

May. 2012



SERVICE MANUAL ADDENDUM

IC-F33GT IC-F33GS IC-F34GT IC-F34GS

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SECTION 8

MECHANICAL PARTS

[CHASSIS PARTS]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6910021491	ANT CONNECTOR 106-1 <SSC>	1
J2	6910015860	IMSA-6277S-02A-G	1
SP1	2510001061	K036NA500-67 <OSC>	1
W1	8900009640	OPC-963	1
MP1	8010019456	2721 CHASSIS-6 T	1
MP2	8210020652	2721 T-FRONT PANEL ASSEMBLY-2	[10-KEY] 1
	8210020742	2721 S-FRONT PANEL ASSEMBLY-2	[4-KEY] 1
	8210022271	2721 S-FRONT PANEL (B)-2G	[SWE-07] 1
	8210022281	2721 S-FRONT PANEL (A)-2	[NOR-08] 1
	8210023061	2721 S-FRONT PANEL (C)-2	[SWE-09] 1
MP8	8210020551	2721 REAR PANEL-1	1
MP9	8310060760	2721 WINDOW PLATE	1
MP10	8930065750	2721 A-WINDOW SHEET	1
MP12	8930061790	2721 KEYBOARD <SEP>	[10-KEY] 1
	8930062760	2721 4-KEY <SEP>	[4-KEY] 1
	8930067350	2721 4-KEY (A) <SEP>	[SWE-07] 1
	8930067350	2721 4-KEY (A) <SEP>	[NOR-08] 1
	8930067350	2721 4-KEY (A) <SEP>	[SWE-09] 1
MP13	8930061710	2721 MAIN SEAL (TOP)	1
MP14	8930063061	2721 T-RUBBER-1 (TOT)	1
MP16	8930064661	2721 SIDE PLATE (A)-1 Y757A 1	1
MP17	8930061860	2721 TOP PLATE	1
MP20	8930061880	2721 MIC SPONGE	1
MP21	8930059361	2600 RELEASE BUTTON-1	1
MP22	8930063030	2721 RELEASE PLATE	1
MP25	8830003440	3285 ANT NUT	1
MP26	8810009221	PHB0 M2 X 8 NI-ZK3 BT	2
MP27	8810009561	PHBT M2 X 6 NI-ZK3	2
MP28	8810008971	BT M2 X3.5 NI-ZC3	11
MP29	8610011930	KNOB N318	1
MP30	8610012130	KNOB N323	1
MP31	8810010430	TRUSS M3 X 5 SUS SSBC	1
MP32	8930063052	2721 PLATE-2	1
MP33	8930046020	1123 SHEET (A)-1	1
MP34	8930056540	PUSH SPRING (AH)	2
MP35	8830001701	VR NUT (Q)-1	1
MP36	8830001691	VR NUT (R)-1	1
MP37	8510016360	2721 MAIN SHIELD Y721	1
MP38	8510016350	2721 ANT PLATE Y720	1
MP42	8930062960	WHITE SHEET (R)	1
MP47	8930048871	2056 A-SPONGE-1	1

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6450002250	HSJ1456-010320	1
J3	6450001680	HSJ1122-010010	1
J4*	6510021901	BM02B-ASRS-TF (LF) (SN)	1
J5*	6510018430	AXN330C038P	1
J6*	6510024391	IMSA-6176S-03Y902	1
DS3	5030003050	S11188 <SUC>	[others] 1
	5030003110	S11351 <SUC>	[SEA-01] 1
MC1	7700002760	EM6027P-46C33-G-01 <HOR>	1
S1*	2230001060	EVQ-PUL 02K	1
S2	2260001900	SW-149 (SKHLLD)	1
S3*	2260002800	SW-167 (SKQTLAE010)	1
S4*	2260002800	SW-167 (SKQTLAE010)	1
S5*	2260002800	SW-167 (SKQTLAE010)	1
S27	2250000180	EC10SP16-47	1
EP7	8930063020	SRCN-2721-SP-N-W (SHJ)	2
MP1*	8510016130	2721 VCO CASE Y709	1
MP2	8510016120	2721 VCO COVER Y710	1
MP3	8930061890	2721 LCD HOLDER Y711	1
MP4	8210020571	2721 REFLECTOR-1	1

[PA UNIT]

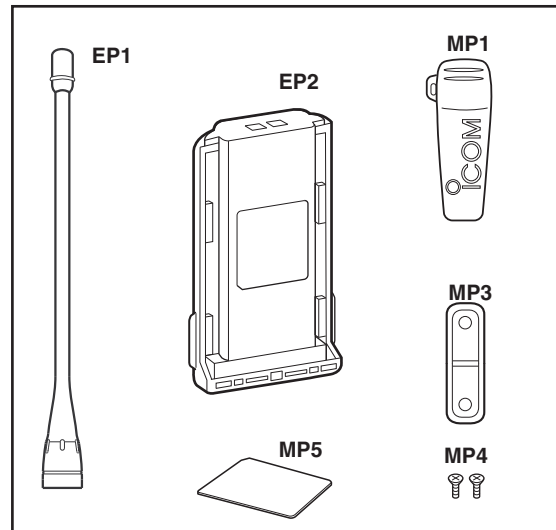
REF NO.	ORDER NO.	DESCRIPTION	QTY.
J701*	6510024391	IMSA-6176S-03Y902	1
J702	6910015891	9230B-1-02Z140-PT1	1
F701*	5210000901	0467003.NR (0434003)	1
MP701*	8410002370	2337 PA HEATSINK Y539	1

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J901	6910015881	9230B-1-02Z141-PT1	1

[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1	(Optional)	FA-SC55V-2 [others]	1
	(Optional)	FA-SC25V-2 [NOR-08]	1
EP2	(Optional)	BP-230N [USA-01], [USA-02], [GEN-01], [EUR-01], [CHN-01], [SEA-01]	1
	(Optional)	BP-232H [SWE-07], [NOR-08], [SWE-09]	1
MP1	(Optional)	MB-94	1
MP3	8210020560	2721 JACK PANEL [others]	1
	8210022310	2721 JACK PANEL (B) G [SWE-07]	1
	8210022290	2721 JACK PANEL (A) O [NOR-08], [SWE-09]	1
MP4	8810004861	PH M2 X 6 ZK3	2
MP5	8930063052	2721 PLATE-2	1



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

** : Refer to "GENERAL WIRING" for the connection

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

PARTS LIST

[VERSION LIST]

Model	Version	Symbol
IC-F33GT	USA-01	[A]
	GEN-01	[B]
	USA-02	[D]
	CHN-01	[E]
IC-F34GT	EUR-01	[C]
	SEA-01	[F]
IC-F33GS	USA-01	[G]
	GEN-01	[H]
	USA-02	[J]
	CHN-01	[K]
	EUR-01	[I]
IC-F34GS	SWE-07	[L]
	NOR-08	[M]
	SWE-09	[N]

[MAIN UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
IC2	1110002751	S.IC TA75S01F(TE85RF)	T	88.1/12.4
IC6	1110005340	S.IC NJM12902V-TE1-#ZZZB	B	55.4/23.8
IC8	1110005771	S.IC S-80942CNMC-G9CT2G	B	20.8/41.5
IC9	1110003201	S.IC TA31136FNG(EL)	T	81.5/17.0
IC10	1130011581	S.IC 24LC64T-I/SN G <SEI>	B	29.7/13.3
IC12	1190001350	S.IC M62364FP 600D	B	38.9/26.2
IC13	1130006221	S.IC TC4W53FU(TE12LF)	B	47.1/24.0
IC14	1110006221	S.IC AK2346P-E2/P	B	41.5/13.2
IC15	1110007850	S.IC TA7368PL-R10-R <SLVJ>	T	97.3/15.4
IC17	1110005350	S.IC NJM2870F05-TE1-#FZZB	B	93.2/20.2
IC19	1110006380	S.IC LM2904PWR	B	42.9/39.6
IC20	1130016390	S.IC PT6586-LQ <HST>	T	57.3/20.3
IC21	1130010100	S.IC LMX2352TMX/NOPB	T	79.5/34.1
IC22	1140011511	S.IC HD64F2238BTF13V(EMPTY)	B	17.4/22.5
IC23	1110006380	S.IC LM2904PWR	B	36.9/39.3
IC24	1110002751	S.IC TA75S01F(TE85RF)	B	56.2/36.9
IC25	1130007021	S.IC TC7S66FU(TE85LF)	B	58.3/33.0
Q2	1590003321	S.FET TPC6103(TE85LF)	T	98.4/4.8
Q3	1590003291	S.TRA UNR9213G0L	T	93.4/5.0
Q4	1560000841	S.FET 2SK1829(TE85RF)	T	91.0/34.7
Q5	1580000731	S.FET 3SK293(TE85LF)	B	90.9/39.0
Q6	1580000760	S.FET 3SK299-T1 U73	B	86.8/29.5
Q7	1530002601	S.TRA 2SC4215-O(TE85RF)	B	89.2/19.7
Q14	1530003260	S.TRA 2SC5006-T1	B	78.8/34.4
Q15	1530003260	S.TRA 2SC5006-T1	B	74.9/28.2
Q16	1530003260	S.TRA 2SC5006-T1	B	76.7/25.1
Q17	1530003260	S.TRA 2SC5006-T1	B	76.2/33.9
Q18	1590001400	S.TRA XP1214(TX)	T	73.8/28.0
Q19	1590003291	S.TRA UNR9213G0L	T	74.2/25.6
Q20	1530002851	S.TRA 2SC4116-BL(TE85RF)	T	86.5/25.6
Q21	1560000541	S.FET 2SK880-Y(T5RICOMF)	T	71.0/23.4
Q22	1530002851	S.TRA 2SC4116-BL(TE85RF)	T	81.3/24.3
Q24	1510000920	S.TRA 2SA1577 T106 Q	B	63.3/14.3
Q25	1510000920	S.TRA 2SA1577 T106 Q	B	64.4/10.4
Q26	1520000450	S.TRA 2SB1132 T100 Q	B	56.6/11.3
Q27	1590001190	S.TRA XP6501-(TX).AB	B	57.5/7.3
Q28	1590003231	S.TRA UNR9113G0L	B	54.1/7.1
Q29	1530003260	S.TRA 2SC5006-T1	B	78.8/23.1
Q38	1590003291	S.TRA UNR9213G0L	B	81.8/39.2
Q40	1590003291	S.TRA UNR9213G0L	B	49.5/18.4
Q41	1590001190	S.TRA XP6501-(TX).AB	T	90.8/21.3
Q42	1520000450	S.TRA 2SB1132 T100 Q	T	89.3/17.2
Q43	1590003381	S.TRA UNR9111G0L	T	77.7/4.9
Q44	1590003271	S.TRA UNR9210G0L	B	29.8/5.8
Q45	1590003231	S.TRA UNR9113G0L	T	54.6/4.6
Q500	1590003291	S.TRA UNR9213G0L	T	78.7/23.8
Q501	1590003291	S.TRA UNR9213G0L	T	84.7/12.0
Q502	1560001360	S.FET 2SK3019 TL	B	36.1/11.8
Eqv.	1560001840	S.FET 2SK3107-T1-AT		
Eqv.	1560001860	S.FET 2SK1824-T1-A		
Q503	1590003291	S.TRA UNR9213G0L	T	81.9/42.8
D5	1160000060	S.DIO DAN202U T106	T	93.6/7.3
Eqv.	1750000271	S.DIO 1SS301(TE85LF)		
Eqv.	1750002340	S.DIO LDAN202UT1G <SLVJ>		
Eqv.	1750002400	S.DIO DA3J103E0L		
D6	1790001261	S.DIO MA2S077G0L	B	27.6/31.0
D8	1790001251	S.DIO MA2S1110G0L	T	86.7/28.6
D9	1750000771	S.VAR HVC376BTRF-E	B	69.4/30.6
D10	1750000771	S.VAR HVC376BTRF-E	B	69.1/26.6
D11	1750000721	S.VAR HVC375BTRF-E	B	73.3/33.8
D12	1720000471	S.VAR 1SV239(TPH3F)	B	72.0/28.5
D13	1750000721	S.VAR HVC375BTRF-E	B	73.6/23.2
D14	1750000711	S.VAR HVC350BTRF-E	B	86.1/35.5
D15	1750000711	S.VAR HVC350BTRF-E	B	87.4/39.5
D16	1790001261	S.DIO MA2S077G0L	B	84.3/18.0
D17	1790001261	S.DIO MA2S077G0L	B	83.5/22.2
D18	1790001251	S.DIO MA2S1110G0L	T	92.9/36.6
D19	1750000721	S.VAR HVC375BTRF-E	B	94.8/39.2
D20	1790001241	S.DIO MA2S7280GL	B	95.0/33.5
D21	1160000060	S.DIO DAN202U T106	B	28.4/22.6
Eqv.	1750000271	S.DIO 1SS301(TE85LF)		
Eqv.	1750002340	S.DIO LDAN202UT1G <SLVJ>		
Eqv.	1750002400	S.DIO DA3J103E0L		
D24	1750000721	S.VAR HVC375BTRF-E	B	96.7/37.8
D25	1790001241	S.DIO MA2S7280GL	B	94.9/34.8
D28	1750001820	S.DIO LRB706F-40T1G <SLVJ>	B	29.8/3.0
D500	1750000771	S.VAR HVC376BTRF-E	B	68.2/32.2
D501	1750000771	S.VAR HVC376BTRF-E	B	68.2/25.0
D502	1790001261	S.DIO MA2S077G0L	B	80.0/28.1
D503	1790001261	S.DIO MA2S077G0L	T	80.2/26.7
D504	1750001810	S.DIO L1SS400T1G <SLVJ>	B	28.2/24.5
D506	1790001261	S.DIO MA2S077G0L	B	45.5/35.0
FI2	2020002410	CER LTM450FW <JJE>		
X2	6050011931	S.XTA CR-781A TTS14VSB-A3 15.3 MHz	B	63.3/38.3
X5	6050011730	S.XTA CR-765 SMD-49TA 3.6864 MHz <KDS>	B	38.3/4.0
X6	6050011830	S.XTA CR-774 SMD-49TB 12.288 MHz <KDS>	B	30.9/31.5

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

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

[PA UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
Q701	1560001232	S.FET RD07MVS2-T112	B	22.6/8.4
Q702	1560001241	S.FET RD01MUS1-T113	B	16.1/8.3
Q704	1530003260	S.TRA 2SC5006-T1	T	3.9/10.3
D701	1750000581	S.DIO 1SV307(TPH3F)	T	33.9/12.9
D702	1750001820	S.DIO LRB706F-40T1G <SLVJ>	T	28.8/17.8
D703	1750001820	S.DIO LRB706F-40T1G <SLVJ>	B	31.7/13.6
D704	1750000581	S.DIO 1SV307(TPH3F)	B	28.4/16.7
D705	1790001241	S.DIO MA2S7280GL	T	25.9/18.2
D706	1750000581	S.DIO 1SV307(TPH3F)	B	30.2/16.7
L702	6200007911	S.COI ELJRF 18NJFB	B	18.0/12.7
L703	6200012390	S.COI 0.30-0.92-3TR 5.8N <COMO>	T	28.0/13.7
L704	6200012970	S.COI 0.30-0.91-4TR 8.6N <COMO>	T	24.2/14.1
L705	6200012720	S.COI 0.30-0.9-9TR 22.3N <COMO>	T	19.2/13.8
L706	6200003590	S.COI EXCCL3225U1	B	10.8/16.0
L707	6200010991	S.COI ELJRF 47NJFB	T	2.3/11.7
L708	6200012470	S.COI 0.30-1.7-7TL 45.3N <COMO>	T	32.8/10.6
L709	6200012910	S.COI 0.35-1.6-8TL 45.5N <COMO>	T	33.5/16.9
L712	6200009290	S.COI LQW18AN47NG00D (LQW1608A47NG00)	B	33.3/16.3
R701	7030007270	S.RES ERJ2GEJ 151 X (150)	B	29.8/10.5
R703	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	25.5/16.8
R704	7030007250	S.RES ERJ2GEJ 220 X (22)	B	19.3/5.2
R705	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	19.2/2.3
R706	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	18.2/2.3
R708	7030005590	S.RES ERJ2GEJ 680 X (68)	B	12.2/11.0
R709	7030005220	S.RES ERJ2GEJ 223 X (22K)	B	10.0/11.5
R710	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	10.0/9.9
R715	7030005000	S.RES ERJ2GEJ 471 X (470)	T	4.9/7.7
R726	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	29.0/14.2
R730	7030007290	S.RES ERJ2GEJ 222 X (2.2K)	T	3.3/8.8
R732	7030004980	S.RES ERJ2GEJ 101 X (100)	T	5.8/10.7
R733	7030010040	S.RES ERJ2GEJ-JPW	T	3.2/5.8
R734	7030010040	S.RES ERJ2GEJ-JPW	T	4.2/14.3
R735	7030010040	S.RES ERJ2GEJ-JPW	T	6.5/14.7
R736	7030010040	S.RES ERJ2GEJ-JPW	B	14.2/13.6
R737	7030004990	S.RES ERJ2GEJ 221 X (220)	T	3.2/6.8
R738	7030004980	S.RES ERJ2GEJ 101 X (100)	B	18.0/11.7
C701	4030017460	S.CER C1005 JB 1H 102K-T	T	35.1/11.0
C702	4030017430	S.CER C1005 CH 1H 101J-T	B	31.3/10.5
C703	4030017420	S.CER C1005 CH 1H 470J-T	B	32.3/10.5
C704	4030017390	S.CER C1005 CH 1H 180J-T	B	31.9/9.3
C705	4030007040	S.CER C1608 CH 1H 180J-T	T	31.4/14.6
C706	4030007050	S.CER C1608 CH 1H 220J-T	T	29.8/14.0
C707	4030017460	S.CER C1005 JB 1H 102K-T	T	27.0/16.6
C708	4030017510	S.CER C1005 CH 1H 680J-T	T	28.0/15.3
C711	4030007100	S.CER C1608 CH 1H 560J-T	T	26.2/14.0
C715	4030017420	S.CER C1005 CH 1H 470J-T	T	15.7/13.6
C716	4030016790	S.CER C1005 JB 1E 103K-T	T	14.7/13.6
C718	4030017460	S.CER C1005 JB 1H 102K-T	B	18.1/5.2
C719	4030017460	S.CER C1005 JB 1H 102K-T	T	13.7/13.6
C720	4030017680	S.CER C1005 CH 1H 820J-T	B	19.1/8.4
C722	4030017460	S.CER C1005 JB 1H 102K-T	B	13.0/13.0
C723	4030017460	S.CER C1005 JB 1H 102K-T	B	11.0/10.4
C724	4030017460	S.CER C1005 JB 1H 102K-T	B	8.3/16.0
C725	4030017460	S.CER C1005 JB 1H 102K-T	T	2.4/14.2
C727	4030017420	S.CER C1005 CH 1H 470J-T	T	3.8/13.0
C728	4030017380	S.CER C1005 CH 1H 050B-T	T	1.3/11.7
C729	4030017430	S.CER C1005 CH 1H 101J-T	B	11.7/12.3
C731	4030017640	S.CER C1005 CH 1H 150J-T	T	3.2/7.8
C732	4030017460	S.CER C1005 JB 1H 102K-T	T	9.9/19.9
C733	4030017420	S.CER C1005 CH 1H 470J-T	T	9.9/20.9
C734	4030018120	S.CER C1005 CH 1H 110J-T	T	16.9/2.3
C742	4030017460	S.CER C1005 JB 1H 102K-T	T	34.1/14.3
C744	4030017640	S.CER C1005 CH 1H 150J-T	T	31.6/17.0
C745	4030017550	S.CER C1005 CH 1H 1R5B-T	T	35.8/15.5
C746	4030017410	S.CER C1005 CH 1H 240J-T	T	31.3/18.4
C748	4030017420	S.CER C1005 CH 1H 470J-T	B	14.2/12.6
C750	4030018120	S.CER C1005 CH 1H 110J-T	B	31.9/15.4
C751	4030017390	S.CER C1005 CH 1H 180J-T	B	31.6/16.8
C752	4030017460	S.CER C1005 JB 1H 102K-T	B	26.8/18.0
C753	4030017460	S.CER C1005 JB 1H 102K-T	B	27.0/16.0
C754	4030017460	S.CER C1005 JB 1H 102K-T	B	30.0/14.2
C755	4030017420	S.CER C1005 CH 1H 470J-T	B	16.8/13.0
C756	4030017420	S.CER C1005 CH 1H 470J-T	B	15.8/13.0
C757	4030017460	S.CER C1005 JB 1H 102K-T	T	16.7/13.6
C758	4030017420	S.CER C1005 CH 1H 470J-T	T	15.9/2.3
C759	4030017460	S.CER C1005 JB 1H 102K-T	T	14.9/2.3
C760	4030017460	S.CER C1005 JB 1H 102K-T	T	6.1/9.5
C761	4030017460	S.CER C1005 JB 1H 102K-T	T	5.3/11.7
C763	4030016790	S.CER C1005 JB 1E 103K-T	T	1.4/14.2
C767	4030017460	S.CER C1005 JB 1H 102K-T	B	16.8/14.6
C768	4030017520	S.CER C1005 CH 1H 0R3B-T	T	29.5/15.9
C769	4030017520	S.CER C1005 CH 1H 0R3B-T	B	34.6/16.8
J701	6510024391	S.CON IMSA-6176S-03Y902	B	6.3/9.7
J702	6910015891	CON 9230B-1-02Z140-PT1		
F701	5210000901	S.FUS 0467003.NR (0434003)	B	10.9/19.6
EP711	6910015370	S.BEA ACZ1005Y-102-T	T	1.7/13.0

[FUSE UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
L901	6200006190	S.COI BLM21PG300SN1D (BLM21P300S)	T	10.2/6.0
C901	4030017460	S.CER C1005 JB 1H 102K-T	T	6.0/6.6
J901	6910015881	CON 9230B-1-02Z141-PT1		

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

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

[ANT UNIT]

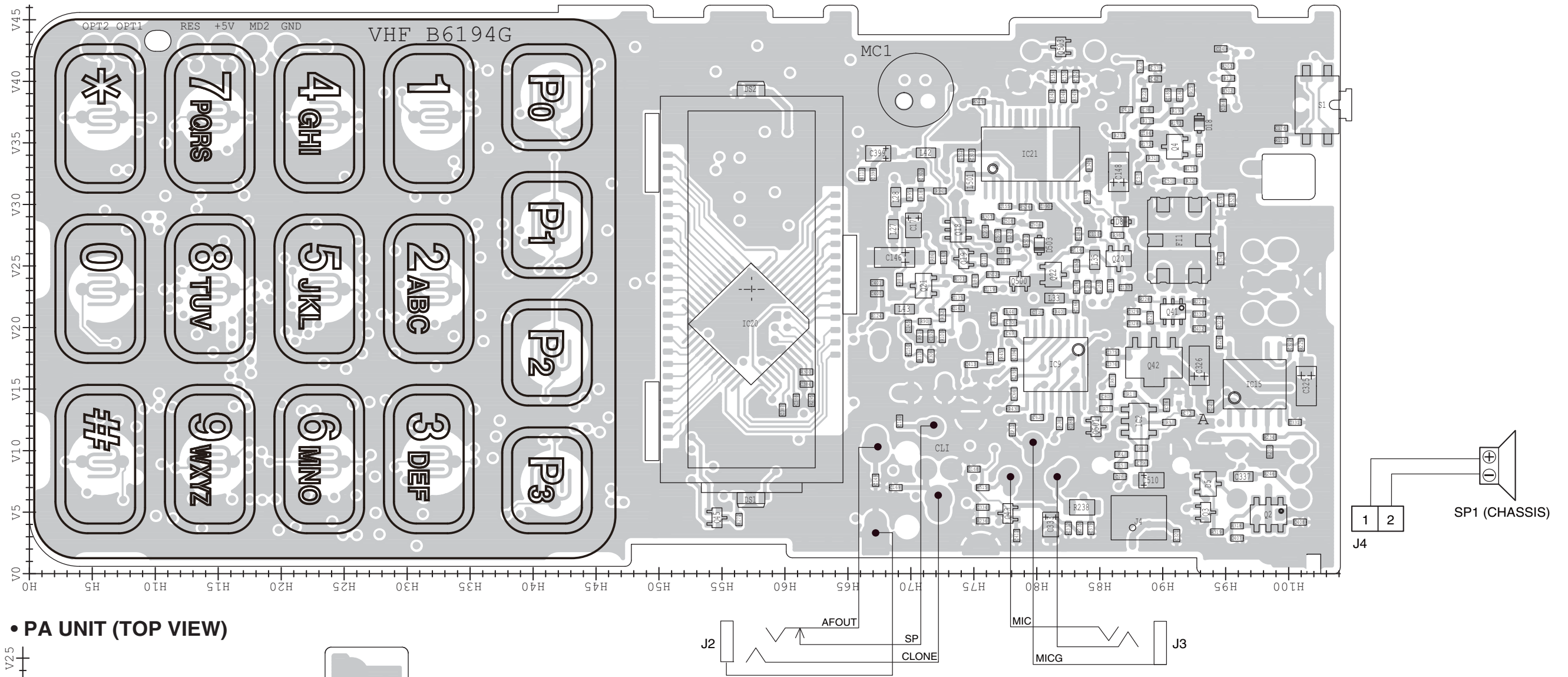
REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
L801	6200012780	S.COI 0.30-1.4-6TL 27.2N <COMO>	T	5.8/12.5
L802	6200012470	S.COI 0.30-1.7-7TL 45.3N <COMO>	T	6.7/9.0
R801	7030005080	S.RES ERJ2GEJ 823 X (82K)	T	3.3/14.2
C801	4030017460	S.CER C1005 JB 1H 102K-T	T	10.1/7.0
C802	4030017380	S.CER C1005 CH 1H 050B-T	T	6.6/7.1
C803	4030017410	S.CER C1005 CH 1H 240J-T	T	3.3/10.7
C807	4030017620	S.CER C1005 CH 1H 100C-T	T	4.0/11.9

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

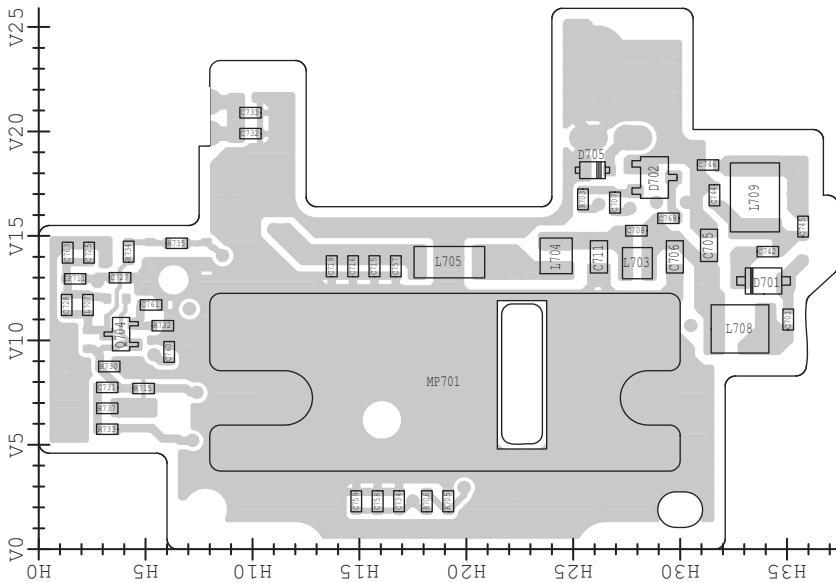
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

BOARD LAYOUTS

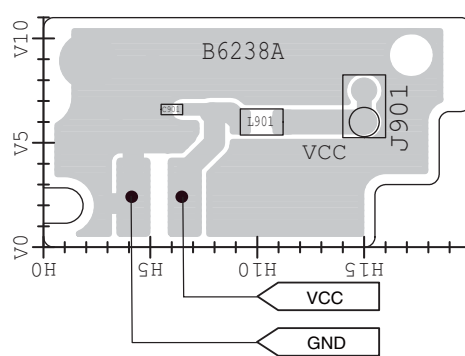
• MAIN UNIT (TOP VIEW)



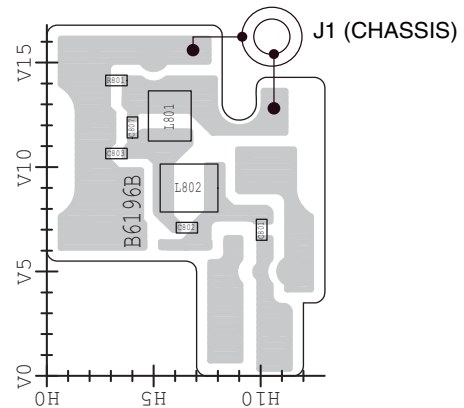
• PA UNIT (TOP VIEW)



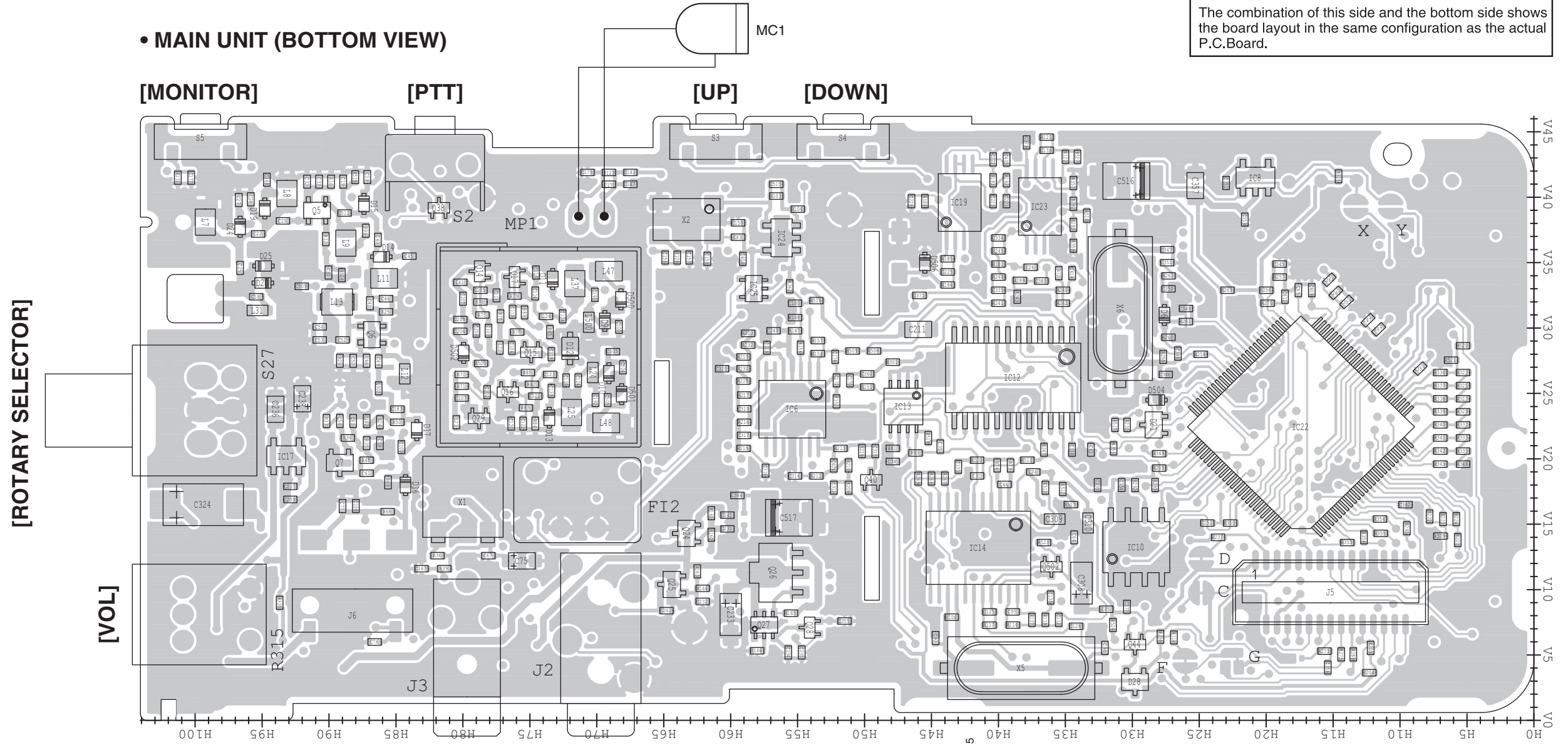
• FUSE UNIT (TOP VIEW)



• ANT UNIT (TOP VIEW)



• MAIN UNIT (BOTTOM VIEW)



[ROTARY SELECTOR]

[VOL]

[MONITOR]

[PTT]

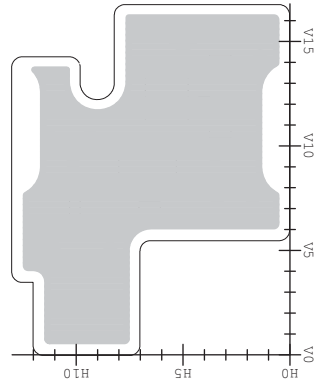
[UP]

[DOWN]

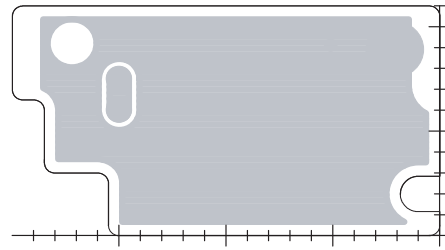
[EXT. MIC] [EXT. SP]

J5	1	PTTIN	16
		PTTOUT	
		MICOUT	
		MICIN	
		AFONOP	
		AUX	
		BEEPOUT	
		BUSY	
		RXMUTE	
		MDWN	
		SIGOUT	
		AFOUT	
		OPT1	
		OPT2	
		OPT3	
		GND	
		CIRQ	
		SO	
		SI	
		SCK	
		OPV1	
		OPV2	
		OPV3	
	30		

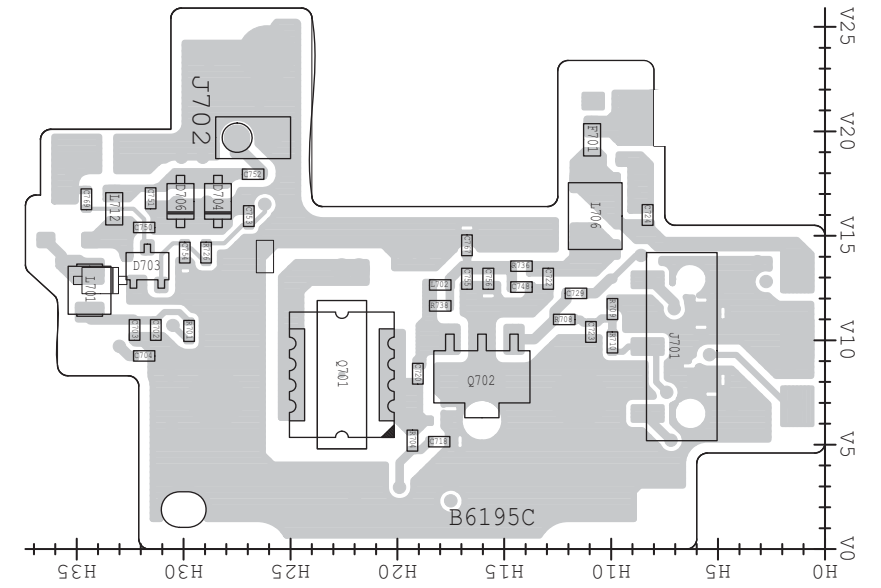
• ANT UNIT (BOTTOM VIEW)



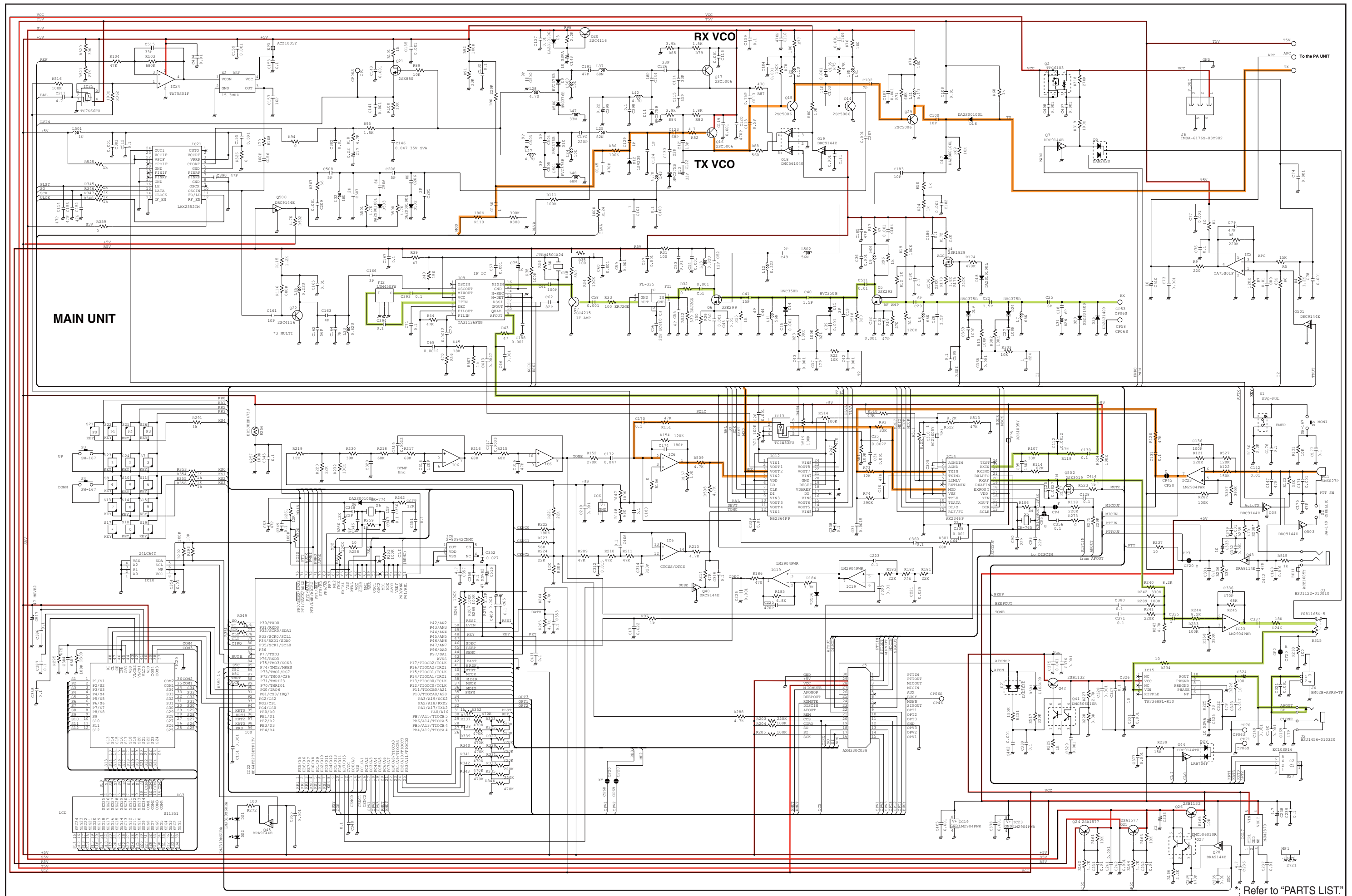
• FUSE UNIT (BOTTOM VIEW)

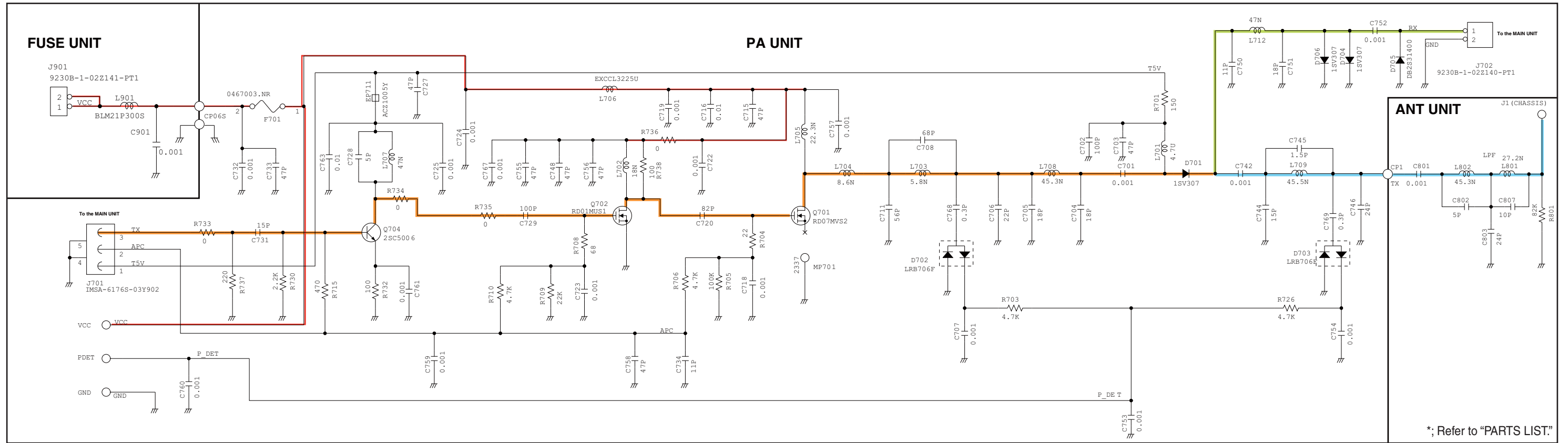


• PA UNIT (BOTTOM VIEW)



VOLTAGE DIAGRAM





*; Refer to "PARTS LIST"

Oct. 2009



SERVICE MANUAL ADDENDUM

IC-F33GT/F33GS/F34GT/F34GS

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BOARD LAYOUTS	7
VOLTAGE DIAGRAM	9

PARTS LIST

[VERSION LIST]

Model	Version	Symbol
IC-F33GT	USA-01	[A]
	GEN-01	[B]
	USA-03	[C]
	USA-02	[D]
	CHN-01	[E]
IC-F34GT	EUR-01	[F]
	SEA-01	[G]
IC-F33GS	USA-01	[H]
	GEN-01	[I]
	USA-02	[J]
	USA-03	[K]
	CHN-01	[L]
IC-F34GS	EUR-01	[M]
	SWE-07	[N]
	NOR-08	[O]
	SWE-09	[P]

[MAIN UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
IC2	1110002751	S.IC TA75S01F(TE85R,F)	T	88.1/12.4
IC6	1110005340	S.IC NJM12902V-TE1-#ZZZB	B	55.4/23.8
IC8	1110005771	S.IC S-80942CNMC-G9CT2G	B	20.8/41.5
IC9	1110003201	S.IC TA31136FNG(EL)	T	81.5/17
IC10	1130011581	S.IC 24LC64T-I/SN G <SEI>	B	29.7/13.2
IC12	1190001350	S.IC M62364FP 600D	B	38.9/26.2
IC13	1130006221	S.IC TC4W53FU(TE12L,F)	B	47.1/24
IC14	1110006221	S.IC AK2346P-E2/P	B	41.5/13.2
IC15	1110001811	S.IC TA7368FG(5,ER)	T	97.3/15.4
IC17	1110005350	S.IC NJM2870F05-TE1-#FZZB	B	93.2/20.2
IC19	1110006380	S.IC LM2904PWR	B	42.9/39.6
IC20	1130009090	S.IC LC75834W-TLM-E	T	57.3/20.3
IC21	1130010100	S.IC LMX2352TMX/NOPB	T	79.5/34.1
IC22	1140011511	S.IC HD64F2238BTF13V(EMPTY)	B	17.4/22.4
IC23	1110006380	S.IC LM2904PWR	B	36.9/39.3
IC24	1110002751	S.IC TA75S01F(TE85R,F)	B	56.2/36.9
IC25	1130007021	S.IC TC7S66FU(TE85L,F)	B	58.2/33
Q2	1590003321	S.FET TPC6103(TE85L,F)	T	98.4/4.8
Q3	1590003291	S.TRA UNR9213G0L	T	93.4/5
Q4	1560000841	S.FET 2SK1829(TE85R,F)	T	90.9/34.7
Q5	1580000731	S.FET 3SK293(TE85L,F)	B	90.9/39
Q6	1580000760	S.FET 3SK299-T1 U73	B	86.8/29.5
Q7	1530002601	S.TRA 2SC4215-O(TE85R,F)	B	89.2/19.7
Q14	1530003260	S.TRA 2SC5006-T1	B	78.7/34.3
Q15	1530003260	S.TRA 2SC5006-T1	B	74.9/28.1
Q16	1530003260	S.TRA 2SC5006-T1	B	76.6/25.1
Q17	1530003260	S.TRA 2SC5006-T1	B	76.1/33.9
Q18	1590001400	S.TRA XP1214(TX)	T	73.7/27.9
Q19	1590003291	S.TRA UNR9213G0L	T	74.2/25.6
Q20	1530002851	S.TRA 2SC4116-BL(TE85R,F)	T	86.5/25.6
Q21	1560000541	S.FET 2SK880-Y(T5RICOM,F)	T	71/23.4
Q22	1530002851	S.TRA 2SC4116-BL(TE85R,F)	T	81.3/24.3
Q24	1510000920	S.TRA 2SA1577 T106 Q	B	63.3/14.3
Q25	1510000920	S.TRA 2SA1577 T106 Q	B	64.4/10.4
Q26	1520000450	S.TRA 2SB1132 T100 Q	B	56.6/11.3
Q27	1590001190	S.TRA XP6501-(TX).AB	B	57.5/7.3
Q28	1590003231	S.TRA UNR9113G0L	B	54.1/7.1
Q29	1530003260	S.TRA 2SC5006-T1	B	78.8/23.1
Q38	1590003291	S.TRA UNR9213G0L	B	81.8/39.2
Q40	1590003291	S.TRA UNR9213G0L	B	49.5/18.4
Q41	1590001190	S.TRA XP6501-(TX).AB	T	90.8/21.3
Q42	1520000450	S.TRA 2SB1132 T100 Q	T	89.3/17.2
Q43	1590003381	S.TRA UNR9111G0L	T	77.7/4.9
Q44	1590003271	S.TRA UNR9210G0L	B	29.8/5.8
Q45	1590003231	S.TRA UNR9113G0L	T	54.6/4.5
Q500	1590003291	S.TRA UNR9213G0L	T	78.6/23.7
Q501	1590003291	S.TRA UNR9213G0L	T	84.7/11.9
Q502	1560001360	S.FET 2SK3019 TL	B	36/11.7
Q503	1590003291	S.TRA UNR9213G0L	T	81.9/42.8
D5	1160000060	S.DIO DAN202U T106	T	93.6/7.3
D6	1790001261	S.DIO MA2S077G0L	B	27.6/31
D8	1790001251	S.DIO MA2S1110GL	T	86.7/28.6
D9	1750000771	S.VAR HVC376BTRF-E	B	69.4/30.5
D10	1750000771	S.VAR HVC376BTRF-E	B	69.1/26.5
D11	1750000721	S.VAR HVC375BTRF-E	B	73.3/33.7
D12	1720000471	S.VAR 1SV239(TPH3,F)	B	72/28.4
D13	1750000721	S.VAR HVC375BTRF-E	B	73.5/23.1
D14	1750000711	S.VAR HVC350BTRF-E	B	86.1/35.4
D15	1750000711	S.VAR HVC350BTRF-E	B	87.4/39.5
D16	1790001261	S.DIO MA2S077G0L	B	84.3/18
D17	1790001261	S.DIO MA2S077G0L	B	83.4/22.2
D18	1790001251	S.DIO MA2S1110GL	T	92.9/36.6
D19	1750000721	S.VAR HVC375BTRF-E	B	94.8/39.1
D20	1790001241	S.DIO MA2S7280GL	B	94.9/33.4
D21	1160000060	S.DIO DAN202U T106	B	28.4/22.6
D24	1750000721	S.VAR HVC375BTRF-E	B	96.6/37.7
D25	1790001241	S.DIO MA2S7280GL	B	94.9/34.7
D28	1790001670	S.DIO RB706F-40T106	B	29.8/2.9
D500	1750000771	S.VAR HVC376BTRF-E	B	68.2/32.2
D501	1750000771	S.VAR HVC376BTRF-E	B	68.1/24.9
D502	1790001261	S.DIO MA2S077G0L	B	79.9/28.1
D503	1790001261	S.DIO MA2S077G0L	T	80.2/26.7
D504	1750000940	S.DIO 1SS400 TE61	B	28.2/24.5
D506	1790001261	S.DIO MA2S077G0L	[A] B	45.5/35
	1790001261	S.DIO MA2S077G0L	[B]	
	1790001261	S.DIO MA2S077G0L	[F]	
	1790000620	S.DIO MA77(TX)	[C]	
	1790001261	S.DIO MA2S077G0L	[D]	
	1790001261	S.DIO MA2S077G0L	[E]	
	1790001261	S.DIO MA2S077G0L	[G]	
	1790001261	S.DIO MA2S077G0L	[H]	
	1790001261	S.DIO MA2S077G0L	[I]	
	1790001261	S.DIO MA2S077G0L	[M]	
	1790000620	S.DIO MA77(TX)	[J]	
	1790001261	S.DIO MA2S077G0L	[K]	
	1790001261	S.DIO MA2S077G0L	[L]	
	1790001261	S.DIO MA2S077G0L	[N]	
	1790001261	S.DIO MA2S077G0L	[O]	
	1790001261	S.DIO MA2S077G0L	[P]	
FI1	2030000150	S.MON DSF753SB 46.350 MHz (FL-335)	T	91.3/27.1
FI2	2020002410	CER LTM450FW <JJE>		

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

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 300 rows of component data for the main unit.

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 300 rows of component data for the main unit, including a vertical column of codes [A] through [P] on the right side.

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
DS1	5010000160	S.LED LNJ310M6URA	T	57.3/6
DS2	5010000160	S.LED LNJ310M6URA	T	57.3/39.4
DS3	50300003050	LCD S11188 <SUC>	[A]	
	50300003050	LCD S11188 <SUC>	[B]	
	50300003050	LCD S11188 <SUC>	[F]	
	50300003050	LCD S11188 <SUC>	[C]	
	50300003050	LCD S11188 <SUC>	[D]	
	50300003050	LCD S11188 <SUC>	[E]	
	50300003110	LCD S11351 <SUC>	[G]	
	50300003050	LCD S11188 <SUC>	[H]	
	50300003050	LCD S11188 <SUC>	[I]	
	50300003050	LCD S11188 <SUC>	[M]	
	50300003050	LCD S11188 <SUC>	[J]	
	50300003050	LCD S11188 <SUC>	[K]	
	50300003050	LCD S11188 <SUC>	[L]	
	50300003050	LCD S11188 <SUC>	[N]	
	50300003050	LCD S11188 <SUC>	[O]	
	50300003050	LCD S11188 <SUC>	[P]	
MC1	7700002760	MIC EM6027P-46C33-G-01 <HOR>		
S1	2230001060	S.SWI EVQ-PUL 02K	T	102.2/38.1
S2	2260001900	SWI SW-149 (SKHLLD)		
S3	2260002800	S.SWI SW-167 (SKQTLAE010)	B	61.1/44.2
S4	2260002800	S.SWI SW-167 (SKQTLAE010)	B	51.6/44.2
S5	2260002800	S.SWI SW-167 (SKQTLAE010)	B	99.6/44.2
S27	2250000180	ENC EC10SP16-47		
EP3	6910015370	S.BEA ACZ1005Y-102-T	B	59.4/36.9
EP4	6910015370	S.BEA ACZ1005Y-102-T	B	37.4/19
EP5	6910015370	S.BEA ACZ1005Y-102-T	B	31.9/8.5
EP7	89300063020	LCD SRCN-2721-SP-N-W (SHJ)		
EP11	6910015370	S.BEA ACZ1005Y-102-T	T	78/11.7
EP12	0800008400	ADA IC20-DES-V TRANSCRIPT	[C]	
	0800008400	ADA IC20-DES-V TRANSCRIPT	[J]	

[PA UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
Q701	1560001232	S.FET RD07MVS2-T112	B	22.6/8.3
Q702	1560001241	S.FET RD01MUS1-T113	B	16/8.3
Q704	1530003260	S.TRA 2SC5006-T1	T	3.8/10.3
D701	1750000581	S.DIO 1SV307(TPH3,F)	T	33.9/12.8
D702	1790001670	S.DIO RB706F-40T106	T	28.8/17.8
D703	1790001670	S.DIO RB706F-40T106	B	31.7/13.5
D704	1750000581	S.DIO 1SV307(TPH3,F)	B	28.4/16.6
D705	1790001241	S.DIO MA2S7280GL	T	25.9/18.1
D706	1750000581	S.DIO 1SV307(TPH3,F)	B	30.1/16.6
L701	6200002861	S.COI NLV25T-4R7J	B	34.4/12.4
L702	6200007911	S.COI ELJRF 18NJFB	B	18/12.6
L703	6200012390	S.COI 0.30-0.92-3TR 5.8N <COMO>	T	28/13.7
L704	6200012970	S.COI 0.30-0.91-4TR 8.6N <COMO>	T	24.2/14
L705	6200012720	S.COI 0.30-0.9-9TR 22.3N <COMO>	T	19.2/13.7
L706	6200003590	S.COI EXCCL3225U1	B	10.7/15.9
L707	6200010991	S.COI ELJRF 47NJFB	T	2.3/11.7
L708	6200012470	S.COI 0.30-1.7-TTL 45.3N <COMO>	T	32.8/10.5
L709	6200012910	S.COI 0.35-1.6-8TL 45.5N <COMO>	T	33.5/16.8
L712	6200009290	S.COI LQW18AN47NG00D (LQW1608A47NG00)	B	33.2/16.3
R701	7030007270	S.RES ERJ2GEJ 151 X (150)	B	29.7/10.4
R703	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	25.4/16.7
R704	7030007250	S.RES ERJ2GEJ 220 X (22)	B	19.3/5.2
R705	7030005090	S.RES ERJ2GEJ 104 X (100K)	T	19.1/2.3
R706	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	T	18.1/20.4
R708	7030005590	S.RES ERJ2GEJ 680 X (68)	B	12.2/11
R709	7030005520	S.RES ERJ2GEJ 22 X (22K)	B	9.9/11.5
R710	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	9.9/9.9
R715	7030005000	S.RES ERJ2GEJ 471 X (470)	T	4.9/7.7
R726	7030005040	S.RES ERJ2GEJ 472 X (4.7K)	B	28.9/14.2
R730	7030007290	S.RES ERJ2GEJ 222 X (2.2K)	T	3.3/8.7
R732	7030004980	S.RES ERJ2GEJ 101 X (100)	T	5.8/10.7
R733	7030010040	S.RES ERJ2GEJ-JPW	T	3.2/5.7
R734	7030010040	S.RES ERJ2GEJ-JPW	T	4.2/14.2
R735	7030010040	S.RES ERJ2GEJ-JPW	T	6.4/14.6
R736	7030010040	S.RES ERJ2GEJ-JPW	B	14.2/13.5
R737	7030004990	S.RES ERJ2GEJ 221 X (220)	T	3.2/6.7
R738	7030004980	S.RES ERJ2GEJ 101 X (100)	B	18/11.6
C701	4030017460	S.CER ECJ0EB1E102K	T	35/11
C702	4030017430	S.CER ECJ0EC1H101J	B	31.3/10.5
C703	4030017420	S.CER ECJ0EC1H470J	B	32.3/10.5
C704	4030017390	S.CER ECJ0EC1H180J	B	31.8/9.2
C705	4030007040	S.CER C1608 CH 1H 180J-T	T	31.3/14.5
C706	4030007050	S.CER C1608 CH 1H 220J-T	T	29.7/14
C707	4030017460	S.CER ECJ0EB1E102K	T	26.9/16.6
C708	4030017510	S.CER ECJ0EC1H680J	T	27.9/15.2
C711	4030007100	S.CER C1608 CH 1H 560J-T	T	26.2/14
C715	4030017420	S.CER ECJ0EC1H470J	T	15.7/13.5
C716	4030016790	S.CER ECJ0EB1C103K	T	14.7/13.5
C718	4030017460	S.CER ECJ0EB1E102K	B	18/5.1
C719	4030017460	S.CER ECJ0EB1E102K	T	13.7/13.5
C720	4030017680	S.CER ECJ0EC1H820J	B	19/8.4
C722	4030017460	S.CER ECJ0EB1E102K	B	12.9/12.9
C723	4030017460	S.CER ECJ0EB1E102K	B	10.9/10.4
C724	4030017460	S.CER ECJ0EB1E102K	B	8.3/16
C725	4030017460	S.CER ECJ0EB1E102K	T	2.3/14.2
C727	4030017420	S.CER ECJ0EC1H470J	T	3.8/13
C728	4030017380	S.CER ECJ0EC1H050B	T	1.3/11.7
C729	4030017430	S.CER ECJ0EC1H101J	B	11.6/12.2
C731	4030017640	S.CER ECJ0EC1H150J	T	3.2/7.7
C732	4030017460	S.CER ECJ0EB1E102K	T	9.9/19.9
C733	4030017420	S.CER ECJ0EC1H470J	T	9.9/20.9
C734	4030018120	S.CER ECJ0EC1H110J	T	16.8/2.3
C742	4030017460	S.CER ECJ0EB1E102K	T	34.1/14.2
C744	4030017640	S.CER ECJ0EC1H150J	T	31.6/16.9
C745	4030017550	S.CER ECJ0EC1H1R5B	T	35.7/15.4
C746	4030017410	S.CER ECJ0EC1H240J	T	31.3/18.4
C748	4030017420	S.CER ECJ0EC1H470J	B	14.2/12.5
C750	4030018120	S.CER ECJ0EC1H110J	B	31.8/15.4
C751	4030017390	S.CER ECJ0EC1H180J	B	31.5/16.8
C752	4030017460	S.CER ECJ0EB1E102K	B	26.7/17.9
C753	4030017460	S.CER ECJ0EB1E102K	B	26.9/15.9
C754	4030017460	S.CER ECJ0EB1E102K	B	29.9/14.2
C755	4030017420	S.CER ECJ0EC1H470J	B	16.7/12.9
C756	4030017420	S.CER ECJ0EC1H470J	B	15.7/12.9
C757	4030017460	S.CER ECJ0EB1E102K	T	16.7/13.5
C758	4030017420	S.CER ECJ0EC1H470J	T	15.8/2.3
C759	4030017460	S.CER ECJ0EB1E102K	T	14.8/2.3
C760	4030017460	S.CER ECJ0EB1E102K	T	6.1/9.4
C761	4030017460	S.CER ECJ0EB1E102K	T	5.2/11.7
C763	4030016790	S.CER ECJ0EB1C103K	T	1.3/14.2
C767	4030017460	S.CER ECJ0EB1E102K	B	16.7/14.5
C768	4030017520	S.CER ECJ0EC1HOR3B	T	29.4/15.8
C769	4030017520	S.CER ECJ0EC1HOR3B	B	34.5/16.7
J701	6510024391	S.CON IMSA-6176S-03Y902	B	6.3/9.7
J702	6910015891	CON 9230B-1-02Z140-PT1		
F701	5210000901	S.FUS 0467003.NR (0434003)	B	10.9/19.6
EP711	6910015370	S.BEA ACZ1005Y-102-T	T	1.7/12.9
MP701	8410002370	S.HEA 2337 PA HEATSINK Y539	T	19/8

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

[FUSE UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
L901	6200006190	S.COI BLM21PG300SN1D (BLM21P300S)	T	10.2/6
C901	4030017460	S.CER ECJ0EB1E102K	T	6/6.6
J901	6910015881	CON 9230B-1-02Z141-PT1		

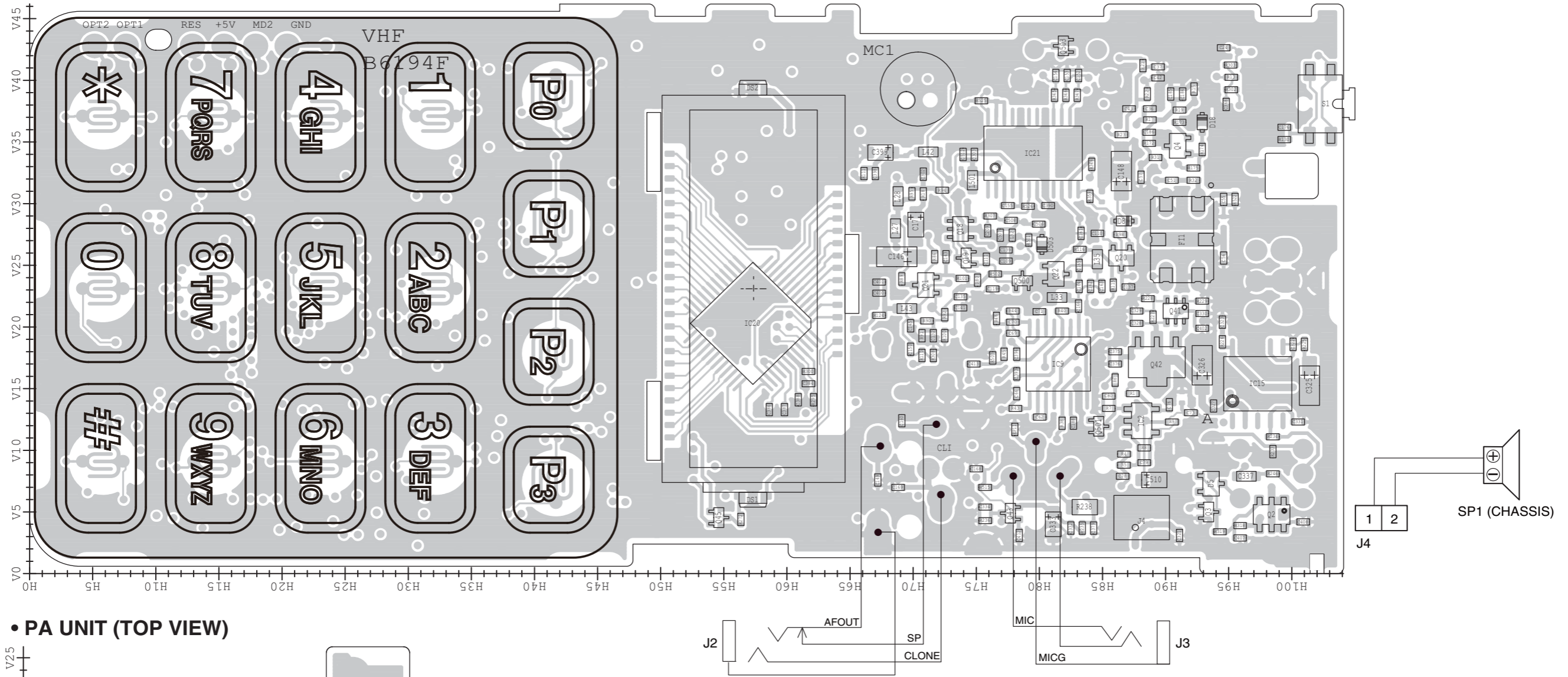
[ANT UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
L801	6200012780	S.COI 0.30-1.4-6TL 27.2N <COMO>	T	5.7/12.4
L802	6200012470	S.COI 0.30-1.7-7TL 45.3N <COMO>	T	6.6/9
R801	7030005080	S.RES ERJ2GEJ 823 X (82K)	T	3.2/14.1
C801	4030017460	S.CER ECJ0EB1E102K	T	10/7
C802	4030017380	S.CER ECJ0EC1H050B	T	6.5/7.1
C803	4030017410	S.CER ECJ0EC1H240J	T	3.2/10.6
C807	4030017620	S.CER ECJ0EC1H100C	T	4/11.9

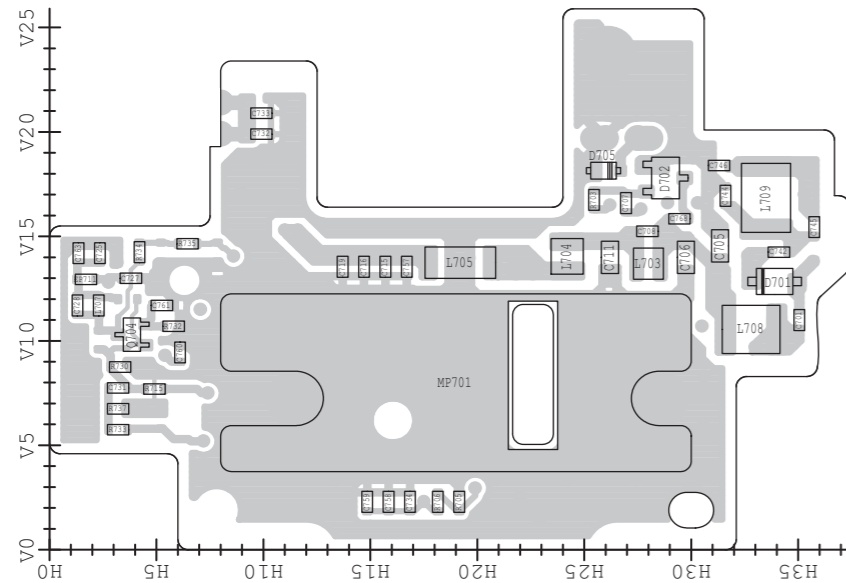
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

BOARD LAYOUTS

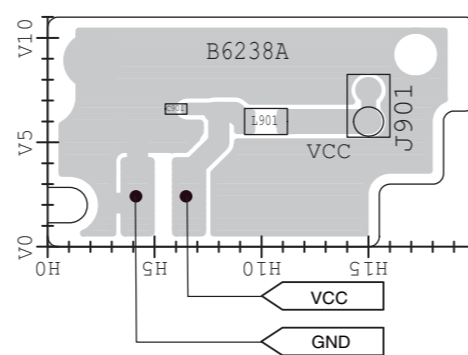
• MAIN UNIT (TOP VIEW)



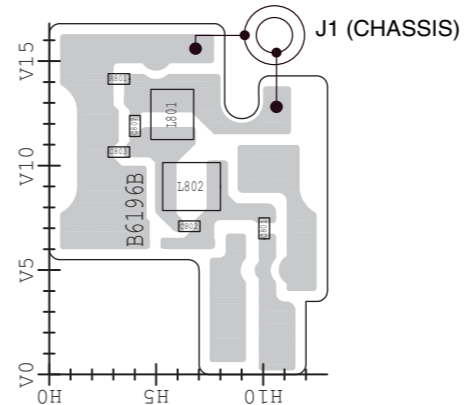
• PA UNIT (TOP VIEW)



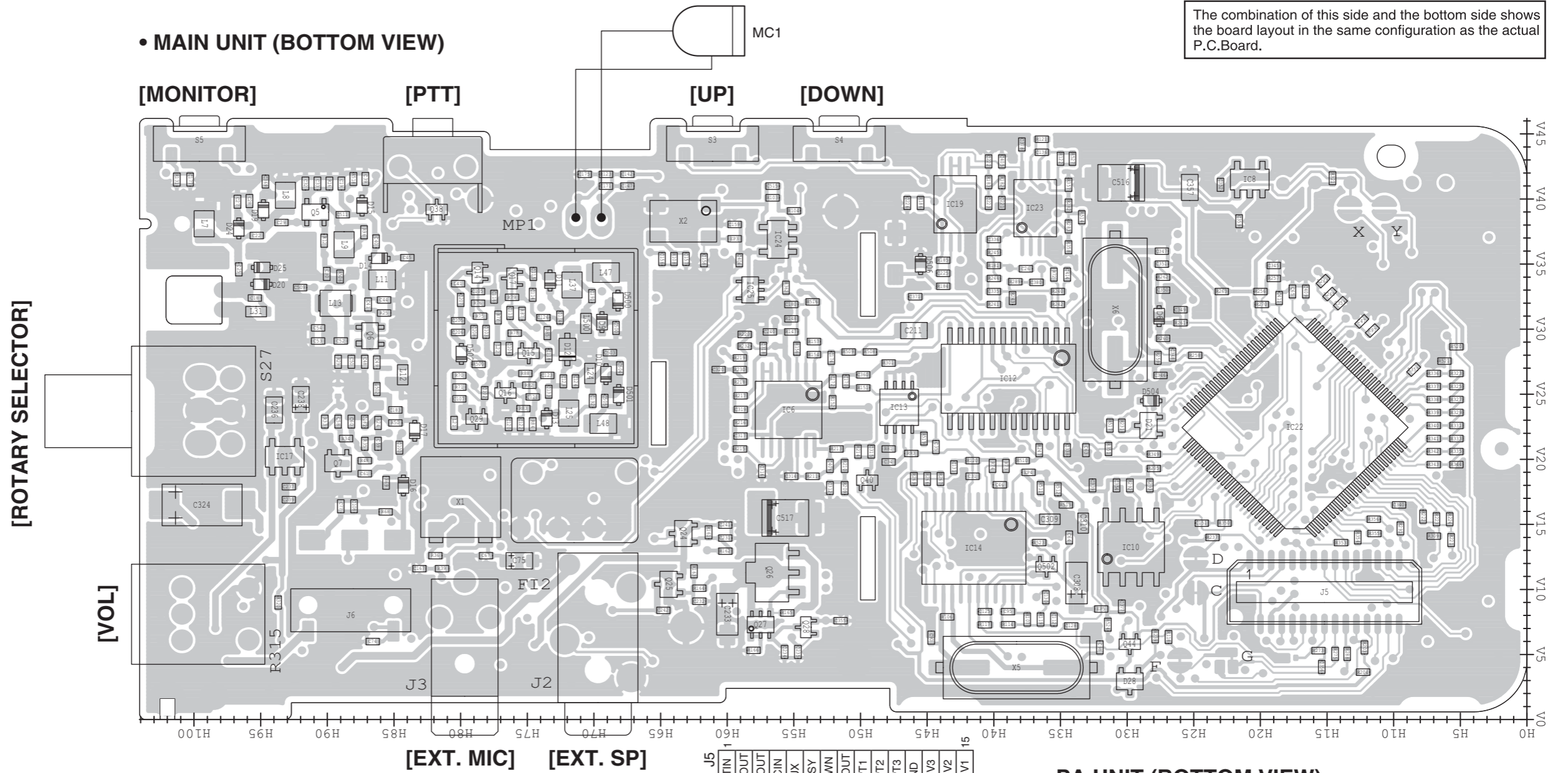
• FUSE UNIT (TOP VIEW)



• ANT UNIT (TOP VIEW)



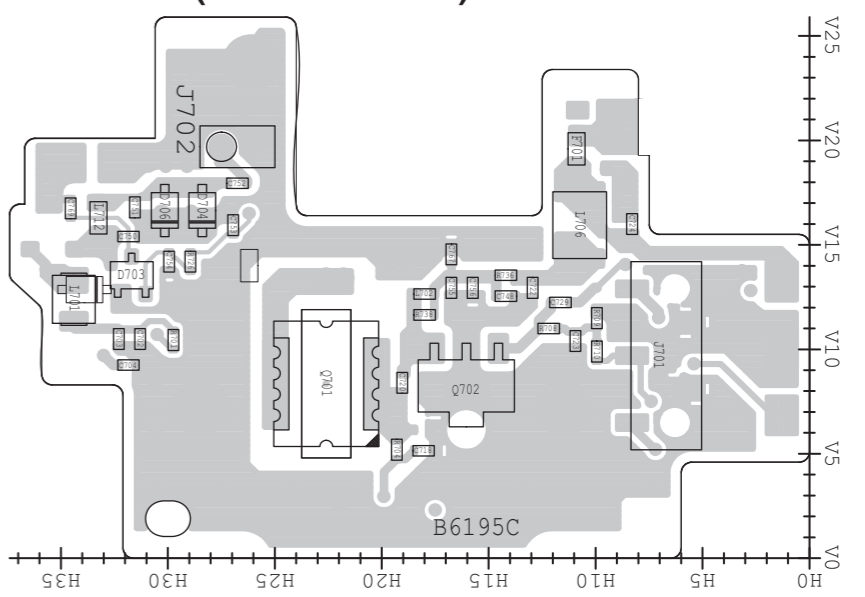
• MAIN UNIT (BOTTOM VIEW)



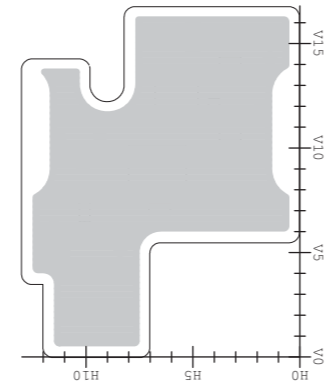
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

J5	1	PTTIN
	2	PTTOUT
	3	MICOUT
	4	MICIN
	5	AFONOP
	6	AUX
	7	BEEPOUT
	8	BUSY
	9	RXMUTE
	10	MDWN
	11	SIGOUT
	12	AFOUT
	13	OPT1
	14	OPT2
	15	OPT3
	16	GND
	17	OPV3
	18	OPV2
	19	OPV1
	20	SCK
	21	SI
	22	SO
	23	CIRQ
	24	CCS
	25	REM
	26	AFOUT
	27	SIGOUT
	28	MDWN
	29	BUSY
	30	MICIN
	31	MICOUT
	32	PTTOUT
	33	PTTIN
	34	GND
	35	+5V
	36	VCC

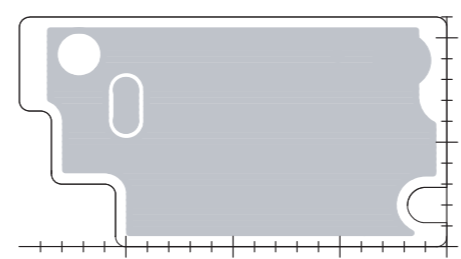
• PA UNIT (BOTTOM VIEW)



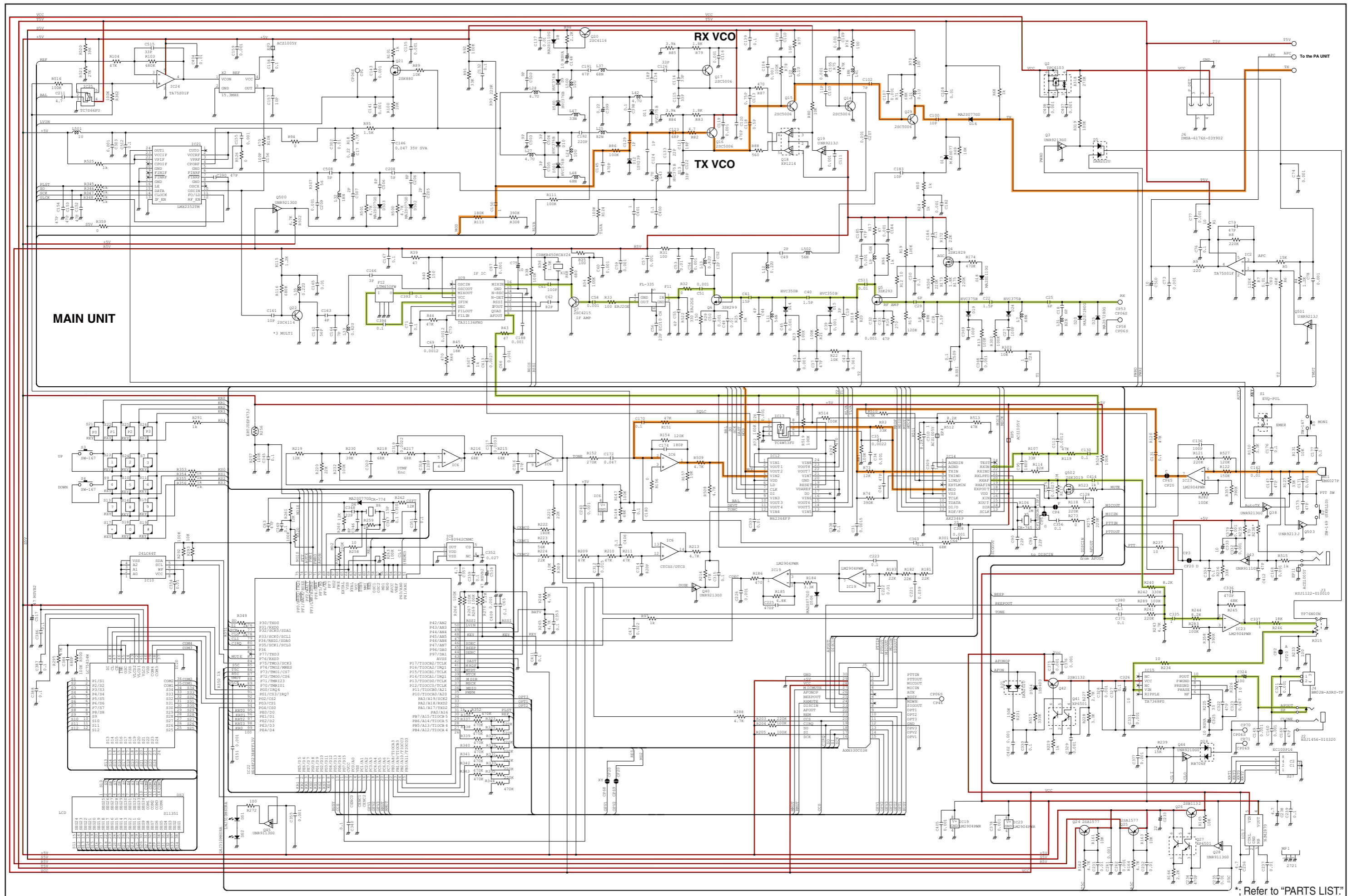
• ANT UNIT (BOTTOM VIEW)



• FUSE UNIT (BOTTOM VIEW)



VOLTAGE DIAGRAM



* Refer to "PARTS LIST."

Jul. 2008



SERVICE MANUAL ADDENDUM

IC-F33GT/GS IC-F34GT/GS

CONTENTS

PARTS LIST	1
BOARD LAYOUTS	6
VOLTAGE DIAGRAM	8

[MAIN UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Lists components like ECJ0EC1H150J, ECJ0EC1H220J, ECJ0EF1C104Z, etc.

[PA UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Lists components like S.FET RD07MVS2-T112, S.FET RD01MUS1-T113, S.TR 2SC5006-T1, etc.

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01] ⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01] ⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

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

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L901	6200006190	S.COL BLM21PG300SN1D	T	10.2/6
C901	4030017460	S.CER ECJ0EB1E102K	T	6/6.6
J901	6910015881	CNR 9230B-1-02Z141-PT1		

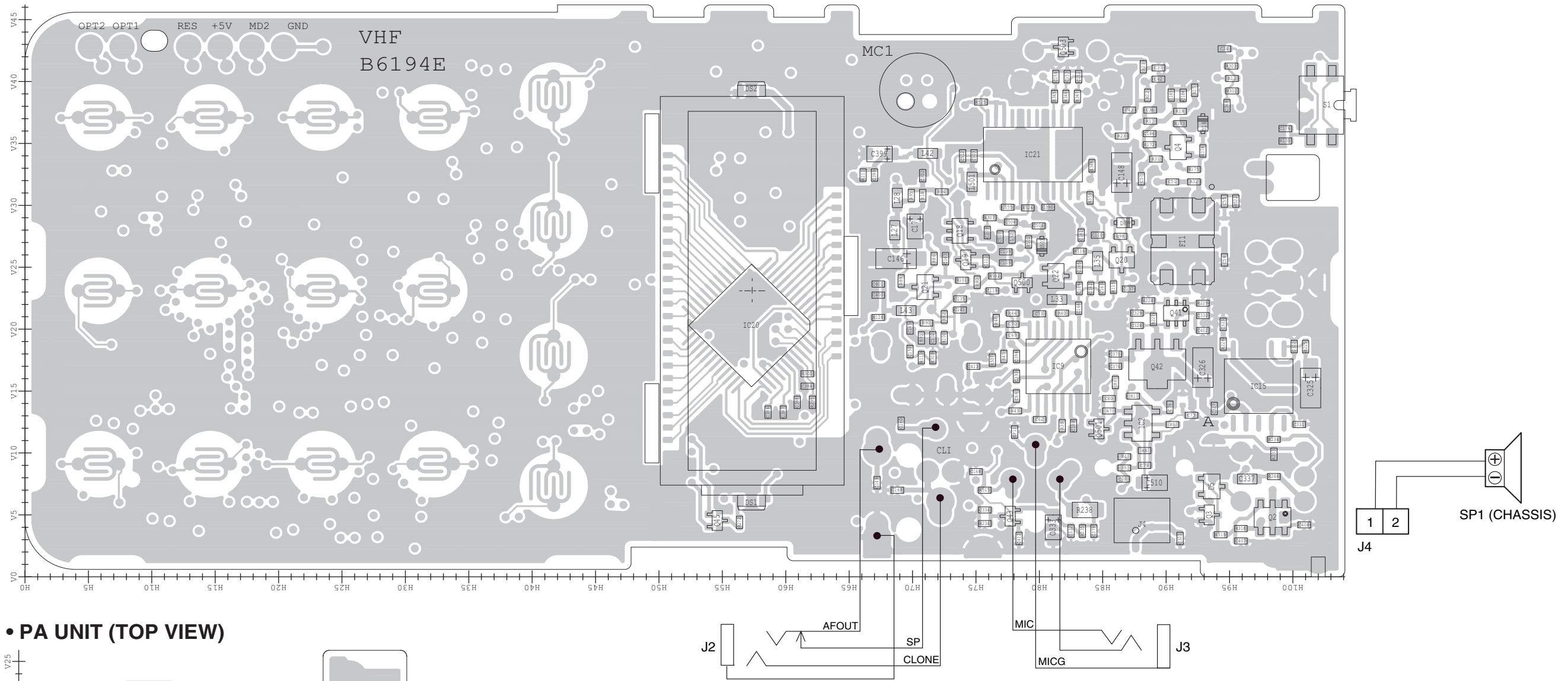
[ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L801	6200012780	S.COL 0.30-1.4-6TL 27.2N	T	5.7/12.4
L802	6200012470	S.COL 0.30-1.7-7TL 45.3N	T	6.6/9
R801	7030005080	S.RES ERJ2GEJ 823 X (82 k)	T	3.2/14.1
C801	4030017460	S.CER ECJ0EB1E102K	T	10/7
C802	4030017380	S.CER ECJ0EC1H050B	T	6.5/7.1
C803	4030017410	S.CER ECJ0EC1H240J	T	3.2/10.6
C807	4030017620	S.CER ECJ0EC1H100C	T	4/11.9

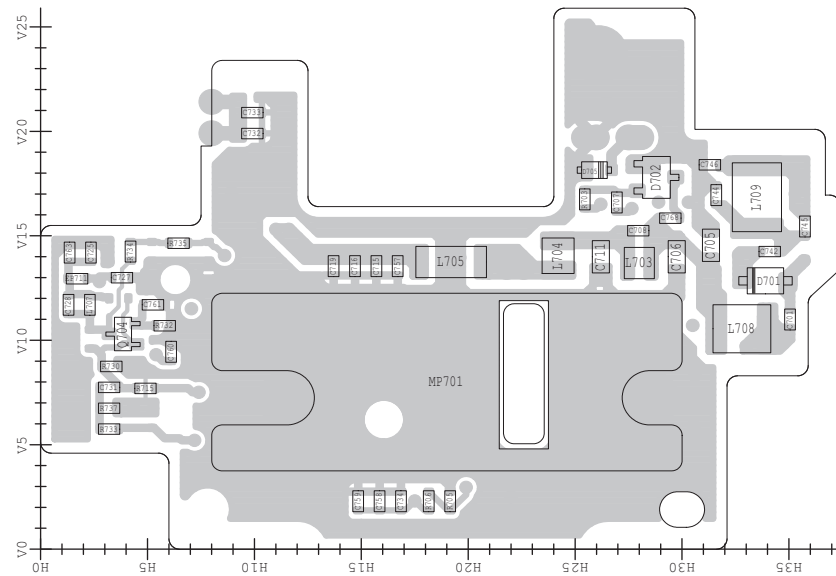
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

BOARD LAYOUTS

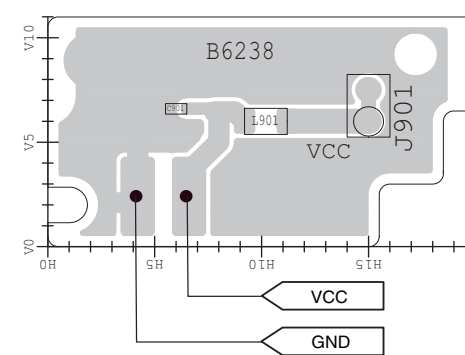
• MAIN UNIT (TOP VIEW)



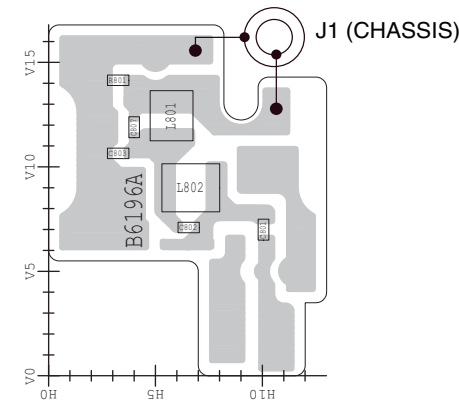
• PA UNIT (TOP VIEW)



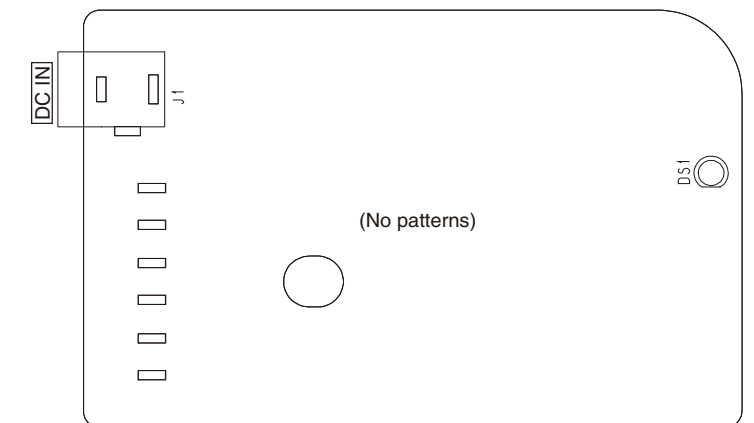
• FUSE UNIT (TOP VIEW)



• ANT UNIT (TOP VIEW)

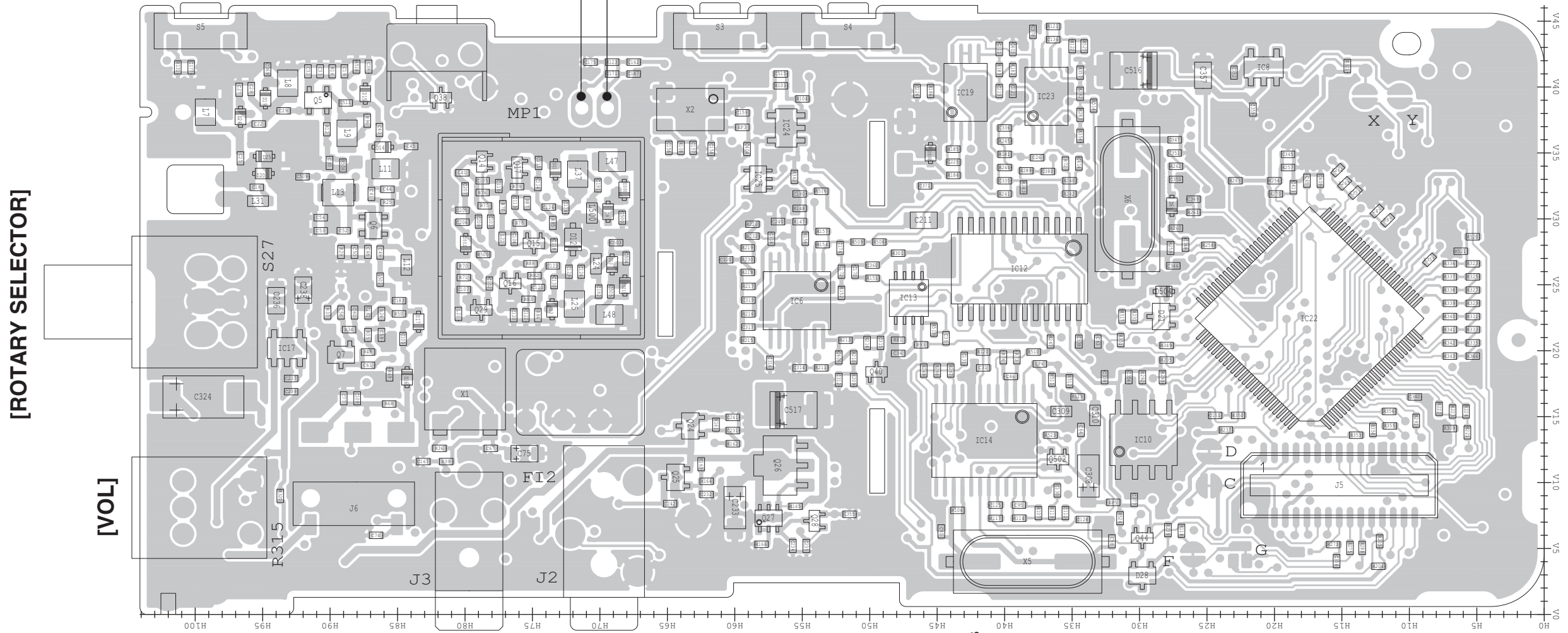


• BC-160 (TOP VIEW)



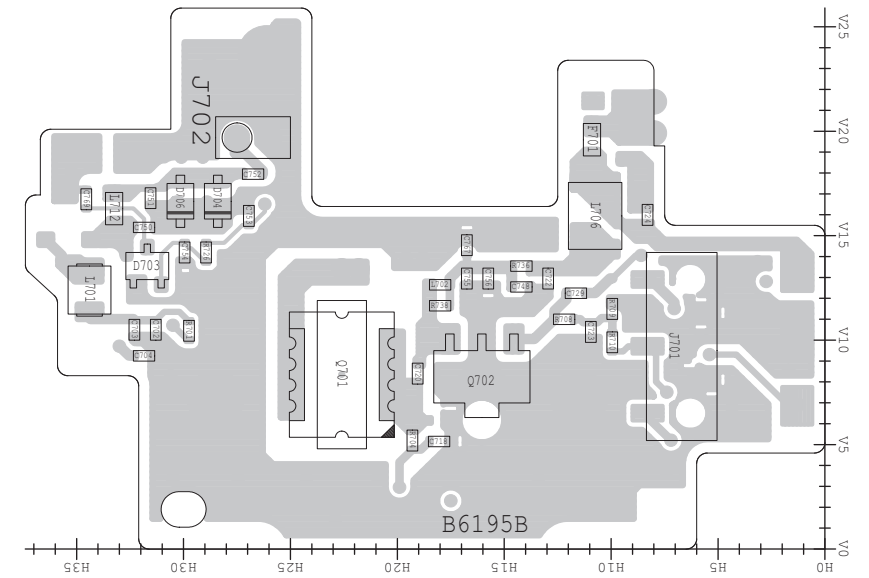
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• MAIN UNIT (BOTTOM VIEW)

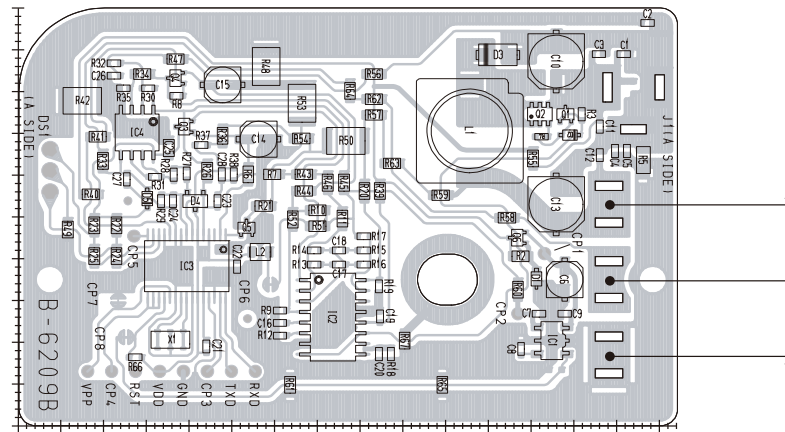


1	
PTTIN	15
PTTOUT	
VCC	
MICOUT	
MICIN	
AFONOP	
AUX	
BEEPOUT	
BUSY	
RXMUTE	
MDWN	
DISCIN	
SIGOUT	
AFOUT	
OPT1	
REM	
OPT2	
CCS	
OPT3	
CCRQ	
GND	
SO	
OPV3	
SI	
OPV2	
SCK	
OPV1	
16	

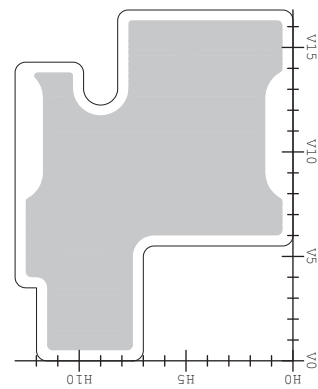
• PA UNIT (BOTTOM VIEW)



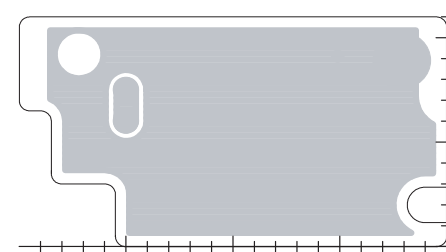
• BC-160 (BOTTOM VIEW)



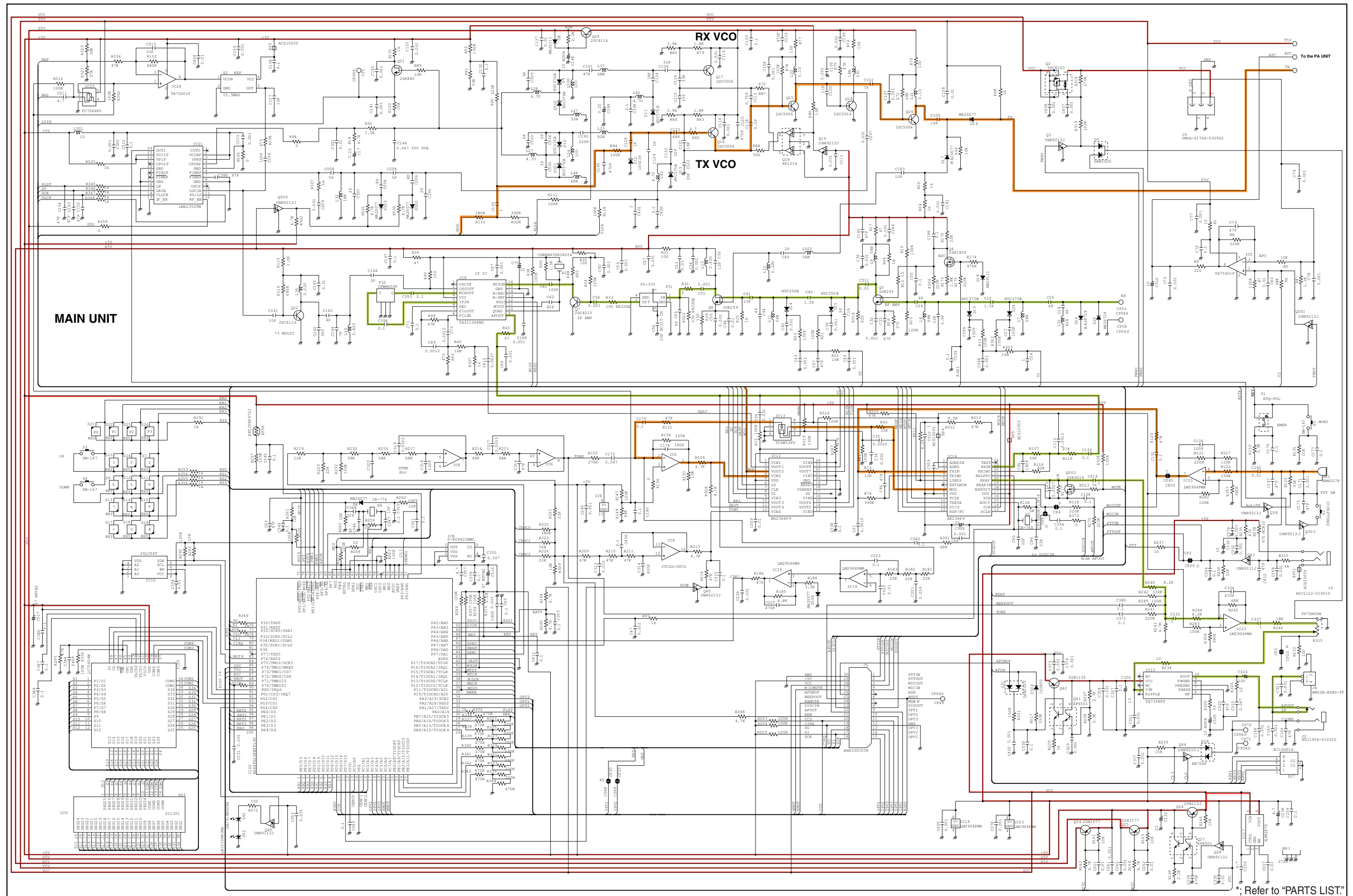
• ANT UNIT (BOTTOM VIEW)



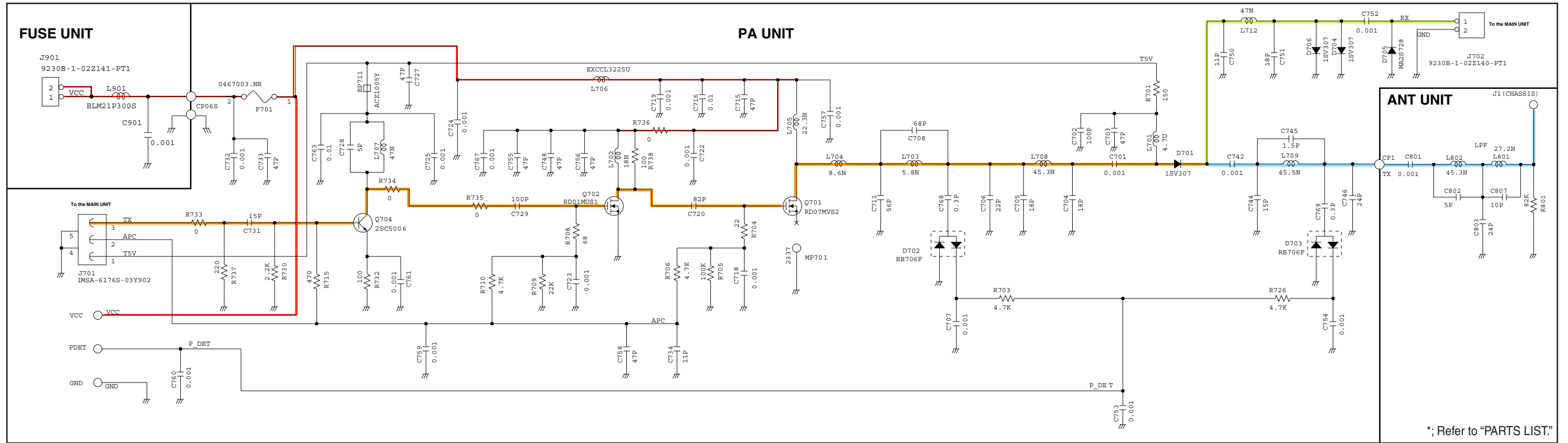
• FUSE UNIT (BOTTOM VIEW)



VOLTAGE DIAGRAM



* Refer to "PARTS LIST."





SERVICE MANUAL

VHF TRANSCEIVER

IC-F33GT
IC-F33GS
IC-F34GT
IC-F34GS

S-14113IZ-C1-①
Apr. 2007

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-F33GT/GS** and **IC-F34GT/GS** VHF TRANSCEIVER at the time of publication.

MODEL	VERSION	CHANNEL SPACING	FREQUENCY RANGE
IC-F33GT (10-key)	USA-01	15.0/30.0 kHz	136–174 MHz
	USA-02		
	GEN-01	12.5/25.0 kHz	
	CHN-01		
IC-F34GT (10-key)	EUR-01	12.5/20.0/25.0 kHz	
IC-F33GS (4-key)	USA-01	15.0/30.0 kHz	
	USA-02	12.5/25.0 kHz	
	GEN-01		
	CHN-01		
IC-F34GS (4-key)	EUR-01	12.5/20.0/25.0 kHz	
	SWE-07		
	SWE-09		
	NOR-08		

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 8 V. This will ruin the transceiver.

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

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-F33GT MAIN UNIT 5 pieces
8820001210 Screw 2438 screw IC-F33GT Top cover 10 pieces

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

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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SECTION 1

SPECIFICATIONS

■ GENERAL

- Frequency coverage : 136.000–174.000 MHz
- Mode : FM
- Type of emission :

VERSION	WIDE	MIDDLE	NARROW
[USA], [GEN]	16K0F3E (25.0 kHz)	N/A	11K0F3E (12.5 kHz)
[EUR]		14K0F3E (20.0 kHz)	8K50F3E (12.5 kHz)
- Number of conventional channels : 256 ch, 16 banks
- Antenna impedance : 50 Ω (nominal)
- Operating temperature range : –30°C to +60°C (–22°F to +140°F) [USA], [GEN]
–25°C to +55°C [EUR]
- Power supply requirement : 7.2 V DC nominal (negative ground)
- Current drain (at 7.2 V DC) :

RECEIVING		TRANSMITTING	
Stand-by	Max. audio	High (5 W)	Low (1 W)
85 mA	300 mA	1.5 A	0.7 A
- Dimensions (projections not included) : 53.0(W) × 120.0(H) × 32.5(D) mm; 2³/₃₂(W) × 4²³/₃₂(H) × 1⁹/₃₂(D) in
- Weight (with BP-231+FA-SC55V-1) : 285 g; 10¹/₁₆ oz (Approx.)

■ TRANSMITTER

- Output power (at 7.2 V DC) : High: 5 W, Low: 1 W
- Modulation : Variable reactance frequency modulation
- Maximum permissible deviation : ±5.0 kHz (Wide), ±4.0 kHz (Middle), ±2.5 kHz (Narrow)
- Frequency error : ±2.5 ppm
- Spurious emissions : 80 dB (typical) [USA], [GEN]
0.25 μW (≤1 GHz), 1.0 μW (≥1 GHz) [EUR]
- Adjacent channel power : 70 dB min (80 dB typical) for Wide and Middle
60 dB min (70 dB typical) for Narrow
- Audio harmonic distortion : 3% typical (Mod. 1 kHz, 40% deviation)
- Limiting charact of modulator : 60–100% of maximum deviation
- Microphone impedance : 2.2 kΩ

■ RECEIVER

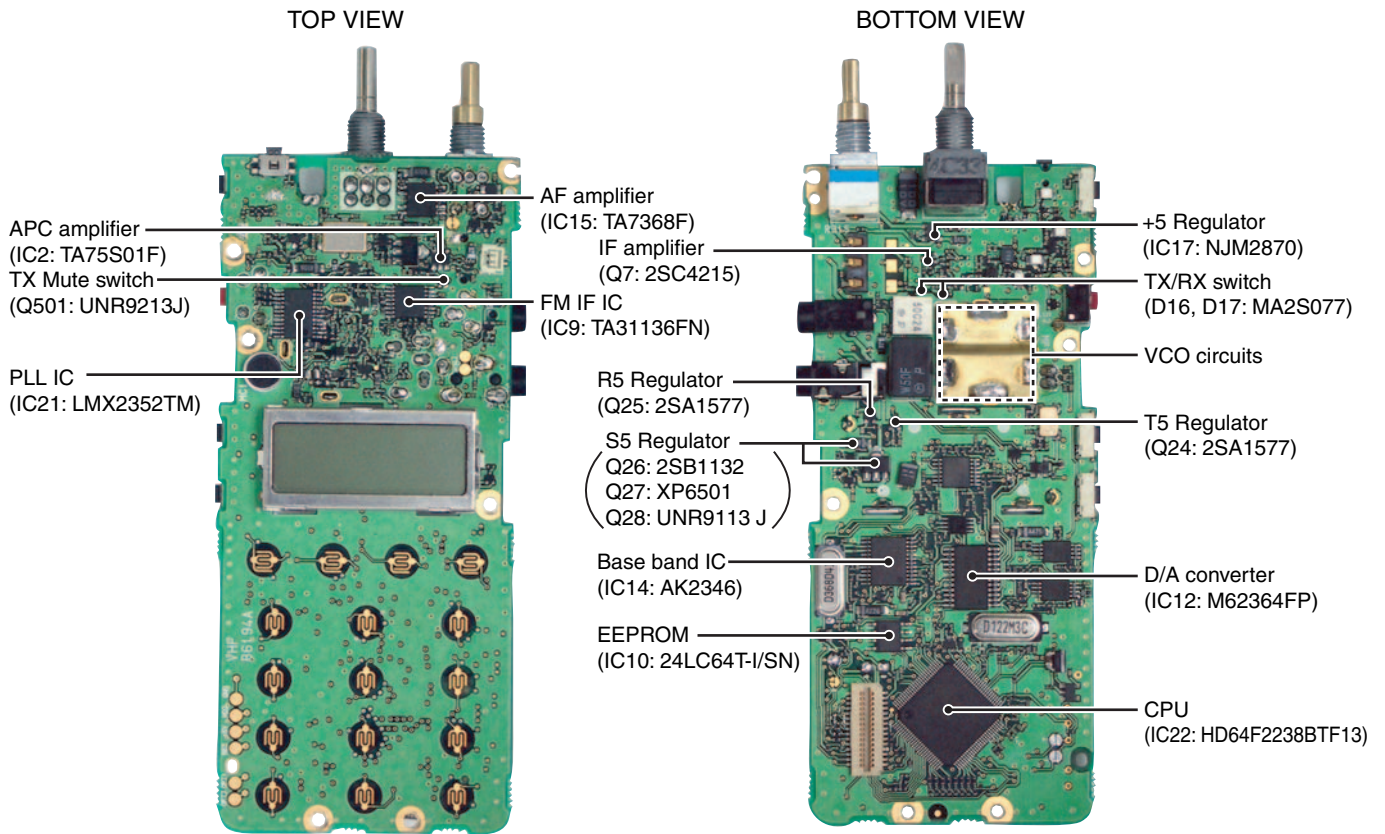
- Receive system : Double conversion superheterodyne system
- Intermediate frequencies : 1st IF: 46.35 MHz, 2nd IF: 450 kHz
- Sensitivity : 0.25 μV (–119 dBm) typical at 12 dB SINAD [USA], [GEN]
–4 dBμV (–111 dBm) emf typical at 20 dB SINAD [EUR]
- Adjacent channel selectivity : 70 dB min (75 dB typical) for Wide and Middle
60 dB min (65 dB typical) for Narrow
- Spurious response : 70 dB
- Intermodulation rejection ratio : 70 dB min (74 dB typical) [USA], [GEN]
65 dB min (67 dB typical) [EUR]
- Audio output power : 0.5 W typical at 5% distortion with an 8 Ω load
- Squelch sensitivity (at threshold) : 0.25 μV typical
- Output impedance (Audio) : 8 Ω

Specifications are measured in accordance with EIA-152-C/204D, TIA-603 or EN 300 086.
All stated specifications are subject to change without notice or obligation.

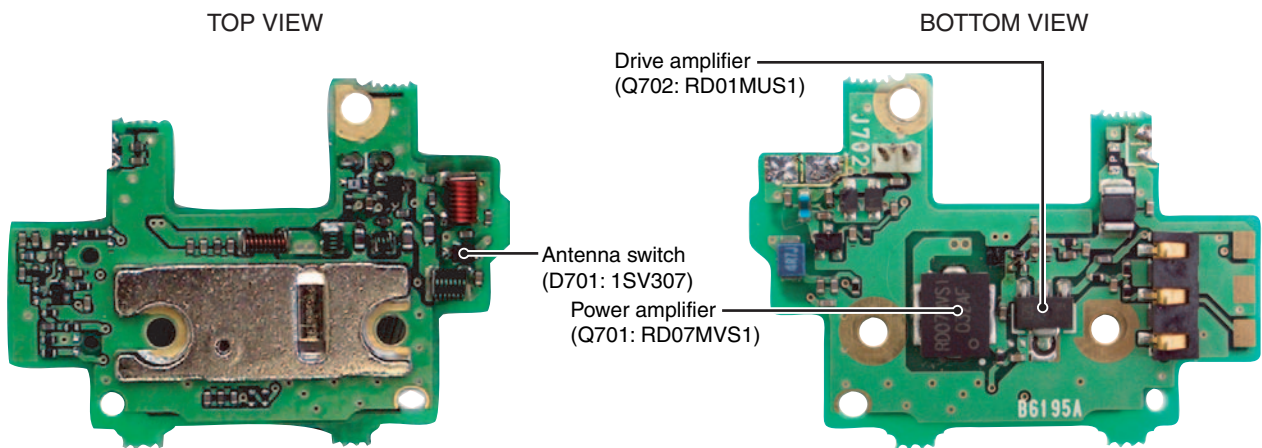
SECTION 2

INSIDE VIEWS

• MAIN UNIT



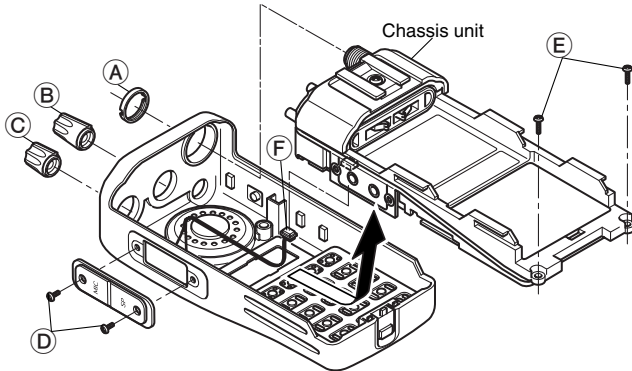
• PA UNIT



SECTION 3 DISASSEMBLY INSTRUCTION

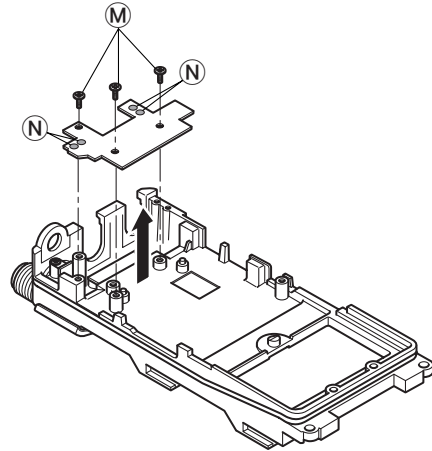
• REMOVING THE CHASSIS UNIT

- ① Unscrew 1 nut (A), and remove 2 knobs (B), (C).
- ② Unscrew 2 screws (D).
- ③ Unscrew 2 screws (E).
- ④ Take off the chassis unit in the direction of the arrow.
- ⑤ Unplug the connector (F) from the chassis unit.



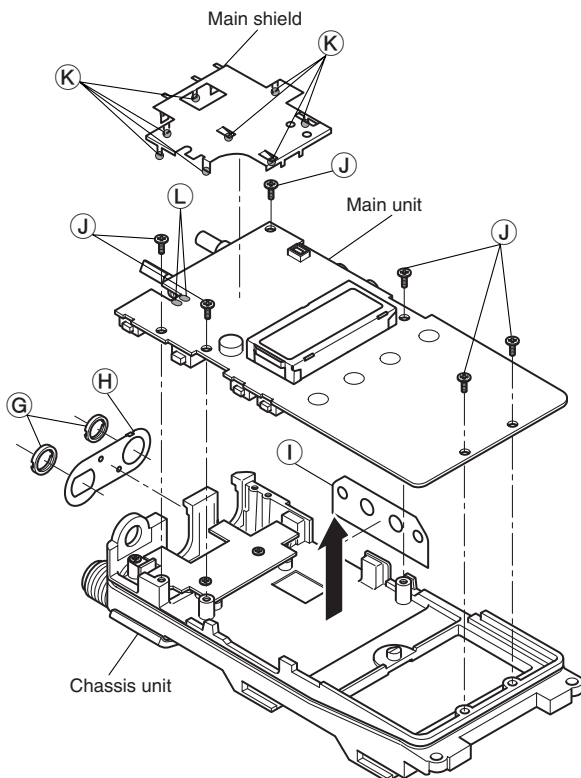
• REMOVING THE PA UNIT

- ① Unscrew 3 screws (M).
- ② Unsolder 4 points (N), and take off the PA unit in the direction of the arrow.



• REMOVING THE MAIN UNIT

- ① Unscrew 2 nuts (G), and remove the top plate (H).
- ② Remove the side plate (I).
- ③ Unscrew 6 screws (J).
- ④ Unsolder 8 points (K), and remove the main shield.
- ⑤ Unsolder 2 points (L), and take off the main unit in the direction of the arrow.



SECTION 4 OPTIONAL UNIT INSTALLATION

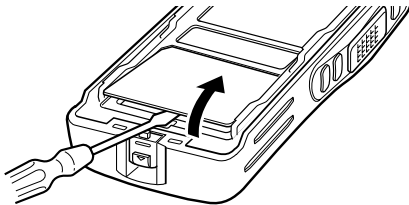
Install the optional unit as follows:

① Rotate [VOL] to turn the power OFF, and remove the battery pack.

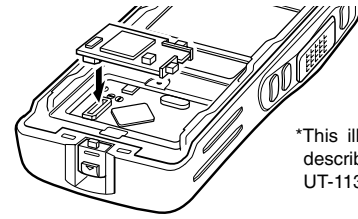
② Remove the unit cover.

NOTE: Use a flat head screw driver or a similar flat instrument, and insert into the hollow of the chassis, then lift and take away the unit cover.

Use the supplied spare unit cover! Do not use the cover that has been removed once. Water or dust may get into the transceiver because the cover may be bent or has lost its adhesion. This may result in the transceiver being damaged.



③ Install the unit as shown below.



*This illustration is described with the UT-113.

④ Replace the unit cover and the battery pack, then rotate [VOL] to turn the power ON.

NOTE: The optional UT-109/UT-110 SCRAMBLER UNITS, UT-105 SmarTrunk II™ LOGIC BOARD or UT-117/UT-117S SmarTrunk 3G™ LOGIC BOARD requires some PC board modifications. Please refer to the additional installation on next page.

■ UT-109 and UT-110 installation

The following PC board modification is required when installing the optional UT-109 or UT-110:

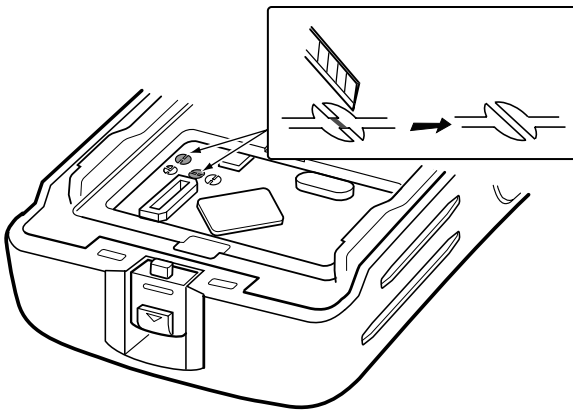
① Rotate [VOL] to turn the power OFF, and remove the battery pack.

② Remove the unit cover as shown above.

③ Cut the pattern on the PCB at the TX mic circuit (MIC) and RX AF circuit (DISC) as shown below.

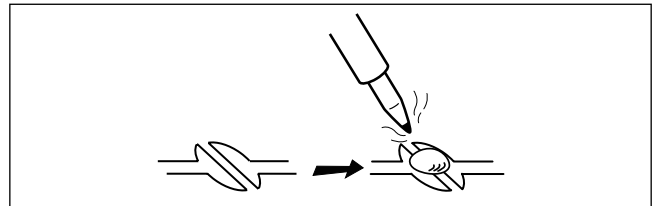
④ Install the scrambler unit as described above.

⑤ Replace the unit cover and the battery pack, then rotate [VOL] to turn the power ON.



NOTE: When uninstalling the scrambler unit

Be sure to re-solder the disconnected points at left, otherwise no TX modulation or AF output is available.

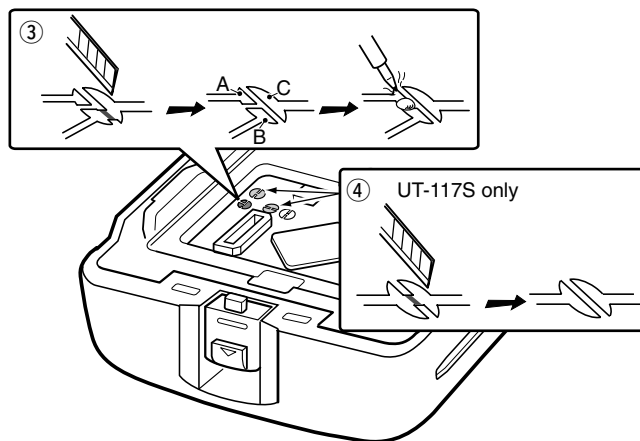


■ UT-105, UT-117 and UT-117S installation

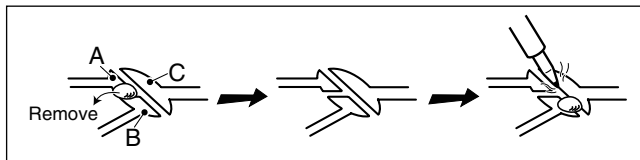
The following PC board modification is required when installing the optional UT-105, UT-117 or UT-117S:

- ① Rotate [VOL] to turn the power OFF, and remove the battery pack.
- ② Remove the unit cover as described above.
- ③ Cut and solder the pattern on the PCB at the RX AF circuit as shown at right.
- ⚡ The next step ④ is necessary for the UT-117S installation.
- ⚡ Go to step ⑤ to install the UT-105 or UT-117.

- ④ Cut the pattern on the PCB at the TX mic circuit (MIC) and RX AF circuit (DISC) as shown at right.
- ⑤ Install the UT-105/UT-117/UT-117S as described above.
- ⑥ Replace the unit cover and the battery pack, then rotate [VOL] to turn the power ON.



⚡ **NOTE: When uninstalling the SmarTrunk 3G™ unit**
Be sure to un-solder A and B, and re-solder B and C as shown below, otherwise no AF output is available. Moreover, the UT-117S is required to re-solder the TX mic circuit (MIC) and RX AF circuit (DISC).



5-1 RECEIVER CIRCUITS

RF CIRCUITS

RF circuits consist of RF filters, antenna switch, preamplifier, etc., and extracts and amplifies the signal which is desired to receive.

An antenna switch toggles RX line and TX line by PIN diodes.

While receiving, the TX line and the antenna is disconnected to prevent received 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 transmit signal entering.

The tuned-BPF is tuned to a desired frequency to receive by variable capacitor, and extracts the signal which is desired to receive.

The signals from the antenna switching circuit pass through the two-stage tunable bandpass filters (D19, D24, L7, L8, C27, C369). The filtered signals are amplified at the RF amplifier (Q5) and then passed through the another two-stage tunable bandpass filters (D14, D15, L11, C39, C45) to suppress unwanted signals. The filtered signals are applied to the 1st mixer circuit.

Received signals enter the antenna connector (CHASSIS; J1) and pass through the low-pass filter (ANT unit; L801, L802, C803). The filtered signals are passed through the 1/4 λ type antenna switching circuit (D701, D704, D706) and then applied to the RF circuit.

D14, D15, D19 and D24 employ varactor diodes, that are controlled by the CPU via the D/A converter (IC12), to track the bandpass filter. These varactor diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image response rejection.

1ST IF CIRCUITS

The 1st IF circuits consist of 1st mixer, 1st IF filter and 1st IF amplifier, and converts the received signals into the 1st IF signal, filters to remove unwanted signals and amplifies.

The RF signals from the bandpass filter are mixed with the 1st LO signals, where come from the RX VCO circuit, at the 1st mixer circuit (Q6) to produce a 46.35 MHz 1st IF signal. The 1st IF signal is passed through a monolithic filter (F11) to suppress out-of-band signals. The filtered signal is applied to the 2nd IF circuit after being amplified at the 1st IF amplifier (Q7).

2nd IF AND FM DEMODULATOR CIRCUITS

The 2nd IF circuits consist of 2nd mixer, 2nd IF filter, 2nd IF amplifier, and converts the 1st IF signal from the 1st IF circuits into the 2nd IF signal, filters to remove unwanted signals and amplifies.

An FM IF detector IC consists of whole of the 2nd IF circuits and FM demodulator circuit.

The 1st IF signal from the IF amplifier (Q7) is applied to the 2nd mixer section of the FM IF IC (IC9, pin 16), and is mixed with the 2nd LO signal to be converted into a 450 kHz 2nd IF signal.

The FM IF IC (IC9) contains the 2nd mixer, limiter amplifier, quadrature detector, active filter and noise amplifier circuits. A 2nd LO signal (45.9 MHz) is produced at the PLL circuit by tripling it's reference frequency 15.3 MHz.

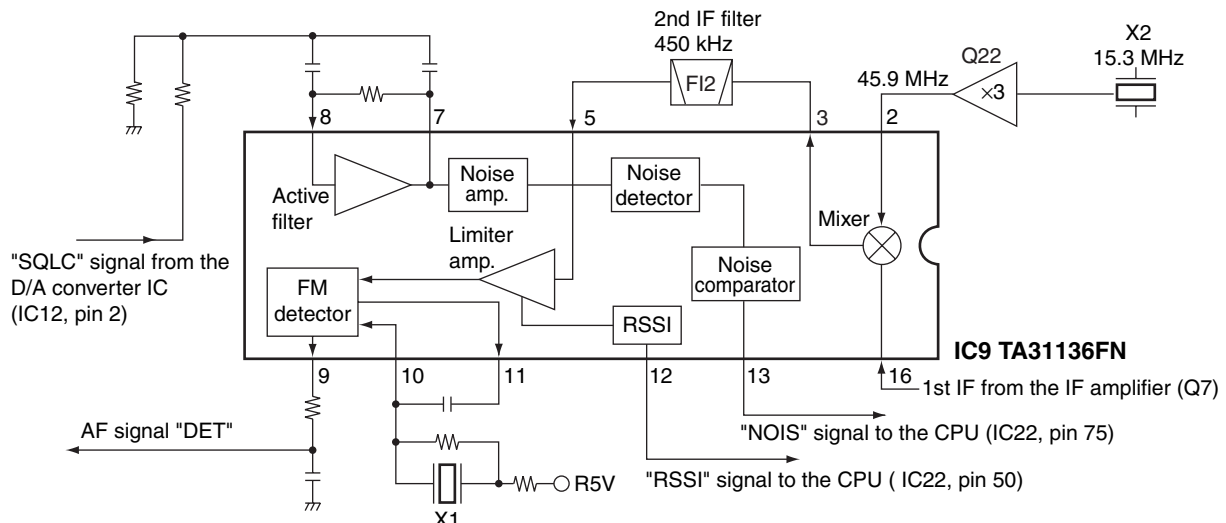
RX AF CIRCUITS

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

The AF selector changes the destination of the AF signals.

The AF signals from the FM IF IC (IC9, pin 9) are amplified at the AF amplifier section in the base band IC (IC14, pin 23), and are then applied to the high-pass filter and low-pass filter section of it.

• 2nd IF AND FM DEMODULATOR CIRCUITS



The filtered signals pass through the high-pass filter to suppress unwanted harmonic components. The signals pass through (or bypass) scrambler and expander sections. The signals are amplified at the amplifier section in the base band IC (IC14).

The output signals from IC14 (pin 20) pass through the low-pass filter sector (IC23, pins 1, 2), and are then applied to the AF amplifier (IC15, pin 8) via the AF volume (R315).

The power amplified AF signals are output from pin 10 and applied to the internal speaker that is connected to J4 via [SP] jack (J2).

SQUELCH CIRCUITS

• NOISE SQUELCH

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

The squelch circuits consist of the threshold level adjuster, noise filter and noise detector.

FM-demodulated AF signals from the FM IF detector IC are adjusted its level (=squelch threshold level) by DAC (D/A converter), then passed through the noise filter to extract the noise components. The noise components are rectified by noise detector to produce DC voltage corresponding to the noise level, then applied to the CPU and compared with the reference voltage preset in the CPU to control AF power amplifier and AF switches ON and OFF.

A portion of the AF signals from the FM IF IC (IC9, pin 9) are passed through the D/A converter (IC12, pins 1, 2). The signals are applied to the active filter section in the FM IF IC (IC9, pin 8). The active filter section filters and amplifies noise components. The amplified signals are converted into the pulse-type signals at the noise detector section. The detected signals output from pin 13 (NOIS) via the noise comparator section.

The "NOIS" signal from the FM IF IC is applied to the CPU (IC22, pin 75). Then the CPU analyzes the noise condition and outputs AF mute control signal from pin 84 to control the squelch switch (Q502) as the "MUTE" signal.

• TONE SQUELCH

The tone squelch connects the RX AF line to emit the AF output signals only when receiving a signal which consists of matched tone frequency preset in the CPU. Detecting CTCSS/DTCS signal in the demodulated AF signals, the tone squelch circuit turns the AF power amplifier and AF switches ON and OFF.

FM-demodulated AF signals from the FM IF detector IC are passed through the tone filter to remove unwanted audible signals. then applied to the CPU and compared with the tone frequency/code preset in the CPU to control AF power amplifier and AF switches ON and OFF.

A portion of the "DET" AF signals from the FM IF IC (IC9, pin 9) pass through the low-pass filter (IC19, pin 5) to remove AF (voice) signals, and are then applied to the amplifier (IC19, pin 3). The amplified signals are applied to the CTCSS or DTCS decoder in the CPU (IC22, pin 46) via the "CDEC" line. The CPU outputs AF mute control signal from pin 84 to control the squelch switch (Q502) as the "MUTE" signal.

5-2 TRANSMITTER CIRCUITS

TX AF CIRCUIT

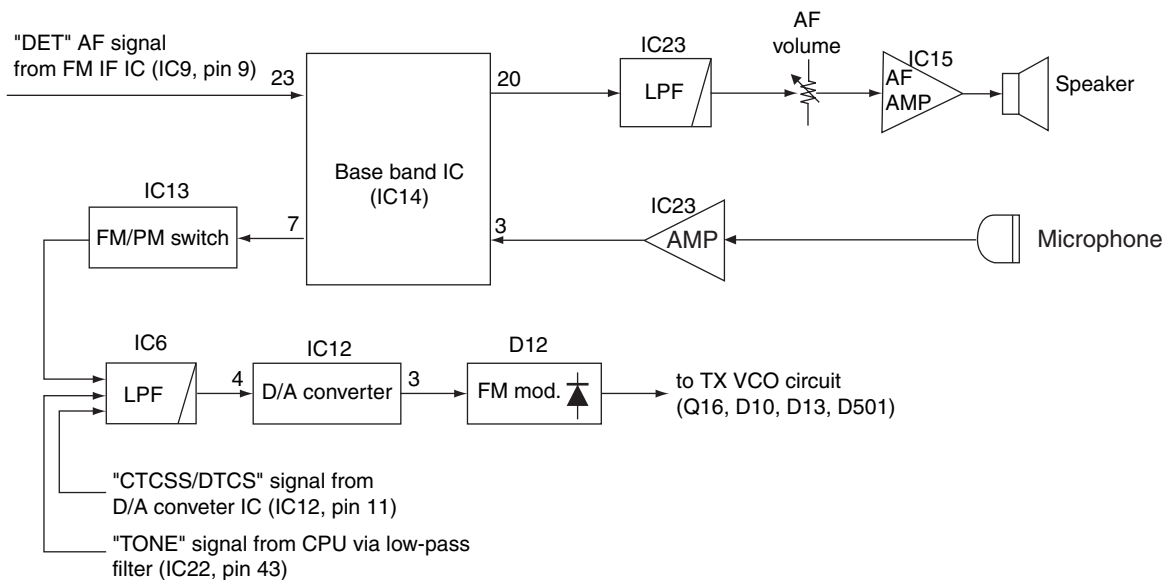
The TX AF circuit consists of microphone amplifier, ALC and AF filter. ALC (Automatic Level Controller) is an amplifier that reduces its gain automatically to prevent over deviation. The AF filter cuts off the signals except voice signals (3 kHz or higher and 300 Hz or lower).

The AF signals (MIC) from the microphone (MC1) are applied to the amplifier (IC23, pins 6, 7). The amplified signals are amplified again at the microphone amplifier section of the base band IC (IC14, pins 3). The amplified signals are passed through or bypass the compressor, scrambler sections of IC14, and are then passed through the high-pass, limiter amplifier, splatter filter sections of IC14.

The filtered AF signals from the base band IC (pin 6) are applied to the FM/PM switch (IC13, pins 6, 7), and pass through the low-pass filter (IC6, pins 1, 2). The filtered signals are applied to the D/A converter (IC12, pin 4). The output signals from the D/A converter (IC12, pin 3) are applied to the modulation circuit (D12).

AF signals range of 300 Hz to 3 kHz

• AF CIRCUIT (TX and RX)



MODULATION CIRCUIT

• VOICE SIGNAL

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

The AF signals from the microphone amplifier circuits are applied to the variable capacitor to change its reactance for FM modulation.

The AF signals from the D/A converter (IC12, pin 3) change the reactance of varactor diode (D12) to modulate the oscillated signal at the TX VCO circuit (Q16, D10, D13, D501). The modulated VCO signal is amplified at the buffer amplifiers (Q15, Q29) and is then applied to the drive amplifier circuit via the T/R switch (D16).

• TONE SIGNAL

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

The CTCSS/DTCS signals ("CENC0," "CENC1," "CENC2") from the CPU (IC22, pins 13, 15, 16) are combined at the resistors (R222–R224) and are then pass through the low-pass filter (IC6, pins 12, 14). The filtered signals are applied to the D/A converter (IC12, pin 12) via the "TONC" line. The output signals from the D/A converter (IC12, pin 11) are mixed with the filtered Mic audio signals.

The mixed signals are passed through the D/A converter (IC12, pin 3, 4), and are then applied to the D12 in the TX VCO circuit.

TRANSMIT AMPLIFIERS

The transmit amplifiers consist several RF amplifier (predriver, driver, power) and amplify the VCO output to the transmit output level.

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.

The power detector rectifies a portion of the transmit output and converts it 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.

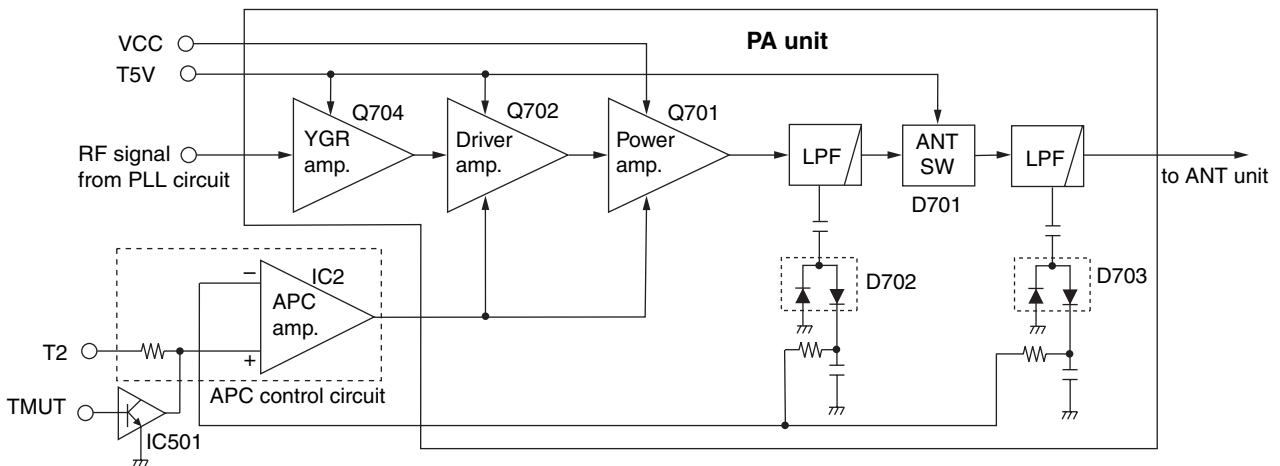
The comparator compares the detected voltage and reference voltage, and the difference of voltage is output. The output voltage controls the bias of the RF amplifiers to reduce/increase the gain of these amplifiers for stable transmit output power.

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

The power detector circuit (PA unit; D702, D703) detects the transmit power output level and converts it into DC voltage. The output voltage is at a minimum level when the antenna impedance is matched with 50 Ω and is increased when it is mismatched.

The detected voltage is applied to the differential amplifier (MAIN unit; IC2; pin 3), and the "T2" signal from the D/A converter (MAIN unit; IC12, pin 23), controlled by the CPU (MAIN unit; IC22), is applied to the other input for reference. When antenna impedance is mismatched, the detected voltage exceeds the power setting voltage. Then the output voltage of the differential amplifier (MAIN unit; IC2, pin 4) controls the input bias voltage of the drive (PA unit; Q702) and power (PA unit; Q701) amplifiers to reduce the output power.

• APC CIRCUIT



5-3 FREQUENCY SYNTHESIZER CIRCUITS

VCO

A VCO is an oscillator which its oscillation frequency is determined by the applied voltage.

Shifting the oscillation frequency range in RX/TX, the VCO generates both of the TX signal and 1st LO signals.

There are 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 circuits contains a separate RX VCO (Q17, D9, D11, D500) and TX VCO (Q16, D10, D13, D501). The oscillated signal is amplified at the buffer amplifiers (Q15, Q29) and is then applied to the T/R switch (D16, D17). Then the receive 1st LO (Rx) signal is applied to the 1st mixer (Q6) and the transmit (Tx) signal to the YGR amplifier circuit (PA unit; Q704).

A portion of the signal from the buffer amplifier (Q15) is fed back to the PLL IC (IC21, pin 6) via the doubler circuit (Q14) as the comparison signal.

PLL (Phase Locked Loop) CIRCUIT

The PLL circuit provides stable oscillation for both of the transmit frequency and 1st LO frequency for receive. By comparing feedbacked VCO output and reference frequency signal and adjusting the differences.

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

A portion of VCO output is applied to the PLL IC via buffer and harmonic filter. The applied VCO output is divided according to the serial data including divid 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 VCO output and the reference frequency signals divide and frequency-matched are applied to the phase comparator and phase-compared. 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).

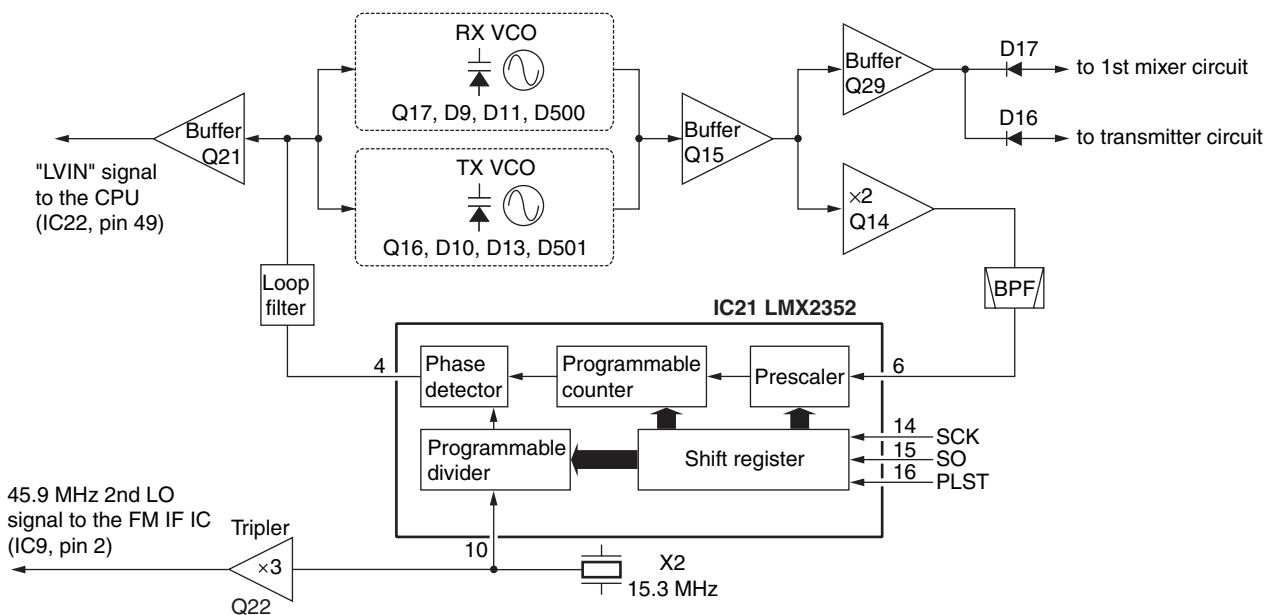
Applying the lock voltage to the variable capacitor which composes a part of the resonator of VCO, the capacitance of VD changes corresponding to the applied lock voltage. This causes the change of resonance frequency that determine the VCO oscillation frequency to keep the VCO frequency constant.

The PLL circuit contains the TX and RX VCO circuits (Q16, Q17, D9–D11, D13, D500, D501). The oscillated signal is amplified at the buffer amplifier (Q15). The output signal frequency is doubled at Q14, and is then applied to the PLL IC (IC21, pin 6) after being passed through the bandpass filter (L32, C205, C507).

Q500, D502 and D503 switch the filtering frequencies between TX and RX which is controlled by R5V.

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.

• FREQUENCY SYNTHESIZER CIRCUITS



5-4 POWER SUPPLY CIRCUIT

LINE	DESCRIPTION
VCC	The voltage from the connected battery pack.
+5V	Common 5 V converted from the VCC line at the +5 regulator circuit (IC17). The output voltage is supplied to the buffer amplifiers (Q21), PLL IC (IC21) etc.
S5V	Common 5 V converted from the VCC line at the S5 regulator circuit (Q26–Q28). The output voltage is supplied to the ripple filter (Q20), etc.
R5V	Receive 5 V converted from the S5V line at the R5 regulator circuit (Q25). The output voltage is supplied to the tripler (Q22), FM IF IC (IC9), IF amplifier (Q7), 1st mixer (Q6), RF amplifier (Q5), etc.
T5V	Transmit 5 V converted from the S5V line at the T5 regulator circuit (Q24). The output voltage is supplied to the APC amplifier (IC2), PA unit, etc.

5-6 PORT ALLOCATIONS

5-6-1 D/A CONVERTOR IC (IC12)

Pin Number	Port name	Description
10	BAL	Outputs the modulation balance level control signal. The signal is applied to the buffer amplifier (IC24, pin 1).
14	TLVA	Outputs the TX VCO lock voltage control signal.
15	RLVA	Outputs the RX VCO lock voltage control signal.
22	T1	Outputs the bandpass filter tuning control signal . The output signal is applied to the bandpass filters (D19, D240).
23	T2	<ul style="list-style-type: none"> Outputs the bandpass filter tuning control signal . The output signal is applied to the bandpass filters (D14, D15). Outputs the TX control signal . The output signal is applied to the APC amplifier (IC2, pin 1).

5-6-2 CPU (MAIN unit; IC22)

Pin number	Port name	Description
13, 15, 16	CENC0–CENC2	Output the CTCSS/DTCS signals.
29	REF	Outputs the reference oscillator correcting voltage. The voltage is applied to the buffer amplifier (IC24, pin 3)
30	PLST	Outputs strobe signals to the PLL IC (IC21, pin 16).
34	PMFM	Outputs the FM/PM modulation switching signal to the FM/PM switch (IC13, pin 5).
35	MDIO	I/O port for the serial data signals from/to the base band IC (IC14, pin 11).
36	MSCK	Outputs clock signal for the base band IC (IC14, pin 13).
37	MDIR	Outputs serial data control signal to the base band IC (IC14, pin 14).
38	MTCK	Input port for transmitting MSK clock signal from the base band IC (IC14, pin 9).
39	MTDT	Outputs MSK data for transmitting to the base band IC (IC14, pin 10).
40	MRDF	Input port for the receiving MSK detection signal from the base band IC (IC14, pin 12).
41	DAST	Outputs strobe signals to the D/A convertor (IC12, pin 6).
43	SENC	Output single tone encoder signal.
44	BEEP	Outputs beep audio signals.
45	SDEC	Input port for single tone decode signal from the base band IC (IC14, pin 21).

Pin Number	Port name	Description
46	CDEC	Input port for CTCSS/DTCS signal from the amplifier (IC19, pin 1).
48	BATV	Input port for the detect signal for connecting battery pack's voltage.
49	LVIN	Input port for the PLL lock voltage.
50	RSSI	Input port for the S-meter signal from the FM IF IC (IC9, pin 12).
51	TEMP	Input port for the transceiver's internal temperature detecting signal.
69	CSFT	Outputs shift signal for reference oscillator's frequency.
70	AFON	Outputs audio control signal. Low: While outputs audio signals from the speaker.
74	PTT	Input port for the PTT switch detection signal. Low: While the PTT switch is pushed.
75	NOIS	Input port for the noise signal from the FM IF IC (IC9, pin 13).
76	SO	Outputs serial data to the PLL IC (IC21, pin 15) and D/A convertor (IC12, pin 8).
78	SCK	Outputs serial clock signal to the PLL IC (IC21 pin 14), D/A convertor (IC12, pin 7), etc.
79	CLI	Input port for the cloning data signal.
80	CLO	Outputs the cloning data signal.
82	ESDA	I/O port for data signals from/to the EEPROM (IC10, pin 5).
84	MUTE	Outputs AF control signal . Low: While Squelch ON.
85	ESCL	Outputs clock signal to the EEPROM (IC10, pin 6).
86	S5C	Outputs the S5 regulator (Q26–Q28) control signal. Low: While the S5 regulator outputs 5 V voltage.
87	T5C	Outputs the T5 regulator (Q24) control signal. Low: While transmitting.
88	R5C	Outputs the R5 regulator (Q25) control signal. Low: While receiving.
89	TMUT	Outputs the transmitting mute switch control signal to the mute switch (Q 501). High: While muting.
90	ULCK	Input port for the PLL unlock signal. Low: The PLL circuit is unlocked.

SECTION 6 ADJUSTMENT PROCEDURE

6-1 PREPARATION

When adjusting IC-F33GT/GS/F34GT/GS, optional CS-F33G ADJ ADJUSTMENT SOFTWARE (Rev. 1.0 or later), OPC-478 CLONING CABLE (RS-232C type), OPC-478U/UC CLONING CABLE (USB type) and a JIG CABLE (see illustration at page 6-2) are required.

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 7.2 V DC Current capacity : 5 A or more	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
FM deviation meter	Frequency range : DC–800 MHz Measuring range : 0 to ±10 kHz	Attenuator	Power attenuation : 20 or 30 dB Capacity : 10 W
Frequency counter	Frequency range : 0.1–300 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Standard signal generator (SSG)	Frequency range : 100–800 MHz Output level : 0.1 μV to 32 mV (–127 to –17 dBm)
Digital multimeter	Input impedance : 10 MΩ/V DC or better	AC millivoltmeter	Measuring range : 10 mV–10 V
RF power meter	Measuring rang : 1–10 W Frequency range : 100–800 MHz Impedance : 50 Ω SWR : Better than 1.2 : 1	Oscilloscope	Frequency rang : DC–20 MHz Measuring range : 0.01–20 V

■ SYSTEM REQUIREMENTS

- Microsoft® Windows® 98/98SE/Me/2000
- RS-232C serial port (D-sub 9 pin)
- USB port

■ ADJUSTMENT SOFTWARE INSTALLATION

- ① Boot up Windows.
 - Quit all applications when Windows is running.
- ② Insert the cloning software CD into the appropriate CD drive.
- ③ Select 'Run' from the [Start] menu.
- ④ Type the setup program name using the full path name, then push [Enter] key.
(For example; D:\Setup.exe)
- ⑤ Follow the prompts.
- ⑥ Program group 'CS-F33G ADJ' appears in the 'Programs' folder of the [Start] menu.

■ BEFORE STARTING SOFTWARE ADJUSTMENT

Program the adjustment frequencies into the transceiver using with the CS-F33G before starting the software adjustment. Otherwise, the transceiver can not start software adjustment.

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.

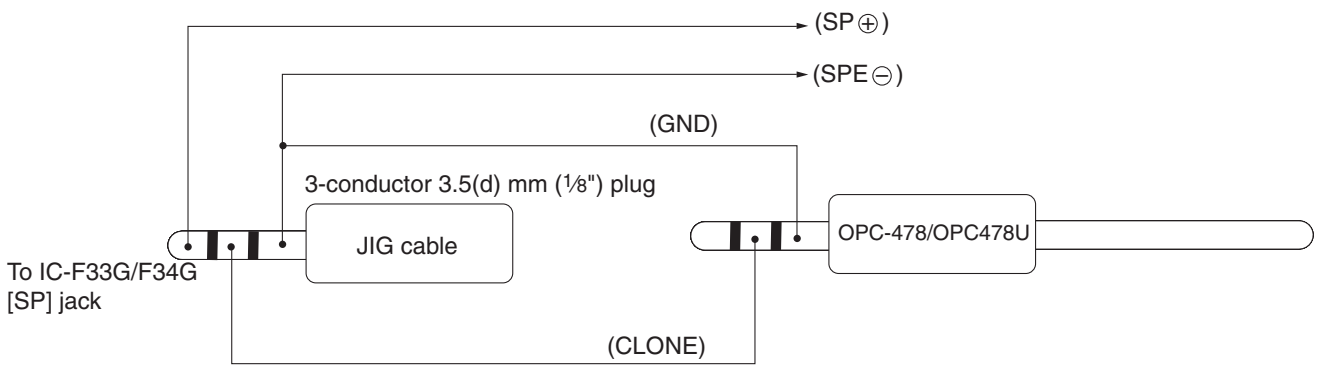
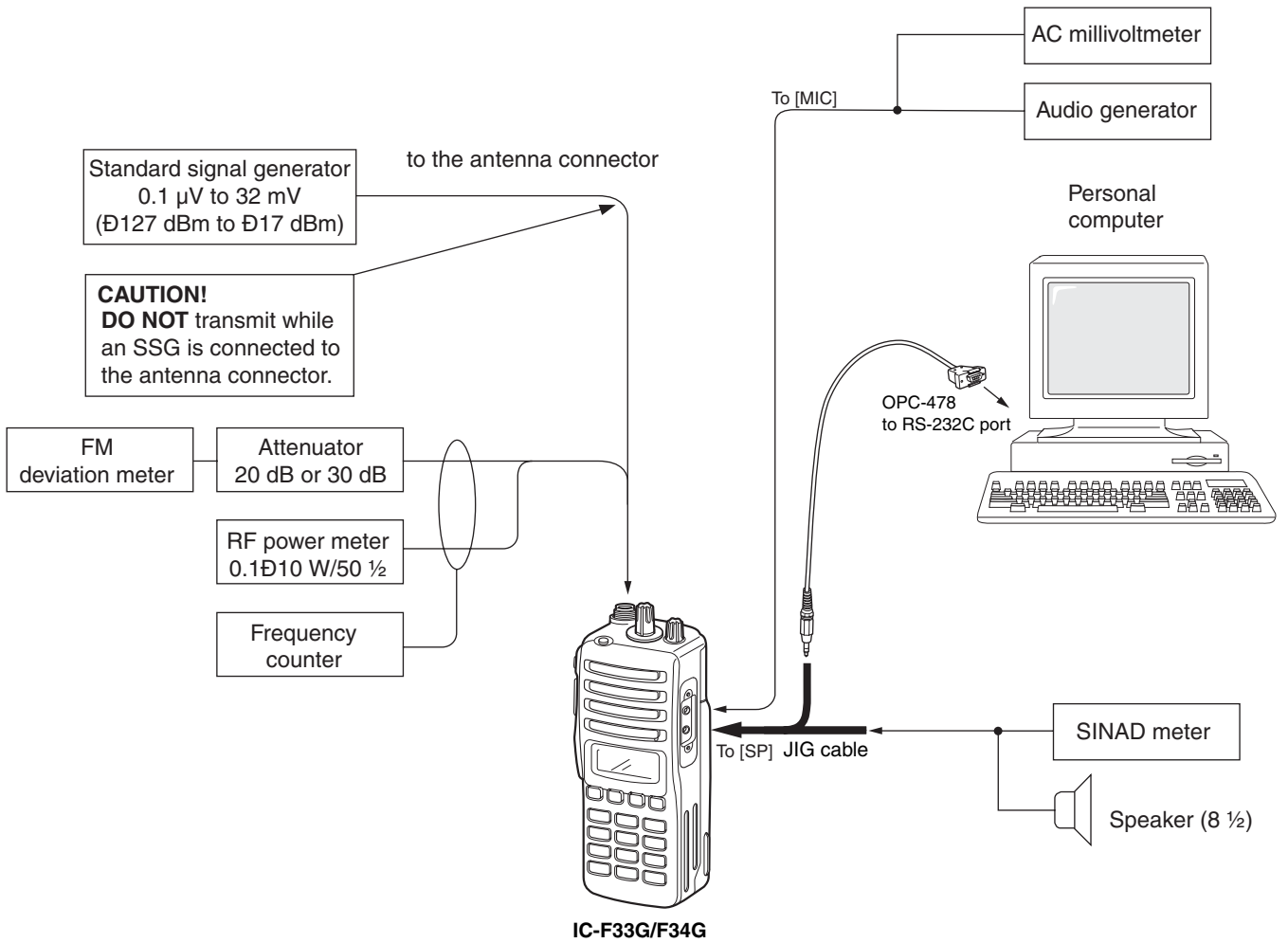
Microsoft and Windows are registered trademarks of Microsoft Corporation in the U.S.A. and other countries.

■ STARTING SOFTWARE ADJUSTMENT

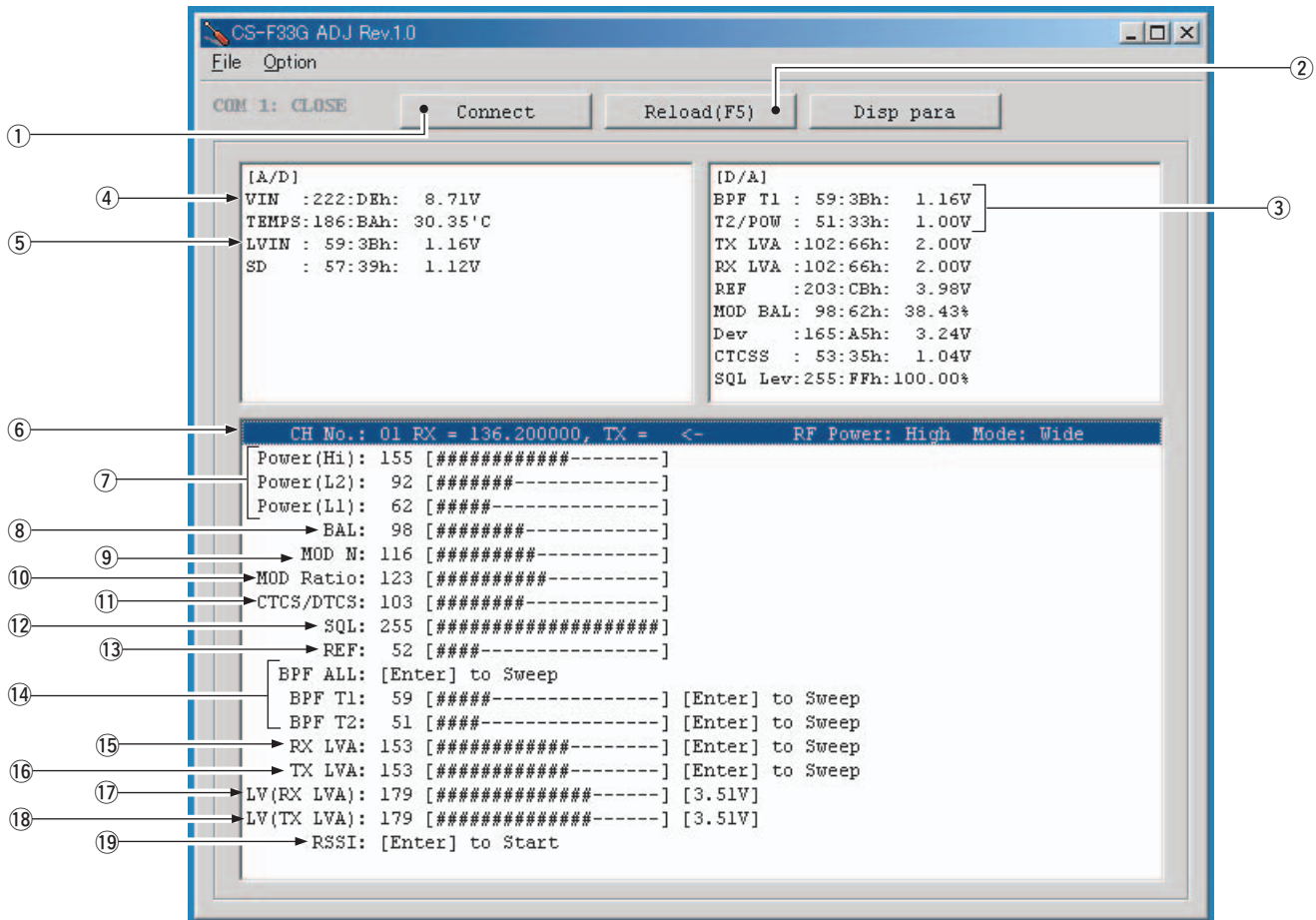
- ① Connect the transceiver and PC with the OPC-478/U and JIG CABLE.
- ② Turn the transceiver power ON.
- ③ Boot up Windows, and click the program group 'CS-F33G ADJ' in the 'Programs' folder of the [Start] menu, then CS-F33G ADJ's window appears.
- ④ Click 'Connect' on the CS-F33G's window, then appears the transceiver's adjustment screen.
- ⑤ Set or modify adjustment data as desired.

• ADJUSTMENT FREQUENCY LIST

CH	FREQUENCY	ADJUSTMENT ITEM
1	155.000 MHz	TX power : High Bandwidth : Wide
2	155.000 MHz	TX power : Low 2 Bandwidth : Wide
3	155.000 MHz	TX power : Low Bandwidth : Wide
4	155.000 MHz	TX power : High Bandwidth : Narrow
5	136.000 MHz	TX power : High Bandwidth : Wide
6	155.000 MHz	TX power : High CTCSS : 151.4 Hz DTCS : 007 Bandwidth : Wide
7	174.000 MHz	TX power : High Bandwidth : Wide
8	155.000 MHz	TX power : High Bandwidth : Middle



• CS-F33G ADJ'S SCREEN EXAMPLE

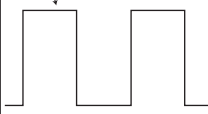


NOTE: The above values for settings are example only.
Each transceiver has its own specific values for each setting.

- | | |
|-------------------------------------|--|
| ①: Transceiver's connection state | ⑪: CTCSS/DTCS deviation |
| ②: Reload adjustment data | ⑫: Squelch level |
| ③: Receive sensitivity measurement | ⑬: Reference frequency |
| ④: Connected DC voltage measurement | ⑭: Receive sensitivity (automatic) |
| ⑤: PLL lock voltage measurement | ⑮: PLL lock voltage for RX (automatic) |
| ⑥: Operating channel select | ⑯: PLL lock voltage for TX (automatic) |
| ⑦: RF output power | ⑰: PLL lock voltage for RX (manual) |
| ⑧: FM modulation balance (Narrow) | ⑱: PLL lock voltage for TX (manual) |
| ⑨: FM deviation (Narrow) | ⑲: S-meter adjustment |
| ⑩: FM deviation (Wide) | |

6-2 SOFTWARE ADJUSTMENT (TRANSMITTING)

Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE		
		UNIT	LOCATION			
PLL LOCK VOLTAGE [LV (RX LVA)] [LV (TX LVA)]	1	<ul style="list-style-type: none"> Operating Channel : CH7 Receiving 	PC screen	Check the "LVIN" item on the CS-F33G ADJ's screen.	3.5 V	
	2	<ul style="list-style-type: none"> Operating Channel : CH7 Transmitting 			3.5 V	
	CONVENIENT: The PLL lock voltage can be adjustment automatically. Set the cursor to "RX LVA"/"TX LVA" and then push [ENTER] key.					
	3	<ul style="list-style-type: none"> Operating Channel : CH5 Receiving 	PC screen	Check the "LVIN" item on the CS-F33G ADJ's screen.	1.0–1.6 V (Verify)	
4	<ul style="list-style-type: none"> Operating Channel : CH5 Transmitting 	1.0–1.6 V (Verify)				
REFERENCE FREQUENCY [REF]	1	<ul style="list-style-type: none"> Operating Channel : CH7 Connect the RF power meter or 50 Ω dummy load to the antenna connector. Transmitting 	Top panel	Loosely couple the frequency counter to the antenna connector.	174.0000 MHz	
OUTPUT POWER [Power (Hi)]	1	<ul style="list-style-type: none"> Operating Channel : CH1 Transmitting 	Top panel	Connect the RF power meter to the antenna connector.	5.0 W	
	[Power (L2)]	2			<ul style="list-style-type: none"> Operating Channel : CH2 Transmitting 	2.0 W
	[Power (L1)]	3			<ul style="list-style-type: none"> Operating Channel : CH3 Transmitting 	1.0 W
MODULATION BALANCE [BAL]	1	<ul style="list-style-type: none"> Operating Channel : CH4 No audio applied to the [MIC] connector. Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P–P)/2 Push [P0] while transmitting 	Top panel	Connect the FM deviation meter with the oscilloscope to the antenna connector through the attenuator.	Set to square wave form 	
FM DEVIATION [MOD N] (Narrow)	1	<ul style="list-style-type: none"> Operating Channel : CH4 Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P–P)/2 Connect the audio generator to the [MIC] connector and set as : 1.0 kHz/150 mVrms Transmitting 	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±2.10 kHz	
	[MOD Ratio] (Wide)	2			<ul style="list-style-type: none"> Operating Channel : CH1 Transmitting 	±4.10 kHz
	[MOD Ratio] (Middle) (F34G only)	3			<ul style="list-style-type: none"> Operating Channel : CH8 Transmitting 	±3.20 kHz
CTCSS/DTCS DEVIATION [CTCSS/DTCS]	1	<ul style="list-style-type: none"> Operating Channel : CH6 No audio applied to the [MIC] connector. Transmitting 	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±0.70 kHz	
FREQUENCY DEVIATION	1	<ul style="list-style-type: none"> Operating Channel : CH16 (156.800MHz) Output power : Low Connect an audio generator to the microphone connector and set as ; Frequency : 1kHz Level : 30mV Set the FM deviation meter as ; HPF : OFF LPF : 20kHz De-emphasis : OFF Detector : (P–P)/2 Transmitting 	Rear Panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.25-4.35kHz	

SOFTWARE ADJUSTMENT (RECEIVING)

- Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard
- Need to adjust "S-METER ADJUSTMENT" after "RX SENSITIVITY ADJUSTMENT" is adjusted.
Otherwise, "S-METER ADJUSTMENT" will not be adjusted properly.

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE
		UNIT	LOCATION	
RX SENSITIVITY [BPF T1] [BPF T2]	1 <ul style="list-style-type: none"> • Operating Channel : CH5 • Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : 10 μV* (-87 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving 	PC screen	Connect the SINAD meter with an 8 Ω load to the [SP] jack through the JIG cable.	Minimum distortion level
	<p>CONVENIENT: The BPF T1, BPF T2 can be adjustment automatically.</p> <p>①-1: Set the cursor to "BPF ALL" and then push [ENTER] key. ①-2: The connected PC tunes BPF T1, T2 to peak levels. or ②-1: Set the cursor to one of BPF T1, T2 as desired. ②-2: Push [ENTER] key to start tuning. ②-3: Repeat ②-1 and ②-2 to perform additional BPF tuning.</p>			
S-METER [S-METER]	1 <ul style="list-style-type: none"> • Operating Channel : CH5 • Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : 14 μV* (-84 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving 	Push the [ENTER] key on the connected computer's keyboard to set "L2" level.		
	2 <ul style="list-style-type: none"> • Set the SSG as: <ul style="list-style-type: none"> Level : 0.45 μV* (-114 dBm) • Receiving 	Push the [ENTER] key on the connected computer's keyboard to set "L0" level.		
SQUELCH LEVEL [SQL]	1 <ul style="list-style-type: none"> • Operating Channel : CH1 • Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 155.000 MHz Level : 0.2 μV* (-121 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving 	Side panel	Connect speaker to the [SP] jack through the JIG cable.	Set SQL level to close squelch. Then set SQL level at the point where the audio signals just appears.

*The output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

[MAIN UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Contains 300 rows of part specifications.

[MAIN UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Contains 300 rows of part specifications.

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01] ⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01] ⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

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

[MAIN UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Contains rows for components like ECJ0EC1H150J, ECJ0EC1H220J, ECJ0EF1C104Z, etc.

[PA UNIT]

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Contains rows for components like S.FET RD07MVS2-T112, S.FET RD01MUS1-T113, S.TR 2SC5006-T1, etc.

①: GT [USA-01] ②: GT [GEN-01] ③: GT [EUR-01] ④: GT [USA-02] ⑤: GT [CHN-01]
⑥: GS [USA-01] ⑦: GS [GEN-01] ⑧: GS [EUR-01] ⑨: GS [USA-02] ⑩: GS [USA-01]
⑪: GS [CHN-01] ⑫: GS [SWE-07] ⑬: GS [NOR-08] ⑭: GS [SWE-09]

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

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L901	6200006190	S.COL BLM21PG300SN1D	T	10.2/6
C901	4030017460	S.CER ECJ0EB1E102K	T	6/6.6
J901	6910015881	CNR 9230B-1-02Z141-PT1		

[ANT UNIT]

REF NO.	ORDER NO.	DESCRIPTION	M.	H/V LOCATION
L801	6200012780	S.COL 0.30-1.4-6TL 27.2N	T	5.7/12.4
L802	6200012470	S.COL 0.30-1.7-7TL 45.3N	T	6.6/9
R801	7030005080	S.RES ERJ2GEJ 823 X (82 k)	T	3.2/14.1
C801	4030017460	S.CER ECJ0EB1E102K	T	10/7
C802	4030017380	S.CER ECJ0EC1H050B	T	6.5/7.1
C803	4030017410	S.CER ECJ0EC1H240J	T	3.2/10.6
C807	4030017620	S.CER ECJ0EC1H100C	T	4/11.9

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

SECTION 8

MECHANICAL PARTS

[CHASSIS PARTS]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6910015910	ANT CONNECTOR 104	1
J2	6910015860	IMSA-6277S-O2A-G	1
SP1	2510001061	K036NA500-67	1
W1	8900009640	OPC-963	1
MP1	8010019454	2721 CHASSIS-4	1
MP2	8210020531	2721 T-FRONT PANEL-1	[10-KEY] 1
	8210020731	2721 S-FRONT PANEL-1	[4-KEY] 1
	8210022161	2721 S-FRONT PANEL (B)-1	[SWE-07] 1
	8210022151	2721 S-FRONT PANEL (A)-1	[NOR-08] 1
	8210023051	2721 S-FRONT PANEL (C)-1	[SWE-09] 1
MP3	8210020540	2721 PTT PANEL	[others] 1
	8210022140	2721 PTT PANEL (B)	[SWE-07] 1
	8210022170	2721 PTT PANEL (A)	[NOR-08] 1
	8210022170	2721 PTT PANEL (A)	[SWE-09] 1
MP4	8930061780	2721 PTT BUTTON	1
MP5	8930061800	2721 PTT RUBBER	1
MP6	8930040390	Speaker net (B)	1
MP7	8930046050	Speaker net (C)	1
MP8	8210020550	2721 REAR PANEL	1
MP9	8310060760	2721 WINDOW PLATE	1
MP10	8930065750	2721 A-WINDOW SHEET	1
MP12	8930061790	2721 KEYBOARD	[10-KEY] 1
	8930062760	2721 4-KEY	[4-KEY] 1
	8930067350	2721 4-KEY (A)	[SWE-07] 1
	8930067350	2721 4-KEY (A)	[NOR-08] 1
	8930067350	2721 4-KEY (A)	[SWE-09] 1
MP13	8930061710	2721 MAIN SEAL	1
MP14	8930063060	2721 T-RUBBER	1
MP16	8930064661	2721 SIDE PLATE (A)-1	1
MP17	8930061860	2721 TOP PLATE	1
MP20	8930061880	2721 MIC SPONGE	1
MP21	8930059360	2600 RELEASE BUTTON	1
MP22	8930063030	2721 RELEASE PLATE	1
MP23	8610007510	knob spring NO.7800	1
MP24	8610007920	knob spring NO.1500	1
MP25	8830001720	2721 ANT NUT	2
MP26	8810009221	Screw BT B0 2X8 NI-ZK3 (BT)	1
MP27	8810009561	Screw BT B0 2X6 NI-ZK3 (BT)	2
MP28	8810008971	0-tap 1flat washerB0 2X3.5NI-ZC3 (BT)	11
MP29	8610011930	KNOB N-318	1
MP30	8610012130	KNOB N-323	1
MP31	8810010430	screw truss M3X5 SUS SSBC	1
MP32	8930063052	2721 PLATE-2	1
MP33	8930046020	1123 SHEET (A)-1	1
MP34	8930056540	Push spring (AH)	2
MP35	8830001701	VR NUT (Q)-1	1
MP36	8830001690	VR NUT (R)	1
MP37	8510016360	2721 MAIN SHIELD	1
MP38	8510016350	2721 ANT PLATE	1
MP42	8930062960	WHITE SHEET (R)	1
MP47	8930048870	2056 A-SPONGE	1

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6450002250	HSJ1456-010320	1
J3	6450001680	HSJ1122-010010	1
J4*	6510021901	BM02B-ASRS-TF (LF) (SN)	1
J5*	6510018430	AXN330C038	1
J6*	6510024391	IMSA-6176S-03Y902	1
DS3	5030003050	S11188	1
MC1	7700002760	EM6027P-46C33-G-01	1
S1*	2230001060	EVQ-PUL 02K	1
S2*	2260002840	SKHLLFA010	1
S3*	2260002800	SW-167 (SKQT)	1
S4*	2260002800	SW-167 (SKQT)	1
S5*	2260002800	SW-167 (SKQT)	1
S27	2250000180	EC10SP16-47	1
EP7	8930063020	SRCN-2721-SP-N-W	2
MP1*	8510016130	2721 VCO CASE	1
MP2	8510016120	2721 VCO COVER	1
MP3	8930061890	2721 LCD HOLDER	1
MP4	8210020570	2721 REFLECTOR	1

[FUSE UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J901	6910015881	9230B-1-02Z141-PT1	1

[PA UNIT]

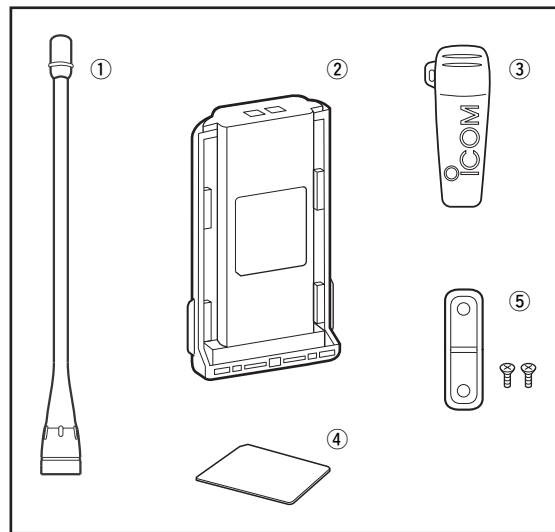
REF NO.	ORDER NO.	DESCRIPTION	QTY.
J701*	6510024391	IMSA-6176S-03Y902	1
J702	6910015891	9230B-1-02Z140-PT1	1
F701*	5210000901	0467003.NR	1
MP701*	8410002370	2337 PA HEATSINK	1

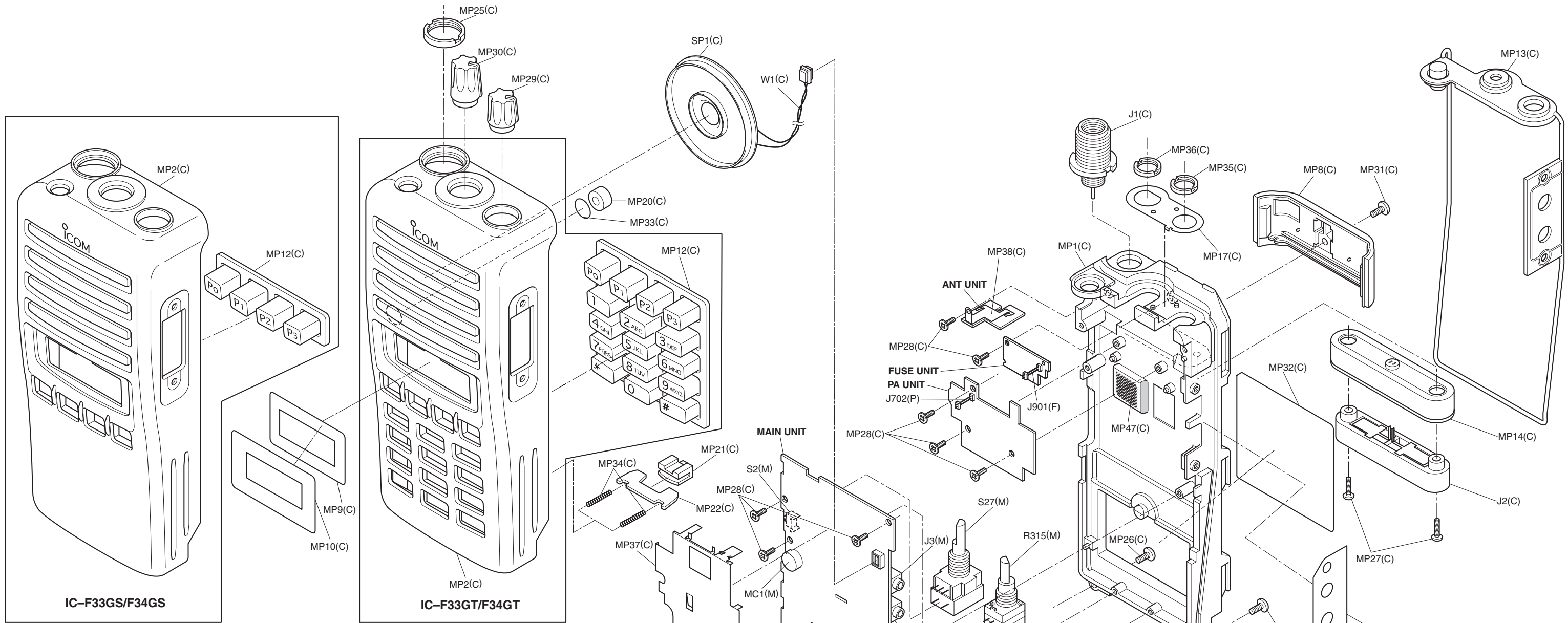
[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1 ①	Option	FA-SC55V-1	1
EP2 ②	Option	BP-230N	[USA-01] 1
	Option	BP-232N	[others] 1
MP1 ③	Option	MB-94	1
MP3 ⑤	8210020560	2721 JACK PANEL	[others] 1
	8210022310	2721 JACK PANEL (B)	[SWE-07] 1
	8210022290	2721 JACK PANEL (A)	[NOR-08] 1
	8210022290	2721 JACK PANEL (A)	[SWE-09] 1
MP4 ⑤	8810004861	Screw PH M2X6 ZK3	2
MP5 ④	8930063052	2721 PLATE-2	1

*: Refer to SECTION 10 "BOARD LAYOUTS."

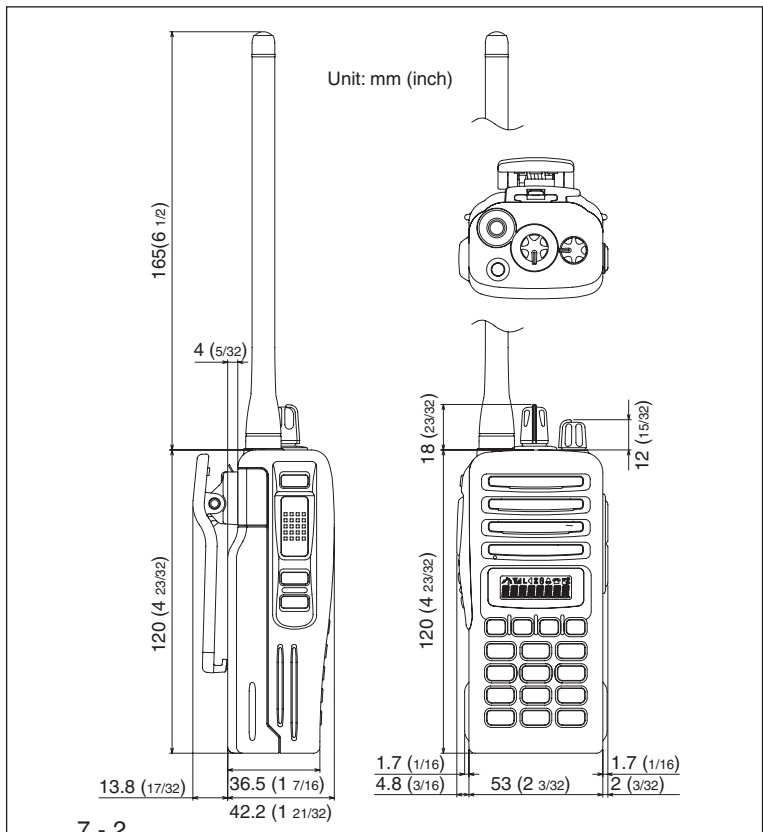
†: Optional product



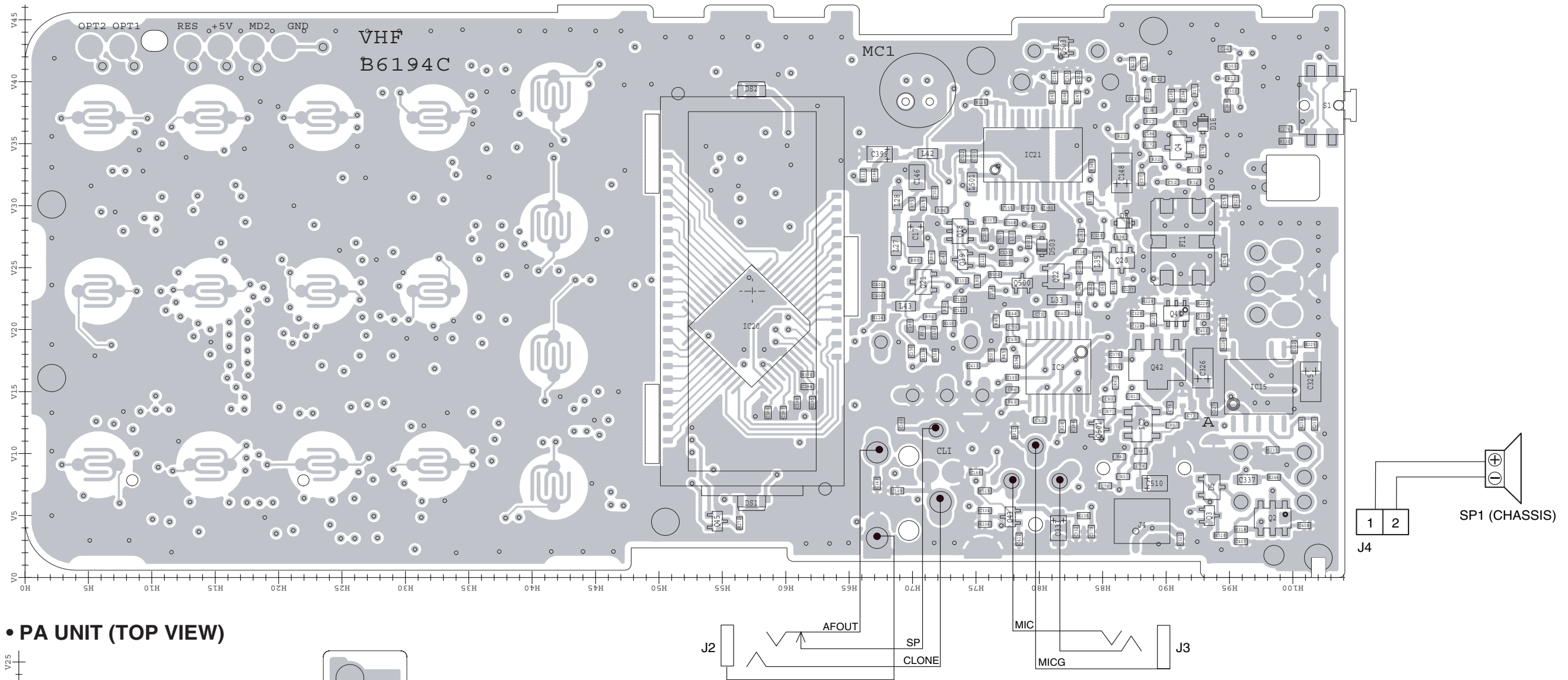


IC-F33GS/F34GS

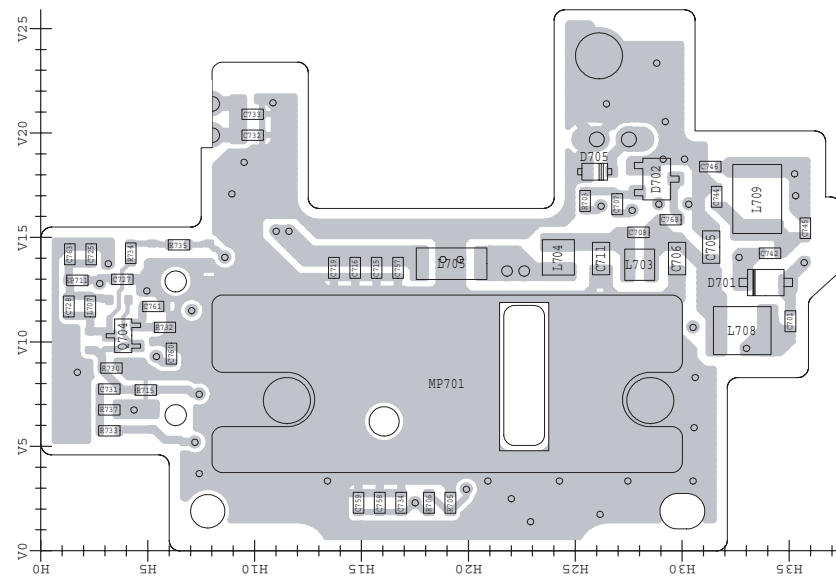
IC-F33GT/F34GT



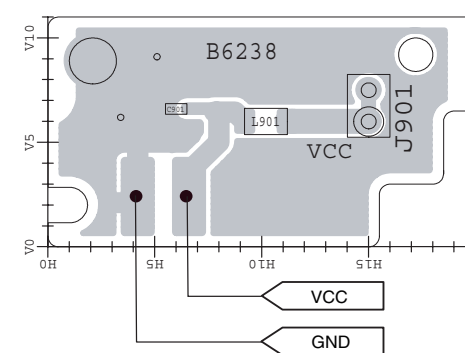
• MAIN UNIT (TOP VIEW)



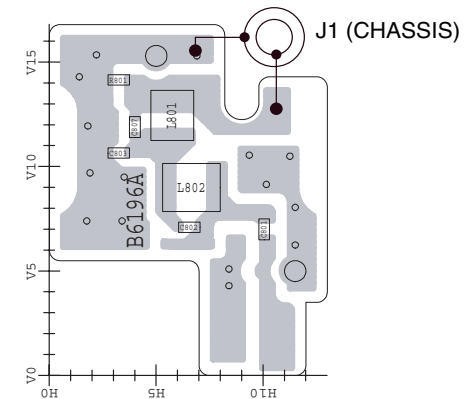
• PA UNIT (TOP VIEW)



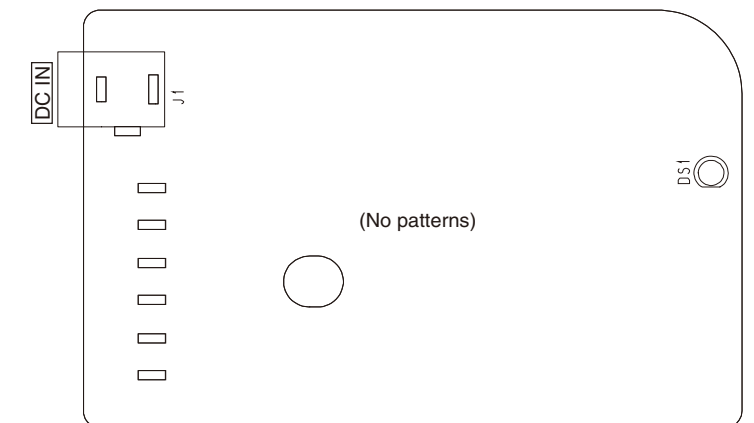
• FUSE UNIT (TOP VIEW)



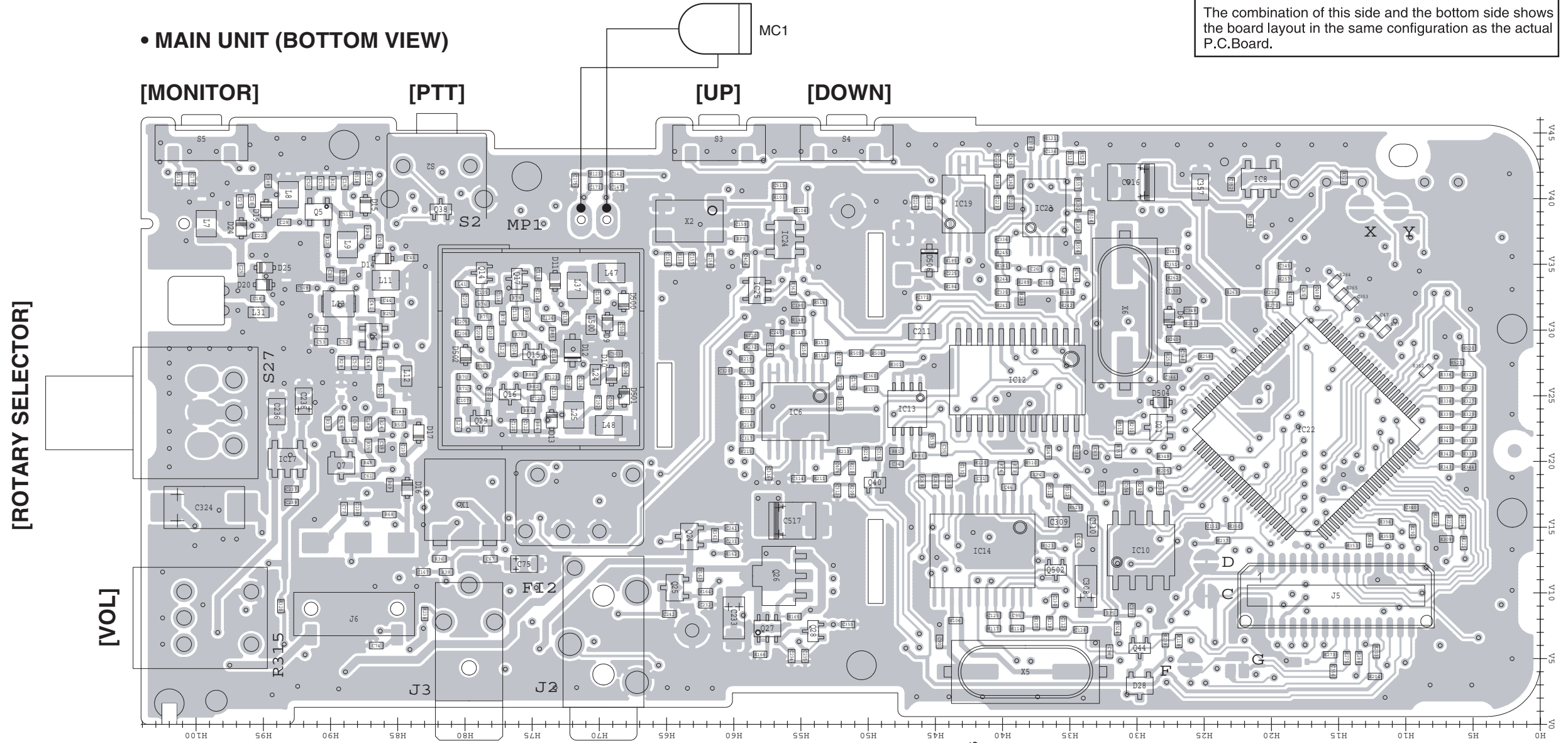
• ANT UNIT (TOP VIEW)



• BC-160 (TOP VIEW)



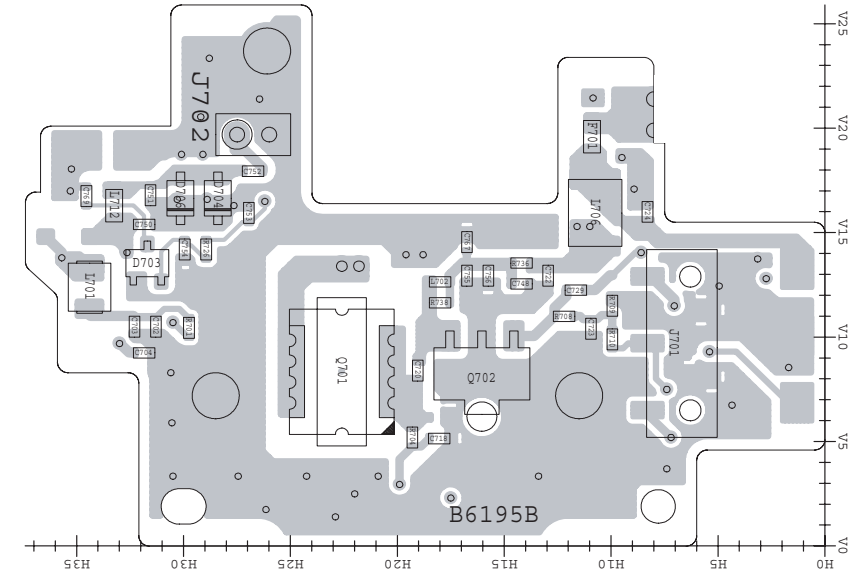
• MAIN UNIT (BOTTOM VIEW)



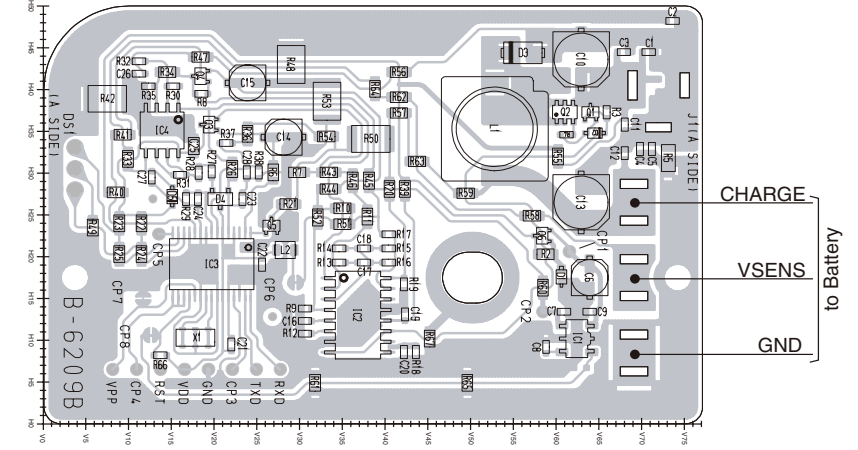
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

30	J5	1
	PTTIN	15
	PTTOUT	
	+5V	
	VCC	
	MICOUT	
	MICIN	
	AFONOP	
	AUX	
	BEEPOUT	
	BUSY	
	RXMUTE	
	MDWN	
	DISCIN	
	SIGOUT	
	AFOUT	
	OPT1	
	REM	
	OPT2	
	CCS	
	OPT3	
	CIRQ	
	GND	
	SO	
	SI	
	OPV3	
	OPV2	
	OPV1	
	SCK	

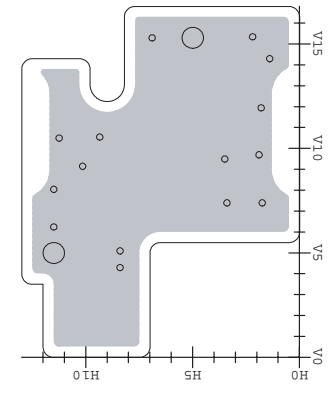
• PA UNIT (BOTTOM VIEW)



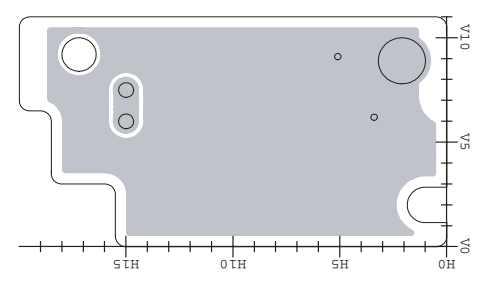
• BC-160 (BOTTOM VIEW)

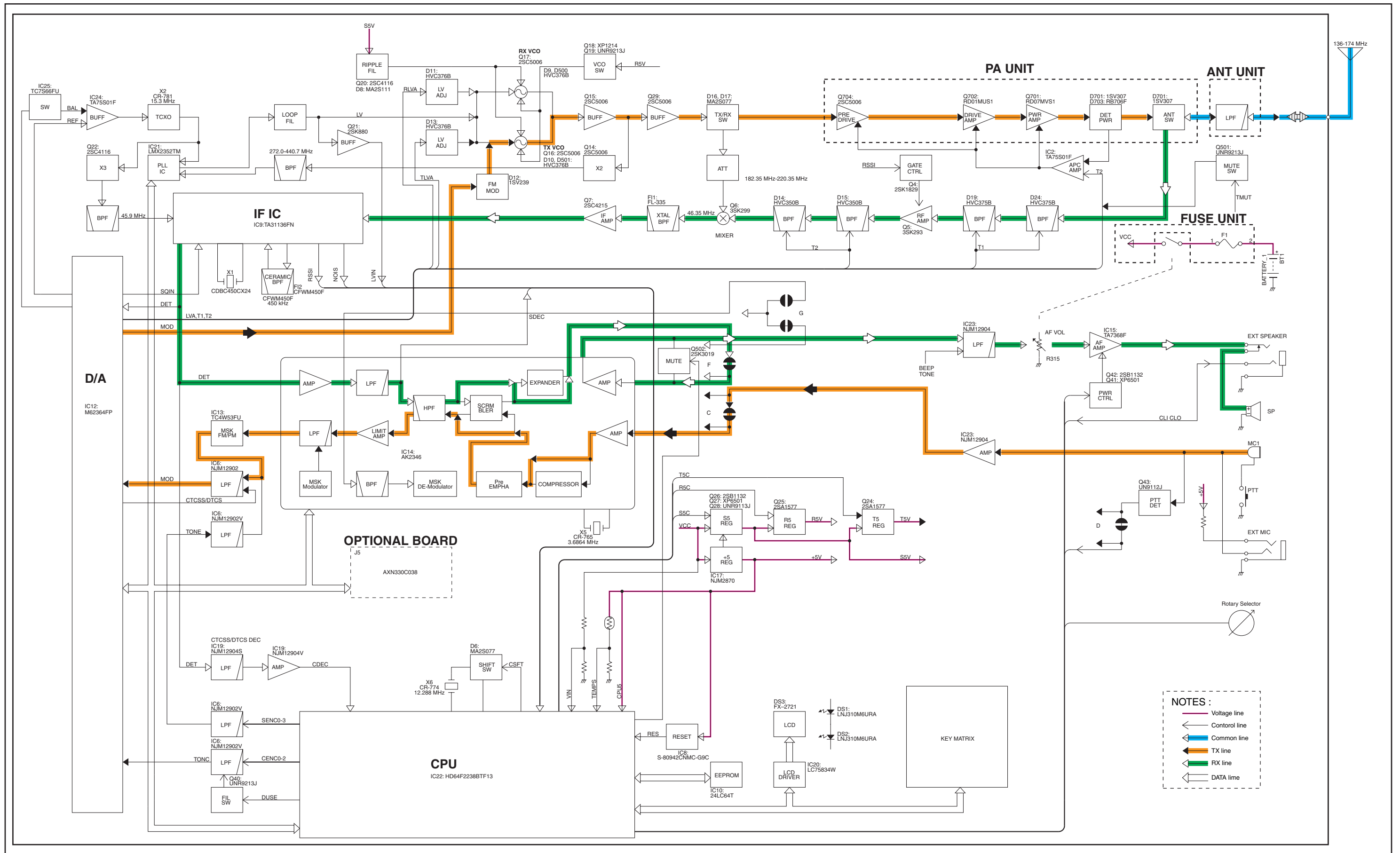


• ANT UNIT (BOTTOM VIEW)



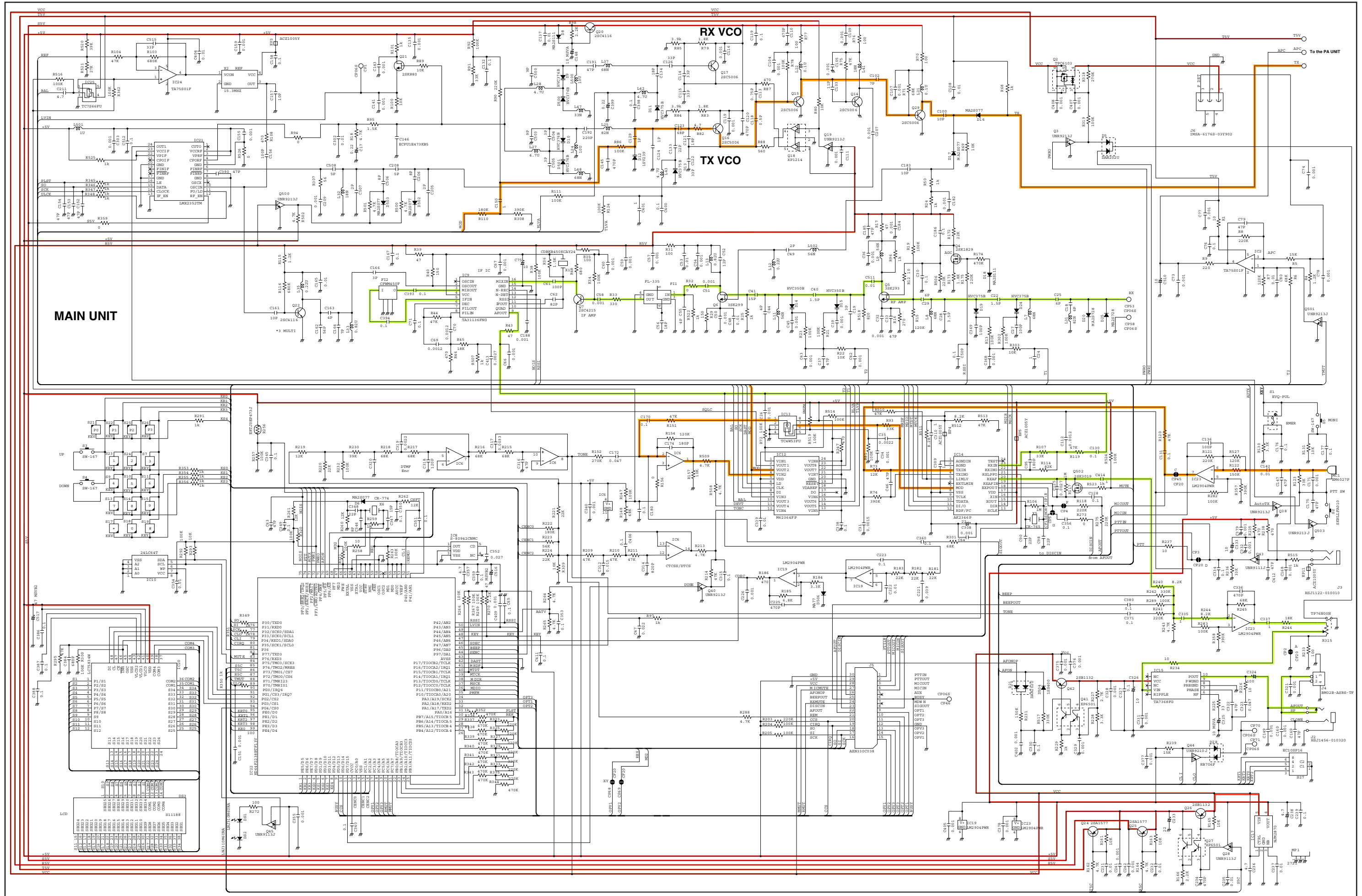
• FUSE UNIT (BOTTOM VIEW)

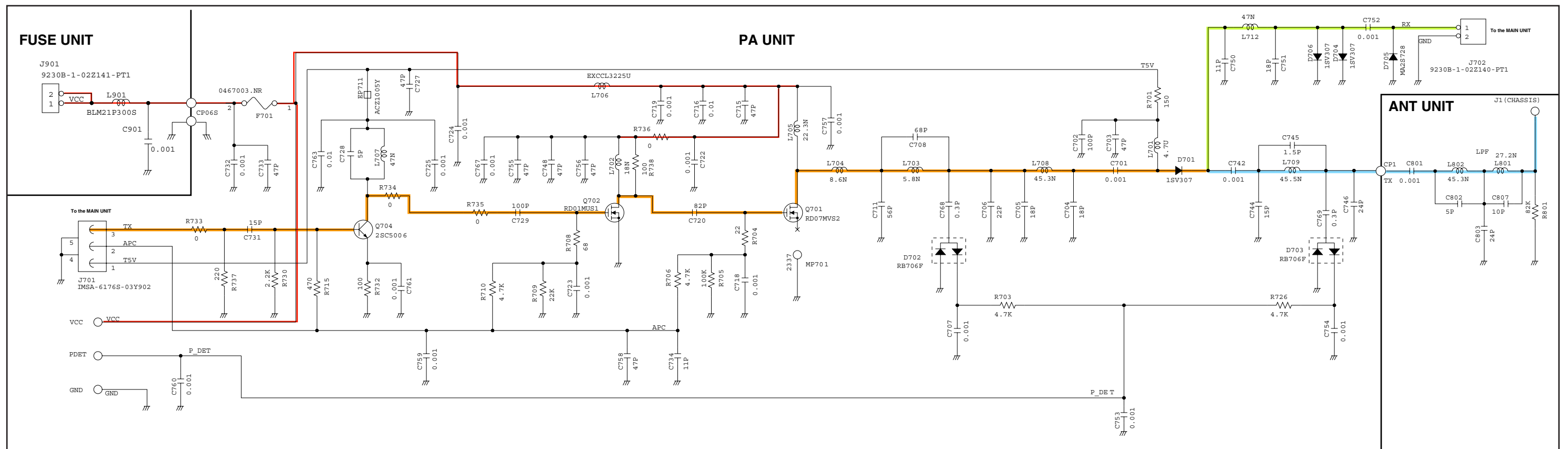




SECTION 11

VOLTAGE DIAGRAM





SECTION 12

BC-160

[CHASSIS PARTS]

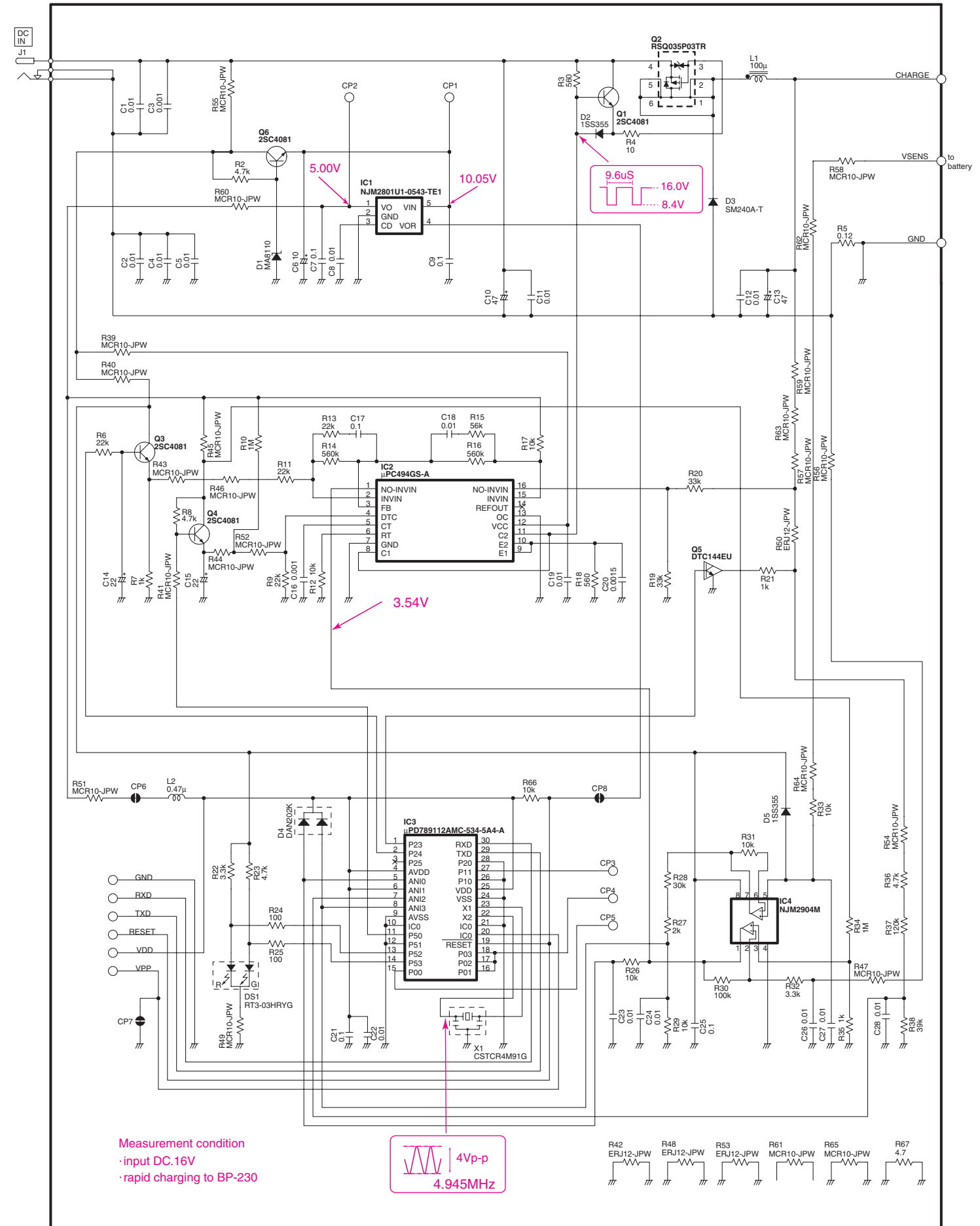
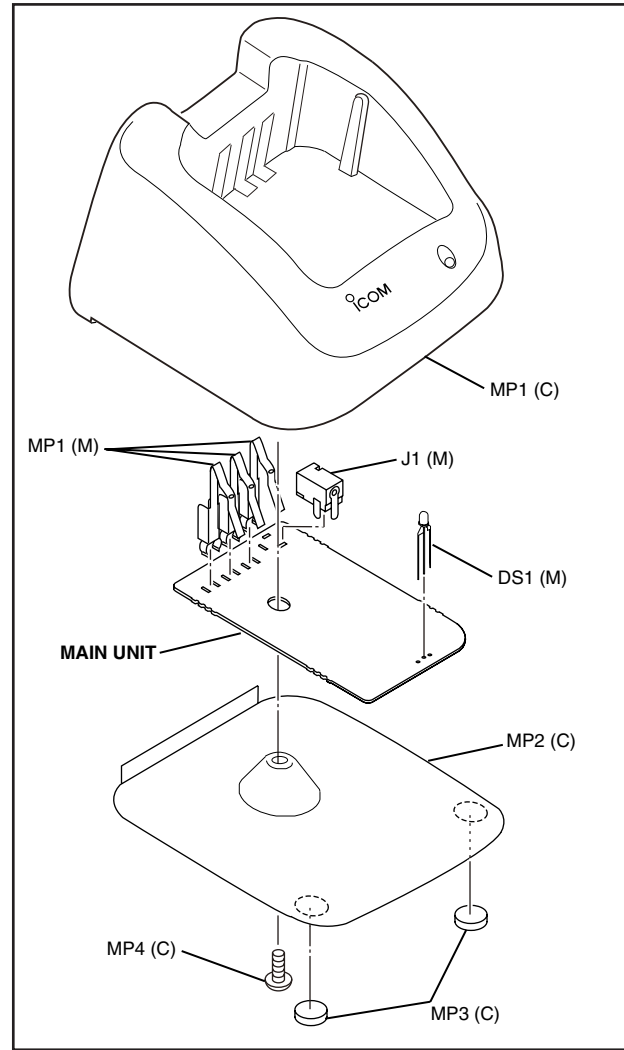
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8010019750	2830 case	1
MP2	8110008220	2830 cover	1
MP3	8930039620	Leg cushion (A)	2
MP4	8810008630	Screw PH BT M3 x 6 NI-ZU	1

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510023070	Connector HEC2305-01-250	1
DS1	5040002740	LED RT3-03HRYG	1
MP1	8930064410	2830 TERMINAL	3

[ACCESSORIES]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
EP1	Optional product	Charger BC-145E	[EUR] 1
	Optional product	Charger BC-145UK	[UK] 1



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