



RADIO SERVICE NEWS

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Vol. 2, No. 8

NEW SERIES OF RCA SERVICE MEETS START SEPTEMBER 14

Technical Features of 1937 RCA Victor Receivers to Be Discussed at Initial Gathering—High Fidelity Reproduction of Records at Second

With total attendance well over 100,000, RCA distributors are inaugurating the third year of the famous RCA Service Meetings with two highly timely and interesting lectures. The first series of lectures, which will run from September 14 to October 23, in more than 150 cities, will cover the new 1937 RCA Victor Receivers and the most recent technical developments in the radio art. A special feature will be a cathode-ray demonstration of alignment stability.

As in the past, there will be free prizes, souvenirs and booklets. In the first series of meetings, each service engineer attending will receive a free portfolio of RCA Victor Service Notes covering the new line of receivers. The second series of meetings, which will get under way November 5, will cover all phases of High Fidelity reproduction, including recording, dynamic amplifiers, new pickups and specialty loudspeakers.

Since 1934, RCA has held twelve series of meetings on a wide variety of subjects of special interest to service engineers. Other meetings have been held for radio amateur organizations, schools, universities, etc. With increasing attendance at each new series, Ted Ostman, service manager, predicted that attendance at the new Magic Voice and High Fidelity Series will far surpass all previous records.

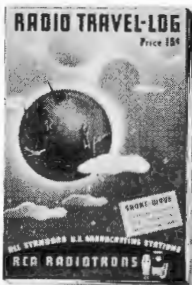
While all dates for these meetings have not been definitely set, RCA Parts and RCA Victor Instrument Distributors are prepared to announce the exact dates for particular localities as soon as possible.

Service engineers desiring to attend these meetings should immediately get in touch with their distributor. Attendance at all meetings (Continued on Page 2, Column 5)

Travel-Log Is Now Available To RCA Dealers

New Log Book Has 36 Pages Of Important Information

A new log book, called the Radio Travel-Log, has just been made available to all RCA dealers and service engineers, according to a recent announcement by D. J. Finn, Manager of Radiotron and RCA Parts Advertising. This book, said Mr. Finn, is fresh from the press and includes more useful features than any other log book ever offered to the listening public. Features include special information on getting the most from



Starts 20,000 Mile Test



Lewis M. Clement, RCA Victor Vice-President in charge of research and engineering, is shown handing shipping instructions to a hostess and pilot of United Air Lines. This picture was taken at the start of a "meteorologic" demonstration of the ability of a new RCA Victor radio to withstand drastic changes of heat, humidity and altitude in a flight from Camden, N. J., to Manila, in the Philippines, and return. F. X. Rettenmeyer, Manager of RCA Victor receiver engineering, is at extreme left, and Ovid Riso, Export Advertising Manager, is at the right.

your radio, characteristic calls of foreign short-wave stations, complete listing of all standard U. S. broadcast stations and short-wave stations throughout the world.

The center spread of the new RCA Travel-Log is occupied by a large time-zone chart which shows the equivalent times in all foreign countries when it is noon at New York. This permits one to quickly compute the exact local time of any broadcast, a necessity for enjoyment of short-wave programs.

The Travel-log contains a strong Check-Up ad for helping the service engineer or the dealer's service department. Blank pages are provided (Continued on Page 2, Column 1)

20,000-MILE FLIGHT TESTS NEW RCA SET

Flight Made From Camden, N. J., to Manila

A demonstration of the ability of one of the new RCA Victor radio receivers to withstand drastic changes in temperature, humidity and altitude in a 20,000-mile air flight between Camden, N. J., and the Philippines, was begun with a brief send-off ceremony at Camden Central Airport recently.

Lewis M. Clement, Vice-President in charge of RCA Victor research and engineering; Tom Joyce, Advertising Manager, and officials of RCA's International Division, stood by as a small table model RCA Victor instrument was turned over to the hostess and pilot of a United Air Lines air express, for a swift journey to Alameda, California. At Alameda, the set was transferred to one of the famous China Clippers which flew it to Manila, in the Philippines.

Perfect at Manila

A check-up of the radio in Manila determined that the various radio circuits were still in perfect alignment, with no apparent impairment of sensitivity or selectivity. The instrument will be shipped back by the same route.

Radio instruments designed for use in tropical countries must receive special cabinet and wiring treatment to withstand the extremes of heat and humidity, Mr. Clement explained. The use of "Magnetite" core (intermediate-frequency) transformers, and of air trimmers of the plunger type insure stable operation of the complex radio circuits under all weather conditions, he said.

RCA Business Registers Big Gains In 1936

New Models In Great Demand, Says RCA Executive

The radio set and phonograph record business of RCA Victor has been making spectacular advances with the introduction of a new line of radio instruments featuring Magic Brain, Magic Eye and the new Magic Voice, and a more widespread appreciation of good music, including the currently popular fancy for "swing" music, according to Thomas F. Joyce, Advertising Manager of the RCA Manufacturing Company.

Public acceptance of the new "Magic" radios, plus the most spectacular low-priced line in RCA Victor history, has more than doubled in the first seven months of 1936 over last year, said Mr. Joyce. In the month of July alone RCA Victor shipped more than three times as many radio sets to its distributors as in the same month last year, he said. The company's factories are working at near capacity to produce enough radio instruments (Continued on Page 2, Column 3)

Keeping Cool



Jane Richardson, pretty NBC dramatic actress, finds it easy to keep cool as long as she is in NBC headquarters in Radio City, New York, which is swept by the cooling breezes of one of the world's finest air-conditioning plants. Miss Richardson graduated to radio from the stage and films.

THE STORE WITHOUT A LEADER—An Editorial By F. B. Ostman, Manager of the RCA Service Division



F. B. Ostman

Is your store "without a leader"?

A study made by RCA Radiotron of various types of retail outlets shows the average radio dealer to be without a means for building a regular flow of business. Retailers in food products, drugs, hardware, and others, build a successful trade largely through a group of common products and necessary staples, the regular demand for which creates steady consumer traffic. Such retailers have a system—a plan of merchandising—which almost automatically regulates sales and profits.

One of the outstanding schemes employed by retail outlets of popular merchandise is the featuring of "leaders" or "specials"—not solely by cutting price—to create a demand for other products. The grocer features nationally advertised staples such as soup, beans, etc., and thus leads his customers to purchases of fancy canned goods in which he reaps a long profit. The auto service station features a \$1.00 (or less) grease

job to lead to sales of spark plugs, accessories, and repairs, in which he maintains a long profit.

But the problem of the radio retailer is somewhat different. He must go to his customer because the customer does not come periodically to him. And yet FEW RETAIL OUTLETS ARE IN A BETTER POSITION TO CAPITALIZE ON A MERCHANDISING PROGRAM WHICH EMPLOYS A "LEADER," THAN THE RADIO RETAILER.

Radio dealers who frown on service scorn the most resourceful leader they can employ for long-profit sales. A properly operated service department can greatly increase the sale of profitable items such as tubes, antennas, accessories and uncover many new customers for higher priced items, radios, refrigerators, etc. The radio dealer's cue is to take his service department out of the "poor relation" class and make it the "helpful Henry"—make it a real leader.

Travel-Log Is Now Available To RCA Dealers

(Continued from Page 1, Column 3) vided for individual dial recordings. The book is 6 x 9 inches and has an unusually attractive three-color cover.

Orders for the new RCA Radio Travel-Log should be placed through RCA Radiotron distributors or direct from any RCA Radiotron warehouse when accompanied by a remittance. Prices are as follows:

- In quantities up to 1000 copies—\$3.00 per hundred.
- In quantities of 1000 to 2500—\$2.75 per hundred.
- In quantities of 2500 or more—\$2.50 per hundred.

All orders for the Travel-Log will include a prominent three-line imprint plus your choice of two consumer messages.

(913S) Ever since we started in the radio business the customer's satisfaction has been our first consideration. That is why today more people than ever before are calling upon us to remedy their radio troubles. Won't you, too, keep us in mind when your radio is not acting properly? Perhaps it's a loose connection; maybe a weak tube—we carry RCA Radio Tubes you know. Whatever the trouble may be, we are at your service—and our prices will please you.

(913) Today more people than ever before are specifying RCA

"Follies" Star



Patti Chapin, young CBS singing star, who was recently chosen as one of the headliners for the new "Ziegfeld Follies of the Air" series, broadcast over WABC and the nationwide Columbia network each Saturday, from 8:00 to 9:00 P. M.

when buying radio tubes for their sets. If it's a tube you need to make your old radio play like new, we carry RCA Radiotrons, stocked and ready to sell in tamper-proof sealed cartons for your protection. Call on us for proven lines of merchandise. (Specify Copy "913S" or "913" when placing orders.)

RCA Business Registers Big Gains In 1936

(Continued from Page 1, Column 5)

to meet the requirements of its retailers.

Public Prefers Magic Features

Mr. Joyce attributes the gains in RCA Victor sales to a number of factors. First, is that the public has shown a preference for the "Magic" features of the RCA Victor instruments. Second, improvement in business generally has had its proportionate effect on the radio industry. The presidential election campaign, too, is having a beneficial effect on radio sales. Then, too, millions of old radio receivers are being replaced by new instruments which embody all the newest convenience and performance features at small cost.

Record Sales Zoom, Too

As convincing evidence of the extent to which the phonograph record business is staging a comeback in popular favor, Mr. Joyce disclosed that each year, for the past three years, sixty per cent more people have bought Victor records of all classes with new gains being registered monthly. In both May and June, of this year, ordinarily the quietest from a volume sales standpoint, more records were purchased than during any December, the high month of the year, since 1930. Appreciation of

so-called classical music has never been more widespread, Mr. Joyce said. Radio broadcasting of famous artists and symphonic orchestras has stimulated this interest, and records are satisfying it. The popular record field, too, is benefiting from the popularity of "swing" music. The leading exponents of this type of music, as well as the most famous classical artists, are all under contract to record for RCA Victor, Mr. Joyce said. "Higher Fidelity" methods of faithfully recording sound-on-disks and reproducing it in the home have also been responsible for the return of the phonograph

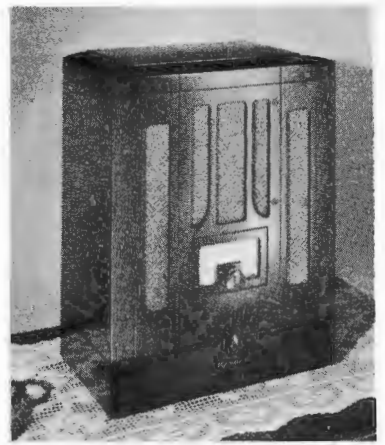
RCA OSCILLOGRAPH NOW HAS SHIELD FOR CALIBRATION

The famous RCA Cathode Ray Oscillograph is now fitted with a special translucent calibration shield that greatly increases the usefulness of this remarkable instrument. The new shield is fitted between the end of the Cathode Ray Tube and the escutcheon on the case. The four escutcheon screws also hold the shield. Those engineers who purchased their RCA Oscillographs prior to the inclusion of this shield, may purchase it from their RCA Parts Distributors at 25 cents, net.



RCA Cathode Ray Oscillograph

Battery Model



The new RCA Victor Model 5BT will find a ready market in the 2-volt battery field. This instrument, which has such features as a 530 to 1800 kc. tuning range, 2.2 watts output and an exceptionally low battery drain, is being featured by RCA Victor Dealers at the low Eastern list price of \$32.95 (less batteries).

RCA Service Meets Start In September

(Continued from Page 1, Column 1) is necessary to gain either an attendance certificate or a second year seal.

The following dates have been set:

	Magic Voice Series	High Fidelity Series
Akron	9/18	11/12
Albany	10/2	12/2
Baltimore	10/20	12/11
Boston	9/22	11/17
Buffalo	10/15	12/11
Burlington	9/30	11/30
Canton	9/22	11/13
Charlotte	10/7	12/2
Chicago	10/6	12/1
Cincinnati	9/16	11/10
Cleveland	9/24	11/17
Columbus	9/28	11/19
Davenport	9/29	11/20
Dayton	9/14	11/5
Detroit	10/15	12/9
Elmira	10/8	12/7
Erie	9/14	11/5
Grand Rapids	10/13	12/7
Hartford	9/14	11/5
Huntington	10/2	11/27
Indianapolis	9/22	11/16
Louisville	9/18	11/12
Milwaukee	10/1	11/24
New York	9/18	
Norfolk	10/13	12/7
Peoria	9/24	11/18
Philadelphia	10/27	
Pittsburgh	9/30	11/24
Portland	9/28	11/24
Providence	9/24	11/19
Richmond	10/9	12/4
Roanoke	10/5	11/30
Rochester	10/13	12/9
South Bend	10/8	12/3
Springfield	9/16	11/9
Syracuse	10/6	12/4
Toledo	10/19	12/11
Washington	10/15	12/9
Worcester	9/18	11/12
Youngstown	9/16	11/9

New Cards

FREE! RADIO "Check-up"

Bring your radio to our shop and we'll do the following work entirely free of charge:

- 1 Check overall set performance for continuity.
- 2 Check speaker and cabinet for proper assembly and safety.
- 3 Test and label all tubes.
- 4 Check volume of cabinet.
- 5 Align antenna, detector and oscillator circuits.
- 6 Check final volume of any automatic or auto-tuning.

If you would prefer to have us call at your home, a \$1.50 service charge will be made. This also will include a thorough check of your street, ground, lightning system and a check of any wiring. If new tubes, parts or additional repairs are necessary, these, of course, will be additional.

YOUR IMPRINT HERE

FORM 1320

Let us X-RAY your Radio

WITH OUR NEW RCA CATHODE RAY OSCILLOGRAPH

This instrument, called the X-Ray of radio, permits us to see as well as hear the condition of your set. It guarantees new set performance to your radio. A phone call brings our representative.

MODERATE CHARGES - PROMPT SERVICE

YOUR IMPRINT HERE

FORM 1321

Either of the above cards have the punch needed to bring in new business. Order direct from RCA Radiotron, Camden, N. J. Price \$1.25 per 100, imprinted on government stamped post cards.

FLASH

All RCA Test Equipment

Now Available on Time Payments!

Radio engineers can now own RCA's finest, most modern apparatus on new easy plan!

BETTER servicing means more profitable business. And there's no advertising that does a better job than the word-of-mouth praise of satisfied customers.

Give your customers a swell service job—and they tell their friends how good you are. This increases your business. The best way to do a praiseworthy job is to start off with the proper test equipment... made by Radio's Leader, RCA!

Lots of radio engineers have realized this—and have laid cash on the line for RCA Test Equipment. Lots of others wanted it—but price stood in the way. So now, in order that all may enjoy the benefits of this varied line of great apparatus, RCA makes it available on easy time payments! The plan outlined for the RCA Cathode Ray Oscillograph (in panel) is a typical example.

Do not wait a day longer! Order your equipment now. Profit now. Pay later!



(Above) RCA Cathode Ray Oscillograph, magic trouble-finder, with tubes \$84.50 cash, or \$10 down, \$6.92 per month, 12 months to pay; newly developed calibration screen for making comparative image measurements now available.

RCA Beat Frequency Oscillator, \$64.50, or \$10 down, \$5.25 per mo., 12 mos. to pay.

RCA Universal AC Bridge, \$49.65, or \$10 down, \$5.71 per month, 8 months to pay.

RCA Regulated Power Unit, \$39.50, or \$10 down, \$5.02 per mo., 7 mos. to pay.

RCA's easy payment plan also applies to a combination purchase of two or more test equipments. RCA test instruments not listed here include RCA Test Oscillator, RCA Frequency Modulator, RCA Vibration Pickup, RCA Piezo-Electric Calibrator.



1936-1937 CHECK-UP PLAN

—The Service Man's Sales Builder BIGGER AND BETTER THAN EVER!

The 1936-1937 Plan will get under way soon. A bigger, better, more profit-resultful plan than ever before. A plan backed with advertising even more aggressive, compelling and comprehensive than in the past. New mailing pieces, new window displays, new interior displays. Ask your distributor about them.

ENGINEER FINDS RCA CRYSTAL CALIBRATOR IS OF GREAT HELP

Robert S. Kruse Reports Good Results With Unit for Amateur and Experimental Frequency Calibration

By ROBERT S. KRUSE, Consulting Engineer

The use of a two-frequency crystal for experimental applications has been greatly accelerated with the introduction of the RCA Piezo-Electric Calibrator. The following article by Mr. Kruse describes a few of the many uses of this remarkable device, now being featured by all RCA Parts Distributors at the low net price of \$29.95, complete with crystal, acorn type tube and power supply.

Courtesy of "Radio"

Frankly, we were not at first very cordial toward the RCA Crystal Calibrator. It looked like another serviceman's "gadget." But—after living with the Calibrator, one gets an altogether different view of the device.

The RCA Crystal Calibrator has as its main distinction a trick crystal which can oscillate at either 100 kc. or 1,000 kc., thus making available two complete families of harmonics. One family starts at 100 kc. and is spaced 100 kc. apart at 200, 300, 400, etc., right on up to 20,000 kc. or more. This gives a fine lot of calibration points. In fact they are so close together that it is easy to get the wrong one by the tail when making a first calibration or spotting points on a receiver dial. This is where the second frequency comes in. By merely flipping a switch to "Hi" the oscillator jumps to 1,000 kc. and gives a point there with harmonics at 2,000, 3,000, 4,000, 5,000, 6,000 and so on, right on up to 50,000 kc. and beyond. Another

unfamiliar receiver is at the wanted frequency or whether one has the wrong harmonic. With the RCA Crystal Calibrator this is simple. By merely flipping the switch to "Hi" we set up the other system of harmonics, one of which is sure to be at 4,000 kc. Locating this, one flips the switch back to "Lo." A signal is still heard, but this is the 40th harmonic of the 100-kc. oscillation. Now we know which harmonic we have and it is only necessary to tune in the direction of lower frequencies until another harmonic is found—it will, of course, be 3,900. In almost any combination these cross-checks are possible in one way or another.

Amateur Band Spotting

About 17 frequency points will outline all the amateur bands for which this oscillator is directly available. Of these 17 points it is possible to hit three with both the "Hi" and "Lo" range, six with the "Lo" range, five with the "Hi" range. This leaves but three which cannot be spotted directly and all of them have values such that they are easily interpolated on either receiver or oscillator (monitor, that is) with considerable ease and acceptable accuracy. The guaranteed accuracy of the crystal calibrator is two parts in a million, and any accidental drift can readily be checked by going to the nearest broadcast receiver, tuning in any station operating on 600, 700, 800, 900, 1,000, 1,100, 1,200, 1,300, 1,400 or 1,500 kc. Several such stations are available every evening and if one is off the others will give the fact away. The crystal oscillator has a trimmer for adjustment to zero-beat the station which is being received. For this work d-c (battery) plate supply is used on the oscillator.

Transmitter Adjustment

Every amateur transmitter should be operated in conjunction with some kind of calibrated monitor, and, if you are using an RCA Crystal Calibrator, this monitor can be simple and cheap, because it is always possible to spot points on the monitor scale 100 kc. apart, permitting immediate detection of any shifts on the part of the monitor, which can then be simple and cheap. At some operating frequencies it is, of course, possible to hear a beat note in the non-oscillating monitor when the calibrator is placed rather near the monitor and across the room from the transmitter. It is not necessary to work at exactly zero-beat in most cases.

All of the foregoing things have been tried here and were done more readily with the RCA Crystal Calibrator than with any other device previously used, largely because of the two-frequency feature. It is certainly a nice gadget.



RCA Crystal Calibrator

nice feature is provision for using either a-c or d-c plate supply for the 955 Acorn Triode which serves as the oscillator. There are three binding posts. When a c-w signal is wanted, a 45-volt B battery is connected between the two outside posts. When a modulated signal is wanted, the battery is removed and the "+" post is connected to a center binding post, which connects the a-c line to the plate-supply lead. The compactness due to the 955 tube is also a very great convenience.

For Use with Receivers

Anyone who has ever used a monitor or other tunable oscillator to spot frequency points on a receiver knows how easy it is to become uncertain whether one has the right harmonic or not. The double set of harmonics at once removes this doubt. For instance, suppose we are trying to locate the 3,900-kc. edge of the "80 meter" amateur phone band. If we have only the 100-kc. oscillator it is easy to become uncertain whether an

Fox Theatres Contract For RCA Service

More Than 300 Houses In West Affected by Contract

The National Agency Corporation, headed by Spyros Skouras, President, has completed arrangements with the Photophone Division of the RCA Manufacturing Company, whereby the sound reproducing equipment in more than three hundred Fox-controlled theatres in the Middlewest and West will be serviced by RCA engineers.

The contract, which becomes effective October 1, extends for a period of five years and will include the theatres which are part of the Fox West Coast Theatres Corporation, The Fox Intermountain, the Fox Columbia, and the Wisconsin Amusement Enterprise groups. It is the first contract which RCA Photophone has thus far signed for servicing a large group of motion picture houses using competitive sound equipment. Under the new arrangement RCA service engineers will make periodic check-up calls and be available for emergency service, without charge, whenever necessary.

Circuits Rearranged

F. B. Ostman, RCA Service Manager, announced that the Photophone service circuit, which extends throughout the country, is being rearranged to include the new contract theatres. Twenty additional trained sound technicians are to be added to the technical staff, he said. Spare replacement parts for sound reproducing equipment will be warehoused at strategic points throughout the country for immediate availability. The RCA service engineers will be equipped with the most advanced test apparatus known to the electrical art, including the cathode ray oscillograph, an instrument which permits a diagnosis of hidden trouble by making it visible on a fluorescent screen, in much the same way as an X-ray is used by the physician. Other equipment includes Multi-Testers, Beat Oscillators and special test films, all of which insure the rendering of the best service possible.

Murray's Marlyn



Gentlemen who prefer blondes will cast a vote for winsome Marlyn Stuart who's shown idling away her time in the country between broadcasts. She's a featured vocalist in the CBS program "Laugh with Ken Murray," heard Tuesdays at 8:30 P. M., EDST. Murray, who's protegee she is, discovered her dancing in the chorus of Earl Carroll's "Sketch Book."

NEW PRICE CARD

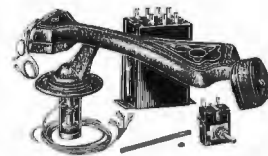
Two new, attractive price cards, one for attaching to the wall near your stock of RCA Radio Tubes, and one for carrying in your pocket, are now ready for RCA Radio Tube Dealers. These cards are up to date; include the new "G" Types and are a necessity for everyone selling tubes. Your RCA Radio Tube Distributor can supply you with either of these cards or you may send your request direct to RCA Radiotron, Camden, N. J.

PICK-UPS AND KITS IMPROVE OLD PHONOS

High Impedance Units Eliminate Input Transformers

A complete regrouping of RCA Pick-Ups and Phonograph Modernization Kits, including the announcement of several new types, has just been made by J. A. Milling, in charge of RCA Parts Sales. This regrouping not only simplifies the line-up of RCA Pick-Ups but also eliminates a number of older types.

Several new universal and high impedance types have been added to the line, while the advanced viscoloid



Stock No. 11080 Kit

type of construction has been adopted for all pick-ups except those of the Junior type. This means that the performance of older type machines, produced prior to 1932, are definitely improved by replacing the pick-up heads with the newer viscoloid type.

Have High Impedance

The addition of two 8,500-ohm pick-ups with output voltages of 1.21 at 400 cycles, gives service engineers a pick-up head that may be connected directly to the grid of a first audio stage without a transformer. While omitting the transformer eliminates the use of a compensated phonograph volume control, nevertheless there are many applications where such connections are necessary.

The complete listing of the new pick-ups and arms is contained in a special descriptive sheet now available from your RCA Parts Distributor. Be sure to ask for your copy.

Operation, With Sound



Eastern Radio Company, of Boston, Mass., has installed RCA Sound Equipment in the operating room and observation gallery of the Massachusetts Memorial Hospital. Speaking through the microphone, the surgeon performing the operation can explain each step to the audience of medical students assembled on the other side of a glass partition.

Window Display Brings Three Calls First Week, Says Dealer

That the quarter mailed for an RCA Check-Up Display was a quarter well invested, was amply proven by the experience of Albert T. Dietrich, owner of the Aetna Radio Electric Co., 127 N. Sutter St., Stockton, Calif. After installing the "Check-Up" Display in his window, three service calls were obtained before the first week had passed and the average price of each was \$5.00. To quote Mr. Dietrich, "The results from this attractive display sure surprised me. Truthfully, I ordered it as an experiment. I am so well pleased with it, that

I'm going in for the whole Check-Up Campaign in a short time."

For those dealers and service engineers who didn't order their display, just place a quarter (or 25 cents in stamps) in an envelope and mail to RCA Radiotron, Camden, N. J. Your display will be promptly mailed.

Distribution of this business-building display is another example of RCA's help to service engineers. Your RCA Radiotron and Parts Distributor will be glad to supply you with details of many other RCA Dealer and Service Engineer helps.

HIGH FIDELITY PHONOGRAPH USES ALUMINUM VOICE COIL

Frequency Range Extends from 50 to 7500 Cycles— Has Volume Expander

By C. M. Sinnett, RCA Engineering Dept.

During the past two years, steady progress has been made in the recording and processing of Victor records. Better tonal balance and lower surface noise are the two outstanding characteristics noted in a direct comparison between older and present day recordings. Paralleling this improvement in Victor records, the RCA Engineering Department has been aggressively engaged in developing a phonograph that would do justice to these record improvements. The RCA Victor R-99 High Fidelity Phonograph is the result of this development work. That it has been an outstanding success is immediately evident on listening to this remarkable instrument, the improvement being so great as to be startling in the realism of its reproduced music.

To accomplish such an improvement in tonal quality, it was determined that frequencies up to at least 7500 cycles must be reproduced. To successfully do this, three new units were required; a new pick-up, a new amplifier and a new speaker.

New Pick-Up Required

The first problem in designing a high fidelity phonograph was to develop a new pick-up. This necessitated a redesign to use smaller moving parts and to greatly increase the flexibility of the armature suspension system. Furthermore, reducing the size of the moving parts meant earlier saturation as well as a direct loss in output voltage. This was overcome by increasing the gain in the amplifier and using a cobalt magnet instead of the conventional chromium magnet in the pick-up. The result of this portion of the development is a pick-up having an essentially flat characteristic from 50-6,000 cycles, with about a 4 db peak at 7,000 cycles and a gradual tapering off in response above that frequency. A viscoloid damping block is used, to hold down the resonance peak and at the same time to push it out somewhat in frequency.

Expansion Required

Having developed a pick-up capable of reproducing the required frequency range, and knowing its impedance and output voltage, the next step involved the development of an amplifier having the desired characteristics. As noted before, the output from the pick-up was considerably lower than any previous type, with the result that it was necessary to incorporate about twice the normal phonograph amplifier gain. In addition to this, approximately 9 db. expansion and at least 10 watts output were desired. A complete schematic diagram (Figure 1) of the instrument is shown to facilitate a better description of the functions of the various parts. Incidentally, the fre-

quency characteristic of the amplifier alone, feeding a speaker load, is flat within 5 db. from 40 to 10,000 cycles. A peak approximately 5 db. in height at 8,000 cycles, and a depression 3 db. deep at 4,000 cycles, have been incorporated for reasons to be explained later. Figure 2 shows the overall frequency characteristic of the amplifier alone.

RCA-6L7 Employed

The first audio stage employs an RCA-6L7 as a volume expander tube. Several circuit changes will be noted if comparison is made with the circuit of the D-22, the major ones being a lower value plate resistor R9, self bias for the No. 1 grid by means of resistor R6, static bias adjusting resistor R20 for the No. 3 grid connected in the RCA-6L7 cathode return, and series feed to the screen through resistor R8. The result is a considerable reduction in the amount of distortion in the tube as an audio amplifier, together with a somewhat less critical adjustment of the expansion starting point or normal gain setting. The RCA-6L7 is resistance coupled to the next tube, an RCA-6C5, which is transformer coupled to the push-pull RCA-2A3 output stage. The RCA-6C5 employs parallel feed in its plate circuit for the purpose of maintaining low frequency response and at the same time insuring that

Uses Dynamic Amplifier



One of the features of the new RCA Victor High Fidelity Phonograph, Model R-99, is an improved new RCA Dynamic Amplifier. Other important features are a new wide-range pick-up, a special aluminum voice coil loudspeaker and an extremely wide-range high-output amplifier. This new instrument is being featured at the low eastern list price of \$149.50.

As on the RCA Victor D-22 the control amplifier tube is an RCA-6C5 but is operated at higher gain than formerly, since less output is available from the magnetic pick-up

Its response at the low frequency end is good down to about 45 cycles. In respects other than the use of an aluminum voice cone, the loudspeaker is of conventional design.

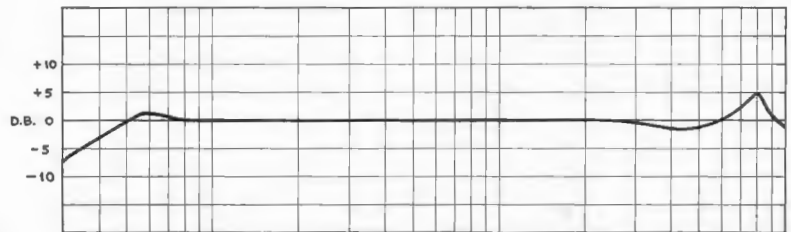


Figure 2—Overall amplifier response

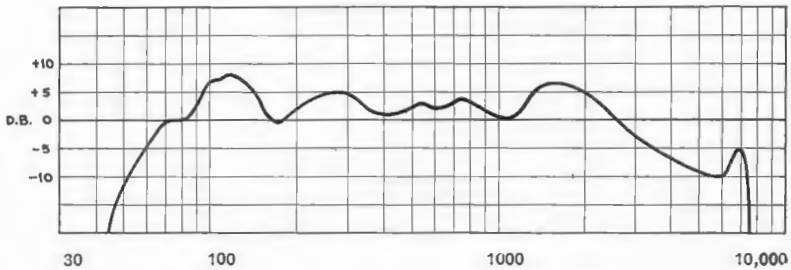


Figure 3—Overall sound pressure curve

maximum voltage step-up to the next stage is obtained. The leakage reactance of transformer T3 causes a high frequency peak at about 9,000 cycles. Since a peak at 8,000 is desirable, the two shunt condensers C12 and C13 serve the double purpose of reducing the frequency of the peak and at the same time prevent parasitic troubles in the grid circuits of the 2A3's. The primary shunt condenser C26 serves to depress the curve ahead of the peak as previously mentioned.

and input transformer system. Also, it will be noted that the rectifier is now a 6H6, employing a higher value diode resistor to make up for this loss in voltage. Resistor R19 and condenser C21 serve as a filter to prevent hash from the rectifier getting back to the No. 1 grid through the adjusting resistor R20 and grid leak R5. The time delay constants R7 and C7 are the same as were employed on the D-22. The rest of the amplifier is essentially conventional, but it should be noted that throughout the design of this unit special care has been taken to insure the hum level being very low. The arrangement of parts on the base, the use of many shielded leads and shielded capacitors have all contributed to an amplifier having an exceptionally low hum level for the amount of amplification present.

Compensation Network Shielded

The input system employed is quite conventional. Transformer T2 is a 40:1 step-up ratio transformer in its own shielding can. The compensation network is also completely shielded in a special steel container to prevent hum pick-up from stray fields generated by the power transformer and motor. The fixed compensation circuit, composed of R1, C2 and L2, takes care of the attenuation of low frequencies on the record during recording. Circuits composed of R2, C3, L3 and R3, C4 and L4 are the aural compensation circuits used in connection with the control R4.

The loudspeaker employed has an aluminum voice coil which greatly increases its high frequency range.

RCA Metal Tube Lighters O.K.'d By Servicemen

Orders for Premium Swamp Factory

When RCA Radiotron Distributors announced the novel RCA Metal Tube Lighters, they felt that service engineers would be interested in this pleasing item. However, neither they nor the factory were prepared for the avalanche of orders that immediately started pouring in. Day work, night work, telegrams and telephones all helped to speed up the job, but still the orders piled up. However, now the factory is beginning to see daylight again, so all the readers of RCA Service News should have their lighters by now.



The lighter is one of the handiest little items yet designed for service engineers. While appearing as a miniature Metal Tube, actually it is a real "he man" lighter—that works—and will give long service. Just what you need to impress your customers and friends.

If you're one of the few who didn't order one, you'd better see your RCA Radiotron Distributor at once.

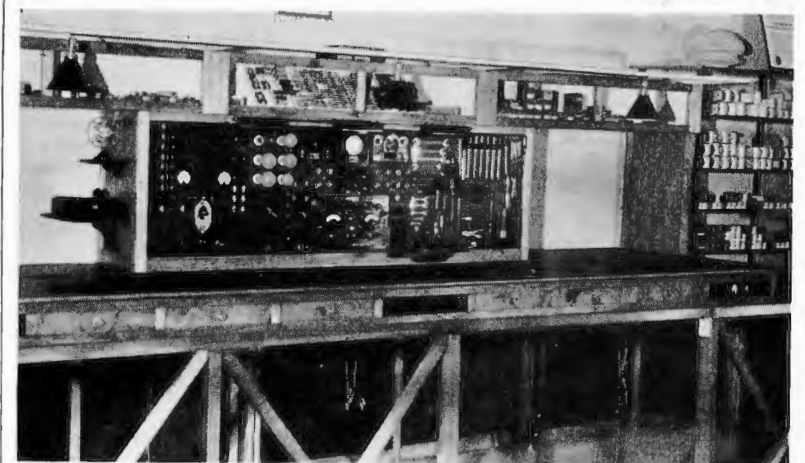
Audio Frequency Discriminator Used

A few words regarding the development of this particular instrument would probably be of interest. In order that the best overall tonal balance could be obtained, at a commercial scratch level, use was made of a device called the audio-frequency discriminator. This device has a control system which permits quick alteration of its frequency characteristic through a division of the audio range (20-10,000 cycles) into eleven bands, each essentially one octave in width. The gain in each of the bands is individually controllable. In addition to this, it is possible to instantly switch the discriminator in and out to obtain a direct comparison between the original and altered fidelities. All the variable controls are suitably calibrated to assist in making preliminary adjustments. An input gain control is provided as a means of adjusting the overall gain through the discriminator for comparison with another system as desired. Output from the pick-up and input system was fed to the discriminator and its output in turn fed to the R99 amplifier and speaker system. A considerable amount of listening was then done by a group of people selected from the RCA Engineering and Sales Departments and the controls of the discriminator adjusted to give the preferred balance between high and low frequencies and surface noise. The result indicated that the overall

fidelity curve should be essentially flat from 50 to 1,000 cycles, with a gradual decrease in response to 4,000 cycles, at which point it should be down approximately 8 db. and then again rise to within 2 db. of the 1,000 cycle level at 7,000 cycles. In this way the fundamental frequencies of the various instruments were not suppressed, the depression at 4,000 cycles reduced the bulk of the needle scratch and the rise above that frequency provided reproduction of the higher frequencies, recorded on the record without appreciable increase in scratch level. A further reduction in surface noise was obtained, amounting to 6 db., by decreasing the pick-up pressure on the record to 2 ounces instead of 4 1/2 ounces as previously used. This reduction in pressure placed a further limitation on the stiffness of the pick-up armature suspension system since faulty tracking would occur unless this flexibility were obtained. It will be noted that a spring balance device is employed in the tone arm to overcome the undesirable effect of a large counterweight.

Figure 2 shows the overall curve of the amplifier alone and Figure 3 shows the overall sound pressure curves of the instrument. It will be noted that the sound curve is quite flat for an instrument of this type employing a single speaker for covering the frequency range required in this instrument.

Has Moving Meter Rack



The Walton Radio Company of Sabetha, Kansas, knows how to make a really convenient service bench. In the center may be seen the Oscillograph, Oscillator and Modulator, and to the left the R-93. The entire panel containing tools and test equipment rides on four rails; an electric motor moves it to any desired position on the bench. The left-hand portion of the panel proper contains a superheterodyne with various circuit leads brought out to binding posts.

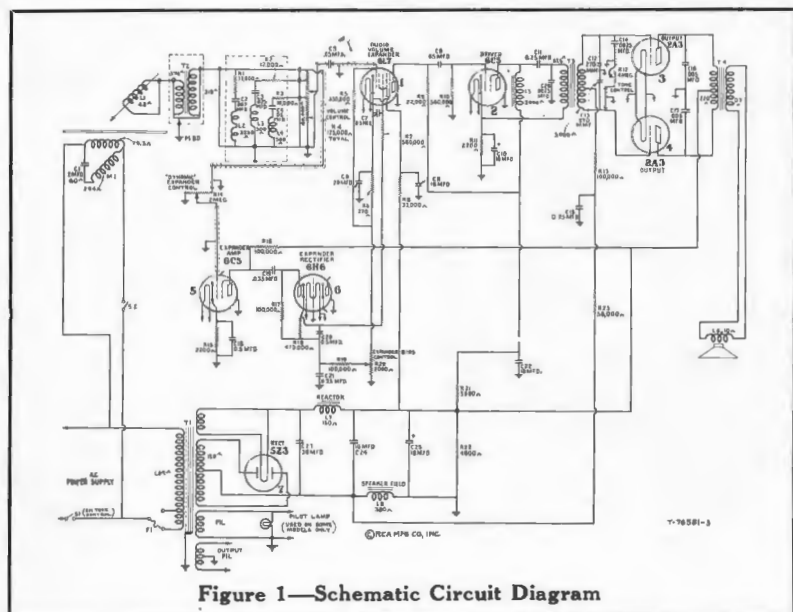


Figure 1—Schematic Circuit Diagram

Service Tips



Now you can win your choice of a handsome RCA Service Engineer's Pencil or any volume of RCA Victor Service Notes by sending tips to RCA Radio Service News, Camden, New Jersey . . . Service Tips must be acceptable for either RCA Radio Service News or the RCA Radio Service Tip File. . . . All tips become the property of RCA to be used as they see fit. . . . Service Tips are our readers' ideas, not ours. While RCA Radio Service News believes they are worthwhile, we cannot be responsible for results.

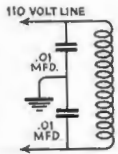
RCA Radiola 60—Correction

In the July issue of Radio Service News the service tip of Mr. J. W. Clark, Geysler Radio Shop, Calistoga, Calif., indicated that the if tuning condensers of this set are the ones near the tubes and the neutralizing ones are those near the front of the set.

Mr. Harry Maurer of Hill Sound Service, 2004 N.E. Second Ave., Miami, Fla., has pointed out that this is incorrect, the reverse being true. To quote Mr. Maurer, "We wonder what happened to that Radiola 60."

Tunable Hum

I have eliminated tunable hum by connecting two .01 MFD condensers across the primary of the power transformer and grounding



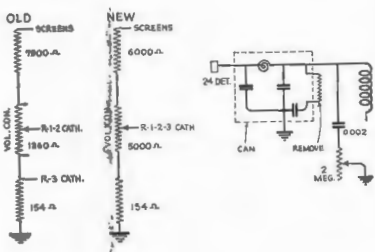
the center connection as shown in the illustration. This is very effective in cheap radios and mail order house radios.

Herman E. Schmidt,
Baldwin & Quentins Roads,
Palatine, Ill.

Modernization of Majestic Model 130-A

The Majestic Model 130-A is a fine receiver with good quality in an expensive cabinet. The improvements consist of super control R.F. tubes and a tone control.

The three type 24 tubes towards the rear of the chassis are the R.F. tubes. Remove them and insert three RCA 35 tubes. The forward tube should be an RCA 24. On the resistor panel, the 7900 ohm resistor is changed to a 6000 ohm



1 watt. The volume control is changed to a 5000 ohm wire wound with right hand taper. The cathode of the third R.F. is disconnected from the 154 ohm resistor and connected to the arm of the volume control. These changes correct the voltages for the new tubes. Realign gang condenser.

The local distance switch is now not needed; remove it and install a 2 megohm carbon left-hand taper in its place. The center contact is grounded to the chassis, the left contact goes to a 0.002 mfd. mica capacitor and then to plate of the audio transformer. The 1 megohm resistor mounted on the adjacent can is cut off entirely. The conventional tone control in the grid of the power tubes is not satisfactory. This control is in the detector plate circuit.

Raymond C. Wyman,
51 Central Avenue,
Medford, Mass.

RCA Victor C11-1

The complaint was "set dead on short wave bands and all but the high frequency end of the standard broadcast band."

A check with the RCA Oscillograph showed the oscillator in the set would only work between 1100 and 1600 k.c. A complete check of oscillator circuits showed

thing normal. Then the small fixed condenser in series with the grid of the oscillator tube and the tuning condenser (C50 in the RCA Service-Notes) was replaced, and the oscillator worked normal. After set was aligned it worked like new.

Aubrey G. Hathorn
623 Travis Street, Dept. 3
Shreveport, La.

Installing New Cones

You can be sure to get all the dirt and metal particles out of the air gap in a dynamic loudspeaker by doing the following: Leave the field current turned on and wipe a piece of ordinary friction tape around in the opening, just before you are ready to put the new cone in. The adhesive qualities of the tape will overcome the magnetic pull of the field coil, and the magnetism makes the metal particles stand out so they can be picked up by the tape.

Bob Shafer
Radio Servicelabs.
900 First Avenue
Dodge City, Kansas

New Use for Magic Eye

By hooking up your 6E5 Magic Eye tube to an external voltage supply and bringing out test leads from the tube, I am able to follow the R. F. signal through each stage of a radio set by connecting it across the secondary of any of the R.F. or I.F. transformers.

I feel that this would be a great help to any service department for isolating trouble quickly and tracing R.F. signals.

Sam Ingram
Service Department
Southern Wholesalers, Inc.
Baltimore, Md.

Ground on Dodge Car

I have noticed the many radio men who do an occasional car radio installation are not aware of the fact that the Dodge car has a very small hole drilled in the cowl under the hood on the driver's side. If a self-tapping screw is used in this hole to ground the antenna lead shielding, more noise will be removed than by grounding at any other place on the car. I understand that this point has less circulating current than any other spot on the cowl.

John M. Hopwood
4520 North 27th Street
Milwaukee, Wisconsin

Eliminating Static Collector Squeaks

I have found that static collectors in the rear wheels of cars with radios in them often develop squeaks or dragging noises. If a small hole is drilled in the Static Collector brush that rides on the brake drum and filled with graphite, the squeak will be eliminated.

Bob Wunce
4231 Hopkins Street
Oakland, California

Ship Installation

On an installation of a ten-tube RCA set aboard ship, using a rotary converter, DC to AC 110 volts, a great deal of power line noise, apparently on the DC side, made the short wave part of the set almost useless. No combination of chokes or condensers, and no commercial filter would make any improvement. The converter was grounded both by wire to the frame and through one side of the DC mains. It was in a lead covered steel locker, grounded, and cable was used to supply the set.

It was found that by placing the hand close to one end of the converter, the noise was entirely eliminated, but when touching the frame itself, the noise continued; in fact, a second ground connection to the top of the frame, made it worse.

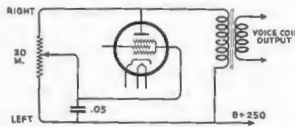
The noise could be eliminated entirely by a metal plate, grounded held close to the DC end, and was

done commercially by a small capacity condenser in series with the ground wire, so isolating the converter from ground, except as regards radio frequency currents.

Gordon Rosekilly
4037 26th Street
San Francisco, Cal.

Tone Improvement on Small Sets, Using Pentode Output

This stunt can, of course, be used on larger sets also, but it is more desirable on midgets. Remove present tone control, if any; otherwise, follow directions as if there was one. Replace with 20,000 ohm uniform taper volume control. Connect as shown after first removing original tone control wires and condenser, and cutting screen wire to power tube right at socket. If more than one wire is on this terminal, keep wires to-

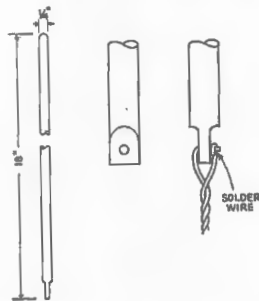


gether when removing. Action is as follows: One low setting, screen is closer to plate terminal, and tube acts similar to a triode, with improvement in tone. Increase of lows is further noticed when tone is at extreme right and tied to plate due to action of .05 condenser. At high setting of tone, the pentode action is back to normal, and the .05 condenser is shorted out. Remember, however, that volume control will have to be shifted to compensate for change between high and low settings, as triode action will improve the tone but reduce the volume somewhat.

Beacon Radio Service,
142 East 4th Street,
St. Paul, Minn.

Wooden Needle

Some service men may have experienced difficulty in placing braided shielding on an antenna lead-in. I took a birch dowel about eighteen inches long and about a quarter of an inch thick and made



a huge needle out of it. A hole was bored into one end and the other end rounded off. The wire, to be passed through the shielding, is threaded through the hole bored in one end and soldered together so that it will not slip off. It is then pushed through the shielding without difficulty.

K. W. Oinonen,
Bents Radio Service,
Gardner, Mass.

Wells-Gardner Model No. 24

We found that this set would distort at low volume, and play normal when turned on nearly full. The trouble was found in the bias resistor of the first A.F. (which is a 30) and output tube which is a 19. This resistor is found in the generator and is and tests 200 ohms. Change the resistor to a 100 ohm, one or two watt. The set clears up and plays clear, even at whisper volume.

Jerry Davidson,
408 West Walnut Street,
Green Bay, Wis.

New "Check-Up" Announced For Early October

Powerful Sales Aids Feature Big Dealer Program

A wealth of brand new sales helps—direct mail, a lavish window display set, novel door-to-door circulars, a tried-and-proven telephone canvassing instruction booklet—these and other sales-pulling items are wrapped up for radio dealers and service men in the new 1936-37 RCA Check-Up campaign, soon to be announced by RCA Radiotron.

More important, the new Check-Up promotional activities have been given an invincible sales theme; one of the soundest merchandising practices in the retail field has been applied to the program in forceful, common-sense style. Radio dealers who have regarded the service phase of their business as a losing proposition will welcome the RCA Check-Up campaign as a new application to service which will yield bigger profits on a systematic basis.

Uses New Theme

The new sales theme of the RCA Check-Up program will show radio dealers how other retail establishments capitalize on a merchandising scheme which leads to longer-profit sales and how this same plan can be put into operation by radio retailers.

Dealers who have looked for a simple, sound and organized scheme of selling radio merchandise, as well as the sale of other appliances and accessories, should lose no time in contacting their distributors for this new RCA Check-Up merchandising program. The editorial by Mr. Ostman, on page 1, briefly outlines the radio dealer's problem and the solution which the best sales and merchandising brains in the country have proven to be successful.

New Sales Aids

The demands by outstanding radio dealers throughout the country who have gained new business and new profits as a result of the RCA Check-Up program, for an even bigger and better program this season, led RCA to produce a smashing portfolio of advertising literature and sales aids. These include novelties to attract attention and put over the story. For the man who uses newspaper advertising, special mats are available. And for trimming the window, one of the most effective window displays yet devised is ready to pull the crowds.

Supplementing these items will be an attractive three-dimensional flashing sign shown at the top of this page, an aggressive advertising campaign and the national support which RCA has placed behind this campaign.

IT FLASHES!



This attractive three-dimensional flashing sign is just what all service engineers and radio dealers need. It is now being featured by RCA Radio Tube Distributors at \$4.00, net.

Sound Catalog Announced For P. A. Engineers

New Catalog Released by RCA Distributors

A new comprehensive catalog, fully illustrated and including all important technical data, has just been released for distribution by all RCA Commercial Sound Distributors, according to a recent announcement by W. L. Rothenberger, Manager of the RCA Commercial Sound Division. This new



catalog, said Rothenberger, includes all the important equipment manufactured by RCA for the Commercial Sound field and is complete with the necessary technical data for intelligent selection of equipment.

Equipment described in the catalog carries all requirements of a P.A. installation from the small call system to the most elaborate hotel or auditorium job. All types of microphones (magnetic, velocity, carbon), a complete line of amplifiers and speakers, and auxiliary equipment such as turntables for record reproduction, are described in detail.

RCA Sound Distributors are featuring the equipment described in this new catalog which they will gladly give you upon request. Be sure to get your copy or if more convenient, write to Dept. S.N., RCA Mfg. Co., Camden, N. J., and your copy will be promptly mailed.

Among the Boys



Permission "Radiolab News" (Radio Laboratories, Kansas City, Mo.)

Sometimes I wish I'd rescued that Blond 'stead of my Analyzer

Likes Ice Cream Best



Annadell Kiger is the petite five-foot blonde who plays the part of Isabell Ricks on Oxydol's Ma Perkins, heard from Chicago over an NBC-WEAF network daily, except Saturday and Sunday, at 3:15 p.m., E.S.T. Only 22, she has been in seven stage productions and in three movie shorts. Radio is the most fun of all, she says, except, of course, fishing, swimming and ice cream.

Battery Radio Has Class "B" Output Stage

Low "A" Battery Drain
Only 0.54 Amperes

Announcement of a remarkable new RCA Victor Battery Receiver, to be known as the Model 5BT, has just been made by L. H. Sullivan, manager of the RCA Victor Farm Radio Division. This new instrument, which has such features as an automatic volume control, eight-inch permanent magnet dynamic loudspeaker and over two watts output, will carry the low Eastern list price of only \$32.95 (less batteries). According to Mr. Sullivan, such a price will insure its immediate dominance of the market in this price class.

Gives High Sensitivity

The Model 5BT is characterized with an unusually high degree of sensitivity and selectivity, and with its wide tuning range of from 530 kcs. to 1800 kcs., it adequately covers the standard broadcast band and one police band. The low "A" battery drain of 0.54 amperes and the "B" battery drain of 18 milliamperes insure long and carefree life from both "A" and "B" batteries. The full-vision, illuminated, translucent dial is fitted with a clear crystal to protect the pointer. Magnetite core i-f transformers for insuring permanent alignment, cables for plug-in batteries and a phonograph terminal board are features which will appeal to the discriminating purchaser. The permanent magnet dynamic loudspeaker uses a magnet of new material which greatly improves its performance over earlier type permanent magnet loudspeakers.

Brings Line to Nine Models

The new RCA Victor Model 5BT joins eight other outstanding battery operated instruments in the RCA Victor Farm Radio line. Two eight-tube consoles, two six-tube consoles, two eight-tube tables and two six-tube tables complete the line, a line which is meeting with excellent acceptance in the farm radio field.

ZWORYKIN TO ADDRESS N. Y. RADIO MEET

To Demonstrate New RCA Electronic Tube Devices

Dr. V. K. Zworykin, noted RCA Victor television and electronics scientist, and his laboratory assistant, Dr. G. A. Morton, will demonstrate the principle of the Electron Multiplier, and the Electron Image tubes, for the benefit of New York radio service engineers, at the Pennsylvania Hotel, on September 18.

This meeting, which is sponsored by the RCA radio and parts distributors of New York, is being held in conjunction with the convention of the Institute of Radio Service Men. Charles Herbst, RCA Victor service engineer, will describe the outstanding technical advances in the newest radio receivers. These include a "Magic Voice" system for improving tone quality, a "beam" power amplifier tube for greater, undistorted power output, a "dynamic" volume expander, and a new, stabilized oscillator system which guards against station fading and insures fixed dial settings.

Important to Television

The Electron Multiplier tube which Drs. Zworykin and Morton will describe and demonstrate is expected to be of great importance in television, facsimile and photo-electric development. It makes use of the "secondary emission" phenomenon; the impact of a stream of electrons emitted by a photo-electric cathode is made to release other electrons from a series of succeeding electrodes, in ever-increasing volume, so that amplification on the order of millions of times may be built up within a single tube. It also permits a greater signal-to-noise ratio than is possible with a photo-electric cell and amplifier.

Sees Through Haze

The Image Tube is another important development from the RCA laboratories which for the first time enables man to see by invisible light and to penetrate haze. The tube functions either in the infra-red or the ultra-violet light spectrum, below and above visibility, and makes electrons behave exactly like light rays. Images to be observed through this tube are focused by electro-static instead of optical means. An interesting application in the field of microscopy is foreshadowed for the Image Tube, because it permits the examination of minute living organisms which might otherwise be destroyed by intense light. The Image Tube may also find application as an electron telescope, to penetrate atmospheric haze which seriously handicaps visible light, but does not impose the same limitation on infra-red light waves.

Lectures such as that delivered by Dr. Zworykin are another example of RCA's efforts to improve the status of service engineers. Be sure and attend the RCA Service Meetings to be held in your community.

RCA To Arctic



Captain Bartlett, Arctic explorer, whose ship *Effie Morrissey* is no stranger to the regions of the far north, knows how RCA Radiotrons behave in sub-zero weather. Mr. Pannill, president of Radiomarine, presented the Captain with a full set of transmitting and receiving tubes for his last voyage.

Direct From Radio City



Carrying a complete display of all RCA Products including an operating RCA Ultra-high-frequency transmitter, the new RCA Show Coach recently left Radio City, New York. This beautiful coach, which is one of the finest ever produced, will tour the entire United States this Fall and Winter. Be sure and see it, when it arrives in your city.

RCA Show-Coach Has Operating High-Frequency Transmitter

Broadcasts From Coach to Demonstrate Police Transmitter—Includes Complete Exhibit

Two gigantic, streamlined show-coaches, their more than 35,000 cubic feet of space packed with an almost unbelievable variety of radio and allied products, are rolling out of Radio City, N. Y., to bring the story of RCA and its many services to communities in all parts of the country.

Costing well over the \$25,000 mark, each, according to Thomas F. Joyce, RCA Victor Advertising Manager, the new traveling show-coaches are outstanding in design as well as size. John B. Sanger, nationally-known architect and industrial designer, has made every inch of their imposing dimensions, both interior and exterior, count for eye-filling appeal and the utmost utility. Made by the Aero-car Company, the majestic lines of the coaches bear a close resemblance to a dirigible airship, even to their finely shaped prows, which fit into the tow car. Boasting an overall length of 37½ feet, with seven feet of head room in the interior and as much room in the width, there is ample space for the display and demonstration of the many ingenious devices and products which it houses. Provision has been made for a continuous stream of visitors to enter at one door and leave through another at the extreme end.

Uses High Power Coupe

The coaches, including the high-powered Hudson coupes which draw them, are strikingly decorated on the outside in bright yellow, black and white. Cleverly concealed in the back and sides are eight high-quality loudspeakers, with two additional seven-foot horns of the High Fidelity theatre type built into the roof and directed toward the front. The most powerful public address system ever to be put on wheels, comparable both in power and quality to the system in use at the Radio City Music Hall theatre, in New York, assures reaching out to an audience of more than 25,000 persons on an open fair ground, if desired. Built into the rear of the trailer coach is an electrically shielded compartment for the massive motor generator, which provides the electric current for the operation of the apparatus on display. Ventilation is assured by four silent, high-speed exhaust fans.

Has School System

Inside, are displayed practically all of the diverse products which RCA Victor makes in Camden—all ready for actual operation. They include a complete two-way police communications system, operating on ultra high frequency waves; the master console of a school sound distribution system which furnishes a choice of radio or speaking programs to individually controlled loudspeakers in the class rooms; a bell-less electric chimes system, for playing carillon tunes and striking the hours; radio receiving sets ranging from the tiniest table model to a deluxe combination radio-phonograph; the Victory Library of Re-

corded Music; the famous cathode ray oscillograph which makes sound "visible" so that engineers may study it; a complete radio tube display including the largest and smallest tubes made; and many types of test and measuring equipment of particular value to the radio technician and service engineer. The decorative scheme in the interior is patterned after a home interior, with beige colored panels and stripings of coral and blue. The ceiling is acoustically treated against reverberation.

According to Mr. Joyce, the new traveling show-coaches will operate in the East and the South for the present. RCA Victor distributors in these territories are already booking both coaches heavily for fairs, special exhibits and demonstrations, he said. The coaches are also expected to take part in many outdoor activities such as outstanding sports events and parades.

50—10,000 Cycles



Having a frequency range substantially flat from 50 to 10,000 cycles, the new RCA MI-4010A Microphone is fast becoming acknowledged as the finest low price velocity microphone in the P.A. and amateur fields. Its impedance is either 250 ohms or 16,000 ohms, and it has an average operating level of — 68 db. List Price \$43.50. Subject to an unusually attractive discount. Desk Stand as shown — MI-4069 — Gunmetal finish. List Price \$1.60. Adjustable banquet and floor stands also available at low prices.

About Books

TELEVISION

Reviewed by John H. Cose
Instructor, Electrical Physics,
RCA Institutes, Inc.

Television to this reviewer, is the most complete work of its kind to date. The volume of 452 pages, with more than 300 illustrations and drawings, is a compilation of recently published papers discussing television from its varied angles. As a reference work it should prove invaluable to radio men of all classes. Television might be used as a text book, covering, as it does, not only the circuits employed, but the problems encountered that necessitated the development of such circuits and devices now being incorporated in experimental equipment.

While the general tenor of the book is quite technical, with generous portions of mathematical formulae, there is much interesting material that may be understood by anyone with a general knowledge of radio.

Pictures Present Status

Articles by David Sarnoff give an authoritative picture of the present status of television with an enlightening discussion of the problems to be solved, particularly those having to do with the business side of visual broadcasting. The kinescope, use of image reproduction, and the iconoscope, together with their associated circuits, are discussed by Dr. V. K. Zworykin. Unusually detailed information on wave propagation and field strength, especially below ten meters, is presented complete with several pages of graphs and curves. Scanning sequence and repetition rate of images are explained in an instructive article replete with drawings.

The book Television, just off the press, constitutes the first volume of a series of technical publications scheduled by the RCA Institutes Technical Press. A copy is being sent free to each subscriber of the new quarterly journal, *RCA Review*.

DON'T FORGET

To ask your RCA tube distributor about the new RCA check-ups. They are your way to bigger and better service jobs.

New G-Series Announced By RCA Radiotron

Total of 24 Tubes Added to
RCA Radiotron Line

Announcement of a complete new series of G-type tubes together with additions to the regular lines of RCA Glass and Metal Tubes was recently made by E. N. Deacon, Manager of the RCA Radiotron Division. These additions now round out the RCA line so that the dealer and service engineer handling RCA Tubes is in a position to make renewals with genuine RCA Tubes in receivers of practically all types and manufacture.

The new tubes have the octal base of metal tubes although in all other respects their construction is of the glass variety. While their general characteristics are similar to certain metal and glass type tubes, they should be used only in receivers specifically designed for them.

The following tabulation covers the important characteristics of the new tubes. In the G-Series type it will be noted that the nearest equivalent in both glass and metal are listed. While a number are exact equivalent, others are not, and the individual characteristics should be checked before substitutions are made.

NEW GLASS TYPES

Type	List Price	Description	Cathode	Volts
15	\$2.00	R. F. Amplifier Pentode.....	Heater	2.0
1A4	1.50	Super-control R. F. Amplifier Tetrode..	Filament	2.0
1F4	1.50	Power Amplifier Pentode.....	Filament	2.0
1F6	1.50	Duplex Diode Pentode.....	Filament	2.0
6G5	1.50	Electron-ray tube (indicator type)....	Heater	6.3

NEW ALL-METAL TYPES

6X5	1.25	Full-wave Rectifier.....	Heater	6.3
5W4	1.00	Full-wave Rectifier.....	Filament	5:0

NEW "G" SERIES TYPES (GLASS WITH OCTAL BASES)

Type	List Price	Description	Cathode	Volts	Near-est Glass	Equivalent Metal
5V4G	\$1.75	Full-Wave High-Vacuum Rectifier...Heater	Heater	5.0	83-V	
5X4G	1.25	Full-Wave High-Vacuum Rectifier...Filament	Filament	5.0	5Z3	
5Y3G	1.00	Full-Wave High-Vacuum Rectifier...Filament	Filament	5.0	80	5Z4
6A8G	1.50	Pentagrid Converter.....Heater	Heater	6.3	6A7	6A8
6C5G	1.00	Detector Amplifier Triode.....Heater	Heater	6.3		6C5
6F5G	1.00	High-Mu Triode.....Heater	Heater	6.3		6F5
6F6G	1.25	Power Amp. Pentode.....Heater	Heater	6.3		6F6
6H6G	1.00	Twin Diode.....Heater	Heater	6.3		6H6
6J7G	1.25	Triple-Grid Detector Amplifier...Heater	Heater	6.3	77	6J7
6K7G	1.25	Triple-Grid Super-Control Amplifier.Heater	Heater	6.3	78	6K7
6L7G	1.50	Pentagrid Mixer Amplifier.....Heater	Heater	6.3		6L7
6N7G	1.50	Class B Twin Amplifier.....Heater	Heater	6.3	6A6	6N7
6Q7G	1.25	Duplex-Diode High-Mu Triode.....Heater	Heater	6.3		6Q7
6R7G	1.25	Duplex-Diode Triode.....Heater	Heater	6.3		6R7
6X5G	1.25	Full-Wave High-Vacuum Rectifier..Heater	Heater	6.3	84	6X5
25A6G	1.25	Power Amplifier Pentode.....Heater	Heater	25.0	43	25A6
25Z6G	1.25	High-Vacuum Rectifier-Doubler....Heater	Heater	25.0	25Z5	25Z6

Calling All Tug-Boats



An unusual installation of RCA Sound Equipment is that of the Boston Towboat Company, which operates a fleet of tug-boats out of Boston. Orders spoken into a microphone in the company offices are reproduced by an outside loudspeaker with sufficient volume for nearby tugs to hear them. The weatherproof speaker picks up the tug-boat captain's voice in reply, and it is reproduced in the office, thereby giving two-way conversation without either party leaving his post. This is another installation made by Eastern Radio Company of Boston, an RCA Commercial Sound Distributor.

RCA Sonotone Aids Connect To Voice Coil

Earphone Adapter Has Three Operating Positions

One of the outstanding features of the RCA Sonotone Hearing Aids, which are now being featured by all RCA Parts Distributors, is the ease with which they may be connected. The Earphone Adapter, by means of which connections are made, is fastened to the side of the cabinet, and the three wire cable is easily attached to the voice coil. Plugging in the Sonotone unit gives a choice of three types of operation—operation of radio alone, Sonotone alone or both simultaneously.

In promoting the sale of RCA Sonotone units for radio, service engineers have an excellent opportunity to cash in on an entirely new market. Surveys indicate that at least one out of every ten people throughout the country is hard-of-hearing. This vast audience heretofore has been able to listen to radio programs only by advancing the volume of the receiver excessively, to the annoyance of those with normal hearing. With the new RCA Sonotone Hearing Aids, radio programs may be heard by thousands who previously had been denied this pleasure. Selling equipment to help the hard-of-hearing overcome their handicap usually just requires a demonstration. Sales resistance is negligible, and profits are high.

Either Bone or Air Conduction

The units are made for either air conduction or bone conduction operation and function on the most advanced scientific principles ever designed to aid the hard-of-hearing. The air conduction unit is for those with merely sub-normal hearing, while the bone conduction unit is for those having defective ear drums, transmission being made via bone conduction to the auditory nerves. These Sonotone Hearing Aids are the same units that are successfully employed for hard-of-hearing patrons in leading motion picture theatres throughout the country.

SHOP NOTES

To keep the readers of RCA Service News posted on the latest changes in and additions to RCA Products and technical literature, the RCA Service Division will report changes applicable to RCA Victor Service Notes in this column from time to time.

To get the most benefit from this column it is recommended that the readers of RCA Radio Service News transfer these changes and additions directly to their Service Notes on the particular model. By doing this, you are assured of always having the latest information handy.

From the RCA Service Division
Publication Section

Model 4T

Refer to the schematic circuit diagram, Page 4, and change the value of the oscillator tuning condenser (C-7) from 18-405 mmf. to 16-200 mmf.

Model 5T

Change stock No. 11237 to read: "stock No. 13144 Volume Control (R8) \$1.00."

Models 5X, 5X3, and 5X4

Omit "stock No. 13150 Coil-Reproducer neutralizing coil (L13) \$0.25." Under stock No. 13149 Coil-Reproducer Field Coil, change (L15) to (L13, L15).

Models 6T and 6K

Change stock No. 12649 Coil to read "less Shield" instead of "with shield."

Change price of stock No. 11198 Socket to \$0.15 instead of \$0.28.

Change price of stock No. 11196 Socket to \$0.15 instead of \$0.22.

Change price of stock No. 11349 spring to \$0.25 instead of \$0.15.

Models 6T2 and 6K2

Change description of stock No. 5237 to read "Variable Tuning Condenser Mounting Bushing Assembly" instead of "Variable Turning Condenser Mounting Bushing."

Change stock No. 11235 Cone to read "package of one, \$1.00" instead of "package of five, \$3.50."

Change stock No. 11258 Cone to read "package of one, \$1.00" instead of "package of five, \$3.85."

Change price of stock No. 11349 Spring to \$0.25 instead of \$0.15.

Change price of stock No. 4982 Spring to \$0.50 instead of \$0.26.

Models 7T, 7K, 8T and 8K

Change price of stock No. 5170 Capacitor to \$0.25 instead of \$0.20.

Change description of stock No. 13144 to read "Volume Control (R11)" instead of "Volume Control—Control and Operating Switch (R11)."

Change price of stock No. 4982 Spring to \$0.50 instead of \$0.26.

Change price of stock No. 11349 Spring to \$0.25 instead of \$0.15.

Refer to the schematic circuit diagram Page 4 and change the resistance of L6 Oscillator Coil to ".09 ohms total" instead of "5.1 ohm total"; also change value from tap to ground on L6 to .04 ohms instead of 1.6 ohms.

Change resistance of L8 Oscillator Coil to "5.1 ohm total" instead of ".09 ohm total"; also change value from tap to ground on L8 to 1.6 ohms instead of .08 ohms.

Refer to the chassis wiring diagram Page 5 and change the resistance value on the Oscillator Coil (Lower right corner) to 5.1 ohms for L8 instead of .09 ohms; and L6 to .09 ohms instead of 5.1 ohms.

When using the RCA Victor Record Player, Model R-93-S, with these instruments, the bottom should be

removed from the R-93-S and the 0.1 mfd. condenser shorted out. No changes are required on the R-93 or the R-93-2.

Models T 8-18, C 8-19, and C 8-20

Add stock No. 11613 Drive—Variable Tuning Condenser Drive \$1.00.

Change stock No. 8073 Resistor to stock No. 8072 Resistor—same description and price.

Models 9T and 9K2

Refer to page 13—Radiotron Cathode current readings—tube 9—RCA-5Z4 Rectifier. This cathode current cannot be measured at the socket and should be measured at the filter input.

Stock No. 11298 should read "package of one" instead of "package of five." (\$0.22).

Model T 9-8

Later production models of this instrument have a 0.25 mfd. capacitor (C57) connected from the junction of R15 and R16 to the common ground connection. This is in the audio plate circuit.

Change stock No. 5170 Capacitor to read (C4, C25, C57) instead of (C4, C25).

From the RCA Service Division
Factory Contact Section

T7-5, C7-6, D7-7

Receiver goes dead at low frequency end of Band "C," due to 6A8 oscillator section stopping. This condition may be remedied by making sure that R-19 (osc. grid leak) is 100,000 ohms.

Instability of operation or inoperation on all bands may occasionally be due to erratic 6A8. Greater stability can be assured by checking to see that R-5 (screen series resistor) is 33,000 ohms.

Model T4-10

R.F. interference from supply line modulating incoming broadcast signal causing apparent distortion of tone quality. The condition may be eliminated by installing a .006 mfd capacitor from the rectifier (RCA-76) plate connection to the chassis.

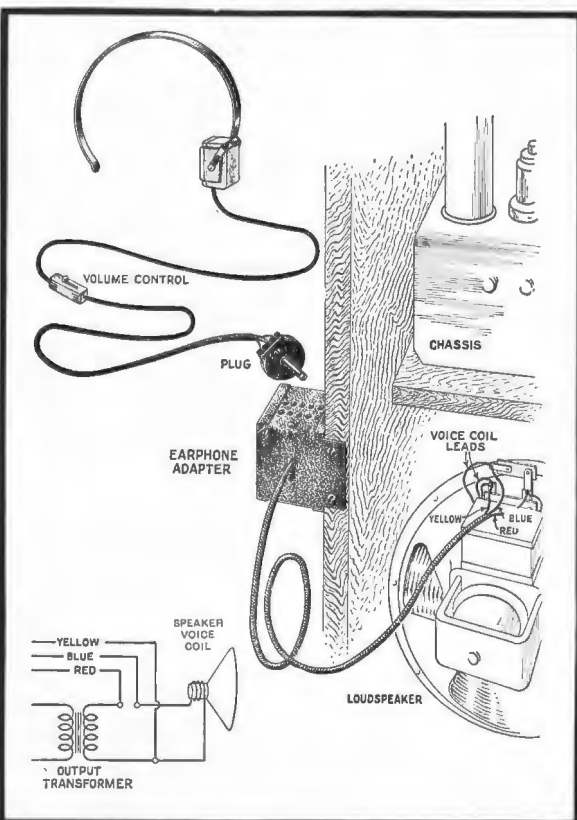
Model T9-7

It is very essential that "C" Band be properly aligned in order to obtain the maximum sensitivity on this instrument. Especial care should be exercised to certify that the oscillator stage is aligned 460 k.c. below the signal frequency on this band in accordance with service note instructions.

Stock No. 6605 Output Transformer for RCA 140 Series

Replacement transformers designed particularly for tropical use are now available from RCA Parts Distributors. This latest type is mounted in a can and is potted by a special preheating process. Its mounting is identical with the original type.

Adapter Easy To Connect



The ease with which RCA Earphone Adapter is connected to a radio set is at once apparent from this illustration.

Service Par Excellence



Ideal Radio Service of 220 Ideal Street, Buffalo, New York, should make other service engineers really envious with their ship-shape shop. RCA Radio Service News extends its congratulations on such an excellent example of modern service facilities.

SPIDER-WEB AERIAL "HOT" SAY OWNERS

Far Ahead Of Others, Is Unanimous Comment Of Listeners

While RCA made sure that the new Spider-Web Antenna was far ahead of anything in use, manufactured either by itself or others, before announcing it to its dealers and service engineers, nevertheless it has remained for actual users to say just how good the new Spider-Web Antenna pulls in short wave stations.

From sunny California, Mr. Lee O. Fassett, RCA Victor Dealer of 3945 Balboa Street, San Francisco, tells about one installation:

"The installation of an RK-40 Antenna was made recently for operation with the C-13-2 RCA Victor. This combination, in the mind of the customer, gave very satisfactory results. When I say satisfactory, I mean practically all major short-wave stations could be brought in clearly with a minimum of noise. At the time the Spider-Web was announced to the trade, however, a personal letter was sent to the customer, accompanied by a pamphlet of same. I knew he was desirous of getting the greatest efficiency from his radio, and as I expected, he instructed me to install the Spider-Web.

"The results from this antenna proved beyond any question of a doubt that it does all that is claimed for it, and is the reason I, as well as my customer, Mr. Satchell, want to congratulate RCA Victor for its development."

Virginia Reports

Not to be outdone by the West Coast, a proud owner from Falls Church, Virginia, reports as follows:

"My antenna was installed last Saturday and I had an excellent opportunity yesterday to give it a thorough workout. The results on all waves covered by my radio were so satisfactory and really astounding that I am compelled to send to you my congratulations on your really wonderful engineering feat reflected by your new antenna. It was amazing to me. Foreign programs came in remarkably clear and distinct, and the same quality of the programs was maintained on the standard broadcast and other bands of the radio where the use of an efficient antenna is needed.

Principles 100% Correct

"The principle of your Spider-Web Antenna seems to me to be 100 per cent correct and efficient and the antenna is so far ahead of all other antennas I have used that there is no comparison."

And so quote Mr. Howard Wait, of 3046 La Salle Avenue, Bronx, New York, "After installing the RCA Spider-Web Antenna, I have found that I am able to get a number of stations I was never able to get before. As to short wave, I am able to hold several European stations without fading or loss in volume."

In Old New England



Permission New York World Telegram and United Feature Syndicate

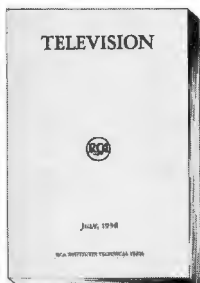
"Wall yes, I did keep radio-bulbs for a while, but there was so many calls fer 'em that I hid 'em away an' I forget where I put 'em."

Free Book Is Given 'Review' Subscribers

"Television," by RCA Engineers, Covers All Late Developments

A new authoritative book, written by RCA Engineers, containing papers on all important Television developments, has just been distributed free to all RCA Review subscribers, according to an announcement by W. S. Fitzpatrick, Secretary of the Board of Editors of the RCA Review. This new book, according to Mr. Fitzpatrick, is the first complete book that has been published by any organization on the highly interesting and timely subject of Television. Because of RCA leadership in the Television field, the book is highly authoritative in character and covers every phase of this highly technical subject.

The eighteen authors of the book—all world-famous engineers—in a series of twenty-four articles, cover the entire Television field, transmitters, receivers, wave propagation, iconoscopes, radio relays, elec-



452 Pages

tric guns and a complete description of an operating Television System. While this book is primarily written for engineers, nevertheless the progressive service engineer will find a wealth of material fully within his understanding. The articles are of a basic character, and include complete descriptions of finished equipment. The book is well printed, has 452 pages and is a handsome addition to any service engineer's library.

Distribution of this book is made to subscribers of the new RCA Review. The first issue of this publication—the July issue—may still be obtained with all new subscriptions. Four issues are published a year, and the subscription price is \$1.50. To insure getting the first issue and the new free book on Television, subscriptions should be sent promptly to the RCA Institutes Technical Press, Dept. S. N., 75 Varick St., New York City.

Engineers Explode Myth Of Lightning Damaging Radios

Keeping pace with the modern trend debunking popular superstitions, engineers of the National Broadcasting Company came forth today with the report that Thor, the god of lightning, has no deep-seated grudge against radio.

The report on lightning is the by-product of a survey made by engineers on radio reception conditions in major cities of the United States. The statement was issued by R. M. Morris, NBC development engineer, whose own house was struck a few years ago and who, therefore, was working against a grudge of his own.

Do Not Attract Lightning

"Contrary to popular belief," Morris said, "radios in the home do not attract lightning, nor do radio antennas. In fact, a properly installed radio antenna, with good lightning arresters, serves as a measure of protection to a house during a thunderstorm. The lightning arresters, found on most antennas, serve to lessen the force of the lightning, deflecting the dangerous current into the ground where it will do no harm.

"The chances during one year that your house will be struck by lightning," said the NBC engineer, "are about one in 1000, as proven by statistics on the subject. Radio will not prevent a house from being hit by an electrical bolt during a storm, but if it is properly installed, a radio antenna may prevent the lightning from doing any damage. Of course, if you live in a building with a steel frame, such as the Manhattan skyscrapers, you need have no fear of lightning. The steel frame serves to ground the current."

SELLING TIPS

Selling Tips are our readers' contributions for selling their services or products. All readers of RCA Radio Service News are invited to submit their ideas for increasing business. All Selling Tips printed will win one of the new RCA Service Engineer's Pencils. Let's have yours.

Selling Antenna

Recently I installed an RCA De Luxe Antenna System in my shop a few feet from an old antenna that I had been using. By demonstrating the difference in performance between the customer's set on the new antenna and the old, I have greatly increased my antenna business.

Alexander Saberski,
428 Wilson Avenue,
Brooklyn, N. Y.

Metal Tube Label

Purchase a roll of Scotch Cellulose Tape (a clear gummed cellophane tape) about 3/4 inch wide. Place a small strip of this right over



the label and so on around the tube. Your label is attached to the tube just like a picture in a frame. The illustration shows the way it's done.

A. S. Cooke,
139 North Euclid Avenue,
Westfield, N. J.

Tube Display

I have made a chart that has proved very helpful in selling both new tubes and new sets. It is much more convincing than just telling the customer the difference between new and old tubes. On one half of the chart I have a type 26 tube taken apart, with each of the parts labeled. On the other half of the chart I have a recent glass tube taken apart and labeled. On the bottom I have a metal tube cut open and taken apart. This shows at a glance the difference in the construction and explains why a new tube will do many times the work of an older tube. This has been helpful in closing deals with sets of 8 tubes and less. I have found that the inside of a tube creates a great interest with the customer and makes him realize that he cannot expect to get proper reception with his old set.

Alan Olin,
Utah Music Company,
Salt Lake City, Utah.

Newspaper Ad

The following copy made up in an ad inserted in your local newspaper will bring in no end of new business: "REWARD. \$10.00. I will pay anyone the sum of \$10.00 for any set manufactured since 1928 by a reputable manufacturer that I cannot repair."

By inserting an ad of the above description I have found that I have been swamped with work. It makes people who have been disgusted with sets they have taken elsewhere to have repaired, bring them to me. It also gives people confidence in you, because they know that one would not insert such an ad if he were not able to back it up. It is my advice to the radio profession that one be well versed in the subject of radio technique and be well equipped, such as the RCA oscillograph, oscillator, sweep unit, bridge, etc., because you will have sets brought to you that will make you wonder if they can really be fixed. Another thing, is that it will be to your advantage to have subscribed to RCA's 3 point system, as it will save you many hours of labor in testing sets, as no amount of your work is already laid out if you know the peculiarity of a radio.

R. A. Bromley,
Box 123,
Hamlin, W. Va.

Foreign Market

One of the stations that I am connected with has carried an educational program for the Japanese speaking people for several years. Recently the station's mails were swamped with requests to change the program to an earlier hour. On investigation we discovered that hundreds of these people had purchased all wave receivers and were listening to stations from their homeland. The stations in the Orient are very strong and consistent, with good programs and the Japanese listeners here in California didn't want to miss either of the programs.

This appears to offer an excellent outlet for all wave receivers as the foreign market has hardly been touched here on the coast. The Japanese truck-garden farmers in California number in the thousands and being a thrifty race they usually pay cash for merchandise.

Maurice E. Kennedy
Technical Director
W6KQ-W6BGC
Los Angeles, Calif.

Removing Creases from Displays

Might I suggest that service engineers receiving RCA sales helps or aids in the form of window streamers and posters remove the creases that occur from being folded by the slightly dampening the creases with water and then ironing over those dampened folds with a not-too-hot iron on the wrong or back side of the poster, being sure that the face of the poster lies on a clean, dry and hard surface. Posters and streamers flattened out in this manner have a better appearance and advertising appeal than those that remain full of folds and creases.

Franklin L. Miller
1010 N. 13th Street
Reading, Penna.

Improving Appearance of Sets

Before replacing chassis in console or cabinet of several sets that I have serviced lately, I suggested painting the interior of the chassis compartment with a good grade of aluminum paint. I pointed out to the customer that the price is small and the advantage of doing so large. With the customer's approval, I paint the entire interior of the compartment, including the rear of the panel with aluminum.

The advantages of painting with aluminum are:
Neater, cleaner appearance.
Adds to shielding of a set.
Keeps moisture, dampness from set.

Easier to see inside.
Frank H. Perry,
139 Lily Street,
Paterson, N. J.

Service Card

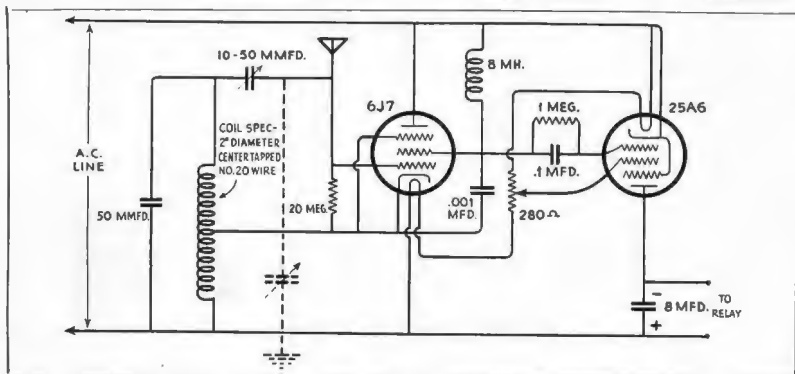
A Service Card that we have been using for the past two years with very good results is shown in the illustration. The body of the



card is filled out and filed away for reference and the stub is marked with the amount on the back and given to the customer, serving as a receipt and also as a business card for future reference.

Radio Service Company,
366 South Street,
Tracy, Minnesota.

A-C Operated Capacity Relay



The above diagram shows a simple a-c operated capacity relay designed by F. H. Sheperd, Jr., of the RCA Manufacturing Co. In operation, this relay is similar to that of the relay described in the March issue of RCA Radio Service News. It operates from a-c only but is easier to build.