



SERVICE MANUAL

HF/50 MHz AUTOMATIC
ANTENNA TUNER

AT-180

S-14619XZ-C1
Dec. 2009

INTRODUCTION

This service manual describes the latest technical information for the **AT-180** HF/50 MHz AUTOMATIC ANTENNA TUNER, at the time of publication. The BOARD LAYOUT and SCHEMATIC DIAGRAM in this document covers only the CTRL UNIT.

MODEL	VERSION
AT-180	[GEN]
	[CHN]

To upgrade quality, any electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

CAUTION

NEVER connect the antenna tuner to an AC outlet or to a DC power supply that uses more than the specified voltage. This will ruin the antenna tuner.

DO NOT expose the antenna tuner to rain, snow or any liquids.



ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit Icom part number
2. Component name
3. Equipment model name and unit name
4. Quantity required

<ORDER EXAMPLE>

1110000960	NJM4558M	AT-180	CTRL UNIT	5 pieces
8210012880	1732 FRONT PANEL	AT-180	CHASSIS	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure that the problem is internal before disassembling the antenna tuner.
2. **DO NOT** open the antenna tuner until the antenna tuner is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the antenna tuner is defective.
6. **READ** the instructions of the test equipment thoroughly before connecting it to the antenna tuner.

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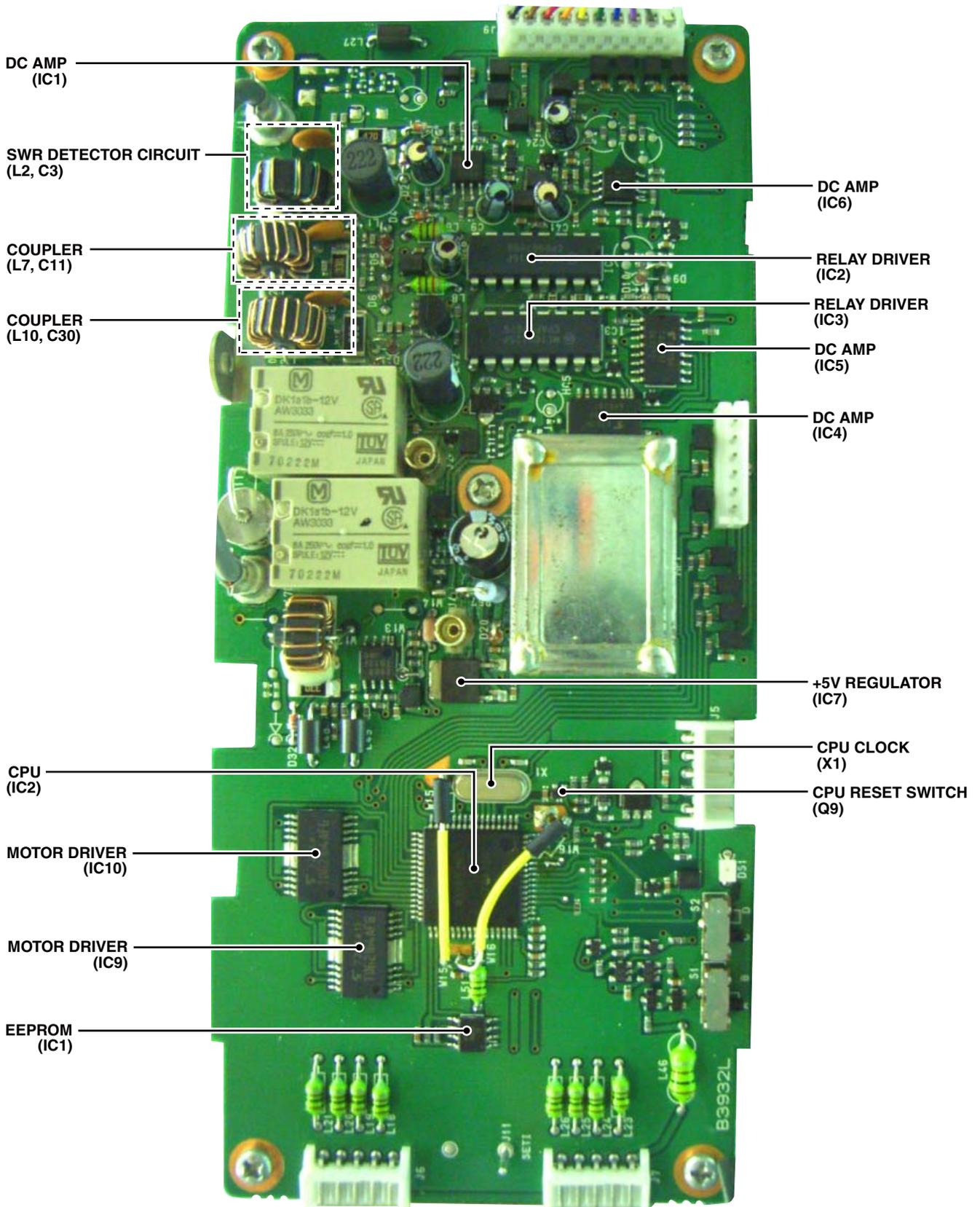
■ GENERAL

- Frequency coverage : 1.8–54 MHz
- Input impedance : 50 Ω
- Maximum input power : 120 W
- Minimum tuning power : 8 W
- Matching impedance range : 16.7–150 Ω (HF band)
20–125 Ω (50 MHz band)
- Tuning accuracy : Less than SWR 1.5:1
- Insertion loss : Less than 1.0 dB (after tuning)
- Power supply : 13.8 V DC/1 A (supplied from requirements the transceiver's ACC socket)
- Dimensions : 167(W) \times 58.6(H) \times 225(D) mm; 6 $\frac{9}{16}$ (W) \times 2 $\frac{5}{17}$ (H) \times 8 $\frac{7}{8}$ (D) in
- Weight (approx.) : 2.4 kg; 5 lb 4 oz
- Supplied accessories : Coaxial cable (1 m), ACC cable (DIN 13 pins)

SECTION 2

INSIDE VIEW

• CTRL UNIT



SECTION 3

PARTS LIST

[CON-A UNIT]

REF NO.	PARTS NO.	DESCRIPTION
J1	6450001671	CON TCS5093-1041577
J2	6510018891	S.CON 52559-1370(1390)

[CON-B UNIT]

REF NO.	PARTS NO.	DESCRIPTION
WS1	8600034850	CBL EX1732 P01*J06CO-B
Q1	1510000510	S.TRA 2SA1576A T106R
Q2	1540000451	S.TRA 2SD1623T-TD-E
Q3	1590000680	S.TRA DTC114EUA T106
D1	1750000271	S.DIO 1SS301(TE85L,F)
L1	2040000490	COI EXC-ELDR25C
L2	6200003331	S.COI NLV32T-1R0J
L3	6200003331	S.COI NLV32T-1R0J
L4	2040000490	COI EXC-ELDR25C
R1	7030007510	S.RES ERJ12YJ270U (27)
R2	7010003440	RES ELR20J 2.2K
R3	7030003410	S.RES ERJ3GEYJ 561 V (560)
R4	7030003440	S.RES ERJ3GEYJ 102 V (1K)
R5	7030003530	S.RES ERJ3GEYJ 562 V (5.6K)
R6	7030003680	S.RES ERJ3GEYJ 104 V (100K)
R7	7030003760	S.RES ERJ3GEYJ 474 V (470K)
C1	4510005120	ELE 16 ME 47 HC
C2	4510003790	ELE 16 ME 10 SWB
C3	4030006880	S.CER C1608 JB 1H 472K-T
C4	4030006880	S.CER C1608 JB 1H 472K-T
C5	4510004990	ELE 16 ME 100 HC
C8	4030006880	S.CER C1608 JB 1H 472K-T
C9	4030006880	S.CER C1608 JB 1H 472K-T
C10	4030006880	S.CER C1608 JB 1H 472K-T
C11	4030006880	S.CER C1608 JB 1H 472K-T
C12	4030006880	S.CER C1608 JB 1H 472K-T
C13	4030006880	S.CER C1608 JB 1H 472K-T
C14	4030006880	S.CER C1608 JB 1H 472K-T
J3	6510018891	S.CON 52559-1370(1390)
J4	6510023661	CON TCS4470-0141577
J5	6450001671	CON TCS5093-1041577
J7	6510018961	S.CON B2B-PH-SM4-TB(LF)(SN)

[CON-C UNIT]

REF NO.	PARTS NO.	DESCRIPTION	
J8	6510007020	CON	TMP-J01X-V6
J9	6510007020	CON	TMP-J01X-V6
J12	6510007020	CON	TMP-J01X-V6
W3	7030012280	JUM	RD25T0R0

[TUNER UNIT]

REF NO.	PARTS NO.	DESCRIPTION	
WS1	8970022230	CBL	EX1732 1.5D (2)/TU
WS2	8600034870	CBL	VEX1732 P01*J01TU
WS3	8600034880	CBL	EX1732 P02*J02TU
IC1	1120000971	IC	M54562P-TB1J
IC2	1120000971	IC	M54562P-TB1J
L1	6110003010	COI	LA-488
L2	6110003840	COI	LA-584
L3	6110003020	COI	LA-489
L4	6110003030	COI	LA-490
L5	6110003020	COI	LA-489
L6	6110003030	COI	LA-490
L7	6140002700	COI	LR-307 (T130-2)
L8	6140002690	COI	LR-306 (T68-6)
L9	6140002690	COI	LR-306 (T68-6)
L10	6140002690	COI	LR-306 (T68-6)
L11	6140002690	COI	LR-306 (T68-6)
L13	2040000490	COI	EXC-ELDR25C
R1	7410001120	ARR	RGLD8X102J
R2	7410001120	ARR	RGLD8X102J
C1	4620000160	VAR	KV-150-05 150P
C2	4010008680	CER	DEA1X3F820JA3B
C3	4010008560	CER	DEA1X3F151JA3B (DE1107SL151J)
C4	4010008690	CER	DEA1X3F101JA3B
C5	4620000160	VAR	KV-150-05 150P
C6	4010008690	CER	DEA1X3F101JA3B
C7	4010008560	CER	DEA1X3F151JA3B (DE1107SL151J)
C8	4010008690	CER	DEA1X3F101JA3B
C9	4020000970	CYL	UP050B 472K Z
C10	4020000970	CYL	UP050B 472K Z
C11	4020000970	CYL	UP050B 472K Z
C12	4020000970	CYL	UP050B 472K Z
C13	4020000970	CYL	UP050B 472K Z
C14	4020000970	CYL	UP050B 472K Z
C15	4020000970	CYL	UP050B 472K Z
C16	4020000970	CYL	UP050B 472K Z
C17	4020000970	CYL	UP050B 472K Z
C18	4020000970	CYL	UP050B 472K Z
C19	4020000970	CYL	UP050B 472K Z
C20	4020000970	CYL	UP050B 472K Z
C21	4020000970	CYL	UP050B 472K Z
C22	4010006900	CER	HE80SJ YB 472K 50V
C23	4020000970	CYL	UP050B 472K Z
C24	4010008690	CER	DEA1X3F101JA3B
C25	4530000250	ARR	B8XC0112-33N
C26	4530000250	ARR	B8XC0112-33N
C27	4010005080	CER	DEA1X3F470JC3B (DE0707SL470J)
C28	4010005080	CER	DEA1X3F470JC3B (DE0707SL470J)
C29	4010008690	CER	DEA1X3F101JA3B
C30	4010006880	CER	HE50SJ YB 102K 50V
C31	4530000050	ARR	B5RC0126-33N
RL1	6330001610	REL	NY-12W-K-IE
RL2	6330001610	REL	NY-12W-K-IE
RL3	6330001610	REL	NY-12W-K-IE
RL4	6330001610	REL	NY-12W-K-IE
RL5	6330001610	REL	NY-12W-K-IE
RL6	6330001610	REL	NY-12W-K-IE
RL7	6330001610	REL	NY-12W-K-IE
RL8	6330001610	REL	NY-12W-K-IE
RL9	6330001610	REL	NY-12W-K-IE
RL10	6330001610	REL	NY-12W-K-IE
RL11	6330001610	REL	NY-12W-K-IE
RL12	6330001610	REL	NY-12W-K-IE
RL13	6330001610	REL	NY-12W-K-IE
RL14	6330001610	REL	NY-12W-K-IE
RL15	6330001610	REL	NY-12W-K-IE
J5	6510003101	CON	RT01T-1.3B(LF)
J6	6510003101	CON	RT01T-1.3B(LF)
EP2	6910000640	BEA	FSRH090160RN000B (FSOH090RN)

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[CTRL UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
WS1	8970022240	CBL EX1732 1.5D (2)/CT		
IC1	1110000960	S.IC NJM4558M-TE1-#FMZB	T	151.6/42.4
IC2	1110006830	IC MC10H116PG		
IC3	1110006820	IC MC10H125PG		
IC4	1120002252	S.IC TC74ACT32F(F)	T	114/22
IC5	1120002242	S.IC TC74AC112F(F)	T	124/13.9
IC6	1110000960	S.IC NJM4558M-TE1-#FMZB	T	149/20
IC7	1180001072	S.IC TA7805F(TE16L1,NQ)	T	76/41.6
IC8	1180001140	S.IC S-8437AF-ZA-T1	T	97.8/26.3
IC9	1160000111	S.IC TD62164AFG(5,EL)	T	37.1/55.4
IC10	1160000111	S.IC TD62164AFG(5,EL)	T	50.7/61.8
IC11	1130011081	S.IC R1EX24016ASA00A	T	25.4/40
IC12	1140004120	S.IC M38022M2-138FP	T	48/40
IC13	1110005711	S.IC S-80842CLUA-B63-T2G	T	59/17
IC14	1130003921	S.IC TCA569F(TE85R,F)	T	34.4/19
IC16	1130003921	S.IC TCA569F(TE85R,F)	T	34.4/15
IC17	1180000251	IC TA78L010AP(F)		
IC18	1110002690	S.IC NJM2903M-TE1-#FMZB	T	78.4/53.8
Q1	1560000041	FET 2SK30ATM-Y(F)		
Q2	1520000531	S.TRA 2SB1119S-TD-E	T	115.8/39
Q3	1590001221	S.TRA RN1302(TE85L,F)	T	118.6/33.4
Q8	1530002691	S.TRA 2SC4116-GR(TE85R,F)	T	46.6/14.6
Q9	1530002691	S.TRA 2SC4116-GR(TE85R,F)	T	60/28
Q10	1510000781	S.TRA 2SA1586-Y(TE85R,F)	T	38/14.4
Q11	1590001221	S.TRA RN1302(TE85L,F)	T	38/22.6
Q12	1510000781	S.TRA 2SA1586-Y(TE85R,F)	T	53.2/13.8
Q15	1530002691	S.TRA 2SC4116-GR(TE85R,F)	T	53.4/22.1
D1	1790001780	DIO MA700		
D2	1790001780	DIO MA700		
D3	1710000580	DIO 1SS265		
D4	1710000580	DIO 1SS265		
D5	1710000580	DIO 1SS265		
D6	1710000580	DIO 1SS265		
D7	1750000220	S.DIO DA113 T107	T	121.4/20.7
D8	1750000220	S.DIO DA113 T107	T	117.1/15.2
D9	1790001780	DIO MA700		
D10	1790001780	DIO MA700		
D11	1790001780	DIO MA700		
D12	1790001780	DIO MA700		
D13	1750000220	S.DIO DA113 T107	T	110.8/44.1
D14	1750000220	S.DIO DA113 T107	T	97/45.6
D20	1710000551	DIO 1S954-AZ		
D21	1790001131	S.DIO D2FS4-5063	T	102.8/31
D24	1750000220	S.DIO DA113 T107	T	64/21.8
D25	1730000411	S.ZEN RD5.1M-T2B-A B2	T	30.4/11
D26	1730000411	S.ZEN RD5.1M-T2B-A B2	T	30.4/14.6
D29	1750000121	S.DIO DWA010-TE-E	T	142.4/11.9
D30	1750000121	S.DIO DWA010-TE-E	T	153/30.4
D31	1750000201	S.DIO 1SS319(TE85R,F)	T	152.7/36
D32	1790001780	DIO MA700		
X1	6050009080	XTA AT-49 6.144 MHz<KDS>		
L1	6180003300	COI T6-222J (2.2M)		
L2	6140000100	COI LR-22A		
L3	6200003261	S.COI NLV32T-101J	T	163/38.1
L4	6200003261	S.COI NLV32T-101J	T	146.3/34
L5	6200001831	S.COI NLV32T-100J	T	136.4/50
L6	6180000960	COI LAL 03NA 102K		
L7	6140002660	COI LR-299		
L8	6180000960	COI LAL 03NA 102K		
L9	6200003261	S.COI NLV32T-101J	T	159/35
L10	6140002650	COI LR-298		
L11	6200003261	S.COI NLV32T-101J	T	149.4/32.1
L12	6200003261	S.COI NLV32T-101J	T	110/41.3
L13	6200003261	S.COI NLV32T-101J	T	100.8/45.2
L16	6180000990	COI LAL 04NA 101K		
L18	6180000900	COI LAL 03NA 101K		
L19	6180000900	COI LAL 03NA 101K		
L20	6180000900	COI LAL 03NA 101K		
L21	6180000900	COI LAL 03NA 101K		
L23	6180000900	COI LAL 03NA 101K		
L24	6180000900	COI LAL 03NA 101K		
L25	6180000900	COI LAL 03NA 101K		
L26	6180000900	COI LAL 03NA 101K		
L27	6910000670	COI BL01RN1A1D2B (BL01RN1-A62)		
L28	6200003261	S.COI NLV32T-101J	T	86/4
L29	6200003261	S.COI NLV32T-101J	T	90/4.4
L30	6200003261	S.COI NLV32T-101J	T	94/5.2
L31	6200003261	S.COI NLV32T-101J	T	82/4
L32	6200003261	S.COI NLV32T-101J	T	102/8
L33	6200003261	S.COI NLV32T-101J	T	111/8
L34	6200003261	S.COI NLV32T-101J	T	167.5/15.1
L35	6200003261	S.COI NLV32T-101J	T	167.5/11.1
L36	6200003261	S.COI NLV32T-101J	T	161/29.7
L37	6200003261	S.COI NLV32T-101J	T	164.8/28.5
L38	6200003261	S.COI NLV32T-101J	T	167.5/23.1
L39	6200003261	S.COI NLV32T-101J	T	167.5/19.1
L40	6200003261	S.COI NLV32T-101J	T	167/37.8
L41	6200003261	S.COI NLV32T-101J	T	48/9.6
L42	6180003300	COI T6-222J (2.2M)		
L43	6200003261	S.COI NLV32T-101J	T	167.1/45.1
L44	6190000221	COI S0971136-101K-LF		
L45	6180002340	COI LAL 04NA 221K		
L46	6180000990	COI LAL 04NA 101K		
L47	6140002660	COI LR-299		
L48	6910000670	COI BL01RN1A1D2B (BL01RN1-A62)		

[CTRL UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
L49	6910000670	COI BL01RN1A1D2B (BL01RN1-A62)		
L50	6200003261	S.COI NLV32T-101J	T	73.6/48.9
L51	6180000900	COI LAL 03NA 101K		
R2	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	156/46.7
R3	7030003640	S.RES ERJ3GEYJ 473 V (47K)	T	158.2/44.8
R4	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	156.3/44
R5	7030003670	S.RES ERJ3GEYJ 823 V (82K)	T	158.2/43.2
R7	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	158.3/41.4
R8	7030003670	S.RES ERJ3GEYJ 823 V (82K)	T	147.9/46.8
R9	7030003730	S.RES ERJ3GEYJ 274 V (270K)	T	156.2/47.0
R10	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	145.8/47.7
R11	7030003640	S.RES ERJ3GEYJ 473 V (47K)	T	147.7/48.2
R12	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	146.6/45.4
R13	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	144.7/43.2
R14	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	147/42.3
R16	7030003430	S.RES ERJ3GEYJ 821 V (820)	T	140.6/47.7
R17	7030000080	S.RES MCR10EZJHJ 3.3 (3R3)	T	131.7/25.5
R19	7030003370	S.RES ERJ3GEYJ 271 V (270)	T	131.2/28
R20	7030003280	S.RES ERJ3GEYJ 470 V (47)	T	130.6/18.5
R22	7030003410	S.RES ERJ3GEYJ 561 V (560)	T	137.5/57.4
R23	7030001070	S.RES MCR50JZHJ 33 (330)	T	136.4/60.9
R24	7030000080	S.RES MCR10EZJHJ 3.3 (3R3)	T	131.2/29.6
R25	7030003370	S.RES ERJ3GEYJ 271 V (270)	T	130.4/33.3
R26	7030003280	S.RES ERJ3GEYJ 470 V (47)	T	130.6/13.7
R27	7030003480	S.RES ERJ3GEYJ 222 V (2.2K)	T	133.4/13.7
R28	7030003360	S.RES ERJ3GEYJ 221 V (220)	T	143.6/19.3
R30	7030006170	S.RES ERJ1WVJ680U (68)	T	125.9/58.4
R31	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	123.6/49.3
R32	7030003800	S.RES ERJ3GEYJ 105 V (1M)	T	126.4/49.3
R33	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	125/49.3
R34	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	125.9/43.4
R35	7030003520	S.RES ERJ3GEYJ 472 V (4.7K)	T	130.6/49.3
R36	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	129.5/43.4
R37	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	151.6/14.5
R38	7030003670	S.RES ERJ3GEYJ 823 V (82K)	T	157.7/16.6
R39	7030003480	S.RES ERJ3GEYJ 222 V (2.2K)	T	145/22.7
R40	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	145/19.3
R41	7030003790	S.RES ERJ3GEYJ 824 V (820K)	T	147.7/15
R42	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	144/17
R43	7030003570	S.RES ERJ3GEYJ 123 V (12K)	T	157.7/22.4
R44	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	157.7/19.4
R45	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	154.1/27.1
R46	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	152.5/24.8
R47	7030003790	S.RES ERJ3GEYJ 824 V (820K)	T	149.1/24.8
R48	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	148.7/27.2
R50	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	119.4/38.9
R51	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	118.1/35.8
R57	7070000511	RES ERG1SJ 180 (18)		
R62	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	24.8/45
R63	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	24.8/46.4
R64	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	50.4/22.4
R65	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	49/22.4
R66	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	47.6/22.4
R67	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	46.2/22.4
R68	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	85.1/8.4
R69	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	89.1/8.8
R70	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	93.1/9.6
R71	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	81.1/7
R72	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	97.9/9
R73	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	106.9/9
R74	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	160.4/10
R75	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	163.4/10.1
R76	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	160/26.1
R77	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	156.2/10
R78	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	157.6/10
R79	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	159/10
R80	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	164.3/34.2
R81	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	57.7/24.9
R82	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	61.3/26
R83	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	59/24.9
R84	7030003760	S.RES ERJ3GEYJ 474 V (470K)	T	61.3/24.4
R85	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	56.6/21.5
R86	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	46.7/16.6
R87	7030003410	S.RES ERJ3GEYJ 561 V (560)	T	39/11.1
R88	7030003640	S.RES ERJ3GEYJ 473 V (47K)	T	38.3/16.8
R89	7030003410	S.RES ERJ3GEYJ 561 V (560)	T	39/19.1
R90	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	37.2/19.1
R92	7030003640	S.RES ERJ3GEYJ 473 V (47K)	T	53.3/11.4
R93	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	51/10.4
R94	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	53.3/10
R95	7030003650	S.RES ERJ3GEYJ 563 V (56K)	T	35.3/12
R96	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	26.7/15

[CTRL UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R122	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	132/32
R123	7030001070	S.RES MCR50JZHJ 33 (330)	T	74.6/63
R124	7030003690	S.RES ERJ3GEYJ 124 V (120K)	T	71.4/58.6
R125	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	71.4/55.4
R126	7030003840	S.RES ERJ3GEYJ 225 V (2.2M)	T	73.5/54.6
R127	7030003720	S.RES ERJ3GEYJ 224 V (220K)	T	82.6/48.6
R129	7030003760	S.RES ERJ3GEYJ 474 V (470K)	T	78.4/48.6
R130	7030003690	S.RES ERJ3GEYJ 124 V (120K)	T	79.8/48.6
R131	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	72.2/53.5
R132	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	73.5/51.9
R133	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	71.4/60
R134	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	143.2/15
R135	7030003560	S.RES ERJ3GEYJ 103 V (10K)	T	150/29.4
R136	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	34.1/31
R137	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	38/31
R138	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	35.4/31
R139	7030003680	S.RES ERJ3GEYJ 104 V (100K)	T	39.3/31
R140	7030003640	S.RES ERJ3GEYJ 473 V (47K)	T	68.4/60
W8	7030003860	S.RES ERJ3GE JPW V	T	43.7/25.3
C1	4030008560	S.CER C1608 CH 1H 300J-T	T	159.6/61.1
C2	4030006860	S.CER C1608 JB 1H 102K-T	T	155.7/49.4
C3	4010005540	CER HM60SJ SL 030C 500V		
C4	4030006860	S.CER C1608 JB 1H 102K-T	T	147.1/49.9
C5	4030008920	S.CER C1608 JB 1H 473K-T	T	154.7/46.9
C6	4510003790	ELE 16 ME 10 SWB		
C8	4030008920	S.CER C1608 JB 1H 473K-T	T	144.7/41.8
C9	4510003790	ELE 16 ME 10 SWB		
C11	4010005530	CER HM60SJ SL 020C 500V		
C12	4030007040	S.CER C1608 CH 1H 180J-T	T	142.9/59
C13	4030007040	S.CER C1608 CH 1H 180J-T	T	144.2/59.7
C14	4030007080	S.CER C1608 CH 1H 390J-T	T	140.6/56.1
C15	4030008920	S.CER C1608 JB 1H 473K-T	T	138.8/49.2
C16	4510003790	ELE 16 ME 10 SWB		
C18	4030007170	S.CER C1608 CH 1H 221J-T	T	132/18.5
C19	4030007080	S.CER C1608 CH 1H 390J-T	T	133.9/57.4
C20	4030006880	S.CER C1608 JB 1H 472K-T	T	130.5/21.7
C21	4030007170	S.CER C1608 CH 1H 221J-T	T	132/13.7
C22	4030006880	S.CER C1608 JB 1H 472K-T	T	137/13.4
C24	4510003790	ELE 16 ME 10 SWB		
C25	4030008920	S.CER C1608 JB 1H 473K-T	T	158.1/32
C26	4030008920	S.CER C1608 JB 1H 473K-T	T	143.6/22.7
C27	4030007170	S.CER C1608 CH 1H 221J-T	T	144.8/14.5
C28	4030006850	S.CER C1608 JB 1H 471K-T	T	140/13.1
C29	4030008920	S.CER C1608 JB 1H 473K-T	T	159.5/18.1
C30	4010005540	CER HM60SJ SL 030C 500V		
C31	4030011540	S.CER C1608 CH 1H 750J-T	T	127.1/54.6
C32	4030007130	S.CER C1608 CH 1H 101J-T	T	127.1/53.2
C33	4030006880	S.CER C1608 JB 1H 472K-T	T	127.1/51.8
C34	4030006880	S.CER C1608 JB 1H 472K-T	T	122.2/49.3
C35	4030006860	S.CER C1608 JB 1H 102K-T	T	127.8/49.3
C36	4030006880	S.CER C1608 JB 1H 472K-T	T	129.2/49.3
C37	4030008920	S.CER C1608 JB 1H 473K-T	T	152.8/27.1
C38	4030007170	S.CER C1608 CH 1H 221J-T	T	150.7/26.4
C39	4030006850	S.CER C1608 JB 1H 471K-T	T	150.7/28
C40	4030008920	S.CER C1608 JB 1H 473K-T	T	143.9/26.4
C41	4510003790	ELE 16 ME 10 SWB		
C43	4030008920	S.CER C1608 JB 1H 473K-T	T	112/49.1
C44	4030008920	S.CER C1608 JB 1H 473K-T	T	97/43.6
C45	4030008920	S.CER C1608 JB 1H 473K-T	T	113.6/33.2
C51	4510004591	ELE 16 ME 470 HC		
C52	4030010070	S.CER C1608 X7S 1C 104K-T	T	74.4/34.6
C53	4030010070	S.CER C1608 X7S 1C 104K-T	T	80.4/37.2
C54	4510003790	ELE 16 ME 10 SWB		
C55	4510004591	ELE 16 ME 470 HC		
C56	4510005000	ELE 16 ME 220 HC		
C57	4510005120	ELE 16 ME 47 HC		
C73	4030010070	S.CER C1608 X7S 1C 104K-T	T	24.8/47.8
C74	4030010070	S.CER C1608 X7S 1C 104K-T	T	33.8/42
C75	4030009990	S.CER C1608 CH 1H 200J-T	T	64.4/41.1
C76	4030009990	S.CER C1608 CH 1H 200J-T	T	64.4/33.7
C77	4030008920	S.CER C1608 JB 1H 473K-T	T	85.1/7
C78	4030008920	S.CER C1608 JB 1H 473K-T	T	89.1/7.4
C79	4030008920	S.CER C1608 JB 1H 473K-T	T	93.1/8.1
C80	4030008920	S.CER C1608 JB 1H 473K-T	T	79.6/4.5
C81	4030008920	S.CER C1608 JB 1H 473K-T	T	97.9/7.6
C82	4030008920	S.CER C1608 JB 1H 473K-T	T	106.9/7.6
C83	4030008920	S.CER C1608 JB 1H 473K-T	T	164.8/14.1
C84	4030008920	S.CER C1608 JB 1H 473K-T	T	164.8/10.1
C85	4030008920	S.CER C1608 JB 1H 473K-T	T	162/26.9
C86	4030008920	S.CER C1608 JB 1H 473K-T	T	165/25.7
C87	4030008920	S.CER C1608 JB 1H 473K-T	T	164.8/22.1
C88	4030008920	S.CER C1608 JB 1H 473K-T	T	164.8/18.1
C89	4030008920	S.CER C1608 JB 1H 473K-T	T	167.7/34.2
C90	4030006880	S.CER C1608 JB 1H 472K-T	T	62.3/13
C91	4030006880	S.CER C1608 JB 1H 472K-T	T	46.9/12.6
C92	4030006860	S.CER C1608 JB 1H 102K-T	T	59.9/30
C93	4550002860	S.TAN TEESVA 1V 224K8R	T	60/21.8
C94	4030006880	S.CER C1608 JB 1H 472K-T	T	33/11.1
C95	4030008920	S.CER C1608 JB 1H 473K-T	T	155.6/36.1
C96	4030008920	S.CER C1608 JB 1H 473K-T	T	150/36.1
C97	4030008920	S.CER C1608 JB 1H 473K-T	T	143.4/34.3
C98	4030006880	S.CER C1608 JB 1H 472K-T	T	122.2/46.1
C101	4030008920	S.CER C1608 JB 1H 473K-T	T	111/15.8
C102	4030008920	S.CER C1608 JB 1H 473K-T	T	129.7/8.1
C103	4030008920	S.CER C1608 JB 1H 473K-T	T	31.3/18
C106	4030008920	S.CER C1608 JB 1H 473K-T	T	166.9/42
C108	4030006900	S.CER C1608 JB 1H 103K-T	T	36.7/31
C109	4030006900	S.CER C1608 JB 1H 103K-T	T	40.6/31
C110	4030007070	S.CER C1608 CH 1H 330J-T	T	159.6/62.5
C111	4030007100	S.CER C1608 CH 1H 560J-T	T	136.4/63.1
C112	4030007090	S.CER C1608 CH 1H 470J-T	T	120.8/58.8

[CTRL UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C113	4030008920	S.CER C1608 JB 1H 473K-T	T	79.5/24.8
C114	4030008920	S.CER C1608 JB 1H 473K-T	T	79.5/28
C115	4510003790	ELE 16 ME 10 SWB		
C120	4030006860	S.CER C1608 JB 1H 102K-T	T	71.4/61.4
C122	4030006880	S.CER C1608 JB 1H 472K-T	T	71.4/51.1
C123	4030006880	S.CER C1608 JB 1H 472K-T	T	81.2/48.6
RL1	6330001500	REL AW3033		
RL2	6330001500	REL AW3033		
J2	6510007020	CON TMP-J01X-V6		
J4	6510007020	CON TMP-J01X-V6		
J5	6510003531	CON S05B-EH-S(LF)(SN)		
J6	6510003531	CON S05B-EH-S(LF)(SN)		
J7	6510003531	CON S05B-EH-S(LF)(SN)		
J8	6510003421	CON B06B-EH-S(LF)(SN)		
J9	6510003461	CON B10B-EH-S(LF)(SN)		
J11	6510003081	CON RT01T-1.0B(LF)		
DS1	5040001260	LED LN01301C(Q)		
S1	2220000750	SWI MHS122		
S2	2220000750	SWI MHS122		
EP2	9036505001	TUB 0.7 L=15MM		
EP3	9036505001	TUB 0.7 L=15MM		
MP4	8930014140	SPR SPRING (D)	B	96/63.4

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

SECTION 4

MECHANICAL PARTS

[CHASSIS PARTS]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J10	6510000370	MR-DS	1
J11	6510000370	MR-DS	1
MF1	2710000580	FBA06T12HF	1
MF2	2710000800	MP24ZA	1
MF3	2710000800	MP24ZA	1
W1	8900015420	OPC-1630	1
W2	8900015420	OPC-1630	1
W9	8900017620	OPC-593A	1
MP1	8210012880	1732 FRONT PANEL	1
MP2	8010016391	1732 CHASSIS-1	1
MP3	8110005661	1732 COVER-1	1
MP4	8930038261	1732 ANGLE-1	1
MP5	8930037010	1691 FAN RUBBER	1
MP7	8930002820	RUBBER REG (D) SK136A	2
MP8	8930005790	COLOR REG (A)	1
MP9	8930005800	COLOR REG (B)	1
MP10	8010001490	STAND (D)	1
MP11	8930037000	1691 EARTH PLATE	2
MP12	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP13	8810009031	SCREW FLAT M3X8 ZK3	2
MP14	8810009031	SCREW FLAT M3X8 ZK3	2
MP15	8810009031	SCREW FLAT M3X8 ZK3	1
MP16	8810009031	SCREW FLAT M3X8 ZK3	4
MP17	8810008451	SCREW BIH M4X8 ZK3	4
MP18	8820000530	FLANGE BOLT M4X8 NI	1
MP19	8850000140	FLAT WASHER M4 BS NI	1
MP20	8850001561	TOOTHED WASHER (A) M4 ZC3	1
MP21	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP22	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP23	8810008631	SCREW BT B0 3X6 NI-ZC3 (BT)	1
MP24	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP25	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP26	8930038280	1732 SHEET	1
MP27	8930038290	INSULATION SHEET (EA)	1
MP29	8010015142	1414 U-CHASSIS-2	1
MP30	8010015152	1414 L-CHASSIS-2	1
MP31	8510008592	1414 SHIELD PLATE-2	1
MP32	8930030112	1414 PLATE-2	2
MP33	8820000811	1414 SCREW-1	4
MP34	8810008631	SCREW BT B0 3X6 NI-ZC3 (BT)	2
MP35	8810008631	SCREW BT B0 3X6 NI-ZC3 (BT)	2
MP36	8810008631	SCREW BT B0 3X6 NI-ZC3 (BT)	3
MP37	8810008631	SCREW BT B0 3X6 NI-ZC3 (BT)	5
MP38	8810009651	SCREW FLAT B0 3X8 NI-ZC3 (BT)	4
MP39	8810009651	SCREW FLAT B0 3X8 NI-ZC3 (BT)	3
MP40	8810009651	SCREW FLAT B0 3X8 NI-ZC3 (BT)	1
MP41	8810009651	SCREW FLAT B0 3X8 NI-ZC3 (BT)	2
MP42	8950003200	UJ6-5 (UNIVERSAL COUPLINGS)	2
MP43	8510008750	1414 A-SHIELD PLATE	1
MP44	8930038760	INSULATION SHEET (H)	1
MP45	8310037080	1732 NAME PLATE	1
MP46	8930058610	INSULATION SHEET (HD)	1

[CON-A UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6450001671	TCS5093-1041577	1
J2	6510018891	52559-1370	1
J3	6510018891	52559-1370	1

[CON-B UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J4	6510023661	TCS4470-0141577	1
J5	6450001671	TCS5093-1041577	1
J7	6510018961	B2B-PH-SM4-TB (LF) (SN)	1
WS1	8600034850	EX1732 P01*J06CO-B	1

[CON-C UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
W3	7030012280	RD25TOR0	1

[CTRL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J5*	6510003531	S05B-EH-S (LF) (SN)	1
J6*	6510003531	S05B-EH-S (LF) (SN)	1
J7*	6510003531	S05B-EH-S (LF) (SN)	1
J8*	6510003421	B06B-EH-S (LF) (SN)	1
J9*	6510003461	B10B-EH-S (LF) (SN)	1
J11*	6510003081	RT01T-1.0B (LF)	1
DS1	5040001260	LN01301CQ	1
S1	2220000750	MHS122	1
S2	2220000750	MHS122	1
WS1	8970022240	EX1732 1.5D (2)/CT	1
W1	7030011280	J1/4Z	1
W2	7030011280	J1/4Z	1
W3	7030011280	J1/4Z	1
W8	7030003860	ERJ3GE-JPW	1
W12	7030011280	J1/4Z	1
W13	9029406002	72/98/025/X98/X98	1
W14	7030012290	RDS2TOR0	1
W15	7030011280	J1/4Z	1
W16	7030011280	J1/4Z	1
EP2*	9036505001	IRRAX D=0.7 L=15MM	1
EP3*	9036505001	IRRAX D=0.7 L=15MM	1
MP1	8510004470	331 VCO CASE	1
MP2	8510008790	VCO CASE COVER (B)(EX-1414)	1
MP3	8930005410	INSULATION SHEET (A)	1
MP4*	8930014140	EARTH SPRING (D)	1

[TUNER UNIT]

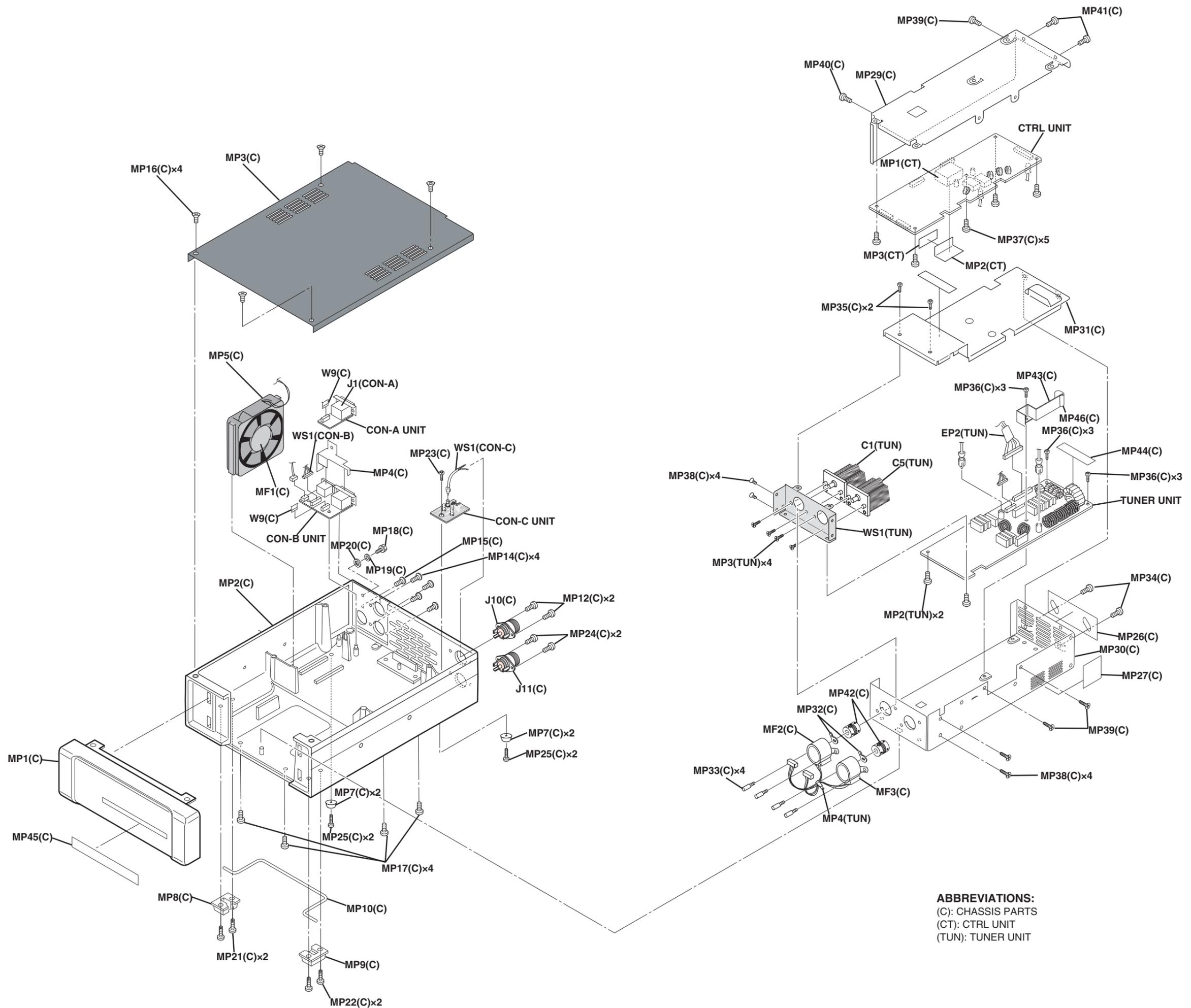
REF NO.	ORDER NO.	DESCRIPTION	QTY.
J5	6510003101	RT01T-1.3B (LF)	1
J6	6510003101	RT01T-1.3B (LF)	1
WS1	8970022230	EX1732 1.5D (2)/TU	1
WS2	8600034870	EX1732 P01*J01TU	1
WS3	8600034880	EX1732 P02*J02TU	1
EP2	6910000640	FSOH090RN	1
MP1	8930030101	1414 ANGLE-1	1
MP2	8810003161	SETSCREW (A) 3X6 ZC3	2
MP3	8810002171	SCREW M3X6 ZC3	4
MP4	8950000180	CABLE TIE-80	1

[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
W1	8900001160	OPC-125	1
W2	8900006120	OPC-597	1

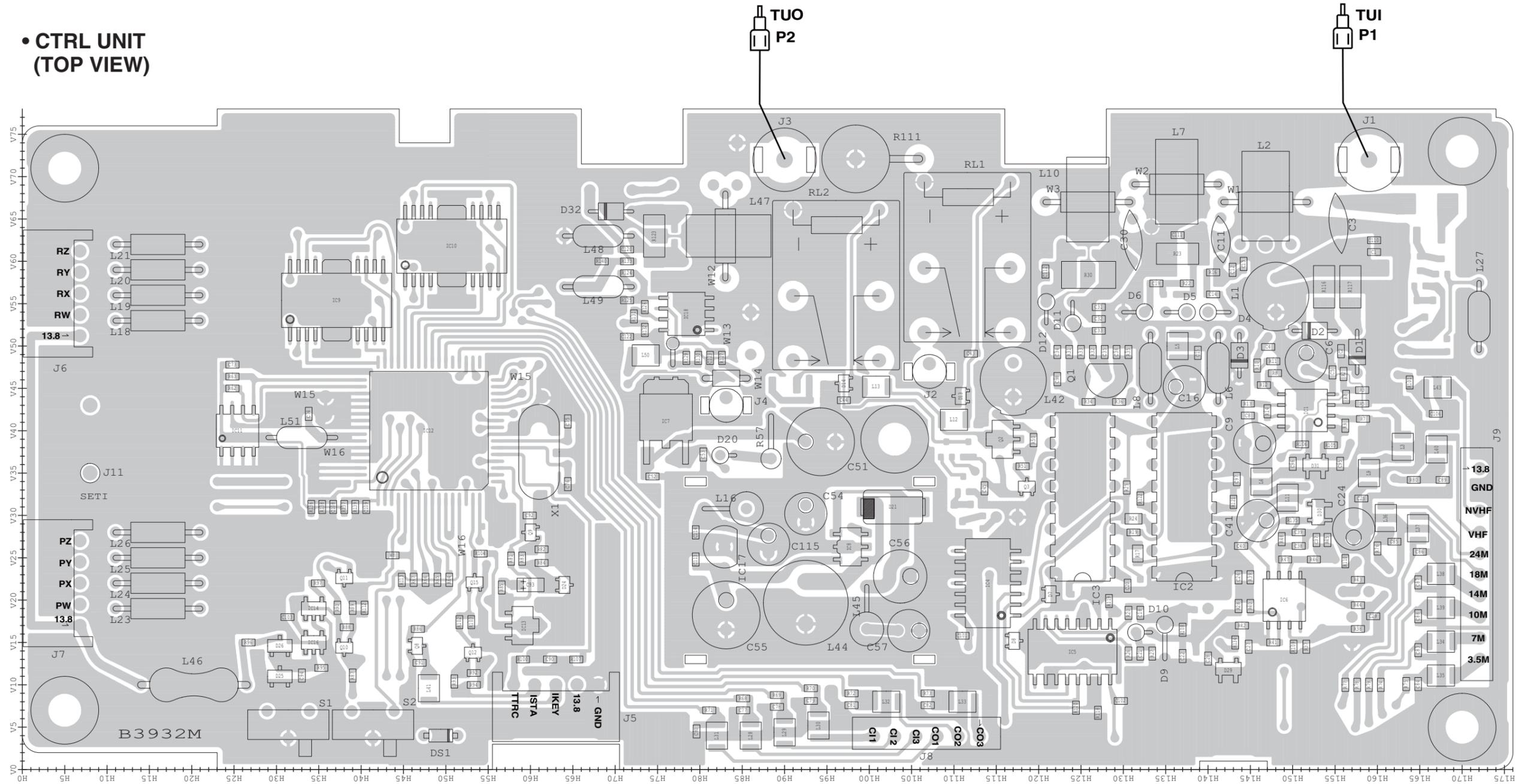
*: Refer to "BOARD LAYOUTS" for the location.

Screw abbreviations A, B0, BT: Self-tapping PH: Pan head ZK: Black NI-ZU: Nickel-Zinc SUS: Stainless

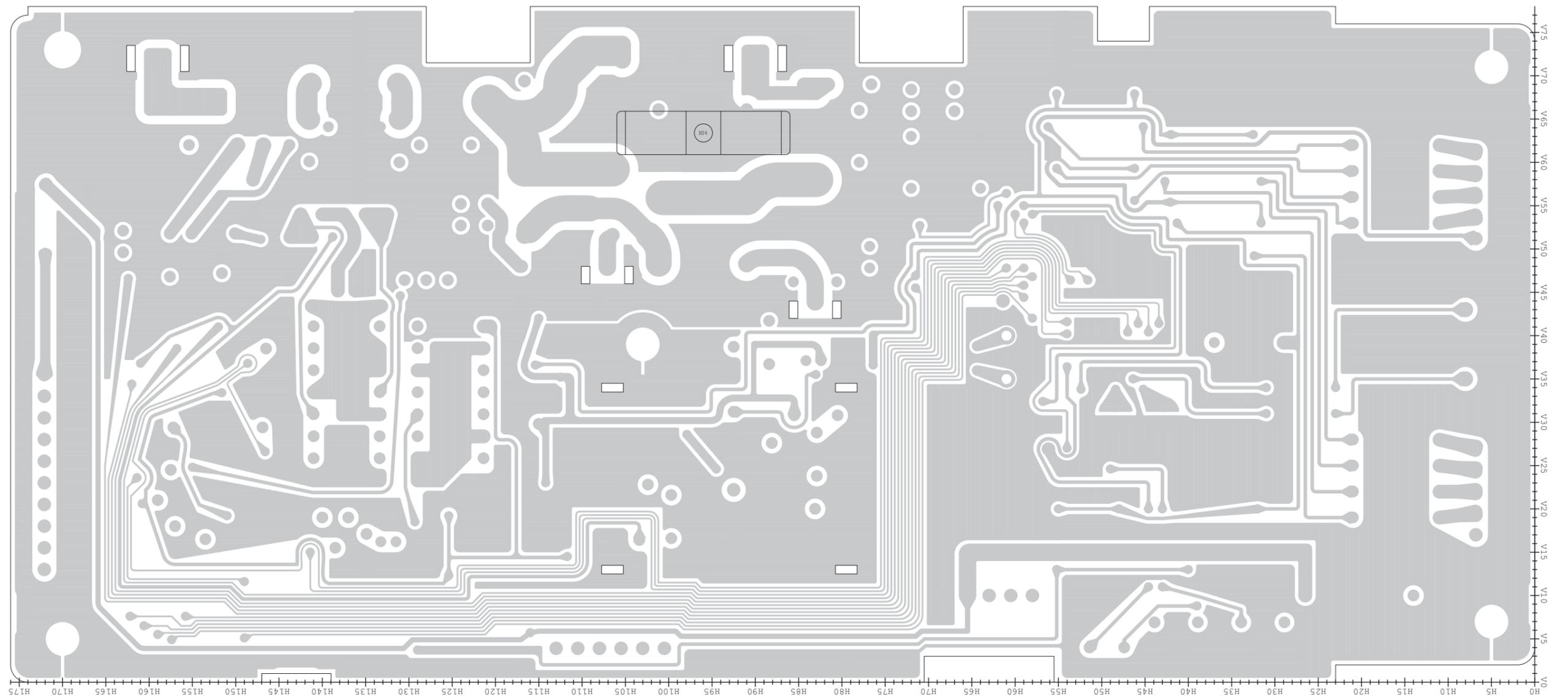


ABBREVIATIONS:
(C): CHASSIS PARTS
(CT): CTRL UNIT
(TUN): TUNER UNIT

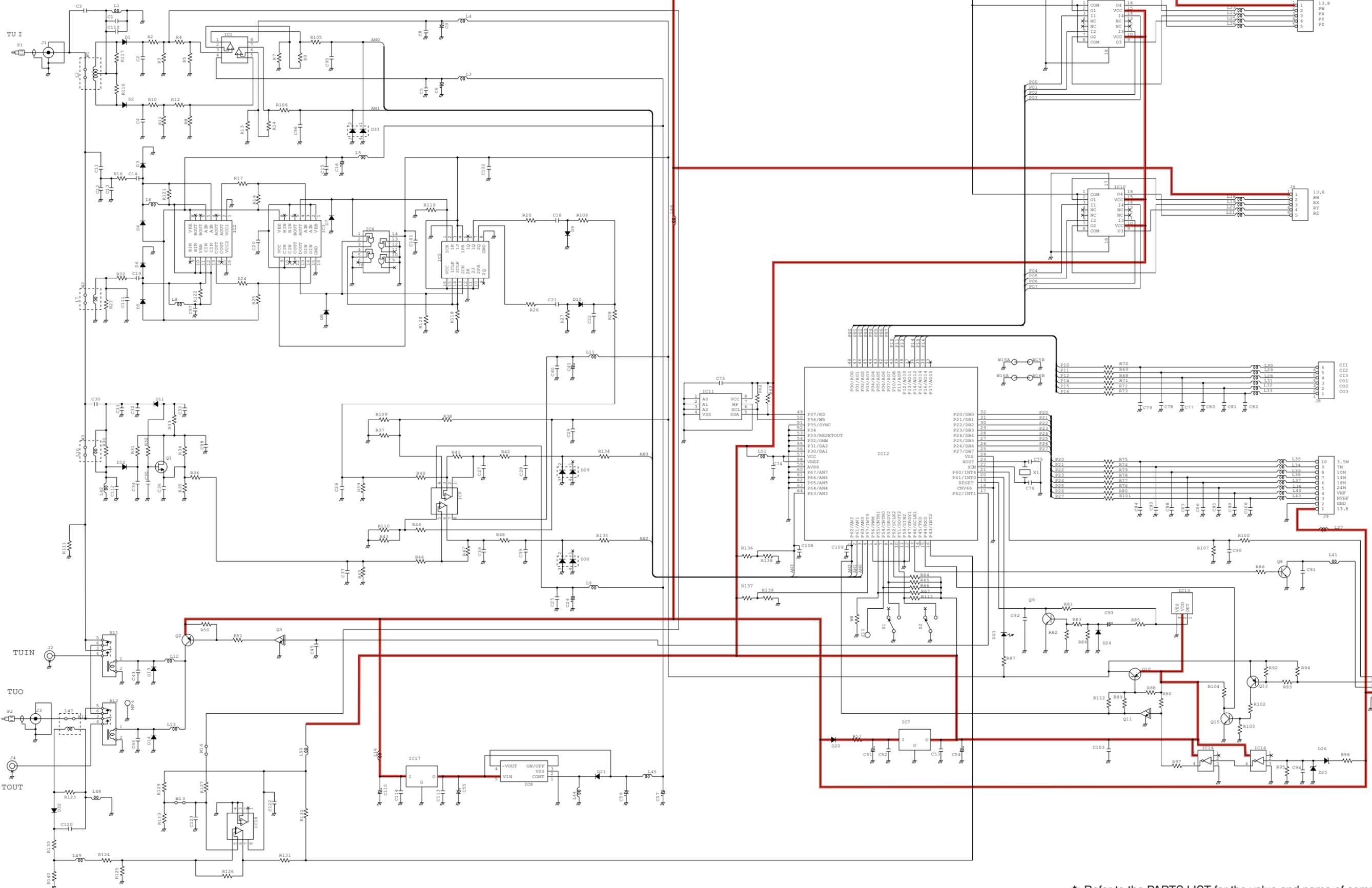
• CTRL UNIT
(TOP VIEW)



• CTRL UNIT
(BOTTOM VIEW)



CTRL UNIT



*: Refer to the PARTS LIST for the value and name of component.

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