EVER READY SKY KING/QUEEN/PRINCE
battery radio receivers

THE three all-dry portable radio receivers covered in this Service Data Sheet all employ basically the same superheterodyne circuit, any small differences between models being described overleaf.

CIRCUIT DETAILS

The loop aerial L3 is wound on four pillars mounted on the baffle and is tuned by C2 to form a high-Q r.f. circuit coupled directly to the signal grid of V1. On medium-wave operation, the loading coil L2 is shorted out. C3 is the m.w. aerial trimmer; C3 is the l.w. aerial trimmer.

The local oscillator is a conventional series-fed tuned-grid type of circuit coupled between G1 and G2 of V1. L6/8 is the m.w. oscillator transformer; L7/9 is the l.w. transformer. Medium-wave trimmer, C9; m.w. padder, C14 (with fixed padder C12). Long-wave trimmer, C10 (shorted out on m.w.); long-wave padder C10 (with fixed padder C11).

The i.f. signal (470 kc/s) is coupled via L4/L5 to the i.f. amplifier V2, thence via L10/L11 to the diode of V3 for demodulation. The a.f. signal developed across the diode load (R14 and volume control R5) is fed to the pentode section of V3 for a.f. amplification.

The d.c. component across the diode load is fed back, via filter components R4, C5 to the signal grids of V1 and V2 as a.g.c. bias.

The output of V3 is r.c. coupled to the output pentode V4 which obtains its negative grid bias due to the voltage drop across R10 in the h.t. negative line.

REMOVAL OF CHASSIS

Sky King/Sky Queen: Remove knobs by slackening grub screws. Knobs not fitted with grub screws are secured by spring clips and may be pulled off vertically. Open back by turning the two coin turns and pulling outwards at the top. Lie receiver on its face; with *Sky Queen* ensure that the medallion is protected.

Disconnect the two aerial leads from their tag panel, disconnect speaker leads and remove the two wood screws. Remove the two nuts and washers holding the underside of the handle and pull handle away and with lower end leading, lift chassis gently off the blocks. The two handle spacers normally secured by the handle will fall away.

Sky Prince: Pull off the three knobs,, secured by springs. Remove back by turning two screw heads inwards and lifting back from the slots in the bottom of cabinet. Disconnect the two flexible leads from aerial tag panel and disconnect speaker leads from transformer tag panel.

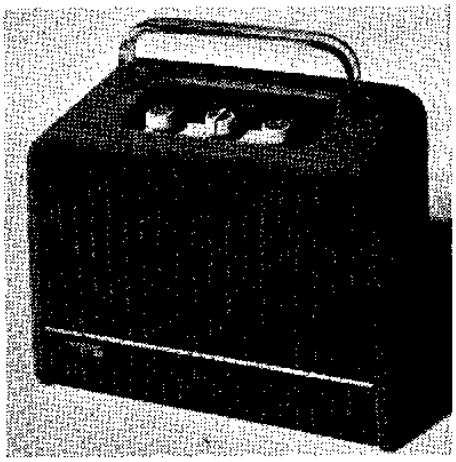
Remove battery shelf by sliding it backwards and remove fixing screw from the cross member of the scale assembly. Tilt cabinet forward and remove the two chassis fixing bolts from the underside of cabinet. Lift chassis free from cabinet, taking care not to damage the frame aerial.

Replacement of Chassis

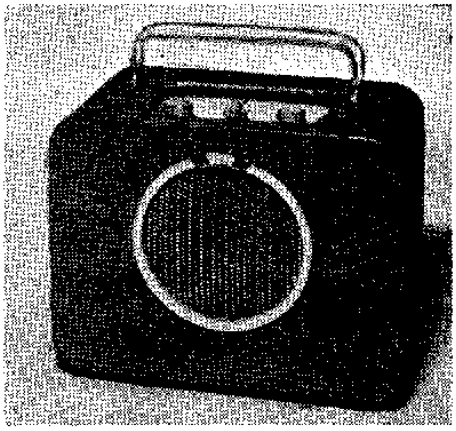
Sky King/Sky Queen: Place cabinet on its face and with spindles leading place it on the mounting blocks. Replace handle and spacers, fixing with nuts and washers. Insert the two wood screws, connect aerial leads, speaker leads and replace knobs.

Sky Prince: Place chassis in position in cabinet. Tilt cabinet forward and insert the two chassis fixing bolts but before tightening, press chassis forward so that it rests against wood spacer in bottom front corner of cabinet and adjust sideways until scale appears symmetrically in window. Tighten bolts.

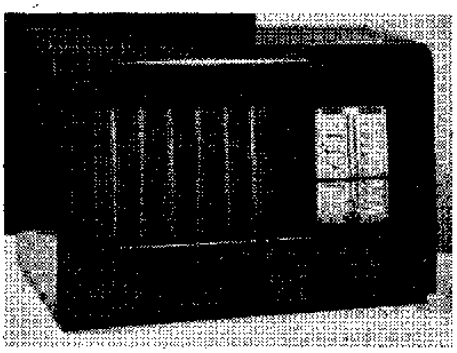
Insert wood fixing screw into hole in the cross member of scale assembly and screw in securely. Reconnect aerial and speaker leads and replace knobs.



Sky King



Sky Queen



Sky Prince

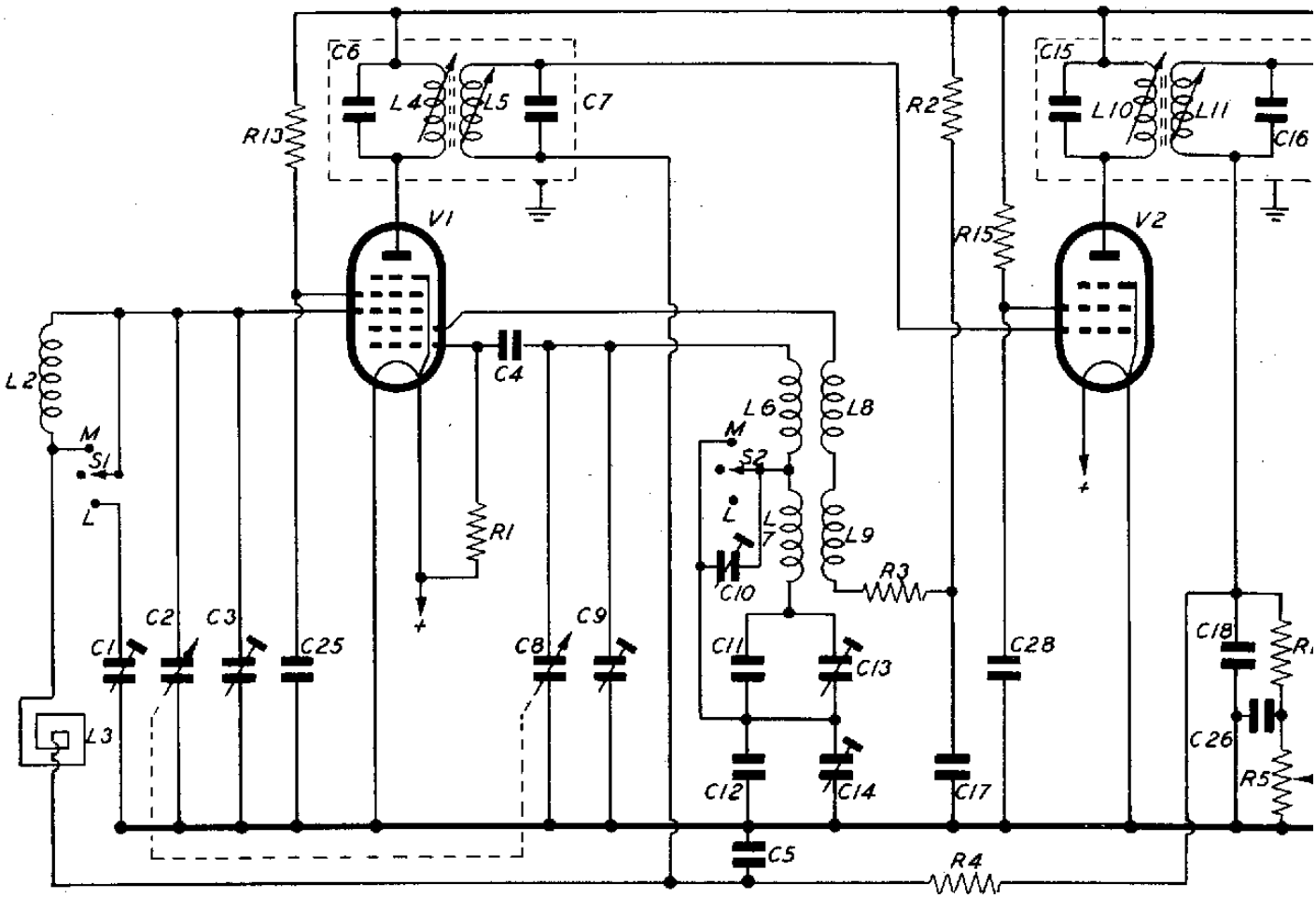
SERVICE SNAPS

EVER READY Sky King, Sky Queen and Sky Prince

Valves: DK96 (f.c.), DF96 (i.f.), DAF96 (det., a.g.c., a.f.), DL96 (output).
Intermediate Frequency: 470 kc/s.
Volume Control: 500kΩ.
Electrolytic: 8μF, 150V.
Waveranges: 194–550m medium-wave; 920–2,000m long-wave.
Power Supply: 90V h.t.; 1.5V l.t. (Ever Ready *Batrymax* type B136.)

RELEASE DATES AND PRICES

Sky King: June, 1956. £10.
Sky Queen: June, 1953. £9 10s.
Sky Prince: June, 1954. £10 12s. 6d.
All prices are less tax tax. Batteries extra.



PRODUCTION CHANGES

The circuit diagram shown above is that for all *Sky King* receivers and all *Sky Queen* models from serial number Q844627 onwards. For *Sky Queen* models previous to serial number Q844627, the following differences obtain:

The oscillator anode of V1 and the screen grid of V2 share a common decoupling network of R2 (15kΩ) and C17 (0.1μF); R15 and C28 are not included. Additionally, the following component values are different:

R1 is 100kΩ, R2 is 15kΩ, R3 is 4.7kΩ, R10 is 470Ω, R13 is 68kΩ, C4 is 60pF, C12 is 400pF.

All models of the *Sky Prince* follow the same circuit as the early *Sky Queen* receivers described above, except for the following component value differences:

R3 is 2.2kΩ, R7 is 1.2MΩ, R8 is 5.6MΩ, R9 is 2.2MΩ, R10 is 560Ω, C12 is 350pF, C22 is 0.002μF, C27 is 60pF.

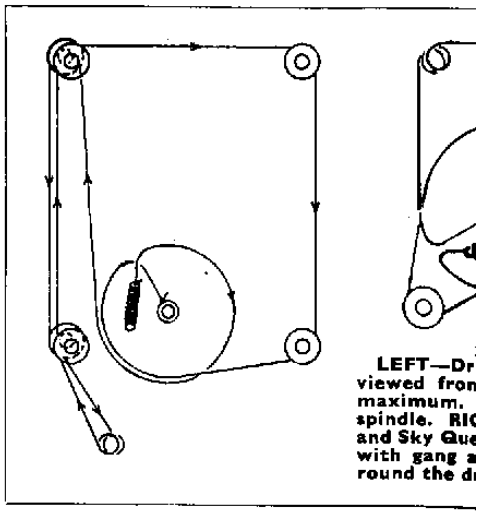
One other difference is in the aerial input circuit. Two loading coils are used in series with the frame aerial, one for m.w. and the other for l.w. (see also alignment procedure).

COMPONENT LIST

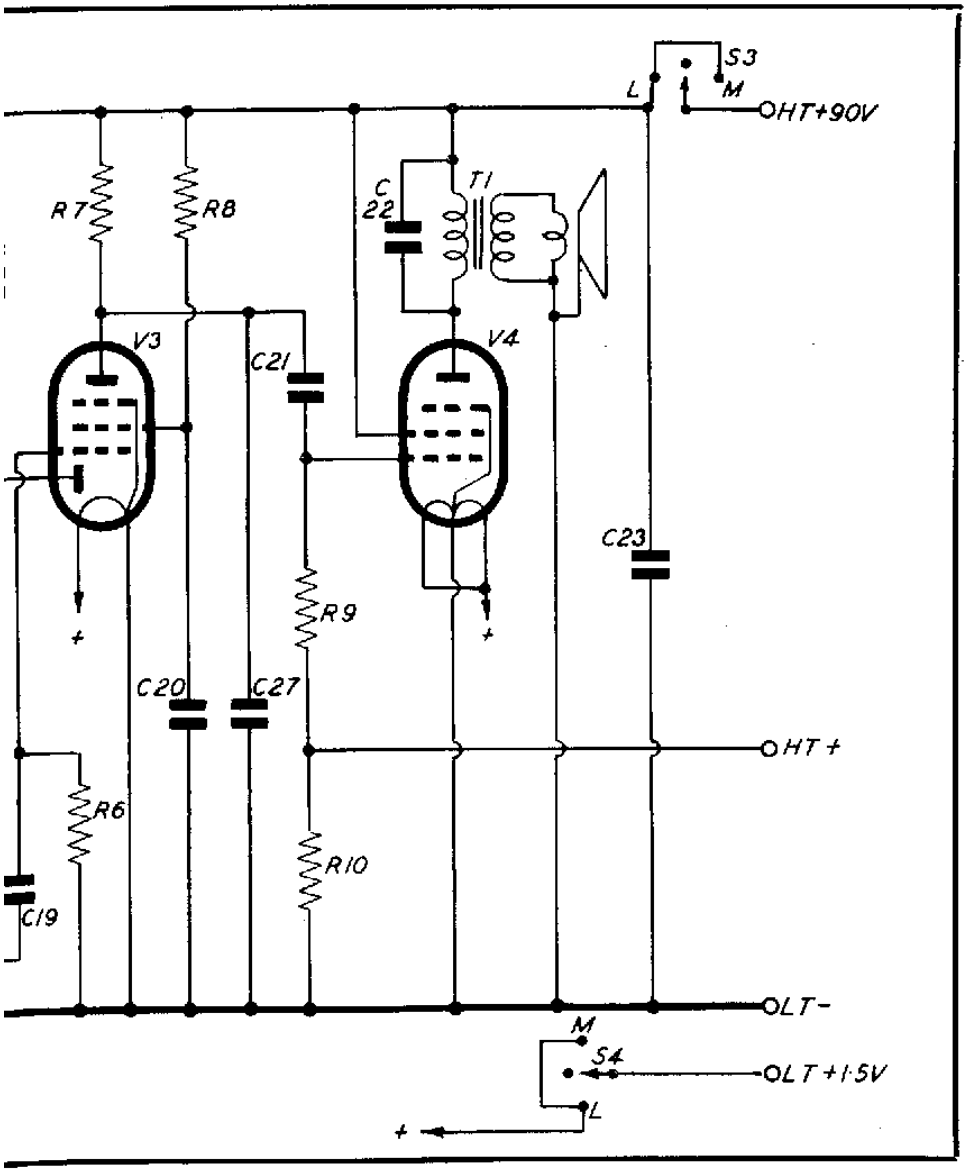
Resistors		C10	120pF
R1	100kΩ	C11	150pF
R2	15kΩ	C12	400pF
R3	4.7kΩ	C13	200pF
R4	2.2MΩ	C14	200pF
R5	500kΩ	C15	100pF
R6	10MΩ	C16	100pF
R7	1MΩ	C17	0.1μF
R8	4.7MΩ	C18	100pF
R9	4.7MΩ	C19	0.001μF
R10	470Ω	C20	0.1μF
R13	68kΩ	C21	0.001μF
R14	47kΩ	C22	0.001μF
		C23	8μF
Capacitors		C25	0.1μF
C1	120pF	C26	100pF
C2	523pF swing	C27	100pF
C3	25pF	C28	0.1μF
C4	60pF		
C5	0.05μF	**Valves**	
C6	100pF	V1	DK96
C7	100pF	V2	DF96
C8	523pF swing	V3	DAF96
C9	60pF	V4	DL96

Drive Cord

Sky King/Sky Queen: The drive system is shown in the diagram. For smoothness of operation, it is important to ensure that the tension spring

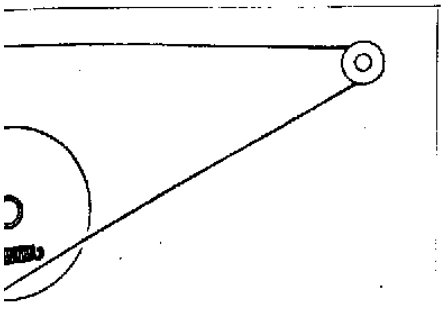


LEFT—Dr viewed fron maximum. spindle. RIC and Sky Que with gang a round the d



Systems

is stretched to about $\frac{1}{8}$in. when the cord is in its correct position. Excessive tension will make the mechanism stiff. The two paxolin washers must fit between scale brackets and drive pulleys.



i cord system of the Sky Prince receiver, rear of chassis with gang capacitor at e cord is taken 2½ turns round the drive IT—Drive cord system of the Sky King i receivers, viewed from front of chassis, maximum. The cord is taken 2 turns e spindle.

When refitting pointer it is important to see that it coincides with the right-hand edge of scale when gang is fully meshed. When positioned correctly, the small clamping lugs should be pressed down firmly on to cord to lock pointer carriage and to prevent slip.

Sky Prince: When fitting new cord it is essential that it be passed over the pulleys so that the two side portions which carry the pointer travel in the same direction when the tuning spindle is rotated. The new cord should be cut so that the tension spring is fully extended in order that it may take up any tendency of the cord to become slack due to subsequent stretching.

When gang is fully meshed, the slot in the drive drum, through which the cord is passed, should appear near the top (as shown in diagram) and it is, therefore, preferable to fit the cord when in this position. If the drum is not positioned correctly, rotation in one direction may be restricted.

VALVE VOLTAGES AND CURRENTS

"Sky King"

	Anode			Screen		
	pin	V	mA	pin	V	mA
V1	2	85	0.5	5	67*	0.1
V2	2	85	1.5	3	67*	0.5
V3	5	38*	47uA	4	29*	13uA
V4	2	82	4.7	3	85	1.0

Notes: V1 oscillator anode (pin 3), 31V, 1.65mA. V4 grid (pin 6) —5V.

"Sky Queen"

V1	2	85	1.02	5	68	0.25
V2	2	85	1.15	3	56*	0.37
V3	5	43*	90uA	4	33*	20uA
V4	2	82	5.4	3	85	0.92

Notes: V1 oscillator anode (pin 3), 49V, 1.48mA. V4 grid (pin 6) —5V.

"Sky Prince"

V1	2	84.4	0.55	5	69*	0.147
V2	2	84.4	0.89	3	55*	0.325
V3	5	38*	38.7uA	4	29*	10.6uA
V4	2	81	5.15	3	84.4	0.995

Notes: V1 oscillator anode (pin 3), 44V, 1.67mA. V4 grid (pin 6) —5.6V.

L.t. consumption 125mA (all models). H.t. consumption 10mA (Sky King), 10.7mA (Sky Queen), 9.8mA (Sky Prince).

Since the anode and/or screen of the valves are fed through high value resistors, the voltage readings obtained are dependent on the resistance of the testmeter used, and allowance should be made for this. Readings marked (*) are absolute values, as taken on an electronic voltmeter. Other readings are those obtained on the 100V range of a 1,000 /V meter.

Removal of Speaker

Sky King/Sky Queen: Remove chassis. Remove aerial/baffle assembly by removing the four nuts and washers. Remove speaker from baffle (four nuts and bolts).

Sky Prince: Remove chassis, baffle fixing screws and four speaker fixing screws.

Replacement of Speaker

Sky King/Sky Queen: Secure speaker to baffle ensuring that the small tag panel on speaker frame faces the block parallel to the long side of the baffle board. Replace baffle in cabinet with horizontal block towards the bottom. Replace the four 4BA fixing nuts and washers and replace chassis.

SERVICE DATA SHEETS

The following Data Sheets covering Ever Ready models are still available:
R104 (Sky Monarch), 9d.
R99 (Sky Baby, Sky Princess), 6d.
R50 (Model "C"), 6d.

Alignment Procedure

Remove chassis from cabinet. Set volume control to maximum. Switch to long-wave band, setting pointer to right-hand end of scale. Connect suitable output indicator across primary of output transformer, using the two tags mounted on terminal panel.

I.F. Alignment

Inject modulated signal of 470 kc/s directly between signal grid of V1 (middle tag on aerial tag panel) and chassis.

Adjust cores of L11, L10, L5 and L4, reducing input as circuit comes into line.

If cores are considerably out of alignment, unscrew them some distance, then screw in taking the first peak as the correct one.

R.F. Alignment

The r.f. circuits must be adjusted with the chassis refitted inside the cabinet and with the battery mounted in its normal position. The two wavebands are interdependent and the medium-wave circuits must be aligned first.

Medium-wave: Ensure that pointer coincides with the 550 mark at extreme right of scale when tuning knob is rotated to maximum clockwise position. Set up suitable loop which, when connected to signal generator, is capable of producing and audible note in receiver which is not less than 12in. distant.

Tune receiver to unnumbered calibration mark between the 200m and 225m marks and, with volume control at maximum, inject modulated signal of 1,400 kc/s to the loop. Adjust m.w. oscillator trimmer C9, then the m.w. aerial trimmer C3.

Set pointer to the 500m. mark. Inject signal of 600 kc/s and adjust m.w. padder C14. (With *Sky Prince* models, the m.w. loading coil is then adjusted.)

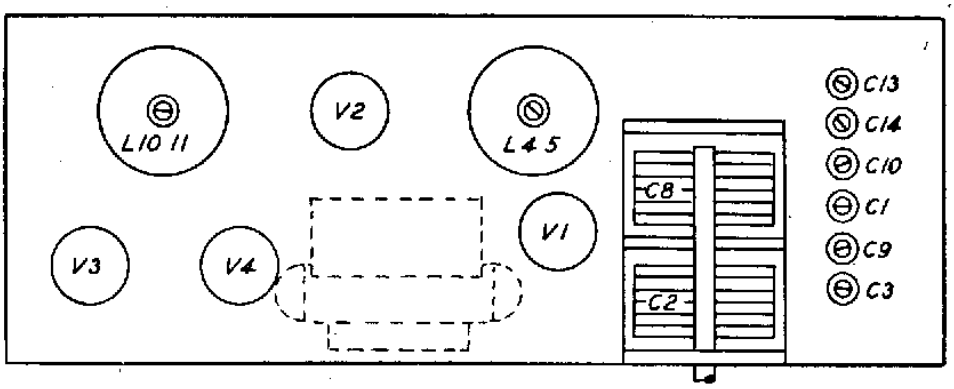
Retune receiver and generator to 1,400 kc/s and repeat oscillator and aerial trimming, reducing signal sufficiently to ensure that the a.g.c. is inoperative.

Long-wave: Set pointer to 1,700m, inject signal of 176.5 kc/s and adjust l.w. padder C13. Set pointer to 1,000m, inject signal of 300 kc/s and adjust l.w. oscillator and aerial trimmers (C10 and C1).

Set pointer to 1,700m, inject 176.5 kc/s and adjust padder for absolute maximum while rocking gang. Then repeat the 1,000m trimming.

With *Sky Prince* models, the following procedure should be adopted:

Set pointer to 1,000m, inject 300 kc/s and adjust oscillator and aerial trimmers. Set pointer to 1,700m, inject 176.5 kc/s and adjust l.w. padder and the l.w. loading coil. Repeat until no further improvement can be obtained.



Top-chassis layout showing positions of valves and trimmers.

Removal of Aerial

Sky King/Sky Queen: Remove chassis and aerial baffle assembly. Slacken four nuts locking aerial support pillars. Turn the four eccentric aerial supporting pillars until the aerial becomes slack; a gentle turn of the screwdriver slot in the top of each pillar will be sufficient.

Pull aerial gently over edge of pillars and remove completely. Place new aerial in position, stretching it gently by turning and locking the pillars and appropriate nuts. Replace aerial/baffle assembly.

Sky Prince: Disconnect aerial from tag panel. Slacken aerial by means of screwdriver slot in top of four eccentric supporting pillars and pull aerial gently over edge of pillars and remove.

Removal of Scale Plate

Sky King/Sky Queen: Remove chassis and turn tuning spindle until gang is fully meshed. Lift drive cord tension spring off the small hook on tuning drum; this will slacken the drive cord which may then be lifted off the two guide pulleys.

Lift pointer carriage off drive bar. Remove scale plate and brackets by removing two 6BA nuts and bolts securing them to chassis via the two support pillars. Remove scale plate from brackets.

Sky Prince: Remove chassis. Remove six spring fasteners securing scale plate to scale assembly. Lift scale off its mounting.

Replacement of Scale Plate

Sky King/Sky Queen: In fitting new scale plate ensure that when fitting pulleys to plate that the two p.v.c. washers are placed under pulley which will be nearer to tuning drum. This is to bring pulley in line with the groove in drum in order to prevent cord from slipping off.

On later models, the plate is separate from drive assembly and can easily be removed from the support brackets by removing the appropriate nuts and screws. The nuts also secure the scale brackets to chassis and if care is taken, the drive cord will not be disturbed when changing the scale plate.