

RADIO SERVICE NEWS

PUBLISHED - IN - THE - INTEREST - OF - RADIO - SERVICE - SALES - ENGINEERS

VOLUME XI, No. 4

EDITORIAL OFFICES, RCA, HARRISON, NEW JERSEY

SEPT.-OCT., 1946

RCA ADVERTISING HELPS UP VOLUME OF DEALER SALES

Extensive Schedules in Leading Publications Establish High Tube Acceptance

Imagine a billboard 20 feet high and running 25 miles long! All that space would be required to display RCA's tube advertising in one year alone. Today the RCA trademark has a great, and growing, consumer recognition—and is an assurance of product acceptance for the radio-service dealer.

RCA institutional ads which appear in leading magazines and newspapers are slanted for home markets. Regardless of their theme, these ads give prominent display to the RCA monogram—continue to sell and “resell” the consumer on RCA products.

Another campaign is directed at the designers of radio receivers, television sets, and other electronic equipment. Here, too, an acceptance for RCA tubes is fostered which directly increases the sales of the service-dealer. Let a consumer purchase a receiver which contains an original set of RCA tubes and, chances are, he will request RCA tubes for renewal.

Ads Identify Dealer

Full attention is being given to the electronization of industry. Dealers and servicemen profit from this form of advertising because industrial equipments often include highly specialized RCA tubes in their circuits. Maintenance requirements of such industrial apparatus are increasingly being turned over to the serviceman.

Space limitations preclude a detailed description of RCA's highly popular radio program “Music America Loves Best,” carried by 147 NBC network stations on Sunday afternoons. Only a summary reference also can be made to the publicity value of its renowned technical tube publications.

This, then, is a glimpse of that 25-mile RCA advertising billboard. It's there day and night, pulling for the dealer and radio serviceman—helping him to sell his services, as well as tubes and batteries made by the greatest name in radio.

A TUNE OF THE TIMES



Robert Merrill, popular NBC baritone, appears in a recent RCA Tube Department rally—part of an extensive program to increase tube production. Gatherings like these are impressing RCA employees with the importance of giving their unsparing efforts to help meet the vast demand for electron tubes.

THE AUDIO CHANALYST —AND WHAT IT DOES

By ART LIEBSCHER

RCA Engineering Products Dept.

Audio amplifying equipment, like radio, has grown up and now wears a neat, new, business-like appearance under the name of commercial sound. In industrial life, the sound system is becoming as much of a reliable cog in the wheels of routine operation as the telephone or typewriter.

The demands for keeping complex sound systems in operation and for quick trouble-shooting of defective amplifiers, has led to the adoption of the same efficient testing principles in the diagnosis of audio trouble as are so successfully used in radio servicing. Employing the same principles of signal tracing and providing complete facilities for sound equipment servicing, the RCA Audio Chanalyst is a trade name for a sound system channel analyzer, designed by RCA engineers.

Employs Signal Tracing

Besides its basic use as a testing unit, the Audio Chanalyst can be used as an emergency replacement unit to bridge a defective section in any standard amplifier. It can also serve as an auxiliary amplifier for communications and entertainment when not in use as a servicing device. Motion picture sound, microphone, or phonograph pick-up can be reproduced by applying the Audio Chanalyst as a combined pre-amplifier, mixer, and power amplifier unit to produce audible output

from its built-in loudspeaker or up to 1 watt from any auxiliary speaker.

The Audio Chanalyst is, in itself, a complete sound system test set, grouping a calibrated amplifier, a signal source, a vacuum-tube voltmeter, and other testing and monitoring facilities, as one semi-portable equipment. It consists of three principal sections or channels: a complete voltohmmeter, complete signal source, and a calibrated audio amplifier. To extend the fa-

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AUTUMN SPORTS BOOST RECEIVER SERVICING WORK

Increase in Listening Audience Points to Excellent Repair Opportunities

Happy days are just around the corner for the nation's sports enthusiasts—and very active ones for the radio service-dealer. Lots of radios are going to get a real workout on the “big-game” days—radios that haven't been seeing heavy duty during the summer months.

Take a look at the record as noted by a national poll organization. During a typical World Series day last year 53% of those listening to radios had their sets tuned to the game. Army-Notre Dame hit 53% and the Rose Bowl tussel chalked up 43%.

During the month of August, 1945, between the hours of 6:00 and 10:30 P.M., 21.4% of all existing sets were in use. In September the figure rose to 25.8%, October 28.1%, November 29.7%, December 32.7%, and January 33.1%.

Promotion Necessary

Now this increased use of receivers during the fall and winter months doesn't imply that every set in need of repair or new tubes and batteries is going to see the inside of a service shop—not unless lots of active promotional work is done by dealers and servicemen.

There's nothing better than a well dressed window display to remind the fellow on the street that he's going to be using his radio pretty heavily in the days just ahead. Tell him that a game is most exciting when it's heard over a receiver that's in good shape. Use signs, window display cards, banners, streamers; but above all use your own ingenuity.

Then, too, a well planned direct mail campaign—even if on penny postcards—to the set owners in your neighborhood will work wonders in boosting service and sales.

Starting such a promotional campaign now insures an opening wedge for winter business, too. People are inclined to stay close to home during the cold months when radio entertainment becomes a chief form of relaxation.

A COMPLETE SOUND TEST SET



Front view of RCA's Audio Chanalyst which employs signal tracing as an efficient testing principle for diagnosing trouble in audio amplifiers, loudspeaker systems, and pick-up devices.

AUDIO CHANALYST

(Continued from Page 1, Column 3)

Facilities of this instrument, several additional devices are included such as an impedance measuring device, a distortion indicating device, a loudspeaker for audible testing, and a monitoring electronic indicator which can also serve as a trouble-shooting device.

Much time was formerly spent in measuring voltages, checking tubes, and substituting parts to determine the cause of an improperly amplified signal. With the signal tracing method, the signal is traced and checked at the point where it enters the amplifier, at any point in the amplifier, and where it comes out of the amplifier. Any change in quality or intensity is readily determined and the causes isolated to the components in the immediate vicinity in which the change in signal was first noticed.

Normal gains and losses can easily be recognized in the course of signal tracing, especially when a speaker is used for audible monitoring. When doubt arises as to sufficient gain or improper attenuation, gain measurements can be employed with a calibrated amplifier as a standard of comparison.

The amplifier channel of the Audio Chanalyst consists of a four-stage calibrated amplifier. Each stage may be used separately or the four stages may be cascaded and used together as a high-gain amplifier with an undistorted output of 1 watt.

Gain Can be Checked

The design of the amplifier section is based on the Volume Unit system using a zero level of 1 milliwatt across 600 ohms. Its maximum power gain is 110 db. Individual calibration controls for each stage are accessible through openings in the bottom of the case and the voltmeter section can be employed as

a standard of gain calibration in making adjustments. The input to any particular stage in the amplifier channel leads to its grid and this makes it possible to trace a signal with a high input impedance and with a choice of input levels.

The Audio Chanalyst amplifier is calibrated in both decibels and voltage multiples, providing for the use of either system of gain measurement. Gain can be checked in any amplifier regardless of its zero level, by merely determining the amount of gain required by the Chanalyst to equal that of the amplifier in question. In such a case, the initially applied voltage can be checked in terms of its multiples. If it is desired to use a basic zero level, it will be found that this instrument, with its meter and amplifier channel calibrated to the Volume Unit system, lends itself well to such application.

Used as Substitution Unit

The amplifier can be adjusted to match various load impedances by means of an output selector switch, which provides 500-ohm, 250-ohm and 10-ohm connections, the latter of which is used for direct loudspeaker testing. A built-in 600-ohm load resistor is included for amplifier termination use in silent monitoring practice.

The amplifier channel is also designed to be used as a substitution unit for checking the performance of amplification systems or any type of audio amplifier. It can be substituted as a complete unit to check the gain between an input source (such as a microphone), and a loudspeaker, or it can be used sectionally to substitute for any defective stage of an amplifier under test. Provision is made to operate a defective amplifier by substituting a high-gain voltage amplifier section or an intermediate or power amplifier section of the Audio Chanalyst as a temporary replacement unit.

(Continued on Page 7, Column 1)

Looking things over with Dave Finn

Manager, RCA Renewal Sales

"Gilding the lily" and subtle phrases are becoming threadbare in the explanation of current merchandise shortages. And that goes for tubes, too. But now, we'd like to roll up our sleeves and give you the story—the true and unadulterated facts as they really are.

You aren't getting enough tubes. Why? The simple reason is RCA—and every other tube manufacturer in this glorious but complex land of ours—is faced by a new, terrific demand that overshadows anything the prewar years offered.

A portion of the available electron tubes is being used in the production of new radio sets—for new industrial applications—and for export. All of these are valid markets. Their very existence, including the jobs of thousands of workers, depend on their receiving a legitimate quantity of tubes.

OK, you say, then why doesn't the tube manufacturer hike up his suspenders and get to work producing more tubes so everybody would be satisfied? Modern tube production is a complex chain of interrelated processes, widely separated plants, and dozens of outside suppliers from whom raw materials and component tube parts are purchased. Cut out one link and the whole chain isn't worth a tinker's dam.

Yet that's what has been happening to tube manufacturing recently—and lots of other important industries. Although there were no strikes in RCA tube plants, production did not escape the effects of strikes. All of us are, I think, just a little more grey about the temples as a result of "sweating out" the days just past when a number of vital tube components were as scarce as hen's teeth.

Right now one of our chief problems is getting more people to work on the production lines. During the war women workers swelled our ranks. Today, despite the attraction of good wages and excellent working conditions, they're more interested in homes and

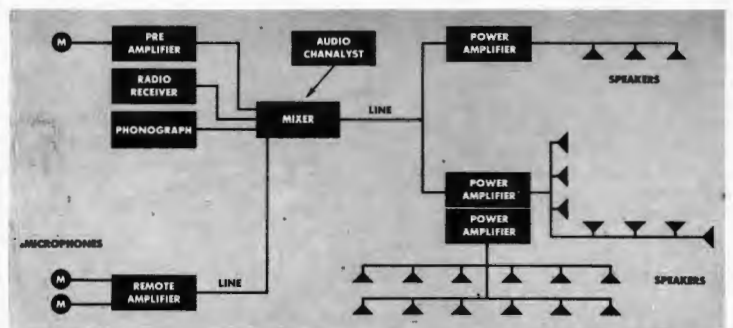
babies. That's a normal situation but it raises the devil with tube production.

Recruiting several hundred additional workers is a tremendous task. It calls for planning, for the sponsoring of employment drives, and other widespread publicity efforts. And even after new personnel are secured, long hours must be spent in indoctrination and training—valuable time which eats into production figures.

What is the production picture now? *It's always easier to stop something than it is to start.* We're picking up speed—good speed. Right now RCA's receiving tube production is higher than ever before in its history. But it will take at least 3 or 4 months of this output to meet all market requirements.

We're not looking for rainbows—keeping our noses on the grindstone doesn't give us much chance for that. Until the pent up demand can be met, current tube availability to the dealer-service trade will require an abundant spicing of the ingenuity which saw radio servicing through the difficult war years. Working hand in hand with you and RCA—using the sharp merchandising prowess that comes with years of business experience—RCA distributors the nation over are doing everything they can to help you bridge the tide.

That's the tube story today without trimmings.



The Audio Chanalyst tests all points in any sound system.

ELECTRONS AT WORK IN ELECTRON TUBES*

By R. S. BURNAP

Manager, RCA Commercial Engineering

The present knowledge of electrons represents the work of many capable scientists and engineers who have made numerous painstaking experiments, reasoned inductively and deductively, made mistakes at times; but who, in each succeeding year, have added their bit of new knowledge to the common store.

While the true nature of an electron—that is, whether it is an infinitesimal particle of matter carrying an electric charge or whether it is pure electricity—is not known, present opinion inclines to the latter hypothesis. It has been calculated that it takes 30 billion, billion, billion (30 and 27 zeros) electrons to weigh one ounce.

The small size of an electron is very important to its use in an electron tube because, since it is so extremely small, only a very minute amount of energy is required to control its movement. This control action is almost instantaneous, and, as a result, electron tubes can operate efficiently and accurately at electrical frequencies impractically high for rotating machines. Although the operation of even a small radio tube may depend on controlling the flight of several million billion electrons, the forces acting on each tiny electron determines its individual movement, and, consequently, the entire aggregation moves in unison at a velocity which may be as high as many thousands of miles per second.

What Makes Electrons?

But from where do the electrons that are used in an electron tube come? Electrons may be produced in a number of ways, but most all engineers depend on extracting them from metals. Electrons can be drawn off from a cold metal by attracting them to a plate charged to a very high positive potential; this method, however, is used infrequently since the potential required may be many tens of thousands of volts. A more practical method is to accelerate the motion of electrons within the metal by the addition of energy. For example, heat is one form of energy than can be used to speed up electrons to a velocity which will permit them to break away from the surface of the metal. Other methods of adding energy are to bombard the metal with electrons or with radiant energy. The former method can produce several electrons for each bombarding electron; the latter method is utilized in the well-known phototube.

A radio tube or, in fact, any electron tube consists of a cathode, which supplies electrons, and one or more additional electrodes, which control and collect the electrons. These parts are inclosed in an evacuated envelope with the necessary electrical connections brought out through airtight seals. The air is removed from the envelope

to allow free movement of the electrons and to prevent injury to the emitting surface of the cathode.

Many complicated electron tubes are now in use: some have eight or more electrodes; some have a power-handling ability of a hundred thousand watts or more; some employ special gases or vapor within their envelopes to give certain desirable characteristics; some, such as cathode-ray tubes, utilize a pencil of electrons to trace a pattern or television image on a fluorescent screen; some, the iconoscopes, for example, can convert an optical image to electrical signals for transmission over a television system; some can measure brightness and can separate colors; some, the electron microscopes, can peer into minute dimensions invisible to the optical microscope; some can control manufacturing operations to a precision impossible with human control; some, such as x-ray tubes, can see through metals; and some can produce and receive radio waves at frequencies of hundreds of millions of cycles. In fact, a list of this nature is almost endless and is being augmented yearly.

Tubes Have Five Senses

The versatility of electron tubes and the devices employing them is amazing. They can hear, see, feel, taste, smell, remember, calculate, and talk. They lack only a conscience; their capability for good or for evil depends solely on the morals of those who employ them. Their usefulness is limited only by the ingenuity of those who design and build them, and the economic needs of the moment.

In all of these activities, RCA engineers are taking an important part. Within the RCA organization, several hundred engineers are engaged in investigating fundamental problems while other hundreds are occupied with engineering matters associated with the design, manufacture, and utilization of electron tubes and the devices in which they are used. Each of these activities is essential to the growth of the electronic art.

*Condensed from RCA RADIO AGE.

MAKES SOCKET TESTING EASY



Point to point signal tracing, signal injection, and circuit checking of tubes and voltages under operating conditions is a simple matter where RCA Testpoint Adapters are used. Under working conditions, a tube in need of testing is removed from socket and inserted in a suitable adapter. The adapter with the tube is then placed back in the socket, leaving base connections easily accessible. Set of RCA Testpoint Adapters consists of seven units, one for each of the seven most common tube base types. Catalogued as MI-18760, they are available from tube and parts distributors and sell for \$7.50 per set, including ready-for-use rack.

TEST OSCILLATOR MODULATION — AN ANALYSIS & EXPLANATION

Often users of Test Equipment like to know some of the details of how the circuits within that equipment operate. As the RCA 167-B Test Oscillator has a unique method of suppressor modulation, a number of inquiries have been received as to the actual circuit functions.

An oscillator operating normally, has zero plate current during the most negative excursion of the control grid. If this were not so, the oscillator might fail to function with low line voltage or after the tube had aged to some extent. Under these circumstances, the wave shape of the voltage appearing on the plate is not purely sinusoidal. Usually the most positive portion of the wave is clipped slightly.

When the suppressor grid voltage is varied in an oscillator of this type, very small change is made in the plate current during the time when the #1 grid is more negative than cutoff. During the time when the #1 grid allows cathode current to flow, the suppressor grid functions normally. If the resulting output voltage is observed on an oscilloscope, the most positive portion of the wave will seem to be modulated only slightly, but the most negative portion of the wave will be modulated heavily. This effect is very surprising when observed for the first time on an oscilloscope. However, if the signal is passed through any tuned circuit which has enough selectivity to suppress second and higher harmonics, the wave will be seen to be modulated normally and will have good wave shape.

Suppressor-grid modulation of a Hartley oscillator is used in the 167-B because this type of oscillator, with this type of modulation, gives dependable performance and a minimum of frequency modulation.

In any type of modulated oscillator, and usually even in signal generators employing a modulated amplifier, some incidental frequency modulation is encountered. Careful checks indicate that the incidental frequency modulation in the 167-B is approximately 0.035% which is slightly better than normal for an oscillator of this type.

Alignment Accurate

The effect of these phenomena on the ease and accuracy of alignment has been very accurately checked. Both theory and experiment indicate that there is no perceptible impairment in the ease or accuracy of alignment.

The effective modulation, with the control clockwise, is very close to 50%. However, with the control in mid-range, the effective modulation is approximately 14%. No claims are made for the variation of modulation with control rotation, as the control has been added merely to facilitate adjustment in the amount of modulation used for various test purposes.



NINE RCA "GO-GETTER" SIGNS PUSH SALES DAY AND NIGHT

These nine RCA silent-salesmen are working wonders for hundreds of dealer-servicemen—are boosting radio repair service and the sale of tubes, batteries and related items. Created by experts in the promotion field, they have been pretested for pulling power and customer appeal. They keep your name constantly in the public eye and identify your business.

Place these signs outside your store, in your window, on your wall, counter and display cases, and watch those sales figures climb.

INDOOR ILLUMINATED SIGN, metal and glass. This handsome and durable attention-getter serves you day and night. Its glowing bright red letters stand out sharply. The sign employs incandescent lighting and has all the attractiveness of neon without its disadvantages.

OUTDOOR METAL FLANGE SIGN WITH DEALER PENDANT. Intended as a permanent identification outside the service dealer and repair shop, it is lettered on both sides and catches the eye of two-direction traffic. Baked in attractive enamel colors, it comes with a pendant imprinted with the dealer or service organization name.

INDOOR DOUBLE-SIDED ILLUMINATED PARCHMENT SIGN. Dignified in appearance and giving off a warm colorful glow, it may be used in any type of store or shop. This sign can be mounted for window promotions or above the service bench. It comes complete with mounting bracket, light socket and cord.

ORDER THESE BY FORM NUMBER THROUGH YOUR DISTRIBUTOR

	RCA Radiatron	Cunningham	RCA Victor
Indoor Illuminated Sign, metal and glass	1F9918	1F9919	1F9920
Outdoor metal flange sign	1F9971	1F9943	2F62
Indoor Illuminated Sign, parchment	2F155	2F154	2F156

THE COMMERCIAL VIEWPOINT AND TECHNICAL ABILITY

By JOHN F. RIDER

The statement has been made time and again by radio servicemen that development of the commercial viewpoint interferes with technical ability—that the former is developed at a sacrifice of the latter. It has been further said that the commercial viewpoint interferes with technical proficiency during service operations. Let us see if such is the case.

While it is true that in years gone by the amount of technical knowledge required for service work was not very extensive, modern receiver design and servicing requirements call for far greater knowledge. Assuming that this knowledge is possessed to start with and is the foundation for the business, we cannot see how the cultivation and formulation of commercial ideas will retard technical advancement. The commercial-minded man, capable of properly interpreting his resources, realizes the value and limitations of the technical ability of the establishment and is more prone to discover the presence of limiting factors than the man who considers his time entirely his own.

"Know How" Essential

It is utter foolishness to think even remotely that any sane-minded business man can suggest that a commercial enterprise, founded upon technical ability, can thrive and prosper by focusing all of its attention upon the monetary considerations and neglect its foundation—technical knowledge. As a matter of fact, the technical advancement of the service industry has actually been retarded, because the industry is not commercial-minded. Many service station operators have voiced the statement that they cannot keep up with radio developments—no matter how they try.

The suggestion to become commercial-minded and to run a service establishment like a business is intended to relieve this situation. It is intended to remove the necessity for working more than a reasonable number of hours a day and to make those hours produce the required revenue. It is intended to supply the leisure and the funds necessary for further education and technical advancement. It is intended to supply the funds required to purchase modern testing equipment as required by changes in radio receiver and allied unit design.

As to interfering with technical proficiency during the completion of a service job, that can mean but one thing. Some men feel that by elevating the commercial side of the business so much thought is given to the monetary angle that sufficient time will not be spent in making a proper check upon the receiver, amplifier or speaker, and that inferior parts may be used to make replacement. Such an argu-

ment indicates a definite misconception of what constitutes being commercial-minded. The first principle of successful business operation is giving the customer his money's worth—fair and honest treatment. Charge for what you sell, but deliver! We do not suggest overcharges, but we do suggest a charge which will show a profit and still be wholly satisfactory to the customer.

Running a radio service shop like a business does not mean that if a resistor is being replaced no further time can be spent in checking that receiver. Proper business administration can develop a certain program of operation which will be profitable and, at the same time, will represent a thorough check upon that receiver. Such a program would call for the employment of the most modern forms of testing equipment, made possible by profits accrued from proper administration.

The ownership of such modern equipment would enable sufficient saving of time in certain operations, so that all the operations required for thorough testing would be possible without involving more time than is required for a casual, routine test with inferior equipment. Running a service shop like a business does mean that if a specific unit has been replaced and the supplementary check shows correct operation of the receiver and amplifier, the operator will not waste additional time in elaborate and unnecessary tests—unless he is being paid for such a thorough test.

Inferior Parts Costly

As to the use of inferior replacement parts, because it means greater immediate profit, that is more apt to be native to the irresponsible individual than to the man who is of sound business mind and is trying to establish himself solidly. The latter classification of man knows the error of such ways . . . He knows the financial loss entailed in making a free repeat call. He realizes the financial loss for time—traveling expenses and all incidental expenses . . . It is not strange that the sensible businessman avoids free repeat calls . . . He knows what they mean . . . The work is guaranteed and the guarantee must be lived up to fully . . . This guarantee covers the replacement parts as well as the actual repair, hence it does not pay to use inferior parts . . . It means a loss rather than a profit . . .

SALES *and* SERVICE TIPS

Once again you can win a handsome RCA Resistor-Code Pencil by sending tips to RCA Radio Service News, Harrison, New Jersey . . . All tips become the property of RCA to be used as it sees fit . . . Service Tips are our readers' ideas, not ours. While we believe they are worthwhile, we cannot be responsible for them.

HOME-MADE LAMP PROBE IS HANDY AID IN SERVICING

A small, convenient yet efficient lamp probe to be used for inspecting of chassis wiring and components can be fabricated quite easily. A miniature socket is inserted into a home-made probe (either fibre, plastic or wood). Passage for wiring is made by boring through the probe (lengthwise) with a drill size that permits ordinary lamp cord to be fished through. A 3-volt transformer, such as is commonly used in night-light sets, is placed in the lead wire circuit and a 2½-volt miniature lamp with magnifying lens is screwed into the socket.

Sherman M. Wolf
Ben's Radio
372 Tremont Street
Boston, Mass.

NEW LAMP CHECKER USEFUL IN PRELIMINARY TESTING

A handy tool to keep around the service bench is a neon tester. This article can be made easily from an insulated socket which will take a small neon lamp, to which are con-

nected two flexible wire leads. Probes are placed on each wire end. With this tool it is possible to check voltages in the set without endangering the usual test equipment, especially where it is suspected that ac current is taking a dc course. Both sections of the neon plate will light when ac is passed through it, whereas only one side lights up with dc current. Once the current type has been established, conventional test equipment should be utilized for precision measurements. Also when a tube tester is not available, the neon lamp tool may be used to locate thermal opens.

Joseph Miller
114-D Alzona Park
Phoenix, Arizona

CHECK RECTIFIER WHEN 6E5 "MAGIC EYE" OVER HEATS

Occasionally the 6E5 Magic Eye in the RCA Victor-13K may overheat after a short period of operation. A check of the cathode current may show it to be in excess of seven ma. Replace tube and check condition of rectifier tube.

Russel E. Sampson
3202 Pine Blvd.
St. Louis 3, Mo.

TOPICS NOT COVERED IN TEXTBOOKS



"But it never needed tubes before"

RADIO SERVICING GOES TO THE FAIR



More than 200,000 interested spectators at the recent Ohio State Fair saw this novel radio servicing display sponsored by the Associated Radio Service Dealers of Columbus, Ohio. Featured in the exhibit were an RCA Volt/Ohmyst, Signal Generator, Oscilloscope, and Dynamic Demonstrator—to help acquaint the public with the problems involved in servicing. The organization's code of ethics guarantees a certified radio service at a fair price and it numbers many of Columbus' outstanding dealers and servicemen among its membership.

TOOL FOR REMOVING TUBES MADE FROM AUTO ANTENNA

Here is a helpful hint for removing hot tubes from a set without burning one's fingers. A piece of hollow rod sixteen inches long is fashioned from the butt end of an old auto whip antenna. The heavy end is then ground down to a 45° angle. Approximately 3 to 3½ inches from the ground end, file or drill one elliptical hole half way through the rod. A large dial belt is then slipped through the hollow aperture at the angle surface and pulled through the hole. The result is a snare which can be slipped over the tube. By pulling the snare closed, a firm grip is made on the tube and a light lever motion will lift it from the socket.

Daniel Mintz
1691 Davidson Ave.
Bronx, N. Y.

WHEEL STATIC ELIMINATED WITH POWDERED GRAPHITE

In some of the late model cars, severe cases of wheel static develop even after the installation of wheel suppressors. This trouble can be completely eliminated by blowing fine powdered graphite into the inner tube of each wheel using a battery hydrometer with the float removed as a bellows.

Edward G. Kertz
Kenosha Police Dept.
Kenosha, Wisconsin

INTERMITTENT OPERATION IN S-C MODELS 935-955

Occasionally servicemen run into a brain-cracking intermittent operating problem on Stromberg-Carlson, Models 935 to 955 which use Speaker #33963. When trouble cannot be located inside the chassis, it is a helpful expedient to try soldering the voice-coil wires where they join with the voice-coil leads. Opens at these points have been found to cause trouble in these sets.

Lawrence J. Mudrock
1034 E. Brady Street
Milwaukee 2, Wisconsin

MODIFICATION KIT AIDS OSCILLATOR STABILITY

Some comments have been received about frequency drift in the Beat Frequency Oscillator channel of the Audio Chanalyst, in locations where line voltage fluctuations are prevalent.

In order to help this condition, a modification kit containing several easily installed parts and directions, will be forwarded free of charge to owners of the Type 170-A Audio Chanalyst on request to the Test and Measuring Equipment Section, RCA, Camden, New Jersey.

The guarantee card must be properly registered or must accompany the request in order to obtain a modification kit.

RCA Victor
Supplementary
Information No. 9

REPLACEMENT PARTS

Section

INITIALS FOR NEW PERSONAL SET MODEL 54B-1, B-2, B-3

Stock number RCA 71635 is assigned to cover initials for use in the new RCA Personal Radio. Each stock number includes a selected assortment of approximately one hundred (100) initials and blanks, estimated to provide twenty-five (25) groups of average initials. These initials are the same as those sold for the BP-10 under stock number RCA 36696 except that the new stock number omits the tube of cement.

To attach initials to the receiver, clean the space provided on the receiver and also the reverse side of the initials and cement together by means of a thin coat of Duco Household Cement or equivalent.

The suggested list price for RCA #71635 Initials is \$1.75.

PHONOGRAPH MOTORS

Due to an exceedingly limited field requirement for many of the older type of phonograph motors, we have been unable to replenish our stock of the complete motor assemblies. To the best of our ability however, we will continue to have available repair parts for these motors.

It is our suggestion that used phonograph motors be saved in your shop in order to salvage usable parts as service needs arise.

RCA #31031 ALIGNMENT TOOL

The original alignment tool for Magnatite Core Trimmers stocked under RCA #31031 is now replaced by a new tool with stock number RCA 70180.

The suggested net price is \$.80.

DEALERS RCA VICTOR SERVICE DATA

No Radio Repair Shop can afford to be without the RCA Victor Service Data. These books contain practical service information on the repair of Radio Receivers, Radio Phonograph Combinations and Phonograph Models manufactured from 1923 to 1942.

Vol. #1, Stk. #112—880 pages, 1923-1937 Inc.

Vol. #2, Stk. #113—816 pages, 1938-1942 Inc.

Price \$6.00 per Volume.

ACT NOW—order from your Distributor to insure your copy.

SHORTCUTS IN RADIO SERVICING



RCA Victor's Service Data volumes contain answers to the thousand and one brain twisters which every serviceman encounters at one time or other in his repair work.

MERCHANDISING IS IMPORTANT, TOO



Heins & Bolet, well known New York City radio service-dealer, has found that good merchandising is a profitable ally to efficient servicing. Its attractive, well lighted store is a real drawing card to tube and battery customers. A well equipped service shop, seen in the background, is separated from the main floor area by a wire gatework.

NEW PHONOGRAPH MOTOR AND TURNTABLE ANNOUNCED

Stock number RCA 70121 covers a complete disc-drive Phonograph Motor and Turntable Assembly for operation on 117 volts, 60 cycle. The assembly has a 10" turntable and is similar to the disc-drive motor and turntable used in the RCA 0-3 Electric Portable Victrola. The RCA 70121 Motor Assembly can be used as a complete replacement to modernize many old spring-wind phonographs. It can also be used to replace hard-to-get electric motors in manually operated phonographs, as well as by individuals interested in building their own turntable.

Shipment of motors is scheduled in large weekly quantities starting September 15th. All orders received will be handled as promptly as stock condition permits.

Suggested list price for complete Motor and Turntable Assembly is \$7.95 each.

RCA #33360 SHAFT AND GEAR ASSEMBLY AS USED IN MODELS O-50 & U-50

The original stock of RCA #33360 Shaft and Gear Assembly is no longer available. For use in motors stamped #64569-P1, P4 or P7 a replacement gear only is available under RCA #70104. This stock number covers the flat fibre helical gear which may be easily pressed over the original shaft after the removal of the defective gear. During installation care should be taken to keep the gear concentric to the shaft and not to "jam" or in any way enlarge the central shaft hole in the fibre replacement gear.

SUBSTITUTION OF RCA #70428 SPEAKER FOR ELLIPTICAL SPEAKER IN MODEL BP-10

The RCA #70428 Speaker as used in the current Model 54-B Receiver can be used as an alternate for the original Elliptical Speaker as employed in the Model BP-10 Receiver.

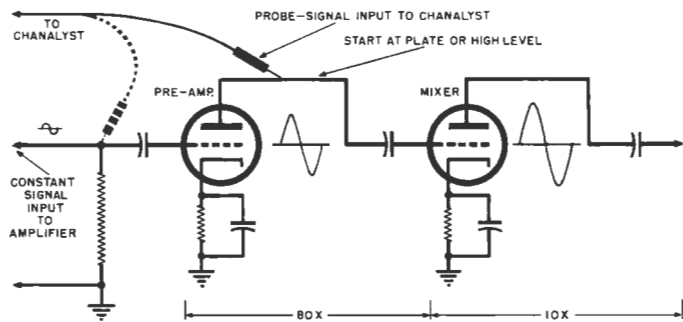
Two (2) possible methods for mounting the speaker are suggested as follows:

Method No. 1—Mount speaker using a $\frac{1}{16}$ " thick spacer washer under the two (2) tapped mounting holes in such a manner that the extruded holes not used in the sub-panel do not interfere with mounting face of speaker. The speaker must mount parallel to the sub-panel. Be sure that the washers used are of sufficient thickness to avoid any warping of the speaker frame.

Method No. 2—Make a cardboard gasket at least $\frac{1}{16}$ " thick, using the speaker as a template. Cut four (4) clearance holes in the gasket to clear extrusions on the sub-panel. The same precautions as mentioned in Method No. 1 above should be followed.

Important:—To avoid the possibility of speaker voice coil terminals being grounded against the output transformer, insulation tape should be used between the terminal board and transformer.

The suggested list price for RCA #70428 is \$5.65, subject to an Excise Tax of 10%.



The Audio Chanalyst may be used to check accurately the gain of any stage.

AUDIO CHANALYST

(Continued from Page 2, Column 2)

Another very useful application of the Audio Chanalyst is found in the silent or audible monitoring of intermittent amplifiers. Three check points can be simultaneously monitored, one by the voltmeter section, another by the indicator eye, and the third by the speaker channel. In this connection the three sections can be applied to give a constant check on a signal such as might originate in the oscillator section to determine when that signal is altered by an electrical defect in an intermittent amplifier undergoing test.

An innovation in the design of commercial audio testing devices is included in the new Audio Chanalyst, which makes it possible to operate the beat-frequency oscillator channel automatically. A repeating sweep of frequencies between 0 and approximately 3000 cycles is provided for loudspeaker testing; it will be found extremely useful in locating defects in multiple speaker installations.

The VoltOhmmeter Channel

The design of the voltOhmmeter circuit, characterized by excellent stability and linearity, is principally that of the famous Junior VoltOhmyst, which has provision for high input resistance measurement of dc voltages in six ranges up to 1000 volts.

The ohmmeter section will measure up to 1000 megohms with only 3 volts of internally supplied dc voltage.

A new feature added to the VoltOhmyst circuit and introduced with the design of the Audio Chanalyst, is a diode circuit. This circuit is capable of measuring, throughout the audio spectrum, the rms value of a sine wave or 70.7 per cent of either positive or negative af peak of any magnitude up to 100 volts. For operation on the 500- and 1000-volt ranges, a two-megohm voltage divider precedes the diode. While this arrangement does affect the above characteristics, it provides an extended range for low-frequency ac readings where it is practical to use an electronic voltmeter with its common ground connection.

The voltmeter, calibrated to read power output in decibels with controls set to read af voltage, may be used as an output meter. Decibel indications can be obtained with the Audio Chanalyst in two convenient ways—first, as a voltage ratio equivalent having no stated zero level (i.e., a voltage gain of 3 to 1 equals a gain of 10 db. regardless of the actual input or output voltage); second, as a voltage or power gain referred to a given value, such as a defined zero level (i.e., a 600-ohm line output may be +10 db. which means that the voltage measured across 600 ohms would be approximately three times the voltage given for the zero decibel value).

Impedance Testing

Impedance checking is made rather easy by the substitution method, in which two principal sections of the Audio Chanalyst are combined by means of patch cables. Impedance can be read directly by comparison with a built-in calibrated variable resistor when the electronic indicator is used to determine the identity of voltages across both the impedance and the calibrated resistor. This is especially helpful in matching speaker lines, line transformers, and in indicating choke-coil values.

Signal Tracing

The amplifier channel is used for signal tracing. In tracing a signal the input stage of the channel section to be used should be comparable to that of the stage in the amplifier under test. Controls on the Audio Chanalyst should be adjusted so that a signal may be heard from the speaker. The gain controls of each stage should be set to the lowest level consistent with fair audibility. As the test lead is moved from the input of the amplifier under test to the plate of its first tube, the volume in the amplifier channel should increase, thereby raising the volume at the Chanalyst speaker. This gives an audible indication of gain. Before the operator proceeds in probing along the signal path, the original sound output level should be restored. This is done by deducting approximately the same amount of

gain as that realized by the change in pickup points. To balance out this gain, it is merely necessary to turn the input gain control to a lower level. If the signal is still too loud at its lowest level, the input cable plug can be transferred to the succeeding stage of the amplifier channel.

Gain Checking

Gain checking is essentially signal tracing plus an increased degree of accuracy. Gain measurements need not be based on actual voltages, but on relative values of increases or decreases in voltage change from a given input level. This is essential in localizing insufficient gain first discovered by signal tracing. It is seldom necessary to measure the gain of the entire amplifier to determine the point of gain deficiency.

Intermittent Operation

Intermittent operation of an audio amplifier may be attributed to a number of causes, such as defects developing spasmodically in tubes, resistors, and capacitors in its circuit. This intermittent condition may be difficult to observe with ordinary test equipment because many of the usual tests will cure the intermittent condition temporarily while they are being made.

With the independent units of the amplifier channel connected to three different sections of the amplifier under test and with a constant signal applied to its input, each unit of the amplifier channel can be set to indicate any change in that signal. Any intermittent condition can then be isolated to that section of the amplifier in which a change in signal level is automatically indicated.

Any one stage or combination of the four stages of the amplifier

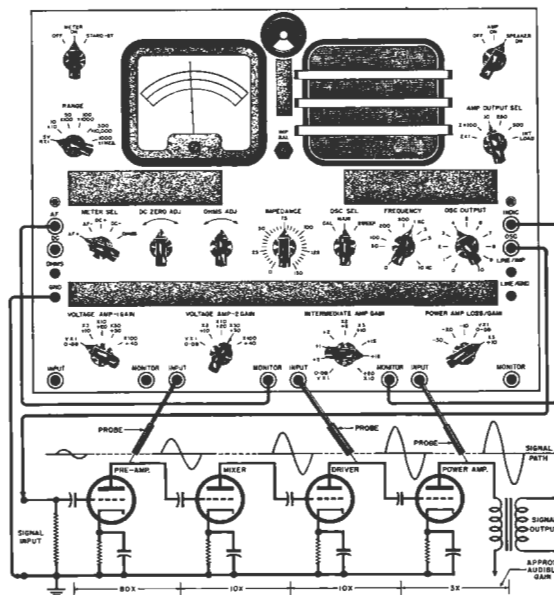
channel may be used to bridge comparable stages of an amplifying system, either as a check to determine improper operation or as a temporary replacement for defective or inoperative stages. The procedure is generally a matter of substituting the stage of the amplifier channel that has sufficient gain to match the bridged section of the amplifying system. In most cases connections are made from the high-impedance output of the last satisfactory signal point in the defective amplifier, through the probe lead to the input jack of the amplifier channel used. The output of the amplifier channel is then connected to the input of the stage following the bridged section.

Applications

Any service engineer would balk at the idea of carrying a test instrument as heavy as the Audio Chanalyst on every service job. It never was designed with any such intention. It was designed, rather, to fill a need for audio test equipment that would be very useful and efficient in solving problems in which the effectiveness of the usual smaller type instrument ceases.

For sound equipment maintenance of large industrial installations, an Audio Chanalyst at the distribution center is highly desirable to insure a minimum of interruptions to the sound system arteries, which are constantly gaining in importance in their relation to production.

As time goes on, the sound men will probably show increased appreciation of being able to procure one instrument capable of testing everything from microphone to speaker. The Audio Chanalyst provides him with what is probably the first complete commercial test set, designed to meet the needs of his specialized business.



With independent units of the Chanalyst's amplifier channel connected to three different sections of the amplifier under test, intermittent conditions are isolated readily.

POSSIBLE SOURCES OF INTERFERENCE
Among Stations on Frequency Allocations as of Jan. 1, 1946

A. IMAGE RESPONSE					E. SECOND HARMONIC OF I-F				
Locality	450 Kc. I-F	455 Kc. I-F	460 Kc. I-F	465 Kc. I-F	Locality	900 Kc. 450 Kc. I-F	910 Kc. 455 Kc. I-F	920 Kc. 460 Kc. I-F	930 Kc. 465 Kc. I-F
Boston, Mass.			WEEL-590 WMEX-1510		Blytheville, Ark.	KLCN			
Charleston, W. Va.		WCHS-580 WGVK-1490			York, Pa.	WSBA			
New York City	WEAF-660 WQXR-1560	WMCA-570 WHOM-1480		WMCA-570 WWRL-1600	Bangor, Me.		WABI		
Omaha, Neb.	WOW-590 KBON-1490				Salt Lake City, Utah		KALL		
Syracuse, N. Y.			WSYR-570 WOLF-1490		Johnson City, Tenn.		WJHL		
Spokane, Wash.			KHQ-590 KGA-1510		Flint, Mich.		WFDF		
San Antonio, Tex.	KTSA-550 KABC-1450				Greeley, Colo.		KFKA		
B. DIFFERENCE COMBINATIONS					Oakland, Cal.		KLX		
Locality		445-455 Kc. I-F			Denver, Colo.		KPOF		
Boston, Mass.		WTAG-580		WBZ-1030	Meridian, Miss.		WCOO		
Chicago, Ill.		WCFL-1000		WHFC-1450	Scranton, Pa.		WGBI-WQAN		
Detroit, Mich.		WWJ-950		WJLB-1400	Iowa City, Iowa		WSUI		
Fort Worth, Tex.		WBAP-820		KFJZ-1270	Richmond, Va.		WRNL		
Los Angeles, Cal.		KECA-790 KMTR-570		KPPC-1240 KFVD-1020	Vancouver, Wash.		KVAN		
Minneapolis, Minn.		WCCO-830		WTCN-1280	Sherman, Tex.		KRRV		
N.Y.C.-Newark		WABC-880 WNYC-830		WBBR-WEVD-1330 WNEW-WHBI-1280	Grand Junction, Colo.			KFXJ	
Philadelphia, Pa.		WIP-610 WPEN-950		KYW-1060 WDAS-1400	Trenton, N. J.			WTTM	
San Francisco, Cal.		KGO-810		KYA-1260	Burlington, N. C.			WBBB	
Spartanburg, S. C.		WSPA-950		WORD-1400	Little Rock, Ark.			KARK	
455-465 Kc. I-F					Shenandoah, Iowa			KFNP	
Chicago, Ill.		WBBM-780		WSBC-WEBC- WCRW-1240	Spokane, Wash.			KFPY	
Los Angeles, Cal.		KHJ-930		KGER-1390	Vermillion, S. C.			KUSD	
Portland, Ore.		KGW-620		KWJJ-1080	West Lafayette, Ind.			WBAA	
St. Louis, Mo.		WEW-770		WIL-1230	Atlanta, Ga.			WGST	
C. SECOND HARMONIC OF BROADCAST STATIONS (TRF and Superhet)					Providence, R. I.			WJAR	
Locality		Interfering Station	Station Affected		Fairmount, W. Va.			WMMN	
Knoxville, Tenn.		WROL-620		WBIR-1240	Visalia, Cal.			KTKC	
Los Angeles, Cal.		KFI-640		KFOX-1280	Washington, N. Car.			WRRF	
		KMTR-570		KRDK-KFSG-1150-10	Los Angeles, Cal.			KHJ	
Phoenix, Ariz.		KTR-620		KPHO-1230-10	Pocatello, Idaho			KSEI	
Washington, D. C.		WMAL-630		WOL-1260	Buffalo, N. Y.			WBN	
New York City		WMCA-570		WNEW-1130+10	Frederick, Md.			WFMD	
		WEAF-660		WBBR-WEVD-1330-10	Jacksonville, Fla.			WJAX	
		WOR-710		WBYN-1430-10	Oklahoma City, Okla.			WKY	
Tampa, Fla.		WSUN-620		WDAE-1250-10	Stevens Pt., Wisc.			WLBL	
D. SUM COMBINATIONS (TRF and Superhet)					Quincy, Ill.			WTAD	
Locality		Station plus	Station gives	Station	Paterson, N. J.			WPAT	
Boston, Mass.		WEEL-590		WAAB-1440	Huntington, W. Va.			WSAZ	
Chicago, Ill.		WMAQ-670		WGN-720					
		WMAQ-670		WHFC-1450					
New York City		WMCA-570		WBBR-WEVD-1330+10					
		WEAF-660		WBYN-1430					
		WOR-710		WHOM-1480					
		WEAF-660		WHOM-1480+10					
		WMCA-570		WQXR-1560					
		WJZ-770		WWRL-1600					
Spokane, Wash.		KHQ-590		KFPY-920					
				KGA-1510					
F. FUNDAMENTAL (I-F Code only)									
Locality		Call and Frequency	I-F Affected						
Mobile, Ala.		WLO 442		450					
New York, N. Y.		WNY							
Westlake, Ohio		WCY 442							
Fort Hancock, N. J.		WUB 444		450					
New Orleans, Miss.		WNU 448		450-455					
New London, Conn.		NBL 450		450-455					
Mackinac Island, Mich.		WHQ 454		450-455-460					
Rogers City, Mich.		WLC							
Alpena, Mich.		WNO							
Frankfort, Mich.		WFK							
Ludington, Mich.		WLD 454		450-455-460					
Cypress, Cal.		KSM 460		455-460-465					
Edmonds, Wash.		KSA 460							
Tuckerton, N. J.		WSC 462							
Chicago, Ill.		NMP 464							
		NAJ							
Key West, Fla.		NAR							
Norfolk, Va.		NAM							
Astoria, Ore.		NPE							
Eureka, Cal.		NPW 464		455-460-465					
Baltimore, Md.		WMH 468		460-465					
St. Louis, Mo.		WZAR 470		465					
Vicksburg, Miss.		WZAO 470							
{ COASTAL AREAS GENERALLY }		{ VARIOUS NAVY STATIONS }							
Amegansett, L. I. (Sayville)		WSL 474							
Jupiter, Fla.		WMR 474		465					

RCA RADIO SERVICE NEWS is published by the RCA Tube Department in the interest of radio servicemen and dealers everywhere. It is distributed free of charge to members of the radio-service fraternity through the courtesy of RCA and its tube, battery, test equipment and parts distributors.

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RADIO CORPORATION OF AMERICA
HARRISON, N. J.