THE FISK AWA RADIOLA

Model 196

FIVE VALVE, TWO BAND, AUTOMATICALLY AND MANUALLY TUNED, A.C. OPERATED SUPERHETERODYNE

Technical Information & Service Data

ELECTRICAL SPECIFICATIONS

TUNING RANGES

"Standard Medium Wave"—1600-550 K.C.

"Short Wave"—13.65-45 M.

R.F. ALIGNMENT SETTINGS.

"Standard Medium Wave"—600 K.C. (Osc.), 1500 K.C. (Osc. and Aer.)

"Short Wave"—15 M. (Osc. and Aer.)

INTERMEDIATE FREQUENCY ..... 455 K.C.

POWER SUPPLY RATING ..... 200-260 V., 50-60 C.

(Instruments available with other voltage and frequency ratings.)

POWER CONSUMPTION ..... 75 watts

VALVE COMPLEMENT

(1) 6J8G Frequency Converter

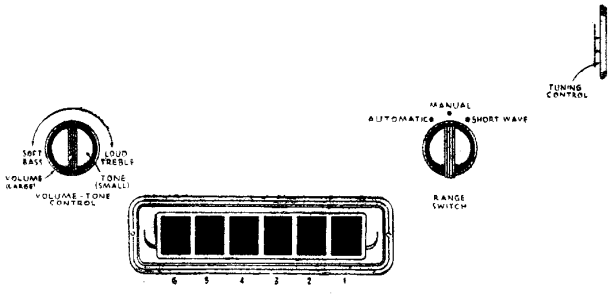
(2) 6U7G I.F. Amplifier

(3) 6B6G 2nd Det., A.V.C. and A.F. Amp.

(4) 6V6G Output

(5) 5Y3G Rectifier.

CONTROLS



Automatic tuning indicated by green pilot on cabinet front.

LOUDSPEAKER ..... 12-inch Type AS8

Loudspeaker Transformer TX20

Field Coil Resistance ..... 1500 ohms

Voice Coil Impedance ..... 2.2 ohms at 400 C.

UNDISTORTED POWER OUTPUT ..... 4.2 watts

DIAL LAMPS ..... 6.3 V., .25 amp.

INTRODUCTION.

The Model 196 introduces an entirely new Automatic Tuning circuit which eliminates frequency drifting. Features of design are:—High-stability Colpitts type oscillator circuit; Temperature Compensation; Permeability tuned coils; Separate aligning adjustment for each push-button circuit; Simple station selection by six thumb screws at rear of chassis.

Another feature is the ease with which the instrument may be serviced. The push-button coils and push-button switch are built in one unit, which can be removed from the chassis by removing four screws and unsoldering five connecting leads.

Apart from the Automatic Tuning section, the circuit arrangement of this model is similar to that employed in the Radiola 195.

ALIGNMENT PROCEDURE.

Alignment should only be necessary when adjustments have been altered from the factory setting or when repairs have been made to the tuned circuits. Climatic conditions should not seriously affect the receiver.

It is important to apply a definite procedure, as tabulated, and to use adequate and reliable test equipment. Instruments ideally suited to the requirements are the A.W.A. Junior Signal Generator, Type 2R3911, or the A.W.A. Modulated Oscillator, Type C1070. An output meter is necessary with both these instruments. If the Type C1070 test oscillator is used, see that a 250,000 ohms resistor is connected between the output terminals and, for Short Wave alignment, a 400 ohms non-inductive resistor in series with the active output lead of the instrument.

Connect the ground connection of the test instrument to the receiver chassis.

Perform alignment in the proper order, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown in the layout diagrams. Keep the volume control set in the maximum clockwise position and regulate the output of the test instrument so that a minimum signal is introduced to the receiver to give a standard indication on the output meter. This will avoid A.V.C. action and overloading.

When the receiver has been satisfactorily aligned, seal the adjusting screws with a small quantity of celluloid cement to eliminate the possibility of them shifting and also to indicate, in the future, whether they have been tampered with after servicing.

ADJUSTING TOOLS:

Two tools, which have been specially designed for alignment purposes, may be obtained from the Service Department of the Company. One is for adjusting and locking air-trimmer condensers, and the other is a non-metallic screwdriver for adjusting the cores within the I.F. transformers and oscillator coils. The part number of the former is No. 5371 and the latter No. 5372.

ALIGNMENT TABLE

Alignment Order.	Test Inst. Connection to Receiver.	Test Inst. Setting.	Receiver Dial Setting.	Circuit to Adjust.	Adjustment Symbol.	Adjust to Obtain
1	*6J8G Grid Cap	455 Kc/s.	Past 550 Kc/s.††	2nd I.F. Trans.	L30	Max. (Peak)
2	*6J8G Grid Cap	455 Kc/s.	Past 550 Kc/s.††	2nd I.F. Trans.	L29	Max. (Peak)
3	*6J8G Grid Cap	455 Kc/s.	Past 550 Kc/s.††	1st I.F. Trans.	L28	Max. (Peak)
4	*6J8G Grid Cap	455 Kc/s.	Past 550 Kc/s.††	1st I.F. Trans.	L27	Max. (Peak)
		Repeat the above adjustments before proceeding.				
5	Aerial Term	600 Kc/s.	600 Kc/s.†	Oscillator	Core L6	Max. (Peak)
6	Aerial Term	1500 Kc/s.	1500 Kc/s.	Oscillator	C8	Max. (Peak)
7	Aerial Term	1500 Kc/s.	1500 Kc/s.	Aerial	C2	Max. (Peak)
		Repeat Adjustments 5, 6, and 7.				
8	Aerial Term	15 M	15 M‡	Oscillator	C10	Max. (Peak)**
9	Aerial Term	15 M	15 M	Aerial	C4	Max. (Peak)***

* With grid clip connected. A .001 mfd. condenser should be connected in series with the active output lead of the test instrument.

† Rock the Tuning Control back and forth through the signal. Reset the dial pointer to 600 Kc/s., if necessary. The pointer is soldered to the control wire, and may be moved by applying a hot soldering iron to the connection.

** Use minimum capacity peak if two peaks can be obtained.

*** Use maximum capacity peak if two peaks can be obtained. Check for image signal by tuning the receiver to approx. 16 M. It may be necessary to increase the output of the Test Oscillator to receive the signal.

‡ Rock the Tuning Control back and forth through the signal.

†† With Tuning Condenser plates in full mesh.

AUTOMATIC TUNING CIRCUIT ALIGNMENT.

(1) Switch Receiver to "Automatic" and press push-button No. 1. Using a test oscillator, inject a 900 K.C. signal into the aerial circuit. Screw push-button adjustment No. 1 back and forth through the signal and at the same time adjust air-trimmer C17 for maximum peak output.

(2) Reset test oscillator at 600 K.C. Screw push-button adjustment No. 1 back and forth through the signal while adjusting the core in No. 1 padding coil (L16) for maximum peak output.

(3) Repeat the above adjustments before proceeding.

(4) Proceed with push-button circuits 2 and 3, following the same procedure as in instruction (2), after having pressed the push-button of the circuit concerned.

(5) Set test oscillator at 1000 K.C., and proceed with push-button circuits 4, 5, and 6, following the same procedure as in instruction (2), after having pressed the push-button of the circuit concerned.

This completes the normal alignment procedure. However, if the signal strength of an automatically tuned station does not compare favourably with that obtainable from the same station by manual tuning, this may be simply rectified. Press the push-

button to tune the station and, while screwing the corresponding push-button adjustment back and forth through the signal, adjust the core in the corresponding padding coil for maximum peak output. This should not be carried out unless absolutely necessary.

If a push-button coil is replaced, it will necessitate re-alignment of the circuit concerned as follows:—

(1) Press the push-button corresponding to the coil and feed a signal into the aerial circuit of the receiver (600 K.C. for coils 1, 2, or 3, and 1000 K.C. for coils 4, 5, or 6). Screw the push-button adjustment for the coil back and forth through the signal and at the same time adjust the core within the corresponding padding coil for maximum peak output.

(2) Reset the test oscillator to 900 K.C., if the coil is Number 1, 2, or 3, and to 1500 K.C. if the coil is Number 4, 5, or 6, and tune this signal with the push-button adjustment. Each push-button coil has two cores within, and adjustment is carried out by varying the distance between these. Loosen the locking nut on the oscillator core, which is that nearest the rear of the chasssis, taking care not to move the core by holding the boss thereon with a spanner. Having done this, and while still holding the core, turn the push-button adjustment to obtain maximum peak output.

(3) Repeat (1) and (2), then tighten locking nut.

AUTOMATIC TUNING STATION SELECTION.

Six stations in the broadcast band may be selected for Automatic tuning. The stations are identified by means of the call-sign tabs supplied for inserting in the recesses in the keys. A sheet of tabs on which is printed the call-signs of all Australasian stations accompanies the receiver. Call-signs of the six stations selected should be cut from the sheet.

The stations should be adjusted in order of their frequencies in kilocycles. This order is used in the following example:—

(1) 2FC—610 K.C.
(2) 2BL—740 K.C.
(3) 2GB—870 K.C.
(4) 2UW—1110 K.C.
(5) 2CH—1190 K.C.
(6) 2SM—1270 K.C.

The range of frequencies covered by each key from right to left is as follows, and only stations within the given range can be obtained:—

(1) 550—1000 K.C.
(2) 550—1000 K.C.
(3) 550—1000 K.C.
(4) 880—1600 K.C.
(5) 880—1600 K.C.
(6) 880—1600 K.C.

Switch the receiver ON, and allow it to operate for at least five minutes before making adjustments.

Then proceed as follows:—

(1) Set the Range Switch at "Manual" and tune the station selected for No. 1 key (2FC in the above example).

(2) Press Key No. 1.

(3) Switch the Range Switch to "Automatic."

(4) The adjusting screws are located on the rear of the chassis. Turn adjustment No. 1 slowly until station No. 1 is heard (2FC in example). Adjust to a position midway between the points where the quality becomes poor or the signal disappears.

(5) While searching for the station, switch the Range Switch to "Manual," frequently, to verify that station No. 1 is that being tuned.

Now proceed in order of frequency to adjust for the other five stations, making the set-up 2, 3, 4, 5, and 6, in that sequence, by the same method as that described above for No. 1.

MECHANICAL REPLACEMENT PARTS.

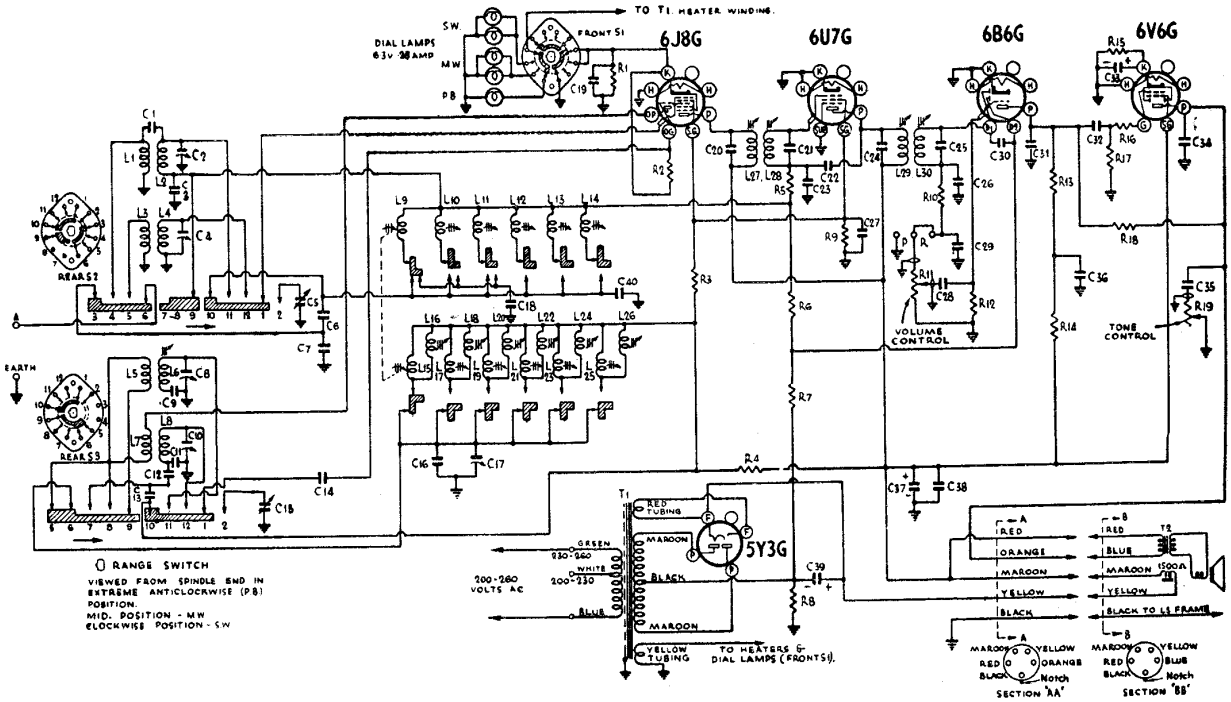
TUNING MECHANISM.

DESCRIPTION.	Part No.
Pointer and Saddle, with Drive Wire	6629
Drive Wire Tension Spring	6641
Drive Wire Jockey Pulleys—Large	6246
Drive Wire Jockey Pulleys—Small	7885
Pointer Drive Drum	8030
Main Drive Segment	8039
Main Drive Spindle Assembly	8035
Intermediate Drive Gear Assembly	8037
Dial Scale	8154

MISCELLANEOUS.

DESCRIPTION.	Part No.
Range Switch	8107
Push-button Switch	8112
Automatic Tuning Unit	8168
Loudspeaker Cable	6465
Tuning Knob	8075
Tuning Knob Clip	7686
Range Switch Knob—Outer	5625
Range Switch Knob—Inner	4589
Volume-Tone Control Knob—Outer	5625
Volume-Tone Control Knob—Inner	4589
Knob Clips	7929
Valve Sockets (4)	4704
Valve Socket (Cushion)	7327
Valve Clips	7459
Loudspeaker Cone Assembly	8588

CIRCUIT DIAGRAM AND CODE



NOTE:—Condenser C1 is incorrectly shown, and should be connected from Aerial to Control Grid 6J8G. Push button circuits, containing coils L9, L10, L11, cover a range from 550—1000 K.C. The remaining three circuits cover a range from 880—1600 K.C.

Code No.	Part No.	COILS.
L1, L2	7974	Aerial Coil 1600-550 K.C.
L3, L4	7975	Aerial Coil 13.65-45 M.
L5, L6	9145	Osc. Coil 1600-550 K.C.
L7, L8	9145	Osc. Coil 13.65-45 M.
L9, L15	8169	Aerial-Oscillator P.B. Coil
L10, L17	8169	Aerial-Oscillator P.B. Coil
L11, L19	8169	Aerial-Oscillator P.B. Coil
L12, L21	8170	Aerial-Oscillator P.B. Coil
L13, L23	8170	Aerial-Oscillator P.B. Coil
L14, L25	8170	Aerial-Oscillator P.B. Coil
L16	8171	Padding Coil
L18	8171	Padding Coil
L20	8171	Padding Coil
L22	8172	Padding Coil
L24	8172	Padding Coil
L26	8172	Padding Coil
L27, L28	8286	1st I.F. Transformer
L29, L30	8287	2nd I.F. Transformer

		TRANSFORMERS.
T1		7979A Power T'former 50-60 C.
T1		7981A Power Transformer 40C.
T2		TX20 Loudspeaker Transformer

Code No.	Part No.	RESISTORS.
R1		350 ohms 1/3W
R2		50,000 ohms 1/3W
R3		8000 ohms 1W
R4		6000 ohms 2W
R5		100,000 ohms 1/3W
R6		1.75 megohms 1/3W
R7		2.3 megohms 1/3W
R8		40 ohms 3W
R9		20,000 ohms 1W
R10		50,000 ohms 1/3W
R11	7303	500,000 ohms Vol. Control
R12		10 megohms 1W
R13		250,000 ohms 1W
R14		20,000 ohms 1W
R15		250 ohms 3W
R16		50,000 ohms 1/3W
R17		500,000 ohms 1/3W
R18		1.75 megohms 1W
R19	7302	100,000 ohms Tone Cont.

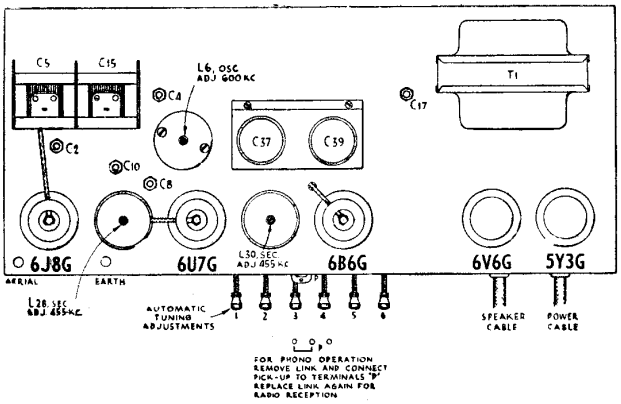
Code No.	Part No.	CONDENSERS.
C1		4 mmfd mica
C2	3661	2-20 mmfd air trimmer
C3		.05 mfd paper
C4	3661	2-20 mmfd air trimmer
C5	7985	Tuning Condenser
C6		260 mmfd mica
C7		2000 mmfd mica
C8	3411A	11-29 mmfd air trimmer
C9		440 mmfd mica (Padder)
C10	3658	2-10 mmfd air trimmer
C11		4000 mmfd mica (Padder)
C12		.05 mfd paper
C13		900 mmfd mica
C14		70 mmfd mica (N)
C15	7985	Tuning Condenser
C16		200 mmfd temp. comp.
C17	6616A	32-50 mmfd air trimmer
C18		43 mmfd mica (X)
C19		.05 mfd paper
C20		70 mmfd Mica (N)
C21		70 mmfd mica (N)
C22		4 mmfd mica
C23		.02 mfd paper.
C24		70 mmfd mica (N).
C25		70 mmfd mica (N)
C26		110 mmfd mica (L)
C27		.1 mfd paper
C28		.01 mfd paper
C29		110 mmfd mica (L)
C30		50 mmfd mica (D)
C31		200 mmfd mica (J)
C32		.02 mfd paper
C33		25 mfd., 25v electrolytic
C34		.0025 mfd paper
C35		.1 mfd paper
C36		.5 mfd paper
C37		16 mfd, 350 P.V. Regulating Electro.
C38		.1 mfd paper
C39		16 mfd, 500 V. Electro.
C40		9 mmfd mica (B)

SOCKET VOLTAGES.

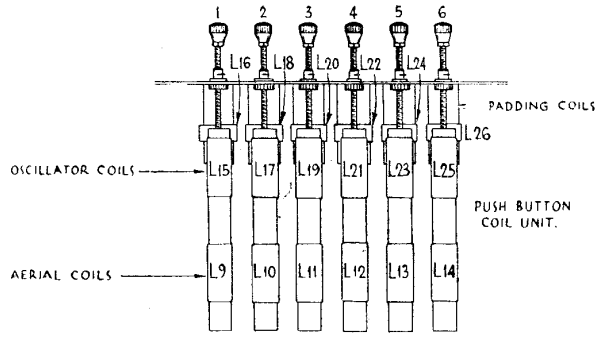
VALVE		Bias Volts.	Screen Grid to Chassis Volts.	Plate to Chassis Volts.	Plate Current M.A.	Heater Volts.
6J8G Converter	M.W.	-3*	95	255	1.3	6.3
	S.W.	-3	95	255	1.3	—
Oscillator	M.W.	—	—	160	5.0	—
	S.W.	—	—	160	5.0	—
6U7G I.F. Amp.	M.W.	-3*	95	255	8.0	6.3
	S.W.	-3*	95	255	8.0	—
6B6G 2nd Detector		0	—	125*	0.52	6.3
6V6G Output		-12.5	255	242	44.0	6.3
5Y3G Rectifier	800/400 volts, 75M.A. Total current ..					5.0

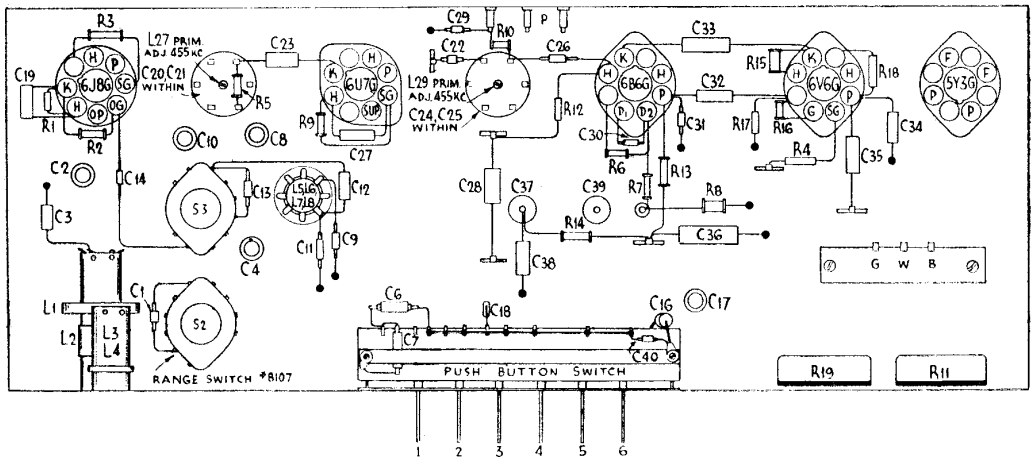
* Cannot be measured with ordinary voltmeter.

Measured at 240 volts, A.C. supply. No signal input. Volume Control at maximum.



Layout Diagram (Top View).





Layout Diagram (Underneath View)