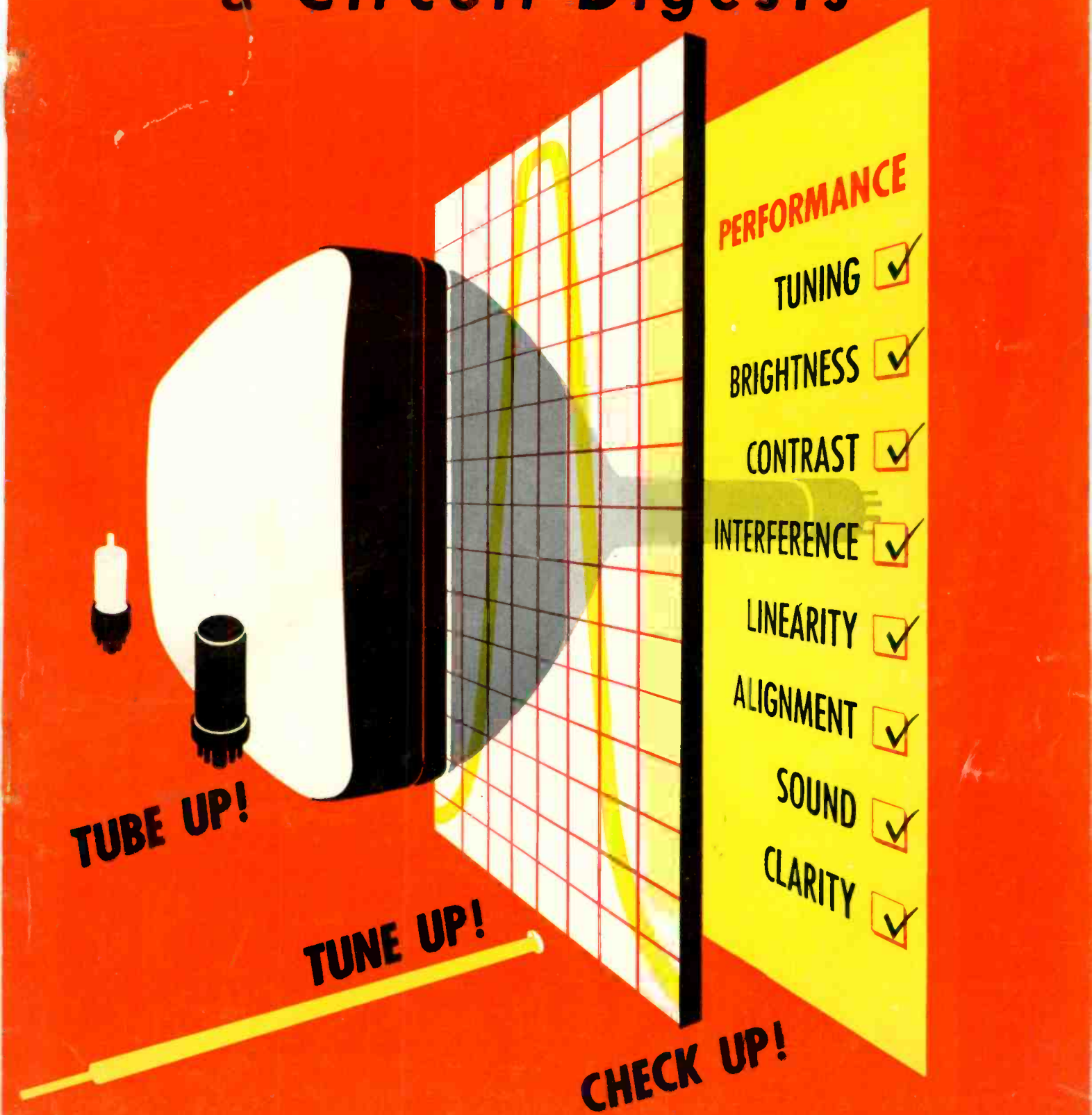
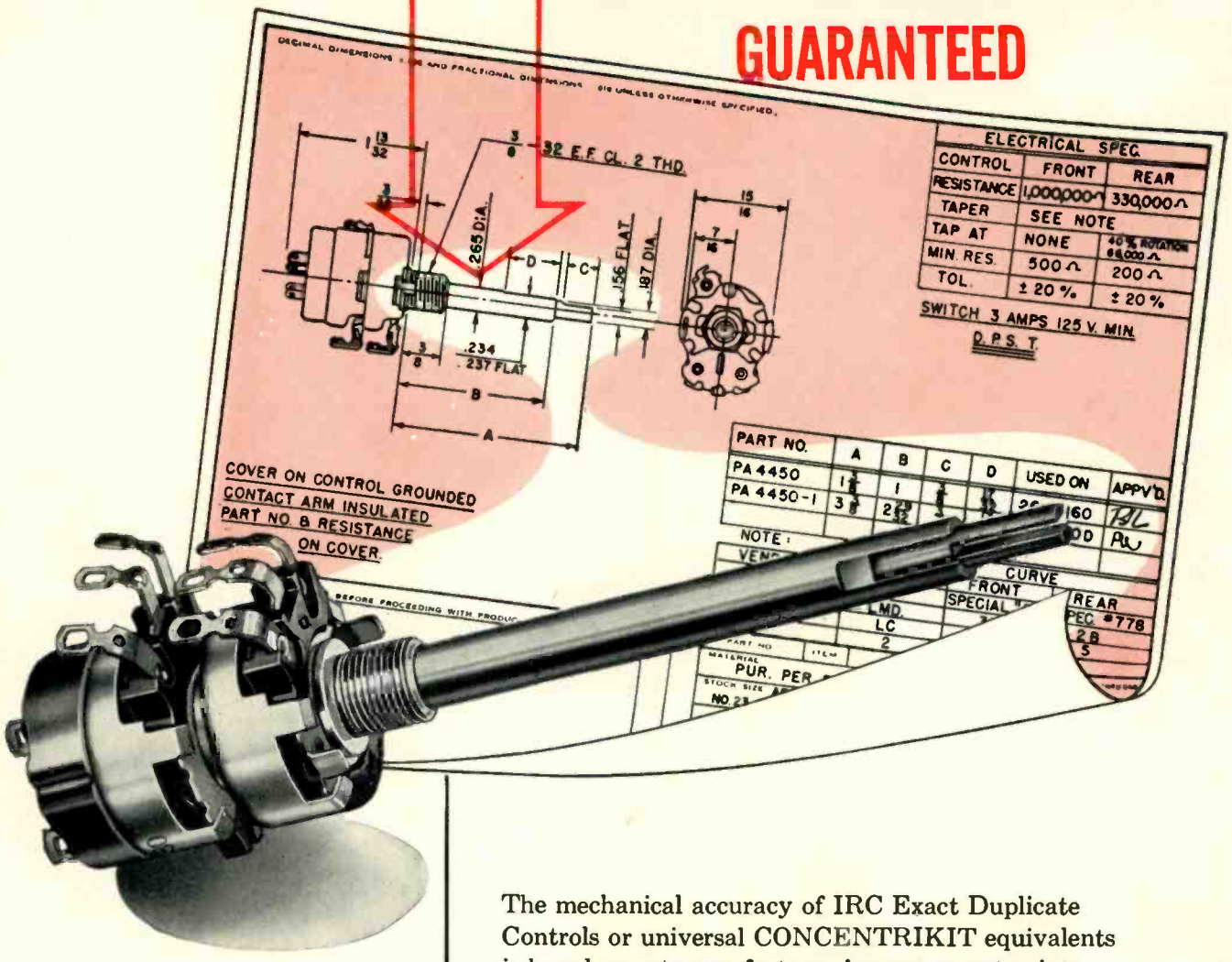
TECHNICIAN

& Circuit Digests



March • 1955

HERE'S WHY IRC EXACT DUPLICATES ARE DOUBLE-MONEY-BACK GUARANTEED



ONLY IRC GUARANTEES SATISFACTORY MECHANICAL FIT AND ELECTRICAL OPERATION OR DOUBLE-YOUR-MONEY-BACK

The typical manufacturer's specifications shown here are *exactly* duplicated by IRC QJ-180 control. CONCENTRIKIT assembly includes P1-229 and R1-312 shafts with B11-137 and B18-132X Base Elements, and 76-2 Switch.

The mechanical accuracy of IRC Exact Duplicate Controls or universal CONCENTRIKIT equivalents is based on set manufacturers' procurement prints. Specifications on those prints are closely followed.

Shaft lengths are *never less* than the set manufacturer's nominal length—*never more* than 3/32" longer.

Shaft ends are precisely tooled for solid fit.

Inner shaft protrusion is accurately duplicated for perfect knob fit.

Alterations are never needed.

For Exact Duplicate Controls, specify IRC. Most Service Technicians do.

IRC

Wherever the Circuit Says ~~~

INTERNATIONAL RESISTANCE CO.

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& Circuit Digests

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*Reg. U. S. Patent Office

MARCH, 1955

FRONT COVER: Three-step program serves as a worthwhile reminder that it's good business to encourage your customers to have you keep their TV receivers in top operating condition. Promote the TUBE-UP, TUNE-UP, CHECK-UP campaign in conjunction with manufacturers' national programs. For a detailed description of what the tube makers are making available to you—selling aids, contests, ads, mailers, posters, etc.—see article starting on page 20.

CAPEHART-FARNSWORTH: Chassis "CX-38" series
GENERAL ELECTRIC: Chassis "N" line
MOTOROLA: Chassis TS-525
RATHEON: Chassis Aristocrat series
WESTINGHOUSE: Chassis V-2315
STANDARD COIL: Model "T" series

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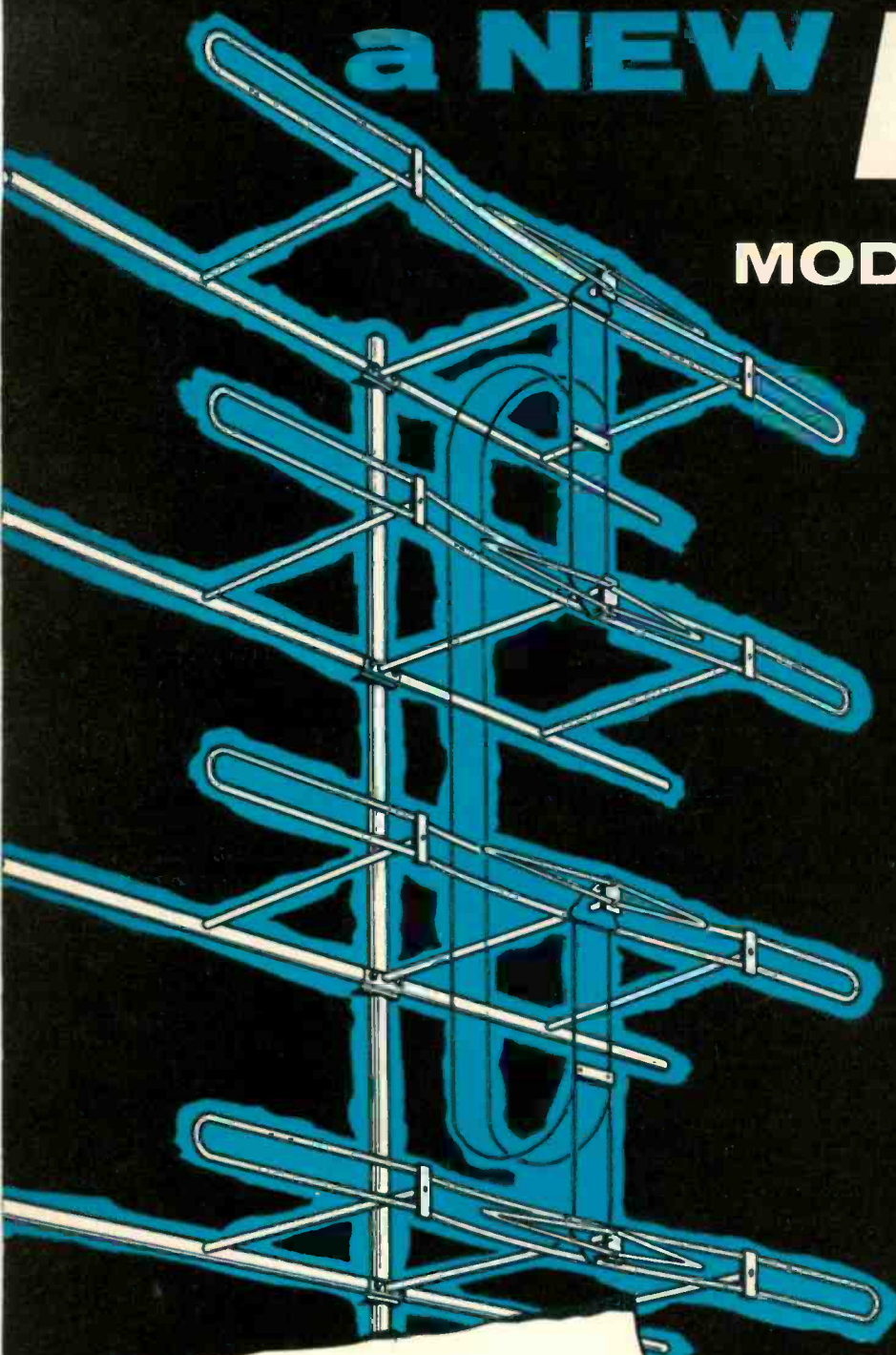
ANNOUNCING

a NEW FINCO®

MODEL F-4

(PAT. PEND.)



with exclusive FIDELITY* PHASING

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

Plus +

Now!

Finest Performance Ever Achieved on LOW-BAND

Acknowledged FINCO Superiority on HIGH-BAND!

"We will stake our reputation on this!"

M. L. Finneburgh, Vice-President, The Finney Company, speaking for the entire FINCO organization:

"The new Finco Model F-4 (pat. pend.) is the closest approach to perfection yet conceived in TV antennas. The F-4 gives the greatest combined performance ever achieved in the Super Fringe Area . . . on both Low and High-band. Upon this, we stake our reputation."

NEW!

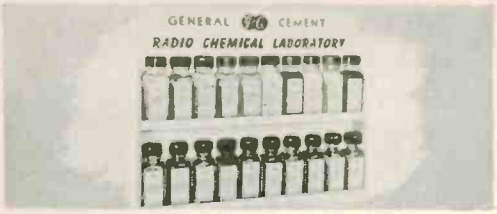
- SENSATIONAL LOW PRICE
- FIDELITY PHASING
- LOW AND HIGH-BAND SUPREMACY
- ENGINEERED FOR COLOR
- UNCONDITIONAL WRITTEN WARRANTY
- FREE TESTING ANTENNA TO QUALIFYING DISTRIBUTORS

WRITE, WIRE OR PHONE TODAY!

The FINNEY Company

4612 St. Clair Avenue
Cleveland 3, Ohio

T-35



G-C RADIO-TELEVISION CHEMICAL LAB
Save time and money, with this complete lab of 20 2 oz. G-C chemicals. Do all repairs to speakers, coils, dials, etc. Free metal rack included.
NO. 997 NET $7.65

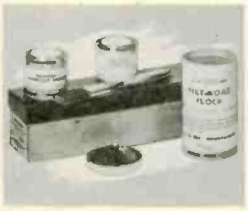
G-C ROOF-SEEL COMPOUND
Seal holes in roofs on roof-top antenna installations. Stop call-backs.
NO. 18-16 Pint can NET $0.60

G-C LENS-TUBE CLEANER
Specially prepared to remove finger marks and spots on picture tube and lens.
NO. 216-2 2-oz. bottle NET $0.36

G-C DE-OX-ID
Cleans and prevents oxidation on all sensitive circuit contacts, switches, etc.
NO. 19-2 2-oz. bottle NET $0.96

G-C INSULATION AND DIPPING VARNISH
Treat field coils, chokes, noisy or buzzing transformers.
NO. 56-2 2-oz. bottle NET $0.39

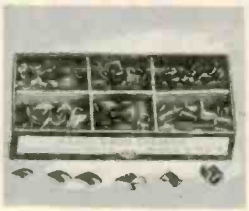
G-C SCRATCH REMOVER
Dark shade covers hairline scratches, renews appearance of TV set, furniture.
NO. 92-2 2-oz. bottle NET $0.30



G-C DELUXE FELT-KOAT KIT
Complete flock finishing kit for applying to turntables, grilles, cabinets, etc.
NO. 180-D NET $2.25

G-C DIAL CORD DRESSING
Prevents dial cord slipping. Simply rub dressing stock on cord. Long lasting.
NO. 1212 NET $0.15

G-C RADIO KNOB KIT
Kit contains 35 assorted walnut and ivory replacement knobs. Includes springs.
NO. 1140 NET $2.82



G-C KNOB SPRING KIT
Kit of 100 knob springs in 12 different styles. Tempered spring steel.
NO. 1051 NET $1.17

G-C TURNTABLE SPRING KIT
Kit of 50 assorted turntable springs for replacement on RCA, Philco, Zenith, etc.
NO. 6478 NET $1.65

G-C WOOD CABINET GLUE
Repair TV and radio cabinets, furniture, etc. Fasten grill cloth, labels.
NO. 39-2 2-oz. bottle NET $0.39

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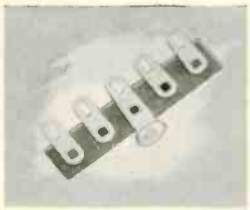
CEMENT

Ask For These
RADIO-TV SERVICE AIDS
... at Your Jobber

G-C RADIO-TV SPAGHETTI
Best grade varnished tubing in 20-ft. lengths. Fit No. 12-No. 18 wire. Five colors.
NO. 499 NET $1.11

G-C MIKE CONNECTOR
Single contact male type, completely shielded. Brass, bright chrome plated.
NO. 7940 NET $0.30

G-C PHONO PLUG
Phono connector for RCA, Philco, Zenith and others. Use also for auto radio.
NO. 1742 NET $0.06



G-C STD. TERMINAL STRIPS
Bakelite insulation 1/16" thick, 3/8" spacing. Five lugs, others 1 to 12.
NO. 1789 NET $0.072

G-C POCKET WIRE STRIPPER
Popular wire stripper is also scraper, cutter, screwdriver and wire winder
NO. 757 NET $0.30

G-C STATIC SPRING
Eliminates auto front wheel static noise. Riveted metal points for firm contact.
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G-C AUTO RADIO TUNER
Handy tuner tool for adjusting auto radio when chassis and cables are removed.
NO. 8285 NET $0.27

G-C FAHNESTOCK CLIPS
Spring brass, 3/4" long x 5/16" wide. No. 6 mtg. hole. Box of 144. Medium Size.
NO. 6302-G NET $2.46

G-C BANANA JACK
Standard jack, insulated 7/16" head. Mounts in 5/16" hole.
NO. 7741 Color Red NET $0.132
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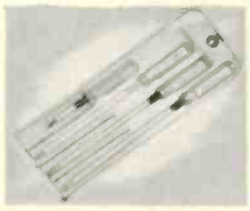
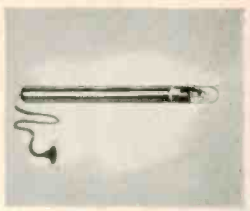


G-C TV ALIGNMENT KIT
Handy versatile alignment tool kit in plastic holder. Four basic tools.
NO. 8457 NET $1.77

G-C HANDLE INSULATORS
Envelope of assorted sizes to insulate handles on pliers, cutters, etc. Neat appearing.
NO. 8118-E NET $0.27

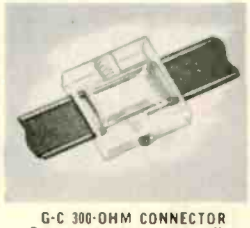
G-C 6-PIECE "SLIP-ON" SET
Friction handle holds 5 plated hex sockets. Sizes: 1/4", 5/16", 11/32", 3/8", 7/16".
NO. 715 NET $1.35



G-C INSPECTION LIGHT
Service light where you want it. Ideal for production inspection. 110 v. AC-DC.
NO. 705 NET $1.35

G-C PIN STRAIGHTENER
Straightens both miniature and jumbo-miniature tubes of both 7- and 9-pin types.
NO. 8655 NET $1.50

G-C LIGHTNING ARRESTOR
Underwriters' approved, for all types of UHF-VHF lead-in lines. Easy to use.
NO. 8642 NET $0.75



G-C 300-OHM CONNECTOR
Screw-type connector to splice 300-ohm twin line. Retains wire characteristics.
NO. 8095-E Env. of 2 NET $0.27

G-C H. D. POWER SWITCH
D.P.S.T. toggle switch. Rated 12 amp. at 125 volts. For motors, appliances, etc.
NO. 1350 NET $1.32

FREE!

Send postcard for your illustrated G-C Catalog.

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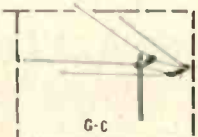
GENERAL CEMENT MANUFACTURING COMPANY

ASK YOUR JOBBER FOR THE GC *SPECIALS OF THE MONTH*

G-C "KLEER LENS" LENS CLEANER
NO. 9081 NET $0.75

G-C 3-WAY TV LINE KLIP
NO. 9015 NET $0.12

G-C UNIV. UHF-VHF LIGHTNING ARRESTOR
NO. 8642 NET $0.75



G-C "MITY-V" ADJUSTABLE UHF-VHF ANTENNA
NO. A-9098 NET $2.25

TELCO

GENERAL CEMENT MFG. CO.

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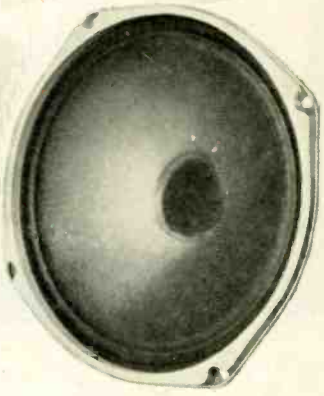
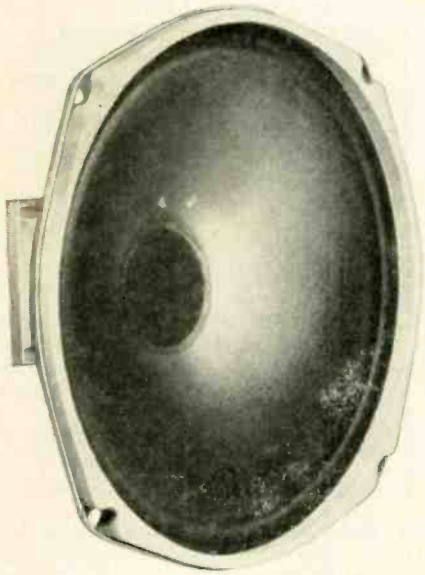
It's here... It's terrific... a great Hi-Fi speaker by Delco Radio



MODEL 8007—The Speaker with Thousands of Replacement Applications!



DELCO RADIO'S Model 8007
A Terrific Value at Moderate Cost

Here is a sensational performer in the big Delco Radio line of speakers . . . a *Hi-Fi* replacement speaker for AM, FM, and TV receivers and phonographs that matches their service requirements with *a voice coil impedance of 4.1 ohms*—not too high, not too low, but just right! And it's ideal, too, for custom-built high-fidelity systems. Wherever installed, the model 8007 Delco Hi-Fi speaker will give new sparkle and life over the full tonal range.

Here are some of the reasons why:

• Its 8-inch curvilinear cone extends the Highs, gives maximum performance over a range of 50 to 12,500 cycles per second • A heavy Alnico-5 magnet provides peak damping action, high output with clean performance, light highs, heavy lows • Power rating of 10 watts • Input impedance of 4.1 ohms. • A 1⅜-inch voice coil for excellent damping effect, high efficiency, minimum distortion • Total these features, add a rugged, zinc-plated, attractively painted basket, and you have the outstanding speaker in its price range . . . the Delco model 8007!

The Most Highs . . . the Most Lows . . . the Most Watts . . . in a Medium-Priced Speaker

A GENERAL MOTORS PRODUCT — A UNITED MOTORS LINE

DISTRIBUTED BY ELECTRONICS WHOLESALERS EVERYWHERE

DELCO RADIO

DIVISION OF GENERAL MOTORS, KOKOMO, INDIANA

LETTERS
To the Editors

Co-op Parts Buying

EDITORS, TECHNICIAN:

As the champion of the small and large TV operator technician, I believe you could get a little more steam behind the elimination of so-called wholesaling of supplies to anyone with the money to buy. What are the possibilities of legitimate retail-service operators forming a cooperative system of purchasing at the manufacturer level? This would put retailing on a bona fide basis.

So long as the so-called wholesaler is permitted to sell direct to the consumer (ham, student, or what have you), the present distribution system is a joke. The only way that technician-retailers can possibly compete is by buying at the same price as the jobber. Perhaps if the present jobber system could be hit in the breadbasket with a cooperative scheme such as this, they might honestly decide to clean house.

O. N. TIMMONS

Campbell, Calif.

NATESA, MINTSE, Licensing

EDITORS, TECHNICIAN:

Much as I like TECHNICIAN magazine, I believe I must question two items that appeared in the January '55 issue on Page 19 (*Licensing and Accreditation*). The first is the quote on the MINTSE set-up. MINTSE is not now an affiliate of NATESA . . . Unfortunately, unauthorized releases were made on NATESA letterheads. MINTSE has accepted the NATESA occupational standards. We are assuming a wait-and-see attitude toward MINTSE.

The second item is the quote attributed to TISA, our Illinois affiliate . . . it appears to have a meaning quite different from our intention. Although I am president of both TISA and NATESA, the attitude toward licensing of both is not necessarily the same. Both feel accreditation is vitally needed. NATESA feels licensing, whatever its form, is a local matter. TISA has been anti and pro licensing, depending on the nature of the bill. At present, TISA feels we must seek outside help to do the industry's own job of protecting the public and the honest operators.

FRANK J. MOCH, Pres.
NATESA

Chicago, Ill.

• *As for MINTSE, the impression concerning NATESA membership was obtained from MINTSE releases, as the writer points out. Concerning the remarks attributed to TISA in January, these were accurate quotes, with no distortion of context from the TISA reply to our questions on licensing. The reply, however, was made by Rubin Saxner, TISA secretary, and represented his own opinion rather than that of the organization as a whole. We failed to note the latter qualification.—Ed.*

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

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

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

And this testing isn't done months before your order is shipped. Just before Westinghouse ships tubes to your Westinghouse distributor, they are "pre-ship" tested to make sure that every one will function properly, operate efficiently.

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

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

ET-95064

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

RELIATRON® TUBES

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

the fabulous VHF-UHF antenna that actually sells itself with performance!

CHAMPION RAINBOW*

What do America's servicemen think of Channel Master's RAINBOW antenna? Here are their very words†:

"The RAINBOW brings metropolitan reception to isolated areas."

"Gets more stations in this fringe area than any other antenna made."

"Just what our customers have been waiting for -- a powerful, sturdy, economical antenna."

†Just a few of the many letters of praise we receive daily.

LOOK at the RAINBOW'S unique design, so deceptively simple, yet so unbelievably efficient. **LOOK** at its advanced features: New *Spacing Formula*, new *Triple-Section* High Band elements, new full-efficiency *Intermix Design*, and the brilliant triple-power TRI-POLE! **LOOK** at its remarkable Yagi performance on every channel, its sharp single lobe. **LOOK** at its rugged, durable 100% aluminum construction, reinforced at all stress points. **LOOK** at its trigger-fast "Snap-Lock" Action, Channel Master's fabulous preassembly that snaps open, *locks* open, without hardware or tightening.

With every installation, Channel Master's RAINBOW again proves itself *the most powerful TV antenna yet developed by modern science*. Bay for bay, it out-performs every all-channel antenna on the market today!

Get In On This High-Powered Advertising Deal

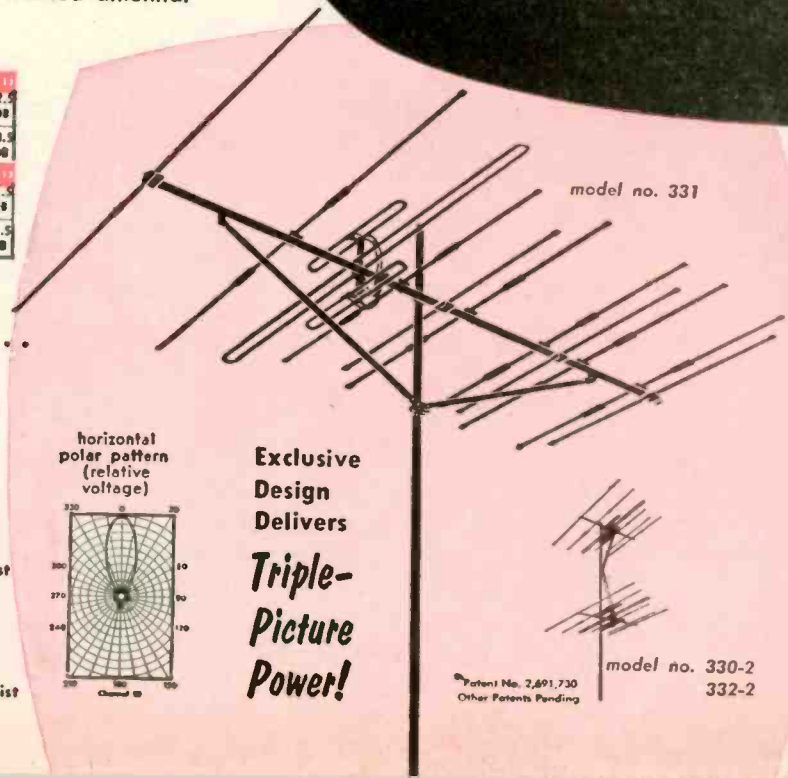
Your Channel Master distributor offers you a hard-hitting promotion program which includes TV spot films, newspaper mat ads, radio ads, full-color display material, and consumer literature. *Advertise* and *install* America's best known, most wanted antenna.

don't kid me!

NOTHING outperforms CHANNEL MASTER

Here's how the RAINBOW out-performs the famous Champion:

	CHANNEL	2	3	4	5	6	7	8	9	10	11	12	13
Gain Over 1-Bay Champion	1-Bay RAINBOW	0 DB	0 DB	0 DB	+1 DB	+2 DB	+3 DB	+2.5 DB	+1 DB	+.5 DB	+.5 DB	+1.5 DB	+2.5 DB
	1-Bay SUPER RAINBOW	+1 DB	+1 DB	+1.5 DB	+2.5 DB	+3.5 DB	+3.5 DB	+3 DB	+2 DB	+1.5 DB	+2 DB	+3.5 DB	+4.5 DB
	CHANNEL	2	3	4	5	6	7	8	9	10	11	12	13
Gain Over Stacked Champion	Stacked RAINBOW	+1.5 DB	+2 DB	+1.5 DB	+1.5 DB	+2 DB	+.5 DB	+.5 DB	+0 DB	+0 DB	+0 DB	+1 DB	+1.5 DB
	Stacked SUPER RAINBOW	+2 DB	+2.5 DB	+3 DB	+3 DB	+4 DB	+.5 DB	+1 DB	+1 DB	+2 DB	+2 DB	+2.5 DB	+3.5 DB



There's a RAINBOW model for every area . . . for every purse!

For fringe and super-fringe areas:

Super RAINBOW model no. 331, **$37.50** list

stacked Super RAINBOW model no. 331-2, **$75.70** list

For suburban and near-fringe areas:

Champion *RAINBOW model no. 330,* **$23.60** list

stacked Champion *RAINBOW model no. 330-2,* **$48.60** list

For economy installations:
(featuring butted tubing)

Challenger *RAINBOW model no. 332,* **$18.06** list

stacked Challenger *RAINBOW model no. 332-2,* **$37.50** list

Exclusive Design Delivers *Triple-Picture Power!*

a major step forward in installation procedures —

CHANNEL MASTER'S SELECTENNA coupling system

the great Channel Master development that permits *unlimited antenna combinations* with only *one* transmission line to the set!

the NEW WAY, the BEST WAY, the only AUTOMATIC WAY to get all-channel, all-direction reception . . .

- ***Without rotators!***

  SelecTenna means: no extra control unit on the set; no moving parts to get out of order; antennas are always in perfect orientation.

- ***Without switches!***

  SelecTenna means: no manual switches to bother with; better performance because couplers have less insertion loss than switches.

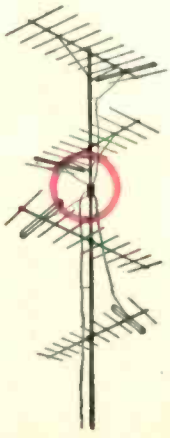
- ***Without multiple lead-in wires!***

  SelecTenna means: neater, more professional installations, because no complicated wiring enters the home. Only one lead connects to the set.

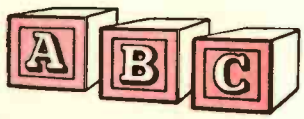
This modern way to obtain multi-directional reception — with its individual band-pass filter networks — offers the consumer great convenience advantages possible in no other system. There's never been anything like it! The SelecTenna System is rapidly replacing all older methods. Use it on your next "multi-direction" installation!

FREE TECHNICAL ADVISORY SERVICE

Our engineers will tell you the correct hook-up for your area. Merely list the channels you expect to receive, as well as the different antennas you would like to hook up. No charge or obligation.



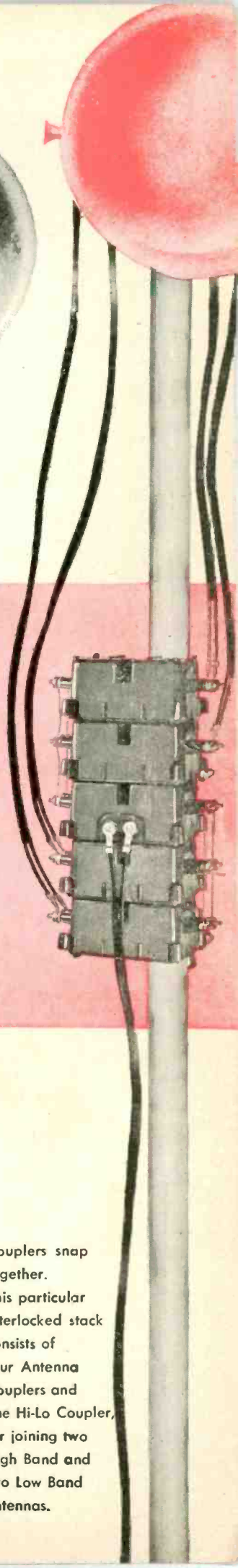
Simple as:



Simply select your channel on the set--- the right signal is always there!

list price: $5.42 each

Including mounting hardware and connecting wire.



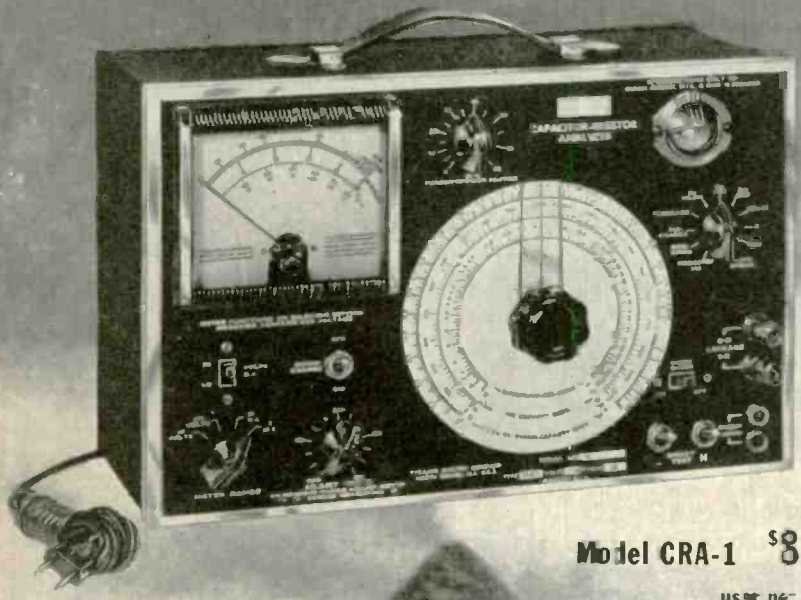
Couplers snap together. This particular interlocked stack consists of four Antenna Couplers and one Hi-Lo Coupler, for joining two High Band and two Low Band antennas.

CHANNEL MASTER CORP. ELLENVILLE, N. Y.

The World's Largest Manufacturer of Television Antennas and Accessories.

NEW Capacitor Resistor-Analyzer AND Quick Capacitor Checker

another Pyramid first



Model CRA-1 $82.95
user net price

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

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

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

PYRAMID ELECTRIC CO.
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2 in 1

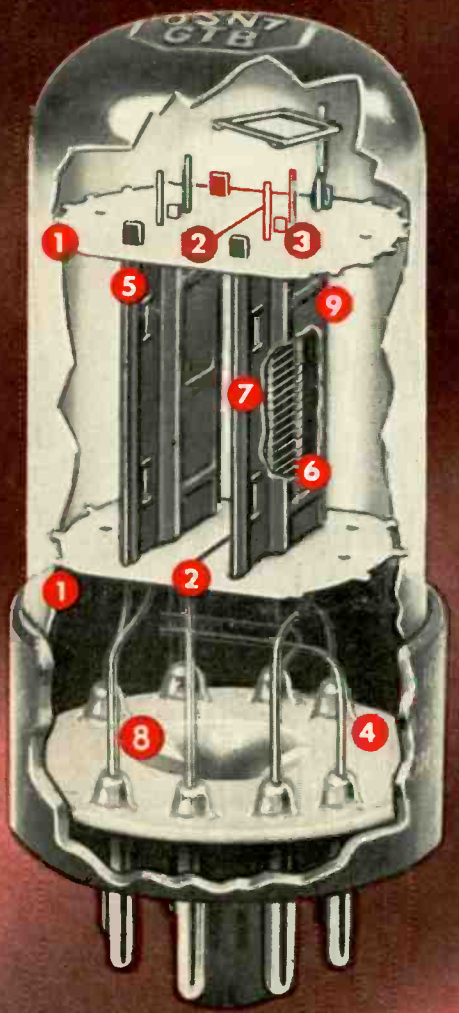
BURTON BROWNE ADVERTISING

PYRAMID

Premium Quality Tubes

FOR TV SERVICE

RAYTHEON



Raytheon Premium Quality Tube Types include: 5U4GA, 5U4GB, 6AX4GT, 6SN7GTA, 6SN7GTB, 12CU6, 25CU6.

A SPECIAL GROUP OF TUBES THAT GIVE YOU MANY ADVANTAGES AT NO EXTRA COST

For example Raytheon 6SN7GTB *has these advantages:*

1. Bumper point micas top and bottom — mount is held rigid in bulb to reduce vibration and microphonics.
2. Slot in micas to reduce leakage between sections.
3. Cathode pinched above top mica for tighter mica cathode fit — lower microphonic level.
4. Short strong leads support mount at several points.
5. All plate tabs pinched or welded above top mica and below bottom mica to strengthen mount.
6. Improved grid design for sharper cut off.
7. High conductivity grid winding wire to eliminate grid emission.
8. Short leads — direct to pins.
9. Strict control of plate diameters (Geometry) for uniform characteristics.
10. Shorter over all length to improve rigidity.

The lessons learned in structural strength of tubes while developing "rugged" types; the vast warehouse of knowledge about how to make tubes reliable gathered while developing and producing RELIABLE tubes; the revolutionary new thinking and pioneering resulting from the development of the rigid, straight lead Raytheon BANTAL Tubes; the boundless skill, know-how and craftsmanship gathered while designing and producing more than 250 million receiving tubes, millions of special purpose and picture tubes, and millions of semiconductor products; all this experience, gathered through more than 30 years, makes the new Raytheon 6SN7GTB and other tubes in this series — the finest Raytheon Receiving Tubes that we've ever produced.

They're Right . . . for Sound and Sight . . .
Always New . . . and Right for You.

RAYTHEON ®
Excellence in Electronics

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

RAYTHEON MAKES ALL THESE:
RECEIVING AND PICTURE TUBES • RELIABLE SUBMINIATURE AND MINIATURE TUBES • SEMICONDUCTOR DIODES AND TRANSISTORS • NUCLEONIC TUBES • MICROWAVE TUBES

TECHNICIAN
& Circuit Digests

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

It Finally Happened

When a good thing is a long time in coming, it's customary to say that it arrives with extra impact. Perhaps that's the case with the recognition now being accorded the importance of you, the service technician, to the TV industry.

Heavy promotion during the past few weeks has called attention to National Television Servicemen's Week, March 7 to 12. A similar campaign heralds TV Service Month, which begins April 19. These large-scale efforts on the part of set manufacturers to let the public know your side of the story are being pushed in the press, on the radio, and on TV. Everyone wants to give the new hero that long-delayed pat on the back.

Can the picture really be changing? As the favorite industry scapegoat—the victim of the consumer's misplaced wrath as well as the manufacturer's short-sighted indifference—you may well be suspicious. After all, what's one week, or even one month? Will you once more be shoved aside for the remaining 51 weeks or 11 months? We don't think that will happen this time.

Manufacturers have learned it is not sufficient to sell the distributor or even the final consumer. Experience shows *your* role to be pivotal. We feel the new "kid-glove" treatment is here to stay.

While We're on the Subject

A recent request for service data on a popular Hi-Fi preamplifier brought an interesting reply from the manufacturer. With all the courtesy in the world, he informed the petitioner that he would be happy to oblige but that the data was not presently available, and he didn't know when he could make it available. He was busily engaged getting out other material that was more important than service information.

We don't know what official stand, if any, this manufacturer has taken toward the fuss being made over the technician. Whatever it is, someone ought to teach him the facts of doing business successfully. Every bit as important as the initial quality of the instrument is the reasonable assurance that it can be maintained in that condition and restored to it, in the case of breakdown, in the years to come.

Where sufficient service data is not made available to you, you are entirely within your rights in telling the equipment owner that his chances of getting the best possible repair have been reduced. You are not only taking yourself off the hook, you are exerting an entirely legitimate pressure on an errant manufacturer.

Sergeant Friday Nabs a Tech

TV viewers recently saw a "Dragnet" program on which Joe Friday of the L. A. police went about trapping a crooked TV technician.

While we have little sympathy for that small segment of the industry that gives us all a black eye, the TV show was a mixed blessing. On the one hand, it pointed out that a bill of $8.50 for replacing a $2.45 tube was justified by the technician's training, expenses, etc. On the other hand, the sleuths found "clues" of illegal activities such as: (1) The tech could be argued into lowering the bill, showing that it was padded in the first place, and (2) the chassis was pulled from the set. No mention was made of how often the latter was really necessary.

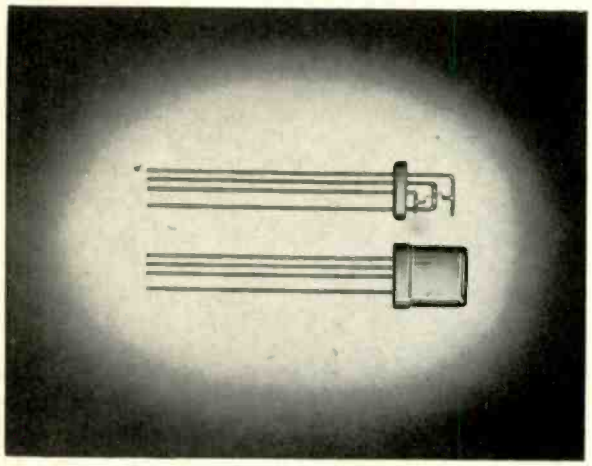
An informal poll of TV viewers of the program indicates that technicians came out on the short end. The drama of illegal operation is more easily remembered than the quick disclaimer that most are honest. Publicity-seeking politicians know this too. Let's not be afraid to set the record straight when loose accusations are thrown around.

Tuning In the

ELECTRONIC CLOCKS FOR HOUSEHOLD USE will be placed on the market by GE, probably later this year. The new timekeepers will not require any cord connection to an electrical outlet. Details concerning operation of these devices have not been released, but the guess is that electromagnetically induced signals are amplified in the clock to drive the hands.

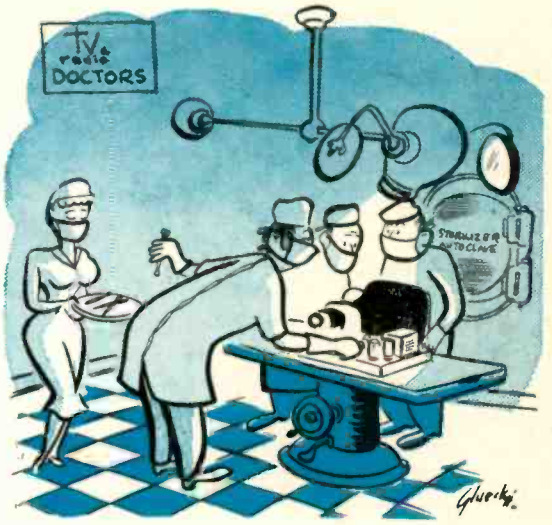
THROW OUT ALL ESTIMATES made earlier on anticipated sales of record players and changers for 1955. While there have been conflicting reports from record dealers concerning the effect of recent price slashes in the list price of long-play and extended-play records on the record market itself, there is little doubt but that player sales are destined for an upward tilt. . . . Will the price cuts impede the popularity of pre-recorded tape?

DON'T MAKE THE MISTAKE of thinking that transistors are still in the science fiction class, or even that they are many months away as far as you're concerned. Several manufacturers, including Raytheon and Germanium Products Corp., are slashing prices on the new midget miracles, up to 50 percent on some types. At the same time, announcements of new types promise greater versatility in circuit application. At this rate, transistors will be swooping down at you from all sides before you can heat up your soldering iron in self defense.



Tetrode type transistor manufactured by Germanium Products Corp.

MONEY-MAKING IDEAS TO UP SERVICE REVENUE: Long-established Eastern dealer uses large signs on his building to attract trade. One sign reads "Over 5,000 Satisfied Customers." Another stresses that the firm guarantees to bring in a certain hard-to-get channel. . . . The Long Island Radio & Television Company, Woodmere, N. Y., maintaining a large and modern service department, attracts plenty of interest with a sparkling Hi-Fi window. Signs advise that the firm specializes in custom work and has its own woodworking, designing and finishing departments.



SERVICE DEPARTMENT OPERATORS are having lots of trouble collecting bills these days, and in many instances the fault lies with the management. Too few owners have clear-cut policies regarding payment, with the result that many a repaired set is returned to the customer who gives the deliverer that old "I'll-pay-you-later," or "send-a-bill" routine. A smart idea is to get a firm understanding from C.O.D. customers that the bill must be paid when the set is delivered. In the absence of such arrangement, the shop is bound to lose money outright or to wait long periods for the payment.

COLOR RADAR is under study by the armed forces. A system demonstrated recently by Chromatic TV Labs makes use of a version of their single-gun Chromatron color TV tube. The experimental radar indicator is intended to make it possible for many different types of data to be displayed at the same time, without confusion, by the use of different colors for different information.

TV SALES FAIR IN MOST AREAS, though slightly down from first two months of this year. However, the outlook is optimistic, and it's entirely likely that 7 million black-and-white receivers will be sold in '55. The color TV picture is still muddled, with some manufacturers looking for a spurt of production and interest by next September. Small radios, particularly clock, continue to move steadily, and a good season for the sales of portables is right ahead.

THOSE SMART SHOP OPERATORS who stress service on changers and other phonos via show-window signs are making money these days since numbers of shops are not too eager to work on players or recorders. Fellow we know got a magnetic recorder back unfixed from two places after a long delay. Third shop took hum out with a couple of filters.

Picture .....

HI-FI TRENDS: Another big metropolitan paper is jumping on the bandwagon with a special issue devoted to high fidelity. This time it's the New York Herald Tribune, in its edition for Sunday, March 6 . . . MORE PRE-RECORDED TAPE manufacturers are hitting the market with their releases. Some of the periodical disc catalogs are beginning to list tapes in a separate section. There is an encouraging trend toward getting together on equalization curves for the tapes, or at least publicizing the curves used. There is less agreement, however, on what the price should be per reel. Some makers are asking less than $5 each, others more than $8 . . . YOUNG FOLKS are responsible for about 50 percent of current sales in Hi-Fi and audio, particularly when it comes to automatic changers, tape recorders, portable phonos, and discs. These buyers of tomorrow promise a bright future for the industry.

PLENTY OF SERVICE BUSINESS lost by numbers of small shops through the customer-antagonizing practice of closing the place, and leaving without any indication as to when it will re-open. Signs, such as those reading, "Will return in a half hour," are poison, too. Suggestion: Make sure that sign states hour of return, such as, "10 AM," and so forth. Some technicians with limited capital, find it profitable to hire housewives or retired persons to "keep shop" while the boss and his men are out on calls.

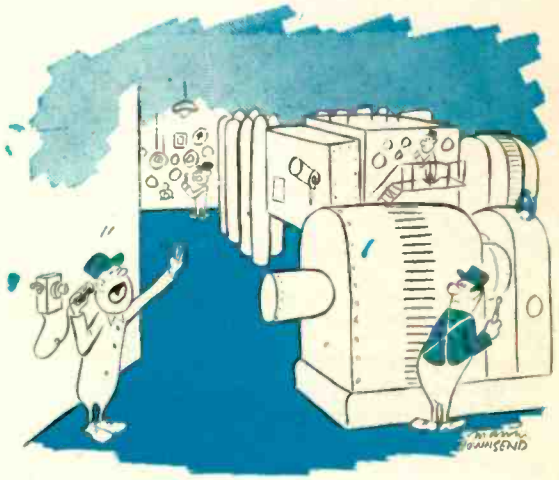
THAT TECHNICIAN'S DUMB GIRL FRIEND is still horning in on the conversation and she's getting tweeter and tweeter aready. . . . She thinks printed circuits should be much easier to read than handwritten ones, and she's sure that a gamma corrector is an English teacher. . . . She believes a binding post is a wedding chapel, that a carrier wave is a woman sailor, and to cap the climax her Hi-Fi fan boy friend, who has been ill, got a relapse when she called on him and asked, "Now, how does my audiophile?"

GARAGE-DOOR OPENERS really appear to be catching the public's fancy this time, although attempts to put them over in years past never quite caught on. Signs of the present trend: the field is being penetrated by new manufacturers; also, established makers are reducing prices on current models or introducing less expensive versions.

SOME TRENDS ALONG THE SERVICING FRONT: Increasingly large number of shops repairing small electrical appliance, and some stocking them for sale. . . . More and more set owners shopping around for price in big city areas forcing repair prices down in such areas to an estimated average of 10 percent below this period last year. . . . Technician manpower market improved with wage demands continuing high in the ranks of the experienced. . . . Bouquets to those manufacturers who are spending plenty of money to publicize the technician; help raise his prestige. . . . Slow rate of buying used cars being reflected in reduced auto radio servicing in some sections.

AUTO RADIOS are moving along on the current tide. The entire current production by Bendix Aviation Corp. for Ford Motors will feature printed wiring, which will help make the sets more compact. The new models are a far cry from the bulky auto receivers of less than 10 years ago, that used octal-base tubes. Bendix also reports increased demand for custom-styled car radios as original equipment.

SOME SELL-MORE-SERVICE ANGLES used by progressive shops these days: Payment of parking fees for customers . . . Payment of out-of-town phone charges for customers . . . Drive-in facilities, thus saving pick up and delivery costs . . . Many of the larger departments are offering custom service to dealers who have no maintenance departments . . . In certain localities, shop owners are making money servicing municipally-owned equipment, such as police radio, electronic signalling devices, and so forth.



"Pull the switches men! Shut off all engines! Mrs. Jones on Elm Street says we're interfering with her television reception."

BY-PRODUCT OF TRANSISTOR RESEARCH is an interesting development in the field of optics. Germanium is now being used to form filters for investigation of the infrared region of the spectrum. Germanium itself, as well as other solid-state materials, has been shown to have many properties of interest to the optical designer.

CALENDAR OF COMING EVENTS

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

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

June 6-8: The Fourth Annual Convention and Trade Show for the National Community Television Association, Inc. Park Sheraton Hotel, New York, N. Y.

Simplified Color Demodulation

R-Y and B-Y Detectors Avoid the Complex

PETER ORNE

• In preceding articles dealing with color-signal demodulation, we have dealt with receivers that detect along the *I* and *Q* axes. Such sets might be termed high-fidelity color receivers. The advantage in using this type of detection is that all of the color signal being transmitted may be recovered and used.

The reader may recall that full color is transmitted up to 0.5 mc,

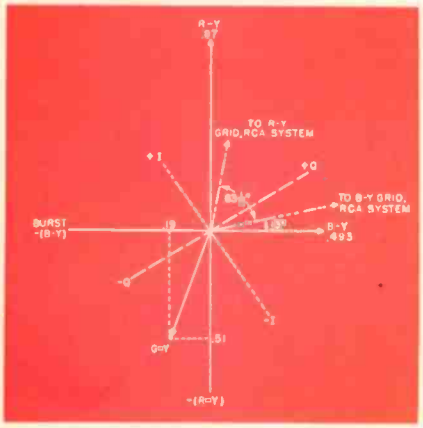


Fig. 1—The phase diagram shows how G-Y signal can be developed from R-Y and B-Y.

which corresponds to large areas of color as seen on the screen. Beyond 0.5 mc, sidebands of the *Q* signal are not transmitted, but *I* sidebands (orange and cyan) continue on up to 1.5 mc, which corresponds to the medium-sized areas as viewed on the screen. Beyond this frequency, only luminance (brightness) information is transmitted up to 4 mc, for small areas and fine detail. This failure to transmit full color for small, detailed areas is not considered a great loss because the human eye, correspondingly, loses its ability to distinguish between colors as the areas on which they appear decrease in size.

When demodulation along the *R-Y* and *B-Y* axes is used, still more of the full color is lost, but important design economies can be affected. For one thing, the bandpass of the receiver's color section is reduced, thus allowing higher gain per stage. Obviously, this makes possible the elimination of some stages of amplification. Also, it now becomes possible to perform color addition in the crt itself. The latter arrangement eliminates the need for separate matrix and adder stages. Two examples of color sets using such simplified systems are the RCA 28-tube circuit and the Motorola 29-tube receiver.

The basic system for the *equiband* set—as such color receivers are called—follows this pattern: The color-carrying portion of the video signal is built up through a bandpass amplifier. This stage eliminates the unwanted portions of the video signal, amplifying only that portion which falls between 3.1 and 4.1 mc. Since the color subcarrier is at 3.6 mc, it passes through the amplifier, along with those sidebands that fall within 0.5 mc to either side of it. In this portion of the color signal, we have a straightforward set of relationships: the *phase* of the subcarrier varies according to *hue*, and subcarrier *amplitude* varies according to *saturation*.

After suitable amplification, these signals are applied to the color demodulators, where detection takes place in the following manner: the suitable phase of the local subcarrier oscillator is made to beat against color signal. One way of accomplishing this is to let the demodulator conduct only during subcarrier peaks. In this method, proper subcarrier phase is selected simply by adjusting the local oscillator so that peaks appear at the proper time. Demodulator output will then depend on the amplitude of the color video signal at that particular moment. Since the transmitted color-sync 8-cycle burst is exactly 180 degrees out of phase with the *B-Y* signal (see Fig. 1), we have a very simple phase relationship to work with.

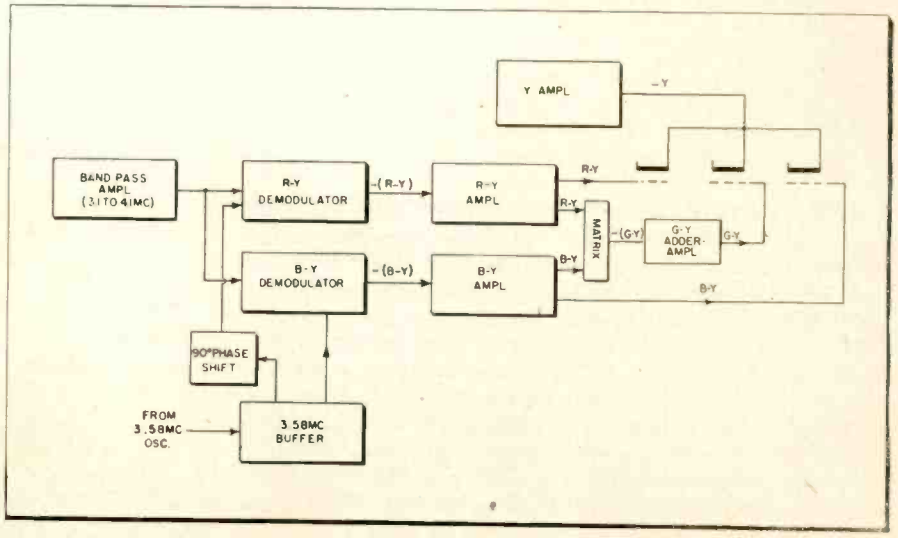
Two Demodulators Used

Two demodulators are used in the set to give *R-Y* and *B-Y* respectively. One might think that another demodulator would be necessary to get the third color-difference signal, *G-Y*. Such a demodulator could be used, but it would be expensive. The phase diagram (Fig. 1) indicates the phase of the subcarrier that would have to be used for a *G-Y* detector. But it can also be seen from the diagram that *G-Y* can be made up by adding the proper amounts of *R-Y* and *B-Y* in the proper polarity. Putting it in the form of a mathematical formula, we can say

$$G\text{-}Y = -.51(R\text{-}Y) - .19(B\text{-}Y)$$

We can therefore take the output of the *R-Y* and *B-Y* demodulators and use a resistive matrix with an adder stage to get the *G-Y* signal. In the Motorola receiver, this system is followed. The output of each color difference amplifier is fed to the grid of the corresponding color gun. The three cathodes are connected together and the *-Y* signal is

Fig. 2—Simplified block diagram of the demodulator section in the Motorola set.



Circuits for Latest Designs

Circuitry Needed for I and Q Detection

applied to them. The actual signal controling the beam of each gun will then be *the difference between the signal on the grid and the signal on the cathode*. On the red gun, for example, the grid signal (*R-Y*) minus the cathode signal (*-Y*) is equal to *R*. The beam of the red gun thus varies in intensity according to the red signal. The same applies to the other two guns. In order to get the correct polarity for green, one more stage, the adder, is used in the green channel.

In the RCA receiver, the designers went one step further. The *G-Y* signal has been shown to consist of a certain ratio of $-(R\text{-}Y)$ and $-(B\text{-}Y)$. But the reader will remember that plate and cathode voltages are 180 degrees out of phase. Thus if we have *R-Y* signal in the *plate* of a tube, the signal in the *cathode* will be $-(R\text{-}Y)$. This principle can be utilized to get all three color-difference signals from the output of two demodulator tubes. The plate output of the two demodulators will be *R-Y* and *B-Y;* and the *G-Y* signal is taken from the common cathode circuit of the two demodulators.

Problems Arise

The trouble with a circuit of this kind is that a signal at the cathode of a tube has a degenerative effect on output. If we start with *B-Y* on the plate of a tube, for example, and then apply *G-Y* to its cathode, the plate signal will no longer be *B-Y*. The adjustments necessary to get the proper outputs can be determined mathematically. In brief, without going into the necessary mathematical analysis, relationships are correct when the following conditions are met:

The plate load of the *R-Y* demodulator must be twice the cathode resistance. The plate load of the *B-Y* demodulator must be 5.25 times the cathode resistor. The amount of color sideband applied to the *B-Y* demodulator must be 1.4 times the amount applied to the *R-Y* demodulator. Finally, the phase angle between the 3.58-mc signal fed to the two demodulator grids must be 63.5 degrees. When all these conditions are met, the three outputs will be *B-Y*, *R-Y*, and *G-Y*.

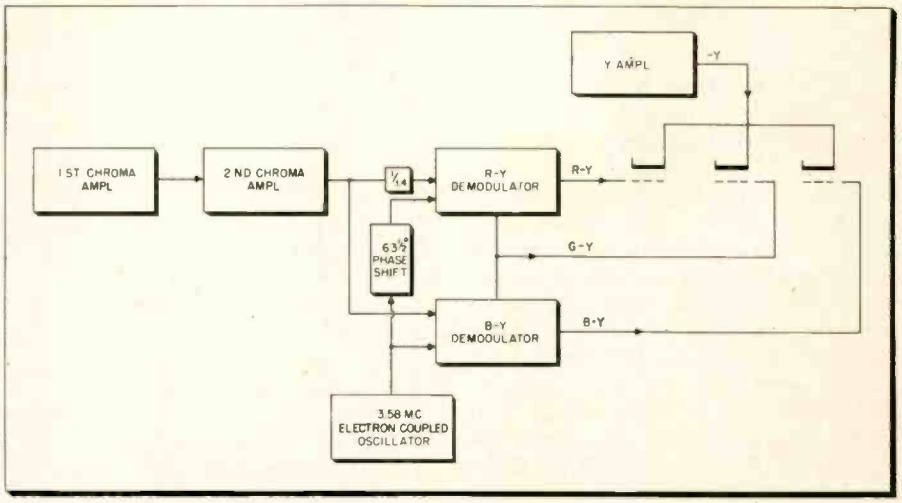


Fig. 3—Simplified block diagram of the demodulator section in the RCA receiver.

It should be noted that we lose some of the simplicity of the previously described system in that we are now dealing with phase angles that are fractions; to offset this, however, we have completely eliminated an adder stage.

The arrangement just described also poses some interesting problems for the service technician. The interaction between the three outputs will doubtless create difficulties. To offset this drawback, however, the number of components which would have to be checked in case of trouble in this circuit has been considerably reduced.

There is one other noteworthy departure in the RCA receiver. The demodulators just described are so-called *high-level* demodulators and their output is applied directly to the grids of the cathode-ray tube guns. This is again a saving, since the necessary amplification is obtained in *one stage*—as long as the signal involved is still the color sidebands. On the other hand, three stages (one for each color) are required for amplification if we do it after demodulation.

The difficulty with high-level demodulation is the large amount of 3.58-mc signal that is now present in the set. Very careful shielding and layout are required to prevent 3.58-mc interference between different sections of the receiver, or from one receiver to another. In working on these sections, the service technician should always be certain to replace any shields that may have been removed to gain access to a component. It is also important that all coils be restored to their original position.

Better B & W Pix from Color Signals

A new development in color broadcasting is said to improve the quality of the picture viewed on home monochrome receivers. The new technique, reported by GE design engineer Pierre H. Boucheron, is also reported to simplify color registration in the studio. The received color picture is also made sharper.

Previous methods formed the black and white picture by superimposing red, blue and green images. Unless registration is absolutely perfect with this method, the picture becomes fuzzy. With the new technique, the monochrome pix is formed directly from a sequential color camera before registration problems are met. Color signals are picked up independently by the sequential camera.

The two independent signals are combined into a single signal before transmission. The reduction in misregistration improves sharpness.

Radio-TV Rectifier and

How Much Do You Know About Half-Wave, Full-Wave, Bridge,

Part I

MICHAEL CRAIG

• Since most technicians still do work on ac-dc AM radios, and because the rectifier circuit used in such sets is fundamental, it is the best one to start with. Half-wave circuits are in the majority, with the 35Z5GT tube being the most commonly used one for this purpose. Others are the 35Z3, 35Y4, and 35W4. In portables we find the 117Z4, 117Z6, and 25Z6GT in older models, with most of the new ones using selenium rectifiers rated at 75 or 100 ma.

Half-wave rectifiers are also usually found in low-priced, self-contained power supplies for phono players which use either a dual tube, such as the 117L7GT or the equivalent 35Z5 and 50L6GT combination, as shown in Figures 1 and 2. *R1* is either a fixed wire-wound resistor or a line cord resistor. *CH* is either a small a-f choke, if a PM speaker is used, or the field coil of an EM speaker. *R2* may replace *CH*, using a value of approximately 1000 ohms, with somewhat reduced efficiency. C^k reduces degeneration, especially of the lower frequencies, but may be left out for reasons of economy.

In Fig. 1, the net effective B voltage available for the output circuit is 110-10, or 100 volts while in Fig. 2 the full 110 volts is used for increased output and quality. In the latter case, the choke or speaker field is in the negative lead of the supply circuit, and the drop across it is used to furnish bias for the output tube grid circuit, while the cathode is returned to ground. This eliminates the need for a large capacitor at this point. Instead, a 0.05 or 0.1 mfd capacitor, in conjunction with a 0.1 megohm resistor, is used to filter any residual hum from the circuit. The phono cartridge generally used in these units is of the high output variety, delivering from 4 to 5 volts peak to the grid. Though this doesn't drive the output tube to recommended maximum, it is usually sufficient for an ordinary room.

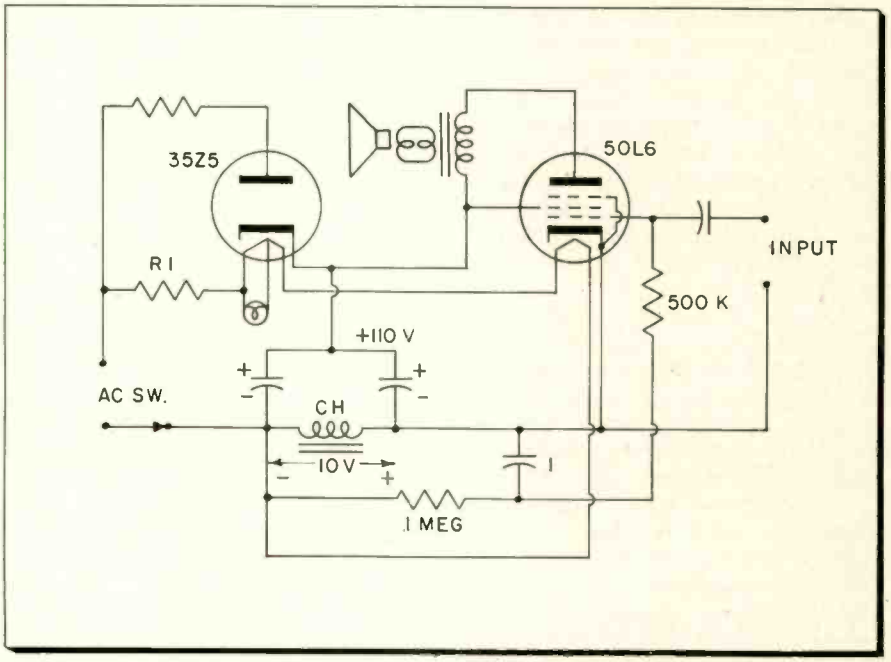
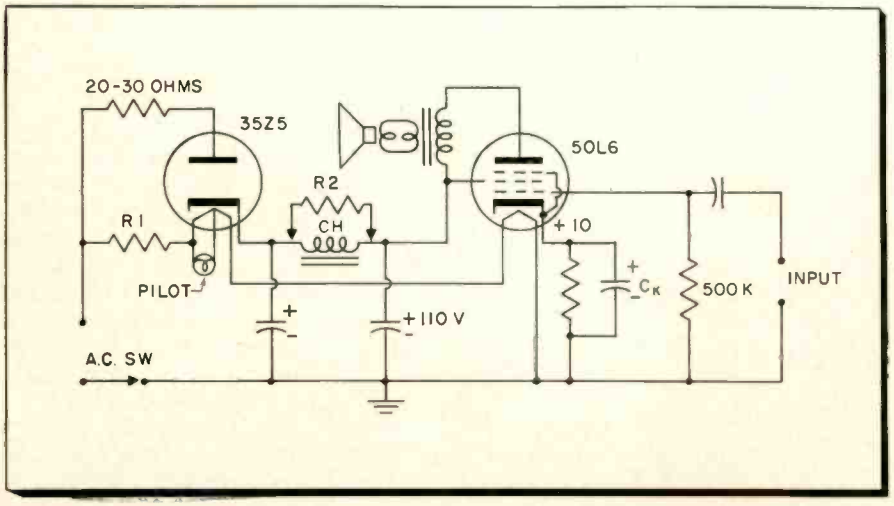


Fig. 2—Alternate circuit for single-stage phono amplifier, showing negative voltage source.

Fig. 1—Circuit of a simple single-stage phono amplifier, showing half-wave rectifier supply.



Many special circuits, such as are used in juke-box amplifiers and in some TV receivers, entail a negative-going supply; that is, one where the positive side of the filter capacitor is grounded and the negative side goes to the bias or other control circuit. Fig. 3 shows such a circuit. Here both negative and positive voltages are secured from the same transformer winding, the tap on the winding furnishes bias voltage (after rectification and filtering).

With slight modifications, this circuit is similar to that used in most oscilloscopes, where positive voltage is required for the amplifier tube plates (usually around 300 volts), and negative voltage on the order of 2000 volts is supplied to the CRT cathode with the plate, or anode, being grounded. This is done for the

Power Supply Circuits

Doubler and Tripler Circuits—Though You See Them Daily?

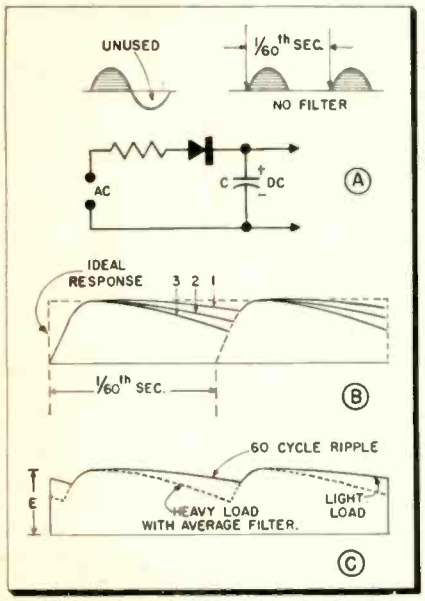


Fig. 4—Ripple filtering, half-wave rectifier.

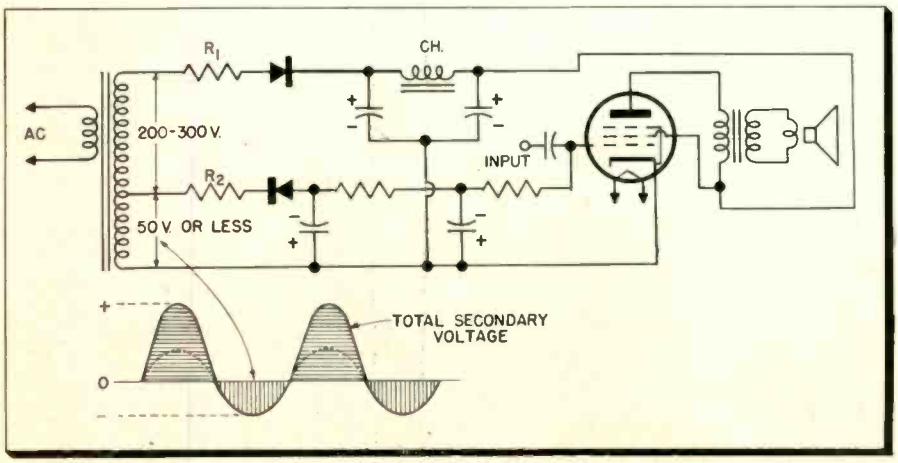
sake of the user's safety, as the high-voltage anode and two of the deflection plates are at the same potential, or ground. If this were not done, high voltage would be present at the input posts if the coupling capacitor broke down, or if direct connection to the deflection plates were made for d-c readings.

As previously mentioned, the simplest rectifier types are of the half-wave variety. Because no rectification takes place on the negative half of the cycle, the output, before filtering, consists of 60 pulses of current or voltage per second. Heavy filtering is thus required to smooth out the output (when drawing a load from the circuit) to fill in the gaps between pulses. This is shown in Fig. 4A, B and C.

Fig. 4B shows how the average dc output drops and how the ripple increases as the load is increased when fixed standard filtering is used. Curve 1 represents the output with a fairly light load; curve 3, with a relatively heavy load. These curves may also be used to illustrate what happens when, with a fixed load, the value of the filter capacitor is decreased. This may happen as a set ages and the electrolytics lose capacitance. In none of the curves of Fig. 4B is the hum ironed out completely. The enclosing dotted rectangle shows the ideal output, such as we might obtain from a perfectly regulated dc supply.

If full-wave rectifier circuits are used, less filtering is required to iron out the hum ripple, as the ripple frequency is now 120 cps instead of 60 and the filters are twice as effective as before. To point up the additional wattage required by a tube rectifier as compared to selenium types, the full-wave rectifier circuit in Fig. 5 shows a 5U4G tube and transformer. This tube draws 3 amps at 5 volts for the heater filament, or 15 watts; and allowing for an efficiency of 80% for the transformer, it will require 18 watts more power to

Fig. 3—A separate rectifier is used with its own filters to develop a negative source.



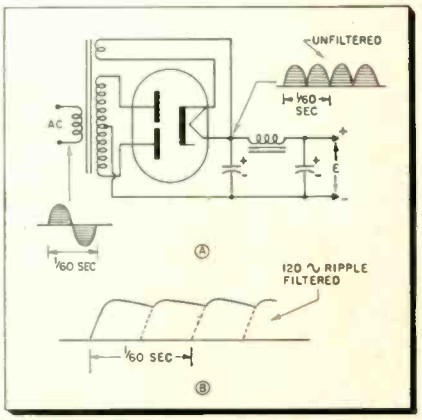


Fig. 5—Full-wave rectifier, 120 cps ripple.

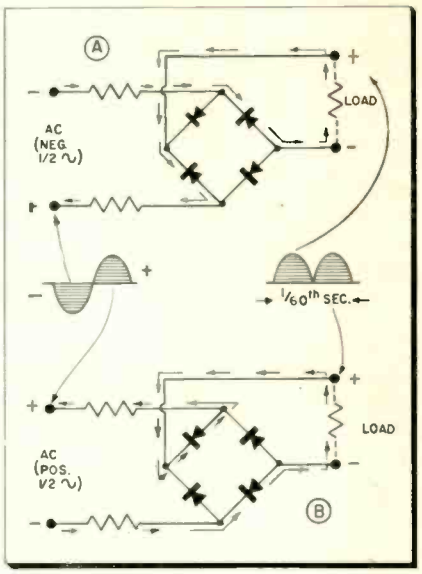


Fig. 6—Full-wave bridge rectifier circuit.

operate this tube than a comparable selenium rectifier. In addition, there are losses due to the plate-to-cathode drop in voltage.

Because of the low forward resistance of the selenium rectifier, the regulation on large surges of current is better, since the voltage drop across the rectifier is low. Small limiter resistors (from 10 to 40 ohms) must therefore be used with them to lower the initial charging surge to the capacitors. This partially nullifies the advantage so far as regulation is concerned.

The same rectifier circuit shown in Fig. 5 may be used with seleniums.

(Continued on page 57)

Tune

These Manufacturers'

INDUSTRY SURVEY

• During these next few months magazines, newspapers and radio and TV will see an unprecedented flood of nation-wide publicity and advertising on behalf of the TV servicing industry. Two large companies are throwing the full weight of their advertising budgets into their respective "TV Service Month" and "National TV Servicemen's Week" campaigns. Other elaborate promotions are being planned by a number of tube and replacement part manufacturers.

At this time, when such tremendous expenditures are being made on our behalf, it seems appropriate to call attention to the many benefits which we enjoy year in and year out through our association with the tube manufacturers. The high points of the companies' promotional programs are described below; it is worth remembering, also, that *all* replacement part advertising, whether the technician is mentioned or not, is ultimately for our benefit. We are the ones who will install and service the parts.

To bring you this up-to-date report, TECHNICIAN's editors canvassed all the major tube manufacturers for details on their current or planned promotions and special bonuses which they are offering to TV technicians. Let's derive the maximum benefit from these campaigns by starting sales and check-up promotions in our own shops—tying in with the manufacturers' national programs, and using the wealth of displays, mailers, etc., available from these companies or their distributors.

CBS-Hytron

Plans are afoot for a big new promotion due to break this spring. In the meantime CBS-Hytron continues to make available to the technician one of the largest selections of tools, service aids and promotional material. The complete program is described in their "Business Builders Catalog" available from CBS-Hytron tube distributors.

Up Your Sales Pitch

Programs are Made-to-Order — For Sales —For You

DuMont

The Cathode Ray Tube Div. is laying plans for a contest but will not release details at this time. Sales emphasis is on the "new-set performance" of their replacement picture tubes. Green and gold medal-type stickers displayed on crt cartons assure the consumer that the replacement tube is equal in quality to those used in new sets.

G.E.

The big news here is "TV Service Month"—April 19 to May 19. The program will be touched off by a huge advertisement in *Look* magazine and the month-long campaign will be supported by promotional pieces, store banners, window streamers, side walk footprints, and "talking postcards," to be played on consumer's phonographs. Highlight of the promotion will be a $25,000 jingle contest. The aim of the campaign is "to focus attention on the technician—dealer as a friend and neighbor—and to call for direct attention in ordering long-put-off repairs."

Haydu Bros.

Keynote of the sales promotion and advertising of Haydu Bros., div. of Burroughs Corp., will be the "Trade-In System" in which used TV picture tubes are accepted as credit toward the purchase of Haydu tubes. Sales emphasis will be on the increased volume of business that dealers and jobbers will experience through this arrangement.

Philco

The current advertising program at Philco is wrapped around the new "Star Bright 20/20 Aluminized Picture Tube." Available from Philco distributors are a series of newspaper ads in mat form, printed radio spot announcements and a series of sales-getting post cards. For the dealer's own store, there are window streamers, store posters, and a helpful crt cross reference replacement wall chart.

Raytheon

The 9-year old "Bonded Electronic Technician" program, whereby Raytheon issues registered bond certificates to selected radio-TV service dealers, ranks as one of the major contributions toward improving public confidence in the TV technician. To qualify, service dealers are first recommended by the Raytheon tube distributor, and then must meet the approval of both Raytheon and the insurance company which posts the bond. In addition to the certificate, Raytheon supplies the bonded dealer with Creed displays, window decals and identification. Advertisements publicizing the program appear in *Life* magazine.

RCA

The big week for RCA will be March 7-12—"National TV Serviceman's Week." The promotion will be marked by a nation-wide RCA advertising and publicity campaign designed to focus maximum consumer and industry attention on the nation's more than 100,000 servicemen. Prizes totalling more than $10,000 will be awarded to radio-TV technician—dealers initiating the most effecting National Week promotions at the neighborhood level. Symbol of The Week is the RCA "Electronic Statuette," a 14-in. high, gold-finished figure holding an electronic emblem, and standing on a base enscribed with a dedication to TV servicemen.

Sylvania

Sales emphasis at Sylvania is on their new "Silver Screen 85" cathode ray tube. Through their nation-wide telecasts of the "Beat the Clock" show they are taking their advertising directly to the consumer. In the mill are plans for a big celebration later this month in honor of their 25th anniversary. High spot of the promotion will be a special contest.

As a tube purchase bonus, Sylvania is currently offering technicians an exceptionally well designed tube caddy which is unique in its adaptability to both home servicing and bench use.

Tung-Sol

The emphasis here is on personalized advertising to make the Tung-Sol serviceman distinctive in his community. Aim is to get the dealer's name on as many items as possible, and to feature the dealer's service and name over the name of Tung-Sol. Among the items designed to assist the dealer at the local level are newspaper mats, direct mail literature, technical aids and illuminated signs. Also available at nominal charge are shop and counter coats, stationery, calendars and uniforms.

Westinghouse

High spot of Westinghouse sales promotion will be the direct-to-consumer advertising soon to appear in selected editions of *TV Guide*. The cost of the ads will be shared with local distributors who will list their key technician-dealers. Also being pushed is the Premium of the Month Club, in which selected tools and accessories are being offered as tube bonuses. Westinghouse also features a particularly elaborate selection of direct mail literature, post cards and envelope stuffers.

In addition to the items listed above, virtually all the manufacturers offer cooperative advertising programs under which the local dealer and the manufacturer split the cost of advertising products bearing the manufacturer's name.

To participate in these programs, contact the nearest distributor handling the particular line in which you are interested. Field representatives of the manufacturer are constantly contacting radio-TV technician-dealers to assist them in their olcal advertising and to keep them aware of the newest sales promotions.

We have here a golden opportunity to raise the professional status of our whole industry but it will only be done with a concerted effort by all involved—the technicians, as well as the manufacturers.

Shop Hints to Speed Servicing

Tips for Home and Bench Service Contributed by Readers

Raster Loss, TeleKing

This is a failure I ran into more than once on TeleKing model XT100 series receivers. The same fault occurs on Coronado receivers which use a similar chassis, and others. The symptoms are: no raster, no high-voltage, but fuses and tubes are okay. Test voltage on prong 5 or 7 of the socket for the 6AL5 horizontal phase detector. If it is too high, simply replace C-211, which is 0.001 mfd, 600 v.—*Ralph Hayes, Rochester, Minn.*

Dial Belt Replacement— Managing on a Shoestring

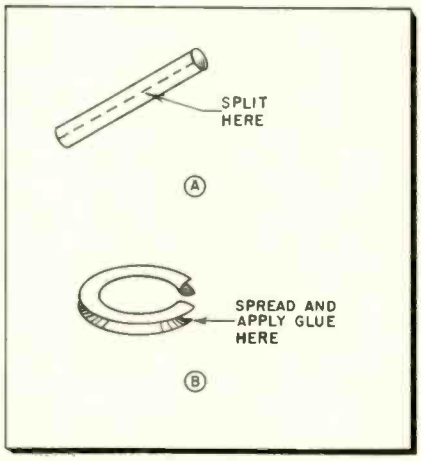
Many radio receivers still use belts instead of cables to operate the dial movement mechanism. Sizes of these belts vary. There is no standard, and keeping many sizes in stock is a problem. However, the ordinary shoestring is a near approach to a "universal" belt.

To make the substitute belt, wrap the string twice around the pulleys, as shown at A. Pull the two ends tight and knot them as shown at B. With needle and very strong thread, sew the string at the two points as shown; after which snip the strings beyond the sewn places (sketch C). Put a dab of cement under each clipped end, applying a clamping pressure with long-nose pliers until the cement has set; then let dry.

Thus prepared, the belt will glide smoothly over the pulleys, especially after a liberal coat of dial cord dressing. I've used one such shoestring-belt for over two years.—*J. Amorose, Richmond, Va.*

Home-made Grommets

We keep a length of auto windshield-wiper hose in the shop, to bush odd-sized or odd-shaped holes in all sorts of chassis and appliances. Suitable grommets are readily made to fit any shape of opening by cutting



Windshild wiper hose is source for grommets.

off the proper length of wiper hose, splitting it open (as shown in sketch A), applying cement to the cut edges, and curling the hose into shape (as at B) so that it can be put snugly into place to line the hole.—*Henry Josephs, Gardenville, Penna.*

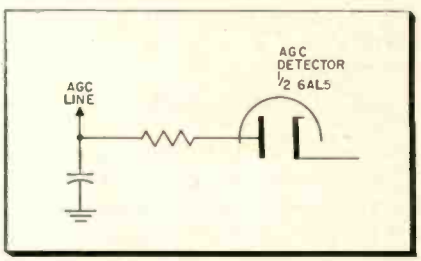
CRT Filament Checker

Many times before putting together the simple testing device described here, I found it difficult to determine whether the picture tube filament was truly open, or whether it was simply the socket that was defective. Simply connect two leads to a No. 44 panel lamp mounted in a suitable socket. Insulated leads are used, but the ends away from the socket are stripped bare so that they can be used as prods.

If the crt filament fails to light, I remove the socket from its base and insert the prods of the test lamp quickly into the filament connections. If the lamp lights, the crt itself is the source of the trouble. This compact tool may be carried easily on calls. The system really pays off in time saved that would be spent in pulling out and setting up a meter to make the same test.—*J. L. Mancini, Winthrop, Mass.*

Quick AGC Check

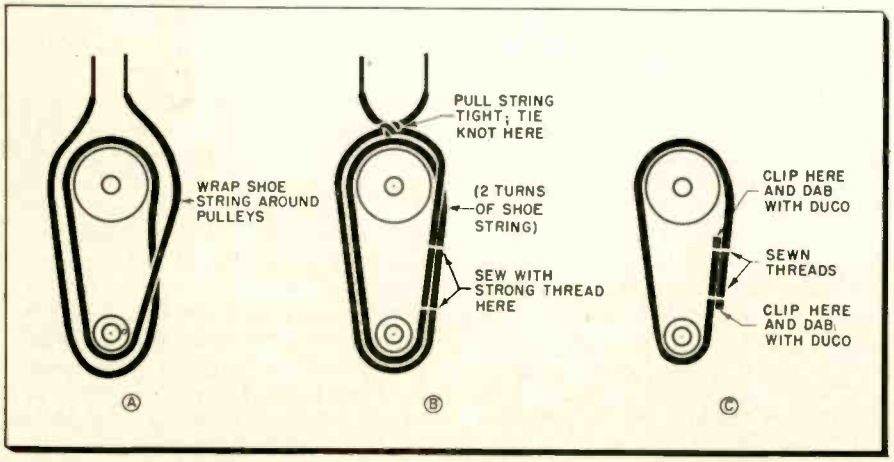
A shortcut that is frequently helpful in troubleshooting agc-related stages, such as the i-f strip or the tuner, involves a meter check on either side of the resistor in the agc line. Readings taken on either side of the resistor (usually 500k to 1 meg) shown in the sketch should be very close to each other. If the reading is noticeably higher (less negative) on the side of the resistor nearest the condenser than it is on the other side, a defective tube or a defect in the tube's circuit is permitting too much current to be drawn, and the agc line is being loaded.



Check on each side of resistor shows fault.

To localize the bad tube or stage, leave the vtvm connected to the point along the agc line where the high reading is obtained and substitute or remove tubes in the video i-f and tuner sections. If substitution or removal of a tube restores the reading, so that it is the same on either side of the resistor, the fault is localized.—*W. A. Skowron, Wichita, Kans.*

Step-by-step procedure for custom-fabricating dial belt substitutes with ordinary shoestring.



New Products Begin on Pg. 30

Adding Extra Speakers

Mismatch, Phasing, Other Problems in a Hi-Fi Sideline

M. G. Goldberg

The advent of Hi-Fi does not mean that every person whose interest has been awakened goes out to buy a complete high-fidelity system all at once. Many fans are building up on a budget basis, piecemeal. The installation of a new speaker to replace or supplement an existing one is a common measure. In many cases, the speaker is used with an older sound system that is acceptable, either permanently or temporarily. In other cases, a speaker may be added to simulate a stereophonic effect.—Ed.

• With the publicity about better audio quality from home equipment, many inquiries are being received about adding an additional speaker to present equipment. In almost all cases the speaker required is larger than the one now in use with radio, phono or TV amplifiers in the customer's home.

Some suggestions on obtaining the most benefit from the combination of two speakers are worth considering if the final results are not to be disappointing. After the customer has put some money into an additional speaker and housing, he wants to hear the difference, and he expects the new speaker to be the most prominent from the standpoint of volume as well as quality.

Where two speakers being driven from the same source are placed fairly close together, phasing is important. If the speaker cones are

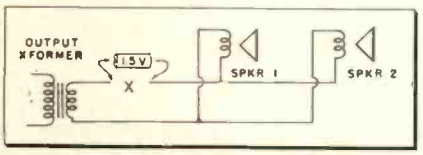


Fig. 1—Phasing speakers with flashlight cell.

moving in and out when energized in opposite phase, cancellations will occur at certain points in the room and at certain frequencies that will distort the response, and a definite drop in volume may be noticed at some points. A simple method for checking proper phase is shown in Fig. 1. The line feeding both speakers, in parallel, is cut at point "X" and an ordinary flashlight cell is connected across the break momentarily. This should cause both speaker cones to move in the same direction. When the cell is removed, the speaker cones should both bounce in the opposite direction. If one cone moves forward while the other moves backward, the speakers are out of phase and the leads to either one or the other should be reversed.

When the newly attached speaker is the larger of the two, as is usually the case, another problem may arise. The small speaker in the existing equipment probably has an impedance of about 4 ohms, while the larger speaker may be expected to have an impedance of 8 ohms or more. In this case, most of the amplifier output would go to the smaller unit, with results unsatisfying to the customer.

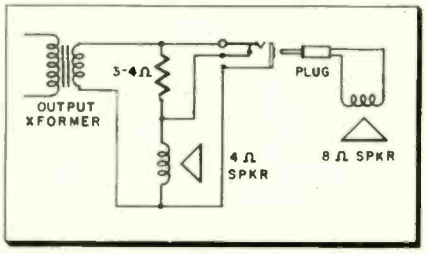


Fig. 2—Matching connection, added speaker.

In Fig. 2, we see the two speakers connected in parallel, the larger one by means of a plug and jack so that it may be disconnected at will. Note that a 2-watt resistor, 2.7 to 4 ohms in value, is wired into the jack circuit. Thus, when the larger speaker is disconnected, the resistor is shorted out and the small speaker is matched directly across the secondary of the output transformer. When the plug to the extra speaker is inserted in the jack, the resistor is then in series with the voice coil of the small speaker, while the larger speaker, directly across the transformer, does not have to share output with a series resistor. It therefore produces more output than the smaller speaker. Also, the matching between speakers and output transformer is now correct, as we have two 8-ohm leads in parallel across a 4-ohm output. If the original speaker had a voice coil impedance other than 4 ohms, the same system can be followed with different values.

What happens when an ion-trap magnet "drifts"? When does a good tube show low emission? For answers to these questions, see "Tough Dogs" on page 24.

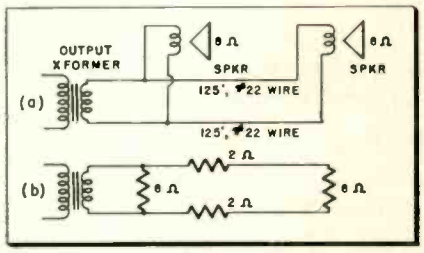


Fig. 3—Mismatch, power loss in long wires.

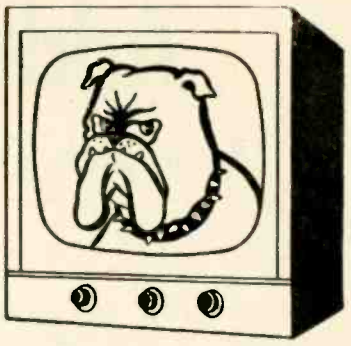
On long speaker runs, the size of the wire used becomes important. A pair of no. 18 wire leads will have a resistance of 1 ohm per 65 ft. (round trip). If the run is longer than this, considerable loss of power may occur in the lead and mismatch will be produced, unless the size of the wire is increased (that is; the wire number is made smaller).

Convenient rule-of-thumb calculations may be made, in the case of long runs, without resorting to tables. First of all, it must be remembered that 1000 ft. of no. 10 wire have about 1 ohm of resistance. From this base point, the resistance of a wire will double every time the size goes *three numbers higher*. In other words, 1000 ft. of no. 13 wire will have 2 ohms resistance. Conversely, 1000 ft. of no. 7 wire (three numbers *lower* than no. 10) will have only ½ ohm resistance; that is, half the resistance of 1000 ft. of no. 10.

The importance of taking wire resistance into account over long runs is illustrated in Fig. 3. Two 8-ohm speakers in parallel are shown, with one of them at a remote location, 125 ft. away, connected by no. 22 wire. The equivalent circuit indicates the lack of balance between the speakers, the waste of power in the wire, and the mismatch. •

"Tough Dog" Corner

Difficult Service Jobs Described by Readers



$10 For Your "Tough Dog Story"

Have you tangled with a difficult or obscure service problem recently? Write it up, telling us how you licked it, and send it to "Tough Dog" Editor, TECHNICIAN, Caldwell-Clements, Inc., 480 Lexington Ave., N. Y. 17, N. Y.

Wild Vertical Oscillator

Here is a rather unusual fault which took a lot of time to clear. The symptoms: about half the normal vertical deflection; jagged edges on the sides of the raster; black and white lines across the screen (as if the picture were truly out of horizontal sync); no clear-cut edge at top and bottom of the shrunken raster; and a fizzing sound from the yoke.

A check in the horizontal department showed correct conditions and frequency. With the scope applied to the grid of the vertical output tube at the socket, the oscillator frequency was an unstable 1200 cps or so—whether the output tube was in or out of the socket. Careful checks of the integrator network, blocking oscillator transformer and all other components in the oscillator grid circuit showed no abnormality; component changes did not improve the fault.

Closer checking indicated the defect was definitely in the oscillator plate load circuit. The 3.3 meg and 4.7 meg resistors (see sketch A) checked normal, as did the 0.1 mfd coupling condenser. Shunting the plate load resistance with 1 meg, however, lowered oscillator frequency considerably. Next the sawtooth shaping network of 8.2k and 0.03 mfd was disconnected, making no change in frequency or waveform shape. *Making no change!* . . . The resistor measured normal, but the condenser was wide open. Replacing it cured the fault.

I had regarded the network as being merely concerned with forming the waveshape of the drive voltage. A good look at the circuit shows the network is effectively in parallel with the plate load of the oscillator. It is, in fact, part of the plate load impedance. This was my first encounter with the fault. A couple of weeks later, another instance cropped up in a vertical-chassis Admiral. Condenser *C* (see sketch B) went open and caused the same effect.

If this "dog" story is worth ten bucks, it will just about repay the loss I made on the repair of the first set!—*R. Eldridge, Vancouver, Canada.*

No Ground for Complaint

A new model was brought to the shop with the complaint of insufficient vertical deflection. According to the customer, the defect had existed since purchase of the set and was more noticeable in the evening. After a 45-second warm-up, the raster developed just enough vertical height, with poor linearity.

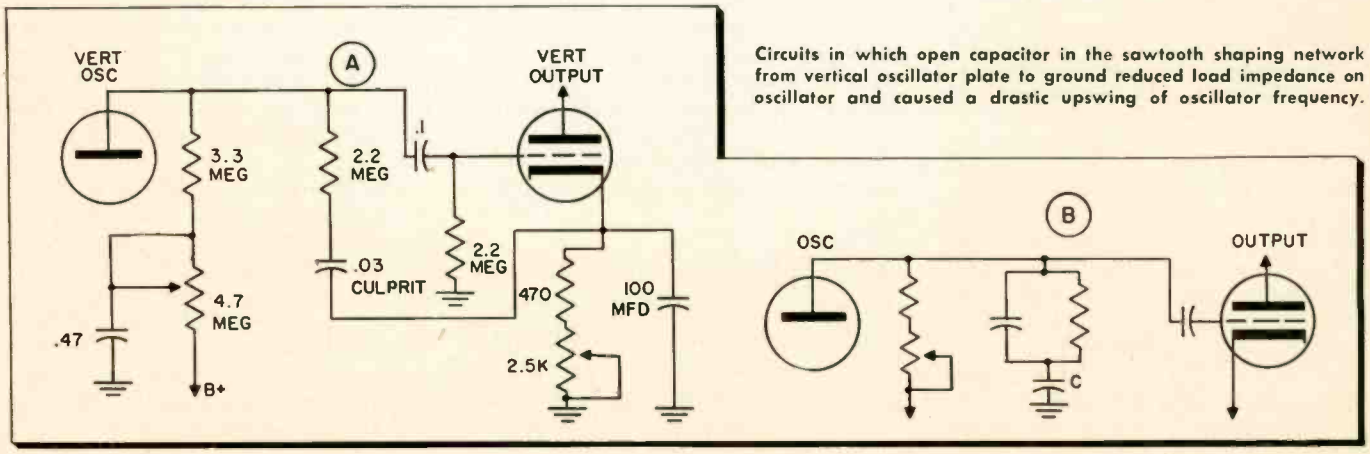
Height and linearity controls were already set at maximum. Vertical oscillator and output tubes were replaced, to no avail. A check of the output stage (12B4) showed all voltages well within tolerance. Remembering that the condition became worse in the evening, I turned my soldering gun on to load the ac line, and noticed a decrease of about 20 percent in vertical scanning. When the line was loaded, the sawtooth waveform at the grid of the 12B4 output tube remained unchanged, but fluctuated considerably at the plate. However, dc plate voltage remained constant.

Everything pointed to low emission of the 12B4, but everything had been checked—that is, I *thought* everything had been checked. Only the filament voltage hadn't been investigated. When I discovered that one half of the center-tapped filament had never been provided with the necessary ground connection, I could have jumped through the roof! Providing the proper ground connection correctly placed 12 full volts on the filament and corrected the trouble.—*F. Fetrow, Harrisburg, Penna.*

Brightness Drifts

When the TV set was first turned on, the picture was bright and clear. About an hour later, the raster faded out. To restore the picture, the set had to be turned off for approximately two hours, then turned on again. The crt, the 2nd anode voltage, as well as other tubes, voltages and components in the associated brightness and high-voltage circuits

(*Continued on page 49*)



Circuits in which open capacitor in the sawtooth shaping network from vertical oscillator plate to ground reduced load impedance on oscillator and caused a drastic upswing of oscillator frequency.

What's New in TV Tuners?

Streamlined Turret-Type Front End Reduces Costs

R. S. Lewis
Standard Coil Products Co.

• Recently released to manufacturers of TV receivers is a new lower-priced line of turret-type tuners, featuring changes from the conventional design that has come to be associated with the type.

The Standard Coil "T" Series features four basic types. Two pentode tuners are included, one for use with 21-mc i-f systems, the other designed for 41-mc i-f operation. The other two types are cascode versions—again, one each for 21 and 41 mc. All models are available in either 12- or 13-position turrets and may be wired to accommodate either regular 6.3-volt filament tubes or series tubes for 600-ma operation. (For a more detailed breakdown of the various models, see this month's Circuit Digest section.)

One innovation results in eliminating the need for individual mixer crystals on every UHF channel to which the tuner is subsequently converted. As shown in Fig. 5, only a single crystal is now mounted on each individual UHF strip. This is the harmonic generator. The single mixer crystal that serves for all is mounted on top of the tuner chassis, where it is held in place by a bracket and screw. One end of the mixer is grounded through the bracket; the other end is connected to a spring contact, through which it is introduced to the UHF strips.

Another new feature involves a departure from the use of a pair of coil strips for each channel. In the "T" series tuners, all the coils for a single channel are fixed on a single strip. The strips, held in the turret by spring tension, can easily be removed. This is accomplished by exerting pressure on the strip retaining spring, which is located on the turret between the center and the rear of the tuner, and lifting outward on the strip. The opposite end of the strip is engaged in a slot in the front turret plate. The new turret is shown in Fig. 4, with one of the single-strip coil sets removed to illustrate the new arrangement. Further clarification of the mounting set-up appears in the exploded view shown in the Circuit Digest section.

When assembled, the "T" series front end does not appear to differ greatly from earlier tuners in the turret line. Alignment procedures, location of adjustments and service considerations are much the same for all tuners in the series. For full details on these matters and other pertinent data, see Circuit Digest 184. •

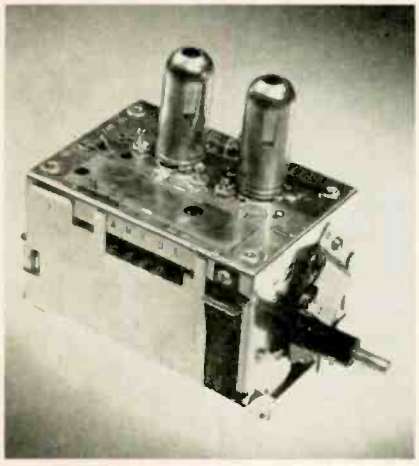
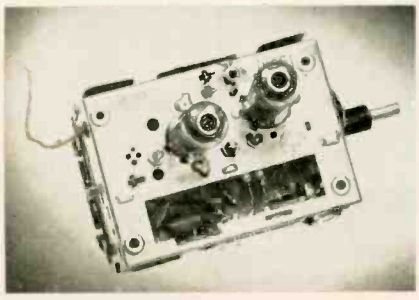


Fig. 1—Externally, the new streamlined front end resembles many of the preceding versions.

Fig. 2—View from above with top plate removed.



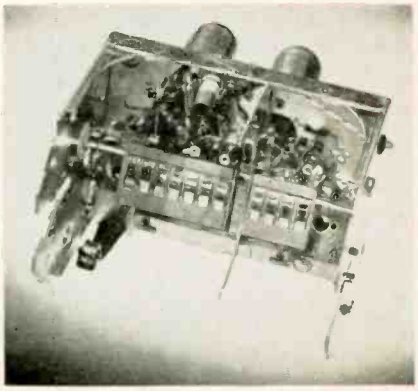


Fig. 3—Inside view of the tuner with the turret drum removed to expose the spring contacts.

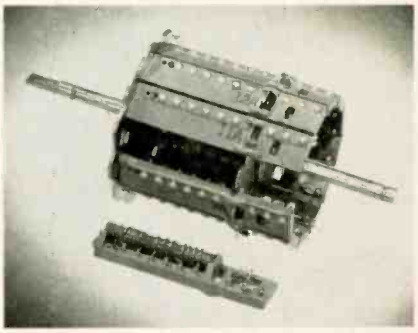
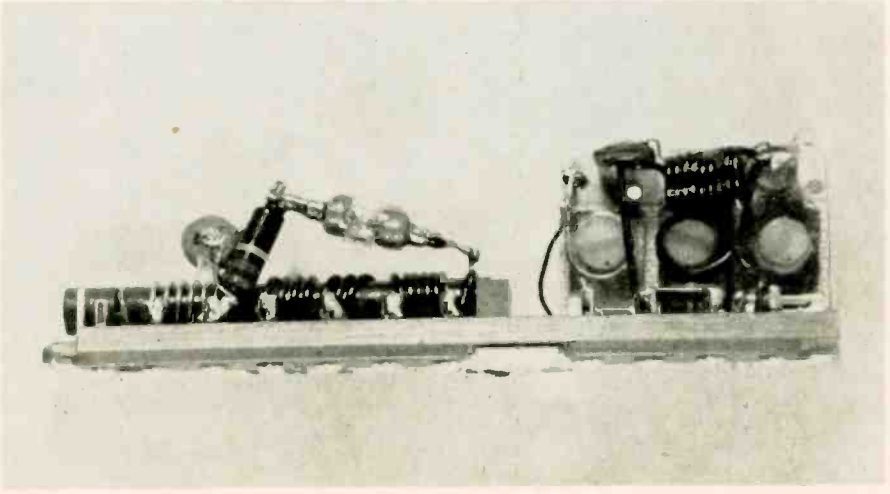


Fig. 4—New turret holds single-strip inserts for each channel with spring contact and slot.

Fig. 5—Each UHF strip carries its own individual harmonic generator crystal, but a single mixer crystal, which is mounted on the chassis, is used in conjunction with all UHF strips.



Auto Radio Bench Hints

How to Substitute a Cut-out for a Fuse on Your Test Bench

By Maurice Michaels

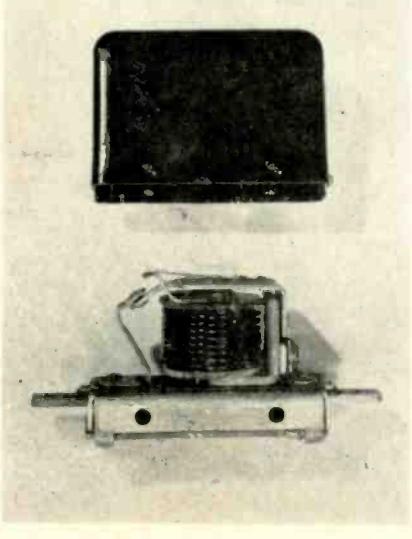
Using Cut-Outs in Auto Radio Servicing

Technicians doing auto radio servicing know that the cost of fuse replacement can run into dollars per year for bench service alone; associated with this expense is the nuisance of replacing the fuses, and the slow-up of servicing each time a fuse is blown during tests. To avoid such troubles, the writer uses an ordinary auto-radio generator cut-out in place of a fuse (see Figs. 1, 2).

This set-up, incidentally, eliminates the possibility of a fire being started by a short-circuit at the power supply input of an auto radio. It not infrequently happens that an auto radio that has not been disconnected from the storage battery powering it is left overnight on the service bench. Even with the switch "off," a short-circuit may develop; traffic passing during the night may cause wires to move or slip along the bench, possibly introducing a short that will make the wires red hot and start a fire.

One cut-out can be used with a 6-v supply; the other with a 12-v one. The cut-out is connected in series with the power supply being used and the receiver under test. It can be adjusted to open automatically when a certain current is exceeded. For instance, if the average receiver to be serviced takes from 6 to 7 amps, the cut-out can be set to open-circuit at 10 or 12 amps.

Fig. 1—Photo of cut-out that can be used to replace fuse in auto radio service work. Only the heavy-turn coil is visible; the fine-wire winding is inside this coil. Contacts have been altered to the solid-line shape shown in Fig. 2B. Cover is at top.



The manner in which the cut-out functions as a fuse may be described as follows: Normally the contacts are closed, and current flows with negligible drop through the heavy winding of the cut-out, the fine-wire winding being shorted out under these conditions (see Fig. 3). When a sudden overload occurs—due to a "stuck" vibrator or a shorted filter, say—the excessive current produces a magnetic field that is large enough to overcome the spring tension, causing the contacts to open. Current now flows through the fine-wire winding (since it is no longer short-circuited), causing it to be energized. This activation of the fine-wire winding increases the magnetic field that is pulling the contacts away from each other, and insures that these contacts will remain apart for as long a time as the overload is present. In fact, even if the overload is removed, the current flowing through the fine wire from the battery will keep the contacts apart until the circuit is interrupted by disconnecting the wires to the battery or the receiver.

The reader should note that current continues flowing through the battery, the fine-wire winding and the receiver in the presence of an overload. This current is, however, limited to a maximum of .2 amps even when a dead short is present across the power input terminals of the set.

Only enough turns should be removed from the heavy coil to keep the cut-out from opening under normal operation. (If too many turns are removed, the spring tension will have to be reduced, and "chattering" may result.) The spring tension of the contacts is increased by reshaping the spring in the manner shown in Fig. 2B; good contact is provided by the procedure, and the chances of the cut-out opening under normal operation are further reduced.

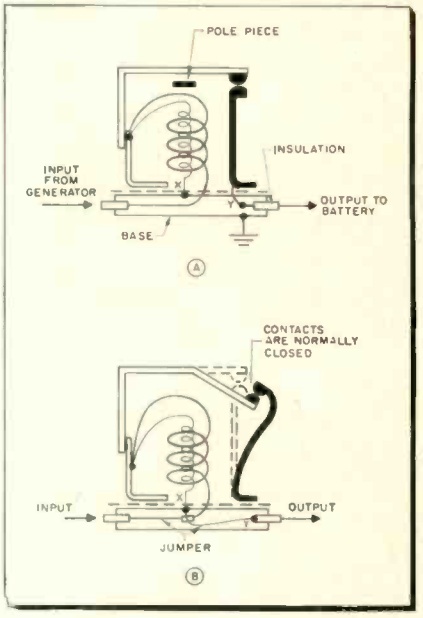


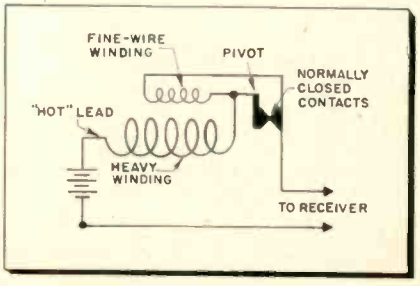
Fig. 2A—Sketch of cut-out as it originally looks. B—How cut-out looks after alteration. Note what has been done to the contacts. (A photographic view of the altered contacts is shown in Fig. 1). Note also the jumper wire that is connected between points X & Y.

For the 12-v cut-out, the heavy turns can be left alone; all one needs to do is bend the contacts into the shape shown in Fig. 2B, and connect a jumper wire between points *X* and *Y* in the base of the unit. Since point *X* connects to the base of the cut-out, the frame (which also contacts the base) must not be grounded to any part of the circuit; to avoid an accidental ground of this kind (which would short-circuit the set input), the cut-out frame may be mounted on a piece of insulating material.

The reason all the turns can be left on in the case of the 12-v unit is that less current is drawn by the

(*Continued on page* 57)

Fig. 3—Schematic of cut-out and its circuit.



Lead Dress Troubles

Chart Listing Symptoms, Causes and Remedies for TV Receiver Faults Arising from Improper Placement of Wires and Components

By Cyrus Glickstein

SYMPTOM	POSSIBLE CAUSE	REMEDY
1. PICTURE TWISTS even at low levels of brightness, and contrast.	a) 6.3 v filament wires too close to horizontal afc coil. b) Pickup of undesired signals in horizontal hold circuits.	a) Reroute filament wires. b) Reroute horizontal hold control and/or use shielded wire for control leads.
2. HORIZONTAL JITTER.	Cross-talk between cathode (or grid) lead of CRT and deflection yoke cable.	Separate CRT and yoke leads.
3. POOR VERTICAL SYNC and horizontal pulling.	Agc plate pulse pickup at grid of sync separator.	Dress coupling condenser and leads to sync sep. close to chassis, and away from agc amplifier output circuit.
4. VERTICAL JITTER.	Pickup from horizontal circuit.	Move horizontal deflection coil "hot" lead away from vicinity of vert. osc. tube, since it may be upsetting vertical triggering.
5. 4.5 MC HASH IN PIX.	a) Radiation from discriminator to tuner. b) Radiation from volume control lead.	a) Place shield between discriminator and tuner. b) Reroute vol. control lead (even if shielded) away from audio i-f, to minimize 4.5 mc pick-up.
6. BARKHAUSEN OSCILLATION (vertical line(s) at left side of pix and raster).	Radiation from hor. output stage.	Alter hor. drive control setting; change horiz. output tube; dress antenna input lead away from horiz. output stage; use magnet on horiz. output tube.
7. VERTICAL BLACK LINE(S) in pix and raster.	Radiation from deflection yoke.	Dress transmission line (or transmission line link in set) away from deflection yoke cable and yoke assembly.
8. PIX SMEAR.	Pickup from horizontal circuit.	CRT cathode or grid lead too close to horiz. yoke or horiz. output tube. Separate.
9. HORIZONTAL OUTPUT TRANSFORMER SQUEALING; raster lines separate (poor interlace).	Interaction between horiz. yoke and horiz. or vert. oscillator stages, causing waveshape of signal applied to sweep output stage to be improper.	Dress leads of horiz. deflection coils away from vert. and horiz. osc. stages.
10. INSUFFICIENT WIDTH, keystone raster, arcing in yoke and/or connecting wires.	Yoke-connecting leads shorting to each other or to horizontal section of yoke inside yoke assembly.	Check visually and by resistance readings. Separate leads from each other and from yoke.

Editorially approved by HOWARD SAMS Photofact Reporter*—

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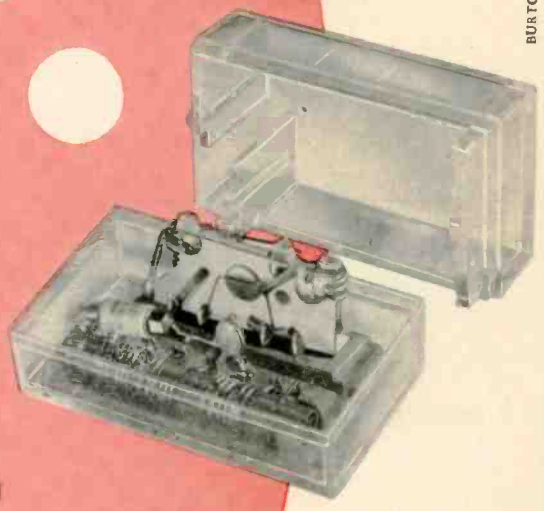
TV sets with Standard Coil tuners in use today.



BURTON BROWNE ADVERTISING

Buy the set owners' goodwill and loyalty by selling them "invisible" conversion with Standard Coil UHF strips in their Standard Coil tuner.

Strip conversion is "designed in" conversion developed by the same engineers who designed the tuners used in the sets. And—no extra box, no extra wires, no extra tuning knobs—and the absolute minimum of interference.

And Standard Coil "invisible" conversion is simple to install and easy to align. Capitalize on the steady demand for UHF conversion. This is all that's needed for each channel converted (actual size).

*Vol. 3, No. 2—page 35 and following

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Transistor Service Tips

Practical Techniques Used by an Experienced Tech

JOSEPH AMOROSE

(The theory of operation of transistors is no longer a novelty. The practical handling of these midget miracles, however, is still a mystery to most technicians. The writer got the "feel" of transistors from his own experience.)

• Transistor leads, which are made of very fine wire, have a habit that is both annoying and damaging to the pocketbook: they will break off quite readily, as shown in Fig. 1A. Attaching a new wire and applying heat in the time-honored manner may be a costly mistake. It often results in ruining the transistor altogether because it destroys the sensitive "whisker" adjustment.

There is a relatively simple way to repair these broken leads, thus preserving the transistor for continued use. The method is illustrated in Fig. 1B. First bend the broken transistor to an "L" shape, as shown. Then wind a spiral of bare copper wire, beginning at the broken lead so that

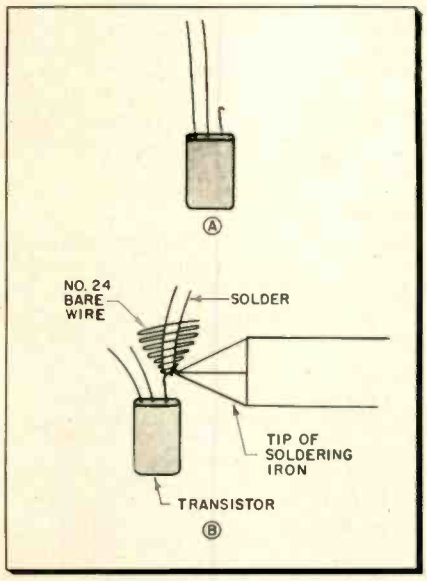


Fig. 1A—Transistor with broken lead. B—Set-up for safe additions of lead wire.

the starting end of the bare wire hooks around the L-hook on the broken lead. Introduce the solder through the center of the spiralled wire, and apply the iron to the *solder* by going through a loop in the spiral. Use a *hot* iron for a *very short* period. A joint made in this way will hold securely although the whisker adjustment will not have been disturbed. The spiralled wire lead may now be stretched out straight and cut to the desired length.

The technique just described, incidentally, is useful for components other than transistors. When leads break off close to the body of condensers, resistors or other components which are still electrically sound, leads can be added in this manner without danger of damaging the parts with excessive heat.

Still better than repairing broken leads is the technique of *preventing* them in the first place. This can be done quite easily if the tech working on the transistors happens to be an experimenter, using them in his own circuits. An easy and inexpensive way to protect the miniature devices and insure prolonged life consists of housing them in a small transparent plastic box. Lucite boxes of this kind whose dimensions are about 1x1½x ½ in. are readily available at a trifling cost. Most radio supply houses use them as containers for small parts.

To adapt these boxes for use with transistors, drill holes through the side of the box, as shown in Fig. 2, to allow the transistor leads to pass through. Then apply Duco or similar cement in the holes to hold the wires in place securely. When the transistor is mounted in the box, be sure not to place it too close to the side of the box through which its leads will

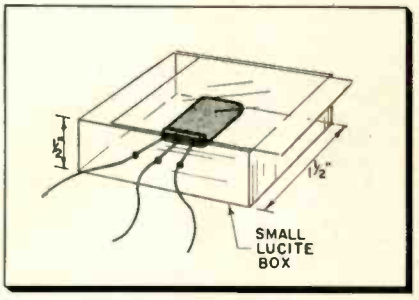


Fig. 2—Protective housing for transistors.

pass. In this way, if one of the leads should break off outside the box, there is sufficient lead length remaining inside the box so that there is no chance of ruining the component for future use. The latter is the case when a lead break occurs close to the body of the transistor.

These little boxes are adaptable to holding three transistors each in the fashion described. Protection is provided in more ways than one, since wear, tear, heat and moisture are all kept out, along with excessive handling. The advantage of compactness is also provided when it is desired to use two or three transistors in a small space.

First TV Receiver with Wings

The initial successful demonstration of television during flight, according to Sylvania Electric Products Inc., was carried out recently with a 21-in. home receiver installed in the lower lounge of a Pan American Stratocruiser bound for Bermuda on a regularly scheduled flight from New York.

The TV flight test was conducted to demonstrate the quality of images transmitted from points as far away as 330 miles, and at altitudes between 15,000 and 19,000 ft.

As many as 12 channels were tuned in during flight from the following eight cities: New York, Boston, Philadelphia, Washington, Baltimore, Norfolk, New London and New Haven. The receiver was successfully operated from the plane's 110-volt, 400-cycle supply without alterations either to the TV set or the source.

To pick up signal, about 50 ft. of RG59U transmission line was strung through the cable compartments to the pilot's compartment, then connected to the plane's receiving and transmitting antenna.

Excellent reception was also reported while the plane was on the ground. There were no difficulties from electrical equipment, motor interference or propeller modulation. Only slight ignition interference was noted during take-offs, with no noise in the sound. Sound volume was enough to over-ride engine noise.

New Test Equipment

Oscilloscope, Tube Checkers, Voltage Calibrator; Adapters

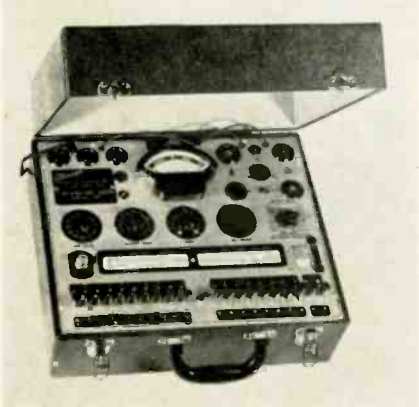
Senco TUBE CHECKER

Designed to speed the checking of tube filaments in the new series-connected TV sets, this new pocket sized checker handles all sizes of tubes, octal, Loctal, 7- and 9- pin miniatures and

5 v. rectifiers. Power is obtained by removing the standard TV line cord from the receiver and plugging it into the checker. Can also be used as a neon voltage indicator. Service Instruments Co., 422 S. Dearborn St., Chicago 5, Ill.—TECHNICIAN (Ask for No. 3-24)

CII TUBE CHECKER

Model 531 tube and battery tester measures tube quality on both English reading and percentage scales in a form of dynamic emission test. Features include a brass-geared roll chart; 13 sockets to accommodate all tubes including sub-miniatures and acorns; added filament voltages for latest ½ v.



to 117 v. tubes; picture tube adapter; 1% load resistors and multipliers. Blue simulated leather case. Size 15 x 13½ x 7 in. overall. $70.00. Chicago Industrial Instrument Co., 536 W. Elm St., Chicago 10, Ill—TECHNICIAN (Ask for No. 3-33)

NRI OSCILLOSCOPE

Wide-band scope designed especially for TV servicemen is also recommended for industrial applications where square-wave and pulse type signals must be observed. Vertical amplifier

response is flat from 10 cps to 4.5 mc, ±3db. Four-step frequency-compensated vertical attenuator is calibrated for direct peak-to-peak voltage measurement. Sensitivity is .014 v. (rms) /in; linear sweep range 10 cps to 100 kc. Average vertical amp. input impedance is 2 meg, and 25 mmf. Price —$147.50. Four probe accessory kit available at $14.95. Supply Div., National Radio Institute, 16th & You Sts., NW, Washington 9, D. C.—TECHNICIAN (Ask for No. 3-43)

Shasta VOLTAGE CALIBRATOR

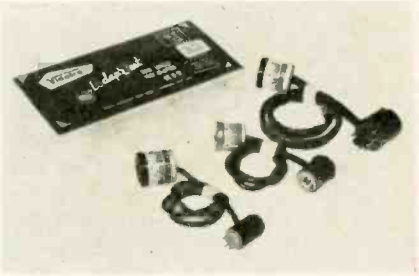
Calibrating an oscilloscope is simplified by the Model 402 Square Wave Voltage Calibrator. This instrument generates a square wave with a constant frequency of 1 kc and an amplitude which is continuously varied from 0 to 50 v. A display of this signal on an oscilloscope appears as 2 parallel horizontal lines, the distance between the lines being equal to the desired voltage. Other signals are then read directly in volts by comparison with the calibrator signals. $75.00. Shasta Div., Beckman Instruments Inc., P.O. Box 296, Sta. A., Richmond, Calif.—TECHNICIAN (Ask for No. 3-17)

MORE TECHNICAL INFORMATION

describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 36.

Vidaire TEST ADAPTER

Checking tube socket voltages is simplified by the new "Adap-Test" line of test cables. Any standard tube socket size can be accommodated by 1 of the 3 units comprising the AT-K kit.



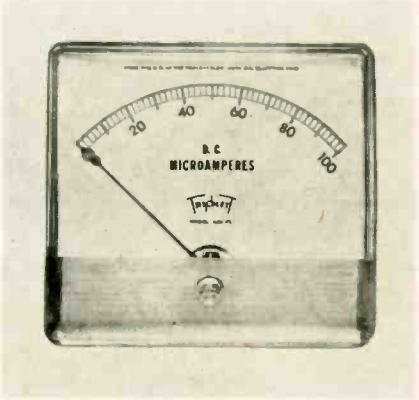
Model AT-1 is for octal tubes, model AT-2 for 7-pin miniature, and model AT-3 for 9-pin miniatures. Each unit has test points clearly numbered for easy identification. Leads are 20-in. long. Vidaire Electronics Mfg. Corp., 576 W. Merrick Rd., Lynbrook, N. Y. —TECHNICIAN (Ask for No. 3-22)

Tele-Matic CRT BOOSTER

Model No. CR-70, "5 in 1" universal picture tube brightener fits every type of picture tube through its five positions: series, parallel, electrostatic, electromagnetic and isolation. Flick of the switch puts the brightener in series or parallel, $3.95. Tele-Matic Industries Inc., 16 Howard Ave., Brooklyn, N. Y.—TECHNICIAN (Ask for No. 3-16)

Triplett METER

New 4-in. panel meter combines a transparent plastic case with a molded base. Case front projects over the rim of the instrument, giving longer scale length and permitting easier readability.



Available in 2 basic types; dc permanent magnet moving coil, and ac iron vane. Triplett Electrical Instr. Co., Harmon Rd., Bluffton, O.—TECHNICIAN (Ask for No. 3-21)

NEW 12AU7A

—**shorter construction** reduces intermittent scan and heater cathode failures.

—**completely interchangeable** with Type 12AU7.

NEW 5U4GB

—**twin-wing plates** provide greater heat dissipation.

—**wafer stem** strengthens construction. Increases ratings to 275 Ma at 44V drop with 1.0 amp. peak plate current.

Sylvania makes important NEW advances in

WAR ON CALL-BACKS

NEW 1X2B

—**all-nickel plates** reduce electrolysis. Lower gas level results in higher breakdown voltage.

—**longer life-test** under conditions well above ratings.

NEW 6BQ6GTA

—**folded-edge plate design** avoids bulb bombardment.

—**double-clearance** between mount and bulb top eliminates the "pigtail" to grid shorts. Avoids bulb-puncturing electron bombardment.

Six "double-duty" tubes designed to lick TV service's costliest problems. More to come!

Sylvania's war against callbacks began with the highly improved 5U4GB tube. Now Sylvania continues its fight against profit-grabbing callbacks and offers *five more* improved types for TV service.

These tubes score a direct hit on the most common "quick failures." Stronger winged-plate design and wafer-stem construction—sturdier welds and glass-to-metal seals; these plus a score of other mechanical and electrical improvements are incorporated to give trouble-free service.

Join the battle against callbacks! Use only Sylvania "double-duty" types! They're designed for servicing old as well as new sets.

Look for the new "double-duty" types in this yellow-and-black carton. It's your calling card of quality.

NEW 1B3GT

—**electrostatic shield-ring** protects filament during high-voltage operation.

—**Sylvania-developed top-cap alloy** produces positive glass-to-metal seal.

—**high-voltage base** makes tube interchangeable with coated types.

NEW 6SN7GTB

—**oblique orientation** of sections reduces microphonism.

—**direct weld** between stem pins and plates strengthens mount.

SYLVANIA

Sylvania Electric Products Inc.
1740 Broadway, New York 19, N.Y.

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New Components & Tools

Compact CRT Check Tube, Capacitors, Resistors; Hole Cutter

C-D CAPACITOR

New STT Midget "Budroc" steatite-cased paper tubular capacitors range in size from $^{7}/_{32}$-in. in diameter and $^{11}/_{16}$-in. in length to $^{3}/_{8}$-in. in diameter and 1⅛-in. in length. Those rated up to 400 vdc are impregnated in HT compound; those rated at 600 vdc are impregnated in Vikane. Both will withstand wide temperature variations. Cornell-Dubilier Electric Corp., 333 Hamilton St., S. Plainfield, N. J.—TECHNICIAN (Ask for No. 3-28)

Clarostat FUSE-RESISTOR

Dual-purpose plug-in fuse-type resistor, "Fuzohm," is designed as a low-cost unit to protect critical and expensive electronic equipment, particularly in TV sets. They repeatedly withstand high surge currents without damage but fuse when surge endangers expensive components. Clarostat Mfg. Co., Dover, N. H.—TECHNICIAN (Ask for No. 3-26)

Ram FLYBACKS

Two new horizontal output transformers, Models X070 and X116, are replacement units for Zenith receivers. Features include a unique anti-corona spray feature, special terminal lead distribution and high voltage stand-off construction. Ram Electronics Sales Co., Irvington-on-Hudson, N. Y.—TECHNICIAN (Ask for No. 3-25)

R & R HOLE CUTTER

Model 400 "Dial Saw" will cut any size hole from 1⅛ to 3½ in. diameter in metals, wood or plastics. Three electronically heat-treated high-speed-steel

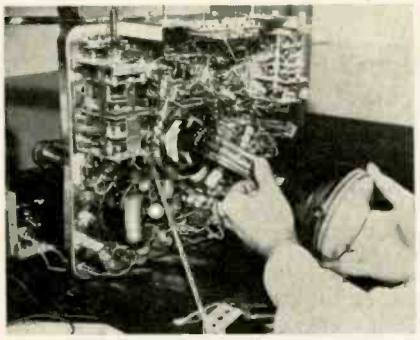
cutting blades adjust simultaneously to the size desired by rotating the dial. The dial is calibrated in standard pipe and conduit sizes, in addition to ⅛ in. spacings. Rust-proof black finish; high alloy shaft, $^{3}/_{8}$-in. round, with 3 flats milled for chuck mounting. Complete with 3 sets of blades for various materials. $14.95. Robertson & Ruth, Box 534, Elmhurst, Ill.—TECHNICIAN (Ask for No. 3-44)

Stackpole CONTROLS

Low-cost variable resistor, Type F, is only $^{5}/_{8}$ in. in diameter, is especially suited for installation in chassis where space is limited. Deposited carbon resistance element, gold plated ring spring contactor. Shaft has ⅛ in. diameter, and comes with either screwdriver slot, flat, knurl, or plain finish. Available in all resistance ranges, tapers and other specifications according to RETMA standards. Electronic Components Div., Stackpole Carbon Co., St. Mary's, Pa.—TECHNICIAN (Ask for No. 3-32)

Sylvania TEST CRT

New TV receiver check tube, designated the 5AXP4, is a 5-in. round, magnetically deflected tube using elec-



trostatic self-focusing. $24.00. Sylvania Electric Products Inc., 1740 Broadway, N. Y. 19—TECHNICIAN (Ask for No. 3-70)

B-M ELECTRICAL TAPE

The vinyl plastic backing on the new "Behr-cat" line of electrical tape has a particularly high dielectric strength—over 1,000 v/mil—which, according to the mfr., makes the tape superior to combinations of rubber or friction tapes for electrical applications. Tape is highly elastic; will stretch 1½ times its length without breaking. Withstands acids, alkalis, water, salt water and oils; highly resistant to abrasion and corrosion. Available in three models, 7, 10 and 20 mils thick. Behr-Manning Corp., 2054 Seifert St., Troy, N. Y.—TECHNICIAN (Ask for No. 3-12)

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Sprague CAPACITOR KITS

Designed to satisfy the needs of both large and small service shops, the "Ceramikits" contain the most frequently used ratings of capacitors in quantities determined on the basis of popularity. The capacitors are packaged in clear "Plasti-Pak" boxes and indexed with stand-up file separators. In 2 models; CK-2, which comprises a 2-drawer cabinet and 150 capacitors, and CK-3, a smaller kit which includes 75 capacitors. Price, for CK-2—$38.00; for CK-3—$19.25. Sprague Products Co., 65 Marshall St., North Adams, Mass.—TECHNICIAN (Ask for No. 3-31)

Vokar TRANSFORMERS

First designed for Regency's all-transistor pocket radio, these new subminiature i-f transformers and oscillator coils measure only ½-in. cube. The 262 kc i-f transformers are enclosed and shielded, and also include a 200 mmf. capacitor. The unloaded Q is 80. Mounting leads are designed for dip-soldering. Vokar Corp., 7300 Huron River Dr., Dexter, Mich.—TECHNICIAN (Ask for No. 3-30)

Aerovox CAPACITORS

Heavy-duty ribbed-case of the new "Cartwheel" ceramic HV capacitor provides an extra-long "creepage path," permits operation at voltages up to 30 kvdc. Exclusive potting compound provides insulation resistance greater than 50,000 megohms. Power factor is 1.5% max. at 1,000 cps. Standard capacitance is 500 mmfd., with tolerance of plus 50% minus zero. Aerovox Corp., Olean, N. Y.—TECHNICIAN (Ask for No. 3-29)

IDI PHONE PLUG

Ruggedized phone plug adapter of molded nylon, designed for the military, is now available for commercial appli-

cations. Plug end of adapter, Model No. 1416, is a standard PJ055B insert. Female end accepts twin test prods of the standard phone type, or .080-in. test prods. Industrial Devices Inc., Edgewater, N. J.—TECHNICIAN (Ask for No. 3-27)

MORE NEW PRODUCTS ON PAGES 30, 34, 36, 38, 40, 42, 44, 61

At Du Mont there is only one *Standard of Quality...*

You take no chances with quality when you use Du Mont picture tubes. *Every* Du Mont picture tube is manufactured to the same exacting quality standards — whether it's for a leading television receiver manufacturer to be used as initial equipment, or for you to be used as a replacement.

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Look for the Initial Quality Picture Tube tag packed with every Du Mont picture tube. Use it to show your customers that you have provided the finest quality components with your service.

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New Audio Equipment

Tuners, Amplifiers, Tape Recorders; Speakers and Enclosures

Bogen HI-FI ENSEMBLE

"Nassau" home music system consists of 2 units, a chairside radio-phono-amplifier cabinet, and the speaker enclosure, which houses a ruggedly constructed 8-in. woofer and a separate compression-horn tweeter. Speaker cabinet may be located anywhere in the room. Units incorporated in the system are: Bogen RR500-1 AM-FM radio-phono chassis and Collaro Model Intermix Model 3/532 with G.E. RPX-050 variable reluctance magnetic cartridge, with dual sapphire styli. $357.75. David Bogen Co. Inc., 29 Ninth Ave., N. Y. 14, N. Y.—TECHNICIAN (Ask for No. 3-38)

Pilot PHONOGRAPH

Hi-fi table model phonograph, Model PT-1020, "Encore," contains a Garrard RC-80 automatic 3-speed changer with GE variable reluctance cartridge and a 6-tube push-pull 8-watt amplifier. Less than 1% distortion; 3 step equalization

control for all records. Speaker system consists of a heavy-duty 8-in. woofer and 6-in. tweeter, enclosed in an acoustic chamber. Mahogany finished cabinet. $179.50. Pilot Radio Corp., 37-06—36th St., Long Island City, N. Y.—TECHNICIAN (Ask for No. 3-34)

TRI RECORDER

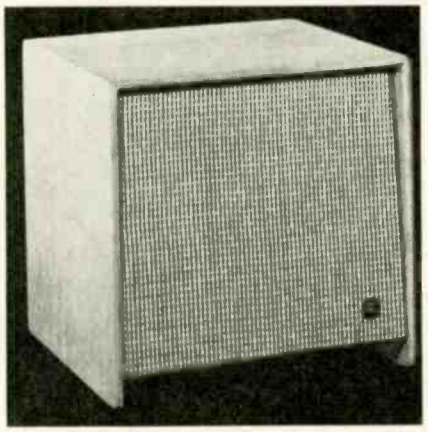
Full fidelity tape player and recorder, the "TriFy Continental," features a plug-in recording head, exclusive tape guide slotting device, neon bulb recording level indicator, pre-equalized amplifier, and 5 x 7 in. speaker. Also includes a 6-tube superhet radio, with full 540-1600 kc broadcast coverage, and a special mixer circuit which permits recording of both the microphone and radio at the same time. $169.95. Tape Recorders Inc., 1501 W. Congress St., Chicago 7, Ill.—TECHNICIAN (Ask for No. 3-5)

Webster TAPE MECHANISM

New addition to the "Ekotape" line of custom tape recorder mechanisms, Model 221 "Symphotone," consists of 2-speed record-playback mechanism finished in antique copper and brushed chrome plate. Plays and records at 3¾ and 7½ ips. with twin track recording head. Response is 40 to 13,000 cps at the 7½ ips speed. Two inputs, for mike and phono or tuner. Two indicator kits—a db meter and a "magic eye" tube—are available as accessories. Sound Sales Div., Webster Electric Co., 1900 Clark St., Racine, Wis.—TECHNICIAN (Ask for No. 3-36)

Hartley ENCLOSURE

New design in a non-resonant enclosure for use with the Hartley 215 speaker has a 2-stage acoustic filter and measures 18 x 18 x 16 in. Un-



finished gumwood, sanded ready for staining or painting. Price—$50.75; with speaker—$115.75. H. A. Hartley Co. Inc., 521 E. 162nd St., N. Y.—TECHNICIAN (Ask for No. 3-35)

Approved FM TUNER KIT

Features of the new V-9 FM kit are the self-contained ac power supply, 200 kc band width, 2 limiters and discriminator, 10 μv sensitivity with 20 db of quieting, and tuned r-f stage. $29.50. Approved Electronic Instr. Corp., 928 Broadway, N. Y. 10.—TECHNICIAN (Ask for No. 3-7)

MORE TECHNICAL INFORMATION

describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 36.

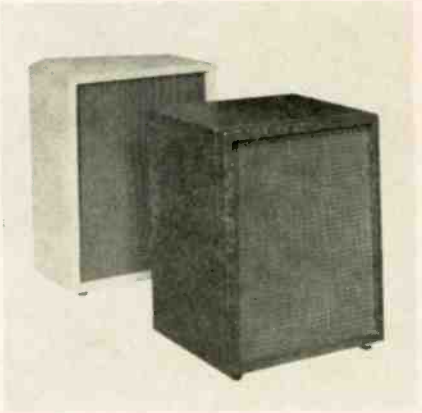
Regency HI-FI CABINETS

Flexible line of cabinets enables dealers and technicians to assemble customer's choice of company's audio components into packaged units. Price range of three units is $17.50 to $85.55, with aux-

iliary panels priced around $5. Table model TM is for Regency HF 80 or HF 150 amplifiers. Model TMC also accommodates record changer, and amplifier or AF 220 tuner. Model CTC is adaptable to any Regency amplifier or tuner, and any standard record changer. Regency, Div. of IDEA, 7900 Pendleton Pike, Indianapolis 25, Ind.—TECHNICIAN (Ask for No. 2-29)

Argos CABINETS

Small size console speaker cabinet is designed and licensed to use the Jenson "Duette" principle, which is claimed to get double the use out of the internal air mass. Available in

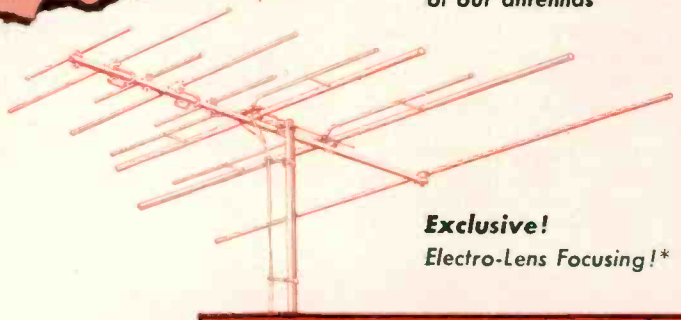


either mahogany or blonde leatherette, in 2 models: AD-1 rectangular model, at $21.50, and Model AD-2, corner model, at $24.50. Argos Products Co., 4753 N. Broadway, Chicago 40, Ill.—TECHNICIAN (Ask for No. 3-42)

"Everywhere! Even in the most extreme fringe areas, the sensational Winegard Interceptors are providing clear, enjoyable TV pictures."

"First shipment of Interceptors and Pixies enthusiastically acclaimed by our dealers. Advertising claims well founded. Pixie will outperform a stacked conical . . . oftentimes at a much lower height. Interceptor better than anything we have run up against including large colinear arrays."
Wilmington, Del.
DELAWARE ELECTRONICS SUPPLY CO.

Reports like these from across the nation are pouring in, testifying to the exceptional performance of our antennas



A great new antenna that gives you both

1. Complete all-channel VHF coverage—
2. Brilliant yagi performance—
   Yes, the extraordinary high gain of a yagi . . .
   The pin-point directivity of a yagi . . .
   Not on just one channel—not on just one band
   —but clear across the whole VHF spectrum.

Exclusive!
*Electro-Lens Focusing!**

The Interceptor is designed *for both black and white and color*

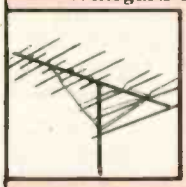
The same Interceptor that gives you those sharp, clear black and white pictures today will give you the truest, brightest color pictures imaginable in the future.

NOTE—The Interceptor has been received so enthusiastically . . . all over the country . . . that the Winegard Company, even with around the clock production in its brand new plant, can't seem to make *Interceptors* fast enough. Twice this season production has been actually doubled over what was originally planned, and still we are experiencing difficulty in keeping up with this tremendous demand. So, get your order in now—and avoid disappointment on delivery.

List price U.S.A. . . . Interceptor . . . per bay . . . $24.95
(Stacking bars available)

AND NOW up to 22% more gain! Super 'Ceptor
(Super Interceptor)

A NEW more powerful version of our famous Winegard Interceptor—Now—makes it possible to have multi-element yagi performance on all channels in the most extreme fringe areas.



The Super 'Ceptor possesses all of the wonderful features of the Interceptor, but with much increased sensitivity . . . up to 22% more gain over the standard Interceptor model.

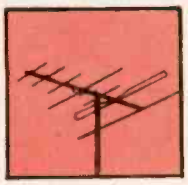
Features of the Interceptor and Super 'Ceptor

- Excellent 300 ohm impedance match over the entire VHF range.
- Extremely narrow yagi type forward lobes, with no side lobes and negligible rear lobes.
- Single lead . . . no switching . . . no interaction between the high channel elements and the low band elements.

The New Winegard Super 'Ceptor
(Super Interceptor)
With Electro-Lens Focusing!*

Gives you—multi-element yagi performance, not on one channel . . . not on one band . . . but on every single channel in the whole VHF spectrum!

List price U.S.A. . . . Super 'Ceptor . . . per bay $34.95
(Stacking bars available)



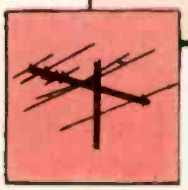
IMP—Model L-7 for channels 7–13. On the high VHF band, the IMP functions as two high gain yagi—operating side by side in perfect phase, to give gain and directivity far in excess of more conventional 7–13 broad band designs.

Imp Features:

- Exceptionally high gain on channels 7–13.
- Full wave driven elements.
- Full wave reflector elements.
- Electro-Lens Focusing.*

Note—the IMP makes the perfect all-channel attic antenna for *all* channels in primary areas.

List price U.S.A. . . . Imp. . . . per bay $12.95
(Stacking bars available)



THE PIXIE

Top all channel performance—at a low price—featuring unique improved conical type driven element—for high gain and uni-lobe directivity.

List price U.S.A. . . . PIXIE . . . per bay $14.95
(Stacking bars available)

*PATENT PENDING

See your jobber or write us for additional information about the Interceptor and other Winegard antennas

WINEGARD COMPANY

3000 SCOTTEN BOULEVARD, BURLINGTON, IOWA

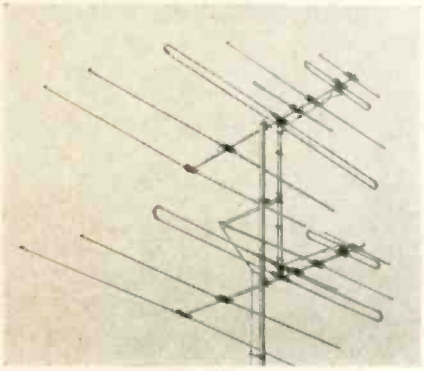
Winegard—America's most wanted line of TV antennas—designed to make installations quicker—easier—and more profitable

Antennas & Related Items

High Gain Outdoor Types; Tunable Indoor Antenna; Accessories

JFD VHF-UHF ANTENNA

The reverse-phase multiplex dipole system employed in the new "Fireball" antenna permits dual operation of all elements for channels 2 through 13. Wide spaced booster and parasitic ele-



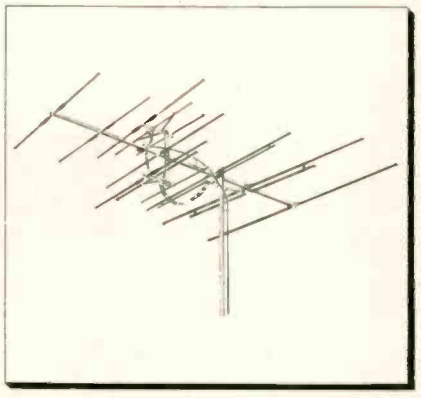
ments assure maximum signal pick-up on all channels. Over-sized folded dipole cuts interference and multiplies the signal strength. Assembly is speeded by new "Hi-Tension" brackets which hold elements in place without use of screws or bolts. Price, for single bay model (No. FB500), $14.95; stacked, (No. FB500S), $31.90. JFD Mfg. Co. Inc., 601—16th Ave., Brooklyn, N. Y. —TECHNICIAN (Ask for No. 3-10)

Dage COAX CONNECTORS

"DM" series of weatherproof coax connectors is one-half the size of the standard BNC type. Designed for use with miniature cables up to 3/16-in. in diameter. Silver plated brass conductors, teflon insulation, and silicone gasketing for operation at extreme temperatures. Positive lock, quick disconnect coupling. Dage Electric Co., Inc., Beech Grove, Ind.—TECHNICIAN (Ask for No. 3-3)

Vee-D-X VHF ANTENNA

New "VeeDXer" all channel VHF antenna is an 18-element yagi composite combining a half-wave broadband yagi on the low band with a full wave broadband yagi on the high band. The system is phased together with the exclusive "dyna-phase" system. Full



wave design for the high channels is said to equal the gain directivity and front-to-back ratio of a single channel 10-element yagi. All-aluminum, preassembled construction. LaPointe Electronics Inc., 155 W. Main St., Rockville, Conn.—TECHNICIAN (Ask for No. 3-2)

Neal YAGI ANTENNAS

The "Fringe Beam" line of 5- and 10-element yagi antennas are designed for the VHF band. Extra rugged construction; heavy gauge plated steel element clamps. Boom is 1-in. seamless aluminum. Step-up type transformer dipole provides excellent 300 ohm match; full 6 mc bandwidth. Gain of 10-element yagi is approximately 10 db. Neal Electronic Co., Inc., P.O. Box 376, Huntsville, Ala.—TECHNICIAN (Ask for No. 3-9)

TENtenna ANTENNA

"No-Ghost" Model T-100, for b&w, or color TV, and FM radio, operates independently as an indoor antenna or in conjunction with roof or existing antenna. Contains 10 variable tuning

circuits, with a calibrated visual indicator. Twin dipoles of "Ceroc" wire spool off to the required length, and are secured behind the receiver by 2 suction cups. $7.95. TENtenna Inc., 122 E. 42nd St., N. Y. 17, N. Y.—TECHNICIAN (Ask for No. 3-15)

Federal TVI FILTER

Television interference caused by auto ignition system, medical diathermy, ham radio transmitters and similar sources is suppressed by the "3-Pi" TVI filter. Features include printed circuit construction and durable, transparent polystyrene plastic case. Attenuation provided by the "3-Pi" is in excess of 46 db, which, according to the mfr., is far superior to existing items on the market. Federal Electronics, Federal Electronics Bldg., Rockville Centre, N. Y.—TECHNICIAN (Ask for No. 3-11)

Radion ARRESTOR

All standard types of 300 ohm twin lead—open, jumbo, flat or tubular—can be handled by the new LA75 lightning arrestor. Utilizes sparkgap, resistor circuit, and exclusive ground wire grip. UL approved for both outdoor and indoor use. Radical twin lead grip is claimed to make installations faster and easier. Price, including mounting strap and hardware—$1.35. The Radion Corp., 1130 W. Wisconsin Ave., Chicago 14, Ill.—TECHNICIAN (Ask for No. 3-14)

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On electrolytics—

FP means MALLORY!

Look for the two names—Mallory and FP—on the electrolytic capacitors you buy. They're your assurance of getting the genuine FP design, offering an exclusive combination of Mallory-developed features.

Famous for long life on the shelf and in service, they have true fabricated plate anodes . . . have been built for years to operate dependably at 85° C (185° F).

FP's handle high ripple currents. They're ideal for voltage doubler applications and for selenium rectifier circuits. Their twist prong mounting cuts installation time to seconds.

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Mallory Plascaps® . . . plastic tubular replacements with permanently secured leads . . . won't short out or open prematurely.

Subminiature Silverlytic Capacitors* . . . only ⅜" long and 7/32" in diameter . . . ideal for transistors and other miniature low-voltage circuits.

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CAPACITORS • CONTROLS • VIBRATORS • SWITCHES • RESISTORS
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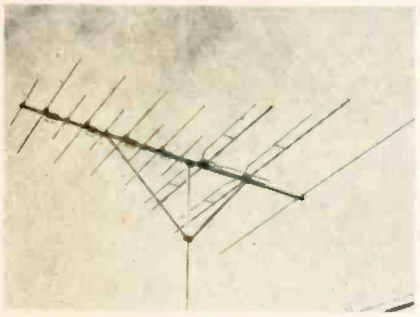
Antennas & Accessories

Outdoor VHF, UHF & FM Antennas; Line Tap-Off; Mast Mount

Winegard VHF ANTENNA

Designed for difficult and extreme fringe area operation, the new "Super 'Ceptor" Model SL-4 is designed to give multi-element yagi performance on all 12 VHF channels. Features include the



patented "Electro-Lens Focusing" and the use of Modified Tee matched driven elements so phased that they reinforce signals arriving from the front of the antenna and cancel signals from back and sides. Uniform gain characteristics; high signal-to-noise ratio. Winegard Co., 3000 Scotten Blvd., Burlington, Ia. —TECHNICIAN (Ask for No. 3-71)

B-T TAP-OFFS

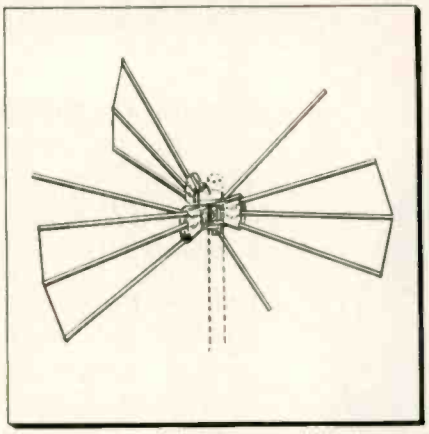
Model MTO-11 tap-off for community systems and the Model MTO-59 for indoor use feature air dielectric insulation to minimize shunt capacitance. They provide uniform 17 db r-f insulation and positive electrical protection through a spring contact resistor-capacitor network. Weatherproof MTO-11 handles RG-11/U through line, and has a clamp for a messenger cable: tap-off fits RG-159/U. MTO-59 taps into RG-59/U. A wall outlet plate and an RG-59/U receptacle are included. Price, for each—$7.00. Blonder-Tongue Labs Inc., 526 North Ave., Westfield, N.J.—TECHNICIAN (Ask for No. 3-84)

Acme PULSE TRANSFORMERS

Two types of miniature pulse transformers have been especially designed for triggering and counting circuits and dc isolation, inversion pulse shaping, and pulse transmission circuits. One group, comprising models 1C, 2C and 3C, has the core and coil assembly mounted within a metal housing with multiple terminal header plates of improved glass seal type. The other group, 1E, 2E and 3E, has the core encapsulated and sealed within a molded improved epoxy resin. Acme Electric Corp., 1375 W. Jefferson Blvd., Los Angeles, Calif.—TECHNICIAN (Ask for No. 3-78)

Snyder FM ANTENNAS

Four new FM antennas, the "S" Model, the "X" Model, the "Ultimate" and the "Directronic" cover all conditions of FM reception. Model "S" is a rigidly constructed omni-directional an-



tenna for metropolitan areas. Model "X", also omni directional, is for metropolitan and suburban areas. It consists of crossed folded dipoles. The "Ultimate" is of a yagi-type construction and is designed for fringe area operation. High gain; low front-to-back ratio. The "Directronic" is constructed to give maximum reception in suburban and fringe areas. No orientation needed. Six-position switch selects combination of elements which provide best reception. Snyder Mfg. Co., 22nd & Ontario St., Phila., Pa.—TECHNICIAN (Ask for No. 3-75)

Alliance DOOR OPENER

New "Lift-A-Dor" line of electrical and radio-controlled garage door openers consists of 7 models designed to fit all the popular types of overhead doors Most elaborate type, Genie Model A, is a completely automatic, radio-controlled model which opens and closes the door, turns the light on and off, locks and unlocks the door. It is operated from the dash of the car. Prices range from $69.95 for the Genie Model KST-1, a key lock straight track, to $219.95 for the Genie Model A described above. Alliance Mfg. Co., 100 Lake Pk. Blvd, Alliance, O.—TECHNICIAN (Ask for No. 3-69)

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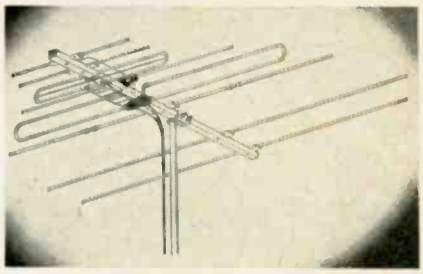
Ward OUTDOOR ANTENNA

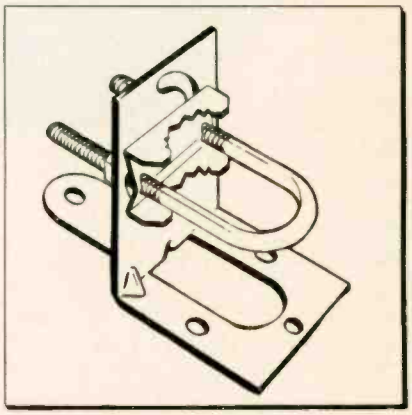
The new "Invader" antenna, designed to operate in fringe areas in a VHF range and in primary signal areas in a UHF range, is a flat type inline yagi. It features a new snap lock bracket



which is claimed to eliminate the possibility of intermittent contact. Requires only 29 in. of stacking. Available in 4-bay stacking kit, model TV-357, and in a 2-bay version with stacking harness, Model TV-356. Price for the TV-356 is $39.95. Ward Products Corp., div. of the Gabriel Co., 1148 Euclid Ave., Cleveland 25, Ohio.—TECHNICIAN (Ask for No. 3-13)

Telco MAST MOUNT

Versatile "Handy Mount," mast mount, designed for use on any rooftop installation, comes completely pre-assembled and has a double support feature to give it extra strength. Fits any size mast up to 1½-in. diameter.



Clamp and U-bolt construction gives the device all-angle versatility. An extra leg provides solid support from both sides. 55¢. Television Hardware Mfg. Co., div. of General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—TECHNICIAN (Ask for No. 3-68)

MORE NEW PRODUCTS ON PAGES 30, 32, 34, 36, 40, 42, 44, 61

Nationwide Sales Contest

Trips to Bermuda on the Furness Line's "Queen of Bermuda" are the grand prizes in Jersey Specialty Co.'s new "Time of Your Life" vacation contest being launched this month. Several hundred worthwhile prizes will also be awarded to others showing meritorious effort in the sales activity.

The prizes are being awarded for the best letters from dealers on TV wire installation techniques. The winning letter takes one grand award, with the others going to the distributor and the distributor's salesman contacting the dealer. Two trips to Bermuda are awarded to each.

An interesting highlight of the contest is the awarding to each of the first 5,000 entries of a 100 ft. coil of 20 gauge, 80 mil-web, pure polyethylene lead-in wire.

All inquiries regarding the "Time of Your Life" contest should be directed to the Contest Manager, Jersey Specialty Co. Inc., Burgess Place, Mountain View, N.J.

Milestone For Publication

On March 1, Sylvania commemorates the 25th anniversary of its "Sylvania News," the service-dealer publication published by the company's renewal tube sales department. It is the oldest continuous service-dealer publication within the electronics industry.

First published on March 1, 1930, with a circulation of 30,000, the "News" now reaches more than 130,000 readers all over the world.

Featured in the "Sylvania News" are technical articles in the radio, TV and electronic fields, practical information for the service dealer, news of the industry, and technical inserts which will become part of the Sylvania Technical Manual—now in its 9th edition.

Motor Capacitor Guide

Technicians eager to expand their business to allied fields will find a new catalog release from Aerovox Corp., New Bedford, Mass., particularly interesting. Entitled "Catalog and Replacement Guide—AC Capacitors," this comprehensive 35-page report gives detailed technical information on electrolytic motor starting capacitors.

The catalog lists typical capacitor ratings for capacitor start motors, with formulas for calculating capacity, current and power factors. Included are wiring diagrams for capacitor motors and a graph showing the electrical characteristics of 110 v. starting capacitors at 60 cps.

New Sound Equipment

Cartridges, Amplifiers, Speaker Systems; Hi-Fi Accessories

GE FILTER

New hi-fidelity "Three-Way Record Filter," Model A1-901, designed for systems using the GE variable reluctance or similar cartridges, combines two independent filter controls and one compensator control in a single unit. It consists of a low frequency cutoff filter, a record compensator and a high frequency cutoff filter. The record compensator adapts individual systems to each of the six commonly used recording curves. Dimensions, including cabinet, 7½ x 3½ x 3½ in. $19.95. Radio & TV Dept., General Electric Co. Inc., Syracuse, N. Y.—TECHNICIAN (Ask for No. 3-76)

A-L HI-FI AMPLIFIERS

Model A-440A, a self-powered preamplifier-control unit, has two low level and three high level inputs with individual gain controls, selection for either conventional volume or loudness control, and choice of 25 recording characteristics. Also incorporates exclusive tape monitoring feature. Hinged door hides all controls except the on-off volume control. Companion power amplifier, Model A-340A, 35 watts, has a response ± 1 db from 5 to 100,000 cps. Variable output impedance and gain control. Utilizes 6550's in push-pull output. Altec-Lansing Corp., 161 Sixth Ave., N. Y. 13—TECHNICIAN (Ask for No. 3-72)

Fenton PORTABLE SPEAKER

Designed for simultaneous listening in different rooms or stereophonic setups, the Fen-Tone extension speaker includes a Jenson 5-in. speaker and 25

ft. of extension cord. Available in 6 satin-finish colors. Equipped with its own baffle, stand and switch. $11.90. Fenton Co., 15 Moore St., N. Y. 4, N. Y. —TECHNICIAN (Ask for No. 3-37)

Recoton CARTRIDGE

Magnetic turnover cartridge, Model 500, features a frequency response of 20 to 16,000 cps, high compliance and low mass, replaceable stylii, diamond or sapphire, and extra shielding. New push-pull coil assembly is claimed to eliminate hum pickup from changer motor, or transformers. $9.90. Recoton Corp., 147 W. 22nd St., N.Y. 11, N.Y.—TECHNICIAN (Ask for No. 3-6)

FME TAPE RECORDER

Two-speed, dual-track tape recorder, Model 37C, is an improved version of the earlier 37B. Improvements include the use of a 2-belt system to eliminate the possibility of wear or squeal and several circuit modifications to provide greater fidelity of tone. External changes include an attractive 2-tone

gray color scheme and redesigned control knobs. $139.95. Federal Mfg. and Engrg. Corp., 211 Steuben St., Brooklyn, N. Y.—TECHNICIAN (Ask for No. 3-66)

Magnavox HI-FI PHONO

Console model hi-fidelity phonograph, the "Magnasonic 210," has a 10-watt push-pull amplifier, a 12-in. woofer and 5-in. tweeter. Changer is 3-speed, automatic, with dual sapphire styli. Cabinet is available in either russet or blond Magnatex. $149.50. The Magnavox Co., Fort Wayne 4, Ind.—TECHNICIAN (Ask for No. 3-39)

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describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 36.

Hallicrafter RECEIVERS

Model SX-96 is a 10-tube double conversion selectable side band communications receiver which covers the standard broadcast band from 538 to 1580 kc and 3 SW bands, from 1720 kc to 34

mc. Features include calibrated bandspread, "S" meter, low drift and five steps of selectivity.

Model SX-99, shown, covers the range from 1680 kc to 34 mc. Over 1000 degrees of calibrated bandspread over the 10, 11, 15, 20, 40 and 80 meter bands, Crystal filter, antenna trimmer, "S" meter, 1 r-f and 2 i-f stages. Price—for the SX-96, $249.95; for the SX-99, $149.95. Hallicrafters Co., 4401 W. 5th Ave., Chicago—TECHNICIAN (Ask for No. 3-83)

National SPEAKER SYSTEMS

Recent additions to the "Horizon" line of hi-fi components are the National "Catenoid," a 4-way corner horn with cross over network, the "Copley," a 3-way corner system, the "Wellesley," a deluxe version of the "Copley," and the "Fantasia," an end table type with dual speakers and wrought iron legs. All models are available in blonde, mahogany and walnut, both hand rubbed and Formica. The National Co., 61 Sherman St., Malden, Mass.—TECHNICIAN (Ask for No. 3-67)

Astatic CARTRIDGES

True tone, smooth response and a marked absence of needle talk are claimed for the new 66 and 68 Series crystal pickup cartridges. Feature of construction is the new high compliance "K" needle. Cartridges are available in both single needle and double-needle turnover models. 66 Series have a 3.0 v. output and 68 Series a 4.0 v. output. Housings are stamped aluminum, and terminals are quick-disconnect type. Crystal elements have moisture-proof coating. Astatic Corp., Conneaut, O.—TECHNICIAN (Ask for No. 3-77)

Magnetic Indoor Antenna

A new magnetic material is the heart of a compact, cabinet-enclosed, permeability tuned indoor antenna announced by Brach Mfg. Co. (Div. of General Bronze Corp.)

Most interesting feature, technically, is the use of *electromagnetic* rather than *electrostatic* means for picking up signals. In this respect, Brach engineer Ira Kamen compared it to preceding types as old long-wire antennas may be compared to ferrite-core miniature receptors.

Housed in a cabinet 14 in. long and 4 in. high, the unit can sit on top of a TV set without contributing an unsightly appearance. A channel-calibrated slide-rule dial and a tuning knob give it the appearance of a small table radio. They also make for simplified adjustment. The unit does not have to be oriented. Performance is stated to at least equal that of any indoor type. The unit retails for $19.95.

Possibilities for future antenna developments based on the new material were said to include: (1) use of the present design by receiver manufacturers to incorporate built-in antennas that will give good results in a large number of installations, (2) easy adaptibility of the present model to UHF reception, and (3) design of multi-unit antennas of small size for use in attics or on rooftops in fringe and ultra-fringe areas.

While antenna design parameters for the new material are completely different from present formulas, no design limits were foreseen.

"Well, who shall we visit tonight, dear? The Johnsons, the Goulds or the Pennypackers?"

Test Instruments & Tools

VTVM, Tube Checker, Signal Tracer; Geiger Counter

Eico SIGNAL TRACER

Deluxe multi-signal tracer Model 147, for r-f, i-f and audio signal tracing, and trouble-shooting in AM, FM and TV sets, has separate high gain r-f and low gain audio input channels. In-

corporates a built-in 5-in. test speaker and magic eye. Exceptionally high r-f sensitivity. Added features include a special Noise Locator Circuit, and a calibrated wattmeter which reveals abnormal wattage consumption in sets under test. Price, in kit form—$24.95; factory wired,—$39.95. Electronic Instrument Co., Inc., 84 Withers St., Brooklyn 11, N. Y.—TECHNICIAN (Ask for No. 3-18)

Drake SOLDERING KIT

New soldering kit consists of three irons which fit into a single handle assembly. Medium-heavy duty model is 150-watt iron, with 1⅛-in. tip. Light duty iron is 100-watts, with ¾-in. tip. Smallest, a 60-watt iron, with ¼-in. tip, is for hobby work. Outfit is contained in an all-steel tool kit, and includes safety stand and 2 tubes of Drake solder—acid and rosin core $15.95. Drake Electric Works Inc., 3656 Lincoln Ave., Chicago 13—TECHNICIAN (Ask for No. 3-79)

EMC TEST EQUIPMENT

Three precision instruments are being offered together as a package in the new "Basic Service Shop Test Equipment" offer. The units are the Model 106 vtvm, Model 500 r-f signal generator, and the Model 208 tube tester. Included without extra charge are the Model CRA picture tube adapter, for the Model 208, and 2 Model IS "Eye Level" instrument stands. Together, the equipment provides all the measurements necessary for basic radio and TV receiver servicing. Total cost—with Models 106 and 500 in kit form, $68.55; with all units factory wired, $90.55. Electronic Measurements Corp., 280 Lafayette St., N. Y. —TECHNICIAN (Ask for No. 3-19)

Precision VTVM

Advanced features in the new Model 88 wide-range VTVM-ohmmeter include special peak-to-peak voltage ranges. The meter provides 7 distinctly separate functions with 40 ranges. In-

cludes all-zero center dc vtvm with 6 overlapping O-center dc ranges from plus to minus 1.2 v to ± 1200 v. Ohmmeter covers range of resistance values from 0 to 1000 megohms; reads 10 ohms center scale on R x 1 range. High frequency vacuum tube probe is available as an accessory and provides high frequency ac-rms reading facility to 300 mc. Price, complete with battery, and coaxial vtvm probe, $69.75. Precision Apparatus Co., Inc., 70-31 84th St., Glendale 27, N.Y.—TECHNICIAN (Ask for No. 3-80)

III TESTER

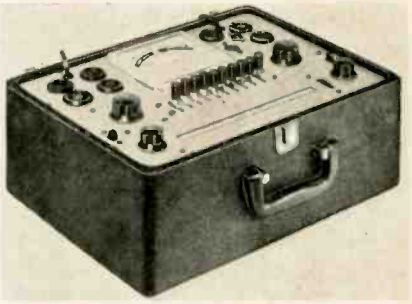
Model HC Tester permits continuity measurements, insulation resistance tests, dielectric strength tests and the use of external instruments on cable harnesses in airplanes, electronic assemblies and communications equipment. Two colored lights serve as indicators for continuity testing, and meters are provided for Lo-Range ohmeter, insulation resistance measurement and dielectric breakdown test. Dielectric breakdown and insulation resistance test of up to 1500 vdc are available. Industrial Instruments Inc., 89 Commerce Rd., Cedar Grove, N. J.—TECHNICIAN (Ask for No. 3-20)

MORE TECHNICAL INFORMATION

describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 36.

Knight TUBE TESTER KIT

Low cost tube tester kit for the TV service shop measures tube performance by the cathode emission method and checks for shorted elements, open elements and heater continuity. Han-



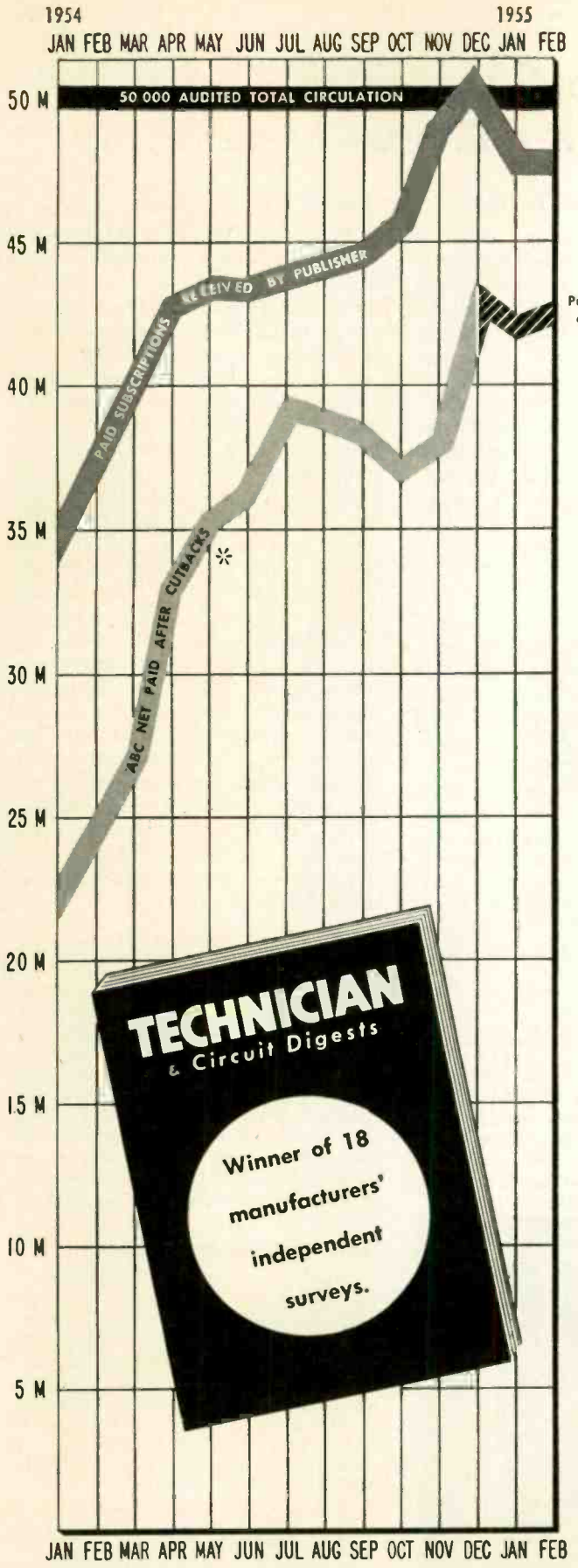
dles all sizes of tubes, and, with special adapter, all types of picture tubes. Features 4½-in. meter, line voltage compensator, and clearly marked roll chart. Single-unit, 10-lever function switch. Price, with counter-type case, $29.75; in portable carrying case, $34.75. Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.—TECHNICIAN (Ask for No. 3-73)

Nucleonic GEIGER COUNTER

Uranium Ore-Lokator Model RM2N has a sensitivity of .02 milliroentgens/hr. and is sensitive to as little as .003% uranium. It detects and measures the intensity of hard beta and/or gamma radiation. Large 2½-in. meter is calibrated to read radiation from 0 to .25-2.5-25 milliroentgens/hr. and counts from 500 to 5,000-50,000 counts per minute. A neon panel light is provided to indicate when the instrument is turned

on and also provides a flashing signal in response to radiation. An audible signal is provided by clicks in the headphone. Models vary in price from $24.95 to $149.50. Nucleonic Co. of America, 497 Union St., Brooklyn, N.Y.—TECHNICIAN (Ask for No. 3-4)

MORE NEW PRODUCTS ON PAGES 30, 32, 34, 36, 38, 40, 44, 61



* As filed with the Audit Bureau of Circulations subject to audit.

† See ABC audit, paragraph 28a, for an official explanation of cutbacks.

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LARGEST AUDITED PAID CIRCULATION AMONG SERVICEMEN

Speeding Up Soldering

Suggestions From Readers on How to Do Difficult Jobs Faster

Soldering in Tight Places

In cramped quarters, it is often desirable to use just enough solder to do the job and no more, since any excess may, sooner or later, form a hard-to-remove short-circuit. A minimum of solder may be applied in such areas as follows: A small ball of solder is melted on a table top, or on a junk block of wood; an ice pick or similar tool is touched to it before it solidifies. The ball of solder will stick to this tool, permitting exactly that amount to be transferred later to the place desired. The wires to be joined are heated until they become hotter than soldering temperature. The joint is then touched with the preformed solder ball. The beauty of this method is that you can regulate the exact amount of solder going to a joint in a ticklish place, say a coil terminal, where splashes or excess solder would be difficult to remove. Obviously, the separate wires to be joined have already been tinned, either in the manner described or by more conventional methods, before the soldering operation.—*James McRoberts, Brooklyn, N.Y.*

Soldering Aluminum Parts

Soldering an aluminum portion of an electronic device can be accomplished quickly and efficiently with a regulation soldering iron and ordinary solder, by first melting a blob of solder at the site of the repair. While keeping the metal hot enough so that the blob of solder remains molten, scrub the solder onto the aluminum surface with a pad of steel wool. Then tin the surface, after which solder will adhere to the aluminum as well as it will to other metals.—*Harvey Miller, Sarasota, Fla.*

Flexible Vise

In assembling small units or many components, we've often found this work easier by clamping or sticking them in a wad of children's modeling clay during the soldering process. The clay can be shaped firmly to hold any irregular pieces, does not conduct away or dissipate the heat, and is firm enough to stay put under the soldering iron.—*Stanley Clark, Box 222, East Bradenton, Fla.*

Solder Flux Cautions

Many technicians are apt, on occasion, to resort to the use of some patented soldering flux, in order to make a soldering job easier—especially in the case of aged radio and television sets, where the wires are old and have an oxidized coating. Where high voltages are present—particularly in the vicinity of low or high-voltage rectifiers—soldering flux should never be used. No damage may be evident for a few days; when the high voltage has eaten its way through the flux, and across a Bakelite socket to ground, however, the wires or Bakelite socket will smoke, and a tough job is on the way, replacing wires and sockets. I have had to replace several sockets lately that had been damaged in the manner just indicated. In some instances, the sets nearly caught fire. It pays to take time to clean and scrape wires and use a good rosin core solder for all jobs, omitting soldering flux in any case where its use might lead to high resistance leakage of this type.—*Roy Hale, Middlesboro, Ky.*

New Products

Browning TUNERS

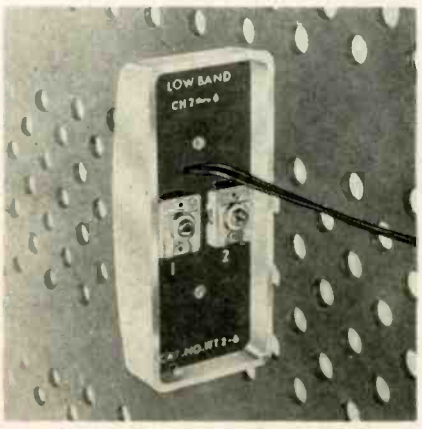
New hi-fidelity tuners, designed for custom installations, are claimed to provide all the features of larger models. FM Model L-300 has a sensitivity of 3.5 μv for 20 db of quieting, 20-20,000 cps frequency response, afc, cathode follower output, tape recorder output and Armstrong circuit. The AM Model L-500 has high sensitivity, variable selectivity, 10 kc whistle filter and a cathode follower output. Browning Laboratories Inc., 750 Main St., Winchester, Mass.—TECHNICIAN (Ask for No. 3-40)

Illinois CAPACITORS

Unusually high insulation resistance, low power factor and long life performance are claimed for the new "Illini Ste-Tite" Type capacitors. The non-inductively wound foil assemblies are oil impregnated and hermetically sealed in steatite cases. They are overload tested and have a standard tolerance of ± 20%. Available in capacity ranges from .0005 to 1.0 mfd. and in 200-400-600 and 1600 wvdc ratings. Illinois Condenser Co., 1616 North Throop St., Chicago 22—TECHNICIAN (Ask for No. 3-82)

JFD FILTER

Interfering adjacent channel signals can be eliminated by one of these two new interference filter wave-traps. Model WT26, for the low band, and Model WT713, for the high band, are



sharply tuned traps which are adjusted at each receiver to eliminate the interference. Particularly useful in cases involving cross-modulation from exceptionally strong local station. $4.50. JFD Mfg. Co., 6101—16th Ave., Brooklyn 4, N.Y.—TECHNICIAN (Ask for No. 2-1)

Ohmite FUSE RESISTORS

Model No. FR-7.5 is a 7½ ohm fuse resistor designed to replace any fuse resistor in TV receivers. It is furnished with 1½ in. tinned wire leads plus a separate plug-in mounting strip. The resistor can be soldered to the strip for plug-in mounting or directly into the circuit under the chassis. Ohmite Mfg. Co., 3675 Howard St., Skokie, Ill.—TECHNICIAN (Ask for No. 3-74)

Tele-Matic WAVE TRAP

Adjacent channel interference is eliminated or reduced by the new "Knock-Out" antenna traps. Factory pre-tuning eliminates all adjustments in installation. The unit consists of 2 hi-Q traps which provide maximum attenuation of interfering channels. Available for channels 2 through 13. $3.50. Tele-Matic Industries Inc., 16 Howard Ave., Brooklyn, N.Y.—TECHNICIAN (Ask for No. 3-1)

Bogue TRANSISTOR

General purpose n-p-n ground junction transistor, intended for applications at power, audio and radio frequencies up to 1000 kc, provide power gains up to 32 db. Hermetically sealed; good temperature characteristics. Bogue Electric Mfg. Co., Dept. WNH-2, 52 Iowa Ave., Paterson 3, N.J.—TECHNICIAN (Ask for No. 3-81)

RCA's Music Synthesizer

A technical description of RCA's new electronic music synthesizer (See p. 54—Feb. Technician) was delivered to the recent 1955 AIEE Winter Meeting in New York By Dr. Harry F. Olson, head of RCA's Acoustical Lab.

Preliminary to his description of the unit's operation, Dr. Olson dwelt on the technical characteristics of sound. These he itemized as frequency, intensity, growth, duration, decay, portamento (a frequency glide), timbre and vibrato (an amplitude or frequency modulation). Knowing the values of these characteristics, and having means for varying each independently, he said, any given tone can be duplicated. The synthesizer is designed so that any combinations of these characteristics can be achieved.

New Tone Structures

Since the synthesizer can control any characteristic of a tone, it can not only reproduce any known sound, it can also form new sounds—tones which cannot be duplicated by any known musical instruments. This has opened the door to unique "electronic engineers' compositions" which have tone structures unlike any previous musical selections.

The exceptional musical accuracy provided by the synthesizer's all-electronic circuitry can be something of a mixed blessing, Dr. Olson pointed out. The tones generated by the unit have an accuracy of 1 part in 10^4, far beyond conventional instruments. The effect upon the ear of such "perfect" tones is eerie and unnatural. Intentional discords and noise must be inserted for realism. A gas tube noise generator achieves this effect.

Operation

The fundamental frequencies (30 to 15,000 cps) are provided by 12 tuning fork oscillators. After amplification a series of filters, resonators and growth, decay and duration controls provide the waveshapes and overtone structures desired. Master control over the complete operation is provided by a punched paper record not unlike the old "player piano" rolls.

In an experiment conducted to determine the fidelity of the synthesizer, recordings of its output were compared with recordings by live musicians. Expressed statistically, it can be said with 70% certainty that only 1 person in 4 can distinguish which performance is "live."

MFRS' Catalogs & Bulletins

MAGNETIC TAPE: The seven questions asked most often about "Scotch" brand "Extra Play" magnetic tape No. 190 are answered in a new, 8-page booklet available upon request from Minnesota Mining and Mfg. Co., Dept. M5-2, St. Paul, Minn. (Ask for No. B 3-1)

WIRE & CABLE: New illustrated bulletin on shielded wire and cable for microphone and sound system use, Bulletin SW-1, describes new microphone cables with semi-conducting textile shield as well as the conventional types with braided copper shield. Available from Whitney Blake Co., New Haven 14, Conn. (Ask for No. B 3-2)

DYNAMOTOR POWER SUPPLIES: Catalog No. 155 has 28 attractively illustrated pages and lists the entire 1955 line of Carter dynamotor power supplies, with complete electrical and mechanical specifications. Available from Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill. (Ask for No. B 3-3)

ELECTRONIC COMPONENTS: A new 1955 edition of stock catalog No. 29 contains 48 pages of photographs and technical data covering five complete stock lines. It is specifically designed for the use of distributor salesmen and manufacturing accounts and can be ordered only through a representative of Centralab, Div. of Globe-Union, 900 E. Keefe Ave., Milwaukee 1, Wisc. (Ask for No. B 3-4)

MINIATURE LOUDSPEAKER: Bulletin No. 1001 describes Jensen's new miniature loudspeaker P275-Y, currently being used in the Regency transistorized radio. All technical information on the P275-Y, as well as the new features the loudspeaker incorporates, are listed on the bulletin. Available from Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago 38, Ill. (Ask for B 3-5)

SUB-MINIATURE PILOT LIGHTS: The Dialco line of pilot light assemblies now includes a new sub-miniature series which mounts in a single $^{15}/_{32}$" clearance hole and requires no insulating mountings. The series is fully described in bulletin L-156 available from Mr. R. E. Greene, Dialight Corp., 60 Stewart Ave., Brooklyn 37, N. Y. (Ask for B 3-6)

BATTERY CATALOG: A new catalog showing the manufacturers complete line of batteries plus a replacement guide for battery operated instruments. Also included is a graph showing battery requirements for transistor circuits. Available from Burgess Battery Co., Freeport, Ill. (Ask for B 3-7)

TV SERVICE BOOKS: A sheet describing seven TV service books by H. G. Cisin, noted TV consultant. They are: "TV Doctor", $1.00, (reviewed in Dec. TECHNICIAN); "The ABC of Color TV", $1.00, (reviewed in Dec. TECHNICIAN); "TV Consultant", $2.00, "Pix Guide TV Terms", $1.00, "TV Tube Locator", $1.00; "TV Trouble Tracer", 50¢ and "Shoot TV Trouble Fast", $1.00. Available from H. G. Cisin, Publisher, Amagansett, N. Y. (Ask for B 3-8)

COLOR BCST. EQUIPMENT: 20-page brochure describes the complete operation of Du Mont's color and monochrome multi-scanners for 16 mm films, slides, and opaques, together with instructions for field conversion of monochrome Du Mont multi-scanners to color. Available from Allen B. Du Mont Labs., Inc., 750 Bloomfield Ave., Clifton, N. J. (Ask for No. B 3-9)

SPEAKER ENCLOSURES: 32-page booklet discusses speaker baffles and new enclosure design principle. Free. Ask for Booklet P-13. Karlson Assoc., 1483 Coney Island Ave., Brooklyn 30, New York. (Ask for No. B 3-10)

OBTAIN THE BULLETINS

described here by writing on company letterhead to Bulletins Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N. Y., listings numbers given at end of each item of interest. Please mention title of position held. Use coupon on page 36.

FLYBACK & YOKE CHECKER: Bulletin describing the new model BF-80 "Flyback Transformer and Yoke Checker" is available from Cornell-Dubilier Electric Corp., South Plainfield, N. J. (Ask for No. B 3-11)

HI-FI PRODUCTS: New catalog provides detailed information on more than 20 high fidelity products, including AM-FM tuners, preamplifiers, amplifiers, speakers, speaker systems, horns, networks and cabinets. Available from Altec Lansing Corp., 9356 Santa Monica Blvd., Beverly Hills, Calif. or 161 Sixth Ave., New York 13, N. Y. (Ask for No. B 3-12)

New Books

THE RADIO AMATEUR'S HANDBOOK. *32nd Edition. By the Headquarters Staff of the American Radio Relay League. Published by the American Radio Relay League Inc., West Hartford, Conn. 148 pp. Paper cover. $3.00. $3.50 in U. S. possessions and Canada; $4.00 elsewhere.*

In addition to being indispensable guides for all those interested in amateur radio, these annual editions of The Handbook are also outstanding reference works for the entire electronics industry.

This new Handbook features 5 chapters of basic radio theory, 3 chapters concerned with the history and operating practices of amateur radio, 3 of basic experimental data and 15 chapters of advanced theory, together with practical constructional details, including transmitters, receivers, transmission lines, antennas, power supplies, SSB, FM, keying, AM and microwave techniques.

Among the principal revisions of the new edition are those in the vacuum tube tables and base diagrams. Two full pages listing 67 new tube types have been added to the miniature-tube section alone.

The chapters on VHF have been extensively changed to improve clarity and to take advantage of techniques developed as a result of greater occupancy of this portion of the spectrum. The high-frequency section has also been revised to include such new features as continuous (multiband) tuning circuits and clamp-tube protective circuits.

SINGLE SIDEBAND FOR THE RADIO AMATEUR. *Prepared and published by the American Radio Relay League Inc., West Hartford, Conn. Paper cover. 208 pp. $1.50 in the U.S.; $1.75 elsewhere.*

A comprehensive digest of over 30 QST articles dealing with the subject of single-sideband transmission and reception. Recommended as a reference work and training text for class or home study. Text is liberally illustrated with over 300 photos, charts, tables and formulae.

ELECTRICITY AND MAGNETISM. *By Ralph P. Winch. Published by Prentice-Hall Inc., 70 Fifth Ave., N. Y. 11, N. Y. 755 pp. Hard cover. $7.75.*

Designed for college-level courses in electricity and magnetism this book assumes a previous knowledge of basic physics and elementary differential and integral calculus—though the author makes a point of avoiding the use of calculus where possible. Primary emphasis is on ac and dc circuit analysis, with particular attention to the action of circuit components—capacitors, resistors, and transformers. In addition, there are particularly thorough treatments of ferromagnetic materials, magnetic fields and oscillating circuits.

UHF CIRCUITS AND COMPONENTS. *By Milton S. Kiver. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 415 pp. Hard cover. $7.50.*

This comprehensive handbook, of broad appeal and up-to-date, may be equally useful to technicians, hams, students and engineers—anyone, in short, who deals with equipment operating in this range. Coverage includes transmission lines, antennas, waveguides, resonators, oscillators and measurements in this frequency range. Also treated are special tubes, such as the magnetron, klystron, resnatron and others.

Service Ass'n. Reports

Technician not Serviceman Says ARTSD

In the last issue of the Associated Radio-Television Service Dealers' News, 2552 N. High St., Columbus, O. protest is made against the continued use by both the Radio Corp. of America and the General Electric Co. of the word "serviceman" instead of "technician." Members of this association are delighted at the push they have been given with National Servicemen's Week and TV Service Month, sponsored by RCA and GE, but are still chagrined at being called "servicemen" instead of "technicians."

(Ed. Note: We, too!!)

GUILD Publishes Shopping Reports

Effective with the February issue, the Radio Television Guild of Long Island, Box 87, Bethpage, N. Y., is featuring the results of their distributor shopping program each month. The report will list the distributors who were shopped and the results of each shopping.

After much planning, members of the Guild have made certain changes in their constitution and by-laws to help carry out the expanding Guild programs.

TV FOR THE NEEDY

Long Island Electronic Technicians Assoc. member, Cosmo Barbaro, installs a TV set for a multiple sclerosis patient. Set was donated to a pool of TV sets and radios set up by Multiple Sclerosis Society and LIETA. Assoc. overhauls and rebuilds sets for the use of MS patients as part of LIETA's Community Service program.

RTA Springfield Branch Elects new Officers

At a recent meeting of the Radio and Television Association of Springfield, Ohio, 1805 Edwards Ave., the following officers were elected: Marvin A. Miller, pres., Frank H. Gross, vice-pres., Jack Carpenter, treas. and Paul Boller, secy. Guest speaker George Reiling, district representative of the RCA tube div., discussed the forthcoming nationwide campaign to honor TV technicians.

SARTA Elects New Officers

New officers were elected at the last meeting of the San Antonio Radio & Television Assoc., Inc., 520 W. Hildebrane. They are: Thomas F. Boyd, pres., H. M. Willmann, secy., Wilbur L. Lehmberg, treas., and Paul W. Carter and Porfirio Zepeda as directors.

MAX FISCHMAN CO. of Pittsburgh has been appointed distributor in O., W. Va. and Penna. for the TV and broadcast receiver div. of BENDIX AVIATION CORP. . . . **KILSBY REFRIGERATION CO.** of Honolulu will cover the Hawaii territory for the same div. of BENDIX.

NAT'L. ELEC. DISTS. ASSOC. Tri-State Chapter met recently for election of new officers. HERBERT J. FARR, Jr. was elected pres. and EDWARD GORSICA secty.

EMERSON RADIO & PHONO. CORP. will market a transistorized radio within 60 days, promises Ben Abrams, Emerson pres.

GORDON DOUGHERTY has been elected sales mgr. for BRENNA & BROWNE, mfrs' reps in the territory of Hawaii.

"Tough Dog" Corner

(*Continued from page 24*)

were checked to no avail. Finally, following one occasion when the pix failed, I tried readjusting the beam bender (ion trap) magnet. The screen lit up, but not as brightly as before.

As long as the set was kept running after this adjustment, the crt would stay lit. However, when the set was turned off for a few hours and then turned on again, the beam bender had to be restored to its original position to produce a raster.

Replacement of the ion trap magnet with a new one cured the trouble. Heat from the crt filament apparently changed the magnetic characteristics of the beam bender gradually.—*J. L. Mancini, Winthrop, Mass.*

Critical Hold, Pulling

The symptoms on this 24-in. Sylvania 512-2 chassis were horizontal pulling and very critical horizontal lock. After replacing the sync amplifier and separator, the noise inverter and phase detector tubes without getting rid of the pulling, I looked for 60-cycle modulation in the composite video waveform at the plate circuit of the video amplifier, using a scope. No dice. I measured all the dc voltage readings in the sync, noise inverter, and phase detector stages, and they all compared favorably with those in a Sylvania 515 that we had in the shop. Having wasted precious time a while back on another set that had pulling, only to find a heater-to-cathode leak in the r-f tube, I took time out to check tuner and video i-f tubes in a tester. All were okay.

I discovered then that removing the noise inverter tube caused the pulling to disappear. Ah! I was on the road to success. A scope showed that my horizontal sync pulse waveform on the grid of the sync separator dropped in amplitude when I put the noise inverter tube back in. I thought that I had isolated my trouble to the noise inverter stage, but was I fooled! All voltage readings and resistor values checked okay, and I couldn't find any leaky capacitors. On an earlier Sylvania chassis I had found that, by changing the resistance in the cathode circuit of the noise inverter to give it more cathode bias, I corrected a horizontal "hopping" trouble. This "dog" was different in that the inverter obtained its cathode bias from the cathode circuit of the 6BQ6, horizontal output tube. The cathode voltage was too high in the present case instead of being insufficient, so the idea was out.

The high cathode voltage on the 6BQ6 was a clue that took a while to sink in. Then came the dawn. I bridged the 2 mfd cathode bypass condenser of the 6BQ6 (C-262) with another unit, and the picture straightened out. The defective capacitor was not open, for it could acquire a normal charge. It took a long time, however, for it to discharge through a meter (long compared to the discharge time of a good capacitor), indicating a high resistance joint on one of its terminals. This made it as useless as if it were open.

Without any bypassing on the 6BQ6 cathode, a negative pulse was developed across the cathode resistor. This pulse was fed to the cathode of the noise inverter, permitting the latter tube to conduct during horizontal retrace time, which includes sync pulse time. As a result, the noise inverter not only cancelled noise, but the horizontal sync pulse as well!—*E. R. Nelson, Tonawanda, N.Y.*

News of Industry

JOHN P. BROCKI has been named asst. service mgr. and A. C. BOSS has been appointed chief field engineer of the TV and Broadcast Receiver div. of BENDIX AVIATION CORP., Baltimore, Md.

WILLIAM C. BAINBRIDGE has been appointed director of automation for AEROVOX CORP., New Bedford, Mass.

HOWARD S. ORCUTT has been appointed chief engineer of the rectifier div. of PYRAMID ELECTRIC CO., N. Bergen, N. J.

GOODWIN G. MILLS has been named manager of the electronic kit dept., and **LEONARD S. PRESKILL** has been appointed product development mgr., for ALLIED RADIO CORP., Chicago, Ill.

FRANK B. ROGERS, JR. has been elected executive vice-pres. in charge of Soundcraft operations for REEVES SOUNDCRAFT CORP., New York, N. Y.

JAMES W. SAFFORD, formerly Eastern regional sales mgr. for the radio & TV div. of SYLVANIA ELECTRIC PRODUCTS, INC., has been named sales mgr. of ANDREA RADIO CORP., Long Island City, N. Y.

DR. A. MELVIN SKELLETT has been named director of color television tube planning and development for TUNG-SOL ELECTRIC INC., Newark, N. J.

Dr. A. M. Skellett

Frank F. Neuner

FRANK F. NEUNER has been appointed to the new post of mgr., semiconductor marketing, tube div., RADIO CORP. OF AMERICA.

MILTON BINSTOCK has been appointed vice-pres. and director of sales for SHELDON ELECTRIC CO., Irvington, N. J. Other appointments were: **FRANK FERDINAND** to sales mgr., **DAN ROSENMAN** to asst. sales mgr. & **JAMES B. MANNION** to exec. asst. of sales dept.

FLOYD REID has been named development engineer at ORRADIO INDUSTRIES, INC., Opelika, Ala., mfrs. of Irish brand recording tape.

MORRIS SALIT has been named pres. of INDUSTRIAL TV UTILITIES CO., New York, N. Y.

WILLIAM H. KELLEY has been elected vice-pres. and general mgr. of all mfg. and sales divs. of ALLEN B. DU MONT LABS., Clifton, N. J. Other appointments: **JOSEPH MANN** to administrative services mgr. for TV receiver sales div. and **ROBERT G. SCOTT** to gen. sales mgr. of cathode-ray tube div.

WILLIAM J. GORMAN has been appointed merchandising mgr. of JEFFERSON ELECTRIC CO., Bellwood, Ill.

ARTICLES WANTED

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

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

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

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

Payment is excellent.

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

B. B. BAUER, vice-pres. of SHURE BROTHERS, INC., Chicago, was elected a Fellow of the Audio Engineering Society.

LT. CMDR. SARAH WHITE has been appointed to salesman-major accounts for INTERNATIONAL RESISTANCE CO., Phila.

CLIFFORD T. BURGETT has been named field service engineer in the Charlotte, N. C. region for CAPEHART-FARNSWORTH CO., Fort Wayne, Ind.

VERNE G. RYDBERG has been appointed manager of power tube equip. sales for WESTINGHOUSE ELECTRONIC TUBE DIV., Elmira, N. Y. Also appointed was **RAYMOND W. ANDREWS** as manager of customer order and sales service.

WILLIAM H. McREDMOND has joined the field service engineering staff of CRESCENT INDUSTRIES, INC., Chicago, Ill.

SYLVANIA SALES SEMINAR

Pictured at the "sales meeting seminar" of Sylvania Electric Products Inc. are: L. to R. Sol Alter, Bay Electronics, Bronx, N. Y.; D. W. Gunn, Sylvania's general sales mgr. and Hy Weintraub also of Bay Electronics.

JOSEPH A. LAGORE has been appointed vice-pres., mfg. and **JAMES D. McLEAN** as vice-pres., sales at PHILCO CORP., Phila. Also announced was **WILSON H. OELKERS** to vice-pres. in chg. of purchasing.

GILBERT HOFFMAN has been named comptroller of branch distributing operations for CBS-COLUMBIA INC., Long Island City, N. Y.

EDWARD BLUESTONE is now chief engineer at INSTRUMENTS FOR SERVICE, INC., Baldwin, L.I., N.Y.

CMDR. DOUGLAS W. A. PLEASANTON has been appointed exec. vice-pres. of ROCKE INTERNATIONAL CORP., New York, N. Y.

EARL F. BOYLE was elected a director, vice-pres. and general mgr. for VAN CLEEF BROTHERS, INC., Chicago, Ill., industrial and automotive products mfrs.

MILTON J. SHAPP, pres. of JERROLD ELECTRONICS CORP., Philadelphia, Penna. is featured in the Feb. 4th issue of Collier's in an article titled "How to Think Your Way to the Top."

(NEWS CONT'D. ON PAGE 60)

New Midget Multimeter

Only slightly larger than a king size pack of cigarettes, yet boasting the meter sensitivity, ranges and flexibility of large, elaborate instruments, Simpson's new "Midgetester," Model 355, is a welcome addition to the field of TV servicing equipment.

The unit measures only 2¾ x 4½ in. overall and has a smooth plastic case which surrounds the entire instrument; clear plastic over the front, and black plastic over the back.

The sensitivity of the indicating meter is 78 μa. This is shunted for all measurements so that the basic sensitivity of the instrument is 100 mμ. The loading characteristic, then, is 10,000 ohms/volt on—and this is worth noting—both ac and dc ranges! The average service-type meter has an ac loading characteristic of 5,000 ohms/volt, or less.

Cigarette pack-sized meter, the "Midgetester"

The meter employs a self-shielding core magnet movement which allows it to be placed close to magnetic fields without danger of the pickup affecting the readings.

The test leads furnished with the instrument are special types having a threaded tip at one end and a sharp probe at the other. The threaded tips are screwed into the appropriate hole in the front of the meter. Provision is made for quickly attaching clips to the probes when desired.

Ranges covered by the instrument are; 5 volts ranges, both ac and dc, from 3 v. to 1200 v., and 4 resistance ranges, 10,000 ohms (120 ohms center). The measurement accuracy is 3% dc and 5% ac, and within 3° of arc from absolute value of resistance being measured.

TECHNICIAN—(Ask for No. 3-90)

MORE NEW PRODUCTS ON
PAGES 30, 32, 34, 36, 38, 40, 42, 44, 61

Electronic Cooling—Pioneer Development

Among several electronic developments recently unveiled by RCA Chairman of the Board Brig. Gen. Sarnoff is an all-electronic cooling device for eventual use in refrigerators and air conditioners. (see February TECHNICIAN, p. 54.)

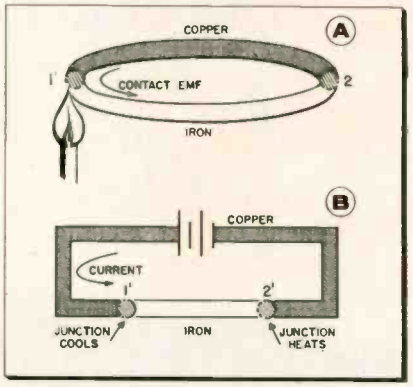
Without motors, compressors or moving parts, the noiseless device operates on a principle known as the "Peltier effect." Though discovered more than 120 years ago, the principle has been little more than a scientific curiosity until recent studies in solid-state physics opened the door to the possibility of practical application.

The cooling action noted in the "Peltier effect," explained in greater detail elsewhere on this page, takes place at one junction between two dissimilar materials during the passage of an electric current through them. In the electronic cooler, copper and zinc alloys are used to form a series of junctions which surround a container. At present, a mechanical pump is being used to circulate water for removal of heat from the apparatus, but a means is being worked out to pump the water electronically.

The Peltier Effect

The recently announced electronic cooling system depends upon Peltier effect to produce its action. In this phenomenon, the passage of electricity through a junction results in cooling at that junction.

This action may best be understood by first considering another so-called *thermoelectric* action known as the Seebeck effect. The latter is illustrated in sketch A. Here two metals, say copper and iron, are joined in such a way as to form two junctions. When heat is applied to



A—Seebeck effect. B—Peltier effect, with emf through metals producing cooling action.

junction 1, thermal agitation of electrons occurs. As a result, electrons at the hot junction transfer from the iron to the copper. The net result is a voltage difference—an emf acting around the circuit in the direction from the copper to the iron at the junction.

The Peltier effect, shown in sketch B, is similar to the Seebeck effect, but there is an important exception. In the latter phenomenon, an external *electrical* force is applied to the combination of two metals, instead of external heat, but a similar motion of electrons takes place.

Current passing through junction 1' requires heat to be supplied in order to maintain the conditions for operation, as was the case with the Seebeck effect. Since no *external* heat source is available, the needed heat is absorbed from the metals themselves in the neighborhood of Junction 1', producing a temperature drop in this region. In other words, in order for the junction to heat, it withdraws heat from surrounding areas. This is the same as saying that it exerts a cooling effect on surrounding areas.

At junction 2' the current flow is from iron to copper. In other words, the *electron* flow is from copper to iron, which is the more difficult direction. The work that has to be done here heats junction 2'.

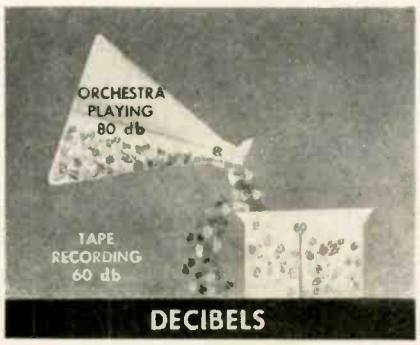
In a commercial cooling system, junction 1' would be in the freezing or *heat-withdrawing* unit, while junction 2' would have its heat carried off by moving air or water. The circulation of air or water is used to carry heat off in similar fashion in present-day cooling and refrigerating systems.

Tape Recording Glossary—Supersimplified

A short dictionary for enthusiasts in tape recording, which is decidedly on the non-technical side, is available from Minnesota Mining and Mfg. Co., Dept. M5-12, 900 Fauquier St., St. Paul, Minn. Covering 57 basic words and phrases commonly used in tape recording, the glossary uses sprightly illustrations to get its concepts across.

Some of the illustrations are re-


SIGNAL TO NOISE RATIO



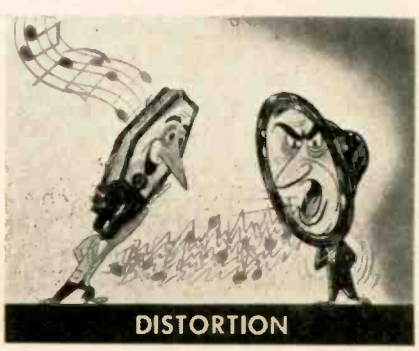
DECIBELS

produced on this page. While definitions are geared to the needs of the non-technical, they may serve as basic jump-off points for the skilled electronic technician who has to start from scratch as far as magnetic recorders are concerned. Typical definitions are as follows:

"DECIBEL—Abbreviated "db," it is a relative measure of sound intensity or "volume." It expresses the ratio of one sound intensity to another. One db is the smallest change in sound volume that the human ear can detect.

"DISTORTION—Any difference between the original sound and that reproduced by a recorder.

"DYNAMIC RANGE—Ratio between the softest and loudest sounds." (Ask for No. B3-15)


DISTORTION

GE Sponsors "TV Service Month" April 19-May 19

"We feel the social significance of television demands we do everything possible to promote understanding and good relations between the service dealer and the public." With this statement, J. M. Lang, gen. mgr. of GE's tube department, officially launched the company's plans for "TV Service Month"—April 19 to May 19.

The program will be touched off next month by a huge advertisement in Look magazine—a directory of all service dealers that handle GE electronic tubes. This will be followed by a month-long barrage of advertising, through all media, aimed at making the public conscious of the TV technician's role in the community.

High spot of the broad public-relations program will be a $25,000 jingle contest. "TV Service Month" emblems identifying each dealer's shop as a headquarters for the contest are one of the many promotion aids.

GE representatives are now in the field, alerting technician-dealers on how they can participate in the promotion and how they can derive the most benefit, on the local level, from the mass of national advertising which will be hitting the consumers.

Anniversary Celebration

The 25th anniversary of the founding of JFD Mfg. Co., 6101-16th Ave., Brooklyn, N. Y. will be the occasion for a testimonial banquet honoring Julius Finkel, the firm's founder,

Emblem of anniversary drive

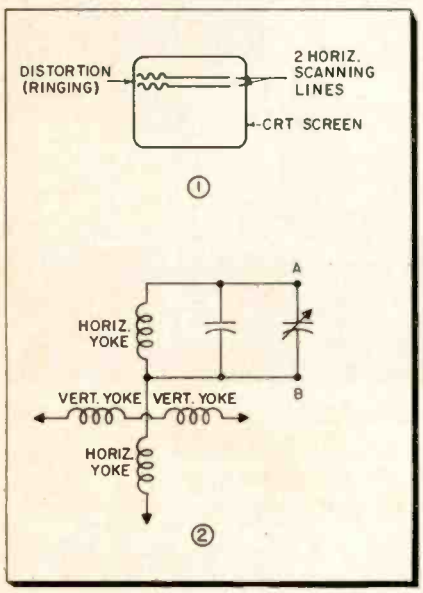
and awards to people outside the company who have furthered the industry. The celebration, which will continue to the end of the year, will be highlighted by contests and special dealer bonuses.

Horizontal Circuit Troubles

Ringing Elimination

Sweep-circuit ringing tends to appear in some television sets after a year or more of service, and the same trouble is even found in some new sets, in the form of a distortion at the left side of the picture (see sketch 1).

Most sets have a condenser across one-half of the horizontal yoke, and if this condenser isn't the right value, the distortion arises.



We found the solution to the problem consisted of bringing a pair of leads (*A* and *B* in sketch 2) out from the yoke coils, and connecting them to a variable condenser. This trimmer was adjusted until the rings disappeared; the amount of capacitance now present in the circuit was measured, and a condenser of that value installed in place of C-1, to cure the trouble.—*Harry J. Miller, Phila. 3, Pa.*

Output Tube Damage

When replacing a horizontal oscillator transformer, or performing any other repairs in this circuit, it is possible that the output tube or transformer may be damaged before the circuit is properly adjusted to frequency, due to the lack of driving power to the 6CD6-G, 6BG6-G or other output tube used. This lack of drive removes most of the bias (and in some cases all of it) from the output tube; the plate will run red hot as a result, with possibly double the normal current flowing through the transformer primary.

To prevent such an occurrence, it is advisable to make a very definite mark on the scope indicating its 15,750 kc setting (or its 7875 kc setting —half-line frequency), so that the serviceman can quickly determine what frequency the circuit under test is operating at. (The horizontal output tube is removed from the circuit during this check.) The horizontal oscillator and stabilizer slugs can thus be set approximately right before the output tube is re-inserted, and it can be ascertained ahead of time whether or not sufficient driving voltage is available at the grid. This voltage should be higher than normal with the grid loading provided by the tube removed.

In the case of series-heater circuits, the correct value of wire-wound resistance may be inserted into the output tube socket, to substitute for the tube filament.—*M. G. Goldberg, St. Paul, Minnesota*

Foldover Remedy

The "low" lead of the high-voltage filter condenser may be connected to either "A" or "B" in various TV receivers (see sketch). Connection "B" adds the B plus voltage at that point to the high-voltage supply; it also adds additional capacitance to the horizontal circuit. The added capacitance from this source, plus the normal stray capacitance present in the horizontal deflection circuit, tends to "stretch" or lengthen the horizontal retrace time. If the horizontal retrace is stretched beyond the blanking period, foldover on the left side of the picture will result.

Due to aging of components, or component replacements, the unfortunately narrow margin present in some sets between allowable and excessive capacitance may be exceeded. In such instances, the foldover may be removed by re-routing the capacitor return to point "A" (when it has been found connected to "B"). The change is permissible only if sufficient high voltage remains present after the re-wiring (several hundred volts are removed from the hv supply by this rerouting).

Most sets, it will be found, will still have ample brightness and require no further adjustment. Some, however, may require readjustment of the drive control and possibly the width control as well (if the width is appreciably altered by the drive control re-adjustment).

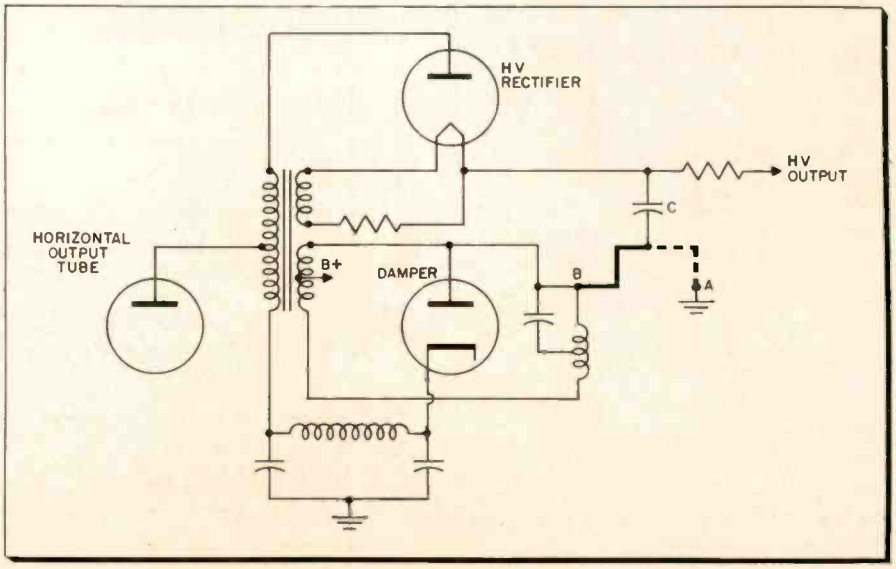
Some cases of foldover are, of course, due to a yoke defect, and will require replacement of the yoke.—*James A. McRoberts, Brooklyn, N.Y.*

Width Coil Trouble

While the particular television set in which this trouble occurred was a Tele-King model K-72, there are many other receiver makes (such as GE and Westinghouse) which em-

(*Continued on page* 58)

To eliminate some cases of horizontal folder, re-route return of condenser C from point *B* to *A*.



Auto Radio Bench Hints

(*Continued from page 26*)

12-v auto radio. In some instances, however, a number of turns may have to be removed.

Storage Battery Hint

Here is a hint for using two batteries, neither of which is in perfect condition, and therefore will not deliver full current to a large auto radio (especially one with motor or solenoid-driven automatic selectors) without a considerable drop in terminal voltage taking place. This hint is tailor-made for those shops that do little auto radio work, and can therefore use two second-hand batteries for the few jobs that do come into the shop.

Connect the two batteries so that they are in parallel when they are to be used on 6-v receivers, as well as on a charger designed for 6-v batteries only (as mine is). When used for a 12-v set, place the two batteries in series; they now deliver 12 v at only half the current required on 6-v sets; in this way, the drop in terminal voltage is minimized.

Radio-TV Rectifier

(*Continued from page 19*)

Note that *twice* the desired output voltage must be supplied by the transformer because of the center-tap arrangement. If the transformer has no center tap, or one half of the transformer is burned out, the circuit shown in Fig. 6 may be used under certain conditions, remembering, of course, that *one* winding must carry current during *both* halves of the ac cycle and that, unless it is well designed, it will overheat if required to supply the same voltage as before. Small limiter resistors of half normal value are used where shown. Full-wave rectifiers are found in practically all old ac model radios, most old and some new TV receivers, and in Hi-Fi equipment.

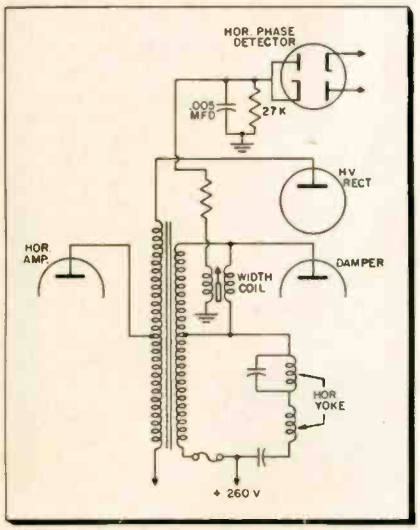
CHICAGO—The board of directors of the 1955 Electronic Parts Distributors Show will be hosts at the second annual Overseas and Pan-American reception at the Conrad Hilton Hotel on May 15th. The reception will honor overseas and Pan-American visitors to the Parts Show held May 16-19.

Flyback Repair; Eliminating Ringing, Foldover and Instability; Width Coil Defect; Protecting Hor. Amp.

(*Continued from page* 56)

ploy a similar circuit, and may therefore develop similar difficulties.

Symptoms: Picture was out of phase horizontally, when locked into sync by the horizontal hold control. It would hold steady on the crt, but was shifted to the left of the screen



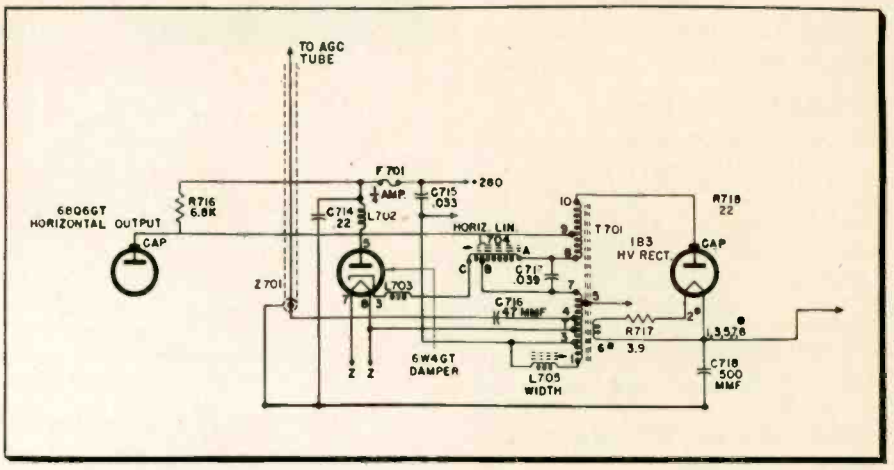
Portion of sweep-afc circuit, showing how hor. sweep signal is applied to phase detector.

approximately one inch, causing the horizontal blanking bar to become visible. Readjustment of the horizontal frequency control did not improve matters. Voltage checks revealed nothing wrong. Scope tests showed, however, that horizontal sweep signal was missing from the input of the phase detector.

After a thorough check of the horizontal oscillator circuit, I found that the secondary of the width coil had increased in resistance from the normal 22 ohms to approximately 40,000 ohms. Replacement of the aforementioned coil was all that was necessary to correct the trouble.—*Frank M. Dickinson, Stony Point, N.Y.*

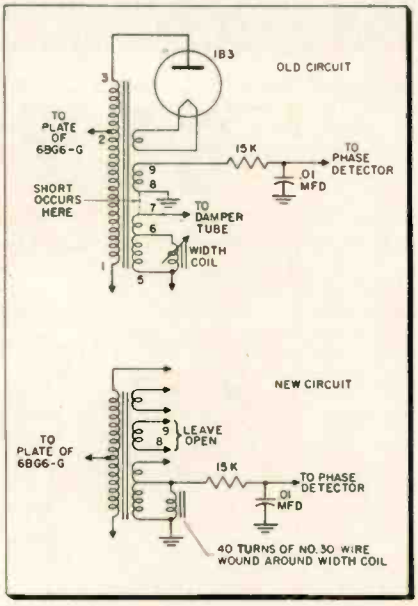
Flyback Repair

Here is a short-cut that I have used successfully in cases where the phase detector winding of a flyback transformer short-circuits to the damper or primary winding (see sketch). The phase detector winding referred to is used in a number of Fada and Philharmonic TV receivers. A loss in the high voltage on the pix tube anode will be produced by such a short.



Partial schematic of Hoffman 196 chassis. Intermittent open in C-716 upset hor. sync.

To remedy the trouble, remove the wires leading to terminals 8 and 9 of the flyback. Then wind about 40 turns of no. 30 wire around the



width coil, and connect the two ends of this coil between ground and phase detector input. If the picture is found to be out of phase, reverse the two coil leads, and you're back in business. There is now much less danger of subsequent break-down of the unit, because it is no longer exposed to pulse voltages as high as in the original set-up.—*John Burisin, McKees Rocks, Pa.*

Technical new products on pgs. 30, 32, 34, 36, 38, 40, 42, 44, 61

Horizontal Instability

The complaint on this Hoffman 196 chassis was horizontal instability. The trouble became evident only after the set had been in operation for an hour or two. The trouble appeared for a short time only; observation showed the receiver to be functioning normally at all other times.

After extensive tests, it was found symptoms appeared only when the chassis was left in its cabinet. It was therefore decided to experiment with a little heat, since the component at fault was evidently breaking down under some sort of stress, and more than likely heat was responsible. The first spot picked for beaming the heat lamp produced the necessary results and the set began to act up. With the aid of the scope, the defective part came to light. C-716, a 47 mmfd-1500 v ceramic capacitor (see schematic) had finally open-circuited, it seemed, as a result of the excessive heat from the lamp.

C-716 is connected to a tap on the horizontal output transformer. Positive-going keying pulses are applied to the plate of the keyed agc tube through this condenser. With capacitor C-716 open, it can be readily seen that horizontal instability will be produced.

Identical trouble was encountered in a number of other Hoffman sets; replacement of the capacitor in question has eliminated the symptoms in all cases encountered so far.—*Walter Fernald, Waco, Texas*

Reps & Distributors

J. W. MARSH CO., Los Angeles, has been appointed sales reps for CLEAR BEAM ANTENNA CORP. for the states of Calif., Nev. and Ariz.

FRED SPELLMAN has been appointed rep for industrial accounts in the greater N. Y. area for JENSEN MFG. CO., Chicago, Ill.

EDWARD HOFFMAN has been appointed sales rep for ERIE RESISTOR CORP., Erie, Penna. He will represent their electronic div. in Minn. and N. & S. Dakota.

COLUMBIA WIRE & SUPPLY CO., Chicago, announces the appointment of JAMES W. ECKERSLEY to represent them in Ore., Wash., Ind. and Alaska.

WILLIAM J. PURDY CO., San Francisco has been appointed by MERIT COIL & TRANSFORMER CORP., Chicago to represent them in the San Francisco area.

CRESCENT INDUSTRIES, INC., Chicago announces the appointment of JAY NIERENBERG and L. D. LOWERY, INC. as representatives in two Eastern sales territories.

CARTER MOTOR CO., Chicago has appointed HYDE SALES CO. as their representatives in Colo. and New Mexico.

PEERLESS PRODUCTS INDUSTRIES, Chicago has appointed the R. J. GIBBONS ELECTRON SALES CO. of Miami, Fla. as exclusive sales rep for its antenna sales in the state of Fla.

CLAROSTAT MFG. CO., Dover, N. H. has nominated BILL KOLANS & CO. of S. San Francisco to represent them in N. Calif.

THE NORTHWEST CHAPTER of the National Electronic Distributors Assoc. held the first quarterly meeting of 1955 in the Spokane Club, Spokane, Wash. . . . **THE EMPIRE STATE CHAPTER** welcomed ROBERT C. SAMPSON of Radio Corp. of America as their guest speaker at the meeting of Feb. 23 in Albany, N. Y.

BENDIX OPENS SALES DRIVE. A new sales program called the "Bendix Selling Bee," scheduled to run from Jan. 15 through April 15, has been inaugurated by the TV and broadcast receiver divisions of BENDIX AVIATION CORP., Baltimore. The selling bee theme will be carried out in a series of mailings directly to the home of each salesman.

CHANNEL MASTER CORP., Ellenville, N. Y., has announced the appointment of four new distributors: C & O ELECTRONICS, Monroe, La., STANDARD ELECTRONIC DISTS., Harrisburg, Ill., CENTRAL MO. DIST. CO., Moberly, Mo., WABASH ELECTRONICS, Mt. Carmel, Ill.

News of Industry

(*Continued from page 51*)

EDWARD BERLIANT has acquired control of INSTRUMENTS FOR SERVICE, INC., Baldwin, L. I., N. Y., mfrs of the "Cap-Check" capacitor checker.

PRESENTATION OF THE HALF MILLIONTH ANTENNA manufactured at the CLEAR BEAM plant, Canoga Park, Calif. was made to entertainer and honorary mayor of Canoga Park, Bob Burns. Presentation was made by Harold Florence, pres. of CLEAR BEAM.

TUBE & TOOL TENDER FREE, with 32 premium tokens—one token being given for every 25 SYLVANIA receiving tubes—of any type—bought between Jan. 1st and March 31st. See your SYLVANIA distributor.

FUSIBLE RESISTORS. The fusible resistors used in new model TV sets can be replaced with the new Model R7 WTV fusible resistor. WORKMAN TV, Teaneck, N. J. is packaging the resistors and pins in polyethylene envelopes on 11" x 14" display cards.

PLANS FOR NEW PYRAMID PLANT

Wm. J. Slawson, asst. jobber sales mgr. for Pyramid Electric Co., N. Bergen, N. J., and Jack J. Poff, jobber sales mgr., look over plans for the 27,000 sq. ft. plant addition.

M. W. BERNS, pres. of ROBURN AGENCIES, INC., export representatives for SNYDER MFG. CO., and BEN SNYDER, head of the auto and TV antenna mfg. firm will tour Puerto Rico and Cuba late this winter to study the possibility of establishing mfg. branches there, Mr. Snyder announced.

GEO. MILLER, pres. of VIDAIRE ELECTRONICS MFG. CORP., 576 W. Merrick Rd., Lynbrook, N. Y. has purchased all outstanding shares in the corporation. Mr. JOSEPH DE ROSA is no longer connected with the corporation.

MARK SIMPSON MFG. CO. Long Island City, N. Y. is reorganizing the engineering dept. in order to facilitate its program of developing new intercoms and amplifiers, according to Miryam Simpson, vice-pres. Under the new setup, Joseph Rice is asst. chief engineer and William Lipson is coordinating engineer, both working under Torulf Aasen, chief engineer.

RAYTHEON CONSTRUCTION AHEAD OF SCHEDULE on Wayland laboratory. The new electronics engineering and research laboratory at Wayland has moved into the second planned stage of construction. The original section of approximately 145,000 sq. ft. will be augmented by a second section of 80,000 sq. ft.

JERSEY SPECIALTY CONTEST

A sales contest among distributors, dealers and TV service associations will be launched March 10th, ending in August, by Jersey Specialty Co., Mountain View, N. J. L. to R. Wm. Hagedoorn, Peter Hagedoorn, pres., Vincent Sullivan (NY Daily News) and J. W. Wilson (Citadel Press) scanning markets being covered by the contest.

NEW PACKAGING PROGRAM. A plan to eliminate jobber stocking problems and speed up service to counter trade has been adopted by **BELDEN MFG. CO.**, Chicago, Ill. Under the new arrangement, heavier cables normally stocked only on large 500 or 1,000 ft. spools will be available in handy packaged 100 ft. lengths. However, these lengths will run continuously in the over-all merchandising carton so that any desired continuous length may be purchased.

JAVEX of Redlands, Calif. announces a new anniversary gift. It is a display case 14" wide, 14" high by 24" long and is constructed of birch trimmed with picture frame maple. The case is available free by purchasing $50.00 worth of JAVEX merchandise plus the display merchandise enclosed in the case ($7.40 net).

CBS-HYTRON, Danvers, Mass. announced the inauguration of TV picture tube warehousing facilities in Dallas, Tex.

TRADE-IN SYSTEM LAUNCHED BY HAYDU BROS. ARTHUR SHESSER, sales mgr. for HAYDU BROS., Plainfield, N. J., is keynoting the sales promotion and advertising for his company's share of the 1955 replacement picture tube market around the theme "Trade-In System." Essence of this system is the increased volume dealers and jobbers will experience by accepting used TV tubes as credit toward the purchase of processed HAYDU tubes.

STROMBERG-CARLSON, Rochester, N. Y., unveiled its new 1955 TV models at an Eastern Div. convention held at the Mayflower Hotel, Washington, D. C. for the company's radio and TV distributors.

WASHINGTON, D. C. BENJAMIN S. HAMILTON, electronics teacher at San Diego Junior College, was named as the country's top-ranking amateur radio operator. He will receive GE's Edison Radio Amateur Award for the outstanding public service of 1954 by a "Ham" operator.

RAYFORD E. NUGENT has been appointed gen. sales mgr. of the parts and accessories div. of PHILCO CORP., Philadelphia. . . . **WILLIAM J. HORN** was appointed merchandising and advertising mgr. of same division.

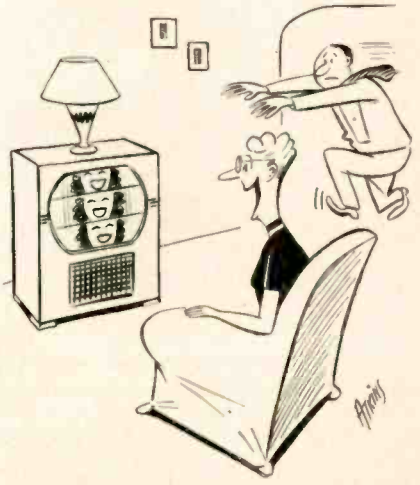
ZENITH INTRODUCES "TREND LINE." The newest 1955 ZENITH "TREND LINE" TV receiver was presented to dealers at an open house showing at the showrooms of the New Jersey Div., ZENITH RADIO CORP. of N. Y.

ANDERSON-O'DONNELL CO., Denver, Colo., has been appointed sales agent for STROMBERG-CARLSON radio & TV products. They will cover the Rocky Mountain area.

JAMES VIBRAPOWER CO., Chicago, Ill. has introduced a new vibrator dealer-labelling program to the distributor market, John A. Kennedy, pres. announced recently. This merchandising program allows the dealer to label his own vibrator components thus providing rapid identification by a dealer of his own service work, Mr. Kennedy said.

A NEW LINE OF DuMONT TV RECEIVERS with custom-made cabinets, for sale in limited quantities in the Metropolitan New York market, was announced by Philip Geth, pres. of DuMONT NEW YORK, INC. The new line will be known as the "Signature" series.

HEPPNER MFG. CO., Round Lake, Ill. has added an additional 10,000 sq. ft. of plant area to the present factory. The new section will house the enlarged tool, die and punch press depts.



"I'm listening to a trio of girls and they all sing so beautifully together."

New Product Briefs

TV "SILENCER": Kit containing 2 headphones, an extension wire reel with plug-in receptacles taking up to 4 headsets, and a unit for connecting the reel wire to the TV set. $14.95. Edward Fleming Inc., Broad St., Westport, Conn. —TECHNICIAN (Ask for No. 3-50)

BRAKE: Angles, brackets, channels, radio or TV chassis or boxes can be formed with the A.B. Parker Sheet Metal Folder. Bends aluminum, copper, brass or steel up to 18 gauge by 24 in. $14.95. Television Accessories Co., Dept. 88, Box 6001, Arlington 6, Va.—TECHNICIAN (Ask for No. 3-51)

TRANSFORMERS: Line to speaker matching transformers for commercial sound systems utilizing 70 v. distribution techniques are available in 3 sizes, for speakers requiring 5, 15 or 50 watts. Efficiency is 90-95%. Electronic Communication Equipment Co., 1249 W. Loyola Ave., Chicago 26, Ill.—TECHNICIAN (Ask for No. 3-52)

VISE: "Float-Lock Mity 7" is claimed to provide the most versatile grip of any vise on the market: holds the work equally well in all positions. All-steel construction. $9.98. Float-Lock Corp., AMF Co., AMF Bldg., 261 Madison Ave., N.Y. 16—TECHNICIAN (Ask for No. 3-53)

MICROPHONE: Type B110 microphone has a response of 30 to 13,000 cps, flat from 30 to 1,000 cps, with a 20 db peak at 4,000 cps. Output level, working into 5 megohm load is 1 mv/μbar. Recommended for communications work, P.A. and paging systems. $7.95. Ronette Acoustical Corp., 135 Front St., N.Y. 5 —TECHNICIAN (Ask for No. 3-54)

MOTOR-ALTERNATOR: Model HA-2 motor-alternator features 2-phase, 30 cps output at 18.5 v. Power output is equivalent to 2.7 watts from the shaft and 1.37 watts for electrical power. Synchronous operation; dynamically balanced rotors on common shaft. Electric Motors and Specialties Inc., King and Hamsher Sts., Garrett, Ind.—TECHNICIAN (Ask for No. 3-55)

RESISTANCE NETWORKS: Hermetically sealed resistance and resistance-capacitance networks can be supplied with resistance values to ±.02% and temperature coefficients matched to within ±3 parts per million/°C. Plug-in or solder terminals. The Daven Co., Dept. RE, 191 Central Ave., Newark 4, N.J.—TECHNICIAN (Ask for No. 3-56)

SOLDERING GUN TIPS: Two new accessory tips for Weller guns are announced; the Cutting Tip, a knife-like blade, and the Smoothing Tip, a trowel shaped edge. Special alloy, heavily plated. 50¢ each. Weller Electric Corp., 808 Packer St., Easton, Pa.—TECHNICIAN (Ask for No. 3-57)

VARIABLE CAPACITOR: New miniature, 2-section variable condenser designed especially for transistorized radio receivers. Low values of tuning capacitance. Radio Condenser Co., Davis & Copewood Sts., Camden, N.J.—TECHNICIAN (Ask for No. 3-58)

EXCITER UNIT: Model 504C Multi-Band Frequency Multiplier covers the 80 to 10 meter bands with a nominal power output of 25 watts. Broad-band type amplifiers. Four 6AQ5's make up the multiplier string. Barker & Williamson Inc., 237 Fairfield Ave., Upper Darby, Pa.—TECHNICIAN (Ask for No. 3-59)

ORDER BOOK: New Television-Radio Repair order book is designed to help the technician in listing labor costs, bill of material, type and model of radio or TV set and all pertinent information. Electronic Publishing Co., Inc., 180 N. Wacker Drive., Chicago—TECHNICIAN (Ask for No. 3-60)

CONTROLS: Series 47 composition-element controls are now available with the twist-tab mounting feature, eliminating the need for bushings, mounting nuts and lock washers. Available with or without switches. Clarostat Mfg. Co., Inc., Dover, N.H.—TECHNICIAN (Ask for No. 3-61)

RESISTORS: Types GM and HM copper clad fixed composition resistors are marketed in combination with copper clamps or supports so that they can be mounted directly on metal chassis or panels. Copper supports provide rigid mounting and efficient heat transfer from the resistors to the metal chassis. Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis.—TECHNICIAN (Ask for No. 3-62)

RESISTORS: "Akra-Ohm" ceramic-bobbin precision wire wound resistors are available from .1 ohm to 1000 megohms, 75 to 2000 v. and .1- to 2-watt. Radial or axial lead, radial or axial lug, or bracket-type mountings. Shallcross Mfg. Co., 520 Pusey St., Collingdale, Pa.—TECHNICIAN (Ask for No. 3-63)

AMPLIFIERS: Packaged circuit plug-in audio amplifiers, "Pakaps," utilize circuits etched on impregnated teflon. Flat response, 20 cps to 40 kc. In 3 models, for 20, 40 and 60 db amplification. Audio Products Corp., 2265 Westwood Blvd., Los Angeles 64, Calif.—TECHNICIAN (Ask for No. 3-64)

MORE TECHNICAL INFORMATION *describing the new products presented here may be obtained by writing on company letterhead to New Products Editor, TECHNICIAN, 480 Lexington Ave., New York 17, N.Y., listing numbers given at end of each item of interest. Please mention title of position held. Please use coupon on page 36.*

Complete Index of

ALL "CIRCUIT DIGESTS" TO DATE

Including Current Issue. CIRCUIT DIGEST NOS. 179 to 184 will be found in this issue of TECHNICIAN.

All Units Are TV Receivers Unless Otherwise Noted

Circuit Digest Numbers

1- 8	Sept.	1952
9- 16	Oct.	1952
17- 24	Nov.	1952
25- 30	Dec.	1952
31- 36	Jan.	1953
37- 43	Feb.	1953
44- 49	Mar.	1953
50- 58	Apr.	1953
59- 64	May	1953
65- 70	June	1953
71- 76	July	1953
77- 81	Aug.	1953
82- 88	Sept.	1953
89- 94	Oct.	1953
95-100	Nov.	1953
101-105	Dec.	1953
106-110	Jan.	1954
111-115	Feb.	1954
116-120	Mar.	1954
121-125	Apr.	1954
126-130	May	1954
131-133	June	1954
134-138	July	1954
139-143	Aug.	1954
144-149	Sept.	1954
150-155	Oct.	1954
156-161	Nov.	1954
162-167	Dec.	1954
168-173	Jan.	1955
174-178	Feb.	1955
179-184	Mar.	1955

(Continued on page 64)

ADVERTISERS INDEX

MARCH, 1955

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

(Continued from page 62)

capacitor replacements

FOR SETS OF THE MONTH

CAPEHART CHASSIS CX-38

Symbol No.	Rating µF @ WVDC	Capehart Part No.	Sprague Replacement
C219	8@250	650228A-13	TVA-1503
C703	50+40+30+20@400	7500908-42	R-1661
C704	50@400/20@200/ 100@150/25@25	7500908-41	R-1658

GENERAL ELECTRIC "N" LINE

Symbol No.	Rating µF @ WVDC	G.E. Part No.	Sprague Replacement
C174	100@6	RCE-131	TVA-1101
C308	5@50	RCE-174	TVA-1303
C400	20@450/150@250	RCE-208	TVL-1540 / TVA-1709
C403	200+15@250	RCE-209	R-1667

MOTOROLA CHASSIS TS-525

Symbol No.	Rating µF @ WVDC	Motorola Part No.	Sprague Replacement
C50	30@150/10+10@50	23B733494	TVA-2315 / TVA-1412
C74	200+140+60@150	23B733495	R-1670
C75	200+5@150	23B710941	TVL-2444
C77	140@150	23B484097	TVA-1422
C99	10@450	23A702450	TVA-1705
C113	60@200/200+140@150	23B731523	R-1670
C114	10@500	23B731537	TVA-1802

RAYTHEON CHASSIS 21T24AS, 21T25AS, 21T27AS ("Aristocrat" Series)

Symbol No.	Rating µF @ WVDC	Raytheon Part No.	Sprague Replacement
C219	25@450/100+10@300/60@50	8C-23689	TVL-3574 / TVA-1711
C504	150@150	8C-22463	TVL-1430
C505	150@150	8C-22464	TVL-1430
C616	5@300/25@25	8C-24193	TVL-3637

WESTINGHOUSE CHASSIS V-2315, V-2325

Symbol No.	Rating µF @ WVDC	Westinghouse Part No.	Sprague Replacement
C210B, C409B, C411B, C421B	30@500/10@450/ 150+30@50	V-11535-1	R-1488
C212A, C401A, C501A	40+40@450/30+30@350	V-9891-1	TVL-4720
Z400	Integrator Plate	V-9213-1	V-1

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You'll never see your dentist hold a "2-for-1" sale on extractions . . .
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The expert service technician, just like other professional people, must undergo years of study and apprenticeship to learn the fundamentals of his skill. And a minimum investment of from $3000 to $6000 per shop technician is required for the necessary equipment to test today's highly complex sets. Finally, through manufacturer's training courses and his own technical journals, he must keep up with changes that are developing as fast as they ever did in medicine, law, or dentistry. Those best equipped to apply modern scientific methods are almost certain to be most economical for you and definitely more satisfactory in the long run.

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

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PRESIDENT

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Television dealers and service technicians all over the country are preparing to tie-in with a great promotional event. It's National Television Servicemen's Week, March 7-12, sponsored by the RCA Tube Division and registered officially with the Chamber of Commerce of the United States.

You can use this unique merchandising plan right in your own neighborhood to meet and sell more television service prospects than ever before. Your RCA Tube Distributor offers you excellent promotional materials to help you identify yourself and your store with this nation-wide consumer promotion.

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Use These Promotional Materials


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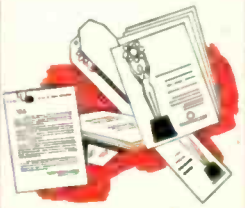
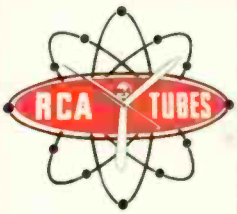

PROMOTION KIT (3F223)



ELECTRONIC SYMBOL CLOCK (3F226)

TV SERVICE SIGN (3F230)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