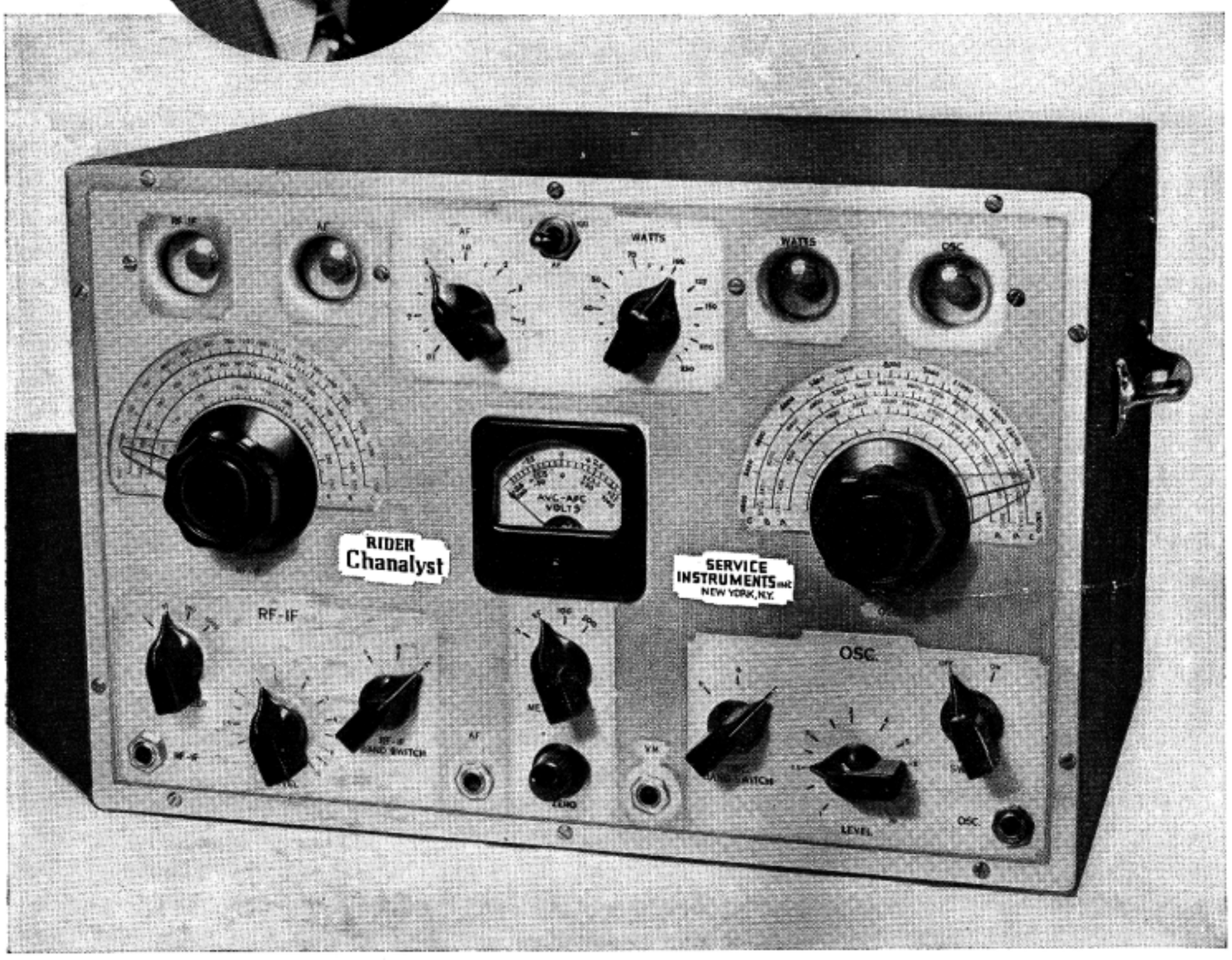
The RIDER Chanalyst



The MODERN Service Instrument

The Greatest Advance Made in the History of Service Instruments

THE RIDER CHANALYST opens a new era in the analysis of receiver troubles. It is based upon an entirely new, easier method of attack, enabling the application of the same systematic diagnosis to all receivers—yesterday's, today's and tomorrow's. This is possible because the utility of the instrument is independent of the complications in receiver circuit design. . . .Tuned radio frequency or superheterodyne receivers with all special circuits are diagnosed with equal facility.

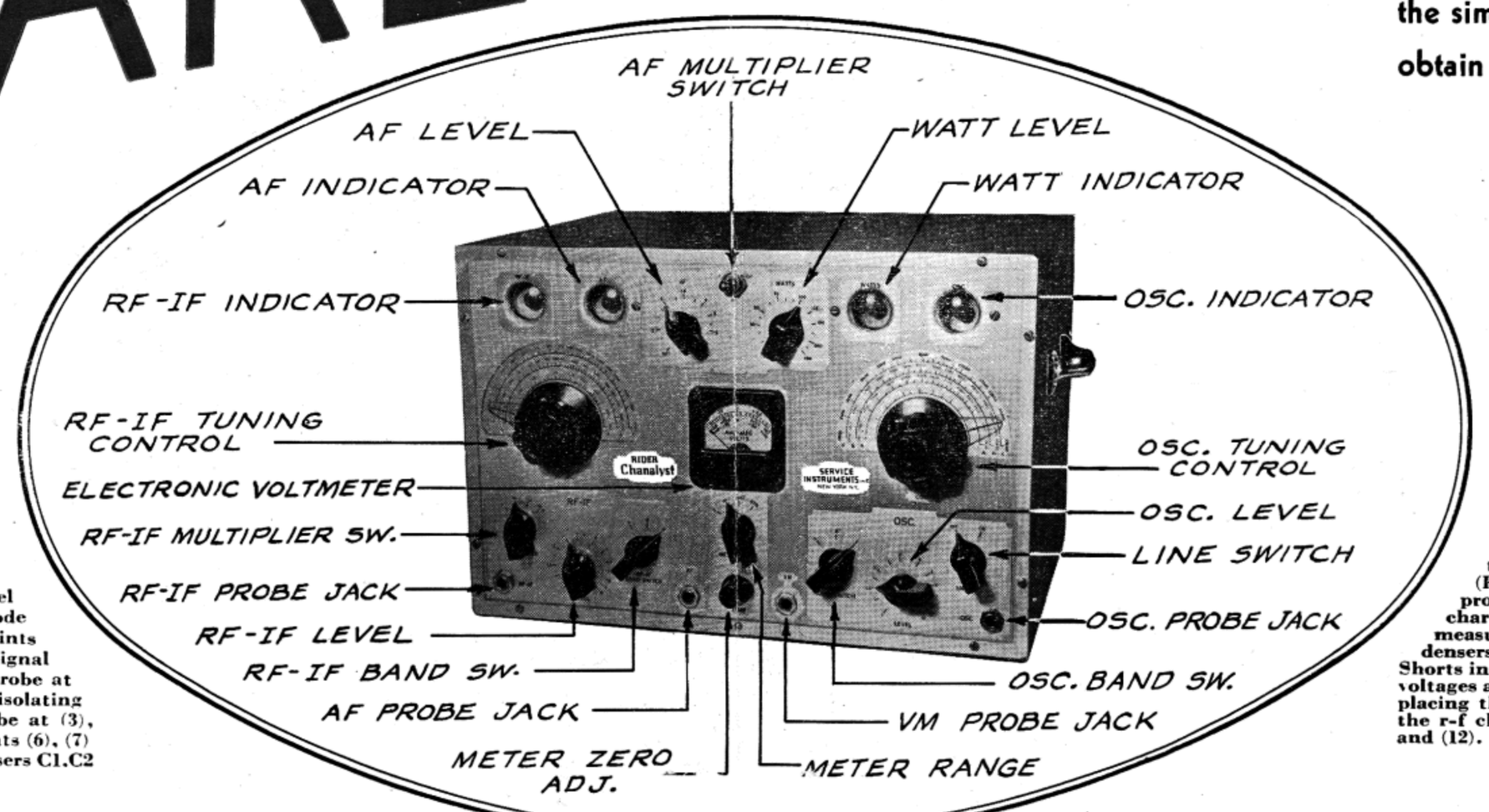
The speed with which troubles can be positively identified is startling. . . .Tests can now be made with the Chanalyst that have been impossible heretofore and these new tests are so all-revealing and so quickly made that your daily output of serviced receivers will be increased beyond belief.

The Chanalyst will enable you to find the most elusive troubles in a receiver with an ease that will astonish you. Intermittent receivers no longer will be the radio service industry's bugbear . . . the Chanalyst has solved that problem and that is only one of its uses.

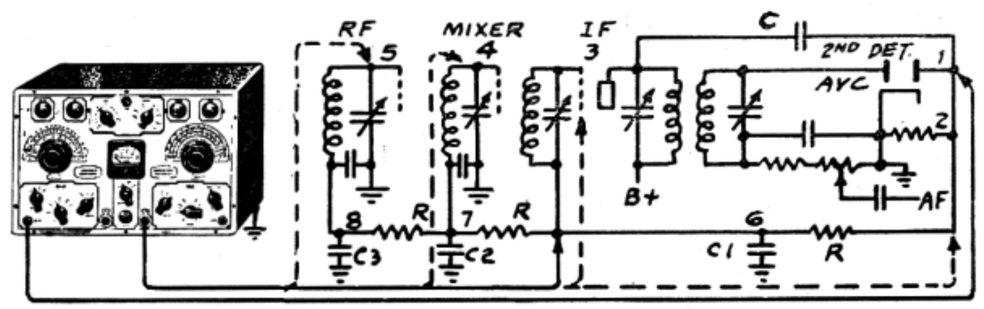
Never before has the radio service industry witnessed a test unit having such tremendous capabilities. Embracing every desirable feature—speed—easy interpretation—universal application—long life—the RIDER CHANALYST, which is independent of tube types and needs no adaptors nor plugs, is truly the MODERN service instrument for profitable servicing.

COMPARE!

THE worth of a service instrument can be established in only one way: see what and how it accomplishes what it is supposed to do . . . We want you to compare the RIDER CHANALYST with all other service instruments . . . You will find the C lyst e definitely superior in every respect and a vital necessity for profitable servicing operation . . . Here are a FEW of its applications . . . Note the ease with which it is possible to explore every portion of the circuit under test and the simplicity of these operations . . . The Chanalyst enables you to obtain positive information with the greatest speed . . . .

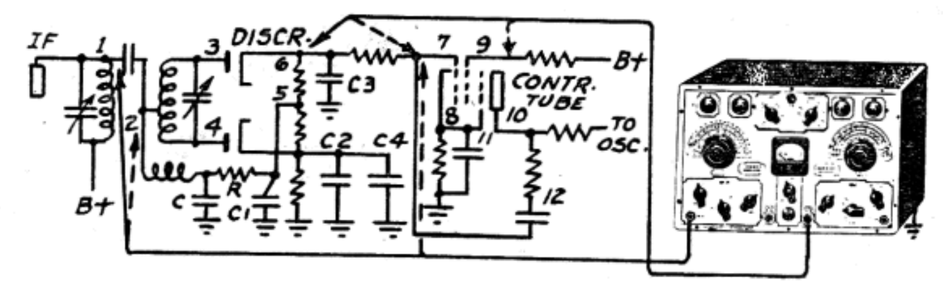


AVC CIRCUITS



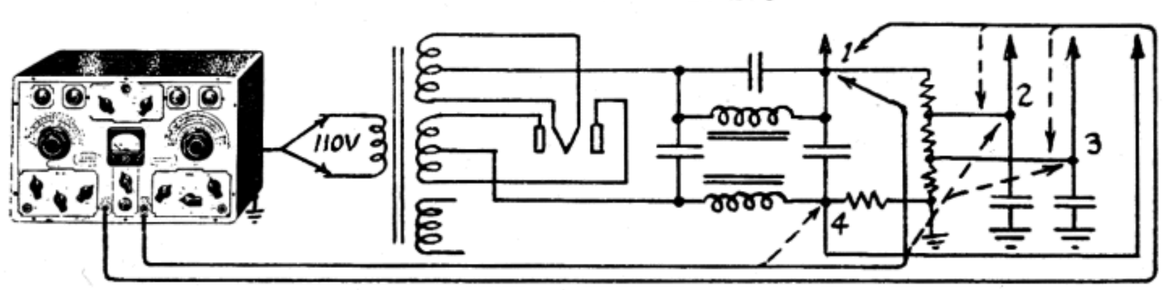
All avc circuits are checked with ease. The i-f probe placed at (1) and the rf-if channel resonated to the intermediate frequency checks the presence of the i-f signal at the diode plate. The voltmeter probe placed at (2) measures the rectified diode voltage. At points (3), (4) and (5), the avc voltage applied to the i-f, mixer and r-f control grids (with the signal present). At points (6), (7) and (8), the avc voltage along the avc bus. The voltmeter probe at point (1) without signal input checks for leakage in capacity C. The presence of the isolating resistors R does not materially influence the voltage indications and the voltmeter probe at (3), (4) and (5) does not interfere with normal operation of the receiver. The i-f probe at points (6), (7) and (8) will establish proper filtering of i-f signal from avc circuit or open by-pass condensers C1.C2 C3. Shorted by-pass condensers influence the avc voltage at (3), (4), (5), (6), (7) and (8).

AFC CIRCUITS



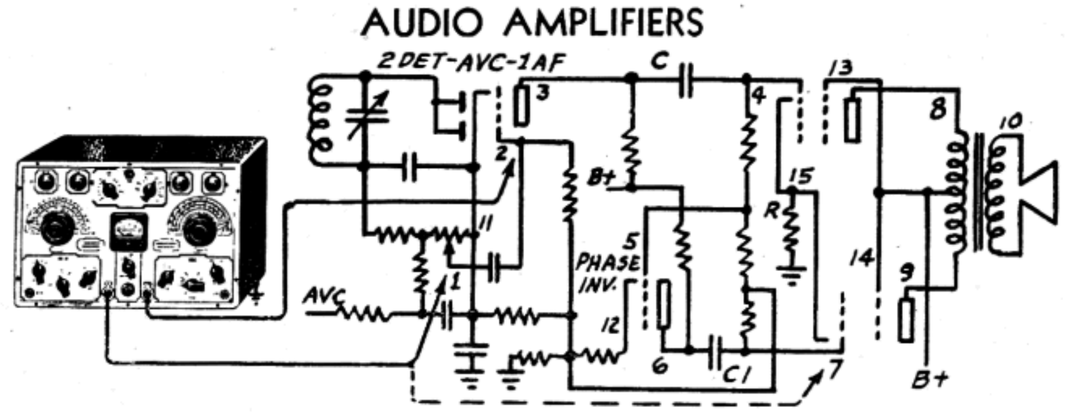
There are a number of different types of afc circuits, but the testing of them with the Chanalyst remains substantially the same—similar information being sought in each case. The i-f signal is checked at the i-f tube plate (1) which feeds the discriminator. The i-f probe at (2) checks the coupling capacity; at (3) and (4), the i-f voltage fed to the discriminator; at (5) to see if any i-f voltage gets into the discriminator load. (Filter R, C and C1.) The voltmeter probe at (6) measures the afc voltage. With this probe connected and the receiver tuned both sides of the correct carrier, the afc voltage characteristic can be plotted. The same probe moved to the control tube control grid (7) measures the control bias applied to this tube. The i-f probe at (7) shows if the i-f filter condensers C2 and C3 are intact. The a-f probe at (7) shows if the a-f filter condenser C4 is intact. Shorts in any of these circuits will naturally show up by interfering with the normal i-f or afc voltages as measured at the respective points. Control tube operating voltages are measured by placing the voltmeter probe in contact with points (8), (9), (10) and (11). Over the broadcast band the r-f channel can be used to check the oscillator signal in the control tube circuit at (7), (10) and (12).

POWER SUPPLY UNITS



When the receiver power supply plug is inserted into the Chanalyst receptacle, the wattage consumption of the receiver is indicated. This combined with the voltmeter probe located at the various d-c voltage output points (1), (2), (3) and (4), furnishes definite data concerning the power supply. Hum is checked by placing the a-f probe at points (1), (2), (3) and (4). Shorted or open by-pass condensers are immediately indicated. Shorts in the receiver which increase or decrease the load on the power supply, are immediately detected.

AUDIO AMPLIFIERS



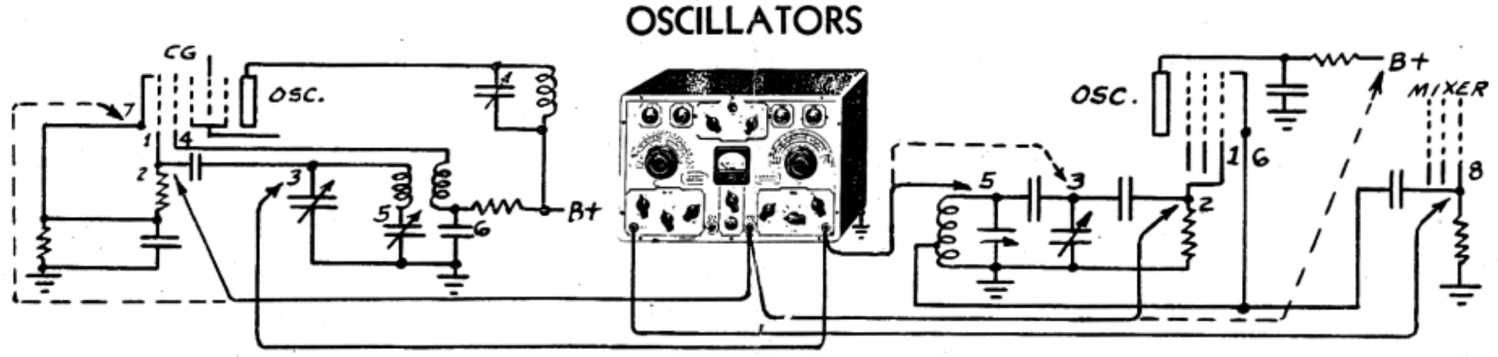
A typical a-f amplifier with phase inverter and push-pull amplification. A check of the presence of the a-f signal can be made by progressively placing the a-f probe in contact with points (1), (2), (3), (4), (5), (6), (7), (8), (9) and (10). It is, of course, possible in a rapid check to advance from (1) to (8) and (9) and thus embrace all between, but in the event of trouble in the system, each point is checked because the level of the signal at these various points can be established. Progressing in this manner through the amplifier, the same operations check the various coupling units. The voltmeter probe at points (2), (3), (4), (5), (6), (7), (8), (9), (11), (12), (13), (14) and (15) will measure the various operating voltages. Measurement of the signal level at points (4) and (7) will establish if the phase inverter output signal voltage applied to (7) is correct with respect to the signal voltage available at (3), and also if the input voltage to the output tubes is balanced. Leakage in condensers C and C1 can be checked by measuring the bias voltage at (4) and (7). High leakage through the condensers will buck or reduce this voltage. Excessive leakage will buck the bias voltage completely and even make the voltage at the grid positive.

INTERMITTENT RECEIVERS

YESTERDAY intermittents were hunted by hit-and-miss methods . . . valuable time was wasted in hurried checking when the condition finally did show up . . . perhaps the trouble was located, more than likely not . . . then another wait——

TODAY and TOMORROW . . . a signal is fed into the receiver to which the five channels of the Chanalyst have been connected at appropriate points. The indicators are adjusted . . . When the intermittent condition develops, the change in one or more of the indicators from normal identifies the portion of the receiver in which the trouble lies.

OSCILLATORS



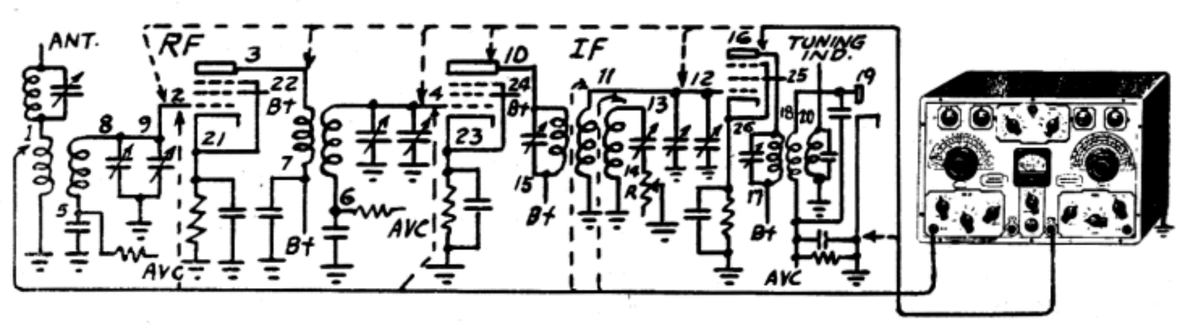
The operation of oscillators can be checked by two methods. The first is the measurement of the d-c voltage developed across the grid leak by the rectified grid current existing during oscillation. The oscillator control grid will be negative with respect to ground while the tube is oscillating and positive when the tube is not oscillating. The voltmeter probe is placed in contact with the oscillator control grid of the tube at (1), or with the grid end of the grid leak (2), or with the stator of the oscillator tuning condenser (3), *if the latter is connected directly to the control grid.* The most accessible of these three connections should be used. This type of test is suitable over the *entire* frequency range of oscillators used in all receivers. Ope of the oscillator over all bands can be checked by tuni receiver over its entire frequency range.

This test can be made with all types of oscillator c ts, irrespective of the type of tube used. Oscillators sus cted of cutting out at certain frequencies can be checked instantaneously with positive results and without the need of connecting a current meter in series with any of the circuits.

The second method will check oscillating circuits over the range between 600 kc and 15,000 kc and trace the presence of the signal in all circuits where it is supposed to flow. The oscillator probe is placed in contact with the oscillator control grid (1), plate (4), or with the tuned circuit at any point (3), (5), (6) or (7) that is convenient and above ground potential. The oscillator channel tuned circuit is resonated with the frequency of the oscillator being tested and the oscillator indicator shows the presence or absence of the signal. The oscillator signal fed from a separate oscillator tube to the mixer can be checked by placing the oscillator probe in contact with the point in the mixer that is coupled to the osc or tube. This may be the grid (8) of the mixer, hode, etc., thus establishing the condition of the coup elements between the oscillator and the mixer.

This type of test also enables fairly accurate approximation of the equency of the signal being generated by the receiver oscillator under test. Naturally all operating voltage tests can be made in routine fashion by connecting the voltage probe to all d-c points in the oscillator system.

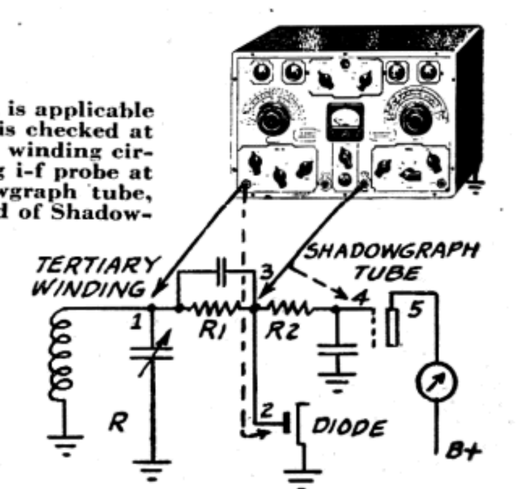
RF-IF CIRCUITS



R-f signals over the broadcast band can be checked at (1), (2), (3), (4), (5), (6) and (7); in fact at any point in the tuned circuit that is above ground potential, for example, (8) and (9). I-f signals can be checked at (10), (11), (12), (13), (14), (15), (16), (17), (18), (19) and (20), as you see, including the tertiary windings. Points (13), (14) and (20) indicate such places. Point (1) is used to check the operation of the wavetrap. Minimum signal at the intermediate frequency is desired here for normal operation. In making r-f and i-f tests all that is necessary is to resonate the Chanalyst and move the probe from point to point. The voltmeter probe at (2), (3), (4), (5), (6), (10), (12), (16), (21), (23), (24), (25) and (26) measures the various operating and control voltages with the signals in the circuit. The i-f probe at (13) will show the operation of the tertiary winding resistor R. Alignment operations proceed along normal lines, but the voltmeter employed any place in the avc circuit makes an excellent output meter during such alignment. Noise can be checked by listening to the signal as it is picked off at various points in the r-f and i-f systems.

TUNING INDICATOR TESTS

This test, while identified with one particular circuit, is applicable to all similar arrangements. Presence of the i-f signal is checked at (1) by placing i-f channel probe at any point in tertiary winding circuit. I-f signal fed to rectifier diode checked by placing i-f probe at (2). To measure rectified voltage intended for Shadowgraph tube, voltmeter probe is placed at (3); then at (4), control grid of Shadowgraph tube. Plate voltage applied to Shadowgraph tube is checked at (5). I-f probe placed at (3) and (4) will indicate the condition of the by-pass condensers in the circuit in the event that Shadowgraph indication is influenced by modulation component of i-f carrier signal. Also i-f probe at (3) and (4) checks presence of higher resistances R1 and R2 by attenuation of i-f signal due to high resistances. Either voltage or signal test can be used to check resistors R1 and R2 . . . Any tuning-eye circuit can be checked in a similar, simple manner and the same holds true for tuned flasher arrangements.



INSIDE THE RIDER CHANALYST

RF-IF CHANNEL

Five tubes are employed in the rf-if channel; three as tuned amplifiers, the fourth as a diode rectifier, and the fifth as a cathode-ray tuning eye indicator. The amplifier covers three frequency bands: 600 kc to 1,700 kc; 240 kc to 630 kc, and 95 kc to 260 kc, the amplification being substantially flat over each band. The input circuit is calibrated, thereby making the channel suitable for gain measurements. The sensitivity of the amplifier at the control grid of the first stage for full indication is approximately 60 microvolts and a signal of less than 6 microvolts will show an indication. The pickup for the channel is made through a shielded cable, terminating in a capacitance of less than 1 micromicrofarad. Attenuation of the input circuit over a ratio of 10,000 to 1 is provided by a continuously variable resistive attenuator and a four-step capacitive attenuator.

A three-step switch selects the frequency band. A jack in the indicator circuit permits the output of the amplifier to be fed to headphones or an oscillograph so that the signal can be heard or its waveform examined. The rectifier circuit is so designed that the output depends upon the carrier voltage and not the modulation component; therefore the indication does not depend on the percentage of modulation of the input signal.

THE OSCILLATOR CHANNEL

The oscillator channel employs three tubes: a tuned amplifier, a diode rectifier and the cathode-ray tuning eye indicator. Coverage of oscillator operation extends as high as 70 megacycles. The tuned amplifier used in the channel operates over three frequency bands: 600 kc to 1,700 kc; 1,650 kc to 4,950 kc, and from 4,800 kc to 15,000 kc. Pickup to the circuit is through a shielded cable which terminates in a capacitance of less than 1 micromicrofarad. The input circuit is equipped with a gain control.

THE A-F CHANNEL

The a-f channel employs three tubes: an amplifier, a diode rectifier and a cathode-ray tuning eye indicator. It is resistance-capacity coupled and flat over a frequency range of 50 to 50,000 cycles. The sensitivity of the amplifier is .1 volt for full indication and is operative over an input voltage range from .1 to 1,000 volts. A jack is provided in the output circuit of the amplifier so that the signal output can be fed to headphones or to an oscillograph for aural or visual observation. The continuously variable attenuator covers a range from .1 to 10 volts and a switch-controlled, single-step attenuator extends the input voltage range to 1,000 volts.

THE WATTAGE INDICATOR

The wattage indicator employs two tubes: a diode rectifier and a cathode-ray tuning eye indicator. It is calibrated to indicate the power consumption of the receiver under test and covers a range from 25 to 250 watts. This unit is automatically connected into the circuit when the receiver is plugged into the receptacle provided for that purpose.

Interior of the Rider Chanalyst

Tube Complement

4—6K7	4—6E5	1—76
1—6Q7	1—6H6	1—6X5

THE ELECTRONIC VOLTMETER

This voltmeter employs a tube and a meter-type indicator. As a result of design, it has a number of special features not found in other instruments. The meter has a center zero and indicates both positive and negative voltages with respect to ground. The range of voltages covered by the meter is as follows: −5 to 0 to +5; −25 to 0 to +25; −100 to 0 to +100; and −500 to 0 to +500. Each range is selected by means of a four-position switch. The input resistance of the instrument on all scales is 10,000,000 ohms, which means that on the low-voltage scale, the resistance is equal to 2,000,000 ohms per volt. The overall accuracy of the voltmeter is approximately 5 percent. of the full-scale deflection. A single probe lead provides contact between the voltmeter and the point being checked.

All d-c operating and control voltages may be measured with the instrument, thus making it possible to measure r-f, i-f, a-f, and oscillator voltages directly at the grid and plate without interfering with the operation of the receiver. The voltmeter is thoroughly protected against damage from overload.

THE POWER SUPPLY

The power supply employs a full-wave rectifier and functions as the source of the operating voltages for all the tubes in the Chanalyst. Exceptional care has been taken in the design of the filter so that the hum level is extremely low.

THE PANEL

The panel is of heavy chromium-plated brass. All the calibrations are deeply etched to assure the maximum visibility. The various controls are grouped for greatest ease of operation, the channel and function of each being clearly designated. The cathode-ray tuning eyes are recessed behind the panel enabling easy observation of these indicators.

THE CABLES AND PROBES

Four probe leads are furnished. The cables have low capacity, are shielded, and have an outer covering of braid. The rubber insulation is of high quality and in order to obtain the greatest flexibility the wire is made up of sixteen strands of No. 34. The probe handles contain the coupling capacity for the rf-if and oscillator channels. These probes terminate in pointed prods with shafts which have an outside thread. Four small copper clips, having internally threaded sleeves, can be screwed over the prods when a permanent connection is required to the different points in a receiver, as when an intermittent receiver is being tested.

Chanalyst Model A 50-60 cycles 117 volts, complete with tubes . . **$107.50 net**

Model AX 25-40 cycles 117 volts, complete with tubes . . **112.50 net**

Size 14" x 9" x 9¾" Weight: 26 pounds

SERVICE INSTRUMENTS, INC.

404 Fourth Ave., New York, N. Y.