

SERVICE BENCH ALIGNMENT DATA AND PROCEDURE - BROADCAST BAND.

<u>Signal Frequency Coverage</u>	- 530 KC/S to 1,600 KC/S.
<u>Oscillator Frequency</u>	- Higher than signal frequency by the I.F.
<u>Intermediate Frequency</u>	- 455 KC/S.
<u>Alignment Points</u>	- (a) 600 KC/S - (b) 900 KC/S - (c) 1,400 KC/S
<u>Receiver Sensitivity</u>	- Equal to or better than 1 microvolt for standard output across a 10,000 ohm load.

PROCEDUREREQUIREMENTS

1. Standard signal generator or good quality modulated oscillator
2. Standard dummy aerial.
3. .01 uf mica condenser.
4. Output meter.

CONDITIONS.

Receiver mounted in case with top and bottom lids removed. Volume control full on. Tone control fully clockwise. Noise limiter, switched to "OFF". Wave-change switch at "Broadcast" position.

Output meter connected across primary of speaker transformer.

METHOD. - I.F. ALIGNMENT.

1. Turn tuning condenser till plates are fully out of mesh.
2. Without disconnecting grid lead, connect signal generator to control grid of 6SK7GT. I.F. tube via. .01 uf mica condenser.
3. Set signal generator to 455 KC/S.
4. Align primary and secondary trimmers of 2nd I.F. transformer for maximum deflection as indicated on output meter, and progressively reducing output from signal generator to minimum necessary for reasonable indication on meter.
5. Remove signal generator lead from I.F. tube, and connect via .01 uf mica condenser to control grid of ECH33, leaving grid cap still connected.
6. With signal generator still at 455 KC/S, align 1st. I.F. primary and secondary slugs for maximum deflection as indicated on output meter, and progressively reducing output still further from signal generator to minimum necessary for reasonable indication on output meter.
7. With signal generator still connected to control grid of ECH33, re-align 2nd I.F. primary and secondary trimmers for maximum meter indication, and then 1st. I.F. primary and secondary trimmers, still keeping output from signal generator at lowest convenient level.
8. Having completed alignment of I.F. transformers, swing signal generator frequency above and below 455 KC/S to ensure that I.F. response curve is symmetrical on either side of 455 KC/S.
9. Disconnect signal generator from ECH33.

FERRIS CAR RADIO  
MODEL 74

Serial Numbers to and Including 12800:

Refer to the circuit diagram dated 8.9.47 and the component list which forms the next page to that diagram in this Manual.  
In sets with Serial Numbers between 12201 and 12800 the R.F. amplifier valve was a 6K7 metal or 6K7GT.

Serial Numbers from 12801 to 14900:

No circuit diagram or list of components is published for these receivers but they were similar to the earlier series with the following exceptions:-

- (a) Valve Complement
- |    |   |       |
|----|---|-------|
| V1 | - | 6N8   |
| V2 | - | 6AN7  |
| V3 | - | 6N8   |
| V4 | - | 6BD7  |
| V5 | - | 6V6GT |
| V6 | - | 6X5GT |
- (b) Circuit Alterations: Grid bias is obtained from the oscillator grid leak from the junction of a voltage divider network formed by a  $10K \frac{1}{2}$  w. resistor connected between the cold end of the 50K oscillator grid leak resistor and chassis. This bias is applied to the R.F., Converter and I.F. valves. A.V.C. voltage is not applied to the I.F. Valve.

Serial Numbers Higher than 14900: Refer to the circuit diagram marked thus together with its Component List.

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Speakers: Three types of speakers were used in Model 74 receivers.

- (1) Rola 5C, Magnavox 5 inch and Kingsley 5 inch: In the case of speaker failure replace with Rola 5C. Kingsley and Magnavox 5 inch speakers are no longer manufactured or repaired by the makers.
- (2) Jensen AC42: Where this type is used only a Jensen AC42 may be used for replacement purposes. The AC42 is a type made specially for Ferris Brothers.
- (3) Magnavox 525 ( Serial Numbers above 12800 ) This should be replaced wherever possible with the same type but a Jensen AC42 uses the same mounting centres and may be used when the Magnavox type is not available. No shortage of Magnavox 525 speakers is anticipated.

Suggested Modification to all Receivers: Mechanical hum from vibrators may be reduced by strapping the vibrator can to the adjacent switch bracket with a soldering lug. Many receivers have already been treated in this manner during manufacture.

Suggested Modification to Receivers With Serial Numbers below 12801: For quieter "between station" operation apply a small standing bias to the R.F., converter and I.F. amplifier stages in the following manner:  
Lift the earthed end of R3 ( oscillator grid leak resistor ) and insert a  $10 K \frac{1}{2}$  w. resistor between it and chassis. Lift the earthed end of the AVC diode load resistor R5 from chassis and connect to the junction of the voltage divider network thus formed.

Thus the bias developed across the  $10K$  resistor or one sixth of the total oscillator grid bias, will be applied to the A.V.C. line under "no signal" conditions.

The receiver should be realigned after this change has been carried out.

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Alignment Procedure: All alignment procedure should be carried out with Volume Control set to maximum and Tone Control in treble position. The carrier input should be modulated 30%. All adjustments listed below are made for maximum output indication.

# LIST OF COMPONENTS

FERRIS CAR RADIO - MODEL 74.

( SERIAL NUMBERS HIGHER THAN 14900 )

## CONDENSERS

C1 - 50 PF mica  
C2 - .05 mfd x 200 v. tubular  
C3 - .05 mfd x 200 v. tubular  
C4 - .05 mfd x 200 v. tubular  
C5 - .05 mfd x 200 v. tubular  
C6 - 100 PF mica  
C7 - .1 mfd x 200 v tubular  
C8 - 100 PF mica  
C9 - 250 PF mica  
C10 - .005 mfd x 600 v mica or tubular  
C11 - .01 mfd x 600 v tubular  
C12 - 50 P.F. mica  
C13 - 500 P.F. mica  
C14 - .05 mfd x 200 v tubular

## CONDENSERS

C15 - 8 mfd x 525 P.V. electrolytic  
C16 - .1mfd x 200 v. tubular  
C17 - .25 mfd x 200 v. tubular  
C18 - 8 mfd x 525 P.V. electrolytic  
C19 - .01 mfd x 600 v. tubular  
C20 - .01 mfd x 600 v. tubular  
C21 - .05 mfd x 200 v. tubular  
C22 - .05 mfd x 200 v. tubular  
C23 - .5 mfd x 200 v. tubular  
C24 - .5 mfd x 200 v. tubular  
C25 - .001 mfd mica  
C26 - .001 mfd mica  
C27 - 100 P.F. mica

## RESISTORS.

R1 - 250 K  $\frac{1}{2}$  w  
R2 - 47 K 1 w  
R3 - 47 K 1 w  
R4 - 47 K 1 w  
R5 - 1 M  $\frac{1}{4}$  w  
R6 - 1 M  $\frac{1}{2}$  w  
R7 - 47 K 1 w  
R8 - 1 M  $\frac{1}{2}$  w  
R9 - 250 K volume control pot.

## RESISTORS

R10 - 10 M 1w.  
R11 - 250 K  $\frac{1}{2}$  w.  
R12 - 50 K ton control pot.  
R13 - .5 M  $\frac{1}{4}$  w.  
R14 - .5 M  $\frac{1}{4}$  w.  
R15 - 250 K  $\frac{1}{2}$  w.  
R16 - 50 Ohm  $\frac{1}{2}$  w.  
R17 - 50 ohm  $\frac{1}{2}$  w.  
R18 - 250 K  $\frac{1}{2}$  w.

## INDUCTANCES

L1 - Aerial Choke - Part No. RP125  
L2 - Aerial Coil - Part No. RP104  
L3 - R.F. Coil - Part No. R.P. 105

## INDUCTANCES

L4 - Oscillator coil - 455 KC Part No. RP106  
L5 ) - Low tension double choke - Part No.  
L7 ) R.P. 122.  
L6 - Low tension single choke - Part No  
R.P. 120.

## TRANSFORMERS

T1 - I.F. Transformer - 455 K.C. first - Part No. R.P. 108  
T2 - I.F. Transformer - 455 K.C. second - Part No. R.P. 109  
T3 - Speaker Transformer - 7000 ohm - Type No. 65  
T4 - Vibrator Transformer - 6 volt - Part No R.P.152  
12 volt - Part No. R.P. 153

## SWITCHES.

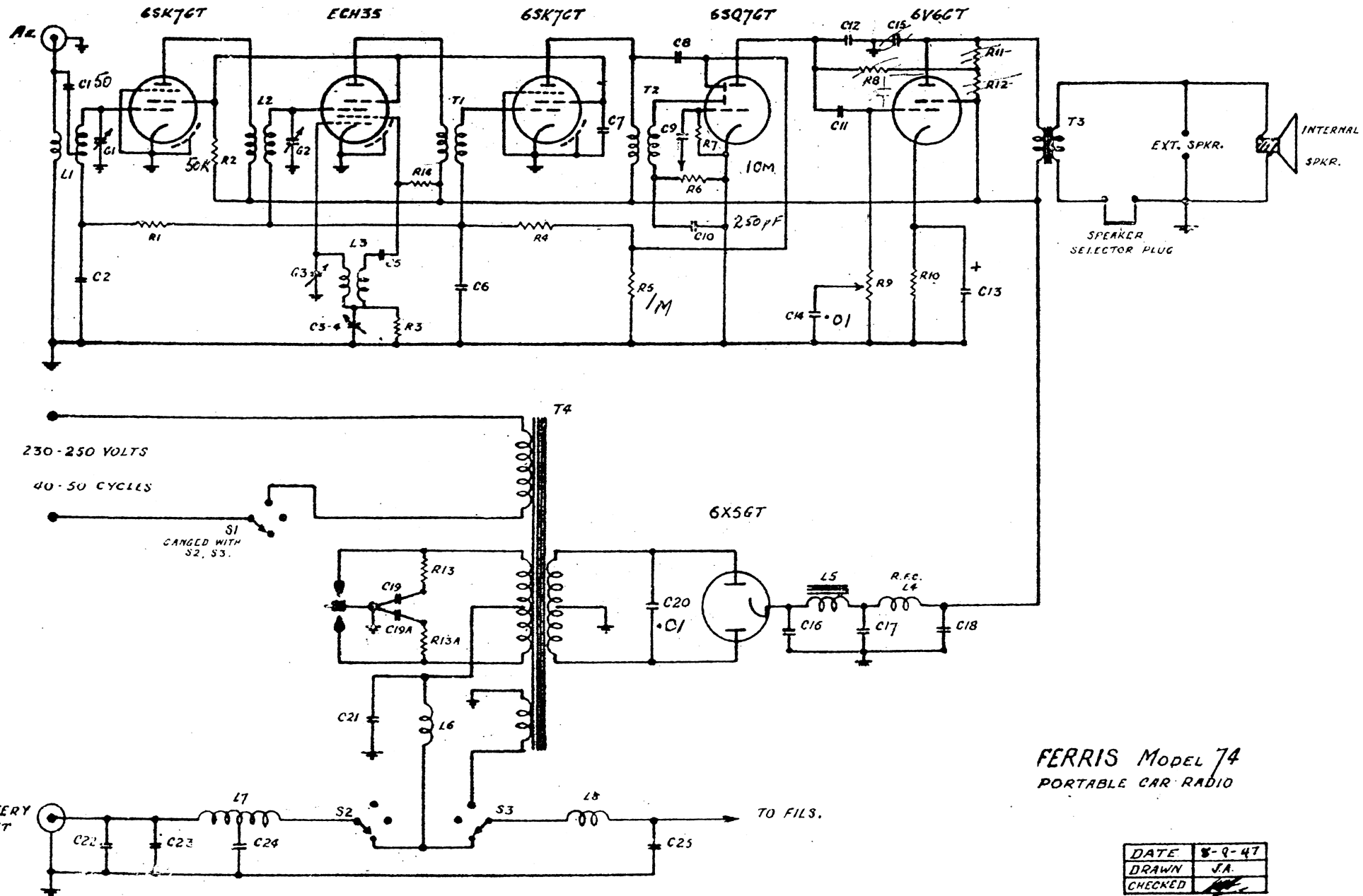
S1, S2, S3 - 3 pole 3 position Oak - Part No. R.P. 163.

## VALVES

V1 - 6 N8  
V2 - 6 AN7  
V3 - 6 N8

## VALVES

V4 - 6BD7  
V5 - 6V6GT  
V6 - 6X5GT





## LIST OF COMPONENTS

FERRIS CAR RADIO - MODEL 74

### CONDENSERS

C 1 - 50 P.F. mica  
C 2 - .05 mfd. x 200 v. tubular  
C 3 - 5 plate padder  
C 4 - delete  
C 5 - 100 P.F. mica  
C 6 - .05 mfd. x 200 v. tubular  
C 7 - .05 mfd. x 200 v. tubular  
C 8 - 100 P.F. mica  
C 9 - .005 mfd. mica or tubular  
C 10 - 250 P.F. mica  
C 11 - .01 mfd. x 600 v. tubular  
C 12 - 250 P.F. Mica  
C 13 - 25 mfd. x 40 P.V. electrolytic  
C 14 - .05 mfd. x 200 v. tubular  
(incorrect in circuit - should  
show between plate of 6V6GT  
to R.T.)

### CONDENSERS

C 15 - 50 P.F. Mica (shown incorrect  
in circuit - should connect  
between plate and control grid  
of 6 v 6 GT)  
C 16 - 8 mfd. x 525 P.V. electrolytic  
C 17 - .5 mfd. x 200 v. tubular  
C 18 - 8 mfd. x 525 P.V. electrolytic  
C 19 - .05 mfd. x 200 v. tubular  
C 20 - .01 mfd. x 2000 v. tubular  
C 21 - .5 mfd. x 200 v. tubular  
C 22 - .5 mfd. x 200 v. tubular  
C 23 - .001 mfd. mica  
C 24 - .001 mfd. mica  
C 25 - 100 P.F. mica

### RESISTORS

R 1 - 240 K  $\frac{1}{2}$  W ✓  
R 2 - 50 K  $\frac{1}{2}$  W ✓  
R 3 - 50 K  $\frac{1}{2}$  W ✓  
R 4 - 1 M  $\frac{1}{2}$  W ✓  
R 5 - 1 M  $\frac{1}{2}$  W ✓  
R 6 - 250 K volume control  
R 7 - 10 M 1 W  
R 8 - 250 K 1 W (incorrect in circuit  
connects between plate of  
6V6GT and B. plus)

### RESISTORS

R 9 - 500 K  $\frac{1}{2}$  W  
R 10 - 500 ohm  $\frac{1}{2}$  W  
R 11 - delete  
R 12 - delete  
R 13 - 50 ohm  $\frac{1}{2}$  W  
R 14 - 50 K  $\frac{1}{2}$  W  
R T - 50 K pot. (tone control)

### INDUCTANCES

L 1 - Aerial coil - Part No. RP 104  
L 2 - R. F. Coil - Part No. RP 105  
L 3 - Oscillator Coil - 455 K.C. - Part No. RP 106  
L 4 - High tension R.F. choke  
L 5 - Iron cored H.T. filter choke - Part No. PP 157  
L 6 - Low tension double choke - Part No. RP 122  
L 8 -  
L 7 - Low tension single choke - Part No. RP 120

### TRANSFORMERS

T 1 - I.F. Transformer - 455 K.C. first - Part No. RP 108  
T 2 - I.F. Transformer - 455 K.C. second - Part No. RP 109  
T 3 - Speaker transformer - 5000 ohms  
T 4 - Vibrator Transformer - 6 volt - Part No. RP 152  
T 5 - 12 volt - Part No. RP 153

### SWITCHES

S 1, S 2, S 3 - 3 pole 3 position switch - Part No. R.P. 163