


Trouble-Finding CHART

 IN the preparation of the list of possible radio receiver faults and remedies which constitutes this supplementary booklet an attempt was made to treat as many of the common troubles as possible. It is fully realised, however, that a considerable number of radio set disorders are still unmentioned. Many obvious ones were omitted simply because it was considered that their discovery and correction would require an intimate knowledge of the subject not possessed by the average radio enthusiast or experimenter. Even as it is, the list of possible troubles is surely formidable. We can quite see the possibility that the nontechnical radio listener, glancing through the pages to follow, will gain the impression that the radio set is likely to be a most troublesome affair. This, of course, is not necessarily the case, since the majority of good receivers can be depended upon to serve with complete satisfaction year after year just so long as the valves and batteries are kept in good condition. In this connection we might mention that the listener with little or no technical knowledge is well advised to depend, for the rectification of any possible troubles, upon some radio service man who has made a specialised study of the matter, since any tinkering with the wiring, particularly if the set is professionally built, is likely to do more harm than good.

To use chart, diagnose your set trouble under one of the following headings, and turn to the page indicated for its probable cause and remedy. No signals (page 3), weak signals (page 5), scraping, scratching, or knocking sounds (page 7), whistles, squeaks, or hisses (page 11), humming or buzzing sounds (page 13), wavering or fading signals (page 15).

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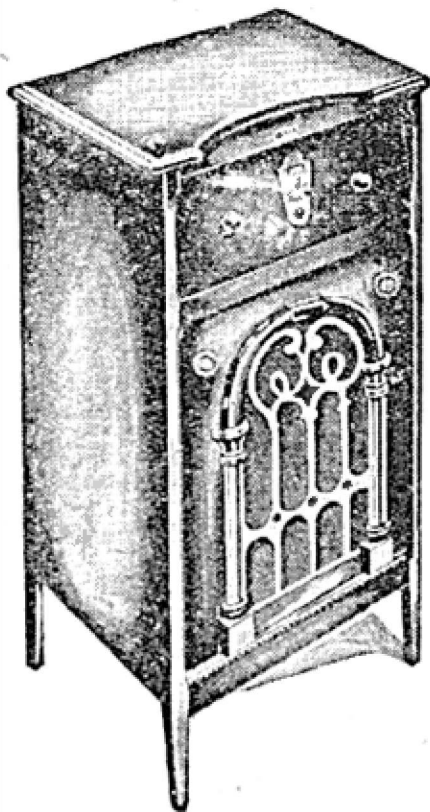
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45 Adelaide Street,
BRISBANE.**

WHEN THERE ARE NO SIGNALS	
Possible Trouble.	Cause and Remedy
Discharged "A" Battery.	Storage batteries or dry cells used for filament supply have a habit of becoming exhausted when particularly required. Filaments lighting dimly or failing to light are symptoms. Recharging of accumulator or replacement of dry cells necessary. "A" battery should be tested with voltmeter since failure of filaments to light may be due to open filament circuit.
Disconnected Battery Leads.	Wires connecting set to "A" or "B" supply may be making imperfect contact at terminals. Wires sometimes break inside insulating covering or ends become corroded Careful search for doubtful spots in wiring necessary.
Faulty Switch.	Blades of switch sometimes fail to close. Short wire connected across switch leads will permit check.
Aerial or earth	Aerial or earth lead may be disconnected. Often caused by terminals working loose. Unclean connections to earth or lead-in. Clean with sandpaper. Solder connections.
Lightning arrester.	Lightning arrester may be short-circuited, thus earthing the aerial Remove arrester and test receiver without it. If signals O K. replace with new arrester. Do not attempt to repair it
Faulty tuning coils.	Open circuit in the windings This usually occurs where taps are taken from the coils; also where connections are made to the ends of the coil windings Solder connections. Coils may also be shorting Usually caused by soldering flux getting on to the windings: also due to broken or defective insulation—re-wind coils.
Valve socket contacts imperfect.	Valve prongs not making contact with the arms of the socket. Clean bottom of valve prongs, also contact springs, and bend up the latter slightly with a button-hook in order that good contact is made.
Grid condenser	Sometimes the heat of the soldering iron will cause an open circuit in the condenser by melting off the internal connections. Replace with new condenser. Also the heat of soldering may remove the insulation wax, causing a short-circuit between the plates. Same remedy
Exhausted "B" battery	Check the "B" batteries with a voltmeter, and if they have dropped to two-thirds of their rated voltage they should be discarded. Never connect half-dead B batteries to others, new or old.
Grid coil disconnected.	Test for open circuit between grid-condenser and filament leads.
Fixed condenser across phones or transformers	This condenser may be shorted. If amplifiers are used it may be the condenser across the primary of the first transformer. Replace condenser
Fault in speaker or 'phones	May be burned out or short-circuited. Take to manufacturer to be re-wound or repaired. Adjusting screw may require turning in order to get correct distance between diaphragm and magnet.
'Phone plug.	Defective or short-circuited Replace

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NEW ZEALAND.

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Possible Trouble.	Cause and Remedy
Valves nearing end of life.	Modern valves rarely burn out. After prolonged service or after operation at excessive filament voltages they lose their emission. Simplest check is to replace each valve in turn by a spare valve of known quality, during operation of the receiver.
Batteries almost discharged.	Both the "A" and "B" batteries must be renewed at intervals. Low voltages cause weak signals. Frequent checking with a voltmeter is desirable to avoid this trouble and to ensure that the accumulator will never be completely discharged between the periods of charging. Such discharging is harmful to battery.
Telephone or speaker terminals reversed.	The majority of 'phones and speakers using magnets acting directly upon the diaphragm have one of the cords marked with a red thread in the insulation covering. This marked cord should be connected to the "B" battery plus terminals, whilst the other will go to the plate of the valve. A reversed connection will cause the "B" current to demagnetise the 'phone magnets.
Primary circuit not tuned.	When tuning is broad it is due usually to the coupling between the primary and secondary windings of the tuning coils being too close together, or it may be due to too many turns on the primary. Space primary and secondary coils farther apart, and remove some of the wire from the primary winding.
Reaction coil reversed.	If the receiver uses regeneration the reaction of tickler coil may be reversed. In some makes of three-coil tuners it is hard to tell which terminal should be connected to the plate of the valve. Reverse tickler leads for best results.
Condensers.	Condensers may be wrongly connected. Moving plates should be connected to the earth part of the circuit. Fibre ends on condensers are subject to leakage, and are hard to locate. The pigtail connection may have become broken. Condensers may be poorly insulated. Use only condensers with good insulation. Try a .001 fixed condenser across the primary of the first transformer—i.e., between the plate of the detector valve and "B" plus, in order to assist oscillation.
Valve socket.	Valve prongs not making good contact in socket Clean valve prongs and socket contact springs, and bend up the latter slightly to ensure good contact.
Grid-condenser.	Short-circuited. This is often caused when soldering leads to the mica grid condenser, the flux flowing between the metal lugs and over the edges. Discard condenser and use small bolts or contact studs for connecting up the new one, inserting the bolt through the small holes in the condenser, and connecting the leads under the nuts of the bolts
Grid-Leak	Resistance too low. If this is the case it allows the charges on the grid to leak off too fast, and full volume of signal is not obtained. Try different values of resistance, and test for best results.

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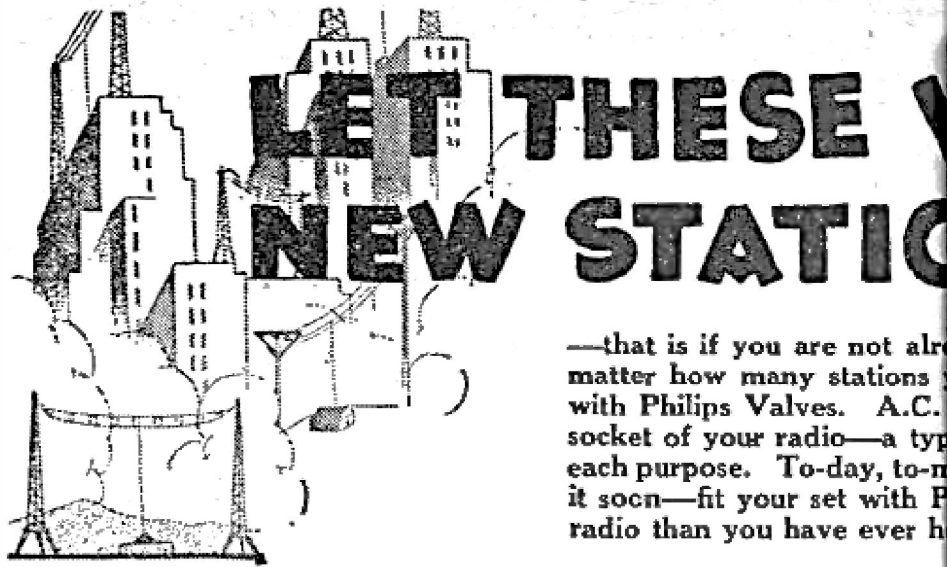
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Excessive filament voltage.	Keep filament voltage as low as possible. Burning valves too brightly causes loss of emission.
Grid-condenser open-circuited.	Sometimes in soldering to the grid condenser the heat melts the internal connections. A new grid condenser must be used.
Batteries in general.	Discard dry batteries that show a reading less than two-thirds of normal voltage. Test "A" battery (if wet) with a hydrometer. If low have accumulator recharged. "C" battery sometimes the cause of poor and distorted reproduction. Replace.
'Phone plug.	Defective or shorted. Replace.
'Phone terminals reversed.	Cord with red thread woven through it should go to the "B" plus terminal.
IF SCRAPING, SCRATCHING, OR KNOCKING SOUNDS INTERFERE WITH RECEPTION.	
Possible Trouble.	Cause and Remedy
Aerial.	Aerial swaying against conducting objects partially or wholly grounded. Keep aerial away from trees and corners of the house.
Tuning coils.	Coils loose or vibrating. With honeycomb coils open out the legs with a small screwdriver or pocket knife. Flimsy construction of apparatus allows relationship of coils to change with the least vibration. Use thicker baseboard and panel.
Poor contacts.	Poor connections at switch points or switch levers. Use a switch with panel bushing, having snug fitting shaft with spring tension. Clean switch occasionally.
Variable condensers.	Dust gets between the plates of the variable condensers. Remove with a piece of silk. Plates sometimes touch, causing loud clicks and sometimes sparks. If bending or buckling is bad replace condensers with new ones.
Faulty grid-leak.	Resistance may be too high. Try a grid leak with a lower resistance. Usually about two megohms will be correct for a broadcast receiver and five megohms for a short-wave receiver. Sometimes the contact in the leak becomes intermittent. Check with new one.
Rheostat.	A loose connection in the rheostat gives an unsteady current. Can be detected by change of brilliancy of valve filament or by change in signals when rheostat knob is jarred.
Plate or grid leads.	Plate lead touching grid leak, or the two running close to each other. This results in a feed-back either by actual contact or by capacity effect. Separate the leads. Run at right angles to each other if possible.
Plate lead touching aerial lead.	In a loose-coupled receiver this results in a capacity feed-back, and where the filament is earthed it short-circuits the "B" battery. Separate the leads. Insulate well.



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DC

Type.	Purpose.	Fila-ment, Current	Grid Bias at				Pa
			80.	100.	120.	150.	
A409	Gen. Pur.....	0.03	4.5	6.0	7.5	9.0	12
A415	Det., 1st Audio...	0.03	1.5	3.0	3.0	4.5	12
A425	Res. Cap., R.F....	0.03	1.5	*2.0	*2.5	3.0	12
A425	R.F.....	0.03	—	—	—	—	12
A442	R.F. Screen Grid.	0.03	—	—	—	—	30

*To be obtained by means of potentiometer.

THE 6-VOLT SERIES

Type.	Purpose.	Fila-ment, Current	Grid Bias at				Pa
			80.	100.	120.	150.	
A609	Gen. Pur.....	.06	4.5	6.0	7.5	9.0	12
A615	Det., 1st. Audio...	.06	1.5	3.0	3.0	4.5	12
A630	Res. Cap., R.F....	.06	—	—	1.5	1.5	12
A635	R.F.....	.06	—	—	—	—	12

PO

Type.	Purpose.	Pa
B504	Power.....	12
B405	Power.....	12
B406	Audio.....	12
B409	High Gain Power...	12
B443	Penthode.....	12
B605	Audio.....	12
C603	Super Power.....	12
G443	Penthode.....	12
TR01/10	Power Amplifier...	12
F704	Power Amplifier...	12

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E416	Gen. Pur.	15	2	27/6
E424	Spec. Det. 1st Audio.	24	3	35/-
E430	Res. Cap. R.F.....	30	2	30/-
E435	R.F.....	35	.8	30/-
E442	Screen Grid.....	—	1.2	40/-



AMERICAN REPLACEMENT SERIES

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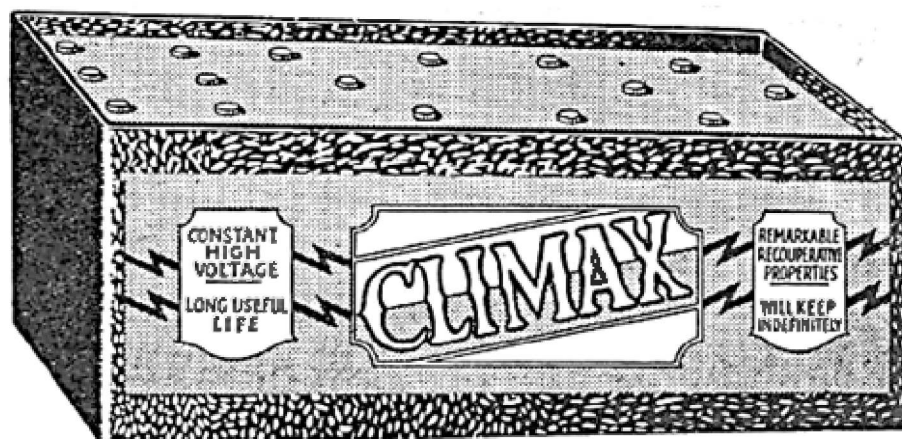
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Wireless, 11/10/29. ADDRESS

FREE EXAMINATION

'Phone or speaker cords defective.	The tinsel cords used often become broken by continual bending, and eventually make a very poor contact that is noticeable every time the 'phone cord is moved. Use a new cord.
Valve elements vibrating.	When rigidly attached to the baseboard slight vibrations will cause the valve elements to vibrate. This is particularly noticeable with the small valves using dry batteries on the filament. The cure is to use shock-absorber socket or mount the sockets on sponge rubber. Rubber feet on cabinet will usually also aid.
Valve sockets.	Moulded sockets sometimes have poor insulating properties. Metal sockets with a fibre base are just as bad. Use bakelite or porcelain sockets.
Rheostat.	Loose connection on the rheostat usually gives an unsteady current. Can be detected by change in brilliancy of valve filaments, or by change in signals when rheostat knob is jarred.
Transformer trouble.	Audio frequency transformers burned out or partially short-circuited should be taken out and replaced with new. If moisture gets to the transformer windings a short circuit would occur. A heated electric light bulb hung inside the cabinet for several hours will usually dry out the moisture.
'Phone plug.	Defective or short-circuited. Disconnect plug, and test to see if current will flow from one terminal to the other when connected to the 'phones. Replace if faulty.
SHOULD WHISTLES, SQUEALS. OR HISSES MAR RECEPTION.	
Possible Trouble.	Cause and Remedy
Static.	Can possibly be reduced by using loop or indoor aerial. Cannot as yet be entirely eliminated.
Tickler coil.	Too much wire on tickler or reaction coil. The large number of turns in use gives such a strong field that energy is fed back into the grids regardless of how the rotor is turned. Remove some of the wire from the reaction coil, and keep turning the rotor until set goes smoothly into oscillation. This is indicated by a dull thud instead of a harsh squeal.
Grid condenser.	Grid condenser short-circuited. Replace with new condenser.
Grid-leak.	Resistance too high. Reduce resistance until best value is found.
Flat "B" batteries.	Test "B" batteries with a voltmeter. Discard if they have dropped below two-thirds of rated power. If a storage "B" is used re-charge it. If storage "A" battery is used test with a hydrometer; If it registers below 1.170 re-charge it. If dry batteries are used discard them, and replace with new ones.
"B" voltage too high.	Too high "B" voltage on plate of detector valve has a tendency to make the valve oscillate. Reduce voltage until this tendency is eliminated.



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"A" voltage too high.	Filaments should be heated to the lowest degree consistent with good signals. To use excessive filament voltage only shortens the life of the valve.
Plate and grid leads.	Plate and grid leads should not run parallel or touch. This causes a feed-back effect resulting in howls.
Aerial lead.	Aerial lead should not touch plate lead. In loose coupled sets this results in a capacity feed-back, and if the filament is earthed it short-circuits the "B" battery.
Transformers (radio frequency).	If the set employs radio frequency amplifications before the detector the transformers may be too close. The transformers feed back from the plate to the grid and cause oscillations. Space R.F. transformers farther apart, and mount at right angles to each other.
Radio frequency valve filaments too bright.	Radio frequency valve filaments are rather critical and need close adjustment to prevent them going into oscillation.
Plate and grid leads.	Plate and grid leads should not touch or run parallel. This causes valves to oscillate. Separate leads.
Batteries run down.	Test "B" batteries with voltmeter, and if they have dropped to two-thirds of their rated voltage discard them. If storage "B" is used recharge it. If dry cell "A" is used discard old batteries and replace with new ones. If wet "A" battery is used re-charge if hydrometer gives a reading below 1.170.
Transformer leads reversed.	Howling and squealing can sometimes be prevented by changing leads on the transformer. If different makes of transformers are used it is often found that the windings are reversed. All that is necessary in this case is to reverse the primary of one of the transformers.
Transformers too close.	Audio frequency transformers should not be mounted too close together. Four and a half inches should be the minimum separating distance. Keep well apart, and mount at right angles to prevent inter-action.
Feed-back from speaker.	When speaker is mounted on set or very near it howling may be caused. Remove speaker from set or cover detector valve with cotton wool.
WHEN HUMMING OR BUZZING SOUNDS PREVAIL	
Possible Trouble.	Cause and Remedy
Tuning coils.	Open circuit in tuner windings. Usually occurs where taps are taken from windings and where connections are made to the ends of the coil. Rewind coils and securely re-solder connections.
Valve elements vibrating.	When rigidly attached to the base of the set, slight vibrations will cause the valve elements to vibrate. The remedy is to use shock absorber sockets, or place the sockets on sponge rubber. Rubber feet underneath the cabinet often help.

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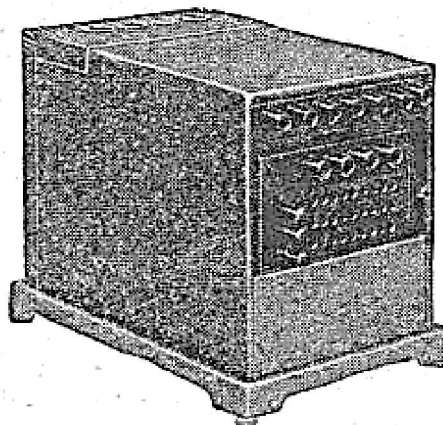
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Aerial.	Aerial too close to alternating current electric wires. Sometimes reduced by running aerial at right angles to such lines. Sometimes caused by leaky transformer on nearby electric pole, in which case notify the power station.
Aerial lead.	Aerial lead running too near electric light wires in home. Electrical gadgets, such as bells, coffee pots. etc., will cause hum. Keep lead well away from such fixtures.
Temporarily shorted transformer.	If moisture gets into the transformer, it will be partially shorted, until the moisture has been driven off. Place a heated lamp globe into the cabinet for a few hours.
Transformers open circuited.	Often in soldering on the terminals the internal connections of the transformer are loosened. Can be repaired by opening the case and carefully re-soldering the fine lead.
Transformer leads.	May be reversed. See that you have not connected filament leads from transformer to positive, instead of negative, side of the "A" battery.
Speaker or 'Phones.	Burned out or shorted windings. Take to a reliable Arm.
'Phone plug.	Defective or short-circuited. Remove plug, and see if current will flow from one terminal to the other when disconnected from the 'phones or speaker. If so, replace with new plug.
Batteries flat.	Discard or charge, respectively, if dry cells or accumulators are used.
'Phone condenser shorted.	The phone condenser may be shorted, causing distortion. Replace. It may be also that the condenser across the primary of the first transformer is shorted. Replace.
WAVERING OR FADING SIGNALS	
Possible Trouble.	Cause and Remedy
Aerial insulators.	Leaky, due to rain, soot, or dirt. Lead-in touching side of house, aerial touching tree, etc. Use glazed insulators and clean periodically. Keep aerial well away from earthed objects.
Variable condenser leads reversed.	If the variable condenser is improperly connected, the signal will fade when the hand is removed from the dial, due to "hand capacity." The fixed plates of the condenser should be connected to the grid circuit.
Rheostat.	A loose connection in the rheostat gives an unsteady current, and, accordingly, signals are caused to vary in intensity. Replace or repair rheostat.
Natural phenomena.	Signals fade under certain conditions, due to some condition existing between the transmitter and the receiver. To date there is no known remedy.
"A" battery.	Weak "A" battery causes unsteady flow of current, resulting in change of intensity in the signals. Replace or re-charge batteries.

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ALL ELECTRIC
with these accessories



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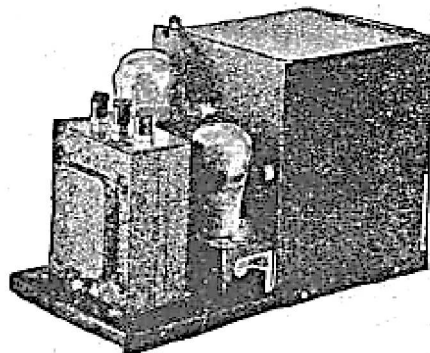


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