Shane

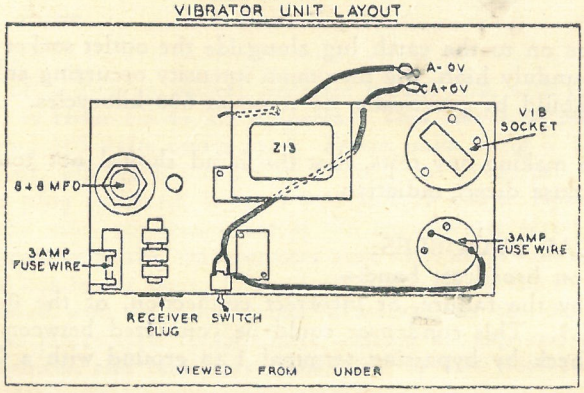
SERVICE BULLETIN

No. 22.

VIBRATOR POWER UNITS, TYPE VU-1.

June, 1937.

MODEL VU - 1
VIBRATOR UNIT LAYOUT



RADIO CORPORATION OF NEW ZEALAND LTD.

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GENERAL.

The development of noise-free vibrator-type power supplies has been the subject of continuous research in the Laboratory over a considerable period, and it has been decided to make our findings available for the benefit of interested dealers and servicemen.

Each complete power unit is individually tested under actual working conditions, and is guaranteed free from electrical noise when despatched from the factory. Any noise which may subsequently develop will be found due to a condition of unbalance arising in the filter circuits. This may be caused by a defective vibrator or bypass condenser, but may also be the result of any tampering with the unit so as to displace components or leads.

The arrangement of components and the placement of earthing points in these units are extremely critical, and are so adjusted that all noise (other than direct radiation, which will be mentioned later) is cancelled.

If a power unit is suspected of being noisy, the installation should be checked by substituting a vibrator of known quietness. Assuming the unit to be found still noisy, check that all shield cans are in place, and that battery cables and connectors are in good order. Only if noise persists after these checks can the power unit itself be considered defective.

It has been found that the location of interference on the receiver dial has a definite association with certain typical defects, thus forming an important basis for diagnosing the cause of the trouble. In carrying out tests for noise, it is important that the hook-up should be identical for each test. This will void possible spurious effects due to different locations of the various pieces of equipment, including battery and receiver, with respect to the unit under test.

Test for noise on broadcast band: Earth the receiver, and allow the aerial wire to rest near the power unit. With the receiver at maximum volume there should be only the faintest trace of noise at any part of the tuning band.

Fasten the aerial wire on to the earth lug alongside the outlet socket of the power unit. The noise should still not be unduly high, the maximum intensity occurring at approximately 1400 and 800 kilocycles. There should be practically no noise at 600 kilocycles.

It is important when making any tests, that the hand should not touch the chassis of the power unit, as this will cause direct radiation.

SUMMARY OF TYPICAL TROUBLES:

1. Excessive noise on broadcast band—

(a) This is caused by the failure, or incorrect connection, of the 0.1 microfarad condenser inside the choke coil RC.3. This condenser could be connected between terminals 1 and 3, the latter being earthed. Check by bypassing terminal 1 to ground with a 0.1 microfarad or larger condenser.

(b) If it is suspected that the power unit has been interfered with it may be necessary to adjust the leads between the shielded vibrator socket and the transformer, to give the minimum of radiation.

This is done by connecting the aerial to the earth lug on the chassis near the outlet socket on the power unit, and bunching the leads referred to with a non-metallic prod. The green leads are the "hot" leads and must be placed near the chassis and covered with the yellow leads to shield them. The position of the leads is quite critical and the smallest movement will make a surprising difference. With the receiver volume control full on there should be practically no noise at any portion of the broadcast tuning range, even with the aerial connection as above.

Minimizing the noise in this manner also removes most of the direct radiation at 12 megacycles. If the noise cannot be reduced by this means, it points to faulty components and further checks must be made as described in the following text. Be careful when placing the leads that they are not pressed against any sharp edges or projections which might pierce the spaghetti insulating sleeving and thus cause a short circuit.

(c) Failure of the mica bypass condenser from transformer high-tension to ground.

2. **Noise at 6 Megacycles:**

(a) This is most invariably caused by the failure of the dual 8 microfarad electrolytic condenser can to make contact with the chassis. Alternatively, the shield can over the vibrator unit may not be earthed. Test by holding the end of the aerial lead and touching in turn the above components and the chassis. The noise will increase when the vibrator shield is touched, but there should be little or no difference in intensity when other components are touched, compared with this chassis.

(b) Same as 1 (c) above.

3. **Noise at 16 Megacycles:**

(a) Direct radiation causes most of the interference at this frequency. In this respect see 1 (b) above re "bunching" of transformer leads. With the new type "squared" transformer shrouds it is essential that the bunching be also applied to the leads above the chassis as well as below. Transformer leads must also be as short as practicable, and it is important that the high-tension leads should be laid nearest the chassis with the low tension leads over the top of them for shielding purposes.

(b) Failure of the bypass condenser from the 6 volt positive switch contact to chassis. This applies particularly to units having the old type "rounded" transformer shrouds which fit right down to the chassis. The earthing of this condenser is extremely critical. In some cases it is grounded to the lug supporting the high-tension lead bracket, and in other cases to the centre lug where the electrolytic condensers and the high-tension condenser are earthed. Both positions should be tried. In some cases it may be necessary to remove the condenser from the centre lug and ground it to the chassis directly between the side and the centre earth lugs.

In extreme cases of persistent noise it may be necessary to install a second condenser to ground from the filament choke lead where it leaves the switch. This should only be done as a last resort, as it has the undesirable effect of bringing up the noise on the broadcast band, the exact frequency depending on the size of the condenser used.

(c) Same as 1 (c) above.

4. **Excessive Drain:**

The normal drain of a 7-valve battery receiver model 7B6, with pilots on, tuned to a local station, and volume off, is from 1.3 to 1.5 amperes. This refers to power units using the T5 transformer and delivering 165 volts under load. Power units using a T6 transformer, which deliver 135 volts under load, will have a drain of from 1 to 1.1 amps. The drain of the power unit alone, with receiver plug removed, is from 0.25 to 0.35 amps. Sparking at the vibrator contacts is minimised by the mica condenser across the transformer secondary. On all older type units, as used on 7BV receivers, the transformers were assembled with an air-gap and had shielded leads, the size of the condenser being 0.03 microfarad. It is essential that this size of condenser be always associated with the transformer described, as the secondary is actually tuned by this capacity. On the newer type transformers without air-gap and unshielded leads the size of condenser is not so critical, and may vary from 0.002 to 0.01 microfarad.

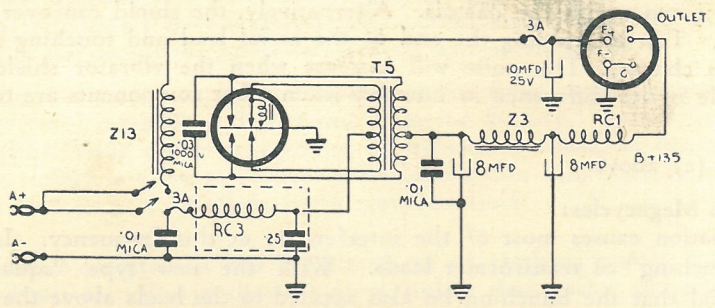
The slightest leakage in this shunt condenser will result in high drain, accompanied by low and erratic voltage output. The unit should be tested for drain without load. Electrolytic condensers should also be checked.

4A- shorted turns on H.T. sec of P.T.

5. **Excessive Hum:**

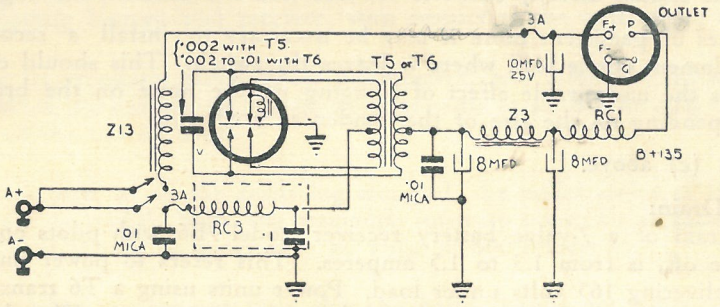
Faulty battery connections or poor switch contacts are responsible for audible hum in the receiver with the volume control completely "off." The smallest amount of extra resistance in the battery circuit will cause hum and for this reason it is essential that the battery leads should not be lengthened or replaced with smaller cable. Check that the 3 ampere fuses are properly soldered. Test the 10 microfarad filament bypass electrolytic condenser. Check the filament choke by temporarily short-circuiting it with a piece of wire from switch to fuse. Make sure that there are two separate leads from each battery connector to supply the vibrator and filaments.

Noise suppression in the type VU-1 power unit depends on the cancellation of circulating currents within the unit. No extra condensers should be added, nor any alterations made, unless all standard remedies have failed as our investigations have proved that the only result of injudicious tampering will be further troubles.



ALL LEADS FROM VIBRATOR TRANSFORMER ARE SHEILDED

DESIGN LAB DRAWN CHECKED DATE 15-1-37	D 260 MODEL VU-1	VIBRATOR UNIT FOR USE WITH STANDARD BATTERY RECEIVERS RADIO CORPORATION OF NEW ZEALAND LTD	AMENDMENTS	CHKED	DATE



DESIGN LAB DRAWN CHECKED DATE ~~15-1-37~~	D 260 MODEL VU-1	VIBRATOR UNIT FOR USE WITH STANDARD BATTERY RECEIVERS RADIO CORPORATION OF NEW ZEALAND LTD.	AMENDMENTS VIBRATOR BYPASS CONDENSER, ALSO SHIELDING TRANSFORMER MODIFIED AS TO	CHKED	DATE 17-3-37 26-5-37

ELECTRICAL DATA:

Power supply ..... 6 volts D.C.
Input current, no load (receiver plug removed) ..... .25 to .35 ampere
Output voltage, no load ..... 150 volts D.C.
Input current, full load† ..... 1.2 amperes
Output current ..... 20 to 25 mA Maximum 14 mA average†
Output voltage ..... 135 volts D.C.
Voltage at vibrator primary socket terminals ..... 5.9 volts minimum
†With Model 7B6 7-valve dual-wave receiver, tuned to local station, Pilot lamps on, volume off.

RESISTANCE TESTS:

(Receiver plug removed from output socket.)
6 volt positive side of switch to vibrator socket ..... Short circuit
Primary of power transformer ..... 50 ohms per side
Secondary of power transformer ..... 160 ohms per side
Centre tap of secondary to high tension outlet contact ..... 550 ohms approx.
Vibrator driving coil resistance "P" to "G" contact ..... Short circuit
6 volt positive side of switch to 6 volt out pins on base ..... 60 ohms approx.