



RADIO AND TELEVISION

# Service News

A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION

SPRING  
1963



Vol. 28, No. 1

Happy? You bet! Graduation from RCA Institutes Home Study Course in Color Television is a big moment in the life of any service technician. And now, RCA's fabulous 1963 "Project IV" promotional program makes it possible for every dealer with an "eye to color" to receive this outstanding course FREE—merely by purchasing RCA entertainment-receiving tubes from participating distributors. For complete details, see story on page 3.

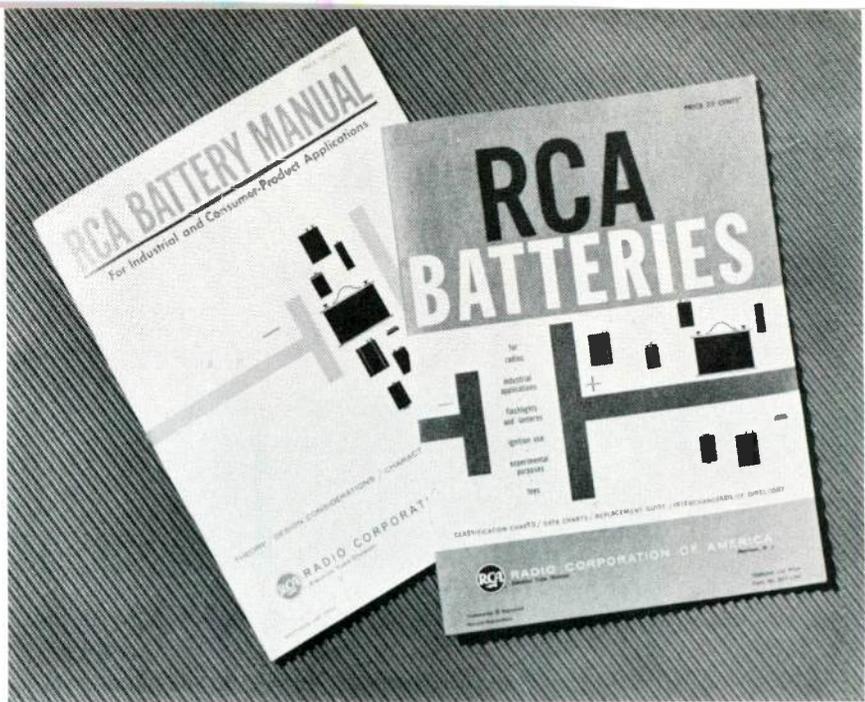
## Two New RCA Battery Publications Available Through Distributors

Keeping posted on the latest battery information? Two new publications covering RCA's extensive line of zinc-carbon (Leclanche), alkaline, and mercury types are "musts" for anyone interested in portable-power sources.

The 1963 edition of the RCA Battery Catalog (Bat-134F)—the more recent of these publications—provides an indispensable reference aid for the service-dealer and technician and lists all the popular industry types in use today. The other publication is the 64-page "RCA Battery Manual" (BDG-111), which offers a completely new approach to the presentation of data on dry cells and batteries for consumer and industrial use.

The 24-page Battery Catalog gives detailed information on 113 RCA battery types. In addition, a battery classification chart groups batteries in the categories of single-voltage, multiple-voltage, and A-B battery packs. Individual types within each group are listed in order of increasing voltage.

The catalog's comprehensive data section groups batteries by types for transistor applications, portable "A" types, portable "B" types, industrial and special-purpose types, flashlight and lantern types, portable "A-B" packs, farm "A-B" packs, and photoflash types. Wide popularity of indoor photography makes the listing of photoflash types a highly valuable supplement for reference purposes. Data for each type include terminal voltage, suggested current range, maximum dimensions, and type of packaging. Socket diagrams are provided for all batteries having



socket-type terminals.

Included in the catalog are an RCA battery replacement guide and an RCA battery interchangeability directory.

The replacement guide lists approximately 3,000 models of portable radios by U.S. and foreign manufacturers and shows the RCA direct-replacement battery for each model. It includes models dating from 1958 through June, 1962.

The interchangeability directory shows direct-replacement RCA batteries for individual types produced by all major U.S. battery manufacturers.

These information sections provide the service-dealer or technician with all the interchangeability data required for sales or servicing. A valuable addition to any battery reference file, the new catalog is available through authorized RCA battery distributors at an Optional List price of 35¢.

The recently published "RCA Battery Manual" is the first reference booklet of its kind in the battery industry. While intended primarily for use by designers and application engineers, this publication also contains a wealth of practical information for technicians, students, experimenters, and hams.

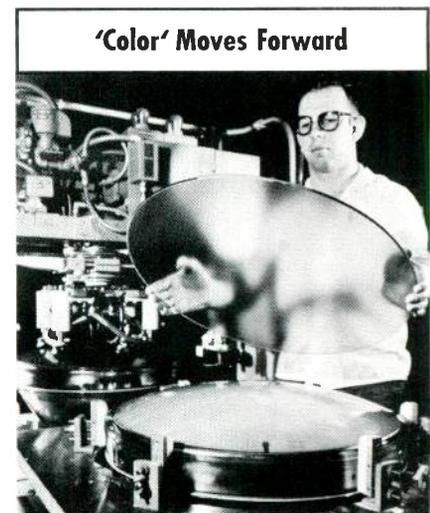
A section on theory outlines the historical development of dry batteries and describes the various basic cells and battery types, their chemical composition and construction (including cutaway views), and techniques for testing.

One of the many outstanding features of the new reference aid is a section that gives electrical characteristics, dimensional outlines, and average hours of service for all RCA batteries. Types are listed in order of increasing voltage starting with 1.4-volt types. Service-life data are provided for several current drains and endpoint volt-

ages for each RCA battery type.

Using the manual's classification chart, the reader can quickly select a specific RCA battery type for a particular requirement.

Available through authorized RCA battery distributors at an Optional List price of only 50¢, the "RCA Battery Manual" can provide all readers with a firm groundwork in the basic principles of battery power.



At the RCA plant in Marion, Ind., production of color television picture tubes is being maintained on an around-the-clock basis to help fill the backlog of orders from set manufacturers. Inaugurated in November, 1962, the new operation represents a \$1.7-million expansion in color tube manufacturing facilities. Earlier in 1962, RCA announced a \$1.5-million expansion of its plant in Lancaster, Pa. The employee shown above is preparing to bond a large glass saucer onto the faceplate of a color tube. The glass panel provides a "glare-proof" window that practically eliminates annoying room-light reflections. Color sets equipped with this type of tube do not require a separate safety glass.

### RADIO AND TELEVISION



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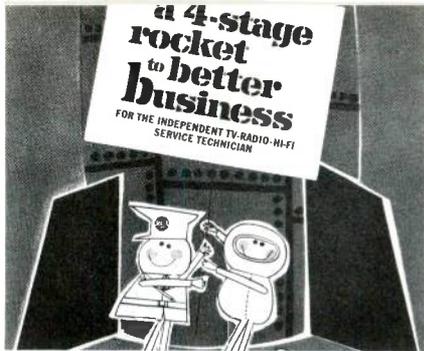
RCA RADIO & TELEVISION SERVICE NEWS is published in the interest of dealers and service technicians. It is written to assist them in providing better service, and to foster the growth of their business by supplying them with information on the latest troubleshooting and sales promotion techniques, sales and service aids, together with invaluable data on RCA tubes, transistors, batteries, and electronic instruments.

SPRING  
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RCA RADIO & TELEVISION SERVICE NEWS is a quarterly publication of the RCA Electron Tube Division, Harrison, New Jersey.

Vol. 21, No. 1

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Radio Corporation of America



A rising star on the consumer horizon is beckoning the nation's TV service-dealers and technicians to a new era of business opportunity.

Color television—a great new industry—now is entering the second phase of its development toward mass market acceptance.

Today, virtually every major television-set manufacturer is marketing color receivers. Significantly, all of these manufacturers are using the RCA-developed-and-manufactured 21-inch picture tube. Significantly, too, commercial colorcasts are based on the all-electronic compatible system which was pioneered by RCA.

Latest indications are that the market can absorb between 750,000 and 1,000,000 color sets in 1963. To help meet this high demand, the RCA Electron Tube Division allocated \$3.2 million in 1962 alone for expansion of its color picture tube producing facilities in Lancaster, Pa., and Marion, Ind.

During the 1962-63 broadcasting season, 68% of the NBC-TV network's "prime-time" night shows will be in color. This percentage does not include "local-station" color shows or network "specials." NBC's 172 color stations account for almost half of the total color stations in the country and cover almost 98% of all television homes. In the meantime, more and more sponsors are flocking to this medium.

### Your Stake in Color Television

As early as mid-1961, one trade journal summed up the market situation by saying: "No longer do we talk in terms of 'who's in color TV,' but now it's 'who's not in color TV?'"

More than 150,000 persons, including dealers and service technicians, have attended lectures on color TV. In the last four years alone, an estimated 10,000 service technicians from all over the country have been trained in color-TV servicing at RCA-sponsored workshops.

From the article, "How's Color TV Doing?"\* comes the following:

"... color TV is real, and is growing by leaps and bounds. As the growth continues, those who accept and mas-

\*Reprinted from the November, 1962 issue of PF REPORTER. Copyright 1962 by Howard W. Sams & Company, Inc.

## RCA's 'Project IV' Launch to Better Business Highlights New Course to Help Technicians

# ADD 'COLOR' TO PROFITS

ter the challenge are bound to profit. "... A boom in set sales is automatically followed by a boom in installations, and in sets which must be adjusted and regularly maintained. The opportunities are expected to abound.

"... the means to carve yourself a slice of this melon are all around you. You should be familiar with trends, learn about the sets, study troubleshooting methods, and prepare to enter a new era in customer relations."

Similar advice comes from other leading trade publications. And as the facts pour in, they all point to one conclusion: A tremendous revolution in the home-entertainment industry is in the making, and *you're part of it!*

The time to get started is *now*—for two very important reasons:

First, color sets contain more parts, utilize more complex circuits, and employ a picture tube infinitely more sophisticated than their black-and-white counterparts.

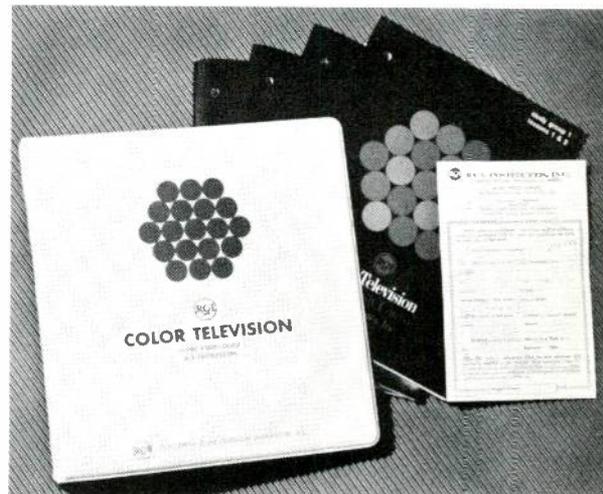
Second, color-TV viewers make up a top-quality audience. Surveys consistently show that their buying power is among the highest in the nation.

Of course, getting to know "color" means a lot of work and a lot of time; but the rewards can be great. Once you decide you want to broaden your technical skills into this flourishing field, the "doors" begin to open.

### How RCA Helps You Prepare For Color

To assist you in crossing the threshold of the color-TV boom, RCA now makes it possible for you to enroll in the famed RCA Institutes Color Television Home Study Course—*free* with your purchases of RCA entertainment-receiving tubes from participating distributors. Incorporating all the latest color-TV advances, this brand-new, completely updated course provides you with the complete know-how for troubleshooting and repairing all modern color receivers—regardless of brand.

Even if you already have the basic knowledge of color circuitry and operation, you'll want to brush up on your servicing techniques with the up-to-the-minute information made available to you through this course. Remember, as an RCA-trained color-TV technician, you can share in the universal recognition and customer acceptance of RCA as the pioneer of color TV. And be-



Enrollment form for the RCA Institutes Home Study Course in Color Television accompanies Study Group 1, the first two lessons in the course, which is available through your participating RCA distributor. Completed application should be mailed to RCA Institutes, Inc., Home Study School, 350 West 4th Street, New York 14.

cause "color" is already big business—and getting bigger every day—this outstanding course can start you off toward a profitable future in this sparkling new entertainment medium.

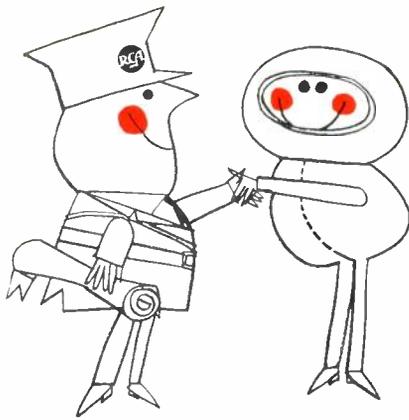
Interested in getting started as soon as possible? See your RCA distributor now. You'll find him willing to cooperate in every way so that your purchases of RCA entertainment-receiving tubes can most effectively be credited towards your enrollment. What's more, he'll provide you with a handsome white vinyl binder containing Study Group 1—your first two lessons—and an enrollment form. To facilitate prompt delivery of remaining lessons to your address, this enrollment form should be completed and mailed directly to the RCA Institutes, Inc., Home Study School, 350 West 4th Street, N. Y. 14.

### Details on RCA Institutes Home Study Course in Color Television

And now you're ready to school yourself with the finest color-TV home-study course available—a course specially prepared for your needs by the nation's foremost experts in color-TV servicing. Here, for example, is what Study Group 1—your first two lessons—covers:

- Lesson 1—Principles of Color Television. Eight separate sections cover-

(Continued on next page)



(Continued from preceding page)

ing an elementary color television system; light and color; the color-TV signal; the principles of modulation; development of the color-TV transmission standards; recovering the chrominance signals at the receiver; an overall view of the system; and supplementary information.

• **Lesson 2—Color Picture Tubes.** Here, in nine sections, are the details of the all-important color picture tube, including means of displaying color-TV pictures; RCA shadow-mask color picture tube; electron guns; purity; convergence; focus; associated picture tube components; color picture tube circuit requirements; and color picture tube handling and safety.

Included with each Study Group are your examinations. You forward the completed examination papers to RCA Institutes as soon as you are through with each lesson. Successful completion of these examinations means that you will receive the next study group automatically.

The entire course consists of four study groups with two lessons in each group. Each lesson is subdivided into sections and sub-sections to cover every aspect of the lesson's subject. In Lesson 3, you will learn the functions of the color receiver. Lesson 4 deals with setups and adjustments. In Lesson 5, the student is introduced to modern color-receiver circuitry—with emphasis on tuners; video if amplifiers; sync and AGC circuits; deflection and high voltage circuits; the chrominance channel; demodulators; color synchronization circuits; video circuits; remote control; and overall servicing features. Lesson 6 covers all aspects of receiver alignment while Lesson 7 carries the student into the most effective troubleshooting techniques. Finally, in Lesson 8, the home-study technician learns about his complete shop needs in test equipment and accessories, including color-bar generators and dot-cross-hatch generators.

With the successful completion of Lessons 7 and 8, your home-study course is ended and you're ready to tackle the most difficult servicing prob-

## 'PROJECT IV' PROGRAM PUTS SERVICE-DEALERS

lems brought in by color-set owners. And to verify your new status as an RCA-trained color-TV technician, you will receive a handsome graduation certificate which can be prominently displayed in your establishment for all customers to see. This RCA recognition and your servicing capability will provide the basis for your future career in color.

### Home-Study Course Is First Phase Of Dynamic 'Project IV' Receiving-Tube Program

Your completion of the home-study course marks only one phase of a dynamic RCA four-phase program to help you promote new business. Known as "Project IV," this program also brings you new promotional and service aids; national advertising support; and an exciting premium which you can offer to your customers.

Successful check-out in "color" means you're all set for the launching pad and Phase 2—a countdown of exciting promotional aids that will help you advertise your services either from within your store or outside your store. These aids include:

- **Acetate Streamer Kit (1A1338).** A selection of four brightly colored streamers in a variety of shapes and sizes to fit any store location. These streamers carry messages for both black-and-white and color servicing and are designed to attract customers approaching from any direction.
- **Truck Decal (1A1335).** A weather-proofed decal in bold RCA red that can be used to advertise your "Expert Color TV Service" from your truck or station wagon.
- **Window Display with Changeable Panels (1A1336).** A handsome window display in striking red, white, and black that features any one of four service-message panels that can be changed at will and handily stored in back of the unit.
- **Indoor Illuminated Color TV Service Sign (1A1339).** An attractive sign

Truck Decal (1A1335)



Window Display with Panels (1A1336)



Outdoor Signs (1A1341 and 1A1340)



Indoor Illuminated Color Sign (1A1339)

framed in shining brass that can be used in your store or store window either as a daytime display or effective night light. A "rainbow" design in this 10¾-inch-by-16¾-inch sign provides the illusion of constantly changing color.

• **Ad Mats (1A1337A through 1A1337G).** A selection of seven outstanding cartoon-type messages that can effectively point out your TV-servicing facilities through the local press.

• **Outdoor Signs (1A1340 and 1A1341).** Two brand-new, double-face outdoor hanging signs that add that extra "gleam and polish" to your store front. In bold RCA colors and of striking, modern design, these signs respectively measure 2-feet-by-5-feet and 3-feet-by-5-feet.

# IN REALM OF BETTER BUSINESS

• **New Business Stationery (IV1002A through IV1007A).** An assortment of new letterheads, billheads, envelopes, and calling cards in a sparkling RCA design that "dresses up" your stationery with a smart contemporary look.

• **Receiving Tube Puller (1A1348).** A useful device that can be easily carried in your pocket for handy removal of tubes from sockets whenever necessary.

## National Advertising Support

Additional power for Phase 3—your big blast-off into new areas of business—will be provided by a provocative new television commercial which will be shown nationally during 1963 commencing early in the year. In this highly effective commercial, you—the Independent Service Technician—will tell the viewing public of your services, your skills, and your dependability. Your audience? The entire coast-to-coast assemblage of viewers tuned in on the popular Walt Disney "Wonderful World of Color" program—a regular Sunday night feature over the NBC-TV network. Here is a magnificent supplement to your own promotional efforts that can create the best possible consumer climate for you.

## Exciting Premium

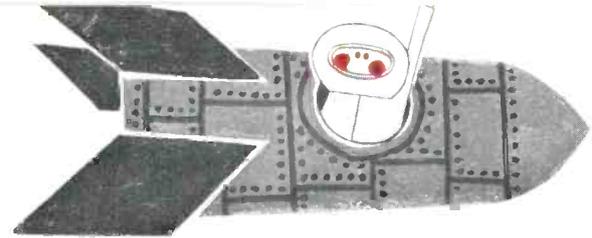
And now, RCA's "Project IV" four-stage rocket to better business puts you in orbit with the outstanding Phase-4 premium plan.

Through this plan, you can offer free coupons (1A1356)—any one of which entitles your customers to purchase a high-quality LP record at the low, low price of \$1.25. What's more, they can make their choice from an assortment of 15 albums featuring such famous RCA Victor recording stars as Dinah Shore, Count Basie, Hugo Winterhalter, Xavier Cugat, Eartha Kitt, Walter Schumann, Julie Andrews, Morton Gould, Eddie Fisher, and the Ames Brothers. You can use these coupons in many ways to help build business volume, including a free coupon on every

service call, or one free coupon with every picture tube installed. To help you advertise this remarkable offer, RCA, through your distributor, furnishes you with a colorful window streamer (1A1351) illustrating all 15 albums.

\* \* \*

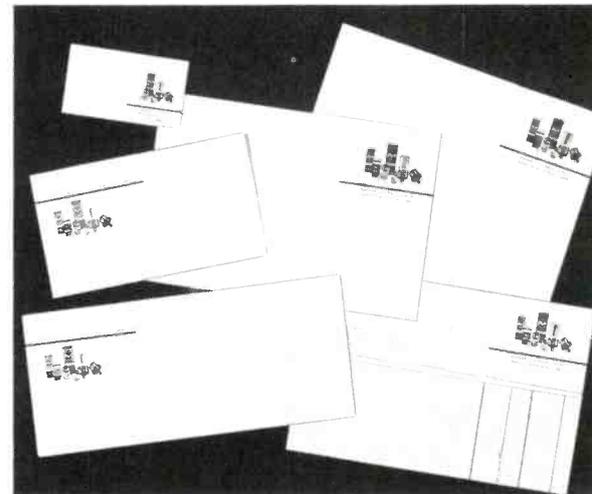
By now you will realize that RCA's dynamic "Project IV" program is designed to meet your needs in the vital areas of educational, promotional, business, and service aids—the four most important avenues of approach to the realm of better business. Here, in one "package," are the highly valuable ingredients that can help you achieve new servicing and sales recognition in your community . . . new fulfillment in your work. Take advantage of this effective program by getting all the details from your participating RCA entertainment-receiving tube distributor at the earliest possible opportunity.



Receiving Tube Puller (1A1348)



Ad Mats (1A1337A through 1A1337G)



New Business Stationery (IV1002A through IV1007A) for dealer use features an assortment of letterheads, billheads, envelopes, and calling cards specially designed to "dress up" billing and correspondence.



Record Coupons (1A1356) and Record Dealer Streamer (1A1351)



Acetate Streamer Kit (1A1338)

# RCA's Mark VIII CB Transceiver: A 3-Way Profit Builder

It's an exciting world that's bursting forth with new business possibilities—especially when you're channeled in to CB!

And now—to make it even more exciting—your authorized RCA Citizens' Band Radio distributor brings you the all-new RCA Mark VIII, a 27-Mc Citizens' Band 2-Way Radio representing the latest advances in versatility, convenience, and styling.

Whether you sell, service, or put CB to work for you, you can't go wrong in concentrating your efforts on the Mark VIII. Here's a low-cost, simple-to-operate transceiver whose countless business, industrial, and pleasure applications make almost everyone a prospective customer. And remember, no operator's license is required. All a purchaser has to do is apply for a station license through the FCC by using the form supplied with the unit.

Compact and lightweight, the Mark VIII measures only 3½ inches high, 11¼ inches wide, 8 inches deep, and weighs only 9 pounds. Its low, slim design permits installation in extremely cramped locations, including under-the-dash mounting in small sports cars.

One of the economy features of the new Mark VIII is the inclusion of *only* an ac power supply in the transceiver. Separate dc power supplies (optional) are available for either 12-volt dc (Type 17705) or 6-volt dc (Type 17705-A) operation. Either of these small units may be mounted on the firewall of the vehicle as a permanent installation, and the Mark VIII can be



Handsome Mark VIII Counter Display (1B1005) stands 21 inches high and is designed to incorporate the actual unit. This display is equally effective for window use. RCA's new Mark VIII 27-Mc two-way Citizens' Band Radio also serves well when used as a base station in conjunction with the famous RCA Personal-Com 300 two-way radio. A small but highly efficient unit, the Personal-Com 300 weighs just slightly more than one pound, including the battery.



Included in the wide variety of advertising and promotional material available to dealers selling the RCA Mark VIII are the Mark VIII Window/Wall Streamer (1B1002), the Mark VIII Color Postcard (1B1006), the Mark VIII Business Reply Card (1B1007), the Mark VIII Self-Mailer (1B1009), the Mark VIII Industrial Applications Flier (1B1008), the Mark VIII Flier (1B1003), and the Mark VIII Envelope Stuffer (1B1010). Other available material includes decals and newspaper ad mats.

plugged in for mobile use, and then unplugged and carried into the home or office for base station operation. In addition to reducing the size of the transceiver, this arrangement results in considerably lower costs for the user who doesn't require a mobile power supply in every unit.

There are only five simple operating controls on the front panel: an illuminated TRANSMIT channel selector with nine fixed (crystal-controlled) channel positions; a dual function (stacked) knob for control of ON/OFF VOLUME and SQUELCH; an all-channel receiver tuning dial calibrated in both channel numbers and frequencies; and an illuminated RECEIVE channel selector with 10 positions. The tenth position switches reception to the tuneable receiver.

The receiver tuning dial rotates through a full 360 degrees. One half of the dial is calibrated by channel number and the other half by frequency—permitting the operator to

use whichever means of tuning he finds most convenient.

Usual problems encountered when changing crystals in the field have been virtually eliminated in the Mark VIII. Two snap-lock trap doors in the top of the cabinet provide access to all crystal sockets. One pair of precision-ground transmit and receive RCA crystals for channel 7 is shipped with each Mark VIII. Among other outstanding features of this transceiver are:

- Maximum permissible Citizens' Band transmit input power: 5 watts; output, 3 watts or better.
- Excellent voice reproduction, high intelligibility.
- Reception of all 23 CB channels.
- Highly effective noise limiter to reduce effects of ignition and similar interference.
- TVI traps to minimize interference with nearby television sets.
- Incorporation of a "message monitor" feature permitting calls from nearby stations to be heard even with

the volume turned all the way down.

Meeting all FCC requirements, the RCA Mark VIII is shipped complete with one pair of RCA crystals; an impact-resistant plastic, push-to-talk ceramic microphone and coil cord; an ac power cord; operating and installation instructions; and a copy of the FCC license application form number 505. Optional List price for the entire unit is \$149.50.

Service-dealers planning to enter the lucrative market for CB equipment via their RCA Citizens' Band Radio distributors will find a vast assortment of advertising and promotional material available for their use. All of this material—covering both the RCA Mark VIII and the RCA Personal-Com 300—is illustrated and described in the dealer sales promotion catalog (1B1012) which also can be obtained from authorized distributors.

With this wide array of effective point-of-purchase promotional material—supported by the famous RCA quality—you can take a major step towards establishing your store as a local headquarters for Citizens' Band 2-way radio.

## RCA Honored by NATESA



Executives of RCA and the National Alliance of Television and Electronic Service Association recently assembled for presentation of the NATESA Friends of Service Management Award. Irving J. Toner, NATESA President (fourth from left), made the award to Douglas Y. Smith, Vice President and General Manager, RCA Electronic Components and Devices, and W. Walter Watts, RCA Group Executive Vice President (fifth and sixth from left, respectively). Directors of NATESA selected the RCA Electron Tube Division for the award at their 1962 convention. The award cited the RCA Electron Tube Division "for outstanding service in creating better customer relations." Others, left to right, are: Harold F. Bersche, Manager, Distributor Products Department, RCA Electron Tube Division; Joseph E. Kelley, Manager, Distributor Products Marketing, RCA Electron Tube Division; Lysle O. Shanafelt, Manager, Distributor Sales Coordination, RCA Electron Tube Division; Frank J. Moch, Executive Director, NATESA; Larry R. Dorst, Secretary General, NATESA; and Kenneth B. Shaffer, Manager, Distributor Sales, RCA Electron Tube Division.

## Handy Workbench Frame Available Through RCA Electronic Instrument Distributors

Your purchases of RCA test equipment can offer a direct and inexpensive route towards obtaining another practical addition to your service shop—the WG-372A Bench Frame Kit.

Now being offered by participating authorized RCA Electronic Instrument Distributors, this handy unit requires only the addition of a top and shelf before it's ready for use. For a long bench, several frames may be used side-by-side. You merely cut plywood, masonite, plank, or sheathing to fit your own space requirements and attach the top and shelf sections to the pre-drilled frame.

Constructed of heavy-gauge steel, the WG-372A Bench Frame measures 34 inches high, 47½ inches wide, and 22½ inches deep, and has a lustrous gray finish of infra-red-baked enamel. Stress beads on each leg strengthen the metal supports. Additional support and rigidity is provided through metal bases which can be bolted to the floor. All horizontal and vertical frame-members are fastened by diagonally spaced stove bolts for extra firmness.

Designed for maximum utility and space-saving, the WG-372A makes a useful addition to any service establishment. See your participating RCA Electronic Instrument Distributor for the complete details.



BENCH FRAME  
RCA WG-372A



## 'RCA Silverama Bandwagon' Program Support

Tune your TV servicing business to the right pitch by climbing aboard the RCA Silverama® Bandwagon—the picture tube industry's brightest new promotional program to help you drum up big sales.

It's an exciting program that backs up all of the other "big extras" that the RCA Silverama Picture Tube Line offers the nation's television service dealers. *Important* sales-building extras, such as Silverama's national advertising on network television; Silverama's wide consumer acceptance and demand; and the unmatched performance and quality of Silverama picture tubes—including envelopes that are thoroughly inspected, cleaned, buffed, polished, and re-inspected prior to re-use.

Now in readiness for your special use through participating RCA picture tube distributors, the RCA Silverama Bandwagon brings you dynamic service and advertising aids, store displays, and customer premiums—all first-rate business supports that add new tone to your overall sales effort.

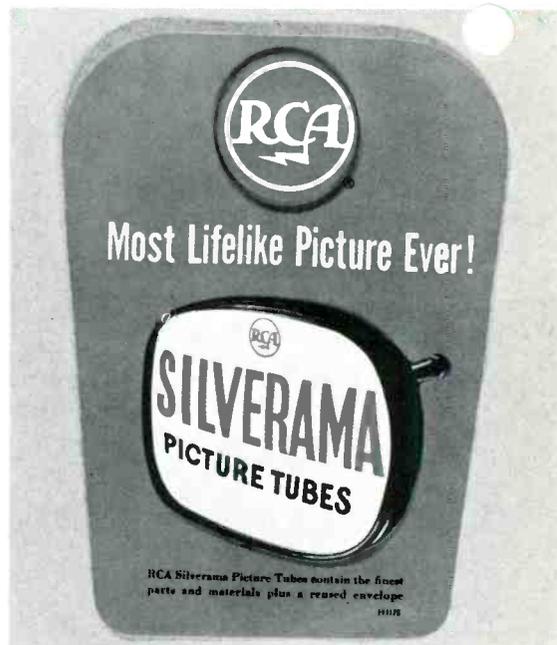
In service aids, for example, what handier item than a picture-tube carrier? You now have one available in

the form of RCA's Picture Tube Tote Bag, which is offered in two sizes: one for accommodating all 16-inch through 19-inch types (1D1169-A); the other for all 20-inch through 24-inch types (1D1169-B).

These specially designed tote bags take a lot of the work and worry out of transporting picture tubes. Made of heavy, durable vinyl with reinforced handles, they can easily support the heaviest-type "bulbs." A built-in plastic foam liner cushions the faceplate—protects it from scratching or chipping while being hand-carried or transported in your service truck.

Highlighting your "Bandwagon's" new point-of-sale material for store window or counter is the Silverama Flashing Display (1D1172), which aims a provocative sales message at "future customers" through a cleverly contrived picture tube design starring the famed Disney cartoon character, "Ludwig Von Drake." The picture on the simulated picture tube seems to disappear as light flashes on behind it, illuminating an RCA Silverama sales "commercial." This attractive display also keys passers-by to your national advertising on Walt Disney's "Wonderful World of Color" NBC-TV network program.

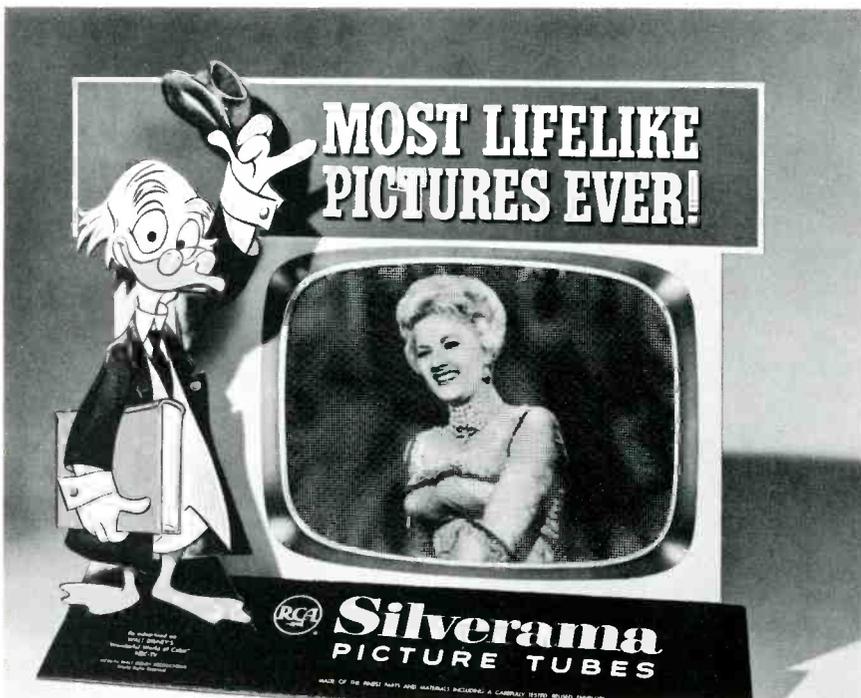
A "third dimension" is added to your wall or window advertising through the handsome 3-Dimensional Window Decal (1D1173). This decal of vacuum-formed plastic projects a simulated



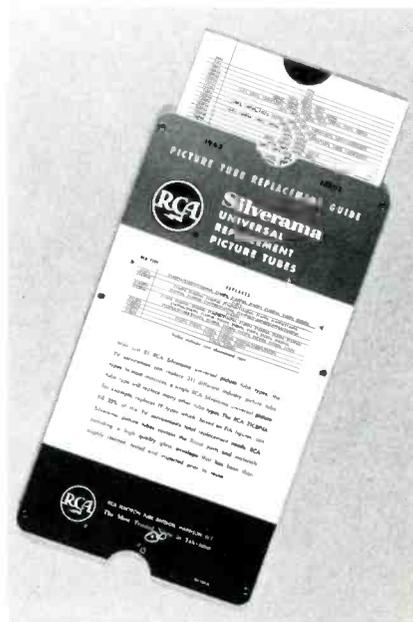
Strong adhesive back holds 3-Dimensional Window Decal (1D1173) securely in place on window, wall, or door.

picture tube face out two inches from other portions of the decal, thus imparting new interest to in-store sign displays.

These are but a few of the many outstanding aids at your disposal through the RCA Silverama Bandwagon program. Other service aids consist of the newly revised Picture Tube Replacement Slide Guide (1D1154-A), the Un-



Silverama Flashing Display (1D1172) features changing sales message.



Picture Tube Replacement Slide Guide (1D1154-A) has been brought completely up to date and now lists all RCA Silverama universal types and the 311 industry types they replace.



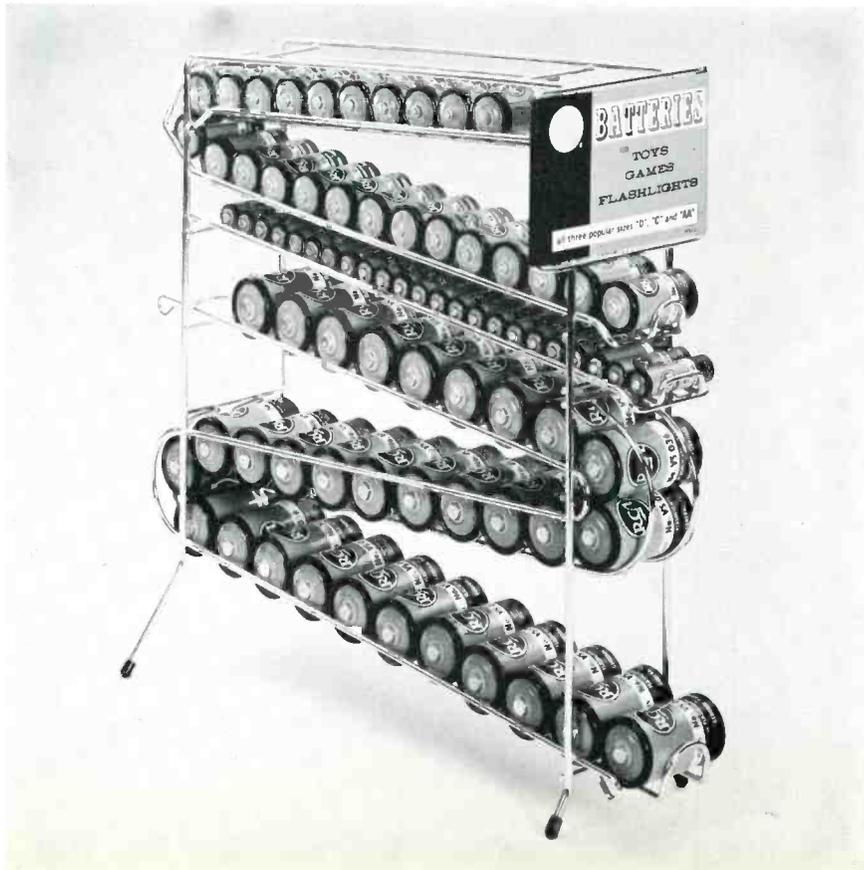
# Growth Market for Radio Batteries Means 'Plus' Business for Dealers

If transistor radios seem to be practically everywhere, that's not an optical illusion. Rather, it's the latest reflection of consumer demand. A demand, incidentally, that has seen some 60-million portable radios (including imports) produced since 1957. Last year alone, for example, the figure was almost 17 million portable radios—practically all of which were transistor types.

Dealer "Essentials" Kit (1P1127) features a wide selection of point-of-purchase display material, reference aids, and ad mats for local advertising.



The "3-in-1 Flashlight Battery Display" (1P1114) is a self-dispensing, gravity-feed unit of space-saving design for efficient counter use.



In other words, the average family in your community owns at least one transistor radio. Each of these sets represents a recurring need for fresh transistor radio batteries.

What's more—the market for transistor radio batteries has mushroomed so rapidly that a large percentage of these consumers have not yet established their buying habits.



The six-prong wire rack display (1P1112) for merchandising individual battery types of your choice is a compact unit which can be used on a counter or hung on a pegboard.

As a radio sales and service outlet, your store offers consumers a logical source for these batteries. Here is an unequalled opportunity to enter a "plus" market by establishing your store as a local headquarters for a complete line of batteries carrying the brand name synonymous with quality in electronics—RCA!

Today, you can take advantage of the modern conveniences of RCA transistor radio batteries in blister-packaging that offers such benefits as complete eye-appeal, convenient product display, and reduced selling time. With these blister-packs are new, compactly designed display units for store use. Having minimum space and inventory requirements, these display units feature all the popular transistor radio battery types in handy, colorful assortments intended to win instant customer attention and promote fast product turnover.

RCA's "Profit-Pak #1" provides you with a pre-packaged assortment of eight of the most popular transistor radio battery types, based on known national movement. These eight types—the largest selection available in blister packs—cover almost 90% of today's transistor radio requirements. The "Profit-Pak" includes a 12-prong wire rack display unit (1P1082) suitable for either counter or pegboard use.

You may also select individual battery types of your choice, in which case a smaller, six-prong display unit (1P1112) is available for your needs.

Regardless of whether you put the pre-packaged display or self-selection display to work for you, you'll be "money ahead." These low-dollar dealer "packages" of fast-moving batteries in convenient blister-packs are your

ticket to increased sales in a dynamic growth market.

Accompanying the increasing popularity of transistor radios are the dramatic increases in battery-operated toys and the steady introduction of self-powered appliance and convenience items—all of which create new demand for a wide variety of battery types in the RCA line. Included in this category is RCA's selection of popular flashlight cells .

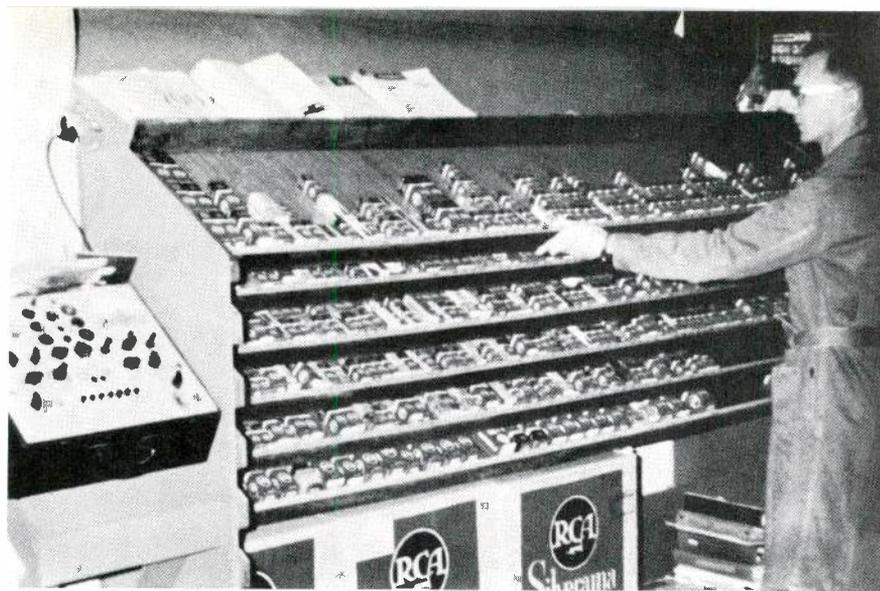


Popular transistor radio battery types in convenient blister-packs include RCA's VS323, VS300A, and VS334, shown above. Attractive display card heightens RCA identification and lists all industry types replaced by each battery. Large type number and voltage rating helps customer make quick, positive selection.

To help spark your sales of flashlight cells, RCA now makes available through your distributor a new gravity-feed counter merchandiser (1P1114) which can be used to display all three popular types with space-saving efficiency. This self-service dispenser can hold two dozen "AA" cells, 2 dozen "C" cells, and more than 30 "D" cells. Of sturdy metal construction with rubber-tipped legs, this handsome display unit has a brass-plated finish for top eye-appeal.

A 1963 catalog of dealer promotion items (1P1124) available through your authorized RCA battery distributor illustrates and describes a wide selection of displays, merchandisers, premiums, technical literature, and point-of-purchase promotional material—all designed to help you obtain your full share of this growing market.

All these display units, together with other promotional material described in the 1963 catalog of dealer items, provide your basis for a sales program that's right in step with the big opportunities of today's battery market. Get off to an early start by contacting your authorized RCA battery distributor for the full details as soon as possible.



S. L. Wagoner, who manages Central TV, Seattle, Wash., in partnership with J. W. Dawson, demonstrates the ease with which shelves on the tube-dispensing rack can be manipulated for checking or replenishment of stock. Unit also accommodates tube tester and product literature.

## 'Shirt-Sleeve' Ingenuity Yields Extra Dividends for Two West Coast Dealers

As every technician knows from experience, a little ingenuity in the right direction can sometimes produce outstanding results. Here are recent examples of how resourcefulness paid off for two West Coast dealer outlets:

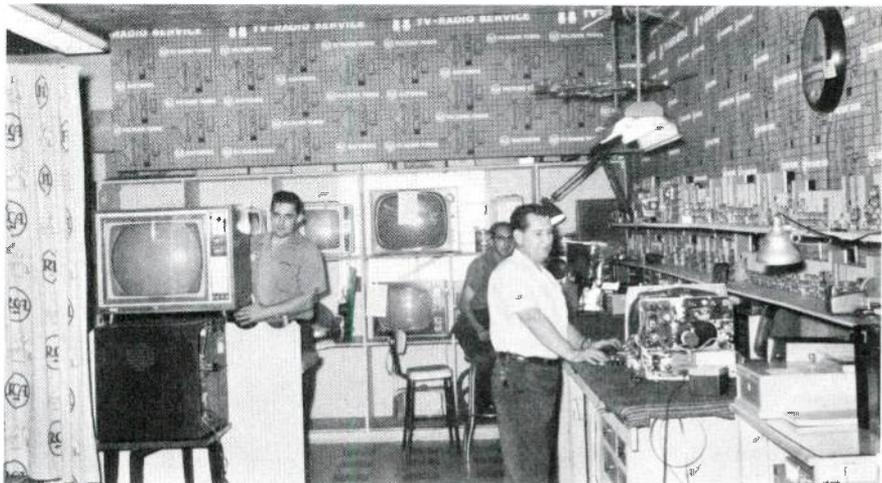
In Seattle, Wash., Central TV devised a tube-dispensing rack that not only accommodates a wide variety and large quantity of types but also offers a simple method for checking stock and maintaining balanced inventories. The unit also includes special shelving for a tube tester and product literature.

At the base of the rack is sufficient space for storage of a few TV picture tubes. Above this, six shelves made of 3/4-inch plywood can be lifted up, pulled out, and individually locked in place while inventory is being checked

or new tubes are being added. When this is accomplished, each shelf is merely pushed back to its original position where it again locks in place.

Tube types are separated by means of "channels" formed by heavy strings and wire brads. These tube types, therefore, are held in line without spilling over into adjoining sections.

In Long Beach, Calif., the Writeway Company redecorated their service department, using all available RCA material supplied by their distributor to maximum advantage. Enterprising adaptation of RCA Corrugated Window Back Drop (1A1170) to available wall space produced a smart "wall-papered" effect. Results have drawn much favorable comment from over-the-counter customers.



Dressed-up "wallpapered" effect in service department of Writeway Company, Long Beach, Calif., was provided through use of RCA Corrugated Window Back Drop (1A1170). Shown, left to right, are Service Technicians James C. Abouzeck and Rudolf Munson and Service Manager Marvin Carithers.

# PLAIN TALK

AND

## Technical Tips

### Shielding

Don't underestimate the importance of replacing tube and circuit shields in the tuner unit, picture if, and sound sections of a television receiver. Carelessness in replacing or securing shields properly can lead to receiver performance problems such as interference beats in the picture, if oscillations, degraded pictures, distorted sound, and critical fine tuning.

Shields have an appreciable effect on the alignment of a receiver and are important to receiver performance. This is especially true in a color receiver. For example: neglecting to replace the shields on the if tubes of a color receiver in certain instances can change the if response enough to result in a complete loss of the color picture signal. This condition may go undetected when checking the color receiver on a black-and-white program.

Always check the circuit and tube shielding after servicing a television receiver. Make sure all shields are properly installed and properly grounded. Avoid an uncalled-for customer complaint.

### Testing Sweep Circuitry

A systematic approach can be of great advantage in troubleshooting sweep circuitry. The use of a good oscilloscope along with practical signal injection tests can save a technician considerable time in servicing and simplify circuit analysis.

**Horizontal Circuits**—In instances where a defective horizontal deflection system affects the horizontal deflection circuits to the point of killing the high-voltage completely (together with B+ boost), it requires a bit of knowhow to pinpoint the source of trouble, since there will be no raster to symptomize the source. In such cases, the circuit can be analyzed most readily through the use of an oscilloscope. Check the control grid of the horizontal output tube first (see Figure

1). If the proper waveform is obtained, it is safe to assume that the horizontal oscillator is driving the output stage, and even though its peak-to-peak amplitude may not be quite up to par, it should be sufficient to develop a raster on the screen. Under these conditions, it's safe to assume that the source of the trouble is located somewhere beyond the control grid of the horizontal-output stage.

To check the horizontal output circuit (assuming all tubes have been tested), measure the "B-Boost" voltage. If "B-Boost" is present, the trouble is most likely an open high-voltage rectifier circuit. If "B-Boost" is not present, remove the cap lead going to the high-voltage rectifier cap and check "B-Boost" again. Should this bring back "B-Boost," a shorted high-voltage rectifier circuit is indicated. If "B-Boost" does not return when the high-voltage rectifier cap is removed, the trouble is isolated to the horizontal output transformer, deflection yoke, or damper circuit of the receiver.

To check the horizontal deflection yoke, unsolder the yoke leads from the

circuit. If the yoke is defective, its removal from the horizontal circuit will (in the majority of circuits) substantially bring back the high-voltage and "B-Boost." Before discarding a yoke, make certain that the yoke winding is defective and that it is not simply a yoke coil shunting capacitor or resistor.

**Vertical Circuits**—Vertical sweep circuitry can be checked easily by employing a similar signal tracing procedure. Use an oscilloscope to check the waveforms on the grid of the vertical output tube (see Figure 2). If the proper waveform is found here, a check of the vertical deflection coil windings is in order. To do this, disconnect the yoke from the circuit and, with the set turned on, apply 6.3 volts ac (from a tube heater) across the yoke. If the yoke is operating satisfactorily, a non-linear raster will form with sections overlapping, since the sweep will be sine-wave in form and not saw tooth.

RCA television receivers use a feedback circuit between the plate of the vertical output tube and the grid of the "discharge tube" to form an oscillator feedback loop. If there is no waveform on the grid of the vertical output tube, the circuit is obviously not oscillating. To find out why, check the stage by applying a 60-cycle, 6.3-volt, ac heater voltage through a .1  $\mu$ f capacitor to the grid of the vertical output tube. If the vertical output stage is operating, some vertical deflection will be noted on the face of the picture tube. If vertical deflection is observed, discount the vertical output transformer yoke and other components in the plate circuit and apply the 6.3-volt ac signal to the plate of the "discharge tube." If vertical deflection is observed from this point, the source of the trouble is isolated to the feedback circuitry or the "discharge tube" grid components.

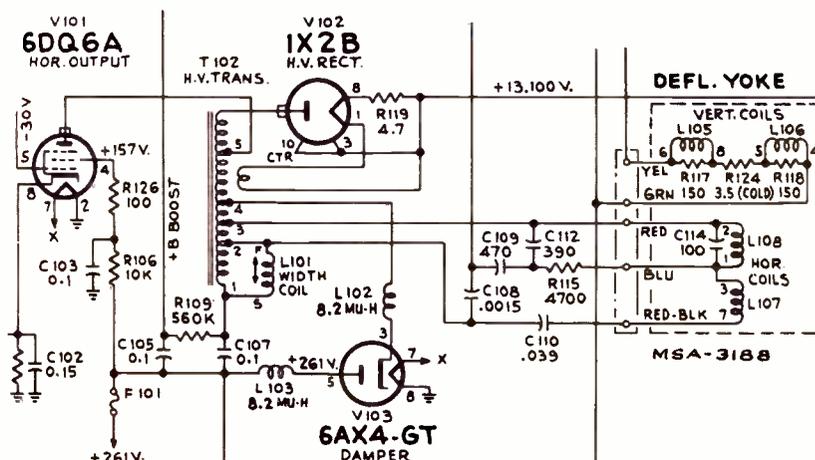


Figure 1: partial schematic of horizontal output circuitry.

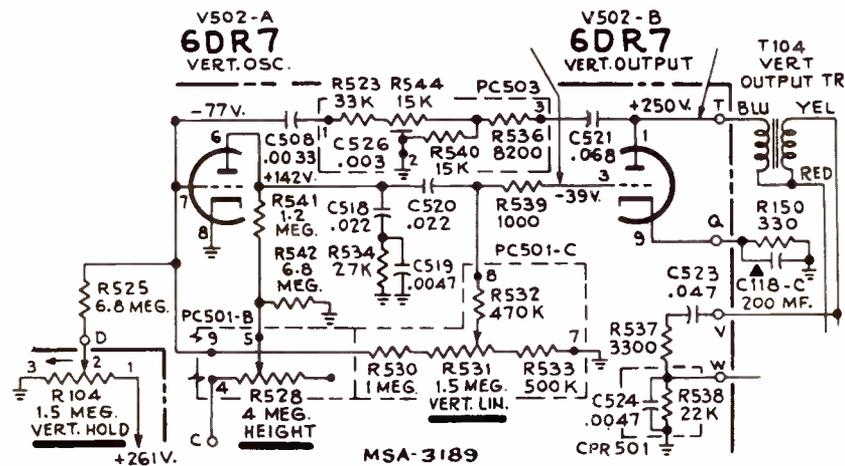


Figure 2: partial schematic of vertical sweep circuitry.

Develop a systematic approach to servicing; learn to use an oscilloscope and signal injection tests advantageously.

### Horizontal Control Systems

Regardless of what method is used to control the frequency of horizontal deflection oscillators in television receivers, the circuits basically function on the principle of comparing the phase and frequency of the horizontal oscillator signals with the phase and frequency of the incoming sync signals. When the two are not in step, a dc control voltage is developed which corrects the frequency of the oscillator. Since two signals are being compared in respect to time, the control circuits are basically phase detectors of some type.

**Synchroguide System**—In the synchroguide type of horizontal control system, a blocking oscillator and control circuit function as an integral unit. The oscillator output is fed to the deflection circuitry and also to the grid of its associated control tube (see Figure 3). The oscillator control action is accomplished by comparing the frequency and phase of the incoming sync pulses with the frequency and phase of the oscillator output waveform at the grid of the control tube. Actually, the combination of the positive peaks of the sawtooth pulses and positive peaks of the sync pulses govern the conduction time of the control tube. The amount of conduction existing in the control tube determines the amount of positive voltage formed on its cathode. This cathode voltage is the dc control voltage used to govern the frequency of the oscillator.

To improve the frequency stability of the circuit, a sinewave pulse is formed in the oscillator circuitry and applied to the grid of the control tube to sharpen the approach of the positive

peak of the oscillator output waveform. This makes the control circuit less susceptible to premature triggering of the control tube due to line voltage fluctuations or slight circuit changes.

The synchroguide type circuit requires no differentiator circuit because the leading edge of the sync pulse is

the controlling medium. However, in order for the circuit to function properly, the sync pulses applied to the system must be constant in amplitude.

The control tube cut-off point is also very critical in the synchroguide circuit. Therefore, to maintain stability, the control tube grid is tied in with the oscillator grid. The Horizontal Hold Control in this circuit serves to change the grid leak bias characteristics of the oscillator section of the circuit whenever an oscillator frequency change is required.

**Synchrophase System**—Control of the horizontal sweep oscillator used in KCS129 chassis is accomplished through the use of a synchrophase type of control system. This type of horizontal oscillator control circuit serves particularly well in areas where the signal is weak or subject to excessive noise interference. The synchrophase system employs an oscillator and control tube circuit that is practically the same as that used in the synchroguide system. However, it incorporates a bal-

(Continued on next page)

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# Plain Talk and Technical Tips

(Continued from preceding page)

anced discriminator type of circuit wherein a dc correction voltage is formed across the diode load resistors (see Figure 4). As in the synchroguide control system, the phase of incoming horizontal pulses are compared with the phase of the horizontal oscillator waveform. Any difference in phase sets up a dc control voltage that corrects the frequency and phase of the horizontal oscillator to conform with the frequency and phase of the incoming sync pulses. Neither the sync pulses by themselves nor the feedback voltages by themselves can produce a dc voltage in the output of the discriminator. However, when both sync pulses and sawtooth voltages are applied to the discriminator diodes, they may produce a positive voltage, a negative voltage, or zero voltage dependent upon the phase relationship between them.

The sync pulses control the conduction of the diodes; the only portion of the waveform fed back from the horizontal oscillator that affects the conduction of the diodes is the portion that is applied at the same time as the sync pulses.

When the two voltages are in phase, the saw-tooth voltage is passing through its ac axis at the same moment that the sync pulse is making the diodes conduct, and each diode conducts equally. This is the desired condition. Any dc voltage developed across the diode load resistors R160 and R161 (see Figure 4) is the result of a phase error between the incoming sync pulses and a voltage derived from the horizontal sweep oscillator. Whenever the sync pulses lead the horizontal sweep waveform, one diode will conduct more than the other. The situation is reversed when the sync pulses lag the horizontal sweep waveform. If the sweep generator tends to run too fast (sweep leading sync pulses), a negative AFC voltage will be developed. Likewise, if the sweep generator runs too slow (sweep lagging sync pulses), a positive voltage will be developed. If the incoming sync pulses and the voltage feed-back from the horizontal oscillators are in phase, the discriminator voltage in the AFC output will be zero.

The output voltage from the discriminator is passed through a filter circuit before it is applied to the oscillator control tube. The filter prevents pulse disturbances from directly affecting the control tube. It also prevents random noise pulses from developing a voltage which if passed on would affect the

proper action of the control tube; and it prevents a condition known as "hunting" from occurring in the control system.

The amplitude of the signals being compared have little effect on the action of the synchrophase control circuitry. Control is governed by the phase relationships of the signals. The synchrophase system features excellent

stability even under extreme conditions of noise and interference.

## Noise Cancellation

One of the performance improving features incorporated in RCA Victor's KCS129 deluxe television-receiver chassis is the noise cancellation circuit. This circuit keeps all the noise pulses that are greater in amplitude than the tips of sync from entering the sync and AGC circuitry of the receiver. The circuit accomplishes this by taking a little of the video signal from the output of

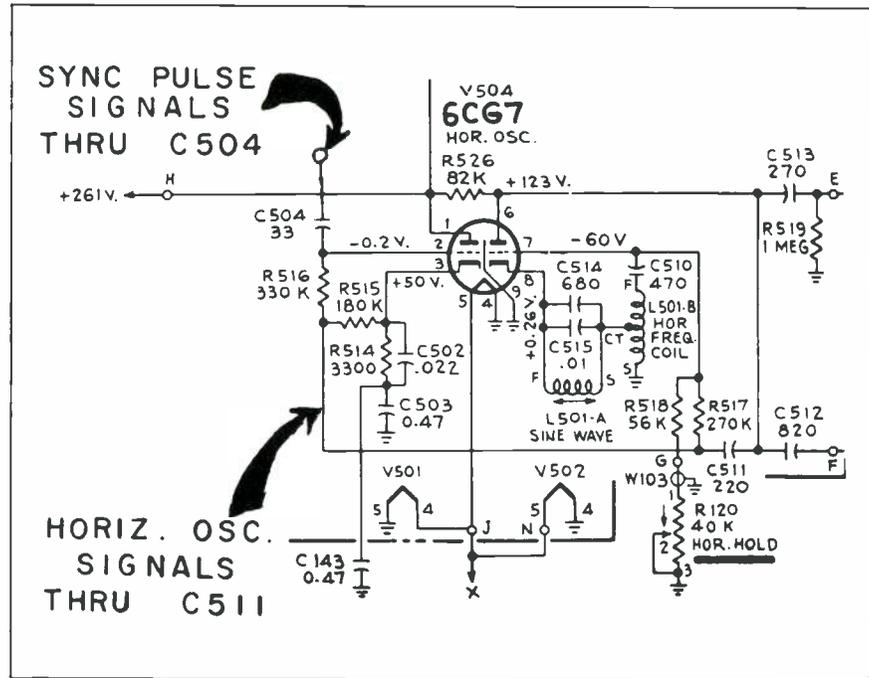


Figure 3: partial schematic—synchroguide type of horizontal oscillator and control system.

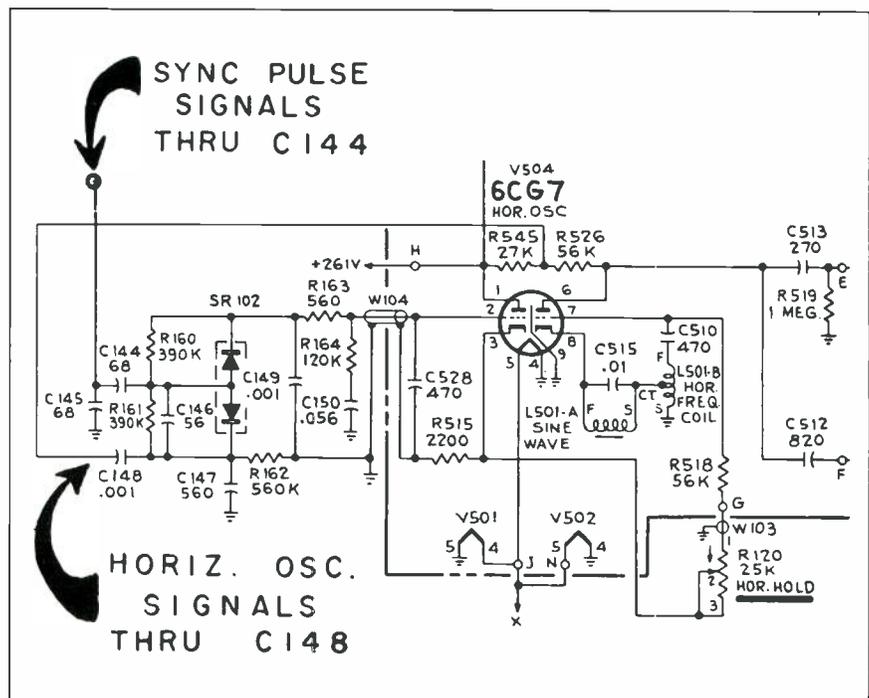


Figure 4: partial schematic—synchrophase type of horizontal oscillator and control system.

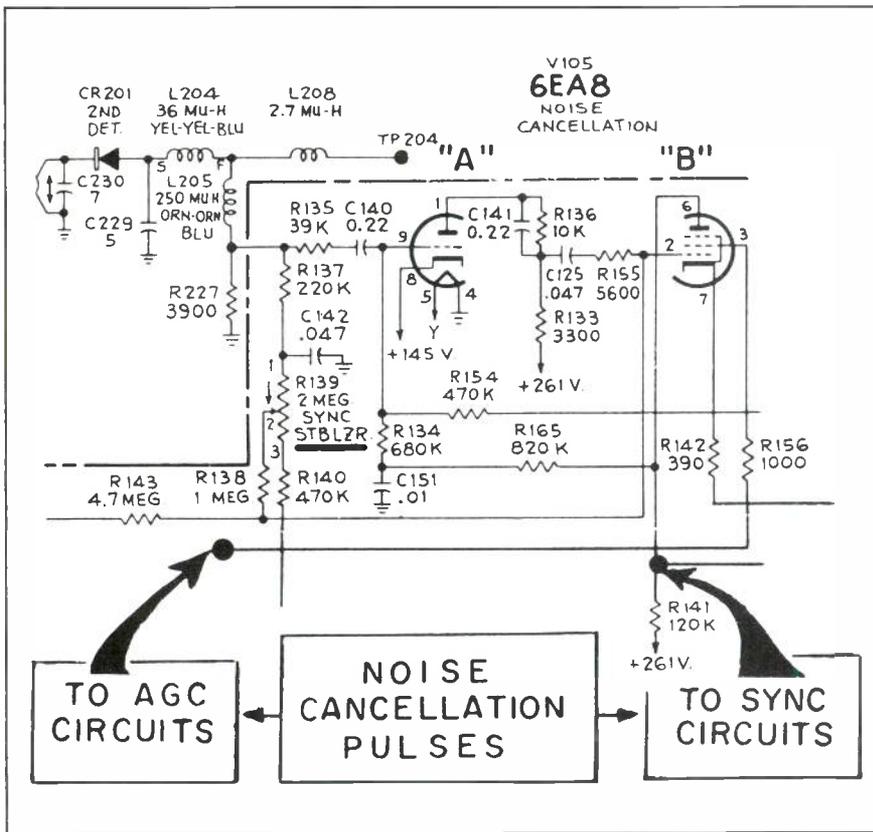


Figure 5: partial schematic—noise cancellation circuitry, KCS129 chassis.

the second detector, clipping the signal (passing only the noise pulses greater than the tips of sync), and governing the phase and amplitude of the pulses so that they may be applied to the input of the sync and AGC stages of the receiver in the form necessary to cancel all high level noise pulses that exist in the video signal being fed into these circuits.

**Circuit Operation**—Video signal information is taken from the output of the second detector and applied to the grid of V105A, the first tube in the noise cancellation circuit (see Figure 5). The tips of sync are negative at this point, and V105A is biased so that all but the tips of the sync pulses are driven into saturation. This provides the desired clipping action. The remaining signals (noise pulses and the tips of sync) are coupled from the plate of V105A to the grid of V105B (the second tube in the noise cancellation circuit). V105B is normally heavily biased so that only the noise pulses above the level of the tips of sync are amplified and made available for noise cancellation purposes.

**Control and Regulation**—Noise cancellation adjustment is accomplished by varying the bias on the second section of the noise cancellation circuit, V105B. The bias applied to V105B is obtained from four different sources which together provide for control and regulation of the noise cancellation cir-

cuitry. The bias is formed by a fixed positive voltage applied to the cathode of V105B (picked up from the cathode circuit of the vertical sweep amplifier) and a negative voltage applied directly to the grid of V105B that is the result of a fixed negative voltage picked up at the grid of the horizontal output tube, a negative voltage derived from the second detector, and a bucking positive voltage picked up from the cathode of the first picture if tube. By combining these voltages, a bias voltage can be set up on the grid of V105B through the adjustment of the STABILIZER CONTROL that provides for the proper amount of noise cancellation within the receiver.

It is interesting to note that the bias in the noise cancellation circuitry is applied in a way that provides for automatic control of the amplitude of the pulses. When weak signals are received, the bias in the noise cancellation circuitry is decreased, which provides greater amplification of noise pulse cancellation signals. This is due to the increase in positive voltage developed at the cathode of the first picture if amplifier and the decrease in negative voltage formed in the output of the sound detector during weak signal reception. Both voltages are used in the development of the bias voltage on V105B (see Figure 5). When strong signals are received, the opposite action takes place. This increases the bias

in the noise cancellation circuitry, decreasing the amplitude of the noise cancellation pulses. In addition, when the noise cancellation circuit is subjected to repetitive noise impulses (such as from an electric motor), the continuous noise amplification lowers the plate voltage of V105B which, in turn, lowers the bias on V105A and provides for greater noise cancellation.

**Anti-AGC Lockout**—To avoid the possibility of AGC lockout due to excessive noise pulse cancellation, a dc voltage is fed back from the screen of the video amplifier to the grid of V105A. Whenever the video stage tends to overload, the voltage from the screen of the video amplifier increases and changes the grid bias voltage of V105A such that it limits the noise pulse amplification.

The noise pulse cancellation circuitry provides for remarkably stable performance and satisfies the most critical of customers, even in fringe area service.





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