



GENERAL SERVICE BULLETIN

This Bulletin is designed to acquaint the Dealer and Distributor with various Installation and Service hints, which apply to all Radio Receivers issued by Thom and Smith, Ltd. For special circuit details and operating instructions, reference should be made to the individual Service Bulletin for each Receiver.

I. INSTALLATION HINTS AND PRECAUTIONS.

(i) Aerial.

For country use, the best results are obtained with an outdoor aerial from 50 to 60 feet in length. It should consist of a good quality wire, absolutely free from joints, and it should not run either over or under any electric light or power cables. It should be kept as far away as possible from trees, metal roofs, gutter pipes and brick walls. In accordance with the regulations of the Fire Underwriters, the aerial should be equipped with an approved lightning arrester. For Metropolitan use, or when close to a broadcast station, an indoor aerial is quite satisfactory. It should be run around the picture rail, under the skirting board or under the carpet, but due care should be exercised in seeing that it does not come into contact with or near electric light or power conduits.

(ii) Earth.

For long distance daylight reception in the country a good and efficient earth connection is most important. It should be as short as possible in length and should consist of high grade 7/20 or larger size wire. At the connecting point to the receiver, it should be thoroughly scraped clean whilst at the earthing point, it should be attached by means of a standard earthing clip to a water pipe. Here again, the points of contact should be thoroughly scraped before making the connection. Hot water pipes and gas pipes should be avoided, as they are not good earthing points. If a cold water pipe is not available, it may be possible to obtain a short earth by driving a metal rod into the ground to a depth of several feet, and making a good soldered connection thereto. In such circumstances, make arrangements to keep the soil around the metal rod in a moist condition.

(iii) Valves.

With the power-lead from the receiver disconnected from the mains, or, in the case of battery-operated receivers, with the batteries disconnected, see that the valves are securely inserted into the correct sockets in accordance with the layout shown on the Terminal and Valve Diagram which is riveted to the back of the chassis. See that the screen-grid clips are firmly attached to the valves and replace valve shields where provided.

(iv) Dynamic Speaker.

See that cone fabric is entirely clear of obstructions, such as wood-wool packing or labels which may inadvertently have entered.

(v) Voltage Supply.

(a) *A.C. or D.C. Receivers.* Care should be taken that the line voltage of the mains corresponds with either the tapping on the power transformer of the receiver or with the setting of the voltage adjustment panel (if such is supplied). If any radical discrepancy is found, arrangements should be made to adjust the receiver to a tapping which is the nearest to, but higher than the actual line voltage.

(b) *Battery-operated Receivers.* Connect the batteries as indicated in the individual Service Bulletin, taking care to join the leads provided to the correct terminals, otherwise damage to the valves will result. Careful use of the receiver and attention to the conditions of the batteries will considerably prolong the life of these latter items. The customer should be given complete instructions as to the care of the A battery. Charging must be effected at least once a month, and preferably once a fortnight. Voltage readings must be taken whilst the battery is on load, *i.e.*, with the receiver operating.

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I. INSTALLATION HINTS AND PRECAUTIONS (Continued).

The normal voltage should be 2 volts per cell and in no circumstances must the reading be allowed to drop below 1.75 volts per cell. A still better indication of the condition of the battery may be obtained with a hydrometer, the normal reading on which should be 1215. A reading of 1180 or less shows that the battery needs recharging. The level of the electrolyte must be kept above the plates by the addition of distilled water while the batteries are on charge. As with the A Battery, the B Battery should be tested whilst on load and should give readings of 45 volts for each block. Directly the voltage drops below 33 volts per block, arrangements must be made for replacement, otherwise noisy and intermittent reception will result.

N.B.—Keep the terminals of all batteries well tightened and free from corrosion by smearing them with vaseline.

(vi) Location of Receiver.

Wherever possible the receiver should be located in a position as near as possible to a power-point and as far as possible from objects which generate heat, such as fireplaces and radiators, as any undue external heat is likely to cause damage to the wooden cabinet. Should it be necessary to place the receiver at such a distance from the power-point that the standard lead from the receiver has to be extended, care should be taken to see that the flex is secure from damage by being walked on, and that the electrical wiring regulations are obeyed in every particular.

2. FAULT LOCATION.

In general, it will be found that the failure of the receiver to operate is due to minor defects which can easily be remedied on site, but much time and trouble may be saved if the Dealer first discovers exactly what is wrong with the receiver and then follows a definite line of examination before tampering with adjustments or wiring. Every serviceman who desires to effect repairs with expedition should equip himself with a set analyser of an approved pattern. Such a piece of equipment will give confidence to the customer and will assist the serviceman to save a considerable amount of time and money in localising a fault. In the absence of a set analyser, a meter reading 0.60-120-300 volts (1,000 ohms per volt) should be provided so that, at least, the Voltage Chart given in each individual Service Bulletin may be read and checked as the receiver is being examined.

It should be noted that the voltmeter must have an internal resistance of 1,000 ohms per volt and that the line voltage must correspond with the tapping on the power transformer (see 1 (v)), otherwise the readings on the Chart will not correspond with those obtained on the meter. Never check voltages until all valves are fully warmed up to their proper operating conditions and see that the Volume Control is turned full on.

The various hints given below by no means cover every fault that can occur, but they do embrace a wide range of the most common troubles and it should be noted that, for the Dealer's assistance, under each heading a list of probable places is given where the fault is likely to be found in such an order as to make for quickness and accuracy of location.

NOTE: IN THE CASE OF A.C. OR D.C. OPERATED RECEIVERS, IF IT IS FOUND NECESSARY TO REMOVE THE CHASSIS FROM THE CABINET, DO NOT MAKE ANY TEST WITHOUT FIRST CONNECTING THE LOUD SPEAKER, AND SEEING THAT THE POWER VALVE IS FIRMLY IN ITS SOCKET.

(i) No Reception.

Should any or all of the valves fail to light when the house power or battery switch is "on," look for:—

- (a) Fault in house power socket, or, for battery-operation, a disconnection in batteries.
- (b) Disconnection in power cord from receiver.
- (c) Damaged power transformer in receiver (A.C. and D.C. Receivers only).
- (d) Burnt-out filaments in valves.
- (e) Valve not properly in socket or faulty contact in valve socket.

If valves are lighting, look for:—

- (f) Disconnected screen grid clips or break in screen grid wire.
- (g) Defective valves. Test on analyser or replace with valve known to be in good order.
- (h) Disconnection in voice coil or transformer of Dynamic Speaker or in speaker cord.
- (i) Aerial disconnected from receiver or grounded externally.
- (j) Volume control not turned on or disconnected at terminals or at resistance strip or movable arm shorting to earth.
- (k) Open circuit or short circuit condensers or resistors. See voltage chart for location of faulty resistor, and use "parallel" method for tracing of condenser.

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2. FAULT LOCATION (continued).

(ii) Weak Reception.

- (a) Defective aerial.
- (b) Insufficient line voltage due either to poor supply or voltage tapping connected to wrong terminal on power transformer. See Item 1 (v) (a). For battery-operated Receiver refer to Item 1 (v) (b).
- (c) Defective valve or valve connection. See (e) and (f) above.
- (d) Aerial or oscillator coils open or short circuit.
- (e) Defect in Dynamic Speaker. Disconnection in coil or transformer or obstruction in cone. If the existence of the latter fault is suspected, proceed as follows:—Remove the speaker from the baffle-board. In the case of speakers marked "Model D," loosen the two screws which holds the spider support-bracket. (These two screws are located on the flat plate to which the cone housing and pot are secured. They are adjacent to the field coil and can be easily recognised as they are equipped with shake-proof washers.) Centre the voice coil in respect to the core so that there is air clearance all round. This can be effected by inserting three pieces of paper each of equivalent thickness to two thicknesses of newspaper at equidistant points around the core and between the core and the voice coil. Gradually retighten the two screws, previously untightened, by giving each screw a turn alternatively until both are quite firm. Remove the paper and blow out the air-gap with compressed air from a motor car pump or similar equipment.
In the case of speakers marked "Model X," slacken the centre screw located in the front of the speaker and proceed to centre the voice coil in respect of the core in a similar fashion to that described above for "Model D."
- (f) Damaged or disconnected condensers or resistors. Locate faulty resistor by testing voltages at valve sockets by the aid of meter and in accordance with voltage chart. Trace faulty Condenser by "parallel" method.
- (g) Intermediate transformers, padding condensers or gang condenser out of alignment. See Item 3 of General Service Bulletin.

(iii) Noisy Reception.

This defect may be due to a variety of causes. It should be the objective of the Dealer first to discover whether the disturbance is external, i.e., coming in by way of the aerial, or internal, i.e., caused by a faulty or loose component inside the receiver. This can be attained by removing both the aerial and earth from their binding posts on the receiver while the noise is being received. If the noise ceases, then it is certain that it is being received from an external source. If, however, the noise is still present, then the trouble must be looked for inside the receiver itself. The procedure for tracking the fault to its source is as follows:—

- (a) *External Noise.* That caused by atmospheric disturbances is easily recognised by its comparative irregularity of incidence and the peculiarity of sound associated with bursts of static, etc. This condition should be carefully explained to the customer. It cannot be avoided or obviated.

Then comes interference due to the picking up of electrical noise from the power mains, refrigerators, vacuum cleaners, motor-generators, fans, electric signs, local electric supply power transformers, overhead tram wires, etc. In such circumstances the Dealer should, first of all, discover whether there is any piece of electrical equipment working in the household. If not, then the aerial and earth should be examined for proximity to power supply leads and for poor connection.

In the case of an all-electric receiver or where electricity is used for lighting or power purposes in the house, a thorough examination should be made of the system for loose or arcing contacts in switches, power and lamp sockets and fuses. Also check the conduit for continuity, especially at T-pieces and elbows. If a break is evident, connect electrically and bond to earth.

Having checked all the foregoing without having located the trouble, the next step is to obtain an "interference suppressor" which can be obtained from this factory and which can be attached to the aerial as indicated on the instruction sheet accompanying it. The cost of such a piece of equipment is comparatively small and its installation is usually effective in either eliminating or, at least, considerably diminishing the offending disturbance.

- (b) *Internal Noise.* This may be due to faulty valves, faulty valve-sockets, loose or badly soldered joints inside the receiver, defective Dynamic Speaker (see 2 (ii) (e)), defective components or, in the case of a battery-operated receiver, a defective battery or faulty battery connection. The only method of tracking this is to make a complete visual and electrical inspection of the receiver.

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2. FAULT LOCATION (Continued).

- (c) Defective Dynamic Speaker. See 2 (ii) (e).
- (d) Faulty battery connection.

(iv) Poor Quality Reception with Distortion.

- (a) See that the Receiver is tuned to resonance point with broadcast station by adjusting Tuning Control for the loudest signal.
- (b) Faulty loud-speaker. See 2 (ii) (e).
- (c) Faulty valves.
- (d) Faulty components. Check voltages.

(v) Hum.

- (a) Faulty valves.
- (b) Faulty loud-speaker or speaker field connections reversed. See 2 (ii) (e).
- (c) Static shield on power transformer disconnected.
- (d) Defective electrolytic condensers.
- (e) Faulty resistor. Check voltages for location.
- (f) Broadcast station hum. Check by tuning-in another station.
- (g) External pick-up from electrical apparatus. Check by disconnecting aerial and earth. If hum ceases then proceed as in 2 (iii) (b).

(vi) Microphonic or Audio Howl.

- (a) Defective valves.
- (b) Loose component. Check gang condenser, loud speaker, baffle board, etc., for loose mechanical connection.
- (c) Faulty components. Check voltages.
- (d) Faulty batteries or battery connection.

(vii) Distortion.

- (a) Faulty valves.
- (b) Aerial too long.
- (c) See Item 2 (iv).
- (d) I.F. transformers out of alignment.
- (e) Battery connections reversed.

(viii) Fading.

- (a) Atmospheric. Explain this condition carefully to the customer and advise that it is better to tune to some other station.
- (b) Faulty valves due to "thermostatic" troubles in the elements.
- (c) Aerial contacting with surrounding objects such as trees, walls, etc.
- (d) Loose or badly soldered joints in receivers.
- (e) Faulty batteries. See Item 1 (v) (b).

3. ALIGNMENT.

Provided that the dial has not moved on the condenser shaft and that the gang condenser is not out of alignment, it is a simple matter to adjust for sensitivity a receiver which is fitted with a dial calibrated in kilocycles, metres or stations.

The procedure is as follows:—

Set the dial or pointer to the wave-length of a station easily receivable between 200 and 250 metres (1500—1200 k.c.) and move the trimmer of the oscillator section of the condenser gang until the wanted station is at maximum strength.

Without altering the tuning control, adjust the trimmers on the other sections of the gang condenser for additional gain. If it is thought desirable, the trimmer condensers on the intermediate frequency transformers can also be adjusted for maximum gain by moving individually each screw to the right or left until the correct position is obtained. This latter procedure should be effected with great care and should be attempted only if the receiver appears weaker than normal. An insulated tool, such as a bakelite rod or a screw driver the blade of which has been covered with a spaghetti tube, should be used to make the adjustments.

Now set the dial or pointer to one of the most easily obtained stations between 470 and 520 metres (630—580 k.c.) and adjust the padding condenser right or left as required until maximum signal is obtained. The receiver is now adjusted for proper tracking and maximum sensitivity.

INSTRUCTIONS FOR THE INSTALLATION AND OPERATION
OF THE TASMA SUPER-HETERODYNE RECEIVER.

AERIAL: For country use the best results are obtained with an outdoor aerial of about 100 feet in length. It should consist of a good quality wire absolutely free from joints and it should not run either over or under any electric light or power cables. It should be kept as far away as possible from trees, metal roofs, gutter pipes and brick walls. In accordance with the regulations of the Fire Underwriters, the aerial should be equipped with an approved Lightning arrester.

For Metropolitan use, an indoor aerial is quite satisfactory. It should be run around the picture rail, around the skirting board or under the carpet but due care should be exercised in seeing that it does not come into contact with or run near electric light or power conduits.

EARTH: A good and efficient earth connection is most important. It should be as short as possible in length and should consist of high grade 7/20 or larger size wire. At the connecting point to the receiver, it should be thoroughly scraped clean whilst at the earthing point, it should be attached by means of a standard earthing clip to a water pipe. Here again, the points of contact should be thoroughly scraped before making the connection. Hot water pipes and gas pipes should be avoided, as they are not good earthing points. If a cold water pipe is not available, it may be possible to obtain a short earth by driving a metal rod into the ground to a depth of several feet and making a good soldered connection thereto. In such circumstances, make arrangements to keep the soil around the metal rod in a moist condition.

VALVES: With the receiver disconnected from the mains or the batteries, see that the valves are securely inserted into the correct sockets, in accordance with the lay-out shown on the terminal and valve diagram, which is riveted to the back of the chassis. See that the grid clips are firmly attached to the valves and replace valve shields where provided.

DYNAMIC SPEAKERS: See that the cone fabric is entirely clear of obstructions such as wood-wool packing or labels which may inadvertently have entered and examine the speaker plug to see that it is making good mechanical contact in the speaker jack (at the back of the chassis). The speaker plug should in no circumstances be removed from the socket whilst the receiver is drawing current from the power source.

LOCATION OF RECEIVER: Wherever possible the receiver should be located in a position as far as possible from objects which generate heat, such as fireplaces and radiators, as any undue external heat is likely to cause damage to a wooden cabinet. Should it be necessary to place the receiver at such a distance from the power point (in the case of an all electric receiver) that the standard lead from the receiver has to be extended, care should be taken to see that the flex is secure from damage by being walked on and that the electrical wiring regulations are obeyed in every particular.