

Jun. 2009



# SERVICE MANUAL ADDENDUM

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## IC-F61M

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[FRONT UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C465	4030017420	S.CER ECJ0EC1H470J	T	26.4/13.7
C466	4030017420	S.CER ECJ0EC1H470J	T	36.9/14.5
C467	4030017420	S.CER ECJ0EC1H470J	T	30.5/13.1
C468	4030017420	S.CER ECJ0EC1H470J	T	40.4/11.5
C473	4030016790	S.CER ECJ0EB1C103K	T	38.1/15.9
C474	4030018860	S.CER ECJ0EB0J105K	T	5/26.6
C475	4030017460	S.CER ECJ0EB1E102K	T	33/45.4
C476	4030017460	S.CER ECJ0EB1E102K	T	29.9/21.9
C477	4030017420	S.CER ECJ0EC1H470J	T	33.3/44.1
C478	4030017420	S.CER ECJ0EC1H470J	T	33.5/41.9
C479	4030017460	S.CER ECJ0EB1E102K	T	27.8/17.7
C481	4030017460	S.CER ECJ0EB1E102K	T	6.4/38.1
C482	4030017460	S.CER ECJ0EB1E102K	T	11.8/41.2
C483	4030017460	S.CER ECJ0EB1E102K	T	38.8/41.8
C485	4030017460	S.CER ECJ0EB1E102K	T	33.7/48
C486	4030017460	S.CER ECJ0EB1E102K	T	32.1/47.5
C487	4030017460	S.CER ECJ0EB1E102K	T	34.4/35.9
C488	4030017460	S.CER ECJ0EB1E102K	T	22.1/43.4
C489	4030017460	S.CER ECJ0EB1E102K	T	9.9/30.9
C490	4030017460	S.CER ECJ0EB1E102K	T	40.3/26.7
C491	4030017460	S.CER ECJ0EB1E102K	T	37.3/37.3
C492	4030017460	S.CER ECJ0EB1E102K	T	6.8/18.2
C493	4030016930	S.CER ECJ0EB1A104K	T	17.4/34.7
C494	4030017460	S.CER ECJ0EB1E102K	T	39.6/67.3
C495	4030017460	S.CER ECJ0EB1E102K	T	10/40.5
C496	4550007880	S.TAN TEESVB2 1A 686M8R	T	12/54.7
C497	4030018390	S.CER ECJ0EB1A563K	T	8.1/37.9
C498	4030017430	S.CER ECJ0EC1H101J	T	10.5/33.2
C499	4030017420	S.CER ECJ0EC1H470J	T	15.4/36.9
C500	4030016930	S.CER ECJ0EB1A104K	T	9.3/37.9
C501	4030017730	S.CER ECJ0EB1E471K	T	35.1/13.2
C502	4030016930	S.CER ECJ0EB1A104K	T	31.9/49.6
C503	4030018860	S.CER ECJ0EB0J105K	T	32.3/48.7
C504	4550007080	S.TAN TEESVA 1C 106M8R	T	40.6/46.4
C505	4030016960	S.CER ECJ0EB1C183K	T	6.3/25.3
C506	4030016960	S.CER ECJ0EB1C183K	T	6.3/23.4
C507	4030017730	S.CER ECJ0EB1E471K	T	5/23
C508	4030017730	S.CER ECJ0EB1E471K	T	11.3/24.2
C510	4550000460	S.TAN TEESVA 1C 105M8R	T	23.5/48.5
C512	4030018860	S.CER ECJ0EB0J105K	B	22.3/49.4
C513	4030018860	S.CER ECJ0EB0J105K	B	25.9/51.5
C514	4030017420	S.CER ECJ0EC1H470J	B	28.3/52.9
J401	6510026130	S.CON IMSA-9681S-36Y900	T	30.9/6.2
J402	6510023831	S.CON (G)SM04B-SRSS-TB(LF)(SN)	T	34.9/52.5
J403	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	29/43.5
DS401	5030002730	LCD L3-0048TAY-5	B	13.5/16.1
DS402	5040002420	S.LED SML-310MT T86	B	32.7/15.3
DS403	5040002420	S.LED SML-310MT T86	B	6.2/38
DS404	5040002961	S.LED SML-A12MT T86J	B	42.8/38
DS405	5040002961	S.LED SML-A12MT T86J	B	45.3/50.2
DS406	5040002670	S.LED CL-165HR/YG	B	
MC401	7700002760	MIC EM6027P-46C33-G-01 <HOR>		
S401	2260002840	SWI SKHLLFA010		
W401	8900016840	CAB OPC-1753 (P0.5,N36,L70) <TJM>		
W402	7030012290	JUM RDS2T0R0		
W403	7030012290	JUM RDS2T0R0		
W404	8900017120	CAB OPC-1754 (P0.5,N11,L35) <TJM>		
EP402	8930061530	LCD SRCN-2681-SP-N-W (SHJ)		
MP430	6910014760	S.PLA OG-503040	T	18.7/54.7

[VR UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R601	7210003130	VAR TP76N97N-13F-10KA-2497		
W601	8900012340	CAB OPC-1260		

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

[CONNECTOR UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
D701	1790001810	S.VAR AVR-M1005C080MTABB	T	9.8/32.2
D702	1790001810	S.VAR AVR-M1005C080MTABB	T	8.9/32
D703	1790001810	S.VAR AVR-M1005C080MTABB	T	4.9/32.4
D704	1790001810	S.VAR AVR-M1005C080MTABB	T	3.4/32
D705	1790001810	S.VAR AVR-M1005C080MTABB	T	4.8/20.7
R701	7410001130	S.ARR EXB28V102JX	T	6.7/32.7
C701	4030017460	S.CER ECJ0EB1E102K	T	4.6/9.9
C702	4030017460	S.CER ECJ0EB1E102K	T	4.4/14.2
C704	4030017460	S.CER ECJ0EB1E102K	T	3.9/17.1
J1	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	3.6/37.1
EP701	6910016330	S.BEA MMZ1005S 601CT-S	T	6.4/9.9
EP702	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/12.9
EP703	6910016330	S.BEA MMZ1005S 601CT-S	T	4.9/16.5
EP704	6910016330	S.BEA MMZ1005S 601CT-S	T	4.4/18.4
EP705	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/19.4
MP703	8510017840	S.PLA OG-321610G	T	7/27

[MAIN UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1110003201	S.IC TA31136FNG(EL)	B	19.1/9.1
IC2	1130008561	S.IC TC75S51F(TE85L,F)	T	52.3/17.1
IC4	1140005991	S.IC MB15A02PFV1-G-BND-ERE1	B	28.7/24.1
IC5	1110002751	S.IC TA75S01F(TE85R,F)	T	34/7.4
IC6	1190000350	S.IC M62363FP-650C	T	25.2/8.9
IC7	1190001860	S.IC EW-460-FT	B	50.7/39.9
IC9	1110005350	S.IC NJM2870F05-TE1-#FZZB	T	73.7/28.5
IC10	1110006221	S.IC AK2346P-E2/P	T	18.9/25.1
IC11	1130009981	S.IC TC7W53FK(TE85L,F)	T	25.2/29.2
IC12	1130011760	S.IC CD4094BPWR	T	17.2/35.8
IC18	1190002660	S.IC ISD4004-08MEYIR [EUR-05] only	B	13.1/36.5
IC19	1180002391	S.REG S-812C33AMC-C2N-G [EUR-05] only	B	24.6/40.9
Q1	1560000841	S.FET 2SK1829(TE85R,F)	T	46.5/10.8
Q2	1580000731	S.FET 3SK293(TE85L,F)	T	47.3/8.2
Q3	1580000800	S.FET 3SK324UG-TL-E	B	41.8/9.3
Q4	1530002601	S.TRA 2SC4215-O(TE85R,F)	B	23.9/4.1
Q5	1530000371	S.TRA 2SC3356-T1B S (R25)	B	53.5/30.6
Q7	1560001232	S.FET RD07MVS2-T112	T	59.8/21.9
Q8	1560001241	S.FET RD01MUS1-T113	T	60.2/28
Q9	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	53.2/24.4
Q10	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	48/23.2
Q11	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	46.1/26.6
Q12	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	48/31.9
Q13	1530002920	S.TRA 2SC4226-T1 R25	B	42.4/29.1
Q14	1530002920	S.TRA 2SC4226-T1 R25	B	43/24.3
Q15	1590001400	S.TRA XP1214(TX)	T	47.5/27.2
Q16	1590003790	S.TRA KRC404E RTK/P	T	47.2/29.9
Q17	1530003900	S.TRA KTC4075 BL-RTK/P	B	47/37.7
Q18	1560000541	S.FET 2SK880-Y(T5RICOM,F)	T	34.2/21.6
Q21	1510001090	S.TRA KTA2015Y-RTK/P	B	53/36.5
Q22	1510001090	S.TRA KTA2015Y-RTK/P	B	31.1/39.4
Q23	1520000840	S.TRA KTA1664Y-RTF/P	B	71.8/25.4
Q24	1590003800	S.TRA KTC811U-GR-RTK/P	B	72/29.2
Q25	1590003780	S.TRA KRA304E-RTK/P	B	68.8/31.6
Q26	1550000090	S.FET RSQ035P03TR	T	73.7/25
Q29	1590003790	S.TRA KRC404E RTK/P	B	54.5/39.9
Q30	1530003900	S.TRA KTC4075 BL-RTK/P [EUR-04]	B	34.2/39
	1530003900	S.TRA KTC4075 BL-RTK/P [EUR-05]		
Q31	1520000840	S.TRA KTA1664Y-RTF/P [EUR-04]	B	38/39.2
	1520000840	S.TRA KTA1664Y-RTF/P [EUR-05]		
Q34	1530003900	S.TRA KTC4075 BL-RTK/P	B	26/15.9
Q36	1590001650	S.TRA XP4601(TX)	B	5.9/26.7
Q37	1530003091	S.TRA 2SC4213-B(TE85R,F) [EUR-05] only	T	18.8/17.2
D1	1750001210	S.DIO HSB888ASTR-E	T	57.3/10.4
D2	1750000581	S.DIO 1SV307(TPH3,F)	B	59.9/9.1
D3	1750000711	S.VAR HVC350BTRF-E	T	60.2/3.6
D4	1750000711	S.VAR HVC350BTRF-E	T	60.2/4.9
D5	1790001261	S.DIO MA2S077G0L	B	57.1/4.8
D6	1790001241	S.DIO MA2S7280GL	T	60.7/7.2
D7	1750000711	S.VAR HVC350BTRF-E	T	50/3.6
D8	1750000711	S.VAR HVC350BTRF-E	T	50/4.9
D9	1750000711	S.VAR HVC350BTRF-E	T	44.4/4.6
D10	1750000711	S.VAR HVC350BTRF-E	T	41.2/4.6
D12	1790001251	S.DIO MA2S1110GL	B	47.3/39.8
D14	1790001261	S.DIO MA2S077G0L	B	52.5/22
D15	1790001261	S.DIO MA2S077G0L	B	51.4/19.8
D16	1750000711	S.VAR HVC350BTRF-E	B	37.1/32.8
D17	1750000711	S.VAR HVC350BTRF-E	B	37.1/20.6
D18	1720000401	S.VAR 1SV245(TPH3,F)	B	36.6/25
D21	1750000711	S.VAR HVC350BTRF-E	B	39.4/25.6
D22	1750000711	S.VAR HVC350BTRF-E	B	38.9/28.9
D25	1790001251	S.DIO MA2S1110GL	T	42.1/9.2
D26	1790000981	S.DIO MA3J7420GL	B	27.4/1.8
D37	1790001251	S.DIO MA2S1110GL	B	32.5/28.7
D38	1790001251	S.DIO MA2S1110GL	T	52.5/14.8
D39	1750001210	S.DIO HSB888ASTR-E	T	63.9/10.4
FI1	2030000410	S.MON MFT46.3P 46.350 MHz (FL-380)	B	32.4/5.8
FI2	2020002160	S.CER CFWKA450KFFA-R0	B	19.7/21
FI3	2040001440	S.LC NFE31PT152Z1E9L (NFM60R20T152)	B	71.8/21.2
X1	6070000191	S.DIS CDBKB450KAY24-R0	T	16.9/9.6
X2	6050011940	S.XTA CR-783 TTS14VSB-A6 15.3 MHz	B	28.4/33.5
X4	6050011730	S.XTA CR-765 SMD-49TA 3.6864 MHz <KDS>	B	16.6/29.6
L1	6200012490	S.COI 0.30-0.9-6TR 13.6N <COMO>	B	65.6/6.1
L2	6200013010	S.COI 0.30-0.9-5TL 10.3N <COMO>	B	61.9/5.5
L3	6200012610	S.COI 0.40-0.9-2TL 2.8N <COMO>	B	62.2/11.2
L4	6200012610	S.COI 0.40-0.9-2TL 2.8N <COMO>	B	67.4/16.2
L5	6200010850	S.COI LQW18AN22NG00D (LQW1608A22NG00)	B	58/6.8
L7	6200007700	S.COI LQW2BHN22NJ03L	T	57/6.6
L8	6200007700	S.COI LQW2BHN22NJ03L	T	53.4/6.6
L9	6200007680	S.COI LQW2BHN12NJ03L	B	46.9/7.2
L11	6200007680	S.COI LQW2BHN12NJ03L	B	41.4/5.3
L12	6200005741	S.COI ELJRE 47NGFA	B	44.7/11.7
L13	6200003350	S.COI ELJNC R27K-F	B	38.8/11.5
L15	6200002851	S.COI NLV25T-R82J	B	56.9/9.8
L17	6200013010	S.COI 0.30-0.9-5TL 10.3N <COMO>	B	68.2/21.4
L19	6200005701	S.COI ELJRE 22NGFA	B	52.1/33.3
L20	6200005741	S.COI ELJRE 47NGFA	B	53.1/27.4
L21	6200005721	S.COI ELJRE 33NGFA	B	46.2/21.3
L22	6200005701	S.COI ELJRE 22NGFA	B	46.9/28.5
L23	6200002790	S.COI ELJFC R82M-F	T	43.6/23.3

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





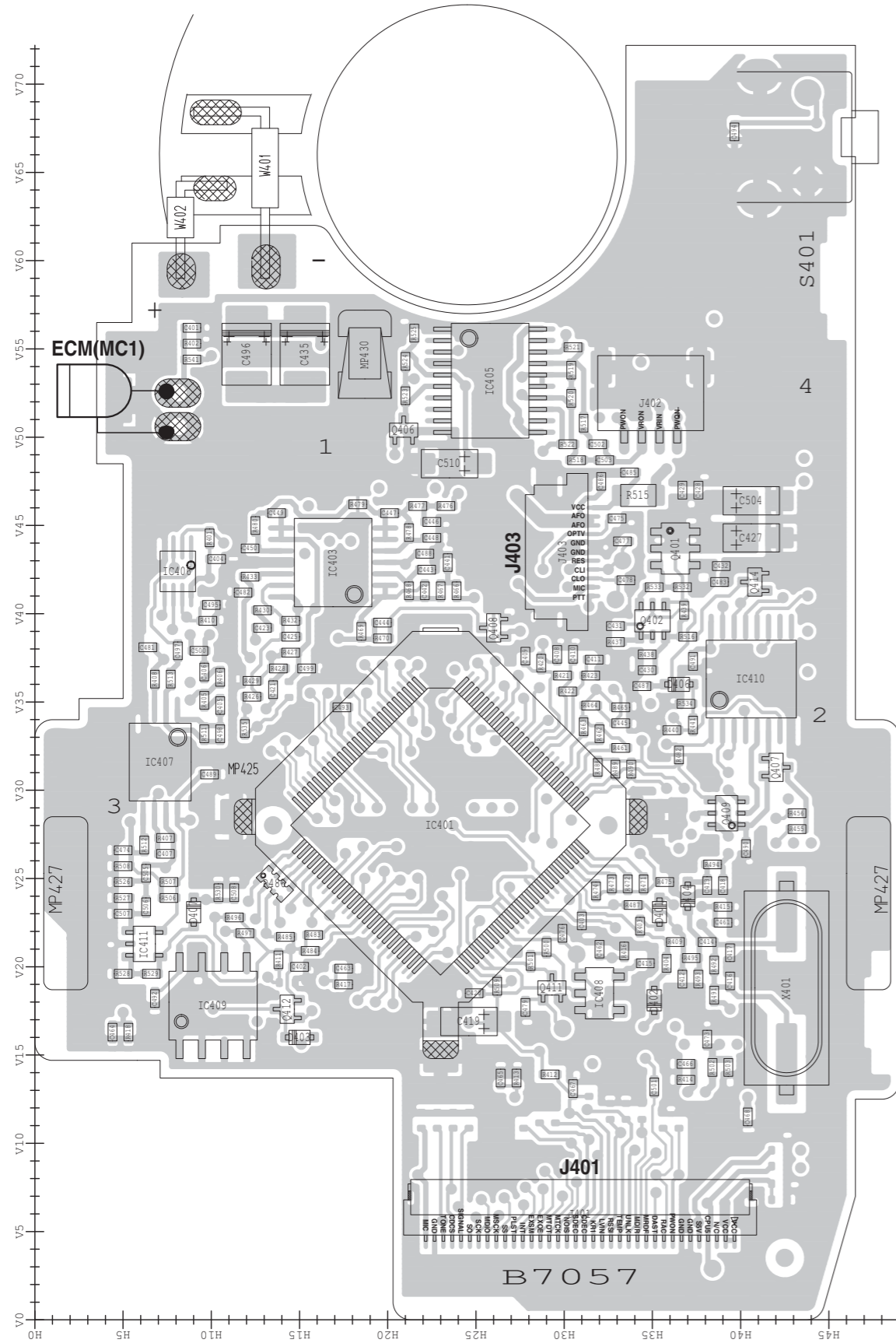
[MAIN UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C265	4030017420	S.CER ECJ0EC1H470J	T	26.8/26.7
C266	4030017720	S.CER ECJ0EB1H331K	T	24.7/26.2
C267	4030017460	S.CER ECJ0EB1E102K	T	25.6/17.6
C271	4030016930	S.CER ECJ0EB1A104K	T	26.6/31.9
C281	4030016930	S.CER ECJ0EB1A104K	T	13.9/38.3
C287	4030016930	S.CER ECJ0EB1A104K	B	24.1/31.7
C291	4030017420	S.CER ECJ0EC1H470J	B	56.1/11.9
C292	4030017460	S.CER ECJ0EB1E102K	B	54.7/8.1
C293	4030017460	S.CER ECJ0EB1E102K	T	78.7/24.7
C294	4030017460	S.CER ECJ0EB1E102K	B	2.5/30.6
C295	4030017460	S.CER ECJ0EB1E102K	T	71.5/26.5
C296	4030017460	S.CER ECJ0EB1E102K	T	77.3/23.9
C297	4030017460	S.CER ECJ0EB1E102K	T	77.7/22.6
C298	4030017460	S.CER ECJ0EB1E102K	T	4.8/38.1
C299	4030017460	S.CER ECJ0EB1E102K	T	13/38.3
C300	4030017460	S.CER ECJ0EB1E102K	T	10.2/41.2
C301	4030017460	S.CER ECJ0EB1E102K	T	4.8/36.5
C302	4030017420	S.CER ECJ0EC1H470J	B	48.6/14.3
C303	4030017460	S.CER ECJ0EB1E102K	B	50.9/13
C305	4030016930	S.CER ECJ0EB1A104K	T	22.6/34.8
C309	4030018860	S.CER ECJ0EB0J105K	B	5.3/35.6
C310	4030016930	S.CER ECJ0EB1A104K [EUR-05] only	B	4.1/35.6
C311	4030018860	S.CER ECJ0EB0J105K [EUR-05] only	B	4.9/38.6
C312	4030018860	S.CER ECJ0EB0J105K [EUR-05] only	B	4.7/36.8
C313	4030016930	S.CER ECJ0EB1A104K [EUR-05] only	B	24.5/37.1
C314	4030016930	S.CER ECJ0EB1A104K [EUR-05] only	B	22.1/41.4
C315	4030018860	S.CER ECJ0EB0J105K [EUR-04] only	B	34/40.9
	4030018860	S.CER ECJ0EB0J105K [EUR-05] only	B	
C316	4550006250	S.TAN TEESVA 1A 106M8R [EUR-04] only	T	31.9/33.7
	4550006250	S.TAN TEESVA 1A 106M8R [EUR-05] only	T	
C317	4030017460	S.CER ECJ0EB1E102K [EUR-04] only	B	39.8/36.8
	4030017460	S.CER ECJ0EB1E102K [EUR-05] only	B	
C318	4030017460	S.CER ECJ0EB1E102K [EUR-04] only	B	34.9/36.2
	4030017460	S.CER ECJ0EB1E102K [EUR-05] only	B	
C319	4550007790	S.TAN TEESVB2 0J 686M8R [EUR-05] only	B	22.1/35.1
C320	4030017460	S.CER ECJ0EB1E102K [EUR-05] only	B	20.9/40.6
C321	4030017420	S.CER ECJ0EC1H470J	B	43.4/13.8
C322	4030017460	S.CER ECJ0EB1E102K	B	42.9/12.9
C325	4030016930	S.CER ECJ0EB1A104K [EUR-05] only	B	10.5/41.3
C326	4030017460	S.CER ECJ0EB1E102K [EUR-05] only	T	19.4/20.2
C327	4030018860	S.CER ECJ0EB0J105K [EUR-05] only	T	19.6/19
C328	4550007880	S.TAN TEESVB2 1A 686M8R [EUR-05] only	B	28/40.7
C329	4030017460	S.CER ECJ0EB1E102K	B	26/3.2
C333	4030017420	S.CER ECJ0EC1H470J	T	46.9/5.4
C339	4030017340	S.CER ECJ0EC1H010B	T	45.3/6.8
C364	4030017590	S.CER ECJ0EC1H070C	B	46.3/11.5
C365	4030009350	S.CER C1608 CH 1H 3R5B-T	B	69.3/5.8
C366	4030017460	S.CER ECJ0EB1E102K	T	65.8/27.6
C367	4030009920	S.CER C1608 CH 1H 050B-T	B	58.5/4.8
C368	4030017420	S.CER ECJ0EC1H470J	T	66.3/28.9
C369	4030006860	S.CER C1608 JB 1H 102K-T	T	55.3/18.7
C370	4030017460	S.CER ECJ0EB1E102K	B	51.7/26.2
C371	4030017460	S.CER ECJ0EB1E102K	T	62.1/10.8
C372	4030017360	S.CER ECJ0EC1H030B	B	53.5/26.2
C373	4030017460	S.CER ECJ0EB1E102K	T	52.6/30.1
C374	4550007180	S.TAN F931C685MAABMA	B	52.6/15.7
C375	4550006250	S.TAN TEESVA 1A 106M8R	T	49.7/33.5
C376	4550007410	S.TAN F931A157MNBMA [EUR-05] only	T	31.1/40.9
C377	4030017640	S.CER ECJ0EC1H150J	T	37.7/20.5
C378	4030017640	S.CER ECJ0EC1H150J	T	36.4/33.5
C379	4030017460	S.CER ECJ0EB1E102K	T	23.9/23.3
J1	6510026130	S.CON IMSA-9681S-36Y900	T	7.6/30.7
J2	6510021901	S.CON BM02B-ASRS-TF(LF)(SN) [EUR-04] only	T	2.5/33.2
	6510021901	S.CON BM02B-ASRS-TF(LF)(SN) [EUR-05] only	T	
F1	5210000830	S.FUS ERBFE3R00U	T	76.1/27.9
F2	5210001100	S.FUS 0467.375NR [EUR-04] only	T	24.7/37.1
	5210001100	S.FUS 0467.375NR [EUR-05] only	T	
S1	2260002750	S.SWI EVQP7M01K	T	81.2/24
MF1	2710000850	MOT QX10A(R5.5X3)3.0V(WIRE30MM) [EUR-04] only		
	2710000850	MOT QX10A(R5.5X3)3.0V(WIRE30MM) [EUR-05] only		
EP3	6910015370	S.BEA ACZ1005Y-102-T	B	25.4/35.1
EP4	6910015600	S.BEA ACZ1005Y-241 (240)	T	23.9/21.7
EP5	6910015600	S.BEA ACZ1005Y-241 (240)	T	14/26.1
EP8	6910014730	S.BEA MPZ2012S331A-T	B	76.7/18.7
EP9	6910019100	S.BEA MPZ1608S101AT	T	76.1/25.3
EP10	6910014730	S.BEA MPZ2012S331A-T	B	76.7/22.1
MP1	8410002531	S.HEA 2681 PA HEATSINK-1	B	61/25.5
MP7	6910014760	S.PLA OG-503040	B	42.3/39.2

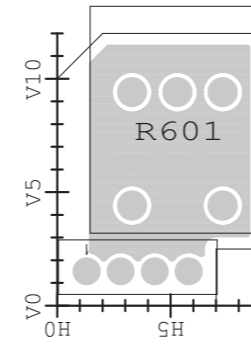
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)  
S.=Surface mount

# BOARD LAYOUTS

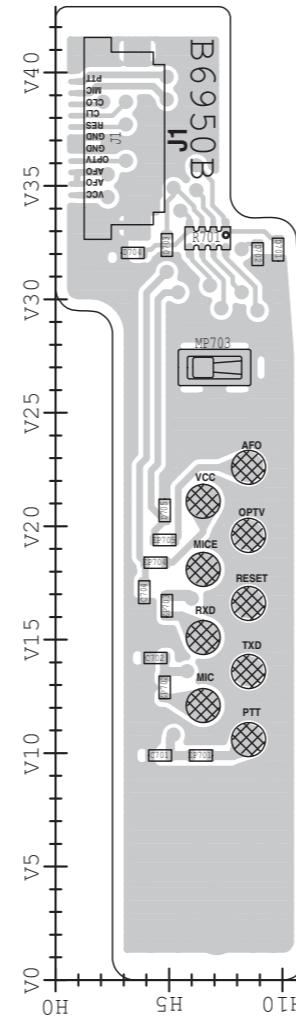
## • FRONT UNIT (TOP VIEW)



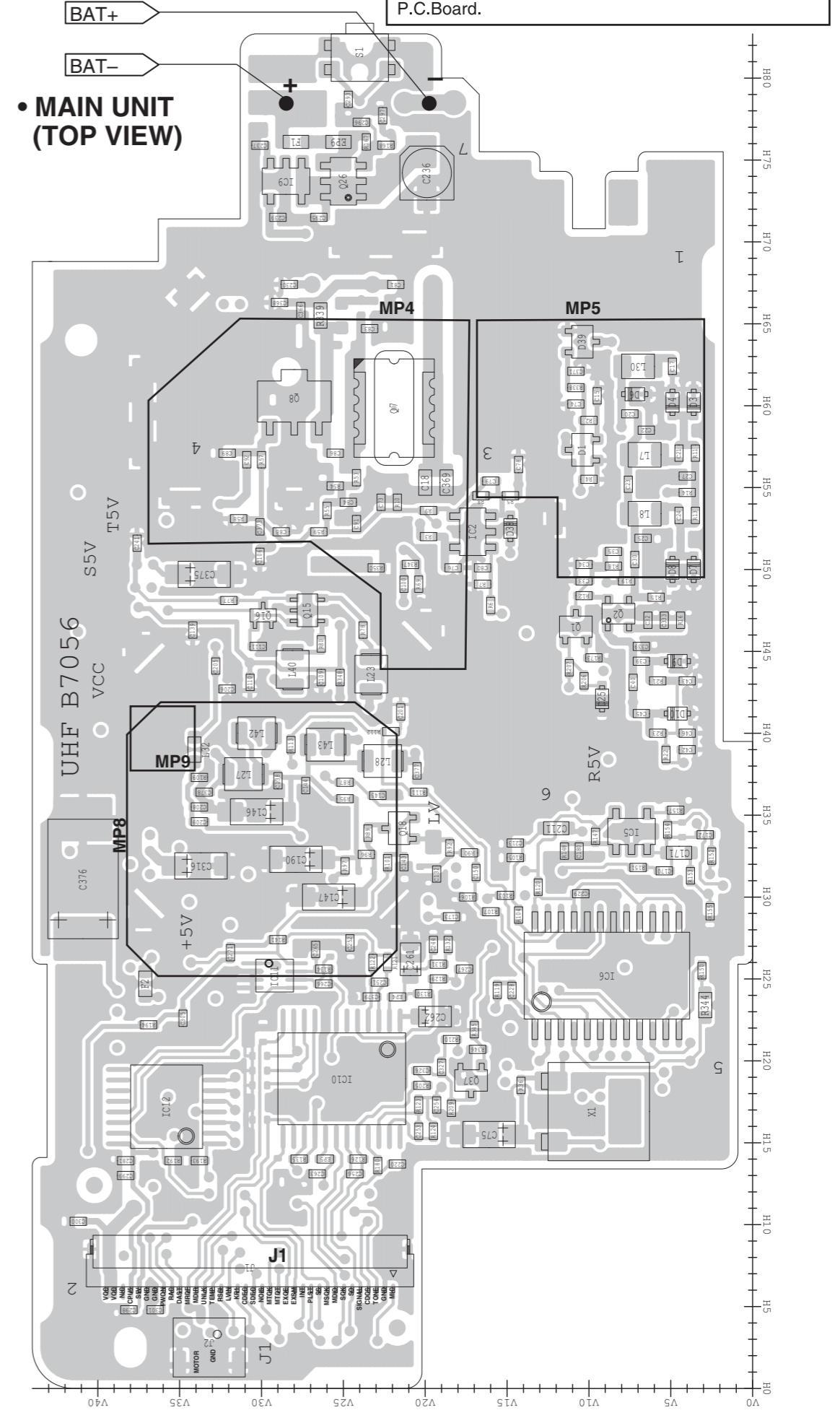
## • VR UNIT (TOP VIEW)



## • CONNECT UNIT (TOP VIEW)



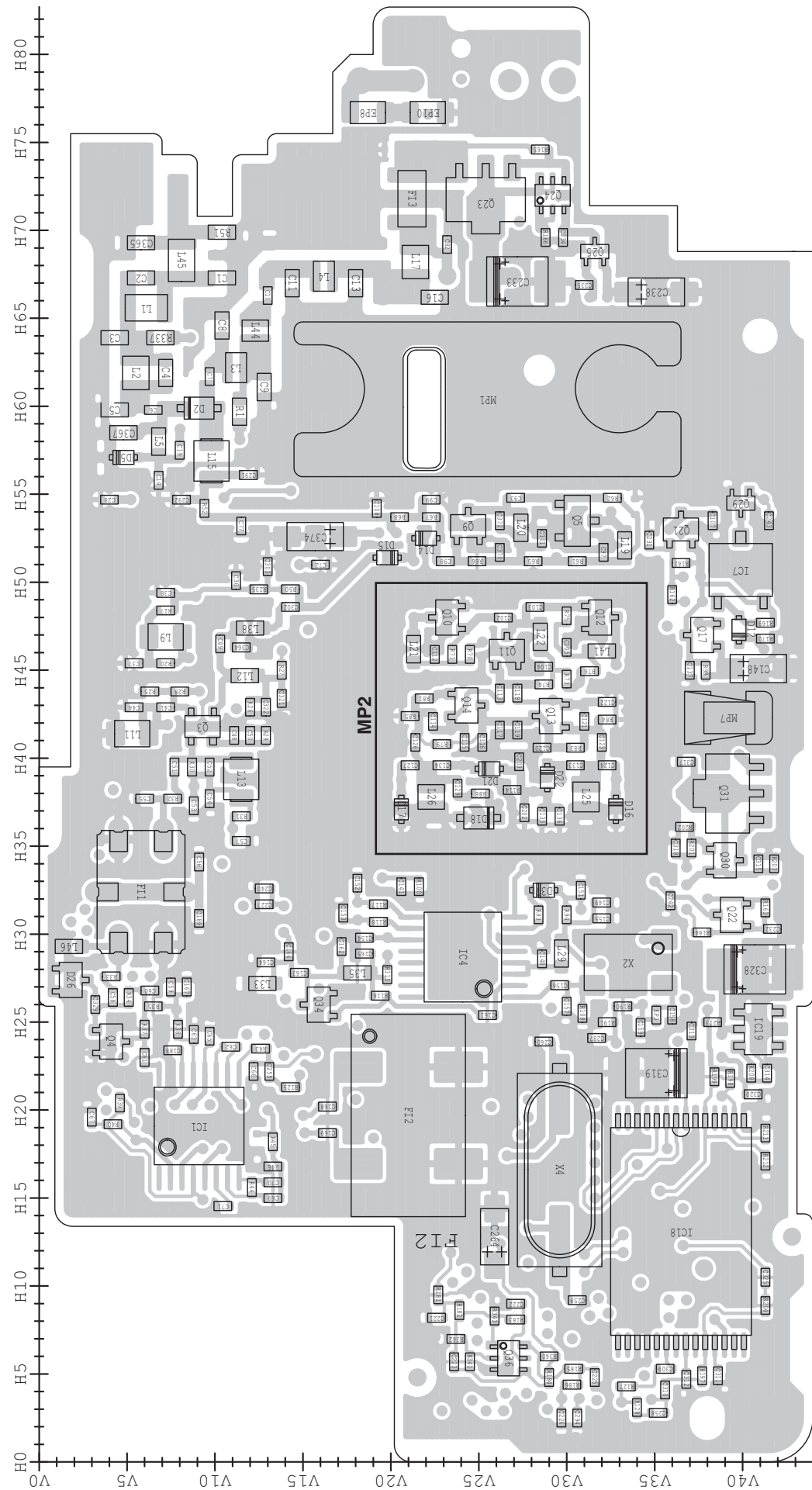
## • MAIN UNIT (TOP VIEW)



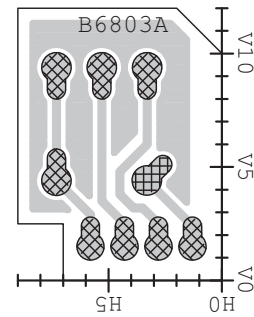


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

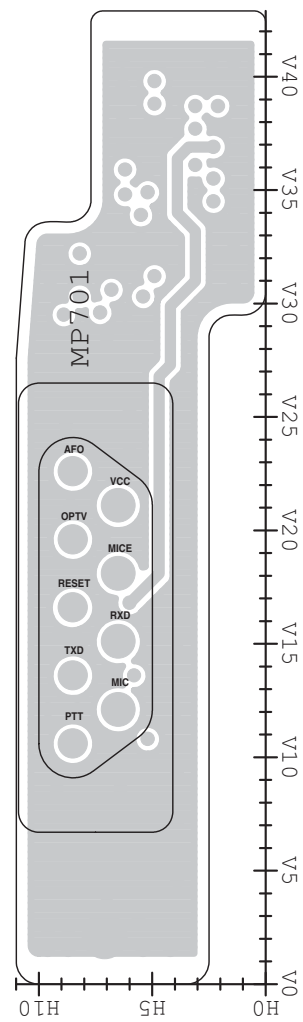
• MAIN UNIT (BOTTOM VIEW)



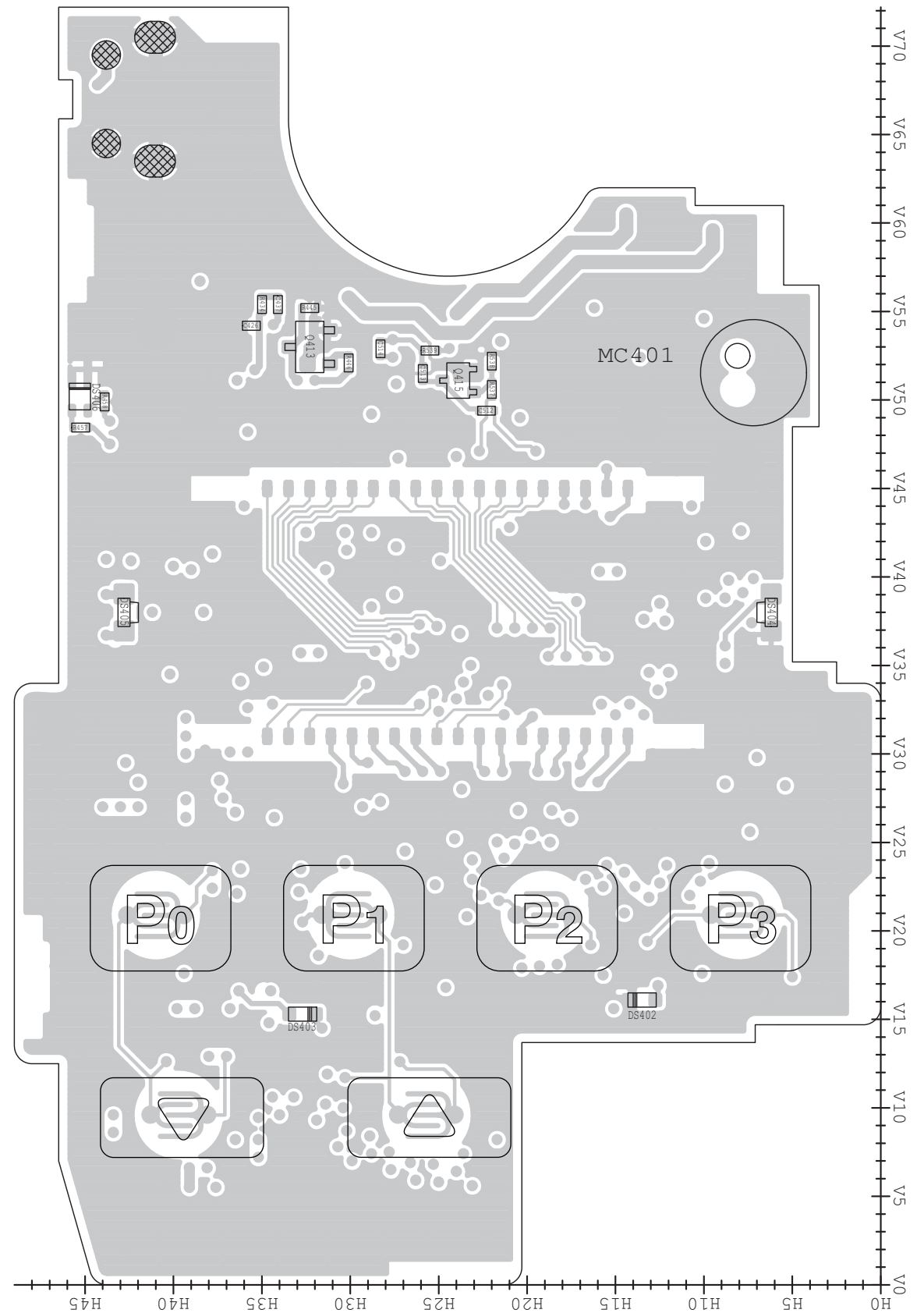
• VR UNIT (BOTTOM VIEW)



• CONNECT UNIT (BOTTOM VIEW)



• FRONT UNIT (BOTTOM VIEW)



May. 2009



# SERVICE MANUAL ADDENDUM

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## IC-F61M

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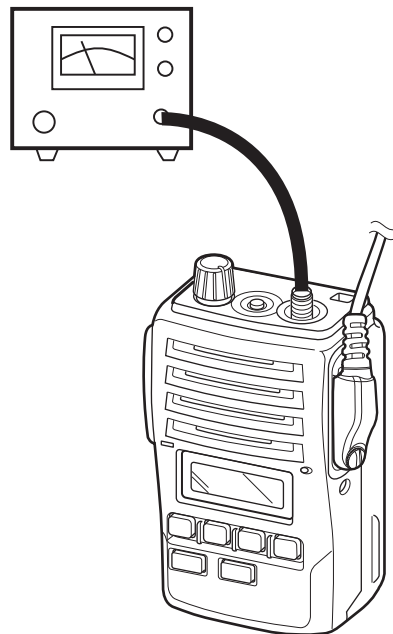
REPLACEMENT PAGE .....	5-4
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VOLTAGE DIAGRAM .....	8

### 5-2 FREQUENCY ADJUSTMENT

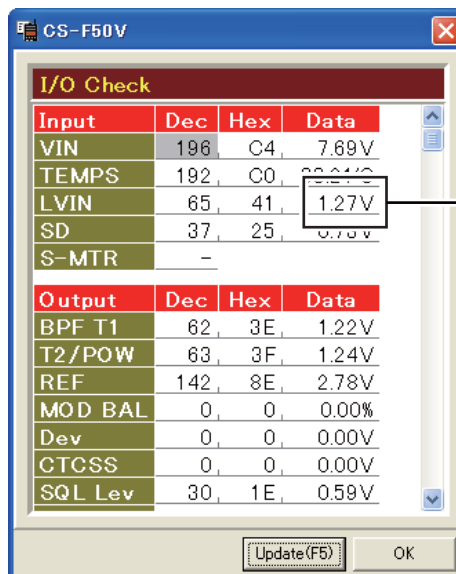
Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
PLL LOCK VOLTAGE [RX LVA]	1 •Channel : 1-1 •Receiving	Click [I/O Update (F5)] in the [Adjust] menu (see the page 5-3), then check the "LVIN" item on the I/O check window as below.	1.7 V
	[TX LVA]		2 •Channel : 1-1 •Connect an RF Power Meter to the antenna connector. •Transmitting
<p><b>CONVENIENT:</b> The "PLL LOCK VOLTAGE" can be adjusted automatically.                      1: Set the Lock voltage preset; [RX LVA] to "87", [TX LVA] to "77."                      2: Push the [ENTER] key on the connected PC's keyboard.</p>			
PLL LOCK VOLTAGE (verify)	1 •Channel : 1-2 •Receiving	Click [I/O Update (F5)] in the [Adjust] menu (see the page 5-3), then check the "LVIN" item on the I/O check window as below.	1.7~3.0 V (Verify)
	2 •Channel : 1-2 •Transmitting		

RF POWER METER  
(3 W/50 Ω)



• I/O CHECK WINDOW



Lock Voltage Check

\* This screen is an example only. Each transceiver has its own specific values for each setting.



[FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C465	4030017420	S.CER ECJ0EC1H470J	T	26.4/13.7
C466	4030017420	S.CER ECJ0EC1H470J	T	36.9/14.5
C467	4030017420	S.CER ECJ0EC1H470J	T	30.5/13.1
C468	4030017420	S.CER ECJ0EC1H470J	T	40.4/11.5
C473	4030016790	S.CER ECJ0EB1C103K	T	38.1/15.9
C474	4030018860	S.CER ECJ0EB0J105K	T	5/26.6
C475	4030017460	S.CER ECJ0EB1E102K	T	33/45.4
C476	4030017460	S.CER ECJ0EB1E102K	T	29.9/21.9
C477	4030017420	S.CER ECJ0EC1H470J	T	33.3/44.1
C478	4030017420	S.CER ECJ0EC1H470J	T	33.5/41.9
C479	4030017460	S.CER ECJ0EB1E102K	T	27.8/17.7
C481	4030017460	S.CER ECJ0EB1E102K	T	6.4/38.1
C482	4030017460	S.CER ECJ0EB1E102K	T	11.8/41.2
C483	4030017460	S.CER ECJ0EB1E102K	T	38.8/41.8
C485	4030017460	S.CER ECJ0EB1E102K	T	33.7/48
C486	4030017460	S.CER ECJ0EB1E102K	T	32.1/47.5
C487	4030017460	S.CER ECJ0EB1E102K	T	34.4/35.9
C488	4030017460	S.CER ECJ0EB1E102K	T	22.1/43.4
C489	4030017460	S.CER ECJ0EB1E102K	T	9.9/30.9
C490	4030017460	S.CER ECJ0EB1E102K	T	40.3/26.7
C491	4030017460	S.CER ECJ0EB1E102K	T	37.3/37.3
C492	4030017460	S.CER ECJ0EB1E102K	T	6.8/18.2
C493	4030016930	S.CER ECJ0EB1A104K	T	17.4/34.7
C494	4030017460	S.CER ECJ0EB1E102K	T	39.6/67.3
C495	4030017460	S.CER ECJ0EB1E102K	T	10/40.5
C496	4550007880	S.TAN TEESVB2 1A 686M8R	T	12/54.7
C497	4030018390	S.CER ECJ0EB1A563K	T	8.1/37.9
C498	4030017430	S.CER ECJ0EC1H101J	T	10.5/33.2
C499	4030017420	S.CER ECJ0EC1H470J	T	15.4/36.9
C500	4030016930	S.CER ECJ0EB1A104K	T	9.3/37.9
C501	4030017730	S.CER ECJ0EB1E471K	T	35.1/13.2
C502	4030016930	S.CER ECJ0EB1A104K	T	31.9/49.6
C503	4030018860	S.CER ECJ0EB0J105K	T	32.3/48.7
C504	4550007080	S.TAN TEESVA 1C 106M8R	T	40.6/46.4
C505	4030016960	S.CER ECJ0EB1C183K	T	6.3/25.3
C506	4030016960	S.CER ECJ0EB1C183K	T	6.3/23.4
C507	4030017730	S.CER ECJ0EB1E471K	T	5/23
C508	4030017730	S.CER ECJ0EB1E471K	T	11.3/24.2
C510	4550000460	S.TAN TEESVA 1C 105M8R	T	23.5/48.5
C512	4030018860	S.CER ECJ0EB0J105K	B	22.3/49.4
C513	4030018860	S.CER ECJ0EB0J105K	B	25.9/51.5
C514	4030017420	S.CER ECJ0EC1H470J	B	28.3/52.9
J401	6510026130	S.CON IMSA-9681S-36Y900	T	30.9/6.2
J402	6510023831	S.CON (G)SM04B-SRSS-TB(LF)(SN)	T	34.9/52.5
J403	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	29/43.5
DS401	5030002730	LCD L3-0048TAY-5		
DS402	5040002420	S.LED SML-310MT T86	B	13.5/16.1
DS403	5040002420	S.LED SML-310MT T86	B	32.7/15.3
DS404	5040002961	S.LED SML-A12MT T86J	B	6.2/38
DS405	5040002961	S.LED SML-A12MT T86J	B	42.8/38
DS406	5040002670	S.LED CL-165HR/YG	B	45.3/50.2
MC401	7700002760	MIC EM6027P-46C33-G-01 <HOR>		
S401	2260002840	SWI SKHLLFA010		
W401	8900016840	CAB OPC-1753 (P0.5,N36,L70) <TJM>		
W402	7120000470	JUM ERDS2T0		
W403	7120000470	JUM ERDS2T0		
W404	8900017120	CAB OPC-1754 (P0.5,N11,L35) <TJM>		
EP402	8930061530	LCD SRCN-2681-SP-N-W (SHJ)		
MP430	6910014760	S.PLA OG-503040	T	18.7/54.7

[VR UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R601	7210003130	VAR TP76N97N-13F-10KA-2497		
W601	8900012340	CAB OPC-1260		

[CONNECT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
D701	1790001810	S.VAR AVR-M1005C080MTABB	T	9.8/32.2
D702	1790001810	S.VAR AVR-M1005C080MTABB	T	8.9/32
D703	1790001810	S.VAR AVR-M1005C080MTABB	T	4.9/32.4
D704	1790001810	S.VAR AVR-M1005C080MTABB	T	3.4/32
D705	1790001810	S.VAR AVR-M1005C080MTABB	T	4.8/20.7
R701	7410001130	S.ARR EXB28V102JX	T	6.7/32.7
C701	4030017460	S.CER ECJ0EB1E102K	T	4.6/9.9
C702	4030017460	S.CER ECJ0EB1E102K	T	4.4/14.2
C704	4030017460	S.CER ECJ0EB1E102K	T	3.9/17.1
J1	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	3.6/37.1
EP701	6910016330	S.BEA MMZ1005S 601CT-S	T	6.4/9.9
EP702	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/12.9
EP703	6910016330	S.BEA MMZ1005S 601CT-S	T	4.9/16.5
EP704	6910016330	S.BEA MMZ1005S 601CT-S	T	4.4/18.4
EP705	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/19.4
MP703	8510017840	S.PLA OG-321610G	T	7/27

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



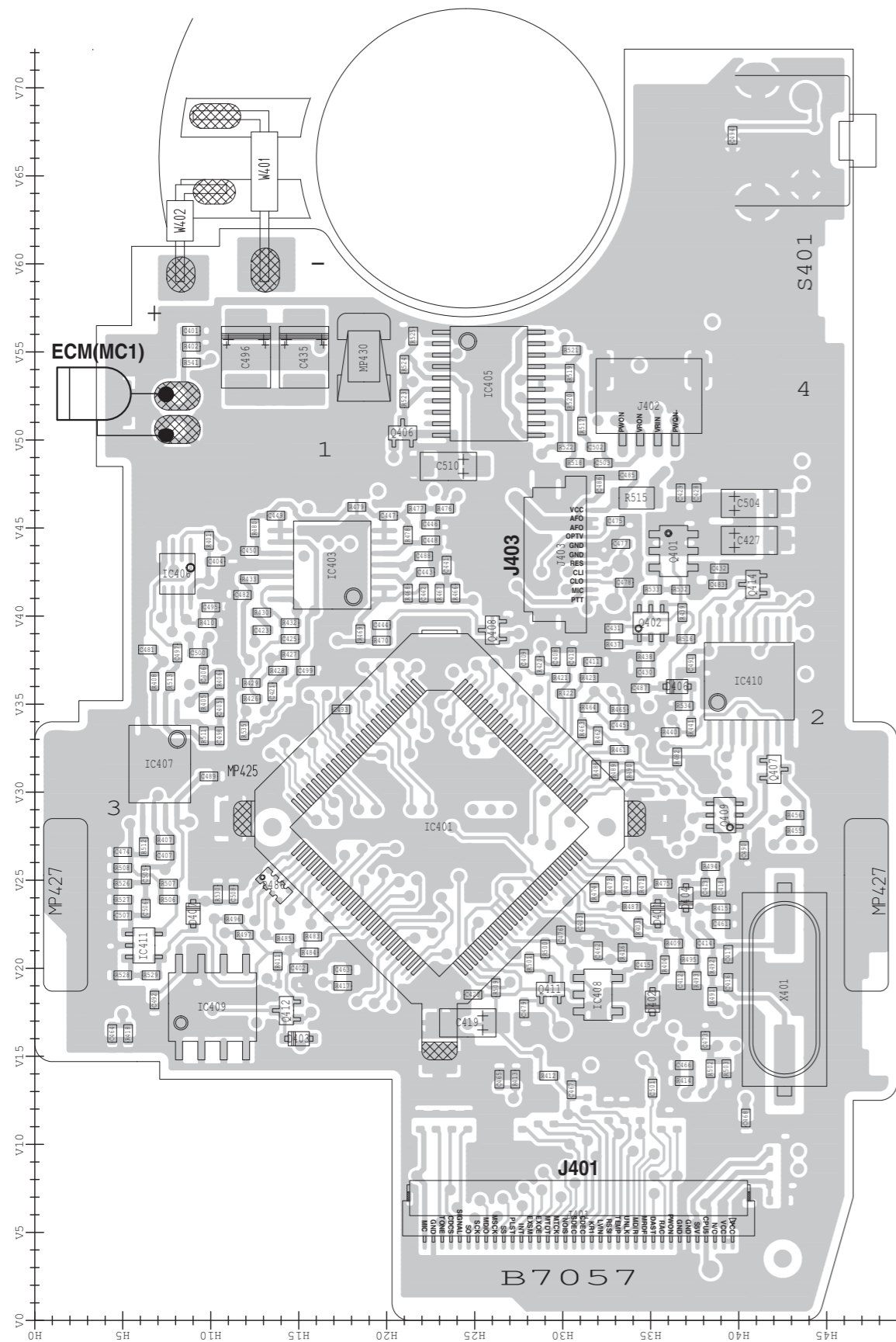




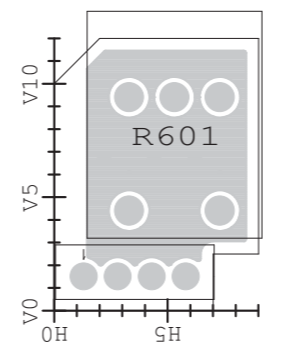


# BOARD LAYOUTS

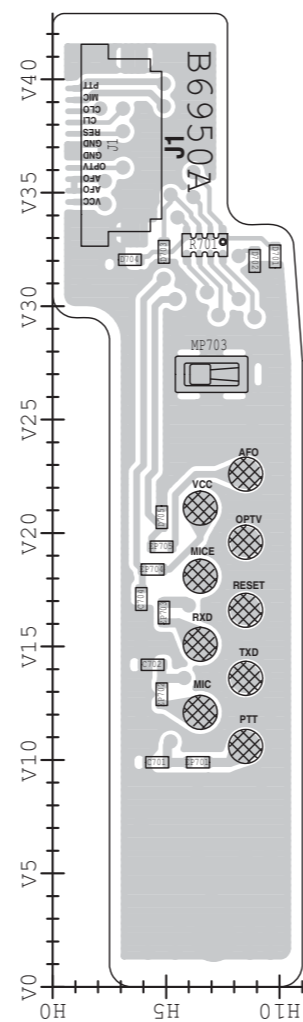
## • FRONT UNIT (TOP VIEW)



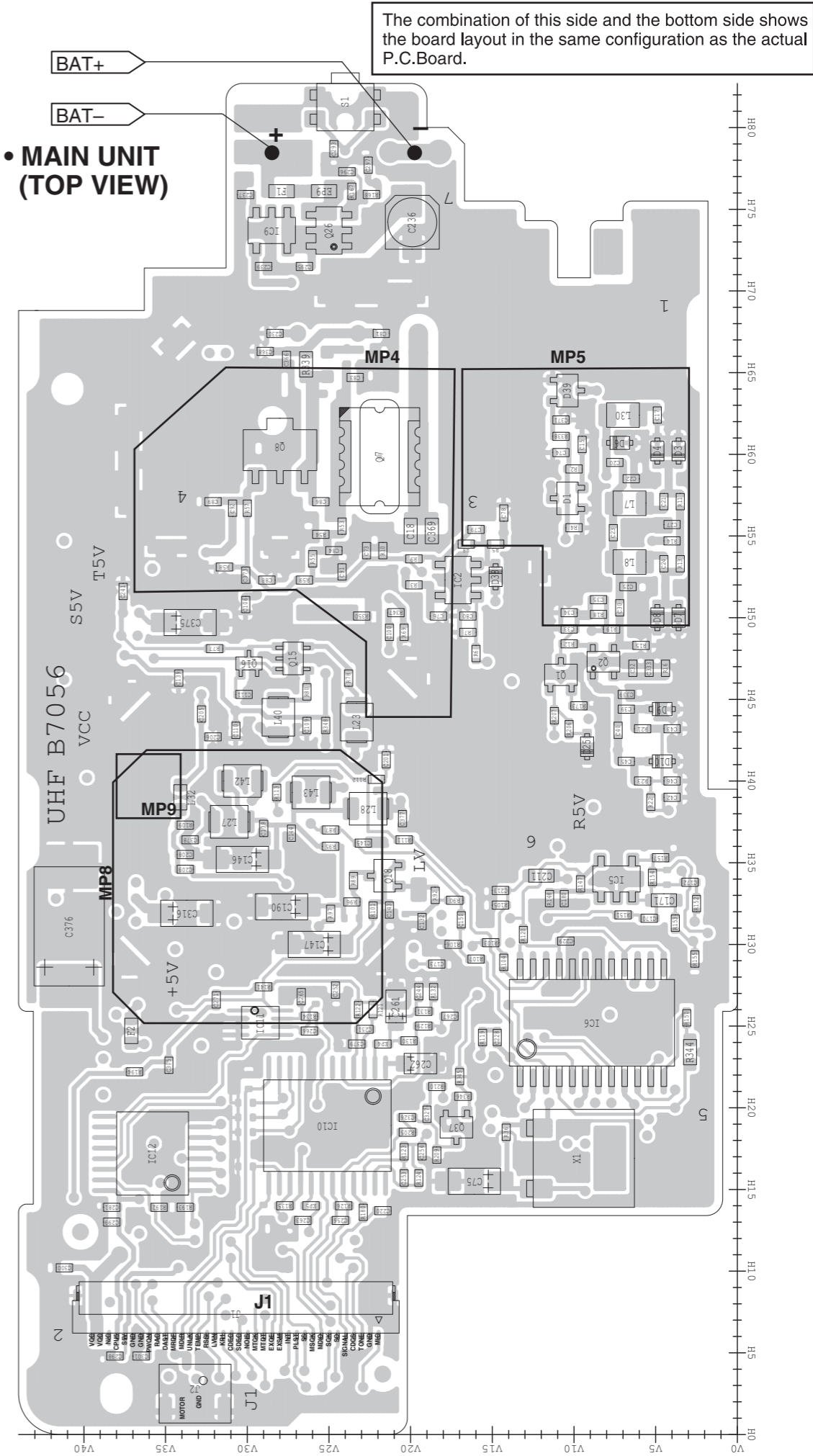
## • VR UNIT (TOP VIEW)



## • CONNECT UNIT (TOP VIEW)

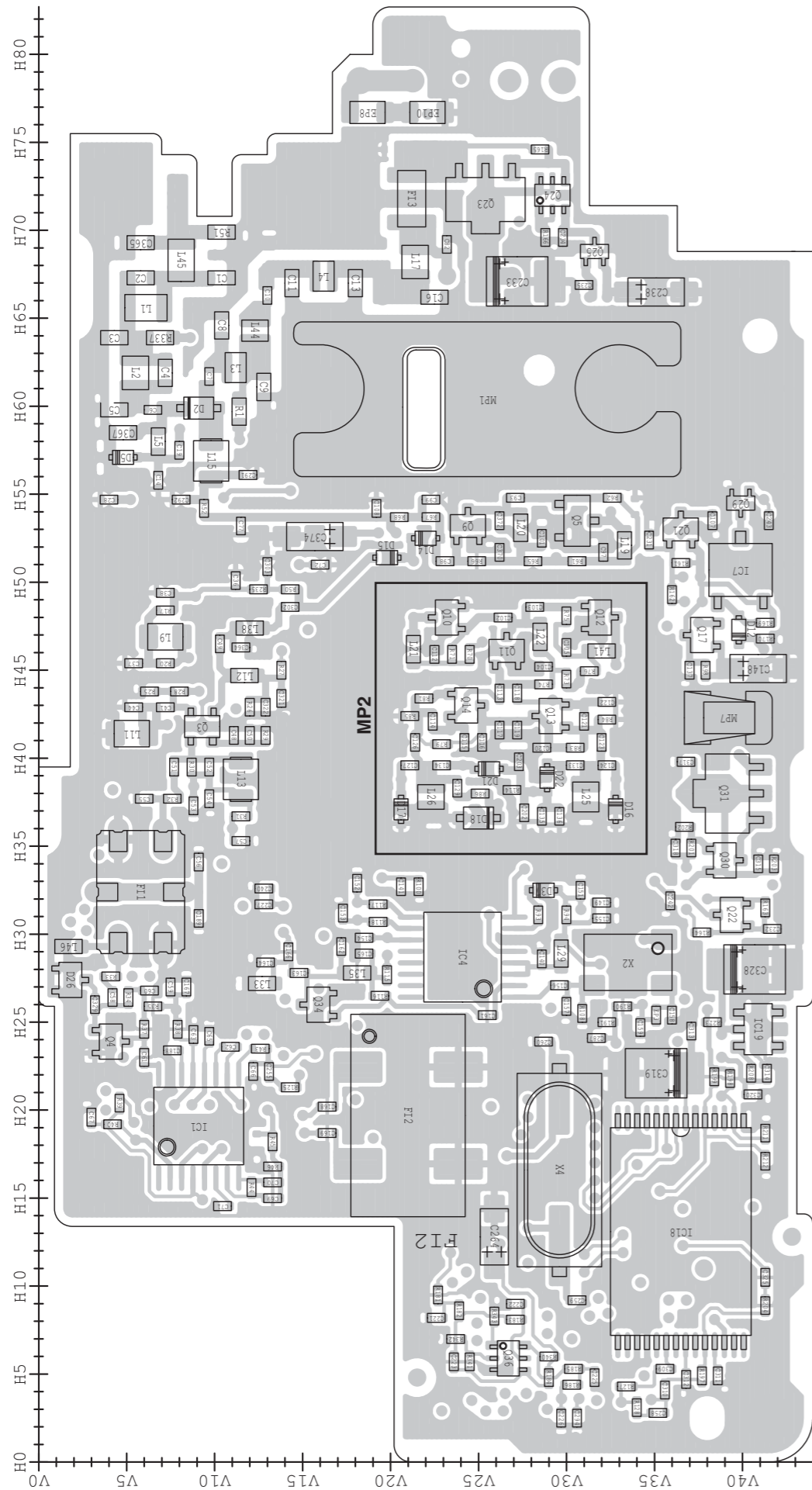


## • MAIN UNIT (TOP VIEW)

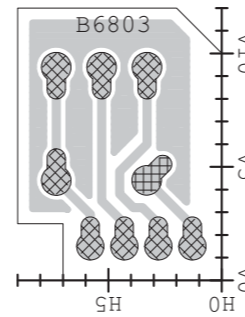


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

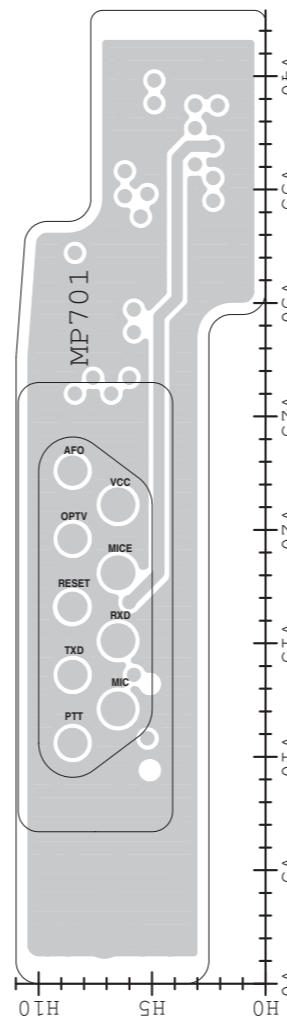
• MAIN UNIT (BOTTOM VIEW)



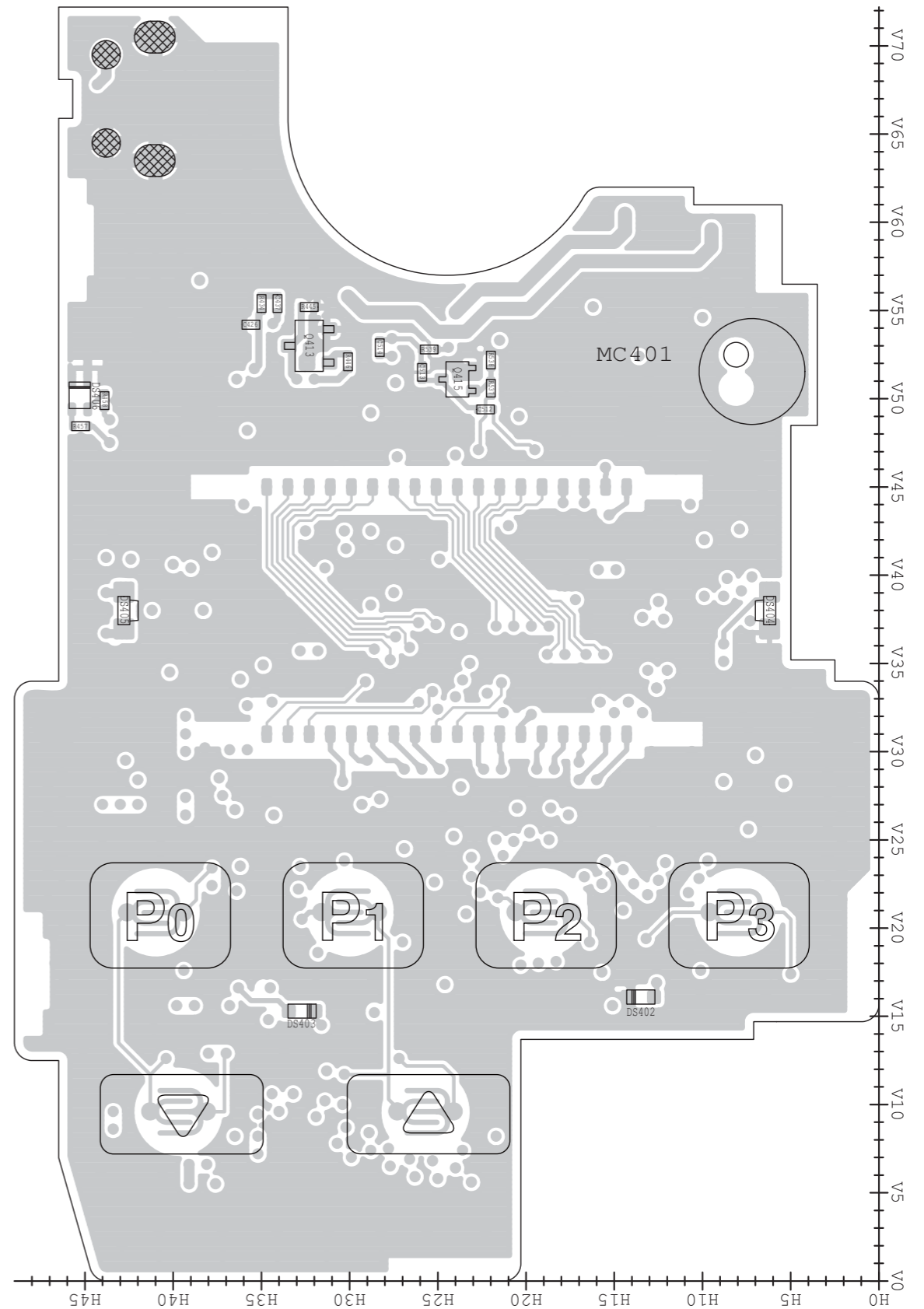
• VR UNIT (BOTTOM VIEW)



• CONNECT UNIT (BOTTOM VIEW)



• FRONT UNIT (BOTTOM VIEW)

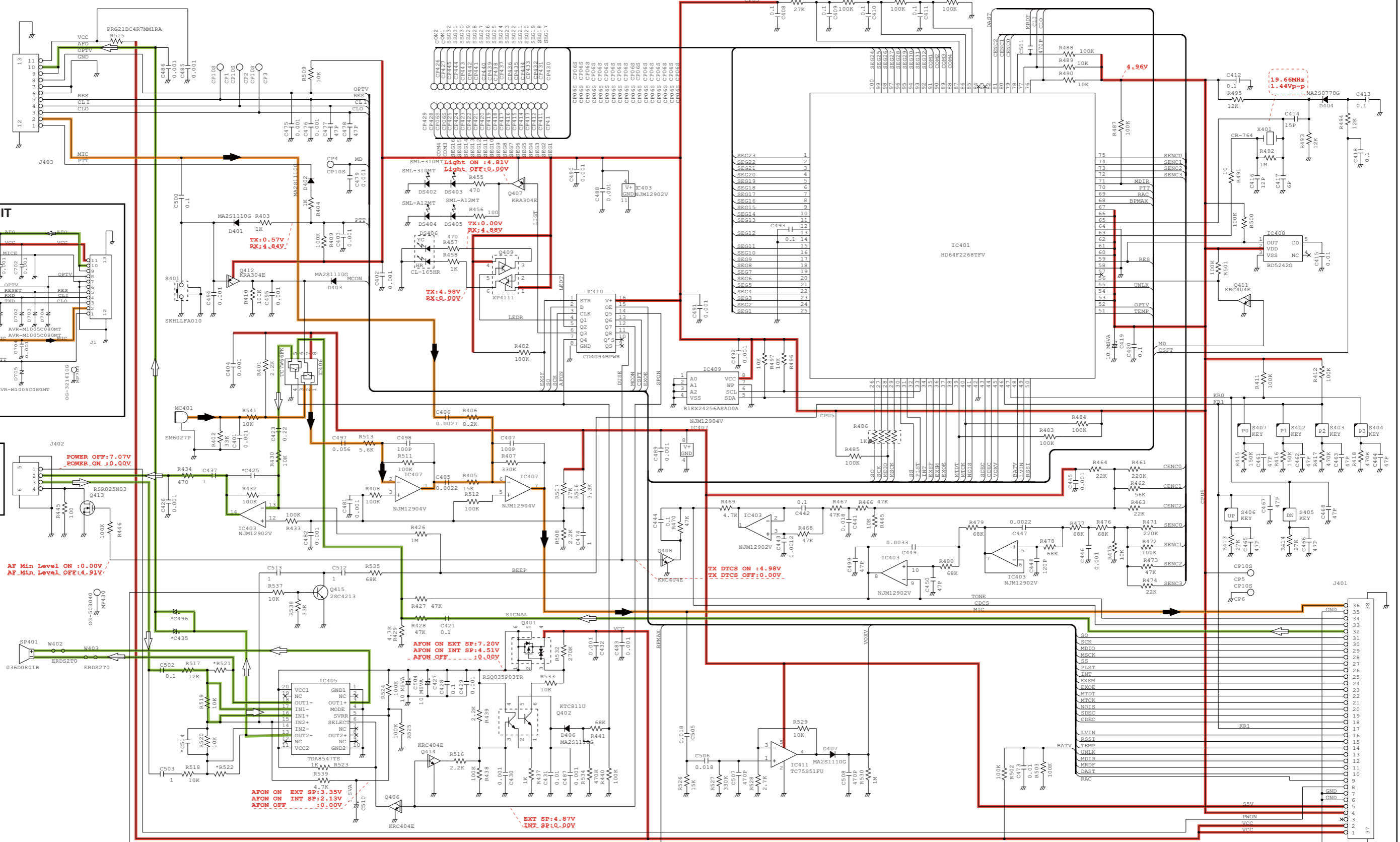


# VOLTAGE DIAGRAM

## • FRONT UNIT

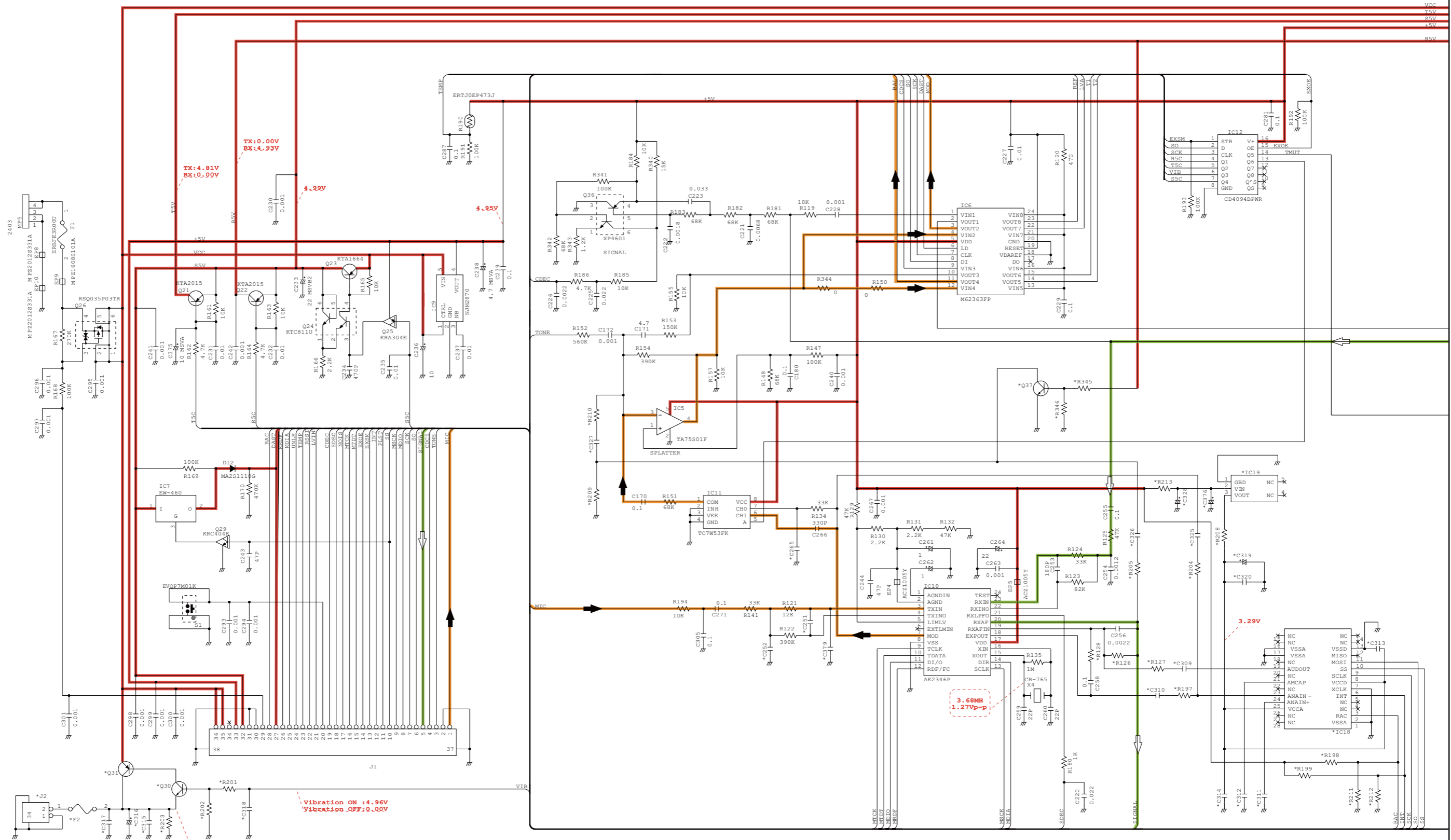
## • CONNECT UNIT

## • VR UNIT



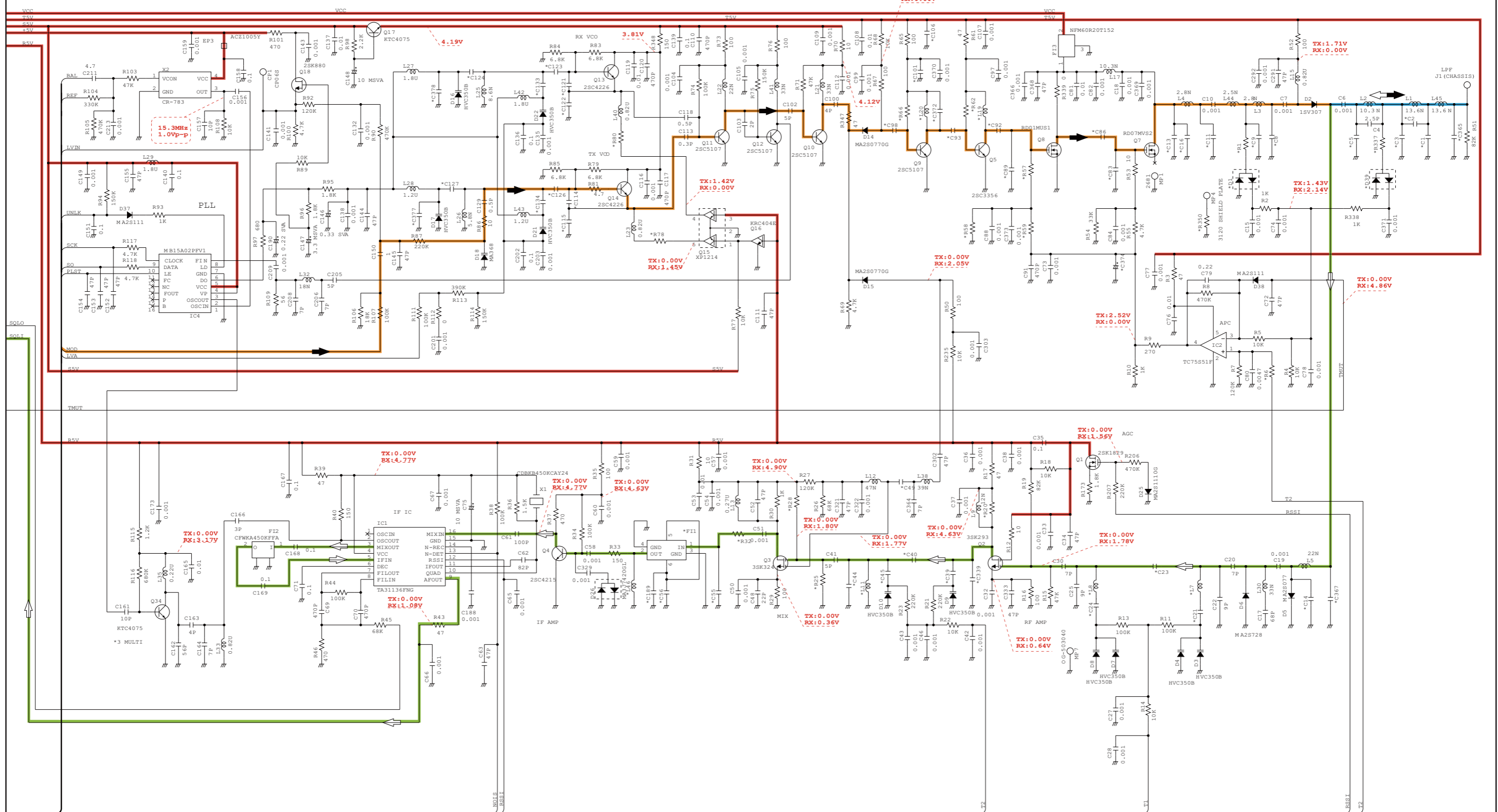
\*; Refer to "PARTS LIST."

• MAIN UNIT (Left side)



\*; Refer to "PARTS LIST"

• MAIN UNIT (Right side)



\*; Refer to "PARTS LIST."



# SERVICE MANUAL

UHF MARINE TRANSCEIVER

## **IC-F61M**

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S-14514XZ-C1  
Aug. 2008

Icom Inc.

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## INTRODUCTION

This service manual describes the latest service information for the **IC-F61M** UHF MARINE TRANSCEIVER at the time of publication.

Model	Version	Vibration	Voice storage	Channel spacing (kHz)
F61M	EUR-03	N/A	N/A	25.0
	EUR-04	Yes	N/A	
	EUR-05	Yes	Yes	

### UNIT ABBREVIATIONS:

F=FRONT UNIT  
M=MAIN UNIT  
V=VR UNIT  
CO=CONNECT UNIT

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

## CAUTION

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

**DO NOT** reverse the polarities of the power supply when connecting the transceiver.

**DO NOT** apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front-end.

## ORDERING PARTS

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

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

### <ORDER EXAMPLE>

1110003491 S.IC TA31136FNG IC-F61M MAIN UNIT 5 pieces  
8820001210 Screw 2438 screw IC-F61M Top cover 10 pieces

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

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## REPAIR NOTES

1. Make sure the problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver 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 transceiver is defective.
6. **DO NOT** transmit power into a Standard Signal Generator or a Sweep Generator.
7. **ALWAYS** connect a 50 dB to 60 dB attenuator between the transceiver and a Deviation Meter or Spectrum Analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting a test equipment to the transceiver.

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## ■ GENERAL

- Frequency coverage : 457.525–467.575 MHz
- Number of conventional channels : 128 ch / 8 zones
- Type of emission : 16K0G3E (25.0 kHz)
- Antenna impedance : 50 Ω (Nominal)
- Operating temperature range : -20°C to +55°C
- Power supply requirement (nominal) : Specified Icom's battery packs only (7.2 V DC; negative ground)
- Current drain (Approx.) : Receiving 85 mA (stand-by)  
500 mA (max. audio with internal speaker)  
300 mA (max. audio with external speaker)  
Transmitting 1.0 A (at 2.0 W)  
0.4 A (at 0.2 W)
- Input impedance(MIC) : 2.2kΩ
- Intermediate frequency : 1st 46.35 MHz , 2nd 450 kHz
- Output impedance(audio) : 8 Ω
- Dimensions (Projections not included) : 56.0 (W)×97.0 (H)×36.4 (D) mm
- Weight (Incl. BP-227) : Approx. 284 g

## ■ TRANSMITTER

- Output power : 2 W (High)/0.2 W (Low)
- Modulation : Variable reactance frequency modulation
- Maximum frequency deviation : ±5.0 kHz
- Frequency stability : ±2.5 ppm
- Spurious emissions : 0.25 μW (≤1 GHz)
- Adjacent channel power : 70 dB min.
- Audio harmonic distortion : 3% (at AF 1 kHz 40% deviation)
- Residual modulation : 40 dB min., 42 dB typ.  
(without CCITT filter, with de-emphasis )
- Limiting charact of modulator : 60–100% of max. deviation
- Microphone impedance : 2.2 kΩ

## ■ RECEIVER

- Sensitivity : -4 dBμ V (EMF) typ. at 20 dB SINAD
- Squelch sensitivity (at threshold) : -4 dBμ V (EMF) typ.
- Adjacent channel selectivity : 70 dB min., 73 dB typ.
- Spurious response : 70 dB
- Intermodulation : 68 dB min., 70 dB typ.
- Hum and noise (with CCITT filter) : 45 dB min., 55 dB typ.
- Audio output power : 0.7 W typ. (at 5% distortion with the internal speaker)  
0.5 W typ. (at 5% distortion with an 8 Ωexternal speaker)
- Audio output impedance : 8 Ω

Specifications are measured in accordance with EIA-152-C/204D, EN 300 720-1.

**All stated specifications are subject to change without notice or obligation.**

## ■ UHF MARINE CHANNEL LIST

### • Single frequency simplex channels

CH	Frequency (MHz)
A	467.525
B	467.550
C	467.575
D	457.525
E	457.550
F	457.575

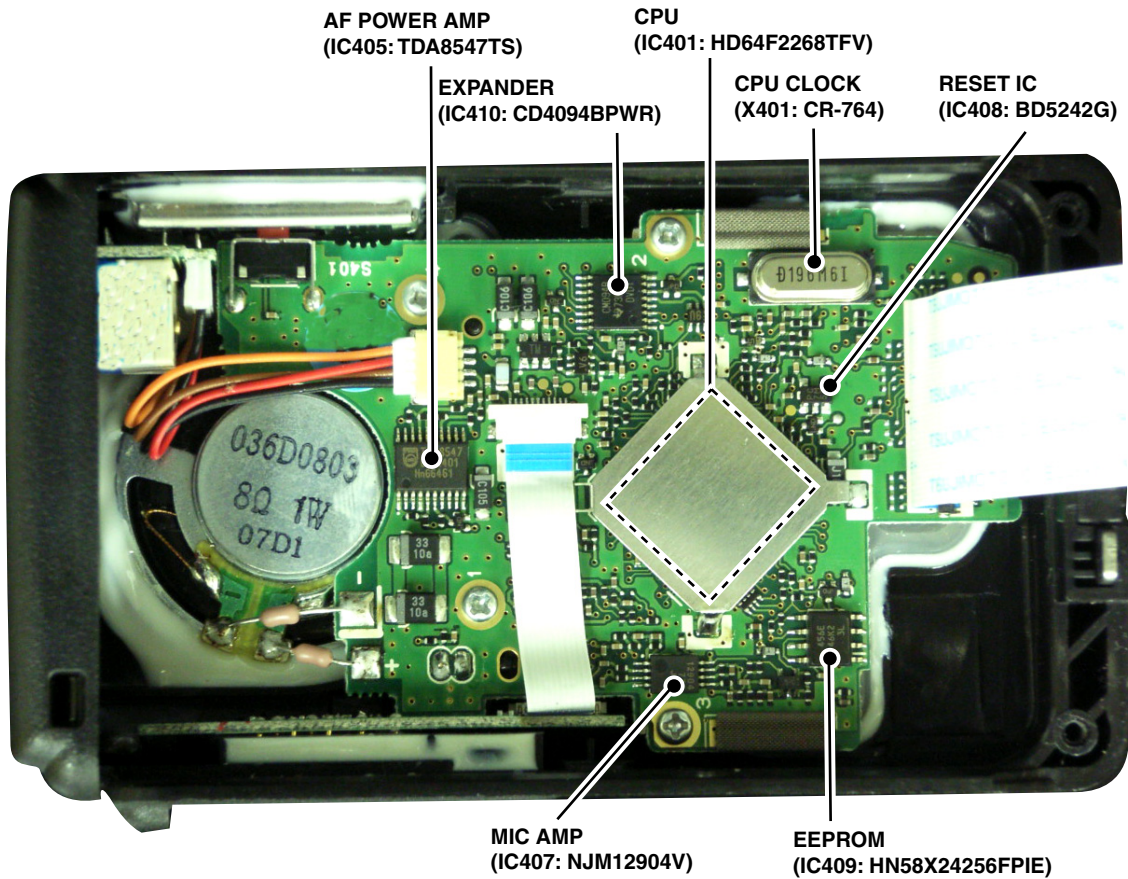
### • Two-frequency semi-duplex channels for use with repeater only

CH	Frequency (MHz)	
	Repeater RX	Repeater TX
G	467.525	457.525
H	467.550	457.550
J	467.575	457.575

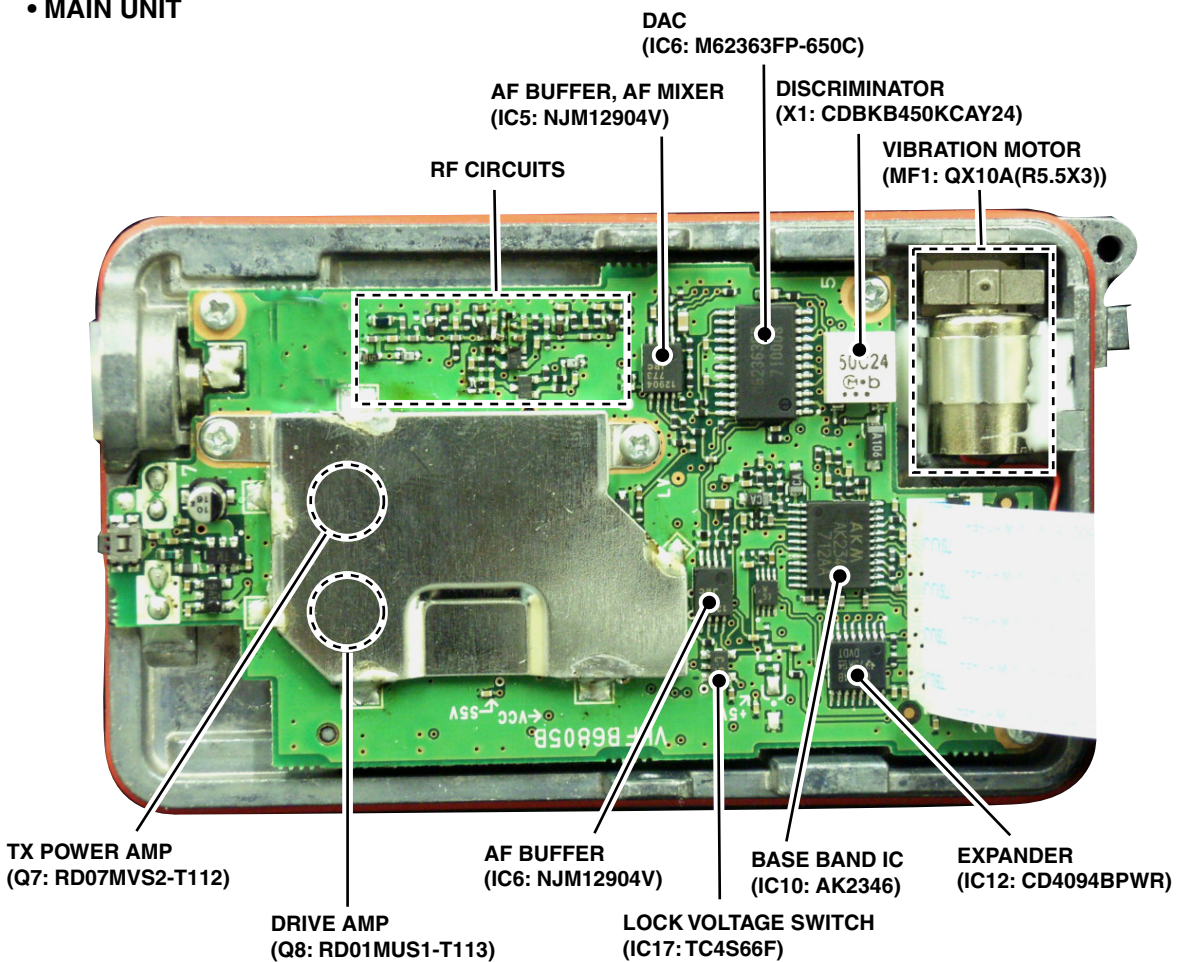
# SECTION 2

# INSIDE VIEWS

## • FRONT UNIT



## • MAIN UNIT

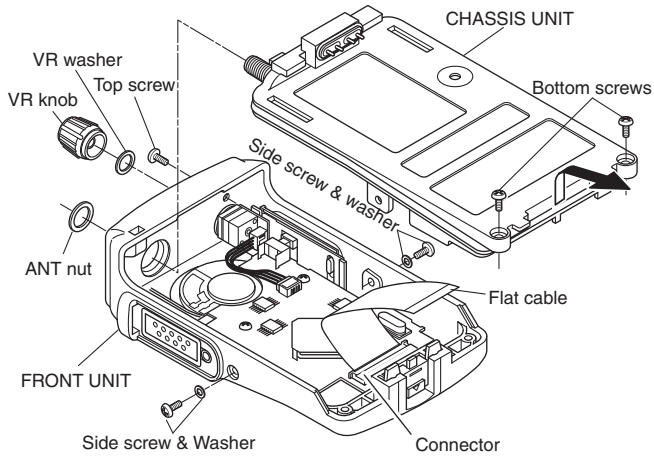


# SECTION 3 DISASSEMBLY INSTRUCTION

## 1. REMOVING THE CHASSIS UNIT

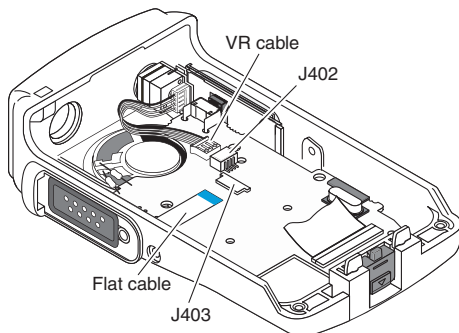
**BE CAREFUL** about the flat cable and connector when separating the CHASSIS UNIT from the FRONT UNIT.

- ① Unscrew the ANT nut, and remove the VR knob.
- ② Remove the VR washer, and unscrew the top screw.
- ③ Unscrew side screws and washers.
- ④ Unscrew bottom screws.
- ⑤ Take off the CHASSIS UNIT carefully in the direction of the arrow.
- ⑥ Disconnect the flat cable from the CHASSIS UNIT (MAIN UNIT).

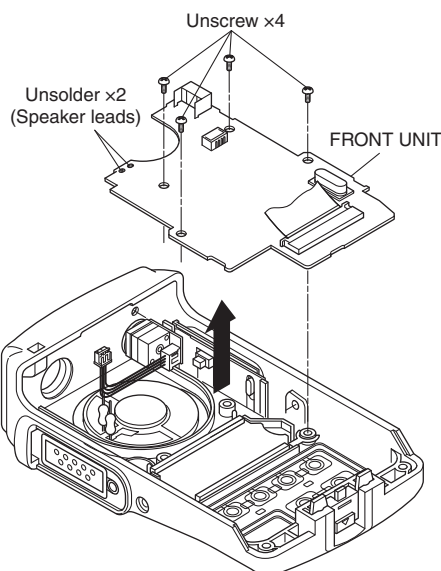


## 2. REMOVING THE FRONT UNIT

- ① Disconnect the VR cable from J402.
- ② Disconnect the flat cable from J403.

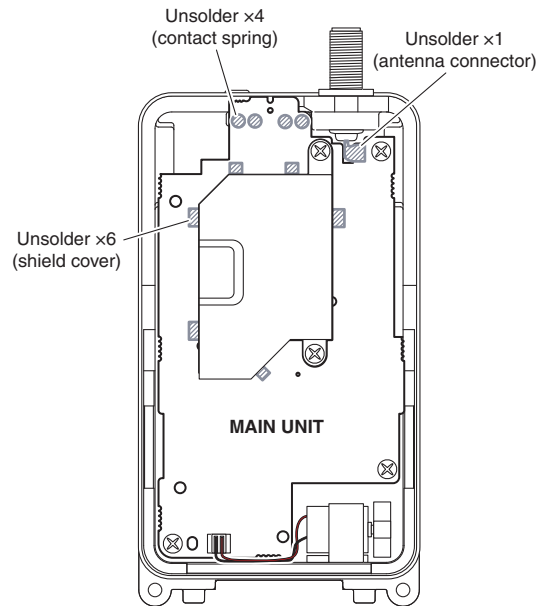


- ③ Unscrew 4 screws.
- ④ Unsolder 2 points (at the speaker leads).
- ⑤ Take off the FRONT UNIT in the direction of the arrow.

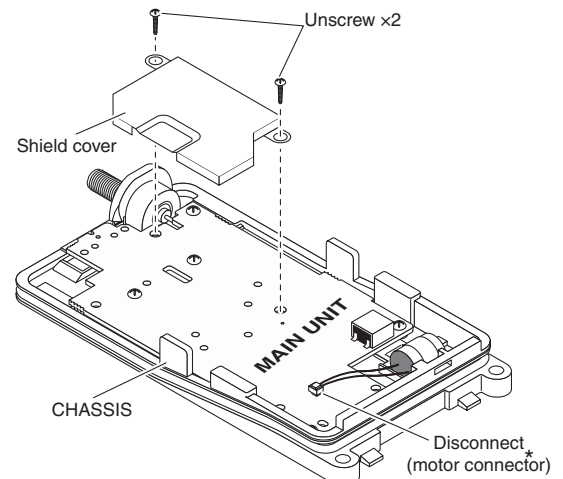


## 3. REMOVING THE MAIN UNIT

- ① Unsolder 6 points from the shield cover.
- ② Unsolder 4 points from the contact spring.
- ③ Unsolder 1 point from the antenna connector.

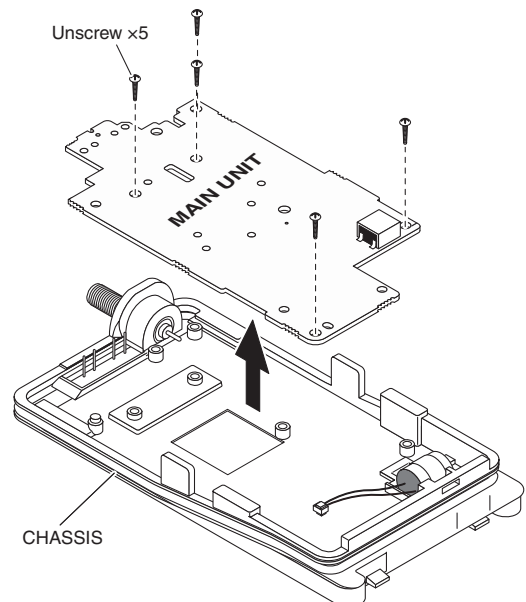


- ④ Unscrew 2 screws, and remove the shield cover.
- ⑤ Disconnect the motor connector\* from the MAIN UNIT.



\*: Except [USA], [EUR], [EXP], [CHN], [USA-03], [EXP-03]

- ⑥ Unscrew 5 screws, and take off the MAIN UNIT.



## 4-1 RECEIVER CIRCUITS

### RF CIRCUITS

RF circuits consist of RF filters, antenna switch (ANT SW), RF amplifier (RF AMP), etc., and extracts and amplifies the signals of frequency which desired to receive.

The received signals (RX signals) from the antenna are passed through the 3-pole LPF, ANT SW (as an LPF in RX), BEF (Band Eliminate Filter; as a trap), limiter, and the two-staged tuned BPF. The filtered RX signals are amplified by the RF AMP, and passed through another two-staged tuned BPF. The filtered RX signals are then applied to the 1st IF circuits.

The ANT SW toggles RX line and TX line. While receiving, the TX line and the antenna is disconnected to prevent RX signals entering. The RX line is disconnected from the GND simultaneously, and an LPF which guides received signals to the RX circuits is composed.

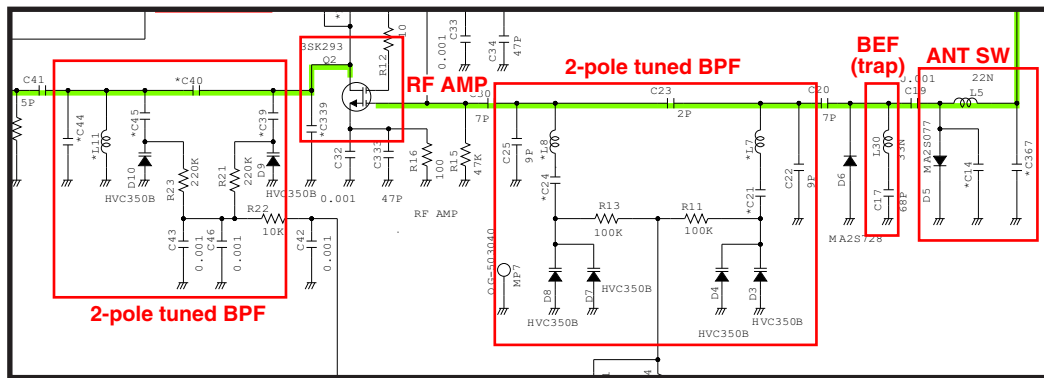
While transmitting, serial-connected PIN diodes are ON, thus the TX line is connected to the antenna, and the RX line is connected to the GND simultaneously to prevent TX signal entering.

The limiter protects RX line from over-level RF inputs, and the BEF (=trap) damps unwanted signals to GND.

The tuned-BPF is adjusted so that it responds to receiving frequency and rejects all others, by the variable capacitor whose capacitance is varied by added voltage "T1" and "T2."

The RF AMP amplifies RX signals to a level suited to the 1st mixer.

### • RF CIRCUITS



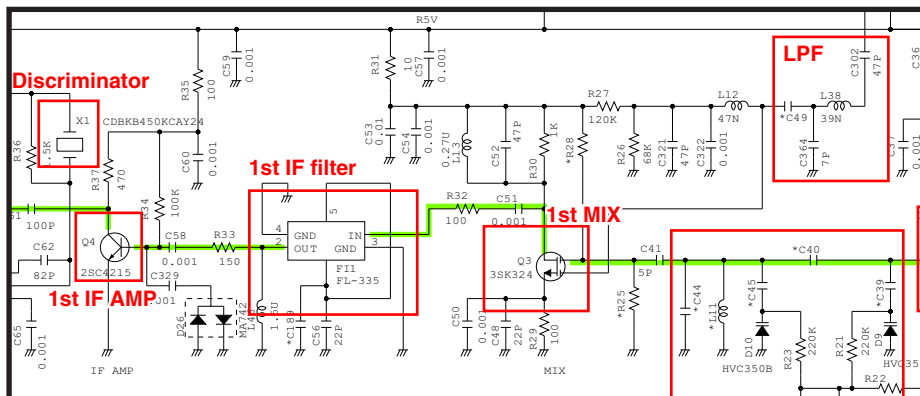
### 1ST IF CIRCUITS

The 1st IF circuits consist of 1st mixer, 1st IF filter and 1st IF amplifier (IF AMP). And it converts the RX signals into the 1st IF signal, then filters to remove unwanted signals and amplifies.

The converted 1st IF signal is passed through the 1st IF filter to be removed unwanted signals. The filtered 1st IF signal is applied to the 1st IF AMP via the limiter. The amplified 1st IF signal is then applied to the 2nd IF circuits.

The filtered RX signals are applied to the 1st mixer to be converted into the 46.35 MHz 1st IF signal, by being mixed with the 1st Local Oscillator (LO) signals from the RX VCO via the LPF.

### • 1ST IF CIRCUITS



**2ND IF AND FM DEMODULATOR CIRCUITS**

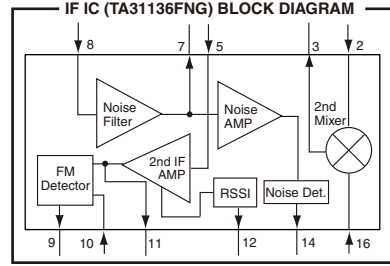
The 2nd IF circuits consist of 2nd mixer, 2nd IF filter, 2nd IF amplifier. And it converts the 1st IF signal into the 2nd IF signal, then filters to remove unwanted signals and amplifies. IF IC "TA31136FNG" contains whole of the 2nd IF circuits and FM demodulator circuit too.

The 1st IF signal is applied to the IF IC, and converted into the 2nd IF signal, by being mixed with the 15.3 MHz 2nd LO signal at internal 2nd mixer.

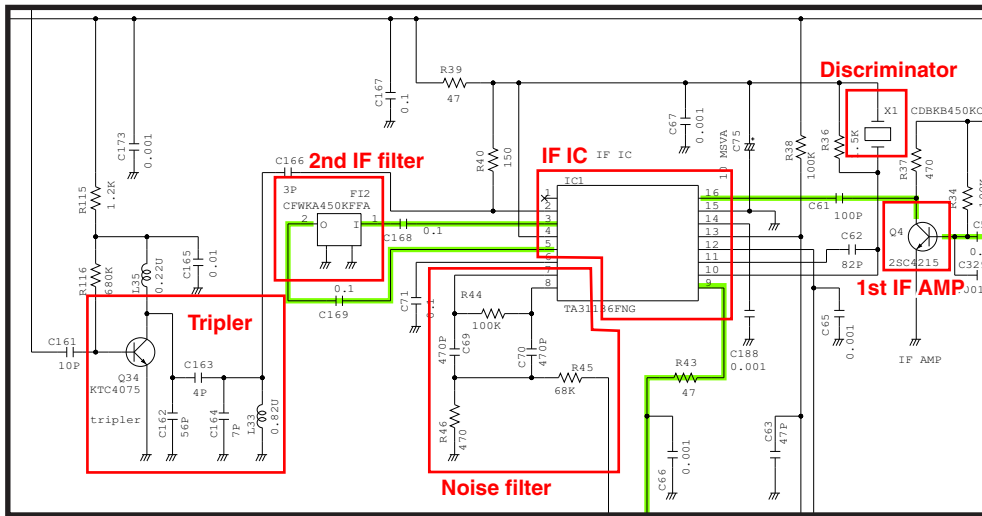
The 2nd LO signal is generated by reference frequency oscillator, buffered by the PLL IC and tripled by the tripler, then applied to the IF IC.

The converted 2nd IF signal is filtered by external 2nd IF filter (ceramic filter), and saturation-amplified by internal 2nd IF AMP. The amplified 2nd IF signal is FM-demodulated by the quadrature detector.

The demodulated AF signals "SQLI" are applied to the RX AF circuits.



**• 2ND IF AND FM DEMODULATOR CIRCUITS**



**RX AF CIRCUITS**

The RX AF circuits consist of AF filters, AF amplifier (AF AMP), AF power amplifier, etc., and amplify, filter the AF signals FM-demodulated by the IF IC.

This transceiver employs the base band IC for audio signal processing for both transmit and receive. The base band IC is an audio processor and composed of RF amplifier, compressor, expander, scrambler, etc. in its package.

The demodulated AF signals from the IF IC are applied to the base band IC (IC10, pin 23). The applied AF signals are amplified at the amplifier section and level adjusted at the volume controller section, then suppressed unwanted 3 kHz and higher audio signals at LPF. The filtered AF signals are applied (bypassed) the TX/RX HPF, scrambler, de-emphasis sections in sequence.

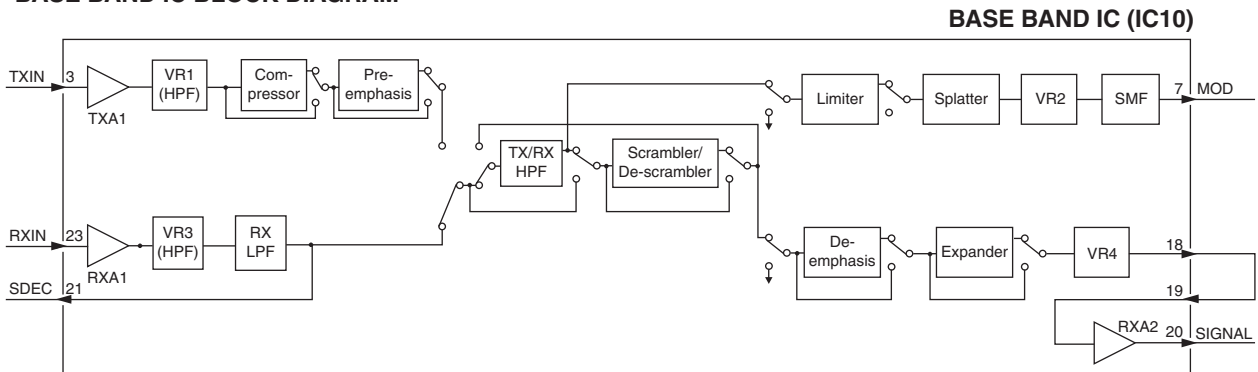
The TX/RX HPF filters out 250 Hz and lower audio signals, and the de-emphasis circuit obtains -6 dB/oct of audio characteristics. The expander expands the compressed audio signals and also noise reduction function is provided.

The AF signals are then level adjusted at the volume controller section and amplified at the amplifier section, then output from pin 20 (IC10).

The processed AF signals from the base band IC (IC10) are applied to the FRONT UNIT via J1 (MAIN) and J401 (FRONT).

The AF signals from the MAIN UNIT "SIGNAL" are passed through the AF mute SW, LPF and variable register (VR UNIT) for audio level adjustment, then applied to the AF power AMP. The amplified AF signals "AFO" are applied to the internal speaker, or external speaker via the [SP MIC] jack (MP701; CHASSIS).

**• BASE BAND IC BLOCK DIAGRAM**



## SQUELCH CIRCUITS

### • NOISE SQUELCH

The noise squelch cuts off the AF output signals when no RF signals are received. Extracting noise components (approx. 30 kHz signals) in the demodulated AF signals, the squelch circuit turns the AF power amplifier and AF switches ON and OFF.

A portion of FM-demodulated AF signal from the IF IC is adjusted its level (=squelch threshold level) by DAC (D/A converter; IC6, pins 1, 2), then passed through the noise filter (M: IC1, pins 7, 8 and R44-46, C69, 70) to extract the noise components (approx. 30 kHz signals) only. The noise components are rectified to be converted into the pulse-type signal by noise detector to produce DC voltage corresponding to the noise level "NOIS". Then the DC voltage is applied to the CPU (IC401, pin 41) and compared with the reference level preset in the CPU.

If the CPU interpretes that the noise level is higher than preset one, the CPU sets the "AFON" signal to "High" to turn the AF power AMP controller OFF, and the AF mute SW is turned OFF simultaneously. Thus closing the squelch is accomplished.

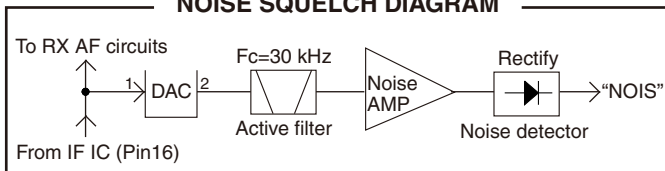
### • TONE SQUELCH

The tone squelch connects the RX AF line and activates the AF power amplifier to emit the AF signals only when receiving a signal which contains the tone frequency matched with preset in the CPU. Detecting signal in the demodulated AF signals, the tone squelch circuit turns the AF power amplifier and AF switches ON and OFF.

#### <CTCSS/DTCS>

A portion of FM-demodulated AF signals from the IF IC are passed through the tone filter (M: Q36, pins 5, 6) to remove unwanted voice signals. The filtered tone signals are applied to the CPU (IC401, pin 44).

**NOISE SQUELCH DIAGRAM**



## 4-2 TRANSMITTER CIRCUITS

### TX AF CIRCUITS

The TX AF circuits consist of microphone amplifier (MIC AMP) and AF filters. The AF filter cuts off the signals except voice signals (300 Hz or lower and 3 kHz or higher).

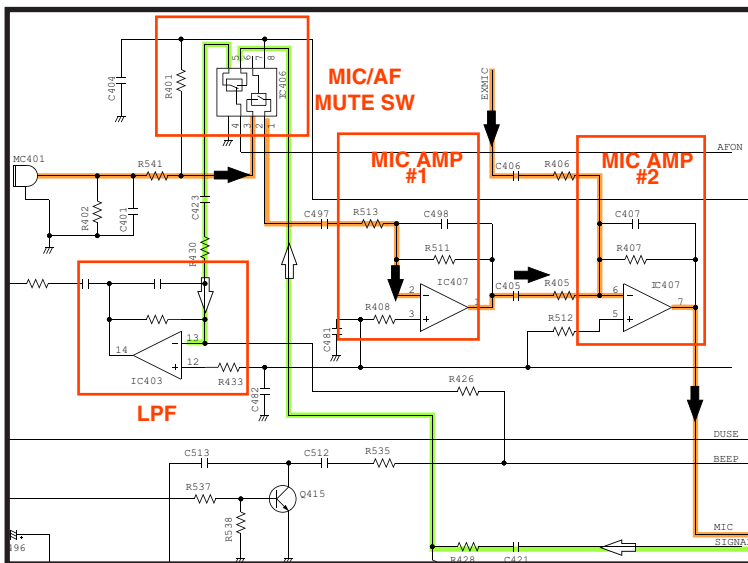
The audio signals from the internal microphone (MIC signals) are passed through MIC mute SW and amplified by two MIC AMPs (#1 and #2).

The MIC signals from the external microphone "EXMIC" are applied to the FRONT UNIT via [SP MIC] jack, and amplified by MIC AMP (#2).

The amplified MIC signals "MIC" are applied to the MAIN UNIT via J401(FRONT UNIT) and J1 (MAIN UNIT).

The MIC signals from the FRONT UNIT are applied to the baseband IC (IC10, pin 3) and processed.

### • TX AF CIRCUITS



The applied MIC signals are amplified at the amplifier (TXA1), and level adjusted at the volume controller (VR1). The level adjusted MIC signals are applied (bypassed) the compressor section, pre-emphasis section, TX/RX HPF, de-scrambler, limiter, splatter, in sequence, then applied to another volume controller.

The compressor compresses the MIC signals to provide high S/N ratio for receive side, and the pre-emphasis obtains +6 dB/oct audio characteristics. The TX/RX HPF filters out 250 Hz and lower audio signals, the limiter limits its level and the splatter filters out 3 kHz and higher audio signals. The filtered MIC signals are level adjusted at another volume controller (VR2), and then output from pin 7 via smoothing filter (SMF).

The output MIC signals are passed through the FM/PM SW (IC11, pins 6, 1) and LPF (IC5, pins 2, 1) then applied to the DAC (D/A Converter; IC6, pin 4) and level-adjusted (deviation adjustment). The level-adjusted MIC signals are output from pin 3, then applied to the modulation circuit as the modulation signals "MOD" via buffer (IC5, pins 6, 7).

<CTCSS/DTCS>

CTCSS/DTCS signals ("CEN0"-"CEN2") are generated by the CPU (F: IC401, pins 79-81) and converted its wave form by R461-R463 (F), then passed through the LPF (F: IC403, pins 3, 1). The filtered CTCSS/DTCS signals are then level-adjusted by DAC (M: IC6, pins 9, 10) and applied to the AF mixer (M: IC5, pin 3) to be mixed with MIC signals, then applied to the TX VCO as the modulation signals. The CTCSS/DTCS signals are also applied to the reference signal oscillator (M; X2) too.

**MODULATION CIRCUIT**

The modulation circuit FM-modulates the VCO oscillating signal with the modulation signals from the TX AF circuits.

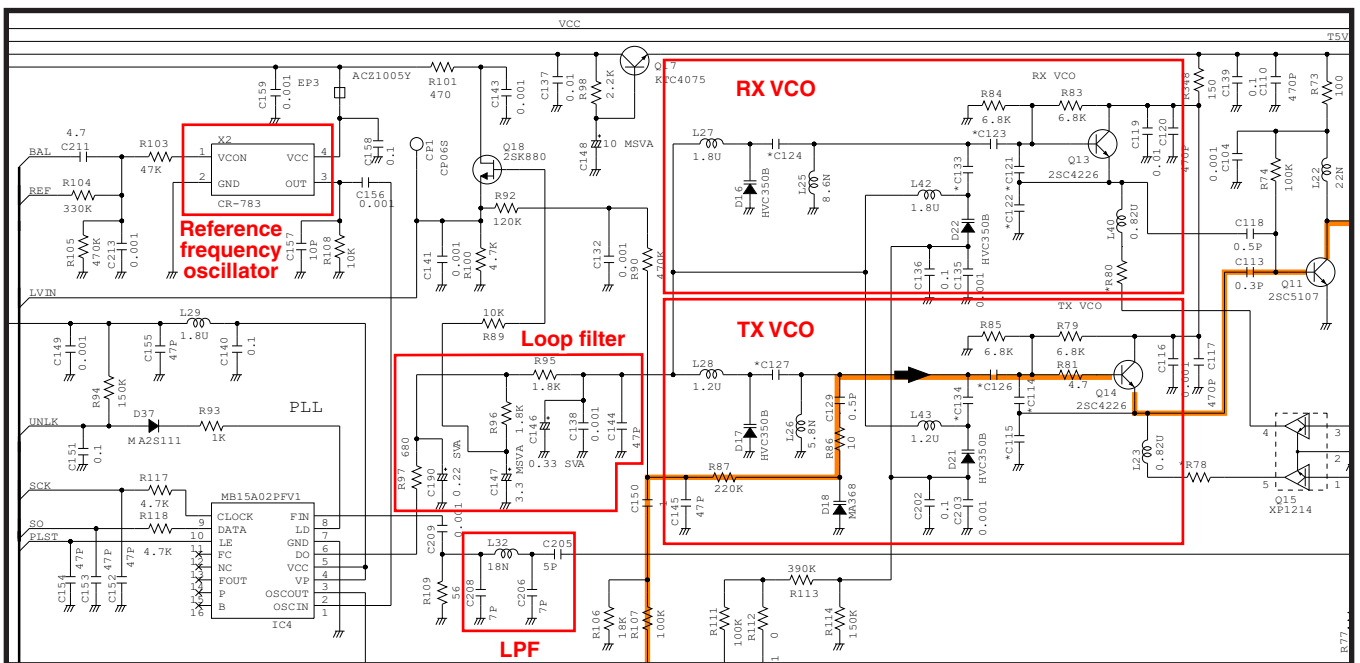
**• VOICE SIGNAL**

The buffer-amplified AF signals are applied to the variable capacitor (VD) to change its reactance for FM modulation.

**• TONE SIGNALS**

Tone signals are generated in the CPU and applied to the both of the VCO and reference frequency oscillator to be modulated.

**• MODULATION CIRCUIT AND TX/RX VCOS**



## TRANSMIT AMPLIFIERS

The transmit amplifiers consist several RF amplifiers (pre-driver, driver and power), and amplify the TX VCO output to the transmit output level.

The TX VCO output is applied to the pre-drive amplifier via the LO SW. The amplified TX signal is amplified by YGR and drive amplifiers, then power-amplified by the power amplifier to obtain 4 W (max.) of TX output power.

The power-amplified TX signal is passed through the LPFs (as a harmonic filter), ANT SW (TX), and another LPF, then applied to the antenna.

## APC CIRCUIT

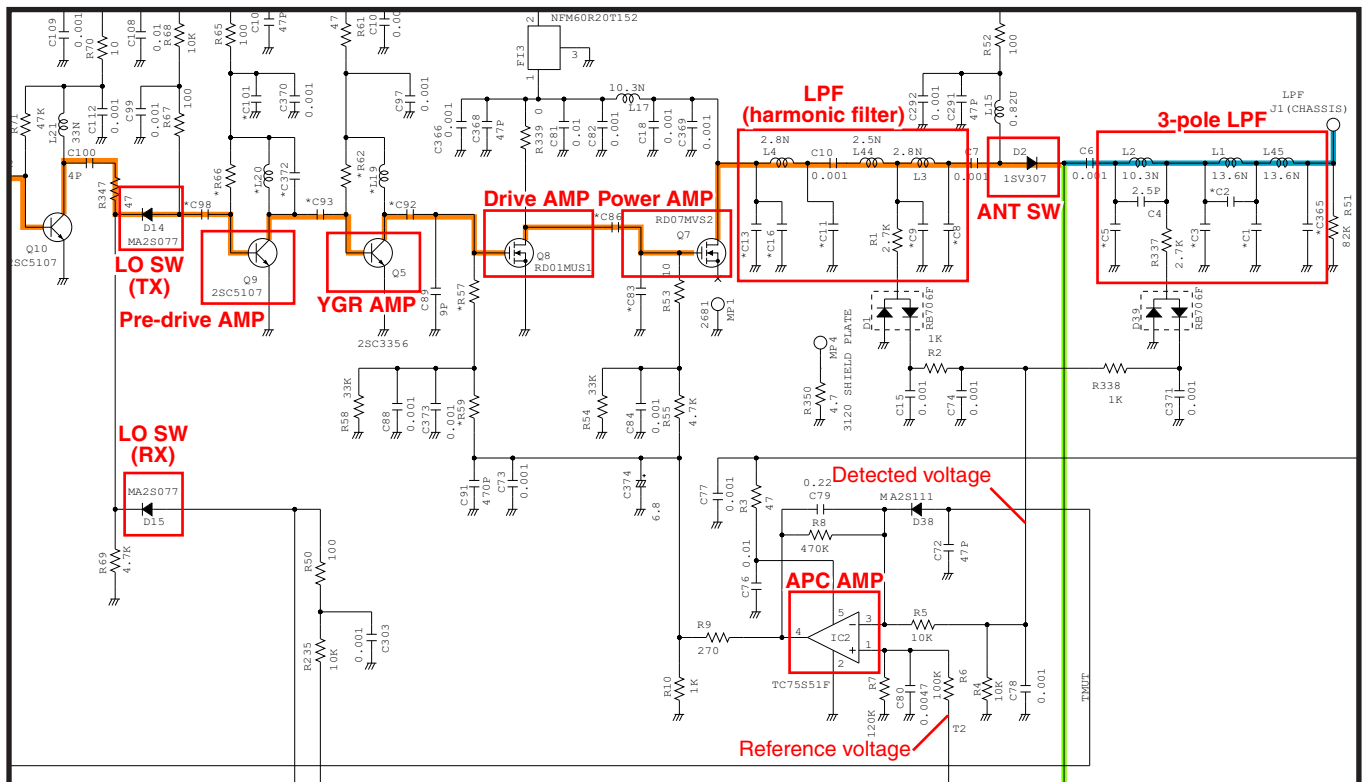
The APC (Automatic Power Control) circuit stabilizes transmit output power to prevent transmit output power level change which is caused by load mismatching or heat effect, etc. The APC circuit also selects transmit output power from high, middle and low power.

A portion of the TX signal is rectified by the power detector to be converted into DC voltage which is in proportion to the transmit output power level. The detected voltage is applied to the comparator. The transmit power setting voltage is applied to another input terminal as the reference voltage.

The APC compares the detected voltage and reference voltage, and the difference of voltage is output. The output voltage controls the bias of the TX amplifiers to reduce/increase the gain of these amplifiers for stable transmit output power.

The change of transmit power is carried out by changing reference voltage.

## • TRANSMIT AMPLIFIERS AND APC CIRCUIT





### 4-3 FREQUENCY SYNTHESIZER CIRCUITS

#### VCOs

A VCO is an oscillator which its oscillation frequency is determined by the applied voltage. This transceiver has two VCOs; RX VCO and TX VCO. The RX VCO generates the 1st LO signals for the 1st IF produce, and TX VCO generates TX signal. The VCO SW toggles these VCOs.

#### • RX VCO

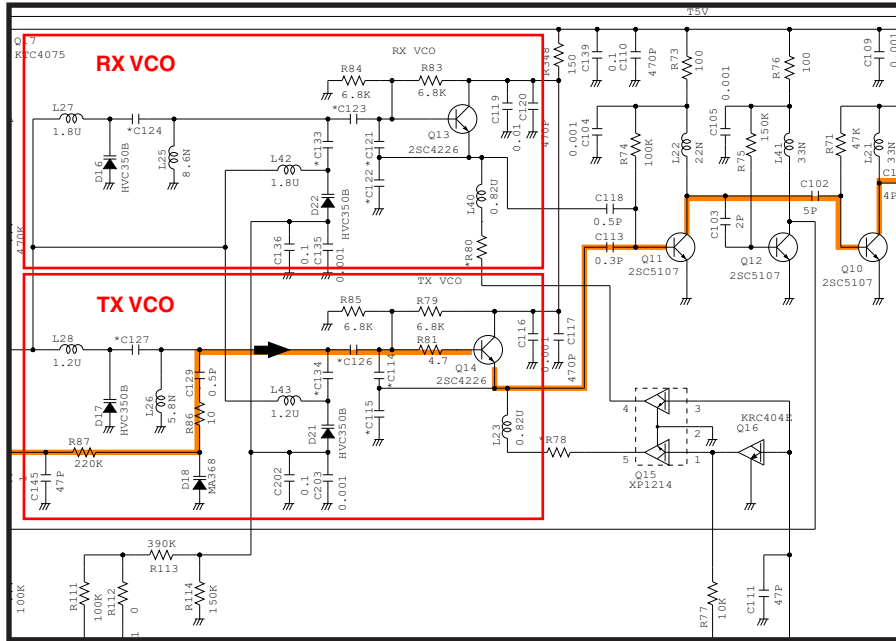
The generated 1st LO signals are applied to the 1st mixer (Q3) via two buffers (Q11 and Q10), LO SW and LPF.

#### • TX VCO

The generated TX signal is applied to the pre-drive AMP (one of TX AMPs) via the LO SW.

A portion of the VCO output is applied to the PLL IC via the buffers (Q11 and Q12).

#### • VCOs AND BUFFERS



#### PLL (Phase Locked Loop) CIRCUIT

The PLL circuit provides stable oscillation for both of the transmit and 1st LO frequencies (for receive). By comparing the feed backed VCO output and the reference frequency signal, the oscillating frequency is stabilized.

The PLL output frequency is controlled by the serial data including divide ratio from the CPU.

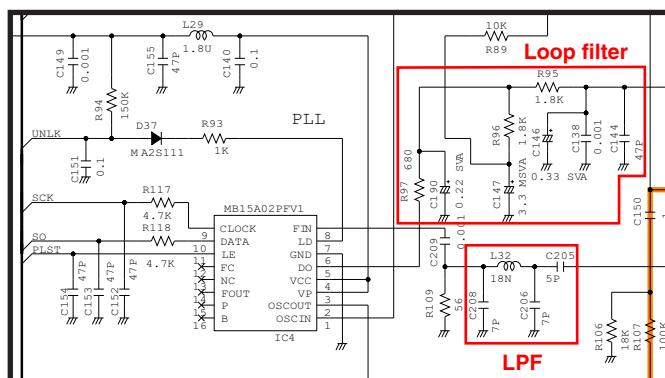
A portion of VCO output from the buffer (Q12) is applied to the PLL IC via LPF. The applied VCO output is divided according to the serial data including divide ratio from the CPU, at the prescaler and programmable divider. In the same way, the reference frequency signal from the reference frequency signal oscillator is applied to the PLL IC and divide so that these are the same frequency.

The frequency-matched signals are applied to the phase comparator and phase-compare. The resulted phase difference is detected as a phase-type signal, and level-adjusted at the charge pump then output. The output pulse type signal is passed through the loop filter to be converted into the DC voltage (=Lock Voltage).

Applying the lock voltage to the variable capacitors (VD) which composes a part of the resonator of VCO, the capacitance of VDs changes corresponding to the applied lock voltage. This causes the change of resonance frequency that determines the VCO oscillating frequency to keep the VCO frequency constant.

When the oscillation frequency drifts, its phase changes from that of the reference frequency, causing a lock voltage change to compensate for the drift in the VCO oscillating frequency.

#### • PLL CIRCUITS



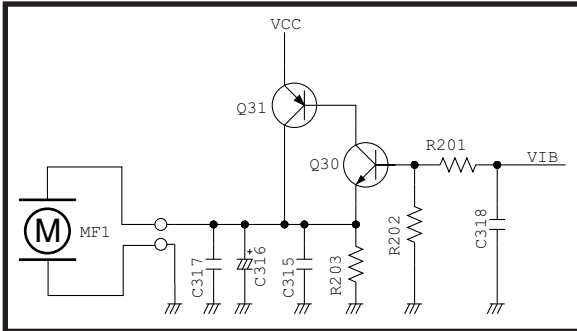
## 4-4 OTHER CIRCUITS

### Vibration MOTOR CIRCUIT ([EUR-04], [EUR-05] only)

MF1 is a vibration motor. When the matched RX code signal is received, MF1 rotates to produce Vibration.

In vibration mode, and when the transceiver is called, "VIB" signal from the expander (IC12, pin 6) turns to "High(=VCC level)" and motor driver (Q30, Q31) is activated to rotate the vibration motor (MF1).

#### • MOTOR DRIVER

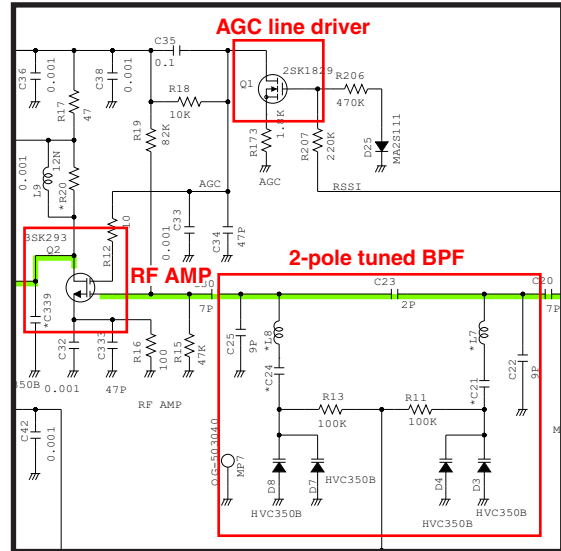


### AGC (Automatic Gain Controller) CIRCUIT

The AGC circuit effectively reduces the RX signal level if the signal is strong, and raises it when it is weaker. The AGC circuit detects the overall strength of the signal and automatically adjusting the gain of the RF AMP to maintain an approximately constant average level of the received signals.

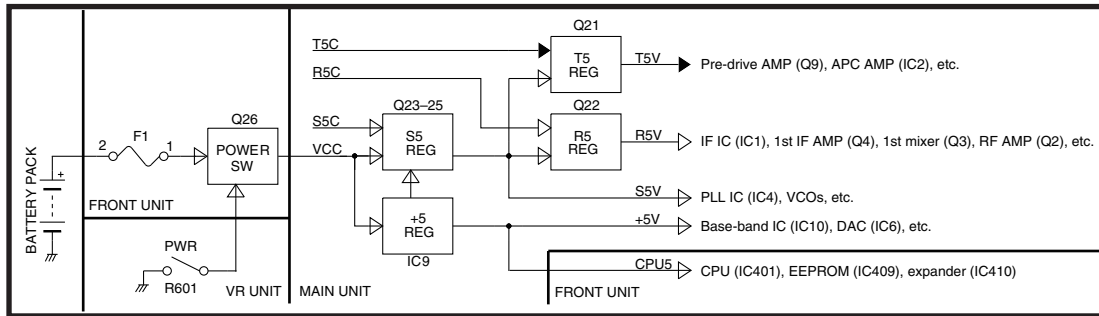
RSSI signal which is in proportion to the RX signal level is applied to the gate terminal of AGC line driver. The driver controls the voltage which supplied to the RF AMP to control the gain of RF AMP.

#### • AGC CIRCUIT



## 4-5 VOLTAGE BLOCK DIAGRAM

Voltage from the battery pack is routed to whole of the transceiver via switches and regulators.



#### 4-6 CPU (F: IC401) PORT ALLOCATION

Pin No.	Line name	Description	I/O
1–11	SEG23–13	LCD segment ports.	O
13	SEG12		
15–25	SEG11–1		
26	SO	Serial data to DAC (M: IC6) and audio strage IC (M: IC18).	O
27	SCK	Serial clock to DAC (M: IC6) and audio strage IC (M: IC18).	O
28	MDIO	Data I/O for baseband IC (M: IC10).	I/O
29	MSCK	Clock to the baseband IC (M: IC10).	O
30	SS	Chip select signal to the Voice strage IC* (M: IC18).	O
31	PLST	Strobe signal to the PLL IC (M: IC4).	O
32	SDA	Serial data to DAC and voice strage IC* (M: IC18).	O
33	SCL	Serial clock to DAC (M: IC6) and voice strage IC* (M: IC18).	O
34	INT	Interupt signal to voice strage IC* (M: IC18).	O
35	EXSF	Strobe to the expander (F: IC410).	O
36	EXSM	Strobe to the expander (M: IC12)	O
37	EXOE	Output enable signal to the expander ICs (F: IC410 and M: IC12).	O
38	BEEP	Beep sounds.	O
39	MTDT	Data (MSK TX data) to the baseband IC (M: IC10).	O
40	MTCK	Clock (for MSK TX data) to baseband IC (M: IC10).	O
41	NOISE	Noise level from IF IC (M: IC1).	I
43	SDEC	Tone signals (DTMF, 2/5tone).	I
44	CDEC	CTCSS/DTCS signals.	I
45	VOXV	VOX detect. "High"=start to transmit.	I
46	KR1	Key input for [UP], [P0] and [P3] keys. (Pulled up)	I
47	KR0	Key input for [DOWN], [P1] and [P2] keys. (Pulled up)	I
48	BATV	Battery volatge for monitoring.	I
49	LVIN	Lock voltage for monitoring.	I
50	RSSI	RSSI voltage from IF IC (M: IC1).	I
51	TEMP	Voltage divided by thermal register (M: R190) and R191. (temperature monitor)	I
52	OPTV	Optional unit detect. "High"=An optional unit is connected.	I
55	UNLK	PLL unlock signal from IC4. "Low"=PLL is unlocked.	I
59	RES	Reset signal from the reset IC (F: IC408).	I
68	BPMAX	Beep sound level control signal to BEEP SW (F: Q415). "Low"=Maximum beep sound level.	O
69	RAC	Row address clock to the Voice strage IC* (M: IC18).	O

\*; [EUR-05] only

Pin No.	Line name	Description	I/O
70	PTT	[PTT] key (F: S401). (Pulled up)	I
71	MDIR	Serial data I/O control signal to the baseband IC (M: IC10).	O
72–75	SENC3–SENC6	2/5 tone, DTMF signals.	O
78	MRDF	MSK data RX flag/flame detect signal to the baseband IC (M: IC6).	O
79–81	CENC0–CENC2	CTCSS/DTCS signals.	O
82	DAST	Strobe signal to the DAC (M: IC6).	O
88–91	COM4–COM1	LCD common terminals.	–
92–100	SEG32–24	LCD segment ports.	O

# SECTION 5 ADJUSTMENT PROCEDURE

## 5-1 PREPARATION

### ■ REQUIRED EQUIPMENTS

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
Cloning software	CS-F50V CLONING SOFTWARE (Revision 1.0 or later)	JIG cable (See the page 5-3)	Modified OPC-966 (RS-232C type) or OPC-966U (USB type)
RF power meter (terminated type)	Measuring range : 0.1–3 W Frequency range : 100–600 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Standard signal generator (SSG)	Frequency range : 0.1–600 MHz Output level : 0.1 mV to 32 mV (–127 to –17 dBm)
Frequency counter	Frequency range : 0.1–600 MHz Frequency accuracy: ±1 ppm or better Input level : Less than 1 mW	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
		AC millivoltmeter	Measuring range : 10 mV to 10 V
Modulation Analyzer	Frequency range : 30–600 MHz Measuring range : 0 to ±10 kHz	External speaker	Input impedance : 8 Ω Capacity : More than 1 W
Audio generator	Frequency range : 300–3000 Hz Output level : 1–500 mV	Attenuator	Power attenuation : 30 dB Capacity : More than 3 W

**CAUTION!** **BACK UP** the originally programmed memory data in the transceiver before programming the adjustment frequencies. When program the adjustment frequencies into the transceiver, the transceiver's memory data will be overwritten and lose original memory data at the same time.

### ■ CLONING ADJUSTMENT CHANNELS

Before starting adjustment, clone adjustment frequencies and other conditions (including Squelch Level) into the transceiver using CS-F50V CLONING SOFTWARE as below.

#### • ADJUSTMENT CHANNELS

Zone 1: (Left CH – 112)													
CH	Atr	Inh	Frequency (MHz)				C.Tone		Text	Com- pander	TOT	RF PWR	F S
			RX	TX	TX Inh	W/N	SQL Tight	RX					
1- 1	AB		457.525000	<-		W						L1	
1- 2			467.525000	<-		W						L1	
1- 3			460.000000	<-		W						L1	
1- 4			457.525000	<-		W						H	
1- 5			457.525000	<-		W						L2	
1- 6			457.525000	<-		W						L1	
1- 7			457.525000	<-		W						L1	
1- 8			457.525000	<-		W						L1	
1- 9			457.525000	<-		W		007N				L1	
1- 10			457.525000	<-	i	W						L1	
1- 11			457.525000	<-	i	W						L1	
1- 12			457.525000	<-	i	W						L1	

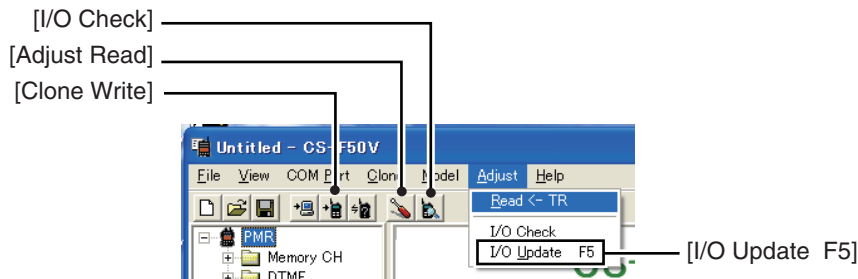
#### • SQUELCH LEVEL SETTING

Set Mode		
	Value	Enable /Inhibit
Backlight	Auto	Enable
Beep	ON	Enable
Ringer Level	Unknd	Enable
SQL Level	2	Inhibit
AF Min Level	OFF	Enable

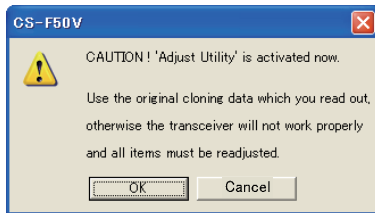
Set the SQL Level to "2"

## STARTING SOFTWARE ADJUSTMENT

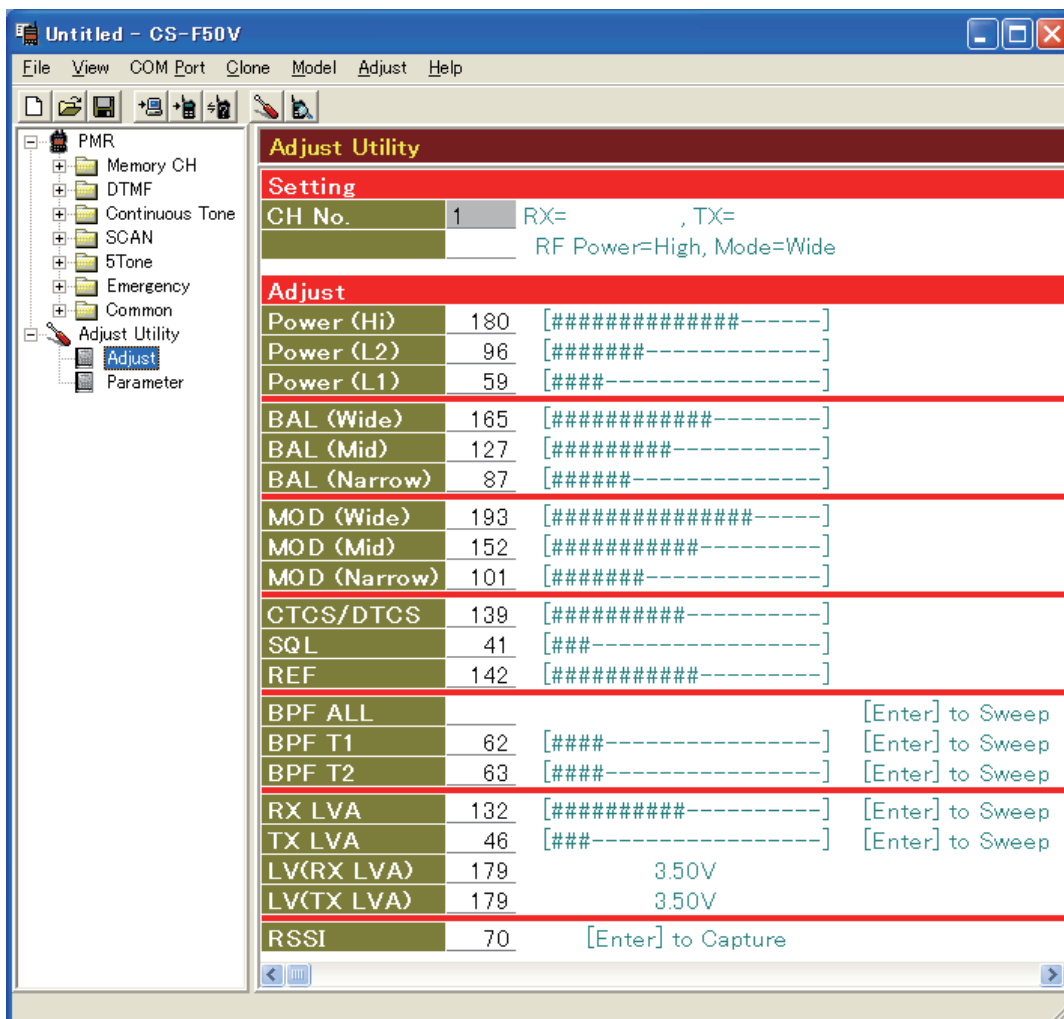
- ① Connect the transceiver and PC with OPC-966/U. (see the page 5-4)
- ② Turn the transceiver power ON.
- ③ Boot up Windows, and click the program group 'CS-F50V' in the 'Programs' folder of the [Start] menu, then CS-F50V's window appears. (Or click the shortcut 'CS-F50V' on the desktop.)
- ④ Click [Adjust Read] button.



- ⑤ The 'CAUTION' dialog appears. Click [OK].



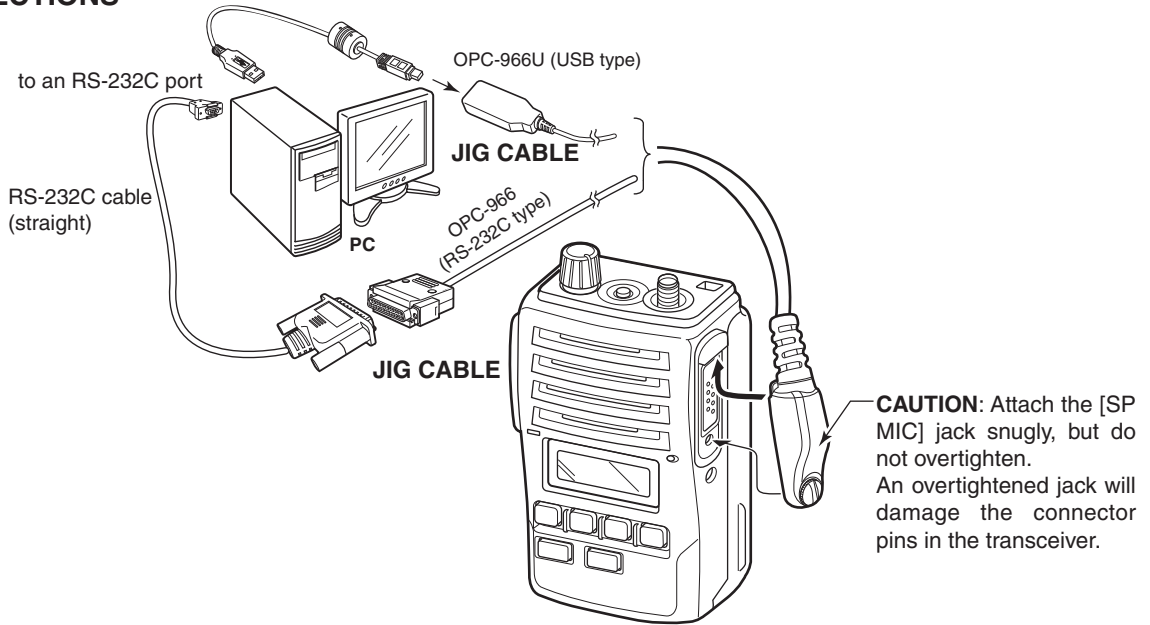
- ⑥ The adjustment window shows transceiver's condition and adjustment items as below.
- ⑦ Set or modify adjustment data as specified in the guidances (pages 5-4 to 5-12).



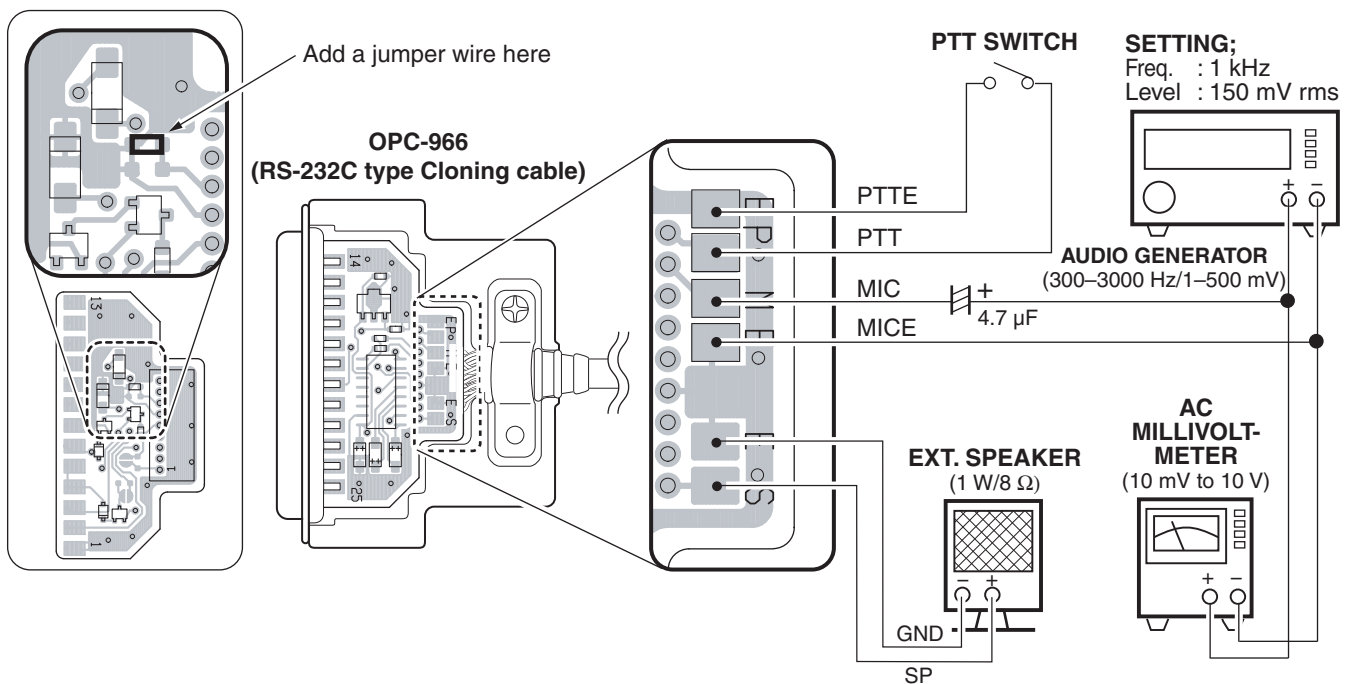
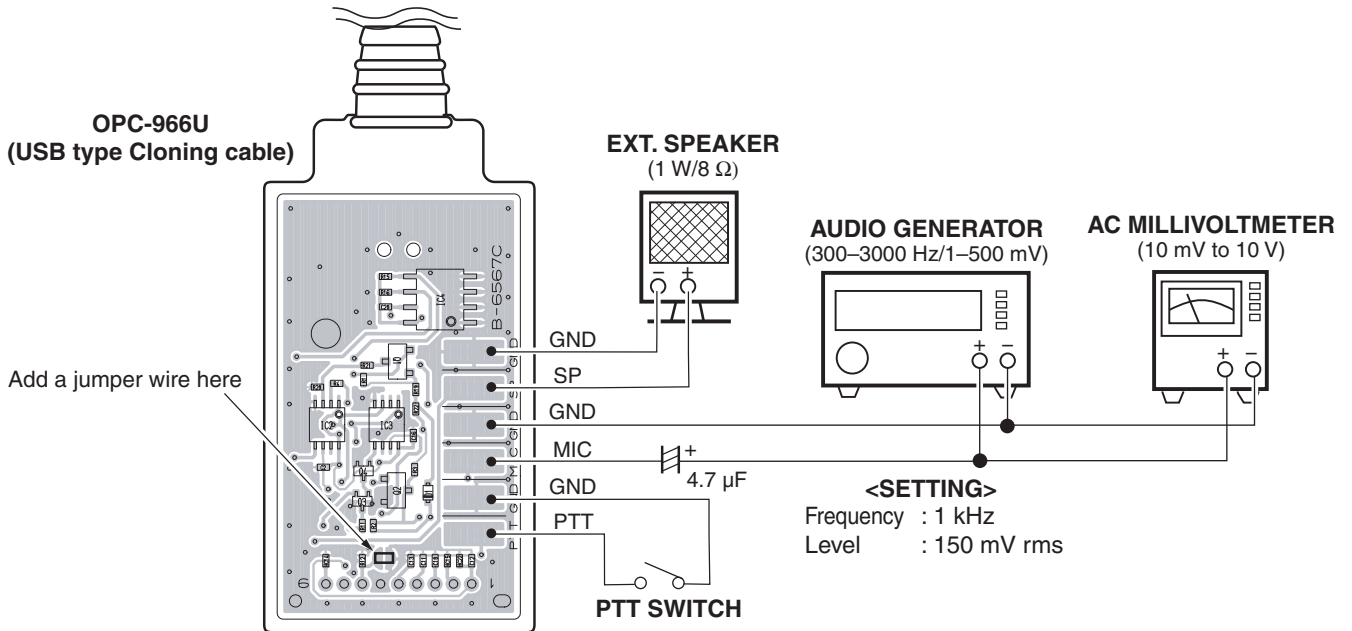
\* This screen is an example only. Each transceiver has its own specific values for each setting.

- ⑧ When the adjustment is completed, click [Clone Write] button.

## ■ PC CONNECTIONS



## ■ JIG CABLES

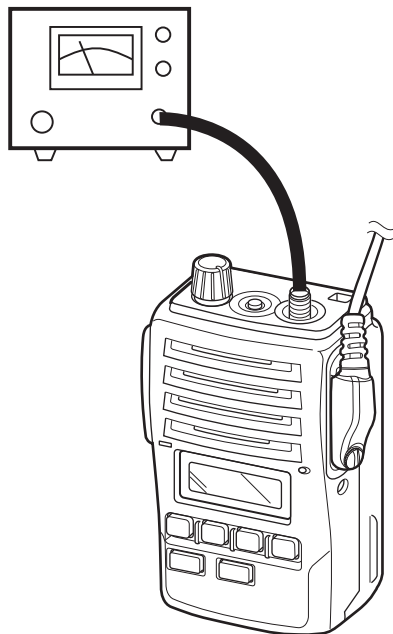


## 5-2 FREQUENCY ADJUSTMENT

Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
PLL LOCK VOLTAGE [RX LVA]	1 •Channel : 1-1 •Receiving	Click [I/O Update (F5)] in the [Adjust] menu (see the page 5-3), then check the "LVIN" item on the I/O check window as below.	1.7 V
	[TX LVA]		2 •Channel : 1-1 •Connect an RF Power Meter to the antenna connector. •Transmitting
<p><b>CONVENIENT:</b> The "PLL LOCK VOLTAGE" can be adjusted automatically.</p> <p>1: Set the Lock voltage preset; [RX LVA] to "87", [TX LVA] to "80."</p> <p>2: Push the [ENTER] key on the connected PC's keyboard.</p>			
PLL LOCK VOLTAGE (verify)	1 •Channel : 1-2 •Receiving	Click [I/O Update (F5)] in the [Adjust] menu (see the page 5-3), then check the "LVIN" item on the I/O check window as below.	1.7~3.0 V (Verify)
	2 •Channel : 1-2 •Transmitting		

RF POWER METER  
(3 W/50 Ω)



### • I/O CHECK WINDOW

I/O Check			
Input	Dec	Hex	Data
VIN	196	C4	7.69V
TEMPS	192	C0	7.69V
LVIN	65	41	1.27V
SD	37	25	0.73V
S-MTR	-		
Output	Dec	Hex	Data
BPF T1	62	3E	1.22V
T2/POW	63	3F	1.24V
REF	142	8E	2.78V
MOD BAL	0	0	0.00%
Dev	0	0	0.00V
CTCSS	0	0	0.00V
SQL Lev	30	1E	0.59V

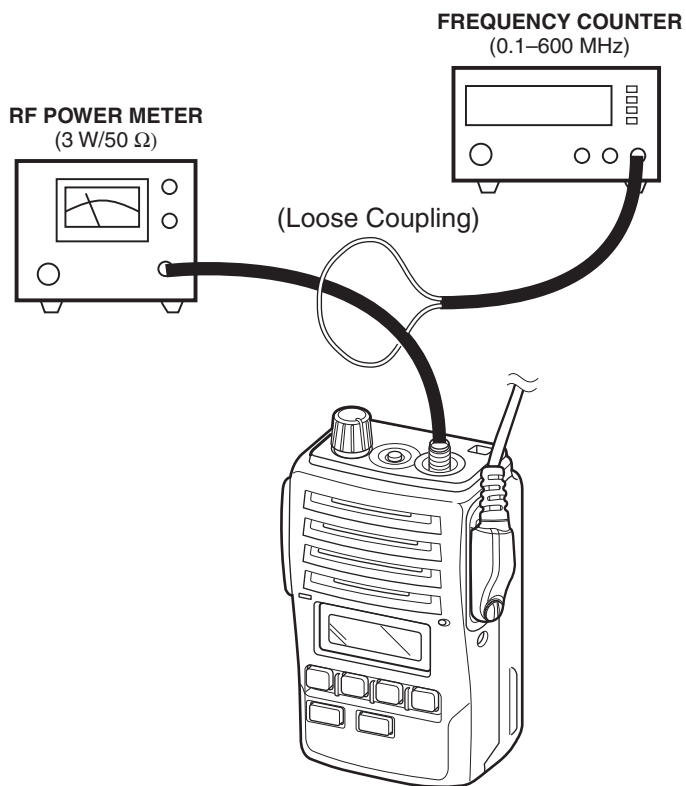
Lock Voltage Check

\* This screen is an example only. Each transceiver has its own specific values for each setting.

### 5-2 FREQUENCY ADJUSTMENT (continued)

Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
REFERENCE FREQUENCY [REF]	1 <ul style="list-style-type: none"> <li>• Channel : 1-3</li> <li>• Connect an RF Power Meter to the antenna connector.</li> <li>• Transmitting</li> </ul>	Loosely couple a Frequency Counter to the antenna connector.	467.0000 MHz



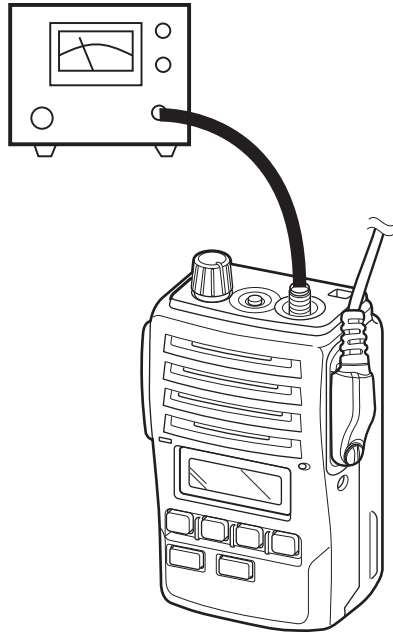


### 5-3 TRANSMIT ADJUSTMENT

Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
TRANSMIT OUTPUT POWER (High) [Hi]	1 • Channel : 1-4 • Transmitting	Connect an RF power meter to the antenna connector.	1.75 W
(Low2) [L2]	2 • Channel : 1-5 • Transmitting		0.175 W
(Low1) [L1]	3 • Channel : 1-6 • Transmitting		0.175 W

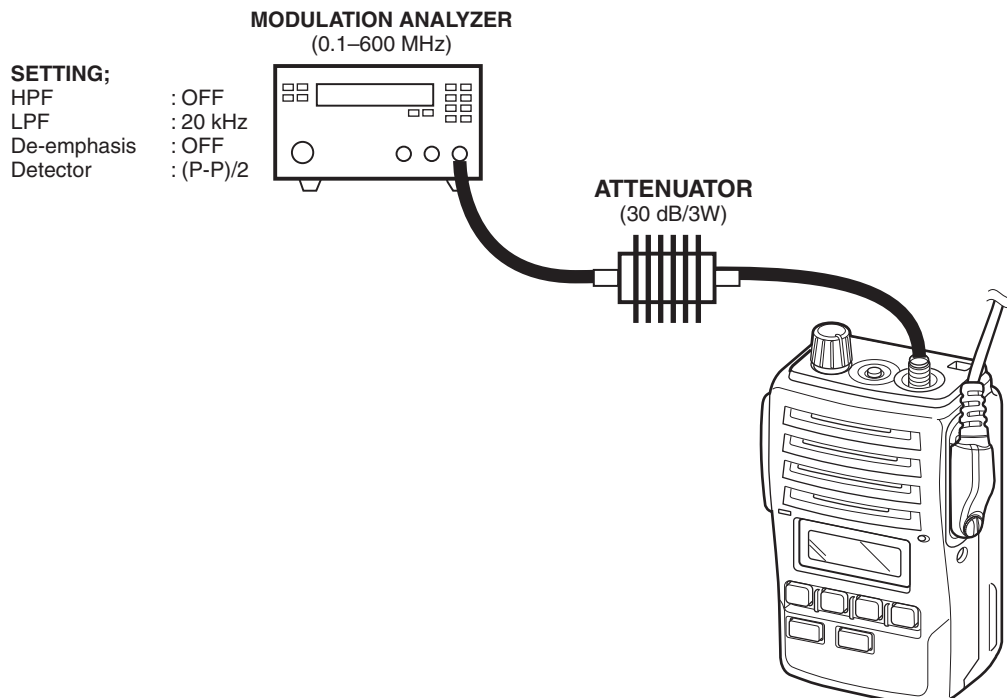
**RF POWER METER**  
(3 W/50 Ω)



### 5-3 TRANSMIT ADJUSTMENT (continued)

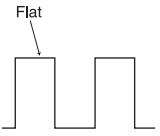
Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
FM DEVIATION [MOD(Wide)]	1 <ul style="list-style-type: none"> <li>Channel : 1-7</li> <li>Connect an Audio Generator and an AC Millivoltmeter to the JIG cable (see the page 5-4).</li> <li>Transmitting</li> </ul>	Connect an Modulation Analyzer to the antenna connector through an Attenuator.	±4.05 to 4.15 kHz

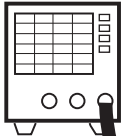


### 5-3 TRANSMIT ADJUSTMENT (continued)

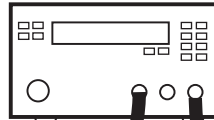
Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
<b>MODULATION BALANCE</b> [BAL(Wide)]	1 <ul style="list-style-type: none"> <li>• Channel : 1-8</li> <li>• No audio signals are applied to the JIG cable.</li> <li>• Transmitting</li> </ul>	Connect an Oscilloscope to the detect output terminal of the Modulation Analyzer.	Set to the square waveform  

**OSCILLOSCOPE**  
(DC to 10 kHz)

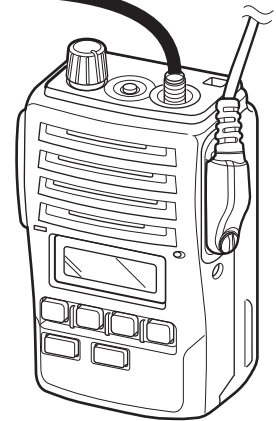
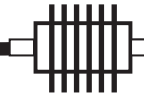


**MODULATION ANALYZER**  
(0.1–600 MHz)



**SETTING;**  
 HPF : OFF  
 LPF : 20 kHz  
 De-emphasis : OFF  
 Detector : (P-P)/2

**ATTENUATOR**  
(30 dB/3 W)

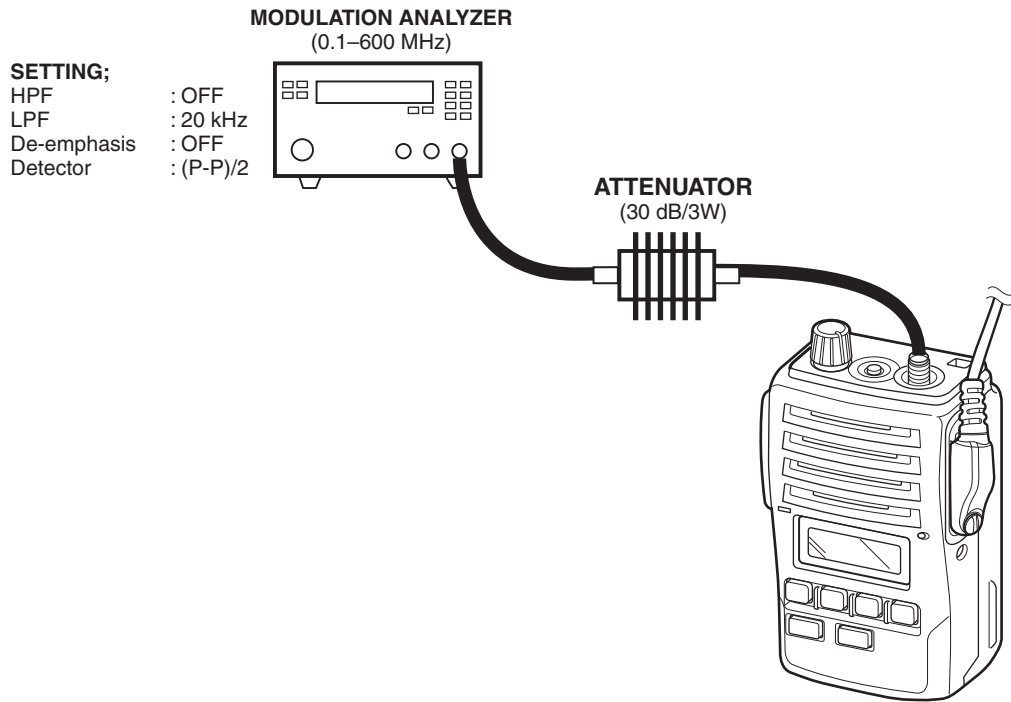


(Detect output)

### 5-3 TRANSMIT ADJUSTMENT (continued)

Select an adjustment item using [ $\uparrow$ ] / [ $\downarrow$ ] keys, then set to the specified value using [ $\leftarrow$ ] / [ $\rightarrow$ ] keys on the connected PC's keyboard.

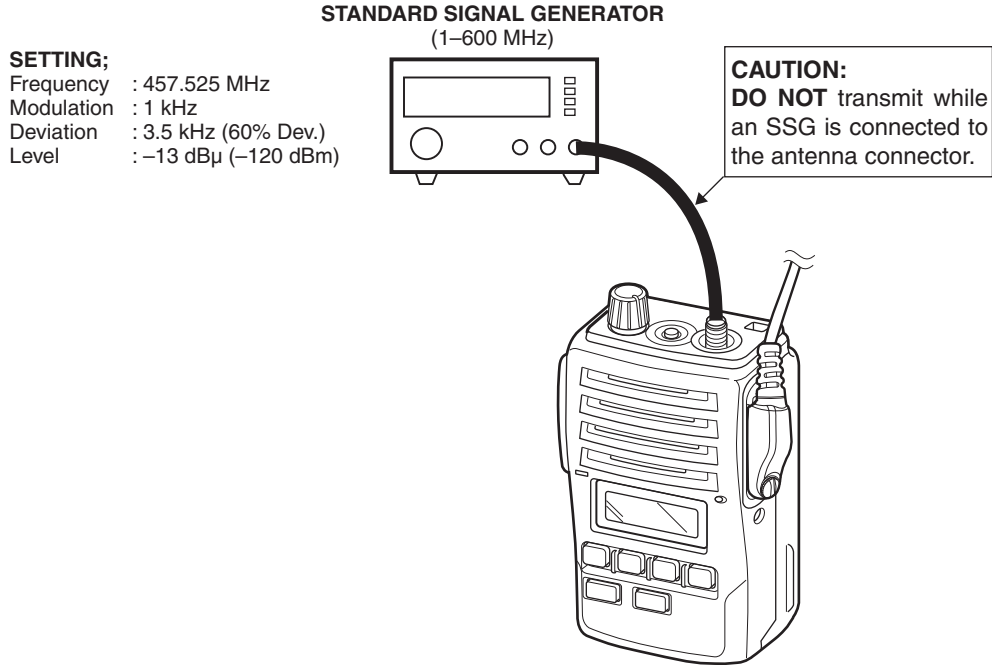
ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
CTCSS/DTCS DEVIATION [CTCSS/DTCS]	1 <ul style="list-style-type: none"> <li>• Channel : 1-9</li> <li>• No audio signals are applied to the JIG cable.</li> <li>• Transmitting</li> </ul>	Connect a Modulation Analyzer to the antenna connector through an Attenuator.	$\pm 0.66$ to 0.70 kHz



## 5-4 RECEIVE ADJUSTMENT

Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
RECEIVE SENSITIVITY [BPF ALL]	1 <ul style="list-style-type: none"> <li>• Channel : 1-10</li> <li>• Connect a Standard Signal Generator to the antenna connector.</li> <li>• Receiving</li> </ul>	Put the cursor on the [BPF ALL], and push the return key.	(Automatic adjustment)



### 5-4 RECEIVE ADJUSTMENT (continued)

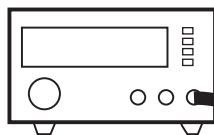
Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE	
S-METER [S-METER] (S6 LEVEL)	<b>NOTE:</b> "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly.			
	1	<ul style="list-style-type: none"> <li>• Channel : 1-11</li> <li>• Connect a Standard Signal Generator to the antenna connector.</li> <li>• Set the SSG output level to "+13 dBμ (-94 dBm)."</li> <li>• Receiving</li> </ul>	Push the return key to set the S6 level.	(Automatic adjustment)
[S-METER] (S1 LEVEL)	2	<ul style="list-style-type: none"> <li>• Set the SSG output level to "-12 dBμ (-119 dBm)."</li> <li>• Receiving</li> </ul>	Push the return key to set the S1 level.	

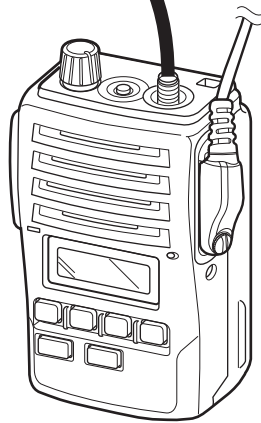
**SETTING;**

Frequency : 457.525 MHz  
 Modulation : 1 kHz  
 Deviation : 3.5 kHz (60% Dev.)  
 Level : +13 dBμ (S6 level)  
 -12 dBμ (S1 level)

**STANDARD SIGNAL GENERATOR**  
(1-600 MHz)



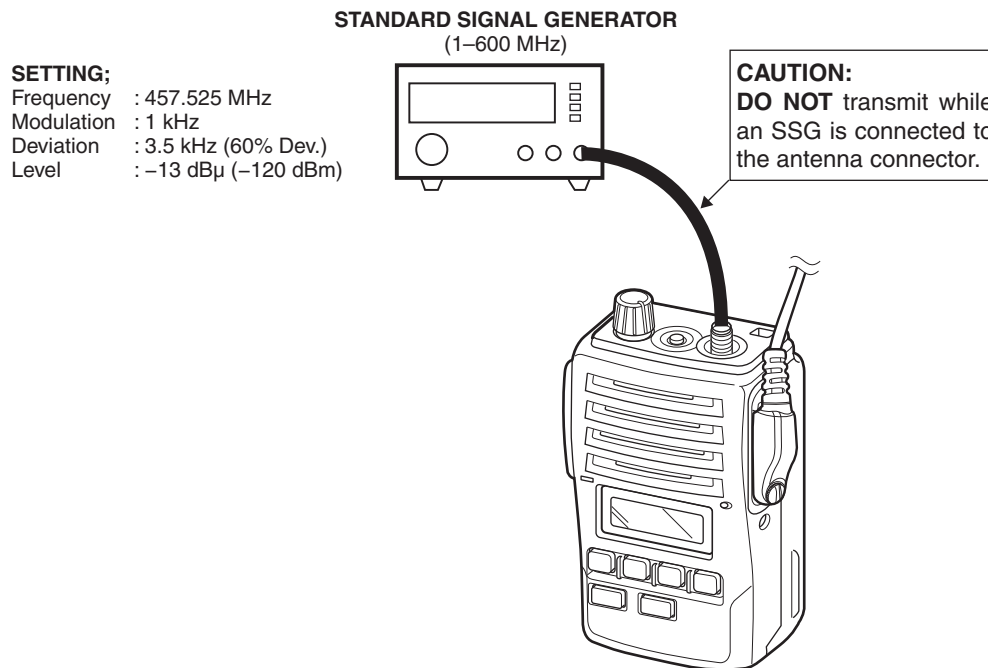
**CAUTION:**  
**DO NOT** transmit while an SSG is connected to the antenna connector.



### 5-4 RECEIVE ADJUSTMENT (continued)

Select an adjustment item using [↑] / [↓] keys, then set to the specified value using [←] / [→] keys on the connected PC's keyboard.

ADJUSTMENT [ADJUST ITEM]	ADJUSTMENT CONDITION	OPERATION	VALUE
SQUELCH [SQL]	1 <ul style="list-style-type: none"> <li>• Channel : 1-12</li> <li>• Connect a Standard Signal Generator to the antenna connector.</li> <li>• Receiving</li> </ul>	-	Set the [SQL] value to close squelch. Then set [SQL] value at the point where the audio signals just appear.



# SECTION 6

# PARTS LIST

## [FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC401	1140010191	S.IC HD64F2268TF20V(EMPTY)	T	22.9/28
IC403	1110005340	S.IC NJM12902V-TE1-#ZZZB	T	16.9/42.9
IC405	1110006770	S.IC TD8547TS/N	T	25.8/53.2
IC406	1130011741	S.IC TC7W66FK(TE85L,F)	T	8.1/42.4
IC407	1110005330	S.IC NJM12904V-TE1-#ZZZB	T	7.1/31.6
IC408	1110006260	S.IC BD5242G-TR	T	32/18.5
IC409	1130012691	S.IC R1EX24256ASA00A	T	10.1/17.8
IC410	1130011760	S.IC CD4094BPWR	T	40.6/36.3
IC411	1130013240	S.IC TC75S51FU(TE85L,F)	T	6.2/21.3
Q401	1550000090	S.FET RSQ035P03TR	T	36.3/43.7
Q402	1590003800	S.TRA KTC811U-GR-RTK/P	T	35/39.6
Q406	1590003790	S.TRA KRC404E RTK/P	T	20.9/50.4
Q407	1590003780	S.TRA KRA304E-RTK/P	T	42/31.3
Q408	1590003790	S.TRA KRC404E RTK/P	T	26/39.2
Q409	1590002370	S.TRA XP4111(TX)	T	39.2/28.7
Q411	1590003790	S.TRA KRC404E RTK/P	T	29.3/18.8
Q412	1590003780	S.TRA KRA304E-RTK/P	T	14.3/17.6
Q413	1560001330	S.FET RSR025N03	B	32.3/53
Q414	1590003790	S.TRA KRC404E RTK/P	T	40.8/41.8
Q415	1530003091	S.TRA 2SC4213-B(TE85R,F)	B	23.9/51.1
D401	1790001250	S.DIO MA2S111-(TX)	T	35.4/23.1
D402	1790001250	S.DIO MA2S111-(TX)	T	35.1/18.1
D403	1790001250	S.DIO MA2S111-(TX)	T	15/16
D404	1790001260	S.DIO MA2S077-(TX)	T	37/24
D406	1790001250	S.DIO MA2S111-(TX)	T	36.5/36
D407	1790001250	S.DIO MA2S111-(TX)	T	9/23.1
X401	6050011720	S.XTA CR-764 SMD-49TB 19.6608 MHz	T	42.6/18.8
R401	7030007290	S.RES ERJ2GJEJ 222 X (2.2K)	T	9.9/44.3
R402	7030005060	S.RES ERJ2GJEJ 333 X (33K)	T	8.9/55.3
R403	7030005120	S.RES ERJ2GJEJ 102 X (1K)	T	34.3/22.3
R404	7030005120	S.RES ERJ2GJEJ 102 X (1K)	T	35.8/20.2
R405	7030007340	S.RES ERJ2GJEJ 153 X (15K)	T	9.6/35.1
R406	7030005210	S.RES ERJ2GJEJ 822 X (8.2K)	T	10.5/36.4
R407	7030005230	S.RES ERJ2GJEJ 334 X (330K)	T	7.4/27.3
R408	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	6.8/36.3
R409	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	36.3/21.4
R410	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	9.8/39.6
R411	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	13.8/20.4
R412	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	29.2/13.9
R413	7030005600	S.RES ERJ2GJEJ 273 X (27K)	T	27.3/13.7
R414	7030005600	S.RES ERJ2GJEJ 273 X (27K)	T	36.9/13.6
R415	7030005100	S.RES ERJ2GJEJ 154 X (150K)	T	39/23.4
R416	7030005100	S.RES ERJ2GJEJ 154 X (150K)	T	33.4/20.9
R417	7030005170	S.RES ERJ2GJEJ 474 X (470K)	T	17.5/19
R418	7030005170	S.RES ERJ2GJEJ 474 X (470K)	T	5.3/16.3
R420	7030005600	S.RES ERJ2GJEJ 273 X (27K)	T	28.7/37.2
R421	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	29.9/36.5
R422	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	30.2/35.6
R423	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	31.5/36.5
R426	7030005160	S.RES ERJ2GJEJ 105 X (1M)	T	12.3/35.3
R427	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	14.5/37.8
R428	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	13.8/36.9
R429	7030005040	S.RES ERJ2GJEJ 472 X (4.7K)	T	12.3/36.2
R430	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	12.9/40.2
R432	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	14.5/39.6
R433	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	12.2/42.1
R434	7030005000	S.RES ERJ2GJEJ 471 X (470)	B	35/55.4
R437	7030005120	S.RES ERJ2GJEJ 102 X (1K)	T	32.9/38.4
R438	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	34.7/37.7
R439	7030007290	S.RES ERJ2GJEJ 222 X (2.2K)	T	36.8/40.2
R440	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	36.1/33.4
R441	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	37.3/33.7
R445	7030004980	S.RES ERJ2GJEJ 101 X (100)	B	32.3/55.2
R446	7030005090	S.RES ERJ2GJEJ 104 X (100K)	B	30.1/52.1
R455	7030005000	S.RES ERJ2GJEJ 471 X (470)	T	43.2/27.8
R456	7030004980	S.RES ERJ2GJEJ 101 X (100)	T	43.2/28.7
R457	7030005000	S.RES ERJ2GJEJ 471 X (470)	B	45.2/48.4
R458	7030005120	S.RES ERJ2GJEJ 102 X (1K)	B	43.9/49.9
R461	7030005110	S.RES ERJ2GJEJ 224 X (220K)	T	33.2/32.4
R462	7030005720	S.RES ERJ2GJEJ 563 X (56K)	T	32/33.2
R463	7030005220	S.RES ERJ2GJEJ 223 X (22K)	T	31.1/33.6
R464	7030005220	S.RES ERJ2GJEJ 223 X (22K)	T	31.5/34.8
R465	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	33.2/34.7
R466	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	23.9/41.3
R467	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	23/41.3
R468	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	21.2/41.3
R469	7030005040	S.RES ERJ2GJEJ 472 X (4.7K)	T	18.5/39
R470	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	19.7/38.6
R471	7030005110	S.RES ERJ2GJEJ 224 X (220K)	T	34.5/24.7
R472	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	33.6/24.7
R473	7030005240	S.RES ERJ2GJEJ 473 X (47K)	T	32.7/24.7
R474	7030005220	S.RES ERJ2GJEJ 223 X (22K)	T	31.8/24.3
R475	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	35.7/24.8
R476	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	23.3/46.1
R477	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	21.7/46.1
R478	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	21.2/44.6
R479	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	18.3/46.2
R480	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	12.5/45
R482	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	36.5/32
R483	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	15.8/21.8

## [FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R484	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	15.6/20.9
R485	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	14.2/21.7
R486	7410001130	S.ARR EXB28V102JX	T	13.6/24.7
R487	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	33.9/23.5
R488	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	31.9/31.3
R489	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	32.9/31.2
R490	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	33.8/31.0
R491	7030005530	S.RES ERJ2GJEJ 100 X (10)	T	38.5/18.4
R492	7030005160	S.RES ERJ2GJEJ 105 X (1M)	T	38.5/20.1
R493	7030008010	S.RES ERJ2GJEJ 123 X (12K)	T	37.6/19.3
R494	7030008010	S.RES ERJ2GJEJ 123 X (12K)	T	38.4/25.8
R495	7030008010	S.RES ERJ2GJEJ 123 X (12K)	T	37.2/20.5
R496	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	11.3/22.8
R497	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	11.9/21.9
R500	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	29/21.1
R501	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	28.1/20.3
R502	7030010080	S.RES ERJ2RHD 104 X (100K)	T	38.4/14.3
R503	7030010080	S.RES ERJ2RHD 104 X (100K)	T	39.3/14.3
R506	7030007300	S.RES ERJ2GJEJ 332 X (3.3K)	T	7.6/23.9
R507	7030005600	S.RES ERJ2GJEJ 273 X (27K)	T	7.6/24.8
R508	7030007290	S.RES ERJ2GJEJ 222 X (2.2K)	T	5/25.7
R509	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	26.2/18.9
R511	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	9.6/33.2
R512	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	6.2/26.9
R513	7030009290	S.RES ERJ2GJEJ 562 X (5.6K)	T	7.7/36.3
R515	7520000270	S.POS PRG21BC4R7MM1RA	T	34.2/46.7
R516	7030007290	S.RES ERJ2GJEJ 222 X (2.2K)	T	37/38.7
R517	7030008010	S.RES ERJ2GJEJ 123 X (12K)	T	31.1/50.8
R518	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	30.7/48.7
R519	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	30.4/53.8
R520	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	30.4/52.2
R521	7030005100	S.RES ERJ2GJEJ 154 X (150K)	T	30.5/55.1
R522	7030005110	S.RES ERJ2GJEJ 224 X (220K)	T	30.2/49.6
R523	7030005120	S.RES ERJ2GJEJ 102 X (1K)	T	21/52.3
R524	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	21/54.3
R525	7030005090	S.RES ERJ2GJEJ 104 X (100K)	T	21.5/55.9
R526	7030007340	S.RES ERJ2GJEJ 153 X (15K)	T	5/24.8
R527	7030005230	S.RES ERJ2GJEJ 334 X (330K)	T	5/23.9
R528	7030009140	S.RES ERJ2GJEJ 272 X (2.7K)	T	5/19.6
R529	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	6.6/19.6
R530	7030005160	S.RES ERJ2GJEJ 105 X (1M)	T	10.4/24.2
R532	7030005700	S.RES ERJ2GJEJ 274 X (270K)	T	36.7/41.5
R533	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	35.1/41.5
R534	7030005170	S.RES ERJ2GJEJ 474 X (470K)	T	36.9/34.9
R535	7030005070	S.RES ERJ2GJEJ 683 X (68K)	T	11.9/33.5
R537	7030005050	S.RES ERJ2GJEJ 103 X (10K)	B	22/50.6
R538	7030005060	S.RES ERJ2GJEJ 333 X (33K)	B	22/52.2
R539	7030005040	S.RES ERJ2GJEJ 472 X (4.7K)	B	25.5/52.8
R541	7030005050	S.RES ERJ2GJEJ 103 X (10K)	T	8.9/54.4
C401	4030017460	S.CER ECJ0EB1E102K	T	8.9/56.2
C402	4030017460	S.CER ECJ0EB1E102K	T	15/20
C403	4030017460	S.CER ECJ0EB1E102K	T	31/22.6
C404	4030017460	S.CER ECJ0EB1E102K	T	10.3/43.1
C405	4030017760	S.CER ECJ0EB1H222K	T	10.5/34.8
C406	4030018110	S.CER ECJ0EB1H272K	T	9.6/36.7
C407	4030017430	S.CER ECJ0EC1H101J	T	7.4/26.4
C408	4030016930	S.CER ECJ0EB1A104K	T	29.6/37.7
C409	4030016930	S.CER ECJ0EB1A104K	T	27.8/37.6
C410	4030016930	S.CER ECJ0EB1A104K	T	30.5/37.7
C411	4030016930	S.CER ECJ0EB1A104K	T	31.7/37.4
C412	4030016930	S.CER ECJ0EB1A104K	T	36.7/19.3
C413	4030016930	S.CER ECJ0EB1A104K	T	38.1/24.6
C414	4030017640	S.CER ECJ0EC1H150J	T	38.1/21.4
C415	4030016790	S.CER ECJ0EB1C103K	T	34.6/20.2
C416	4030017630	S.CER ECJ0EC1H120J	T	39.4/19.2
C417	4030017580	S.CER ECJ0EC1H060K	T	39.4/20.8
C418	4030016930	S.CER ECJ0EB1A104K	T	39/24.6
C419	4550006050	S.TAN TEESVA J0 106M8R	T	24.6/16.9
C420	4030016930	S.CER ECJ0EB1A104K	T	24.9/18.5
C421	4030016930	S.CER ECJ0EB1A104K	T	13.5/35.7
C423	4030018890	S.CER ECJ0EB0J224K	T	12.9/39.2
C425	4030017720	S.CER ECJ0EB1H331K	T	14.5/38.7
C426	4030017460	S.CER ECJ0EB1E102K	B	35.6/54.2
C427	4550007080	S.TAN TEESVA 1C 106M8R	T	40.6/44.3
C428	4030016930	S.CER ECJ0EB1A104K	T	37.6/47
C429	4030017460	S.CER ECJ0EB1E102K	T	36.7/47
C430	4030017460	S.CER ECJ0EB1E102K	T	34.7/36.8
C431	4030016790	S.CER ECJ0EB1C103K	T	32.9/39.3
C432	4030017460	S.CER ECJ0EB1E102K	T	38.9/42.7
C435	4550007880	S.TAN TEESVB2 1A 686M8R	T	15.3/54.7
C437	4030018860	S.CER ECJ0EB0J105K	B	34.1/55.4
C441	4030016960	S.CER ECJ0EB1C183K	T	23.4/42.9
C442	4030016930	S.CER ECJ0EB1A104K	T	22.1/41.3
C443	4030017750	S.CER ECJ0EB1E122K	T	22.2/42.5
C444	4030016930	S.CER ECJ0EB1A104K	T	19.7/39.5
C445	4030017460	S.CER ECJ0EB1E102K	T	33.2/33.8
C446	4030017460	S.CER ECJ0EB1E102K	T	22.5/45.2
C447	4030017760	S.CER ECJ0EB1H222K	T	20.1/45.7
C448	4030017690	S.CER ECJ0EC1H121J	T	22.5/44.



**[FRONT UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C466	4030017420	S.CER ECJ0EC1H470J	T	36.9/14.5
C467	4030017420	S.CER ECJ0EC1H470J	T	30.5/13.1
C468	4030017420	S.CER ECJ0EC1H470J	T	40.4/11.5
C473	4030016790	S.CER ECJ0EB1C103K	T	38.1/15.9
C474	4030018860	S.CER ECJ0EB0J105K	T	5/26.6
C475	4030017460	S.CER ECJ0EB1E102K	T	33/45.4
C476	4030017460	S.CER ECJ0EB1E102K	T	29.9/21.9
C477	4030017420	S.CER ECJ0EC1H470J	T	33.3/44.1
C478	4030017420	S.CER ECJ0EC1H470J	T	33.5/41.9
C479	4030017460	S.CER ECJ0EB1E102K	T	27.8/17.7
C481	4030017460	S.CER ECJ0EB1E102K	T	6.4/38.1
C482	4030017460	S.CER ECJ0EB1E102K	T	11.8/41.2
C483	4030017460	S.CER ECJ0EB1E102K	T	38.8/41.8
C485	4030017460	S.CER ECJ0EB1E102K	T	33.7/48
C486	4030017460	S.CER ECJ0EB1E102K	T	32.1/47.5
C487	4030017460	S.CER ECJ0EB1E102K	T	34.4/35.9
C488	4030017460	S.CER ECJ0EB1E102K	T	22.1/43.4
C489	4030017460	S.CER ECJ0EB1E102K	T	9.9/30.9
C490	4030017460	S.CER ECJ0EB1E102K	T	40.3/26.7
C491	4030017460	S.CER ECJ0EB1E102K	T	37.3/37.3
C492	4030017460	S.CER ECJ0EB1E102K	T	6.8/18.2
C493	4030016930	S.CER ECJ0EB1A104K	T	17.4/34.7
C494	4030017460	S.CER ECJ0EB1E102K	T	39.6/67.3
C495	4030017460	S.CER ECJ0EB1E102K	T	10/40.5
C496	4550007880	S.TAN TEESVB2 1A 686M8R	T	12/54.7
C497	4030018390	S.CER ECJ0EB1A563K	T	8.1/37.9
C498	4030017430	S.CER ECJ0EC1H101J	T	10.5/33.2
C499	4030017420	S.CER ECJ0EC1H470J	T	15.4/36.9
C500	4030016930	S.CER ECJ0EB1A104K	T	9.3/37.9
C501	4030017730	S.CER ECJ0EB1E471K	T	35.1/13.2
C502	4030016930	S.CER ECJ0EB1A104K	T	31.9/49.6
C503	4030018860	S.CER ECJ0EB0J105K	T	32.3/48.7
C504	4550007080	S.TAN TEESVA 1C 106M8R	T	40.6/46.4
C505	4030016960	S.CER ECJ0EB1C183K	T	6.3/25.3
C506	4030016960	S.CER ECJ0EB1C183K	T	6.3/23.4
C507	4030017730	S.CER ECJ0EB1E471K	T	5/23
C508	4030017730	S.CER ECJ0EB1E471K	T	11.3/24.2
C510	4550000460	S.TAN TEESVA 1C 105M8R	T	23.5/48.5
C512	4030018860	S.CER ECJ0EB0J105K	B	22.3/49.4
C513	4030018860	S.CER ECJ0EB0J105K	B	25.9/51.5
C514	4030017420	S.CER ECJ0EC1H470J		
J401	6510026130	S.CON IMSA-9681S-36Y900	T	30.9/6.2
J402	6510023831	S.CON (G)SM04B-SRSS-TB(LF)(SN)	T	34.9/52.5
J403	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	29/43.5
DS401	5030002730	LCD L3-0048TAY-5	B	13.5/16.1
DS402	5040002420	S.LED SML-310MT T86	B	32.7/15.3
DS403	5040002420	S.LED SML-310MT T86	B	6.2/38
DS404	5040002961	S.LED SML-A12MT T86J	B	42.8/38
DS405	5040002961	S.LED SML-A12MT T86J	B	45.3/50.2
DS406	5040002670	S.LED CL-165HR/YG	B	
MC401	7700002760	MIC EM6027P-46C33-G-01 <HOR>		
S401	2260002840	SWI SKHLLFA010		
W401	8900016840	CAB OPC-1753 (P0.5,N36,L70) <TJM>		
W402	7120000470	JUM ERDS2T0		
W403	7120000470	JUM ERDS2T0		
W404	8900017120	CAB OPC-1754 (P0.5,N11,L35) <TJM>		
EP402	8930061530	LCD SRCN-2681-SP-N-W (SHJ)		
MP430	6910014760	S.PLA OG-503040	T	18.7/54.7

**[VR UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R601	7210003130	VAR TP76N97N-13F-10KA-2497		
W601	8900012340	CAB OPC-1260		

**[CONNECT UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
D701	1790001810	S.VAR AVR-M1005C080MTABB	T	9.8/32.2
D702	1790001810	S.VAR AVR-M1005C080MTABB	T	8.9/32
D703	1790001810	S.VAR AVR-M1005C080MTABB	T	4.9/32.4
D704	1790001810	S.VAR AVR-M1005C080MTABB	T	3.4/32
D705	1790001810	S.VAR AVR-M1005C080MTABB	T	4.8/20.7
R701	7410001130	S.ARR EXB28V102JX	T	6.7/32.7
C701	4030017460	S.CER ECJ0EB1E102K	T	4.6/9.9
C702	4030017460	S.CER ECJ0EB1E102K	T	4.4/14.2
C704	4030017460	S.CER ECJ0EB1E102K	T	3.9/17.1
J1	6510026140	S.CON 11FH-SM1-TB(LF)(SN)	T	3.6/37.1
EP701	6910016330	S.BEA MMZ1005S 601CT-S	T	6.4/9.9
EP702	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/12.9
EP703	6910016330	S.BEA MMZ1005S 601CT-S	T	4.9/16.5
EP704	6910016330	S.BEA MMZ1005S 601CT-S	T	4.4/18.4
EP705	6910016330	S.BEA MMZ1005S 601CT-S	T	4.8/19.4
MP701	8950005520	M.O 2403 9-PIN CONNECTOR		
MP702	8930062140	SPR 2682 EARTH SPRING		
MP703	8510017840	S.PLA OG-321610G	T	7/27

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

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1110003201	S.IC TA31136FNG(EL)	B	19.1/9.1
IC2	1130008561	S.IC TC75S51F(TE85L,F)	T	52.3/17.1
IC4	1140005991	S.IC MB15A02PFV1-G-BND-ERE1	B	28.7/24.1
IC5	1110002751	S.IC TA75S01F(TE85R,F)	T	34/7.4
IC6	1190000350	S.IC M62363FP-650C	T	25.2/8.9
IC7	1190001860	S.IC EW-460-FT	B	50.7/39.9
IC9	1110005350	S.IC NJM2870F05-TE1-#FZZB	T	73.7/28.5
IC10	1110006221	S.IC AK2346P-E2/P	T	18.9/25.1
IC11	1130009981	S.IC CTW753FK(TE85L,F)	T	25.2/29.2
IC12	1130011760	S.IC CD4094BPWR	T	17.2/35.8
IC18	1190002660	S.IC ISD4004-08MEYIR	B	[voice storage] only 13.1/36.5
IC19	1180002391	S.REG S-812C33AMC-C2N-G	B	[voice storage] only 24.6/40.9
Q1	1560000841	S.FET 2SK1829(TE85R,F)	T	46.5/10.8
Q2	1580000731	S.FET 3SK293(TE85L,F)	T	47.3/8.2
Q3	1580000800	S.FET 3SK324UG-TL-E	B	41.8/9.3
Q4	1530002601	S.TRA 2SC4215-O(TE85R,F)	B	23.9/4.1
Q5	1530000371	S.FET 2SC3356-T1B S (R25)	B	53.5/30.6
Q7	1560001232	S.FET RD07MVS2-T112	T	59.8/21.9
Q8	1560001241	S.FET RD01MUS1-T113	T	60.2/28
Q9	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	53.2/24.4
Q10	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	48/23.2
Q11	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	46.1/26.6
Q12	1530003311	S.TRA 2SC5107-O(TE85R,F)	B	48/31.9
Q13	1530002920	S.TRA 2SC4226-T1 R25	B	42.4/29.1
Q14	1530002920	S.TRA 2SC4226-T1 R25	B	43/24.3
Q15	1590001400	S.TRA XP1214(TX)	T	47.5/27.2
Q16	1590003790	S.TRA KRC404E RTK/P	T	47.2/29.9
Q17	1530003900	S.TRA KTC4075 BL-RTK/P	B	47/37.7
Q18	1560000541	S.FET 2SK880-Y(T5R1COM,F)	T	34.2/21.6
Q21	1510001090	S.TRA KTA2015Y-RTK/P	B	53/36.5
Q22	1510001090	S.TRA KTA2015Y-RTK/P	B	31.1/39.4
Q23	1520000840	S.TRA KTA1664Y-RTF/P	B	71.8/25.4
Q24	1590003800	S.TRA KTC811U-GR-RTK/P	B	72/29.2
Q25	1590003780	S.TRA KRA304E-RTK/P	B	68.8/31.6
Q26	1550000090	S.FET RSQ035P03TR	T	73.7/25
Q29	1590003790	S.TRA KRC404E RTK/P	B	54.5/39.9
Q30	1530003900	S.TRA KTC4075 BL-RTK/P	B	[vibrator], [voice storage] only 34.2/39
Q31	1520000840	S.TRA KTA1664Y-RTF/P	B	[vibrator], [voice storage] only 38/39.2
Q34	1530003900	S.TRA KTC4075 BL-RTK/P	B	26/15.9
Q36	1590001650	S.TRA XP4601(TX)	B	5.9/26.7
Q37	1530003091	S.TRA 2SC4213-B(TE85R,F)	T	[voice storage] only 18.8/17.2
D1	1750001210	S.DIO HSB88ASTR-E	T	57.3/10.4
D2	1750000581	S.DIO 1SV307(TPH3,F)	B	59.9/9.1
D3	1750000711	S.VAR HVC350BTRF-E	T	60.2/3.6
D4	1750000711	S.VAR HVC350BTRF-E	T	60.2/4.9
D5	1790001260	S.DIO MA25077-(TX)	B	57.1/4.8
D6	1790001240	S.DIO MA25728-(TX)	T	60.7/7.2
D7	1750000711	S.VAR HVC350BTRF-E	T	50/3.6
D8	1750000711	S.VAR HVC350BTRF-E	T	50/4.9
D9	1750000711	S.VAR HVC350BTRF-E	T	44.4/4.6
D10	1750000711	S.VAR HVC350BTRF-E	T	41.2/4.6
D12	1790001250	S.DIO MA25111-(TX)	B	47.3/39.8
D14	1790001260	S.DIO MA25077-(TX)	B	52.5/22
D15	1790001260	S.DIO MA25077-(TX)	B	51.4/19.8
D16	1750000711	S.VAR HVC350BTRF-E	B	37.1/32.8
D17	1750000711	S.VAR HVC350BTRF-E	B	37.1/20.6
D18	1720000570	S.VAR MA368(TX) 0	B	36.6/25
D21	1750000711	S.VAR HVC350BTRF-E	B	39.4/25.6
D22	1750000711	S.VAR HVC350BTRF-E	B	38.9/28.9
D25	1790001250	S.DIO MA25111-(TX)	T	42.1/9.2
D26	1790000980	S.DIO MA742(TX)	B	27.4/1.8
D37	1790001250	S.DIO MA25111-(TX)	B	32.5/28.7
D38	1790001250	S.DIO MA25111-(TX)	T	52.5/14.8
D39	1750001210	S.DIO HSB88ASTR-E	T	63.9/10.4
F11	2030000410	S.MON FL-380 MFT46.3P 46.350 MHz	B	32.4/5.8
F12	2020002160	S.CER CFWKA450KFFA-R0	B	19.7/21
F13	2040001440	S.LC NFE31PT152Z1E9L (NFM60R20T152)	B	71.8/21.2
X1	6070000191	S.DIS CDBKB450KAY24-R0	T	16.9/9.6
X2	6050011940	S.XTA CR-783 TTS14VSB-A6 15.3 MHz	B	28.4/33.5
X4	6050011730	S.XTA CR-765 SMD-49TA 3.6864 MHz	B	16.6/29.6
L1	6200012490	S.COI 0.30-0.9-6TR 13.6N <COMO>	B	65.6/6.1
L2	6200013010	S.COI 0.30-0.9-5TL 10.3N <COMO>	B	61.9/5.5
L3	6200012610	S.COI 0.40-0.9-2TL 2.8N <COMO>	B	62.2/11.2
L4	6200012610	S.COI 0.40-0.9-2TL 2.8N <COMO>	B	67.4/16.2
L5	6200010850	S.COI LQW18AN22NG00D (LQW1608A22NG00)	B	58/6.8
L7	6200007700	S.COI LQW2BHN22NJ03L	T	57/6.6
L8	6200007700	S.COI LQW2BHN22NJ03L	T	53.4/6.6
L9	6200007680	S.COI LQW2BHN12NJ03L	B	46.9/7.2
L11	6200007680	S.COI LQW2BHN12NJ03L	B	41.4/5.3
L12	6200005741	S.COI ELJRE 47NGFA	B	44.7/11.7
L13	6200003350	S.COI ELJNC R27K-F	B	38.8/11.5
L15	6200002851	S.COI NLV25T-FR82J	B	56.9/9.8
L17	6200013010	S.COI 0.30-0.9-5TL 10.3N <COMO>	B	68.2/21.4
L19	6200005701	S.COI ELJRE 22NGFA	B	52.1/33.3
L20	6200005741	S.COI ELJRE 47NGFA	B	53.1/27.4
L21	6200005721	S.COI ELJRE 33NGFA	B	46.2/21.3
L22	6200005701	S.COI ELJRE 22NGFA	B	46.9/28.5

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L23	6200002790	S.COI ELJFC R82M-F	T	43.6/23.3
L25	6200012970	S.COI 0.30-0.91-4TR 8.6N <COMO>	B	37.8/31.1
L26	6200012390	S.COI 0.30-0.92-3TR 5.8N <COMO>	B	37.8/22.3
L27	6200004951	S.COI NLV25T-1R8J	T	37.5/31.1
L28	6200002940	S.COI ELJFC 1R2K-F	T	38.3/22.6
L29	6200004660	S.COI MLF1608A 1R8K-T	B	28.9/29.7
L30	6200007720	S.COI LQW2BHN33NJ03L	T	62.4/7
L32	6200005691	S.COI ELJRE 18NGFA	T	39/34.1
L33	6200004480	S.COI MLF1608D R82K-T	B	27.2/12.7
L35	6200003540	S.COI MLF1608D R22K-T	B	27.8/18.1
L38	6200005731	S.COI ELJRE 39NGFA	B	47.4/12
L40	6200002851	S.COI NLV25T-R82J	T	43.9/28.1
L41	6200005721	S.COI ELJRE 33NGFA	B	46.1/32
L42	6200004951	S.COI NLV25T-1R8J	T	40/30.3
L43	6200002940	S.COI ELJFC 1R2K-F	T	39.3/26.1
L44	6200012940	S.COI 0.30-0.9-2TR 2.5N <COMO>	B	64.3/12.3
L45	6200012490	S.COI 0.30-0.9-6TR 13.6N <COMO>	B	68.3/8.1
R1	7030003480	S.RES ERJ3GEYJ 222 V (2.2K)	B	59.7/11.4
R2	7030005120	S.RES ERJ2GEJ 102 X (1K)	T	59.1/10
R3	7030004970	S.RES ERJ2GEJ 470 X (47)	T	52/19.8
R4	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	55.5/10
R5	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	54.5/14.8
R6	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	47.8/16
R7	7030005310	S.RES ERJ2GEJ 124 X (120K)	T	49.1/16.5
R8	7030005170	S.RES ERJ2GEJ 474 X (470K)	T	54.5/16.6
R9	7030008280	S.RES ERJ2GEJ 271 X (270)	T	53.6/19.8
R10	7030005120	S.RES ERJ2GEJ 102 X (1K)	T	54.1/21.7
R11	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	57.1/3.5
R12	7030005530	S.RES ERJ2GEJ 100 X (10)	T	48.4/10.3
R13	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	53.3/30.5
R14	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	54.7/4
R15	7030005240	S.RES ERJ2GEJ 473 X (47K)	T	48.3/5.9
R16	7030004980	S.RES ERJ2GEJ 101 X (100)	T	46.9/4.4
R17	7030004970	S.RES ERJ2GEJ 470 X (47)	B	48.4/7.2
R18	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	50.2/8.5
R19	7030005080	S.RES ERJ2GEJ 823 X (82K)	T	49.3/7.7
R20	7030005240	S.RES ERJ2GEJ 474 X (47K)	B	45.4/7.2
R21	7030005110	S.RES ERJ2GEJ 224 X (220K)	T	43.2/5.8
R22	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	38.7/5.3
R23	7030005110	S.RES ERJ2GEJ 224 X (220K)	T	40/5.8
R25	7030005290	S.RES ERJ2GEJ 682 X (6.8K)	B	43.8/6.3
R26	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	42.9/12.8
R27	7030005310	S.RES ERJ2GEJ 124 X (120K)	B	45/13.8
R28	7030008010	S.RES ERJ2GEJ 123 X (12K)	B	43.8/8
R29	7030004980	S.RES ERJ2GEJ 101 X (100)	B	41.3/12.9
R30	7030005120	S.RES ERJ2GEJ 102 X (1K)	B	39.5/8.7
R31	7030005530	S.RES ERJ2GEJ 100 X (10)	B	36.7/11.5
R32	7030007280	S.RES ERJ2GEJ 331 X (330)	B	37.7/7.6
R33	7030007270	S.RES ERJ2GEJ 151 X (150)	B	27.6/4.1
R34	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	26.4/5.1
R35	7030004980	S.RES ERJ2GEJ 101 X (100)	B	25.9/6.5
R36	7030005030	S.RES ERJ2GEJ 152 X (1.5K)	T	18.5/14.1
R37	7030005000	S.RES ERJ2GEJ 471 X (470)	B	24.6/6
R38	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	24.6/7.9
R39	7030004970	S.RES ERJ2GEJ 470 X (47)	B	20.4/4.6
R40	7030007270	S.RES ERJ2GEJ 151 X (150)	B	19.2/4.2
R43	7030004970	S.RES ERJ2GEJ 470 X (47)	B	23.5/12.6
R44	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	15.6/12.1
R45	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	18.2/13.3
R46	7030009280	S.RES ERJ2GEJ 391 X	B	16.8/13.3
R50	7030004980	S.RES ERJ2GEJ 101 X (100)	B	49.6/14.3
R51	7030003670	S.RES ERJ3GEYJ 823 V (82K)	B	69.9/10.4
R52	7030004980	S.RES ERJ2GEJ 101 X (100)	B	54.2/9.4
R53	7030005530	S.RES ERJ2GEJ 100 X (10)	T	55.6/24.2
R54	7030005060	S.RES ERJ2GEJ 333 X (33K)	T	55.1/25.5
R55	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	53.6/26
R57	7030004990	S.RES ERJ2GEJ 221 X (220)	T	56.7/30
R58	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	53.1/31.4
R59	7030005060	S.RES ERJ2GEJ 333 X (33K)	T	52.3/26.5
R61	7030004970	S.RES ERJ2GEJ 470 X (47)	B	51.2/30.6
R62	7030007350	S.RES ERJ2GEJ 393 X (39K)	B	54.8/32.6
R65	7030004980	S.RES ERJ2GEJ 101 X (100)	B	51.2/28.1
R66	7030007340	S.RES ERJ2GEJ 153 X (15K)	B	51.2/24.9
R67	7030004980	S.RES ERJ2GEJ 101 X (100)	B	53.7/22.3
R68	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	53.7/20.5
R69	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	49.1/20.4
R70	7030005530	S.RES ERJ2GEJ 100 X (10)	B	45.9/24.5
R71	7030005240	S.RES ERJ2GEJ 473 X (47K)	B	45.9/23.5
R73	7030004980	S.RES ERJ2GEJ 101 X (100)	B	44.5/30
R74	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	44.2/28.7
R75	7030005100	S.RES ERJ2GEJ 154 X (150K)	B	48.1/30
R76	7030004980	S.RES ERJ2GEJ 101 X (100)	B	44.9/31.3
R77				

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R101	7030005000	S.RES ERJ2GEJ 471 X (470)	T	32.1/22.3
R103	7030005240	S.RES ERJ2GEJ 473 X (47K)	T	30.1/15.1
R104	7030005230	S.RES ERJ2GEJ 334 X (330K)	T	28.9/14.3
R105	7030005170	S.RES ERJ2GEJ 474 X (470K)	T	32.4/14.5
R106	7030008290	S.RES ERJ2GEJ 183 X (18K)	T	30/17.4
R107	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	29.1/16
R108	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	25.5/30.9
R109	7030005580	S.RES ERJ2GEJ 560 X (56)	T	37.2/33.8
R111	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	36.4/20.4
R112	7030010040	S.RES ERJ2GEJ-JPW	T	40.1/22.1
R113	7030006610	S.RES ERJ2GEJ 394 X (390K)	T	39.3/28.2
R114	7030005100	S.RES ERJ2GEJ 154 X (150K)	B	38.2/26.9
R115	7030007570	S.RES ERJ2GEJ 122 X (1.2K)	B	27.7/19.8
R116	7030007060	S.RES ERJ2GEJ 684X (680K)	B	26.5/19.4
R117	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	31.7/19.3
R118	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	30.7/19.3
R119	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	24.3/15.6
R120	7030005000	S.RES ERJ2GEJ 471 X (470)	T	30.6/13.1
R121	7030008010	S.RES ERJ2GEJ 123 X (12K)	T	26/23.3
R122	7030006610	S.RES ERJ2GEJ 394 X (390K)	T	26/23.2
R123	7030005080	S.RES ERJ2GEJ 823 X (82K)	T	17.3/20.4
R124	7030005060	S.RES ERJ2GEJ 333 X (33K)	T	15.7/19.5
R125	7030005240	S.RES ERJ2GEJ 473 X (47K)	B	21.3/14.3
R126	7030008310	S.RES ERJ2GEJ 564 X (560K)	T	14/24.1
R127	7030007350	S.RES ERJ2GEJ 393 X (39K) [voice storage] only	B	4.3/33.4
R128	7030005720	S.RES ERJ2GEJ 563 X (56K)	B	3.1/34
R129	7030005840	S.RES RR0510P-473-D (47K)	T	25/19.2
R130	7030006000	S.RES RR0510P-222-D (2.2K)	T	24.1/20.1
R131	7030006000	S.RES RR0510P-222-D (2.2K)	T	25.9/19.2
R132	7030005840	S.RES RR0510P-473-D (47K)	T	27.1/18.6
R134	7030005060	S.RES ERJ2GEJ 333 X (33K)	T	25.6/26.2
R135	7030005160	S.RES ERJ2GEJ 105 X (1M)	T	14/27.7
R141	7030005060	S.RES ERJ2GEJ 333 X (33K)	T	27.4/29
R147	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	33.7/9.6
R148	7030005070	S.RES ERJ2GEJ 683 X (68K)	T	32.8/11.5
R150	7030010040	S.RES ERJ2GEJ-JPW	T	25.5/3.1
R151	7030005070	S.RES ERJ2GEJ 683 X (68K)	T	31.8/7
R152	7030008310	S.RES ERJ2GEJ 564 X (560K)	T	32.5/2.5
R153	7030005100	S.RES ERJ2GEJ 154 X (150K)	T	31.3/3.8
R154	7030006610	S.RES ERJ2GEJ 394 X (390K)	T	34.1/5.2
R155	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	29.1/2.6
R157	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	35.3/4.7
R161	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	51.1/36.5
R162	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	49.3/36
R163	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	31.5/41.3
R164	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	30.1/37.7
R165	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	74.6/28.5
R166	7030007290	S.RES ERJ2GEJ 222 X (2.2K)	B	69.6/28.8
R167	7030005700	S.RES ERJ2GEJ 274 X (270K)	T	76.1/23.6
R168	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	75.9/22.4
R169	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	47.7/41.3
R170	7030005170	S.RES ERJ2GEJ 474 X (470K)	B	46.8/41.3
R173	7030008400	S.RES ERJ2GEJ 182 X (1.8K)	T	44.6/9.7
R180	7030005120	S.RES ERJ2GEJ 102 X (1K)	T	13.6/22.9
R181	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	9.5/22.7
R182	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	8.6/23.9
R183	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	8.1/27.1
R184	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	4.8/29
R185	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	5.3/30.4
R186	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	4.4/30.3
R190	7510001730	S.THE ERJTJOP 473J	B	25.9/33.2
R191	7030010080	S.RES ERJ2RHD 104 X (100K)	B	25/32.3
R192	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	13.9/35.4
R193	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	13.9/33.8
R194	7030005050	S.RES ERJ2GEJ 103 X (10K)	T	22.2/36.9
R197	7030009150	S.RES ERJ2GEJ 824 X (820K) [voice storage] only	B	4.9/37.7
R198	7030005240	S.RES ERJ2GEJ 473 X (47K) [vibrator], [voice storage] only	B	21.8/39.3
R199	7030005240	S.RES ERJ2GEJ 473 X (47K) [voice storage] only	B	21.9/38.4
R201	7030005050	S.RES ERJ2GEJ 103 X (10K) [vibrator], [voice storage] only	B	34.9/37.1
R202	7030005060	S.RES ERJ2GEJ 333 X (33K) [vibrator], [voice storage] only	B	36.1/36.7
R203	7030007290	S.RES ERJ2GEJ 222 X (2.2K) [vibrator], [voice storage] only	B	34/41.8
R204	7030006610	S.RES ERJ2GEJ 394 X (390K) [voice storage] only	B	8.9/41.3
R205	7030005050	S.RES ERJ2GEJ 103 X (10K) [voice storage] only	T	18.5/20.2
R206	7030005170	S.RES ERJ2GEJ 474 X (470K)	T	43.2/10.3
R207	7030005110	S.RES ERJ2GEJ 224 X (220K)	T	44/11.2
R208	7030010090	S.RES ERJ2GEJ 180 X (18) [voice storage] only	B	22.1/40.5
R209	7030005050	S.RES ERJ2GEJ 103 X (10K) [voice storage] only	T	17.1/18.4
R210	7030005220	S.RES ERJ2GEJ 223 X (22K) [voice storage] only	T	21.3/18.4
R211	7030005240	S.RES ERJ2GEJ 473 X (47K) Except [vibrator], [voice storage]	B	18.7/41.3
R212	7030005240	S.RES ERJ2GEJ 473 X (47K) Except [voice storage]	B	17.1/41.3
R213	7030005580	S.RES ERJ2GEJ 560 X (56) [voice storage] only	B	25/38.3
R235	7030005050	S.RES ERJ2GEJ 103 X (10K)	B	49.6/12.5
R337	7030003480	S.RES ERJ3GEVJ 222 V (2.2K)	B	63.9/6.9
R338	7030005120	S.RES ERJ2GEJ 102 X (1K)	T	61.1/10.8
R339	7030003860	S.RES ERJ3GE JPW V	T	65.5/26.4
R340	7030007340	S.RES ERJ2GEJ 153 X (15K)	B	6/29
R341	7030005090	S.RES ERJ2GEJ 104 X (100K)	B	5.7/24.5
R342	7030005070	S.RES ERJ2GEJ 683 X (68K)	B	7/23.7
R343	7030007570	S.RES ERJ2GEJ 122 X (1.2K)	B	8.3/25.9

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
R344	7030003860	S.RES ERJ3GE JPW V	T	23.4/2.9
R345	7030005090	S.RES ERJ2GEJ 104 X (100K) [voice storage] only	T	21.9/17
R346	7030005090	S.RES ERJ2GEJ 104 X (100K) [voice storage] only	T	20.7/16.8
R347	7030004970	S.RES ERJ2GEJ 470 X (47)	T	50.3/20.9
R348	7030007270	S.RES ERJ2GEJ 151 X (150)	T	43.4/25.2
R350	7030009320	S.RES ERJ2GEJ 4R7 X (4.7)	T	50.1/23
C1	4030007000	S.CER C1608 CH 1H 090D-T	B	67.3/10.4
C2	4030009520	S.CER C1608 CH 1H 020B-T	B	67.3/5.8
C3	4030006990	S.CER C1608 CH 1H 080D-T	B	63.9/4.3
C4	4030009550	S.CER C1608 CH 1H 2R5B-T	B	61.9/7.2
C5	4030009920	S.CER C1608 CH 1H 050B-T	B	59.8/4.3
C6	4030017460	S.CER ECJ0EB1E102K	B	59.8/6.5
C7	4030017460	S.CER ECJ0EB1E102K	B	61.7/9.7
C9	4030009910	S.CER C1608 CH 1H 040B-T	B	61.1/12.8
C10	4030017460	S.CER ECJ0EB1E102K	B	66.3/13
C11	4030007020	S.CER C1608 CH 1H 120J-T	B	67/14.4
C13	4030007050	S.CER C1608 CH 1H 220J-T	B	67/18
C14	4030017580	S.CER ECJ0EC1H060C	B	55.8/6.8
C15	4030017460	S.CER ECJ0EB1E102K	T	60.6/9.5
C16	4030009650	S.CER C1608 CH 1H 240J-T	B	66.2/22.5
C17	4030017510	S.CER ECJ0EC1H680J	T	62.4/9.9
C18	4030006860	S.CER C1608 JB 1H 102K-T	T	55.3/20
C19	4030017460	S.CER ECJ0EB1E102K	B	57.5/8
C20	4030017590	S.CER ECJ0EC1H070C	T	59.5/7.5
C21	4030017390	S.CER ECJ0EC1H180J	T	57.1/4.5
C22	4030017610	S.CER ECJ0EC1H090C	T	58.5/6.5
C23	4030017550	S.CER ECJ0EC1H1R5B	T	55.2/7.6
C24	4030017390	S.CER ECJ0EC1H180J	T	53.3/4.5
C25	4030017610	S.CER ECJ0EC1H090C	T	51.9/7.7
C27	4030017460	S.CER ECJ0EB1E102K	T	55.7/4
C28	4030017460	S.CER ECJ0EB1E102K	B	54.7/4
C30	4030017590	S.CER ECJ0EC1H070C	T	50.6/7.2
C32	4030017460	S.CER ECJ0EB1E102K	T	46.9/6.4
C33	4030017460	S.CER ECJ0EB1E102K	T	49.3/10.3
C34	4030017420	S.CER ECJ0EC1H470J	T	50.3/10.3
C35	4030016930	S.CER ECJ0EB1A104K	T	51.1/8.5
C36	4030017460	S.CER ECJ0EB1E102K	B	50.1/11.2
C37	4030017460	S.CER ECJ0EB1E102K	B	45.4/5.4
C38	4030017460	S.CER ECJ0EB1E102K	B	49.4/7.2
C39	4030017620	S.CER ECJ0EC1H100C	T	44.4/6.8
C40	4030017520	S.CER ECJ0EC1H0R3B	T	43.1/7.3
C41	4030017380	S.CER ECJ0EC1H050B	B	42.9/7.2
C42	4030017460	S.CER ECJ0EB1E102K	T	39/4
C43	4030017460	S.CER ECJ0EB1E102K	B	43.2/4
C44	4030017550	S.CER ECJ0EC1H1R5B	B	42.9/5.4
C45	4030017620	S.CER ECJ0EC1H100C	T	41.2/6.8
C46	4030017460	S.CER ECJ0EB1E102K	T	40/4
C48	4030017400	S.CER ECJ0EC1H220J	B	41.3/11.1
C49	4030017380	S.CER ECJ0EC1H050B	B	46.5/10.3
C50	4030017460	S.CER ECJ0EB1E102K	B	41.3/12
C51	4030017460	S.CER ECJ0EB1E102K	B	39.5/7.7
C52	4030017420	S.CER ECJ0EC1H470J	B	39.5/9.7
C53	4030016790	S.CER ECJ0EB1C103K	B	37.3/8.8
C54	4030017460	S.CER ECJ0EB1E102K	B	37.7/9.7
C55	4030017350	S.CER ECJ0EC1H020B	B	34.1/9.1
C56	4030017390	S.CER ECJ0EC1H180J	B	35.3/11.5
C57	4030017460	S.CER ECJ0EB1E102K	B	26.4/4.2
C58	4030017460	S.CER ECJ0EB1E102K	B	27.7/5
C59	4030017460	S.CER ECJ0EB1E102K	B	26.8/6.3
C60	4030017460	S.CER ECJ0EB1E102K	B	23/6
C61	4030017430	S.CER ECJ0EC1H101J	B	23.6/10.9
C62	4030017680	S.CER ECJ0EC1H820J	B	24.3/8.8
C63	4030017420	S.CER ECJ0EC1H470J	B	24.2/9.7
C65	4030017460	S.CER ECJ0EB1E102K	B	22.2/12.2
C66	4030017460	S.CER ECJ0EB1E102K	B	19.6/3
C67	4030017460	S.CER ECJ0EB1E102K	B	15/13.3
C69	4030017730	S.CER ECJ0EB1E471K	B	15.9/13.3
C70	4030017730	S.CER ECJ0EB1E471K	B	14.5/10.4
C71	4030016930	S.CER ECJ0EB1A104K	B	51/16
C72	4030017420	S.CER ECJ0EC1H470J	T	54.1/22.7
C73	4030017460	S.CER ECJ0EB1E102K	T	60.1/10.8
C74	4030017460	S.CER ECJ0EB1E102K	T	15.5/16.1
C75	4550006050	S.TAN TEESVA OJ 106M8R	T	50.1/18.3
C76	4030016790	S.CER ECJ0EB1C103K	B	53.2/11.5
C77	4030017460	S.CER ECJ0EB1E102K	B	56.4/14.3
C78	4030017460	S.CER ECJ0EB1E102K	T	55.4/16
C79	4030018890	S.CER ECJ0EB0J224K	T	50.1/16.5
C80	4030017780	S.CER ECJ0EB1E472K	T	67.4/21.8
C81	4030016790	S.CER ECJ0EB1C103K	B	69.2/23.2
C82	4030017460	S.CER ECJ0EB1E102K	T	64.7/23.4
C83	4030017660	S.CER ECJ0EC1H330J	T	54.1/24.7
C84	4030017460	S.CER ECJ0EB1E102K	T	57.1/25.5
C86	4030017400	S.CER ECJ0EC1H220J	T	52.3/28.8
C88	4030017460	S.CER ECJ0EB1E102K	T	57.1/32.1
C89	4030017610	S.CER ECJ0EC1H090C	T	52.8/24.2
C91	4030017730	S.CER ECJ0EB1E471K	T	56.7/30.9
C92	4030017600	S.CER ECJ0EC1H080C	B	54.8/27.1
C93	4030017360	S.CER ECJ0EC1H030B	B	51.7/32.1
C97	4030017460	S.CER ECJ0EB1E102K	B	51.2/23.1
C98	4030017360	S.CER ECJ0EC1H030B	B	54.7/22.3
C99	4030017460	S.CER ECJ0EB1E102K	T	49.1/21.3
C100	4030017570	S.CER ECJ0EC1H040B	B	48/26.4
C102	4030017380	S.CER ECJ0EC1H050B	B	48.6/28.2
C103	4030017350	S.CER ECJ0EC1H020B	B	45.2/28.7
C104	4030017460	S.CER ECJ0EB1E102K	B	46.3/30
C105	4030017460	S.CER ECJ0EB1E102K	B	50.8/30.1
C106	4030017420	S.CER ECJ0EC1		

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REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C110	4030017730	S.CER ECJ0EB1E471K	T	43.1/30.7
C111	4030017420	S.CER ECJ0EC1H470J	T	45.3/30.2
C112	4030017460	S.CER ECJ0EB1E102K	B	45.9/22.5
C113	4030017520	S.CER ECJ0EC1H0R3B	B	43.7/26.2
C114	4030017630	S.CER ECJ0EC1H120J	B	42.1/22.4
C115	4030017620	S.CER ECJ0EC1H100C	B	40.9/24.2
C116	4030017460	S.CER ECJ0EB1E102K	B	40.9/25.2
C117	4030017730	S.CER ECJ0EB1E471K	B	41.6/26.2
C118	4030017530	S.CER ECJ0EC1H0R5B	B	43.7/27.2
C119	4030016790	S.CER ECJ0EB1C103K	B	41.6/27.2
C120	4030017730	S.CER ECJ0EB1E471K	B	40.6/28.6
C121	4030017620	S.CER ECJ0EC1H100C	B	42.1/31
C122	4030017630	S.CER ECJ0EC1H120J	B	43.2/32.3
C123	4030017620	S.CER ECJ0EC1H100C	B	40.9/32
C124	4030017380	S.CER ECJ0EC1H050B	B	39.6/32.3
C126	4030017640	S.CER ECJ0EC1H150J	B	40.9/21.4
C127	4030017380	S.CER ECJ0EC1H050B	B	39.6/21.1
C129	4030017530	S.CER ECJ0EC1H0R5B	B	38.3/23.8
C132	4030017460	S.CER ECJ0EB1E102K	T	31.4/19.3
C133	4030017620	S.CER ECJ0EC1H100C	B	39.6/30.5
C134	4030017620	S.CER ECJ0EC1H100C	B	39.6/22.9
C135	4030017460	S.CER ECJ0EB1E102K	B	36.7/28.6
C136	4030016930	S.CER ECJ0EB1A104K	B	36.7/29.6
C137	4030016790	S.CER ECJ0EB1C103K	B	45/37
C138	4030017460	S.CER ECJ0EB1E102K	T	37.1/29
C139	4030016930	S.CER ECJ0EB1A104K	T	46.3/34.2
C140	4030016930	S.CER ECJ0EB1A104K	B	28.6/28.6
C141	4030017460	S.CER ECJ0EB1E102K	B	32.7/20.6
C143	4030017460	S.CER ECJ0EB1E102K	T	32.1/21.3
C144	4030017420	S.CER ECJ0EC1H470J	T	36.8/27.3
C145	4030017420	S.CER ECJ0EC1H470J	T	36.2/22.9
C146	4550000560	S.TAN TEESVA 1V 334M8R	T	35.2/30.3
C147	4550006390	S.TAN TEESVA 1C 335M8R	T	30/25.9
C148	4550006250	S.TAN TEESVA 1A 106M8R	B	45.1/40.9
C149	4030017460	S.CER ECJ0EB1E102K	B	31.8/32
C150	4030018860	S.CER ECJ0EB0J105K	T	31.5/16.9
C151	4030016930	S.CER ECJ0EB1A104K	B	32.5/30.8
C152	4030017420	S.CER ECJ0EC1H470J	B	32.9/18.1
C153	4030017420	S.CER ECJ0EC1H470J	B	31.2/17.3
C154	4030017420	S.CER ECJ0EC1H470J	B	29.8/18.5
C155	4030017420	S.CER ECJ0EC1H470J	B	30.9/32
C156	4030017460	S.CER ECJ0EB1E102K	B	27.1/29.6
C157	4030017620	S.CER ECJ0EC1H100C	B	25.9/30
C158	4030016930	S.CER ECJ0EB1A104K	B	25.4/36
C159	4030017460	S.CER ECJ0EB1E102K	B	24.7/34.2
C161	4030017620	S.CER ECJ0EC1H100C	B	25.4/25.5
C162	4030017500	S.CER ECJ0EC1H560J	B	29.3/17.2
C163	4030017570	S.CER ECJ0EC1H040B	B	27.8/14.8
C164	4030017590	S.CER ECJ0EC1H070C	B	28.4/12.9
C165	4030016790	S.CER ECJ0EB1C103K	B	28.9/18.5
C166	4030017360	S.CER ECJ0EC1H030B	B	29/14.2
C167	4030016930	S.CER ECJ0EB1A104K	B	27/8.4
C168	4030016930	S.CER ECJ0EB1A104K	B	20.2/16.4
C169	4030016930	S.CER ECJ0EB1A104K	B	18.7/16.4
C170	4030016930	S.CER ECJ0EB1A104K	T	31.6/5.4
C171	4030018910	S.CER C1608 JB 0J 475K-T	T	32.7/4.5
C172	4030017460	S.CER ECJ0EB1E102K	T	33.8/2.9
C173	4030017460	S.CER ECJ0EB1E102K	T	28.8/18.4
C180	4030016930	S.CER ECJ0EB1A104K	T	32.8/10.6
C188	4030017460	S.CER ECJ0EB1E102K	B	23.4/7.6
C190	4550000550	S.TAN TEESVA 1V 224M8R	T	32.3/27.9
C201	4030017460	S.CER ECJ0EB1E102K	T	41.3/21.5
C202	4030016930	S.CER ECJ0EB1A104K	B	36.9/27.6
C203	4030017460	S.CER ECJ0EB1E102K	B	39.8/27.3
C205	4030017380	S.CER ECJ0EC1H050B	T	44.1/32.8
C206	4030017590	S.CER ECJ0EC1H070C	T	42.7/32.1
C208	4030017590	S.CER ECJ0EC1H070C	T	36.2/33.8
C209	4030017460	S.CER ECJ0EB1E102K	T	35.2/33.8
C211	4030018910	S.CER C1608 JB 0J 475K-T	T	34.2/12
C213	4030017460	S.CER ECJ0EB1E102K	T	33.3/14.5
C220	4030016970	S.CER ECJ0EB1C223K	T	13.7/21.7
C221	4030017790	S.CER ECJ0EB1E682K	B	8.2/22.6
C222	4030018080	S.CER ECJ0EB1H182K	B	9/27.1
C223	4030017040	S.CER ECJ0EB1A333K	B	5.7/23.6
C225	4030016970	S.CER ECJ0EB1C223K	B	4.8/31.6
C226	4030017760	S.CER ECJ0EB1H222K	B	2.5/29.7
C227	4030016790	S.CER ECJ0EB1C103K	B	31.7/12.8
C228	4030017460	S.CER ECJ0EB1E102K	T	24.3/14.7
C229	4030016930	S.CER ECJ0EB1A104K	T	30.2/10.5
C230	4030017460	S.CER ECJ0EB1E102K	T	67.4/28.3
C231	4030016790	S.CER ECJ0EB1C103K	B	52.4/34.7
C232	4030016790	S.CER ECJ0EB1C103K	B	30.3/41.7
C233	4550006350	S.TAN TEESVB2 1A 226M8R	B	67.1/27.2
C234	4030017730	S.CER ECJ0EB1E471K	B	69.6/29.8
C235	4030016790	S.CER ECJ0EB1C103K	B	66.9/31
C236	4510008490	S.ELE EEE1CS100SR	T	74.2/19.9
C237	4030016790	S.CER ECJ0EB1C103K	T	75.9/30.1
C238	4550006480	S.TAN TEESVA 1C 475M8R	B	66.5/35.1
C239	4030017330	S.CER ECJ0EF1C104Z	T	71.5/29
C240	4030017460	S.CER ECJ0EB1E102K	B	32.6/12.8
C241	4030017460	S.CER ECJ0EB1E102K	T	51.6/37.6
C242	4030017460	S.CER ECJ0EB1E102K	B	31.9/35.9
C243	4030017420	S.CER ECJ0EC1H470J	B	53.5/41.5
C244	4030017420	S.CER ECJ0EC1H470J	T	27.1/19.5
C251	4030017650	S.CER ECJ0EC1H270J	T	24.8/22.8
C252	4030017770	S.CER ECJ0EB1E332K	T	27.2/24.6
C253	4030017710	S.CER ECJ0EC1H181J	T	15.7/20.4
C254	4030017750	S.CER ECJ0EB1E122K	T	17.3/19.3
C255	4030016930	S.CER ECJ0EB1A104K	B	22.2/13.1
C256	4030017760	S.CER ECJ0EB1H222K	T	13.1/24.3
C258	4030016930	S.CER ECJ0EB1A104K	B	2.8/35.2
C259	4030017400	S.CER ECJ0EC1H220J	B	9.2/30.6
C260	4030017400	S.CER ECJ0EC1H220J	B	23.9/28.7
C261	4550007690	S.TAN TEESVP 1C 105M8R	T	26.2/20.9

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
C262	4550007690	S.TAN TEESVP 1C 105M8R	T	22.7/19.4
C263	4030017460	S.CER ECJ0EB1E102K	T	13.1/26.6
C264	4550007090	S.TAN TEESVA 1A 226M8R	B	12.8/25.9
C265	4030017420	S.CER ECJ0EC1H470J	T	26.8/26.7
C266	4030017720	S.CER ECJ0EB1H331K	T	24.7/26.2
C267	4030017460	S.CER ECJ0EB1E102K	T	25.6/17.6
C271	4030016930	S.CER ECJ0EB1A104K	T	26.6/31.9
C281	4030016930	S.CER ECJ0EB1A104K	T	13.9/38.3
C287	4030016930	S.CER ECJ0EB1A104K	B	24.1/31.7
C291	4030017420	S.CER ECJ0EC1H470J	B	56.1/11.9
C292	4030017460	S.CER ECJ0EB1E102K	B	54.7/8.1
C293	4030017460	S.CER ECJ0EB1E102K	T	78.7/24.7
C294	4030017460	S.CER ECJ0EB1E102K	B	2.5/30.6
C295	4030017460	S.CER ECJ0EB1E102K	T	71.5/26.5
C296	4030017460	S.CER ECJ0EB1E102K	T	77.3/23.9
C297	4030017460	S.CER ECJ0EB1E102K	T	77.7/22.6
C298	4030017460	S.CER ECJ0EB1E102K	T	4.8/38.1
C299	4030017460	S.CER ECJ0EB1E102K	T	13/38.3
C300	4030017460	S.CER ECJ0EB1E102K	T	10.2/41.2
C301	4030017460	S.CER ECJ0EB1E102K	T	4.8/36.5
C302	4030017420	S.CER ECJ0EC1H470J	B	48.6/14.3
C303	4030017460	S.CER ECJ0EB1E102K	B	50.9/13
C305	4030016930	S.CER ECJ0EB1A104K	T	22.6/34.8
C309	4030018860	S.CER ECJ0EB0J105K		
C310	4030016930	S.CER ECJ0EB1A104K		[voice storage] only
C311	4030018860	S.CER ECJ0EB0J105K		[voice storage] only
C312	4030018860	S.CER ECJ0EB0J105K		[voice storage] only
C313	4030016930	S.CER ECJ0EB1A104K		[voice storage] only
C314	4030016930	S.CER ECJ0EB1A104K		[voice storage] only
C315	4030018860	S.CER ECJ0EB0J105K		Except [EUR-03]
C316	4550006250	S.TAN TEESVA 1A 106M8R		
C317	4030017460	S.CER ECJ0EB1E102K		Except [EUR-03]
C318	4030017460	S.CER ECJ0EB1E102K		Except [EUR-03]
C319	4550007790	S.TAN TEESVB2 0J 686M8R		[voice storage] only
C320	4030017460	S.CER ECJ0EB1E102K		[voice storage] only
C321	4030017420	S.CER ECJ0EC1H470J		
C322	4030017460	S.CER ECJ0EB1E102K		
C325	4030016930	S.CER ECJ0EB1A104K		[voice storage] only
C326	4030017460	S.CER ECJ0EB1E102K		[voice storage] only
C327	4030018860	S.CER ECJ0EB0J105K		[voice storage] only
C328	4550007880	S.TAN TEESVB2 1A 686M8R		[voice storage] only
C329	4030017460	S.CER ECJ0EB1E102K		[voice storage] only
C333	4030017420	S.CER ECJ0EC1H470J		
C339	4030017340	S.CER ECJ0EC1H070C		
C364	4030017590	S.CER ECJ0EC1H010B		
C365	4030009350	S.CER C1608 CH 1H 3R5B-T		
C366	4030017460	S.CER ECJ0EB1E102K		
C367	4030009920	S.CER C1608 CH 1H 050B-T		
C368	4030017420	S.CER ECJ0EC1H470J		
C369	4030006860	S.CER C1608 JB 1H 102K-T		
C370	4030017460	S.CER ECJ0EB1E102K		
C371	4030017460	S.CER ECJ0EB1E102K		
C372	4030017360	S.CER ECJ0EC1H030B		
C373	4030017460	S.CER ECJ0EB1E102K		
C374	4550007180	S.TAN F931C685MAABMA		
C375	4550006250	S.TAN TEESVA 1A 106M8R		
C376	4550007410	S.TAN F931A157MNMMA		[voice storage] only
C377	4030017640	S.CER ECJ0EC1H150J		
C378	4030017640	S.CER ECJ0EC1H150J		
C379	4030017460	S.CER ECJ0EB1E102K		
J1	6510026130	S.CON IMSA-9681S-36Y900	T	7.6/30.7
J2	6510021901	S.CON BM02B-ASRS-TF(LF)(SN)	T	2.5/33.2
F1	5210000830	S.FUS ERBFE3R00U	T	76.1/27.9
F2	5210001100	S.FUS 0467.375NR	T	24.7/37.1
S1	2260002750	S.SWI EVQP7M01K	T	81.2/24
MF1	2710000850	MOT QX10A(R5.5X3)3.0V(WIRE30MM)		Except [EUR-03]
EP3	6910015370	S.BEA ACZ1005Y-102-T	B	25.4/35.1
EP4	6910015600	S.BEA ACZ1005Y-241 (240)	T	23.9/21.7
EP5	6910015600	S.BEA ACZ1005Y-241 (240)	T	14/26.1
EP8	6910014730	S.BEA MPZ2012S331A-T	B	76.7/18.7
EP9	6910019100	S.BEA MPZ1608S101AT	T	76.1/25.3
EP10	6910014730	S.BEA MPZ2012S331A-T	B	76.7/22.1
MP1	8410002531	S.HEA 2681 PA HEATSINK-1	B	61/25.5
MP7	6910014760	S.PLA OG-503040	B	42.3/39.2

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

# SECTION 7

# MECHANICAL PARTS

## [CHASSIS PARTS]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6910015630	2682 ANT CONNECTOR	1
MP1	8010020920	3060 CHASSIS	1
MP2	8950005512	2403 CONTACT SPRING -2	1
MP3	8930058561	2403 A-MAIN SEAL-1	1
MP4	8930059800	2600 PET SHEET	1
MP5	8930059830	2600 SHEET	1
MP6	8930051500	O-RING (AB)	1
MP7	8930055870	O-RING (AO)	1
MP8	8930058550	O-RING (AS)	1
MP9	8830001600	NUT (L)	1
MP10	8830003140	VR NUT (Y)	1
MP11	8850001880	SEALING WASHER (W)	2
MP12	8810009511	SCREW BT B0 2X4 NI-ZC3 (BT)	7
MP13	8810007890	SCREW BT B0 2X4 SUS	1
MP14	8810010850	SCREW BTB0 2X8SUS SSBC (BT)	2
MP15	8810010191	SCREW BIH M2X4 SUS SSBC	3
MP18	8930073030	3060 MOTOR PLATE	1
MP19	8930068750	SHIELD TAPE (R)	1
MP20	8310070300	3060 PLATE	1
MP21	8930073450	3060 VOL SEAL	1
MP22	8930076150	SHIELD SPONGE (CI)	1
MP23	8930071360	FERRITE SHEET (Q)	1

## [FRONT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J401*	6510026130	IIMS-9681S-36A-TB	1
J402*	6510023831	SM04B-SRSS-TB (LF) (SN)	1
J403*	6510026140	11FH-SM1-TB (LF) (SN)	1
DS401	5030002730	L3-0048TAY-5	1
MC401	7700002760	EM6027P-46C33-G-01	1
S401	2260002840	SKHLLFA010	1
SP401	2510001330	036D0803	1
W401	8900016840	OPC-1753	1
W402*	7120000470	ERDS2T0	1
W403*	7120000470	ERDS2T0	1
W404	8900017120	OPC-1754	1
EP402	8930061530	SRCN-2681-SP-N-W	2
MP401	8210024190	3060 FRONT PANEL (Incl. MP402, 403, 416, 420)	1
MP402	8210019870	2681 TOP PANEL	1
MP403	8930060530	2681 TOP KEY	1
MP404	8930077210	2681 4-2 KEY (A)	1
MP405	8210019880	2681 PTT BUTTON	1
MP406	8930060550	2681 PTT PLATE	1
MP407	8930060711	2681 PTT RUBBER-1	1
MP408	8310059540	2681 LCD PLATE	1
MP409	8930060520	2681 LED LENS	1
MP410	8210019890	2681 REFLECTOR	1
MP411	8310072810	2681 WINDOW PLATE (B)	1
MP412	8930060860	2681 WINDOW SHEET	1
MP413	8930059360	2600 RELEASE BUTTON	1
MP414	8930063030	2721 RELEASE PLATE	1
MP415	8930056540	PUSH SPRING (AH)	2
MP416	8830001591	1362 INSERT NUT (A)-1	1
MP417	8930055730	2403 CONNECTOR SEAL	1
MP418	8930055890	2403 CONNECTOR SHEET	1
MP419	8930056430	2403 9-PIN SHEET	1
MP420	8930073610	SP NET (D)	1
MP421	8610011380	KNOB N-313	1
MP422	8610009240	KNOB SPRING NO.7800P	1
MP423	8930068980	2905 VENT SHEET	1
MP424	8810009511	SCREW BT B0 2X4 NI-ZC3 (BT)	4
MP425	8510015660	2681 F-SHIELD PLATE	1
MP426	8930061200	2681 MIC RUBBER	1
MP427	8930061120	SHIELD SPONGE (AA)	2
MP429	8930062240	SPONGE (HM)	1
MP430	6910014760	OG-503040	1

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

†: Optional product.

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510026130	IIMS-9681S-36A-TB	1
J2*	6510021901	BM02B-ASRS-TF (LF) (SN)	1
S1*	2260002750	EVQP7M01K	1
F1*	5210000830	ERBFE3R00U	1
F2*	5210001100	0467.375NR	1
MF1	2710000850	QX10A (R5.5X3)3.0V (WIRE30MM)	1
MP1*	8410002531	2681 PA HEATSINK-1	1
MP2*	8510015520	2681 VCO CASE	1
MP3	8510015510	2681 VCO COVER	1
MP4	8510018830	3120 A-SHIELD COVER	1
MP5	8510018840	3120 B-SHIELD COVER	1
MP7*	6910014760	OG-503040	1
MP8	8510015660	2681 F-SHIELD PLATE	1
MP10	8930062950	SHIELD SPONGE (AF)	1
MP13	8930077220	SPONGE (KF)	1

## [VR UNIT]

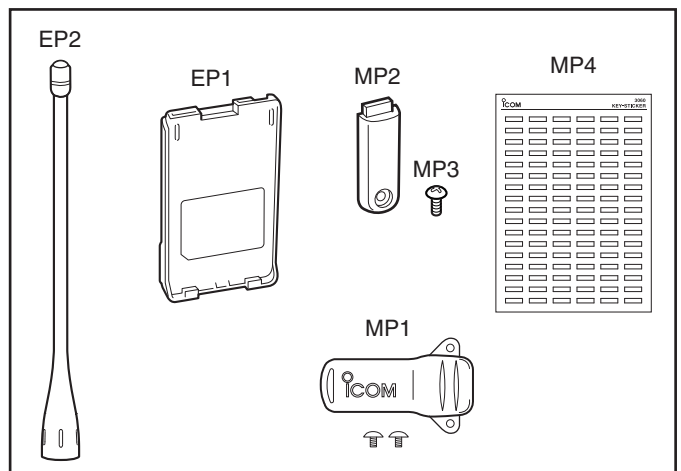
REF NO.	ORDER NO.	DESCRIPTION	QTY.
R601	7210003130	TP76N97N-13F-10KA-2497	1
W601	8900012340	OPC-1260	1

## [CONNECTOR UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510026140	11FH-SM1-TB (LF) (SN)	1
MP701	8950005520	2403 9-PIN CONNECTOR	1
MP702	8930062140	2682 EARTH SPRING	1
MP703*	8510017840	OG-321610G	1

## [ACCESSORIES]

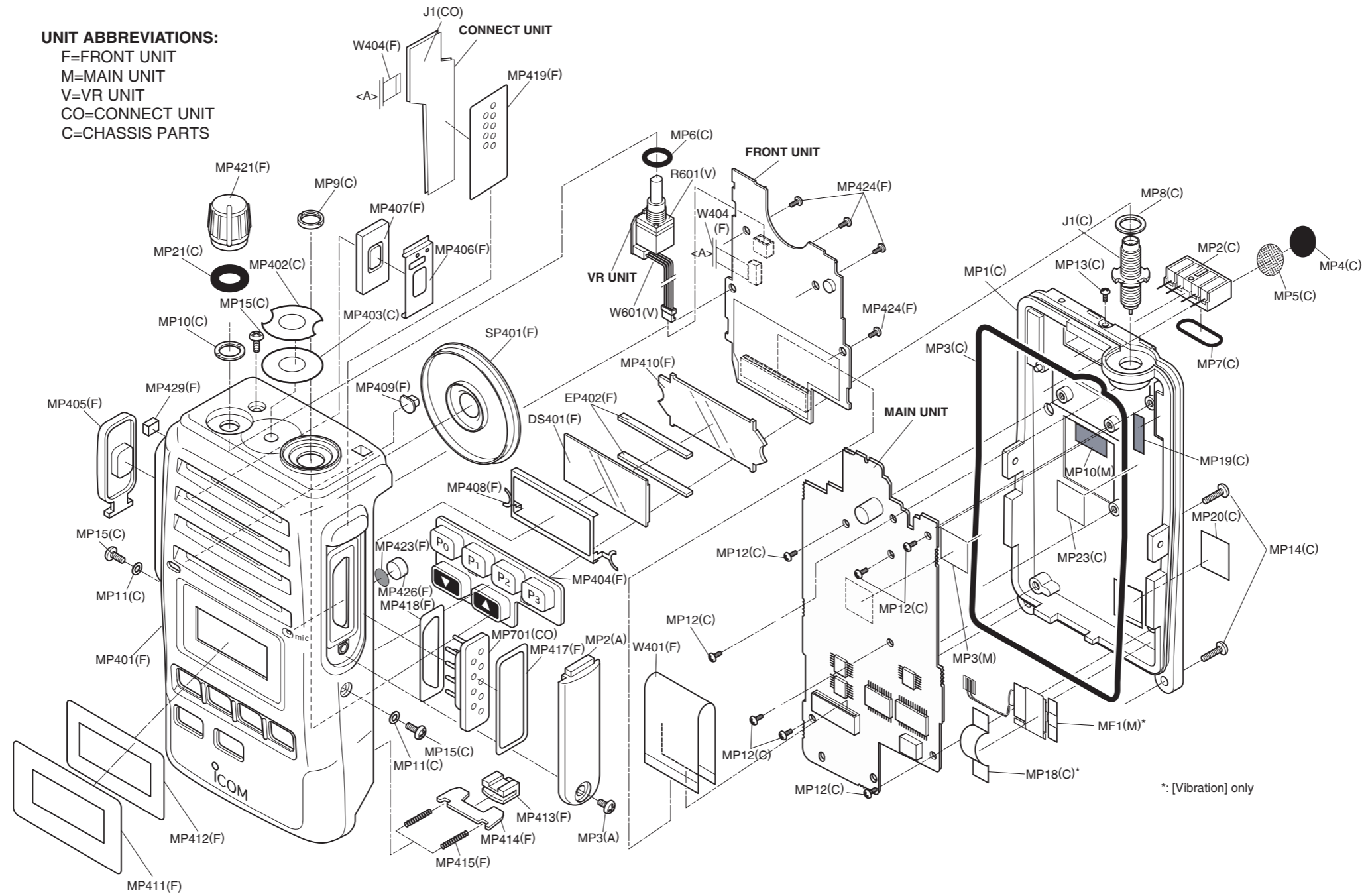
REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1†	-	BP-227	1
EP2†	-	FA-S27U	1
MP1†	-	MB-98	1
MP2	8210017071	2337 C-PANEL-1	1
MP3	8810010470	SCREW TRUSS M3X4 SUS SSBC	1
MP4	8310070780	3060 KEY-STICKER	1



### Screw abbreviations

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

**UNIT ABBREVIATIONS:**  
 F=FRONT UNIT  
 M=MAIN UNIT  
 V=VR UNIT  
 CO=CONNECT UNIT  
 C=CHASSIS PARTS

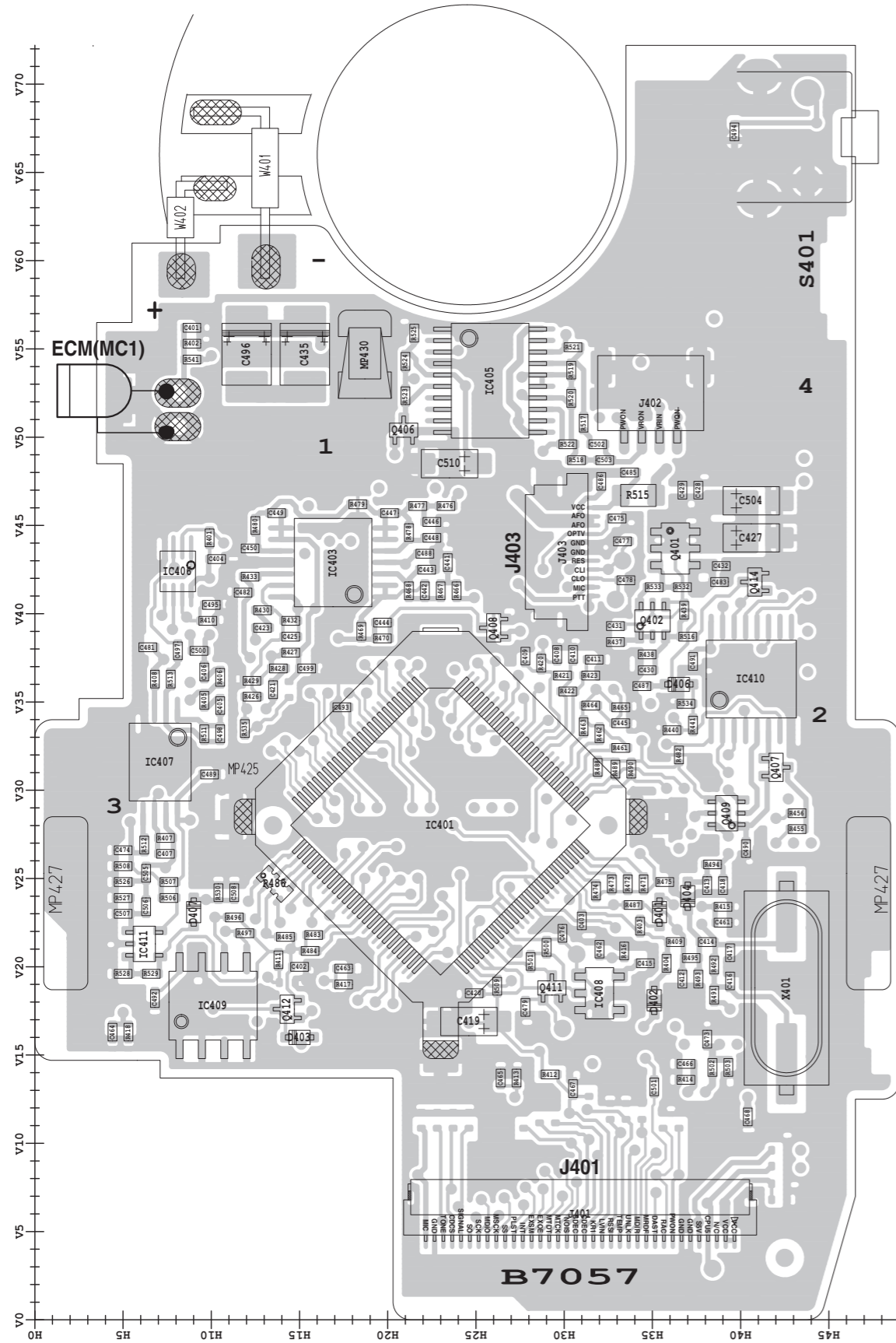


\*: [Vibration] only

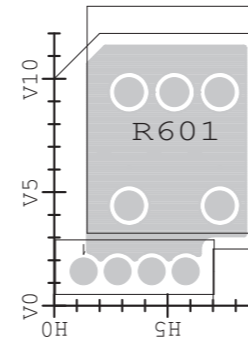
# SECTION 8

# BOARD LAYOUTS

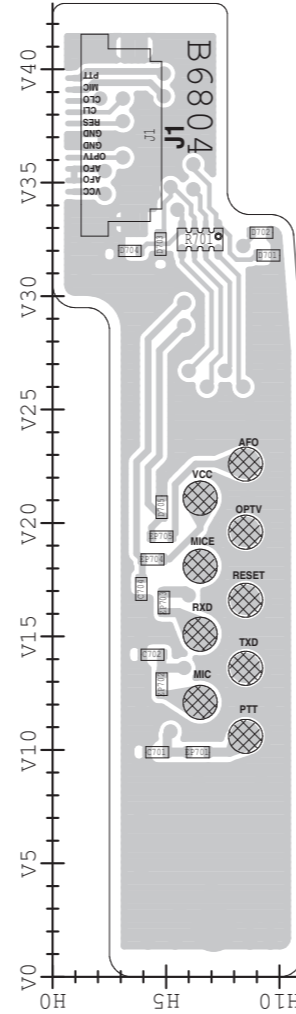
• FRONT UNIT  
(TOP VIEW)



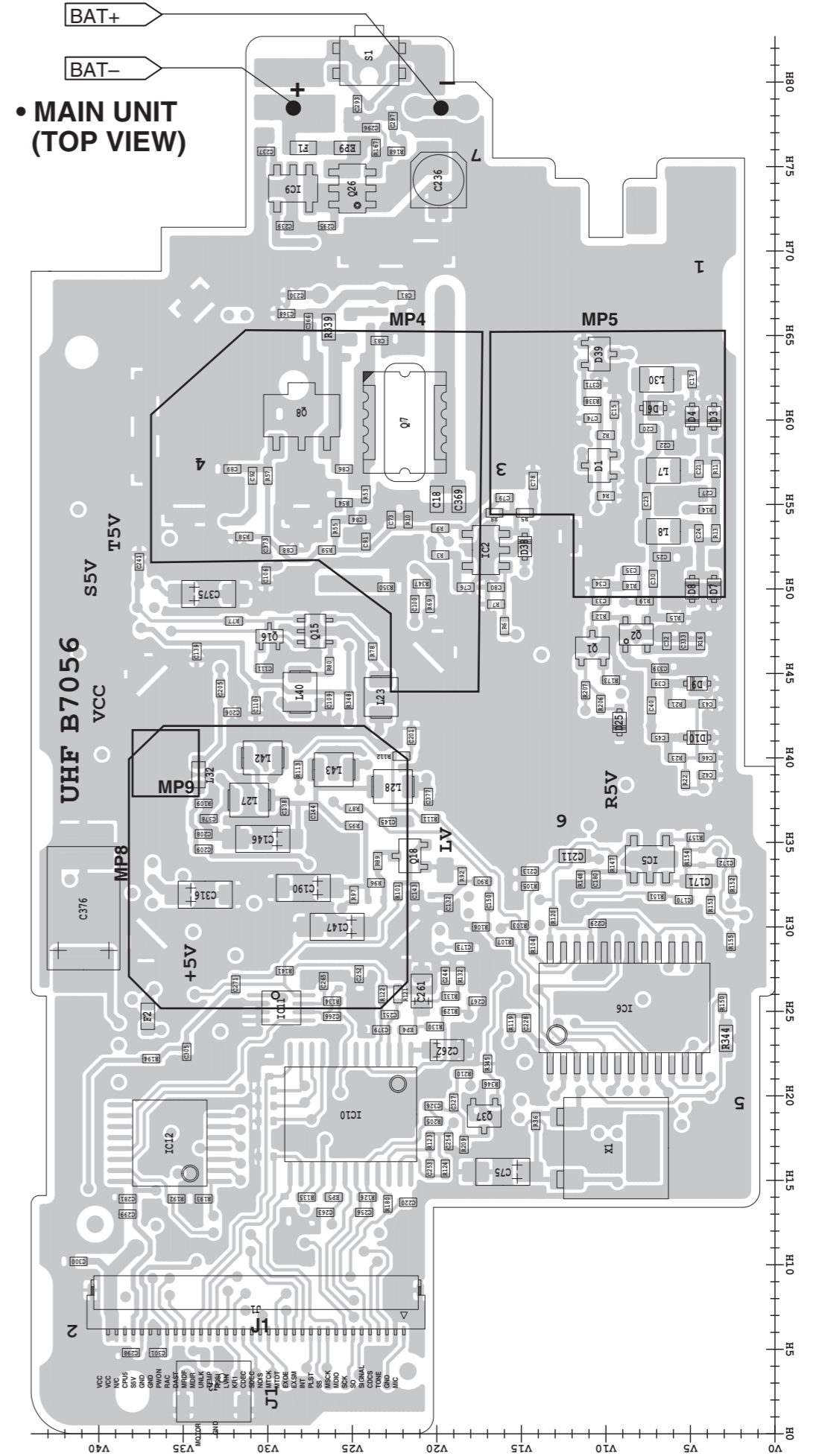
• VR UNIT  
(TOP VIEW)



• CONNECT UNIT  
(TOP VIEW)

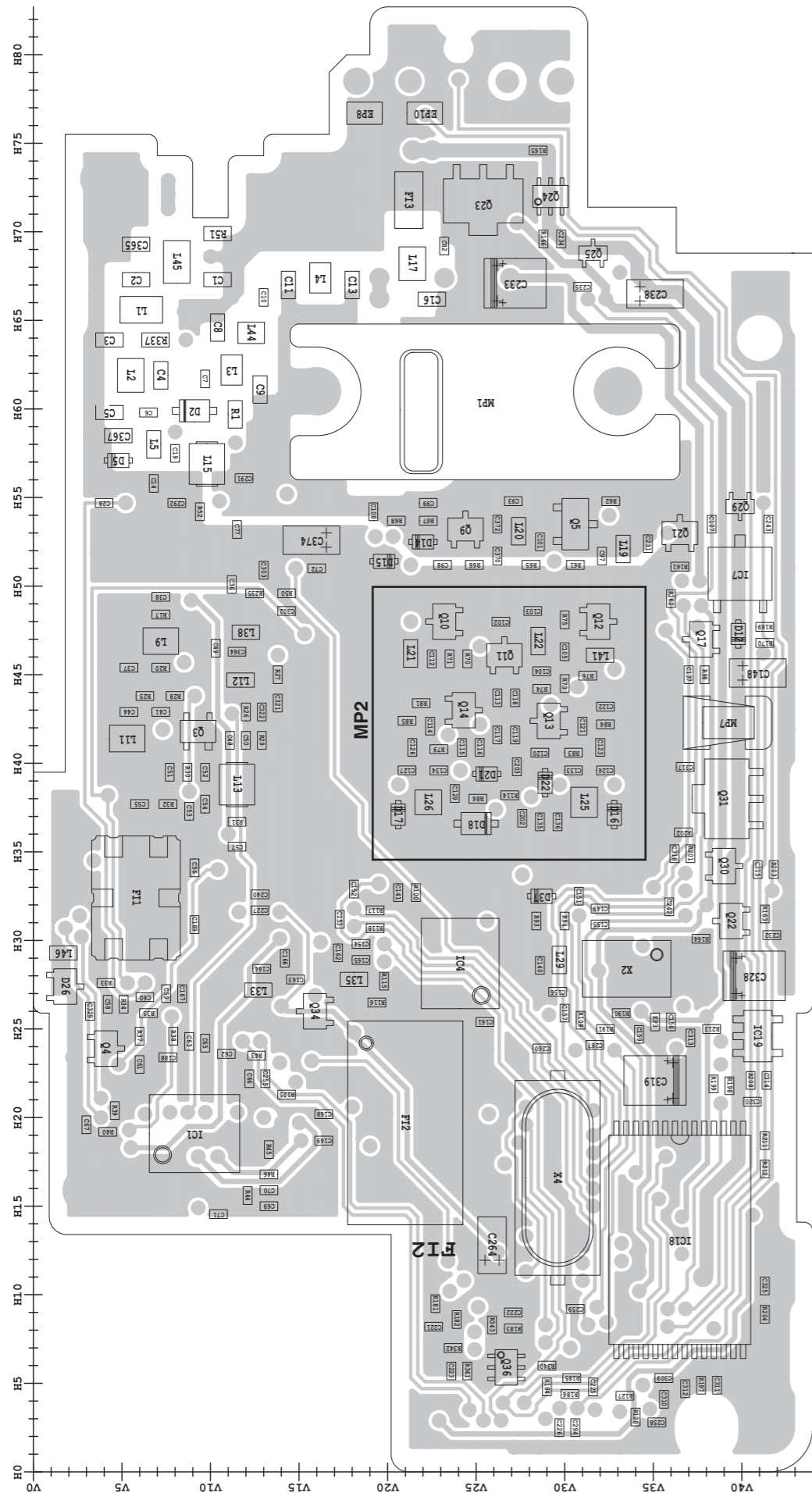


• MAIN UNIT  
(TOP VIEW)

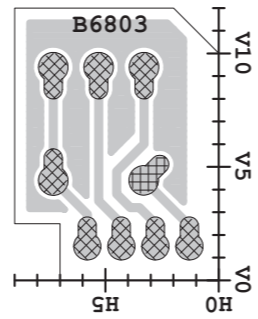


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

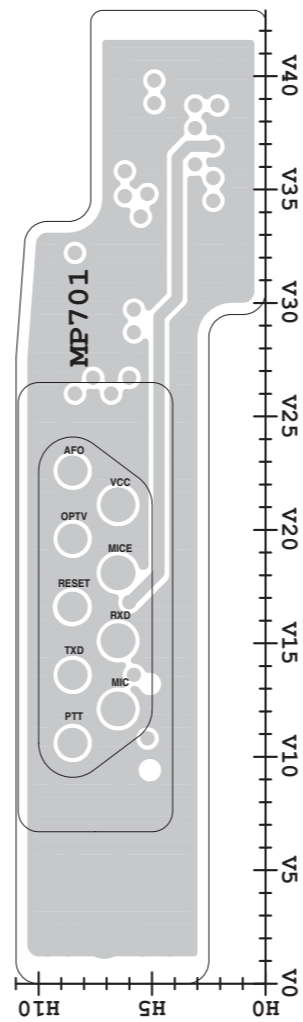
• MAIN UNIT  
(BOTTOM VIEW)



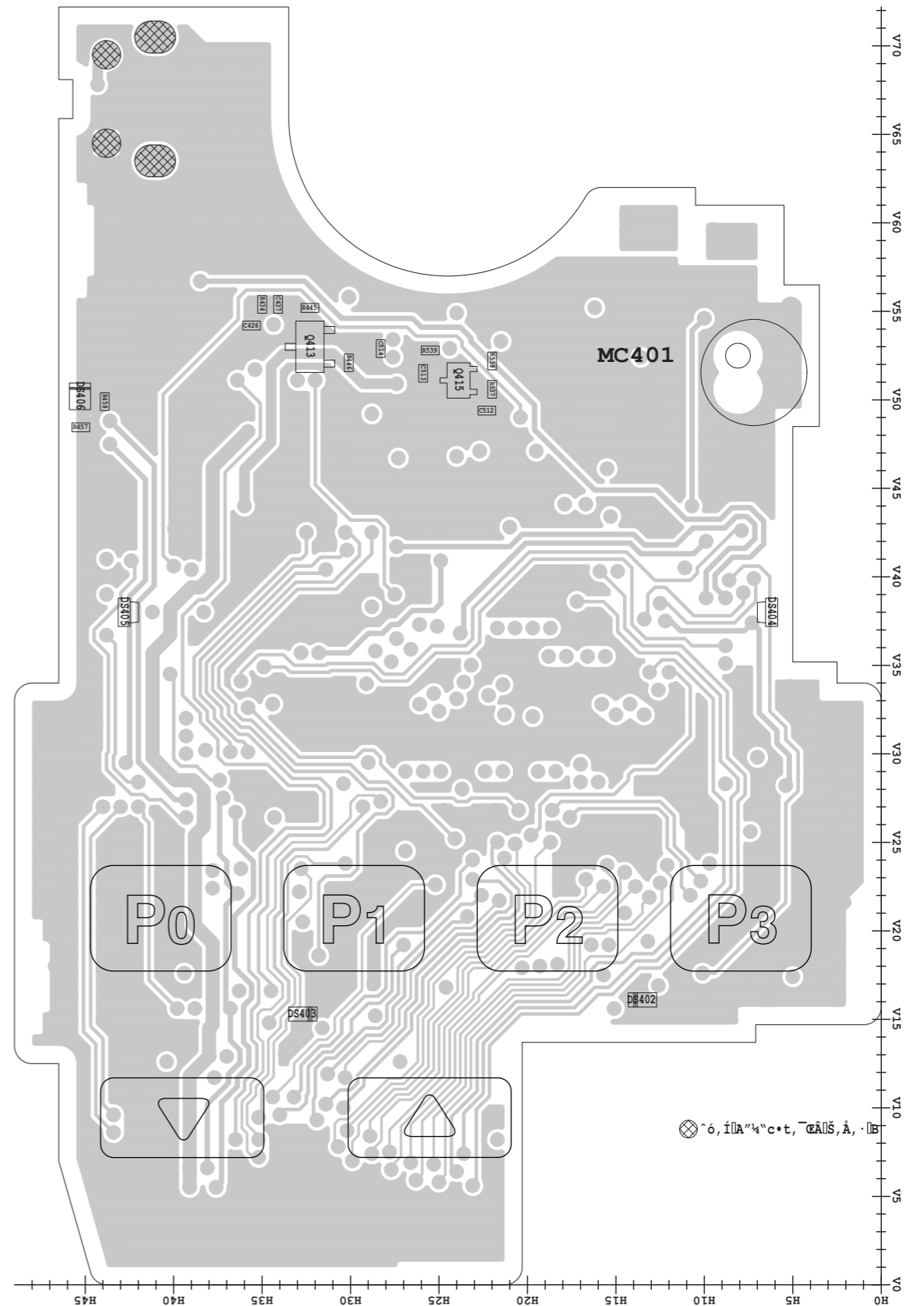
• VR UNIT  
(BOTTOM VIEW)



• CONNECT UNIT  
(BOTTOM VIEW)



• FRONT UNIT  
(BOTTOM VIEW)

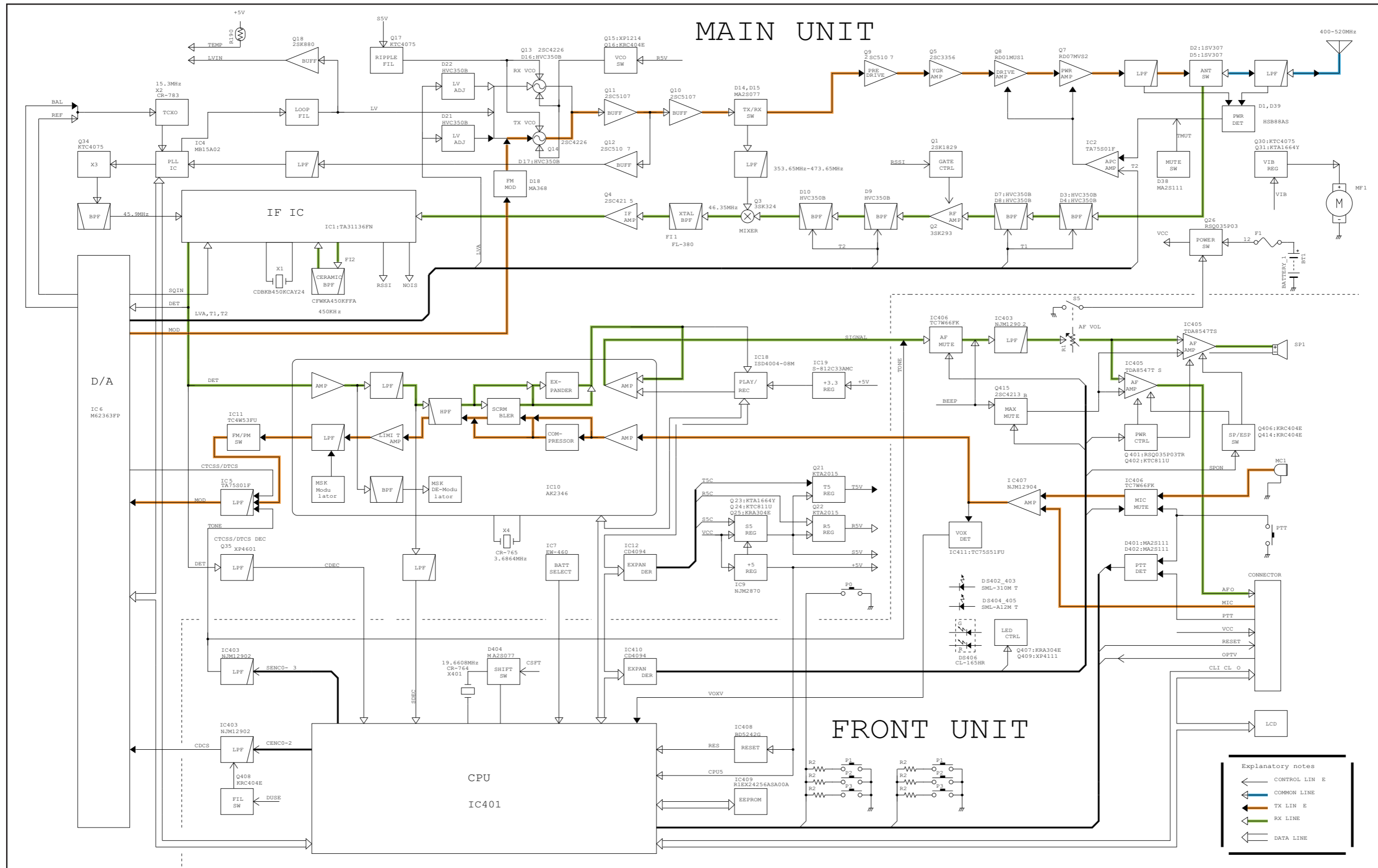


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.



# SECTION 9

# BLOCK DIAGRAM



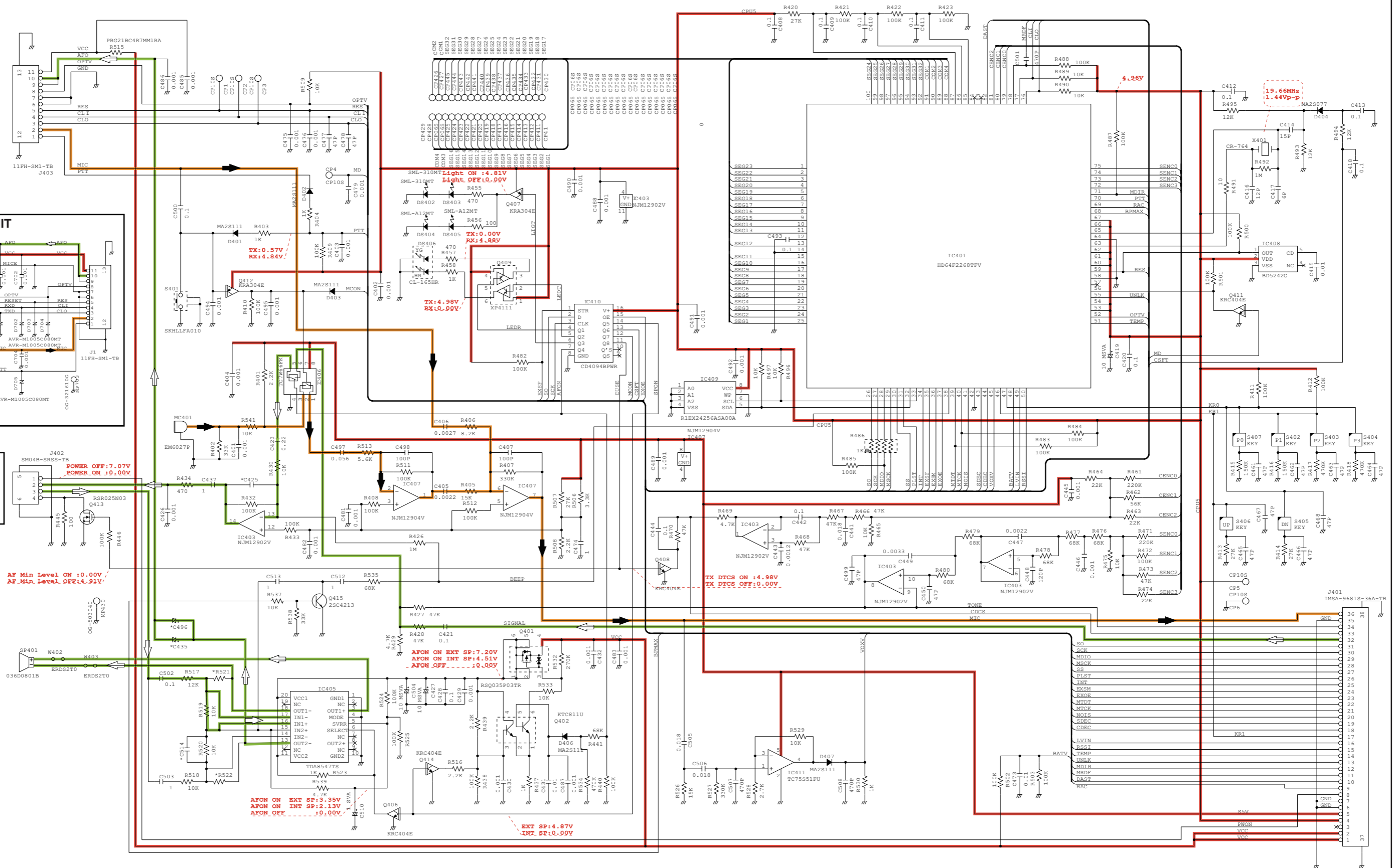
# SECTION 10

# VOLTAGE DIAGRAM

## FRONT UNIT

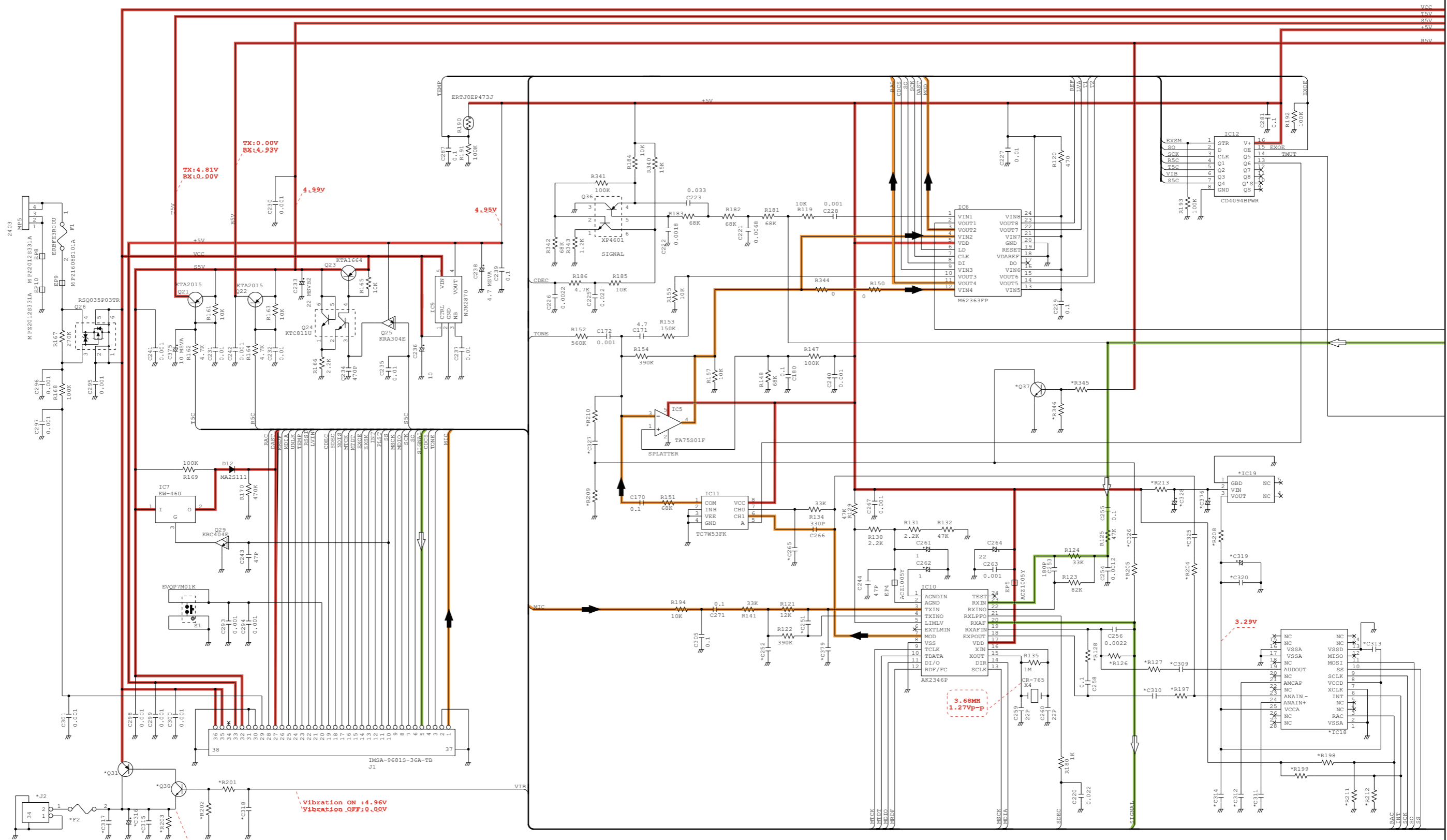
## CONNECT UNIT

## VR UNIT



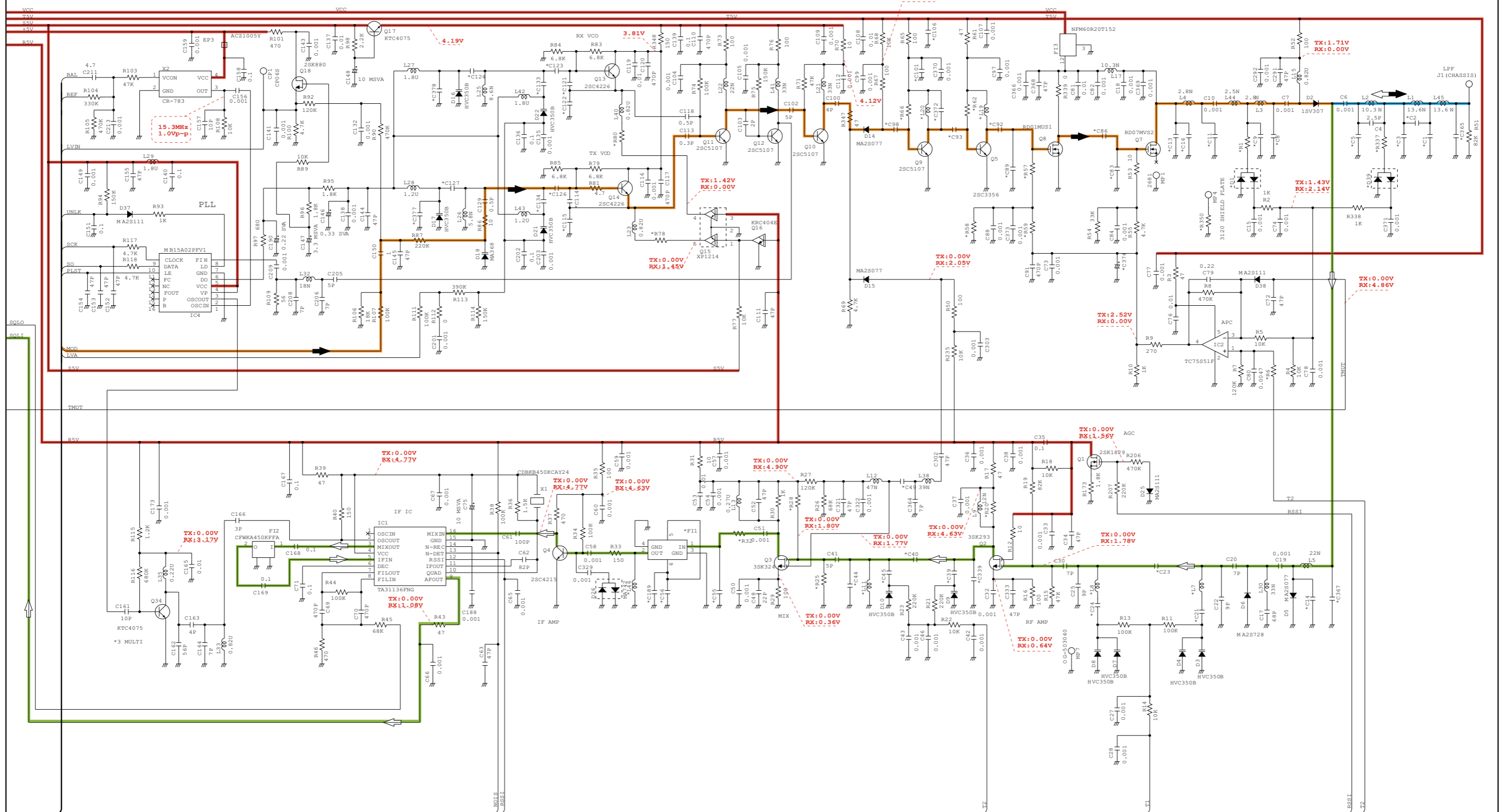
\*; Refer to "PARTS LIST."

• MAIN UNIT (Left side)



\*; Refer to "PARTS LIST"

• MAIN UNIT (Right side)



\*; Refer to "PARTS LIST."

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**Count on us!**

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S-14514XZ-C1  
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