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# THE FISK RADIOLA

## Models 84, 193, 194, 501 and 310

### FIVE VALVE, ONE BAND, A.C. OPERATED SUPERHETERODYNES

## Technical Information & Service Data

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### ELECTRICAL SPECIFICATIONS.

<p><b>TUNING RANGE.</b> "Standard Medium Wave"—1600-550 K.C.</p> <p><b>INTERMEDIATE FREQUENCY</b> ..... 455 K.C.</p> <p><b>POWER SUPPLY RATING</b> ..... 200-260V., 50-60 cycles (Instruments with other voltage and frequency ratings available.)</p> <p><b>POWER CONSUMPTION</b> ..... 60 watts</p> <p><b>VALVE COMPLEMENT.</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(1) 6A8C Frequency Converter.</td> <td style="width: 50%;">(4) 6F6G Output Pentode.</td> </tr> <tr> <td>(2) 6U7G I.F. Amplifier.</td> <td>(5) 5Y3G Rectifier.</td> </tr> <tr> <td>(3) 6B6G 2nd Det., A.V.C., and A.F. Amp.</td> <td></td> </tr> </table> <p><b>LOUDSPEAKER.</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Model 84 ..... 5 inch, Type AA4</td> <td style="width: 50%;">Model 194 ..... 7 inch, Type AW2</td> </tr> <tr> <td>Models 193 and 501 ..... 12 inch, Type AS7</td> <td>Model 310 ..... 7 inch, Type AW6</td> </tr> <tr> <td>Loudspeaker Transformer</td> <td>Models 84, 194 and 310 ..... Type XA2</td> </tr> <tr> <td></td> <td>Models 193 and 501 ..... Type TU2</td> </tr> <tr> <td>Field Coil Resistance</td> <td>Model 84 ..... 1000 ohms</td> </tr> <tr> <td></td> <td>Models 193, 194, 501, 310 ..... 2000 ohms</td> </tr> <tr> <td>Voice Coil Impedance</td> <td>Types AA4, AW2, and AW6 ..... 3 ohms at 400 cycles</td> </tr> <tr> <td></td> <td>Type AS7 ..... 2.2 ohms at 400 cycles</td> </tr> </table> <p><b>UNDISTORTED POWER OUTPUT</b> ..... 3 watts</p> <p><b>DIAL LAMPS</b> ..... 6.3V., .25 amps-</p> <p><b>CABINET STYLE.</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Model 84 ..... Moulded Mantel</td> <td style="width: 50%;">Models 193, 194, 501 ..... Console</td> </tr> <tr> <td>Model 310 ..... Table Model Combination Radio-Gramophone</td> <td></td> </tr> </table>	(1) 6A8C Frequency Converter.	(4) 6F6G Output Pentode.	(2) 6U7G I.F. Amplifier.	(5) 5Y3G Rectifier.	(3) 6B6G 2nd Det., A.V.C., and A.F. Amp.		Model 84 ..... 5 inch, Type AA4	Model 194 ..... 7 inch, Type AW2	Models 193 and 501 ..... 12 inch, Type AS7	Model 310 ..... 7 inch, Type AW6	Loudspeaker Transformer	Models 84, 194 and 310 ..... Type XA2		Models 193 and 501 ..... Type TU2	Field Coil Resistance	Model 84 ..... 1000 ohms		Models 193, 194, 501, 310 ..... 2000 ohms	Voice Coil Impedance	Types AA4, AW2, and AW6 ..... 3 ohms at 400 cycles		Type AS7 ..... 2.2 ohms at 400 cycles	Model 84 ..... Moulded Mantel	Models 193, 194, 501 ..... Console	Model 310 ..... Table Model Combination Radio-Gramophone		<p><b>R.F. ALIGNMENT SETTINGS.</b> 600 K.C. (Osc.), 1500 K.C. (Osc. and Aerial).</p>
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### GENERAL DESCRIPTION.

The Model 84 is a mantel type receiver housed in a moulded cabinet. The Models 193, 194 and 501 are consoles and the Model 310 a table model combination Radio-Phonograph.

A loop aerial is fitted within the cabinet of the Models 84 and 310, and it eliminates the necessity for an external aerial and earth connection, although provision is made so that these may be used when the receiver is installed in a situation remote from broadcasting stations.

The loudspeaker in the Model 84 is mounted on the chassis, while in the other models it is mounted in the cabinet and connected

by a cable and plug. Reference to the data above and to the circuit diagrams will show that the field coil of the loudspeaker fitted to the Model 84 is of lower resistance to that fitted to the other models. The power transformer secondary voltage is likewise lower in this receiver in order to compensate.

In the Model 310 the tone control and Radio-Phono switch are combined in a single control.

Apart from the differences mentioned above, the chassis used in all five models are similar.

### 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 A.W.A. Type C1070 test oscillator is used, see that a 250,000 ohms resistor is connected between the output terminals of the instrument.

Connect the ground connection of the 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 obtain an observable indication. This will avoid A.V.C. action and overloading.

#### ADJUSTING TOOLS.

Two tools are used in the alignment procedure; one is a combination tool for air-trimmer adjustment and locking (Part No. 5371), and the other is a non-metallic screwdriver specially constructed for adjusting the cores with the I.F. transformers and oscillator coil (Part No. 5372). These tools may be obtained from the Service Department of the Company.

### ALIGNMENT TABLE — MODELS 84 AND 310.

Alignment Order.	TEST INSTRUMENT			RECEIVER	Adjust for Max. Peak Output.	
	Test Inst. Connection to Receiver.	Test Inst. Setting.	Receiver Dial Setting.		84	310
1	*6A8G Grid Cap.	455 K.C.	550 K.C.	2nd I.F. Trans.	L10	L8
2	*6A8G Grid Cap.	455 K.C.	550 K.C.	2nd I.F. Trans.	L9	L7
3	*6A8G Grid Cap.	455 K.C.	550 K.C.	1st I.F. Trans.	L8	L6
4	*6A8G Grid Cap.	455 K.C.	550 K.C.	1st I.F. Trans.	L7	L5

Repeat the above adjustments before proceeding.

4	**Inductively Coupled to Loop—600 K.C.		600 K.C.†	Oscillator	Core L6	Core L4
5	**Inductively Coupled to Loop—1500 K.C.		1500 K.C.	Oscillator	C7	C7
6	**Inductively Coupled to Loop—1500 K.C.		1500 K.C.	Aerial	C2	C2

Repeat adjustments 4, 5, and 6.

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

\*\* A coil comprising 5 or 6 turns of 16 gauge D.C.C. wire and about 6 inches in diameter should be connected between the output terminals of the test instrument and placed parallel to and approx. 3 inches from the loop.

† Rock the tuning control back and forth through the signal. Reset the dial pointer to 600 K.C. if necessary. The pointer is soldered to the control wire and may be moved by applying a hot soldering iron to the connection.

### ALIGNMENT TABLE — MODELS 193, 194, AND 501.

Alignment Order.	TEST INSTRUMENT			RECEIVER	Adjust for Max. Peak Output.	
	Test Inst. Connection to Receiver.	Test Inst. Setting.	Receiver Dial Setting.			
1	*6A8G Grid Cap.	455 K.C.	550 K.C.	2nd I.F. Trans.	L10	
2	*6A8G Grid Cap.	455 K.C.	550 K.C.	2nd I.F. Trans.	L9	
3	*6A8G Grid Cap.	455 K.C.	550 K.C.	1st I.F. Trans.	L8	
4	*6A8G Grid Cap.	455 K.C.	550 K.C.	1st I.F. Trans.	L7	

Repeat the above adjustments before proceeding.

5	Aerial Term.	600 K.C.	600 K.C.†	Oscillator	Core L6	
6	Aerial Term.	1500 K.C.	1500 K.C.	Oscillator	C7	
7	Aerial Term.	1500 K.C.	1500 K.C.	Aerial	C2	

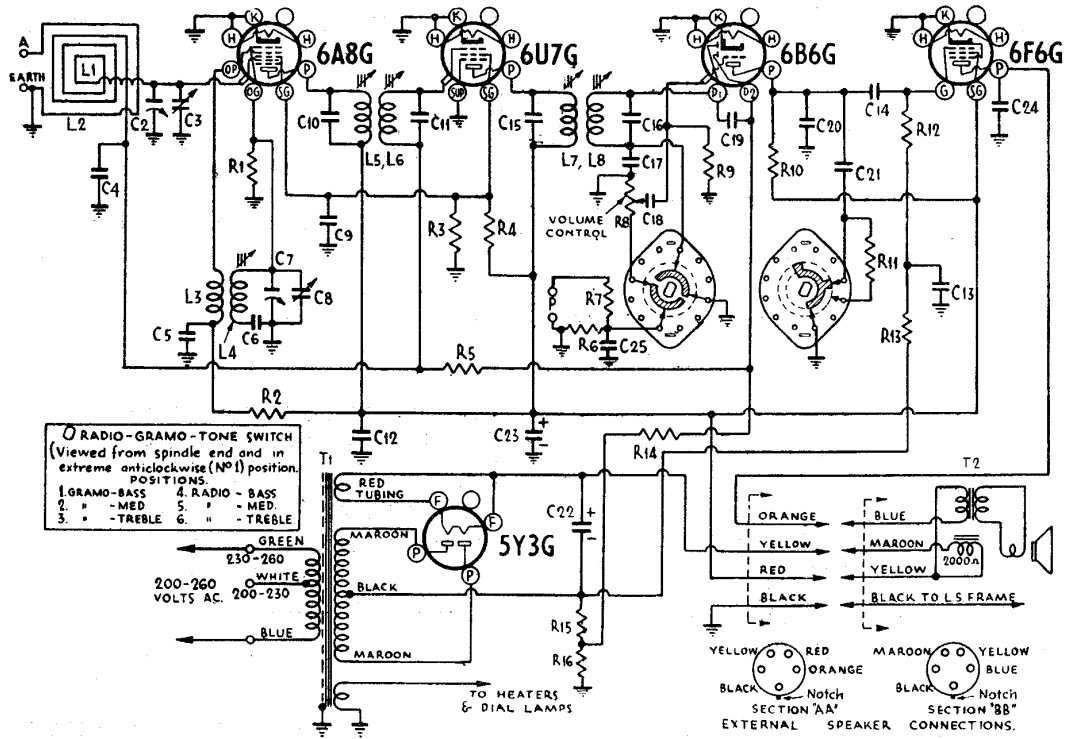
Repeat adjustments 5, 6, and 7.

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

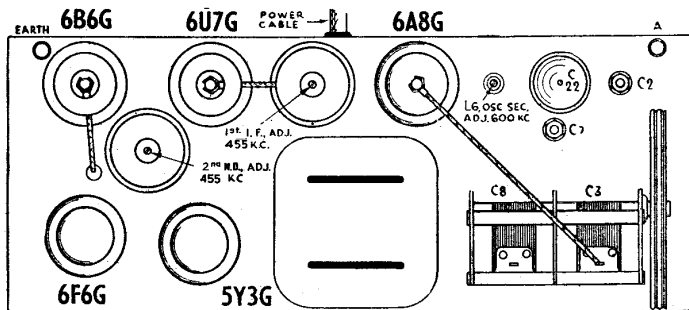
† Rock the tuning control back and forth through the signal. Reset the dial pointer to 600 K.C. if necessary. The pointer is soldered to the control wire and may be moved by applying a hot soldering iron to the connection.



## CIRCUIT DIAGRAM AND CODE—MODEL 310.



Code No.	Part No.	COILS	Code No.	Part No.	RESISTORS.	Code No.	Part No.	CONDENSERS.	Code No.	Part No.	CONDENSERS.
L1, L2	8428	Loop Aerial.	R1		50,000 ohms 1/3 W.	C1		Deleted.	C12		.1 mfd. paper.
L3, L4	7638	Oscillator Coil.	R2		20,000 ohms 1 W.	C2		4642A 6-14 mmfd. air trimmer	C13		.035 mfd. paper.
L5, L6	7639	1st I.F. Transformer.	R3		30,000 ohms 1 W.	C3		7645 Tuning condenser.	C14		.01 mfd. paper.
L7, L8	7641	2nd I.F. Transformer.	R4		20,000 ohms 2 W.	C4		.05 mfd. paper.	C15		115 mmfd. mica (A).
		<b>TRANSFORMERS.</b>	R5		1.75 megohms 1/3 W.	C5		.05 mfd. paper.	C16		115 mmfd. mica (A).
T1	7999A	Power Transformer, 50-60C.	R6		50,000 ohms 1/3 W.	C6		420 mmfd. mica (padder).	C17		110 mmfd. mica (L).
T1	8001A	Power Transformer, 40C.	R7		50,000 ohms 1/3 W.	C7		4849A 16-24 mmfd. air trimmer.	C18		.01 mfd. paper.
T2	TU2	Loudspeaker Transformer.	R8	7927	500,000 ohms Vol. Control.	C8		7645 Tuning condenser.	C19		50 mmfd. mica (D).
			R9		10 megohms 1 W.	C9		.1 mfd. paper.	C20		350 mmfd. mica.
			R10		250,000 ohms 1 W.	C10		70 mmfd. mica (N).	C21		.01 mfd. paper.
			R11		30,000 ohms 1/3 W.	C11		70 mmfd. mica (N).	C22		8 mfd., 500V. electro.
			R12		500,000 ohms 1/3 W.				C23		8 mfd., 525V. electro.
			R13		25,000 ohms 1/3 W.				C24		.01 mfd. paper.
			R14		1.75 megohms 1/3 W.				C25		.0025 mfd. paper.
			R15		250 ohms 3 W.						
			R16		50 ohms 3 W.						



Layout Diagram (Top View).

## SOCKET VOLTAGES (84).

VALVE.	Control Grid to Chassis Volts.	Screen Grid to Chassis Volts.	Plate to Chassis Volts.	Plate Current M.A.	Heater Volts.
6A8G Detector	-3*	95	240	3	6.3
Oscillator	—	—	160	4	—
6U7G I.F. Amp.	-3*	95	240	8.5	6.3
6B6G 2nd Det.	0	—	120*	0.5	6.3
6F6G Pentode	-17*	240	225	30	6.3
5Y3G Rectifier	640/320 volts, 60 M.A. Total current, 5.0				

Voltage across loudspeaker field—60 volts.  
\* Cannot be measured with ordinary voltmeter.

## SOCKET VOLTAGES (193, 194, 501 and 310).

VALVE.	Control Grid to Chassis Volts.	Screen Grid to Chassis Volts.	Plate to Chassis Volts.	Plate Current M.A.	Heater Volts.
6A8G Detector	-3*	95	240	3	6.3
Oscillator	—	—	160	4	—
6U7G I.F. Amp.	-3*	95	240	8	6.3
6B6G 2nd Det.	0	—	120*	0.5	6.3
6F6G Pentode	-17*	240	225	30	6.3
5Y3G Rectifier	740/370 volts, 60 M.A. Total current, 5.0				

Voltage across loudspeaker field—120 volts.

\* Cannot be measured with ordinary voltmeter.

## PHONO. MOTOR SERVICE (MODEL 310)

### LUBRICATION.

As the rotor bearings are of the self-lubricating type, little attention is required. After 1,000 hours running, place a few drops of oil in the hole in the phosphor bronze bearing and in the hole in the casting at the other end.

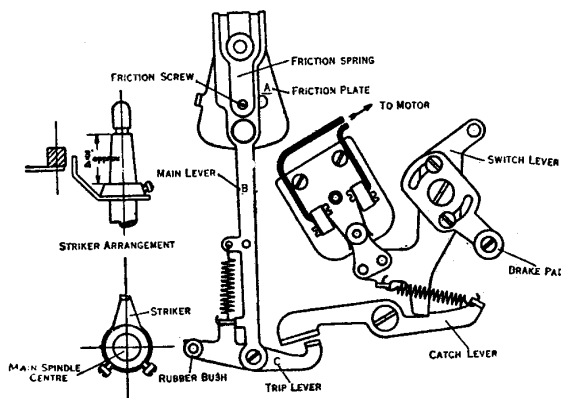
Remove the turntable and two lubricating points are reached through two holes in the top plate of the motor—to the right of the regulating spindle—looking from the front of the motor. The turntable spindle top bearing should be lubricated periodically at the point where it enters the top plate of the motor.

### SPEED REGULATION.

When despatched from our Works, "Garrard" Motors are set on 230 volts to run at a turntable speed of 78 r.p.m. when lever is set at this point on the indicator plate.

The speed of the motor may vary slightly with different voltage supplies and should be checked by means of the stroboscope supplied, or by counting the number of revolutions per minute.

If adjustment is necessary, it can easily be carried out. Move the regulating lever until the correct speed is obtained. Next remove turntable, loosen quadrant screw in speed adjusting quadrant. Then replace regulating lever on the "78" mark, or centre position on the indicator plate. Tighten the screw, speed should then be correct.



### STARTING AND STOPPING MOTOR.

The action of lifting the Pick-up Head off the Rest and moving slightly towards the right releases the brake and switches the current on. When the end of the Record (with run-off or eccentric groove) is reached, the Motor is automatically stopped and the current switched off.

To stop the motor by hand, lift the pick-up and move arm inwards toward centre of record, when stop mechanism will operate.

### PRINCIPLE OF ACTION.

The "GARRARD" Patent Stop and Switch is fully automatic.

As the needle travels towards the centre of the Record, the Pick-up Arm moves Friction Plate A (see diagram), which, through the friction pad and spring, carries with it the Main Lever B and Trip Lever C.

This Main Lever moves in towards the Turntable Spindle, on which is mounted the Striker, which gently wipes against the rubber bush on end of Trip Lever C at every revolution, thus tapping back the Main Lever B (the friction between Lever A and Lever B allows this).

The "tapping back" process continues until the needle reaches the "run-in" groove in the centre of the record. The trip lever is now moved forward into the path of the striker, which strikes the side of the lever and trips the Stop mechanism.

### ADJUSTMENTS.

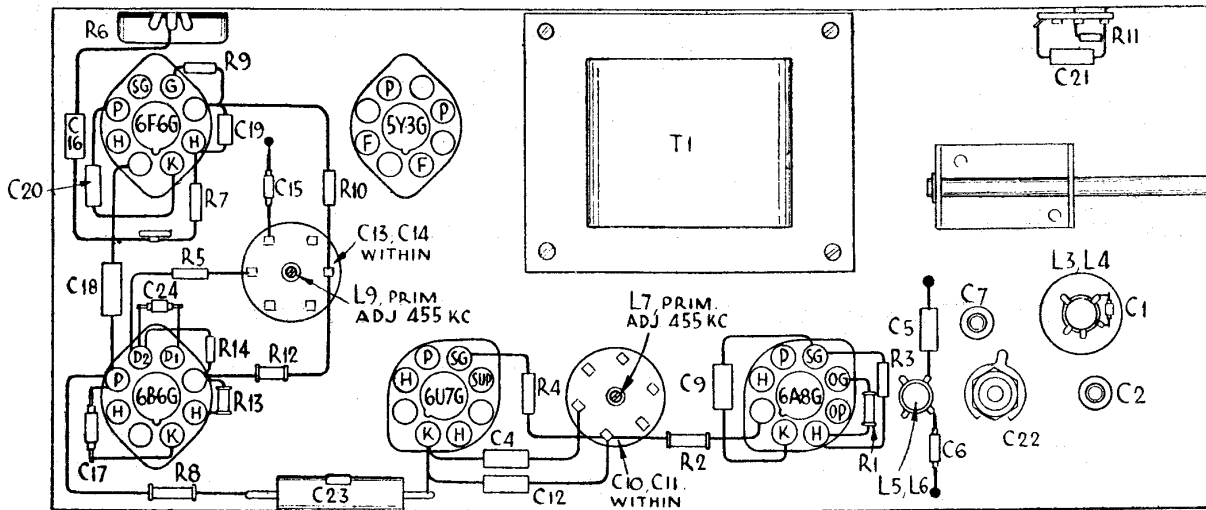
If Stop fails to operate at finish of record, there is probably insufficient friction between lever A and lever B. This may be rectified by turning the friction screw in lever B in a counter-clockwise direction.

When Stop operates early, i.e., before needle reaches the end of the record, the trouble is either due to excessive friction or to the rubber bush on the trip lever being worn. Friction can be reduced by turning the friction screw clockwise.

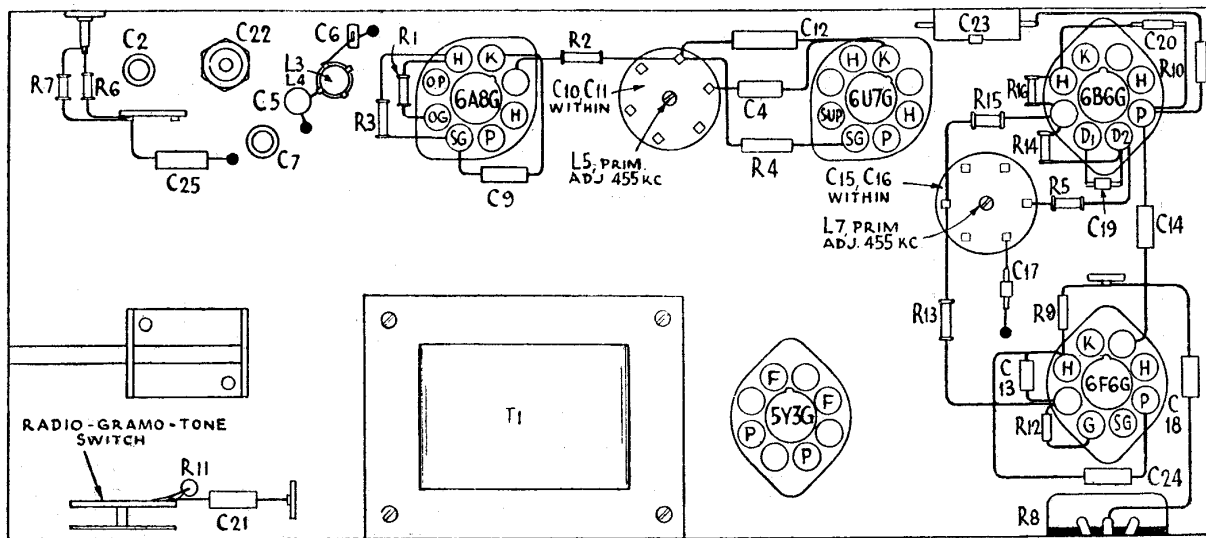
As this adjustment is very sensitive, the screw should not be turned more than a quarter of a turn at a time. Excessive friction may cause a knocking sound to be heard in the loudspeaker and undue wear on records.

When the rubber bush is worn, this may be turned round on its pin to expose a new face to the striker.

A brake pad is provided which is automatically applied to the turntable rim after switching off. It can be adjusted by loosening the two screws securing the brake pad lever. After adjustment, it is important to verify that the switch breaks contact before brake operates.



Layout Diagram (Underneath View), Models 84, 193, 194 and 501.



Layout Diagram (Underneath View), Model 310.