

INVICTA

Models 91, 92, 93

General Description : Model 91 is a seven-valve (including rectifier), four-waveband superheterodyne receiver, typical of a series of similar receivers. Model 92 is powered by a vibrator, Model 93 has the addition of a tuning eye and a long waveband and the 91RG is a radiogramophone. Details of the Model 91 will be sufficient to cover the several variations. Released May 1948.

Power Supply : Model 91, A.C. mains, 110-250 volts, 40-100 c/s.

Wavebands: M.W. 187-545 m.; S.W.1 60-187 m.; S.W.2 25-60 m.; S.W.3 10.7-25 m.

The 16-, 19-, 25- and 30-m. bands are "bandspread" on the right-hand section of the dial when they have been selected by the left-hand pointer.

Intermediate Frequency : 465 kc/s.

Valves : Mullard (V1) ECH35, frequency changer; (V2) EF39, I.F. amplifier; (V3) EBC33, detector, A.V.C. and L.F. amplifier; (V4) EBC33, phase splitter; (V5 and V6) EL33s, push-pull output; (V7) GZ32, rectifier.

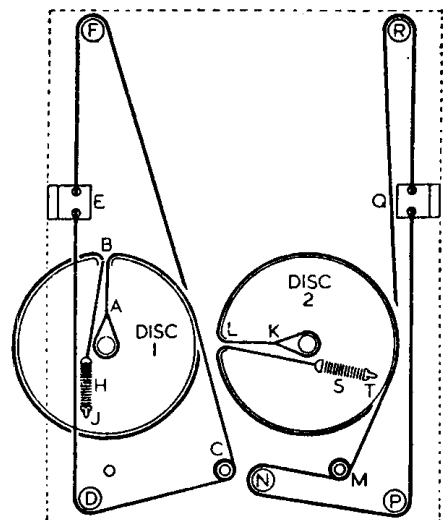
Replacing Drive Cord :

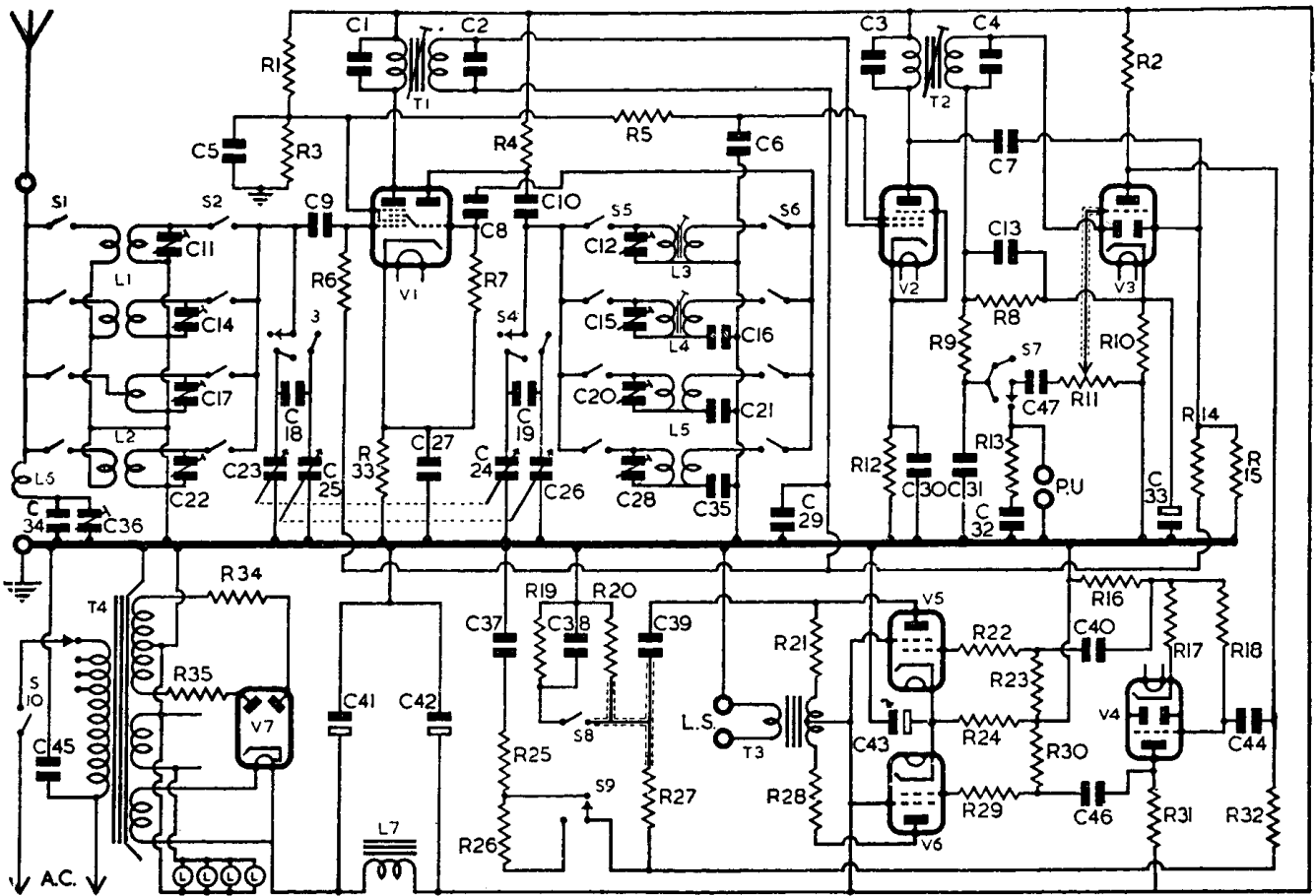
To Replace Drive Cord on Main Gang Capacitor : Commence by loosening drive disc 1 from capacitor spindle. Place hole in disc at extreme left. Tie knot *A* in cord, thread cord through hole *B* and anchor to centre spindle. Turn chassis on one end, and pass cord twice in a clockwise direction round driving spindle *C*, then round pulley *D*. Turn chassis upright, thread on pointer carriage *E*, pass over pulley *F*, loop round drive disc, and pass through starting hole *B*. Tie on spring *H*, rotate drive disc 1 and hook spring *H* on lug *J* with a pair of pliers. Put gang to maximum, tighten drive disc 1 and adjust pointer *E*.

To Replace Drive Cord on Bandspread Gang Capacitor : Commence by loosening drive disc 2 from capacitor spindle. Place hole in disc at extreme right. Tie knot *K* in cord, thread cord through hole *L* and anchor to centre spindle. Turn chassis on one end and pass cord twice in a clockwise direction round driving spindle *M*, round pulley *N*, then pulley *P*. Turn chassis upright, thread on pointer carriage *Q*, pass cord round pulley *R*, then round drive disc 2 and through starting hole *L*. Tie on spring *S*, rotate drive disc 2 until it is possible to hook springs *S* on lug *T*, through the hole provided in dial back plate. Put gang to maximum, tighten drive disc 2 and adjust pointer *Q*.

Alignment Procedure :

I.F. : Switch to M.W. with tone switch and volume control fully clockwise. Main gang capacitor fully closed. Bandspread gang capacitor fully open. Inject a 465-kc/s. signal into the grid of the ECH35 and adjust cores of T1 and T2 for maximum output.





CIRCUIT DIAGRAM—INVICTA MODEL 91

Note: R36 (47k) not shown on diagram is a grid stopper in the flexible lead of V3.

<i>Capacitors.</i>		C18	400 pF.	C36	3-30 pF.	R4	47k	R20	22k
C1	70 pF.	C19	400 pF.	C37	0.05	R5	10k	R21	100
C2	70 pF.	C20	3-30 pF.	C38	100 pF.	R6	470k	R22	68k
C3	140 pF.	C21	2000 pF.	C39	0.1	R7	22k	R23	220k
C4	140 pF.	C22	3-30 pF.	C40	0.01	R8	470k	R24	68
C5	0.05	C23	532 pF. Gang	C41	32 (350 v.)	R9	47k	R25	4.7k
C6	0.05	C24		26 pF. Gang	C42	32 (350 v.)	R10	1k	R26
C7	22 pF.	C25	26 pF. Gang		C43	25 (25 v.)	R11	1M (incorporating S10)	R27
C8	100 pF.	C26		26 pF. Gang	C44	0.01	R12	220k	R28
C9	100 pF.	C27	0.1		C45	0.005	R13	100k	R29
C10	60 pF.	C28	3-30 pF.	C46	0.01	R14	680k	R30	220k
C11	3-30 pF.	C29	0.05	C47	0.01	R15	1M	R31	47k
C12	3-30 pF.	C30	0.1			R16	47k	R32	220k
C13	100 pF.	C31	100 pF.			R17	4.7k	R33	220
C14	3-30 pF.	C32	0.002			R18	470k	R34	100
C15	3-30 pF.	C33	25 (25 v.)			R19	22k	R35	100
C16	6000 pF.	C34	250 pF.					R36	47k
C17	3-30 pF.	C35	680 pF.						

<i>Resistors.</i>		R1	20k
R2	47k	R3	10k

Inject 465-kc/s. signal into the aerial socket at the maximum output of the signal generator and adjust I.F. rejector, C36, for minimum output.

Adjust the wavebands as follows :

1. Set scale pointer at 93 and inject 1500-kc/s. signal, line up C28, and adjust C22 for maximum output. Inject 500-kc/s. signal and check calibration at 23 on the scale.

2. Switch to S.W.1. Set scale pointer at 97 and inject 5-Mc/s. signal. Adjust C20 and C17 for maximum output.

3. Switch to S.W.2, set scale pointer at 96 and inject 12-Mc/s. signal. Adjust C15 for maximum output. (Avoid lining up on "image".)

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Set scale pointer at 11 and inject 5-Mc/s. signal. Adjust core of L₄ for maximum output. Set scale pointer at 96 and inject 12-Mc/s. signal. Re-check adjustment of C₁₅ and adjust C₁₄ for maximum output while gently rocking gang.

4. Switch to S.W.3. Set scale pointer at 91.5 and inject 25-Mc/s. signal. Adjust C₁₂ for maximum output (avoiding "image").

Set scale pointer at 18 and inject 12-Mc/s. signal. Adjust core of L₃ for maximum output. Re-set scale pointer at 91.5 and inject 25-Mc/s. signal. Re-check adjustment of C₁₂ and adjust C₁₁ for maximum output while gently rocking gang.