

Nov. 2008



# SERVICE MANUAL ADDENDUM

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## IC-7200

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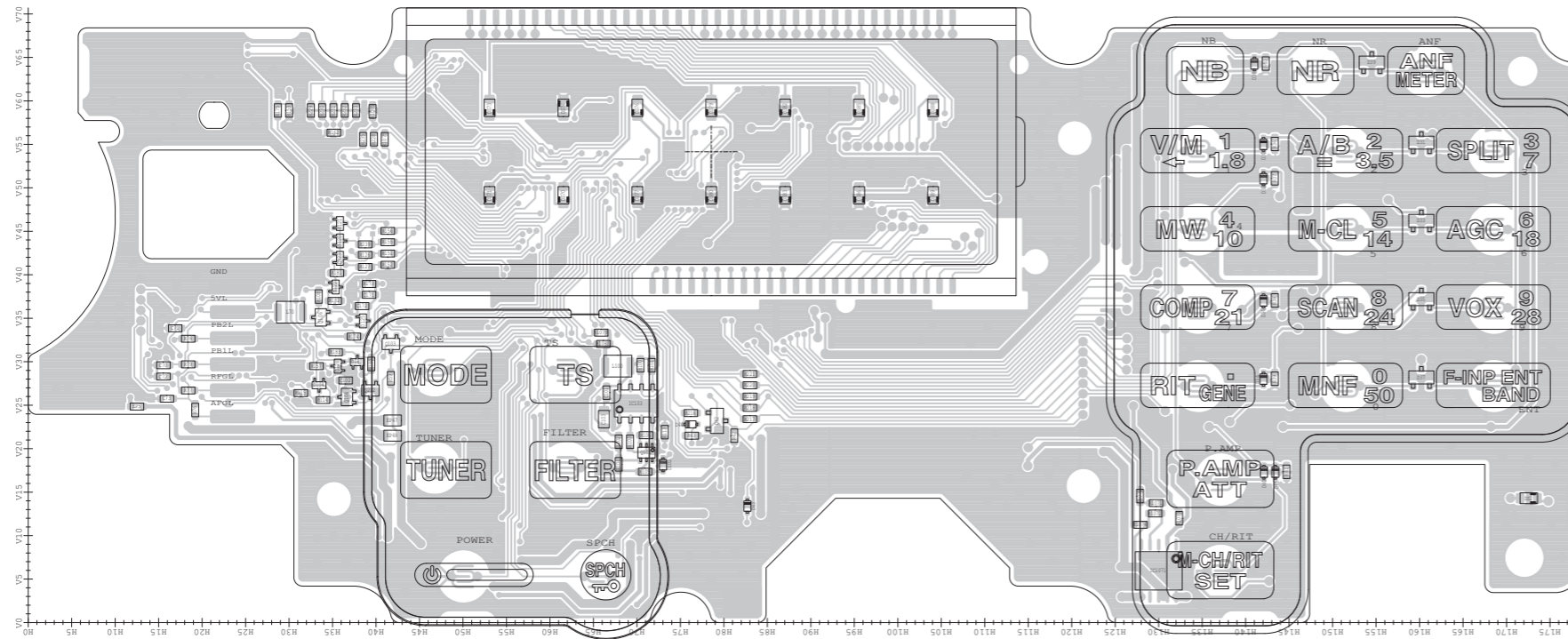
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BOARD LAYOUTS (LOGIC AND MAIN UNITS) . . . . 1

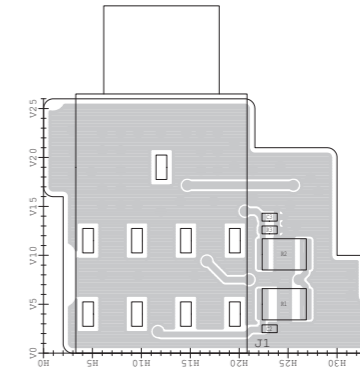
# BOARD LAYOUTS

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

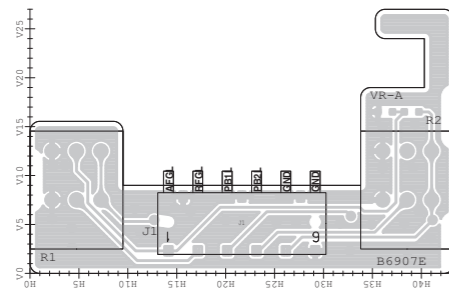
• LOGIC UNIT  
(TOP VIEW)



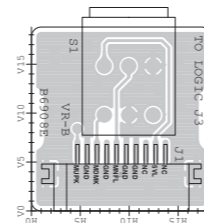
• PHONE UNIT  
(TOP VIEW)



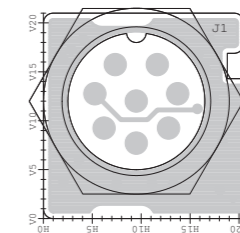
• VR-A UNIT  
(TOP VIEW)



• VR-B UNIT  
(TOP VIEW)

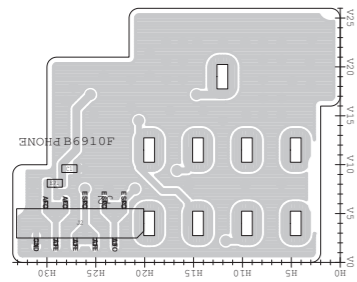


• MIC UNIT  
(TOP VIEW)

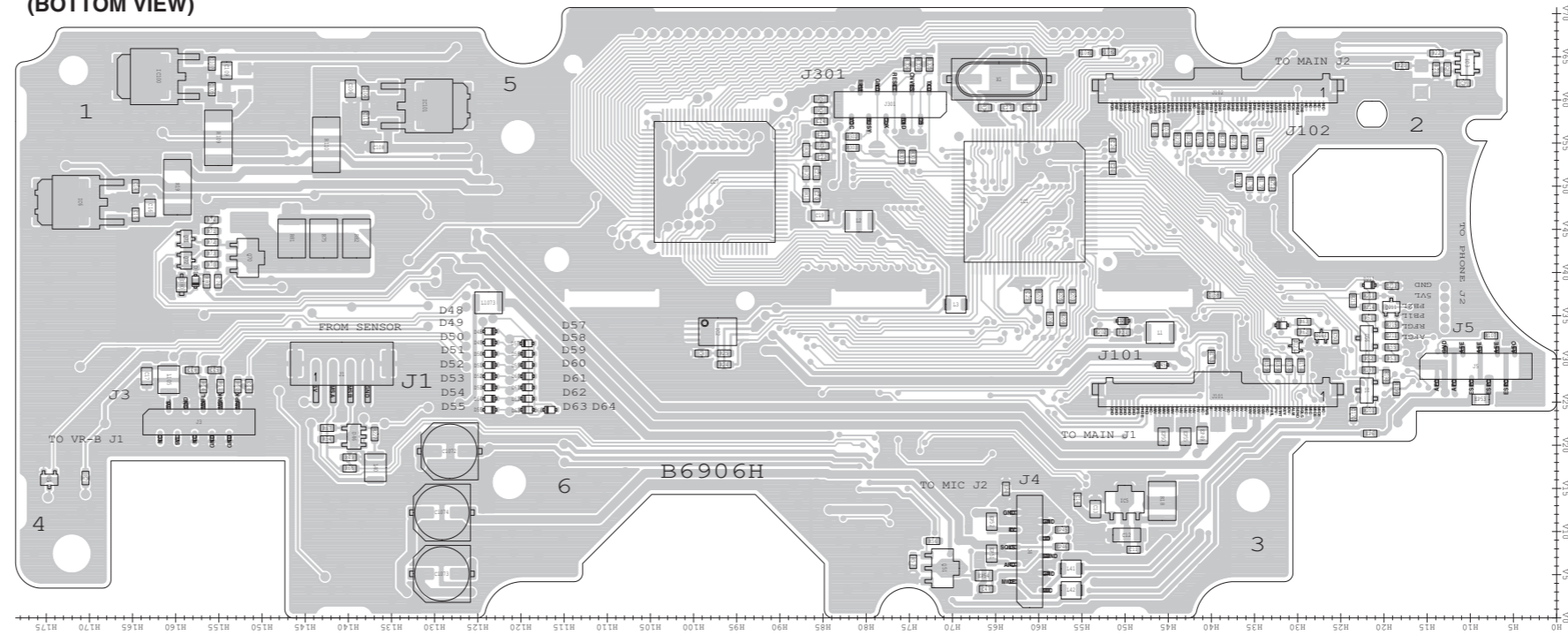


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

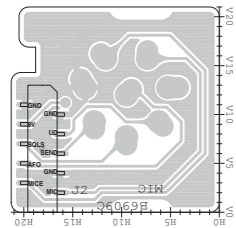
• PHONE UNIT (BOTTOM VIEW)



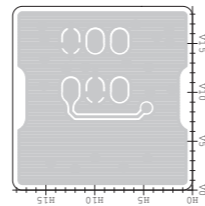
• LOGIC UNIT (BOTTOM VIEW)



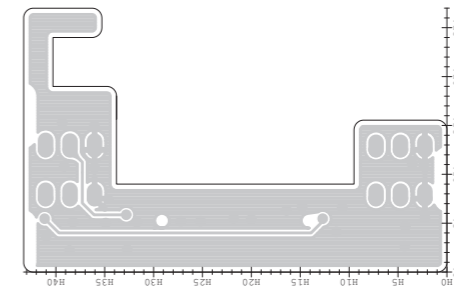
• MIC UNIT (BOTTOM VIEW)



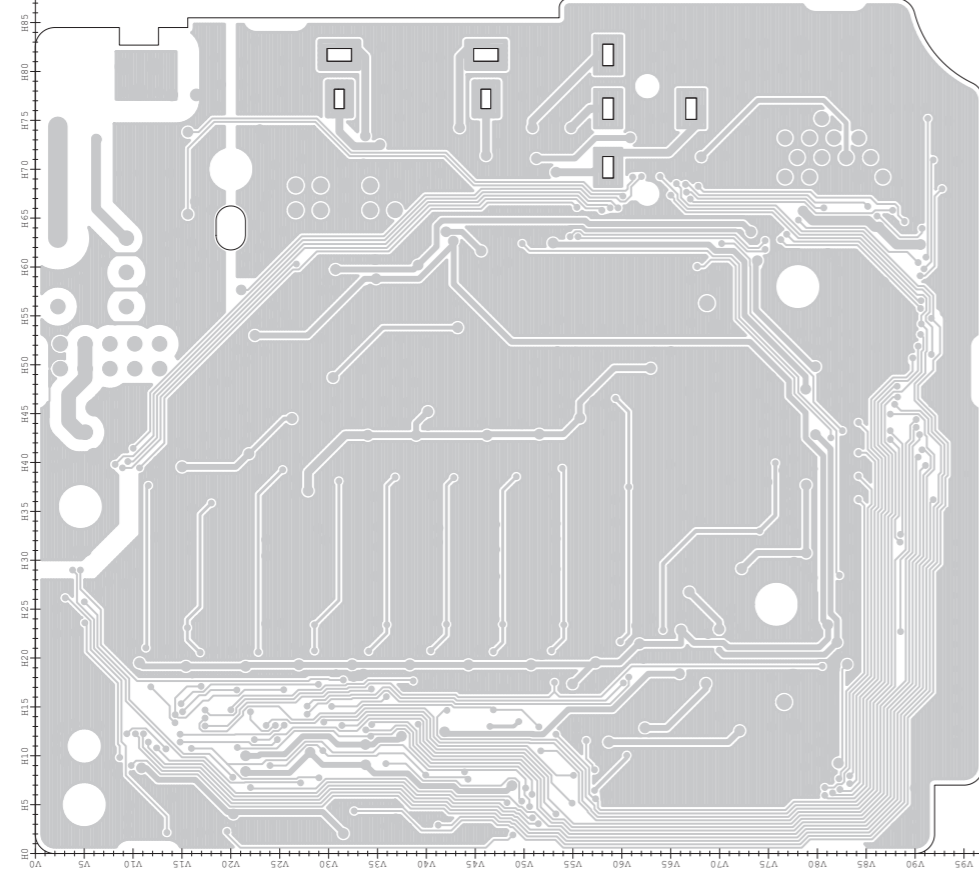
• VR-B UNIT (BOTTOM VIEW)



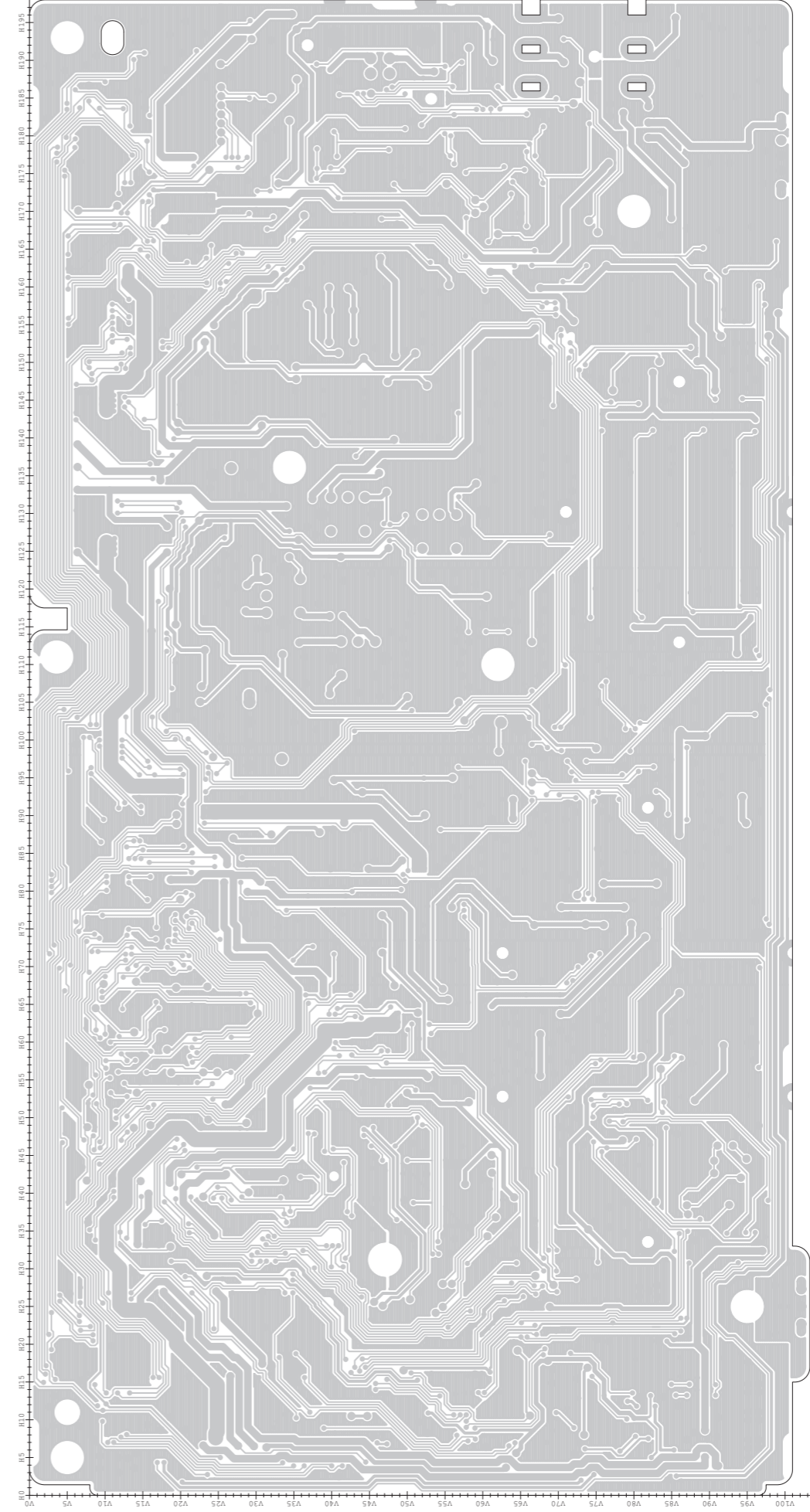
• VR-A UNIT (BOTTOM VIEW)



• RF UNIT  
(TOP VIEW)

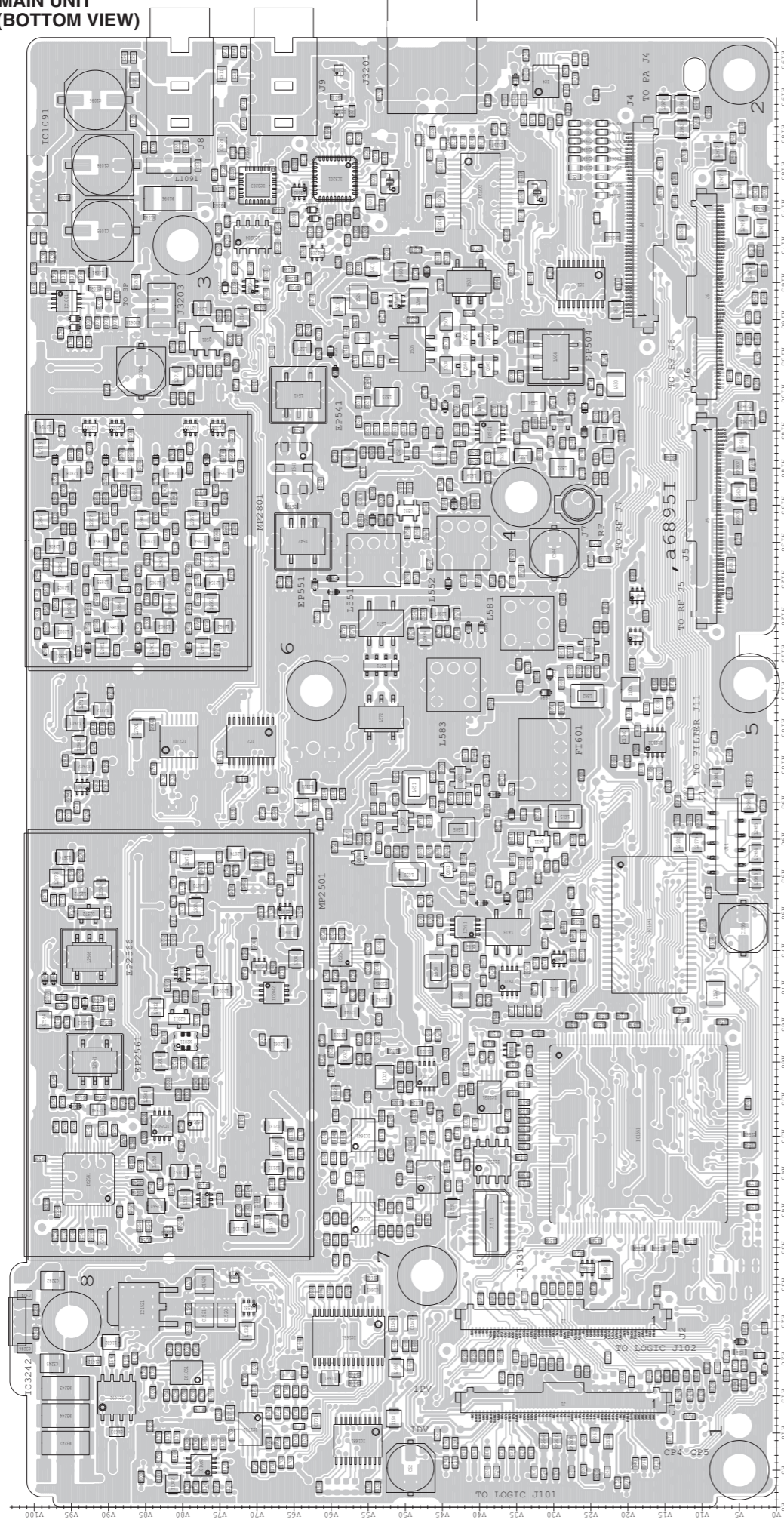


• MAIN UNIT  
(TOP VIEW)



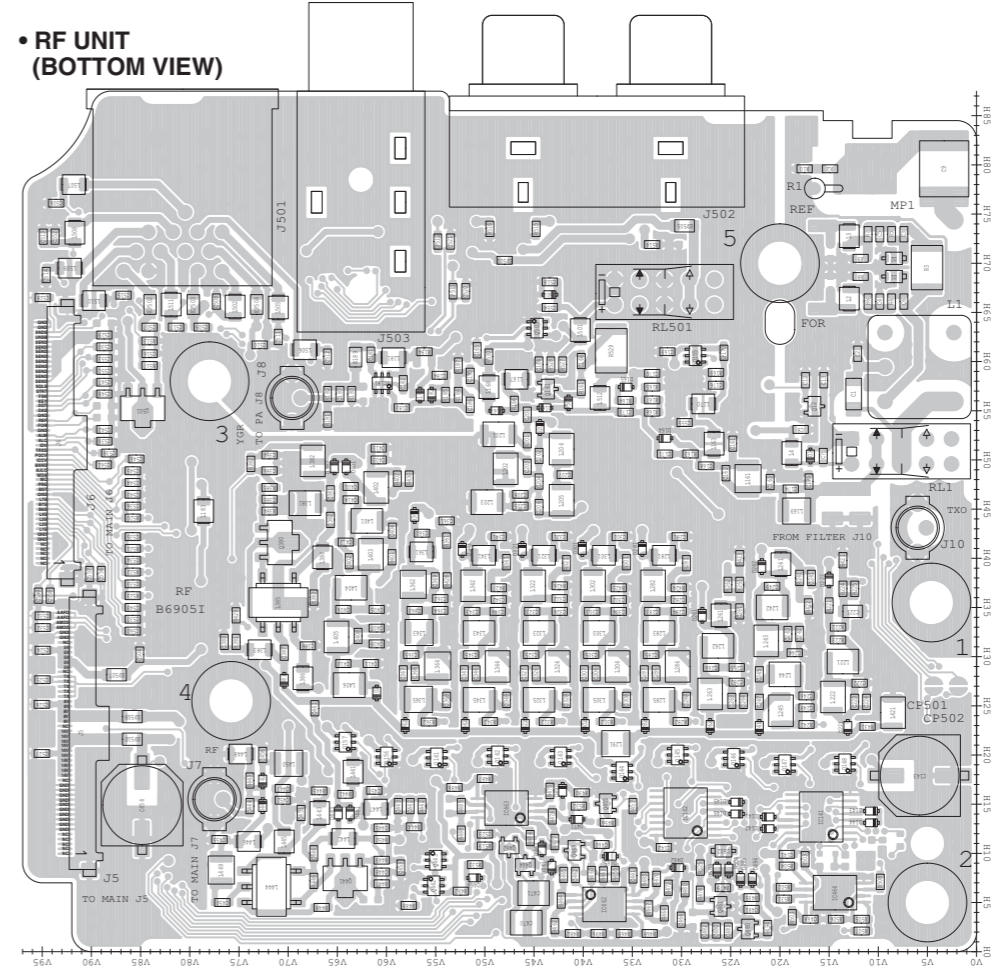
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• MAIN UNIT  
(BOTTOM VIEW)



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

• RF UNIT  
(BOTTOM VIEW)



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# SERVICE MANUAL ADDENDUM

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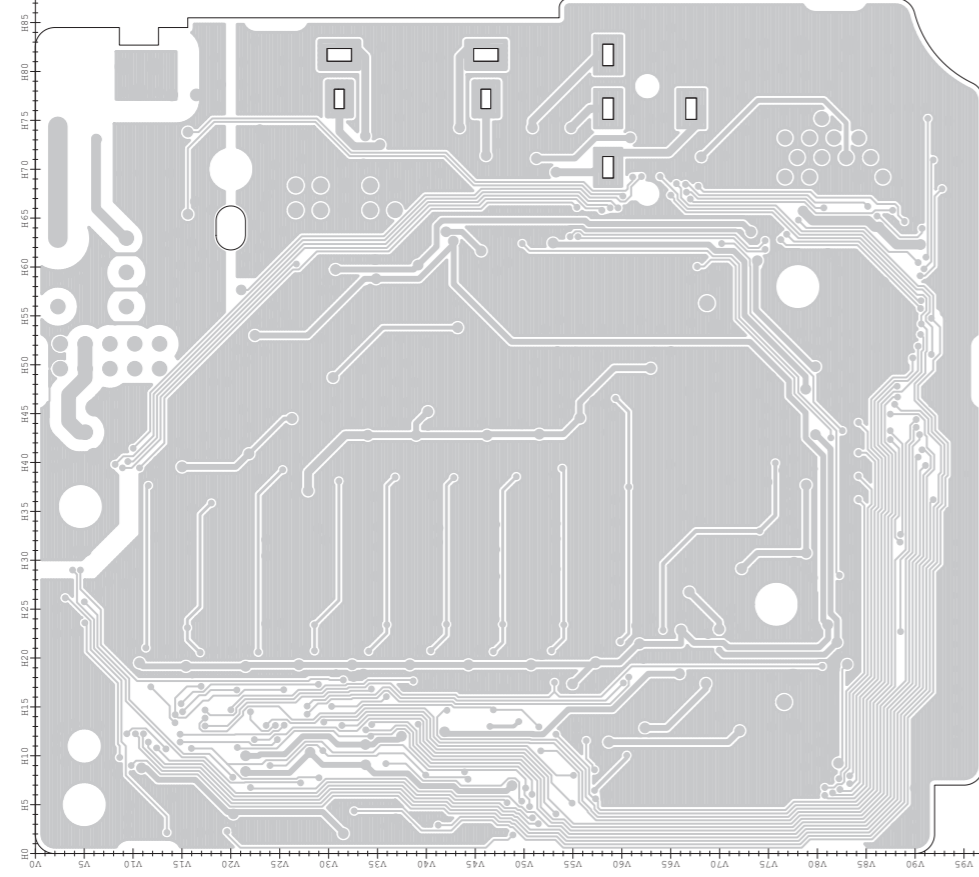
## IC-7200

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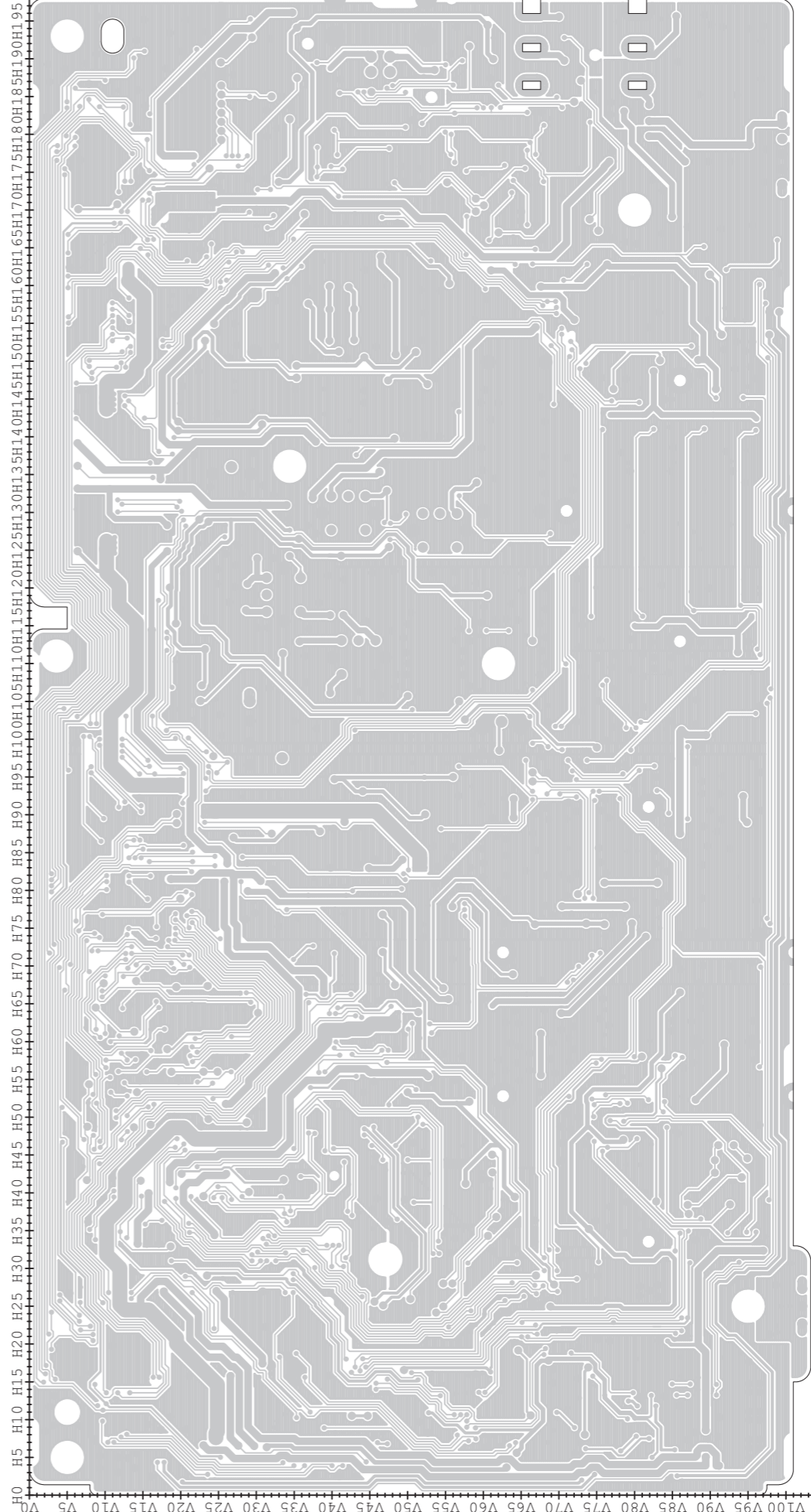
### CONTENTS

BOARD LAYOUTS (RF AND MAIN UNITS) . . . . . 1

• RF 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.





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# SERVICE MANUAL ADDENDUM

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## IC-7200

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PARTS LIST

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Lists various electronic components and their locations.

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Lists various electronic components and their locations.

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





















[PA UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains rows for parts R34 through R132, C1 through C66, and C66.

[PA UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains rows for parts C67 through C134, RL1, J4, J8, J9, J13 1, J132, F1, F2, W40, EP1 through EP27.

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



[FILTER BOARD]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C166	4030006860	S.CER C1608 JB 1H 102K-T	T	86.5/86.7
C167	4030006880	S.CER C1608 JB 1H 472K-T	T	4/52.2
RL21	6330001721	REL ATN207-K1		
RL22	6330001721	REL ATN207-K1		
RL41	6330001721	REL ATN207-K1		
RL42	6330001721	REL ATN207-K1		
RL61	6330001721	REL ATN207-K1		
RL62	6330001721	REL ATN207-K1		
RL81	6330001721	REL ATN207-K1		
RL82	6330001721	REL ATN207-K1		
RL101	6330001721	REL ATN207-K1		
RL102	6330001721	REL ATN207-K1		
RL121	6330001721	REL ATN207-K1		
RL122	6330001721	REL ATN207-K1		
RL141	6330001721	REL ATN207-K1		
RL142	6330001721	REL ATN207-K1		
J9	6510007020	CON TMP-J01X-V6		
J10	6510007020	CON TMP-J01X-V6		
J11	6510019971	S.CON 52808-1071	T	80.5/89.2

[LOGIC UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
IC1	1140014972	S.IC M30620FCPGP(SX-3015A-2)	B	61.6/48.2
IC2	1130012430	S.IC S-24CS64A0I-T8T1G	B	97.2/33.1
IC3	1110006260	S.IC BD5242G-TR	B	10.3/64.3
IC5	1180000421	S.IC TA78L05F(TE12R,F)	B	50/13.3
IC6	1180001071	S.IC TA7805F(TE16L,Q)	B	171.5/48.1
IC7	1130013580	S.IC LC75813T-E	B	97.5/50.5
IC100	1180002080	S.REG BA09FP-E2	B	161.2/62.7
IC101	1180001071	S.IC TA7805F(TE16L,Q)	B	130.6/59.3
IC103	1130005721	S.IC TC7W04F(TE12L,F)	T	69.9/25.2
IC1071	1110001811	S.IC TA7368FG(5,ER)	T	130/5.9
Q1	1590000680	S.TRA DTC114EUA T106	B	174.6/16
Q51	1560001290	S.FET 2SK3065 T100	B	71.2/5.7
Q70	1540000441	S.TRA 2SD1619T-TD-E	B	151.7/41.7
Q71	1590000680	S.TRA DTC114EUA T106	B	158.8/43.9
Q72	1590000680	S.TRA DTC114EUA T106	B	158.8/41.4
Q102	1590001650	S.TRA XP4601(TX)	T	71.1/19.5
Q103	1590000680	S.TRA DTC114EUA T106	T	41.7/32
Q104	1590000680	S.TRA DTC114EUA T106	T	36.6/25.9
Q106	1590001330	S.TRA DTA114EUA T106	T	33.6/35.1
Q211	1530002060	S.TRA 2SC4081 T106 R	B	19.1/36
Q212	1590001330	S.TRA DTA114EUA T106	T	39.3/26.7
D1	1160000070	S.DIO DAN202K T146	B	22/26.3
D2	1790001250	S.DIO MA2S111-(TX) 0	B	50.2/34.4
D30	1790001250	S.DIO MA2S111-(TX) 0	T	142/55
D31	1160000070	S.DIO DAN202K T146	T	160.2/55.2
D32	1790001250	S.DIO MA2S111-(TX) 0	T	142/51
D33	1160000070	S.DIO DAN202K T146	T	160.2/46.2
D34	1790001250	S.DIO MA2S111-(TX) 0	T	142/37
D35	1160000070	S.DIO DAN202K T146	T	160.2/37.2
D36	1790001250	S.DIO MA2S111-(TX) 0	T	142/28
D37	1160000070	S.DIO DAN202K T146	T	160.2/28.2
D38	1790001250	S.DIO MA2S111-(TX) 0	T	141/64.2
D39	1160000070	S.DIO DAN202K T146	T	154.5/64.4
D40	1790001250	S.DIO MA2S111-(TX) 0	T	142.1/17.3
D41	1790001250	S.DIO MA2S111-(TX) 0	T	143.4/17.3
D42	1160000070	S.DIO DAN202K T146	T	79.2/23.2
D43	1790001250	S.DIO MA2S111-(TX) 0	T	82.7/13.4
D44	1790001250	S.DIO MA2S111-(TX) 0	T	76.2/22.8
D45	1790001250	S.DIO MA2S111-(TX) 0	B	45.7/29.3
D46	1730002531	S.ZEN NNCD6.2G-T1-A	B	139.3/21
D47	1790001250	S.DIO MA2S111-(TX) 0	B	31.8/33.9
D48	1790001250	S.DIO MA2S111-(TX) 0	B	123.6/33.2
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ITR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
D49	1790001250	S.DIO MA2S111-(TX) 0	[USA]	B 123.6/31.9
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ITR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[KOR]	
	1790001250	S.DIO MA2S111-(TX) 0	[CHN]	
	1790001250	S.DIO MA2S111-(TX) 0	[EXP]	
D50	1790001250	S.DIO MA2S111-(TX) 0	[USA]	B 123.6/30.6
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[CHN]	
	1790001250	S.DIO MA2S111-(TX) 0	[EXP]	
D51	1790001250	S.DIO MA2S111-(TX) 0	[FRA]	B 123.6/29.3
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[KOR]	
D52	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	B 123.6/28
	1790001250	S.DIO MA2S111-(TX) 0	[ITR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
D53	1790001250	S.DIO MA2S111-(TX) 0	[USA]	B 123.6/26.7
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ITR]	
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[KOR]	
	1790001250	S.DIO MA2S111-(TX) 0	[CHN]	
	1790001250	S.DIO MA2S111-(TX) 0	[EXP]	
D54	1790001250	S.DIO MA2S111-(TX) 0	[USA]	B 123.6/25.4
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[CHN]	
	1790001250	S.DIO MA2S111-(TX) 0	[EXP]	
D55	1790001250	S.DIO MA2S111-(TX) 0	[FRA]	B 123.6/24.1
	1790001250	S.DIO MA2S111-(TX) 0	[ESP]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[KOR]	
D56	1160000070	S.DIO DAN202K T146	B	22/32.4
D57	1790001250	S.DIO MA2S111-(TX) 0	B	119.3/31.8
	1790001250	S.DIO MA2S111-(TX) 0	[USA]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR]	
	1790001250	S.DIO MA2S111-(TX) 0	[FRA]	
	1790001250	S.DIO MA2S111-(TX) 0	[EUR-01]	
	1790001250	S.DIO MA2S111-(TX) 0	[KOR]	
	1790001250	S.DIO MA2S111-(TX) 0	[CHN]	
	1790001250	S.DIO MA2S111-(TX) 0	[EXP]	
D58	1790001250	S.DIO MA2S111-(TX) 0	B	119.2/30.6
D59	1790001250	S.DIO MA2S111-(TX) 0	B	119.2/29.3
D61	1790001250	S.DIO MA2S111-(TX) 0	B	119.2/26.7
D62	1790001250	S.DIO MA2S111-(TX) 0	B	119.2/25.4

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



[LOGIC UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C25	4030011600	S.CER C1608 JB 1E 104K-T	B	61.3/37.2
C26	4030017490	S.CER C1608 JB 1A 105K-T	B	51.4/52.1
C27	4030011600	S.CER C1608 JB 1E 104K-T	B	63.6/59.1
C28	4030017490	S.CER C1608 JB 1A 105K-T	B	51.4/54.7
C44	4030006880	S.CER C1608 JB 1H 472K-T	B	151.5/26.8
C45	4030006880	S.CER C1608 JB 1H 472K-T	B	155.5/28.7
C47	4030006880	S.CER C1608 JB 1H 472K-T	B	66.1/3.3
C49	4030006880	S.CER C1608 JB 1H 472K-T	B	158.1/28.7
C50	4030006880	S.CER C1608 JB 1H 472K-T	B	25.6/32.5
C70	4030006880	S.CER C1608 JB 1H 472K-T	T	15.5/29.6
C71	4030006880	S.CER C1608 JB 1H 472K-T	T	16.9/33.8
C72	4030006880	S.CER C1608 JB 1H 472K-T	T	15.5/28.3
C73	4030006880	S.CER C1608 JB 1H 472K-T	T	15.9/25.7
C74	4030017490	S.CER C1608 JB 1A 105K-T	B	155.1/39
C101	4030011600	S.CER C1608 JB 1E 104K-T	T	66.5/26.4
C102	4030006880	S.CER C1608 JB 1H 472K-T	T	36.5/27.8
C103	4030012610	S.CER C2012 JB 1C 474K-T	T	66.2/23.4
C104	4030011600	S.CER C1608 JB 1E 104K-T	B	138/60.8
C105	4030011600	S.CER C1608 JB 1E 104K-T	B	155.8/61.2
C106	4030019490	S.CER C2012 JB 1A 106K-T	B	139.7/61.3
C107	4030011600	S.CER C1608 JB 1E 104K-T	B	155.8/64.2
C108	4030019490	S.CER C2012 JB 1A 106K-T	B	136.4/54.5
C109	4030019490	S.CER C2012 JB 1A 106K-T	B	154.1/63.4
C110	4030011600	S.CER C1608 JB 1E 104K-T	B	138/57.9
C158	4030017490	S.CER C1608 JB 1A 105K-T	B	39.7/37.4
C170	4030006880	S.CER C1608 JB 1H 472K-T	B	23.5/23.6
C171	4030006880	S.CER C1608 JB 1H 472K-T	T	39.2/37.7
C172	4030018910	S.CER C1608 JB 0J 475K-T	T	38.4/36.4
C211	4030006880	S.CER C1608 JB 1H 472K-T	B	19.1/32.6
C212	4030011600	S.CER C1608 JB 1E 104K-T	B	19.1/38.4
C1071	4030011600	S.CER C1608 JB 1E 104K-T	T	127.8/14.5
C1072	4510009700	S.ELE EEEFK1C101P	B	128.2/19.3
C1073	4510009820	S.ELE EEEFK1C470P	B	129.1/5.1
C1074	4510009820	S.ELE EEEFK1C470P	B	129.1/12.2
J1	6510018971	S.CON B4B-PH-SM4-TB(LF)(SN)	B	140.7/29.4
J3	6510019971	S.CON 52808-1071	B	157.3/22.7
J4	6510019971	S.CON 52808-1071	B	61/7.7
J5	6510019971	S.CON 52808-1071	B	9.3/29.1
J101	6510024151	S.CON 50FY-BMT-TB(LF)(SN)	B	39.2/25.8
J102	6510024151	S.CON 50FY-BMT-TB(LF)(SN)	B	39.2/61
J301	6510019971	S.CON 52808-1071	B	77.2/59.4
DS1	5030003090	LCD S11325 <SUC>		
DS2	5040002940	S.LED TLYU1002A(T02)	T	172.5/14.3
DS70	5040002940	S.LED TLYU1002A(T02)	T	61.5/49.1
DS71	5040002940	S.LED TLYU1002A(T02)	T	53/49.1
DS73	5040002940	S.LED TLYU1002A(T02)	T	53/59.2
DS74	5040002940	S.LED TLYU1002A(T02)	T	61.5/59.2
DS76	5040002940	S.LED TLYU1002A(T02)	T	70/59.2
DS77	5040002940	S.LED TLYU1002A(T02)	T	70/49.1
DS79	5040002940	S.LED TLYU1002A(T02)	T	78.5/59.2
DS80	5040002940	S.LED TLYU1002A(T02)	T	78.5/49.1
DS82	5040002940	S.LED TLYU1002A(T02)	T	87/59.2
DS83	5040002940	S.LED TLYU1002A(T02)	T	87/49.1
DS85	5040002940	S.LED TLYU1002A(T02)	T	95.5/59.2
DS86	5040002940	S.LED TLYU1002A(T02)	T	95.5/49.1
DS88	5040002940	S.LED TLYU1002A(T02)	T	104/59.2
DS89	5040002940	S.LED TLYU1002A(T02)	T	104/49.1
EP2	8930076650	LCD SRCN-3015-SP-N-W (SHJ)		
EP4	6910012350	S.BEA MMZ1608Y 102BT	B	63.8/14.9
EP5	6910012350	S.BEA MMZ1608Y 102BT	T	12.5/24.8
EP6	6910012350	S.BEA MMZ1608Y 102BT	B	21.6/21.3
EP45	6910012350	S.BEA MMZ1608Y 102BT	B	57.3/10.2
EP46	6910012350	S.BEA MMZ1608Y 102BT	B	57.3/8.2
EP47	6910018930	S.BEA MPZ2012S601A	T	41.9/23.2
EP48	6910018930	S.BEA MPZ2012S601A	T	41.9/21.5
EP49	6910018930	S.BEA MPZ2012S601A	B	41/21.1
EP50	6910018930	S.BEA MPZ2012S601A	B	45.5/21
EP51	6910018930	S.BEA MPZ2012S601A	B	65.4/7.4
EP52	6910018930	S.BEA MPZ2012S601A	B	65.4/11.1
EP53	6910018930	S.BEA MPZ2012S601A	B	8.8/25.3
EP54	6910018930	S.BEA MPZ2012S601A	B	66.3/4.9
EP55	6910018930	S.BEA MPZ2012S601A	B	43/21

[VR-A UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R1	7210002910	VAR RV-310(RK0972210 10KB/10KB)		
R2	7210002960	VAR RV-313(RK0972210 10KB/10KB)		
J1	6510026670	S.CON IMSA-6281S-06Y900	T	21.6/5.1

[VR-B UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
J1	6510020711	S.CON 52793-1070(1090)	T	9.2/2.4
S1	2250000640	ENC TP96D96E20-22F-10KB-3015		

[MIC UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
J1	6510000191	CON FM214-8SS(P)-1		
J2	6510019971	S.CON 52808-1071	B	18.1/6.5

[PHONE UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R1	7030006070	S.RES ERJ12YJ101U (100)	T	24.6/5
R2	7030006070	S.RES ERJ12YJ101U (100)	T	24.6/10.1
R3	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	23.1/12.6
C1	4030006880	S.CER C1608 JB 1H 472K-T	B	27.7/9.6
C2	4030006880	S.CER C1608 JB 1H 472K-T	T	23.1/2.5
C3	4030006880	S.CER C1608 JB 1H 472K-T	T	23.1/13.9
J1	6510023891	CON S-G4617#01F 0		
J2	6510019971	S.CON 52808-1071	B	26.6/4
EP1	6910014690	S.BEA MPZ1608S221A-T	B	29.2/8.1

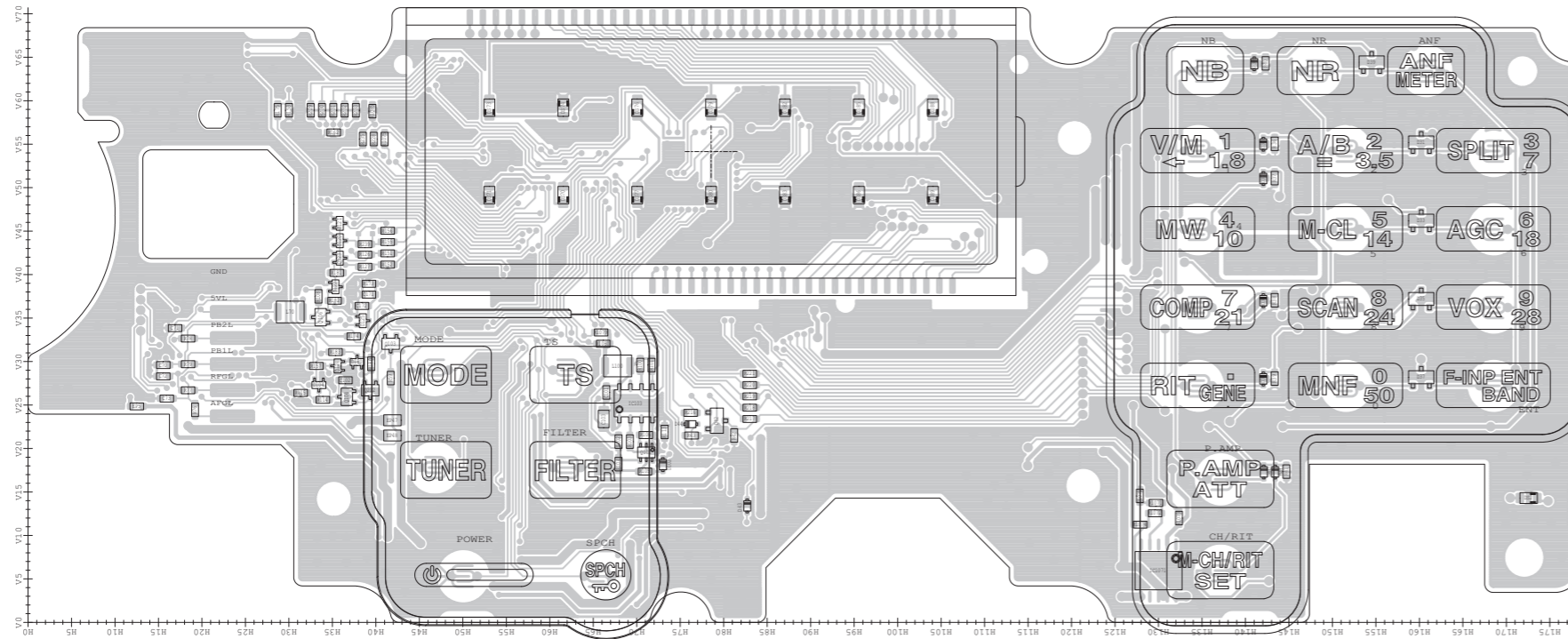
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)  
S.=Surface mount



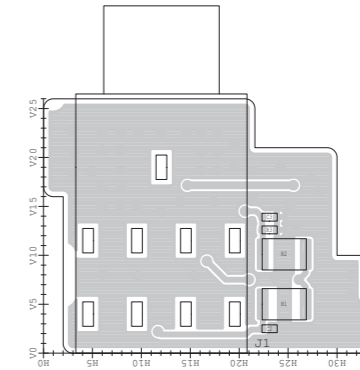
# BOARD LAYOUTS

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

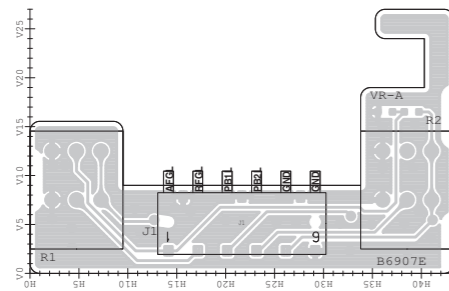
• LOGIC UNIT  
(TOP VIEW)



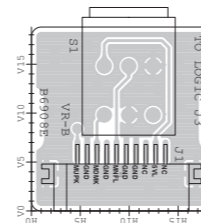
• PHONE UNIT  
(TOP VIEW)



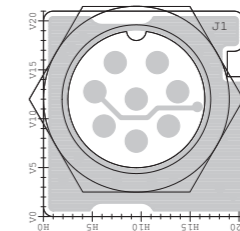
• VR-A UNIT  
(TOP VIEW)



• VR-B UNIT  
(TOP VIEW)

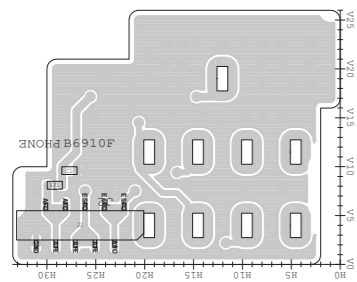


• MIC UNIT  
(TOP VIEW)

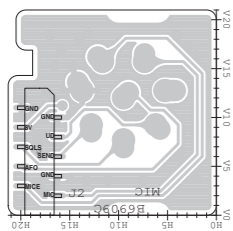


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

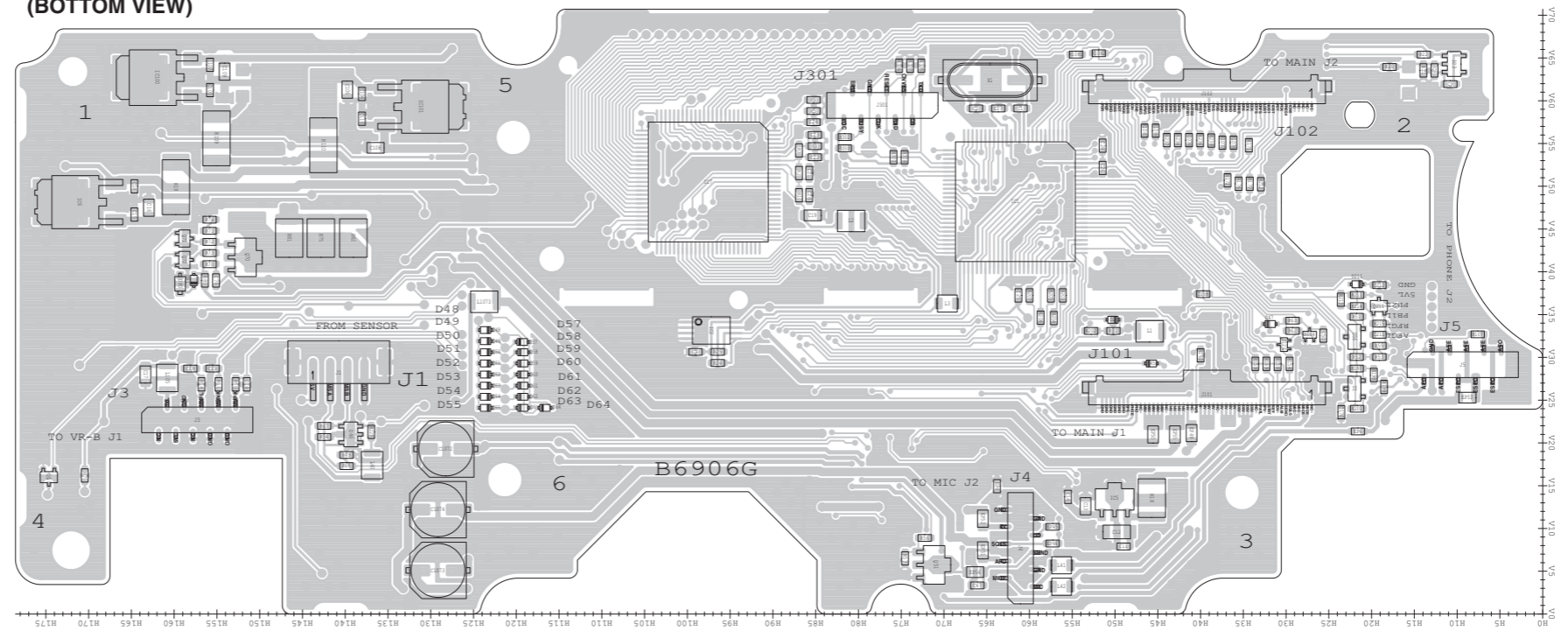
• PHONE UNIT  
(BOTTOM VIEW)



• MIC UNIT  
(BOTTOM VIEW)



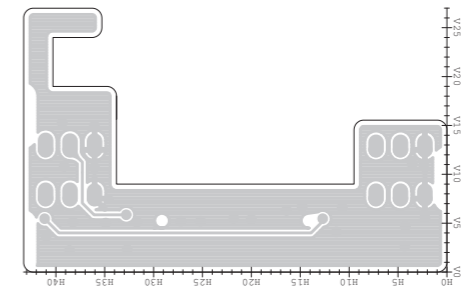
• LOGIC UNIT  
(BOTTOM VIEW)



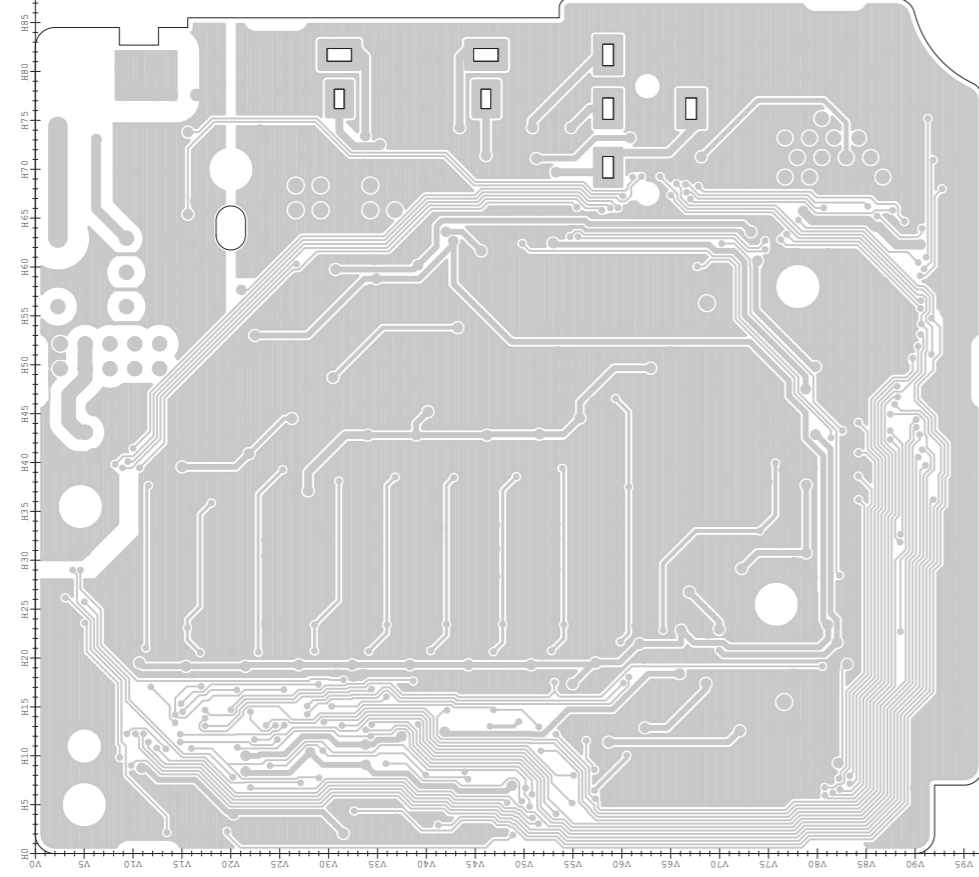
• VR-B UNIT  
(BOTTOM VIEW)



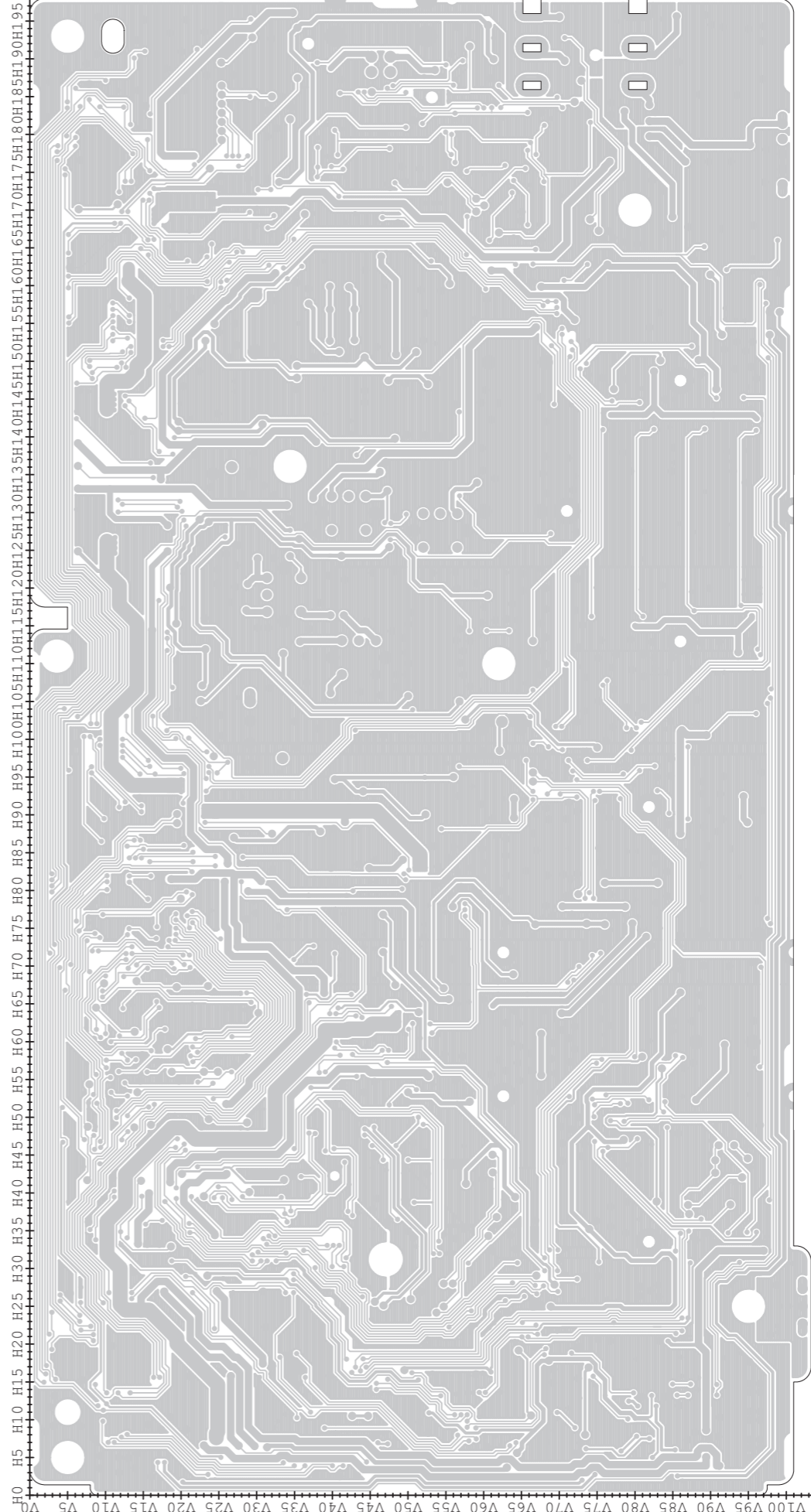
• VR-A UNIT  
(BOTTOM VIEW)



• RF UNIT  
(TOP VIEW)

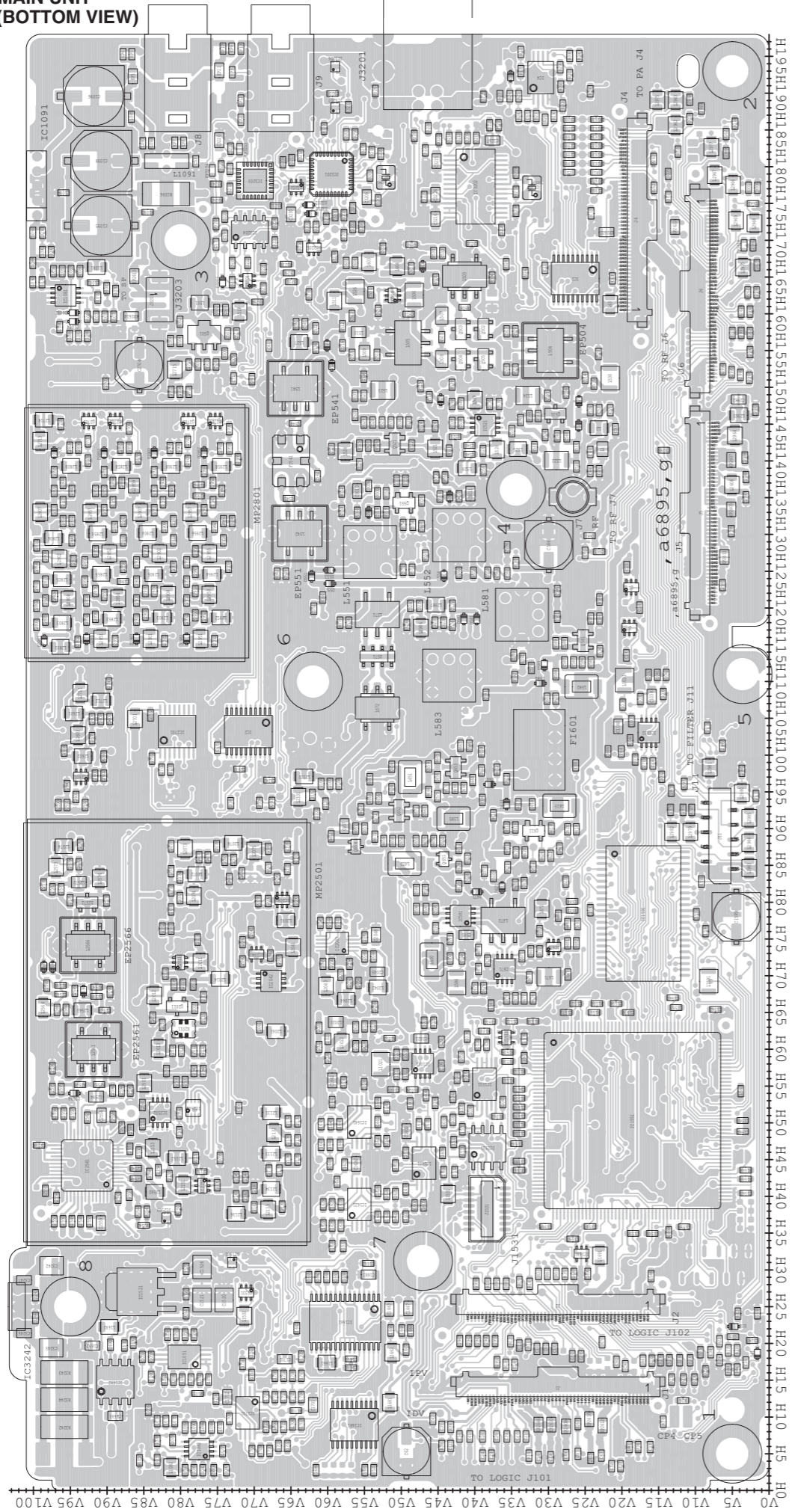


• MAIN UNIT  
(TOP VIEW)



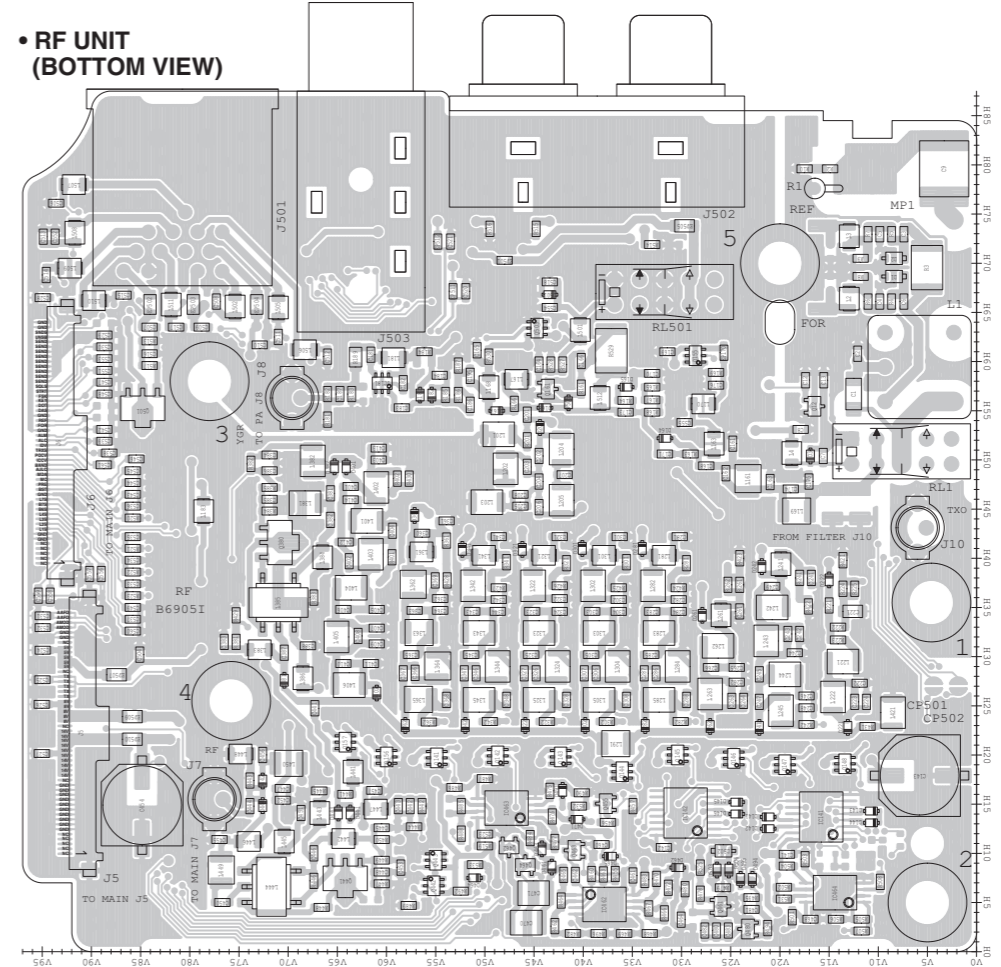
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• MAIN UNIT  
(BOTTOM VIEW)



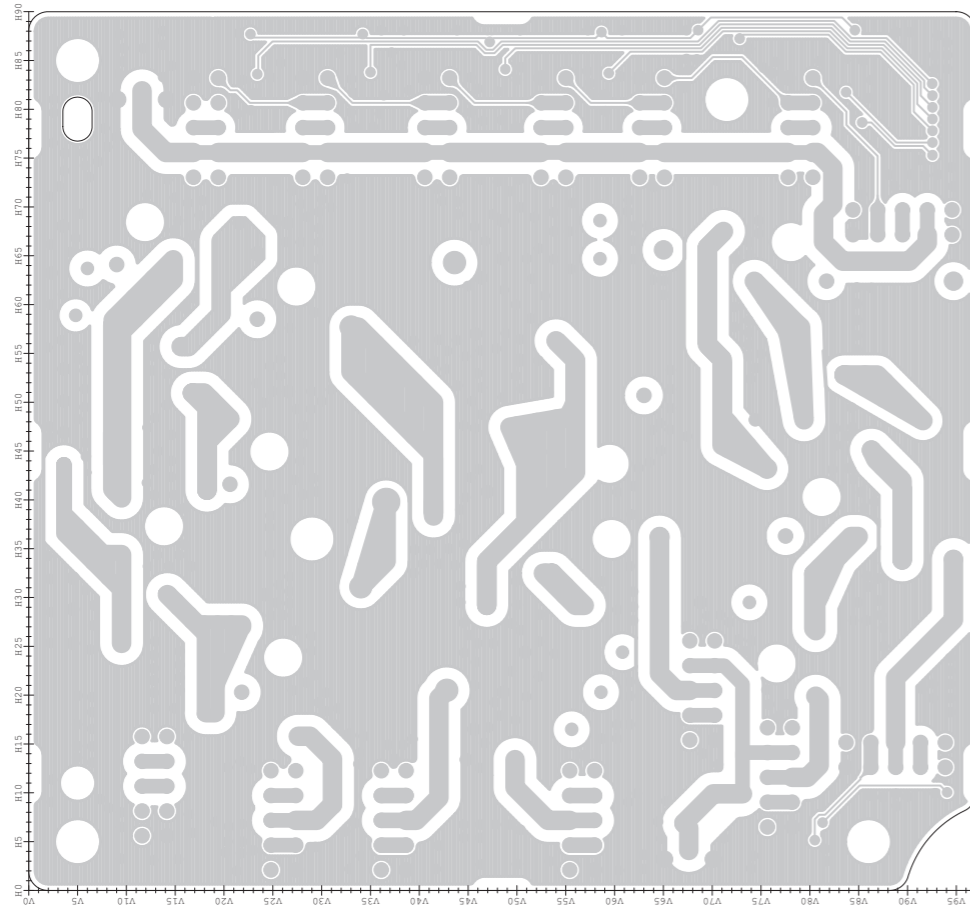
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• RF UNIT  
(BOTTOM VIEW)

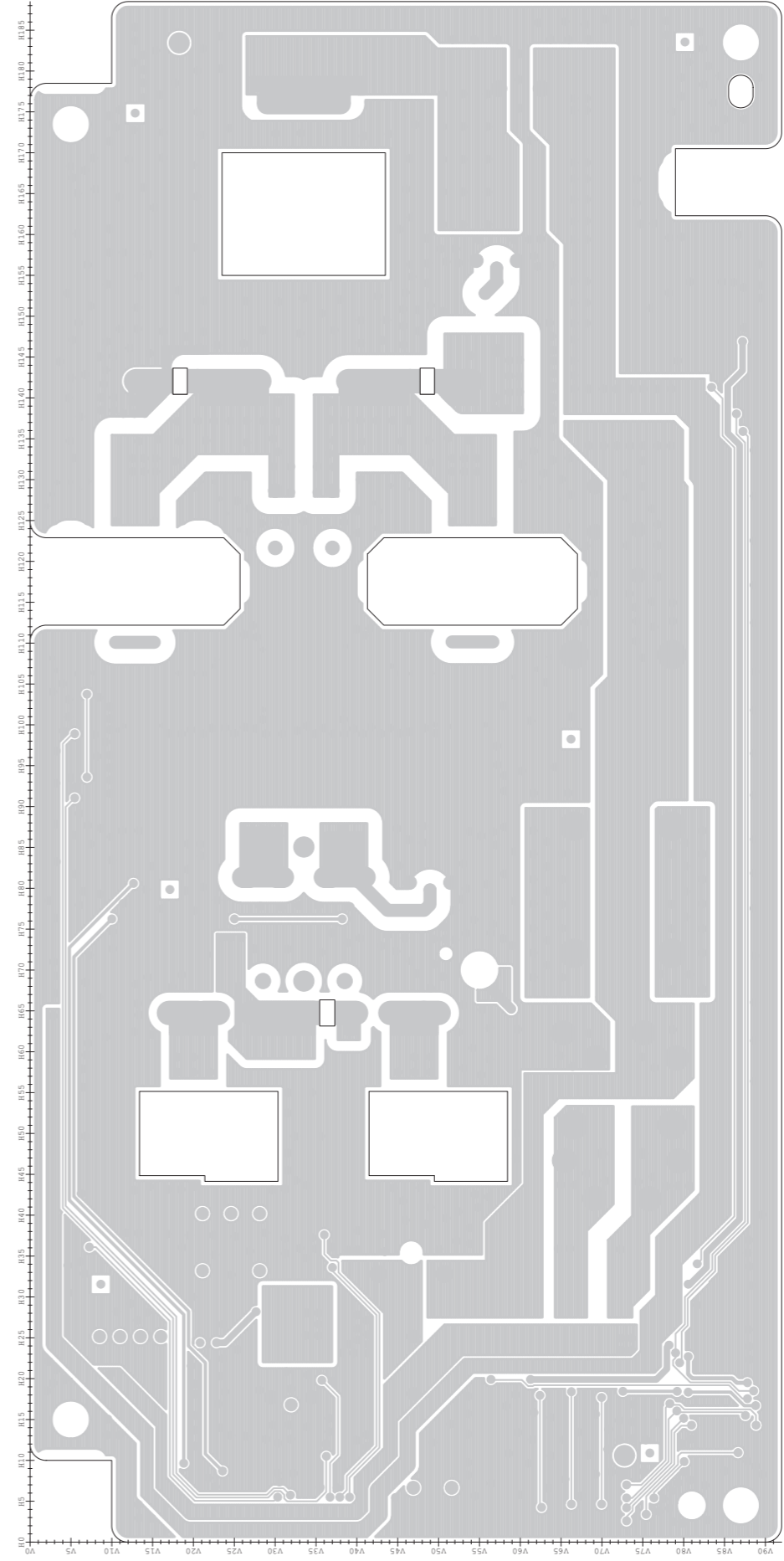


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• FILTER UNIT  
(TOP VIEW)

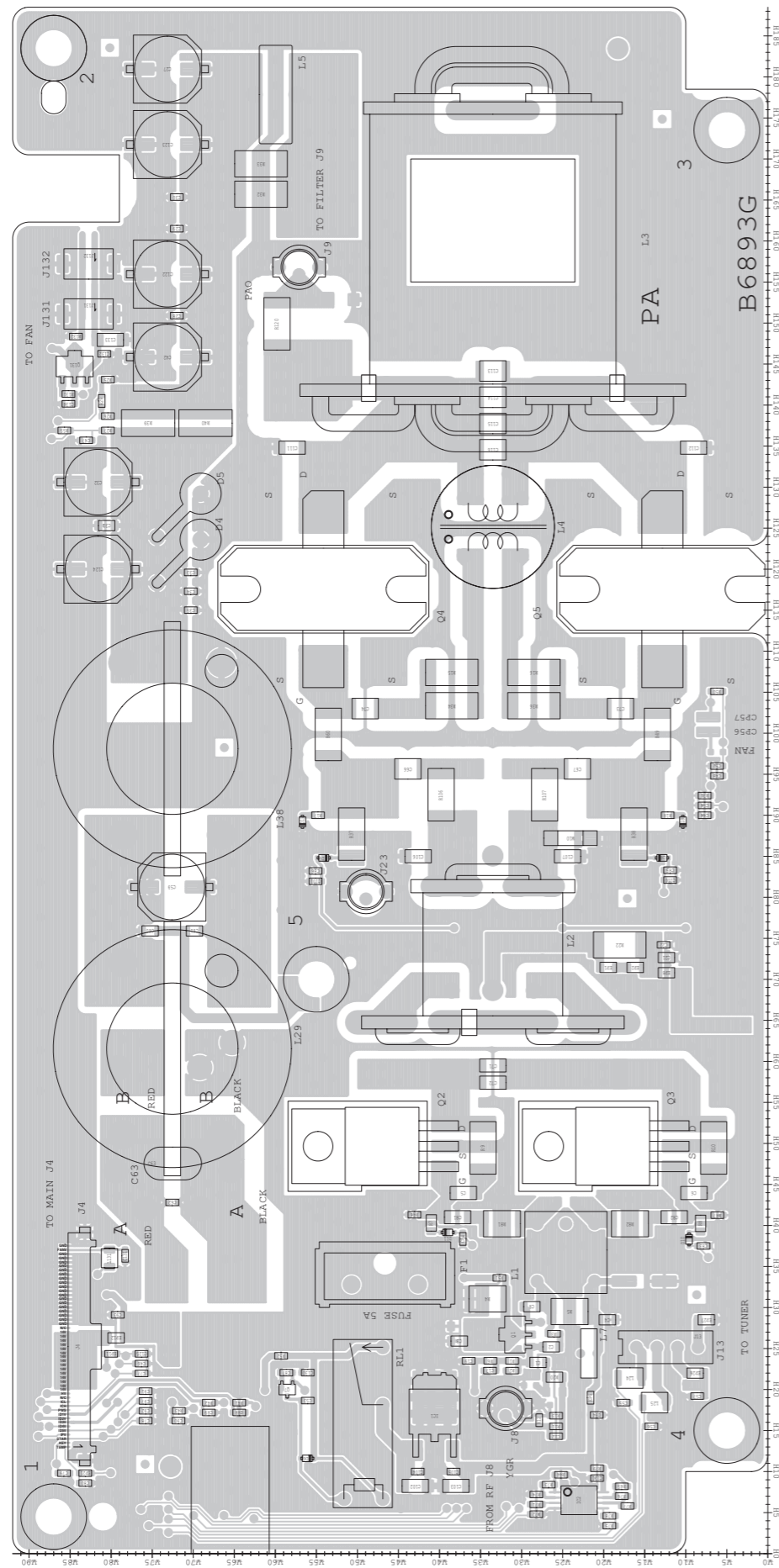


• PA UNIT  
(TOP VIEW)

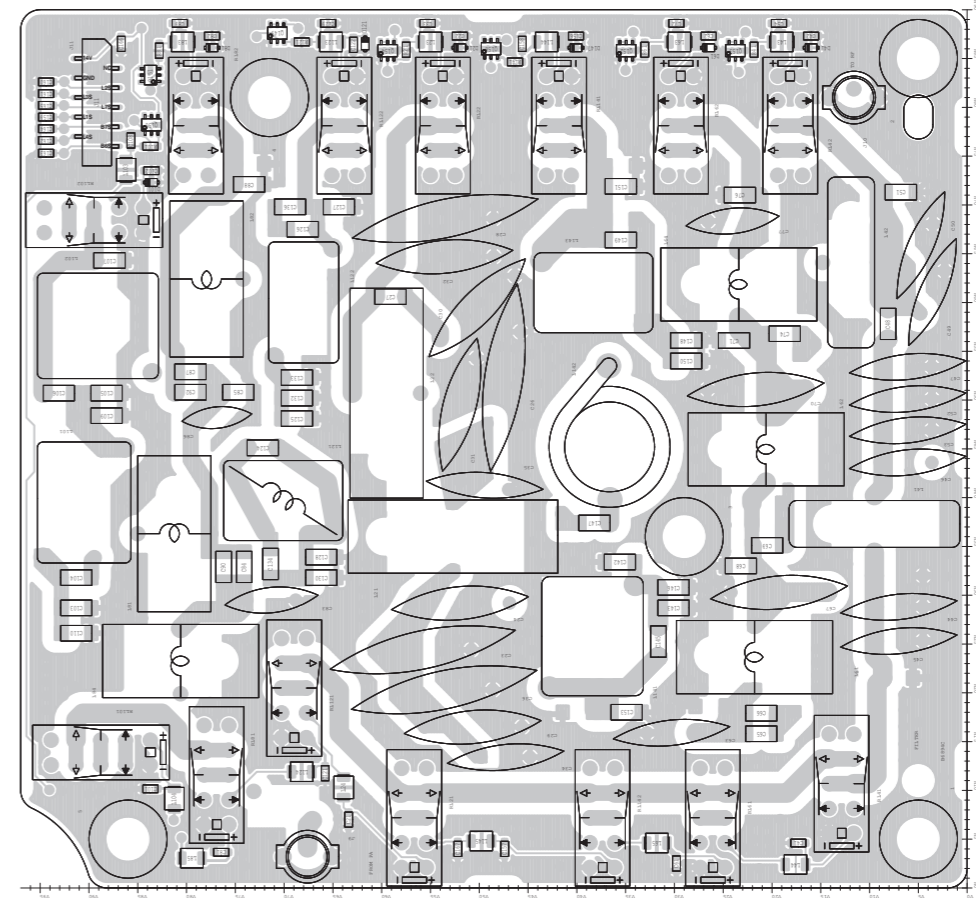


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• PA UNIT  
(BOTTOM VIEW)

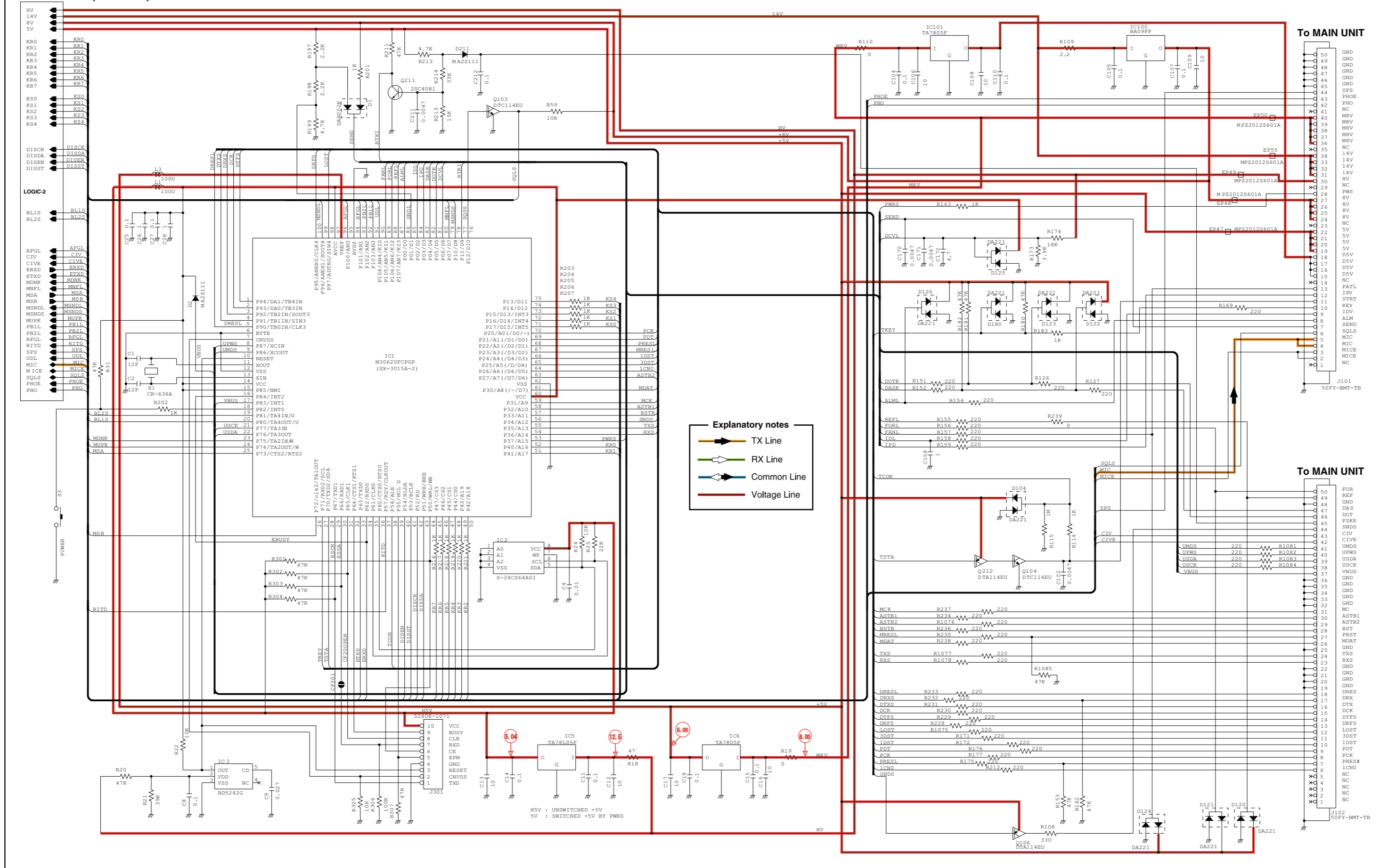


• FILTER UNIT  
(BOTTOM VIEW)



# VOLTAGE DIAGRAM

## • LOGIC UNIT (LOGIC-1)

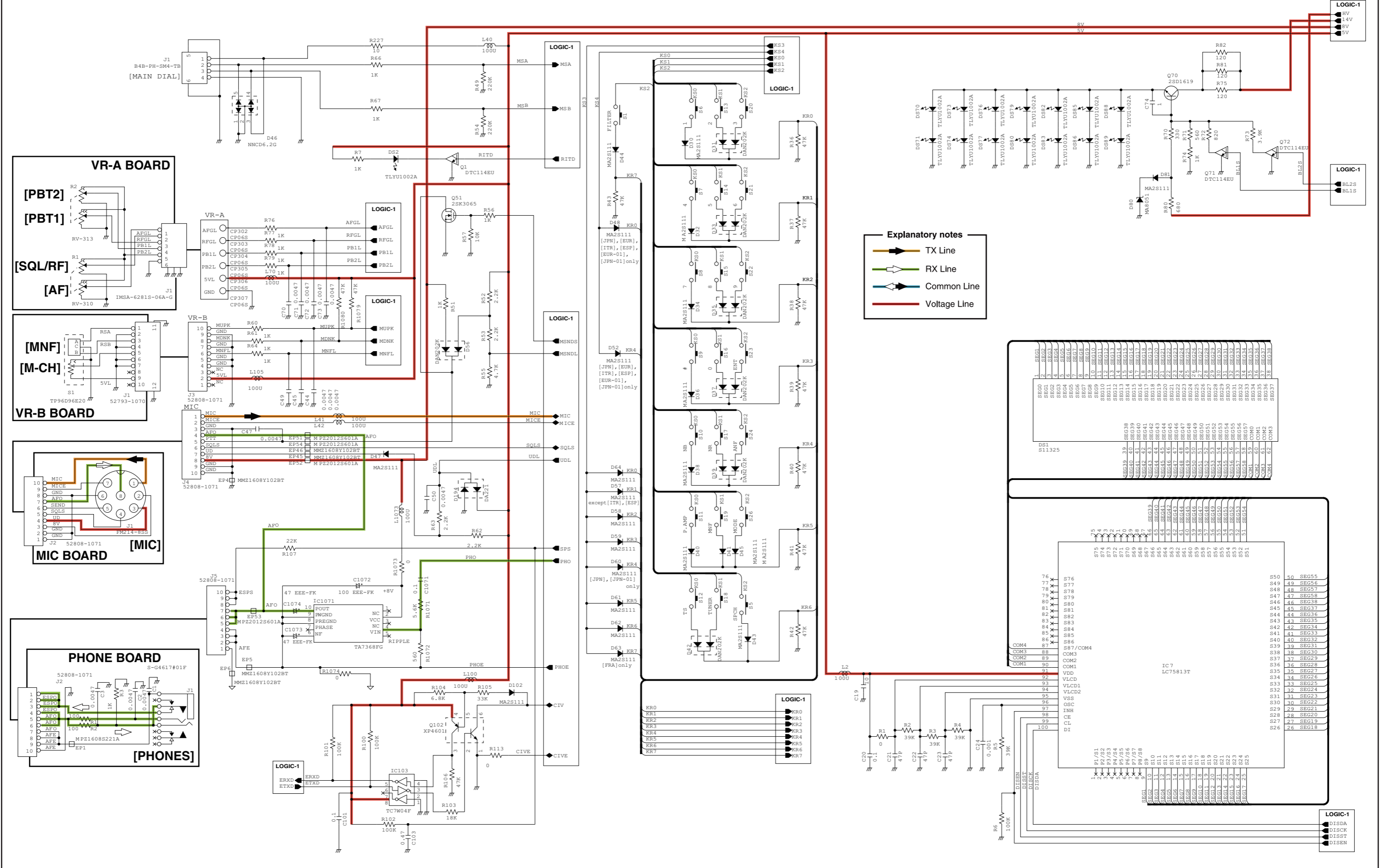


**Explanatory notes**

- TX Line
- RX Line
- Common Line
- Voltage Line

\*; Refer to "PARTS LIST."

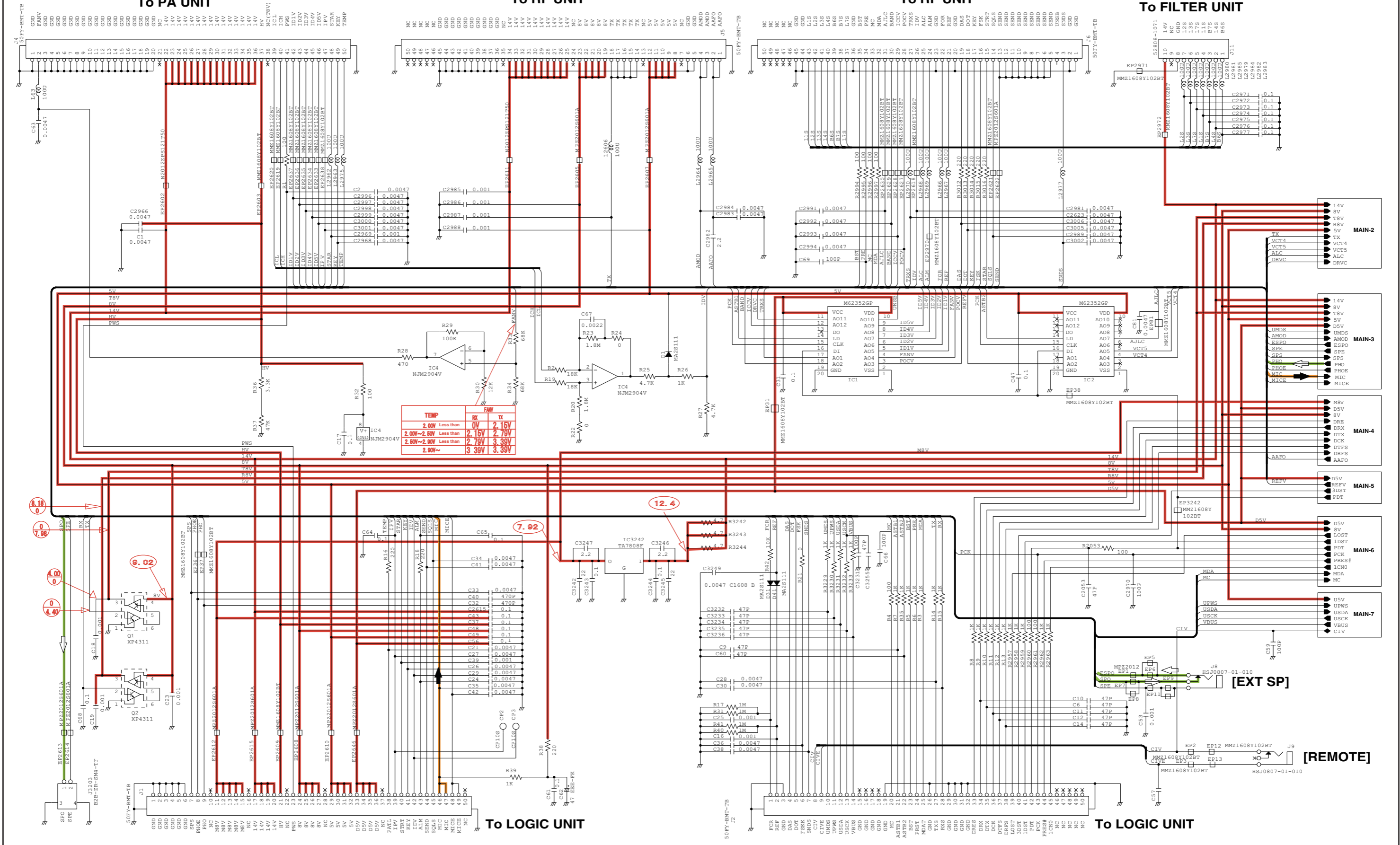
• LOGIC UNIT (LOGIC-2)



\*; Refer to "PARTS LIST"

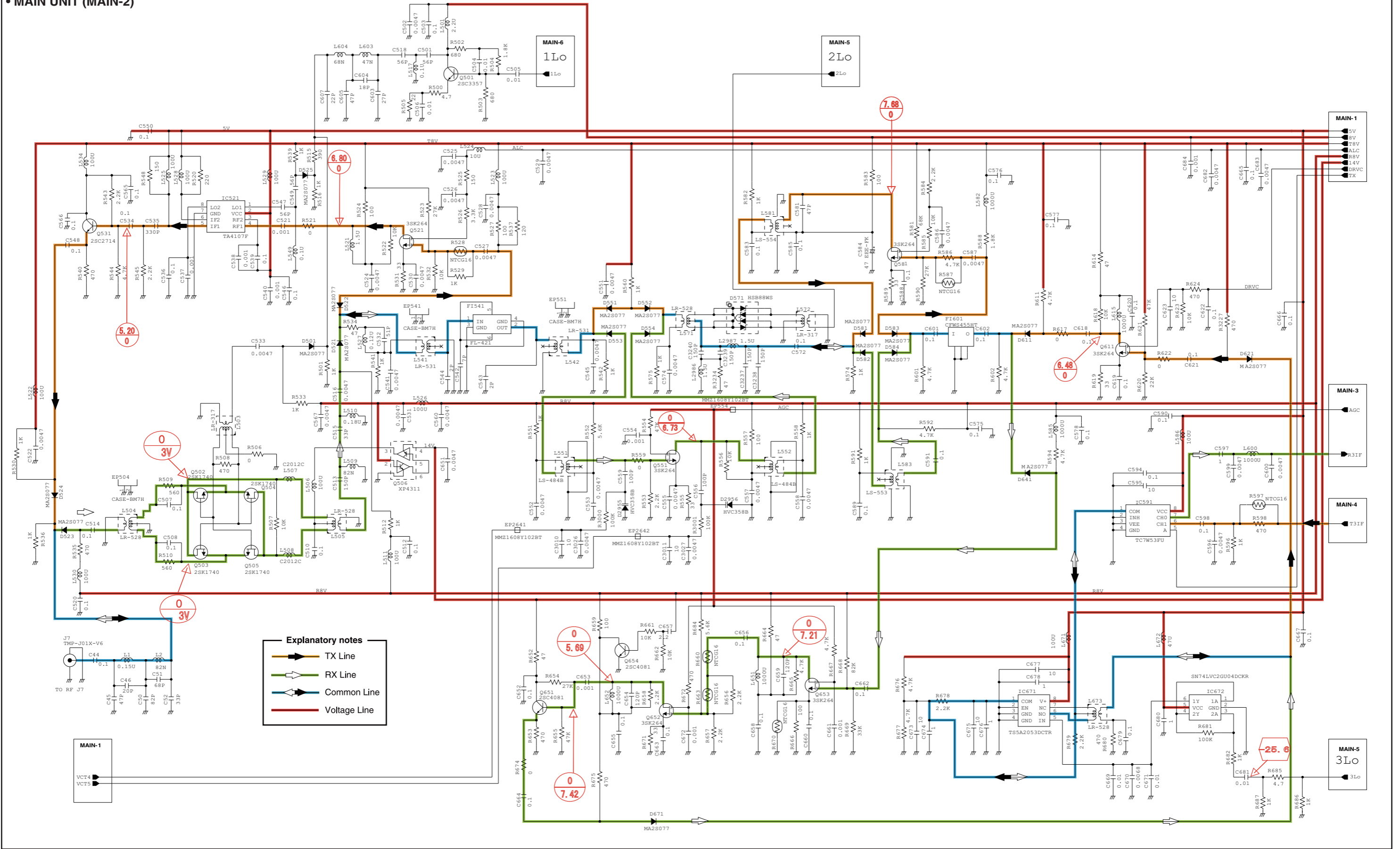


• MAIN UNIT (MAIN-1)



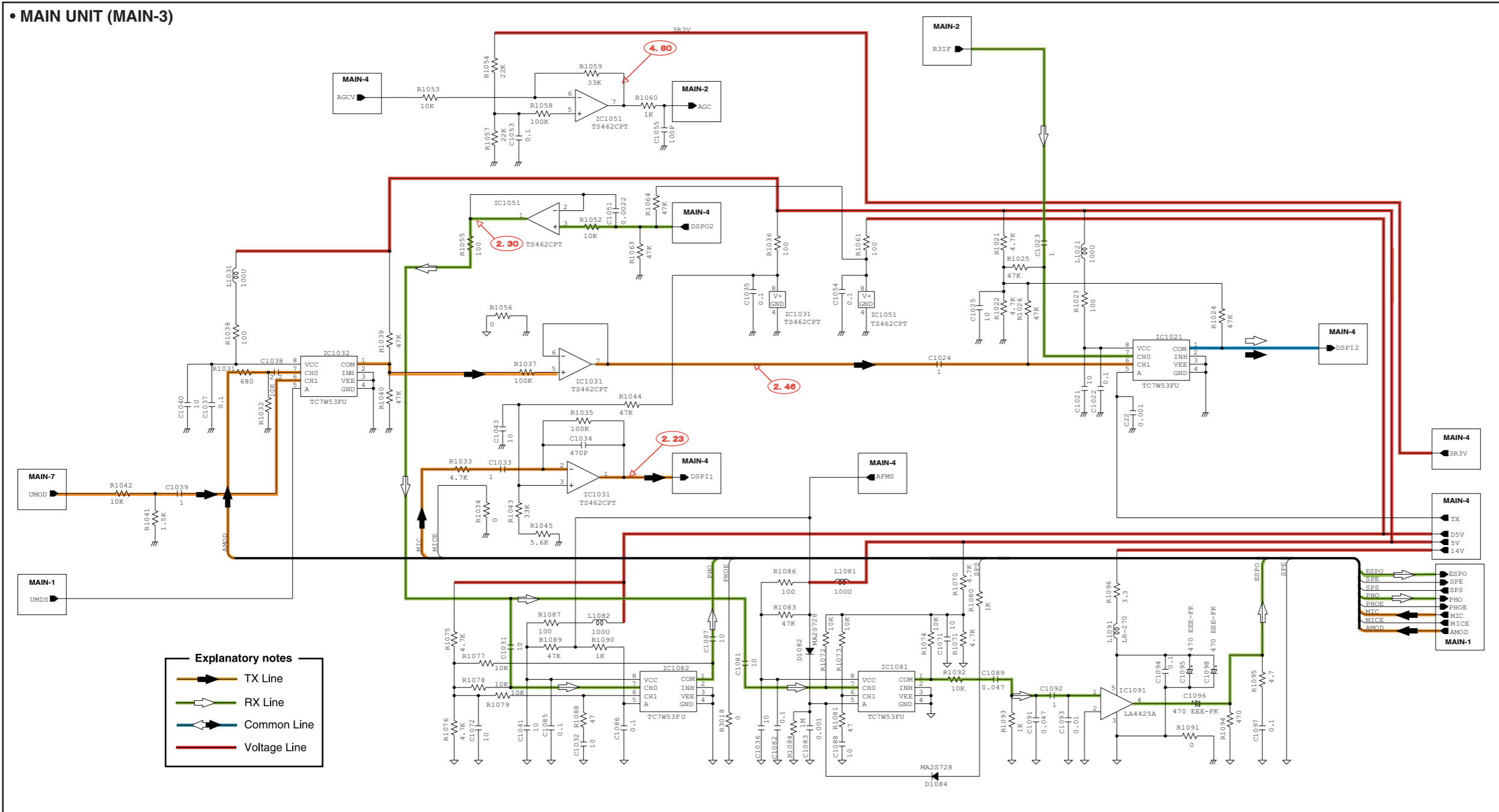
\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-2)



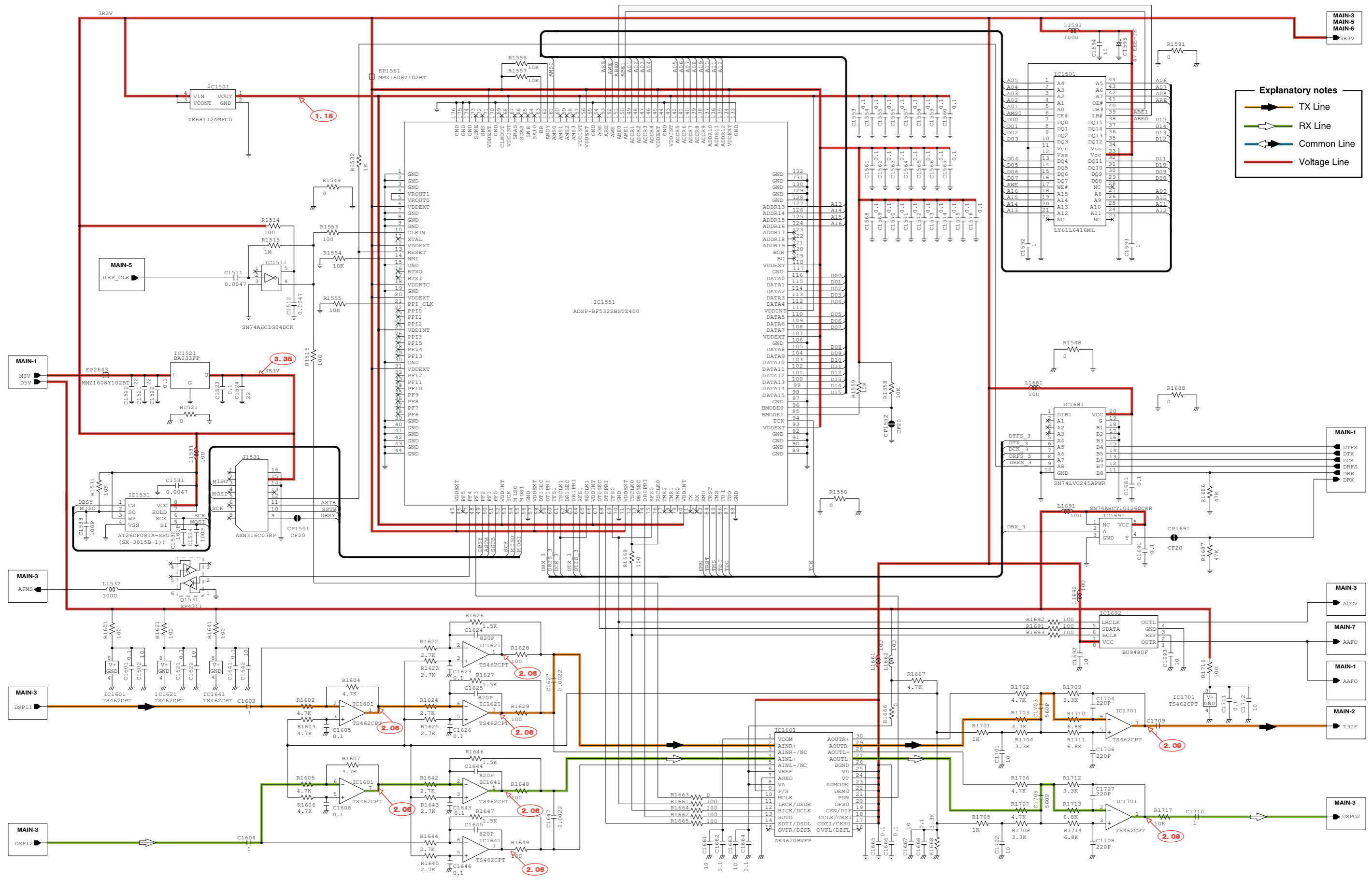
\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-3)



\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-4)

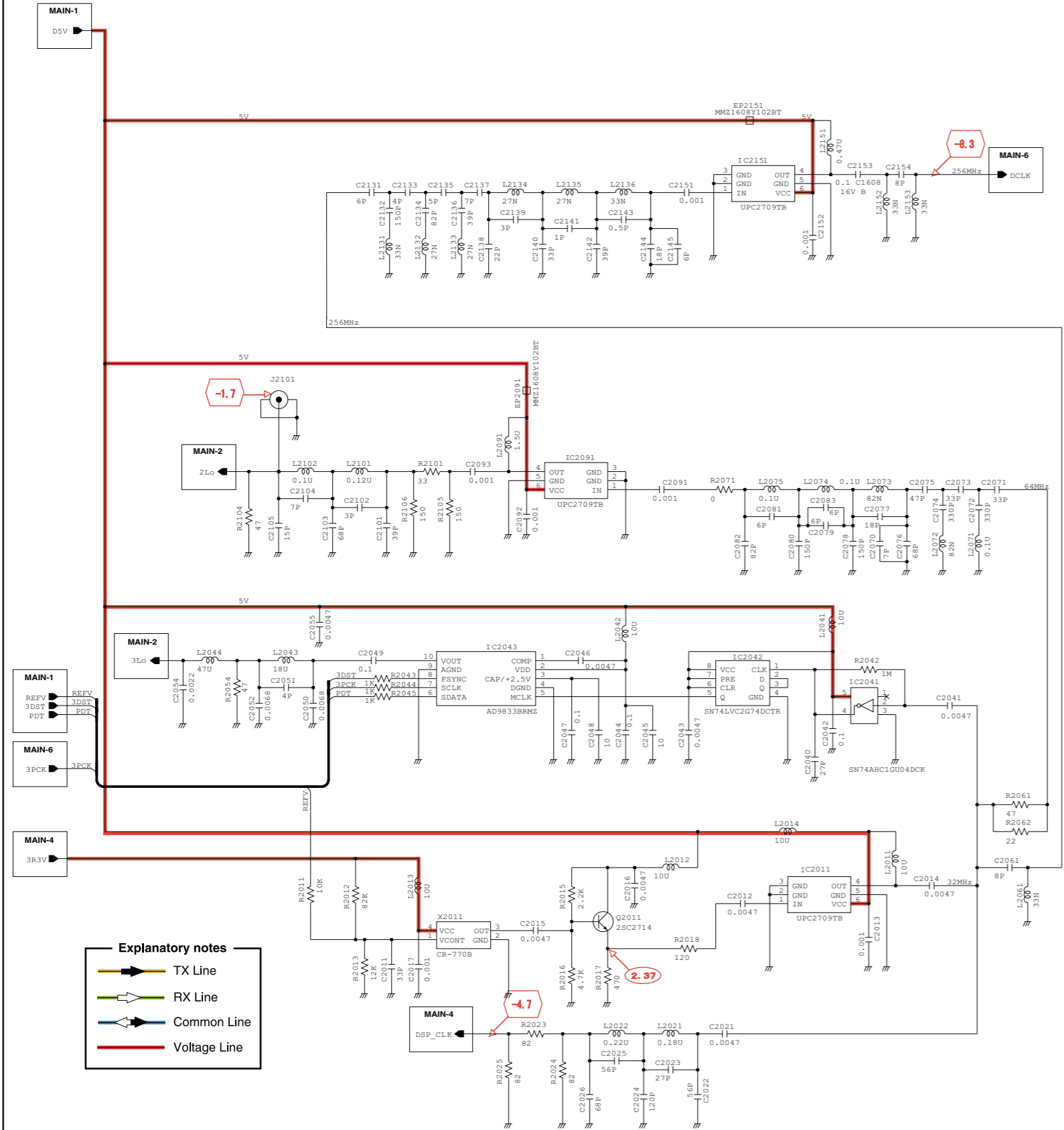


**Explanatory notes**

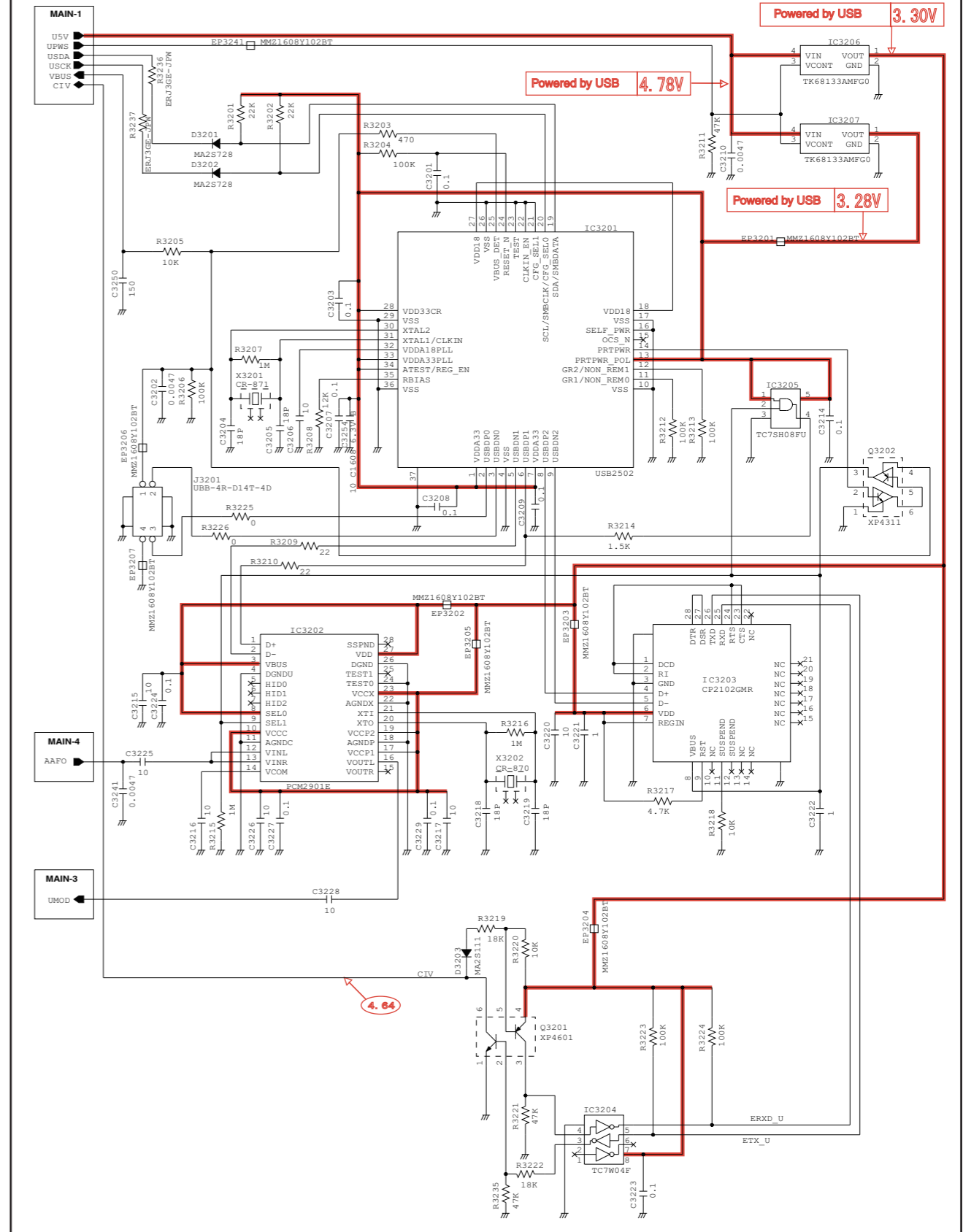
- TX Line
- RX Line
- Common Line
- Voltage Line

\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-5)

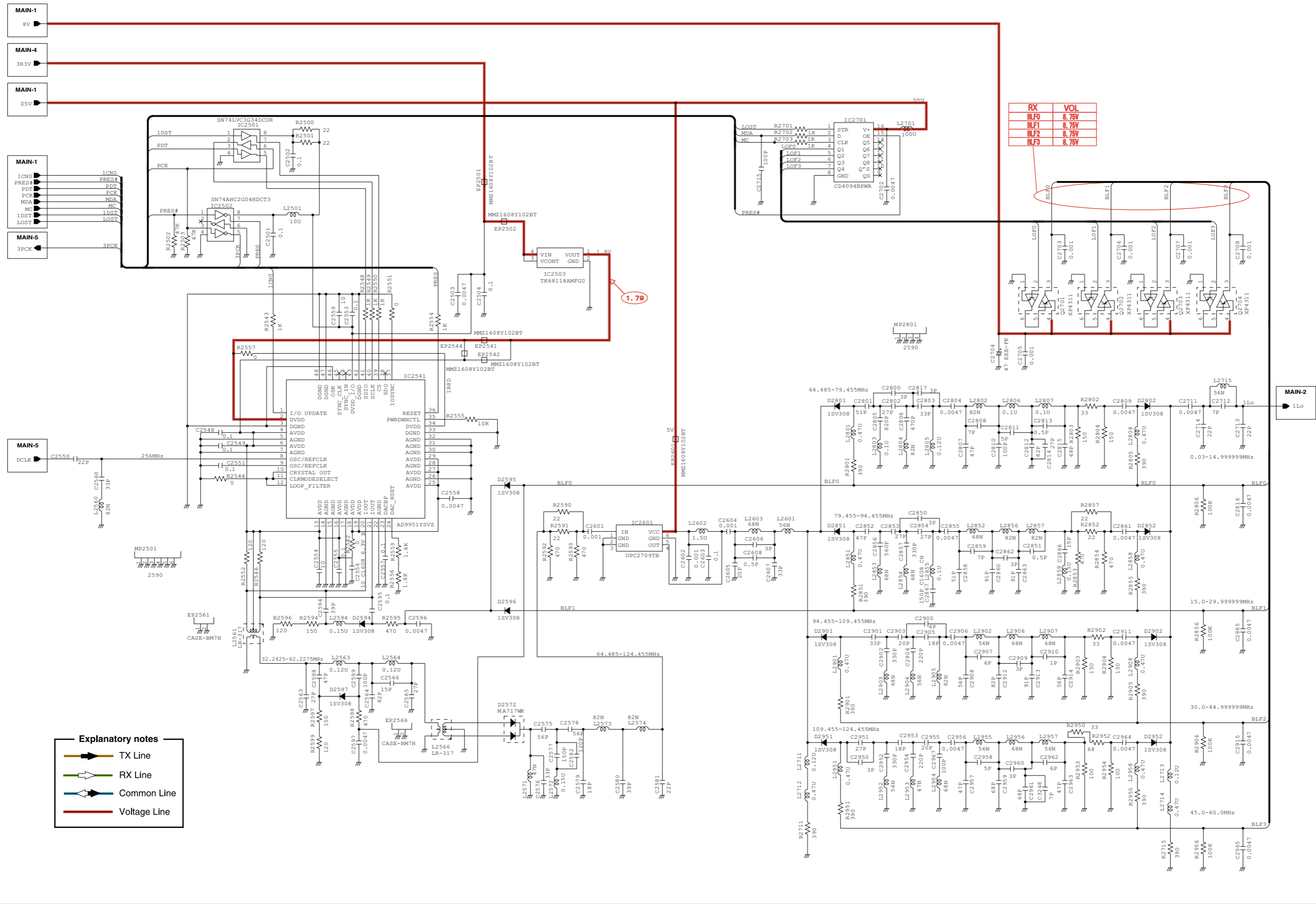


• MAIN UNIT (MAIN-6)



\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-7)



RX	VOL
BLF0	8.75V
BLF1	8.75V
BLF2	8.75V
BLF3	8.75V

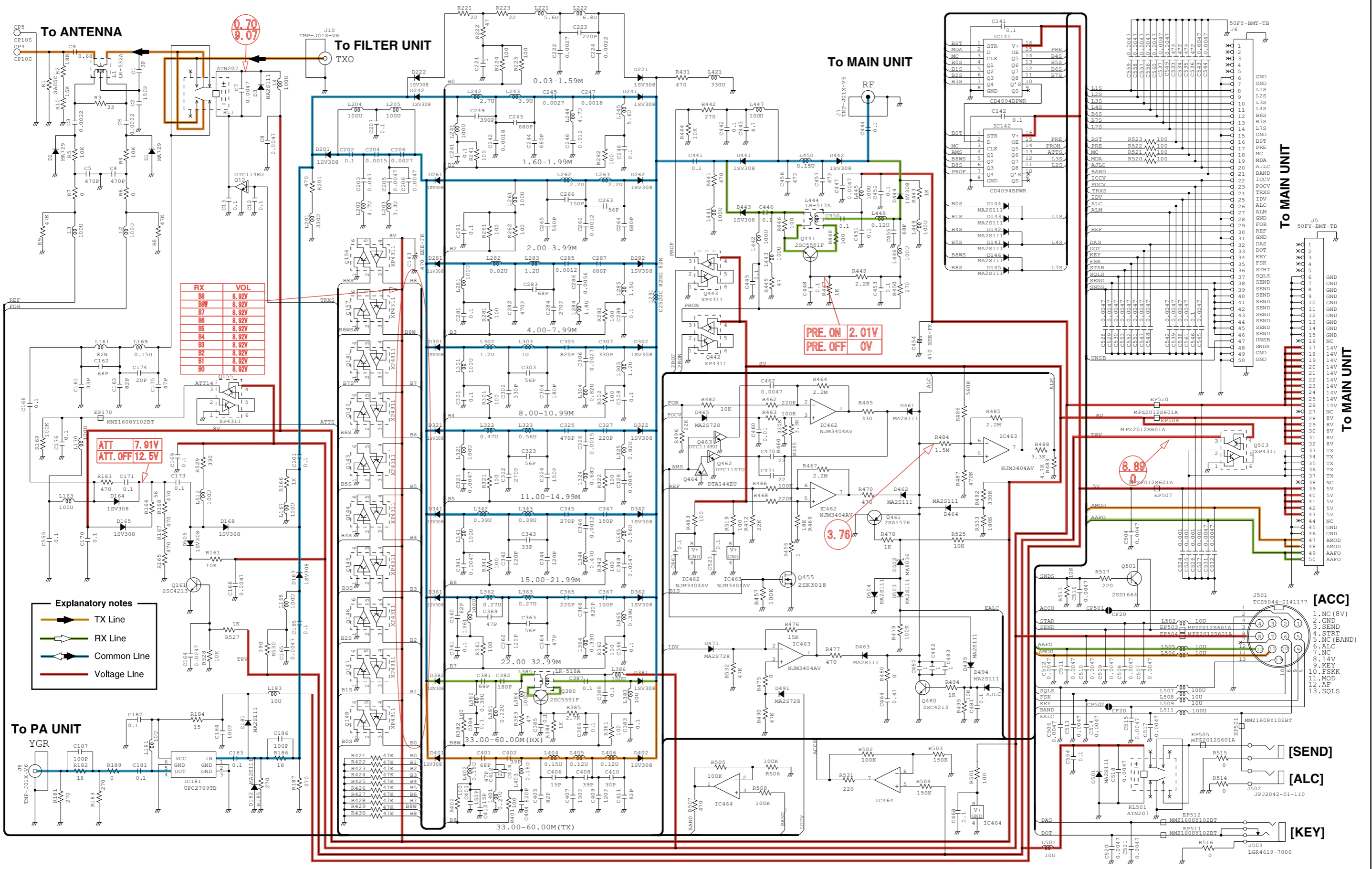
1.70

**Explanatory notes**

- ▶ TX Line
- ▶ RX Line
- ▶ Common Line
- ▶ Voltage Line

\*; Refer to "PARTS LIST."

• RF UNIT



RX	VOL
B0	8.02V
B1	8.02V
B2	8.02V
B3	8.02V
B4	8.02V
B5	8.02V
B6	8.02V
B7	8.02V
B8	8.02V

ATT 7.91V  
ATT.OFF 12.5V

PRE. ON 2.01V  
PRE. OFF 0V

3.76

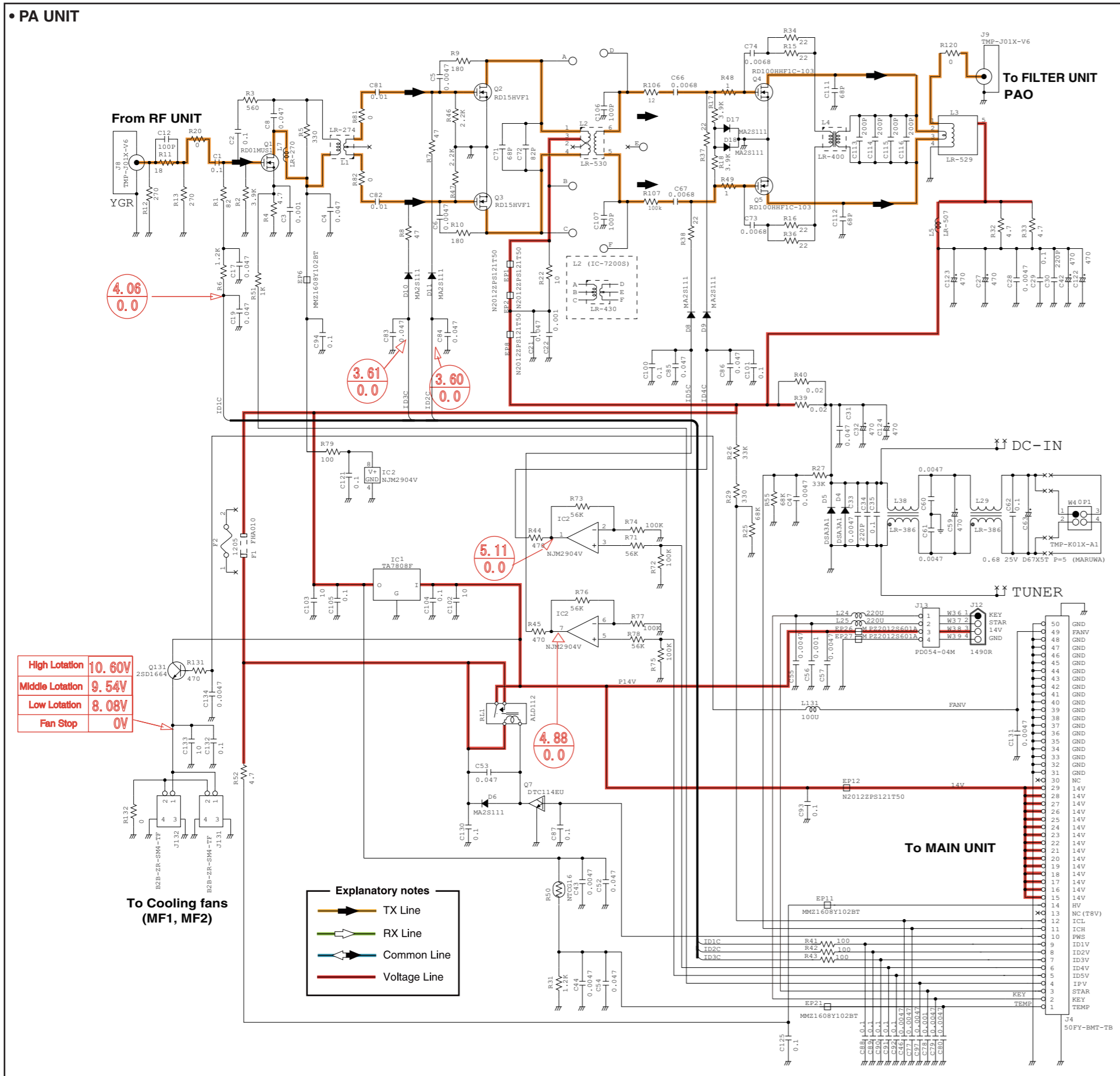
8.89

**Explanatory notes**  
 TX Line  
 RX Line  
 Common Line  
 Voltage Line

- [ACC]
- [SEND]
- [ALC]
- [KEY]

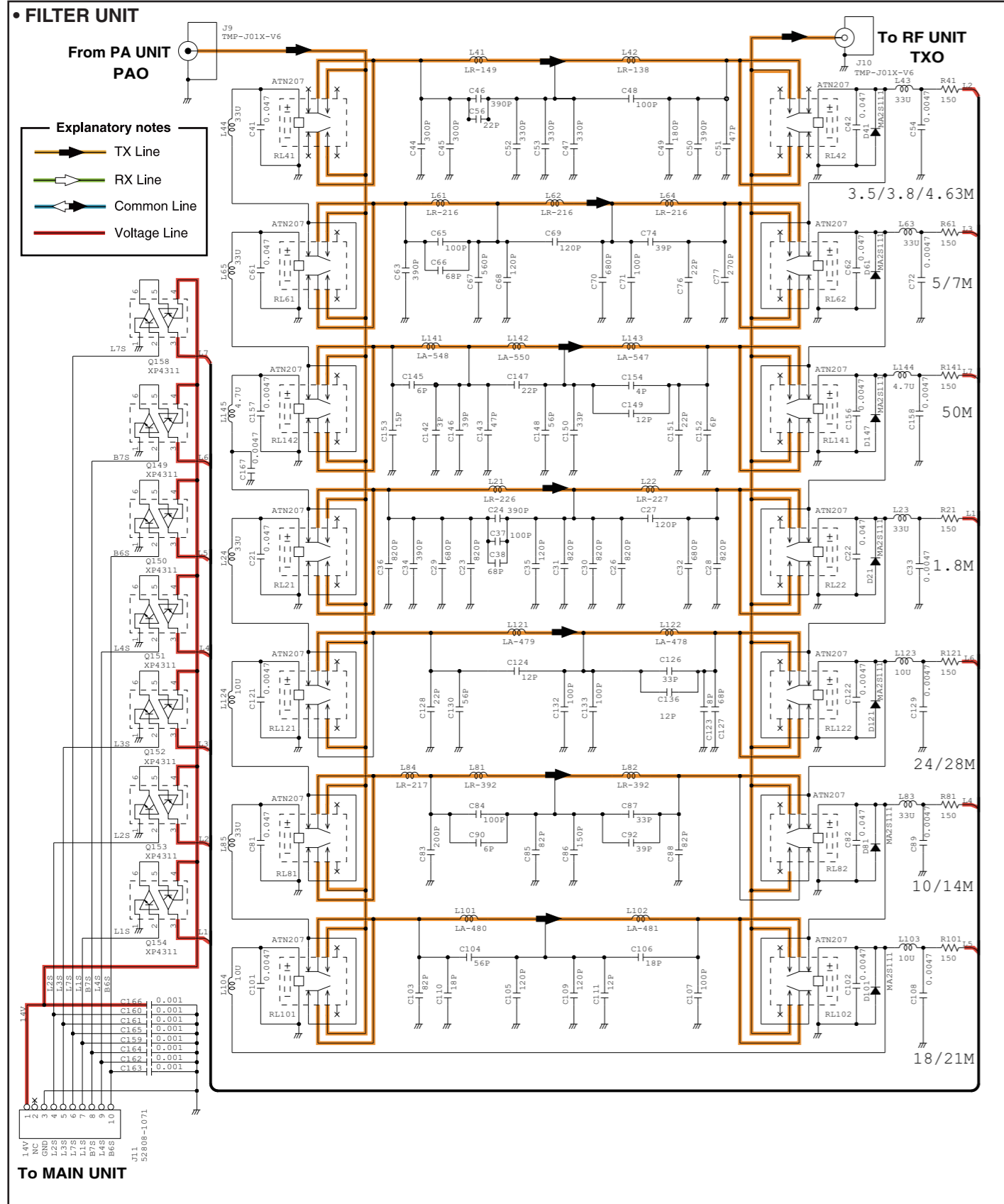
\*; Refer to "PARTS LIST."

• PA UNIT



\*; Refer to "PARTS LIST."





\*; Refer to "PARTS LIST."



# SERVICE MANUAL

HF/50MHz TRANSCEIVER

# IC-7200

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S-14513XZ-C1  
Oct. 2008

Icom Inc.

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## INTRODUCTION

This service manual describes the latest technical information for the **IC-7200 HF/50MHz TRANSCEIVER** at the time of publication.

MODEL	VERSION	BAND	CARRIER POWER
IC-7200	[USA]	HF/50 MHz	100 W
	[EUR]		
	[FRA]		
	[ITR]		
	[ESP]		
	[EUR-01]		
	[KOR]		
	[CHN]		
[EXP]			

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** 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.

### UNIT ABBREVIATIONS:

F:	FRONT UNIT
C:	CHASSIS
M:	MAIN UNIT
L:	LOGIC UNIT
MC:	MIC BOARD
PA:	PA UNIT
RF:	RF UNIT
FIL:	FILTER UNIT
VA:	VR-A BOARD
VB:	VR-B BOARD
PH:	PHONE BOARD



## 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-7200	MAIN UNIT	5 pieces
8820001210	Screw	2438 screw	IC-7200	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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## ■ General

- Frequency coverage :
  - Receive  
30 kHz–60.000000 MHz\*1\*2
  - Transmit  
1.800–1.999999 MHz\*2, 3.500–3.999999 MHz\*2  
5.33050\*3, 5.34650\*3, 5.36650\*3,  
5.37150\*3, 5.40350\*3,  
7.000–7.300 MHz\*2, 10.100–10.150 MHz,  
14.000–14.350 MHz, 18.068–18.168 MHz,  
21.000–21.450 MHz, 24.890–24.990 MHz,  
28.000–29.700 MHz, 50.000–54.000 MHz\*2,  
\*1Some frequency bands are not guaranteed.  
\*2Depending on version. \*3USA version only.
- Mode : SSB, CW, RTTY, AM
- Number of memory CH : 201 (split memory: 199; scan edges: 2) channels
- Antenna connector : SO-239
- Antenna impedance : 50 Ω (unbalanced)
- Usable temperature range : –10°C to +60°C (+14°F to +140°F)
- Frequency stability : Less than ±0.5 ppm
- Power supply requirement : 13.8 V DC±15% (negative ground)
- Current drain (at 13.8 V DC) : Transmit (at 100 W) 22 A  
Receive squelched 1.3 A  
max. audio 2.0 A
- Dimensions : 241(W) × 84(H) × 281(D) mm,  
(projections not included) 9½(W) × 3⅝(H) × 11¼(D) in
- Weight (approx.) : 5.5 kg (12.1 lb)
- CI-V connector : 2-conductor 3.5 (d) mm (⅛")
- ACC connector : 13-pin

## ■ Transmitter

- Output power
  - SSB, CW, RTTY : 2–100 W
  - AM : 1–25 W\* (\*Carrier power)
- Modulation system
  - SSB : Digital PSN modulation
  - AM : Digital Low power modulation
- Spurious emissions
  - HF bands : Less than –50 dB
  - 50 MHz band : Less than –63 dB
- Carrier suppression : More than 50 dB
- Unwanted sideband : More than 50 dB
- Microphone connector : 8-pin connector (600 Ω)
- KEY connector : 3-conductor 6.3 (d) mm (¼")

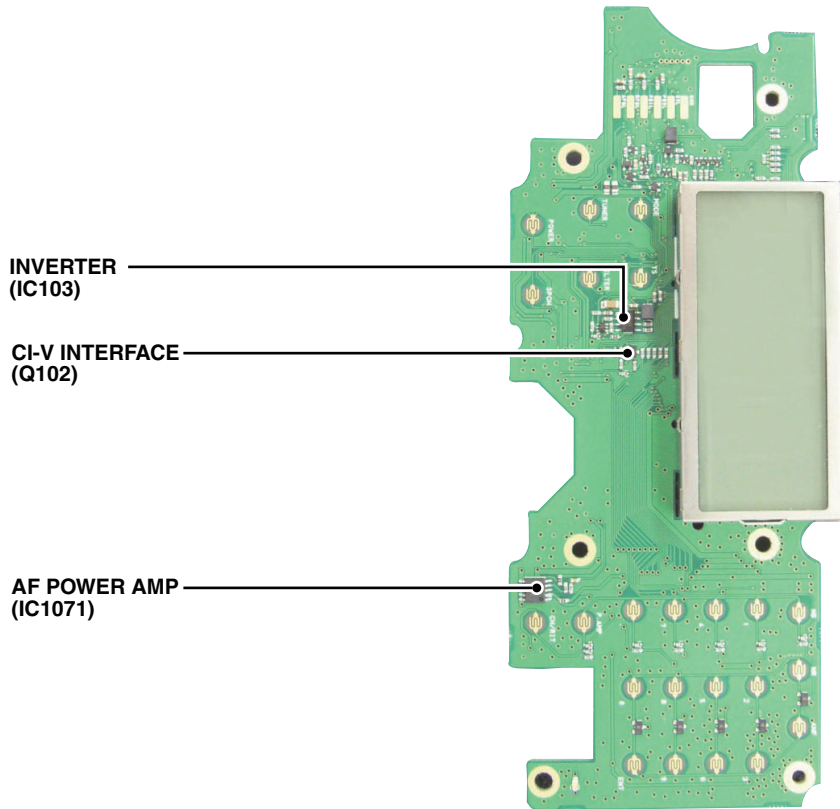
## ■ Receiver

- Receive system : Triple-conversion superheterodyne
- Intermediate frequencies
  - 1st : 64.455 MHz
  - 2nd : 455 kHz
  - 3rd : 15.625 kHz
- Sensitivity (10dB S/N, preamp: ON, Filter shape: sharp)
  - SSB, CW : Less than 0.16 μV  
(1.8–29.7 MHz)  
Less than 0.13 μV  
(50 MHz band)
  - AM : Less than 13 μV  
(0.5–1.799 MHz)  
Less than 2 μV  
(1.8–29.7 MHz)  
Less than 1 μV  
(50 MHz band)
- Squelch sensitivity (SSB, threshold, preamp ON) : Less than 5.6 μV
- Selectivity
  - SSB\* (BW=2.4 kHz) : More than 2.4 kHz/–6 dB  
Less than 3.6 kHz/–60 dB
  - CW\* (BW=500 Hz) : More than 500 Hz/–6 dB  
More than 900 Hz/–60 dB
  - RTTY (BW=350 Hz) : More than 360 Hz/–6 dB  
Less than 650 Hz/–60 dB
  - AM (BW=6 kHz) : More than 6.0 kHz/–6 dB  
Less than 15.0 kHz/–60 dB  
\*IF filter shape is set to SHARP.
- Spurious and image rejection ratio : More than 70 dB  
(except ½ IF through on 50 MHz band)
- Audio output power : More than 2.0 W at 10% distortion with an 8 Ω load (at 13.8 V DC)
- RIT variable range : ±9.999 kHz
- PHONES connector : 3-conductor 6.3 (d) mm (¼")/8 Ω
- EXT SP connector : 2-conductor 3.5 (d) mm (⅛")/8 Ω

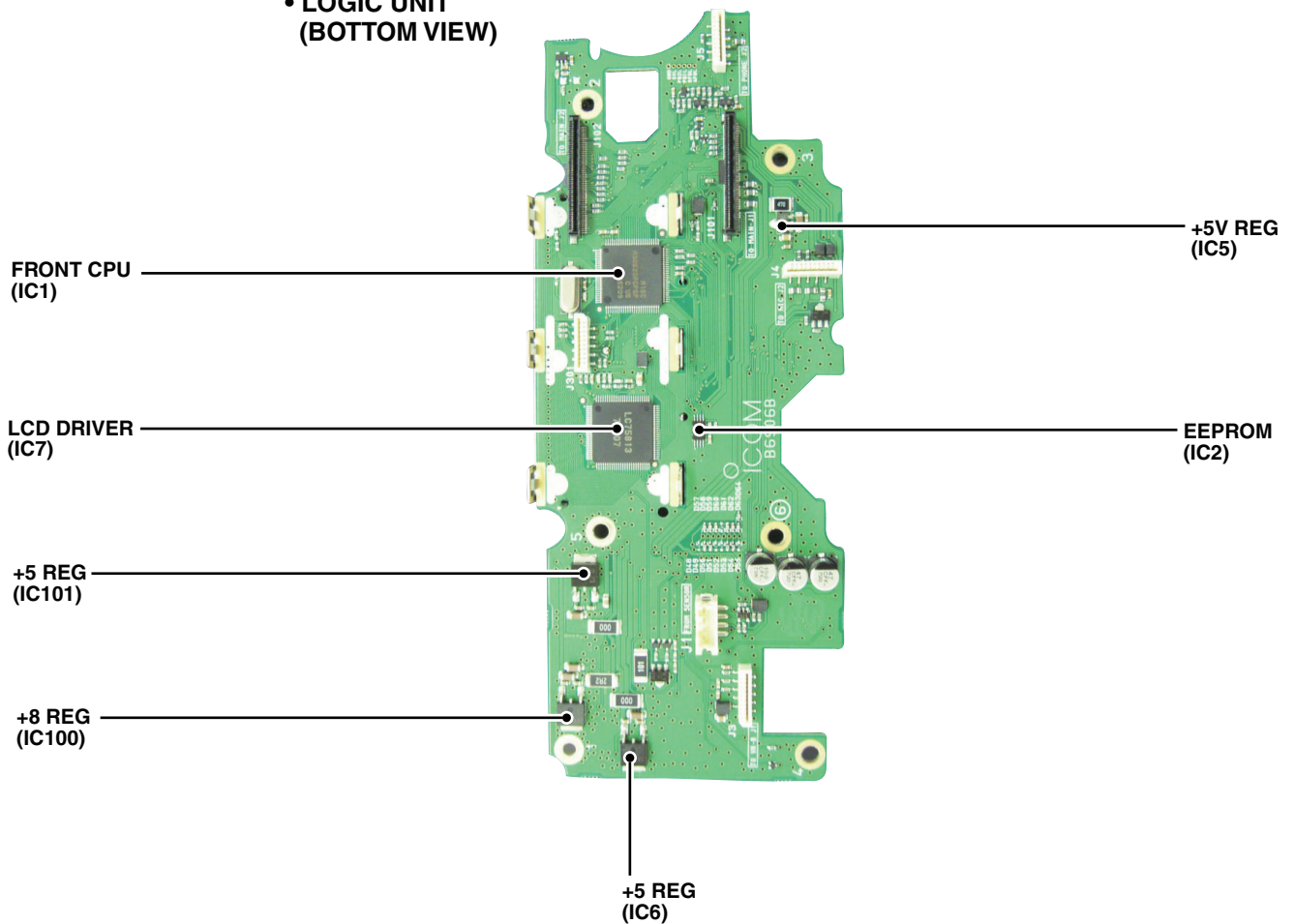
# SECTION 2

# INSIDE VIEW

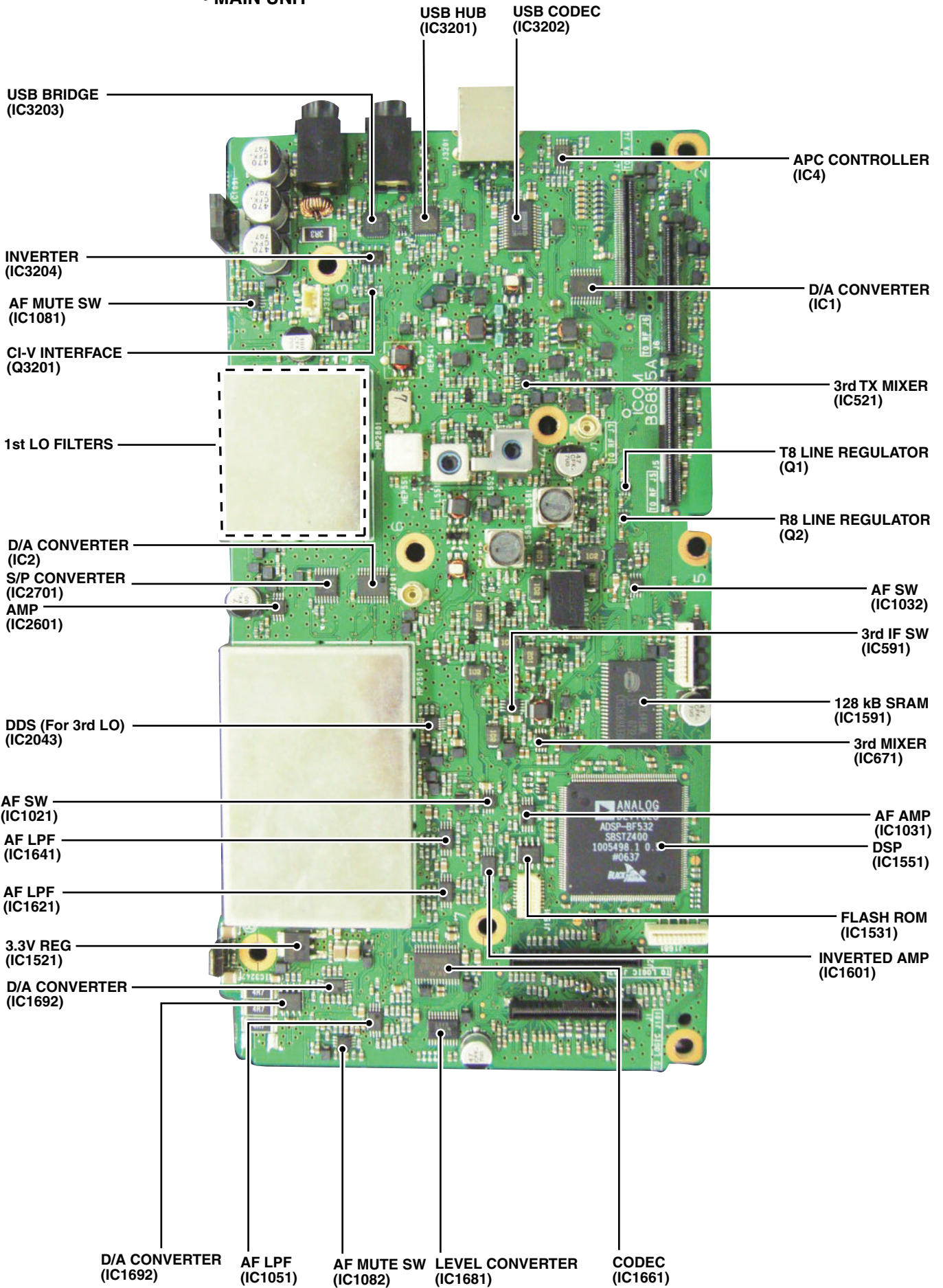
## • LOGIC UNIT (TOP VIEW)



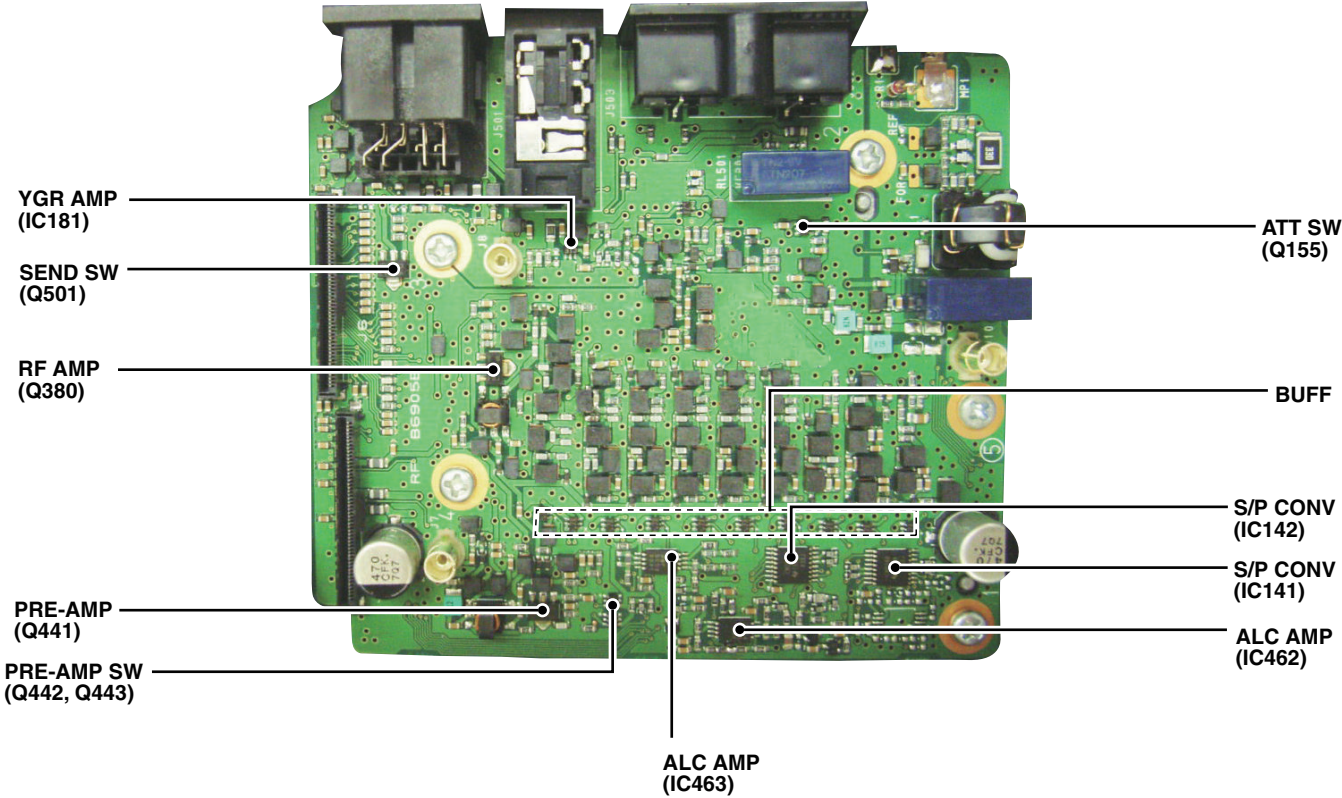
## • LOGIC UNIT (BOTTOM VIEW)



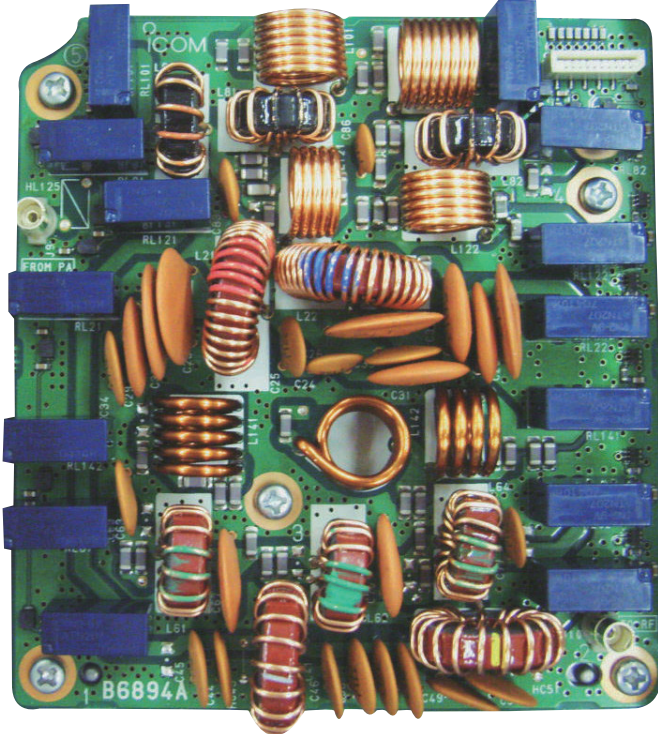
• MAIN UNIT



• RF UNIT

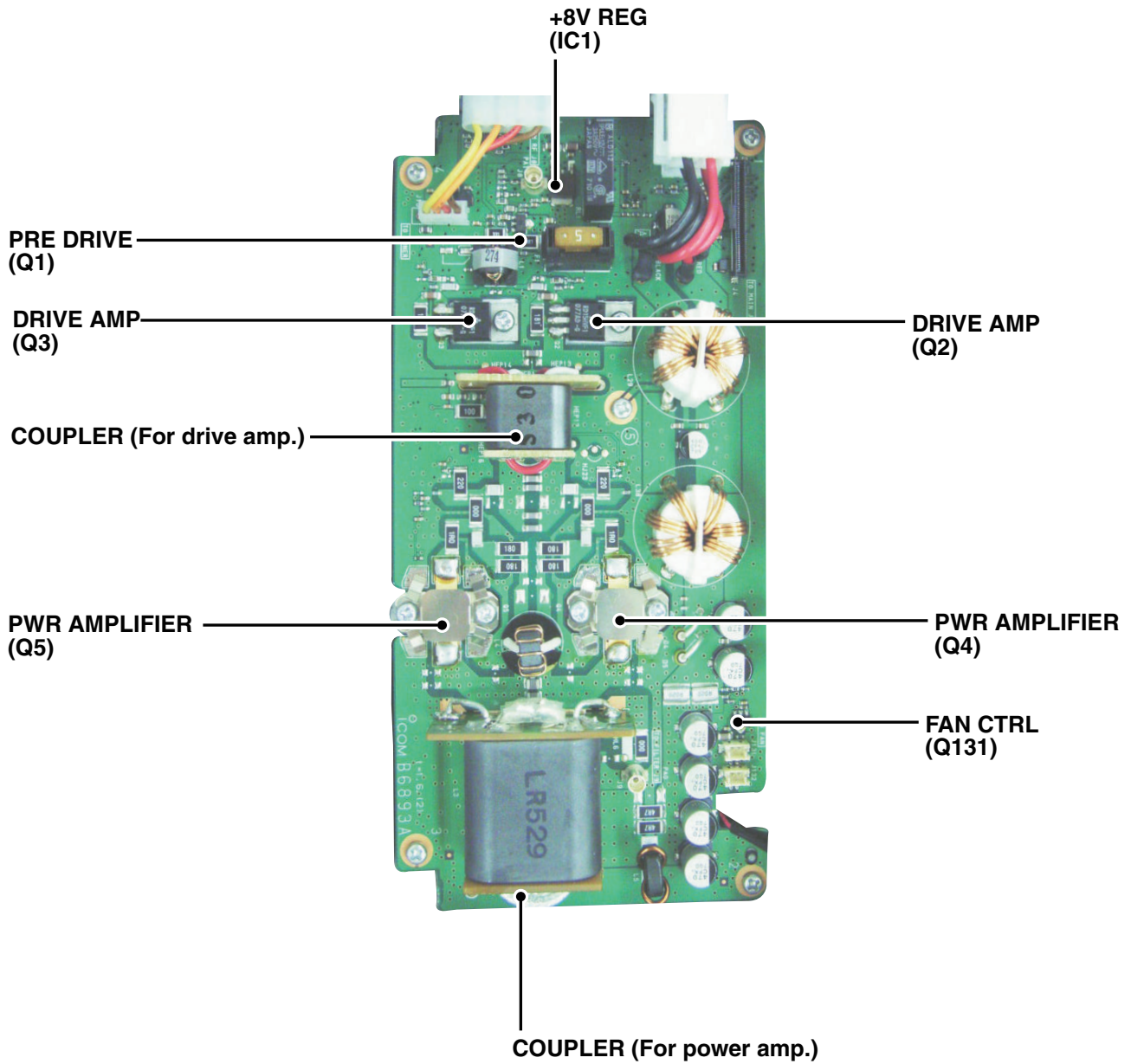


• FILTER UNIT





• PA UNIT



## 3-1 RF UNIT

The RF UNIT is composed by BPFs for both TX and RX, attenuator and pre-AMP for RX line, YGR AMP, SWR detect circuit and ALC circuit for TX line.

### • TX/RX SW

RL1 connects the RX/TX circuit to the antenna connector according to the operation (receiving/transmitting).

While receiving, RL1 connects the antenna connector and the attenuator through the LPF. While transmitting, RL1 connects the antenna connector and J10 which guides the TX signal from the FILTER UNIT.

### • ATTENUATOR (ATT)

The attenuator is composed of D164, D165, R163 and R164.

While the ATT function is inactivated, D164 turns ON and D165 turns OFF to apply the RX signals to next RX stage via D164 without attenuation.

While the ATT function is activated, D164 turns OFF and D165 turns ON and the RX signals are divided by R163 and R164 for 20 dB of attenuation.

### • BPF

The RX signals from the ATT are passed through one of 9 BPFs. The BPF for MF band contains an attenuator to prevent the saturation caused by strong RX signals. The BPF for 50 MHz band contains a pre-AMP (Q380) to make up the loss for high sensitivity.

These BPFs are commonly used in TX and RX, but exclusive BPF for 50 MHz TX is also equipped to secure the transmit signal path for 50 MHz.

### • PRE-AMP

While the pre-amp. function is activated, the RX signals from the BPF are applied to the noiseless feedback AMP (Q441). This AMP provides low-noise, high RF gain and good IP characteristic. The amplified RX signals are entered to the MAIN UNIT via J7.

### • YGR AMP

While TX, the transmit signal (YGR signal) is entered to the MAIN UNIT via J7. The transmit signal is by-passed the pre-AMP and passed through one of BPFs, and amplified to the level required in PA UNIT by IC181, then output through J8.

### • SWR DETECT CIRCUIT

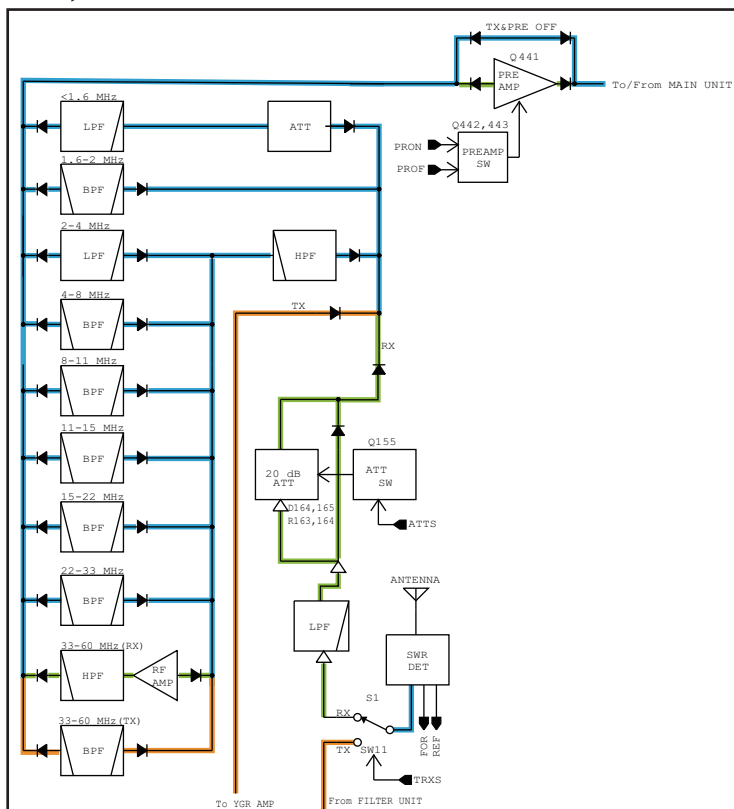
The TX signal which is amplified to the output power level in the PA UNIT is entered to the RF UNIT via J10. The TX signal is passed through the TX/RX SW (RL1) and the SWR detect circuit (L1), then fed to the antenna connector. The detected forward and reflected signals are rectified by D1 and D2 to be converted into DC voltage.

### • ALC CIRCUIT

The detected forward signal is applied to IC462 and compared with TX power setting voltage "POCV" which is supplied from the CPU (voltage is differ according to the TX output power), and the resulting voltage controls the TX power according to the setting.

The ALC voltage is also used for two APC circuits. One is the SWR APC circuit which is controlled by reflected voltage "REF", another is ID APC circuit which is controlled by driving current of the power amplifier.

## - ATT, BPF AND PRE-AMPLIFIER CIRCUITS -



### 3-2 MAIN UNIT

The MAIN UNIT is the core of IC-7200.

#### • RF INPUT/OUTPUT

The RX signals from the RF UNIT are passed through the LPF and D523, then applied to the 1st mixer.

The TX signal from the YGR AMP is passed through D524 and LPF, then output to RF UNIT via J7.

#### • RX IF CIRCUIT

Q502, Q503, Q504 and Q505 (these are junction FETs) compose a quad-structured 1st mixer circuit, and provides high enough intercept point. RX signals are mixed with the 1st LO signals from the 1st LO AMP (Q501) to be converted into the 64.455 MHz 1st IF signal. The 1st IF signal is filtered by the roofing filter (FI541) to remove the RX frequency signal and 1st LO signals, and amplified by the 1st IF AMP (Q551).

The amplified 1st IF signal is applied to the 2nd mixer (D571) to be converted into the 455 kHz 2nd IF signal. A double balanced mixer is adopted to the 2nd mixer and is used for both TX and RX.

The 2nd IF signal is filtered by FI601 and amplified by Q653, Q652, Q651, then applied to the 3rd mixer (IC671). The 3rd mixer operated by switching SPDT switch using LO signal, and commonly used in TX and RX. The converted 15.625 kHz 3rd IF signal is applied to the DSP section.

#### • RX AF CIRCUIT

The 3rd RX IF signal is demodulated, audio level-adjusted and squelch-controlled in the DSP, then directly applied to the AF AMP.

IC1091 is an exclusive AF AMP for driving internal speaker.

While a headphone is connected, IC1081 cuts the input line of IC1091 off. For the headphone operation, an extra AF output line connected to the FRONT UNIT is available.

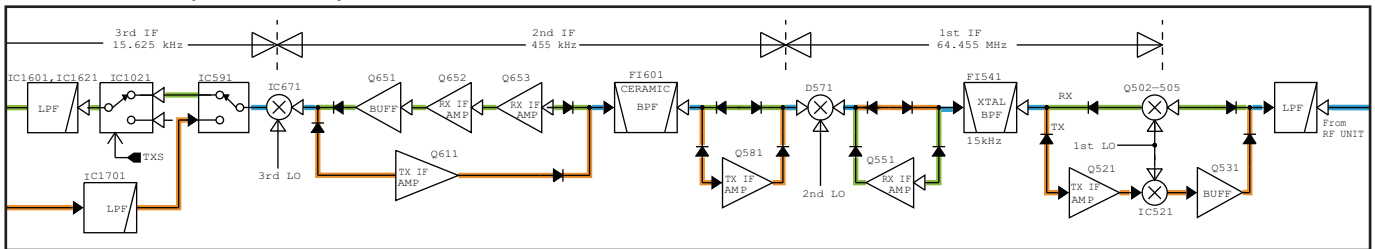
#### • MICROPHONE AMP CIRCUIT

The MIC signals from the FRONT UNIT are amplified by IC1031 and are applied to the DSP. The TX audio signals (MIC signals) are processed completely in the DSP (MIC gain adjust, compression, etc.) entirely, thus no analog circuits are required in this stage.

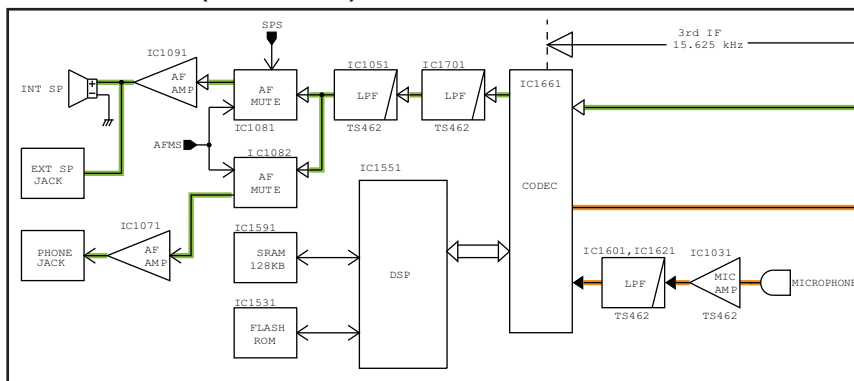
#### • TX IF CIRCUIT

The 15.625 kHz TX IF signal from the DSP section is converted into the 455 kHz TX IF signal by IC571, then amplified by the IF AMP (Q611). The amplified signal is filtered by FI601 to remove unwanted signals and amplified by Q581, then converted into the 64.455 MHz TX IF signal by D571, filtered by FI541 for unwanted signal removal. The 64.455 MHz signal is then amplified by Q521, and mixed with the 1st LO signals from the 1st LO AMP (Q501) by IC521 to be converted into the TX frequency. The converted signal is amplified by Q531 and applied to the YGR AMP.

#### - IF CIRCUITS (RX AND TX) -



#### - AF CIRCUITS (RX AND TX) -



**• 1st LO GENERATOR CIRCUIT**

DDS circuit is employed for LO signal generation; no PLL circuit is used with the IC-7200. This provides extremely high frequency stability against temperature and vibration.

The 32 MHz reference frequency signal from the TCXO (X2011) is buffer-amplified by Q2011 and amplified by IC2011. The 8th harmonic component (256 MHz) in the 32 MHz reference frequency signal is extracted and amplified by IC2151 to the level needed for the DDS. The amplified 256 MHz reference signal is applied to the DDS (IC2541) as the master clock signal.

The 32.2425–64.2275 MHz signals are output from the DDS, and doubled by D2572. The doubled signals are used as the 1st LO frequencies. The 1st LO signals are amplified by IC2601, filtered by the appropriate BPF to remove unwanted frequency components, then applied to the 1st LO AMP.

**• OTHER LO GENERATOR CIRCUIT**

The 32 MHz reference signal is also used for the another DDSs of 2nd and 3rd LO signal generation, as well as the DSP.

The 32 MHz reference signal from IC2011 is adjusted its wave form, and divided by two by IC2042, then the divided reference signal (16 MHz) is applied to the DDS (IC2043) as the master clock signal. The DDS outputs 439.375 kHz signal as the 3rd LO.

The doubled reference signal (64 MHz) signal is amplified by IC2091, and used as the 2nd LO.

**• FREQUENCY CONFIGURATION**

IF Signal	Frequency	LO Signal	Frequency
1st RX IF	64.455 MHz	1st RX LO	64.485–124.455 MHz
2nd RX IF	455 kHz	2nd RX LO	64.000 MHz
3rd RX IF	15.625 kHz	3rd RX LO	439.375 kHz
3rd TX IF	15.625 kHz	3rd TX LO	439.375 kHz
2nd TX IF	455 kHz	2nd TX LO	64.000 MHz
1st TX IF	64.455 MHz	1st TX LO	64.485–124.455 MHz
TX signal	(*)	–	–

\*; Refer to "SPECIFICATIONS."

**• USB CONTROLLER**

By connecting the PC through the USB connector (J3202; type B), IC-7200 can be controlled by a PC. The communication with the PC is accomplished by connecting to the USB audio IC (IC3202) and UART bridge (IC3203) through the USB hub (IC3201).

IC3202 converts the analog AF signals into the digital audio signals (A/D conversion), and converts the digital audio signals from the PC into the analog AF signals (D/A conversion). IC3203 controls the transceiver from connected PC using CI-V commands.

**3-3 PA UNIT**

The PA UNIT is composed by power AMP which amplifies the YGR output signal from the RF UNIT to the TX output power, power supply line control circuits and cooling fan control circuit.

**• POWER AMP**

The TX signal from the RF UNIT is amplified by the pre-drive AMP (Q1) on the entire band (HF to 50MHz band). The amplified TX signal is passed through L1, and amplified by the push-pulled drive AMP (Q2, Q3). These AMPs (Q1 to Q3) are individually gain-adjusted so that the frequency characteristic of TX signal is flat one by feeding back the 180-degree phase-shifted signal.

The amplified TX signal from the drive AMP (Q2, Q3) is passed through L2 and applied to the power AMP (Q4, Q5). The TX signal is power-amplified to the 100 W (max.) of output power. The power-amplified TX signal is entered to the FILTER UNIT via J9, and passed through a BPF corresponds to the TX frequency.

**• POWER SUPPLY LINE**

When the power SW on the FRONT panel is pushed, Q7 turns RL1 ON and the 13.8 V DC is supplied to the "P14V" line.

**• COOLING FAN CONTROL CIRCUIT**

The cooling fan control circuit is also equipped on the PA UNIT. The cooling fan control voltage "FANV" is applied to the base terminal of Q131, and the change of the voltagage causes the rotation speed of cooling fan.

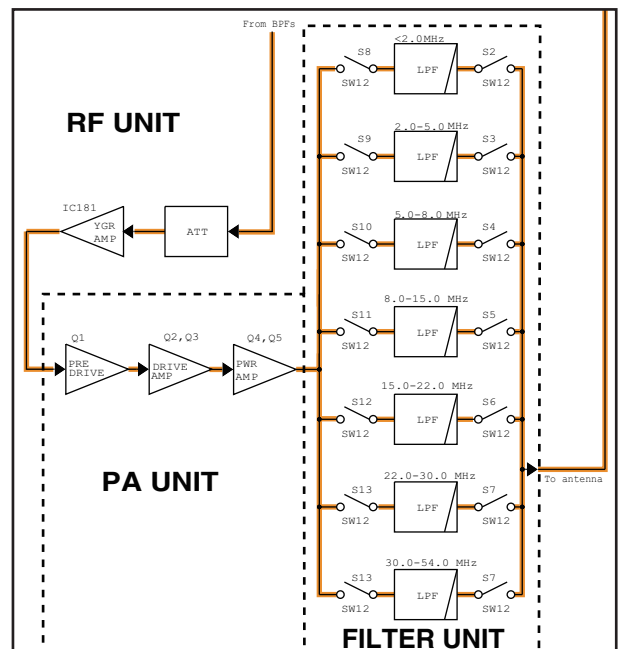
**3-4 FILTER UNIT**

The FILTER UNIT is composed by LPFs which reduces the harmonic components in the TX signal to be less than –50 dB.

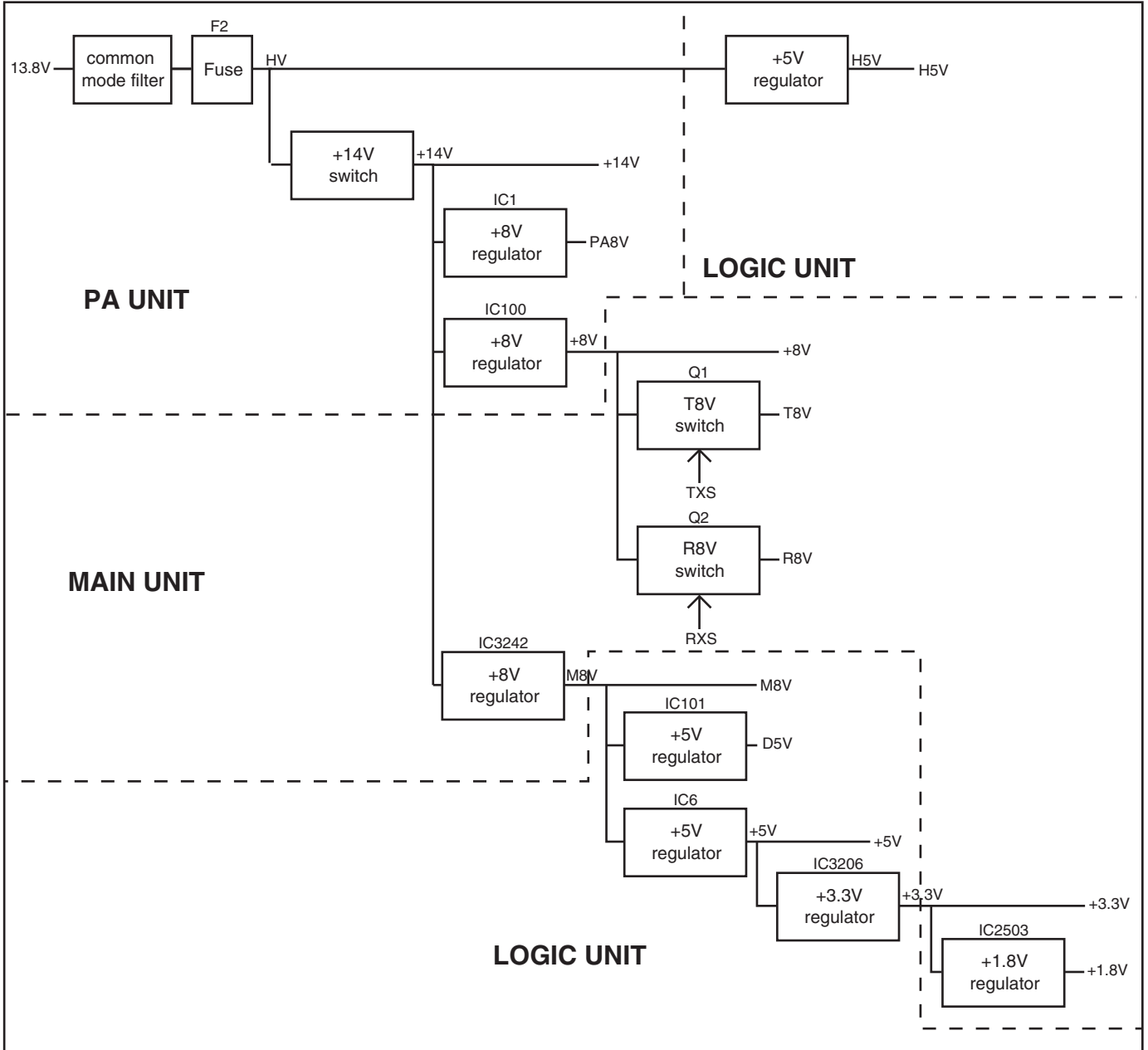
**• LPF**

The LPF stage is composed by seven Chebyshev-typed LPFs which have different cut-off frequencies. The TX signal passes through the one of 7 LPF according to the TX frequency. A switching relay is used for LPF selection on both input and output terminals for each LPF.

**- TX AMPLIFIERS AND LPFs -**



### 3-5 VOLTAGE BLOCK DIAGRAM



### 3-6 PORT ALLOCATIONS

#### • CPU (LOGIC UNIT: IC1)

PIN No.	LINE NAME	SIGNAL DESCRIPTION	IO	ACTIVE		PULL-UP/ PULL-DOWN
1	DTFS	DSP data frame (TX)	O	H	–	–
2	DCK	DSP data clock	O	–	–	–
3	DRXS	DSP data (RX)	I	–	–	47 kΩ pull-down
4	DTXS	DSP data (TX)	O	–	–	–
5	DRESL	DSP reset	O	L	DSP reset=L	47 kΩ pull-down
6	BYTE	External bass width setting 16 bit=H, 8 bit=L, single chip=VSS	O	–	–	–
8	UPWS	USB HUB power supply control	O	H	USB turn ON=H	47 kΩ pull-down
9	UMDS	USB modulation input line control	O	H	USB side=H, ACC side=L	–
10	RESET	Reset signal	I	L	Reset	10 kΩ pull-up
16	EBUSY	CI-V buss busy input	I	–	edge interrupt	100 kΩ pull-up
17	VBUS	USB VBUS detect	I	H	USB connect	–
18	PWRK	[PWR] key input	I	L	L=ON	47 kΩ pull-up
19	BL2S	LCD back light DIMMER control	O	H	H: dark, L: bright	47 kΩ pull-up
20	BL1S	LCD back light DIMMER control	O	H	H: dark, L: bright	47 kΩ pull-up
21	USCK	USB HUB control (Clock)	O	L	data latch	–
22	USDA	USB HUB control (Data)	O	L	data=1	–
23	RSB	[M-CH/RIT] dial phase B input (10 pulse/20 click)	I	H	pulse (DOWN: phase B gain)	47 kΩ pull-up
24	RSA	[M-CH/RIT] dial phase A input (10 pulse/20 click)	I	H	pulse (UP: phase A gain)	47 kΩ pull-up
25	MSA	[DIAL] phase A input	I	–	–	220 kΩ pull-down
26	MSB	[DIAL] phase B input	I	–	H=down, L=up	220 kΩ pull-down
27	TKEY	Key signal for optional tuner	I	L	–	47 kΩ pull-up
28	TSTA	START signal for optional tuner	O	L	–	10 kΩ pull-up
33	ETXD	CI-V output (CLONE output)	O	H	–	100 kΩ pull-up
34	ERXD	CI-V input (CLONE input)	I	H	–	100 kΩ pull-up
35	ESCK	EEPROM Clock	O	L	data latch (output)	22 kΩ pull-up
36	ESDA	EEPROM Data	IO	L	–	10 kΩ pull-up
37	RITD	RIT LED	O	H	turn on	47 kΩ pull-down
38	TCON	Tuner connect detect	I	H	tunet connect	1 MΩ pull-down
40	DISEN	LCD OFF	O	L	L=turn on, H=turn off	100 kΩ pull-down
41	DISST	LCD driver serial chip enable	O	H	data transmitting	–
42	DISCK	LCD driver serial clock	O	–	data latch	–
43	DISDA	LCD driver serial data	O	H	data=1	–
45– 52	KR7– KR0	Key matrix input return	I	H	H: key pull down	47 kΩ pull-down
53	PWRS	Power control	O	H	power ON=H	47 kΩ pull-down
54	RXS	RX control	O	H	RX=H	47 kΩ pull-down
55	TXS	TX control	O	H	TX=H	47 kΩ pull-down
56	SNDS	External SEND control (via ACC socket)	O	L	except ACC SEND TX=L	47 kΩ pull-up
57	BSTB	Strobe for shift register of MAIN	O	H	data renewal	–
58	ASTB1	Strobe (1/2) for M62352GP (D/A)	O	H	data renewal	–
59	MCK	BAND relay system clock (shift register for RF, shift register for 1st LO filter)	O	–	data latch	–
61	MDAT	BAND relay system data (shift register for RF, shift register for 1LO filter)	O	H	data=1	–
63	ASTB2	Strobe (2/2) for M62352GP(D/A)	O	H	data renewal	–
64	1CN0	AD9951 (DDS for 1st LO) IO UPDATE	O	–	DDS output renewal	–
65	3DST	AD9833 (DDS for 3rd LO) strobe	O	L	data transmitting	–
66	1DST	AD9951 (DDS for 1st LO) strobe	O	L	data transmitting	–
67	MRESL	System reset (shift register for MAIN)	O	L	main system resetting =L	47 kΩ pull-down
68	PRESL	DDS system reset (shift register for 1st LO filter, AD9951)	O	L	DDS system resetting=L	47 kΩ pull-down

• CPU (LOGIC UNIT: IC1) (continued)

PIN No.	LINE NAME	SIGNAL DESCRIPTION	I/O	ACTIVE		PULL-UP/ PULL-DOWN
69	PDT	PLL+MAIN system data (M62352GP×2, AD9951, AD9833)	O	H	data=1	–
70	PCK	PLL+MAIN system clock (M62352GP×2, AD9951, AD9833)	O	–	data latch	–
71–75	KS0–KS4	Key matrix strobe output 0	O	H	H strobe subject of interrupt	–
76	SQSS	Squelch signal (SQLS) output via the [ACC/MIC] terminal	O	H	open (mute OFF)	47 kΩ pull-down
77	RTKI	Keying input for RTTY	I	H	H=SPACE (keying)	47 kΩ pull-up
78	MSNDS	External SEND control (via MIC jack)	O	H	transmitting (except MIC SEND)=H	47 kΩ pull-down
79	MNFL	Manual notch volume input	I	–	CCW=0 V, CW=5 V	–
80	DCVL	Power voltage loading	I	–	power voltage 5V convert	–
81	DOTK	DOT input (keying)	I	L	down=1.55 V, up=2.5 V	47 kΩ pull-up
82	DASK	DASH input (keying)	I	L	down=1.55 V, up=2.5 V	47 kΩ pull-up
83	IPD	Pre-driver current (sauce voltage) input	I	–	In proportional (Voltage vs Current)	–
84	IDL	Id (current) loading	I	–	In proportional (Voltage vs Current)	–
85	SNDL	SEND loading (from ACC socket)	I	L	Detect TX (less than 1.0 V)	–
86	ALML	ALC meter	I	–	0 (min)–5 V (max)	–
87	REFL	REF voltage (SWR detection)	I	–	0 (min)–5 V (max)	–
88	FORL	FOR voltafe (SWR detection)	I	–	0 (min)–5 V (max)	–
89	FANL	PA UNIT temperature (thermo-sensor)	I	–	0 (min)–5 V (max)	–
90	UDL	MIC UP/DOWN input	I	–	0–5 V	–
91	PB2L	[TWIN PBT] volume (outer)input	I	–	CCW=0 V, CW=5 V	–
92	PB1L	[TWIN PBT] volume (inner)input	I	–	CCW=0 V, CW=5 V	–
93	RFGL	[SQL/RF] gain volume input	I	–	CCW=0 V, CW=5 V	–
95	AFGL	[AF gain] volume input	I	–	CCW=0 V, CW=5 V	–
96	VREF	A/D conversion reference voltage (=VCC1)	I	–	–	–
98	LOST	Strobe for shift register for 1st LO filter	O	H	–	–
99	MSNDL	SEND signal from [MIC] jack.	I	L	TX detect (less than 1.0 V)	–
100	DRFS	DSP data frame(RX)	O	H	–	–

• SHIFT REGISTER (RF UNIT: IC141)

LINE NAME	DESCRIPTION	ACTIVE
B0S	BPF/LPF (0.030000–1.599999 MHz) select	H
B1S	BPF/LPF (1.600000–1.999999 MHz) select	H
B2S	BPF/LPF (2.000000–3.999999 MHz) select	H
B3S	BPF/LPF (4.000000–7.999999 MHz) select	H
B4S	BPF/LPF (8.000000–10.999999 MHz) select	H
B5S	BPF/LPF (11.000000–14.999999 MHz) select	H
B6S	BPF/LPF (15.000000–21.999999 MHz) select	H
B7S	BPF/LPF (22.000000–32.999999 MHz) select	H

• SHIFT REGISTER (RF UNIT: IC142)

LINE NAME	DESCRIPTION	ACTIVE
AMS	AM mode select	H
B8WS	RX BPF/LPF (33.000000 MHz and higher) select	H
B8S	TX BPF/LPF (33.000000 MHz and higher) select	H
PROF	PREAMP OFF	H
PRON	PREAMP ON	H
ATTS	Attenuator control	L
L3S	LPF (5.000000–7.999999 MHz) select	H
L2S	LPF (2.000000–4.999999 MHz) select	H

• SHIFT REGISTER (MAIN UNIT: IC2701)

LINE NAME	DESCRIPTION	ACTIVE
LOF0	1st LO filter (0.030000–14.999999 MHz) select	H
LOF1	1st LO filter (15.000000–29.999999 MHz) select	H
LOF2	1st LO filter (30.000000–44.999999 MHz) select	H
LOF3	1st LO filter (45.000000–54.000000 MHz) select	H

• D/A CONVERTER (MAIN UNIT: IC1)

LINE NAME	DESCRIPTION	
TRXS	Antenna switching (TX/RX)	TX, over input=5V, other conditions:0V
BAND	N/C (RF UNIT: CP502)	-
POCV	TX output power setting	0 (TX low)–5V (TX high)
FANV	Cooling fan rotation speed control	0 (Stop) –5V (max. speed)
ID1V	Idling current control (Pre-driver)	In proportional Voltage vs Current (IPD)
ID2V	Idling current control (driver 1/2)	In proportional Voltage vs Current (IDL)
ID3V	Idling current control (driver 2/2)	In proportional Voltage vs Current (IDL)
ID4V	Idling current control (Final AMP 1/2)	In proportional Voltage vs Current (IDL)
ID5V	Idling current control (Final AMP 2/2)	In proportional Voltage vs Current (IDL)
UNSB	N/C	–
DRVC	Drive gain control	–
ICCV	APC current adjustment	ALC line control

• D/A CONVERTER (MAIN UNIT: IC2)

LINE NAME	DESCRIPTION
REFV	Reference fequency adjustment
VCT4	RX 1st IF AMP tunig voltage
VCT5	RX 1st IF AMP tunig voltage
AJLC	ALC control



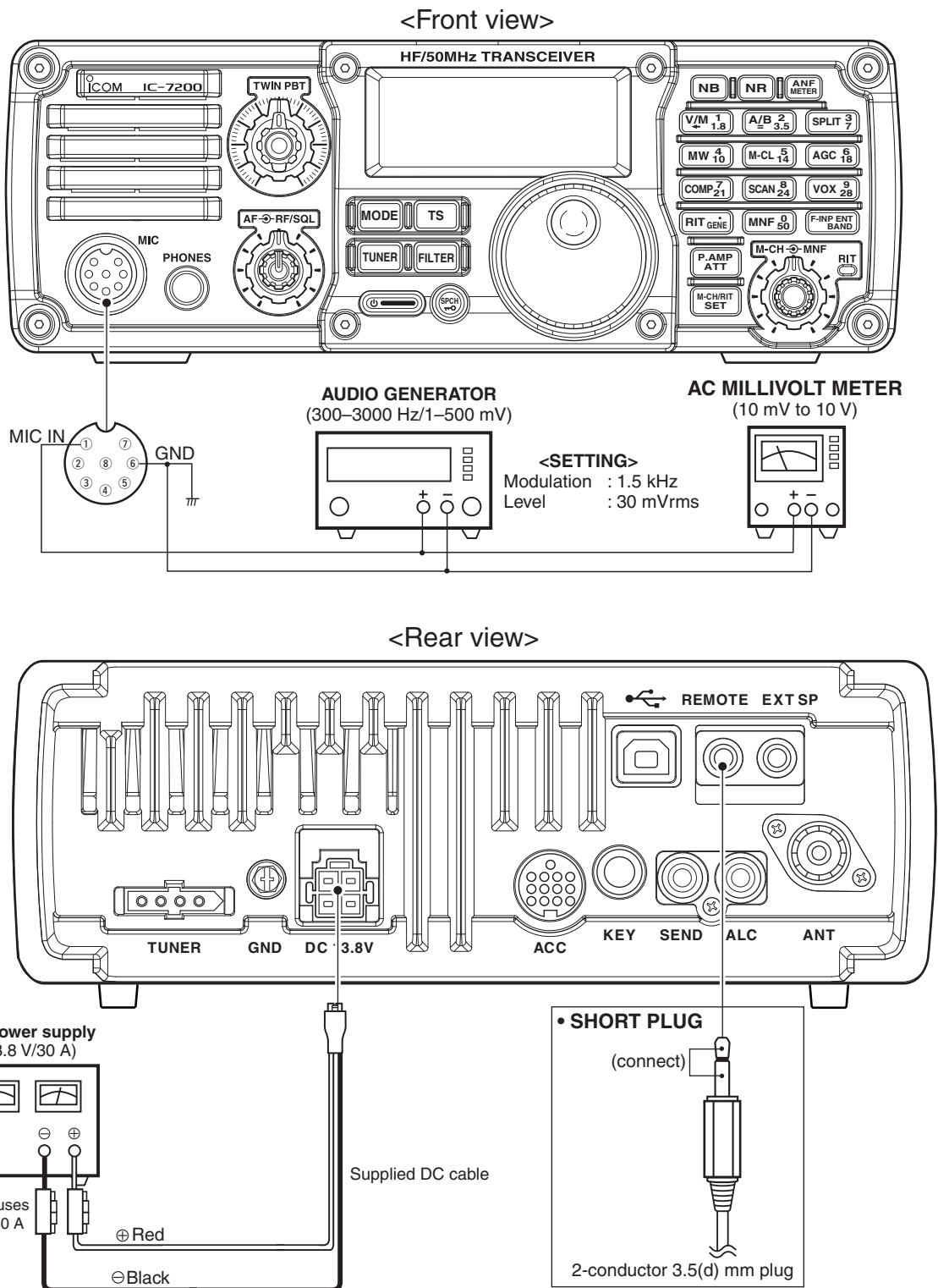
# SECTION 4 ADJUSTMENT PROCEDURE

## 4-1 PREPARATION

### REQUIRED EQUIPMENTS

EQUIPMENT	SPECIFICATION	EQUIPMENT	SPECIFICATION
RF power (terminated type)	Measuring range : 5–120 W	DC Ammeter	Measuring range : 0.1–30 A
	Frequency range : 1.8–60 MHz	DC Voltmeter	Measuring range : 0.1–20 V
Frequency Counter	Impedance : 50 Ω	Standard Signal Generator (SSG)	Frequency range : 0.1–60 MHz
	Frequency range : 0.1–50 MHz		Output level : 0.1 μV to 32 mV (–127 to –17 dBm)
50 Ω Dummy Load	Frequency accuracy : ±0.5 ppm or better	25 Ω Dummy Load	Impedance : 25 Ω
	Input level : Less than 1 mW		Capacity : More than 100 W
	Impedance : 50 Ω		
	Capacity : More than 100 W		

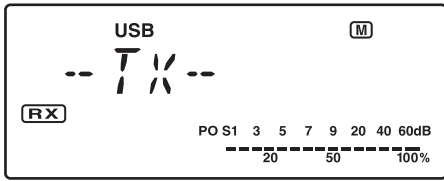
### COMMON CONNECTION



## ■ ADJUSTMENT MODE

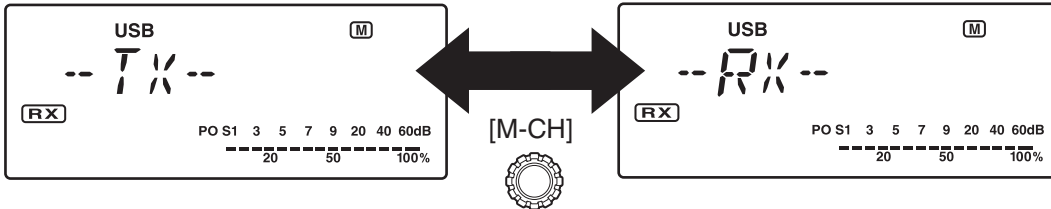
### • ENTERING ADJUSTMENT MODE

While pushing [NB] and [NR] keys, turn the power ON. Then the transceiver enters the adjustment mode.



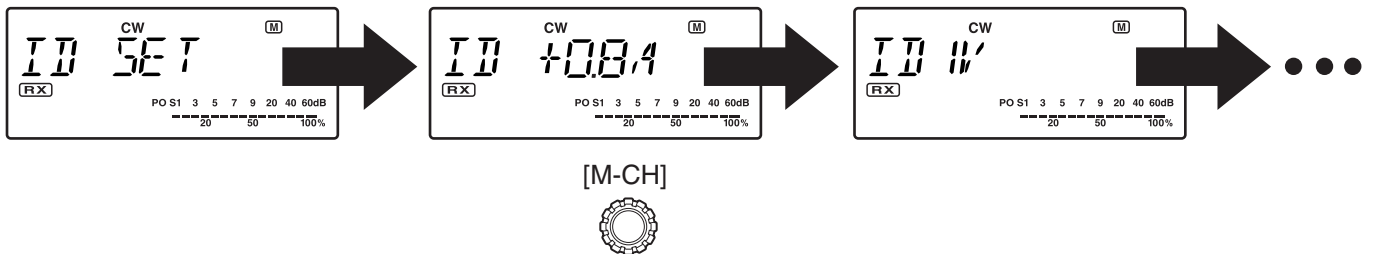
(Initial display)

Turn the [M-CH] control to toggle the adjustment main menu "TX" and "RX," and push [SET] key to select.



Turning the [M-CH] dial selects the adjustment for "TX" or "RX."

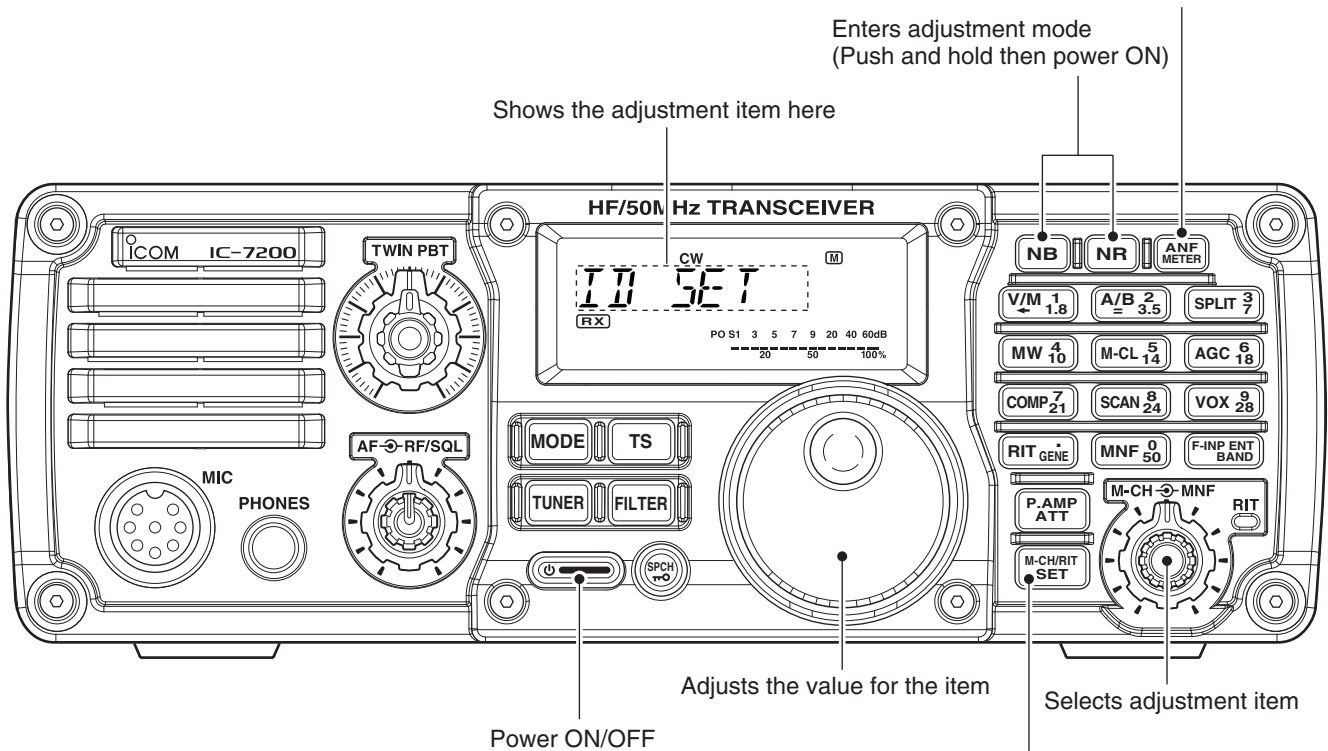
Turn the [M-CH] control to select each adjustment item, and push [SET] key to start.



Turning the [M-CH] dial selects each adjustment item.

### • KEY ASSIGNMENTS IN THE ADJUSTMENT MODE

- Returns to main menu (Push momentary)
- Quits adjustment mode (Push for 1 sec.)



- Stores the adjustment value
- Moves to next adjustment item

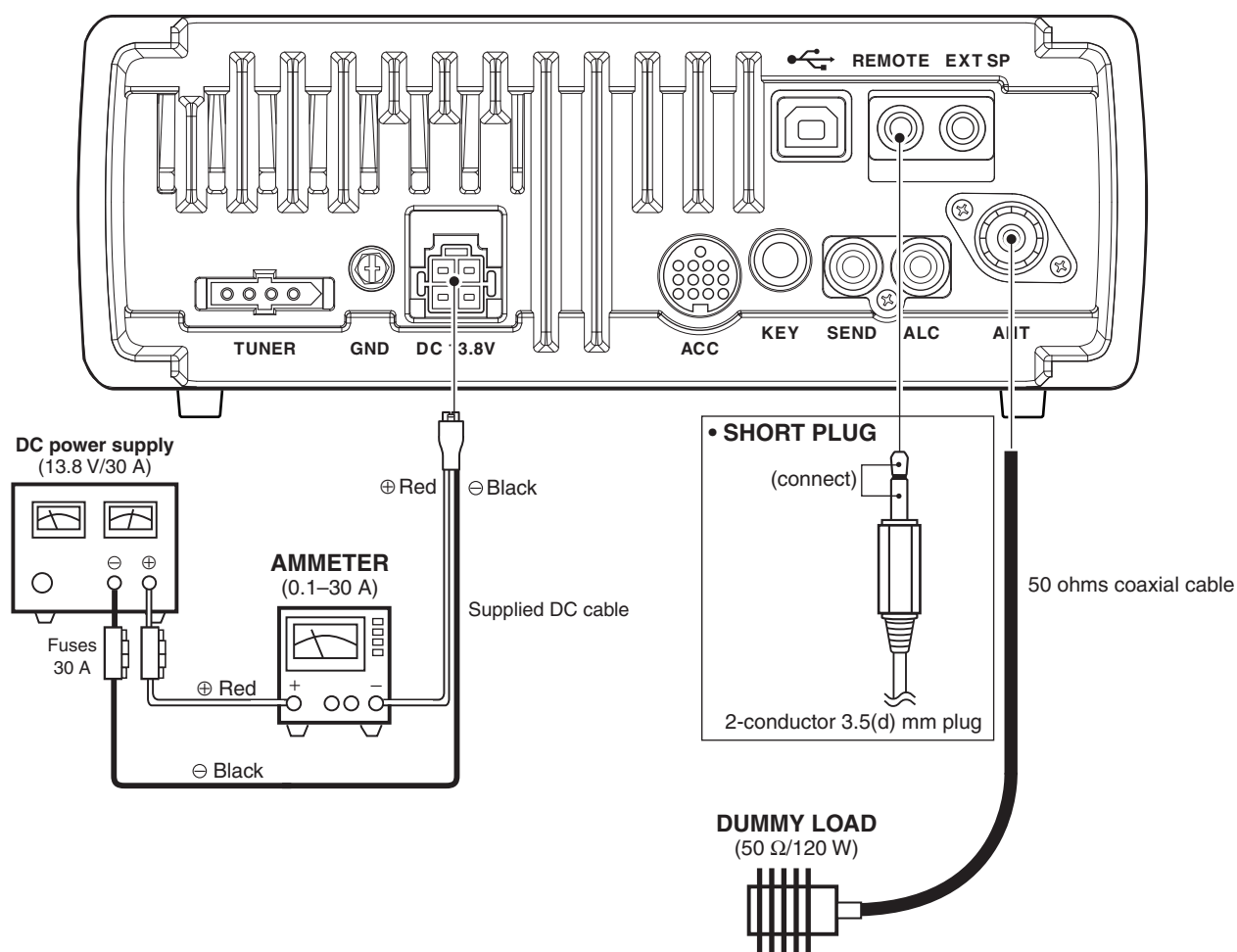
### • QUITTING ADJUSTMENT MODE

Push [ANF] for 1 sec.

## 4-2 ADJUSTMENT

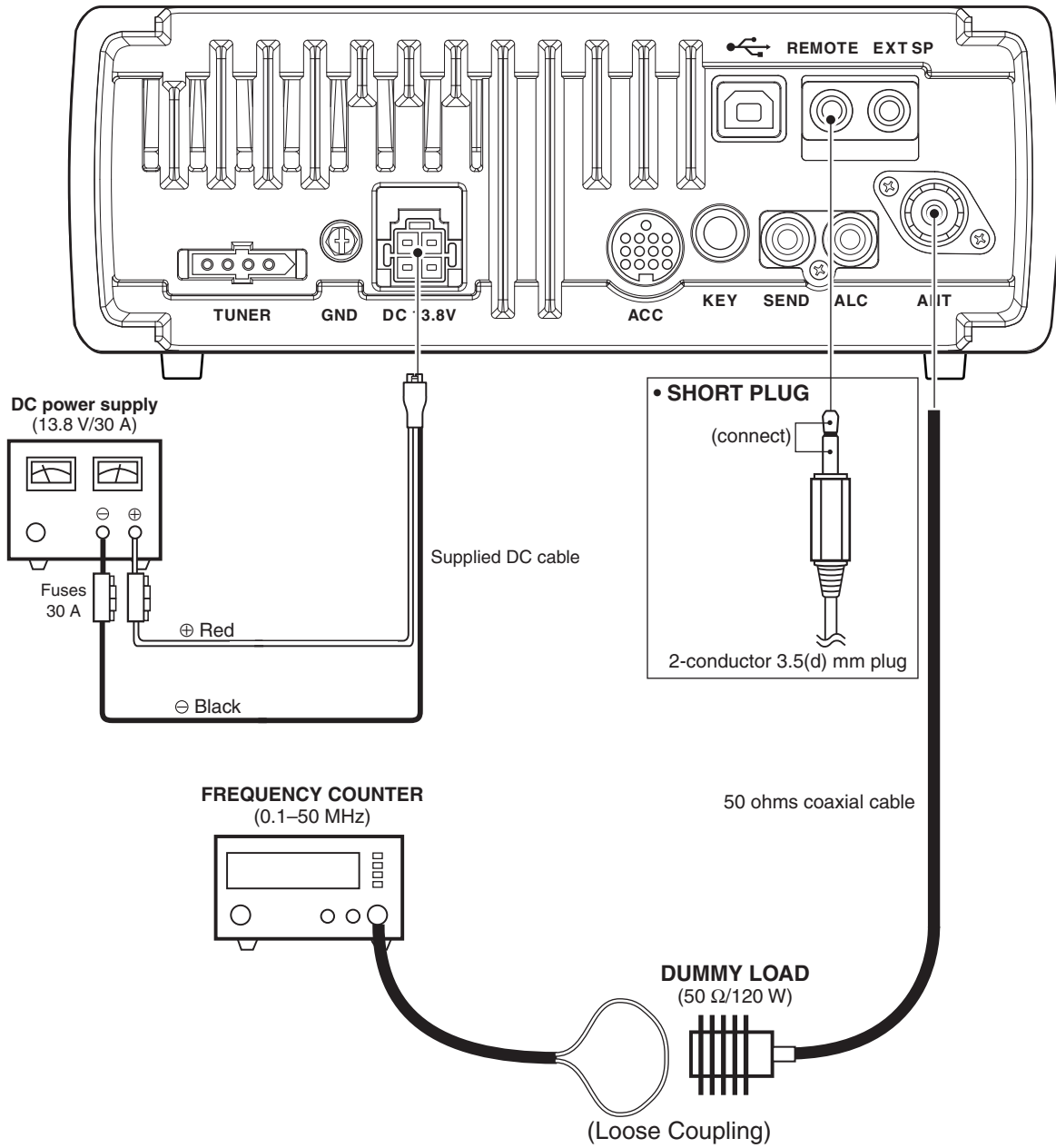
### • TRANSMITTER ADJUSTMENT

ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE	
IDLING CURRENT	1	[ID SET]	• Push [SET] key.	—
	2	[ID +0.8A]	• Measure the driving current, and note it as the initial value.	(Note the driving current value)
	3	[ID1V]	• Push [SET] key. (Beep "Pi!" sounds) (After 2.5 sec., another beep "Pipi!" sounds)	—
	4	[ID2V]	1) Adjust the idling current using [DIAL]. 2) Push [SET] key.	+0.8 A more than initial value
	5	[ID3V]	• Push [SET] key. (Beep "Pi!" sounds) (After 2.5 sec., another beep "Pipi!" sounds)	—
	6	[ID4V]	• Push [SET] key. (Beep "Pi!" sounds) (After 2.5 sec., another beep "Pipi!" sounds)	—
	7	[ID5V]	• Push [SET] key. (Beep "Pi!" sounds) (After 2.5 sec., another beep "Pipi!" sounds)	—



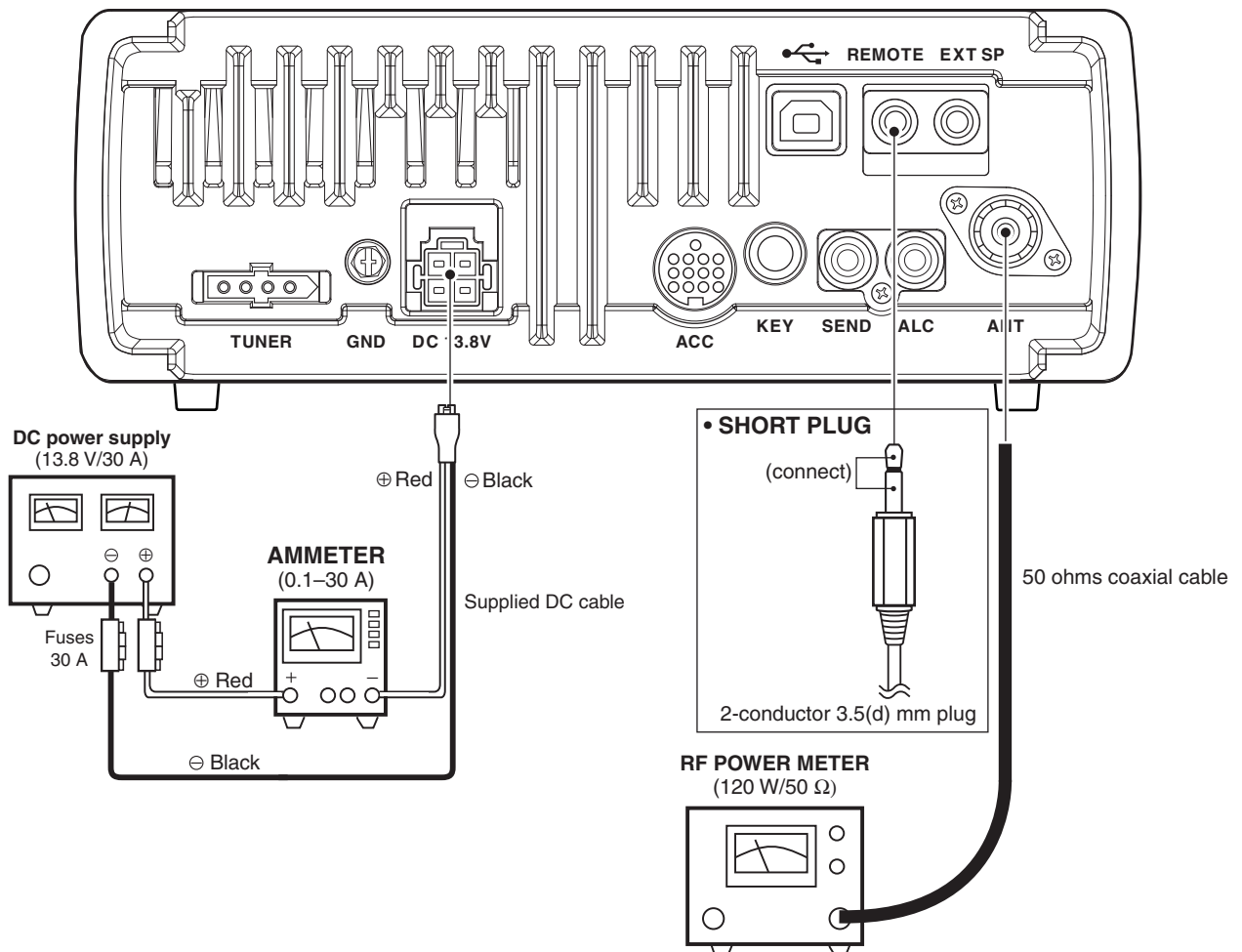
• TRANSMITTER ADJUSTMENT (continued)

ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE
REFERENCE FREQUENCY	1	[REF SET] • Push [SET] key.	—
	2	[REF FREQ] 1) Adjust the frequency using [DIAL]. 2) Push [SET] key.	29.999000 MHz



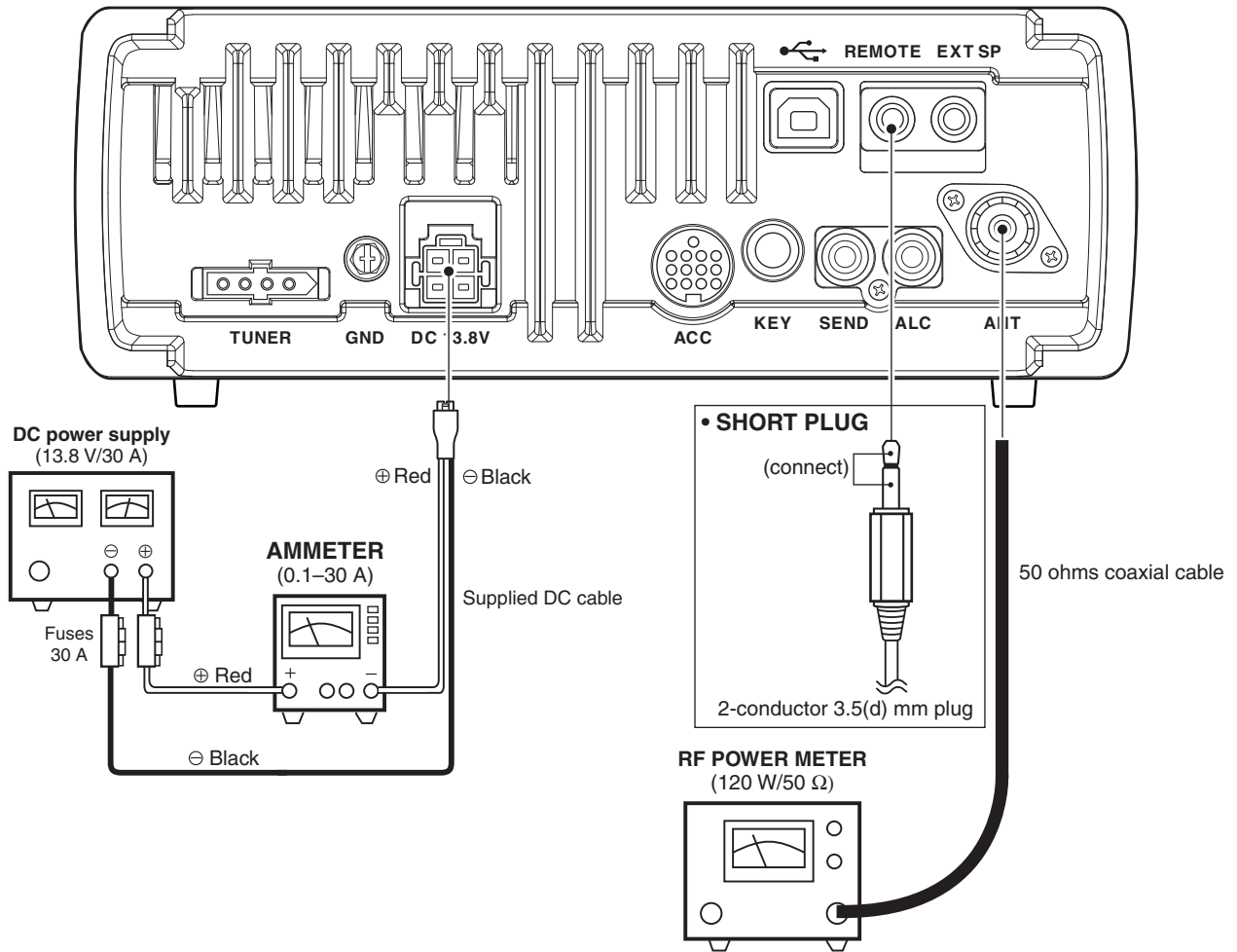
• TRANSMITTER ADJUSTMENT (continued)

ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE
VD TUNING (TX)	1 [VCT SET]	1) Connect an RF Power Meter to the antenna connector. 2) Push [SET] key.	-
	2 [VCT3 TX]	• Select the item "TXG SET" with [M-CH] control. (Skip this item)	(Skip this item)
TX TOTAL GAIN	1 [TXG SET]	• Push [SET] key.	-
	2 [14.1 TXG]	1) Connect an RF Power Meter to the Antenna connector. 2) Adjust the TX power using [DIAL]. 3) Push [SET] key. (The transceiver transmits automatically.)	50 W
	3 [1.91 TXG]	• Push [SET] key. (Beep "Pi!" sounds) (After 1.5 sec., another beep "Pipi!" sounds)	-
	4 [28.5 TXG]	• Push [SET] key. (Beep "Pi!" sounds) (After 1.5 sec., another beep "Pipi!" sounds)	-
	5 [51.0 TXG]	• Push [SET] key. (Beep "Pi!" sounds) (After 1.5 sec., another beep "Pipi!" sounds)	-
POWER METER (HF BAND)	<b>NOTE:</b> When the [PoHF SET] is adjusted, the [Po 50 SET] MUST be re-adjusted (or verified) too.		
	1 [PoHF SET]	• Push [SET] key.	-
	2 [PoHF MIN]	1) Connect an RF Power Meter to the Antenna connector. 2) Adjust the TX power using [DIAL]. 3) Push [SET] key.	1 W
	3 [PoHF 10]	1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	10 W
	4 [PoHF TUNE]	1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	10 W
	5 [PoHF 50]	1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	50 W
	6 [PoHF 75]	1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	75 W
	7 [PoHF MAX]	1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	102 W



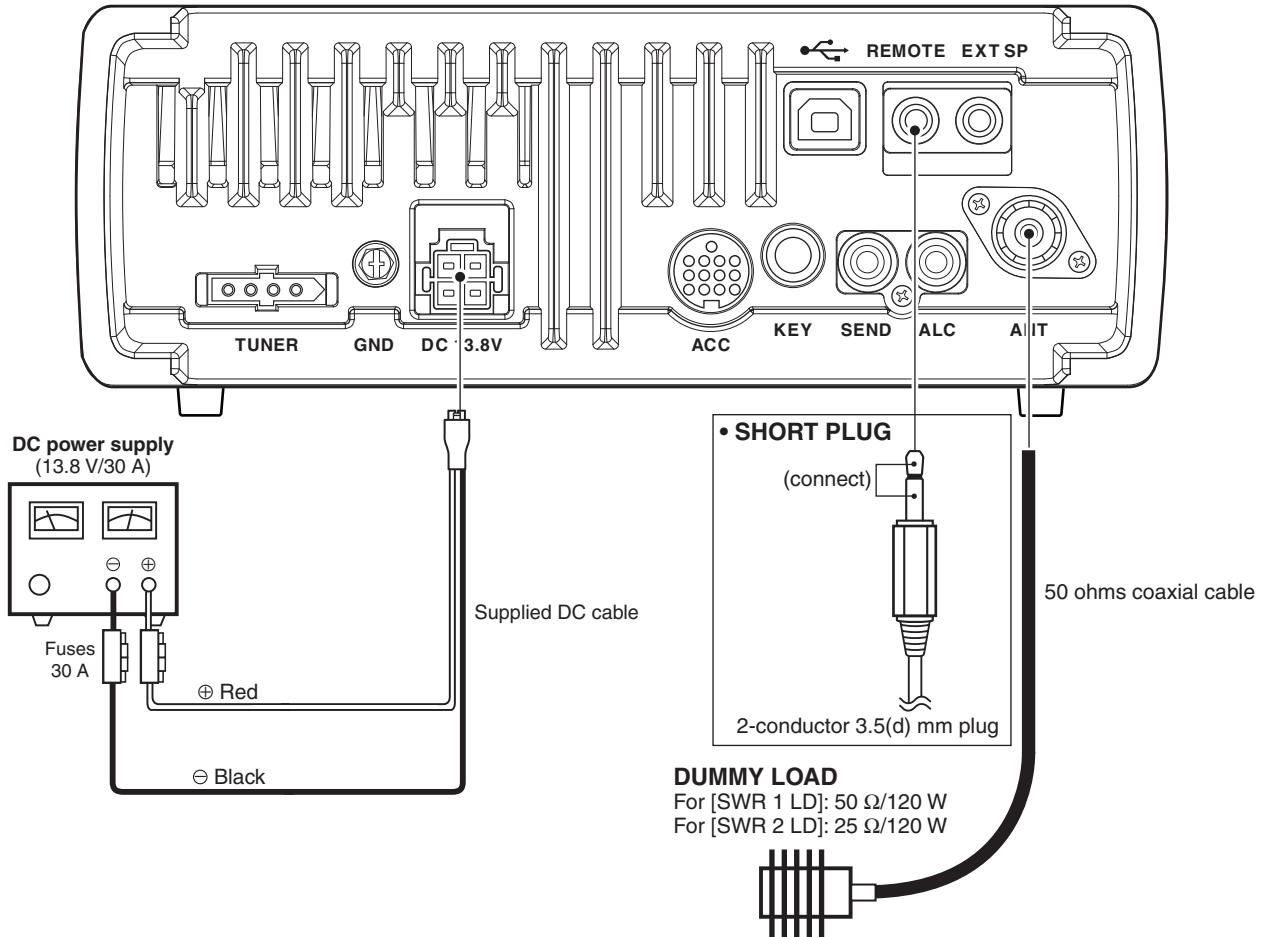
• TRANSMITTER ADJUSTMENT (continued)

ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE
<b>POWER METER (50 MHz BAND)</b>	1	[Po50 SET] • Push [SET] key.	–
	2	[Po50 MIN] 1) Connect an RF Power Meter to the Antenna connector. 2) Adjust the TX power using [DIAL]. 3) Push [SET] key.	1 W
	3	[Po50 10] 1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	10 W
	4	[Po50 TUNE] 1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	10 W
	5	[Po50 50] 1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	50 W
	6	[Po50 75] 1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	75 W
	7	[Po50 MAX] 1) Adjust the TX power using [DIAL]. 2) Push [SET] key.	100 W
<b>POCV RATIO (AM)</b>	1	[AM R SET] • Push [SET] key.	–
	2	[AM RATIO] 1) Connect an RF Power Meter to the Antenna connector. 2) Adjust the TX power using [DIAL]. 3) Push [SET] key.	27.5 W
<b>ALC METER</b>	1	[AL-M SET] 1) Connect an RF Power Meter (or a Dummy Load) to the Antenna connector. 2) Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	–
<b>DRIVE GAIN</b>	1	[DRV SET] 1) Connect an RF Power Meter (or a Dummy Load) to the Antenna connector. 2) Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	–



• TRANSMITTER ADJUSTMENT (continued)

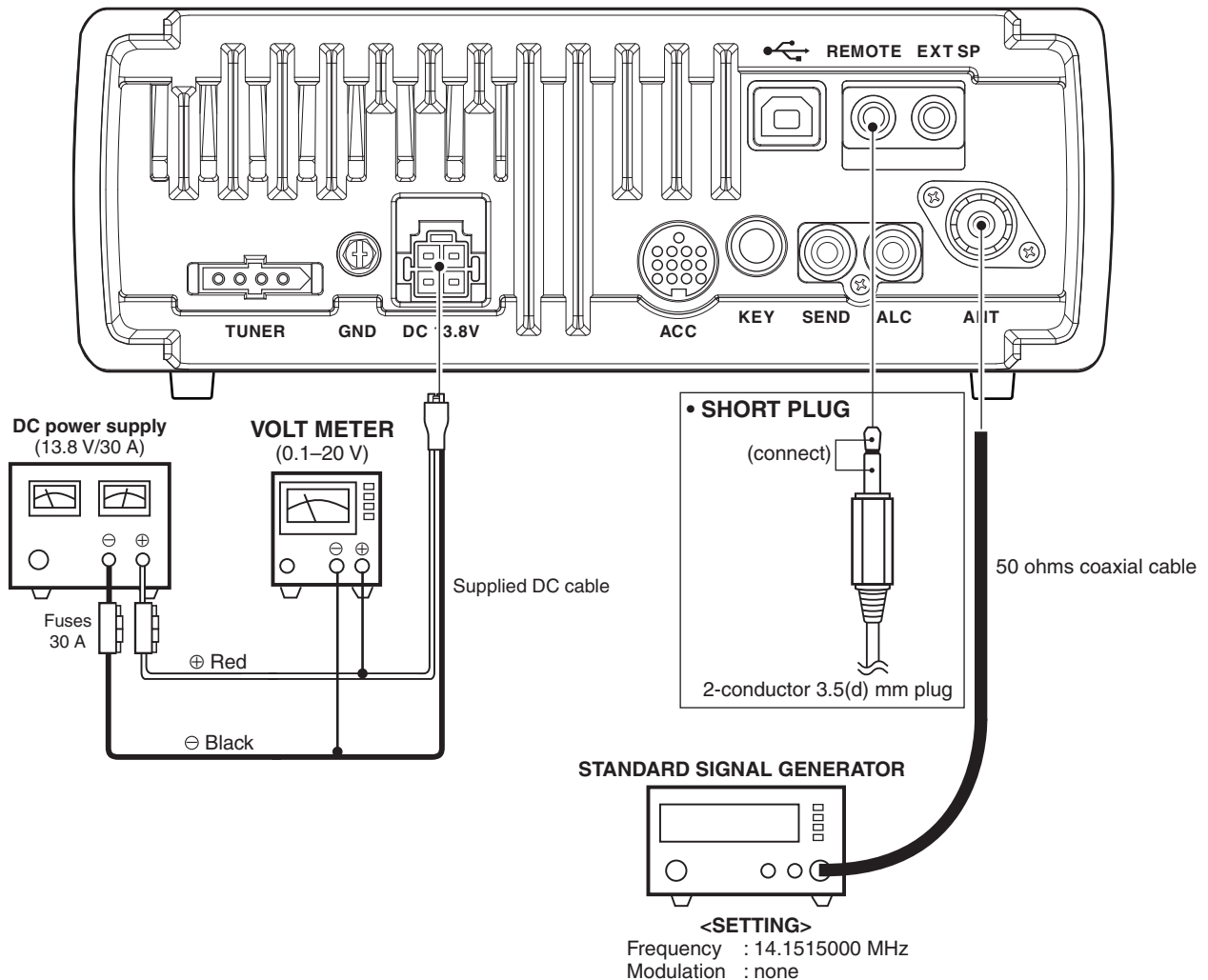
ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE
SWR METER	1 [SWR 1 LD]	1) Connect a 50 Ω Dummy Load to the Antenna connector. 2) Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	—
	2 [SWR 2 LD]	1) Connect a 25 Ω Dummy Load to the Antenna connector. 2) Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	—
ID-APC CHECK	1 [IDAPC CK]	1) Connect a 25 ohms Dummy Load to the Antenna connector. 2) Push [SET] key. (Beep "Pi!" sounds) (Another beep "Pipi!" sounds, then "TX" is displayed)	—



• RECEIVER ADJUSTMENTS

ADJUSTMENT	DISPLAYED ITEM	OPERATION	VALUE
PREPARATION	[RX]	1) Connect an SSG to the Antenna connector, and set as; • Frequency : 14.1515000 MHz • Modulation : None • Level : +34 dBμ (-73 dBm) 2) Select the adjustment main menu "RX," using [M-CH] control. 3) Push [SET] key.	-
PBT DIAL CENTER POSITION	1 [TWIN PBT]	1) Set [PBT1] and [PBT2] controls to the center position. 2) Push [SET] key. (Beep "Pipi!" sounds)	-
REFERENCE VOLTAGE	1 [13.8 SET]	1) Connect a Voltmeter to the DC power cable. 2) Verify that the measured voltage is "13.8 V." 3) Push [SET] key.	13.8 V
VD TUNING (RX)	1 [VCT2 RX]	• Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	-
	2 [VCT1 RX]	• Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	-
	3 [VCT3 RX]	• Select the item "RX GAIN" with [M-CH] control. (Skip this item)	(Skip this item)
RX TOTAL GAIN	1 [RX GAIN]	<b>NOTE:</b> NEVER change the SSG's condition until the beep sounds. • Push [SET] key. (Beep "Pi!" sounds) (After 30 sec., another beep "Pipi!" sounds)	-
	1 [S0 LEVEL]	• Select the item "S9 LEVEL" with [M-CH] control. (Skip this item)	(Skip this item)
S-METER	2 [S9 LEVEL]	• Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds)	-
	3 [+60 LEVEL]	1) Set the SSG as; • Level : +90 dBμ 2) Push [SET] key. (Beep "Pi!" sounds) (After 1 sec., another beep "Pipi!" sounds, then "RX" is displayed.)	-

When the adjustment is finished, push [ANF] key for 1 sec. to quit adjustment mode.















[MAIN UNIT]

Table with 6 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Lists components C1706 through C2580 with their respective specifications and locations.

[MAIN UNIT]

Table with 6 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Lists components C2581 through C2972 with their respective specifications and locations.

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



















**[LOGIC UNIT]**

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C45	4030006880	S.CER C1608 JB 1H 472K-T	B	155.5/28.7
C47	4030006880	S.CER C1608 JB 1H 472K-T	B	66.1/3.3
C49	4030006880	S.CER C1608 JB 1H 472K-T	B	158.1/28.7
C50	4030006880	S.CER C1608 JB 1H 472K-T	B	25.6/32.5
C70	4030006880	S.CER C1608 JB 1H 472K-T	T	15.5/29.6
C71	4030006880	S.CER C1608 JB 1H 472K-T	T	16.9/33.8
C72	4030006880	S.CER C1608 JB 1H 472K-T	T	15.5/28.3
C73	4030006880	S.CER C1608 JB 1H 472K-T	T	15.9/25.7
C74	4030017490	S.CER C1608 JB 1A 105K-T	B	155.1/39
C101	4030011600	S.CER C1608 JB 1E 104K-T	T	66.5/26.4
C102	4030006880	S.CER C1608 JB 1H 472K-T	T	36.5/27.8
C103	4030012610	S.CER C2012 JB 1C 474K-T	T	66.2/23.4
C104	4030011600	S.CER C1608 JB 1E 104K-T	B	138/60.8
C105	4030011600	S.CER C1608 JB 1E 104K-T	B	155.8/61.2
C106	4030019490	S.CER C2012 JB 1A 106K-T	B	139.7/61.3
C107	4030011600	S.CER C1608 JB 1E 104K-T	B	155.8/64.2
C108	4030019490	S.CER C2012 JB 1A 106K-T	B	136.4/54.5
C109	4030019490	S.CER C2012 JB 1A 106K-T	B	154.1/63.4
C110	4030011600	S.CER C1608 JB 1E 104K-T	B	138/57.9
C158	4030017490	S.CER C1608 JB 1A 105K-T	B	39.7/37.4
C170	4030006880	S.CER C1608 JB 1H 472K-T	B	23.5/23.6
C171	4030006880	S.CER C1608 JB 1H 472K-T	T	39.2/37.7
C172	4030018910	S.CER C1608 JB 0J 475K-T	T	38.4/36.4
C211	4030006880	S.CER C1608 JB 1H 472K-T	B	19.1/32.6
C212	4030011600	S.CER C1608 JB 1E 104K-T	B	19.1/38.4
C1071	4030011600	S.CER C1608 JB 1E 104K-T	T	127.8/14.5
C1072	4510009700	S.ELE EEEFK1C101P	B	128.2/19.3
C1073	4510009820	S.ELE EEEFK1C470P	B	129.1/5.1
C1074	4510009820	S.ELE EEEFK1C470P	B	129.1/12.2
J1	6510018971	S.CON B4B-PH-SM4-TB(LF)(SN)	B	140.7/29.4
J3	6510019971	S.CON 52808-1071	B	157.3/22.7
J4	6510019971	S.CON 52808-1071	B	61/7.7
J5	6510019971	S.CON 52808-1071	B	9.3/29.1
J101	6510024151	S.CON 50FY-BMT-TB(LF)(SN)	B	39.2/25.8
J102	6510024151	S.CON 50FY-BMT-TB(LF)(SN)	B	39.2/61
J301	6510019971	S.CON 52808-1071	B	77.2/59.4
DS1	5030003090	LCD S11325 <SUC>		
DS2	5040002940	S.LED TLYU1002A(T02)	T	172.5/14.3
DS70	5040002940	S.LED TLYU1002A(T02)	T	61.5/49.1
DS71	5040002940	S.LED TLYU1002A(T02)	T	53/49.1
DS73	5040002940	S.LED TLYU1002A(T02)	T	53/59.2
DS74	5040002940	S.LED TLYU1002A(T02)	T	61.5/59.2
DS76	5040002940	S.LED TLYU1002A(T02)	T	70/59.2
DS77	5040002940	S.LED TLYU1002A(T02)	T	70/49.1
DS79	5040002940	S.LED TLYU1002A(T02)	T	78.5/59.2
DS80	5040002940	S.LED TLYU1002A(T02)	T	78.5/49.1
DS82	5040002940	S.LED TLYU1002A(T02)	T	87/59.2
DS83	5040002940	S.LED TLYU1002A(T02)	T	87/49.1
DS85	5040002940	S.LED TLYU1002A(T02)	T	95.5/59.2
DS86	5040002940	S.LED TLYU1002A(T02)	T	95.5/49.1
DS88	5040002940	S.LED TLYU1002A(T02)	T	104/59.2
DS89	5040002940	S.LED TLYU1002A(T02)	T	104/49.1
EP2	8930076650	LCD SRCN-3015-SP-N-W (SHJ)		
EP4	6910012350	S.BEA MMZ1608Y 102BT	B	63.8/14.9
EP5	6910012350	S.BEA MMZ1608Y 102BT	T	12.5/24.8
EP6	6910012350	S.BEA MMZ1608Y 102BT	B	21.6/21.3
EP45	6910012350	S.BEA MMZ1608Y 102BT	B	57.3/10.2
EP46	6910012350	S.BEA MMZ1608Y 102BT	B	57.3/8.2
EP47	6910018930	S.BEA MPZ2012S601A	T	41.9/23.2
EP48	6910018930	S.BEA MPZ2012S601A	T	41.9/21.5
EP49	6910018930	S.BEA MPZ2012S601A	B	41/21.1
EP50	6910018930	S.BEA MPZ2012S601A	B	45.5/21
EP51	6910018930	S.BEA MPZ2012S601A	B	65.4/7.4
EP52	6910018930	S.BEA MPZ2012S601A	B	65.4/11.1
EP53	6910018930	S.BEA MPZ2012S601A	B	8.8/25.3
EP54	6910018930	S.BEA MPZ2012S601A	B	66.3/4.9
EP55	6910018930	S.BEA MPZ2012S601A	B	43/21

**[VR-A UNIT]**

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R1	7210002910	VAR RV-310(RK0972210 10KB/10KB)		
R2	7210002960	VAR RV-313(RK0972210 10KB/10KB)		
J1	6510026670	S.CON IMSA-6281S-06Y900	T	21.6/5.1

**[VR-B UNIT]**

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
J1	6510020711	S.CON 52793-1070(1090)	T	9.2/2.4
S1	2250000640	ENC TP96D96E20-22F-10KB-3015		

**[MIC UNIT]**

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
J1	6510000191	CON FM214-8SS(P)-1		
J2	6510019971	S.CON 52808-1071	B	18.1/6.5

**[PHONE UNIT]**

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
R1	7030006070	S.RES ERJ12YJ101U (100)	T	24.6/5
R2	7030006070	S.RES ERJ12YJ101U (100)	T	24.6/10.1
R3	7030003440	S.RES ERJ3GEYJ 102 V (1K)	T	23.1/12.6
C1	4030006880	S.CER C1608 JB 1H 472K-T	B	27.7/9.6
C2	4030006880	S.CER C1608 JB 1H 472K-T	T	23.1/2.5
C3	4030006880	S.CER C1608 JB 1H 472K-T	T	23.1/13.9
J1	6510023891	CON S-G4617#01F 0		
J2	6510019971	S.CON 52808-1071	B	26.6/4
EP1	6910014690	S.BEA MPZ1608S221A-T	B	29.2/8.1

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

# SECTION 6

# MECHANICAL PARTS

## [CHASSIS] (C)

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510000370	MR-DS	1
P1**	5610000380	TMP-K01X-A1	1
P2**	5610000380	TMP-K01X-A1	1
P3**	5610000380	TMP-K01X-A1	1
P4**	5610000380	TMP-K01X-A1	1
P5**	5610000380	TMP-K01X-A1	1
P6**	5610000380	TMP-K01X-A1	1
P7**	5610000380	TMP-K01X-A1	1
P8**	5610000380	TMP-K01X-A1	1
MF1	2710000810	FD124010HB-1N7	1
MF2	2710000810	FD124010HB-1N7	1
W1**	8900014720	OPC-909A	1
W5**	8900017870	OPC-1887	1
W6**	8900017870	OPC-1887	1
W7**	8900017870	OPC-1887	1
W8**	8900017870	OPC-1887	1
W9**	8900017870	OPC-1887	1
W10**	9025900290	62/99/150/C31/C31	1
W11**	9086700300	Wire 8	1
W12**	9025900290	62/99/150/C31/C31	1
W13**	9086700300	Wire 8	1
W14**	9025900290	62/99/150/C31/C31	1
W15**	9086700300	Wire 8	1
W16**	9025900290	62/99/150/C31/C31	1
W17**	9086700300	Wire 8	1
MP1	8010021070	3015 CHASSIS	1
MP2	8110009510	3015 L-COVER	1
MP3	8110009500	3015 U-COVER	1
MP4	8930075130	3015 L-PACKING	1
MP5	8930075140	3015 U-PACKING	1
MP6	8930075590	3015 ANT PLATE	1
MP7	8510018690	3015 MAIN COVER	1
MP8	8510018700	3015 PA COVER	1
MP9	8930042690	RUBBER REG (L)	2
MP10	8930075100	3015 STAND HOLDER	2
MP11	8930074520	3015 STAND	1
MP12	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	5
MP13	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	5
MP14	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	5
MP15	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	8
MP16	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	2
MP17	8810010491	SCREW PH M3X15 ZK3	7
MP18	8810010491	SCREW PH M3X15 ZK3	7
MP19	8810004431	SCREW PH M3X6 ZK3	4
MP20	8810004431	SCREW PH M3X6 ZK3	4
MP21	8810003171	SETSCREW (A) 3X8 ZC3	6
MP24	8810009991	SCREW BT B0 3X8 NI-ZK3 (BT)	2
MP25	8930076070	3015 BUSH	1
MP26	8930076080	3015 A-NET	1
MP27	8930076090	3015 FAN HOLDER	1
MP28	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	4
MP29	8810004301	SCREW PH M3X10 ZK3	4
MP30	8810009371	SCREW BT B0 3X12NI-ZK3 (BT)	1
MP31	8820000530	FLANGE BOLT M4X8 NI	1
MP32	8850000140	FLAT WASHER M4 BS NI	2
MP33	8850000430	S-WASHER M4 NI	1
MP34	8930075810	SPONGE (KB)	1
MP35	8930075810	SPONGE (KB)	1
MP36	8930047070	SPONGE (FQ)	1
MP37	8930049770	SPONGE (GF)	1
MP38	8930049770	SPONGE (GF)	1
MP39	8930071840	HIMELON SHEET (CT)	1
MP40	8930077150	INSULATION SHEET (MJ)	2
MP42	8930077680	3015 PA EARTH SPRING	1
MP42	8930077680	3015 PA EARTH SPRING	[EUR] 1
MP42	8930077680	3015 PA EARTH SPRING	[FRA] 1
MP42	8930077680	3015 PA EARTH SPRING	[ITR] 1
MP42	8930077680	3015 PA EARTH SPRING	[ESP] 1
MP42	8930077680	3015 PA EARTH SPRING	[EUR-01] 1
MP43	8930048971	SHIELD TAPE (C)-1	[EUR] 2
MP43	8930048971	SHIELD TAPE (C)-1	[FRA] 2
MP43	8930048971	SHIELD TAPE (C)-1	[ITR] 2
MP43	8930048971	SHIELD TAPE (C)-1	[ESP] 2
MP43	8930048971	SHIELD TAPE (C)-1	[EUR-01] 2
MP121	8930068260	THERMALLY SHEET (AV)	1
MP1091	8930049600	2240 IC CLIP	1
MP3242	8930078200	3015 IC CLIP	1

## [FRONT UNIT] (F)

REF NO.	ORDER NO.	DESCRIPTION	QTY.
SP1	2510001480	4050P0802	1
W1**	8900014720	OPC-909A	1
W2**	8900014740	OPC-885A	1
W3**	8900014740	OPC-885A	1
W4**	8900018190	OPC-1892A	1
	8900018200	OPC-1941	[USA] 1
	8900018200	OPC-1941	[EUR] 1
	8900018200	OPC-1941	[FRA] 1
	8900018200	OPC-1941	[ITR] 1
	8900018200	OPC-1941	[ESP] 1
	8900018200	OPC-1941	[EUR-01] 1
	8900018190	OPC-1892A	[KOR] 1
	8900018190	OPC-1892A	[CHN] 1
	8900018190	OPC-1892A	[EXP] 1
EP1	0880001360	EX-2500 [USA]	1
EP3	6450001230	HLJ0999-01-480 (SNAP PLATE)	1
MP1	8210024670	3015 FRONT PANEL	1
MP2	8310071540	3015 WINDOW PLATE	1
MP3	8830003210	3015 HEX NUT	2
MP4	8610013750	KNOB N-366 COVER (Incl. MP30, 31)	1
MP5	8610013671	KNOB N-375-1	1
MP6	8610013610	KNOB N-367 (Incl. MP29)	1
MP7	8610013621	KNOB N-368-1	1
MP8	8610013630	KNOB N-369 (Incl. MP29)	1
MP9	8610013640	KNOB N-370 (Incl. MP23)	1
MP10	8610013651	KNOB N-371-1	1
MP11	8930075120	3015 FRONT PACKING	1
MP12	8930074990	3015 17-KEY	1
MP13	8930075000	3015 6-KEY	1
MP14	8930074530	3015 JACK HOLDER	1
MP15	8930076520	3015 A-VR RUBBER	1
MP16	8820001490	3015 CAP SCREW	8
MP17	8930076510	3015 VR RUBBER	1
MP18	8930074540	O-RING (BU)	1
MP19	8930074350	O-RING (BW)	8
MP20	8930075160	3015 LENS	1
MP21	8010021020	3015 SUB CHASSIS	1
MP23	8610007510	KNOB SPRING NO.7800	1
MP24	8930069760	2914 SP NET	1
MP26	8930075150	3015 CONNECTOR SEAL	1
MP27	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	6
MP28	8810008661	SCREW BT B0 3X8 NI-ZC3 (BT)	6
MP29	8610007420	KNOB SPRING NO.6601	2
MP30	8610010040	KNOB-N-239 FINGER REST	1
MP31	8930060190	2591 N-SPRING	1
MP32	8610010024	KNOB-N-239 BASE-4	1
MP33	8930021220	SPONGE (CP)	1
MP34	8930071830	HIMELON SHEET (CS)	1
MP35	8930070300	SPONGE (JD)	1
MP36	8930021220	SPONGE (CP)	1
MP37	8930067980	SHIELD SPONGE (AS)	[EUR] 1
	8930067980	SHIELD SPONGE (AS)	[FRA] 1
	8930067980	SHIELD SPONGE (AS)	[ITR] 1
	8930067980	SHIELD SPONGE (AS)	[ESP] 1
	8930067980	SHIELD SPONGE (AS)	[EUR-01] 1
MP38	8930078390	THERMALLY SHEET (BQ)	1
MP39	8930072650	RUBBER SHEET (BX)	1

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

\*\* : Refer to "GENERAL WIRING" for the location.



**[MIC BOARD] (MC)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510000191	FM214-8SS (P)-1	1
J2*	6510019971	52808-1071	1

**[PHONE] (PH)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510023891	S-G4617#01F	1
J2*	6510019971	52808-1071	1

**[VR-A BOARD] (VA)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
R1	7210002910	RV-310 (RK0972210 10KB/10KB)	1
R2	7210002960	RV-313 (RK0972210 10KB/10KB) *	1
J1*	6510026670	IMSA-6281S-06A-G	1

**[VR-B BOARD] (VB)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510020711	52793-1070	1
S1	2250000640	TP96D96E20-22F-B103-3015	1

**[LOGIC UNIT] (L)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510018971	B4B-PH-SM4-TB (LF) (SN)	1
J3*	6510019971	52808-1071	1
J4*	6510019971	52808-1071	1
J5*	6510019971	52808-1071	1
J101*	6510024151	50FY-BMT-TB (LF) (SN)	1
J102*	6510024151	50FY-BMT-TB (LF) (SN)	1
J301*	6510019971	52808-1071	1
DS1	5030003090	S11325	1
EP2	8930076650	SRCN-3015-SP-N-W	2
MP1	8210024710	3015 REFLECTOR	1
MP2	8930074390	3015 LCD HOLDER	1
MP3	8930075470	3015 LCD FILTER	1

**[MAIN UNIT] (M)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510024151	50FY-BMT-TB (LF) (SN)	1
J2*	6510024151	50FY-BMT-TB (LF) (SN)	1
J4*	6510024151	50FY-BMT-TB (LF) (SN)	1
J5*	6510024151	50FY-BMT-TB (LF) (SN)	1
J6*	6510024151	50FY-BMT-TB (LF) (SN)	1
J7*	6510007020	TMP-J01X-V6	1
J8*	6450000140	HSJ0807-01-010	1
J9*	6450000140	HSJ0807-01-010	1
J11*	6510019971	52808-1071	1
J1531*	6510025840	AXN316C038P	1
J3201*	6510026540	UBB-4R-D14T-4D (LF) (SN)	1
J3203*	6510014961	B2B-ZR-SM4-TF (LF) (SN)	1
EP504*	6910002161	CASE-BM7H-LF	1
EP541*	6910002161	CASE-BM7H-LF	1
EP551*	6910002161	CASE-BM7H-LF	1
EP2561*	6910002161	CASE-BM7H-LF	1
EP2566*	6910002161	CASE-BM7H-LF	1
MP1	8930077690	3015 MAIN EARTH SPRING	[USA] 1
MP1	8930077690	3015 MAIN EARTH SPRING	[EUR] 1
MP1	8930077690	3015 MAIN EARTH SPRING	[FRA] 1
MP1	8930077690	3015 MAIN EARTH SPRING	[ITR] 1
MP1	8930077690	3015 MAIN EARTH SPRING	[ESP] 1
MP1	8930077690	3015 MAIN EARTH SPRING	[EUR-01] 1
MP551	8930076610	3015 LS SPRING	1
MP581	8930057870	2429 EARTH SPRING	1
MP1521	8930070510	THERMALLY SHEET (BF)	1
MP2501*	8510015770	2590 DSP CASE	1
MP2541	8930070510	THERMALLY SHEET (BF)	1
MP2801*	8510015880	2590 S2LO CASE	1
MP3201	8930068000	SHIELD SPONGE (AT)	[USA] 1
MP3201	8930068000	SHIELD SPONGE (AT)	[EUR] 1
MP3201	8930068000	SHIELD SPONGE (AT)	[FRA] 1
MP3201	8930068000	SHIELD SPONGE (AT)	[ITR] 1
MP3201	8930068000	SHIELD SPONGE (AT)	[ESP] 1
MP3201	8930068000	SHIELD SPONGE (AT)	[EUR-01] 1
MP3202	8930078630	FERRITE SHEET (AB)	1

**[RF UNIT] (RF)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
RL1	6330001721	ATN207-K1	1
RL501	6330001721	ATN207-K1	1
J5*	6510024151	50FY-BMT-TB (LF) (SN)	1
J6*	6510024151	50FY-BMT-TB (LF) (SN)	1
J7	6510007020	TMP-J01X-V6	1
J8	6510007020	TMP-J01X-V6	1
J10	6510007020	TMP-J01X-V6	1
J501	6450001641	TCS5044-0141177	1
J502	6450001130	JPJ2042-01-110	1
J503	6510023900	LGR4619-7000	1
MP1	8930075430	3015 ANT SPRING	1

**[PA UNIT] (PA)**

REF NO.	ORDER NO.	DESCRIPTION	QTY.
RL1	6330001600	ALD112	1
J4*	6510024151	50FY-BMT-TB (LF) (SN)	1
J8	6510007020	TMP-J01X-V6	1
J9	6510007020	TMP-J01X-V6	1
J12	6510001920	1490R	1
J13	6510009890	PD054-04M	1
J131*	6510014961	B2B-ZR-SM4-TF (LF) (SN)	1
J132*	6510014961	B2B-ZR-SM4-TF (LF) (SN)	1
F1	5220000400	FHA010-01F	1
F2	5210000940	1205	1
WS1	8600036641	SX2242 J12 13PA-1	1
W40	8900018210	OPC-1942	[USA] 1
	8900018220	OPC-1943	[EUR] 1
	8900018220	OPC-1943	[FRA] 1
	8900018220	OPC-1943	[ITR] 1
	8900018220	OPC-1943	[ESP] 1
	8900018220	OPC-1943	[EUR-01] 1
	8900017860	OPC-1857	[KOR] 1
	8900017860	OPC-1857	[CHN] 1
	8900017860	OPC-1857	[EXP] 1
MP4	8930075440	3015 RUG SPRING	1
MP5	8930075440	3015 RUG SPRING	1
MP39	8930073470	THERMALLY SHEET (BK)	1

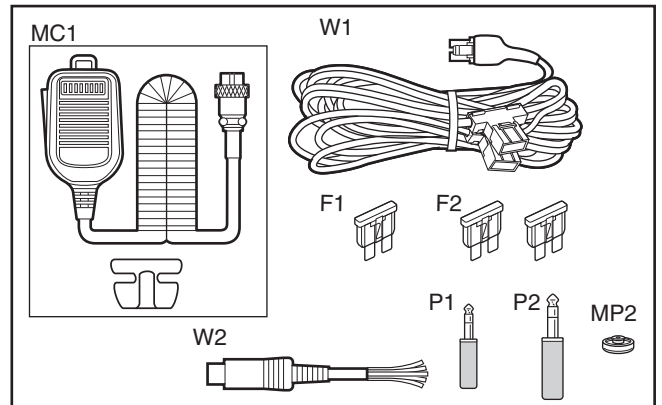
**[ACCESSORIES]**

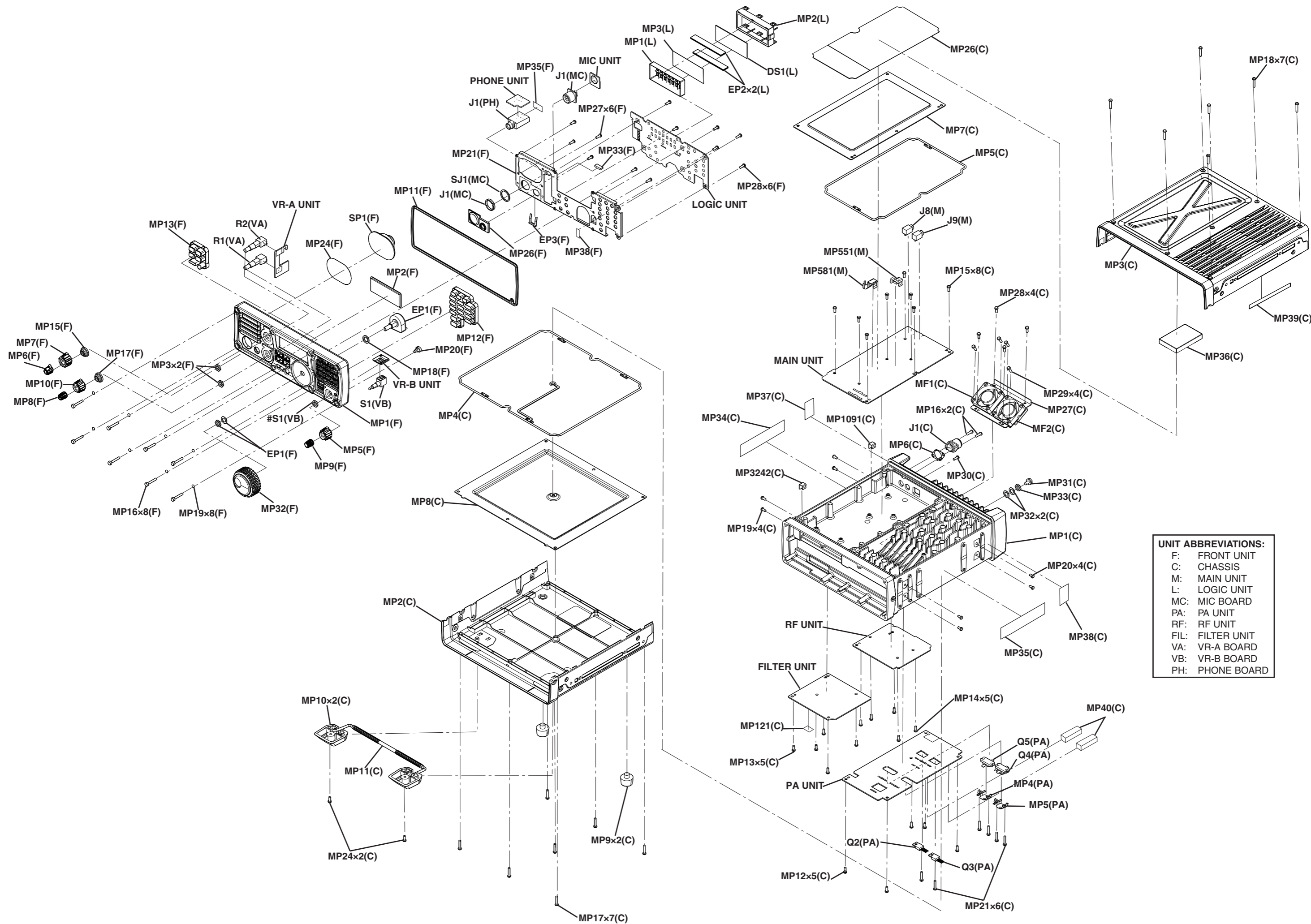
REF NO.	ORDER NO.	DESCRIPTION	QTY.
P1	5610000410	AP-319	1
P2	5610000420	AP-338	1
MC1†	-	HM-36-1	1
F1	5210000840	ATC 30	2
F2	5210000940	1205	1
W1	8900013980	OPC-1457	1
W2	8900006110	OPC-596	1
MP2	8930076480	3015 JACK CAP	1

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

\*\* : Refer to "GENERAL WIRING" for the location.

†: Optional product.



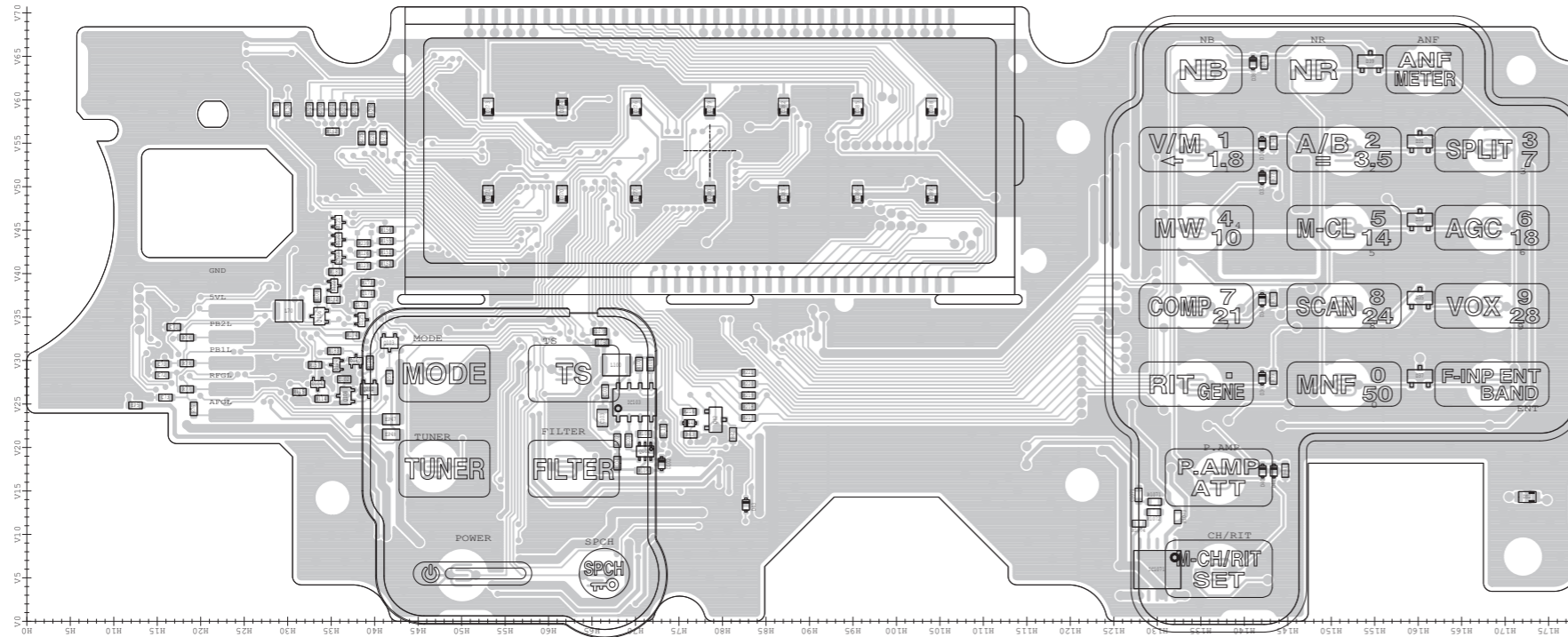


**UNIT ABBREVIATIONS:**

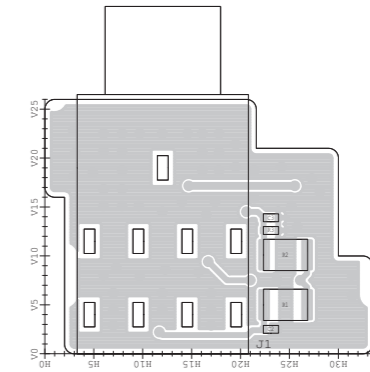
F:	FRONT UNIT
C:	CHASSIS
M:	MAIN UNIT
L:	LOGIC UNIT
MC:	MIC BOARD
PA:	PA UNIT
RF:	RF UNIT
FIL:	FILTER UNIT
VA:	VR-A BOARD
VB:	VR-B BOARD
PH:	PHONE BOARD

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

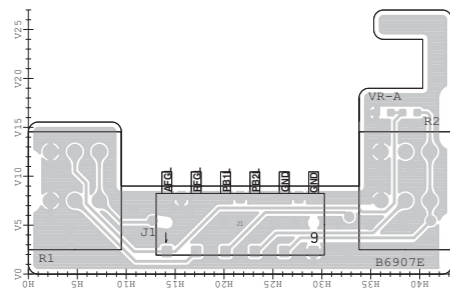
• LOGIC UNIT  
(TOP VIEW)



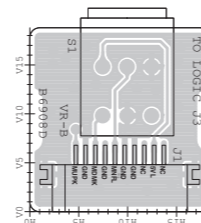
• PHONE UNIT  
(TOP VIEW)



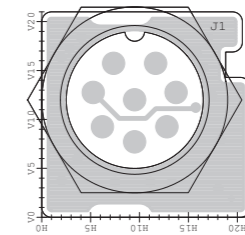
• VR-A UNIT  
(TOP VIEW)



• VR-B UNIT  
(TOP VIEW)

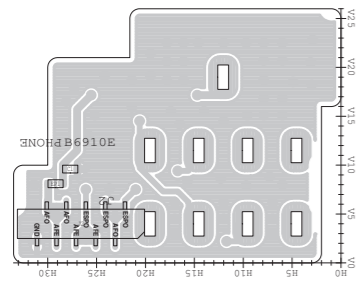


• MIC UNIT  
(TOP VIEW)

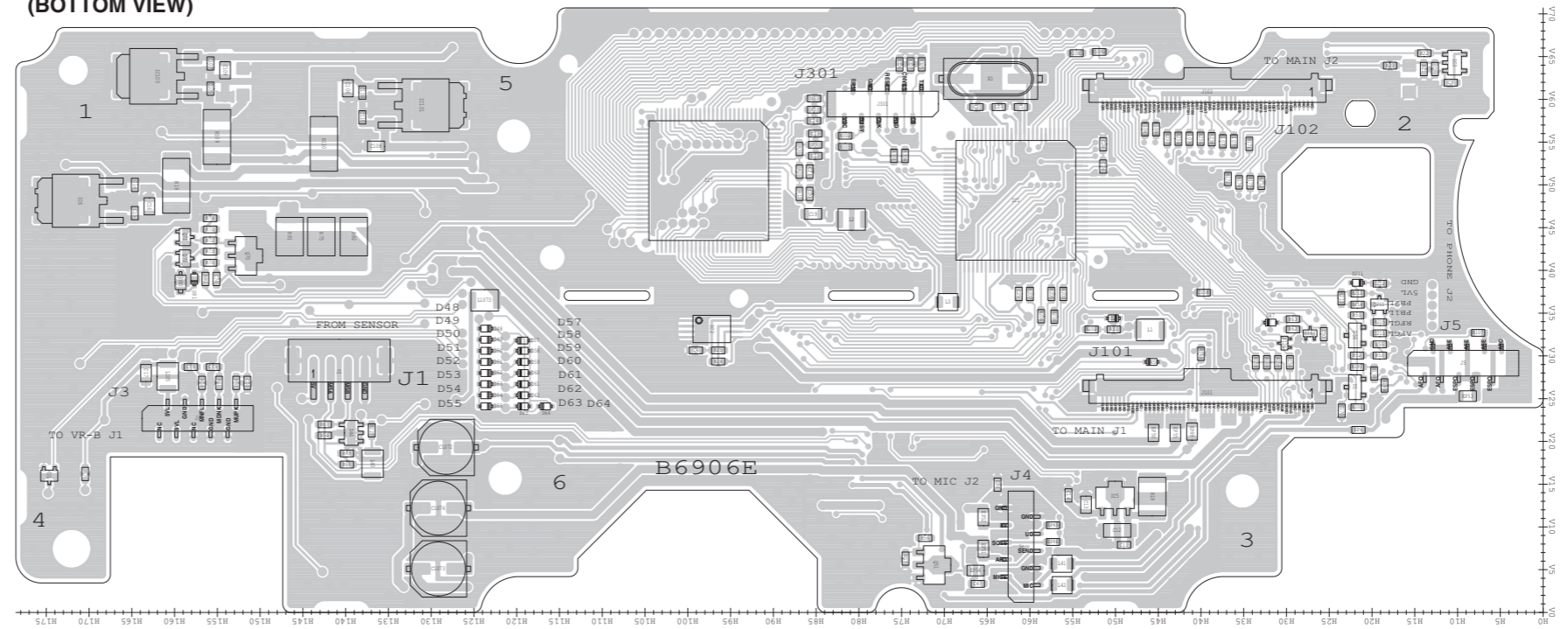


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

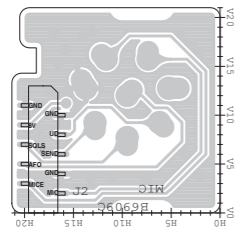
• PHONE UNIT  
(BOTTOM VIEW)



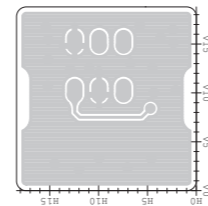
• LOGIC UNIT  
(BOTTOM VIEW)



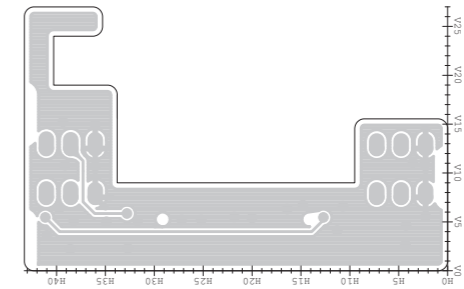
• MIC UNIT  
(BOTTOM VIEW)



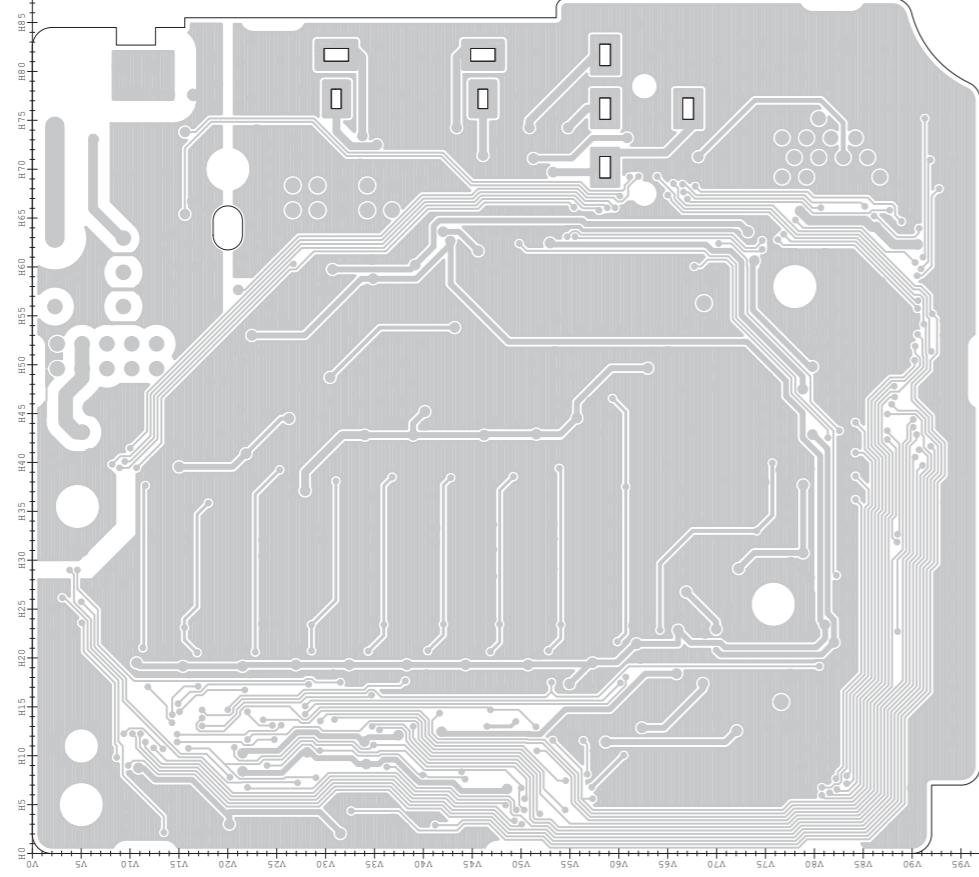
• VR-B UNIT  
(BOTTOM VIEW)



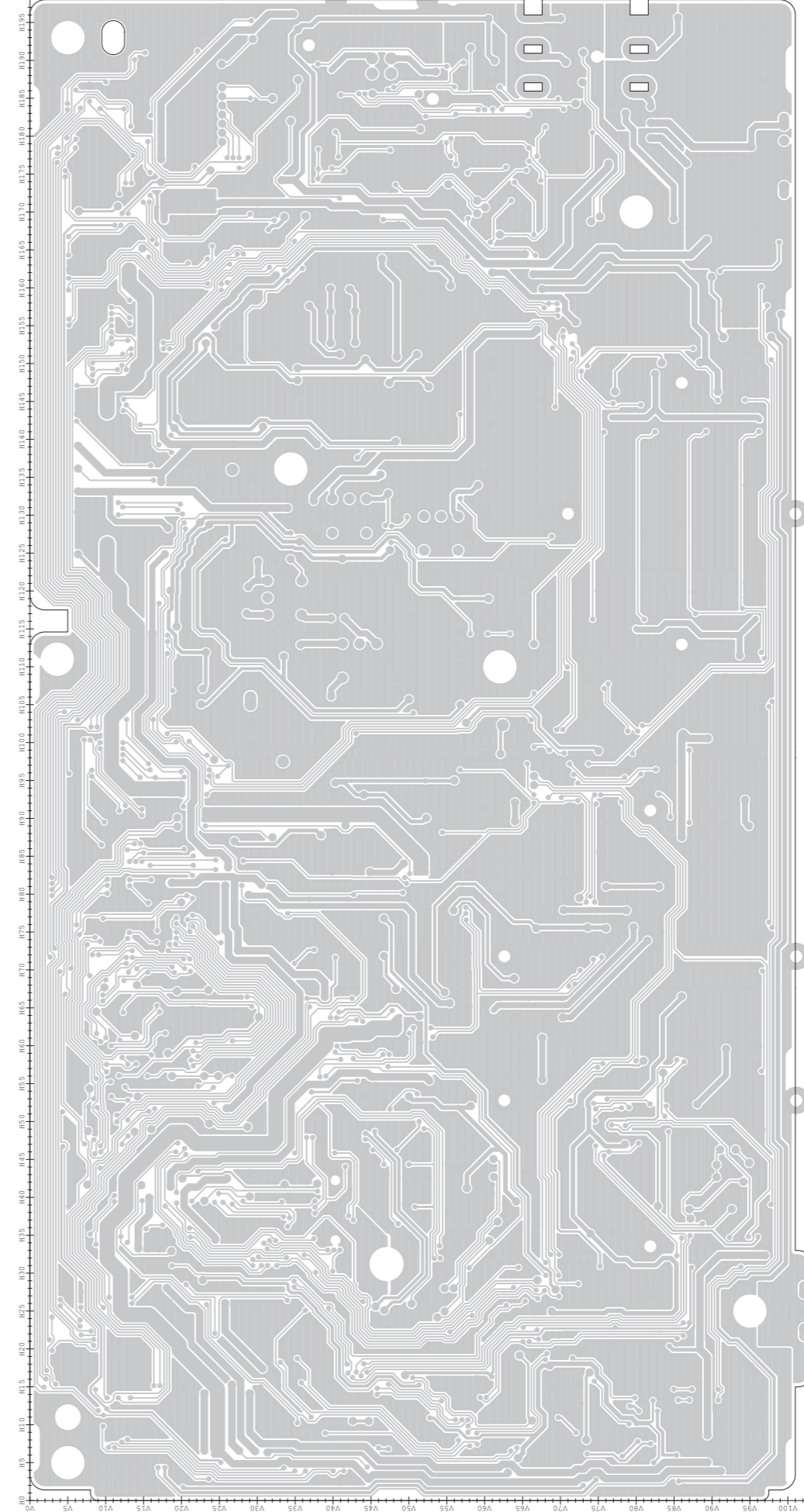
• VR-A UNIT  
(BOTTOM VIEW)



• RF UNIT  
(TOP VIEW)

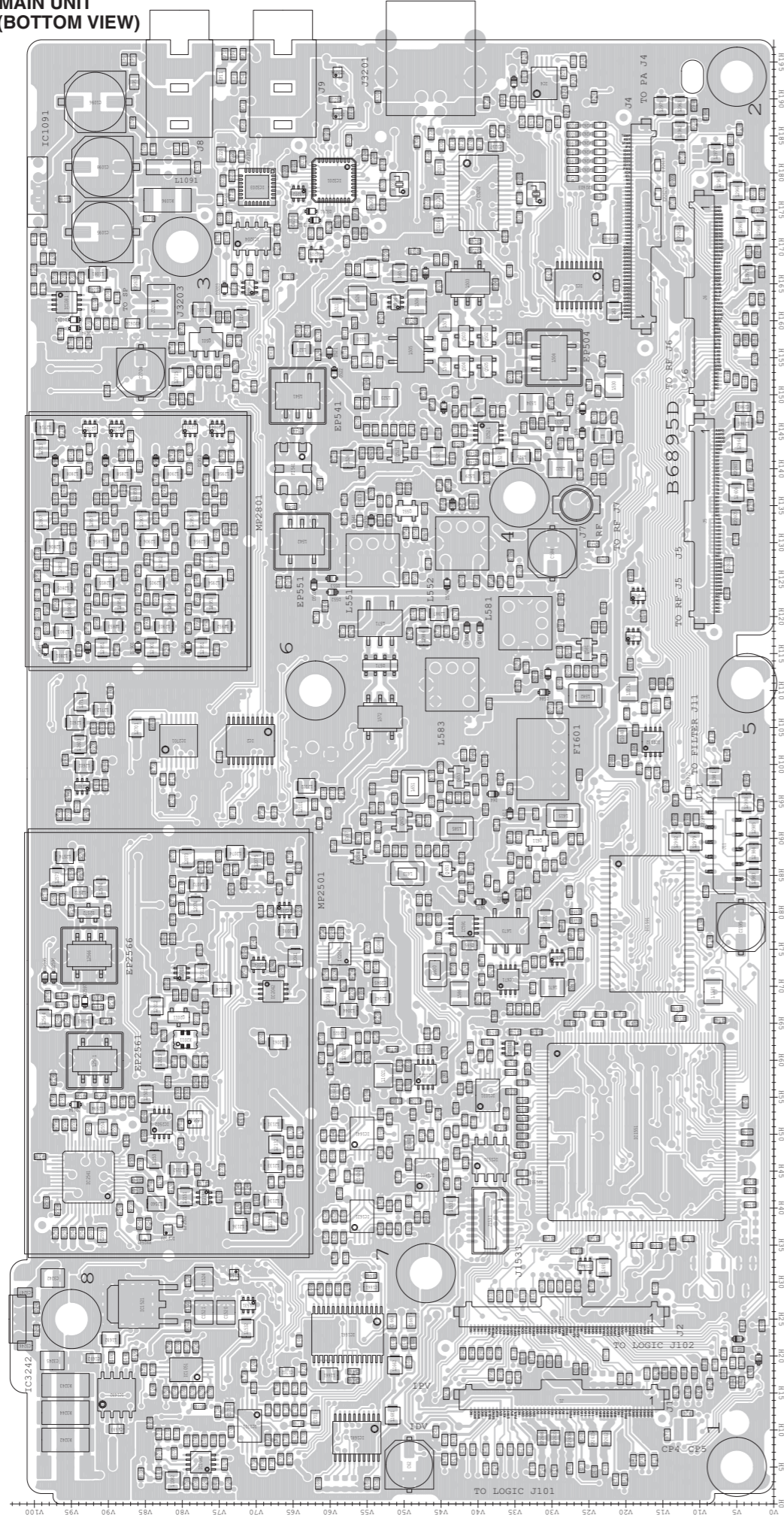


• MAIN UNIT  
(TOP VIEW)



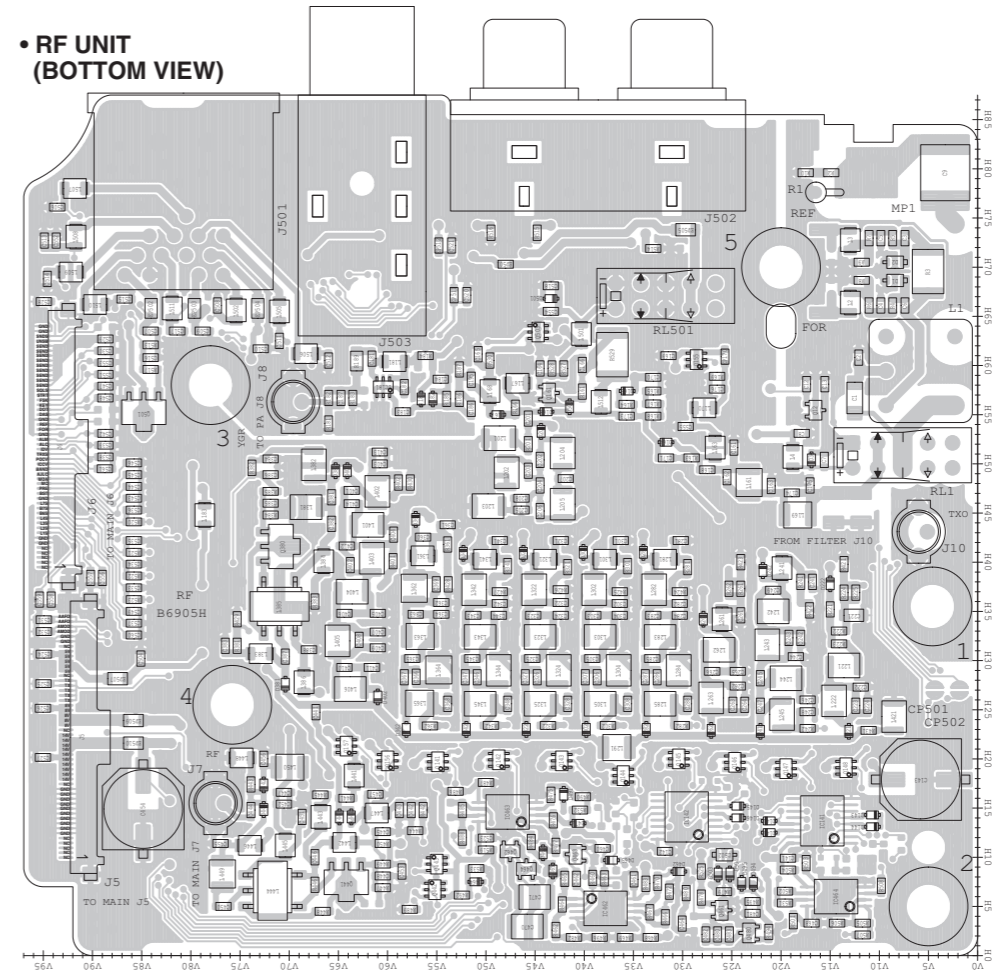
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• MAIN UNIT  
(BOTTOM VIEW)



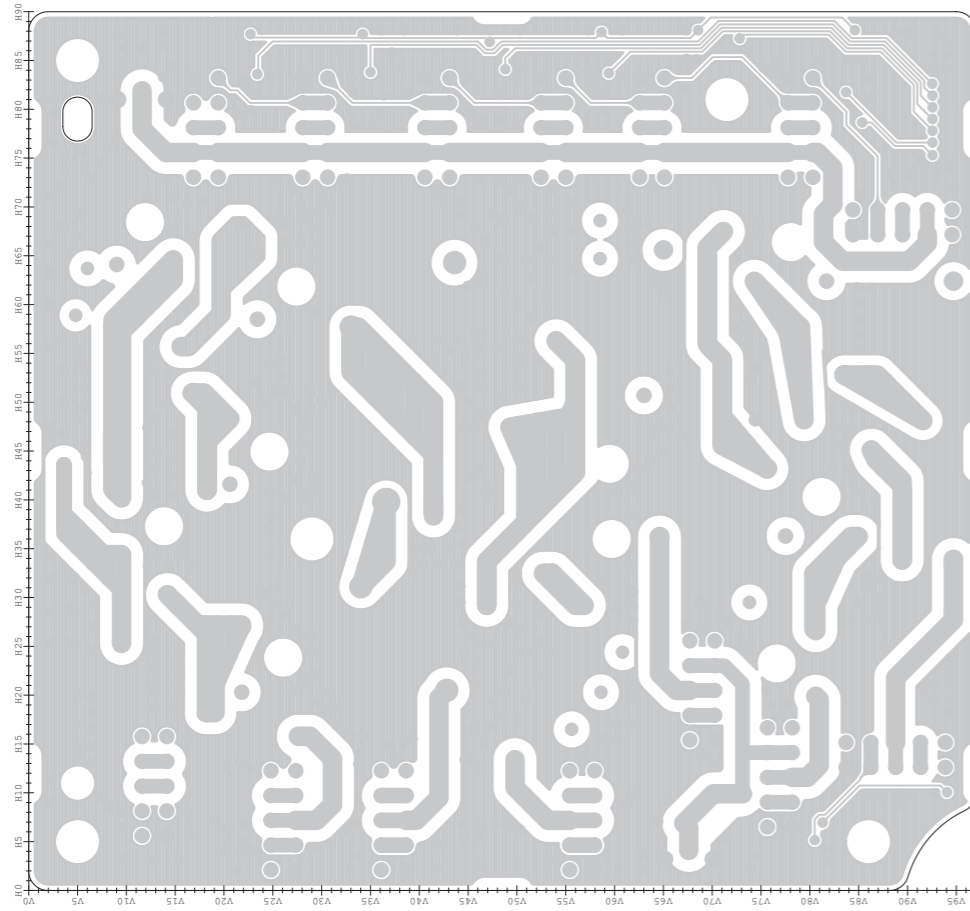
The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• RF UNIT  
(BOTTOM VIEW)

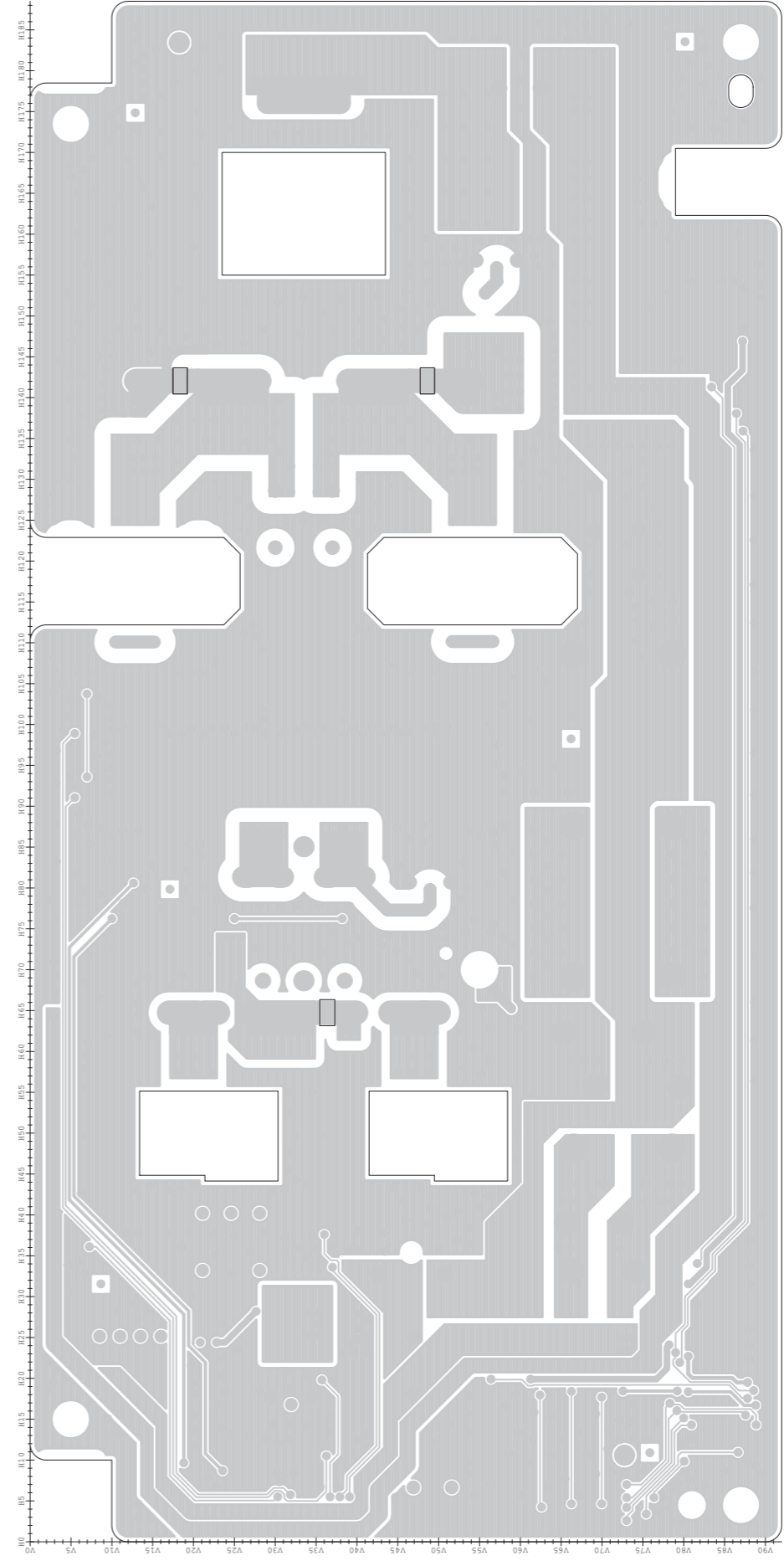


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• FILTER UNIT  
(TOP VIEW)

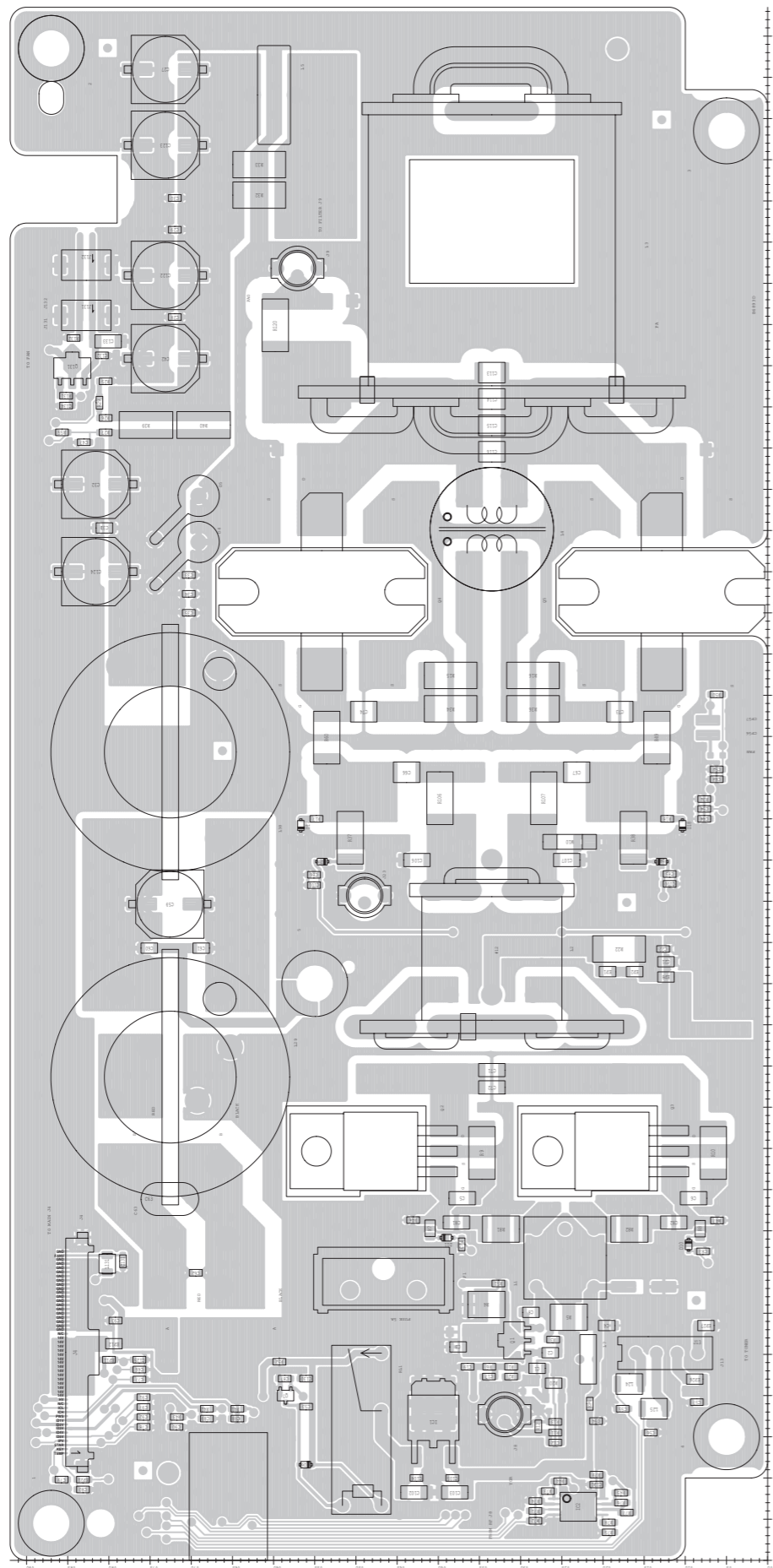


• PA UNIT  
(TOP VIEW)

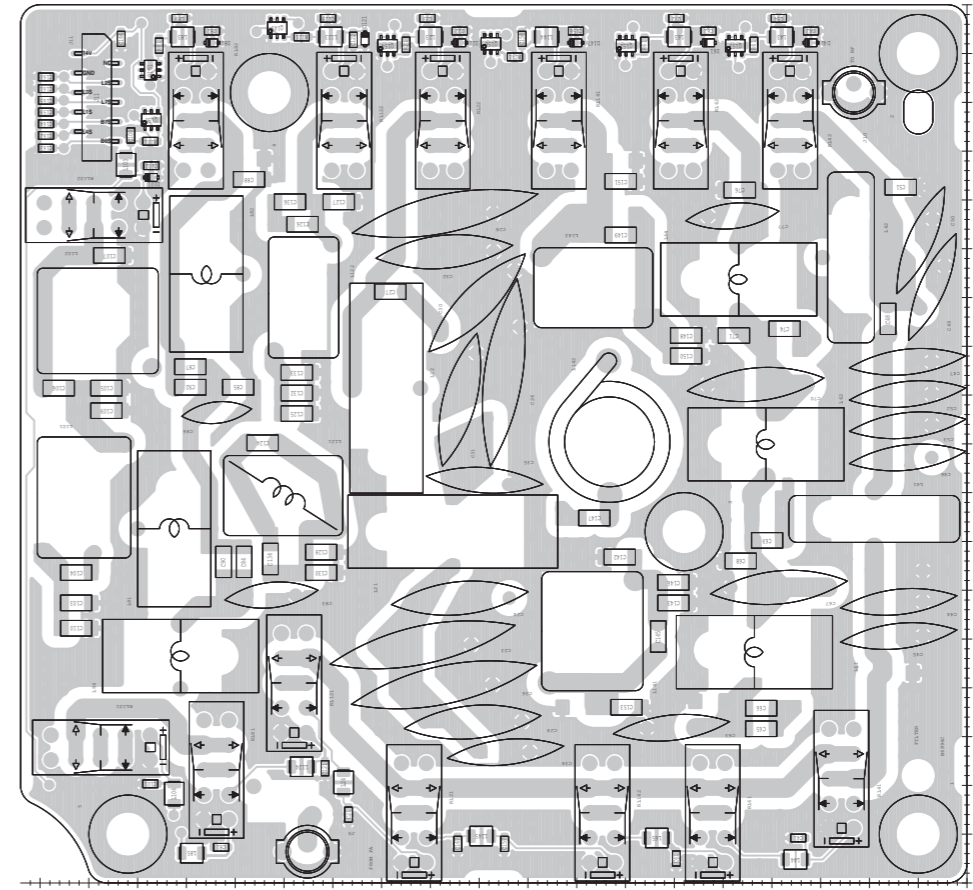


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

• PA UNIT  
(BOTTOM VIEW)

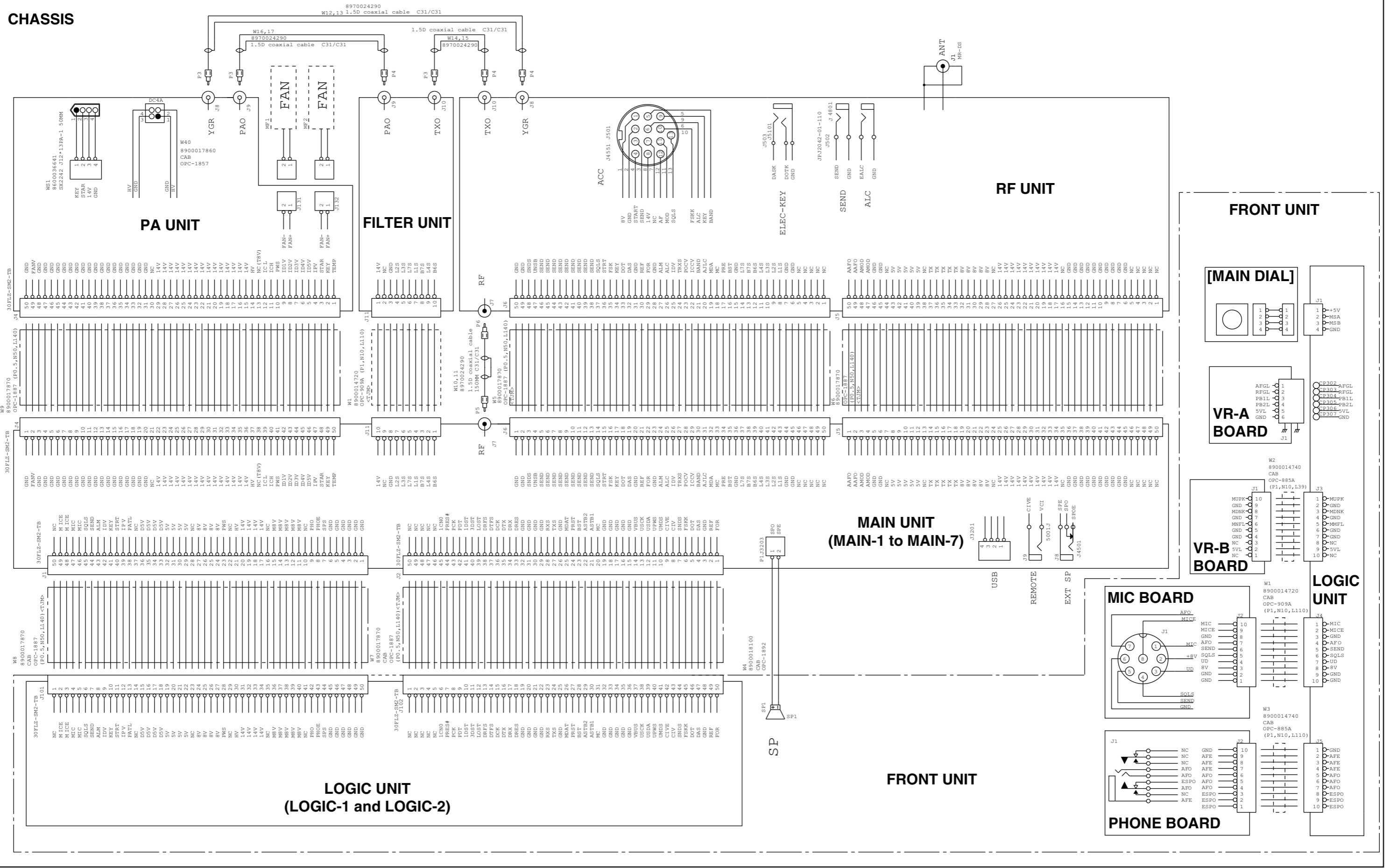


• FILTER UNIT  
(BOTTOM VIEW)



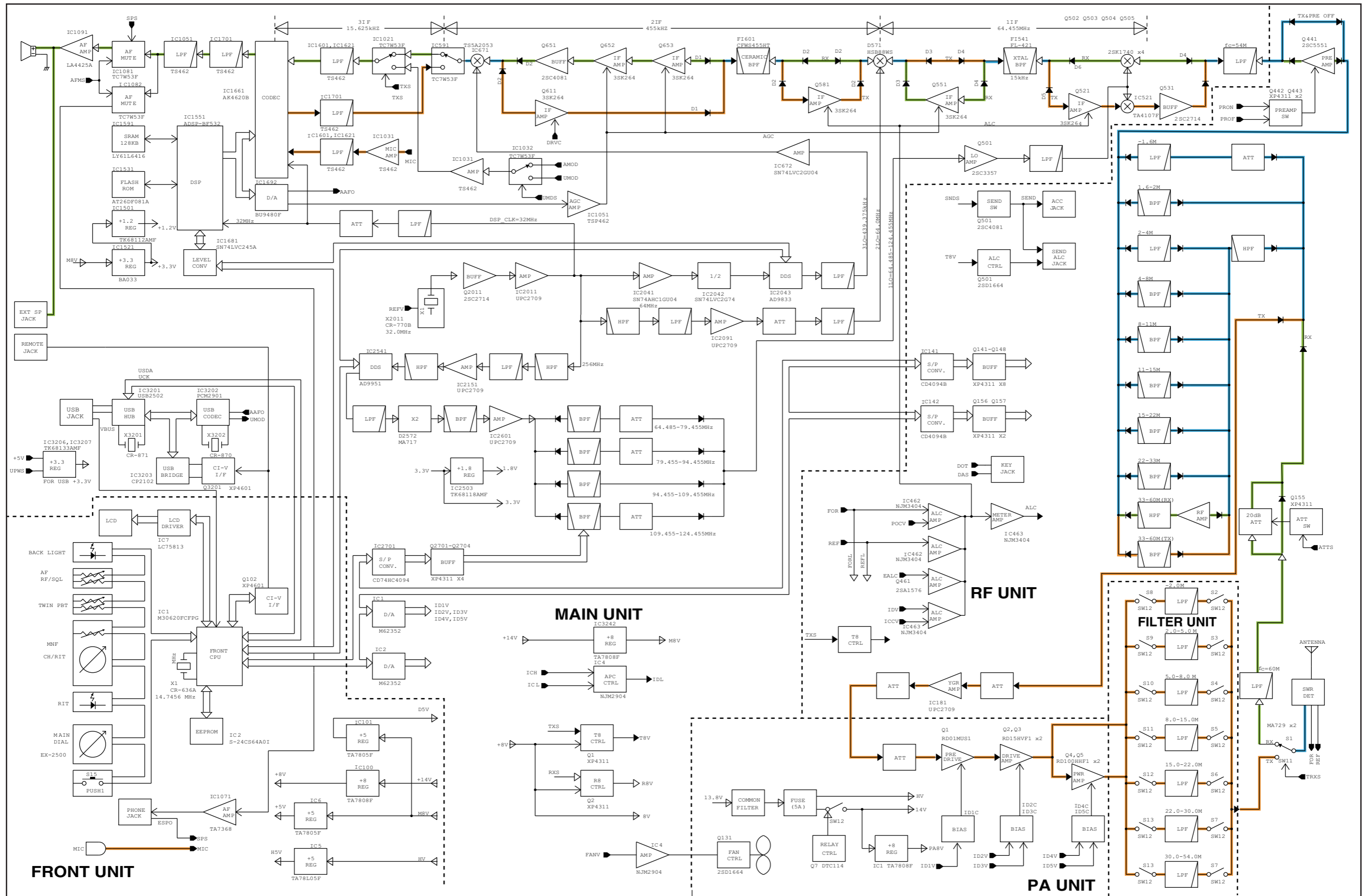


CHASSIS



# SECTION 9

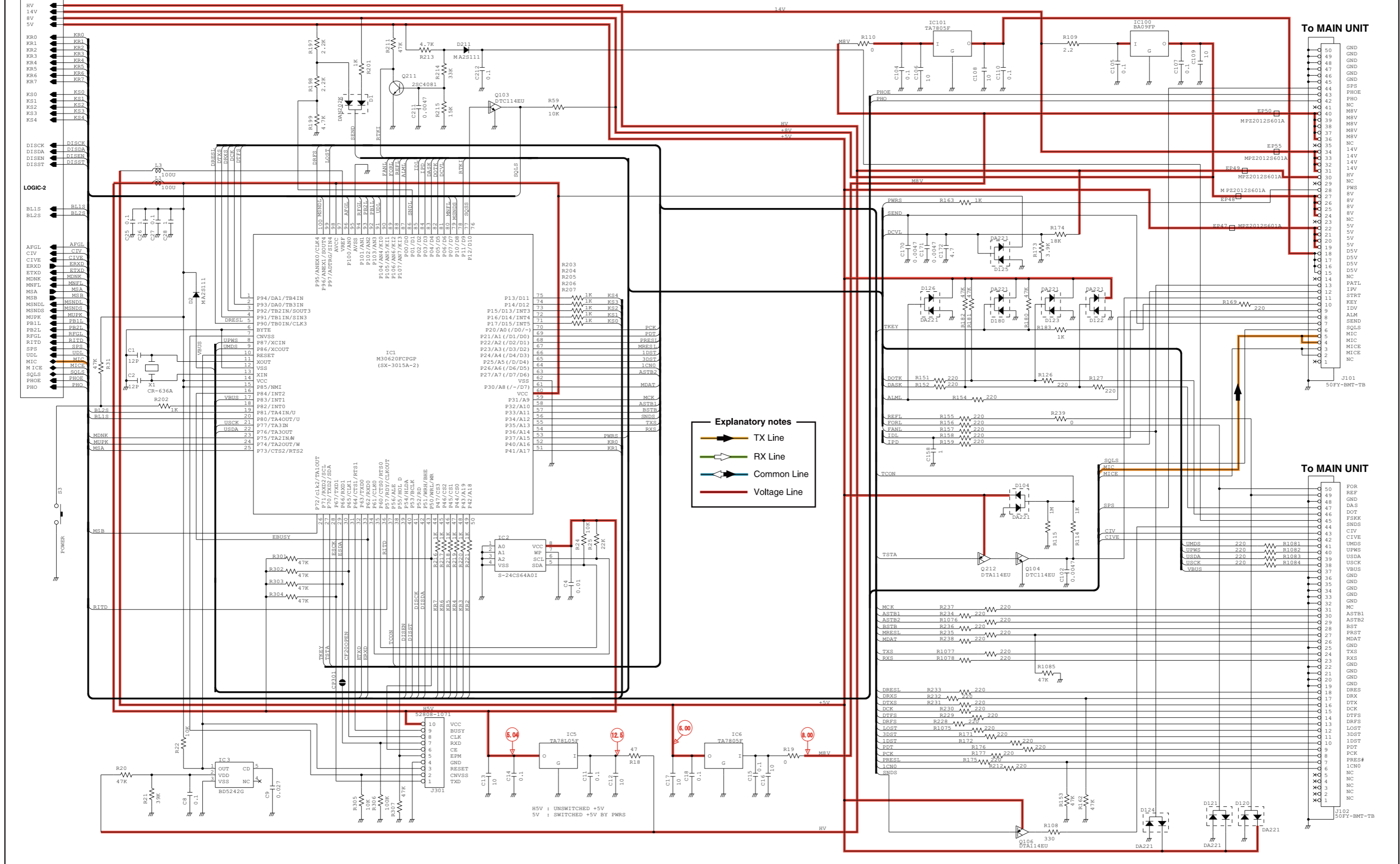
# BLOCK DIAGRAM



# SECTION 10

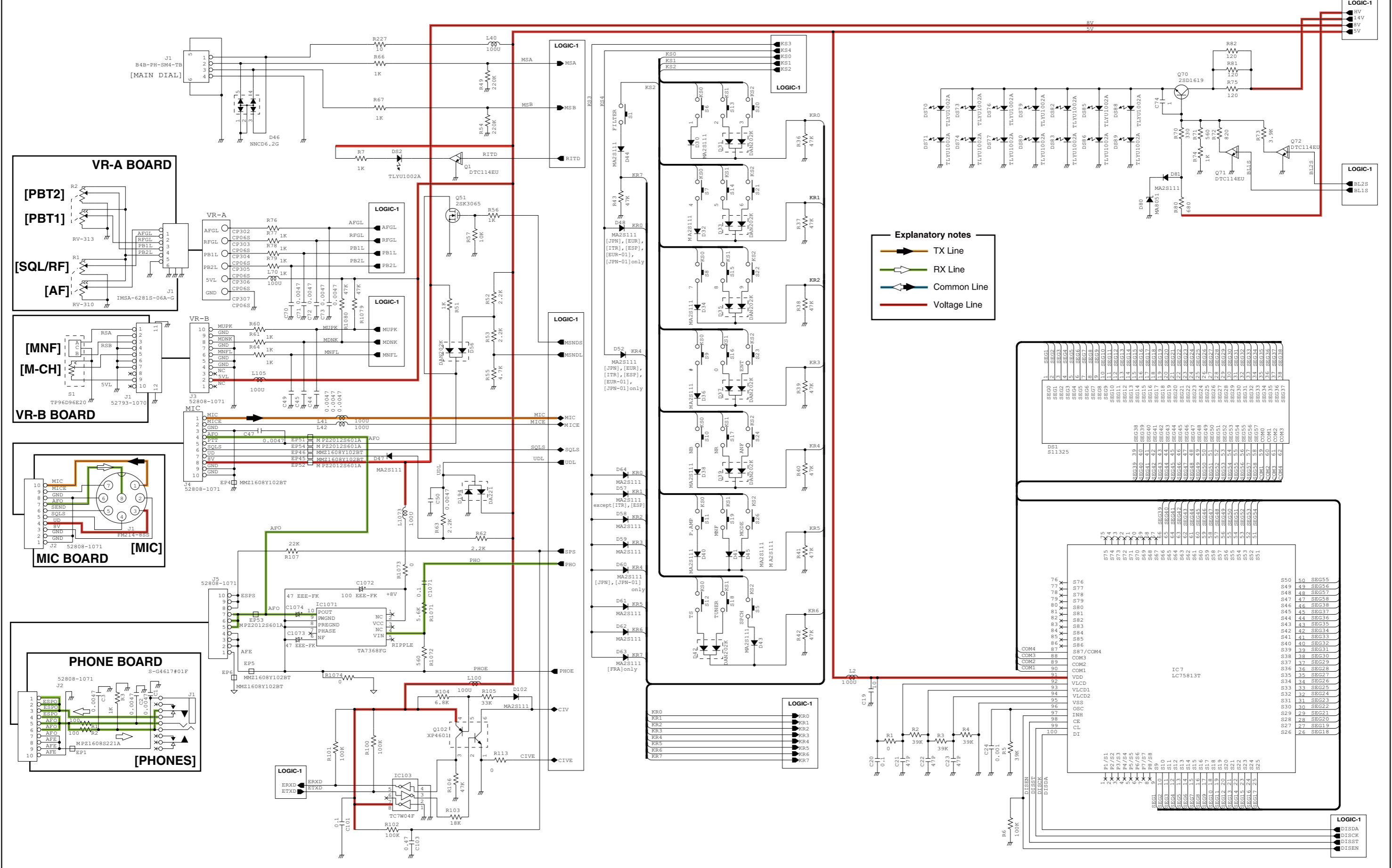
# VOLTAGE DIAGRAM

## LOGIC UNIT (LOGIC-1)



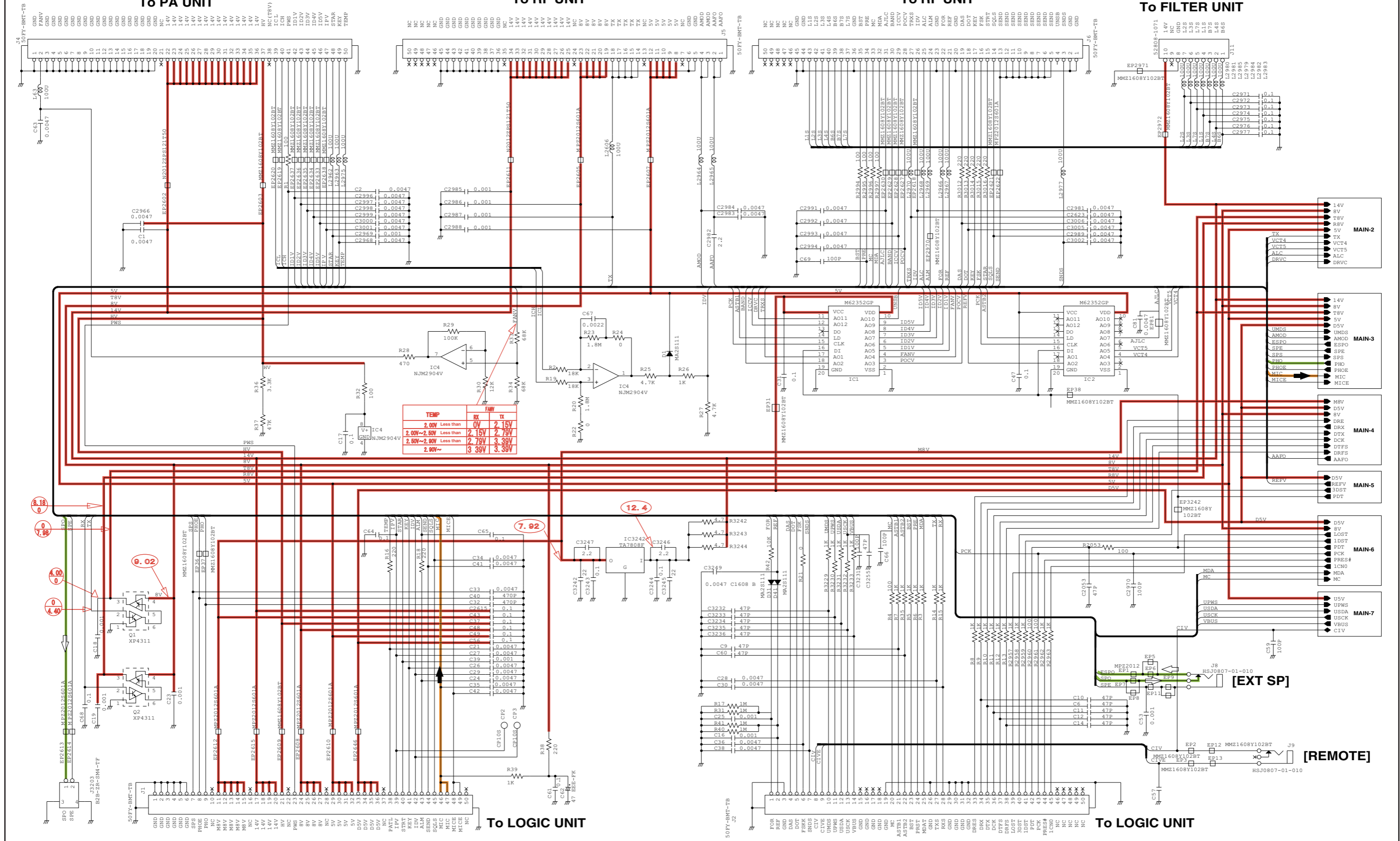
\*; Refer to "PARTS LIST."

• LOGIC UNIT (LOGIC-2)



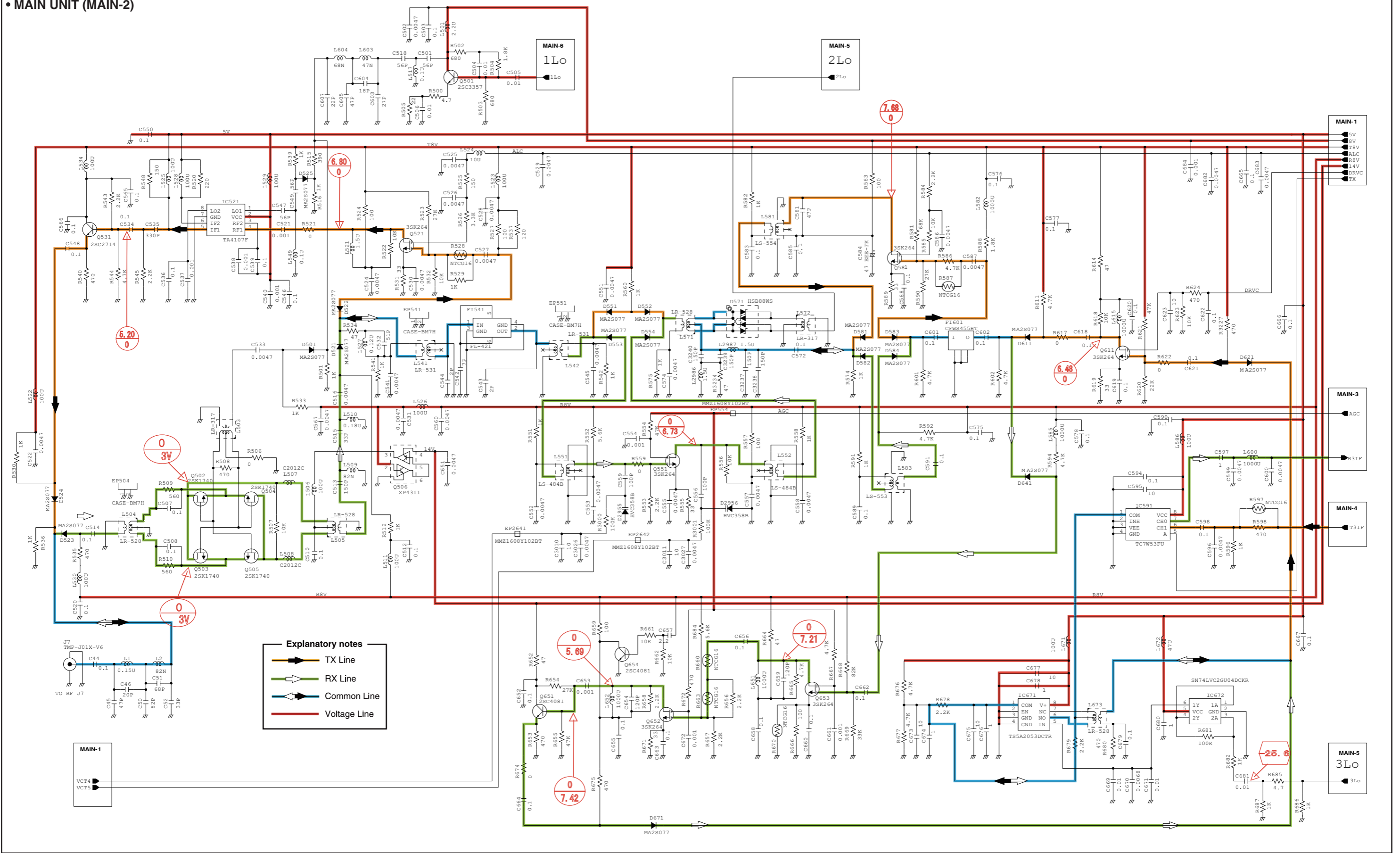
\*; Refer to "PARTS LIST"

• MAIN UNIT (MAIN-1)



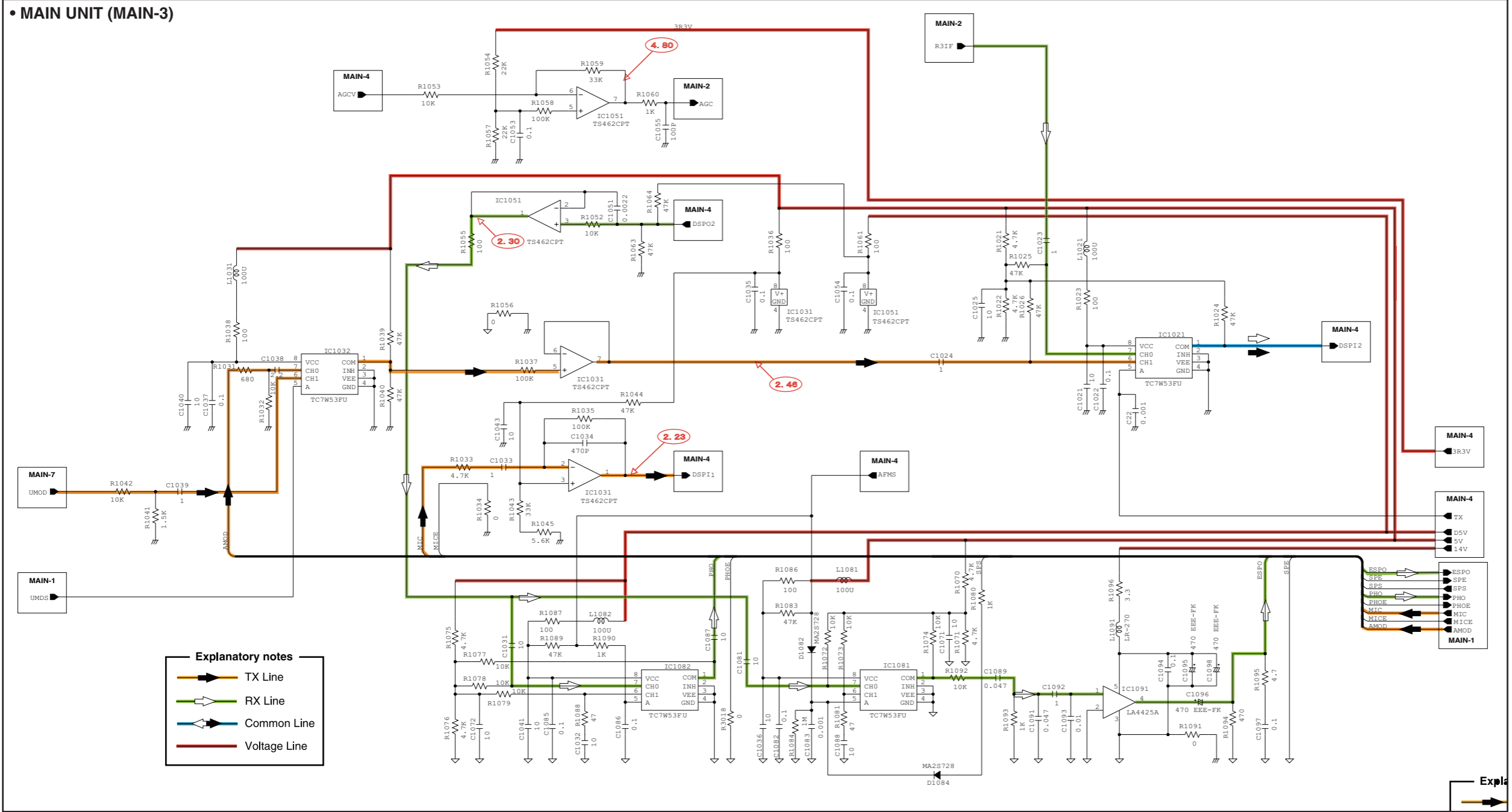
\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-2)



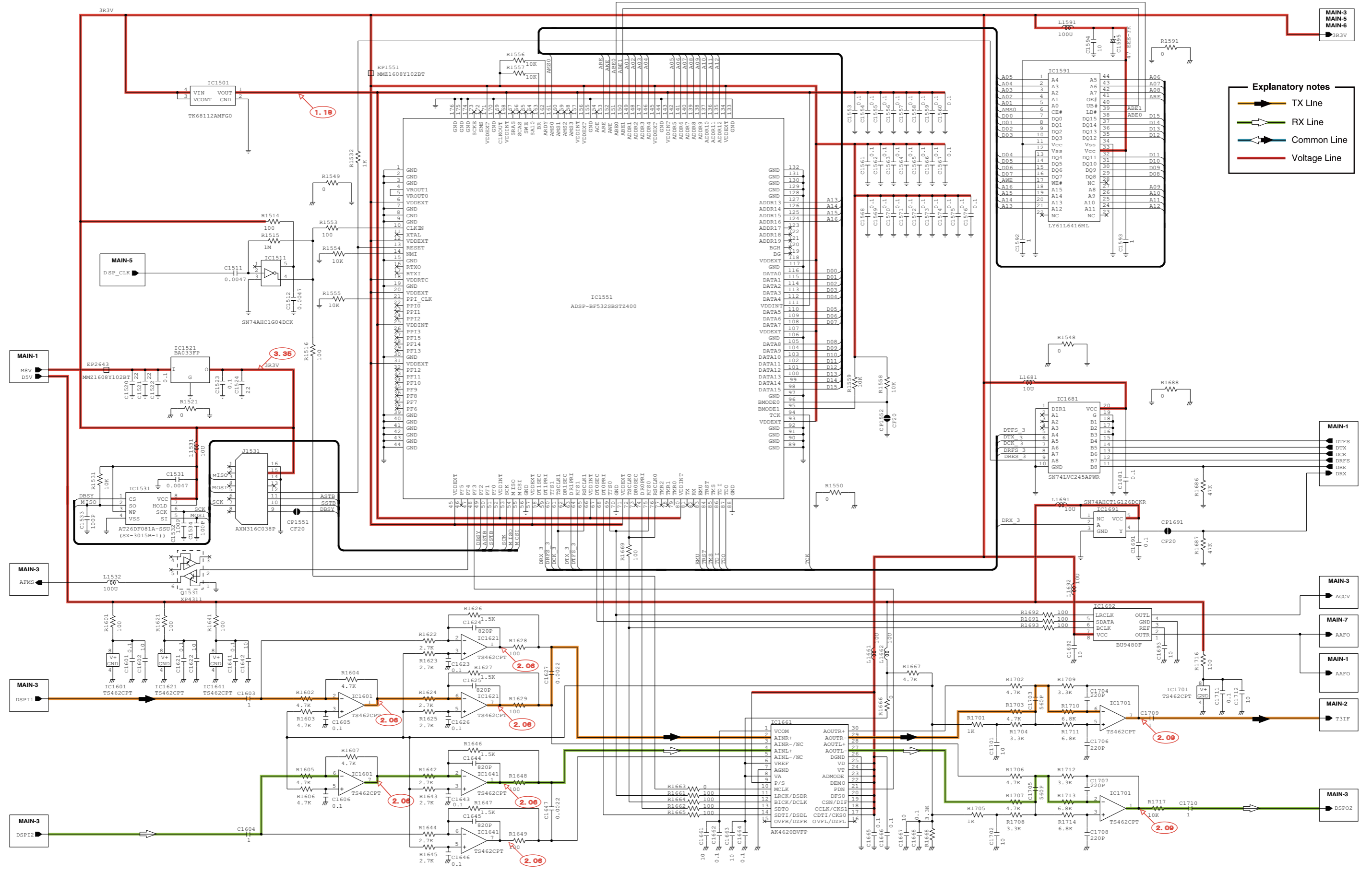
\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-3)



\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-4)



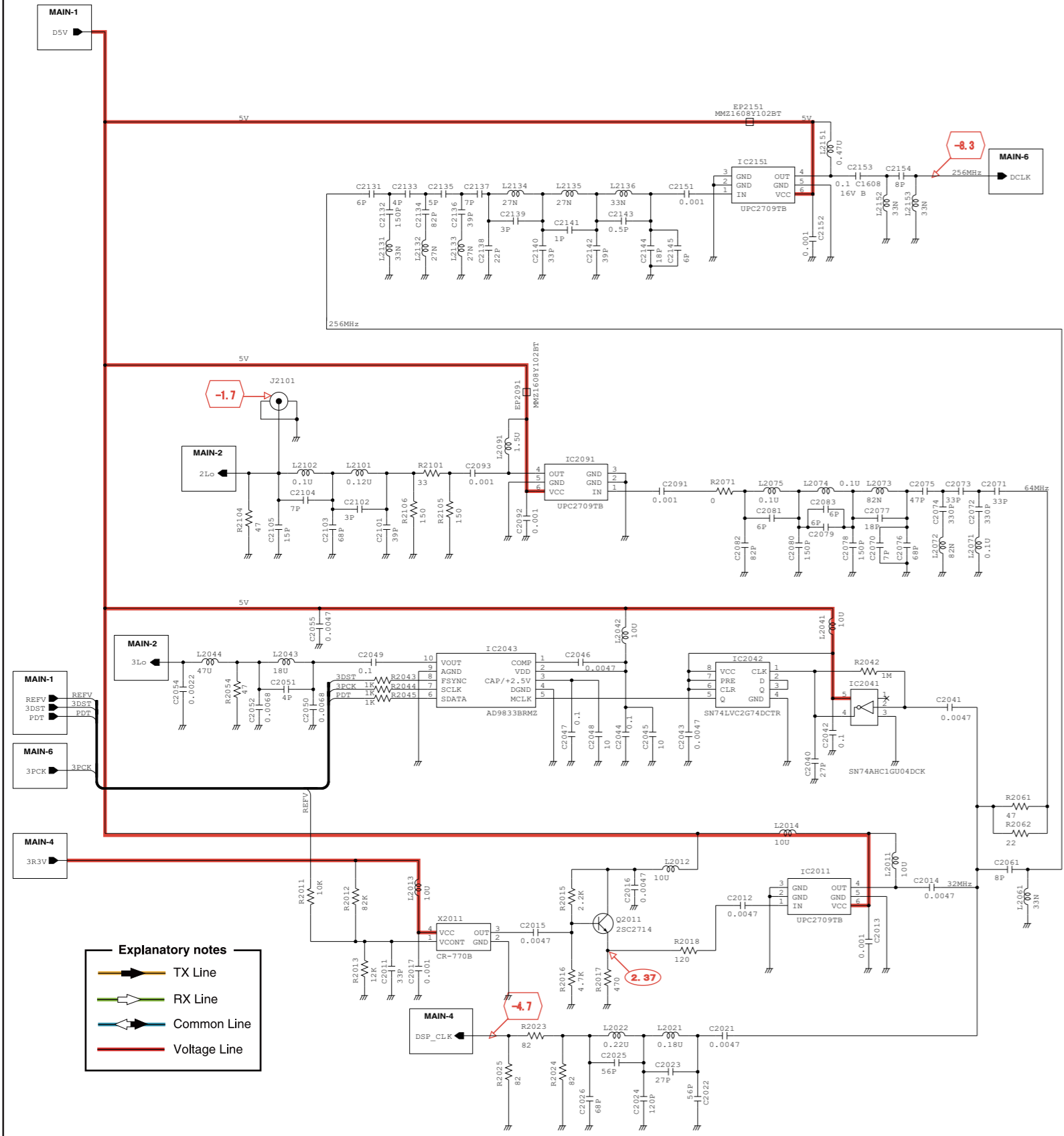
**Explanatory notes**

- TX Line
- RX Line
- Common Line
- Voltage Line

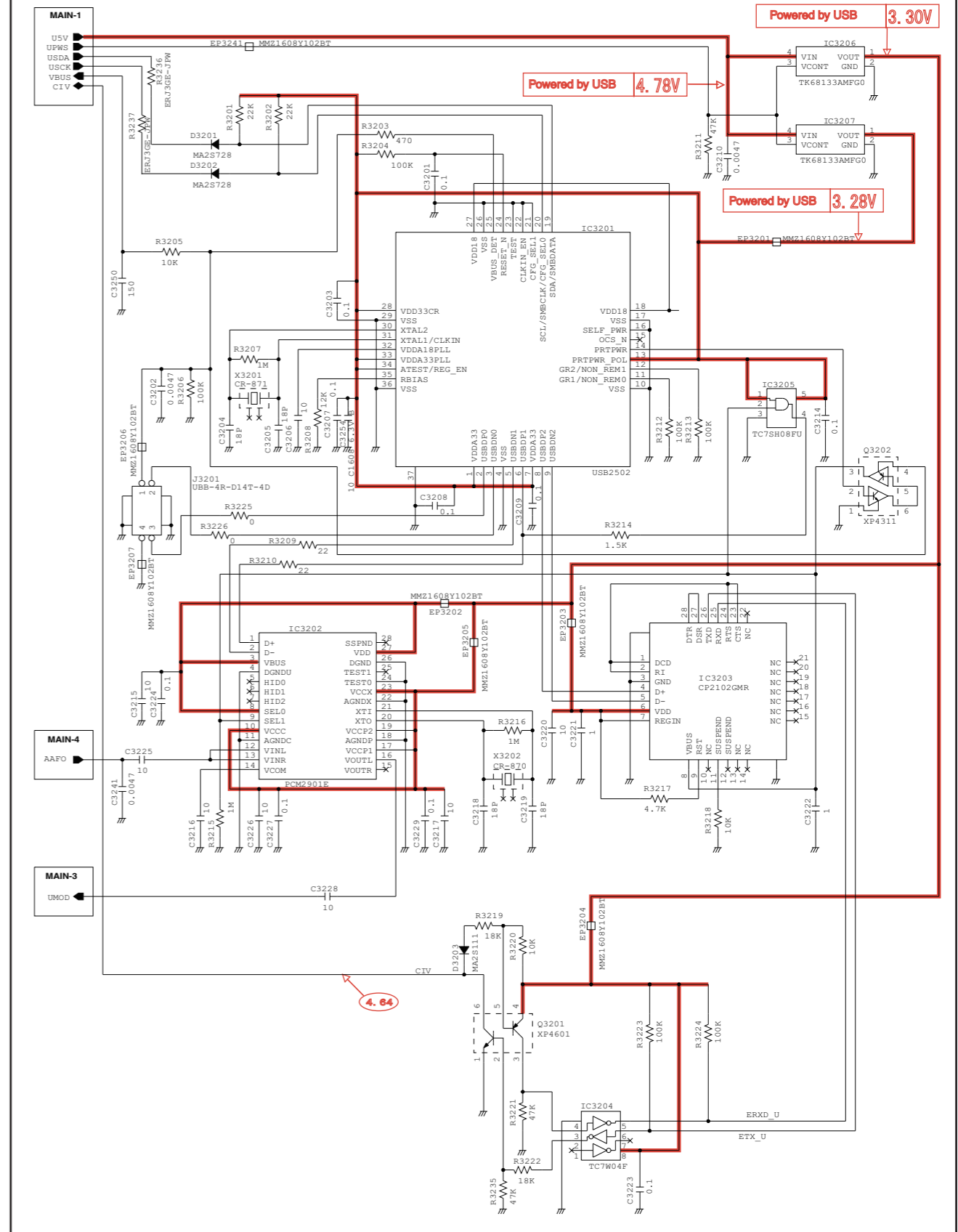
\*; Refer to "PARTS LIST."



• MAIN UNIT (MAIN-5)

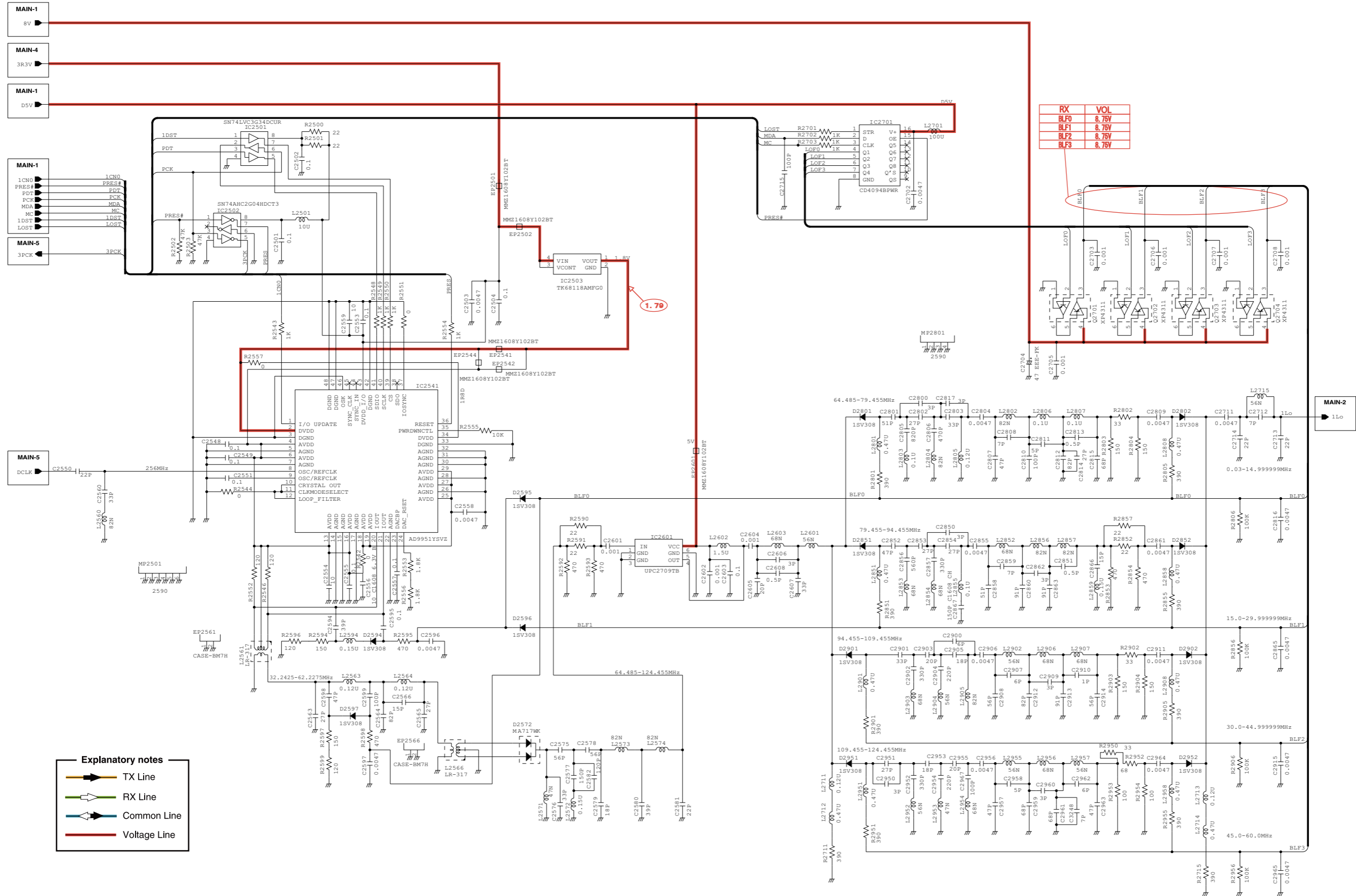


• MAIN UNIT (MAIN-6)



\*; Refer to "PARTS LIST."

• MAIN UNIT (MAIN-7)



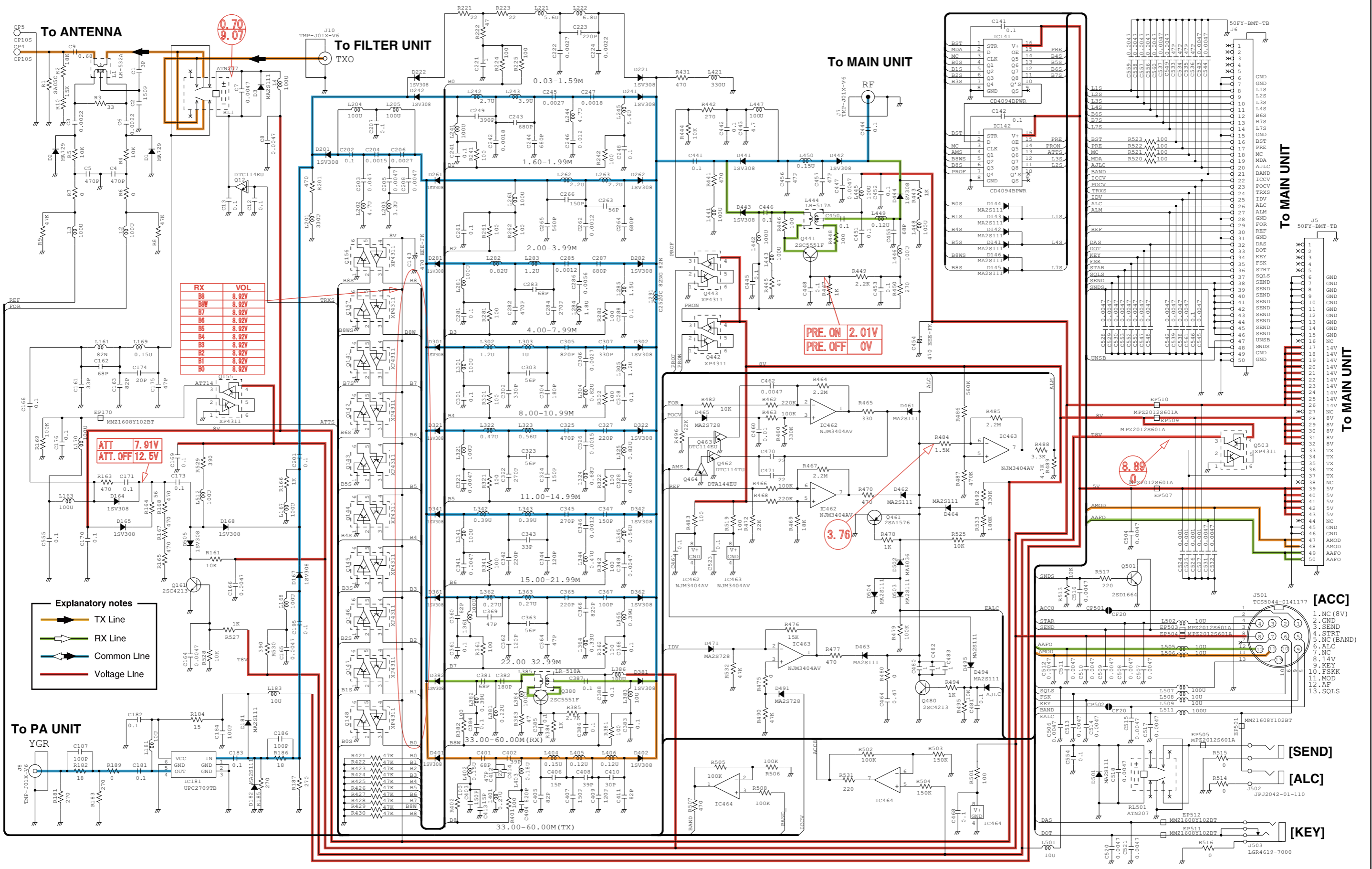
RX	VOL
BLF0	8.75V
BLF1	8.75V
BLF2	8.75V
BLF3	8.75V

**Explanatory notes**

- ▶ TX Line
- ▶ RX Line
- ▶ Common Line
- ▶ Voltage Line

\*; Refer to "PARTS LIST."

• RF UNIT



RX	VOL
B9	8.02V
B8	8.02V
B7	8.02V
B6	8.02V
B5	8.02V
B4	8.02V
B3	8.02V
B2	8.02V
B1	8.02V
B0	8.02V

**Explanatory notes**

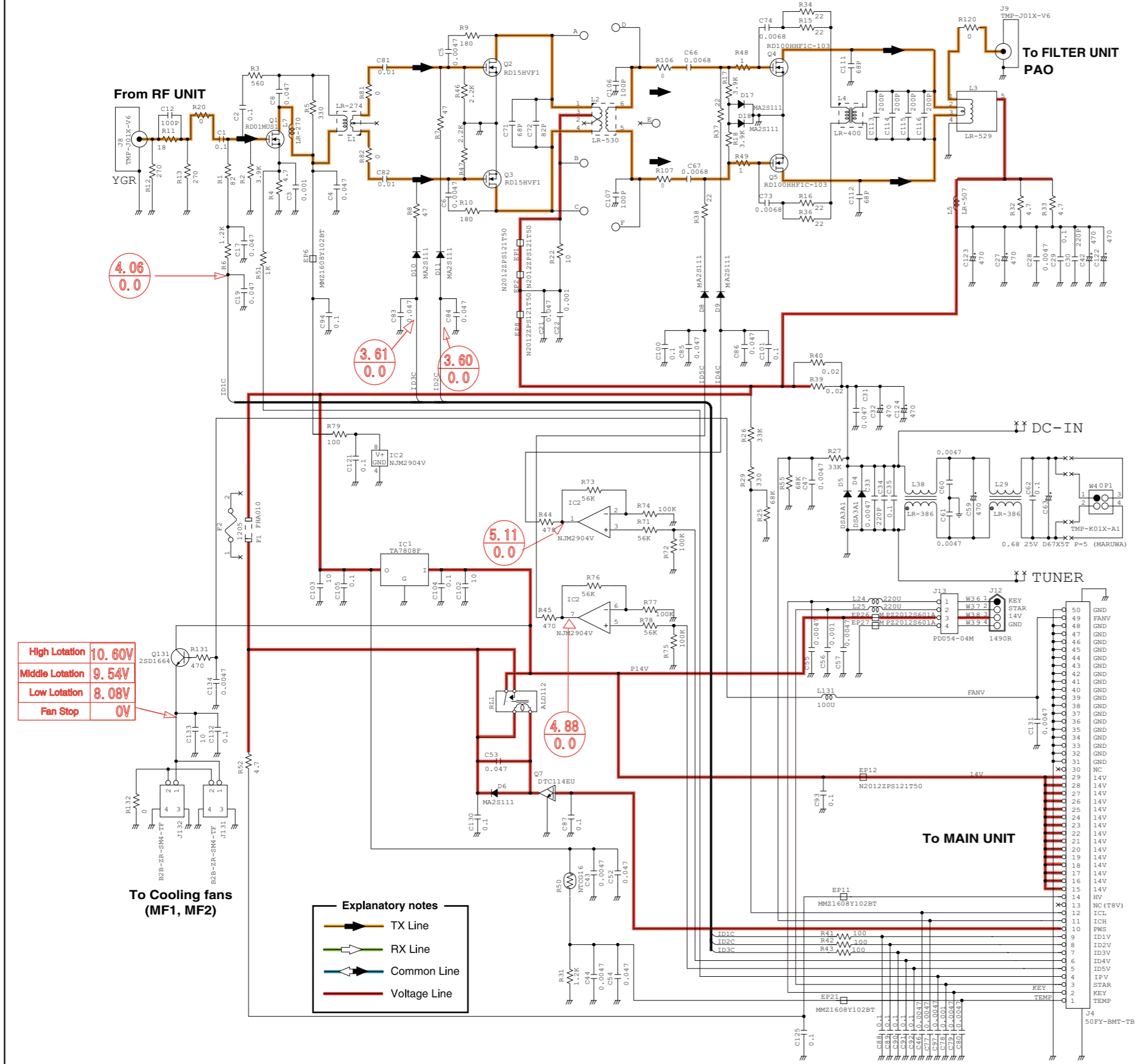
- TX Line
- RX Line
- Common Line
- Voltage Line

- [ACC] 1. NC (8V)
- 2. SEND
- 3. SEND
- 4. STRT
- 5. NC (BAND)
- 6. ALC
- 7. NC
- 8. 14V
- 9. KEY
- 10. FSK
- 11. MOD
- 12. AF
- 13. SLS

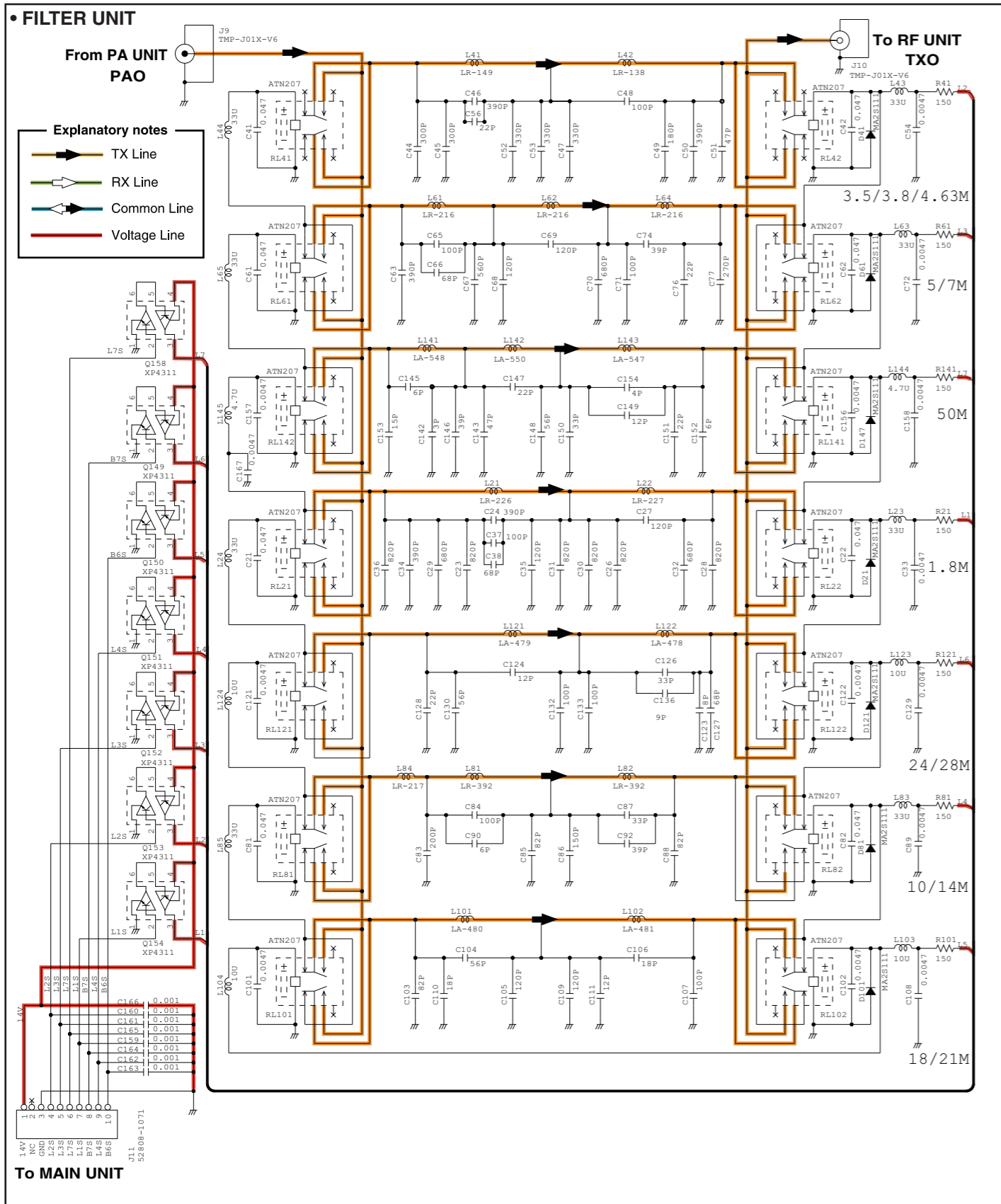
- [SEND] EP505 MP22012S601A
- [ALC] J502 JPJ2042-01-110
- [KEY] EP511 MM21608Y102BT

\*; Refer to "PARTS LIST."

• PA UNIT



\*; Refer to "PARTS LIST."



\*; Refer to "PARTS LIST."

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