisture-proof coating. Designed for 85°C operation.



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## LETTERS TO THE EDITOR

furnish him with the necessary information.

FRANCIS J. GORMAN  
Allentown, Pa.

### Electronics for Dogs

I would like to know if you or if any ET readers have any information, schematics, etc. regarding a dog trainer collar. A receiver with a relay is attached to collar and triggered by a remote transmitter.

JOE W. MEEK  
TOPOCK, ARIZ.

*\* We have received several requests for such information. Can anyone help? — Ed.*

### Needs Manual

I read with interest the success that Mr. MacDonald had in securing an operation Manual for a Dumont 274 scope. I have a Triplet Model 3440 scope and have been unable to secure an operation Manual. I wonder of some reader has one that he has no use for.

I'm a newcomer, but I thoroughly enjoy your magazine.

ROBERT F. CAREY  
East Falmouth, Mass.

### Affiliated TV Labs

I have an automatic tube checker made by Affiliated TV Labs, Inc., Queen Village 29, N.Y. I understand this company is no longer in business.

Is there any way possible that I can get a new roll chart?

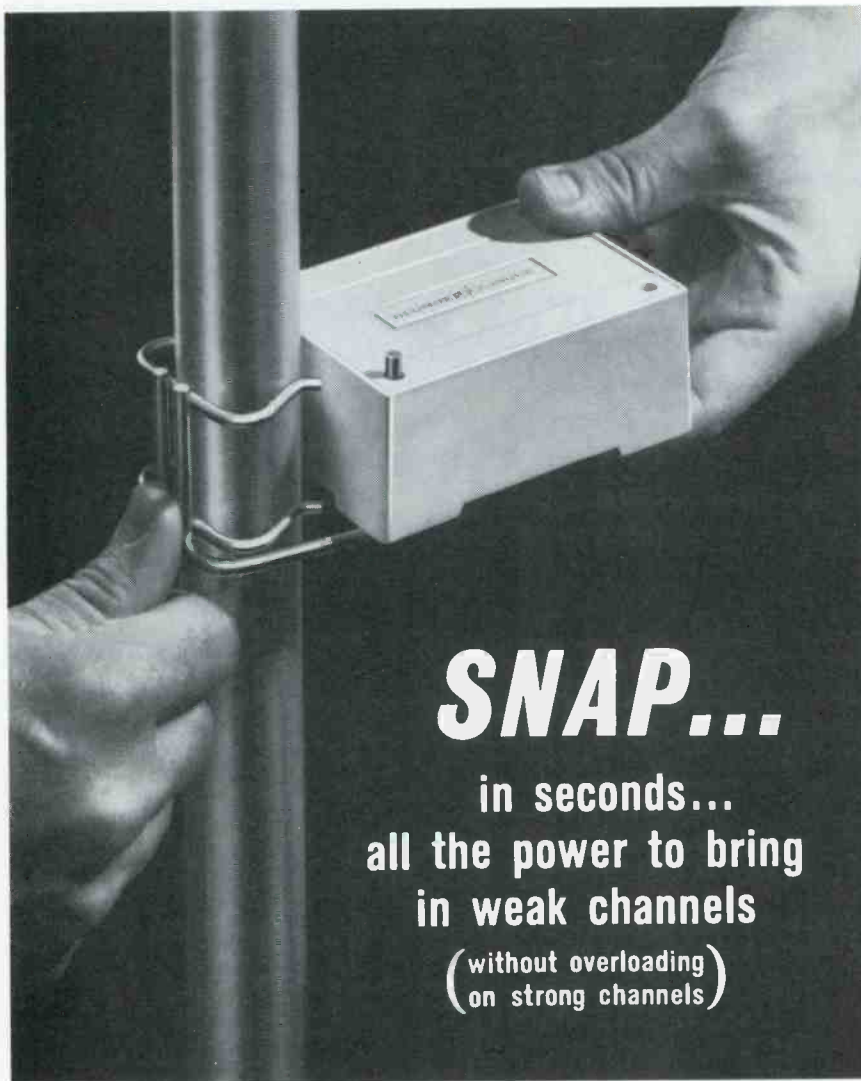
JOHN SETHMAN  
Monongahela, Pa.

● *Do any of our readers have this information?—Ed.*

### On Printed Circuits

As one who services printed circuits, I feel compelled to comment on the subject at this time.

I have found printed circuits to be very reliable if properly designed. However, when the majority of manufacturers turned to printed circuits they blindly turned to series



# SNAP...

in seconds...  
all the power to bring  
in weak channels

(without overloading)  
on strong channels)

## NEW BLONDER-TONGUE ABLE-2

The new two transistor ABLE-2 is no ordinary booster—it performs better, longer than other home boosters available today. It's well worth the slightly higher price. The toughest weak signal problems are no match for the ABLE-2. List \$44.95

2 TRANSISTORS for more power on weak channels—handles up to 30X more signal voltage than one-transistor models without overloading

3-SET SPLITTER delivers sharp, clear pictures up to 3 sets with power to spare (TV, FM, COLOR)

'MIRACLE MOUNT' means fastest, easiest installation of any mast mounted booster

REMOTE AC POWER SUPPLY, striplless 300 ohm terminals and other features

Also available—New ABLE-1—Top Quality mast mounted 3-set TV/FM booster similar to ABLE-2, but with only one transistor. Recommended for weak signal areas only. List \$39.95

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**BLONDER-TONGUE**  
9 Alling St., Newark, 2 N. J.

Canadian Div: Benco Television Assoc., Ltd., Tor., Ont.

home TV accessories • closed circuit TV systems • UHF converters • master TV systems

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BRAND NEW  
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**FASTATCH II®**  
FRK-200 KIT WITH  
**EXACT  
REPLACEMENT  
SHAFTS**

## Makes Control Replacement A SNAP!

- Centralab's new FRK-200 kit gives you the most convenient, most versatile, and simplest system for control replacement.
- Since it includes 13 sizes of exact replacement shafts, shaft cutting is eliminated on *all* the popular dual concentric controls and on almost 60% of all dual controls.
- The Fastatch II® Control System is a snap to use. Single and dual concentrics snap together without tools! Shafts plug in and are permanently locked. Assembled units can't loosen—shafts can't pull out.

### JUST CHECK THESE EXCLUSIVE FEATURES:

1. Just one control system for dual concentric or single controls.
2. Universal terminals.
3. Plug-in, permanently locking shafts.
4. Rotary or push-pull (snap-on) line switches attach to both front and rear controls.

The FRK-200 kit is contained in two stacking Equipto steel cabinets with plenty of extra space for expansion. *All* your control needs, including push-pull, are at your finger tips.

### THE FRK-200 KIT CONTAINS:

- |                                       |  |
|---------------------------------------|--|
| 35 Exact Front Shafts (7 sizes)       | 9 Assorted Rear Controls                                     |
| 30 Exact Rear Shafts (6 sizes)        | 40 Assorted Universal Shafts for Single and Dual Concentrics |
| 5 Universal Push-Pull Shafts (1 size) | 5 SPST on/off Switches                                       |
| 5 Push-Pull Line Switches             | 2 DPST on/off Switches                                       |
| 5 Twist-Tab Adapter Plates            | 1 DP on/off Switch   |
| 2 3-Drawer Equipto Cabinets           | Complete with current cross-reference guides.                |
| 27 Assorted Front Controls            |  |

Dealer Net \$72.50

Less Credit for your old controls!

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put the best  
on your bench



## EICO 667 dynamic conductance tube and transistor tester

The EICO 667 will earn money for you by catching the bad tubes an emission tester would miss. The 667 combines a mutual conductance test with a peak emission test to give a single reading of tube quality. Bad transistors can be spotted easily. Gain and leakage tests find the defective ones.

**TESTS ALMOST EVERY DOMESTIC OR FOREIGN RECEIVING TUBE MADE.** The EICO 667 checks 5 and 7-pin Nuvisors; 9-pin Novars; 12-pin Compactrons; 7, 9 and the new 10-pin miniatures; 5, 6, 7 and 8-pin subminiatures; octals and octals. It will also check many low-power transmitting and special purpose tubes, voltage regulators, cold-cathode regulators, electron ray indicators, and ballast tubes. And by inserting pilot lamps into the special output in the center of the Novar socket you get an instant good-bad test of these lamps.

**TESTS MADE UNDER ACTUAL TUBE OPERATING CONDITIONS.** When one section of a multi-purpose tube is being tested, all sections are drawing their full rated current. Pentodes are tested as pentodes rather than combining all the elements for a simple emission check. Leakage between tube elements is read directly on a  $4\frac{1}{2}$ " meter in ohms.

**EICO 667 NEVER WILL BE OUTDATED.** A new rollchart is prepared periodically. Data on one or two tubes, can be added by unsnapping the windows over the chart.

**TRANSISTORS CHECKED IN TWO STEPS.** First for leakage, then for Beta or current amplification factor. Both are read directly off the meter dial, and both n-p-n and p-n-p transistors can be checked.

**FEATURES OF THE 667.** Multi-circuit lever switch sets up plate, screen and control grid voltages rapidly. 13 pushbutton switches insert alternate tube elements for rapid leakage testing. 200-ma  $4\frac{1}{2}$ -inch D'Arsonval meter is sensitive enough to give accurate readings even for tubes with low cathode current. 20 heater voltages cover all tube types including 300-, 450- and 600-ma series string tubes. Line voltage variations are compensated for by a line-adjust potentiometer. \$79.95 kit, \$129.95 wired.

Tests all Color, B & W CRT's—70, 90 and 110"! **EICO CRU universal crt test adapter**—New CRT adapter for models 667 and 628 has 12-pin socket for 70° and early 90° deflection black and white tubes. Three additional back-to-back plug-socket adapters for 7- and 8-pin 90 and 110° and color CRT's. Adaptable to many other tube testers. Wired \$99.95



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**ET-7**  
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VTVM including  
exclusive Uni-Probe  
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Wired \$42.95.



**EICO ELECTRONIC INSTRUMENT CO. INC., 3300 Northern Blvd, L. I. C. 1, N. Y.**

EXPORT: ROBURN AGENCIES INC., 431 GREENWICH ST., N. Y. 13, N. Y.

ADD 5% IN WEST

## LETTERS TO THE EDITOR

filaments, inexpensive tuners slim line design, elimination of some needed circuits (the worst mistake in my opinion). The sets are built in such a manner that it takes about an hour and a half to get at an adjustment, another hour to adjust such a simple thing as a tuner oscillator coil. Another hour or so is required to put the set together.

Some even went so far as to place printed wiring on both sides of the circuit board. (Did you ever try to remove a major component and find half of the printed wiring coming along with it?) This I think is why technicians in general take such a dim view of printed circuits.

Printed circuits and miniaturization are here to stay. But I think service ability will have to be improved somewhat. I don't think independent dealers and technicians are going to recommend a TV set unless it is serviceable. After all, he is going to have to service these sets and if he can't make money on a flat rate basis servicing a set, he certainly isn't going to "push" it.

Some of the more successful manufacturers seem to have adapted some reliability and serviceability into their design:

1. Printed circuits on only one side of the printed board.
2. Not using printed circuits where high temperatures or high voltages are involved.
3. Easy access to printed wiring and components.
4. All delicate extensions recessed.
5. Filament transformers.
6. Fuses in ac line and high and low voltage power.
7. Tube diagrams and parts list on inside of back cover.
8. Easy access to controls such as oscillator slugs in the tuner, etc.

JACK M. WRIGHT  
Edmonds, Wash.

### Quote

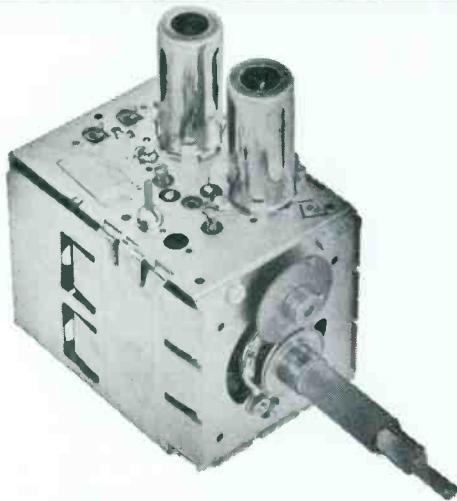
First magazine printed for the service technician — and you can quote me.

KEN WOOD  
Albuquerque, N. M.

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Prices effective January 1, 1963

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 two complete, well-equipped Factory Service Centers—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 repaired and shipped out the next. Allow a little more time for service on other than Tarzian-made tuners.

Tarzian offers a 12-month guarantee against defective workmanship and parts failure due to normal usage. And, compare our cost of \$9.50 and \$15 for UV combinations. There is absolutely no additional, hidden charge, for **ANY** parts except tubes. You pay shipping costs. Replacements on tuners beyond practical repair are available at low cost.

Ⓢ Tarzian-made tuners are identified by this stamping.

When inquiring about service on other tuners, always give TV make, chassis and Model number. All tuners repaired on approved, open accounts. Check with your local distributor for Sarkes Tarzian replacement tuners, replacement parts, or repair service.

 **SARKES TARZIAN, INC.**  
*Bloomington, Indiana*

MANUFACTURERS OF TUNERS . . . SEMICONDUCTORS . . . AIR TRIMMERS . . . FM RADIOS . . . AM/FM RADIOS . . . AUDIO TAPE . . . BROADCAST EQUIPMENT

**ONLY**  
**\$9.50**  
**INCLUDING**

**ALL PARTS**  
(except tubes)  
**and LABOR**

**24-HOUR SERVICE**  
**1-YEAR WARRANTY**

**TWO SERVICE CENTERS  
TO SERVE YOU BETTER**

**See your distributor, or use the  
address nearest you for fast fac-  
tory repair service**

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Bloomington, Indiana  
Tel: 332-6055

10654 Magnolia Blvd.  
North Hollywood, Calif.  
Tel: 769-2720



A.



B.



C.



D.



E.

# They turned to Norelco...

## and here's why:

Take the case of (A) Independence Hall, Philadelphia. To tell the "cradle of liberty" story to thousands of visitors, Norelco developed an outdoor sound-and-light spectacle utilizing Norelco equipment. . . . Or look at (B) Parleys Stake House, Salt Lake City, where, for precision of speech reproduction, the answer was a Norelco sound system of microphones, amplifiers and sound columns. . . . (C) The State Department, Washington, wanted the same simultaneous interpreting equipment that Philips installed in NATO Headquarters in Paris. They got it with the Norelco multi-channel system. . . . In (D) Sts. Peter and Paul Cathedral, Philadelphia, the prob-

lem of difficult acoustics in a high-vaulted area was solved with a columnar speaker arrangement. . . . And for the (E) House of Representatives, State Capitol, Denver, the answer again was Norelco microphones, amplifiers and speakers. . . . These, just a handful of the Norelco sound systems in operation, indicate the wide range of equipment and experience available from Norelco—and from no other manufacturer. For full details, check Sweet's File—or write to Dept. ET-7, North American Philips Company, Inc., Commercial Sound Department, High Fidelity Products Division, 100 East 42nd Street, New York 17, New York.

IN CANADA AND THROUGHOUT THE FREE WORLD, NORELCO IS KNOWN AS THE "PHILIPS".

**Norelco**® Sound Systems



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ELECTRONIC TECHNICIAN

# TECHNICAL DIGEST

## EMERSON

### TV Chassis 120692A — Control Adjustment

Improper adjustment of the DuMonitor, RF AGC Delay or Trans-Lok Controls may result in one or more of the following adverse conditions:

1. Receiver overload on strong signals (sync instability, sound buzz or loss of interlace).
2. Insufficient picture contrast on suburban and weak signals.
3. Excessive picture snow on weak signals.

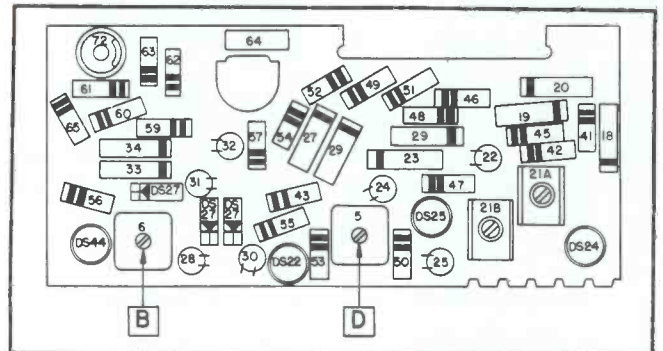
If any of these conditions are observed, readjust the controls as follows with the ABC switch in the OFF position and the Trans-Lok turned fully CCW.

1. Switch to the strongest station and turn the RF AGC Delay control fully clockwise, (position of maximum noise in the picture).
2. Rotate the DuMonitor fully counter-clockwise and then slowly clockwise until the receiver begins to overload (sync instability, sound buzz or loss of interlace), then back the control off slightly and leave it in this position. If the receiver does not overload when the control has been rotated fully, leave it in this position.
3. Switch to a medium-weak signal and turn the RF AGC Delay control slowly counter-clockwise until the noise in the picture just minimizes. This adjustment must be carefully made, otherwise strong signal performance will suffer due to overload or loss of picture contrast.
4. Switch back to the strongest station and, if there is evidence of overload, repeat step 2.
5. With the receiver still turned to strongest channel, rotate the Trans-Lok control slowly clockwise until the picture begins to overload (sync instability, sound buzz, kinks in picture), then back off slightly to eliminate this condition. With controls properly set, switch channels to verify setting for strongest signals. This optimizes operation of the Trans-Lok for mixed signal conditions (strong and weak). However, in extreme fringe areas it is possible to improve the picture stability by further clockwise adjustment of the control. In areas where all signals are strong, the Trans-Lok control can be left in extreme counter-clockwise position.

## DELCO

### Buick Model 980464 — Audio Circuit Change

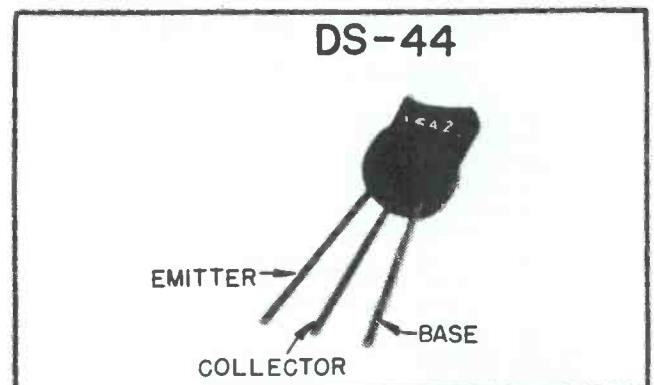
Buick Special Pushbutton radios which have a letter designation of "A" after the model number have an audio driver circuit different than the standard Del-



New transistor lead arrangement.

co audio driver circuits. In this circuit the germanium PNP audio driver transistor (DS-26) has been replaced with a silicon NPN audio driver transistor (DS-44).

1. The DS-44 has a completely new lead arrangement.
2. The circuit side of the circuit board does not change; the component side of the board has been changed.
3. Voltages on the AF driver are completely different.



Component side of the circuit board on A models.

If you should encounter a problem of picture flashing in any QX Chassis model, it is probably due to poor contact between the aluminum foil strip, located on the left side of the cabinet back, and some of the grounding clips which press against it. In servicing, care should be taken to be sure that all three clips press firmly against the foil when the cabinet back is installed.

4. Bias voltage is .6 v instead of .2 v.
5. Resistance of DS 44 diodes on RX100 range of most meters:

Low reading — less than 1000 ohms.

High reading — at least 5 times low reading.

6. The test for conduction of the DS-44 is made from the 11 v line to the collector instead of the emitter.

## GENERAL ELECTRIC

### Models P835A, P840A, B, and P870A — DC Isolation for Radio

When servicing radio models P835, P840A, B, and P870A, the audio output terminals of these radios must be dc isolated from ground during servicing procedures. This is to prevent the audio output transistors from becoming damaged by excess voltages in the audio circuit. Therefore, care must be exercised in using test equipment that may cause a dc path to ground.

Use of a VOM creates no particular problem as the meter is isolated from ground. If a VTVM is used, a 100  $\mu$ fd 200 v electrolytic capacitor must be inserted in the negative probe to isolate the VTVM.

### M6, MWm MX-MXT — Power Tuning Assemblies

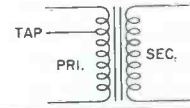
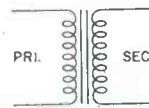
If difficulty is experienced with loosening of the pin upon which the intermediate gear revolves, it is not necessary to replace the entire gear case. A replacement pin, with mating gear, retaining ring and installation instructions, is available from your General Electric Television Receiver distributor.

In most of the cases where a power tuning motor fails to operate satisfactory, the problem is due to a stripped nylon pinion gear on the end of the rotor shaft. Replacement rotors are available from your distributor. Three (3) different types were used, so be sure to check for correct motor number.

## WESTINGHOUSE

### Vertical Output Transformer Replacement Guide

Original Transformer	Lead Color		Approx. D-C Ohms		Turns Ratio	Fig. No.	Replacement Transformer
	PRI	SEC.	PRI.	SEC.			
V15325-1	BL-R	Y-B/W	255	8.3	8:1	1	These transformers are interchangeable.
V15325-2	"	"	"	"	"	"	
V15325-3	"	"	"	"	"	"	
V15325-4	"	"	"	"	"	"	
V8325-4	"	"	"	"	"	"	
430V00SH01	"	"	"	"	"	"	These transformers are interchangeable.
430V00SH02	BL-R	Y-B/W	1625	6	18:1	1	
430V00SH03	"	"	"	"	"	"	
430V00SH04	"	"	"	"	"	"	
430V00SH05	"	Y-B	"	"	"	"	
430V00SH06	"	"	"	"	"	"	
430V00SH07	"	"	"	"	"	"	
430V00SH08	"	LUGS	"	"	"	"	
430V00SH09	"	"	"	"	"	"	
430V03H01	BL-R/Y-R	Y-B/W	235	8	7:1	2	Use original.
430V03H02	BL-R/Y-R	Y-B/W	185	4.15	"	2	These transformers are interchangeable.
430V03H03	"	"	"	"	"	"	These transformers are interchangeable.
430V03H01	BL-R	Y-B/W	300	4	9:1	1	
430V03H02	"	O-G	"	"	"	"	
430V03H03	"	"	"	"	"	"	
430V03H04	"	"	"	"	"	"	
430V03H05	BL-R	LUGS	148	4.4	5.5:1	1	These transformers are interchangeable.
430V03H06	"	O-G	"	"	"	"	Use original.
430V03H07	"	"	"	"	"	"	
430V03H01	R-BL	Y-B	150	4.3	5:1	1	



This Chart lists replacement for all of the vertical output transformers used in 1955 through 1962 Westinghouse TV chassis. Any transformer within an interchangeable group may be used to replace any other transformer in that group.

## ZENITH

### Chassis 25LC20 and 25LC20QS — Improving Interlace

A connection between terminal "G" of the vertical output transformer (95-2109) and 390 v B+ is being added in early production to further improve interlace. In the near future, this connection will be made internally in the vertical output transformer.

Change: Resistor R31 (in brightness control circuit) from 3.3 megohm to 2.2 M; Capacitor C93 from 47 mmf ( $\pm 10\%$ ) to 75 mmfd ( $\pm 20\%$ ), and Resistor R142 from 4.7 megohm to 2.7 M.

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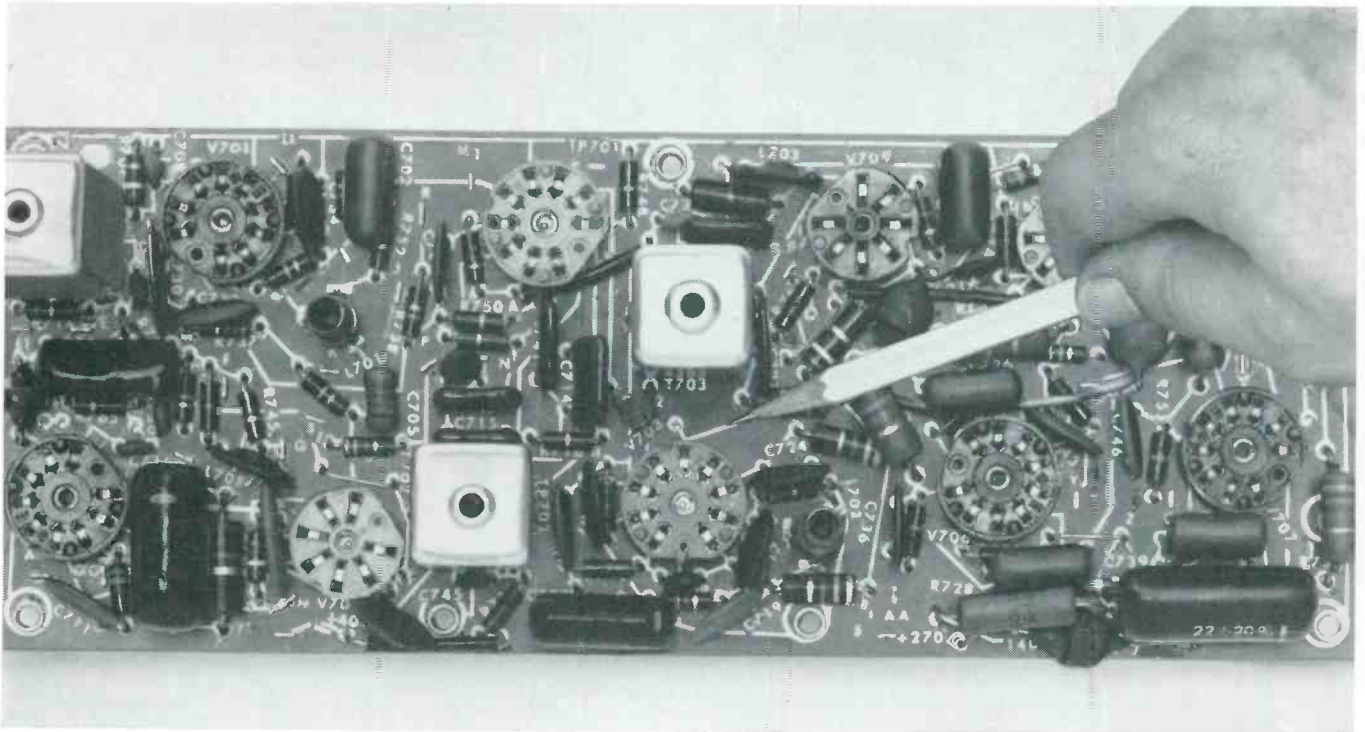
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# From RCA Victor—another big advance in Space-Age Sealed Circuitry



RCA Victor Color TV Chroma Circuitry

You can see at a glance how new streamlined “road-mapping” makes servicing faster, easier, surer than ever before

Pictured above is the “new look” in RCA Space Age Sealed Circuitry . . . the new precision-crafted boards that you’ll see in *all* 1964 New Vista Color and in most RCA Victor black-and-white television sets for 1964.

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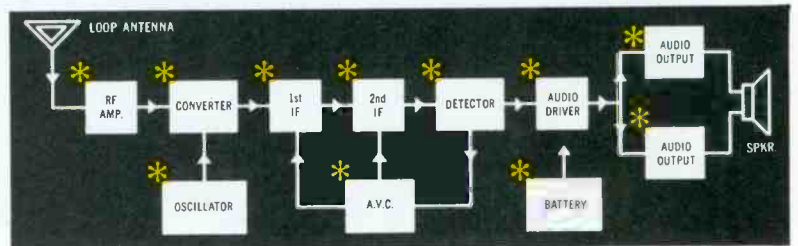
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#### BUILT-IN METERED POWER SUPPLY FOR EASY SERVICING

Makes it easy to operate radio under test, while you inject your own signals. Provides from 1 to 12 volts in 1½ volt steps. Supplies all bias taps that may be required.

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#### TESTS ALL TRANSISTORS OUT-OF-CIRCUIT

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ELECTRONIC TECHNICIAN

## EDITOR'S VIEWPOINT



### Ohm's Law is Fine But . . .

Business operation is the single most important facet in the success or failure of your TV shop. Technical competence, believe it or not, is secondary. By that I don't mean that your shop could be operated without someone to make intelligent repairs. But that a shop with a good business manager will be successful. One with a good technician, on the other hand, will not necessarily be a success.

If you are operating a one-man shop, you have to be the business manager and the competent technician. Not an easy job.

This month *ELECTRONIC TECHNICIAN* is focusing on business — every aspect we can squeeze in: advertising, merchandising, insurance, loans, and bookkeeping for a "profit alarm." Lack of any one of these could cause you to have a business failure.

But I haven't mentioned the most important area of all: customer relations. This is an area which is most neglected in almost every business. No matter how good your product, prices or repairs, without a good relationship with your customers, you are doomed.

The simple tips mentioned in *Preventive Maintenance Customer Relations* may seem too obvious for some of you . . . but are you practicing them? They may seem rather basic. But since they haven't been said, we feel like there is no time like right now.

Another article in this issue worth mentioning is *Protect Yourself From Check Artists*. We mention it because of the author's unusual relationship to the people he so aptly describes. Using our usual philosophy of going to the "horse's mouth" for authoritative data, we went to a state penitentiary for our author. Read it. It may save you a lot of money.

National Electronic Distributors Association's Executive Vice President, Gail Carter, gives some interesting tips to the technician in this month's issue too. Distributors are honestly

worried about you! Read it and see why — and more important, what you can do about it.

*ELECTRONIC TECHNICIAN* is not alone in an attempt to increase your business know-how. I recently heard an excellent record produced by RCA which gives you 36 minutes of uninterrupted business tips. Much like this issue of *ET*, some of the information is "old hat," but if you are earnest enough, you'll find something in it very rewarding. Perhaps even business-saving.

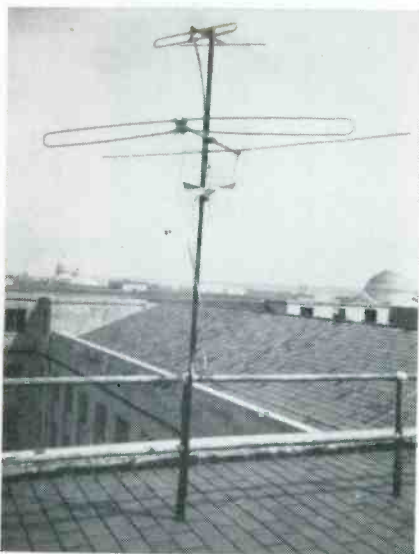
Included in the record are tips on advertising, house call service, store traffic and handling your telephone customers. The record is not new, but can be ordered through your RCA distributor. It's called "Building Blocks of Successful TV Salesmanship."

The first part of the record is devoted to the TV shop's appearance. Most of you can't help but be aware of your shop's appearance; yet it's one of the last things you think about. Undoubtedly, you are impressed with other places of business which are spotlessly clean and neat. Why not dust off your test equipment and stock, and sweep the floor a little more frequently?

Good customer relations is one of your best chances to fight and overcome the high school boy's premature ambitions to be TV technicians. A clean shop is an important part of customer relations; a glittering shop with test equipment in full view gives your walk-in traffic a feeling of confidence in your ability.

Don't wait until next week, or when business picks up — start right now!

Vic Beale



Chimneys are not always the best antenna locations.

■ One of the biggest stumbling blocks UHF must still overcome is the TV technicians' disbelief of the quality available from UHF broadcasts. In the near future, UHF will become an increasing factor in profits for the technician both in terms of sales and services. In April, 1964, all new TV sets will be required to have UHF reception capabilities.

A few new techniques are required, however, if the technician is to get the most benefit for his customer in a UHF installation.

The recent comparison of UHF-TV reception in the city of New York can greatly benefit the technician from what was discovered in this test.

In this test, picture quality observations and field strength measurements were made by technicians of the Jerrold Electronics Corp.

Complete details are available from the Federal Communications Commission in a "Report on Receiver Installations, New York City UHF-TV Project." Here is a brief summary of the results:

"The data shows that on the basis of percentage of locations receiving excellent or fine (Grade 1 or Grade 2) pictures indoors, Channel 31 was inferior to Channels 2 and 7 by approximately 10%. This was due primarily to receiver (thermal) noise caused by lower penetration of UHF signals. This difference almost disappears completely when outside antennas are installed.

"Slightly more time is needed to select the final positioning of UHF antennas, otherwise, except for receiver cost, there is little difference in cost between UHF and VHF installations. The simplest antennas

## Selling and Installing UHF TV

Careful attention to detail insures a reliable, good UHF picture

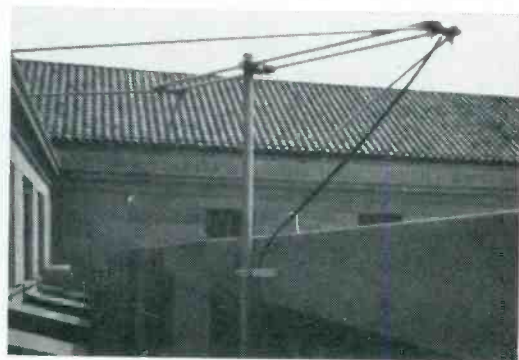
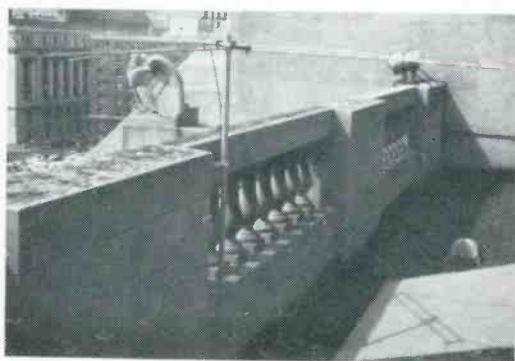
*by Jules Dettz*

*\*The author is employed in the Office of the Chief Engineer of the Federal Communications Commission. For the past two years he has been active in the Commission's UHF-TV test conducted in New York City. He led in the development of receiver installation procedures, obtained the equipment necessary for reception and supervised the work done by the Commission's contractor.*

How not to install an antenna. Note the sharp loop in the wind-lashed broken transmission line and how the line is taped to the mast.



In the city this simple Double V antenna did well at both UHF and VHF.



are usually satisfactory for reception of UHF or VHF. Good reception was obtained at most locations using a single antenna for both frequency bands. Color reception was favored in either case and ghosting difference between UHF and VHF are small enough to be disregarded."

If New York City is any criterion, fine TV reception is available at most locations in metropolitan and suburban areas at both UHF and VHF. This is especially true when outdoor antennas are used. Reception with indoor antennas favors VHF somewhat — but not very much.

*Fine reception is available.* Whether or not it materializes depends on the quality of the receiver, its installation and maintenance. What we found out in New York more exactly represents the *Potential* of VHF and UHF TV reception. The receivers we used were carefully selected, regularly maintained and painstakingly installed by trained personnel. However, any service technician can do as well if he makes up his mind to do so. *Not only must he know the technicalities of his trade but he also must be a part-time salesman — capable of convincing his customer that he should make a reasonable first investment.* The service technician, in turn, should do a good job, using materials that will last for

at least five years in that location.

There will be locations where the installer will not get excellent or fine pictures (Grades 1 or 2) the quick, easy way. But it is to your long range interest to take the extra time where it is needed.

I recall locations during the New York City UHF-TV Project that required hours of roof-scrambling before the technicians convinced themselves that they had done their best. Conversely, and more often, a chimney mounted simple double V antenna was all that was needed for both UHF and VHF.

Unfortunately the customer will never be certain of the quality of his TV reception until he first turns on his receiver at home. When he invested in a UHF receiver, he most likely counted on being among the greater majority that get good reception forthwith. Failing to fall in with the majority, the customer expects to be rescued by his local technician. This calls for some effort and knowledge on the technicians' part.

Although it is definitely to your long range interest, it may not be easy to convince yourself to be farsighted. One obvious incentive is higher pay for your extra time. This might be difficult for the customer to understand, especially should the final results not please him. However, the same thing happens everyday in the medical field. But, of

course, the doctor gets paid anyhow!

The knowledge required for successful UHF-TV installations is well known to manufacturers, distributors and many service people in areas where UHF is not new. Perhaps the knowledge could be spread around more. Here are some of the more important standard recommendations and a few suggestions of my own:

1. When necessary, probe extensively for the best antenna location.

2. Don't be "married" to chimneys — you may need a better antenna position at difficult locations.

3. Carefully orient the outdoor antenna, preferably using a portable receiver on the roof. Should ghosting increase when the transmission line is connected to the indoor receiver — you might try the use of double shielded coaxial line (with proper matching transformers) providing you are able to take the extra losses.

4. The best antenna orientation may not be in the direction of the transmitter.

5. Do not economize on the quality of transmission line.

6. a. Keep the transmission line short as possible, particularly horizontal runs.

b. Try to use the building for shielding the transmission line.

c. Use few bends and see that they are not sharp.

d. Use at least 6 in. stand-offs.

7. Anticipate the effect of foliage, especially during winter installation.

8. The antenna should be mechanically rigid. Vibration effects may show up as flutter.

9. Don't install an antenna in a "hot spot" without checking reception over a period of time.

10. Encourage the use of outdoor antennas. With indoor antennas even a metal venetian blind can ruin reception.

11. Where outdoor antennas are not possible — demonstrate indoor antennas that may be more efficient than rabbit ears.

12. Do not overlook the possibility of a master antenna system where it may be practical.

13. If separate transmission lines



The service technician should teach his customer how to tune in UHF stations.

# Selling and Installing UHF TV

Continued



Probing for the best antenna location using an intercom between the receiver position and the antenna.

are not used for UHF and VHF, isolate the antennas and tuners with crossover networks.

14. Teach the householder how to tune in UHF stations.

15. You may want to consider the use of inexpensive UHF amplifiers that are now available.

16. Carry a good portable receiver for comparison purposes. It is possible that the receiver being installed or serviced is not up to par. This can also be true of converters.

UHF means more TV receivers, more parts and consequently more new sales and servicing. Don't leave yourself out in the cold when UHF really starts to move. ■



A shorted IF tube was the actual cause of poor reception. The technician's portable placed suspicion where it belonged.



The tube was replaced with good results. The indoor type antennas shown performed well in New York City.



One of the more elaborate UHF/VHF arrays used in the New York test. Note the cross-over network which permits the use of one transmission line.



Unusual but interesting: Channel 31 at 60 miles.

■ There is some loose talk rampant in the electronics industry which adds up to saying that electronic technicians are afraid about their future in the industry. I regard the word afraid as a dirty one since it applies to a very small, almost insignificant number. Most technicians are more knowledgeable than they were five years ago— not just because of the passage of time, but due to the many efforts which have been made and embraced to improve their commercial way of life.

Technicians know that the necessity for 10 to 12 service calls per year to keep a television receiver operating is past history. They recognize that the national average is one service call per year per modern television receiver. The components are of much higher quality and frequently last the full lifetime of the receiver. If they do not fail within a month, the chance for a long life is assured.

The foregoing applies to the newer television receivers. There are still 40 million or more of the older receivers which still require extensive service to keep them operating. The servicing of these sets still represents a substantial market. Knowledgeable technicians, however, recognize this market as a diminishing one and are not basing their long range plans on it.

Many technicians have come to realize that the word electronics has become a household word. Everyone has been exposed to its wonders and its applications to our daily lives. This has resulted in a demand by the public for electronic products which has created market places outside the radio and TV dealers' stores.

Some dealers have found a profitable market in concessions in chain store operations. Others have found concession arrangements in discount stores to be a substantial outlet for tubes and similar products. The public traffic in chain and discount stores cannot be denied and since the public has become electronics-minded, it will buy what it wants where it finds it. The success of the national mail order

# AFRAID-

# IS A

# DIRTY

# WORD



*by Gail S. Carter*

Executive Vice President  
National Electronic Distributors Association

houses in all industries has been based, primarily, on the premise that the public could not get what it wanted in local communities.

Knowledgeable dealers recognize that wherever there is a commercial, educational, governmental, religious or home installation, there is a market for some kind of electronic product. Some dealers stand at their cash registers believing the market will come to them. They are doomed to failure because they must take their story to the markets wherever they are.

Not long ago a dealer made available to those in charge of the official opening of a large airport three electronic roving rostrums. All he asked was a small card be attached to each of the roving rostrums stating that they were there through the courtesy of his company. He sold, within two weeks after the opening of the airport, roving

ing rostrums to banks, manufacturers, motels, churches and other installations. He did not wait for the market to come to him, but took his product to a market far beyond the horizon of the normal retail outlet for electronic products.

Independent electronic dealers are not afraid of the future. They well know that they have their work cut out for them and are making plans to meet the challenge of the new markets for electronic products. Some will not make the grade because they do not want to change their long established ways of doing business. Others will not make the grade because they will jump too fast, expand too much and run out of working capital.

The majority of the independent dealers will make the grade because they have learned to recognize what they see and what to do about it when they have seen it. ■

Don't risk loss of income or business through lack of proper insurance coverage



# Insurance for the Retail TV Shop

■ Many TV service dealers stand to benefit from new approaches to insurance protection for retail stores — particularly “packaged” insurance.

This “package” can mean adequate protection at a significant saving in cost over previous insurance programs. Not every TV shop will qualify for this insurance, however. If the store is largely a retail store, it is quite probable that package insurance can be obtained. However, if the shop does not do much retail business, it may not qualify for packaged treatment under most available Mercantile Package Policies.

Fundamental risks faced by retailers have given rise to various insurance contracts. Advantages of the “package” can be seen after looking at these risks and the separate policies designed to meet them.

Risks fall into these categories: (1) property risks, (2) liability risks, (3) personal risks and (4) crime risks.

In all categories, a dealer without adequate coverage faces the possibility of loss of income, or even

his business through some accidental event.

Here is a discussion of these risks and some of the traditional, separate policies available to cover them.

## Property Risks

Property risks can be placed in two subdivisions: (1) property risks — direct physical damage, and (2) property risks — consequential losses.

**DIRECT PHYSICAL DAMAGE** — “Perils” under this classification include fire, windstorm, lightning, glass breakage and explosion.

Single insurance contracts available to cover these risks include:

- *Fire Insurance*, on both building and contents.

- *Extended Coverage*, which is attached to the fire insurance form to include coverage of such perils as windstorm, hail, explosion, riot and civil commotion, and damage by smoke, vehicles and aircraft.

- *Glass Insurance*, covering just about all glass breakage, except that caused by war or fire. Breakage caused by the latter comes under fire insurance.

**CONSEQUENTIAL LOSSES** — A dealer who suffers a fire, for example, not only faces the cost of repairing his building and contents, but a “business interruption” loss. With a destroyed store — which earns no income, he may discover that he has certain continuing expenses, including his pay, the pay of key employees retained while closed, taxes, advertising and, under certain leasing arrangements, rent.

Occasionally, a dealer whose facilities are destroyed can set up shop in temporary quarters. However, this normally results in considerable additional expense.

- *Business Interruption Insurance* is designed basically to pay continuing expenses and normal profit, without covering non-continuing expenses.

## Liability Risks

In the U. S., a person or a business firm held by a court to be negligent can be called upon to pay monetary damages to an injured party. This arises from laws relating to *negligence* — a term easily defined in theory, but one which, in



practice, depends on the circumstances of the individual case.

If a person suffers either what is known as bodily injury, property damage, or both, he may sue, alleging negligence. The end result may be a verdict which could be ruinous.

A partial list of law suit causes would include: bodily injury to customers in stores, to pedestrians on walks in front of stores, to customers resulting from products purchased in stores, and bodily injury and property damage by motor vehicles. This may include, of course, injury from CRT implosion in some packages.

● **Liability Insurance.** The majority of retail stores are covered under "owners, landlords and tenants liability (OLT)." Under OLT, a dealer is protected against law suits arising from his alleged negligence. As with all liability policies, an important feature is the agreement that the insurance company will defend the policyholder and pay court costs — even if the suit is groundless.

OLT has some options. For example, product liability can be covered, in addition to the normal liability risks or retail premises. This isn't intended as a warranty against a product malfunctioning; because, normally, the product must actually injure someone for there to be grounds for a suit.

#### Personal Risks

Personal risks fall into four subdivisions:

**PREMATURE DEATH** — This is where a dealer or some key employee dies prematurely, creating financial problems for the firm and/or his family.

**DEPENDENT OLD AGE** — This is the reverse of premature death. Many people now live well beyond their financially-productive years. This is a risk in a sense that most people don't plan to live to be 80, 85 and 90 and more years.

● **Life Insurance and Annuities** have traditionally been available for the risks of premature death and dependent old age. These policies have, in recent years, been supplemented by Social Security.

**DISABILITY** — This is a risk in the sense that no one knows when

he might face an accident or illness which could cut off his earning power.

● **Individual or Group Insurance** policies have been designed which will take care of disability by paying hospital and medical bills, as well as a weekly indemnity for the injured party. This has been supplemented by workman's compensation laws. Every dealer should be aware of his state's workmen's compensation laws and its provisions for workmen's compensation insurance.

**UNEMPLOYMENT** — Normally, this is the type of unemployment that results from the ups and downs of the business cycle. There is no private insurance for unemployment.

#### Crime Risks

Crime affecting business establishments comes from two sources: (1) insiders and (2) outsiders.

**INSIDERS** — Recently much attention has focused on the "white collar thief" — the embezzler or so-called "trusted" employee who secretly has his hand in the till or the merchandise. American business firms lose more than \$4 million a day because of employee dishonesty, according to one source, which states that more than 62 percent of this loss is attributable to employees who hold supervisory or executive positions. Part of the solution to this problem is effective management control.

● **Fidelity Bond.** This is the normal protection against the "inside" thief. Various bonds are available, either on an individual or a blanket basis. Basically, any bond is a promise of performance and, in the case of fidelity bonds, a promise of honesty to the employer. In the event dishonesty develops, the bonding company makes good the loss to the employer — reserving the right to recover, when possible, from the dishonest employee. Bonding companies require very strong evidence of loss where inventory shortages are involved. Thus, particularly in this area, the existence of a bond should not lull the shopowner into any relaxation of his internal controls over petty thievery by employees.

**OUTSIDERS** — Criminal acts committed by "outsiders" take various forms. Insurance companies distinguish between burglary and robbery, for example. Burglary entails breaking and entering, normally when the premises are closed. Robbery may mean a daylight holdup. "Outside" criminals can do tremendous harm to retail stores in stealing money and merchandise, and may do considerable damage to the building in the process.

● **Burglary, Robbery and Theft Insurance.** Various policies are available, including the storekeepers burglary and robbery policy — basically designed to indemnify the store owner for losses due to burglary and robbery under several different insuring agreements. This policy, used by many small establishments requiring several coverages in relatively small amounts, can cover: premise robbery (inside holdup), messenger robbery (outside holdup), kidnapping, safe burglary and limited burglary, theft (night depository or residence), mercantile, open stock — covering merchandise, furniture and equipment, but not money and securities.

Another form of insurance is known as money and security (broad forms). This is often used in stores to cover against loss of money or securities by destruction, disappearance or wrongful abstraction. This form doesn't cover losses caused by employees. Another separate form used frequently to pick up the gaps left by the money and security broad forms is the mercantile open stock policy mentioned above.

This outline of risks and available separate coverages, while not all-inclusive, demonstrates that the well-protected dealer needs a number of different policies.

Many dealers indulge in reciprocity with insurance agents, purchasing one policy from one agent, a second from another, and so on. They frequently don't allow one man to make a thorough survey of their insurance needs and, consequently, run the risk of being under-insured in significant areas and, occasionally, over-insured in others — because individual policies

*Continued on page 80*

Based on personal interviews with more than 25 convicted forgers now serving time in Southern Michigan Prison, here is an authoritative guide on how to . . .

## Protect Yourself

■ Check forgery is a crime that 'takes' the American public for more than \$600 million a year. An astronomical figure? Not at all, when you consider that some seventy million checks are cashed each year, and more than \$175 is handled in checks for every dollar in cash.

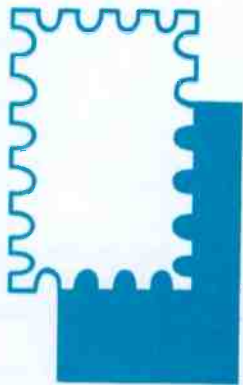
These forgery losses represent more than just great-criminals-at-work; they represent mistakes, carelessness, and a lack of knowledge of how bad-check artists operate.

I live with the largest group of bogus check writers ever assembled under one roof—at the State Prison of Southern Michigan. Among them are the amateurs — those with a yen for a quick buck who have passed a check or two or three on the spur of the moment; semi-professionals — those who invariably get caught; and professional check artists — thieves who spend hours every day trying to figure out new methods to swindle an unsuspecting public. These are the crooks who

have worked every check-writing racket in the book, and their methods of operation are as numbered as they are varied.

Unfortunately for businessmen, these crooks of the paper-hanging crowd are the most presentable and charming thieves you could ever hope to meet. And gaining people's confidence is their business — so you can't rely on swarthy features, low foreheads or any of the traditional "criminal characteristics."

Take, for example, convict No.



## TRADING STAMPS: Pro and Con

Will trading stamps help or hinder your business?

■ Trading stamps have been one of the fastest growing types of retail sales promotions in the past decade. Last year, over \$600 million was spent by retailers and other users to purchase them from the close to 200 trading stamp companies.

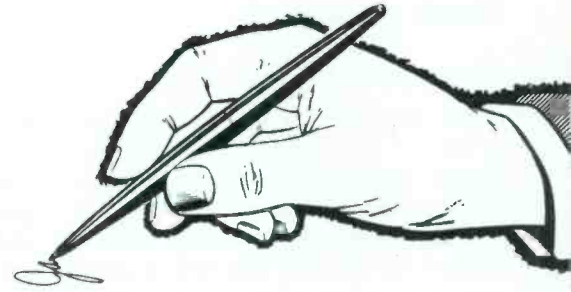
About 260,000 stores — including those of some of your fellow technicians — gave them. Indeed, even some OEM manufacturers offer stamps to technician dealers through participating distributors.

Someday, if the trend to stamps

Andy Anderson (left) and Stan Skylondz in business at Spot Radio and Television's Duluth, Minnesota branch give trading stamps with both service and parts sales. When questioned, Stan said, "We've been giving stamps for about 10 years. We think it's helped business—customers have grown to expect stamps and we will continue to give them." Andy said they had no proof, but some said they called Spot because they offered stamps with quality service.



# from Check Artists



by Dale Morey

88541. In everyday dress he looks like the average man on the street. He dresses well, has exceptionally good manners, is a good conversationalist and has above-average intelligence. He is presently serving a five to fourteen-year sentence for forgery. His girl friend, who was his accomplice in the racket, is serving a similar term in a women's prison.

This couple worked their racket from coast-to-coast, concentrating on what they termed the "musical

circuit." Their method of swindling Hi Fi, TV-radio dealers was relatively simple.

Armed with phony identifications, they would enter a store as man and wife bent on buying a TV or Hi Fi set for their apartment. During their conversation with the salesman, they made it appear that they had been married only a few days. The girl remarked casually, "Honey, we'll have to settle on a cheaper model if we're to get that kitchenette set this week. Don't

forget, we only have six hundred left in the bank."

This bit of husband-wife talk throws a salesman off guard. When the couple made their selection, they asked if they could leave a deposit and pick the item up later in the evening or the following day. The deposit, as a rule would be \$20 or \$30 and, naturally, the check offered was far larger than the amount of the deposit.

Quite often they made full payment and took the purchase with

continues, you might have to offer them; even if you have a small gross or are located in a remote area. Let's look at some of the things you should know about trading stamps.

## Cost

Stamps are purchased directly from the stamp company. Prices and terms vary.

One large stamp company claims that the cost works out to an effective average cost to you of 2 percent of sales. This figure represents only the "out-of-pocket" cost to the merchant.

A further amount must be added to cover accounting, promotional and other incremental costs associated with operation of a stamp plan.

Studies indicate that the total cost of trading stamps to most retailers lies somewhere within the range of 2 to 3 percent of annual sales. If stamps increase sales by 12 percent, you can consider it a break-even condition.

## Who Saves Stamps

About 75 percent of America's 53 million households save and redeem stamps. Housewives, who generally determine the buying pattern for most goods, tend to concentrate on one, or at the most two kinds of stamps in order to build up their hoard of books quickly for redemption. This would seem to indicate that it would be wise, if you decide to give stamps, to offer a plan that other non-competitive merchants in your area have.

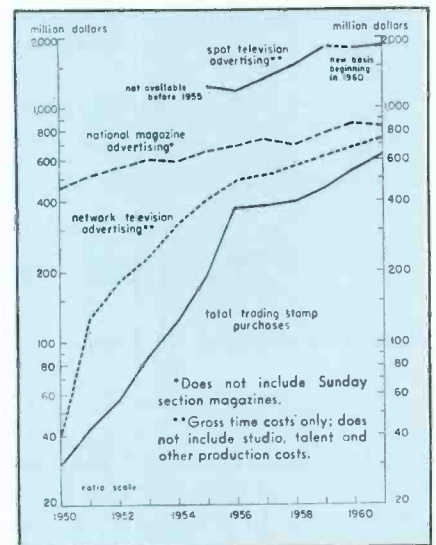
Where does it go from here? One large company, accounting for 35 to 40 percent of total stamp sales, hopes to double its business in the next decade.

This firm expects that consumer interest in stamps will remain strong; that more stores will adopt trading stamps to differentiate themselves from their competitors; and that stamps will make greater penetration into the department variety and discount stores.

Also, trading stamps are expect-

ed to be used increasingly as sales incentives and rewards for superior work performance in the industrial and wholesale sectors, as well as in retailing.

We have seen examples of the latter in our own industry.



Graph shows sales promotions during the past decade. Courtesy of Business Conditions magazine.

## Check Artists Continued

them, disposing of it later through a fence. Whether a radio, TV or Hi Fi, whatever they received for the items was clear profit.

This couple managed to travel around the country and bilk dealers for more than three years. They worked on a moderate scale, but they were professional bad-check artists in every sense of the word.

Most businesses, unfortunately, place too much confidence in cards and licenses as solid identification. They are asking for a loss when they do. Larceny-minded persons can obtain a blank license, fill it out and give it an official appearance with an improvised stamp.

Another convicted forger depended largely on the impressive identifications he carried to pass bad checks.

"Many business places," he says, "are quite fussy. They demand to see everything in your wallet with a name on it. But I carried a repertory that left nothing to chance. I began by showing a driver's license, then several fraternal cards, a credit card, Social Security card, and anything else I had at the time. This identification-array helped me purchase enough electronic equipment to open my own store — all paid for with bad checks. I made the gross error of selling a TV set purchased with a bad check to the wrong guy one time, and my present abode is a result of carelessness."

Several of these convicted forg-

ers posed as professional men — doctors, lawyers, etc. — while cashing their bad checks. One professional, who preyed on every type of business imaginable, assumed the role of a man-of-the-cloth. He carried ample identification, although he seldom had need for it, and worked his racket in this manner:

When entering a place of business, it was always with a bible tucked under his arm, and he made certain that the salesman would see it. This, he felt, set the stage. He immediately introduced himself as Reverend Wadsworth P. Willow (a name he always used), then proceeded to purchase a small table model radio (for a shut-in member of his congregation who couldn't afford one). If the establishment appeared capable of handling a sizeable check, he would offer what seemed to be a legitimate paycheck. If the business didn't look too prosperous, he would write a personal check — complete with church address — for several times the amount of the purchase.

When arrested, this man had a bank account worth some \$30,000.

Many businessmen feel obligated to cash checks for their customers. This is a fine courtesy, but it should not be done in a haphazard manner. If you cash checks at all, there is no sure guarantee against being stuck. But by remaining constantly alert and by taking proper precautions, you can manipulate the odds in your favor.

The most basic precaution is never to hesitate to ask questions about a check or the person who is

cashing it. And don't let yourself be hurried or distracted. Misdirection is a standard tactic of all check-artists.

Keep a convenient list of stolen checks. These can be obtained from city or state police agencies who keep lists of all known illegal checks.

Never cash a check that appears altered. Many forgers specialize in raising the amount on legitimate checks. A professional can do this so skillfully that it's virtually beyond detection, but the average effort is less sophisticated and can be detected by careful inspection.

Always insist that a check be endorsed in your presence. If it has already been endorsed, demand that the customer sign it again. Then compare signatures.

Be careful of any unknown customer who tries to pass a check for more than the purchase amount.

Ask the payee to place his thumb-print on the back of the check. This will usually stop a forger. The thumb print is ample evidence to convict him if caught. A standard ink pad, with water-base ink can be kept conveniently on hand.

Most checks that come your way will be legitimate, but it only takes one to put a costly dent in your profits. Remember, there are plenty of carelessly run business places where a forger can ply his trade at much profit and little risk. See to it that you are not among them. Treat each check as though it were the first one you had ever seen . . . and you won't have to worry about being stuck with worthless paper. ■

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## TRADING STAMPS Continued

### When Everybody Gives Stamps

The big question, of course, is what happens when everybody offers stamps? In the past, brisk sales gains were generally achieved by the first merchant to offer stamps in a previously non-stamp community. This first burst invariably waned as others adopted stamps or

other promotional techniques as defensive moves.

As stamps gain general acceptance in one type of store, they lose much of their chief selling point, namely, their ability to provide one retailer in an otherwise homogeneous group with a competitive advantage over his rivals.

If two stores are equal in other

respects, the one that gives stamps will draw more customers; if both give stamps, customers will favor the store that has the better stamp plan. If the stamp plans are approximately equal, the competing merchants are back where they were before they offered stamps — then they have to become better merchants. ■

Tips to help you pass the second-class  
radiotelephone license exam

# How To Get An FCC License the Easy Way

by J. D. Amorose

■ More than 350,000 licensed Citizens band sets are in use today. And the FCC has been getting thousands of new applications for CB licenses every month. That's a lot of CB sets to be serviced. Who will do the job?

Established TV-radio service technicians will have to take care of these sets. Most technicians have the necessary background knowledge and the test equipment. But — to service CB transmitters — technicians need a bit more know-how than the shingle hanging outside indicates.

You must get a Federal Communications Commission license. A 1st or 2nd class commercial radio telephone license is required. The most skilled service technician is not permitted to make adjustments or repairs on CB transmitting equipment without proper FCC certification.

## Breaking the Ice

What special knowledge is needed to qualify for a 2nd class telephone license? How many questions are in the test? Are the questions difficult to answer? How many hours does it take to complete the 2nd class examination? What preparatory studies are necessary before taking the examination?

Passing a 2nd class license test is, admittedly, not a simple matter. But it is not difficult. You should not be frightened by it. The estab-

lished service technician who intends to take the test is fortunate. He already possesses the required "background knowledge." More fortunate is the TV-radio technician who happens to hold an advanced class "ham" — radio amateur license. Since part of the commercial examination deals with 2-way communications, the amateur license-holder has a decided advantage because he is already familiar with transmitter fundamentals. For those technicians not too familiar with transmitter operation and principles, a little brushing up on transmitters (both AM and FM) is recommended. Knowledge of the simple familiar AM and FM transmitter and receiver circuitry will prove helpful.

No questions on single side-band or TV operation are presently being asked on 2nd class examinations. These appear in the 1st class examination.

## The Test

There are about 170 questions to answer in the 2nd class phone test. Most questions have multiple-choice answers. About ten questions deal with diagrams.

The FCC now uses a data processing type form for answers. All answers must be marked on one (or two) sheets. Spaces allotted for answers are very small. This introduces an added chance for error if you are not careful to place selected answers in the proper "boxes."

Study this special "answer sheet" before working problems — so there will be no doubt about placement of the answers you have selected. The system saves time and work for the FCC. It eliminates the need to look through each individual examination paper for answers selected by examinees. It is a boon to the FCC — but a hazard to careless examinees.

It takes the better part of a day to complete the 2nd class test, as a rule. Some can do it in a half day — but don't rush. Take all the time you need. And be sure to review all your answers before turning in the papers!

Two of the five possible answers to some questions are so close to being correct that a wrong answer may be easily selected, if you rush. A review will often catch a number of these "tricky" answers. Failure to review answers may result in missing that vital question necessary for a passing grade.

## Study Aids

A substantial number of books have been compiled which contain possible questions and answers which may appear in an FCC examination. These are available at book stores and large TV-radio supply houses.

One preliminary booklet is free for the asking by writing to the FCC, Commercial Radio Telephone License Examinations, Washington

*Continued on page 82*

They display the same symptoms  
as other circuit problems

# Automatic Noise Circuit Defects

■ When a noise immunization circuit breaks down, electrical disturbances can ride along with sync pulses and trigger deflection oscillators at the wrong time. The result — vertical rolling, jitter or picture tearing—is often diagnosed incorrectly as oscillator, sync, agc, video or IF difficulties.

Unfortunately, noise pulses from ignition systems, static discharges and line transients don't reveal themselves through picture interference patterns because their impulse durations are too short. And since these pulses are AM signal types, they can't cause sound buzzes or crackles to guide TV troubleshooters. Without any particular symptoms to distinguish between noise circuit or other circuit defects, the only troubleshooting path open is to consider noise circuits as possible culprits, among other suspect circuits, when faced with erratic sync.

In view of the relative simplicity of automatic noise circuits, it may

save considerable time to investigate noise circuits first before digging into other circuit areas. Sometimes a simple control adjustment will solve an exasperating sync problem quickly. In any event, TV technicians should understand how automatic noise circuits operate and how to determine if they are causing unstable sync.

## Low-amplitude Noise Elimination

The clipping action of sync tubes has a three-fold purpose: (1) separate sync pulses from composite video signal; (2) equalize sync amplitude fed to sweep oscillators; (3) remove noise pulses lower in amplitude than sync pulses.

The third function — removing low-amplitude noise pulses — prevents normal noise from entering oscillator circuits. As shown in Fig. 1, noise pulses below sync clipping levels can't affect oscillators because only sync pulse tips are removed. When noise pulses are above the tube's cut-off level, however, they

will appear in the output as false sync pulses and, depending on their strength, cause some degree of erratic sync.

One of the most popular noise-reducing circuits used by manufacturers is designed around a pentagrid tube, generally a 6CS6 tube or its 3CS6 600 ma version. A typical circuit design is illustrated in Fig. 2. From grid 3 to plate it operates as an ordinary sync separator and clipper.

A composite video signal from the video amplifier's plate applied to grid 3 establishes a bias voltage across grid-leak resistor R3, which cuts off the tube at the blanking level. Therefore, only the sync tips make the tube conduct and, accordingly, amplified sync pulses appear at the 6CS6's plate. The separated sync pulses are relatively constant in amplitude because of clipping action in the plate circuit, which is maintained at low voltage (usually about 50 v).

The result is clean sync pulses

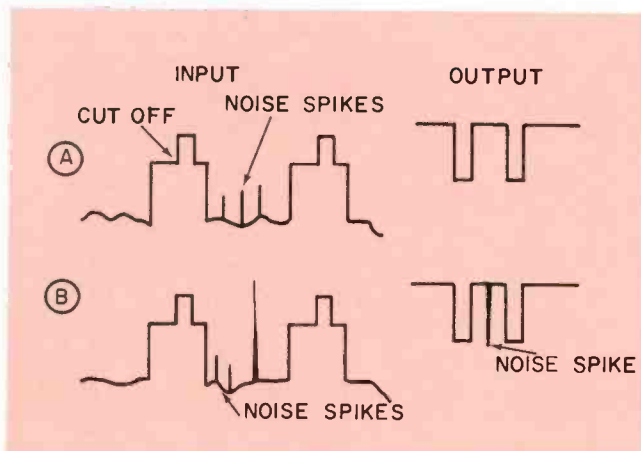


Fig. 1 (A) — Since only sync tips are amplified, normal noise is not reproduced in the output circuit. (B) — If a noise spike reaches black level, however, it will appear in the output and interfere with deflection oscillators.

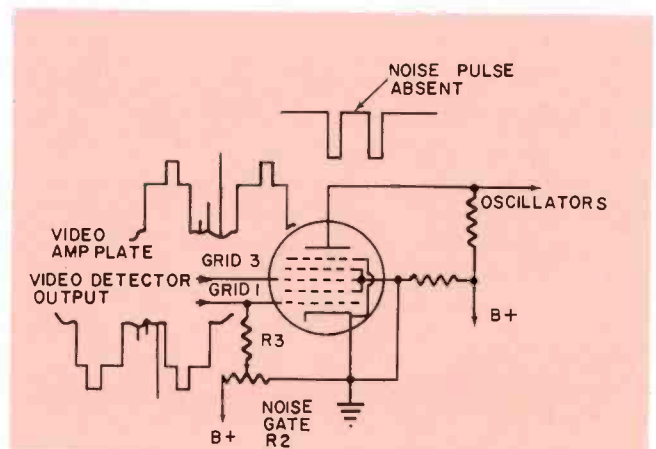
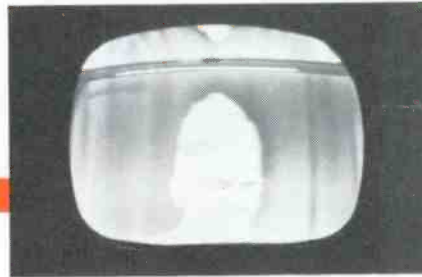


Fig. 2 — Normal noise pulses are removed by clipping action from grid 3 to plate. High amplitude noise spikes at grid 1 will cut off the tube momentarily — preventing the pip from being reproduced in the circuit.

# Can Fool You!

by Art Salsberg



Vertical blanking bar can be used as a quick check to learn if sync pulses are being fed to the CRT.

when the video signal is strong and noise is low. But in a fringe area where signals tend to be weaker and noise comparatively stronger, or even in strong reception areas where noise is abnormally high, noise pulses *will* appear in the plate circuit. Automatic noise circuits are designed to reduce or eliminate these high amplitude pulses.

## ANC Operation

Many names are applied to automatic noise circuits, according to each manufacturer's predilection. Sylvania, for example, calls it a "noise gate," Zenith, a "fringe lock," General Electric, a "noise canceller," Westinghouse, a "sync control," RCA, a "noise limiter," etc. Whatever the name and regardless of minor circuit differences, they all do the same basic job: pre-

vent high amplitude, short duration noise pulses from triggering deflection circuits.

The 6CS6 circuit illustrated in Fig. 2 functions as a high noise pulse eliminator as well as a normal sync separator-clipper-amplifier. Actually, it's a dual control heptode with five grids. Grid 1 is utilized as the noise elimination control grid. Being closest to the cathode, it exhibits greatest control over tube conduction and can cut off current flow with only a small negative voltage.

Whereas the signal applied to grid 3 is obtained from the video amplifier's plate, the signal at grid 1 is taken from the video detector's output. Consequently, grid 1 receives the same signal as grid 3, except that grid 1's incoming signal has reversed polarity and is much

lower in amplitude. The tube's bias is adjusted by R2 so that cut-off will be close to the sync pulse tip. R2's arm is adjusted to provide a small positive voltage that almost balances the negative voltage developed across grid 1's grid-leak resistor, R3. As a result, plate current flows normally, though slightly reduced by the negative sync pulse tips.

Should a high amplitude noise pulse contaminate the video signal, its spike at grid 1 will cut off the tube and thereby prevent noise from appearing in the output. Momentum generated by the normal chain of sync pulses generally maintains sync stability when the tube is cut off.

Another effective noise-limiting circuit popularly employed uses a 6BU8 tube. One-half of this twin

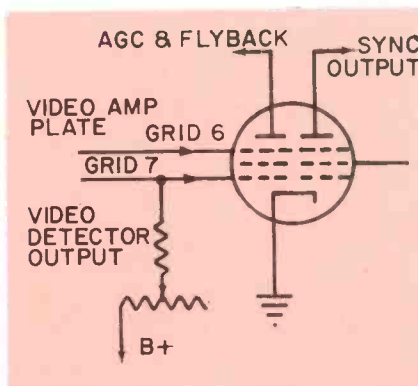


Fig. 3 — One-half of a 6BU8 tube is popularly used as a sync-noise tube. The other half is part of the keyed agc circuit.

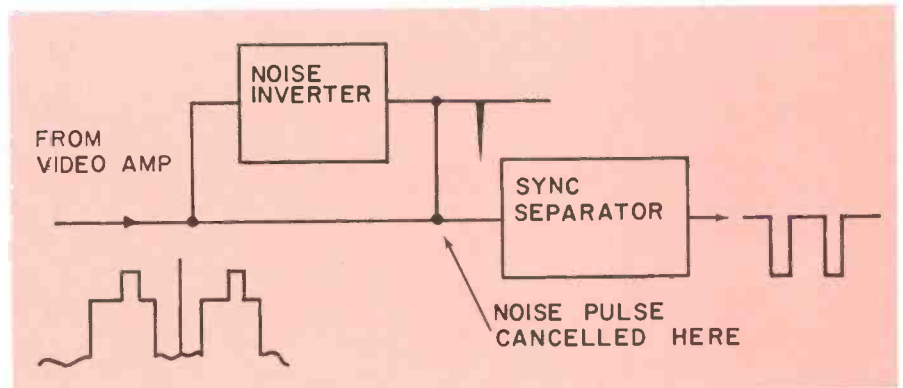


Fig. 4 — A noise inverter tube is held at cut-off until a high-level noise spike occurs. Spike is then reversed in polarity and fed back to the input where it cancels the incoming noise.

# Noise Circuit Defects Can Fool You

Continued

pentode operates as an agc keying tube, while the other half functions as a sync tube. In Fig. 3 a positive video signal is impressed on grid 6 from the video amp's plate. With the tube's bias maintained to allow sync tips to cause current flow, normal sync pulses are amplified. The agc circuit is an integral part of the noise circuit and should be investigated, too, if noise difficulties are suspected.

Using the same noise-eliminating principle as that of the 6CS6 circuit, a small, negative video signal from the detector is applied to control grid 7. The "fringe lock" control of Fig. 3 is adjusted so that any noise pulse exceeding a sync tip will cut-off the tube. Thus, bursts of noise will not appear in the plate circuit.

Another type of noise-limiting circuit often incorporated into TV sets is the noise-cancelling circuit. As the name implies, it operates on the principle of a negative noise pulse cancelling a positive pulse rather than cutting off tube conduction as in foregoing described circuits. Generally, a dual-triode tube is employed, such as a 12AU7, with one-half as the sync separator and the other as a noise inverter. Sometimes a triple-triode is employed with the third triode function used for gated AGC (for example, the 6K11 tube used in Admiral's 19B8B chassis).

In this noise-eliminator system, an identical video signal is applied to each triode's grid, as shown in Fig. 4. The noise inverter is biased beyond cut-off so that only noise pulses higher than the sync tips will cause it to conduct. When a noise pulse exceeding the sync tip ampli-

tude occurs, it's amplified by the noise inverter, reversed 180 degrees at the output, and fed back to the sync tube's grid. Since the two pulses being fed into the sync tube's grid are out-of-phase, they cancel each other. In the event a noise pulse and sync pulse coincide, the sync pulse may be cancelled too. However, the flywheel effect of the sweep oscillators normally maintain proper picture sync.

## Service Techniques

Noise entering the oscillator circuits will generally trigger the vertical oscillator well before it affects the horizontal oscillator because the latter's AFC circuit provides corrective voltage. Since the vertical oscillator depends upon amplitude directly, improper noise circuit operation is usually displayed as a vertical oscillator fault symptom.

It's fairly simple to check out a noise circuit when sync instability occurs. First substitute known good tubes. If this doesn't correct the defect, adjust the control for maximum picture stability: (1) Rotate the noise control through its entire range to determine how it operates. At one end of the control, the sync tube will operate as an ordinary clipper. At the other end, over-control can eliminate sync pulses itself, causing extreme instability. (2) After finding the optimum control setting, observe the picture for awhile and if it becomes "jittery," simply advance the control slightly until it becomes stable. (3) In some circuits, the AGC adjustment is interrelated with the noise circuit and it's necessary to adjust the AGC control, too.

If new tubes and adjustments

don't correct instability, a quick oscilloscope check of the tube's two input signal grids and plate will quickly indicate if a defect exists in this circuit area.

A scope probe placed at grid 3 of the 6CS6 should produce a positive composite video signal about 20 to 40 v P-P. The same signal, with negative polarity and much smaller amplitude (0.1 to 3 v P-P), should be displayed at grid 1. Applying the probe to the tube's plate should indicate negative-going sync pulses about 40 to 70 v P-P. Schematic literature will indicate the normal values more accurately, of course.

Should the coupling capacitor between the video detector and grid 1 (the noise grate control grid) open, the negative composite video signal will be absent and, consequently, the tube will not be cut off when a noise pulse is present at grid 3. Noise, therefore, will appear in the tube's output and trigger deflection oscillators. On the other hand, if bias components should change value and cause increased positive voltage, the tube will pass noise also. The noise control can often compensate for such value changes.

Horizontal oscillators, too, are sometimes affected by improper signals. For example, if the signal on grid 3 is too small, some video may be passed along with sync. The video information can cause faulty AFC correction voltages and result in picture pulling. Black objects on the screen, in particular, will be subject to pulling effects.

Many customer complaints concern intermittent jumping or rolling symptoms. These intermittent problems may be caused by noise-producing equipment operating at certain hours. Certainly, TV technicians can't sit it out and wait for the condition to appear. You can create your own noise pulses with an electric shaver, electrical drill or other interference producing object.

When noise circuit defects are discovered in the shop, service technicians returning sets to the customers should be alerted to re-adjust noise controls in the home where different conditions may exist. ■



# Preventive Maintenance in Customer Relations

More business is lost  
because of poor  
customer relations  
than any other reason

■ Good customer relations cost little or nothing, but pay consistently.

This is a universal bit of wisdom that speaks of the soundest of business policies. And it's a bit of wisdom that involves *everyone* connected with the television/audio service business. You and other employees of your firm cannot operate like hermits, because you prosper and grow as a result of relationships with your customers.

Any discussion of customer relations could fill volumes. But let's talk about two particular aspects in detail: home service calls and presenting the bill.

First, any serviceman going into the home must be neat. Remember, the first impression in any human relationship is extremely important. If you come in with hair wildly misarranged, dirty face and hands, or soiled or dirty clothes, chances are nine out of ten times your customer will adopt a negative attitude toward you immediately. This will be reflected when you must justify your service charge.

A grimy, dirty caddy put down on the householder's carpet will not win laurels for you either. A clean drop-cloth is essential.

Check your shoes when you enter the house. Mud, dirt or snow tracked into the customer's home is a frequent customer complaint. We've heard of a technician carrying along a pair of house slippers. When entering the home during inclement

weather, he slips off his street shoes and into the slippers. Call it an idiosyncrasy, gimmick or what have you, but the housewife will respect your courtesy and you'll reap considerable word-of-mouth goodwill from it.

One of the most irritating examples of poor customer relations is the technician in the home who mumbles "Oh, oh", "That's bad" or who continually shakes his head to indicate "There's real trouble in there" as he probes around the chassis. Save your breath for a clear, and detailed description of the set's trouble, indicating why, for example, that capacitor or tube must be replaced and the trouble it is causing.

When you're through troubleshooting, take a few seconds additional time to give the customer as much detail as he or she wants. Any service call, whether it be for an engine tune-up or for replacing a bad tube is basically an intangible to the layman. And because it's an intangible, the customer wants and expects more from you than "Well, it's fixed." Tell the customer what you fixed, why it needed repairing, and the charge.

This same tip is applicable in presenting a bill for service charges. Simply write out "House call, replacing tube and re-adjusting set — \$8.50" will lead you to trouble. Spell out the charge for the house call, spell out the charge for the

tube, and itemize those little "extras" you give, like re-adjusting the vertical linearity, cleaning the chassis for face plate, *even if you don't charge for it*. Many "service charge complaints" arise because the customer didn't fully understand what he was getting for his money.

When you present the bill, go over it with the customer. The best way to head off complaints, is to snip them in the budding stage. Don't drop the bill and run as if you were ashamed of your charges. Being prepared to justify your charges is another way of leaving the customer with a positive image of yourself and your firm.

Certainly in any discussion on customer relations, it should be pointed out that you'll seldom win an argument with a customer. "The customer is always right" is an old axiom with a great deal of truth in it. Most of the time you can avoid an argument and frequently it's best to let the customer win the argument and keep his business, than to persist in telling him he is wrong and lose future business.

Let's remember that the success of even the best technician, the best mechanic or the best physician is limited if his customer relations are neglected. Most successful business people attribute 75 percent of their success to good customer relations. Little else needs to be said in favor of this ultra-important aspect of the TV/audio service business. ■

# Reap the Benefits of **PLANNED** **ADVERTISING**



Mel Cohen, a firm believer in the power of the printed word.

■ If you advertise only when business is slack, or only when the spirit moves you, chances are excellent that you're wasting your money.

These words have been echoed time and time again by experienced sales, and advertising authorities, yet advertising planning in many service-dealer shops fits the above description.

Advertising should be viewed as an investment — immediate and long-term — not purely as an out-of-the-pocket cost. An example of what can be done with advertising is typified by Mel's TV and Stereo Center in Duluth, Minn. Owner Mel Cohen started 17 years ago repairing radio in the rear of his father's jewelry store (total investment: \$400) and because of sound judgment displayed toward advertising and other sales tools, has parlayed his business into one grossing nearly a quarter of a million dollars last year.

Mel is quick to summarize his advice on how to use newspaper advertising:

1. To be effective, advertising must

be consistent. Stay with advertising, even in your slack season by cutting down the size of your ad . . . but stay with it.

2. Try to maintain the same style ad, using the same type faces, the same style sig (signature or name).
3. Don't try to cram too much information in your ad. Tell your story briefly and clearly.
4. Request position for your ad. The front or back page of a section is excellent. If you're placed on the inside pages, try to get above the middle of the page and in the upper righthand corner, if possible.
5. Use brand names to advantage and inquire of your suppliers about cooperative advertising programs.
6. Do long range planning and develop a program of consistent advertising to meet your needs.
7. Be original.

## Equipment Ads

"If you want to develop an ad specifically to sell equipment, use

leader prices. Don't *ever* use the highest price color set, but rather, talk about the low end of your price line and subordinate the most costly items," Mel emphasizes. "If you offer credit or "easy terms," that too has an important place in your equipment ads."

The most *uneffective* equipment ads Mel has run, have been without prices. With today's competition from discount stores, catalogs, drugstores, etc., it's no wonder that price is a must in any equipment ad.

## Service Ads

Mel is a firm believer in personalizing service ads. "My most effective service ad featured my eight employees and their job titles. After running the ad, customers called and began to ask for our 'color TV expert,' as an example, because they had seen our man and his title."

Good consistent advertising has been compared to the eroding effects of wind and rain. Both leave a permanent effect, and both require time and patience. ■



# MEL'S TV Pioneered Television

Back in 1951 in the Infancy Days of Fringe Area TV

NOW AGAIN . . .

Mel's TV Pioneers

# COLOR TV

Duluth's Only TV Dealer to Win the —

## RCA VICTOR COLOR ACHIEVEMENT AWARD

In the past year we have sold more color TV consoles than black and white and are still doing it. As Duluth's leading color dealer we have the personnel and know-how it takes to guarantee our customers EXCELLENT COLOR RECEPTION.



A typical ad placed by Mel's TV and Stereo Center.

### MEET THE FOLKS AT MEL'S TV THAT SERVE YOU—



MEL COWEN  
President  
Established  
Business in 1946.



DICK MOE  
Sales manager with  
firm since 1957.



JIM MOE  
Sales and Installa-  
tion Specialist with  
firm since 1956.



BILL TRUDEAU  
Color TV expert,  
8 years' color  
experience with  
RCA factory  
service.



KEN KVENILD  
Electronic  
Technician, over 20  
years' experience.



DENNIS FORD  
Technician and  
Specialist in  
Photograph and  
Stereo equipment.



KEN TOMLINSON  
TV Technician



ART AHUNDSON  
Service Man  
Radio and  
photograph  
repro's.



CONNIE MALONI  
Bookkeeper and  
Manager of  
Record Dept.

Presenting the All New

## RCA VICTOR MARK 8 COLOR TV LINE



Choose from 42 new models, including 4 new table models, 36 new consoles, 12 new color TV-Stereo 5-F' AP Radio combi' tons.

# Realistic Pricing and Breakeven Point Charts

■ Every TV-radio service-dealer and technician needs a continuous monitor on the financial pulse of his operation. Is the business making a profit? If so, how much? Are costs and charges for parts and services out of line? And, most important, at what volume-level does profit begin?

These questions can be answered if you keep good records of your operations and translate these records into a monthly chart — a breakeven chart. This is a graphic representation of the breakeven point under a given set of condi-

tions — the point on a chart where you neither make nor lose money.

Knowing where your operation's breakeven point is won't solve any particular problems. But it will operate like an automated fire alarm — a warning device — to ring a bell or trip off a siren if your operation is not doing well. It is much more than that.

The breakeven chart is a tool for management control. It can help you bring expenses in line with income. And it will tell you if you need to get out and hustle-up more business. It will help you keep

tuned in on the pulse-beat of your business.

### How It Works

Assume that you are a one-man owner, employing two technicians. According to your records and past experience, for example, you know how much sales and service business you can handle with your present facilities. With your operation running full blast, but no one killing themselves with over-work, you can take in \$6500 a month — or whatever figure fits your particular business under similar conditions —

and past experience and records show that this figure represents about all the business you can handle with present facilities. It represents 100 percent full volume and your records indicate that you can make a reasonable profit on that basis.

Now suppose at the end of a recent three-month period your books reveal that you averaged \$6500 a month. You sold six TVs, a few radios and batteries, serviced a good many sets and installed a lot of TV and FM antennas. You grossed \$19,500 — about \$6000 more than the previous three-month period — but your bank account balance is only about \$60 more than it was three months before. In fact, you couldn't write a check for \$150 to pay for that new neon sign you ordered installed.

The aforementioned example is highly exaggerated — but it *can* and *has* happened.

You now call in your auditor and find that your fixed expenses (rent, utilities, transportation, wages, taxes, and your own salary, etc.) are the same as in past months. Your variable expenses, (parts, tubes, TV and radio sets), of course, showed a substantial increase. Variable expenses mean exactly that — they change with the amount of sales and services. Your fixed and variable expenses for the three month period came to \$19,440. What happened in this case? You don't know yet but

you will be finding out soon.

If you had been keeping a monthly breakeven chart, you would have recognized the problem two months or more before. Now you decide to make up a Chart like the one shown here (Chart I). You take the information from your books — possibly with your accountant's help.

After the chart is ruled off and marked up with figures to fit your particular situation, draw a linear line from the left-bottom corner to the top-right corner — ending at a point marked sales-and-service. Assume your average fixed expenses amount to \$2100 a month. Plot a horizontal line across the chart at \$2.1-thousand.

Now since your variable expenses change, check back on your books and find a month where you took in \$4500 (or your comparable figure) — and where business was more normal. You estimate at this point that you are operating at about 80 percent of your potential. Your books show that you spent \$2000 for sets, parts and tubes — a total of \$4100 — including fixed expenses which were about the same then as now.

Next, plot a linear line from \$2.1-thousand, your *fixed* expense point at zero volume, to \$4.1-thousand—total expense point — on the 80 percent-of-capacity vertical line. Where the *total expense* line crosses the sales-service line — at about 53-percent-of-volume point, or a to-

tal monthly intake of about \$3500 (in this example), is your breakeven point. Under present conditions you need to take in that amount to break even after paying out fixed and variable expenses. But now you have been going full-blast for three months, averaging \$6500 a month — with a profit of \$60! You previously made money on a monthly take of \$4500 — coasting along easy at 80 percent capacity.

### What Happened?

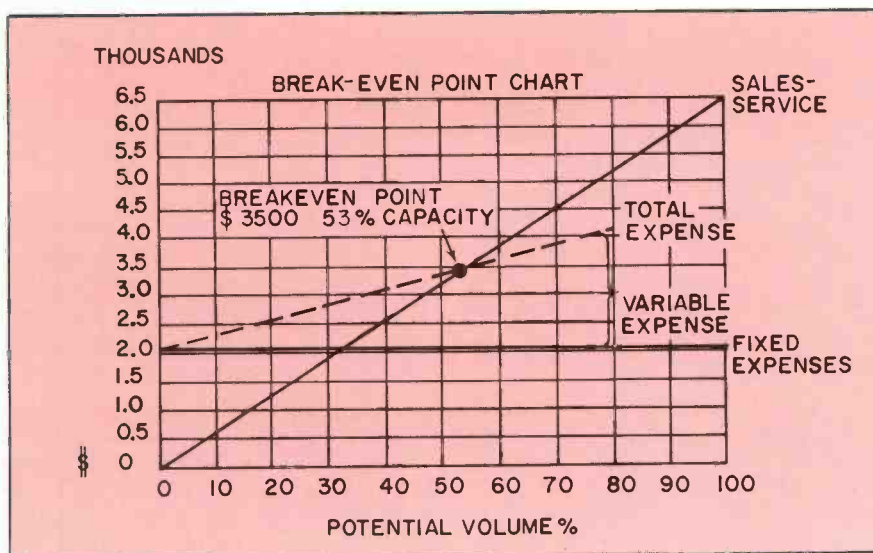
Many things could have happened to create this problem. Chances are they did not happen suddenly as shown in the foregoing example. A check-up may show that you overbought parts, tubes and antenna equipment and your money is lying around as inventory.

Go back and make a breakeven chart for each month — for six months or a year. Note the spread between the sales-and-service and total-expense lines — in the profit area. Find out just *when* it narrowed down. And then find out what changes took place that month.

Maybe you have been “giving away” your TV sets — under pressure of price-cutting competition in the neighborhood. Or a “give-away” sale on radios helped narrow profits. Chances are there will be a number of factors involved. Did you begin putting more expensive equipment in your antennas without increasing charges accordingly? Was there a general increase in parts, tubes and antenna equipment? Did your charges for service calls and shop labor gradually get out of line with costs of parts? Many other specific things, depending on your particular operation, could have happened — including non-productive or out-of-line costs of advertising.

If you don't now have a proper bookkeeping system, you won't be able to make up breakeven charts. Work with your accountant or bookkeeper to get your records straight.

Breakeven charts are fast and reliable warning signals to alert you to potential or actual dangers in your sales-service operation. Make one every month. ■



## SERIES 54-48JA 3" diameter vari/phase single-turn potentiometers

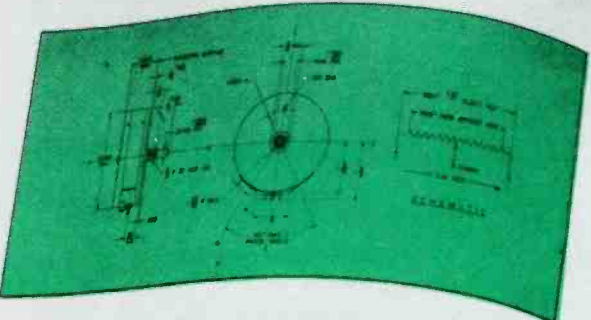


Specification	Unit	Value
Resistance Tolerance	%	± 3
Linearity	Linearity	± 0.3
Power Dissipation	Watts @ 60°C	6.1
Temp. Coeff. at 60°C	%/°C	0.0000
Dielectric Strength	Volts AC for amp housing	1,000
Electrical Isolation	Degrees	355 Min.
Electrical Rotation	Degrees	360 ± 0
Mechanical Rotation	Degrees	360
Permanence	Ohm In.	3.0
Perpendicularity	In. T.I.R. Max	0.03
Concentricity	In. Max.	0.03
Shaft End Play	In. Max.	± .0010
Ambient Temperature Range	°C	- 55 to + 125
Life	Cycles	1,000,000
Max. Speed of Rotation	RP/Min	60
Weight	Oz.	4.3

Permits external phasing of electrical rotation for mechanical rotation. Ultra-precision unit for precision use. Exclusive Clarostat design eliminates bulky, hard-to-adjust clamping rings. Anodized aluminum housings for minimum weight. Widely used in aircraft instrumentation.

Resistance Ohms	Resolution 100 Total Turns	SERIES 54-48JA Stock Values
250,000	0.2% ±	1,000
100,000	0.3% ±	10,000
50,000	0.40% ±	90,000
10,000	0.6% ±	100,000
1,000	0.8% ±	250,000

\*Depends on shaft diameter.  
\*Depends on shaft diameter.  
\*Depends on shaft diameter.  
\*Depends on shaft diameter.  
\*Depends on shaft diameter.



## SERIES 57M AND SERIES 57EJ 1/2" single-turn potentiometers

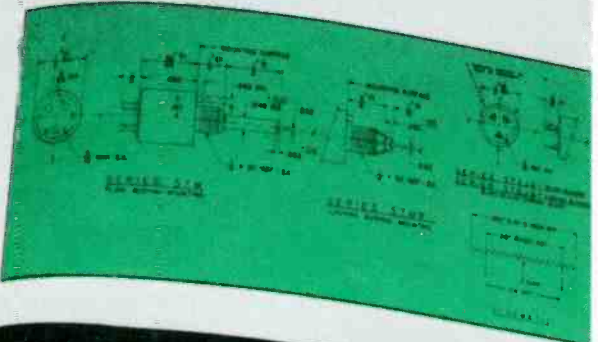


Resistance Tolerance	± 3%
Linearity	± 2%
Functional Output	Linear
Temp. Coeff. of Wire	± 0.0002 Ω/Ω/°C
Electrical Rotation	300° ± 5'
Mechanical Rotation	320° ± 5'
Power Rating	1.5 Watts @ 40°C 2 Watts @ 70°C
Dielectric Strength	1,000 Volts AC
Torque	6 Oz. In. Max.
Locking Bushing	20 Oz. In. Min. Torque with Locking Nut Tightened to 8 Lb. In.
Shaft Torque	3 Lb. In.
Shaft Size	Yes
Weight Approximate	25 Oz.
Housing	Corrosion Resistance, Per QQ-M-151
Shaft	Centerless Ground, Stainless Steel

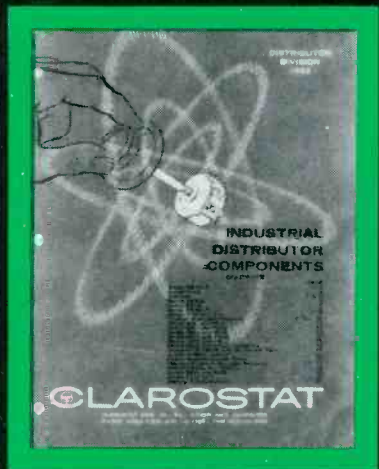
High performance potentiometer packages 1/2" diameter housing. Quality construction, three watts at 40°C and Series 57EJ rated at 2 watts at 70°C. The high-temperature Series 57EJ features glass-sealed terminals. Both units are corrosion resistant.

SERIES 57M & 57EJ Stock Values	SERIES 57EJA & 57EJLB Stock Values	Resistance Ohms	Resolution 100 Total Turns
50 Ω	50 Ω	50,000	0.16% ±
100 Ω	100 Ω	20,000	0.15% ±
200 Ω	200 Ω	10,000	0.30% ±
500 Ω	500 Ω	9,000	0.30% ±
1,000 Ω	1,000 Ω	1,000	0.33% ±
5,000 Ω	5,000 Ω	500	0.49% ±
10,000 Ω	10,000 Ω	200	0.58% ±
20,000 Ω	20,000 Ω	100	0.70% ±
50,000 Ω	50,000 Ω	50	0.81% ±

Source: MIL-D-117 Series 57M potentiometer to wire gauge 22; Series 57EJ, minimum to wire gauge 20.



# FREE... complete guide to Industrial Resistor Components



Precision potentiometers—single and multi-turn, instrument-grade carbon and wire wound pots, power resistors, precision carbon-deposited resistors, and resistance standard instruments—all wrapped up in one reference catalog.

Clarostat offers the most complete line of industrial resistor products on a convenient, off-the-shelf, immediate delivery program through your local Clarostat industrial distributor. Ask him for free copy of catalog, or write directly to...

DISTRIBUTOR SALES DIVISION

# CLAROSTAT

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



**Dick Nyholm, Radio & TV, 108 N. Lower Ave., Centralia, Washington**

"Television antennas represent an important part of my business. Since handling Winegard Colortrons, my business has increased greatly. Seems that one person tells another and your advertising also pays off."

**Edwin L. Fisher, Fisher Appliances, Inc., 107 N. E. Front Street, Milford, Delaware**

"During the thirty-one years I have been in the Radio and Appliance business few new items have been so immediately successful as your Colortron antenna."

"Our sales of color television testify that your new Colortron antenna has been the answer. In fact we will not sell a customer if they are not willing to install a proper type antenna to operate the new color set."

"Hoping this letter will encourage you to further efforts in developing more new products."

**Ken Kesler, Electromatic, Inc., 237 N. E. Broadway, Portland 12, Oregon**

"We have used the Winegard assortment of antennas for over three years and find that whatever situation we encounter, Winegard has the answer."

"We have been especially pleased with the WINEGARD COLORTRON which we have used extensively since Color TV has come into its own."



**Ray Summers, Ray Summers, Inc., Louisville, Illinois**

"We live in an area which has the poorest television reception in the State of Illinois. There are no stations closer than 100 miles. Our TV and antenna sales have more than doubled since using the Winegard Colortron as it has improved reception to the point where we can get good reception from several channels."

**George W. Terry, Terry's Electric, McLean, Texas**

"I am so pleased with the new Winegard Colortron antennas that I would like to tell you about the reception we have here in McLean, Texas."

"We have these antennas as far as 100 miles from our local stations in Amarillo, Texas and the customers are overjoyed with the reception."

"We have installed over 200 Winegard Powertrons and Colortrons on a money back guarantee. As yet we haven't had the return of even one antenna!"

**Twin City Radio & TV, Inc., 97 National Avenue, Chehalis, Washington**

"We are especially pleased with Winegard Colortrons and the Nuvistor amplifier is the best by far. Keep up the great engineering and your fine advertising-both help us sell more antennas and boosters."



# THEY SAY IT BETTER THAN

*Some of America's leading dealers tell why they think Winegard Colortrons are*



**Max Schwartz, Avon Television Co., 189 Bway, Amityville, New York**

"We here at Avon T.V. have used many different antennas for our color installations and have found that for best all around results in color as well as black and white reception the Winegard Colortron is superior in every respect."



**William D. Miles, Miles Electronic Co., Baxley, Georgia**

"We are over one hundred miles from the nearest commercial station. We have tried most of the so-called color antennas. Thanks to Winegard's high signal-to-noise ratio and high directivity Winegard is the only acceptable antenna-booster combination which was found to meet our 'customer's satisfaction' requirements. Beautiful color is being received now with the Colortron."



**Roy Sahlin, Central Television & Appliance, 911 Chehalis Ave., Chehalis, Washington**

"Finest piece of equipment we have worked with in electronic field. The Winegard Colortron and all Winegard products have no competition."



**Walter Finkbeiner, 107 New Jersey Ave., Absecon, New Jersey**

"I have found the Winegard Colortron and Electronic Power Pack to be the most powerful antenna in our fringe area. Colortron antennas make a perfect combination with our Admiral Color television installations."

"I install Colortrons on trial and have not lost a sale to date."



**Charles Dumaine, Dumaine Antenna Service, 735 Woodtick Road, Waterbury, Conn.**

"Among the top three antennas I have found it to be the best for any reception. The AP220N Nuvistor Amplifier is tremendous in controlling both high and low channels; eliminating all types of interference. Being an exclusive Winegard dealer, I make between 30 to 40 installations per week of the Winegard Colortron and Amplifier. The people for whom the installations were made are all well satisfied with the performance; bringing more business my way than I can handle."



**Leonard P. Henthall, Nielsen & Neilson, Inc., 1462 Glendale Blvd., Los Angeles 26, California**

"I am extremely happy to inform you that we have been a constant user of the Winegard line of antennas and related products for six or seven years."

"We are now moving into the Colortron series which we find to be another added improvement in new type hardware and improved over-all performance."

"As you know, our clients in this area consist of many television and movie stars as well as prominent city officials. We are, therefore, of necessity, quite concerned about the equipment we use and its performance. We are looking forward to future success with this newer series of antennas and amplifiers."



**J. C. McNiven, The Gester-McNiven Co., 305 N. Tower, Centralia, Washington**

"We feature Winegard Colortrons because they have helped us immeasurably to sell more color sets. They really bring in a magnificent color picture and black and white is also the best. Finest antenna on the market, and we've tried them all."



**G. Borders, Borders Radio & TV Service, Flora, Illinois**

"In my opinion, the Winegard Electronic Antenna is perhaps the finest piece of equipment I have worked with in the last thirty years."



**J. A. Etchison, Etchison Brothers Appliances, Flora, Illinois**

"The new Winegard Colortron with the twin nuvistor amplifier permits us to give our customers the best television reception ever!"

**Berkeley M. Phelps, TV & Radio Repair, Washington Depot, Conn.**

"The high gain of Winegard antennas and boosters give the customer excellent pictures on channels that were not usable before. Winegard equipment does not require sales pressure—seeing is believing!"



# WE DO!

*the world's finest TV antennas...*



**Jack Ross, Smith's Home Furnishings, Portland 2, Oregon**

"This is hilly country, with lots of tall trees. We install and service thousands of sets a year. We've found many real problem areas—where only a Winegard Colortron antenna with Nuvistor amplifier will pull in the kind of picture a set owner has the right to expect. We recommend Colortron to our customers—especially to the many people now buying Color TV."

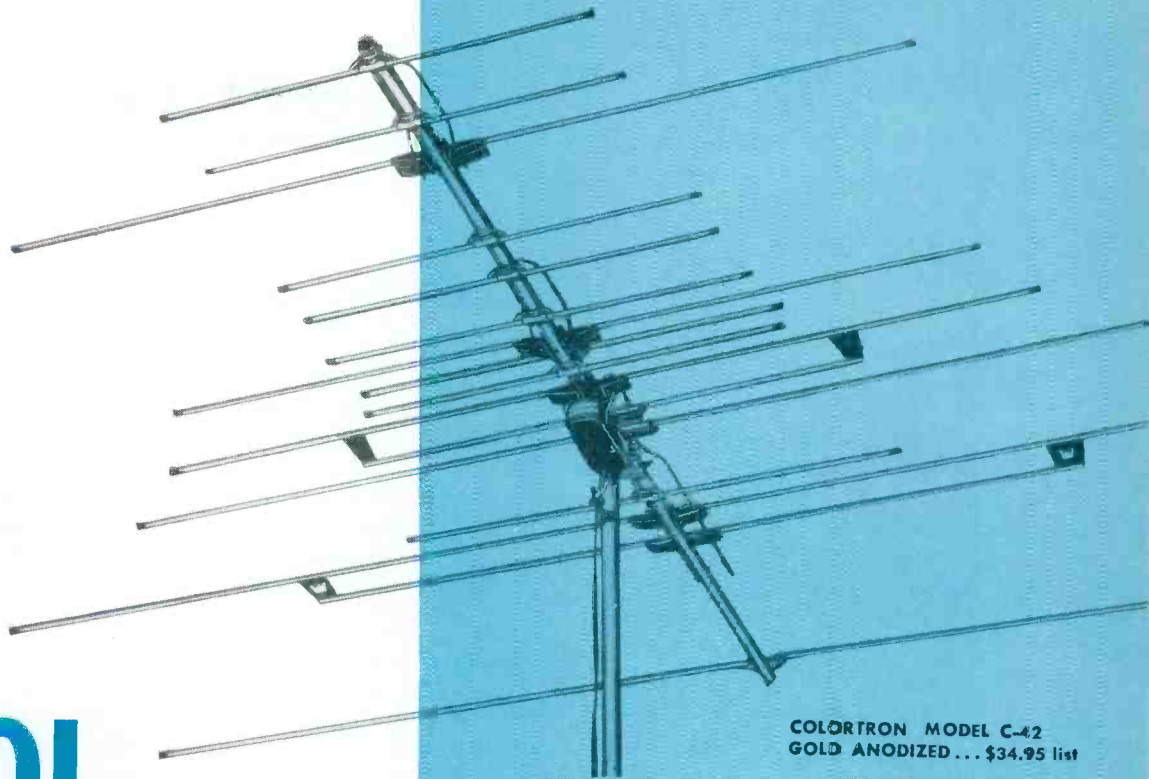
**David B. Newman, Radio Service Co., 262 Ninth St., Astoria, Oregon**

"With the new Colortron TV antenna and Stereotron FM antenna and matching Nuvistor boosters we have obtained excellent reception of the Portland, Oregon TV and FM stations. We are 100 miles from Portland with the coast range of hills between us. We also obtain good results from Seattle, 150 miles away. These are the finest antennas on the market today!"



*If you haven't tried Winegard Colortron antennas or Colortron Nuvistor amplifiers, we hope you will try a few soon.*

*We feel confident there is nothing on the market that can match them for performance and quality. Write for technical bulletins or ask your Winegard distributor.*

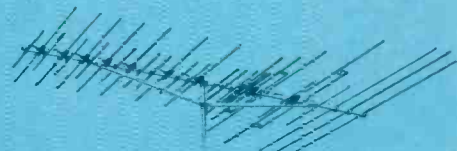


**COLORTRON MODEL C-42  
GOLD ANODIZED ... \$34.95 list**

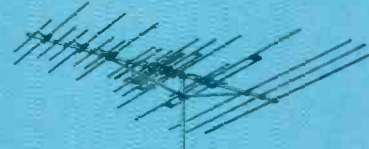


Takes up to  
400,000 Micro-  
volts input—  
Model AP-200N  
\$39.95 list

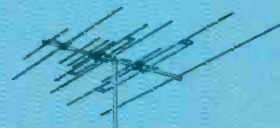
**COLORTRON  
Twin Nuvistor  
AMPLIFIER**



**MODEL C-44 \$64.95 list**



**MODEL C-43 \$51.90 list**



**MODEL C-41 \$24.95 list**



**Winegard**  
ANTENNA SYSTEMS

3019-S KIRKWOOD • BURLINGTON, IOWA  
... for more details circle 43 on post card



## Difficult Service Jobs Described by Readers

### Vertical Coupling Kills HV

A few weeks ago a customer brought in a General Electric Series M-5 portable. The set had no picture, but the sound was normal. A check revealed that there was no high voltage at the CRT anode. All horizontal sweep tubes were replaced by tubes known to be good; still no high-voltage. We pulled the chassis to measure voltages. Boost voltage was down from 560 v to 150 v. We checked the damper circuit and the horizontal circuit — nothing was found amiss. A short somewhere in the boost line was the next suspected cause of the malfunction. We removed the boost line from the flyback and immediately several thousand volts were produced at the CRT anode. Since this line of attack gave us some results, we removed each branch of the boost line until the lead going to the vertical section was isolated as drawing too much current. Vertical output transformer and yoke were in perfect shape, but it was found that when the vertical output tube was removed from its socket,

the high-voltage section began to function normally and a thin line could be seen across the picture tube.

We measured the voltages on the vertical output tube. Grid voltage was found to be positive due to a

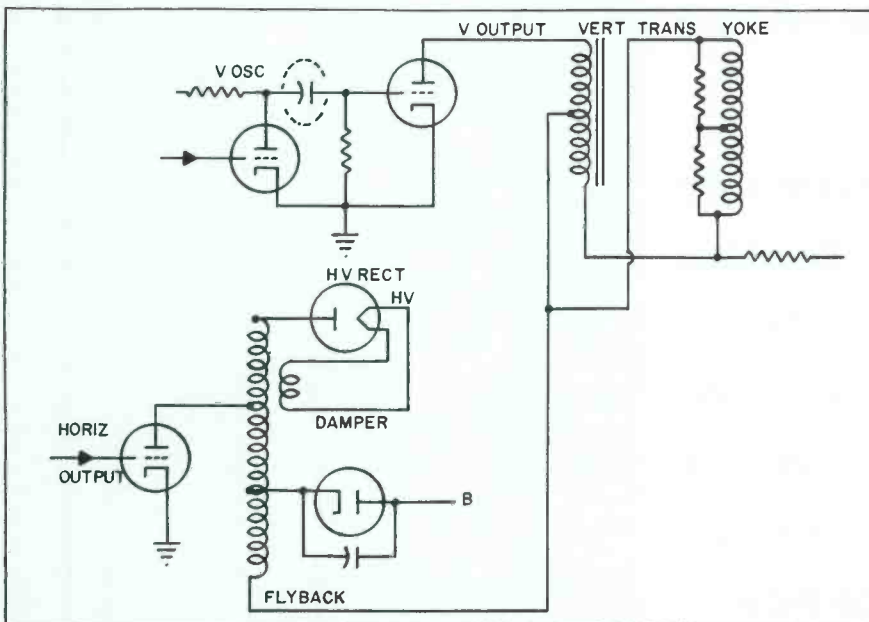
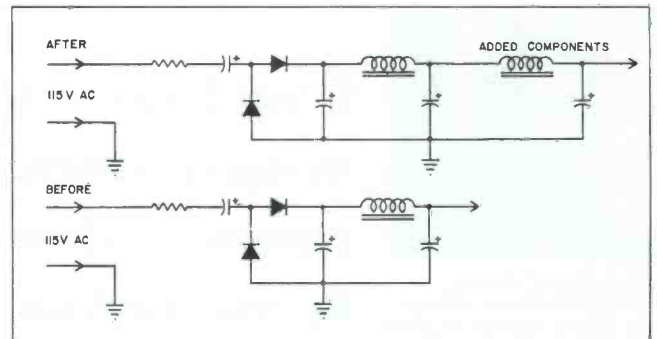
leaky coupling capacitor. This made the output tube draw current from the flyback by way of the vertical output transformer. Replacing the coupling capacitor restored the set to normal operation. — *Richard L. Panosh, Lisle, Ill.*

### Ripple Triggers Sync

A Sylvania Model 21C401 series was brought into the shop with the complaint that the picture would "roll" intermittently. In checking the set out I found that the picture would lose vertical sync, but could always be locked in by a slight adjustment of the vertical hold

control. My first thought was that a new tube, resistor or capacitor would quickly eliminate the trouble. However, this soon proved to be a false assumption, as eventually every component in the vertical circuit was either replaced or substituted along with the components in the sync separator and amplifier

Double filtering was required to kill this dog which had erratic sync.



circuits which all proved to no avail. Checks were made in the video IF and amplifier circuit, and the AGC circuit with no results. Voltage outputs from the power supply were normal, and bridging filter capacitors did not help.

Finally, it was noticed that the

*Continued on page 80*

### 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, Minnesota.





**YOU'D HAVE TO STOCK ALL THESE**



**IF IT WEREN'T FOR THESE**

Yes, if you had to stock an original part for every transistor in some radio set, you'd have hundreds upon hundreds of numbers on your shelves. But, the Tung-Sol ET transistor line cuts your inventory to just twelve numbers. That's all you need to service all the popular transistor radios.

Each ET transistor replaces scores of older types. Altogether more than several hundred. The packages are marked to show the type of service for which each transistor was designed. Selection of the proper type is easier—more accurate and the job is done quicker.

Tung-Sol ET transistors are made to original equipment standards. They're the same high quality that have made Tung-Sol a leading supplier of tubes and semiconductors. Tung-Sol Electric Inc., Newark 4, N.J.

Low power PNP	Medium power PNP	High power PNP	Low power NPN
ET1 Mixer/oscillator/ converter	ET6 AF power amplifier	ET7 AF high power amplifier	ET8 Mixer/oscillator/ converter
ET2 IF amplifier			ET9 IF amplifier
ET3 AF amplifier 6v.			ET10 AF amplifier 9v.
ET4 AF amplifier 12v.			ET11 AF amplifier 12v.
ET5 AF amplifier 9v.			
ET12 RF-IF amplifier Mixer/converter			



TELL YOUR SUPPLIER YOU'D RATHER HAVE

**TUNG-SOL**  
ET TRANSISTORS

CENTER LINE  
QUALITY

# SHOP HINTS

SERVICE TIPS FOR THE PROFESSIONAL TECHNICIAN

## Earphones for Organs

Get acquainted with a dealer of electronic organs and ask him to give you the names of purchasers. Then approach the organ owner and sell him on the idea of having an earphone jack installed on his instrument so he can play in silence. Some organs don't have this convenience. There's no harm in looking over the customer's TV set while you're in his home, too. — *Walter Luehr, Elmwood Place, Ohio.*

## Polish Identifies Tubes

When substituting new tubes in a radio or TV chassis, I dab a little fingernail polish on the top of the tube envelope. This identifies those new tubes from the customer's. If the set comes in the shop again, the polish will have changed color to brown. — *Jas. H. Robinson, East Meadow, N. Y.*

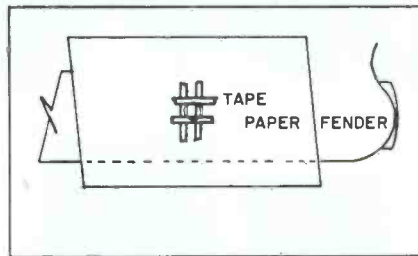
## Antenna Preamp Power

When it is necessary to bring antenna amplifiers to the shop for service, I use my tube tester to supply ac to it. Take an old octal tube and clip all pins but 2 and 7. Solder 2 wires to these. Set up tester for 25BQ6-25CQ6, etc. In addition to making voltage checks, performance can be checked by using two capacitors as shown in the

accompanying drawing. You have to take the mis-match into consideration, but it is possible to tell if it is amplifying. Of course, this cannot be used on dc powered amplifiers. — *W. C. Davis, Spearman, Tex.*

## Paint Protector

When drilling an auto antenna hole on a flat surface with a hole



saw, the cuttings flying away from the saw will often burn the paint

or scratch it when wiping the cuttings away.

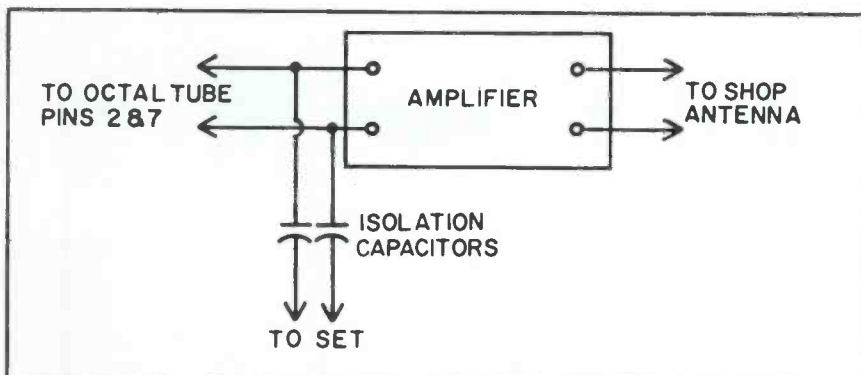
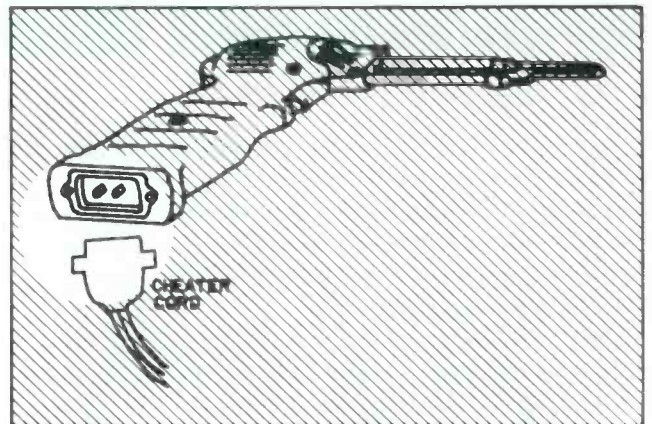
To prevent this, I attach a large piece of paper over the previously center punched area with masking tape.

The small amount of effort and time involved thoroughly compensates with the prevention of an unhappy customer. — *Harold Wolff, San Antonio, Tex.*

## Cordless Gun

The cord on my 100 w caddy solder gun has always been a problem so I filed out an opening at the bottom and installed a TV chassis type male interlock. Now I just connect by already-plugged-in cheater cord to the gun and I'm ready to solder in the customer's home. — *Bob Ciszak, Buffalo, N.Y.*

Interlock connector built into the handle of a soldering gun eliminates cord problems in the customer's home.



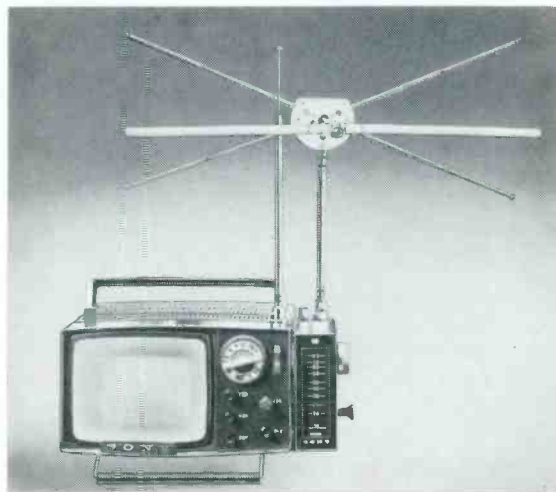
## SHOP HINTS WANTED

\$3 to \$10 for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Unacceptable items will be returned if accompanied by a stamped envelope. Send your entries to Shop Hints Editor, ELECTRONIC TECHNICIAN, Ojibway Building, Duluth 2, Minn. The hints published in this column have not necessarily been tried by ELECTRONIC TECHNICIAN editors and are the ideas of the individual writers.

# ALL Small TV Sets are NOT ALIKE!

## COMPARE THE OUTSTANDING FEATURES OF SONY MICRO-TV WITH ANY OTHER TELEVISION

■ Only Micro-TV has 25 transistors including the new and revolutionary epitaxial type in the power supply ■ Only Micro-TV weighs a feather light 8 lbs. and is barely larger than a telephone so you can carry it anywhere as easily as a briefcase ■ Only Micro-TV operates on all three types of power—its own rechargeable battery pack, 12v auto and boat power and 110-120v alternating current—to permit you to use it anywhere about the house or in the office, outdoors on the patio, the beach or on a picnic, or even in the back of an auto\* or on a boating weekend ■ Only Micro-TV uses the remarkable new 70° deflection picture tube with special phosphors, designed in SONY laboratories and built exclusively by SONY for a bright, beautifully sharp and clear picture with no distracting scanning lines to mar the reception ■ Only Micro-TV gives you the Synchro-Noise Suppressor Circuit to permit perfect reception with no streaks or bars or hash or snow in electrically noisy environments ■ Only Micro-TV permits instant control with all dials on the front panel and within easy reach



■ Only Micro-TV gives you snap-out circuit boards for complete simplicity in servicing ■ Only Micro-TV can be serviced through the mail, simply by returning the defective board to any of SONY's service stations located in principal cities throughout the United States ■ Only Micro-TV provides a full range of accessories for the utmost in flexibility in use, including: lightweight, rechargeable battery pack complete in its own shoulder case; luggage case that permits you to carry Micro-TV like a fashion accessory; complete auto accessory kit including seat bracket, car antenna, car battery cord, sunshade; "Snap-Tite" bracket to hold Micro-TV securely on any horizontal surface ■ Only Micro-TV has the new UHF adaptor which opens the whole wide new world of UHF television. Micro-TV \$189.95. Accessories extra.

\*Before installing a TV set in an automobile, check your Motor Vehicle Bureau to verify permissibility.

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# NEW PRODUCTS

FOR MORE INFORMATION CIRCLE PRODUCT NUMBERS ON POST CARD FOLLOWING PAGE 82

## RADIO RECEIVERS 200

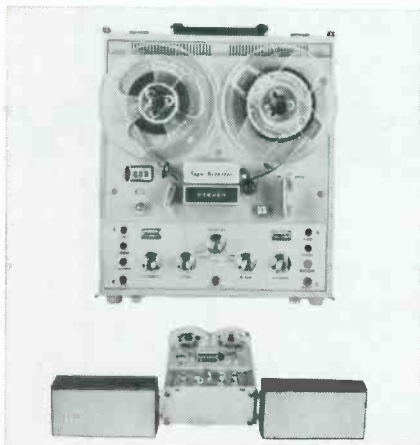
Called the WR-2000, the WR-2500 and the WR-3000, these models are said to augment the



line's WR-1000 and WR-1500 marketed last fall. The WR-2000 and the WR-2500 are the same unit except for cabinet styling. Each is claimed to be markedly smaller, lighter and lower in cost than past sister receiver providing AM-SW-FM coverage. The WR-2000 lists at \$124.95, the WR-2500 at \$144.95. Each covers the AM broadcast band (88 to 108 Mc). Model WR-3000 is a six-band portable receiver which covers the console, aeronautical and mobile frequencies as well as the broadcast, amateur and international short wave bands. It receives AM, CW and SSB signals and essentially covers the spectrum from 185 kc to 23 Mc. List price is \$199.50. The Hallicrafters Co.

## TAPE RECORDER 201

Designated the Cipher VII, this recorder is said to feature three-



speed operation, two VU level meters, individual controls on each channel for volume and tone, instant stop lever which also operates when the machine is in record mode, fast forward and rewind facilities, digital counter, automatic tape shut-off, facilities for sound-on-sound recording, and stereo earphone connection. Jacks are also provided for radio, phonograph and microphone, as well as for external speakers and amplifiers. Frequency response is given as 35 to 15,000 cps at 7½ ips, and signal-to-noise ratio is said to be better than 50 db. Wow and flutter are said to be 0.2% at 7½ ips, and distortion is said to be less than 2%. Operation can be vertical or horizontal. Retail price is \$274.95. Inter-Mark Corp.

## ORGAN KITS 202

Newest in a line of 14 kit organs, ranging from one to three manuals, the "YORK" with "theatre" type



horseshoe console is said to be designed for the apartment or home where space is limited. It has two full-size 61-note manuals, 25-note pedal keyboard, dual expression pedals and 40 multi-colored stop tabs. The unit can be purchased in a complete kit or in smaller component kits. The component kits consist of tone generators (one octave of generators comprises one kit), tone changers, pedal keyboard, manuals and console. There are

optional accessory items as, chimes, Band Box, glockenspiel, speakers and amplifiers. The organ can be played through the customer's hi-fi audio system or optional audio components are available. Artisan Organs.

## HEADPHONES 203

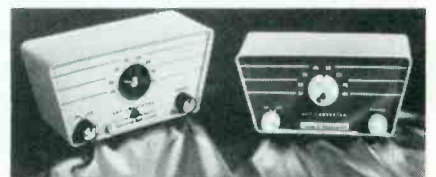
Type A Stereo headphones are claimed to offer advanced features which contribute to superb acous-



tical performance and comfort. Constructed of unbreakable "Royalite," these headphones have replaceable parts, left and right drivers and headband simply plug into one another. Frequency range is 20 to 17,000 cps; impedance is 8 ohm per channel; sensitivity is 97 db re 0.0002 Microbar for 1 mw input. List price is \$17.95. R-Columbia Products Co.

## UHF CONVERTERS 204

UHF converters, Models TC-10 (one tube) and TC-20 (two tubes) are said to meet the important FCC requirements for oscillator radiation. Available in a variety of cabinets in both painted and vinyl-clad finishes with panel designs and





## Compactrons take the heat off service dealers



More and more of today's newest TV sets are featuring compactrons . . . G.E.'s multifunction electronic devices. This means, eventually, you'll be seeing more compactron circuits in your shop. Therefore, to anticipate some of your questions about compactrons, let's take a look at how compactrons can help take the heat off you and your business:

**1. Long waits for repair will be a thing of the past.** Simple compactron circuits mean you can locate trouble faster, repair it easier, get sets back to your customers quicker. Fast, effi-

cient service builds repeat business and gets you free word-of-mouth advertising.

Repairs are consistently better because compactrons combine functions having similar life spans. Thus if one section fails, the entire compactron must be replaced—automatically restoring top performance through replacement of the other weakened sections. You save time by not having to check extra tubes and you eliminate the possibility of "weakened ordinary-tubes" not showing up on the tester.

**2. No more call backs!** When you fix a compactron set, *it stays fixed*. Call backs are virtually eliminated by service-designed compactrons which have a 40% lower operating temperature than ordinary tubes. Cooler operation means greater reliability and gets rid of a difficult trouble spot—peeling and cracking of printed circuits.

**3. You make more profit on compactrons** because the unit price is higher. Replacing a compactron is like replacing 2 or 3 ordinary tubes. Simpler compactron circuits, plug-in replacement, and fewer tubes to check, let you service more sets in any given time. Employees become more efficient, and need less training.

Multifunction design means that eventually you can substantially reduce your tube inventory. This gives you more "free" operating capital, more shelf space, plus less capital investment . . . hence a greater profit per dollar invested.

Remember, you'll be seeing more compactrons in the future . . . They'll mean easier servicing and happier customers for you.

*Progress Is Our Most Important Product*

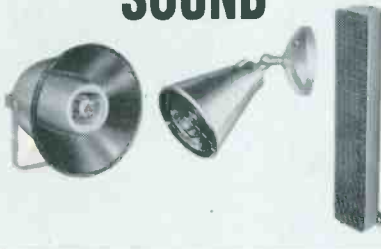
**GENERAL  ELECTRIC**

**DISTRIBUTOR SALES**

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**MORE MONEY**  
in P.A.  
**SOUND**



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, auditoriums, restaurants, offices, schools, bowling alleys... for outdoors — athletic fields, airports, stadiums, 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 Sound 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.

**Breakthrough**  
In Design, Materials,  
Performance

**ATLAS SOUND EC-10**  
ALL-NEW  
PAGING SPEAKER



**\$1425 net**

Every way you look at it, this compact, weather-proof, American-made speaker is 100% NEW. It's a powerhouse of crisp, articulate sound for a wide variety of uses. Precision-molded Implex\* horn assures vibration-free, resonance-free output. Improved magnetic circuit features new ceramic magnet. Handsome 2-tone colors blend with any decor. Adjustable, versatile bracket.

Specs: 6 watts; 8 ohms (also 45 ohms); Length 6 $\frac{3}{8}$ "; Bell Diameter 6 $\frac{1}{4}$ "; Weight 2 lbs. Special Model T-4 line matching transformer available.

\*t.m. Rohm & Haas — new, tough, all-weather plastic.



Write for full details and latest catalog

**ATLAS SOUND**

Division of  
American Trading and Production Corporation  
1419-51 39th Street, Brooklyn 18, N. Y.  
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— for more details circle 12 on post card

**NEW PRODUCTS**

matching knob combinations, each of the new UHF converters weighs only about 6 lb, is no larger than a table model radio (approximately 9 $\frac{1}{2}$  x 4 x 5 in.) and can be easily connected to the TV set in a matter of minutes. Both converter models are capable of tuning channels 14 through 83 continuously with approximately 9 Mc overtravel at each end of the band. Dial calibration is such that channels are equally spaced over the entire tuning range, making for simplified tuning and elimination of station crowding. Suggested retail list price for the one-tube Model TC-10 is \$29.95; for the two-tube Model TC-20, \$42.95. General Instrument Corp., F. W. Sickles Div.

**STEREO RECEIVER KIT 205**

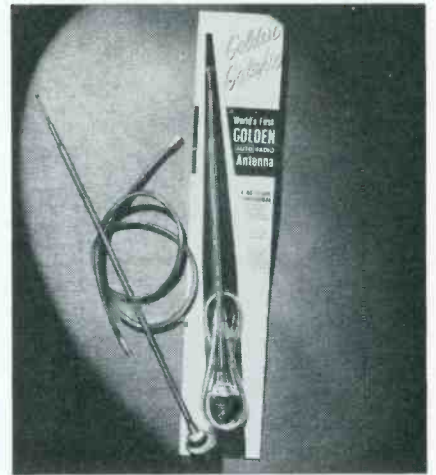
Designated the Award FA30XK, this receiver kit is a combination of stereo tuner, preamplifier, and



power amplifier on a single chassis. The kit delivers 30 w and is said to be easy to build. The FM section of the kit includes a multiplex section with a frequency response of  $\pm 1$  db from 15 to 15,000 cps and 30 db of stereo separation. Automatic frequency control (AFC) is provided. A zero to infinity balance control which permits balancing of stereo speakers for virtually any listening position in the room. The power amplifier section features special grain oriented cores in the output transformers to provide a frequency response of 15 to 70,000 cps at normal listening levels. A silicon diode power supply provides B+ regulation. Award FA30XK stereo receiver kit less enclosure is \$169.95. Harman-Kardon, Inc.

**AUTO ANTENNA 206**

The Golden Galaxie is a four-



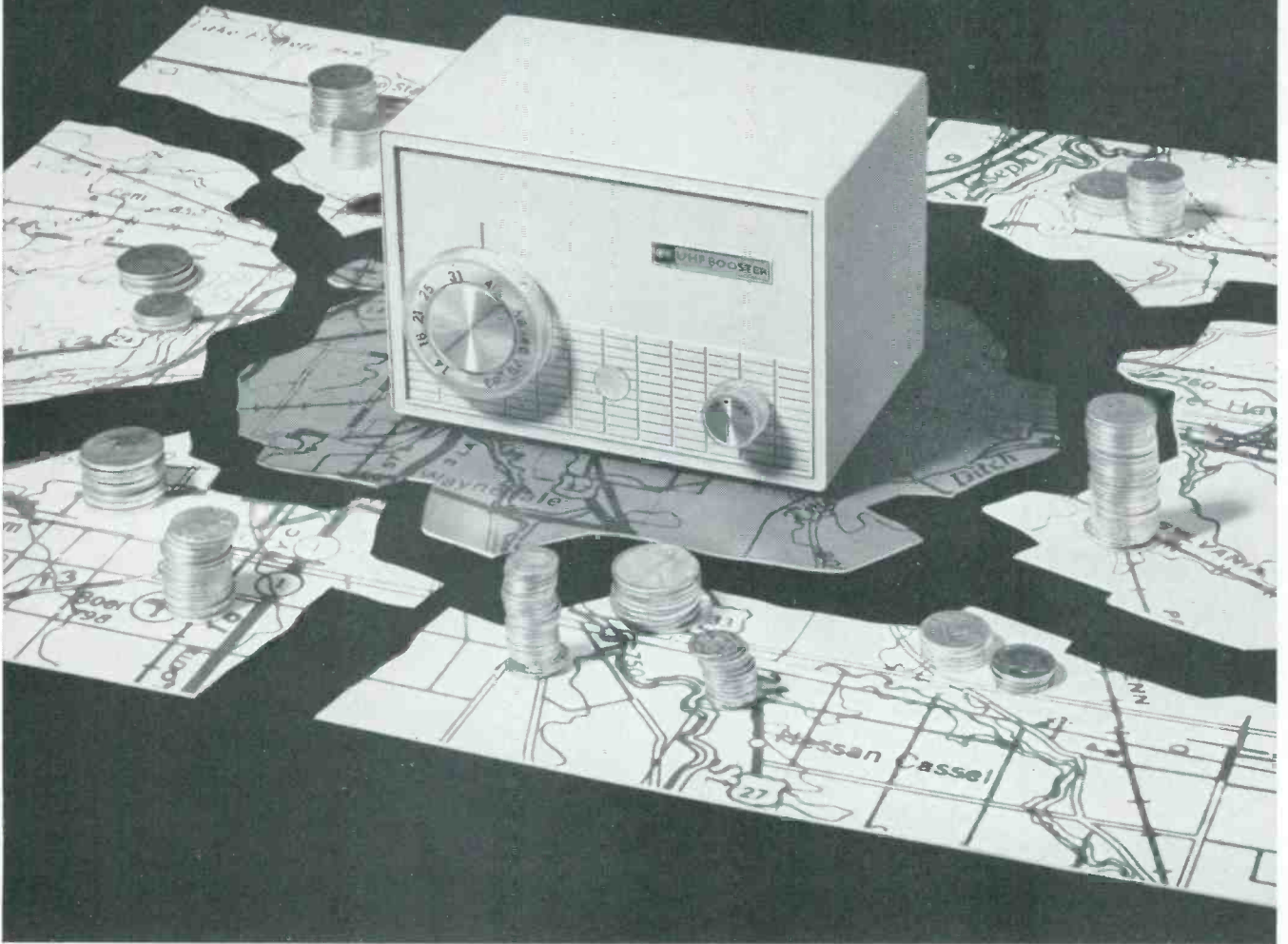
section model reportedly offering many practical advantages while serving as an undeniable status symbol. The 24-carat gold-plating is rust-proof and corrosion proof, with weather resistance. Other advantages are claimed to be found in the four-section design which extends to 54 in. for better reception in fringe areas, while offering more breakage resistance than three-section types. Precision engineered with tolerances as close as requirements for Detroit manufacturers, the Golden Galaxie is easy to install, with a deluxe ball and rocker base that mounts on any surface, at any angle, on any fender contour. Tenna Corp.

**TEST RECORD 207**

The Model QR-2007 monophonic, and Model QR-2009 stereophonic test record sets are designed for testing tape and record players. There are five of the 12 in. records in a set, each with identical sides, providing 10 sides per set, enough to guarantee a great number of playings before alteration of the record characteristics due to wear. Each side contains a series of 10 logarithmic sweeps from 20 to 20,000 cps. Each sweep is preceded by a 1 kc reference and starting signal. The different sweeps present different groove speeds because of the various diameters (wave lengths), which permits checking the stylus tip radius to an



# Blonder-Tongue increases the UHF profit zone



## First all-channel UHF Booster—the U-BOOST

The fabulous new Blonder-Tongue can add up to 15 miles to your city's UHF reception range. It turns TV viewers formerly beyond the range of UHF into profitable UHF customers—prospects for UHF converters, UHF antennas, all-channel TV receivers and the U-Boost itself. The U-Boost will also clean up and improve reception for viewers in poor signal areas—More money in your pocket!

The U-Boost, (gain 10 db) triples the antenna signal voltage. Teamed up with a UHF converter or added to an all-channel receiver, the U-Boost improves reception on any UHF channel 14 to 83. Just a turn of the dial pinpoints the desired channel and brings it in sharp and clear. TV picture quality is always excellent with the U-Boost since it amplifies the signal before conversion delivering the best signal-to-noise ratio.

The U-Boost is easy to install: convenience AC receptacle; patented 300 ohm stripless twinlead terminals. And finally,

the modern U-Boost styling matches the new Blonder-Tongue UHF converters — making combination sales easy. Sell a Blonder-Tongue converter and a U-Boost together. They're "profit-mates". U-Boost, List \$39.95

### BLONDER-TONGUE TOTAL SALES POWER SPELLS BIGGEST UHF PROFITS

1. World's finest UHF converters performance tested in 2,000,000 homes.

Model 99-S for prime signal areas. List \$27.95.

BTU-2T for weak signal areas. List \$44.95.

2. New U-Boost to increase your UHF profit zone.

3. Powerful merchandising program backing up every Blonder-Tongue product.

Look to the leader in UHF.

Contact the Blonder-Tongue distributor in your area now.



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**BLONDER-TONGUE**  
9 Alling St., Newark, 2 N. J.

Canadian Div.: Benco Television Assoc., Ltd., Toronto, Ont./home TV accessories • closed circuit TV • community TV • UHF converters • master TV

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## WHAT YOUR CUSTOMER DOESN'T KNOW ABOUT SHORTENED ANTENNAS MAY HURT YOU

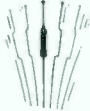


M. R. Friedberg, President  
The Antenna Specialists Company  
explains why:

If you want your mobile antenna sales to stay sold, here are a few tips on the desirable electrical qualities in a "shortened" or loading coil type antenna:

There are four basic ways to shorten an antenna: 1) base loaded, shunt fed; 2) base loaded, series fed; 3) center loaded; 4) top loaded. We at Antenna Specialists favor base loading, shunt fed, over top loading wherever possible, for these reasons.

The electrical shunt capacity from antenna to vehicle rooftop and thus to true earth is stabilized compared to wide variations in top loading shunt capacity. This is due to continuous whip swaying with respect to ground plane. Constant "de-tuning" of top loads is impossible to compensate and results in degradation of theoretical performance.



Our design and engineering experience have proven that shunt loading is preferable to series loading because we can design and achieve a practical 50 ohm resistive antenna with negligible reactance. Series loading results in an antenna having a low resistance with an appreciable reactance which is difficult to compensate in transmitter loading. A shunt fed antenna offers a direct DC path to ground and tends to raise signal-to-noise ratio in that local noise takes the shorter path to the ground and doesn't appear at the receiver.

From this engineering experience was born the Antenna Specialists "Maggie-Mobile" series for rooftop, cowl or trunk groove mounting for 27 Mc., 30-50 Mc., and 6-10 meter bands. To take the fear out of bent or broken antennas resulting from hitting obstructions, we went to a 17-7 stainless steel whip because it bends from tip to butt without a set. No two car mounting installations are the same so a whip adaptor was built in to permit 1/4" adjustment for extra fine tuning.



These mobile antennas for all three bands have been consistently among CB dealers' leading sellers. You can recommend an Antenna Specialists mobile antenna and know your customers will stay sold on it and on you!



the antenna  
specialists co.,

Antenna Division  
ANZAC Automotive Division  
ZEUS Generator Division

12435 Euclid Ave., Cleveland 6, Ohio  
Exp.Div., 15 Moore St., New York 4, N.Y.



Amateur, professional and CB base and mobile antennas. Customer design broadcast and professional installations. ZEUS portable generators.

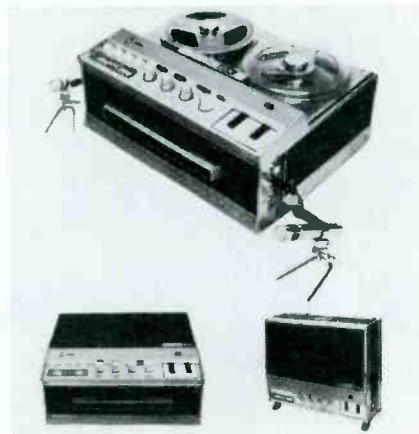
- - for more details circle 11 on post card

## NEW PRODUCTS

accuracy of 0.001 in. The first two bands on each side of the Model QR-2009 stereophonic test records allow cross-talk measurements down to -40 db in the middle of the audible range. The 45-rpm records are 11 7/8 in. dia, and are fine-groove, lateral cut. Price is \$45 per set. B & K Instruments, Inc.

### TAPE RECORDER 208

The 47/26 stereo tape recorder is named for its complement of 47 transistors and 26 diodes. The in-



strument is self-contained, with dual recording and playback amplifiers and built-in monitoring speakers. It delivers 10 w of audio power per channel. Besides its tape recording functions, the 47/26 is designed to serve as the audio center for a complete high fidelity system, and can be installed permanently connected to a tuner, record player and external speakers. For this use, the tape speed switch is simply turned to zero. Frequency response by laboratory test is said to be 30-20,000 cps within 3 db at 7 1/2 ips and up to 15,000 cps at 3 3/4 ips. Signal-to-noise ratio is 50 db down at both speeds. Flutter and wow are less than 0.15% at 7 1/2 and 0.25% at 3 3/4 ips. Bias frequency is 85 kc. Total harmonic distortion is 1.0%. Retail price is \$600. Vernon Audio Div.

### TUNER-AMPLIFIER 209

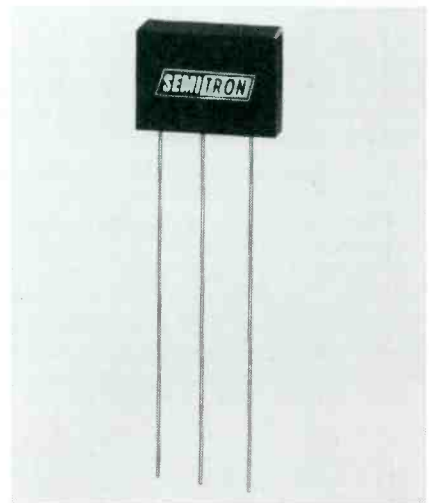
The Model 340B FM stereo tuner-amplifier combines the FM performance of the 350 FM stereo



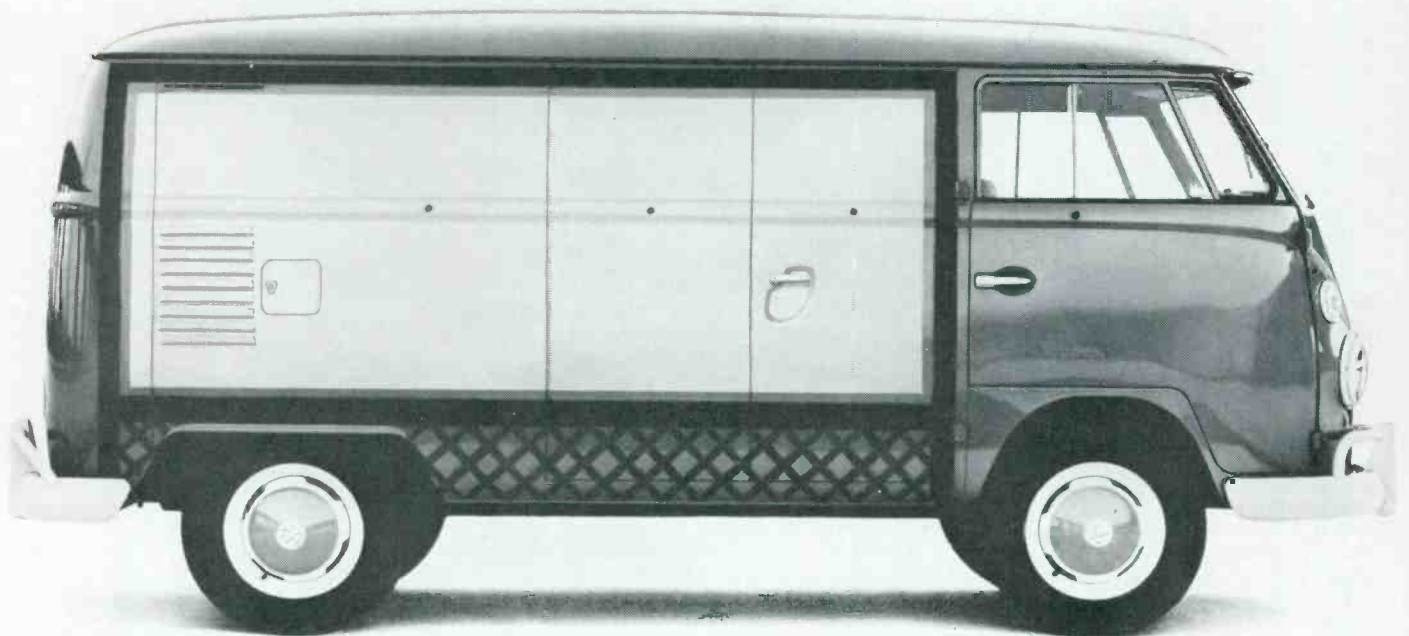
tuner with the power and control flexibility of the 299 stereo amplifier. The 340B features new panel styling, slide-rule tuning, convenient front-panel earphone receptacle and Auto-Sensor circuitry which automatically switches to stereophonic or monophonic mode of operation depending on which type of broadcast is being received. Operating in conjunction with the Auto-Sensor is a signal which lights when stereo is being received, and is automatically extinguished when Auto-Sensor switches to monophonic mode. Additional features include: illuminated d'Arsonval meter for pinpoint tuning of all signals; powered third channel for direct connection of remote speakers or for a three-channel system and complete tape monitoring facilities. All controls operate on playback. The 340B carries an audiophile net price of \$399.95. H. H. Scott Inc.

### DIODE REPLACEMENTS 210

Presently available are service-engineered selenium dual diode replacements for TV phase detector circuits. Semitron part No. SDD4 is the common cathode type and part No. SDD5 is the series connected type. Packaged two units in a reusable plastic box and available on a multi-color display card, these selenium dual diodes are said to be for use in most TV sets, from Admiral to Zenith. They come com-







Take a pencil. Fill in the blank space. See how your name looks on the side of our truck.

## Why buy a billboard when you can drive one?

The reasons are as obvious as the side of a barn.

With every Volkswagen panel delivery, you get 106 sq. ft. of advertising space. Free of charge.

The advantages are obvious. A few bucks for paint and lettering and you've got an advertisement on wheels.

Heads turn.

And, of course, what's big on the outside has to be big on the inside.

You get enough room to carry 1830 lbs. (Almost as much as a 1-ton truck.)

You also get better than 20 miles on a gallon of regular.

And an engine that can never freeze.

Or boil over. It's air-cooled.

Tires that run about 35,000 miles to a set on the average.

Maintenance that runs about 2½¢ a mile. (That's for gas, oil, tires, lube. Everything.)

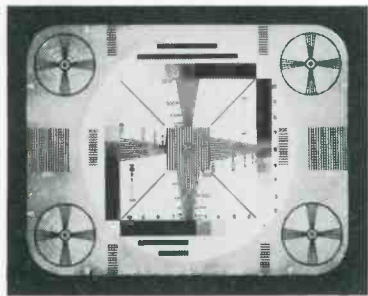
And how many billboards do you know that can do all that?



- - - for more details circle 42 on post card

# TV TIPS FROM TRIAD

NO. 21 IN A SERIES



Joe, the Junior PTM, connected the heavy red and black leads protruding from the apron of a small chassis to the corresponding + and - terminals on a 12-volt auto radio power supply. He then connected a 0-600 DC voltmeter to the other pair of terminals on the chassis, snapped the switch, and watched the voltmeter needle pin to the right. "600 volts at 200 milliamps," he said aloud. "What's up?" asked Bill, the Senior PTM.

"Just finished this DC-to-DC power supply for the transceiver in my car," said Joe.

"What's with this DC to DC?" asked Bill, "You trying to upset my transformer theory?"

"Nope. Here's the scoop. DC...12-volt battery input;...DC...600-volt rectified output. Two transistors and a transformer are used in an oscillator or high frequency (2,000-3,000 cps) switching circuit to provide a modified square wave high voltage which can be rectified in a full wave bridge, filtered, and presto!...B+!"

"Bully," said Bill, "Tell me more."

"Well," continued Joe, "I picked up this Triad TY-84 at our favorite distributor, added a few resistors and capacitors, two transistors and heat sink, plus four inexpensive silicon rectifiers... and here we are. That bulky power equipment in the trunk of my car has had it!"

"Sounds great!" said Bill, "Keep talking!"

Joe did. "Transistor power supplies are becoming very popular. They're easy to make, small, very efficient—ideal for cars, boats, aircraft, and other mobile uses, since transformers come in 6, 12, or 28-volt input models?"

"Where did you steal the circuit?"

"Packed right in the red and white box with the TY-84. The Triad people furnish a circuit for common collector, or common emitter lashups, as well as suggested component values?"

"You're a budding genius," said Bill. "By the way, what does DC to DC mean?"

**MORAL:** Want to know more about our space-age toroidal power transformers? Write for our "Toroid Tips" brochure. It's loaded with handy construction and adjustment ideas. While you're at it, ask for a copy of our new TV replacement catalog TV-63/64...Just off the press.

Write Triad Distributor Division, 305 No. Briant St., Huntington, Indiana.

A DIVISION OF LITTON INDUSTRIES 

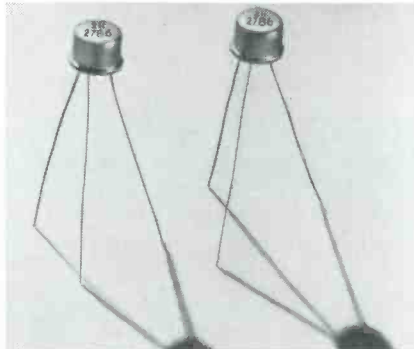
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## NEW PRODUCTS

plete with connecting diagrams and interchangeability tables and carry a suggested list price of \$0.89. Semitronics Corp.

### POWER TRANSISTOR 211

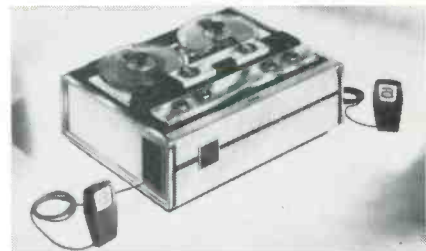
The 2N2786 is said to be a germanium VHF power transistor with a unique combination of character-



istics: high frequency (ft of 350 Mc, 100 ma at 5 v), high dissipation (PD of 1.8 v); lost cost (\$2.75 in 1000 quantities); and ability to operate with high gain and efficiency at low supply voltage. The manufacturer claims that at 89 Mc with a 12 v source, the 2N2786 has a minimum power output of 500 mw with a minimum power gain of 10 db. At 180 Mc, with a 12 v source, it has a minimum power output of 400 mw with a minimum power gain of 9 db. The 2N2786 incorporates strip geometry, a refinement in the Post Alloy Diffusion Process in which stripes are used instead of pellets to make enlarged emitter and base regions. These enlarged regions provide reduced thermal resistance with conservative current densities. Amperex Electronic Corp.

### TAPE RECORDER 212

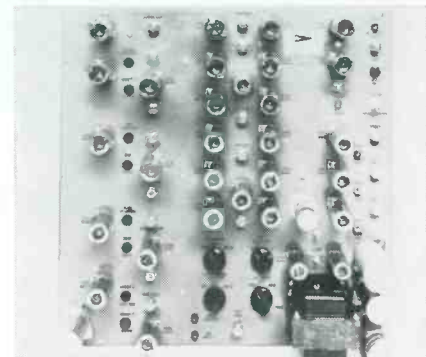
One of the largest manufacturers of photographic equipment, announced its entry into the booming tape recorder field with the introduction of three units. At the top of the line is the 800 full stereo recorder featuring four track stereo and monophonic recording. Other recorder units introduced are the 400, a four track monophonic recorder; and the 200 which will re-



cord and playback dual track high fidelity. Each unit reportedly has a peak output of 12 w, plays all available speeds and has a circuit based on NAB standards. Frequency response ranges from 40 to 15,000 cps with the model 800 to 40-8,000 cps in the model 200. All three units are portable and built into their own carrying case. Argus, Inc.

### COLOR BAR GENERATOR 213

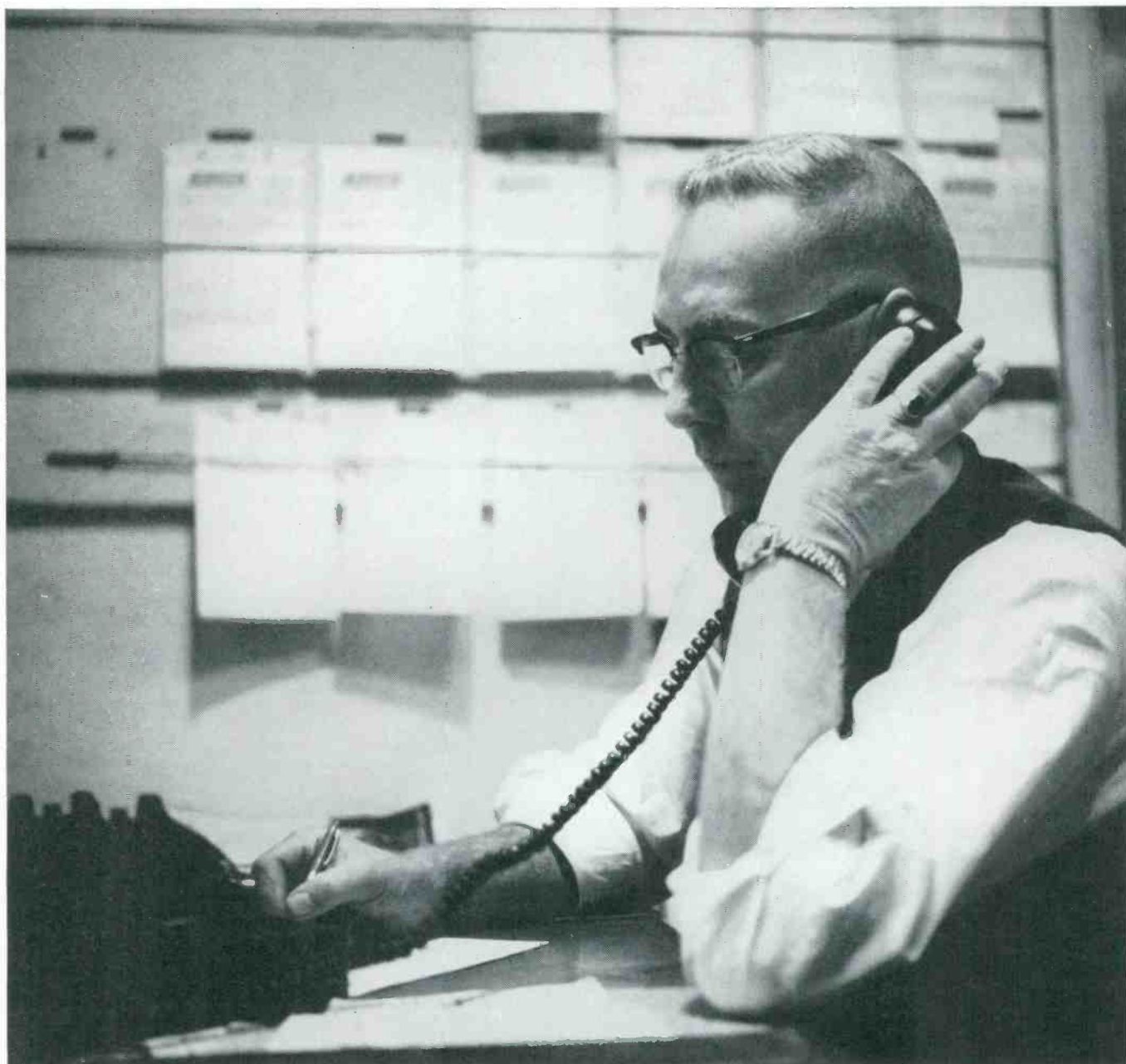
The Telechrome Model 509-E1 color bar generator electronically generates four video test signals that enable the user to check and adjust the color circuits of studios, transmitters or receivers. Signals produced are a color bar signal containing green, yellow, red magenta, blue, cyan, and green in that order; a color bar signal containing I, R-Y,



Q, black and white; a white dot pattern; and a split screen display of two simultaneous test signals. Input signals required are vertical drive and composite blanking only. The dot pattern (used for making linearity measurement and convergence adjustments of tri-color tubes) may be displayed on the raster alone or superimposed on the color bars. Two inputs are supplied for monochrome signals that can be presented alone or on a split-screen basis with the color bar signals. Telemet Co.

### UHF BOOSTER 214

An all-channel booster said to be strong enough to bring UHF



**“One out of five of our service calls comes in through the Yellow Pages!” says Tom Carmichael, partner, Burns & Carmichael, Seattle, Wash. “That comes to over a call a day! And a lot of first-time customers who find us in the Yellow Pages come back again and again! We advertise under eight Yellow Pages headings and have numerous trade-mark listings under RCA, MAGNAVOX, GE, HOOVER, KITCHENAID. This way, we attract people looking for specific items or specific brands!”**



Display ad (shown reduced) runs under TELEVISION REPAIRING & PARTS. Call your Yellow Pages man to plan your program. Find him in the Yellow Pages under ADVERTISING - DIRECTORY & GUIDE.

**LA 4-2300**

**TV SERVICE**

ALL MAKES

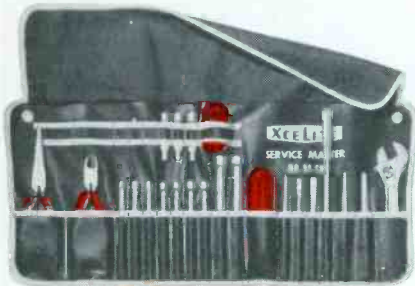
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Appliances • TV      Radios • Stereo



# SERVICE MASTER... EVERY TOOL YOU NEED 99% OF THE TIME



complete 23-piece kit for radio, TV, and electronic service calls

## 2 HANDLES:

shockproof plastic. Regular 4" length... 2" Stubby. Interchangeable. Patented spring holds snap-in tools firmly in place.



## 9 NUTDRIVERS:

High Nickel chrome finish, 3/16" to 1/2"



## 3 STUBBY

NUTDRIVERS: 1/4", 3/16", 3/8"



## EXTENSION BLADE:

Adds 7". Fits both handles.



## 3 SCREWDRIVERS:

Two slotted... 3/16", 3/32", #1 Phillips



## 2 REAMERS:

1/8"-3/8", 1/4"-1/2"



## ADJUSTABLE WRENCH:

6" thin pattern, 1" opening



## LONG NOSE PLIER:

"Cushion Grip", 2 1/4" nose



## DIAGONAL PLIER:

"Cushion Grip" hand-honed cutting edges



## ROLL UP KIT:

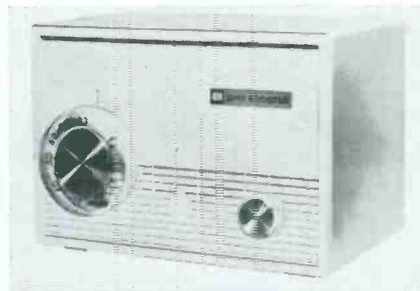
Durable, plastic-coated canvas. Compact, easy-to-carry.

Ask your distributor to show you kit 99 SM

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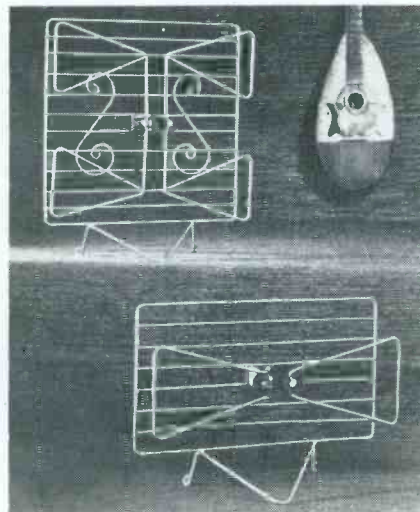
## NEW PRODUCTS



broadcasting to scores of new communities, the U-Boost, has a list price of \$39.95. According to the maker, the U-Boost is a rugged and reliable indoor device. Blonder-Tongue Laboratories.

## UHF INDOOR ANTENNAS 215

The Wonder Bow Model 4170 UHF indoor antenna is a single-bay bow and screen with a wire form



dipole. The Double Wonder Bow Model 4160 is a stacked bow and screen, also using wire from dipoles. Both antennas are styled, in a gold-color. Channel Master Corp.

## SIGNAL GENERATOR 216

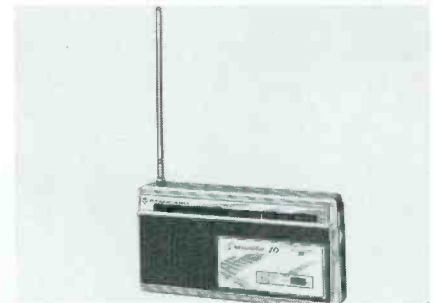
Port-O-Gen is a compact, self-contained, battery-operated crystal



signal generator. Insertion of a crystal and a flip of a switch is all that is required to develop a reliable modulated signal for purposes of RF-IF alignment, spotting tuneable receivers and checking crystal activity, claims the maker. As an added feature, two crystal sockets are provided to accommodate both the large and small crystal pins. The Port-O-Gen is \$14.95, battery included. Electronic Devices Corp.

## FM PORTABLE 217

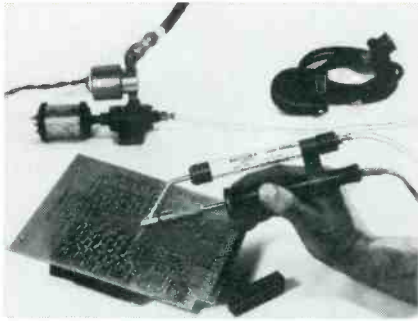
An all-FM transistor portable, SR-J715F, has a superheterodyne 4-diode circuit and features a full



FM band. Claimed ideal for tape recording enthusiasts who prefer transistorized compact tuners, it contains an audio terminal for direct tape recording while monitoring FM reception. The radio can be connected to an AM amplifier for enhanced FM reception. Powered by four penlight batteries, the SR-J715F contains a thermistor for signal stability during temperature changes, automatic gain control to compensate for signal-level variations, and a "slide rule" tuning band for optimum FM signal selectivity ranging from 88 to 108 Mc. Standard Radio Corp.

## SOLDER GOBBLER 218

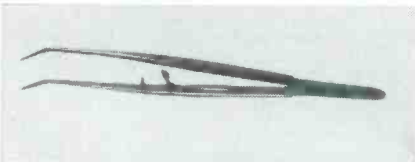
The model SG-200 "Solder Gobbler" Iron melts and vacuums solder from eyelets on printed circuit boards so components can be removed. Model SG-200 is also used for removing icicles and excess solder. The complete unit can be held with one hand, leaving the other free to hold the board or remove the component, the manufacturer says. The Solder Gobbler is attached to the new ESICO miniature industrial soldering iron with its long-life, mica-wound element. The entire unit weighs only 5 ozs. The element heats the intermediate



fitting and the replaceable tip, both of which are made from nickel-plated copper tubing. Model SG-200-E Solder Gobbler Iron (attached to an ESICO No. 3345 miniature iron, with 6 feet of flexible tubing, cleaning brush, tube connector and 3 extra tips) is priced at \$29. The Model TD-110 vacuum transducer, air muffler, solenoid valve and foot switch are priced at \$53.40. The complete de-soldering tool and vacuum source package is \$82.40. Air-Vac Engineering Co.

**LONG TWEEZER 219**

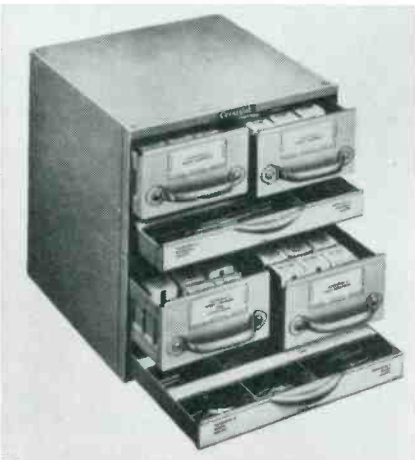
This lock-type extra length tweezer, No. 3105, is said to have applications where tool needed for specific function must fit easily in small spaces. Locking action assists



in accessibility when assembling, soldering, etc. It is made of stainless steel with finely serrated beaks. Techni-Tool Inc.

**REPLACEMENT KIT 220**

A kit designed to enable the serviceman to assemble all the popular



# AN AUTOMATIC PHONE ANSWERING SET GIVES YOU THE EDGE ON EVERY SERVICEMAN IN YOUR AREA

It answers the phone when you're out  
Takes messages day or night  
Plays them back when you return  
Rents for only pennies a day



ASK YOUR PHONE COMPANY ABOUT THE  
ELECTRONIC SECRETARY® telephone answering set

When a customer has trouble with his TV set, what does he do? He gives you a call. If it's at night, or on a weekend, you're probably not there. On a weekday ... you may be out on a job. In any event, chances are your customer will start calling other repairmen till someone answers the phone.

That's where the ELECTRONIC SECRETARY telephone answering set—installed in your shop—gives you the edge. It answers the phone in your voice, with your prerecorded message. Asks whoever calls to leave any message he wishes. Records the message for playback when you return.

The result: no lost calls, no lost orders; more satisfied customers, more business for you.

ELECTRONIC SECRETARY telephone answering sets rent for only pennies a day. Ask your phone company about this new business-building service today.

**AUTOMATIC ELECTRIC** Northlake, Illinois

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**



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# Troubleshoot, repair receivers and transmitters faster

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by Marvin Tepper

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- Detailed coverage on transmitter servicing.
- Practical repair techniques as they would be done at the workbench.

There are other books that cover the subject of radio receiver repair. Some also cover transmitter servicing. But none of them make it easier to apply your knowledge of radio circuitry to the maintenance and repair of defective equipment. These books show you how to use the best and fastest approach to circuit troubleshooting and repair. Valuable to both newcomer and veteran, the text provides practical servicing procedures for both radios and transmitters. By a combination of dramatic illustrations and down-to-earth description, you are brought as close as possible to actual workbench conditions.

### HIGHLIGHTS OF BASIC RADIO REPAIR

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**SERVICING PROCEDURES** — Outlines methods of approach in servicing to make repairs in the fastest possible way.

**SUPERHETERODYNE RECEIVERS** — Treats each stage of a receiver in the same order most likely to be followed during actual servicing.

**SERVICING PORTABLE RECEIVERS** — Discusses circuits and problems peculiar to portable receivers, including 3-way portables.

**SERVICING AUTOMOBILE RECEIVERS** — Details this neglected but lucrative field. Includes such special circuits as the "signal-seeker".

**VOLUME II SERVICING FM RECEIVERS** — Includes a discussion of antenna requirements as well as complete coverage of the various detector circuits.

**TRANSISTOR RECEIVERS** — Covers best methods to service transistor receivers: transistor handling and testing; servicing printed circuits and transistor receiver circuits; hybrid auto radios.

**SERVICING TRANSMITTERS** — Discusses transmitter symptoms and checks before covering individual stages. Details servicing FM and single sideband circuits.

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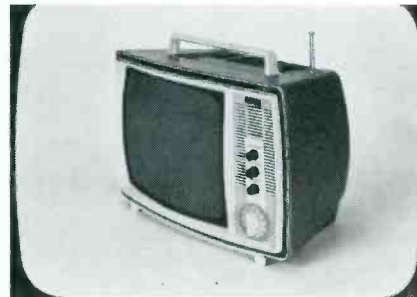
## NEW PRODUCTS

dual concentric controls required for replacement applications without cutting shafts has been announced. Designated as the FRK-200, the kit contains 36 controls, 65 exact replacement front and rear shafts, 8 standard switches, 5 push-pull switches, 45 push-pull and standard universal shafts, and 5 twist-tab plates. Almost 60% of all dual concentric controls can be assembled without shaft cutting. The controls are housed in two identical stacking steel cabinets. The kit also contains replacement guides. Centralab.

### PORTABLE TV

221

A portable television set designed to retail for \$99.95 has an 11-in. picture tube. Two additional per-

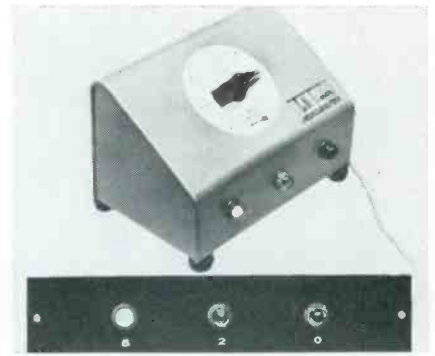


sonal portables of similar design and weight, expected to retail for \$109.95, also have been marketed. The leader model is M110YBG. It has a dusky beige polypropylene cabinet, a 6 x 2 in. front-mounted speaker and front controls, molded carrying handle, and monopole antenna. The step-up models are M112YVY and M112YRD in champagne and cherry red, respectively. These sets have a die-cast aluminum carrying handle, dipole antenna, feature an earphone jack and have polypropylene cabinets. Each of these three sets has its all-channel VHF-UHF counterpart. General Electric.

### SPEECH TIMER

222

Talk Timer is an electronic speech timer that automatically warns the speaker that his allotted time is up. The master unit consists of a timer to be pre-set by the chairman or instructor for the



length of time assigned to each speaker. Automatically, a series of colored lights indicate the time remaining for the speech. On the podium, a second unit containing only the signal lights warns the speaker of his remaining time. When five minutes remain, a green light appears on both units. An amber signal indicates two minutes remaining and a red light signals the end of the speech. Talk Timer is produced in three models ranging in price from \$39.95 to \$99.95. C.M.C. Corp.

### PREAMPLIFIER KIT

223

The all-transistor Citation A preamplifier kit utilizes 33 transistors and eleven modules or circuit boards, which the kit builder plugs into a computer-type rack panel on the chassis. Each of the modules are said to have been pre-wired and factory-tested to give the kit performance specifications identical



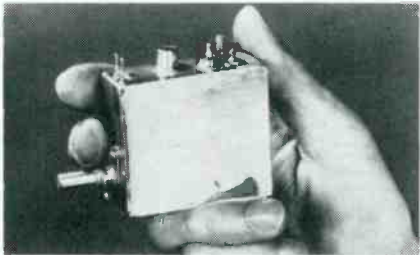
with those of the factory-wired unit. The Citation A is packaged to resemble a miniature tool box with drawers and compartments to separate all parts. The price is \$269.95. Harman-Kardon, Inc.

### UHF TV TUNER

224

A miniature, transistorized UHF television tuner is said to permit

production of smaller, very thin all-channel TV sets by the "cut-off" date (April 30, 1964) when all new sets shipped interstate must be equipped to receive VHF and UHF broadcasts. The new solid state tuner (Model 218) is smaller than a pack of cigarets. A major advantage claimed for the tuner is its extremely low radiation (varying from 50 to 300  $\mu\text{v}$ ), far below the radiation



limits of 500  $\mu\text{v}$  set by the FCC. General Instrument Corp.

#### TAPE RECORDER 225

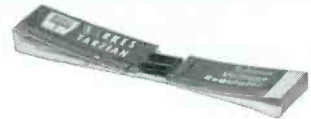
The Continental 301 (Model EL3549) transistorized 4-track, 4-speed tape recorder features two



preamps for stereo playback through any radio, TV or hi-fi system. The 301 also features the new fourth speed of 15/16 ips for up to 32 hr of recording on a standard 7-in. reel. The Continental 301 includes two preamplifiers, power amplifier and speaker and comes furnished with a cardioid pattern microphone. The machine has inputs for recording from microphone, tuner and phono with facilities for mixing and a special input jack for a foot control. Monitoring is possible by means of the internal speaker or with headphones. A parallel operation feature permits tracks 1 and 3 or 2 and 4 to be played back simultaneously so that prerecorded stereo tapes can be played back monaurally without loss through the built-in speaker. The 301 has also been designed to function as a public address system. The manufacturer's suggested list price is \$299.50. North American Philips Co.

# SARKES TARZIAN Silicon Rectifiers

*are first choice among service technicians (according to nation-wide polls) for good and simple reasons:*



Tarzian 400V and 600V "F" Series units in handy Ten-Paks, Doubler Replacement Kits, and in bulk



Tarzian 400V and 600V "H" Series units in handy Ten-Paks, Doubler Replacement Kits, and in bulk



- ★ They are immediately available from distributors throughout the nation
- ★ They are "handy-packed" in the quantities and sizes you need most
- ★ Their proven quality and dependability eliminates callbacks that waste your time and profits

A free Tarzian "Replacement Line" catalog is yours for the asking. It's your guide to replacement rectifiers with competitive prices, unsurpassed performance.

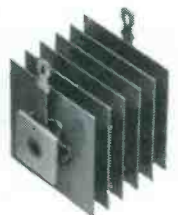
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# NEWS OF THE INDUSTRY

## Wholesale Abuses

NATESA has been invited by Rep. James Roosevelt (D-Calif.) to appear as witness at a date yet to be specified, before the Subcommittee on Distribution of the House Select Committee on Small Business, in Washington, D. C.

Executive Director Frank J. Moch plans to appear to give NATESA's ideas on "elimination of wholesale abuses that are severely damaging small retail TV-radio service businesses."

## TV Sales Up

Brisk March business at distributor outlets moved first-quarter television sales better than 73,000 sets above the total for the same period last year but failed to close the gap in comparative quarterly radio sales, the Electronic Industries Association reports.

Distributor-to-retailer TV sales in March stood at 601,797, ahead of both the 535,999 receivers sold the month before and the 580,876 turned over in March of last year. First-quarter sales reached 1,641,617, compared with 1,567,987 for the like three months in 1962.

On the radio side, the gain in monthly sales was substantial — from 616,036 sets in February to

818,510 in March. But in March of last year, 917,236 receivers were sold by distributors, and for the three-month period then sales totaled 2,177,998. This year's sales through March stood at 1,887,894 radios.

## Imports from Japan Swell

Japanese manufacturers exported 87,000 television receivers and chassis to the United States during the first nine months of 1962, compared with 12,000 in the corresponding period of 1961, the United States Department of Commerce reveals.

Of the sets shipped to the U. S. in the first nine months of 1962, a total of 72,000 were tube type TV receivers and 15,000 were transistorized sets.

During the initial nine months of 1962, some 4,623,000 radios with three or more transistors were exported by Japanese firms to the U. S., compared with only 2,897,000 units a year earlier. Shipments of tube-type radios fell off from 1,475,000 units in the initial nine months of 1961 to 1,103,000 in 1962.

## Net Falls Off

Net income of the Emerson Radio & Phonograph Corp. for the 26-week period ended May 4 totaled \$847,000, or 37 cents a share. This compares with a net a year earlier of \$1,140,000, or 50 cents a share.

## Sales Running Ahead

Sylvania Electric Products Inc. reports that factory television unit sales in the first four months of 1963 were 15 percent ahead of the same 1962 period.

Robert J. Theis, President of Sylvania Home &



List Price \$149.50

## HALLMARK 512

UNEXCELLED IN PERFORMANCE, STYLING  
AND RUGGED RELIABILITY!

Today's best selling CB from Hallmark features dual-power. 12 channel crystal-controlled, push to talk operation. Sensitivity better than 0.3 $\mu$ v for 10 db S/N ratio. Selectivity better than 30db. RF power over 3.2 watts. Audio power 3 watts. Top-quality components in rugged hand-wired chassis. 26.965 to 27.255 mc. High-level modulation, improved low-noise front end. "S" meter and neon modulation indicator standard.

### NOW FROM HALLMARK! NEWEST ADVANCE IN IMPROVED MULTI-PURPOSE TRANSCIVER TESTERS!

Price \$ 49.50



A precision instrument designed to assist the technician in installation and servicing of low power transceivers. Measures: RF power (absolute) 0-5 w.; 0-120% amplitude modulation; VSWR; Produces a 100mw carrier (with or without amplitude modulation of a 1000 cps tone) for checking receivers; Use as a field strength meter.



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Commercial Electronics Corp., a marketing subsidiary of the company, added that factory stereophonic high fidelity unit sales are running 12 percent ahead of last year.

Mr. Theis credited much of the increase in sales to Sylvania's new straight line distribution program of factory to dealer sales that is in effect in many of the major metropolitan markets.

#### B & K Test Records

Model QR-2007 monophonic, and Model QR-2009 stereophonic test records set for testing tape and record players are introduced by B & K Instruments. There are five of the 12-in. records in a set, each with identical sides, providing 10 sides per set, enough to guarantee a great number of playings before record characteristics are altered by wear. Each side contains a series of ten logarithmic sweeps from 20 to 20,000 cps. Each sweep is preceded by a 1 kc reference and starting signal. This starting signal synchronizes the paper-drive mechanism of graphic level recorder in systems employing the Model 4409 response test unit.

#### Admiral Gets Sencore Line

The National Service Div. of Admiral Corp., Bloomington, Ill., has tested and approved the Sencore Test Equipment line for distribution through all Admiral distributors. Admiral's National Service Div. has outlined a complete merchandising program for the Admiral distributors.

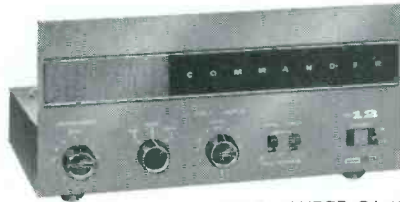
#### Phono Sales Soar

First quarter phonograph sales were ahead of last year's for both monophonic and stereophonic types, the Electronic Industries Association reports.

Sales of stereos rose from 256,257 sets. Last year March sales totaled 236,051 and the first quarter ended with 569,213 stereos sold.

March monophonic sales totaled 78,922, compared to 73,424 the month before and 63,206 in March 1962. Cumulative sales of monophonics totaled 233,392, against a first quarter total of 162,192 last year.

# Harman-Kardon Shatters Old Concepts of Economy-Class Public Address Amplifiers!



COMMANDER CA-12

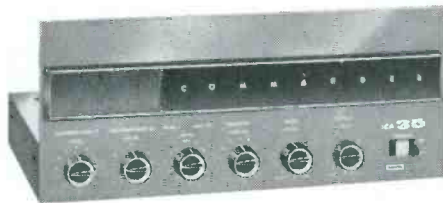
## New performance and versatility standards with the "CA" SERIES COMMANDER

*Unprecedented!* 5 New Commanders . . . every one with CERTIFIED POWER RATING! Now you can plan a job accurately, get the results you expect!



COMMANDER CA-23

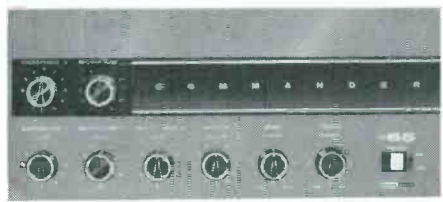
*Versatile!* Inputs for High and Low Impedance Mics—with on-chassis socket for plug-in mic matching transformer! Every quality or cable length requirement is now satisfied!



COMMANDER CA-35

*Expandable!* Add Mic Channels as Needed! Space provided on medium and high power models for two additional mic channels. Up to four mic inputs now possible.

*Fidelity!* Socket for an optional plug-in mag phono-tape head preamp with genuine built-in RIAA and NARTB equalization. Works in aux channel; avoids loss of a mic input.



COMMANDER CA-65  
with extra mic pre-amp installed

*Adaptability!* Every Commander can be set up for precedence operation, essential for background music systems, special and emergency announcements, etc. CA-12 has MIX-MUSIC-PAGE switch; all others function automatically.

*Flexible!* Optional area speaker selector assembly installs in CA-35/65/100 to provide selective paging and musicasting to any or all of 8 areas.

*It's impossible . . . to add here the numerous other MAJOR features of this remarkable new economy class public address line. But, a big new free catalog tells you the whole story about Commander and provides valuable, revealing information about public address amplifiers generally . . . Send for it.*



COMMANDER CA-100  
with extra mic channels and area selector switch assembly

HK-108

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# You May Qualify for A Government Loan

Small Business Administration  
can and has helped  
TV-radio Hi Fi dealers  
with financial assistance



■ A review of recent loan-listings from the government Small Business Administration shows that few Radio-TV-Hi Fi service-dealers and technicians are using this service. Some are—including small one and two-man operations.

The SBA has made more than 34,000 loans to small businesses, totaling \$1.6 million, since its inception almost 10 years ago. The federal agency was created by Congress in 1953 solely to "aid, counsel and assist" small firms.

Through a network of 60 field offices which are staffed by individuals trained in the problems and needs of small firm ownership and management, the SBA extends its programs of assistance — without charge.

The agency has established four main programs of assistance to fulfill the role given it by Congress:

1. Financial assistance, including business and disaster loans.

2. Licensing of privately-owned small business investment companies for the purpose of lending equity-type money to small firms.

3. Helping small concerns obtain government contracts.

4. Management and research assistance.

To be eligible for assistance from SBA, a firm must meet size stand-

ards set by the agency. Generally, a business is defined as small if independently owned and operated and not dominant in its field. Size standards are periodically revised and the current size definition for TV-radio dealers and service businesses is available from any SBA field office.

## SBA Services

Financial services offered by the SBA to small businessmen to encourage successful small business operation include long-term loans for construction, expansion, modernization and for capital expansion.

Before applying to the SBA for a loan, the small business first must have attempted to obtain the needed money from a local bank or other lending institution. If it fails in securing help, one of SBA's loan plans may be available. SBA frequently works out a participation loan with a private bank. The agency attempts to avoid government competition with banks or lending institutions. About 65 percent of all SBA business loans are made in participation with local financial institutions. The agency has instituted several new lending programs designed to reduce paperwork and time for all concerned.

In addition to business loans, the agency makes disaster loans to business or home owners suffering damage from natural catastrophes. These loans are made at 3 percent interest and are used for reconstruction or replacing lost furnishings or business machinery, equipment and inventory. Although there is no limit on the amount SBA may lend to a disaster borrower, the amount is fixed by the actual tangible loss suffered by an applicant. Disaster loans have a maximum maturity of 20 years.

## SB Investment Act

To provide additional long-term financing for small business, Congress passed the Small Business Investment Act in 1958. It authorized the SBA to license and regulate privately-owned small business investment companies (SBICs). These SBICs in turn provide long-term and equity-type financing to small firms. More than 650 SBICs have been licensed to date. Total capital and surplus available for investment in small business is almost \$550-million. Current SBIC listings by states may be obtained from SBA field offices.

This program is intended to stimulate and supplement the flow of private equity capital and long-term

loans which small businesses need for the sound financing of their operations and for growth, expansion and modernization. These SBICs offer financial assistance to small firms in several ways: through purchase of convertible debentures, through purchase of capital stock in a small business, by purchase of debt securities and through long-term loans.

#### Management Assistance

Since poor managerial ability is one primary handicap of small business, SBA has established an extensive program designed to help small businessmen improve management skills.

Through this management pro-

gram and research assistance, the agency co-sponsors administrative management courses in cooperation with leading educational institutions. Many businessmen report using the ideas gained through these courses to achieve substantial and profitable improvements in their operations.

Because of the limited time available to small businessmen, courses are usually held once a week in the evening, and last from 6 to 8 weeks. Courses cover small business finance, management, marketing, personnel management and other subjects.

SBA also provides many publications exploring the problems of small business ownership-management, many of which are available

without charge at the agency's 60 field offices. Others are available at nominal cost from the government printing office. SBA's three series of leaflets, called Management, Technical, and Small Marketers Aids, cover "Problems of Small Retailers," "Is Your Store A Sales Builder or Barrier?," "Keeping Overhead Costs in Line," "Guides For Profit Planning," "A Handbook of Small Business Finance" and "Making Your Sales Figures Talk." These are some samples of SBA's publications. There are many others and almost any businessman is sure to find a number of appealing titles that will help him improve his business. A full list of these publications is available at any SBA office.

### Here's the current directory of the 60 SBA field offices

#### ALABAMA, Birmingham 3

Fred H. Foy, Branch Manager  
Small Business Administration  
First Savings & Loan Assn. Bldg., 3rd Floor  
2030 First Ave., N.

#### ALASKA, Anchorage

Edward T. Brehm, Acting Branch Manager  
Small Business Administration  
307 E. Penthouse Federal Bldg.  
P. O. Box 1253

#### ARIZONA, Phoenix

Claire M. Dolan, Acting Branch Manager  
Small Business Administration  
Central Towers Bldg.  
2727 N. Central Ave.

#### ARKANSAS, Little Rock

Chris W. Ferguson, Branch Manager  
Small Business Administration  
3209 Federal Office Bldg.  
700 W. Capitol Ave.

#### CALIFORNIA, Los Angeles 13

Alvin P. Meyers, Regional Director  
Small Business Administration  
312 W. 5th St.

#### CALIFORNIA, San Francisco 5

Edward L. Turkington, Regional Director  
Small Business Administration  
525 Market St.

#### COLORADO, Denver 2

Harold R. Smethills, Regional Director  
Small Business Administration  
Railway Exchange Bldg.  
909 17th St.

#### CONNECTICUT, Hartford

William O. Van Blarcom, Branch Manager  
Small Business Administration  
44 Gillett St.

#### FLORIDA, Jacksonville

Kennon H. Turner, Branch Manager  
Small Business Administration  
Jacksonville National Bank Bldg., 4th Floor  
47 W. Forsyth St.

#### FLORIDA, Miami 32

Thomas A. Butler, Branch Manager  
Small Business Administration  
Huntington Bldg., Room 301  
168 SE. First St.

#### GEORGIA, Atlanta 3

James F. Hollingsworth, Regional Director  
Small Business Administration  
90 Fairlie St., N. W.

#### HAWAII, Honolulu

George Shiroma, Branch Manager  
Small Business Administration  
Finance Factors Bldg.  
195 S. King St.

#### IDAHO, Boise

Oliver T. Davis, Branch Manager  
Small Business Administration  
214 Senna Bldg.  
910 Main St.  
P. O. Box 933

#### ILLINOIS, Chicago 3

Richard E. Lassar, Regional Director  
Small Business Administration  
Bankers Bldg., Room 430  
105 W. Adams St.

#### INDIANA, Indianapolis 4

Earl W. Merry, Branch Manager  
Small Business Administration  
Farm Bureau Insurance Bldg., Room 721  
130 E. Washington St.

#### IOWA, Des Moines

Edward B. Storey, Branch Manager  
Small Business Administration  
850 Insurance Exchange Bldg.  
Fifth & Grand Ave.

#### KANSAS, Wichita 2

Vernon F. Coss, Branch Manager  
Small Business Administration  
Board of Trade Bldg., Room 215  
120 S. Market St.

#### KENTUCKY, Louisville 2

Richard B. Blankenship, Branch Manager  
Small Business Administration  
Commonwealth Bldg., Room 1900  
Fourth & Broadway

#### LOUISIANA, New Orleans 12

Justin Green, Branch Manager  
Small Business Administration  
Federal Office Bldg., Room 303  
610 South St.

#### MAINE, Augusta

Maurice F. Williams, Branch Manager  
Small Business Administration  
116 State St.

#### MARYLAND, Baltimore 2

Meredith R Hoffmaster, Branch Manager  
Small Business Administration  
Calvert Bldg., Room 611  
Fayette & St. Paul St.

#### MASSACHUSETTS, Boston 2

Thomas J. Noonan, Regional Director  
Small Business Administration  
Sheraton Bldg.  
470 Atlantic Ave.

#### MICHIGAN, Detroit 26

Robert F. Phillips, Regional Director  
Small Business Administration  
232 W. Grand River Ave.

#### MINNESOTA, Minneapolis 2

Harry A. Sieben, Regional Director  
Small Business Administration  
Lewis Building  
603 Second Ave., So.

#### MISSISSIPPI, Jackson 1

George A. Field, Branch Manager  
Small Business Administration  
U.S. Post Office & Courthouse Bldg., Rm. 322  
Capital & West Streets

#### MISSOURI, Kansas City 6

C. I. Moyer, Regional Director  
Small Business Administration  
Home Savings Bldg., 5th Floor  
1006 Grand Ave.

#### MISSOURI, St. Louis 3

Mrs. Ruby H. Koelling, Branch Manager  
Small Business Administration  
Federal Bldg., Room 2469  
1520 Market St.

#### MONTANA, Helena

Rex B. Zachary, Branch Manager  
Small Business Administration  
Power Block, Room 205  
Corner Main & Sixth Ave.  
P.O. Box 1690

# Government Loans *Continued*

## NEBRASKA, Omaha 2

Lyle S. MacKenzie, Branch Manager  
Small Business Administration  
Federal Bldg., Room 7425  
215 N. 17th St.

## NEW HAMPSHIRE, Concord

Josephat T. Benoit, Branch Manager  
Small Business Administration  
DuBois Bldg.  
72 N. Main St.

## NEW MEXICO, Albuquerque

Dick A. Valdez, Branch Manager  
Small Business Administration  
U.S. Courthouse, Room 102  
Fifth & Gold Streets, S.W.

## NEW YORK, New York 4

Charles H. Kriger, Regional Director  
Small Business Administration  
42 Broadway

## NEW YORK, Syracuse 2

Norbert J. Finkler, Branch Manager  
Small Business Administration  
Chimes Bldg., Room 1206-08  
500 So. Salina St.

## NORTH CAROLINA, Charlotte

Robert B. Horning, Branch Manager  
Small Business Administration  
Independence Bldg., Room 1116  
102 W. Trade St.

## NORTH DAKOTA, Fargo

Paul W. Olander, Branch Manager  
Small Business Administration  
Commercial Life Bldg., Room 300  
207 No. Fifth St.

## OHIO, Cleveland 13

James G. Garwick, Regional Director  
Small Business Administration  
Standard Bldg., 4th Floor  
1370 Ontario St.

## OKLAHOMA, Oklahoma City 2

E. Bruce Cafky, Branch Manager  
Small Business Administration  
U.S. Post Office Bldg., Room 807  
Third & Robinson

## OKLAHOMA, Tulsa

Thorton J. Lucado, In Charge  
Small Business Administration  
Mayo Bldg., Room 519  
420 So. Main St.

## OREGON, Portland

John G. Barnett, Branch Manager  
Small Business Administration  
Pittock Block, Room 330  
921 S.W. Washington

## PENNSYLVANIA, Philadelphia 7

Edward N. Rosa, Regional Director  
Small Business Administration

Jefferson Bldg., Room 1500-15  
1015 Chestnut St.

## PENNSYLVANIA, Pittsburgh 22

Fernand A. Thomassy, Branch Manager  
Small Business Administration  
Fulton Bldg., Room 801-02  
107 Sixth St.

## PUERTO RICO, Santurce

Antonio Yordan, Branch Manager  
Small Business Administration  
San Alberto Condomino Bldg.  
P.O. Box 2442  
1200 Ponce De Leon Ave.

## RHODE ISLAND, Providence 3

Anthony S. Stasio, Branch Manager  
Small Business Administration  
Smith Bldg., Room 611  
57 Eddy St.

## SOUTH CAROLINA, Columbia

Howard M. McKenzie, Branch Manager  
Small Business Administration  
Universal Bldg., Room 109  
1801 Assembly St.

## SOUTH DAKOTA, Sioux Falls

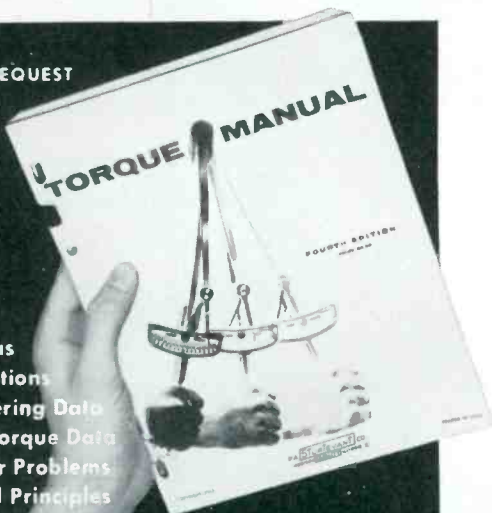
Edwin Jenison, Branch Manager  
Small Business Administration  
Leaders Bldg.  
109½ No. Main Ave.

## TENNESSEE, Knoxville 2

Brice W. Jordan, In Charge  
Small Business Administration  
301 W. Cumberland Bldg., Room 233  
301 W. Cumberland Ave.

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Curry K. White, Branch Manager  
 Small Business Administration  
 Federal Savings & Loan Bldg.  
 301 Security  
 500 Union St.

**TEXAS, Dallas 2**

Robert E. West, Regional Director  
 Small Business Administration  
 Fidelity Bldg.  
 1000 Main St.

**TEXAS, Houston 2**

Henry A. Schumacher, Branch Manager  
 Small Business Administration  
 1424 Hadley St.

**TEXAS, Lubbock**

Jack Teddlie, Acting Branch Manager  
 Small Business Administration  
 Veterans Administration Bldg., Room 212  
 1616 19th St.

**TEXAS, Marshall**

Rush Crain, Branch Manager  
 Small Business Administration  
 Marshall National Bank Bldg., Room 509  
 101 E. Austin St.

**TEXAS, San Antonio 5**

W. E. Woodman, Branch Manager  
 Small Business Administration  
 Kallison Bldg., Room 412  
 434 So. Main Ave.

**UTAH, Salt Lake City**

Ross S. Tyson, Branch Manager  
 Small Business Administration  
 Kearns Bldg., Room 520  
 136 So. Main St.

**VERMONT, Montpelier**

Gordon W. Morris, In Charge  
 Small Business Administration  
 79 Main St.

**VIRGINIA, Richmond 26**

Clarence P. Moore, Regional Director  
 Small Business Administration  
 Executive Office Bldg.  
 Post Office Box 8565  
 1904 Byrd Ave.

**WASHINGTON 25, D.C.**

Arthur H. Doll, Branch Manager  
 Small Business Administration  
 First Federal Bldg.  
 608 13th Street, N.W.

**WASHINGTON, Seattle 4**

William S. Schumacher, Regional Director  
 Small Business Administration  
 Smith Tower, Room 1206  
 506 Second Ave.

**WEST VIRGINIA, Charleston**

Small Business Administration  
 United States Courthouse & Federal Bldg.  
 500 Quarter St., Room 3000

**WEST VIRGINIA, Clarksburg**

Delbert E. Williams, Branch Manager  
 Small Business Administration  
 Old Post Office Bldg.  
 227 W. Pike St.

**WISCONSIN, Madison**

Edward P. Kowerski, Branch Manager  
 Small Business Administration  
 Commercial State Bank Bldg.  
 114 N. Carroll St.

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## FREE LITERATURE

### DISTRIBUTION EQUIPMENT 300

A line of television distribution equipment for homes, motels, apartment buildings and hospitals is reviewed in this report. The information, including photographs, charts, block diagrams and specifications, covers a wide range of newly developed systems and components. Distributor Sales Div., Jerrold Electronics Corp.

### SEMICONDUCTORS 301

This full color 32-page brochure features a line of rectifiers, assemblies, transistors, thermistors, thermoelectric coolers, including JEDEC numbers and specifications with operating conditions. Schweber Electronics.

### TUBES 302

"The Box With No Bottom" — a 16-page booklet characterizes the electronic tube carton as a magician's box from which come an end-

less variety of developments and products. The book contains details of 22 recent developments in compactrons, receiving tubes, ceramic tubes, photoconductive cells and reed switches. General Electric Co.

### CARTRIDGE REFERENCE 303

Cartridge cross-reference data is divided into two sections: Cartridge to cartridge and phonograph to cartridge. The manual is also indexed by models for fast easy reference. Over 4000 cartridges and phonograph models are listed. The manual is printed in two colors and contains 24 pages. Sonotone Corp.

### CARDIOID MICROPHONES 304

A definitive "Fact and Fiction" guide details specific unidirectional characteristics and performance features that should be expected from a true cardioid microphone. The guide explains common claims for, and misconceptions about, so-called cardioid microphones with facts based upon a precise mathematical formula which limits and defines the term "cardioid." Shure Brothers, Inc.

### WIRE AND CABLE 305

This 1963 Electronic Wire Catalog #863 is said to be the most complete wire catalog in the industry. The catalog has a chart called the Cable Finder. It references the number of conductors, gages of the conductors and shield construction to trade numbers and to the wire catalog page. Belden Manufacturing Co.

### NARROW BAND RADIO 306

Bulletin ECR-1064 describes Federal Communications Commission rules which take effect in November, 1963. Of special interest to wide band FM users who have not already converted, this bulletin explains narrow band operation, the reason for the FCC ruling, who is affected and how transmitters must be changed. It also explains converting possibilities to comply with the mandatory rules. General Electric Communication Products Dept.

### INDICATOR LIGHTS 307

This catalog discusses the principles, design and construction of STI-series Sub-Miniature Transis-

torized Indicator Lights. Two general classes of lights are described. The catalog, designated as No. L-166B, consists of 10 pages in two colors. Dialight Corp.

### SPEAKERS 308

Five speakers and two transformers are described in this bulletin. The units are for low level background music and can also be used for inexpensive Hi Fi units. For the automotive replacement field, many speakers with popular voice coil impedances are cataloged. Quam-Nichols Co.

### FLEXIBLE PHONO NEEDLE 309

This cross-reference brochure lists over 1400 phonograph models now in use in which a flexible, virtually unbreakable needle can be installed. A special formulated butyl rubber makes possible the flexing action of the Sono-Flex needle. This rubber expansion link between the shank and lever arm of the needle assembly gives the needle the springiness that enables it to withstand rough treatment. Sonotone Corp.

### MASTER CATALOG 310

Titled FR-64, this 340 page book contains over 15,000 products for the dealer. Product lines included color TV antennas, couplers, UHF and FM antennas. Named the "Colormagic Line," the group contains antennas for all reception areas with particular attention to keep fringe reception. Included are an updating of all tool, chemical and service aid lines, as well as strong emphasis on phono-recorder drives and belts. GCElectronics Co. drives and belts. GC Electronics Co.

### SPEAKERS 311

A line of Hi Fi speakers is presented along with specifications and comments from various turntables. Acoustic Research, Inc.

### RELAY CATALOG 312

Relay Catalog No. 63-3 presents comprehensive specifications, and consolidates them together with dimensional illustrations. It is designed to facilitate relay selection and ordering. All of the approximately 200 relay models detailed in the 10 page catalog are stock items. Kurman Electric Co.

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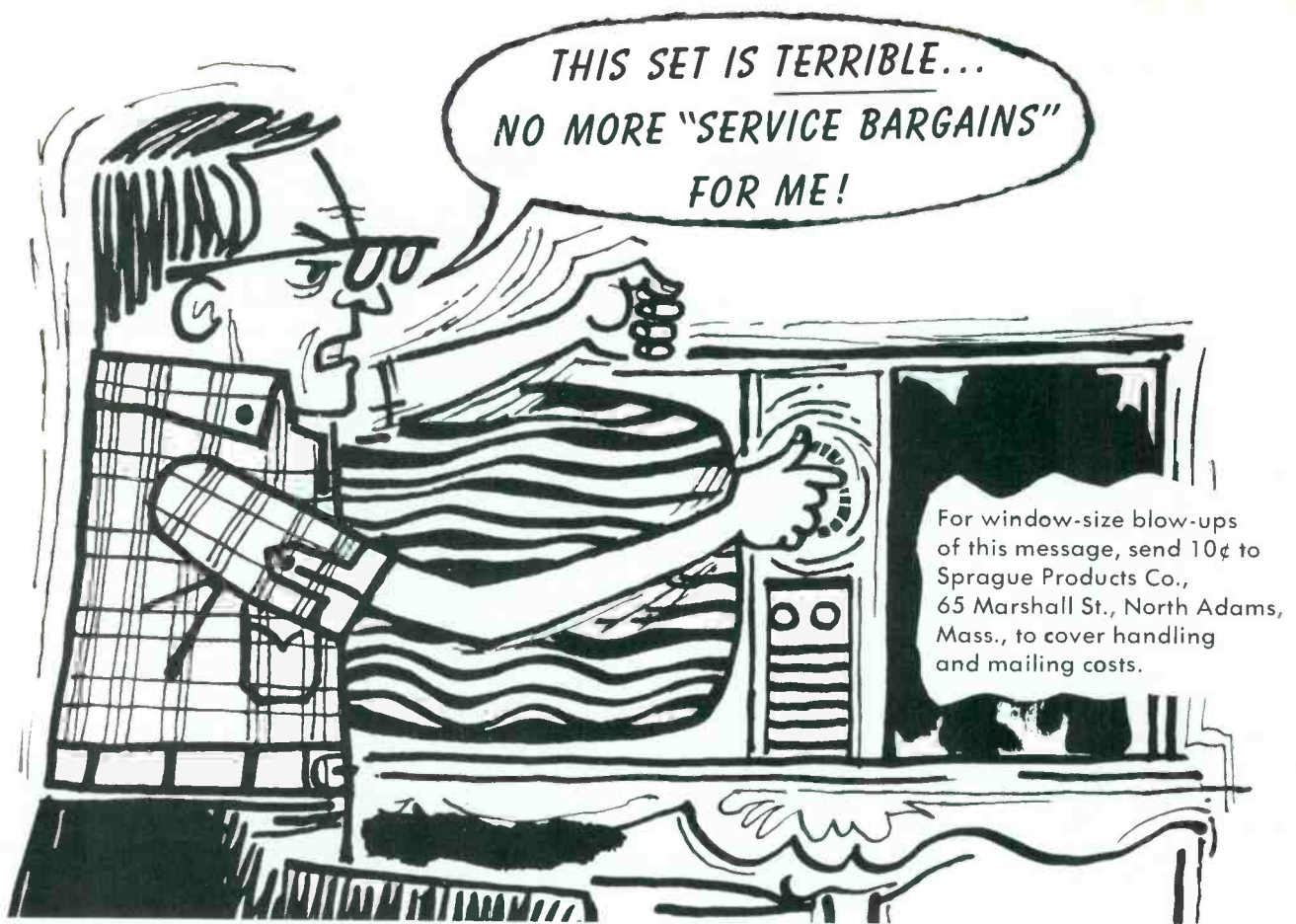
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## HOW TO BE SURE OF GOOD TV SERVICE...

**1. Beware the Service "Bargain."** If you shop around for cut-rate prices or extra-liberal service contracts, you're *asking* for trouble. A "something-for-nothing" offer usually means cut-rate parts and substandard service methods. The *reputable service dealer* spends years in study and training—thousands of dollars on test equipment, tools, and service manuals—countless hours in keeping up-to-date on new developments and service techniques. Because of this heavy investment, he can't *afford* to offer "bargains."

**2. Rely on a Fully Qualified Independent Service Dealer.** Well known and highly regarded by your friends and neighbors, his professional training and experience have made him a real technical expert. He takes pride in his work. He wants to stay in business. And he stakes his reputation and his future on satisfying *you*. So he'll use only component parts of the highest quality and latest design—plus his thorough knowledge and keen skills—to do the job right. Depend on him; he can't *afford* to let you down!

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**YOUR INDEPENDENT TV-RADIO SERVICE DEALER**

65-342

## ... 'TOUGH DOGS'

*Continued from page 56*

loss of vertical sync did not follow a pattern of drifting as is usually the case with a component change due to heat, but rather, the blanking bar might move down the screen one time, and then up the screen the next. With this in mind it was decided that the trouble was not caused by change in value of a component, but was caused from oscillator triggering by a frequency near the oscillator frequency. Following this theory 60 cycle ac was the prime suspect. Since defective tubes had already been eliminated, a close checking and dressing down of all filament leads around this circuit was made, but still with no results. The scope was then turned to (it had already been used in checking vertical waveforms and waveforms in the sync circuits which were all acceptable) in checking the ripple of the B+. Sure enough, the ripple of the B+ showed a little in excess of 5 v P-P. Once the output filter was bridged, but the ripple

was only slightly decreased; next the output filter was removed from the circuit and another wired in, but the ripple remained constant. The input filter was then changed along with the choke, but still no results in lowering the output ripple; higher value of filters were tried which did help, but did not give satisfaction. In desperation, a new choke and output filter capacitor were added to the filter circuit of the set with the result being a ripple at the output slightly less than 2 v P-P. This not only gave satisfaction in the amount of ripple, but also eliminated the problem of losing vertical sync.

Why there was such a problem in filtering the B+, I do not know. Your answer is good as mine, but the set is working fine now, and has been for some time; nevertheless, the B+ ripple created quite a "tough dog." — *Joe R. Sport, Patsburg, Ala.*

with photos, drawings and schematics. But authors and publishers omitted one important revision in the text. Every beginner in this business aspires to become an *electronic technician* — not a "serviceman." And every TV-radio technician we have ever met resents being called a "serviceman." Despite this omission we can recommend the book's technical aspects — as we did the 1st edition.

**SERVICING HORIZONTAL SWEEP CIRCUITS.** *By Wayne Lemons. Published by Howard W. Sams & Co. Inc. 112 pages, soft cover. \$2.50.*

Not since the knowledge-explosion began — followed by recorded information-tremors from book publishers — have we come across a book that communicates more information in fewer words than this one. If you ever get "cornered" by a "dog" this is the weapon to reach for. Chances are it will get you out of the corner. The text is not a general theoretical discussion of horizontal sweep circuit problems. It is practical and oriented toward circuits in present-day TVs. Cathode coupled horizontal multivibrators with diode phase detectors, "synchronphase" stabilized blocking oscillators, Hartley reactance-tube-controlled oscillators, and Colpitts oscillators with triode phase detectors are all included. In plain simple language you are told how to cure "piecrusting," "Christmas treeing," drift, narrow raster, poor linearity, and many other faults characteristic of horizontal sweep circuits. Flybacks, yokes, boost and anti-hunt circuits are covered. The book is adequately illustrated with schematics, photos and drawings. And we can recommend it.

## NEW BOOKS

**PRACTICAL RADIO SERVICING 2nd Edition.** *By William Marcus and Alex Levy. Published by McGraw-Hill Book Company, Inc. 624 pages, hard cover. \$11.95.*

This book was designed for the beginner. It can be used with maximum benefit in technical high schools, electronic classes in vocational and technical schools. In fact, it can serve as an excellent text wherever radio servicing is taught. It gives all the basic information necessary to understand radio servicing procedures. It describes the operation and application of basic test instruments for successful service work. It proceeds from simple to advance techniques in an orderly step-by-step manner. And its contents can provide a valuable reference for the apprentice and the advanced technician. All previous material has been updated and includes information on transistor receivers, printed circuits, hybrid and all-transistor receivers, FM receivers with multiplexing — stereo receivers and phonographs. The book is adequately illustrated

## ... TV SHOP INSURANCE

*Continued from page 41*

spread around in this manner are so small that no one agent has incentive to do an adequate job for them.

However, even before the advent of "packaged" insurance, many dealers decided to do all or most of their business with one independent agent. In this way, one man checks

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to see that the dealer is not under or over-insured. Under this system, expiration dates and policies can be made more uniform, and billing and handling premiums is an easier task.

#### The Package Policy

The package policy for retail stores accomplishes several things. First, it requires that a dealer carry adequate insurance against direct physical damage and liability. To this basis nucleus, he can add additional coverages to fit his special needs.

Cost of the package is normally at least 15 percent less than the cost of purchasing separate policies for all areas covered. Here is what a dealer can have with a package policy:

- A broad list of direct physical damage coverages, with which he may obtain business interruption insurance.

- Coverage for his neon, automatic or mechanical signs, and coverage for glass and equipment.

- Liability insurance written on a storekeepers liability basis, which protects against claims for bodily injury or property damage arising from the operation of the business — including medical payments for injured persons, regardless of legal liability. The storekeepers legal liability policy — a package in itself — covers premises and operations, product and completed operations, elevator liability and contractual liability.

If a dealer doesn't want or qualify for this type of coverage, his liability may be written under owners, landlords and tenants forms, which permits exclusion of certain items. Also, OLT may be written on large stores, while the upper limits for eligibility under storekeepers liability are \$375,000 annual gross sales, or 3000-square-feet of area.

Under packages available is a comprehensive crime coverage with these options: (1) employee dishonesty, (2) loss inside the premises, (3) loss outside the premises, (4) loss on money orders or counterfeit paper and (5) depositors forgery.

At the present time, most packages — which go under the general title of "merchantile package policy" — do not include package credit for automobile, health, or

life insurance, or workmen's compensation. But the latter are a part of an intelligent insurance program.

In summary, the package policy:

- Requires a dealer to carry certain coverages.

- Gives him cause to question purchasing separate policies and reciprocity.

- Saves him money, compared with purchasing separate policies for equal coverage.

Finally, the technician-dealer should be cautioned to give all the details of his service work to his

insurance agent. He will then be sure he is covered under all circumstances which are peculiar to service-type work. Repair shops often have problems arising from the fact that they have property on their premises which is being repaired. The dealer should carefully check his responsibility for the property of others in planning an intelligent insurance program. ■

*Information for this article was compiled by C. Harvey Kelly, director of research and development for the National Association of Insurance Underwriters.*

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## ... FCC LICENSE

*Continued from page 45*

25, D. C. Ask for the "Special Study Guide and Reference Material" which covers elements 1 & 2 (3rd class examination). Another booklet, "Study Guide and Reference Material for Commercial Radio Operators," costs 75 cents from the U. S. Government Printing Office, Superintendent of Documents, Washington 25, D.C. Send a money order — they will not accept stamps. This study guide contains about 600 questions from which the FCC may select examination questions. The book contains no answers to questions.

The FCC study guide merely reveals the examination's scope. Although most of the examination questions are chosen from it, it does not mean that the applicant will get the questions in the same exact form as they appear in the study guide. Sometimes the questions are completely reversed. The guide may ask, for instance, "What happens when the plate current of an audio amplifier stage is too low?" In the actual examination, the question may be phrased, "What happens when the plate current of an audio amplifier stage is too high?" This makes it necessary for you to know your radio subjects. Rote learning won't pull you through.

For the 600 answers to questions contained in the FCC study guide it is necessary to obtain a regular

Q & A book. There are a number of good books available. Be sure to get books with the latest copy-right dates. Examination questions and patterns do change.

### Pre-Examination Tips

Before taking a test you should make sure that you have a good working knowledge of the simpler, more familiar formulas involved in radio theory: ohms laws, power formulas, resonant circuit formulas, time constants, etc. These problems are few and not too difficult. Usually they require only simple computations. But you must be adept in handling them or valuable time will be lost groping around. The Q & A books contain many typical examination problems; these should be studied till they can be solved quickly.

Finally, brush up on most of the familiar radio circuits: basic oscillators; RF and AF stages. Know the standard, single-ended and push-pull audio circuits so they can be drawn if one is asked for. Few diagrams are requested. You may be asked to correct a schematic improperly drawn. To the experienced service technician this presents no big problem.

Some of the questions are simple at the start. But when the 50th question is reached, the applicant may begin to realize that the FCC means business. Yet, to one who has studied diligently, there is nothing in the examination that is frightening. It should not be too difficult to make that coveted 75 percent passing grade. Thousands have done it.

If you should fail, you can go back for another test — after a 60 day wait. No — you won't get the same set of questions the second time. But you'll probably have an easier time on the second try.

Passing an FCC test is clear proof of an applicant's electronic knowledge and skill. The FCC license can be displayed with pride. It is a mark of distinction — official recognition of a worth-while accomplishment. And it gives you a competitive "edge" over the technician who doesn't have one. ■

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Unusual opportunity in an important new electronic field for qualified radio or TV electronic technician. Basic electronic knowledge and practical field experience required. Position offers attractive salary and splendid opportunity for career advancement.

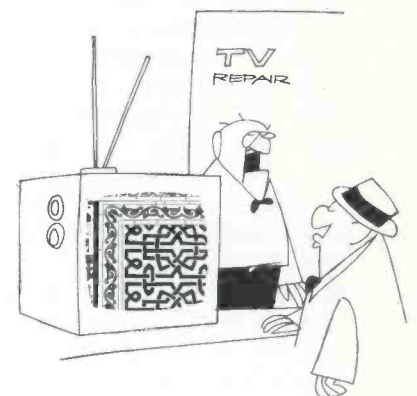
Please send resume to:

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### ELECTRONIC TECHNICIAN

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**LOOK!**

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All crystal controlled

## A STANDARD COLOR BAR GENERATOR

at **1/2**  
THE COST OF OTHERS

only **\$99<sup>50</sup>**

# the all new **SENCORE** CG126 STANDARD COLOR BAR GENERATOR

A standard color bar, white dot, crosshatch generator especially made for field service on color TV . . . and at a great savings to you.

Check these outstanding features and you will see why this generator belongs on the top of your list for color TV servicing.

**All patterns crystal controlled offering "rock like" stability.** You'll think the patterns are painted on the TV screen.

**Simplified operation speeds up every servicing job.** Just dial the standard keyed bars, white dots, crosshatch, vertical bars or horizontal bars and watch them "pop" on the screen. That's all there is to it.

**Exclusive adjustable dot size.** The white dots can be adjusted to the size that satisfies your needs by a screwdriver adjustment on the rear. No need to argue about dot size anymore. Just select the size that you like to work with best.

**Pretuned RF output to Channel 4.** Other low channels can be selected if Channel 4 is being used in your area by simple slug adjustment. Patterns are injected directly into antenna terminals, simplifying operation and saving servicing time.

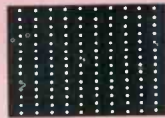
**Reserved output on color bars** for forcing signal through defective color circuits. The color output control is calibrated at 100 percent at the center of rotation, representing normal output. A reserve up to 200 percent is available on the remainder of rotation.

**Smaller and more portable.** With color receivers weighing much more than black and white TV, portable equipment becomes essential for home servicing. The CG126 weighs less than 10 pounds and measures only 11" x 8" x 6".

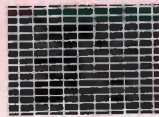


phases . . . but without need of interpretation when servicing.

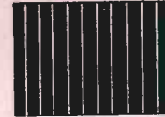
Ten standard keyed color bars (RCA type) that automatically provide all colors at specified NTSC



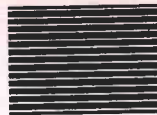
Stable white dots with new exclusive dot size adjustment in rear.



Stabilized crosshatch pattern for simplifying convergence adjustments.



10 thin white vertical lines for horizontal dynamic convergence adjustments . . . often missing on other generators.



14 thin horizontal lines for vertical dynamic convergence. Also missing on many high priced generators.

**March into your local parts distributor and demand the CG126 Sencore color generator that sells at 1/2 the price of others. Don't let him switch you.**

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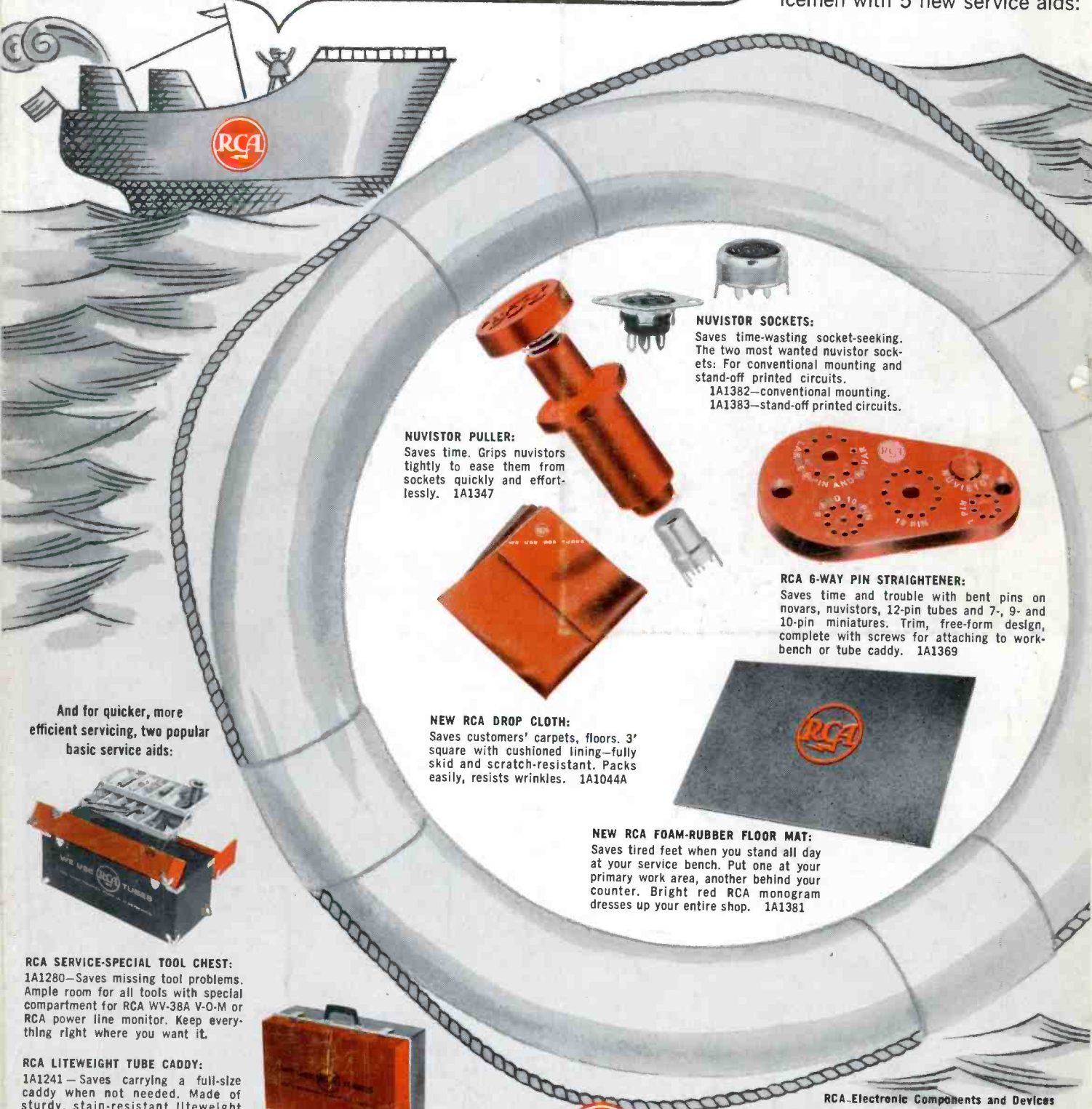
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And for quicker, more efficient servicing, two popular basic service aids:



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**NUVISTOR PULLER:**

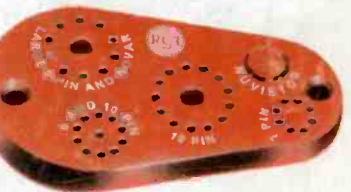
Saves time. Grips nuvistors tightly to ease them from sockets quickly and effortlessly. 1A1347



**NUVISTOR SOCKETS:**

Saves time-wasting socket-seeking. The two most wanted nuvistor sockets: For conventional mounting and stand-off printed circuits.

1A1382—conventional mounting.  
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Saves time and trouble with bent pins on novars, nuvistors, 12-pin tubes and 7-, 9- and 10-pin miniatures. Trim, free-form design, complete with screws for attaching to work-bench or tube caddy. 1A1369

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Saves tired feet when you stand all day at your service bench. Put one at your primary work area, another behind your counter. Bright red RCA monogram dresses up your entire shop. 1A1381

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