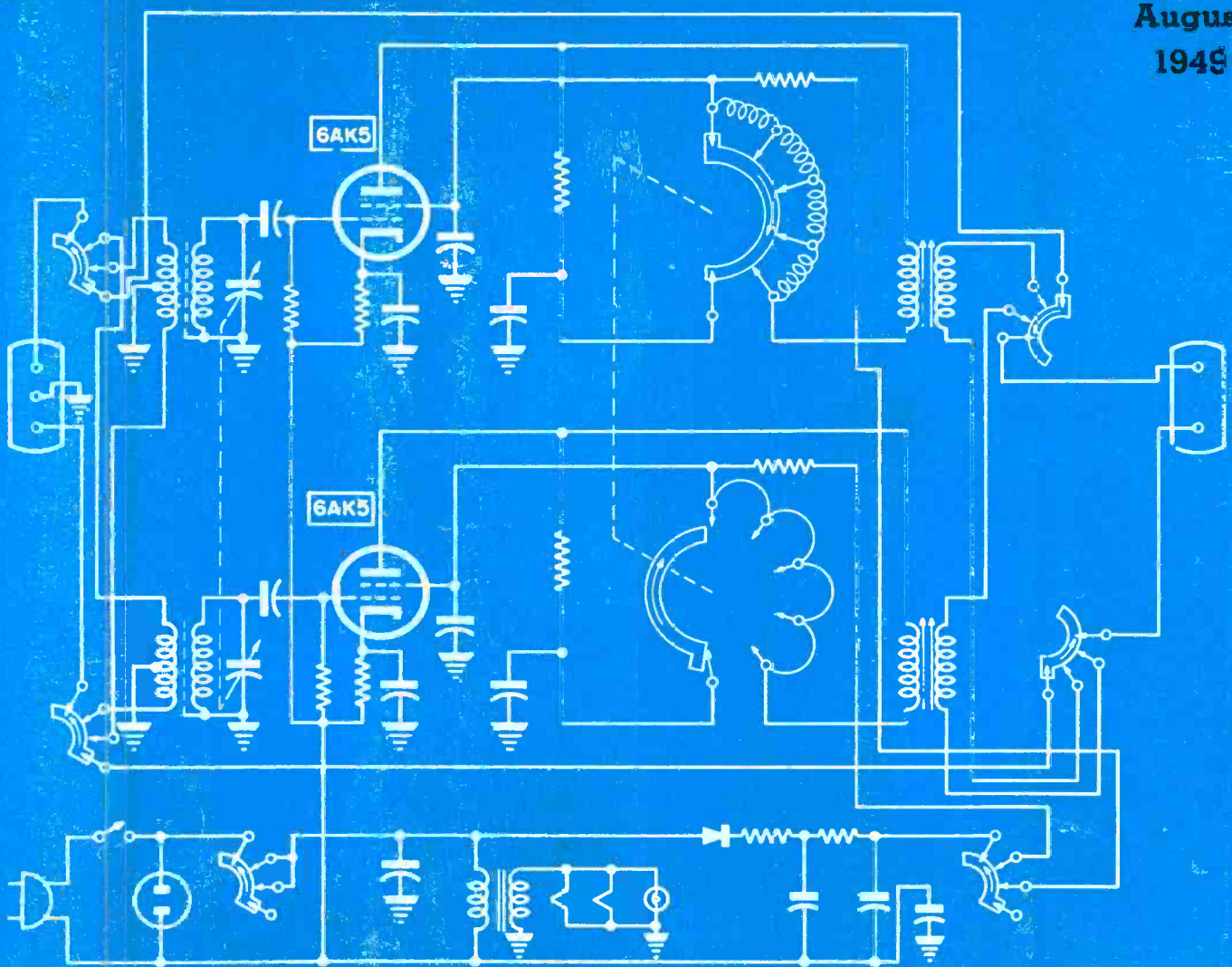
RADIO · TELEVISION · ELECTRONIC

SERVICE

August
1949



V bands employing high-gain 6AK5s for low and high-band operation.

[See page 2]

THE TECHNICAL JOURNAL OF THE RADIO TRADE

C-D SKYHAWK ANTENNAS

MINUTES FOR INSTALLATION...YEARS OF RELIABLE SERVICE

MODEL 8B

MODEL 4B

FOR CARS

NOW! A Stainless Steel Antenna For Your Quality Trade

MODEL 8B $5.95

- quick installation on any surface — at any angle
- 3 section all stainless steel, 60" extended
- chrome-plated metal top spacer
- full 36" polyethlene lead-in
- 100% waterproof construction
- exclusive "spring finger-plug"
- fits any cowl or fender contour

A Durable, Economical Antenna

MODEL 4B $3.33

- 2 section mast extends to 43"
- ½" mounting hole is all that's needed to install on any cowl or fender
- universal mounting spacer with 30° angular adjustment fits all contours
- full length 36" polyethlene lead-in
- brilliant chrome finish

STRATE-LINE ANTENNAS WITH HI-LO BAND COVERAGE, CHANNELS 2-6, 7-13

Speedy installation, trouble-free operation and reliable performance. This type of installation puts money in your pocket — and keeps it there. There's no profit leakage with wasted "call-back" time when you install C-D Strate-line antennas. They're built to stand up under all weather conditions.

MODEL	CONTENTS	LIST PRICE
85 X	"STRATE-LINE" Hi-Lo array, 8 ft. mast, phase line. 6 standoffs, base mounting bracket.	$23.00
T85 X	Same as 85 X with 60" trans. line.	25.50
85 XAX	Double stacked 85 X, feeder bars, 6 standoffs, 8 ft. mast, phase lines, base mounting bracket.	42.50
T85 XAX	Same as 85 XAX, with 60" trans. line.	45.00
K85 X	Single 85 X bay, feeder bars, "U" bolt mast bracket for converting single to double stack. No mast.	17.50

FOR TELEVISION

CORNELL-DUBILIER

CONSISTENTLY DEPENDABLE

★ CAPACITORS
★ VIBRATORS
★ ANTENNAS
★ CONVERTERS

CORNELL-DUBILIER can now supply you with a full line of AUTO, TV and FM antennas. If your jobber does not stock them, send your order to us, Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey. We will ship your order through your nearest C-D distributor. Other plants in New Bedford, Brookline and Worcester, Mass.; Providence, R. I.; Indianapolis, Indiana; and a subsidiary, The Radiart Corporation, Cleveland, Ohio.

1910 CORNELL-DUBILIER ANTENNAS 1949

Reg. U. S. Pat. Off.

"KEN-RAD TUBES ARE RELIABLE BUSINESS-BUILDERS!"

"To succeed you have to sell reliable merchandise. That's one thing my years in this business have taught me.

"Take Ken-Rad Tubes. I don't mind telling you, I've built a good solid business with these tubes. When I sell Ken-Rad Tubes I know I'm selling dependable tubes that will not let me or the customer down.

"I don't know any other item that's done more to establish my reputation and build my business than Ken-Rad Tubes."

VICTOR A. REITH, Reith's Radio and Television Service, Woonsocket, R.I., insists on Ken-Rad Tubes because he knows—like thousands of other dealers—that Ken-Rad Tubes sell fast and stay sold.

J. H. WORTH, Foreman, Miniature Stem Section, is one of the many supervisors concerned with the comprehensive testing of Ken-Rad Tubes. This testing results in a tube unsurpassed for quality.

"KEN-RAD TUBES HAVE TO BE RELIABLE TO PASS THESE TESTS!"

"There's no tube made that has to undergo more rigid testing than a Ken-Rad Tube.

"It's tested at practically every step in its production.

"For instance, stems are checked every hour in the polariscope (above, left), an instrument used for detecting strain in glass by means of color or line change.

"When the strain pattern is constant, the stems are uniform and one acts like the next in the finished tube.

"Result is a final tube that is more uniform, of better quality.

"Reliable is the word for Ken-Rad Tubes, all right!"

KEN-RAD *Radio Tubes*

PRODUCT OF GENERAL ELECTRIC COMPANY

Schenectady 5, New York

182-HAB

THE SERVICEMAN'S TUBE

. . . backed by profit-making sales aids which your Ken-Rad distributor will be glad to show you. Phone or write him today!

Vol. 18, No. 8

RADIO · TELEVISION · ELECTRONIC
SERVICE

August, 1949

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Published monthly by Bryan Davis Publishing Co., Inc.
52 Vanderbilt Avenue, New York 17, N. Y. Telephone MUrray Hill 4-0170

Bryan S. Davis, President — Paul S. Weil, Vice-Pres., Gen. Mgr. — F. Walen, Secretary — A. Goebel, Circulation Manager

Cleveland Representative: James C. Munn, 2253 Delaware Dr., Cleveland 6, Ohio. Telephone: Erieview 1726

Pacific Coast Representative: Brand & Brand, 1052 W. Sixth St., Los Angeles 14, Calif. Telephone: Michigan 1732
Suite 1204, Russ Building, San Francisco 4, Calif. Telephone: SUtter 1-2251

Entered as second-class matter June 14, 1932, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Subscription price: $2.00 per year in the United States of America and Canada; 25 cents per copy. $3.00 per year in foreign countries; 35 cents per copy.

25 Set Makers Pick HYTRON

TV Picture Tubes

Twenty-five of the shrewdest buyers in the industry. All lead in TV set manufacture. All specify Hytron TV Picture Tubes as original equipment. If you are continually servicing TV, this may be no news to you. But it helps emphasize one fact of importance to you. In TV Picture Tubes—as well as receiving, transmitting, and special purpose tubes—you buy the best when you buy Hytron.

"MAKING TUBES IS EASY—*IF* YOU KNOW HOW!"

by SERVICEMEN
A HYTRON TOOL for SERVICEMEN

HYTRON
RADIO AND ELECTRONICS CORP.
MAIN OFFICE: SALEM, MASSACHUSETTS

HYTRON RADIO TUBES

HYTRON SERVES THE SERVICEMAN

TUBE TAPPER 5¢

7-PIN MINIATURE STRAIGHTENER 55¢

9-PIN MINIATURE STRAIGHTENER 55¢

SOLDERING AID 49¢

TUBE LIFTER 15¢

AUTO RADIO TOOL 24¢

Already Six Tools Available From Hytron Jobbers. Watch For More!

Sales Stimulators Like These Are Pulling in Profits for RAYTHEON *Bonded* ELECTRONIC TECHNICIANS

Wherever Service Dealers are riding the Raytheon "Bond" Wagon, volume and profit are riding high, too. The bigger and better RAYTHEON *Bonded* ELECTRONIC TECHNICIAN Program has a complete line of brand new displays, decals, mats, mailing pieces, shop and sales aids specially designed to create customer confidence and stimulate sales. Most of these hard-hitting sales tools are yours for the asking — if you can qualify as a RAYTHEON *Bonded* Technician. The Bond costs you nothing — but it pays big dividends.

Better ask your RAYTHEON TUBE DISTRIBUTOR whether *you* can ride the "BOND" Wagon to bigger business.

ASK YOUR RAYTHEON TUBE DISTRIBUTOR for this presentation. It gives you the complete "Bonded" story and shows you why you can't afford to pass up this free Raytheon "dividend".

The Raytheon Bantal Tube simplifies your tube stock without loss of sales. Eight fast-moving Bantals replace sixteen equivalent GT and metal types. A new and better tube at no extra cost! Ask your Raytheon Distributor for Raytheon Bantal Tubes.

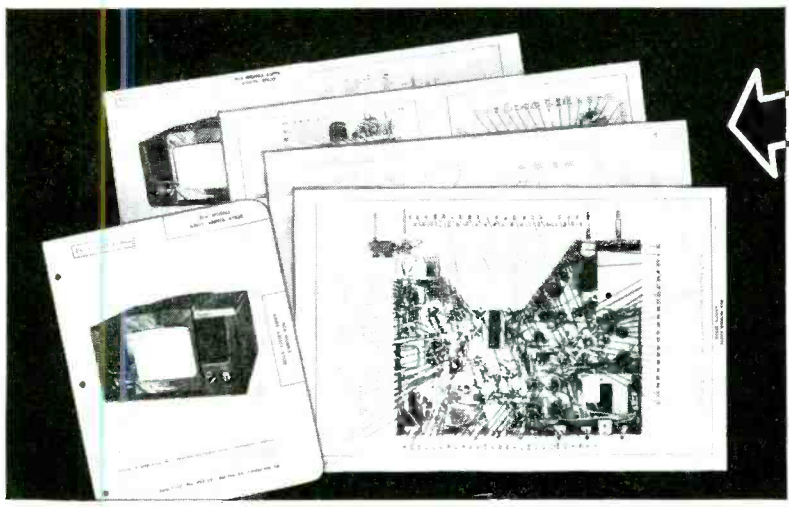
RAYTHEON
MANUFACTURING COMPANY
Radio Receiving Tube Division
NEWTON, MASS. • CHICAGO, ILL. • ATLANTA, GA. • LOS ANGELES, CAL.

RADIO RECEIVING TUBES • CATHODE RAY TUBES • SPECIAL PURPOSE TUBES • SUBMINIATURE TUBES • MICROWAVE TUBES

SERVICEMEN: WE'LL PROVE YOU'LL SAVE TIME AND EARN MORE WITH PHOTOFACT—

AT NO COST TO YOU!

. . . We'll send you absolutely FREE



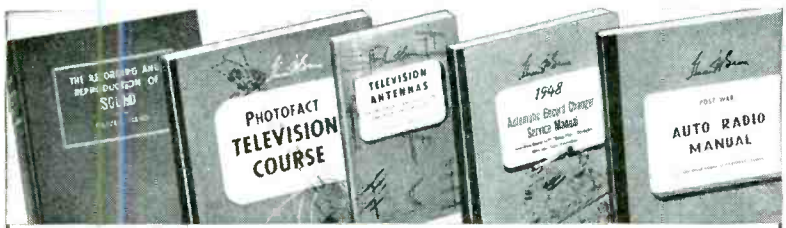
THIS PHOTOFACT FOLDER ON THE RCA 630 TELEVISION RECEIVER

OR

A PHOTOFACT FOLDER ON ANY POST-WAR AM OR FM SET OF YOUR CHOICE

(as listed in the PHOTOFACT Cumulative Index)

NOW, you can discover for yourself—at our expense—how PHOTOFACT can make your service work quicker, easier, and more profitable! Examine an actual PHOTOFACT Folder. Use it. You'll learn first-hand why this indispensable service data is used exclusively by thousands of successful service technicians. These men-in-the-know subscribe to PHOTOFACT year after year because it helps them every minute of every working day. No other service data gives you PHOTOFACT'S outstanding advantages: *completeness, accuracy, uniformity* and *ease-of-use*. PHOTOFACT and *PHOTOFACT alone*, is the *only* radio service data prepared from laboratory analysis of the actual equipment it describes. Know the facts—get your FREE Folder now. Examine it—use it—compare it with others—and you will understand why no modern service shop can afford to be without PHOTOFACT.



NOTE: This FREE offer is limited to Service Technicians. Attach coupon below to your letterhead and mention the name of your jobber. If you have no letterhead, send coupon to your jobber. Experimenters and others may obtain the Photofact Folder by remitting 50c.

CURRENT PHOTOFACT *BEST-SELLERS*

The Recording and Reproduction of SOUND, by Oliver Read. The complete, authoritative treatment of the entire subject of Sound, written by the editor of *Radio & Television News* **$5.00**

Photofact Television Course. The book used by thousands; gives you a clear understanding of TV principles, operation and practice. **$3.00**

Television Antennas. Shows you how to select and install the proper antenna, and how to overcome antenna problems **$1.25**

1948 Record Changer Manual. Covers 45 models made in 1948, including new LP and dual-speed changers, plus leading wire recorders. Based on actual analysis of the equipment **$6.75**

Auto Radio Manual. Complete Photofact service data on more than 100 post-war auto radio models—a time-and-money-saver . . **$4.95**

HOWARD W. SAMS & CO., INC. INDIANAPOLIS 1, IND.

HOWARD W. SAMS & CO., INC.
955 N. Rural St., Indianapolis 1, Ind.

I am a Service Technician:
- ☐ Send FREE Photofact Folder on RCA 630 TV Receiver
- ☐ Send Photofact Folder for set model . . . . . .

I am an Experimenter:
- ☐ Send Photofact RCA 630 Folder. (50c enclosed)
- ☐ Send FREE Photofact Cumulative Index

Name . . . . . .

Address . . . . . .

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

(Offer expires Sept. 30, 1949. Good only in U. S. A.)

BUY THE BEST • THE V.O.M.A. THAT DOES MORE

MORE FOR YOUR MONEY

Triplett Model 630

$37.50 Dealer Net

In the relatively short time since Model 630 was introduced to the trade it has steadily risen to the top in sales. The reason is obvious. Here is a Volt-Ohm-Mil-Ammeter that does more . . . has proven components . . . and will give a lifetime of satisfaction. All the engineering skill and facilities of the industries' largest manufacturer of Volt-Ohm-Mil-Ammeters joined forces to make it outstanding in every way. Look over all the features and you too will buy Model 630.

NOTE THESE SENSATIONAL IMPROVEMENTS:

★ Individual Scales with separated spacing are easy to read.

★ Large 5½ Inch Meter In Special Molded Case Under Panel.

★ Resistance Scale Markings from .2 Ohms to 100 Megohms—Zero Ohms Control Flush With Panel.

★ Only One Switch—Has Extra Large Knob 2½" Long—Easy To Turn—Flush With Panel Surface.

★ Enclosed New Molded Selector Switch and insulated resistor housing in unit construction.

★ All Resistors Are Precision Film or Wire Wound Types For Permanent Accuracy.

★ Batteries Easily Replaced—Balanced Double-Contact Grip. Spiral Spring—Battery for Ohms test due to low drain insures shelf-life usage.

TECH DATA

D.C. VOLTS: 0-3-12-60-300-1200-6000 at 20,000 Ohms/Volt
A.C. VOLTS: 0-3-12-60-300-1200-6000 at 5,000 Ohms/Volt
D.C. MICROAMPERES 0-60 at 250 Millivolts
D.C. AMPERES 0-12 at 250 Millivolts
D.C. MILLIAMPERES 0-1.2-12-120, at 250 Millivolts
OHMS: 0-1000-10,000; (4.4 Ohms and 44 Ohms center scale)
MEGOHMS: 0-1-100 (4400-440,000 at center scale)
DECIBELS: —30 to +4, +16, +30, +44, +56, +70
OUTPUT: Condenser in series with A.C. Volt ranges
High voltage Probes available, extra; also plug-in shunts for other current measurements to suit special needs.

Laboratory Standard Model 630-A—All scales on this model are hand drawn and hand stepped, used with mirror for extreme accuracies, beyond the average servicing needs of the model 630.

Triplett Model 630-A **Dealer Net $47.50**

VOMA JR.—A NEW VOLT-OHM-MIL-AMMETER

Handy "POCKET-SIZE LABORATORY" By Triplett

VOMA Jr. MODEL 666-R has many of the design features of the popular Model 630:

1. Switch and controls flush with panel.
2. Enclosed molded selector switch.
3. Exclusive Unit construction-resistor housing integral with switch.
4. Resistors Precision wire wound and permanent film type.
5. Resistance Measurements to 3 Megohms.
6. Batteries with spiral spring contacts, easily replaced.

VOMA Jr. MODEL 666-R . . . $24.50
U.S.A. Dealer Net Price

Note: *Model 666-HH The Original Pocket-Size Lab—still a favorite with many. U.S.A. Dealer Net $22.00.*

TECH DATA

D.C. VOLTS: 0-10-50-250-1000-5000, at 1000 Ohms/Volt
A.C. VOLTS: 0-10-50-250-1000-5000, at 1000 Ohms/Volt
D.C. MILLIAMPERES: 0-10-100, at 250 Millivolts
D.C. AMPERES: 0-1, at 250 Millivolts
OHMS: 0-3000-300,000 . . . . (20-2000 at center scale)
MEGOHMS: 0-3 . . . . . (20,000 ohms center scale)

Precision first . . . to Last

TRIPLETT

TRIPLETT ELECTRICAL INSTRUMENT COMPANY • BLUFFTON, OHIO, U.S.A.

In Canada: Triplett Instruments of Canada, Georgetown, Ontario

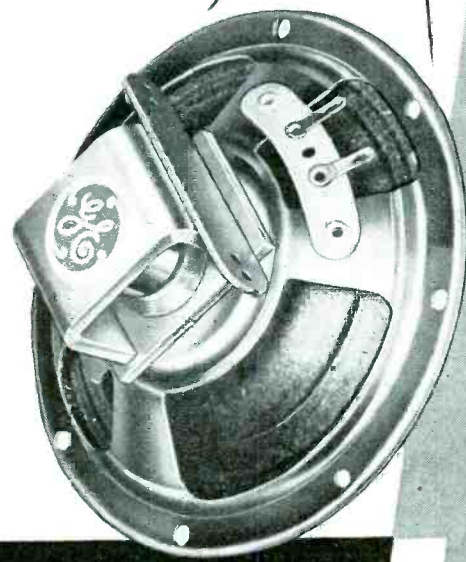
New baby in a proud family . . .

5" ROUND PM LOUDSPEAKER

THERE's always something new and better in the G-E Speaker Line—Now it's the G-E 5" Round *—specifically designed for service replacement!*

• • •

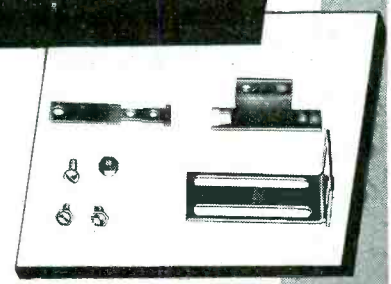
Naturally it has the quality you expect of a General Electric Speaker — sturdy all-weld construction, rock-steady G-E Alnico 5 magnet—plenty of power, sensitivity, fidelity! Give your customers the best—that G.E. gives you! See your G-E parts distributor and stock up today.



Of course it has the famous G-E Aluminum Foil Base Coil! Not subject to warping resulting from high humidity. Provides much higher power handling capacity. P. S. All G-E Speakers have this Metal Base Voice Coil—don't forget that!

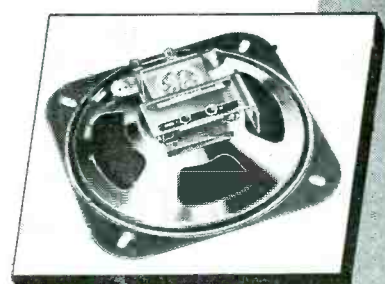
FREE—with all 4", 5" and 5¼" G-E Speakers!

Chassis Mounting Brackets



Save time, money and materials for the hard-working serviceman!

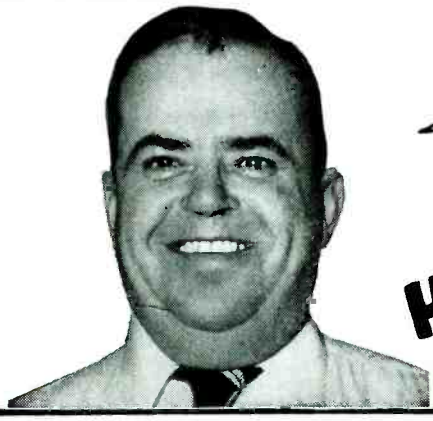
Well, now, here's the story. With the serviceman in mind, G. E. has cooked up these neat little mounting kits to save your temper and please your customers. They're adjustable—up, down or sideways, for simplified mounting of speakers in small working areas. Less work for you—and a cleaner job for that important fellow—your customer. The brackets are FREE with every 4", 5" and 5¼" G-E speaker you get from your G-E distributor or jobber. *General Electric Company, Parts Section, Electronics Park, Syracuse, New York.*



You can put your confidence in—

GENERAL ELECTRIC

Another radio service dealer thanks Sylvania Campaigns for big rise in business



"THE FIRST DAY'S PROFIT FROM THE MAILING PAID FOR THE ENTIRE THREE MONTHS SERVICE!"

HERE'S YOUR OPPORTUNITY!

BENNY'S

RADIO SHOP

CHIEF KEEPER-UPPER OF YOUR RADIO

411 ARCADIA AVE.

ARCADIA, FLORIDA

MODERN EQUIPMENT — EFFICIENT AND RELIABLE

March 9, 1949

Hammond-Morgan, Inc.
9 South Terry Street
Orlando, Florida

Gentlemen:

Last month your representative showed me his display matter on the Sylvania Direct Mail Advertising campaign for February, March and April.

I placed an order for the series of direct mail cards and received them about two weeks later.

I mailed the first group of cards out on the morning of February 26th about 8 o'clock. Before 2 PM I had a call for service as the result of the mailing!!! Later the same afternoon I had a couple come in to look over new radios. They had received my card regarding repairs and decided that instead of having their set repaired, they would come in and see what I had in new radios. They are at this time about decided on buying a set retailing for $99.95 plus an FM antenna installation.

I have read the statements of other servicemen over the country about their business increasing 30% and upward as the result of this Sylvania advertising, but I believe the results I have obtained are above anything I have yet heard about. The first day I had made enough profit from the mailing to pay for the entire three months service, and the prospects are that the other two months mailings will bring other business.

I thought perhaps you would be interested in the results I had with this series, and I can tell you now that I hope to increase my mailing list on the next series, and I think I will stick to this form of advertising as long as it is available at such a very low cost.

Yours very truly,

BENNY'S RADIO SHOP

B. McGehee

B. McGehee

RADIO EXPERT TRAINED BY NATIONAL RADIO INSTITUTE

PUBLIC ADDRESS SYSTEMS — BEST REPAIR SERVICE ON ANY MAKE OR MODEL RADIO — HOME RECORDING APPARATUS

Increase your Business with Sylvania's Fall Campaign— READY NOW!

Sylvania's September, October, November, and December campaigns are available now. Here's what you receive:

- 4 Postal Card Mailings — one for each month.
- 4 Window Displays — one for each month.
- 4 Window Streamers — one for each month.
- 8 Newspaper Ad Mats — two for each month.
- Radio Spot Announcements—several for each month.
- 8- and 12-inch decals for window, door and truck.

Tied up directly with Sylvania's national advertising, these campaigns will boost your business. You pay only the postage on the cards you mail. Sylvania gives you everything else *free*. Write for full details immediately, or see your Sylvania distributor.

SYLVANIA ELECTRIC

RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES; FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, SIGN TUBING; LIGHT BULBS; PHOTOLAMPS

Sylvania Electric Products Inc.
Advertising Department R-1908
Emporium, Pa.

Gentlemen: Please send me full details on your September, October, November, and December Service Dealer Campaigns.

Name.....

Company.....

Address.....

City..... Zone.....

State.....

The TV Service Operation

TV SERVICING, often probed in these columns, also appears to have become a major topic at the all-important new set announcement meetings now being conducted by manufacturers throughout the country. At one such session in Philadelphia, conducted by Philco, John Pell offered an impressive analysis of the problem. He pointed out that they had found a four-point program which worked quite well in all phases of TV servicing.

Adequate training of Service Men was a featured item in this program. According to Pell, this training involved actual work on receivers and test equipment, coupled with substantial text instruction.

Proper supervision was a second item that was found to be extremely important. Pell stated that distributors should maintain a small group of well-trained men to supervise and assist Service Men during the first few months of operation. It was pointed out that this part of the plan can be made to work more effectively if the distributor is paid for his work, because the help is given unstintingly by the distributor and accepted wholeheartedly by the service shop. In addition, the Service Man has the incentive to operate without help as quickly as possible, so he may stop paying for supervisory assistance.

The third point on the program, which was found to be of particular importance, concerned the right kind and amount of test equipment. Service Men should have adequate test equipment for their operations, stressed Pell.

Analyzing the fourth point, Pell said that the thinking which characterizes successful distributors' service operations must be passed on to the Service Man perhaps in the form of regular service training classes.

A common problem is the large percentage of unnecessary phone calls, involving the explanation of normal receiver operation, the effects of airplanes, vacuum cleaners and other internal and external conditions which often puzzle the new television set owner. It was noted that in a number of cases, the percentage of calls requiring education only was as high as 50%. Pell pointed out that the problem could be solved by the simple expedient of non-solicited educational calls during the evening when the man-of-the-house was home.

Pell also covered the extremely delicate problem of inoperative sets or difficult service jobs. It was a frank admission that the no-charge policy often resulted in a high degree of confusion and dissatisfaction. Pell stated that a solution which has been found fair to everyone involves the establishment of a written policy which covers the method of handling necessary Service Man and dealer repairs with a schedule of prices set up for work performed in the shop. The price of such work should, of course, cover the actual cost only and no attempt should be made to realize a profit. Pell pointed out that distributors using this plan have shown a remarkable improvement in Service Man and dealer good will, since the dealer has to ask for service only when he really needs it.

Thanks, John, for this sound advice!

Preventive Maintenance

PREVENTIVE MAINTENANCE, which has been a subject of national interest, will now be the theme of a three-day pioneering event in Philadelphia in September, an event which will be widely heralded and stamped as one of the most beneficial of the year for the Service Man.

Sponsored by that active City of Brotherly Love association, PRSMA, the three-day affair will be held at Town Hall on September 18, 19 and 20, and offer to the Service Man an unusually wide assortment of exhibits by parts and test equipment distributors, broadcasters, manufactures and publications, and a program of practical talks on such subjects as 'scopes, general test equipment, antennas, etc. All this will be available to the Service Man at absolutely no charge.

The virtues of preventive maintenance which will be stressed at this unusual session, labeled as a Radio and TV Service Convention and Exhibit, will be reviewed in dynamic fashion not only during the talks, but in the booths where there will appear a wide assortment of booklets, leaflets, pamphlets, advertisements, posters and radio and TV scripts showing how the Service Man can help Mr. and Mrs. set owner and himself through preventive maintenance.

A general invitation is being mailed out, not only to the Service Men of Philadelphia, but to the associations throughout the country so that everyone may have an opportunity to become fully familiar with the striking possibilities of a preventive maintenance program and perhaps cooperate with PRSMA during its preventive maintenance drive in October, or set up a campaign of their own for the late fall or winter months in their areas.

A hearty salute to PRSMA and its energetic members who conceived the plans for the three-day meeting and the subsequent program for October. Everyone feels fully confident that both events will be successful and help to accent the key role played by the Service Man in radio, electronics and TV.

The Ultrahighs

THE RECENT ANNOUNCEMENT of the proposed forty-two channel ultrahigh schedule and subsequent comment on the possible use of color on these bands has resulted in unfortunate confusion in many quarters, set owners and prospective set owners assuming that within the next few months there would be new ultrahigh stations on the air, and thus their present receivers or those that they might purchase would become obsolete. More than a few months will elapse before the new ultrahigh stations begin transmitting. In fact, according to authoritative broadcast and manufacturing sources, at least a year or possibly two will elapse before practical commercial ultrahigh transmission will be possible. At present, it is difficult to secure any substantial power on these higher bands, and coverage is limited to but a few miles.

Broadcasters admit that there are innumerable problems to be solved on these high frequencies and a long period of experimentation will be required to learn the solutions.

There is no doubt that eventually there will be ultrahigh stations in many communities, particularly those that do not have any television at present, but the program will not become effective for quite a long span. And when the new schedule does become practical, there'll be quite an assortment of converters and dual-range receivers available to provide the proper pickup in this new range.—L. W.

TV Receiver

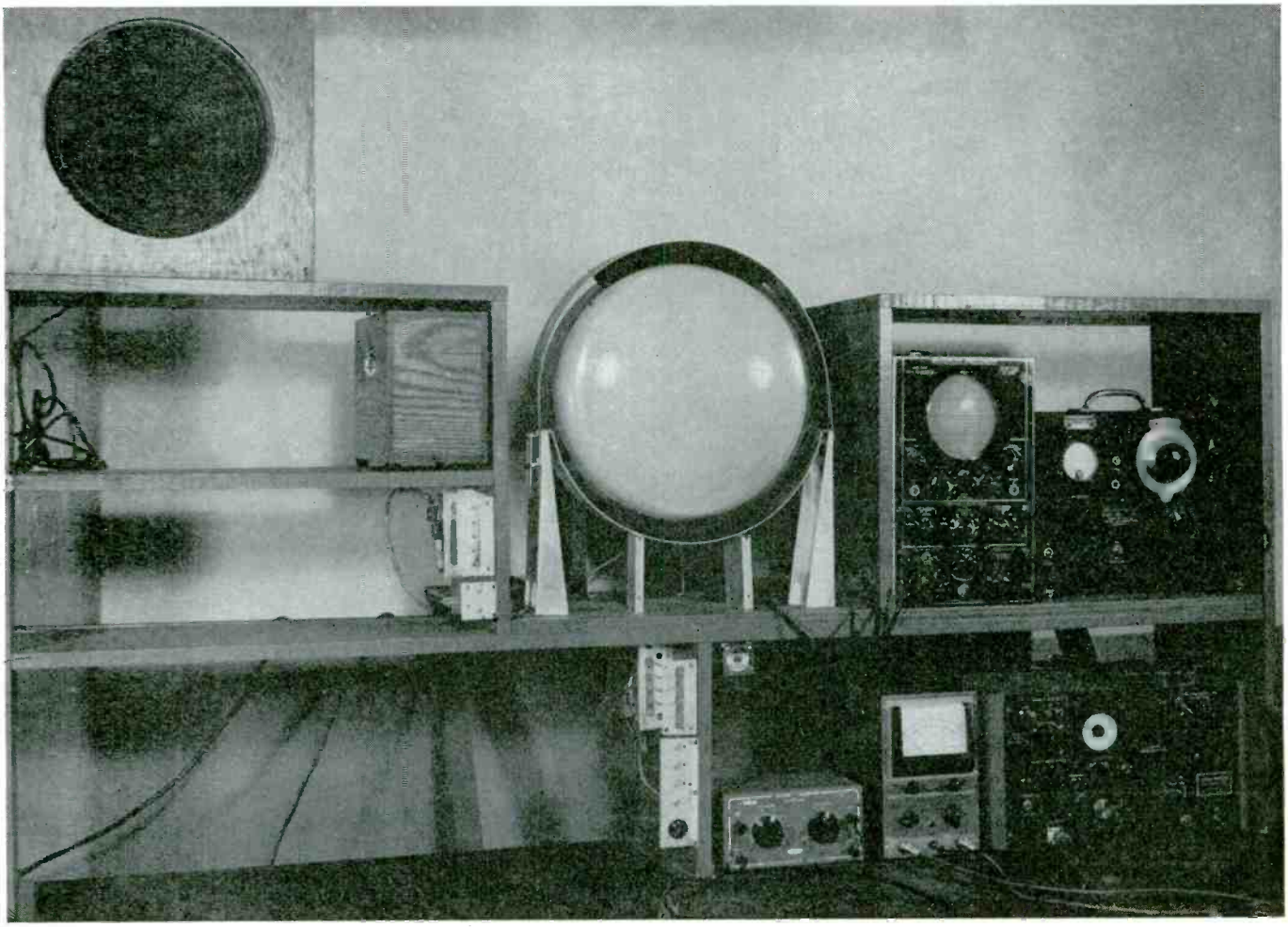


Fig. 1. Work bench with TV test equipment and a 15" picture-tube mounted on a suporting shelf.

TV SERVICING, with its many variables to consider, has accented the need for a well-planned program of approach to the problems which might be encountered in the field or shop.

For instance, because of rabid interests in TV, and the corresponding reluctance of set owners to part with their set requiring repairs, home repair practice has become quite a factor. And since no degree of viewing distortion can be tolerated, Service Men must effect a *perfect* repair, in which video defects are removed completely.

To be able to handle this exacting type work the Service Man must equip himself both mentally and materially so that he can provide quality service and as rapidly as possible. There are three essentials which have been found to be ideal for this conditioning:

(1) A working knowledge of at least the fundamentals of the present TV system.
(2) Adequate test equipment and spare parts.
(3) Service instructions and service manuals.

The working knowledge of television fundamentals should, of course, apply primarily to receivers. However, a knowledge of what happens at the transmitter also should be acquired by the Service Man. Such knowledge permits an appreciation of the entire system and in many cases is of immediate help in diagnosing troubles.

Service Men should not only understand the function of each stage of the receiver, but what happens electrically in the receievr as the various controls are adjusted. Perhaps what is most important of all is the ability to observe the operation of a television receiver and accurately diagnose the difficulty and determine the necessary remedy.

Test Equipment

The necessary test equipment to acquire is always a problem. The amount of servicing that is to be performed is an important consideration when determining what test equipment to purchase.

If the service program were to involve the repair of only those sets having defective tubes, with the rest of the work being farmed out, it would be necessary to have only a representative assortment of tubes for the various make receivers that might be serviced. If the TV servicing business were small, and the present servicing equipment were to be used for TV, then the equipment would have to include at least a good vtvm, using perhaps a probe detector to permit signal tracing in the *rf* and *if* stages of the receiver.

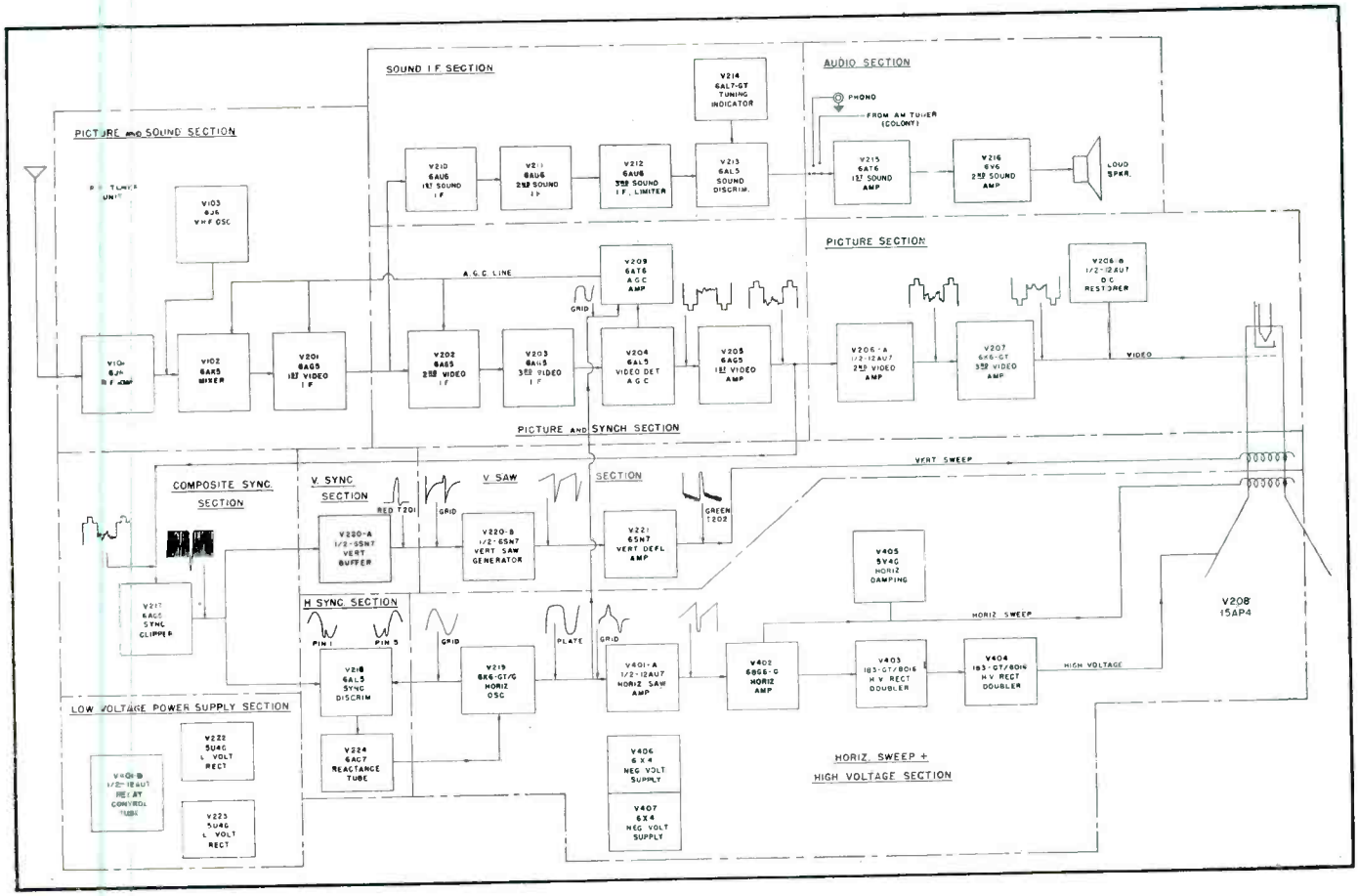
It must be remembered, however, that an *excellent* knowledge of TV and radio servicing must prevail, if the equipment is not adequate for TV work. In other words any inadequacy of test equipment must be overcome by a *superior* technical knowledge, to stay in business.

A service shop, for average TV service work, should have:

A *vtvm* (preferably one with an

SERVICING

Fig. 2. Block diagram of Du Mont RA-105.



Setting Up a Pattern for Servicing in the Home and Field . . . How to Break Down Circuits and Follow Through With an Analysis to Facilitate Servicing.

rf probe for high frequency measurements).

A *'scope.*

Voltage calibrator to be used with the 'scope.

Sweep generator.

Some type of *traveling detector* or probe. (The traveling detector consists of a 1N34 crystal detector with a filter built into a small probe-like case. This can be used with a 'scope for observing waveforms in the video *if* stages in the receiver.

The sweep generator should have a self-contained marker system. If not, a suitable *rf* generator will have to be used for this purpose; at any rate an *rf* generator whose calibration is accurate and whose output has a calibrated attenuator is necessary for

by CARL QUIRK

Head, Technical Service Section
Teleset Service Control Dept.
Allen B. Du Mont Labs, Inc.

checking stage gains in the *rf* and *if* stages.

In some cases a good tube checker is handy, but it is advisable to maintain a set of tubes that have been operating in the same type of circuits in which they are to be used. It is very possible that some tubes that check well in the checker will not work in certain circuits.

Some type of meter for measuring high voltage also should be available. The range of the meter will depend on the type receivers that are to be serviced.

For most home receiver units, a 15-kv range is satisfactory. For servicing projection receivers a high voltage meter with a 30-kv range is perfect.

Of course, a representative set of tubes and parts should be on hand. Regardless of the skill of the technician, in locating the fault, any defects cannot be repaired without the proper replacement parts.

The work bench is another particularly important Service Shop factor. Such a bench must be neatly set up, and all the necessary test equipment should be handy. In repairing certain types of television receivers that contain a number of chassis, it may be advisable to have a picture tube permanently mounted on the bench. This method is being used with the Du Mont type RA-101 and RA-105 receivers, with a 15" tube mounted on a supporting shelf in the center of the

(*Continued on page 26*)

Visual TV Alignment Procedures

Part II . . . Analysis of RCA 630 TS Alignment Techniques for Sound Discriminator, Sound IF Transformer, RF and Converter. Local Oscillator Adjustments for Receiver.

by VICTOR I. ROBINSON

Senior Engineer
Precision Apparatus Co., Inc.

IN THE initial installment[1] of this series, we pointed out that many manufacturers' instruction call for alignment of the video *if* stages using an unmodulated signal from an AM generator, adjusting for peak indications, on a *vtvm*. Under these conditions, after the peaking procedure has been completed, the configuration of the resultant overall response characteristic must be examined using the sweep generator and 'scope. Slight readjustments can then be made to obtain the most satisfactory configuration. The 50% down point (25.75 mc video carrier point) should always be checked (using a 25.75 mc marker) at the completion of video *if* alignment.

Sound Discriminator

Continuing our step-by-step alignment analysis[2], we now come to the discriminator of the sound section. The output of the sweep generator should be set to approximately 21.25 mc and connected into the grid of the last sound *if* tube. The vertical terminal of the 'scope, with its limiting resistor, should be connected to the junction of R_{219} and R_{220}, and the ground terminal to the TV set chassis. The AM marker generator (or internal crystal marker) should then be set to 21.25 mc. Adjustment of the primary of T_{113} (sound discriminator transformer) will materially affect the *amplitude* of the resultant *S* curve (Fig. 1). Adjustment of the secondary should be made to achieve symmetry and linearity about the 21.25 marker. Incidentally, the center marker on a discriminator *S* curve is usually difficult to discern. The center of the marker will be the relatively straight line between the two *wiggles*, as noted in Fig. 1. *Expansion* of the marker may be accomplished in the same fashion as previously noted; i.e., by reduction of the *sweep width* control of the sweep generator. If the sweep generator incorporates dual sweep width ranges, the use of the low range for FM circuit alignment will materially assist in smooth stepless adjustment of pattern width on the 'scope.

Sound IF Transformers

The sound *if* stages are next to be aligned by connecting the 'scope (using the isolating resistor) across the third *if* stage grid resistor R_{217}. The output of the sweep generator (still set to 21.25 mc) should be connected into the grid of the second sound *if* amplifier. With the marker generator (or crystal marker of the sweep generator) set to 21.25 mc, the second sound *if* output transformer can be adjusted for maximum height of pattern and symmetry about the 21.25 mc marker.

The same procedure should be repeated for the first sound *if* amplifier by connecting the output of the sweep generator to the top of the trap winding of T_2 (on the top side of the chassis), leaving the 'scope connected as previously, and adjusting the first sound *if* output transformer (T_{111}) for maximum height and symmetry about the 21.25 mc marker.

If desired the response width, at the top of the curve, can be easily checked by carefully varying the frequency of the external marker generator, and noting the frequency reading of the marker generator for pertinent positions of the marker pip on the response characteristic. In all cases, of course, where the operator possesses crystals of the proper frequency, for use in the internal crystal marker oscillator of the sweep generator, the internal crystal marker may be substituted for the external AM generator providing ultimate marking accuracy.

Local Oscillator Adjustment

The *rf* oscillator section can now be aligned. Inasmuch as the tuned circuit components of the oscillator section are in a progressive series from channel 13 downwards, the alignment must begin with channel 13 and proceed from there down to channel 2.

The oscillator alignment technique is based on several interesting factors.

The FM sound carrier in TV transmission is always 4.5 mc higher than the video carrier. For example, the video carrier of channel 4 is 67.25 mc, whereas the sound carrier of this channel is 71.75 mc.

The oscillator of the 630TS (properly aligned) at channel 4 operates (above the incoming signal) at 93 mc. The incoming sound carrier at 71.75 mc beats with the oscillator and produces the required 21.25 sound *if* signal. The video carrier at 67.25 mc, for channel 4, beats against the oscillator (93 mc) and produces the 25.75 mc video *if* signal.

Therefore, in a properly aligned set, if the swept signal from the sweep generator is set to 71.75 mc (sound carrier), and injected into the antenna terminals of the set, and the channel switch of the set is rotated to channel 4, the typical *S* discriminator pattern will be obtained centrally located on the 'scope screen, with the 'scope connected to the output of the discriminator.

Under these conditions the oscillator would be set properly to 93 mc and would automatically and simultaneously beat against the video carrier to produce the required 25.75 video *if* signal. When the local oscillator is adjusted by setting the sweep generator to the sound channel frequency, you automatically provide for correct converter output into both the 25.75

[1] July, 1949, SERVICE.

[2] RCA 630TS receiver.

Fig. 1. An *S* curve. At *a* is the discriminator response curve with a mid-frequency marker. At *b* appears the center portion of the curve and marker expanded on the 'scope screen by reducing the *sweep width* control setting on the sweep generator. At *c* we note that the central portion of the marker is not visible because of the absence of vertical amplitude at that point.

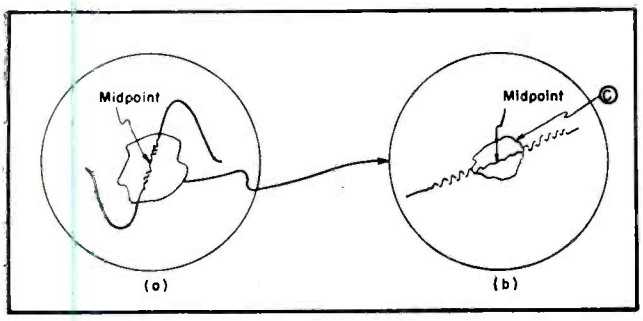
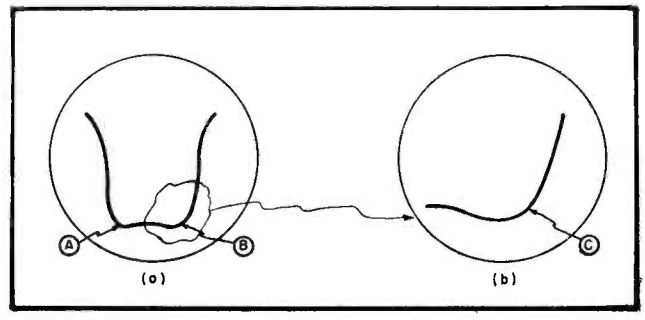


Fig. 2. At *a* is the *rf* response characteristic of channel 7, and at *b* appears the result when the sweep generator tuning dial is set to 179.75 mc with the sweep control of the sweep generator reduced. The sound channel point of the *rf* response curve will correctly locate in the center of the 'scope screen when this adjustment is made. At *A* is the picture carrier of channel 7 (175.25 mc) and at *B* is the sound carrier of this channel (179.75 mc). The sound carrier of channel 7 (179.75mc) is shown at *C*.



video *if* stages and the 21.25 mc sound *if* system.

Now, if the dial setting of the sweep generator is moved slightly away from the sound *if* carrier frequency (71.75 mc for channel 4) the discriminator *S* pattern will move off to one side of the 'scope screen. If the sweep generator dial is then moved in the opposite direction, the *S* curve will move off to the other side of the 'scope screen. These shifts of the sweep generator dial produce signals from the converter state which are higher and lower than 21.25 mc. Therefore we find that the discriminator *S* patterns, at positions other than the center of the 'scope screen (*with the 'scope beam originally centered*), indicate that the input to the antenna terminals is of incorrect frequency, or, if a signal at the *proper* sound carrier frequency is injected at the antenna and produces a discriminator pattern to the left or right end of the 'scope trace, the TV set *oscillator* is off frequency and must be adjusted to bring the *S* pattern into the *middle* of the 'scope screen.

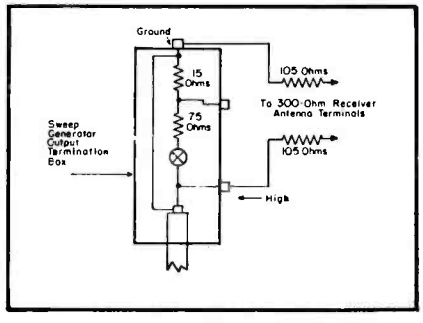
The foregoing method of oscillator adjustment for channels 13 to 2 can be applied in the following way:

The TV set channel switch should be set to *13*. Then the dial of the sweep generator should be adjusted to the sound carrier frequency for channel 13 (215.75 mc) with the *sweep range* or *deviation* control set to approximately 150 kc sweep. The sweep generator should then be connected to the antenna terminals of the TV set, and the vertical terminals of the 'scope across the discriminator load resistors. If the oscillator is properly aligned for this channel, the discriminator *S* curve will appear on the center of the 'scope horizontal trace (*fine tuning* knob of the *TV* channel switch set to approximately mid-position). If the *S* curve is off to one side of the 'scope screen, L_{77} and L_{78} must be adjusted to bring the pattern into mid-position on the 'scope. The setting of the *deviation* or *sweep width* control of the sweep generator may then be decreased, causing the *S* pattern to occupy greater space on the 'scope screen. This wider pattern allows for more accurate mid-screen setting. The same procedure is carried out for channels 12 down to 2, setting the sweep generator in each case to the proper sound carrier frequency for the channel being aligned. As a final double check of the oscillator alignment on active channels in the particular area, the antenna should be connected to the TV set and the transmitter test pattern or picture observed on each active channel.

Any departures from true channel selection due to difference between actual station frequency and signal generator output, can usually be accommodated by adjustment of the TV receiver's fine tuning control.

If an external marker generator whose *rf* range covers the actual TV channel frequencies is available, this generator may be used to provide marker pips on the 'scope trace. Under these conditions, the oscillator adjustments are made such that the discriminator *S* pattern moves into the marker pip and finally locates with the pip at at the center of the *S* pattern (Fig. 1). *Expansion* of the *S* curve, as previously described, will assist in more clearly defining the *pip*.

Fig. 3. How to connect a sweep-generator output termination box to the input of a 300-ohm television receiver.



RF and Converter Alignment

The last operation consists of alignment of the *rf* and converter circuits. The type of response curves to be obtained are illustrated in Fig. 2. *A* indicates the picture carrier and *B* the sound carrier frequencies. For optimum results the *rf* and converter slugs must be adjusted so that the response curve humps fall closely into the respective *rf* and sound carrier frequencies on all channels.

The sweep generator is coupled to the antenna terminal of the set through the impedance matching network illustrated in Fig. 3. The vertical terminals of the 'scope are connected to the junction of L_{80} and R_{8}, using a carbon isolating resistor (value 25,000 to 250,000 ohms). The *if* bias is set to approximately –1 volt, and the grid of the first video *if* tube is bypassed to ground using a .001-mfd mica capacitor.

The response or bandwidth of channel *7* is the narrowest of the high frequency channels. If this channel is aligned *first*, the response of channels *8* to *13* are broad enough to require only a visual double-check.

The channel switch is therefore set to *7*, the *sweep width* control of the sweep generator set to maximum and the sensitivity of the 'scope is adjusted to give a pattern of satisfactory height. If a high-frequency marker generator (or proper crystals) is available, markers at 175.25 and 179.75 mc are then inserted and L_{25}, L_{26}, L_{61} and L_{62} are adjusted to provide a response pattern similar to that shown in Fig. 2. The response curve shapes of channels *8 to 13* are checked to insure that the picture and sound carrier humps are close to their proper points. It

(*Continued on page 27*)

RHOMBIC TV ANTENNA Installation*

Rhombic Lengths . . . Tilt Angle Adjustments . . . Matching.

by IRA KAMEN

Manager, Antenaplex and TV Dept.
Commercial Radio Sound Corp.

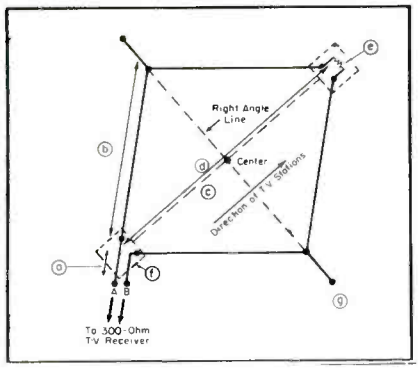


Fig. 1. Typical rhombic antenna layout for unidirectional reception; *a*, 500-ohm quarter-wavelength matching section; *b*, five wavelengths at lowest frequency TV channel; *c*, five wavelengths less approximately half wavelength to center; *d*, nine wavelengths; *e*, 800-ohm load at TV channels, in water-tight box; *f*, water-tight box for transmission-line termination; *g*, insulated supports, minimum of 10′ from ground.

Fig. 2. Diagram illustrating the adjustment values required in providing the correct tilt angle to a rhomboid.

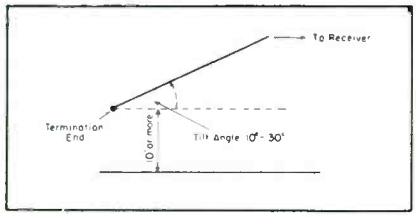
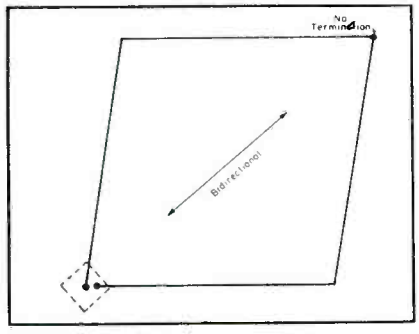


Fig. 3. A bidirectional rhombic antenna layout where the 800-ohm termination is omitted.



*From the Ira Kamen-Lewis Winner book *TV-FM Antenna Installation.*

IN PLANNING a TV antenna installation in fringe areas, when a hill is available, with a relatively flat top, which can be considered to replace a tower structure, it is possible to install an antenna known as a *rhombic*. This type antenna has high gain and directive characteristics in the TV bands.

Rhombic Lengths

To realize the best results with this form of antenna the legs of the rhombic should be made at least three to five wavelengths long at channel *two* or *three* depending on which is the lowest frequency channel in the area.

The greater the number of wavelengths the greater is the efficiency of the array. Obviously a rhombic antenna adjusted for three wavelengths at a low-frequency channel will have a greater number of wavelengths on the higher TV channels, and therefore it may be said that fundamentally a rhombic possesses a broadband characteristic. The rhombic shown in Fig. 1 was found to be several times more sensitive at channel *11* than at channel *2*, which compensated for the increased loss of the receiver-transmission line at the high-frequency channel.

Terminal Impedance

Unfortunately the rhombic has an impedance of 800 ohms at its terminal and can only be matched to 300-ohm twisted or ribbon-type transmission line through a matching section which can be calculated as follows:

Impedance (Z) of matching section

$$= \sqrt{800 \times 300} = \sqrt{240{,}000}$$
$$= 489 \text{ ohms.}$$

Remote Relay Setup

Commercially, a 500-ohm quarter wavelength of line can be employed as a matching section. However, this matching section can only be adjusted in length for one TV channel, or for one TV band where a compromise can be accepted. A remote relay arrangement can be made to insert different lengths of 500-ohm matching stubs between the antenna terminals and the 300-ohm transmission line, when it is necessary to realize all of the power available from the antenna due to local signal-to-noise conditions.

Tilt-Angle Adjustment

In adjusting the rhomboid, the tilt angle of the rhomboid with respect to ground is important in determining the best signal-to-noise ratio available from the installation. The tilt-angle adjustment is usually between 10° and 30° depending on the terrain and the number of wavelengths in each leg of the rhomboid. The vertical pickup angle may be adjusted to a point where reflections which are caused by flying objects such as planes, balloons, etc., can be eliminated. This adjustment is very critical and requires control by two men, with one varying the height of that end of the rhomboid which feeds the receiver, a few degrees at a time.

Bidirectional Rhombic

When a rhombic antenna is erected in a rural area between two metropolitan cities it can accept transmissions from either direction if the 800-ohm resistor as shown in Fig. 1, is removed from the far end of the rhombic antenna. In Fig. 3 we see

(*Continued on page* 25)

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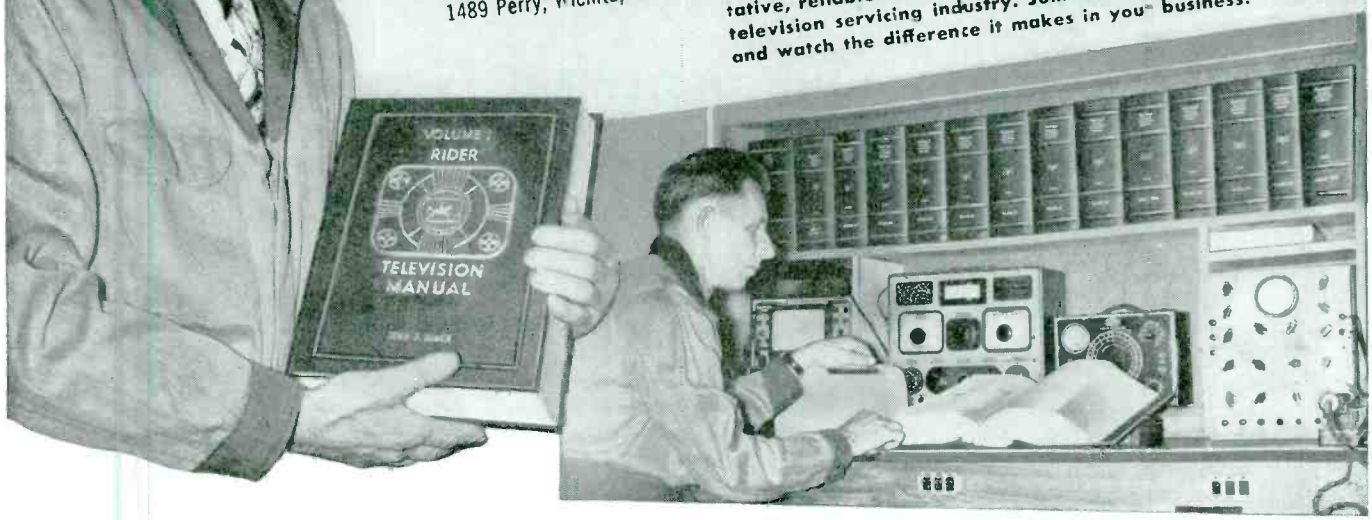

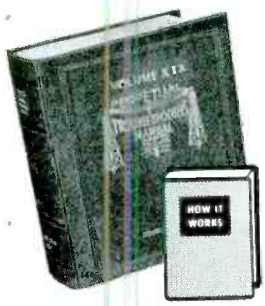

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PHONO installation and service

Circuit Features of RCA Magic Monitor and Bendix Hush-O-Matic Systems . . . Operation of Two-Arm Standard-Long Playing Setup in Philco Models . . . Three-Way Player-Converter Characteristics.

by KENNETH STEWART

MANY INTERESTING phono arrangements have been included in recently-announced receivers. In the RCA 8V112 receivers, for instance, a magic monitor circuit is used (Fig. 1), with a 6AV6 serving as an *mm* amplifier and a 6BA6 as a *mm* reactor.

This circuit acts a capacity shunt across the audio input to the balance control when the selector switch is turned to *mm* position. This shunt is not effective when the developed grid voltage applied to the grid of the 6BA6 is high enough to cause plate current cutoff.

The phono signal input is applied to the grid of the 6AV6, amplified and fed through a resistance-capacity network to the diode plates of the tube, which rectifies it and produces a grid voltage on the 6BA6 in proportion to the level of the high frequencies contained in the audio signal.

To check the operation of the system, a .04-volt 400-cycle signal should first be fed from a low-impedance source into the phono jack. Then the volume control should be adjusted for maximum output with the selector switch in *phono* position. The switch should next be set to *mm*. The output level should decrease to approximately one half.

There are three additional steps to be followed to check output level. In the first, the procedure just described is repeated. However a 2-volt signal is used. The output level should decrease only slightly when the selector switch is turned to *mm* position. In the next step, a 3,000-cycle signal is used, and the output level should *not* decrease when the selector switch is turned to the *mm* position. And in the final check a .04-volt signal is used, providing a decrease of one-fourth in the output level when the selector switch is turned to the *mm* position.

In Fig. 2 appears another unqiue phono circuit, the *Hush-O-Matic,* featured in the Bendix 1524 and 1525 models.

In the phono-input circuits of these models, two additional miniature tubes are incorporated into a dynamic noise-suppressor circuit designed to reduce to a minimum all noise originating from needle scratch or from old and worn records. This circuit functions only on phonograph operation and is completely out of the radio circuit.

The advent of the slow-speed techniques requiring lightweight pickups has prompted the development of special types of arms and cartridges for various receivers. In the Philco automatic record changer and record-player combination, model M-12C, a ⅓ ounce pickup is used.*

The record changer has two speeds, controlled by a play-control button, with positions *st'd play,* and *long play.* When the play control is set to *st'd play,* an idler wheel on the motor engages the motor shaft directly, driving the turntable at a speed of 78 rpm. When the play control is set to *long play,* a selector link, one end of which is attached to the base of the control under the changer, actuates a selector lever mounted on the changer base

Fig. 1. Circuit of RCA chassis BC-616 (model 8V112) featuring the magic monitor phono system.

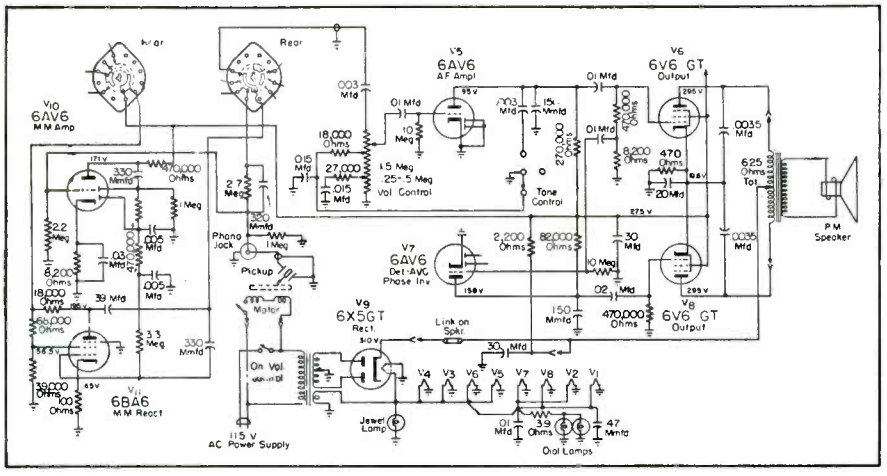
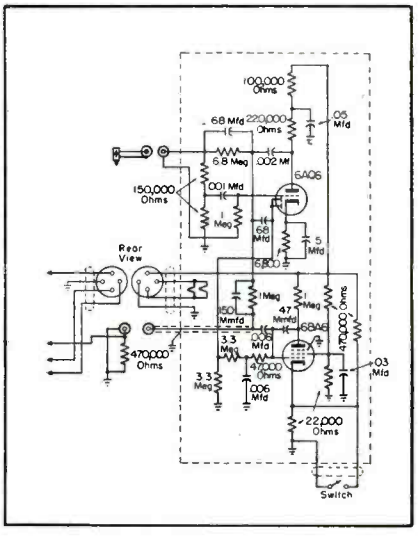


Fig. 2. The Hush-O-Matic circuit used in Bendix models 1524 and 1525.



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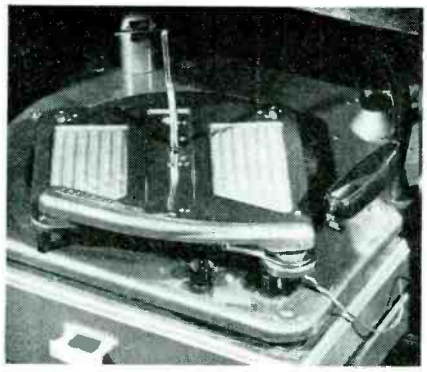
place. This selector lever engages a shift lever mounted on the motor. A large pulley on the shift lever is connected to the motor shaft by means of a small rubber belt. The idler wheel engages this large pulley, driving the turntable at a speed of 33⅓ rpm. The play control also actuates a single-pole, double-throw switch, which is mounted on the base plate under the turntable. The output leads of the two tone arms are connected to this switch. When the play control is set to the *long play* position, the switch cuts off the output of the changer tone arm, and closes the circuit for the long-play tone arm. The reverse of this action takes place when the play control is set to the *st'd* play position.

Retractable Gears

The changer mechanism of the record changer is brought into action when a small retractable gear segment, mounted on the cam gear, is released, and engages the hub gear of the turntable shaft, causing the cam gear to be driven. While a record is playing, the retractable gear segment is held in the retracted position by the trip-plate ear; the segment is released either manually, by pushing an *off-man-aut-rej* control to *rej,* or automatically, when the changer tone arm follows the finish groove of a record; automatic tripping is initiated by a trip arm, which is attached to the tone-arm shaft, and which rides over the trip-plate ratchet screw, causing the cam-gear segment to be released.

Link Assemblies

The tone arm of the record changer is operated by two link assemblies attached to actuator levers, which are in contact with the cam surface of the cam gear. When the cam gear starts, the lower actuator lever is pushed outward first, and the short link assembly attached to it raises the tone arm off the record. (The same action also raises the long-play tone arm, at the end of a record, by means of a long link assembly, which is also attached to the lower actuator lever.) As the cam gear continues to turn,



A 3-speed phono converter.
(Courtesy Carbonneau)

the upper actuator lever is pushed outward, and its link assembly pulls the tone arm out against the rest post; at this instant, a roller on the cam gear makes contact with the push-off actuator (which is connected to the record-shelf assembly through a series of push-off bars), and operates the record-dropping mechanism.

Long-Playing Converters

The increased interest in long-playing phono systems has also prompted the development of many interesting converter devices. In one such system[1] three-speed operation is provided.

To operate, the unit is slipped over the spindle of the phono and allowed to rest on the turntable. Near the center of the converter are two off-center holes. When the hole nearest the center is slipped over the spindle, 45 rpm records can be played. By lifting the converter and slipping the other hole over the spindle, the phono is ready to play 33⅓ rpm records. Standard 78 rpm records can be played as usual, when the converter unit is removed.

Speed Ratio Control

Changes in the speed ratio of the converter are accomplished by the special design and arrangement of two tiny drive wheels. The wheels are aligned on a very thin drive shaft running underneath the die-cut base. There is a bearing in the center and at either end of the shaft. The lower wheel travels on an aluminum driving disk placed on the 78 rpm turntable. The wheel on the other end of the shaft is raised to a higher level and travels on the underside of the slow-speed record, rotating it at either 45 or 33⅓ rpm. Speeds are said to be maintained within ½ rpm.

Each wheel is made up of three parts. The rubber center, which travels on the turntable and on the record, is especially resistant to wear. The two metal hubs are machined to tolerances within one ten thousandth of an inch. The design of these metal hubs is such that it is said to prevent the development of flutter or wow.

Three-speed single-arm record changer.
(Courtesy Comet Corp.)

Vibration Supports

Vibration is also said to be further eliminated by a dual equilateral triangular support of the base. Metal peg-type legs are encased in rubber tubing. The user merely exerts a slight pressure on these legs to adjust the converter to the proper height on the turntable.

Each converter is equipped with a simple universal connector which can be plugged into the phono jack on a radio combination, or clipped into the crystal cartridge inside the pickup. An extension is provided which makes it possible to bring the jack up into the record-playing chamber for easy accessibility.

Push-Off Plunger System

Another type of record changer[2] which will automatically play up to twelve 10" records or ten 12" records at speeds of 78 rpm and 33⅓ rpm, and up to twelve 7" records at speeds of 33⅓ or 78 rpm without a 1½" diameter spindle, has also been developed. Using the 1½" turntable spindle, twelve 7" records can be played at a speed of 45 rpm with the original record, 1½" center holes. The records are supported both at the spindle and at the ejector box. They are shuttled on to the turntable by means of a wide push-off plunger. The double support of the records and the utilization of a shuttling pressure against the edge, are said to minimize wear and tear on the records, particularly at the center hole.

Aluminum Pickup Arm

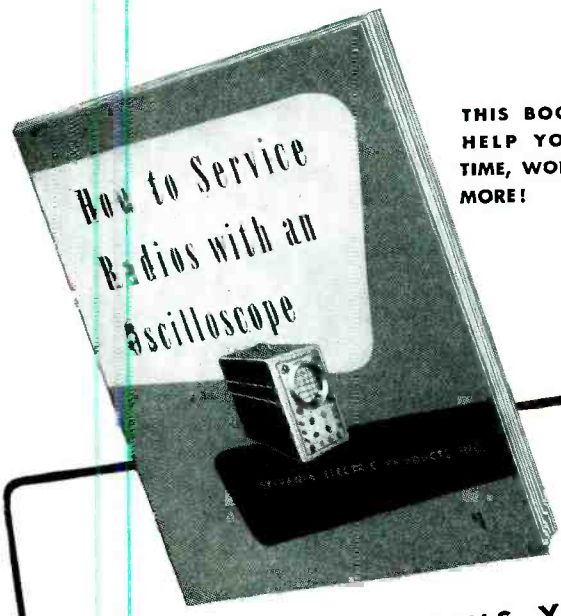
One pick-up arm plays all the sizes of records. This arm is entirely constructed of aluminum. By means of a specially designed step-down lock, the arm set-down is held firmly until the stylus meets the record. Standard on the changer is a crystal cartridge with a double tipped needle of osmium. The arm plays all types of records at approximately six to eight grams pressure.

The turntable actuating mechanism is a patented spiral that is said to do away with any gears or belts, and also assures long, trouble-free service; a specially designed clutch prevents jamming or throwing of the unit out of cycle.

*Based on copyrighted information prepared by Philco.

[1]Carbonneau Playsall (Carbonneau Industries, Inc., Grand Rapids, Mich.

[2]Comet Corp., 540 Lake Shore Drive, Chicago 11, Ill.



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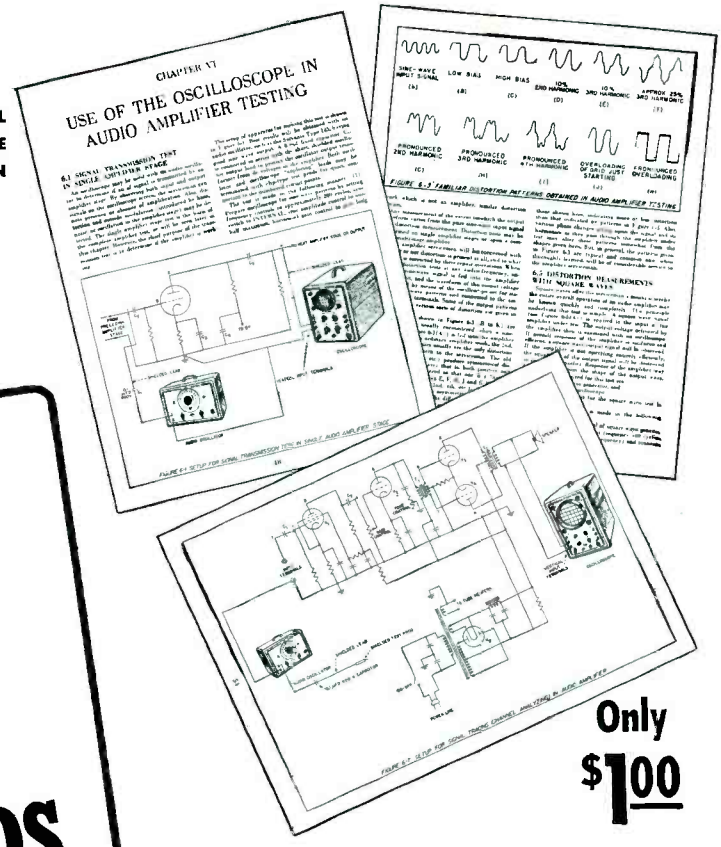

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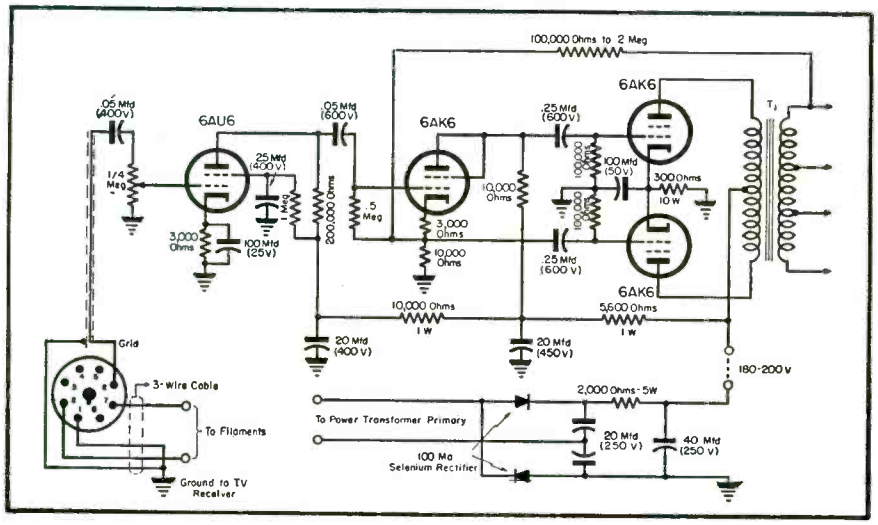
Fig. 1. Circuit of amplifier which can be adapted to television receivers to provide high-fidelity reproduction.



by IRVING GREENE
Sound-TV Manager
Sun Radio and Electronics Co., Inc.

TV HI-FI Audio Installations

Installing a Hi-Fi Amplifier in a TV Receiver.

ADAPTING a *hi-fi* amplifier[1] to a TV set is not too involved, but for maximum efficiency it is best to follow a sequence of installation.

First, the receiver audio portion should be made inoperative as an audio stage, but left in the circuit. The audio stage must not be disconnected as it may affect some other portion of the circuit. To render the receiver audio stage inoperative without any effect on the remainder of the circuit, the following wiring steps should be followed:

(*a*) The voice coil leads from the speaker should be disconnected and a 2 or 5-watt resistor of 10 to 50 ohms substituted across the voice coil leads from the output transformer in the receiver circuit. The speaker may be removed from the chassis or left there; it is of no consequence.

(*b*) The lead from the center arm of the volume control to the grid of the first audio tube in the receiver circuit should be disconnected; this wire may be taped or removed from the circuit after disconnecting from the grid of the first audio tube. In some circuits there is a capacitor between the center arm of the control and the grid of the first audio tube. It is then necessary to remove the capacitor.

(*c*) A shielded wire should be connected from the center arm of the volume control to an unsued pin of the output tube socket, pin *6* of a 6V6, 6K6 or 6F6 socket, making sure to connect shield to circuit or chassis ground, whichever is used in the circuit.

(*d*) Connection of the audio chassis to the receiver is provided via an octal adaptor socket.[2] If a 6V6 is the output tube, it should be connected as follows: Using socket and base of the adaptor, the adaptor should be wired from the socket to base to provide all connections for the 6V6; *3* to *3*, *4* to *4*, *5* to *5* and *8* to *8*. Then a 3-wire cable that is color coded is connected to pins *2* and *7* of the adaptor base, at the same time connecting to pins *2* and *7* of the adaptor socket. The third wire is connected to pin *1* which should also be connected on the receiver chassis to ground. Using a shielded wire the signal wire is connected to pin *6* of the adaptor base; do not connect to the adaptor socket. If another output tube is used, connections should be changed accordingly to conform with the circuit. In the event the output tube is not used for any other purpose in the circuit other than its function as an audio output tube, then the tube may be removed and an octal plug[3] used, following the same procedure.

This method of connection is desirable, inasmuch as it presents no complicated tangle of cables and wires. It is neat and simple in appearance. As it is most convenient to control the volume at the receiver, the limiting control on the audio chassis may be set by turning the receiver control to 75% maximum and then adjusting the limiting control on the audio chassis to maximum desired. This limiting control can be left alone once it is set.

The amplifier (Fig. 1) is a conventional push-pull pentode output, using an output transformer of rather good quality. The frequency response of the output transformer used should be at least 50-10,000 cps and fairly flat. Bass quality can be varied to suit the ear by the amount of feedback used in the circuit. Although the recommended value of the feedback resistor is 100,000 ohms, the builder may change this value by experimentation until desirable results are obtained. It will be noted that feedback is taken from the transformer secondary. It would be wise to check and be sure that the power transformer filament winding can handle the extra current drain of the tubes in the audio chassis. In the event it cannot, a filament transformer may have to be added to the circuit. Of course, if the Service Man feels that he would rather use a com-

(*Continued on page 28*)

[1]Originally described in June, 1948, SERVICE.
[2]Amphenol, 44-8 or 50-8SG.
[3]Amphenol 86PM8.

TV Receiver Production Changes

Removal of Audio Hum . . . Sync Amplitude Increase . . . Remedy for Gassy Tubes . . . Eliminating 120-Cycle Modulation in Westinghouse TV Receivers. Adding Noise Filters to Admiral 19A1 Models. Increasing Audio Output on Admiral 30 Series for Fringe Area Operation.

by DONALD PHILLIPS

Westinghouse H-196[1]

Removal of Audio Hum: A 30-mfd electrolytic (C_{140}) has been inserted between the screen of the 6AQ5 sound output tube and ground to remove audio hum.

Sync Amplitude Increase: The 12AU7 horizontal and vertical sync amplifier tube has been replaced by a 12AT7 to increase the sync amplitude. This is a direct replacement and no wiring changes are required.

Gassy Tubes: The 5Z4 *lv* rectifier tube has been replaced by a 5V4G to eliminate trouble due to gassy tubes. This is also a direct replacement with no wiring changes required.

In another change, R_{101} (330,000 ohms), which is connected between the sound *avc* line and ground, has been replaced by R_{151} (680,000-ohms).

120 Cycle Modulation: The sawtooth voltage fed to the 6AT6 *agc* amplifier has been taken from a different point to eliminate 120 cycle modulation of the picture. This change necessitates the removal of R_{82} and the addition of R_{150} (560 ohms), as shown in Fig. 1.

C_{140} (47 mmfd) has been inserted between control grid and cathode of the 6AQ5 sound output tube, and C_{141} (470 mmfd) inserted across the grid resistor of the same tube. These capacitors serve to bypass *rf* from the grid of the tube. The connections for this change appear in Fig. 2.

Schematic Error: The screen voltage dropping resistor (R_{15}) in the 6BH6 input *if* amplifier was incorrectly connected in the schematic. The bottom of R_{15} should connect to the bottom of R_{22} rather than to the top of R_{22}.

Minimizing Horizontal Oscillator Drift in Westinghouse H-196, H-207

Difficulty due to drifting of the horizontal oscillator has been traced to certain capacitors in the horizontal oscillator tank and discriminator secondary circuits; C_{85} and C_{94} in the V-2130 chassis, C_{428} and C_{429} in the V-2130-1 chassis, and C_{426} and C_{427} in the V-2146-1 chassis. If the set goes out of horizontal sync after it warms up, or if the discriminator was adjusted when the set was warm and the set will not stay in sync during the warm-up period, these capacitors should be checked.

Eliminating Picture Foldover in Westinghouse H-196, H-207, and H-217

Foldover of the picture can be caused by failure of C_{54} or C_{58} in H-196 and H-207 or the equivalent capacitors (C_{407} and C_{406}) in H-217.

If C_{54} (H-196) or C_{407} (H-217) in the plate circuit of the 6AQ5 horizontal ocillator is leaky, or shorted, the differentiating action will be lost, and the horizontal discharge tube will be triggered by a broad pulse rather than by a sharp spike. A fold-over on the picture will result.

If C_{53} (H-196) or C_{406} (H-217) across the horizontal deflection coil is defective, a decrease in picture width

(*Continued on page 24*)

[1]See circuit in April, 1949, SERVICE.

Fig. 1. Revised sweep circuit of Westinghouse H-196 TV receiver. The dotted lines indicate the old connections and the heavy lines the new arrangement.

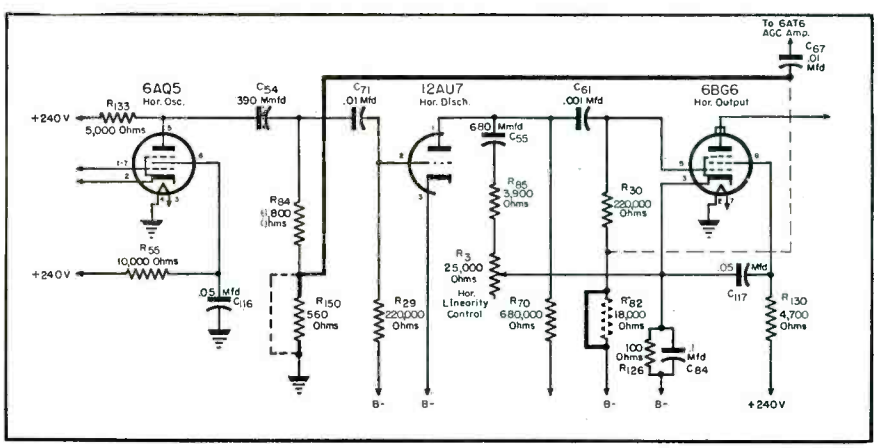


Fig. 2. The revamped sound output circuit of the Westinghouse television receiver, the heavy lines indicating the new components inserted.

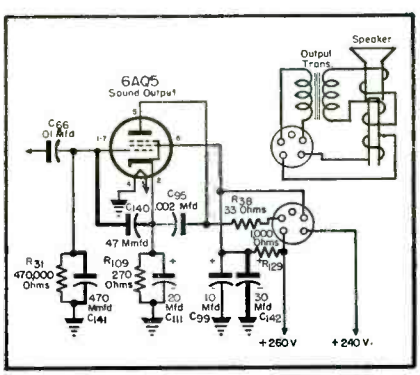


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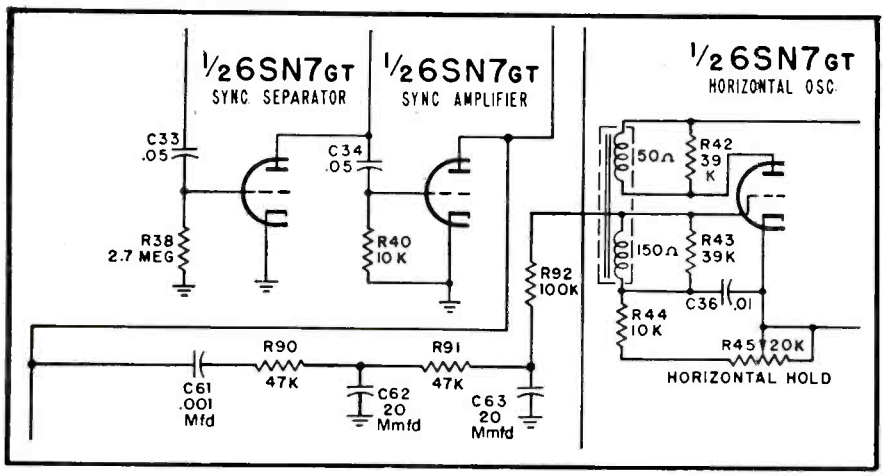
Fig. 3. Revised horizontal sync filter circuit of the Admiral 19A1 chassis, featuring a noise filter between the sync amplifier and the horizontal oscillator.



TV Receiver Changes

(*Continued from page 22*)

in addition to picture fold-over will occur.

Admiral 19A1

OFTEN, in low signal-strength areas where the noise level is high, the vertical lines in the picture will appear jagged or broken because the *hf* noise signals are entering the horizontal oscillator. In the Admiral 19A1 chassis, this condition can be corrected by insertion of a noise filter between the sync amplifier and horizontal oscillator.

The circuit changes are shown in Fig. 3. All parts, with the exception of C_{61}, must be mounted on a tie strip. The tie-strip can best be mounted under the chassis between the vertical oscillator transformer and third *if* amplifier. The lead dress and placement of a few small parts will have to be altered slightly to permit mounting the tie-strip. C_{61} should be connected between terminal 2 of V_{12} and the tie-strip. The leads from C_{61} should be dressed to avoid shorts.

When this circuit modification is incorporated, adjustment of the horizontal hold control becomes critical. This adjustment must be carefully made and checked on all channels currently in use. However, once set, readjustment will be seldom necessary.

Increasing Audio Output on Admiral 30 TV Chassis

THE AUDIO output on the Admiral *30A, B, C* and *D* series TV chassis can be increased for fringe area operation, by making six alterations in the circuit:

(1) The 150,000-ohm resistor, R_{220}, must be removed first on the 4H1 tuner chassis.

(2) Then the values of the R_{218} and R_{220} ratio detector 15,000-ohm load resistors should be increased to 27,000 ohms.

(3) Next, the 6AG5 *rf* amplifier grid return should be removed from the center arm of the R_{306A} contrast control and connected to the junction of R_{305} and R_{307}. This will fix the grid bias on the 6AG5 *rf* amplifier tube at about 1.25 volts, resulting in more *rf* gain. However, if the receiver is located in an area where strong signals are to be received as well as weak signals, this change may cause the contrast control to function improperly on strong signals. If this happens the bias must be fixed at a higher negative voltage by reversing the grid return from the video *if* and the 6AG5

rf amplifier, by changing the *if* grid return from the junction of R_{304} and R_{305} to the movable arm of the contrast control. The *rf* grid return of the 6AG5 *rf* amplifier should then be changed from the contrast control arm to the junction of R_{304} and R_{305}.

(4) The ratio detector transformer will then have to be realigned.

(5) It will then be necessary to check the 6AU6's in the audio *if*; be sure these are good tubes.

(6) Finally the 6KGT audio output tubes (V_{512} and V_{513}) should be changed to 6V6GT types. No circuit change will be needed here.

These changes will improve audio sensitivity and output, but it is recommended only on receivers where the complaint is low volume on TV in fringe-area operation. It must be remembered that in some areas the TV transmitter is only deviating its audio transmission 7 to 10 kc instead of the allowable 25 kc, which will result in low audio volume at the receiver.

If the station is found to be the cause of low TV audio, these changes will improve output but may not produce more than room volume.

•

Rhombic TV Antennas

(Continued from page 14)

a bidirectional rhombic with the 800-ohm termination resistor removed.

Single Wire Matching Difficulties

The rhombic antenna is about the only practical long-wire antenna unit. Single wire antennas which are ten-to twenty wavelengths may pick up adequate signals, but when they are transformed from their single-ended high impedance to the balanced 300-ohm commercial input of a TV receiver, so much signal is lost in the step down and cross-over network that the value of a single long-wire an tenna system in TV installations is questionable.

The Rhombic's Place

It is thus obvious that the rhombics are quite practical for specific types of TV receiving, but the long-wire antenna systems are limited to commercial communications applications which employ, in the main, AM receivers with high impedance inputs.

TV Receiver Servicing

(*Continued from page* 11)

bench. The major chassis must be strategically located so that all the units may be connected together with the supplied cabling. In this manner, any one of the chassis may be tested.

For example, if a bad chassis comes in from the field, it may be substituted in the set up for an operating chassis and serviced. Any other receiver using several chassis can be handled in the same manner.

Diagnosing Troubles

To establish a procedure for rapidly locating troubles, the Service Man should be able to take the schematic of a television set and break it down into sections. (The section would consist of a stage or stages where certain types of trouble might prevail.)

Let us see how this might work out in practice and study a detailed block diagram of a Du Mont model, RA-105; Fig. 2. This receiver is constructed on two chassis: the main receiver chassis, and the power supply chassis. All stages of both chassis are shown on the detailed block diagram.

The block diagram breaks the receiver down into eleven sections:

(1) Picture and Sound Section: This section includes the front end[1] of this receiver as well as V_{201} identified as the first video *if*; V_{201} handles the 21.9 mc sound *if* signals, as well as the video *if*. Thus, if there is no picture and no sound then this section would require immediate inspection.

(2) Sound IF Section: This section includes the stages up to and including the sound discriminator. Since this receiver uses a tuning indicator, this indicator can be used as a help in isolating trouble. Thus, if the picture is normal but no sound output is present and the tuning indicator does not function as the channel is tunned, then the trouble would be in this section. However, if the receiver did not include a tuning indicator, then it would not be immediately possible to determine if the trouble were in the sound *if* stages or in the *audio amplifier*. However, if the receiver included a record player a quick check could be made of the audio amplifier and thus eliminate that as a possible source of trouble.

(3) Audio Section: The audio section includes those stages after the sound discriminator and no trouble should be experienced in determining

[1] Inputuner.

whether or not the amplifier is functioning properly.

(4) Picture and Sync Section: This stage is so identified because a tube going bad in this section, will not only affect the picture, but the sync signal too, in one way or another. It will be noted that the point in the circuit where the sync is taken off is in the plate circuit of the first *video amplifier,* and from here it is fed to the sync clipper stage where the composite sync is removed and then applied to the sync circuits to perform the synchronization function.

[To Be Continued]

•

Visual TV Alignment

(*Continued from page* 13)

may be noticed that as the high-frequency channels are checked, the response width becomes so broad that only the top portion of the curve becomes visible on the 'scope. As long as the trace is recognized by the operator, no difficulties should result, inasmuch as it is only the top portion which is of interest in the alignment procedure.

If a high-frequency marker generator is not available the following method can provide a satisfactory wave shape check:

With the wave shape in full view on the 'scope screen, the setting of the sweep generator *sweep range* control, should be slowly reduced and the sweep generator main tuning dial adjusted until only that portion of the response curve indicated in Fig. 2 appears centrally located on the 'scope. The sweep generator tuning dial calibration at this setting is then indicative of the frequency of this response curve sector. The same procedure can be used to check the frequency of the other *hump* of the response curve characteristic.

The bandwidth of channels *6* to *2* are next checked by setting the sweep generator to approximately 85 mc, checking channel *6* for conformance with the proper configuration. If required, L_{11}, L_{12}, L_{37} and L_{38} can be adjusted for proper alignment. The response characteristics of channels *5* down to *2* should then be examined and L_{11}, L_{12}, L_{37} and L_{38} slightly readjusted if considered necessary in order to arrive at a satisfactory alignment compromise for channels *6* to *2*.

[To Be Continued]

TV HI-FI Audio

(*Continued from page 20*)

mercial amplifier, there are many ten-watt units on the market that would serve very well, although they will not be as compact as the model described.

Regardless of which avenue the Service Man decides to take, by adapting his services to provide high fidelity components and making available to his customers the *know how* of fabricating high-fidelity systems, he will find a new and pleasant source of revenue and future business.

•

WILLIAM DUBILIER HONORED

Professor Gaston E. Varlan (left), president of the Association des Ingenieurs Docteurs de France, congratulating Dr. Boris Preget, atomic scientist, and William Dubilier, technical director and founder of Cornell-Dubilier Electric Corp., during an award ceremony at the French Embassy in N. Y. Dubilier was the recipient of two of the highest honors of France in recognition of his recent service to that country and also of his activities during World War I; the Honorary Medal of the Association des Ingenieurs - Docteurs de France, and the Diploma of the Officer of the Academy and the Order of Academic Palms by decree of the French government. (*Acme*)

GOLDHAMER RECEIVES RADIART PLAQUE

L. K. Wildberg (right), president of Radiart, presenting the first plaque award to Joe Goldhamer, president of Goldhamer's, Inc., radio and electronic jobbers of Cleveland. Witnessing the presentation, left to right, are Neal Bear, Radiart rep; Goldhamer; Wildberg; and Milton S. Roth, jobber sales manager of Radiart. Plaque awards are being made to jobbers who have earned them by reason of their length of service with Radiart. To be eligible for award, jobbers must have been affiliated with Radiart for a minimum of five years, and for each five years of service, a gold star is affixed to the plaque. The Goldhamer plaque bears three gold stars.

New TV Parts . . . Accessories

GRAYHILL TWIN LINE CONNECTORS

A twin line connector for television receivers and accessories has been announced by Grayhill, 1 N. Pulaski Road, Chicago, Ill.

By means of the connector, it is suggested, different lead length combinations which might be required for varying conditions of operation may be hooked into the TV circuit.

The impedance within the connector, according to the manufacturer, has been matched to that of the 300-ohm twin-line wire. This has been done by spreading the pin connectors apart sufficiently to compensate for the larger diameter of the sockets and pins used with this wire.

Installation is said to be simple. Both halves of the connector are exactly the same; each has a protruding pin and one socket. The pin of one half matches the socket of the other half. To attach the wire, the screw holding together the two sections of a molded phenolic housing is removed and the wires are inserted into the pin connectors.

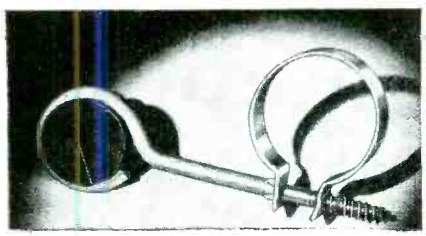
Further information and prices may be obtained from Bernard Doran.

* * *

TACO ANTENNA MAST CLAMP

An antenna mast clamp, the *Jiffy-Clamp,* featuring a special thread on the standoff that requires no nut, and no aligning time to start it, has been announced by Technical Appliance Corp., Sherburne, N. Y. Will grip mast or pipe from 1" to $1\frac{5}{16}$" diameter.

May also be used as a wall standoff by unscrewing the clamping band and using the standoff alone.



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JERROLD MUL-TV ANTENNA SYSTEM

A *Mul-TV Antenna System* has been announced by Jerrold Electronics Corp., 121 North Broad St., Philadelphia 7, Penna.

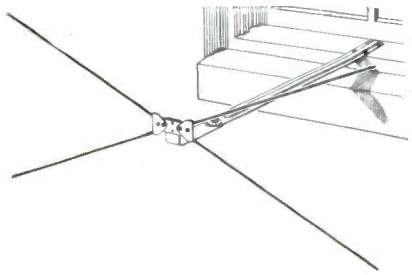
Only one antenna array is said to be necessary for use with the system; all receivers are fed from one RG-59U coaxial cable. An antenna distribution outlet box, designed to be mounted on the wall or baseboard, is required for every apartment, and will handle two receivers. Each outlet box is self-powered with an *ac*-operated selenium rectifier power supply.

Each amplifier uses six tubes for each channel in an *rf* amplifier circuit. Unit is said to have a minimum gain of over 40 db across the bandwidth of each channel. Has a separate gain control for each channel.

TELREX WINDOW MOUNTING TV ANTENNA

A conical type antenna, the *Superex* type, for window mounting has been announced by Telrex, Inc., Asbury Park, New Jersey. Can be oriented through an 180° arc for proper pickup. Can be stacked at the window. Center impedance is said to be constant at 150 ohms.

Constructed of stainless steel elements.



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ELECTRO ENGINEERING TV DISTRIBUTION SYSTEM

A TV distribution system, TVD-8, permitting the use of from one to eight sets from each unit, has been announced by Electro Engineering and Mfg. Co., 627 W. Alexandrine, Detroit 1, Michigan.

Units use eight 6J6s in a circuit arranged to provide balanced 300-ohm input and output facilities.

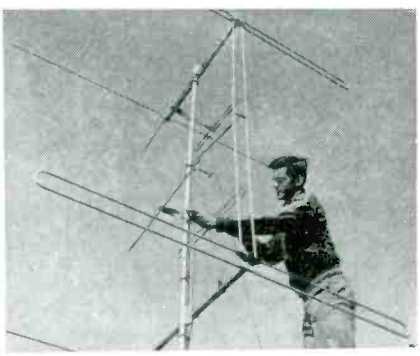
* * *

WARD TV ANTENNAS

A pre-assembled TV antenna, model TVS-47, which consists of a combination of low band stacked folded dipoles and reflectors and high band stacked folded dipoles and reflectors, has been announced by The Ward Products Corp., a division of the Gabriel Co., 1523 E. 45th St., Cleveland 3, O.

High bank section can be oriented independently of low band section. Has ½-wave bay spacing with phasing link designed to provide for maximum gain on entire band.

TVS-47 employs Perma-tube, a non-corroding steel tubing, especially developed for Ward by the Jones and Laughlin Steel Corporation. Perma-tube is said to offer resistance to corrosive atmospheric conditions such as ice, sleet, snow, fog, and high wind blasts.



Vertical mast and cross-arms of antenna of *Perma-tube* (electricweld steel tubing coated with a plastic type rust-resisting finish) developed by Jones & Laughlin Steel Corp.

New Parts, Accessories

PERMOFLUX HI-FIDELITY SPEAKERS

Hi-fidelity speakers, in 6" to 15" sizes and 12½" and 15½" in a Coronet line have been announced by Permoflux Corp., 4900 West Grand Avenue, Chicago, Ill. Diaphragm material and contour are said to produce distortion free radiation transition through an extended frequency range.

Physical strength and fatigue resistance of the diaphragm flexing are said to have been increased 5 to 10 fold. A newly developed edge damping compound formula is said to permit a low frequency range not otherwise practical.

* * *

HYTRON TUBE FILTER

A *tube lifter*, has been announced by the Hytron Radio and Electronics Corp., Salem, Mass. This tool, the second handy shop item produced as a result of the recent tool contest, is made of stainless steel with rolled edges and can be used to lift tubes, vibrators, plugs and knobs.

Has a slotted 45° angle end which reaches tubes from rear of cabinet. Slot fits around one pin of lock-in applying leverage near center of metal base.

* * *

UNIVERSITY COAXIAL SPEAKER

A lightweight, coaxial speaker, model 6201, with a built-in cobra shaped tweeter for high frequency which is installed coaxially with the cone has been developed by University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y. Tweeter is driven unit type and operates through the pole piece of the woofer magnet. An *LC* dividing network is incorporated.

Response is said to be 50-15,000 cycles; input impedance, 6-10 ohms; power, 20 watts; dimensions, 12" x 7¾"; weight, 5 pounds.

SYLVANIA VACUUM TUBE VOLTMETER

A vacuum-tube voltmeter, *Polymeter* 221, for servicing TV and high fidelity audio circuits as well as measurement of a wide range of voltage, current and resistance values in standard broadcast receivers, has been announced by the Radio Division of Sylvania Electric Products Inc., 500 Fifth Avenue, New York 18, New York.

The *vtvm* is said to provide an essentially flat response in voltage measurements at frequencies ranging from 20 cycles to 300 mc and useful measurement at frequencies between 300 and 500 mc.

The high *rf* frequency range is due, in part, to the use of a subminiature tube contained in the *rf* probe which provides a combination of high input impedance and low input capacitance.

Six scales provide ranges for *dc* measurements from 0-3 to 0-1000 volts and these ranges may be multiplied by a factor of 10 by means of an inexpensive 10 kv accessory probe. *AC* voltage measurement of 0-3 to 0-1000 volts is also accomplished through the use of six scales. Five *rf* ranges permit measurements of 0-3 to 0-300 volts.

* * *

TRIPLETT TV-FM SWEEP GENERATOR

A TV-FM sweep generator, model 3434, with two built-markers, has been announced by The Triplett Electrical Instrument Co., Bluffton, O.

Continuous ranges to 240 mc. Continuous tuning is provided over all TV and FM bands. Sweep width is 0-12 mc, continuously variable.

Built-in markers can be used simultaneously; 19.5-40 mc marker frequency for *if* and 5-240 mc for *rf* and oscillator. Marker has both pip and absorption dip control. Crystal marker provision up to 216 mc (plug-in crystals not supplied).

TV Booster

(See Front Cover)

THE HIGH-GAIN 6AK5s have been applied quite effectively in TV receivers and particularly boosters. In the booster shown on the cover, two 6AK5s are used, one in each band.

The use of individual circuits for each band was found to permit shorter leads and thus minimize losses.

Tapped inputs have been included for a two-fold purpose; cancellation of noise and the reduction of ignition noise. An electrostatic shield, a feature of this booster, also contributes to the reduction of ignition noise.

To afford a broad-band response, 4700-ohm loading resistors have been included in the plate circuits of each tube.

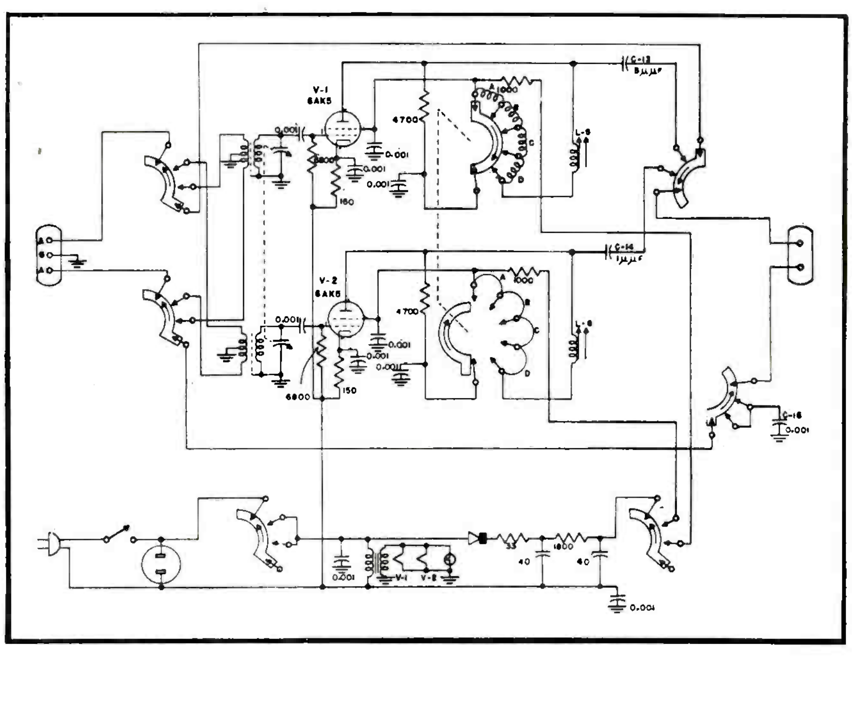
Either 72 or 300-ohm lines can be used with the booster.

Circuit Modifications

In Fig. 1, below, appears a modified version of the booster with several changes which were found to improve gain matching and coupling, particularly on *hf*.

The three capacitors, C_{13}, C_{14} and C_{15} were included to improve the plate impedance at the specific operating frequencies of the circuits. Secondaries of the iron-core coupling coils, L_5 and L_6, were removed to increase the gain and afford a more satisfactory match. The removal of the secondary also was found to improve the coupling on the upper bands, a result achieved by raising of the plate impedance of the tube.

Fig. 1. Modified version of the National TVB-1 TV booster.



NEWS

SYLVANIA TO HOLD TV SERVICE MEETINGS

A group of nation-wide TV meetings to be sponsored by Sylvania distributors for Service Men has been scheduled by the radio division of Sylvania with Ralph R. Shields and Clarence L. Simpson scheduled to conduct the meetings.

Meetings will be held in Arkansas, Oklahoma, Texas, Indiana, Kentucky, Michigan, Ohio, Illinois, Minnesota, North Dakota, Wisconsin, Colorado, Idaho, Iowa, Kansas, Missouri, Nebraska, New Mexico, Montana, Oregon, Washington, Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Maryland, West Virginia, Pennsylvania, Connecticut, Delaware, New Jersey, New York, and the District of Columbia.

* * *

WELLER SOLDERING GUN CATALOG

A catalog bulletin covering soldering guns has been announced by Weller Manufacturing Company, 808 Packer Street, Easton, Penna.

Specifications, characteristics, tip types and prices for each model are included.

* * *

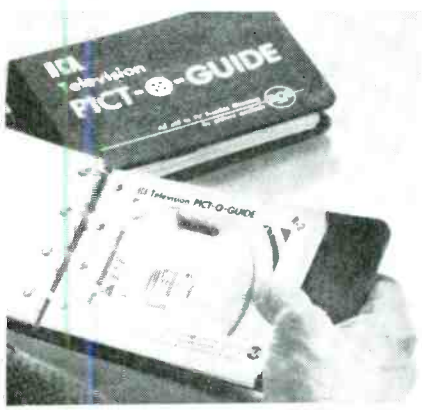
RCA TV TROUBLE-SHOOTING GUIDE

A 100-page loose-leaf handbook, the *Pict-O-Guide*, for television trouble-shooting and service, has been announced by the RCA Tube Department.

Book is an album of photographs showing common operating troubles encountered in television receivers.

Each chapter is devoted to a basic section of a TV receiver and gives a schematic of the basic circuit for the section. When the Service Man has compared the faulty picture with the corresponding photo he can determine which section of the receiver is defective.

Material is work of John R. Meagher. Text and photographs in book are identical to those used by Meagher in the television service clinics which RCA parts distributors have been sponsoring around the country. The photos were made from actual signals received on the RCA television dynamic demonstrator used by Meagher in these clinics.



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ED MAGED BECOMES RACON SALES MANAGER

Edward Maged, formerly sales manager of the distributor division of University Loudspeakers, Inc., has been appointed sales manager of Racon Electric Company, Inc., N. Y. C.

ASSOCIATIONS

RSA-LRTA

THE RADIO SERVICEMEN'S Association of Luzerne County and the Lackawanna Radio Technicians' Association of Scranton recently held their annual picnic at Beckley's Hunlock Creek.

ART, British Columbia, Canada

A MINIMUM WAGE plan, set up by the Associated Radio Technicians of British Columbia, Canada, has been recognized by the government of the Province of British Columbia, who have passed a minimum wage law for Service Men.

Service Men will now receive a minimum of 80c per hour as against the former wage rate of 54c per hour, which was paid to ordinary unskilled labor.

In defining who are entitled to this new rate, the order states that a Service Man is one who is engaged in: (*a*) Designing, repairing, adjusting and installing of radio and electronic equipment including home receivers, record playing equipment, public address and audio amplifier systems and industrial electronic equipment; and (*b*) . . . designing, repairing, adjusting and installing of long and short-wave and high-frequency receiving and transmitting equipment.

The order does not apply to technicians employed in broadcasting stations.

A copy of the order may be obtained by writing to the Department of Labor, Legislatures Building, Victoria, British Columbia, Canada.

J. R. Baird was chairman of the Minimum Wage Committee of the ART.

AT PRSMA TV LECTURE

At a recent PRSMA meeting (left to right): S. K. Macdonald; H. A. Bernreuter, vice president and general manager of the Simpson Electric Company, who spoke on the testing of TV receivers; Morris Green of Almo Radio; Frank Baratta and Joe Bronca of A. C. Radio; Al Margolis of Almo Radio and Carmen Linsalata and Al Steinberg of Albert Steinberg Co.

TEN YEARS AGO

From The Association News Page of SERVICE, August, 1939

THE NEWARK chapter of the RSA announced arrangements for their annual picnic at Mountain View, New Jersey. . . . Kenneth Beatty provided a demonstration of facsimile equipment at a meeting of the Springfield chapter. A stag party, held at the Leland Hotel in the early spring, was reported to have been quite successful. . . . J. S. Patterson of the Tung-Sol Radio Company, Inc., delivered an address on new developments in radio tubes and how they effect the radio Service Man, at a meeting of the Stamford, Connecticut, chapter. Henry M. Lutters, director for the 18th district and Irving Einhorn, Tung-Sol sales rep in Connecticut attended the meeting. . . . John Creutz, consulting engineer, delivered a talk on frequency allocation at a meeting of the Washington, D. C., chapter. . . . The NAB heard an address by RSA's executive secretary on the *missing link in broadcasting*. The talk disclosed how the Service Man serves as the *good-will ambassador* of the radio industry in the American home. . . . The RSA board of directors authorzied the granting of honorary memberships "to those individuals, firms or corporations who have given their active support or inspiration to RSA". . . . The Andrea Radio Corporation announced a series of television sessions. Harold J. Heindel, chief engineer of Andrea, served as one of the principal lecturers.

SIMPSON ELECTRIC CATALOG

A 50-page spiral-bound catalog, No. 16, has been published by the Simpson Electric Company, 5200-18 West Kinzie Street, Chicago 44, Ill.

Catalog, which has an acetate cover, lists a variety of measurement instruments, including the model 480 FM-TV genescope, which provides the necessary signal sources for the alignment and servicing of FM and TV receivers.

* * *

C. M. ODORIZZI NOW RCA VICE PRESIDENT IN CHARGE OF SERVICE

Charles M. Odorizzi has been appointed vice president in charge of service of the RCA Victor Division.

Odorizzi recently resigned as vice president and general manager of the mail order division of Montgomery Ward & Co.

C. M. Odorizzi

* * *

ADAMS BECOMES HYTRON VICE PRESIDENT

John Q. Adams has been elected vice president of Hytron Radio and Electronics Corporation, Salem, Mass.

Adams will remain in charge of tube sales.

J. Q. Adams

* * *

TURNER APPOINTS SHAFFER

Grant Shaffer, 1980 Lawrence Avenue, Detroit 6, Mich., has been appointed Turner Company manufacturers' rep for Mich.

Shaffer was formerly sales manager for the distributor division of Standard Transformer Corporation.

Grant Shaffer

* * *

RADIART ANTENNA CATALOG

An eight-page catalog on television and FM antennas, has been prepared by The Radiart Corp., Cleveland, Ohio.

Catalog covers TV and FM antennas, and adaptor kits, add-on arrays, accessories and antenna parts.

SYLVANIA 'SCOPE BOOK

A 72-page instruction booklet entitled *How to Service Radios with an Oscilloscope* has been published by the Radio Division of Sylvania Electric Products Inc.

The publication contains more than ninety diagrams, tables and schematic circuits including many waveform patterns as they appear on the face of a 'scope in actual service application. Text is grouped in eight chapters treating: 'scope fundamentals; linear time base; the complete 'scope; voltage measurements; radio receiver servicing; audio amplifier testing; transmitter testing; and miscellaneous applications.

Specific 'scope applications described include AM and FM receiver alignment; location of hum; signal tracing; trouble shooting; identification of faults through 'scope pattern; checking *avc* action; voltage gain measurement; auto radio vibrator tests; peak current check in rectifiers; impedance measurement; and capacitor filter check.

Booklet, which measures 8½" x 11", is priced at one dollar per copy, and may be obtained from Sylvania Electric Products Inc., Radio Division, 500 Fifth Avenue, New York 18, N. Y.

* * *

MALLORY OPENS L. A. OFFICE

A P. R. Mallory & Co., Inc. branch office has been opened at 1338 South Lorena St., Los Angeles, under the direction of J. E. Templeton, which will serve Southern California and Arizona.

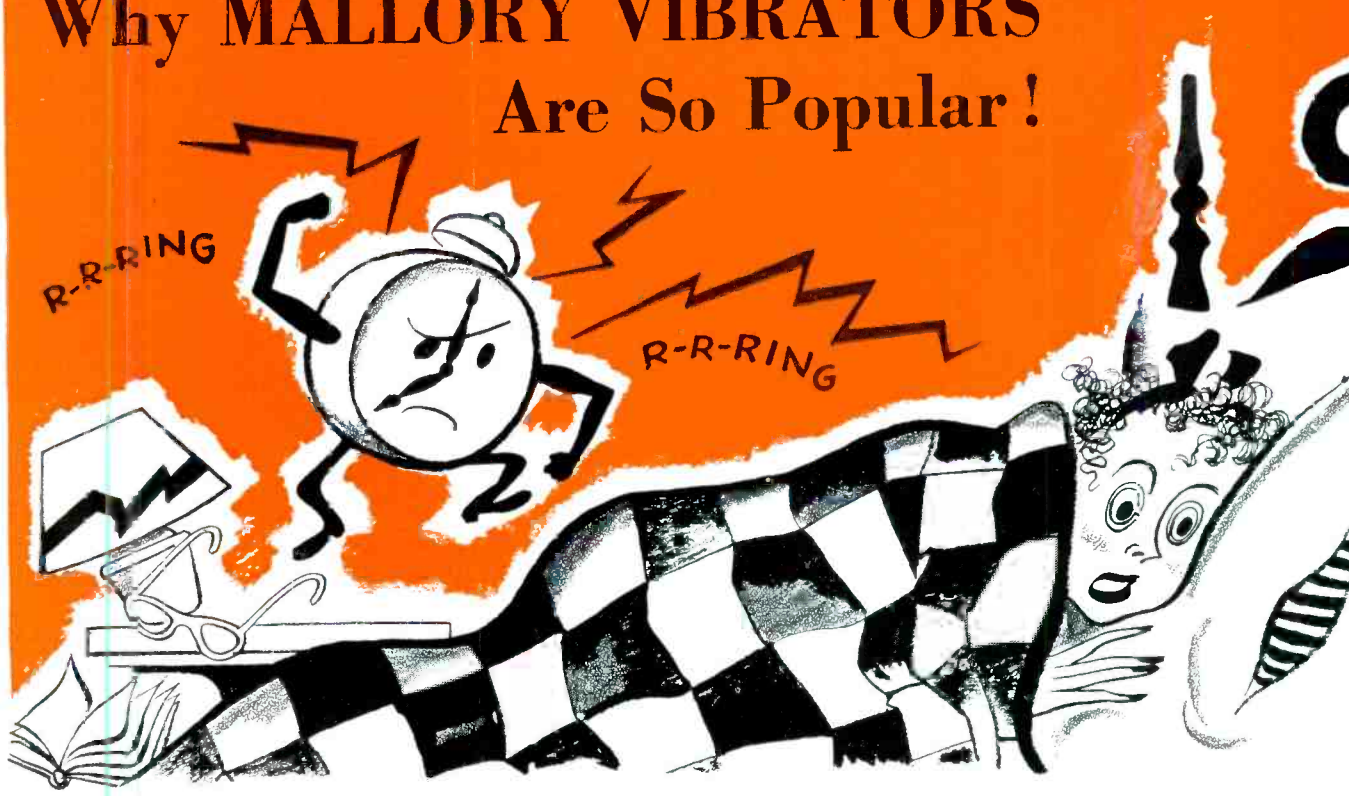
JOTS AND FLASHES

A CAMPAIGN to minimize TV set nuisance calls and simultaneously educate set owners in the performance characteristics of their receivers will begin this fall, under the sanction of RMA, in the form of a series of films which will be released to TV broadcasters. A committee of three has been named to follow through the preparation of the film: A. T. Alexander, Motorolo, Inc.; L. A. Goodwin, Jr., RCA Victor and H. A. Ehle, IRC. . . . A *bureau* of *television optical standards* was recently suggested by the Starrett Television Corp., N. Y. C., as a means of combating any adverse publicity surrounding the so-called optical hazards in viewing TV, establish for the industry a seal of commendation for sets meeting highest optical standards and to generally promote the virtues of TV. . . . Philco reported recently that during the past twenty years they have manufactured and sold about 4,500,000 auto radios to the car industry. . . . Irving M. Seideman, formerly with Drake America Corp., is now with Lafayette Radio, Inc., 100 Avenue of the Americas, New York City, as advertising manager. . . . Samuel S. Egert and Jack Fields have formed a new rep unit, The Egert and Fields Co., 11 Park Place, New York 7, New York. . . . Percy D. Terwilliger, 636 East 96th St., Kansas City 5, Missouri, is now a sales rep for the Workshop Associates, Newton Highlands, Massachusetts. . . E. Patrick Toal has become sales manager of the television division of North American Philips Company, Inc., New York City. Toal was formerly with G. E. . . . John K. McDonough is now director of sales of television receivers at Sylvania Electric Products, Inc. C. K. Bagg has been named sales manager of this division and B. Holsinger has been appointed advertising and sales promotion manager of the new section. . . . Austin C. Lescarboura recently completed his year's term as governor of the 174th District Rotary International. . . . The RCA TV dynamic demonstrator has been installed at RCA Institutes, Inc., 350 West 4th Street, New York City. . . . Apex Electronic Sales Corp., 225 West 17th Street, New York, have been named national sales agents for the Federal Television Corp., New York. The agency is headed by Al Jacobs and Max Zimmer. . . . Charles E. Anderson, 4500 Euclid Avenue, Cleveland, Ohio, is now district sales rep for the Sprague Electric Company, North Adams, Massachusetts. . . . Ross Gessford has been appointed chief engineer for the TV picture tube division of Sylvania Electric. . . . The June issue of the *Aerovox Research Worker* contained an extremely interesting discussion of intercarrier sound reception.

ADVERTISERS IN THIS ISSUE

SERVICE INDEX—AUGUST, 1949

Dependable Starting is One Reason Why MALLORY VIBRATORS Are So Popular!



And there is more than one reason why Mallory Vibrators are so dependable in starting and why knowing radio service men choose them *every time*. Read the facts and see for yourself.

The contacts in Mallory Vibrators are Mallory-specified and Mallory-made to insure maximum resistance to corrosion. Therefore, Mallory Vibrators last longer on your shelf. And when you put them in use, a Mallory "self-cleaning" action prevents oxide formation—and trouble.

In addition to *dependable* starting, Mallory Vibrators give you *long life* and *high output efficiency*. For Mallory focuses on Vibrator design an unusual combination of engineering talent and resources in electronics, electrochemistry and metallurgy.

No wonder more Mallory Vibrators are used in original equipment than all other makes combined. No wonder they are best for replacements. See your Mallory Distributor.

Mallory "2448" Vibrator Deal

This deal gives you a handsome storage and display cabinet for your stock of vibrators, together with a selection of vibrators and buffer capacitors that will answer 75% of your requirements.

You pay only the service man's net price for the six vibrators and twelve buffer capacitors. There is no charge for the attractive, convenient cabinet. Your Mallory distributor has them in stock for immediate delivery.

More Mallory Vibrators are used in original equipment than all other makes combined

P. R. MALLORY & CO. Inc.

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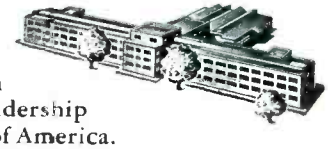
Cunningham tubes have enjoyed customer acceptance for over 33 years. Whether it's metal, miniature, or glass, there's a Cunningham type to meet practically every service requirement. Your Cunningham Distributor keeps complete stocks on hand to meet your immediate needs.

RCA LABORATORIES
PRINCETON, N. J.



Behind every Cunningham tube is the engineering leadership of the Radio Corporation of America.

SEE YOUR CUNNINGHAM DISTRIBUTOR TODAY

A QUALITY PRODUCT OF THE RADIO CORPORATION OF AMERICA