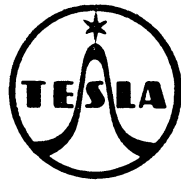
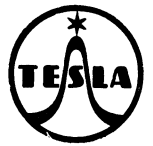
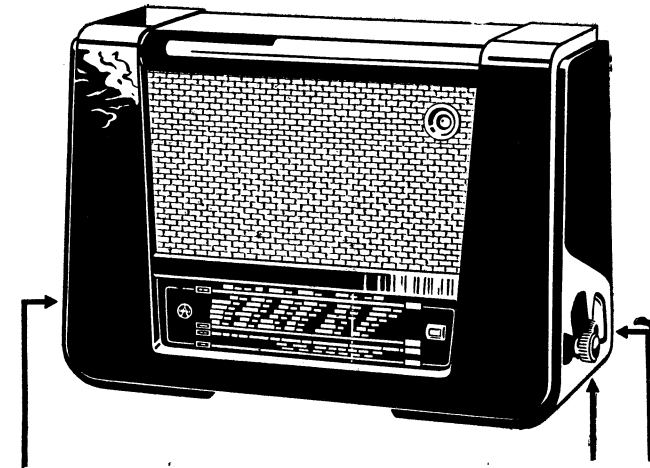


SERVICE MANUAL AND TECHNICAL DESCRIPTION OF THE TESLA "ARIE 501 A" RADIO RECEIVER



(Refers to versions 501 A-2 and 501 A-3)



Mains switch, volume control and tone control, ganged

Tuning Waveband switch

CIRCUIT

3+2 valve superheterodyne with six circuits for operation on A. C. mains.

WAVEBANDS

Spread band	31 m	(9.47—10.4 Me/s)
Short waves	16— 51 m	(18.7— 5.9 Me/s)
Medium waves	187— 571 m	(1605— 525 kc/s)
Long waves	1000—2000 m	(300— 150 kc/s)

VALVES

ECH 21 — mixer and oscillator
 ECH 21 — I. F. and A. F. amplifier
 EBL 21 — detector and power amplifier
 AZ 11 — full-wave rectifier
 EM 11 — cathode-ray tuning indicator
 Two pilot lamps (6-7 V/0.3 A)

INTERMEDIATE FREQUENCY

452 kc/s (501A and 501A-2)
 445 kc/s (501A-3)

MAINS SUPPLY

A. C. 110, 125, 150, 220, 240 V; 40—60 c/s

CONSUMPTION

55 W
 Primary current 307 mA \pm 10% at 220 V A. C.

POWER OUTPUT

2.5 W (at 10% distortion)

LOUDSPEAKER

Permanent magnet moving coil, diameter 160 mm, speech coil impedance approximately 5 Ω .

DIMENSIONS AND WEIGHTS

	Receiver	Receiver incl. packing
Width	480 mm (incl. knobs)	555 mm
Height	310 mm	400 mm
Depth	180 mm	275 mm
Weight	7.60 kg	11.6 kg

VOLTAGES AND CURRENTS

Valves		V _a V	V _{g2} V	I _a mA	I _{g2} mA	V _f V
ECH 21	heptode	228	86	2	5.6	6.3
	triode	141	—	3.8	—	
ECH 21	heptode	228	86	4.9	3.8	6.3
	triode	68	—	2	—	
EBL 21	duodiode pentode	250	228	39	4.9	6.3
AZ 11	full-wave rectifier	2×255	total current 66 mA			4
EM 11	tuning indicator	228	1st deflecting plate 22 V 2nd deflecting plate 19 V			6.3
Electrolytic capacitors		260 V D. C. on C 29 228 V D. C. on C 30				

All voltages have been measured by a 1000 Ω/V meter.

REPLACEMENT COMPONENTS

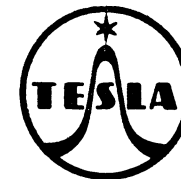
Item	Mechanical Parts	Order No.	Notes
1	Cabinet	PF 127 07	
2	Baffle	PA 110 12	
3	Window for EM 11	187 L8 Vd2	
4	Brocade speaker grille	PM 100 03	
5	Bracket for magic eye indicator (EM 11)	187 L8-Vd4	
6	Back panel	PA 132 20	
7	Nut for back panel fixing screw	M3×St - z	
8	Chassis base cover	PF 800 02	
9	Knob, volume control	PA 243 13	
9a	Knob, tuning	PA 243 24	
10	Waveband knob	PA 243 11	
11	Dial (for 501A)	PF 157 31	
11a	Dial (for 501A-3)	PF 157 43	
11b	Dial (for 501A-2)	PF 157 47	
12	Rubber ring for dial	EK 764 50	
13	Dial background screen	PA 614 07	
14	Pointer	PF 166 03	
15	Pointer guiding rod	PA 892 01	
16	Pulley	EK 401 00	
17	Tuning drive drum	EK 399 10	
18	Tuning drive cable	M4 - 37	
19	Tuning drive cord	M4 - 38	
20	Tension spring	EK 975 30	
21	Waveband indicator	PK 164 00	
22	Securing ring	NTN 028 3.2 St	
23	Tuning spindle	PA 726 21	
24	Dial lamp holder with hook	PF 498 08	
25	Dial lamp holder	PF 498 04	
26	Dial lamp, 6.3 V/0.3 A (Z1, Z2)	8046 P - 00	

Item	Mechanical Parts	Order No.	Notes
27	Potentiometer spindle	PA 726 22	
28	Securing ring	NTN 028-5 St	
29	Switch-off wafer of tone control	PA 670 05	
30	Connecting tube	PA 910 00	
31	Tone control switch	PK 521 00	
32	Waveband switch spindle	PA 726 17	
33	Waveband indicator pulley	PF 806 64	
34	Locking disc	PA 569 13	
35	Friction roller	PA 013 09	
36	Locking spring	PA 783 09	
37	Tension spring of waveband indicator cord	ČP 770 63	
38	1st wafer of waveband switch (P1)	PK 533 11	
39	2nd wafer of waveband switch (P2)	PK 533 16	
40	Valve socket for AZ 11 and EM 11 valves	PK 497 04	
41	Valve socket for E-21 valve	PK 497 01	
42	Aerial-earth socket strip with wavetrap	PK 852 04	
43	Pick-up socket strip	PK 523 02	
44	Extension speaker socket strip	PF 806 02	
45	Mains voltage selector panel	EK 679 03	
46	Mains voltage selector disc	PK 461 00	
47	Coil bracket, spare	A1 385 00	
48	Sealing compound	M4 - 58	
49	Mains cord with plug	28 502 66	
50	Mains cord clamp	EK 514 35	
51	Mounting clamp assembly for EM 11	187 L9-Vd1	
52	Rubber pad (under chassis)	172 Vd3	
53	Loudspeaker	PN 632 11	
54	Annular rim	28 452 68	
55	Annular spacer	28 452 69	
56	Cone with speech coil	PF 759 05	
57	Canvas cover, for speaker	28 475 24	
58	Thermal fuse	08, 100 99	

Electrical Parts

L	Coils	Value	List No.	Notes
1	I. F. rejector	40 Ω	PK 586 31	
2, 3	Input, short waves	< 1 Ω	PF 600 06	
4	Input, medium and long waves	31.3 Ω	PK 590 06	
5		7.3 Ω		
6		130.5 Ω		
7		44.8 Ω		
11		2.3 Ω		
12		< 1 Ω		
13	Oscillator short and medium waves	< 1 Ω	PK 590 07	(501A, 501A-2) (501A-3)
14		3.2 Ω	PK 590 10	
15		6.5 Ω		
16	Oscillator long waves	8 Ω	PF 600 04	
17		17.2 Ω		
21		9.4 Ω		
22	1st I. F. transformer	9.4 Ω	PK 854 17	
23		9.4 Ω		
24	2nd I. F. transformer	10 Ω	PK 854 19	
24'				
30, 31	Output transformer		PN 673 05	
34, 35, 35', 36, 37	Power transformer		PN 661 04	

C	Capacitors	Value	Working Voltage V D. C.	List No.	Notes
1	Mica	40 pF \pm 10%	500	TC 200 40/A	
4	Mica	40 pF \pm 10%	500	TC 200 40/A	
5	Wire-wound	25 pF		PN 700 00	
6	Wire-wound	25 pF		PN 700 00	
7	Mica	74 pF \pm 2%	500	TC 200 74/C	
8, 20	Variable	2 \times 400 pF		EK 215 24	
9	Mica	43 pF \pm 2%	500	TC 200 43/C	
10	Mica	100 pF \pm 10%	500	TC 200 100/A	
11	Mica	80 pF \pm 10%	500	TC 200 80/A	
12	Mica	40 pF \pm 10%	500	TC 200 40/A	
13	Wire-wound	25 pF		PN 700 00	
14	Mica	396 pF \pm 1%	500	TC 201 396/D	
15	Mica	170 pF \pm 1%	500	TC 201 170/A	
16	Wire-wound	25 pF		EM 218 025/A	
17	Mica	100 pF \pm 1%	500	TC 200 100/D	
18	Trimmer	30 pF		PN 703 01	
19	Mica	45 pF \pm 1%	500	TC 200 45/D	
21--24	Mica	103 pF \pm 5%	500	TC 200 103/B	
25	Mica	95 pF \pm 2%	500	TC 200 95/C	
26	Mica	100 pF \pm 10%	500	TC 200 100/A	
27	Paper	50000 pF \pm 20%	400	TC 103 50k	
28	Paper	0.1 μ F \pm 20%	400	TC 103 M1	
29--30	Electrolytic	2 \times 32 μ F	350/420	WK 705 11	
31	Paper	0.1 μ F \pm 20%	160	TC 101 M1	
32	Paper	25000 pF \pm 20%	250	TC 102 25k	
33	Mica	80 pF \pm 10%	500	TC 200 80/A	
34	Mica	100 pF \pm 10%	500	TC 200 100/A	
35	Paper	50000 pF \pm 20%	160	TC 101 50k	
36	Paper	10000 pF \pm 20%	400	TC 103 10k	
37	Mica	10 pF \pm 10%	500	TC 200 10/A	
38	Paper	5000 pF \pm 20%	1000	TC 105 5k	
39	Paper	25000 pF \pm 20%	1000	TC 105 25k	
42	Mica	105 pF \pm 2%	500	TC 200 105/C	
43	Paper	50000 pF \pm 20%	160	TC 101 50k	
44	Paper	0.5 μ F \pm 20%	400	TC 103 M5	



R	Resistors	Value	Load	List No.	Notes
1	Wire-wound	100 Ω \pm 10%	1 W	TR 502 100/A	
2	Carbon	0.5 M Ω \pm 13%	0.25 W	TR 101 M5	
3	Carbon	50000 Ω \pm 13%	0.25 W	TR 101 50k	
7	Carbon	0.8 M Ω \pm 13%	0.25 W	TR 101 M8	
9	Carbon	20000 Ω \pm 13%	2 W	TR 104 20k	
10	Carbon	16000 Ω \pm 13%	2 W	TR 104 16k	
11	Carbon	1250 Ω \pm 13%	2 W	TR 104 1k25	
12	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
14	Carbon	64000 Ω \pm 13%	0.5 W	TR 102 64k	
15	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
16	Carbon	50000 Ω \pm 13%	0.25 W	TR 101 50k	
17	Potentiometer	0.5 M Ω		WN 697 18	
18	Carbon	20000 Ω \pm 13%	0.25 W	TR 101 20k	with on/off switch
19	Carbon	0.4 M Ω \pm 13%	0.25 W	TR 101 M4	
20	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
21	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
22	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
23	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
24	Carbon	1 M Ω \pm 13%	0.25 W	TR 101 1M	
25	Carbon	20000 Ω \pm 13%	0.25 W	TR 101 20k	
26	Carbon	50000 Ω \pm 13%	0.25 W	TR 101 50k	

RECEIVER ALIGNMENT

General

Before alignment the receiver should be mechanically and electrically adjusted, and the valves which will be used in the receiver have to be inserted.

The dial pointer has to cover the right-hand end of individual wave ranges, when the stator and rotor plates of the variable capacitor are flush.

The iron cores are adjusted by a special screwdriver (without metal parts), the capacitors C 5, C 6, C 13 and C 16 by reeling off the appropriate length of thin wire. When adjusting the wire-wound trimmer capacitors, take care not to pass over optimum alignment.

The air trimmer C 18 can be adjusted by means

of a special spanner made of insulating material, and capacitor C 15 by scraping off silver film in the small window.

The local oscillator frequency is on all wave ranges by I. F. higher than the signal frequency, therefore the reached maximum with lower capacity of the trimmer is correct.

Connect the signal generator as indicated in the alignment chart, earth the receiver, turn volume control to maximum and connect output meter to sockets of extension speaker.

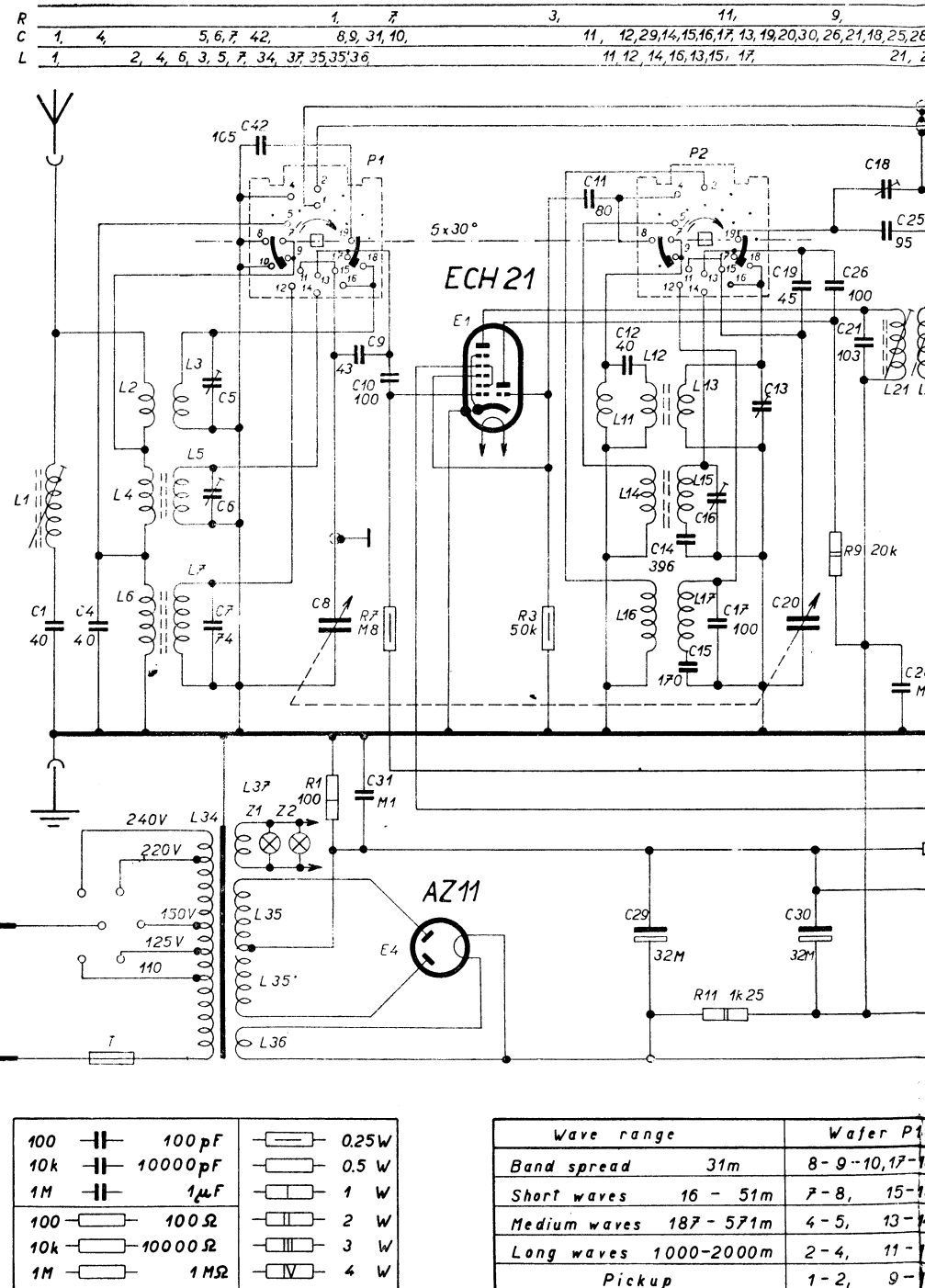
The aligned parts should be secured with sealing wax.

ALIGNMENT CHART

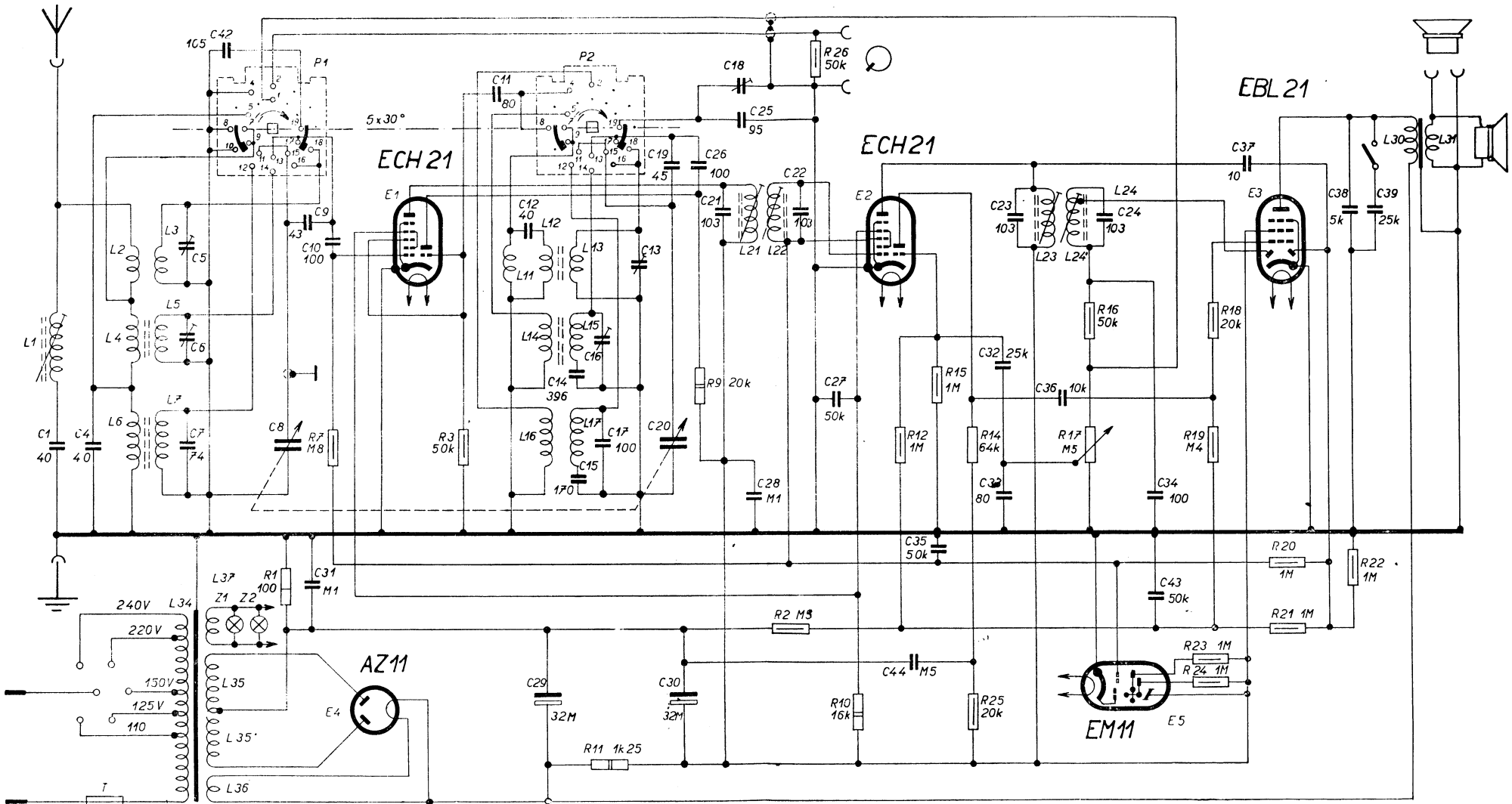
Steps	Circuit aligned	Signal generator		Receiver				Output meter deflection
		Frequency	Connection to	Band switch	Set dial pointer to	Connect 100 pF capacitor parallelly to coil	Sequence of adjustment	
1	I. F.	452 kc/s (445 kc/s)†	signal grid of first ECH 21 via 30,000 pF capacitor	MW	beginning of MW range (200 m)	L 23	iron cores of L 24+L 24'*	maximum
L 24 + 24'						iron core of L 23		
L 21						iron core of L 22		
L 22						iron core of L 21*		
5	I. F. rejector circuit	452 kc/s (445 kc/s)†	aerial socket via standard dummy aerial	MW	end of MW range (550 m)	—	iron core of L 1	minimum
6	SW (16 — 51 m)	17 Mc/s	aerial socket via 400 Ω dummy aerial	SW (16 — 51 m)	17.64 m	—	capacitors C 13, C 5	maximum
7	31 m spread band	accurate signal of 9.6 Mc/s	aerial socket via standard dummy aerial	31 m spread band	31.25 m	—	capacitor C 18	maximum
8	MW (187 — 571 m)	1,500 kc/s	aerial socket via standard dummy aerial	MW (187 — 571 m)	200 m	—	capacitors C 16, C 6	maximum
9	LW (1000 — 2000 m)	160 kc/s	aerial socket via standard dummy aerial	LW (1000 — 2000 m)	1875 m	—	capacitor C 15	maximum

* Upper coils of I. F. transformers.

† Version 501 A-3.



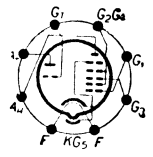
R		1, 7	3,	11,	9,	2, 26,	10,	12, 15,	14, 25,	16, 17,	23, 24, 18, 19,	20, 21,	22,
C	1, 4,	5, 6, 7, 42,	8, 9, 31, 10,	11, 12, 29, 14, 15, 16, 17, 13, 19, 20, 30, 26, 21, 18, 25, 28, 24, 27, 22,		44, 35,	32, 33, 23,	36,	24,	34, 43,	37,	38, 39,	
L	1,	2, 4, 6, 3, 5, 7, 34, 37, 25, 35, 36,		11, 12, 14, 16, 13, 15, 17,		21, 22,				23, 24, 24,		30, 31,	



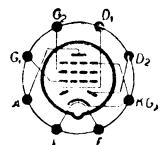
100	100 pF		0.25 W
10k	10000 pF		0.5 W
1M	1 μF		1 W
100	100 Ω		2 W
10k	10000 Ω		3 W
1M	1 MΩ		4 W

Wave range	Wafer P1	Wafer P2
Band spread	31m	8-9-10, 17-18-19
Short waves	16-51m	7-8, 15-16-17
Medium waves	187-571m	4-5, 13-14-15
Long waves	1000-2000m	2-4, 11-12-13
Pickup	1-2, 9-10-11	9-11

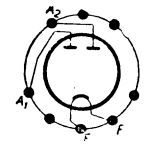
Circuit diagram of
TESLA "ARIE 501A"



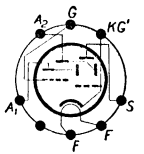
ECH 21



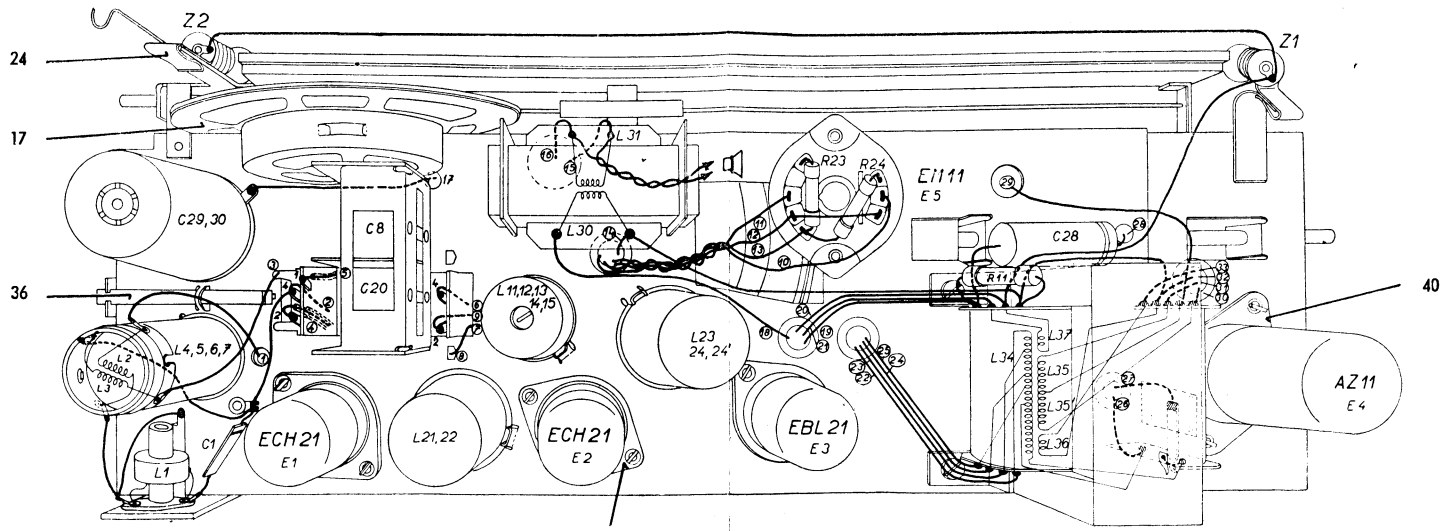
EBL 21



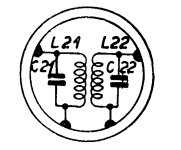
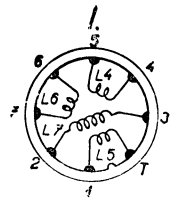
AZ 11



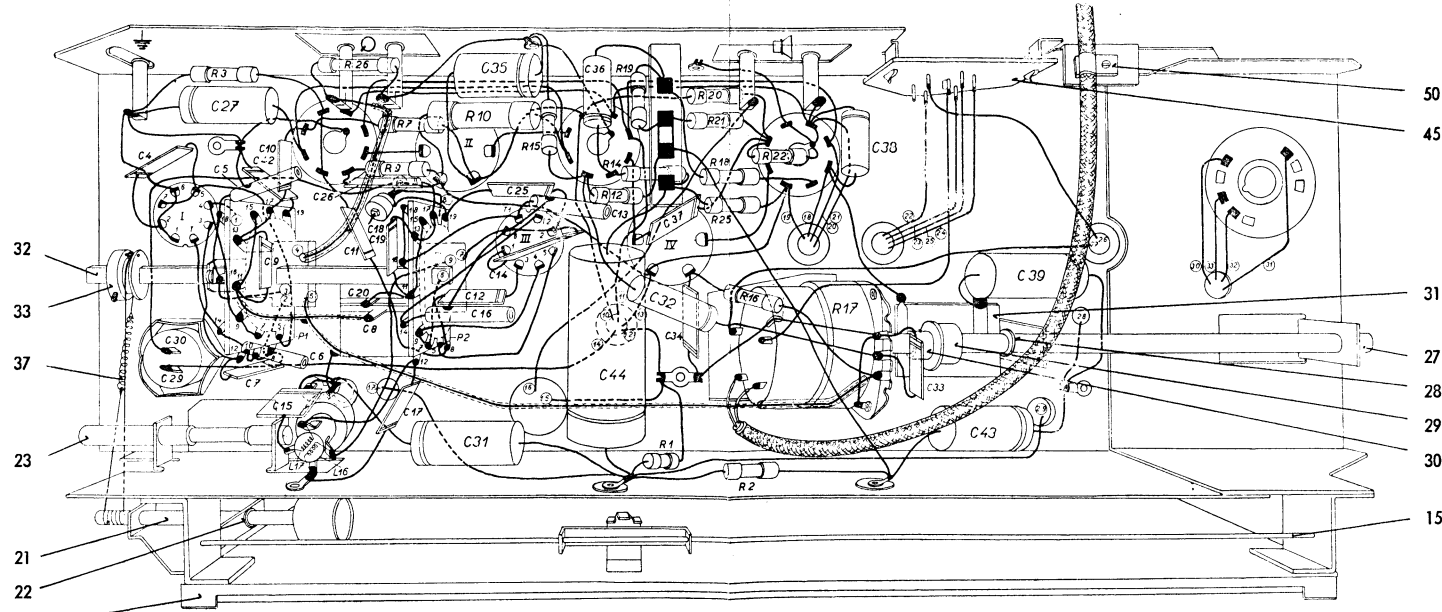
EM 11



TOP VIEW OF CHASSIS



R	3	26	9	7	10	15	12	14	19	1	20, 21, 18, 25, 2, 22, 16	17					
C	4	30, 29	27	5, 7, 9, 6, 42, 10, 15	11, 20, 26, 8, 18, 19, 12, 16, 12, 35, 31, 25	14	13, 44, 36	32	37	34		38	33	43	39		
L	4	5	6	7	16, 17			21	22	11	12	13	14	15		23	24



UNDER-CHASSIS VIEW

