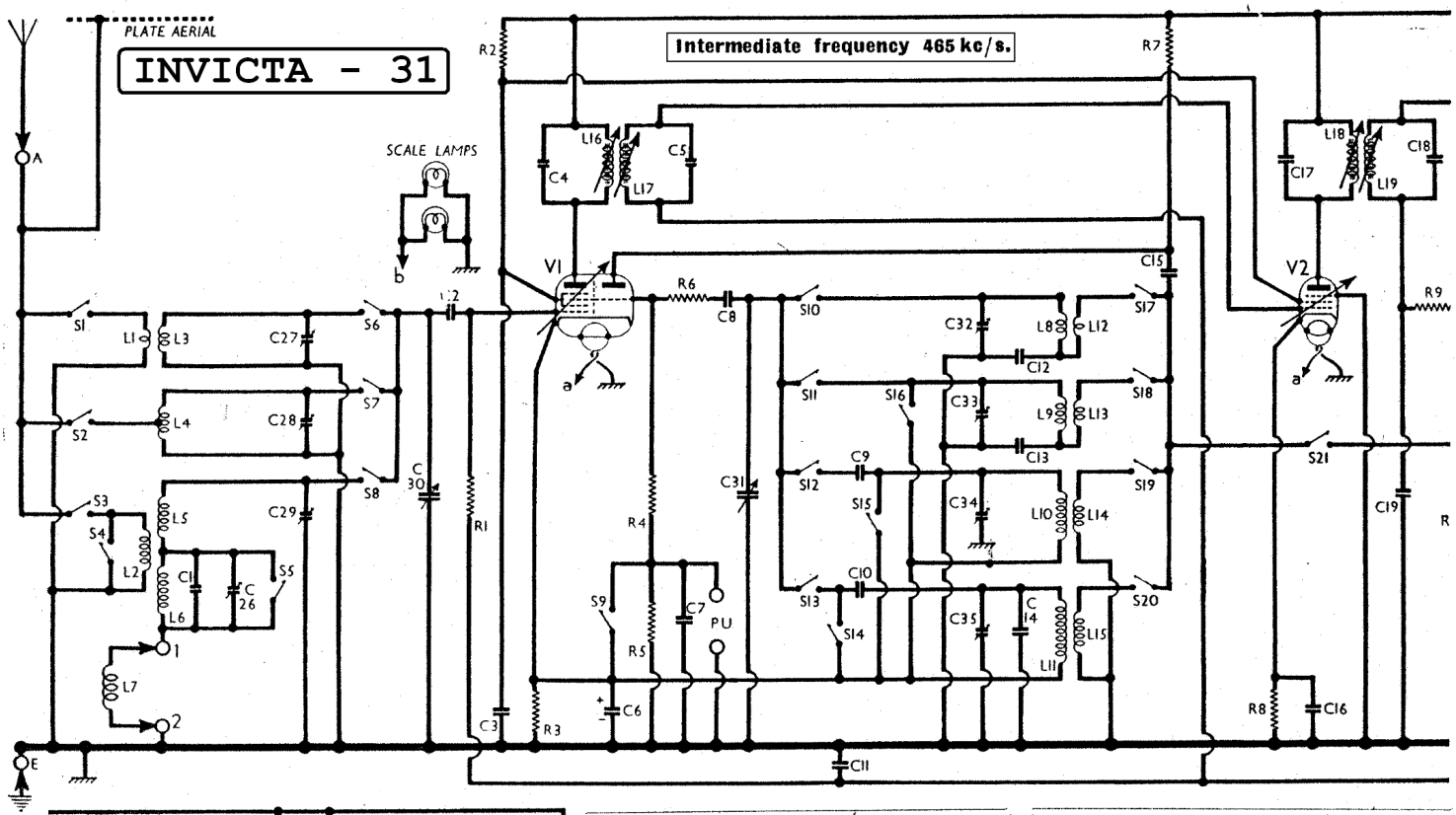
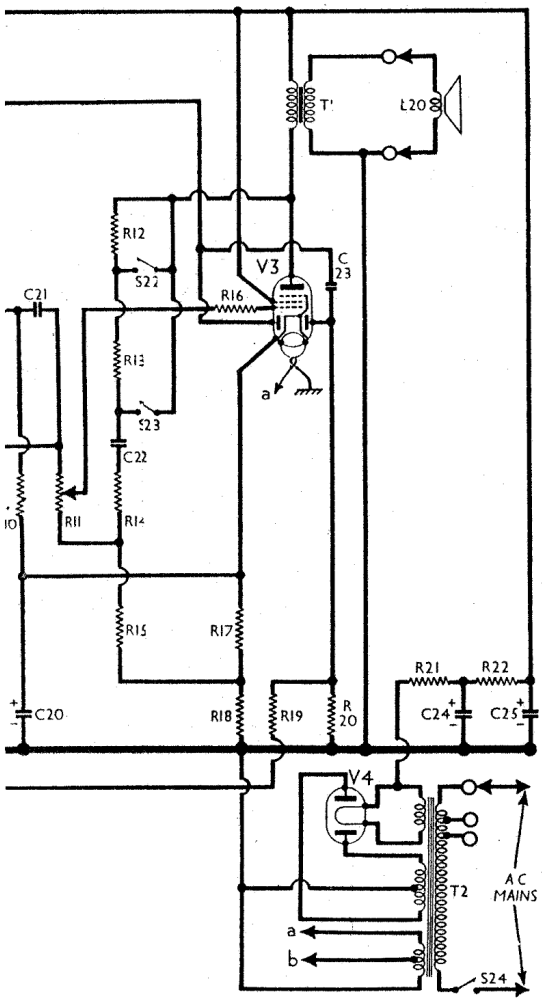
INVICTA - 31





RESISTORS		Values (ohms)	Locations
R1	V1 hex. C.G. ...	1,000,000	B2
R2	S.G.'s H.T. feed ...	47,000	L4
R3	V1 fixed G.B. ...	220	L3
R4	V1 triode C.G. resistors ...	47,000	M4
R5	V1 triode C.G. resistors ...	200,000	M4
R6	Osc. stabilizer ...	56	M4
R7	Osc. H.T. feed ...	47,000	M4
R8	V2 fixed G.B. ...	220	L5
R9	I.F. Stopper ...	47,000	K5
R10	Sig. diode load ...	470,000	K5
R11	Volume control ...	1,000,000	G3
R12	Negative feed-back potential divider resistors ...	100,000	H3
R13	Negative feed-back potential divider resistors ...	33,000	H3
R14	Negative feed-back potential divider resistors ...	15,000	G3
R15	Negative feed-back potential divider resistors ...	4,700	J4
R16	V3 C.G. stopper ...	100,000	D2
R17	V3 G.B., A.G.C. delay resistors ...	150	J4
R18	V3 G.B., A.G.C. delay resistors ...	330	J4
R19	A.G.C. decoupling	1,000,000	K5
R20	A.G.C. diode load ...	1,000,000	K5
R21	V4 surge limiter ...	100	J5
R22	H.T. smoothing ...	1,500	J4

CAPACITORS		Values (μF)	Locations
C1	Aerial L.W. trim. ...	0·000022	B2
C2	V1 hex. C.G. ...	0·0003	A1
C3	S.G.'s decoupling ...	0·02	L5
C4	1st I.F. transformer tuning ...	0·00007	C2
C5	1st I.F. transformer tuning ...	0·00007	C2
C6*	V1 cath. by-pass ...	50·0	L4
C7	P.U. tone corrector	0·005	M4
C8	V1 osc. C.G. ...	0·0001	O3
C9	Osc. M.W. tracker	0·00057	N3
C10	Osc. L.W. tracker	0·00034	O3
C11	A.G.C. decoupling	0·1	L5
C12	Osc. S.W.1 track ...	0·005	M3
C13	Osc. S.W.2 track ...	0·002	N4
C14	Osc. L.W. trimmer	0·00014	M4
C15	Osc. anode coupling	0·02	M3
C16	V2 cath. by-pass ...	0·1	L5
C17	2nd I.F. transformer tuning ...	0·00014	D2
C18	2nd I.F. transformer tuning ...	0·00014	D2
C19	I.F. by-pass ...	0·0001	K5
C20*	V3 cath. by-pass ...	50·0	H5
C21	A.F. coupling ...	0·01	K5
C22	F.-B. coupling ...	0·01	H3
C23	A.G.C. coupling ...	0·000022	K5
C24*	H.T. smoothing capacitors ...	32·0	E1
C25*	H.T. smoothing capacitors ...	32·0	E1
C26‡	Aerial L.W. trim.	0·00003	B2
C27‡	Aerial S.W.1. trim.	0·00003	B2
C28‡	Aerial S.W.2. trim.	0·00003	A2
C29‡	Aerial M.W. trim.	0·00003	B2
C30†	Aerial tuning ...	0·000537	B1
C31†	Oscillator tuning ...	0·000537	B1
C32‡	Osc. S.W.1. trim. ...	0·00004	N4
C33‡	Osc. S.W.2. trim. ...	0·00004	N4
C34‡	Osc. M.W. trim. ...	0·00004	O4
C35‡	Osc. L.W. trim. ...	0·00004	O4

* Electrolytic. † Variable. ‡ Pre-set.

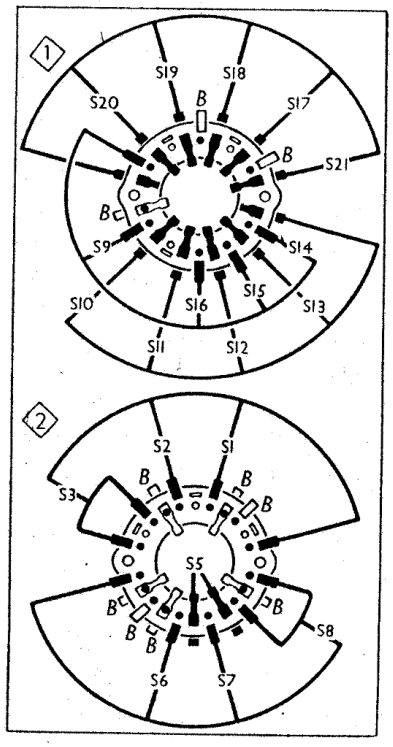
OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coupling coils ...	0·1	B2
L2	Aerial coupling coils ...	68·0	B2
L3	Aerial tuning coils	Very low	B2
L4	Aerial tuning coils	0·3	A2
L5	Aerial tuning coils	2·3	B2
L6	Aerial tuning coils	12·7	B2
L7	Frame aerial ...	0·6	A2
L8	Oscillator tuning coils ...	Very low	N3
L9	Oscillator tuning coils ...	0·3	N4
L10	Oscillator tuning coils ...	2·2	M3
L11	Oscillator tuning coils ...	3·3	M4
L12	Oscillator reaction coils ...	18·0	N3
L13	Oscillator reaction coils ...	23·0	N4
L14	Oscillator reaction coils ...	68·0	M3
L15	Oscillator reaction coils ...	83·0	M4
L16	1st I.F. trans. Pri.	8·0	C2
L17	1st I.F. trans. Sec.	8·0	C2
L18	2nd I.F. trans. Pri.	6·0	D2
L19	2nd I.F. trans. Sec.	6·0	D2
L20	Speech coil ...	2·5	—
T1	Output trans. Pri. ...	340·0	K4
T1	Output trans. Sec. ...	0·1	K4
T2	Mains trans. Pri., total	26·0	F2
T2	Mains trans. Heat. sec.	Very low	F2
T2	Mains trans. Rect. heat. sec.,	Very low	F2
T2	Mains trans. H.T. sec., total	510·0	F2
S1-S21	W/band and Gram. switches ...	—	—
S22	Tone control switches ...	—	H3
S23	Tone control switches ...	—	H3
S24	Mains sw., g'd R11	—	G3

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 ECH35	243	1·5	66	2·1
	Oscillator			
	86	3·4		
V2 EF39	243	5.5	66	1·6
V3 EBL31	233	35·0	243	4·3
V4 AZ31*	330†	—	—	—

* May be EZ35. † Each anode, A.C.

Switch Diagrams and Table

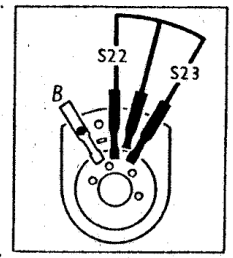


Diagrams of the waveband switch units, drawn as seen when viewed from the rear of an inverted chassis. *B* indicates blank tags. The associated table is on the right of these diagrams, in col. 2. **S4** is shown in location M5 in our chassis illustration opposite.

Switch	Gram.	S.W.1	S.W.2	M.W.	L.W.
S1	—	C	—	—	—
S2	—	—	C	—	—
S3	—	—	—	C	C
S4	—	—	—	C†	C†
S5	C	C	C	C	—
S6	—	C	—	—	—
S7	—	—	C	—	—
S8	—	—	—	C	C
S9	—	C	C	C	C
S10	—	C	—	—	—
S11	—	—	C	—	—
S12	—	—	—	C	—
S13	—	—	—	—	C
S14	C	C	C	C	—
S15	C	C	C	—	C
S16	C	C	—	C	C
S17	—	C	—	—	—
S18	—	—	C	—	—
S19	—	—	—	C	—
S20	—	—	—	—	C
S21	C	—	—	—	—

† Opens upon insertion of external aerial plug

Diagram of the tone control switch unit, as seen from the rear of an inverted chassis.



INVICTA - 31

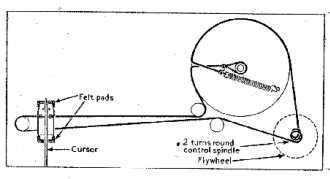
DRIVE CORD REPLACEMENT

Forty inches of Nylon braided glass yarn is required for the drive cord, which should be run as shown in the sketch below.

First thread the cord through the cursor carriage as shown in the sketch, with the free ends of the cord emerging from the rear of the carrier. Thread the right-hand end of the cord through the entry hole in the rim of the drum, then tie a loop about ½in in diameter and slip it into the groove round the centre boss of the drum.

Slide the cursor along the cord so that it takes up a position somewhere on the upper horizontal run, and complete the circuit as shown, making two turns round the control spindle and tying off so that the tension spring is extended to about 1½ times its closed length.

With the spring unhooked, the cursor can be slid comfortably along the cord to approximately the correct position, final adjustment being made on the taut cord with the scale in position after replacing the chassis in the cabinet.



Sketch showing the tuning drive system as it appears when viewed from the front, with the gang at minimum capacitance, which is the correct position for fitting a new cord.

CIRCUIT ALIGNMENT

For these operations the chassis must be in position in the cabinet.

I.F. Stages.—Connect signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (top cap) of **V1** and the **E** socket, after removing the original top cap connector and joining a 100,000 Ω resistor between the top cap of the valve and chassis.

Switch set to M.W., turn gang and volume control to maximum, feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L16, L17, L18** and **L19** (location references M5, C2, K5, D2) for maximum output. Finally, remove the 100,000 Ω resistor and replace **V1** top cap connector.

R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursor should be vertical and coincident with the high wavelength ends of the four scales. It may be adjusted in position by sliding the cursor carriage along the drive cord. Transfer "live" signal generator lead to "**A**" socket, via a suitable dummy aerial.

M.W.—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C34** (O4) and **C29** (B2) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and check calibration.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C35** (O4) and **C26** (B2) for maximum output. Tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and check calibration.

S.W.1.—Switch set to S.W.1, tune to 15 m on scale, feed in a 15 m (20 Mc/s) signal, and adjust **C32** (N4) and **C27** (B2) for maximum output, while rocking the gang. Tune to 40 m on scale, feed in a 40 m (7.5 Mc/s) signal, and check calibration.

S.W.2.—Switch set to S.W.2, tune to 60 m on scale, feed in a 60 m (5.0 Mc/s) signal, and adjust **C33** (N4) and **C28** (A2) for maximum output. Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and check calibration.