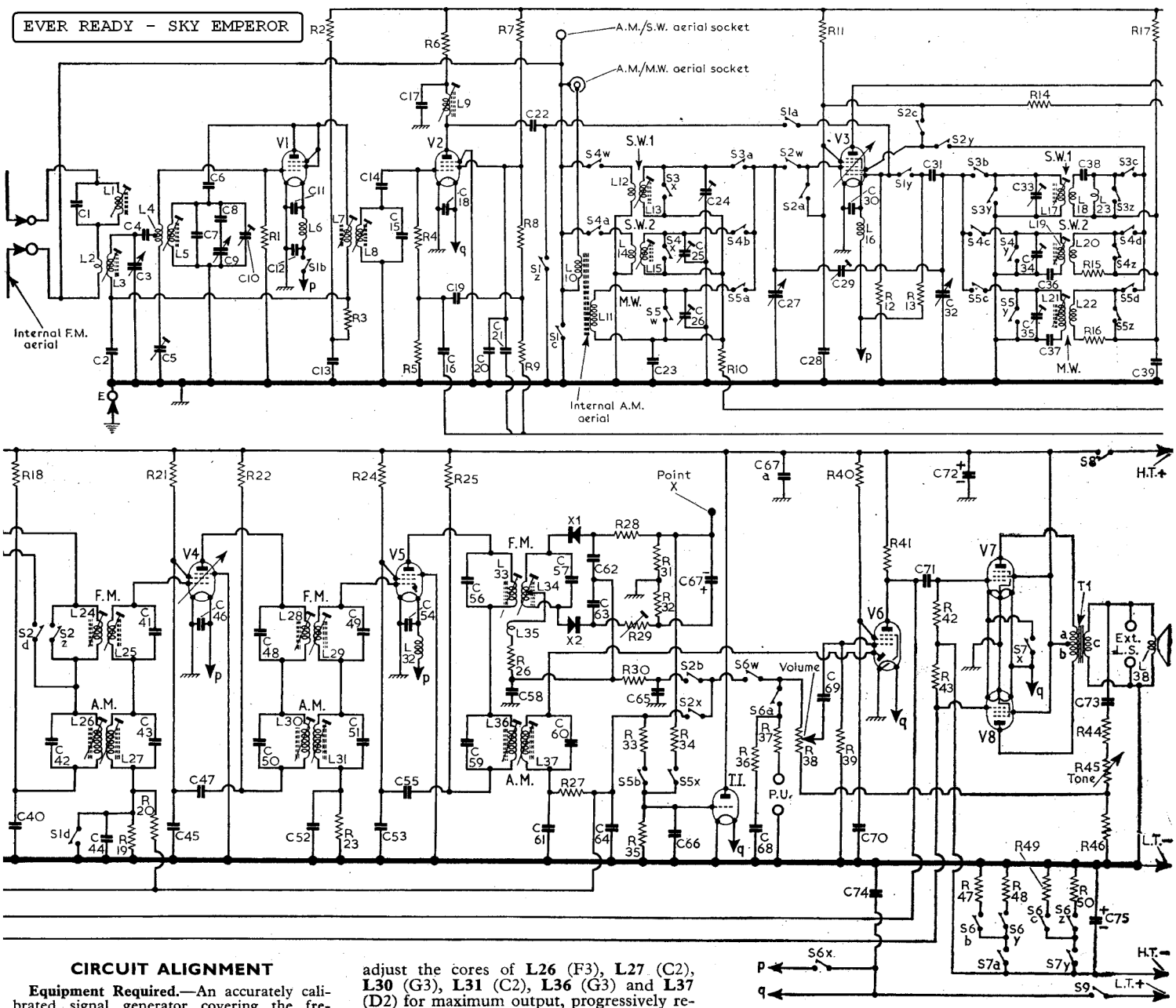
EVER READY - SKY EMPEROR



CIRCUIT ALIGNMENT

Equipment Required.—An accurately calibrated signal generator covering the frequency range 100kc/s-100Mc/s, modulated 30 per cent at 400c/s; an A.C. voltmeter for use as audio output meter; a 20,000Ω/V meter for use as D.C. output meter; an R.F. valve-millivoltmeter; a coupling coil which may be constructed by winding 20 turns of 20-24 S.W.G. wire on a 10cm diameter former; a 4.7kΩ resistor for use as a damping shunt; a 330Ω resistor; and a non-metallic screwdriver type trimming tool.

The manufacturers stress that only if an R.F. valve-millivoltmeter is available should the adjustment of neutralizing capacitors **C5** and **C29** be attempted.

Before commencing the alignment process, screw the cores of all the R.F. and oscillator tuning coils fully in, so that they are at the bottoms of their coil formers. All alignment adjustments start from this position.

A.M. Alignment

1.—Remove chassis from the cabinet as described under "Dismantling." Connect A.C. voltmeter to the external speaker sockets. Connect signal generator to **V3** control grid (pin 4), earth lead to chassis. Switch receiver to M.W., set volume and tone controls to their maximum clockwise position.

2.—Feed in a modulated 470kc/s signal and adjust the cores of **L26** (F3), **L27** (C2), **L30** (G3), **L31** (C2), **L36** (G3) and **L37** (D2) for maximum output, progressively reducing the signal generator output as the circuits are brought into line. Remove signal generator.

3.—Check that with the tuning gang at maximum capacitance the cursor coincides with the extreme left-hand edges of the tuning scales.

4.—Switch receiver to SW1 and tune it to 15Mc/s. Connect the R.F. valve-voltmeter across **C27** (B2) and adjust **C29** (B2) for *minimum* reading on the valve-voltmeter. If the reading obtained is too small for accurate adjustment, screw the core of **L13** (J5) in for maximum reading on the valve-voltmeter, then adjust **C29** for *minimum* reading. Disconnect valve-voltmeter.

5.—Connect signal generator via the 330Ω resistor to the S.W. aerial socket. Tune receiver to the dot at 6.6Mc/s on the tuning scale. Feed in a modulated 6.6Mc/s signal and adjust the core of **L17** (J5) to the first peak obtained from the farther end of the coil. To check that the correct peak has been selected, slowly swing the signal generator frequency approximately 1Mc/s above and below 6.6Mc/s (5.6Mc/s to 7.6Mc/s). If a second (image) signal is obtained at approximately 1Mc/s *above* 6.6Mc/s, then the oscillator is tuned to the correct peak. If the image signal is found below 6.6Mc/s, readjust **L17.**

6.—Feed in a modulated 6.6Mc/s signal and adjust the core of **L13** (J5) for maximum output.

7.—Tune receiver to 15Mc/s. Feed in a modulated 15Mc/s signal and adjust **C33** (J5) and **C24** (J5) for maximum output. If two peaks are obtained when adjusting **C33,** tune to the peak giving the lower capacitance setting.

8.—Recheck calibration at 6.6Mc/s and, if necessary, repeat operations 5-7.

9.—Switch receiver to SW2 and tune it to 1.8Mc/s. Feed in a modulated 1.8Mc/s signal and adjust the core of **L19** (K5) for maximum output, taking care that the correct peak is obtained. Then adjust **L15** (K5) for maximum output.

10.—Tune receiver to 4.5Mc/s. Feed in a modulated 4.5Mc/s signal and adjust **C34** (K5) and **C25** (K5) for maximum output. If two peaks are obtained when adjusting **C34,** tune to the peak giving the lower capacitance setting. Finally readjust **C34** for maximum output while rocking the tuning gang either side of 4.5Mc/s.

11.—Repeat operations 9 and 10 if necessary, then disconnect signal generator.

12.—Place the coupling coil approximately 4ft from the ferrite rod aerial coils **L10, L11** (location reference C1, D1) and on the same axis. Connect the signal generator output across the coupling coil.

13.—Switch the receiver to M.W. and tune it to 500m. Feed in a 600kc/s signal and adjust the core of **L21** (L5) for maximum output.

14.—Tune receiver to 200m. Feed in a 1,500kc/s signal and adjust **C35** (L5) and **C26** (L5) for maximum output.

15.—Repeat operations 13 and 14. Remove signal generator and audio output meter.

F.M. Alignment

1.—Connect signal generator to the junction of **L8, C14** (E4). Connect the 20,000Ω/V D.C. output meter, set to its 10V range, between "point X" (D2) and chassis, positive lead to chassis. Throughout the following operations, adjust the signal generator output to maintain a 3V reading on the D,C. output meter.

2.—Switch the receiver to F.M. Feed in an unmodulated 10.7Mc/s signal and adjust the core of **L33** (D2) for maximum output.

3.—Connect the D.C. output meter across **C58** (H3). Feed in an unmodulated 10.7Mc/s signal and unscrew the core of **L34** (G3). Starting with the core well out screw it inwards until a maximum positive or negative peak is obtained. Continue to screw the core in through a zero and then on to a peak in the opposite direction. The correct tuning point is the zero position between the two peaks.

4.—Connect the audio output meter to the external speaker sockets. Feed in a modulated 10.7Mc/s signal and adjust **R29** (H3) for *minimum* audio output. Remove audio output meter.

5.—Repeat operation 3.

6.—Transfer D.C. output meter to "point X" and chassis, positive lead to chassis. Feed in an unmodulated 10.7Mc/s signal, damp **L28** (G3) with the 4.7kΩ resistor and adjust the core of **L29** (C2) for maximum output.

7.—Transfer damping resistor to **L29** and adjust **L28** for maximum output.

8.—Transfer damping resistor to **L24** (F3) and adjust **L25** (B2) for maximum output.

9.—Transfer damping resistor to **L25** and adjust **L24** for maximum output. Remove damping resistor.

10.—Adjust **L9** (F3) for maximum output.

11.—Repeat operations 2, 3, 8 and 9.

12.—Transfer signal generator to the junction of **L1, L2** (A2). Connect damping resistor across **L7** (E3). Feed in an unmodulated 10.7Mc/s signal and adjust **L8** (A1) for maximum output.

13.—Transfer damping resistor to **L8** and adjust **L7** for maximum output.

14.—Repeat operations 2, 3, 8, 9, 12 and 13.

15.—Transfer signal generator to the F.M. aerial sockets. Feed in an unmodulated 10.7Mc/s signal and adjust **L1** (E3) for *minimum* output.

16.—To check the I.F. bandwidth, transfer signal generator to the junction of **L1, L2** (A2). Feed in an unmodulated 10.7Mc/s signal and adjust the generator output to obtain a 3V reading on the D.C. output meter. Then increase the signal generator output by 1.4 times and swing its frequency either side of 10.7Mc/s until the original 3V output reading is obtained. The total frequency swing to obtain this condition should be within the limits 120-170kc/s (60-85kc/s either side of 10.7Mc/s). If these conditions are not met, the I.F. circuits should be re-adjusted.

17.—Connect generator to the F.M. aerial sockets. Tune receiver to 98Mc/s. Feed in an unmodulated 98Mc/s signal and adjust **C10** (E3) for maximum output.

18.—Tune receiver to 89.5Mc/s. Feed in an unmodulated 89.5Mc/s signal and adjust the core of **L5** (A1) for maximum output. As two tuning peaks may be found when adjusting **L5**, the correct peak is the one nearer to the chassis.

19.—Feed in an unmodulated 94Mc/s signal and tune it in on the receiver. Adjust the core of **L3** (A2) for maximum output (tune to the peak nearer chassis).

20.—Disconnect signal generator and D.C. output meter.

21.—Connect the R.F. valve-voltmeter to the F.M. aerial sockets. Tune the receiver to 94Mc/s and adjust **C5** (E4) for *minimum* output.

Valve		Anode (V)	Anode (mA)	Screen (V)	Screen (mA)
V1 DF97†		65·0[1]	1·59	—	—
V2 DF97*		82·5	0·88	44·4	0·36
V3 DK92*	mixer	83·0	0·48[2]	63·0[3]	0·105[4]
	osc.	22·0	1·47	—	—
V4 DF97*		82·0	1·49	59·5	0·67
V5 DF97*		82·0	1·49	59·5	0·67
V6 DAF96*		42·0	0·04	28·5	0·01
V7 DL96*		82·5	3·8	83·5	0·62
V8 DL96*		82·5	3·8	83·5	0·62
T.I. DM70*		83·5	0·2	—	—

**Measured with receiver switched to A.M.*
†Measured with receiver switched to F.M.
[1]Measured with 1MΩ resistor in series with positive meter lead.
[2] 0.93 mA, [3] 27V, [4] 1.23 mA — Measured with receiver switched to F.M.

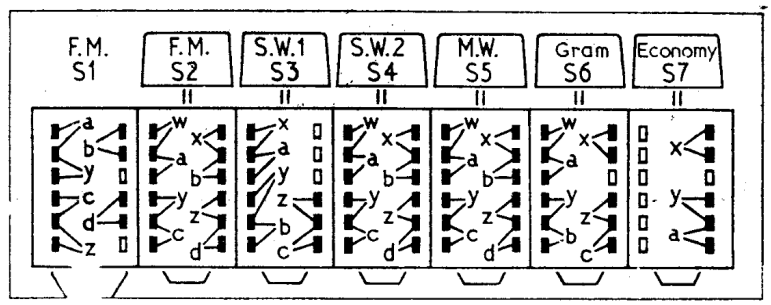


Diagram of the switch assembly as seen from the rear of an upright chassis. **S1** *and* **S2** *form a combined F.M. switch, operated by the press-button of* **S2**. *The wafers of these two switches move on and off in opposite directions so that all their individual switches which are lettered from* **a** *to* **d** *are closed when* **S2** *is pressed.*

Resistors

R1	1MΩ
R2	820Ω
R3	4·7kΩ
R4	220kΩ
R5	2·7MΩ
R6	820Ω
R7	100kΩ
R8	10MΩ
R9	10MΩ
R10	2·2MΩ
R11	180kΩ
R12	1MΩ
R13	33kΩ
R14	56kΩ
R15	150Ω
R16	1·5kΩ
R17	33kΩ
R18	820Ω
R19	2·2MΩ
R20	10MΩ
R21	33kΩ
R22	820Ω
R23	220kΩ
R24	33kΩ
R25	820Ω
R26	27Ω
R27	47kΩ
R28	1·5kΩ
R29	4·7kΩ
R30	47kΩ
R31	15kΩ
R32	15kΩ
R33	4·7MΩ
R34	470kΩ
R35	10MΩ
R36	100kΩ
R37	470kΩ
R38	500kΩ
R39	10MΩ
R40	5·6MΩ
R41	1·2MΩ
R42	2·2MΩ
R43	2·2MΩ
R44	820Ω
R45	10kΩ
R46	100Ω
R47	910Ω
R48	470Ω
R49	560Ω
R50	330Ω

Capacitors*

C1	20pF
C2	450pF
C3	19pF
C4	70pF
C5	30pF
C6	35pF
C7	10pF
C8	200pF
C9	19pF
C10	8pF
C11	0·001μF
C12	0·01μF
C13	0·01μF
C14	35pF
C15	10pF
C16	10pF
C17	0·01μF
C18	0·01μF
C19	0·01μF
C20	0·001μF
C21	0·01μF
C22	50pF
C23	0·04μF
C24	60pF
C25	30pF
C26	30pF
C27	528pF
C28	0·01μF
C29	3·7pF
C30	0·01μF
C31	80pF
C32	528pF
C33	30pF
C34	30pF
C35	30pF
C36	1,500pF
C37	500pF
C38	60pF
C39	0·04μF
C40	0·01μF
C41	10pF
C42	80pF
C43	80pF
C44	0·01μF
C45	0·003μF
C46	0·01μF
C47	0·01μF
C48	5pF
C49	10pF
C50	300pF
C51	300pF
C52	100pF
C53	0·003μF
C54	0·01μF
C55	0·01μF
C56	5pF
C57	45pF
C58	300pF
C59	80pF
C60	80pF
C61	100pF
C62	300pF
C63	300pF
C64	100pF
C65	500pF
C66	0·01μF
C67	5μF
C67a	0·01μF
C68	0·005μF
C69	0·01μF
C70	0·01μF
C71	0·01μF
C72	8μF
C73	0·1μF
C74	0·1μF
C75	100μF

Miscellaneous*

T1	a	320·0
	b	320·0
	c	—
X1		OA70
X2		OA70
S1-S3		—
S4-S7		—
S8, S9		—

**Approximate D.C. resistance in ohms.*