HIS MASTER'S VOICE

MODEL 467S.B.

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Seven-Valve, Spread Band
Superheterodyne Receiver

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Technical Information and Service Data

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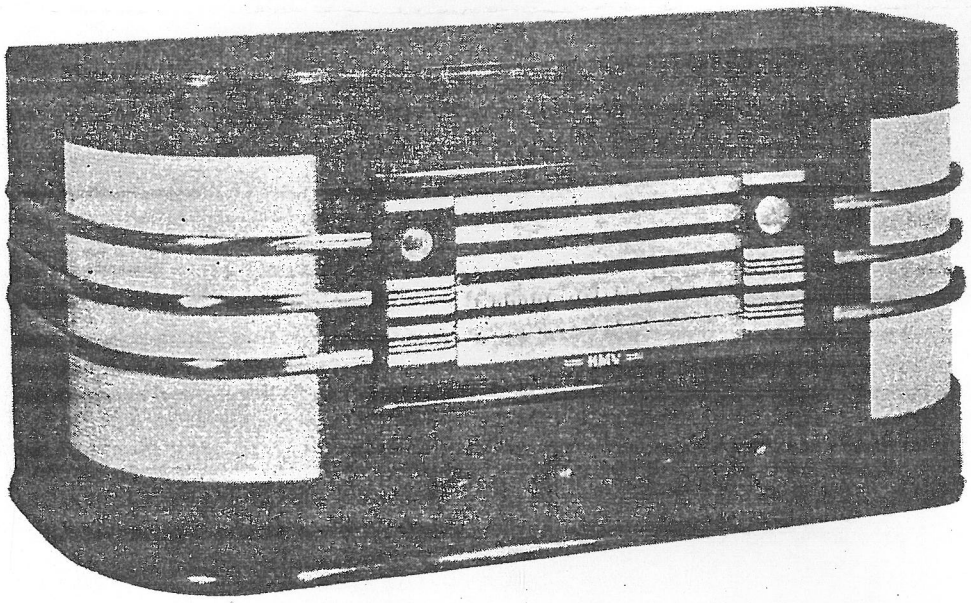
H-M-V

SERVICE DIVISION

HIS MASTER'S VOICE (New Zealand) LTD.
118-120 WAKEFIELD ST., WELLINGTON



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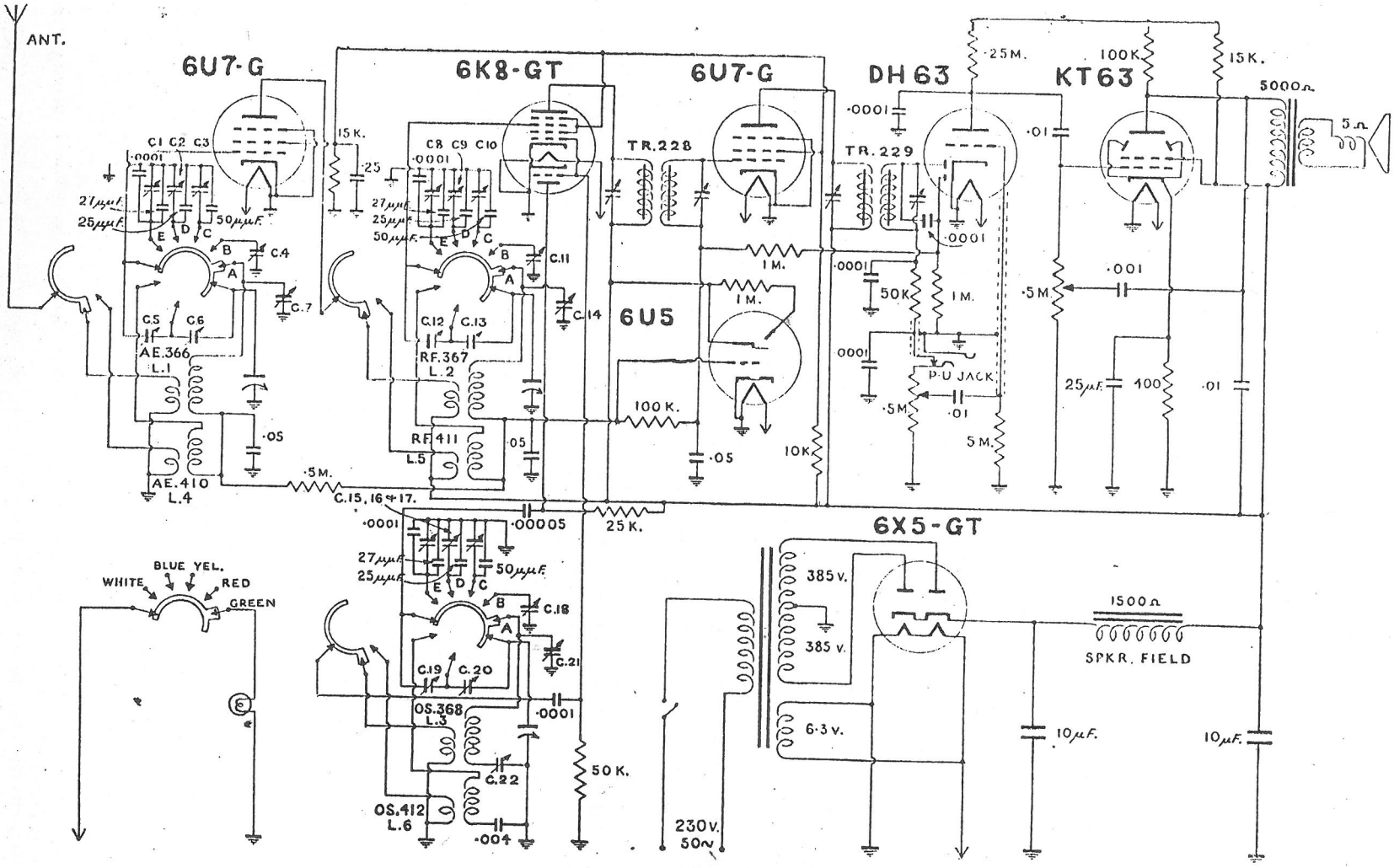

Figure 1—Circuit Diagram

Circuit Arrangement

"Bandspread" is accomplished by the switching of various combinations of fixed and variable condensers in series and in parallel with the ganged tuning condenser and short-wave coils, L.4, 5 and 6.

R.F. Amplification is accomplished by a triple-grid super-control amplifier, a 6U7-G. The input of this valve is coupled to the aerial through a tuned R.F. transformer, while its output is coupled to the next stage through a further tuned R.F. transformer.

The first detector and oscillator functions are accomplished in a single tube, a 6K8-GT. The three gang condenser tunes the aerial transformer secondary, the coupling (R.F.) transformer secondary and the heterodyne oscillator coil. The padding condenser C.22 is in series with the "Broadcast" oscillator coil, and the trimmers C.7, 14 and 21 (in parallel with the gang) are for obtaining exact alignment on the "Broadcast" band. Trimmers C.4, 11 and 18 serve the same purpose on the full "Short-wave" band. The remaining trimmers provide exact alignment on the "Spread-bands" (bands C, D and E). The series condensers C.5 and 6 in the aerial section, C.12 and 13 in the R.F. section, and C.19 and 20 in the oscillator section, provide the actual "Spreading," while the remaining trimmers allow for exact aligning or "Trimming."

The intermediate frequency stage also incorporates a 6U7-G and is coupled to the 6K8-GT and to the DH63 by means of iron-cored transformers which resonate with variable condensers. These transformers are adjusted to tune at 455 K/cs.

The modulated signal as obtained from the output of the I.F. system is detected by the diodes of the DH63. Audio frequency secured by this process is passed on to the control grid of the same valve for amplification before final reproduction. The D.C. voltage, which results from the detection of the signal, is also used for Automatic Volume Control and is applied as grid bias to the R.F. Amp., 1st Det. and I.F. Amp. valves.

Manual volume control is effected by means of a potentiometer connected as a variable coupling element between the output of the second Det. and the first audio control grid. After amplification by the DH63, the audio signal is transmitted by resistance-capacitance coupling to the input of the KT63 power output stage, which, in turn is transformer-coupled to the electrodynamic speaker. High frequency tone control is provided by means of a resistor and condenser combination from plate to control grid of the KT63, the resistor being the variable element.

The power supply system consists of a 6X5-GT rectifier valve which is supplied from an efficiently designed power transformer and which works into a suitable filter. The various potentials required for the plate, screen and cathode circuits are obtained from the output of the filter. The electrodynamic speaker field coil is used as a filter reactor.

SERVICE DATA

Alignment Procedure

There are twenty-one alignment trimmers and one padder provided in the aerial, R.F. and oscillator tuned circuits which cover the alignment of all bands ("A" Broadcast, "B" Short-wave, "C" 19 meters Spread, "D" 25 meters Spread, "E" 31 meters Spread). The I.F. transformer adjustments are made by means of screws attached to variable condensers. All of these circuits have been accurately adjusted during manufacture, and should remain properly aligned unless affected by abnormal conditions or altered during servicing. Loss of sensitivity, improper tone quality and poor selectivity are the usual indications of improper alignment.

The correct performance of this receiver can only be obtained when the aligning has been done with adequate and reliable apparatus.

A test oscillator is required as a source of the specified alignment frequencies. Visual indication of receiver output during the adjustment is necessary and should be accomplished by the use of a good type of output indicator.

The procedure outlined below should be carefully followed in adjusting the various trimmer condensers. (Locations found on figures 1 and 2.)

I.F. Transformer Adjustments

The four adjustment screws of the two I.F. transformers are located on top of the cans. Each circuit must be aligned to a basic frequency of 455 K/cs. To do this attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator to the control grid of the 6K8-GT through a .05 mfd. condenser. Connect the test oscillator ground terminal to the ground terminal of the receiver chassis. The wave-change switch should be in Band "A" position. Tune the test oscillator to 455 K/cs. Advance the receiver Volume Control to its full-on position and adjust the receiver tuning control to a point on the low frequency end of the dial where no interference is encountered, either from local broadcast stations, or from the heterodyne oscillator, shorting the aerial and ground terminals if necessary. Increase the output of the test oscillator until a slight indication is present on the output indicator. Adjust the two condensers, located on the second I.F. transformer, to produce maximum indicated receiver output. Then adjust the two condensers located on the first I.F. transformer, in the same manner. During these adjustments regulate the test oscillator output so that the indication is always as low as possible. By doing so, broadness of tuning due to A.V.C. action will be avoided. It is advisable to repeat the adjustment of all I.F. variable condensers to ensure that the interaction between them has not disturbed the original adjustment.

R.F. Trimmer Adjustments

"Broadcast"

(*a*) Attach the output of the test oscillator to the receiver aerial through a 200 mmfd. condenser. The ground terminals remain connected together. Check the pointer adjustment by setting it to a point where it is just visible at the high frequency end of the dial (three-gang condenser fully out of mesh). The output indicator should be left connected to the system. Adjust both the test oscillator and the dial pointer to 1,400 K/cs. Leave the volume control of the receiver at its maximum position. Make sure that the wave-change switch is in the Band "A" position. Carefully align the oscillator, R.F. and aerial trimmers C.21, 14 and 7 respectively, so that each brings about maximum indicated receiver output. During all adjustments, care should be taken that the test oscillator output is kept as low as is practicable. (*b*) Shift the test oscillator to 600 K/cs. and tune the receiver to pick up this signal, then, disregarding the dial reading at which it is best received, rock the tuning control backward and forward through the signal, simultaneously adjusting the oscillator padder C.22 for maximum receiver output. After completing this adjustment the trimmers C.21, 14 and 7 should be re-aligned as in (*a*) to correct any change brought about by the adjustment of C.22.

"Short Wave"

Adjust the test oscillator to 18 M/cs. and set the receiver tuning control to a dial reading of 18 M/cs. Make sure that the wave-change switch is in the Band "B" position. Adjust the trimmers C.18, 11 and 4 of the oscillator, R.F. and aerial coils, so that each produces maximum receiver output. Two positions of maximum will be found with the trimmer C.18. The one of minimum capacitance is correct and should be used. This can be checked by tuning the "image" signal, which will be received twice the I.F. frequency (910 K/cs.) away (i.e. at 17.09 M/cs. on dial). Now adjust the test oscillator to 6 M/cs. and tune the receiver. With no further alignment the dial reading should correspond.

"Spreadbands"

It will be necessary to repeat the following alignment procedure several times before exact alignment is obtained. Trimmers C.20, 13 and 6 are common to all three of the bands, but will give maximum receiver output on all bands if the receiver is correctly aligned.

Band "E" (31 Meters)

Adjust the test oscillator to 9.8 M/cs. and set the receiver tuning control to a dial reading of 9.8 M/cs. Make sure that the wave-change switch is in the Band "E" position. Adjust the trimmers C.15, 8 and 1 for maximum receiver output. Now tune both the test oscillator and the receiver to 9.5 M/cs. and adjust C.20 (the "Spreading" condenser) for maximum signal. Shift the receiver pointer to a point somewhere in the middle of the band and adjust C.13 and C.6 for maximum output, using either the signal generator, a station or general noise.

Band "D" (25 Meters)

Adjust the test oscillator to 12 M/cs. and set the receiver tuning control to a dial reading of 12 M/cs. Ensure that the wave-change switch is in the Band "D" position. Adjust the trimmers C.16, 9 and 2 for maximum receiver output. Now tune both the test oscillator and the receiver to 11.5 M/cs. and adjust C.20 again for maximum receiver output. The setting of this condenser should be very nearly the same as the setting for maximum signal in the alignment of Band "E." With the receiver pointer at a point somewhere in the middle of the band adjust C.13 and C.6 again for maximum output.

Band "C" (19 Meters)

Adjust the test oscillator to 15.5 M/cs. and set the receiver tuning control to a dial reading of 15.5 M/cs. The wave-change switch should now be in the Band "C" position. Adjust the trimmers C.17, 10 and 3 for maximum receiver output. Now tune the test oscillator and the receiver to 15 M/cs. and adjust C.19 (the "Spread" condenser) for maximum signal. With the receiver pointer somewhere in the middle of the band adjust C.12 and C.5 for maximum output, again using either the signal generator, a station or general noise as an indication.

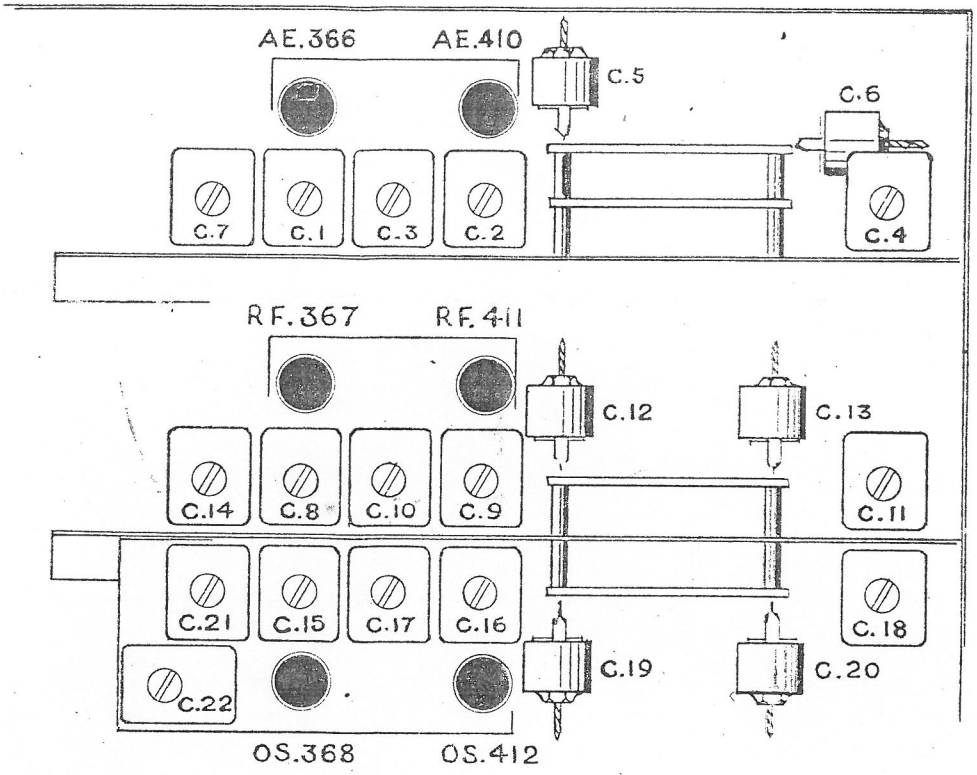

Figure 2

Modifications and Service Notes

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Seven Valve, Spread Band
Superheterodyne Receiver

TECHNICAL INFORMATION

Electrical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A)	550-1,650 K/cs.
"Short Wave" (B)	5.75-18.5 M/cs.

BANDSPREAD

"19 Meters" (C)	15-15.5 M/cs.
"25 Meters" (D)	11.5-12.1 M/cs.
"31 Meters" (E)	9.5-9.8 M/cs.

ALIGNMENT FREQUENCIES

Band "A"	600 K/cs., 1.400 K/cs.
Band "B"	6 M/cs., 18 M/cs.
Band "C"	15 M/cs., 15.5 M/cs.
Band "D"	11.5 M/cs., 12 M/cs.
Band "E"	9.5 M/cs., 9.8 M/cs.
Intermediate Frequency	455 K/cs.

VALVE COMPLEMENT

(1)	6U7-G — R.F. Amplifier.	(5)	KT 63 — Audio Power Amp.
(2)	6K8-GT — First Det.-Oscillator.	(6)	6X5-GT. — Full-wave Rectifier.
(3)	6U7-G — Intermediate Amp.	(7)	6U5 — Tuning Indicator.
(4)	DH 63 — Second Det., A.F. Amp. & A.V.C.		

POWER SUPPLY RATING — 230 Volts, 50 Cycles.

Mechanical Specifications

Height	12¾ inches.
Width	11 inches.
Length	25 inches.
Operating Controls	(1) Tone-power Switch, (2) Volume, (3) Tuning, (4) Wave-change Switch.
Tuning Drive Ratio	18 to 1

General Features

The 467SB. is a mantel or console type receiver and incorporates many distinctive features. Three of the Short-wave bands (C, D and E) are "SPREAD" over the full length of the dial, thus providing broad tuning of the short-wave stations. The elliptical cone loudspeaker provides a balanced reproduction of "treble" and "bass" frequencies. The design also includes iron cored I.F. transformers, resistance coupled audio system, flood lit dial and a visual tuning indicator. "Spin tuning" is accomplished by a balanced fly-wheel incorporated in the dial assembly. The variable tuning condenser is supported by a shock-proof mount which prevents chassis vibration from producing audio "howl." A readily detachable plug type connection is used in the chassis to loudspeaker cable, while a phonograph pick-up jack plug is also provided on the back panel of the chassis.

Service convenience has been a controlling factor in the layout of the chassis parts and wiring, as exampled in the mounting of coils, trimmers and wave-change wafers on plates which can be readily removed as complete units.