

SERVICE MANUAL ADDENDUM

IC-F5061 IC-F5062 IC-F5063 IC-F5061D IC-F5062D

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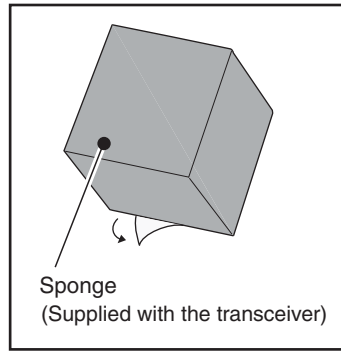
| MODEL | VERSION | CHANNEL SPACING | TX POWER | MDC | UT-126H already installed | |
|-----------|---------|--------------------|----------|----------------|------------------------------|-----|
| IC-F5061 | USA-01 | 15.0/30.0 kHz | 50 W | Not compatible | No | |
| | USA-02 | | | Compatible | | |
| IC-F5062 | EUR-01 | 12.5/25.0 kHz | 25 W | Not compatible | | |
| | EUR-02 | | | Compatible | | |
| IC-F5063 | EXP-01 | 12.5/20/25.0 kHz | | Not compatible | | |
| | EXP-02 | | | Compatible | | |
| IC-F5061D | USA-01 | 6.25/15.0/30.0 kHz | | 50 W | Compatible | Yes |
| | USA-11 | | | | | |
| | USA-12 | | | | | |
| IC-F5062D | EUR-03 | 6.5/12.5/20/25 kHz | 25W | Not compatible | | |

SECTION 4 OPTIONAL UNITS INSTALLATION

BEFORE INSTALLING OPTIONAL UNITS

Before installing optional units, the sponge supplied with the transceiver must be attached to the units. Remove the bottom protective paper, and attach the sponge to the specified position on the optional units as shown below.

NOTE: Attach the sponge by pressing it gently but ensure that it is attached to the unit securely.

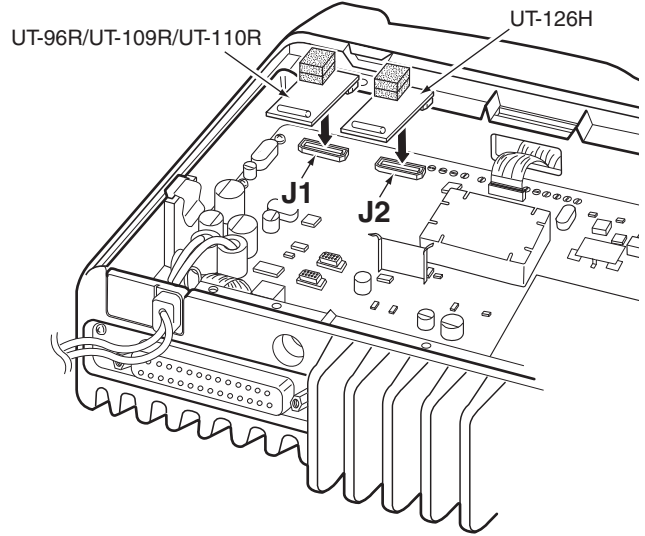


| | |
|--------------------------------|--|
| <p>• UT-96R</p> <p>Sponge</p> | <p>• UT-109R/UT-110R</p> <p>Sponge</p> |
| <p>• UT-126H</p> <p>Sponge</p> | |

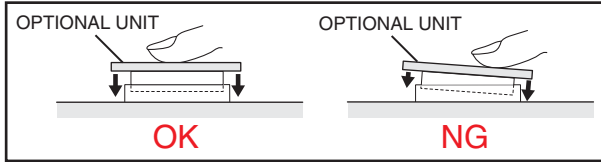
Optional units installation

- ① Turn the transceiver power OFF, then disconnect the DC power cable.
- ② Unscrew the 4 cover screws, then remove the bottom cover.
- ③ Remove the protective paper from the sponge on the bottom of the unit.
- ④ Install the UT-96R/UT-109R/UT-110R to J1 and the UT-126H to J2 as shown.
- ⑤ Replace the bottom cover and screws, then re-connect the DC power cable.

UT-96R/UT-109R/UT-110R must be installed to J1, and UT-126H must be installed to J2.

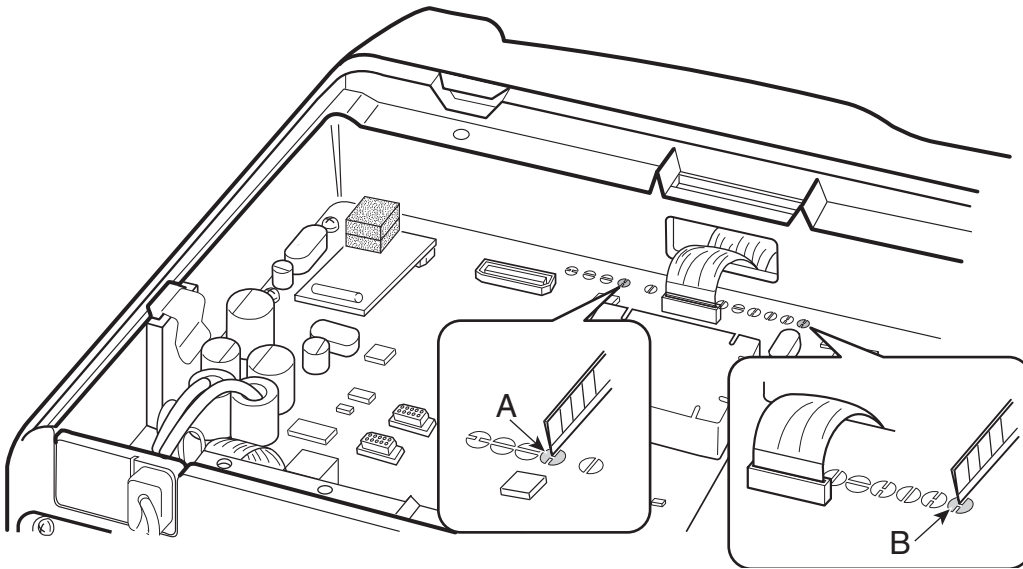


NOTE: When installing the unit
Be sure that the unit is inserted correctly.

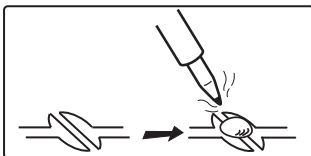


Required modification for the UT-109R and UT-110R

- Cut the pattern on the PCB at the A (MIC) and B (AF OUT) as shown below.



NOTE: When uninstalling the UT109R or UT-110R
Be sure to re-solder the cut points as below when you remove the unit. Otherwise no TX modulation or AF output is available.



PARTS LIST

[VERSION LIST]

| MODEL | VERSION | SYMBOL |
|-----------|---------|--------|
| IC-F5061 | USA-01 | [A] |
| | USA-02 | [B] |
| IC-F5062 | EUR-01 | [C] |
| | EUR-02 | [D] |
| IC-F5063 | EXP-01 | [E] |
| | EXP-02 | [F] |
| IC-F5061D | USA-01 | [G] |
| | USA-11 | [H] |
| | USA-12 | [I] |
| IC-F5062D | EUR-03 | [J] |

[MAIN UNIT] (Other than "MDC compatible")

| REF NO. | PARTS NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------|----------|--------------|
| IC1 | 1110005340 | S.IC NJM12902V-TE1-#ZZZB | T | 82.3/12.9 |
| IC2 | 1110006221 | S.IC AK2346P-E2/P | B | 44.7/11.7 |
| IC3 | 1140013200 | S.IC CD4053BPWR | B | 58.7/9.3 |
| IC4 | 1130010100 | S.IC LMX2352TMX/NOPB | T | 82.9/46 |
| IC5 | 1110003491 | S.IC TA31136FNG(D,EL) | T | 28/13.9 |
| IC6 | 1190001350 | S.IC M62364FP 600D | B | 84.9/12.9 |
| IC7 | 1110005340 | S.IC NJM12902V-TE1-#ZZZB | T | 108.5/43.7 |
| IC8 | 1140013200 | S.IC CD4053BPWR | B | 58.7/16.1 |
| IC9 | 1130012960 | S.IC BU8872FS-E2 | B | 133.1/21.3 |
| IC10 | 1190002051 | S.IC SPM5001-TL-E | B | 33.8/36.9 |
| IC12 | 1190001340 | S.IC M62334FP 600C | B | 9.1/25.7 |
| IC13 | 1110005771 | S.IC S-80942CNMC-G9CT2G | B | 126/44.8 |
| IC14 | 1140014550 | S.IC HD64F2506RFC26DV(EMPTY) | B | 111.8/35.7 |
| IC15 | 1150002073 | IC RA60H1317M-125 | [A] | |
| | 1150002042 | IC RA30H1317M-121 | [E] | |
| | 1150002042 | IC RA30H1317M-121 | [C] | |
| IC16 | 1140012950 | S.IC 24LC512T-I/SM | B | 133.3/29 |
| IC17 | 1110002751 | S.IC TA75S01F(TE85R,F) | T | 54.1/70.4 |
| IC18 | 1180000970 | S.IC AN78L05M-(E1) | B | 113/65.3 |
| IC19 | 1120002510 | S.IC DS14C232TM S | T | 104.7/70.5 |
| IC20 | 1180001251 | S.IC TA7808F(TE16L,Q) | B | 121.5/65.8 |
| IC21 | 1110003091 | IC LA4425A-E | | |
| IC22 | 1110002751 | S.IC TA75S01F(TE85R,F) | B | 135.5/54.4 |
| IC23 | 1130006221 | S.IC TC4W53FU(TE12L,F) | B | 106.9/9.6 |
| Q1 | 1590003231 | S.TRA UNR9113G0L | B | 15.2/6 |
| Q3 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 36.4/15.5 |
| Q4 | 1590001650 | S.TRA XP4601(TX) | B | 92.8/12.4 |
| Q5 | 1590003291 | S.TRA UNR9213G0L | B | 76.7/50 |
| Q6 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | T | 63.2/55.1 |
| Q7 | 1560000541 | S.FET 2SK880-Y(T5RICOM,F) | B | 81.2/27.1 |
| Q8 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 79.2/31.8 |
| Q9 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 81.7/31.8 |
| Q10 | 1560001360 | S.FET 2SK3019 TL | B | 57/31.6 |
| Q12 | 1530002601 | S.TRA 2SC4215-O(TE85R,F) | T | 26.9/20 |
| Q13 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 31.8/9.9 |
| Q16 | 1590003291 | S.TRA UNR9213G0L | T | 113.2/47.6 |
| Q17 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 50.9/47.6 |
| Q18 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 61.6/42.6 |
| Q19 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 72.1/43 |
| Q20 | 1590003231 | S.TRA UNR9113G0L | B | 33.9/25.2 |
| Q22 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | T | 58.1/46.3 |
| Q23 | 1590001400 | S.TRA XP1214(TX) | B | 55.7/40.9 |
| Q24 | 1590003281 | S.TRA UNR9211G0L | B | 55.8/38.2 |
| Q25 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | B | 65.9/49.5 |
| Q26 | 1590001400 | S.TRA XP1214(TX) | B | 67.2/43.1 |
| Q27 | 1590003231 | S.TRA UNR9113G0L | T | 124.7/52 |
| Q28 | 1590003291 | S.TRA UNR9213G0L | B | 123.4/46.3 |
| Q29 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | B | 53.5/51.2 |
| Q30 | 1530000372 | S.TRA 2SC3356-T1B R (R24) | B | 65.5/66 |
| Q31 | 1580000731 | S.FET 3SK293(TE85L,F) | B | 10.2/38.6 |
| Q32 | 1560000841 | S.FET 2SK1829(TE85R,F) | T | 11/42.5 |
| Q33 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | [A] only | 47.5/69.4 |
| Q34 | 1590003291 | S.TRA UNR9213G0L | T | 83/67.4 |
| Q35 | 1520000460 | S.TRA 2SB1132 T100 R | T | 100.1/57.9 |
| Q36 | 1590001190 | S.TRA XP6501-(TX).AB | T | 104.3/55.8 |
| Q37 | 1540000550 | S.TRA 2SD1664 T100Q | T | 75.5/63.6 |
| Q38 | 1510000920 | S.TRA 2SA1577 T106 Q | T | 39.3/21.3 |
| Q39 | 1590003291 | S.TRA UNR9213G0L | T | 42.6/21.3 |
| Q40 | 1590003291 | S.TRA UNR9213G0L | T | 104.1/51.9 |
| Q41 | 1590001451 | S.FET 2SJ144-GR (TE85R,F) | B | 110.3/83.3 |
| Q42 | 1590003291 | S.TRA UNR9213G0L | B | 132.1/45 |
| Q43 | 1590000990 | S.TRA DTC363EK T146 | B | 135.7/49 |
| Q44 | 1590003291 | S.TRA UNR9213G0L | T | 108.5/21.6 |
| Q45 | 1590003291 | S.TRA UNR9213G0L | B | 133.3/58.9 |
| Q46 | 1590003291 | S.TRA UNR9213G0L | T | 117.9/84.4 |
| Q47 | 1550000100 | S.FET 2SJ377 (TE16L1,NQ) | B | 131.3/71.5 |
| Q48 | 1590003291 | S.TRA UNR9213G0L | B | 124.9/77.7 |
| Q49 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 139.3/37.2 |
| Q50 | 1530002601 | S.TRA 2SC4215-O(TE85R,F) | T | 40.6/39.2 |
| Q51 | 1590003321 | S.FET TPC6103(TE85L,F) | B | 133.6/63.4 |
| Q52 | 1590003291 | S.TRA UNR9213G0L | B | 128.2/61.1 |
| Q53 | 1590000430 | S.TRA DTC144EUA T106 | B | 52.3/67.4 |
| Q54 | 1590000430 | S.TRA DTC144EUA T106 | T | 25.5/6.3 |
| Q55 | 1560001360 | S.FET 2SK3019 TL | T | 75.5/20.9 |
| Q57 | 1590003291 | S.TRA UNR9213G0L | T | 112/14.4 |
| D1 | 1750001070 | S.DIO DAN235ETL | T | 10.4/15.7 |
| D2 | 1750001070 | S.DIO DAN235ETL | T | 22.6/8.9 |
| D3 | 1790001251 | S.DIO MA2S1110GL | T | 61.3/55 |
| D4 | 1790001261 | S.DIO MA2S077G0L | B | 72.9/49.8 |
| D5 | 1790001261 | S.DIO MA2S077G0L | B | 71.1/51.3 |
| D6 | 1750001070 | S.DIO DAN235ETL | T | 30.6/20.8 |
| D7 | 1160000140 | S.DIO DAP222 TL | T | 58.9/14 |
| D8 | 1720000791 | S.VAR HVC321B1TRF-E | T | 49.5/32.4 |
| D9 | 1720000791 | S.VAR HVC321B1TRF-E | T | 52.7/32.4 |
| D10 | 1720000791 | S.VAR HVC321B1TRF-E | T | 60.5/30 |
| D11 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 52.7/33.6 |
| D12 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 52.7/34.8 |
| D13 | 1720000791 | S.VAR HVC321B1TRF-E | T | 63.8/28.6 |
| D14 | 1720000791 | S.VAR HVC321B1TRF-E | T | 73.6/30.4 |
| D15 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 63.8/31.3 |
| D17 | 1720000791 | S.VAR HVC321B1TRF-E | T | 72.1/27.9 |
| D18 | 1750000721 | S.VAR HVC375BTRF-E | T | 69.8/33.3 |
| D19 | 1160000140 | S.DIO DAP222 TL | B | 120.5/17.8 |
| D20 | 1720000471 | S.VAR 1SV239(TPH3,F) | T | 69.4/34.9 |

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

[MAIN UNIT] (Other than "MDC compatible")

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include components like S.DIO DAN225ETL, S.DIO DAN222TL, S.DIO MA2S077G0L, etc.

[MAIN UNIT] (Other than "MDC compatible")

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include components like S.COI AS080547-47N, S.COI LQW2BHN56NJ03L, S.COI ELJRE 56NGFA, etc.

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

[MAIN UNIT] (Other than "MDC compatible")

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains part numbers from C154 to C266 and their corresponding descriptions and locations.

[MAIN UNIT] (Other than "MDC compatible")

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains part numbers from C267 to C356 and their corresponding descriptions and locations.

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

[FRONT UNIT]

| REF NO. | PARTS NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|-------------------------------|-----|--------------|
| R555 | 7030005220 | S.RES ERJ2GEJ 223 X (22K) | [A] | B 71.4/11.5 |
| | 7030005220 | S.RES ERJ2GEJ 223 X (22K) | [E] | |
| | 7030005220 | S.RES ERJ2GEJ 223 X (22K) | [C] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [B] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [F] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [D] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [G] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [J] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [H] | |
| | 7030008290 | S.RES ERJ2GEJ 183 X (18K) | [I] | |
| R556 | 7030005050 | S.RES ERJ2GEJ 103 X (10K) | B | 73.2/8.7 |
| R557 | 7030005050 | S.RES ERJ2GEJ 103 X (10K) | B | 71.8/10.2 |
| R558 | 7030005060 | S.RES ERJ2GEJ 333 X (33K) | [A] | B 74/13.5 |
| | 7030005060 | S.RES ERJ2GEJ 333 X (33K) | [E] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [C] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [B] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [F] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [D] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [G] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [J] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [H] | |
| | 7030008010 | S.RES ERJ2GEJ 123 X (12K) | [I] | |
| R559 | 7030005090 | S.RES ERJ2GEJ 104 X (100K) | B | 11/20.8 |
| R560 | 7030005090 | S.RES ERJ2GEJ 104 X (100K) | T | 6.2/20.8 |
| C501 | 4030016930 | S.CER ECJ0EB1A104K | B | 41.8/30.2 |
| C502 | 4030016930 | S.CER ECJ0EB1A104K | B | 40.9/30.2 |
| C503 | 4030016930 | S.CER ECJ0EB1A104K | B | 42.7/30.2 |
| C504 | 4030016930 | S.CER ECJ0EB1A104K | B | 43.6/30.2 |
| C505 | 4030016930 | S.CER ECJ0EB1A104K | B | 44.5/30.2 |
| C506 | 4030017490 | S.CER C1608 JB 1A 105K-T | B | 44.7/23.2 |
| C507 | 4030017460 | S.CER ECJ0EB1E102K | B | 46.1/22.7 |
| C508 | 4030017490 | S.CER C1608 JB 1A 105K-T | B | 43.4/23.2 |
| C509 | 4030017730 | S.CER ECJ0EB1E471K | B | 13.1/33.3 |
| C510 | 4030017730 | S.CER ECJ0EB1E471K | B | 18.6/30.5 |
| C511 | 4030016790 | S.CER ECJ0EB1C103K | B | 58.3/17.1 |
| C512 | 4030016930 | S.CER ECJ0EB1A104K | B | 62/17.1 |
| C513 | 4030017030 | S.CER ECJ0EB1A273K | B | 59.1/10.2 |
| C514 | 4030016930 | S.CER ECJ0EB1A104K | B | 58.3/18.3 |
| C515 | 4030017630 | S.CER ECJ0EC1H120J | B | 57.1/17.8 |
| C516 | 4030017580 | S.CER ECJ0EC1H060C | B | 48.9/22.7 |
| C517 | 4030016790 | S.CER ECJ0EB1C103K | B | 52.9/22.7 |
| C518 | 4030017640 | S.CER ECJ0EC1H150J | B | 49.8/22.7 |
| C519 | 4030016930 | S.CER ECJ0EB1A104K | B | 53.8/22.7 |
| C520 | 4030017420 | S.CER ECJ0EC1H470J | T | 12.5/36.3 |
| C521 | 4030017460 | S.CER ECJ0EB1E102K | B | 78.8/27.5 |
| C522 | 4550006480 | S.TAN TEESVA 1C 475M8R | B | 87.7/9.8 |
| C523 | 4550006250 | S.TAN TEESVA 1A 106M8R | B | 12.8/7.6 |
| C524 | 4550006250 | S.TAN TEESVA 1A 106M8R | B | 7.2/7.6 |
| C525 | 4030017330 | S.CER ECJ0EF1C104Z | B | 85.7/7.7 |
| C526 | 4030016790 | S.CER ECJ0EB1C103K | B | 84.1/7.7 |
| C527 | 4030017420 | S.CER ECJ0EC1H470J | T | 5.9/17.2 |
| C528 | 4030017460 | S.CER ECJ0EB1E102K | T | 8.4/17.2 |
| C529 | 4550006250 | S.TAN TEESVA 1A 106M8R | B | 82.1/9.8 |
| C530 | 4030016930 | S.CER ECJ0EB1A104K | B | 84.1/12.1 |
| C531 | 4030017460 | S.CER ECJ0EB1E102K | B | 79/22.5 |
| C533 | 4030017460 | S.CER ECJ0EB1E102K | B | 80/22.5 |
| C534 | 4030017420 | S.CER ECJ0EC1H470J | B | 76.2/22.9 |
| C535 | 4030016930 | S.CER ECJ0EB1A104K | B | 5.4/9.1 |
| C536 | 4030016930 | S.CER ECJ0EB1A104K | B | 3.3/18.2 |
| C537 | 4030017460 | S.CER ECJ0EB1E102K | B | 14/25 |
| C538 | 4030017330 | S.CER ECJ0EF1C104Z | B | 6/10.9 |
| C539 | 4030017420 | S.CER ECJ0EC1H470J | T | 10.9/17.2 |
| C540 | 4030017460 | S.CER ECJ0EB1E102K | B | 10.9/17.8 |
| C541 | 4030017420 | S.CER ECJ0EC1H470J | B | 8.5/10.9 |
| C543 | 4030017420 | S.CER ECJ0EC1H470J | B | 77.6/16.7 |
| C544 | 4030017420 | S.CER ECJ0EC1H470J | B | 79.8/16.7 |
| C545 | 4030017420 | S.CER ECJ0EC1H470J | B | 77.6/15.8 |
| C546 | 4030017420 | S.CER ECJ0EC1H470J | B | 74/15.3 |
| C547 | 4030017460 | S.CER ECJ0EB1E102K | B | 74/16.2 |
| C548 | 4030017490 | S.CER C1608 JB 1A 105K-T | B | 9.7/19.3 |
| C549 | 4030016930 | S.CER ECJ0EB1A104K | B | 3.7/21.2 |
| C550 | 4030018900 | S.CER ECJ0EB0J474K | B | 70.1/11.9 |
| C551 | 4030016930 | S.CER ECJ0EB1A104K | B | 70.9/10.2 |
| C552 | 4030017460 | S.CER ECJ0EB1E102K | B | 75.2/6.9 |
| C553 | 4030017460 | S.CER ECJ0EB1E102K | B | 71.4/13.3 |
| C554 | 4030016790 | S.CER ECJ0EB1C103K | B | 74.2/8.7 |
| C555 | 4030017460 | S.CER ECJ0EB1E102K | [A] | B 74/14.4 |
| | 4030017460 | S.CER ECJ0EB1E102K | [E] | |
| | 4030017460 | S.CER ECJ0EB1E102K | [C] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [B] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [F] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [D] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [G] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [J] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [H] | |
| | 4030018920 | S.CER ECJ0EB1H392K | [I] | |
| C556 | 4550006480 | S.TAN TEESVA 1C 475M8R | B | 76.9/10.2 |
| J501 | 6510022022 | S.CON 14FLT-SM2-TB(LF)(SN)(M) | B | 88/28.5 |
| J502 | 6510023092 | S.CON 20FLT-SM2-TB(LF)(SN)(M) | B | 75.5/19.5 |
| J503 | 6450002210 | CON 3017-8821 <KIN> | | |
| DS501 | 5030003020 | LCD L6-0226TVM-3 | T | 18.2/35.9 |
| DS502 | 5040002670 | S.LED CL-165HR/YG | T | 32.8/6.5 |
| DS503 | 5040002310 | S.LED SML-311YTT86 | T | 46.1/6.3 |
| DS504 | 5040002310 | S.LED SML-311YTT86 | T | 59.8/6.3 |
| DS505 | 5040002310 | S.LED SML-311YTT86 | T | 92.3/24.5 |
| DS506 | 5040002310 | S.LED SML-311YTT86 | T | 73.1/6.5 |
| DS507 | 5040002310 | S.LED SML-311YTT86 | T | 31.7/26 |
| DS508 | 5040002310 | S.LED SML-311YTT86 | T | 40.2/26 |

[FRONT UNIT]

| REF NO. | PARTS NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------------|----|--------------|
| DS510 | 5040002310 | S.LED SML-311YTT86 | T | 48.7/26 |
| DS511 | 5040002310 | S.LED SML-311YTT86 | T | 74.2/26 |
| DS512 | 5040002310 | S.LED SML-311YTT86 | T | 65.7/26 |
| DS513 | 5040002310 | S.LED SML-311YTT86 | T | 57.2/26 |
| SP501 | 2510001400 | SPE 3050S-E6227 <PRI> | | |
| W501 | 8900012711 | CAB OPC-1297A (P0.5,N20,L62) <TJM> | | |
| W502 | 7120000470 | JUM ERDS2T0 | | |
| W503 | 7120000470 | JUM ERDS2T0 | | |
| EP502 | 8930072220 | LCD SRCN-2979-SP-N-W (SHJ) | | |

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

[CONNECT UNIT]

| REF NO. | PARTS NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------------|----|--------------|
| C601 | 4030017420 | S.CER ECJ0EC1H470J | T | 12.7/4.6 |
| C602 | 4030017420 | S.CER ECJ0EC1H470J | T | 15.4/4.6 |
| C603 | 4030017420 | S.CER ECJ0EC1H470J | T | 18.2/4.6 |
| C604 | 4030017420 | S.CER ECJ0EC1H470J | T | 19.6/4.6 |
| C605 | 4030017420 | S.CER ECJ0EC1H470J | T | 20.9/4.6 |
| C606 | 4030017420 | S.CER ECJ0EC1H470J | T | 25.1/4.6 |
| C607 | 4030017420 | S.CER ECJ0EC1H470J | T | 37.5/13.2 |
| C608 | 4030017420 | S.CER ECJ0EC1H470J | T | 16.8/4.6 |
| C609 | 4030017420 | S.CER ECJ0EC1H470J | T | 40.3/13.2 |
| C610 | 4030017420 | S.CER ECJ0EC1H470J | T | 41.7/4.6 |
| J601 | 6510025240 | S.CON IMSA-9631S-20Y912 | B | 32.2/16.2 |
| J602 | 6510023210 | CON CD6125SA1J0 <CVI> | | |
| W601 | 8900012711 | CAB OPC-1297A (P0.5,N20,L62) <TJM> | | |

[MAIN-A UNIT] (MDC compatible)

| REF NO. | PARTS NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------|-----|--------------|
| IC1 | 1110005340 | S.IC NJM12902V-TE1-#ZZZB | T | 82.3/12.9 |
| IC2 | 1110006221 | S.IC AK2346P-E2/P | B | 44.7/11.7 |
| IC3 | 1140013200 | S.IC CD4053BPWR | B | 58.7/9.3 |
| IC4 | 1130010100 | S.IC LMX2352TMX/NOPB | T | 82.9/46 |
| IC5 | 1110003491 | S.IC TA31136FNG(D,EL) | T | 28/13.9 |
| IC6 | 1190001350 | S.IC M62364FP 600D | B | 84.9/12.9 |
| IC7 | 1110005340 | S.IC NJM12902V-TE1-#ZZZB | T | 108.5/43.7 |
| IC8 | 1140013200 | S.IC CD4053BPWR | B | 58.7/16.1 |
| IC9 | 1130012960 | S.IC BU8872FS-E2 | B | 133.1/21.3 |
| IC10 | 1190002051 | S.IC SPM5001-TL-E | B | 33.8/36.9 |
| IC12 | 1190001340 | S.IC M62334FP 600C | B | 9.1/25.7 |
| IC13 | 1110005771 | S.IC S-80942CNMC-G9CT2G | B | 126/44.8 |
| IC14 | 1140014550 | S.IC HD64F2506RFC26DV(EMPTY) | B | 111.8/35.7 |
| IC15 | 1150002073 | IC RA60H1317M-125 | [B] | |
| | 1150002042 | IC RA30H1317M-121 | [F] | |
| | 1150002042 | IC RA30H1317M-121 | [D] | |
| | 1150002073 | IC RA60H1317M-125 | [G] | |
| | 1150002042 | IC RA30H1317M-121 | [J] | |
| | 1150002073 | IC RA60H1317M-125 | [H] | |
| | 1150002073 | IC RA60H1317M-125 | [I] | |
| IC16 | 1140014160 | S.IC 24LC1025T-I/SM | B | 133.3/29 |
| IC17 | 1110002751 | S.IC TA75S01F(TE85R,F) | T | 54.1/70.4 |
| IC18 | 1180000970 | S.IC AN78L05M-(E1) | B | 113/65.3 |
| IC19 | 1120002510 | S.IC DS14C232TM S | T | 104.7/70.5 |
| IC20 | 1180001251 | S.IC TA7808F(TE16L,Q) | B | 121.5/65.8 |
| IC21 | 1110003091 | IC LA4425A-E | | |
| IC22 | 1110002751 | S.IC TA75S01F(TE85R,F) | B | 135.5/54.4 |
| IC23 | 1130006221 | S.IC TC4W53FU(TE12L,F) | B | 106.9/9.6 |
| IC25 | 1110006230 | S.IC NJM2711F-TE1-#ZZZB | B | 26.1/6.6 |
| Q1 | 1590003231 | S.TRA UNR9113G0L | B | 15.2/6 |
| Q3 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 36.4/15.5 |
| Q4 | 1590001650 | S.TRA XP4601(TX) | B | 92.8/12.4 |
| Q5 | 1590003291 | S.TRA UNR9213G0L | B | 76.7/50 |
| Q6 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | T | 63.2/55.1 |
| Q7 | 1560000541 | S.FET 2SK880-Y(T5RICOM,F) | B | 81.2/27.1 |
| Q8 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 79.2/31.8 |
| Q9 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 81.7/31.8 |
| Q10 | 1560001360 | S.FET 2SK3019 TL | B | 57/31.6 |
| Q12 | 1530002601 | S.TRA 2SC4215-O(TE85R,F) | T | 26.9/20 |
| Q16 | 1590003291 | S.TRA UNR9213G0L | T | 113.2/47.6 |
| Q17 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 50.9/47.6 |
| Q18 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 61.6/42.6 |
| Q19 | 1530002920 | S.TRA 2SC4226-T1 R25 | T | 72.1/43 |
| Q20 | 1590003231 | S.TRA UNR9113G0L | B | 33.9/25.2 |
| Q22 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | T | 58.1/46.3 |
| Q23 | 1590001400 | S.TRA XP1214(TX) | B | 55.7/40.9 |
| Q24 | 1590003281 | S.TRA UNR9211G0L | B | 55.8/38.2 |
| Q25 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | B | 65.9/49.5 |
| Q26 | 1590001400 | S.TRA XP1214(TX) | B | 67.2/43.1 |
| Q27 | 1590003231 | S.TRA UNR9113G0L | T | 124.7/52 |
| Q28 | 1590003291 | S.TRA UNR9213G0L | B | 123.4/46.3 |
| Q29 | 1530003311 | S.TRA 2SC5107-O(TE85R,F) | B | 53.5/51.2 |
| Q30 | 1530000372 | S.TRA 2SC3356-T1B R (R24) | B | 65.5/66 |
| Q31 | 1580000731 | S.FET 3SK293(TE85L,F) | B | 10.2/38.6 |
| Q32 | 1560000841 | S.FET 2SK1829(TE85R,F) | T | 11/42.5 |
| Q33 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | [B] | |
| | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | [G] | |
| | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | [H] | |
| | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | [I] | |
| Q34 | 1590003291 | S.TRA UNR9213G0L | T | 83/67.4 |
| Q35 | 1520000460 | S.TRA 2SB1132 T100 R | T | 100.1/57.9 |
| Q36 | 1590001190 | S.TRA XP6501-(TX).AB | T | 104.3/55.8 |
| Q37 | 1540000550 | S.TRA 2SD1664 T100Q | T | 75.5/63.6 |
| Q38 | 1510000920 | S.TRA 2SA1577 T106 Q | T | 39.3/21.3 |
| Q39 | 1590003291 | S.TRA UNR9213G0L | T | 42.6/21.3 |
| Q40 | 1590003291 | S.TRA UNR9213G0L | T | 104.1/51.9 |
| Q41 | 1590001451 | S.FET 2SJ144-GR (TE85R,F) | B | 110.3/83.3 |
| Q42 | 1590003291 | S.TRA UNR9213G0L | B | 132.1/45 |
| Q43 | 1590000990 | S.TRA DTC363EK T146 | B | 135.7/49 |
| Q44 | 1590003291 | S.TRA UNR9213G0L | T | 108.5/21.6 |
| Q45 | 1590003291 | S.TRA UNR9213G0L | B | 133.3/58.9 |
| Q46 | 1590003291 | S.TRA UNR9213G0L | T | 117.9/84.4 |
| Q47 | 1550000100 | S.FET 2SJ377 (TE16L1,NQ) | B | 131.3/71.5 |
| Q48 | 1590003291 | S.TRA UNR9213G0L | B | 127.4/78 |
| Q49 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 139.3/37.2 |
| Q50 | 1530002601 | S.TRA 2SC4215-O(TE85R,F) | T | 40.6/39.2 |
| Q51 | 1590003321 | S.FET TPC6103(TE85L,F) | B | 133.6/63.4 |
| Q52 | 1590003291 | S.TRA UNR9213G0L | B | 128.2/61.1 |
| Q53 | 1590000430 | S.TRA DTC144EUA T106 | B | 52.3/67.4 |
| Q54 | 1590000430 | S.TRA DTC144EUA T106 | T | 25.5/6.3 |
| Q55 | 1560001360 | S.FET 2SK3019 TL | T | 75.5/20.9 |
| Q57 | 1590003291 | S.TRA UNR9213G0L | T | 112/14.4 |
| Q58 | 1530002851 | S.TRA 2SC4116-BL(TE85R,F) | B | 24.9/9.5 |
| Q59 | 1590003291 | S.TRA UNR9213G0L | B | 96.6/8 |
| Q60 | 1590003291 | S.TRA UNR9213G0L | B | 97.8/11.6 |
| D1 | 1750001070 | S.DIO DAN235ETL | T | 10.4/15.7 |
| D2 | 1750001070 | S.DIO DAN235ETL | T | 22.6/8.9 |
| D3 | 1790001251 | S.DIO MA2S1110GL | T | 61.3/55 |
| D4 | 1790001261 | S.DIO MA2S077G0L | B | 72.9/49.8 |
| D5 | 1790001261 | S.DIO MA2S077G0L | B | 71.1/51.3 |
| D6 | 1750001070 | S.DIO DAN235ETL | T | 30.6/20.8 |
| D7 | 1160000140 | S.DIO DAP222 TL | T | 58.9/14 |
| D8 | 1720000791 | S.VAR HVC321B1TRF-E | T | 49.5/32.4 |
| D9 | 1720000791 | S.VAR HVC321B1TRF-E | T | 52.7/32.4 |
| D10 | 1720000791 | S.VAR HVC321B1TRF-E | T | 60.5/30 |
| D11 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 52.7/33.6 |
| D12 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 52.7/34.8 |
| D13 | 1720000791 | S.VAR HVC321B1TRF-E | T | 63.8/28.6 |
| D14 | 1720000791 | S.VAR HVC321B1TRF-E | T | 73.6/30.4 |
| D15 | 1720000641 | S.VAR 1SV284(TPH3,F) | T | 63.8/31.3 |
| D17 | 1720000791 | S.VAR HVC321B1TRF-E | T | 72.1/27.9 |

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

[MAIN-A UNIT] (MDC compatible)

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

[MAIN-A UNIT] (MDC compatible)

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

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

[MAIN-A UNIT] (MDC compatible)

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Includes rows for parts like GRM31M2C2H120JV01L, ECJ0EB1E102K, etc.

[MAIN-A UNIT] (MDC compatible)

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Includes rows for parts like ECJ0EB1A104K, AXK540147YG, etc.

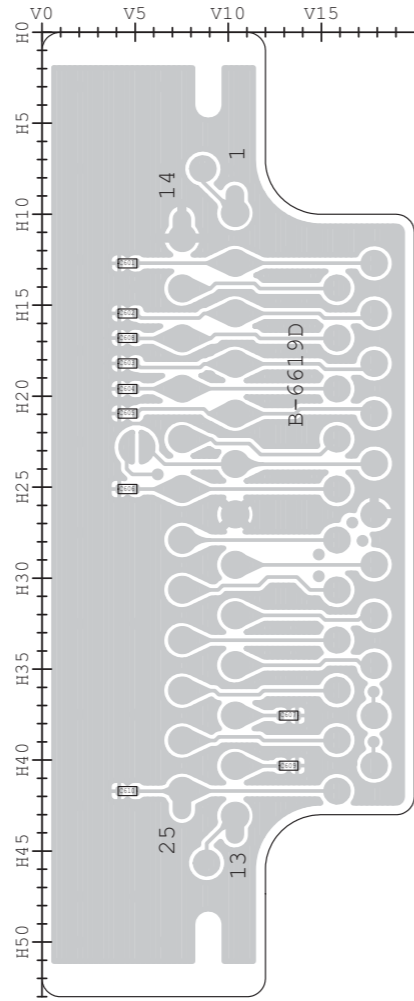
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side) S.=Surface mount

BOARD LAYOUTS

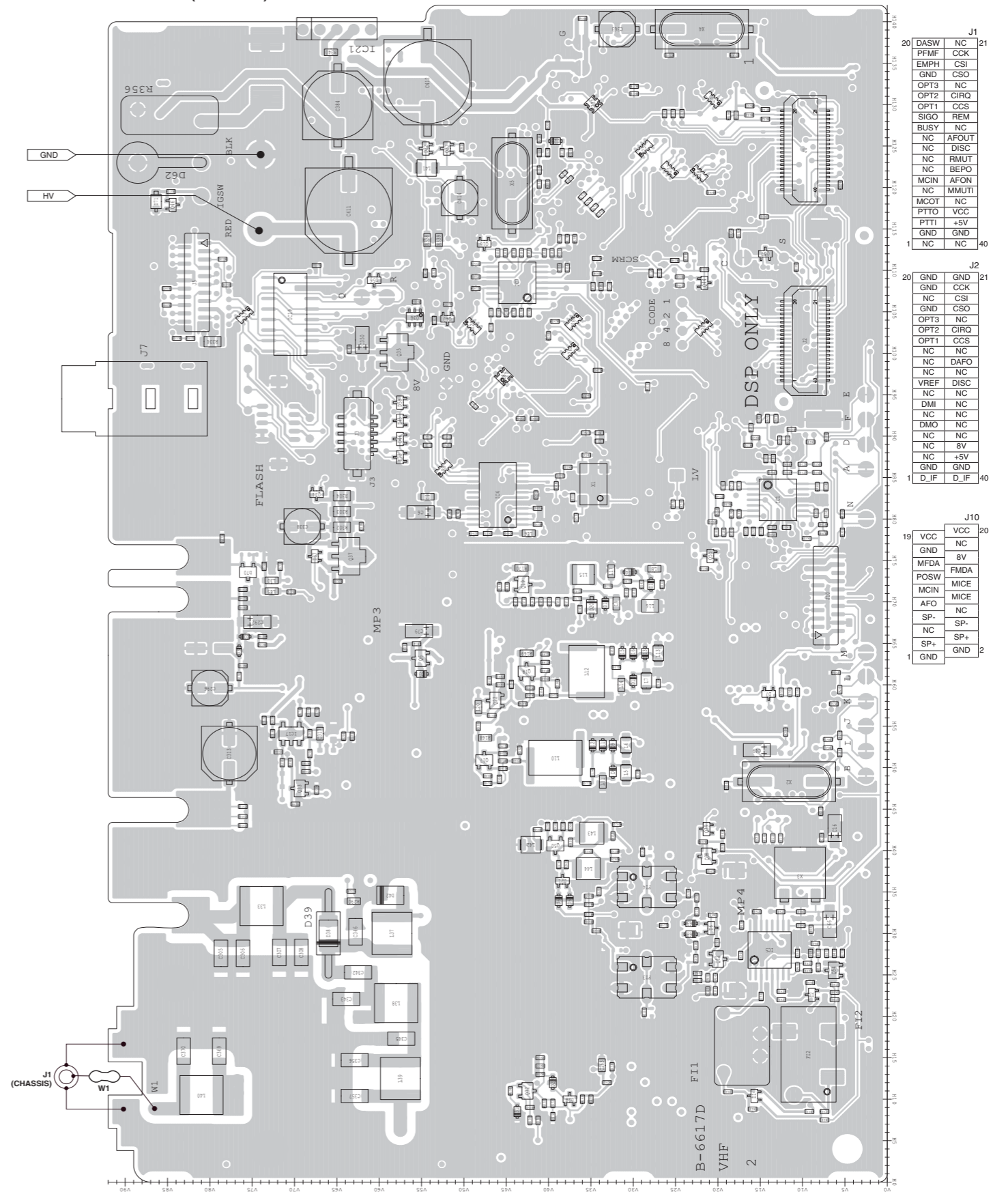
• Other than "MDC compatible"

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

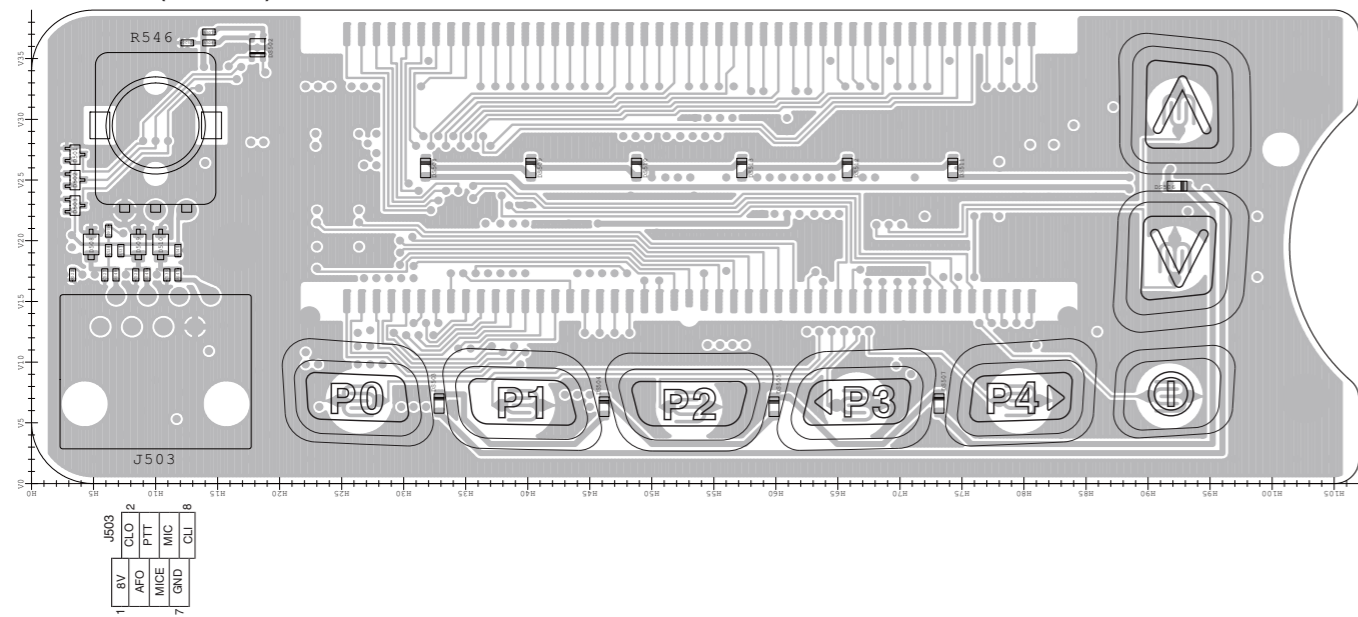
• CONNECT UNIT (TOP VIEW)



• MAIN UNIT (TOP VIEW)



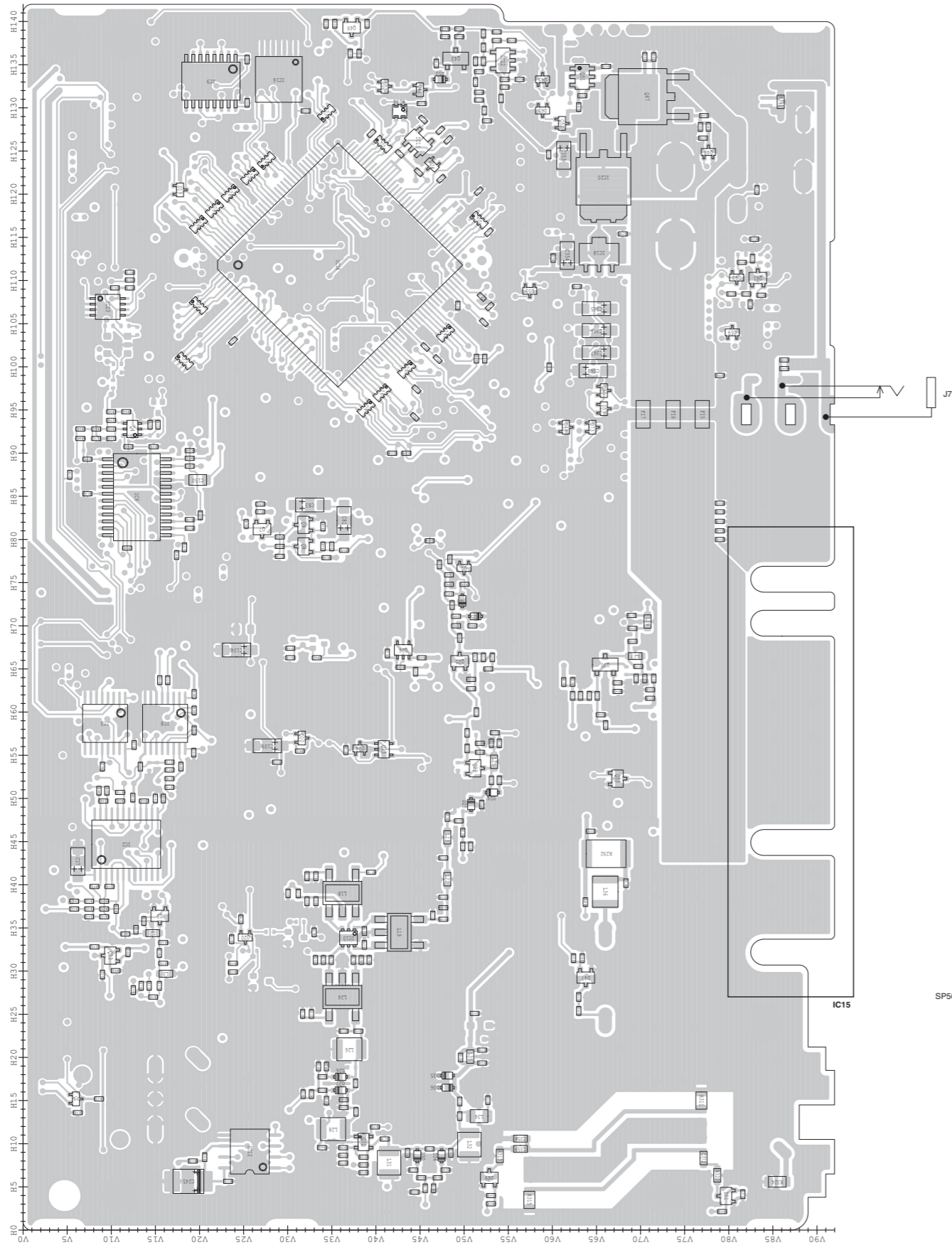
• FRONT UNIT (TOP VIEW)



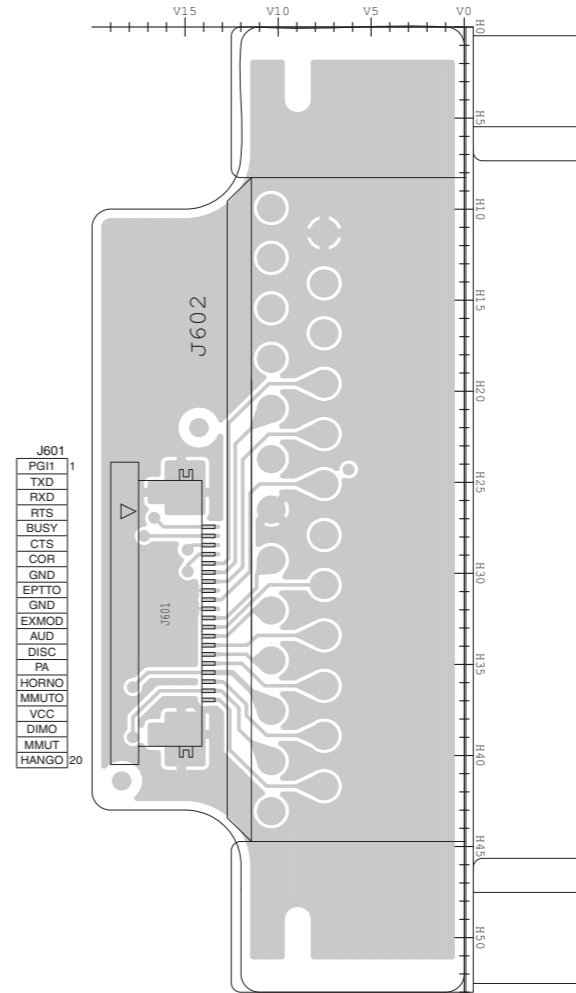
• Other than "MDC compatible"

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

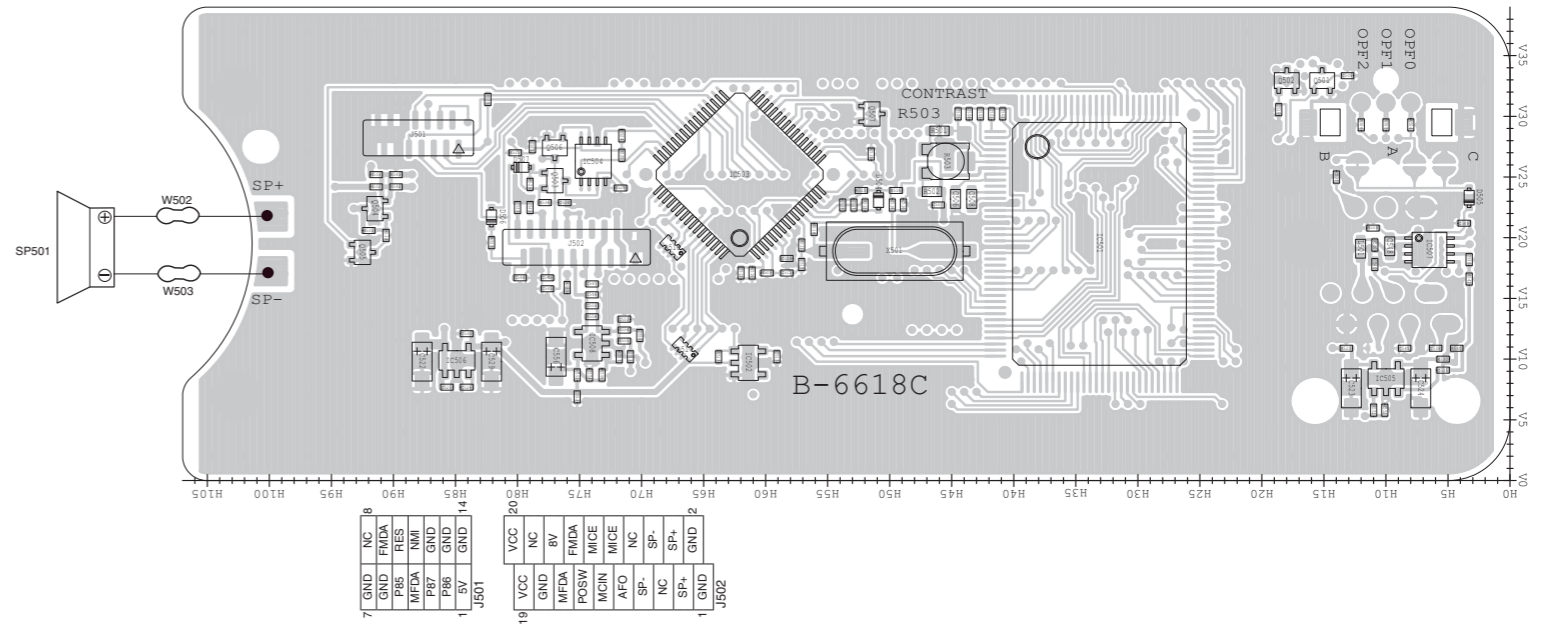
• MAIN UNIT (BOTTOM VIEW)



• CONNECT UNIT (BOTTOM VIEW)

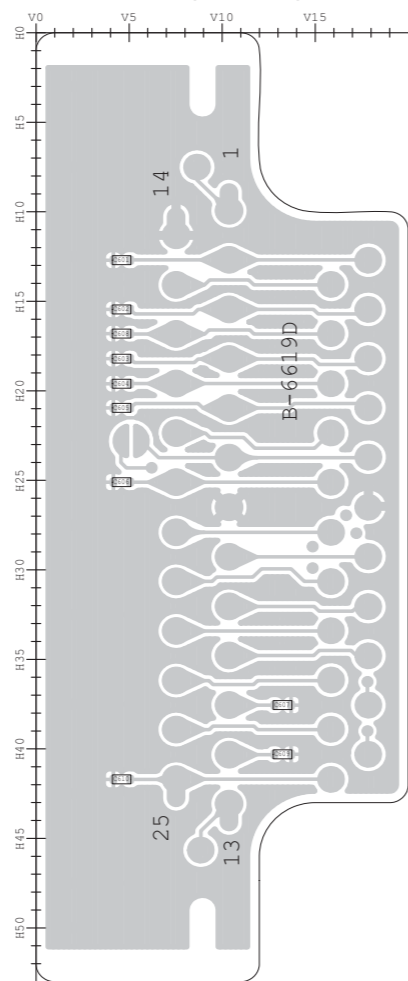


• FRONT UNIT (BOTTOM VIEW)

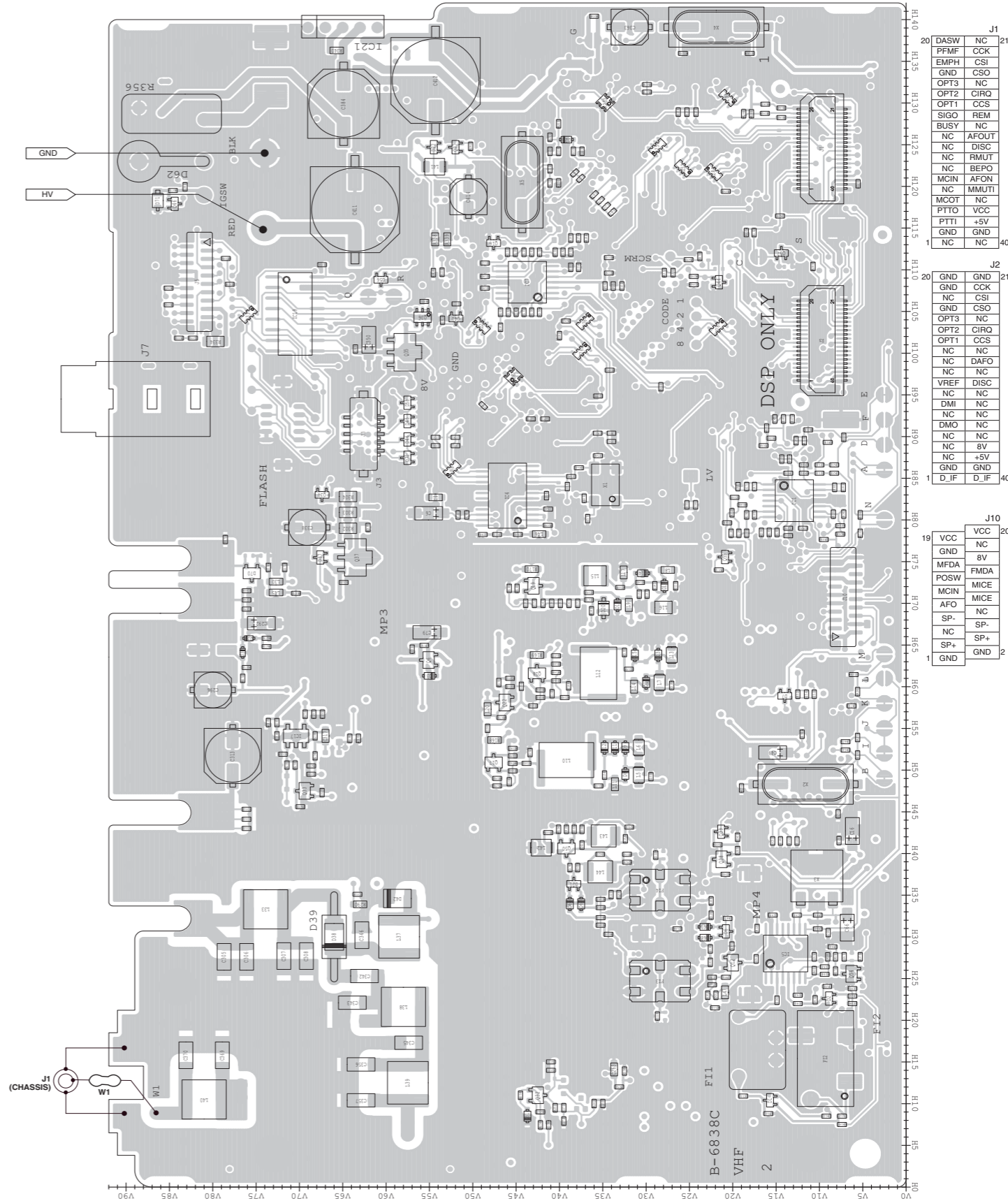


The combination of this side and the bottom side shows the board layout in the same configuration as the actual P.C.Board.

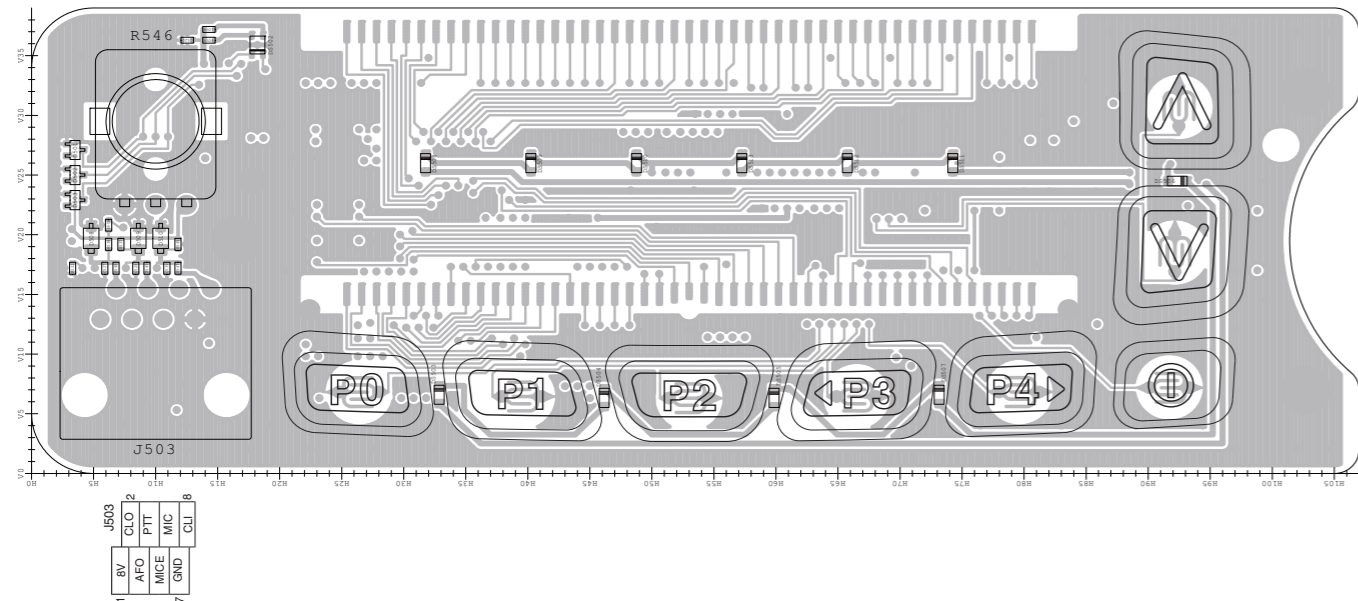
• CONNECT UNIT (TOP VIEW)



• MAIN-A UNIT (TOP VIEW)



• FRONT UNIT (TOP VIEW)



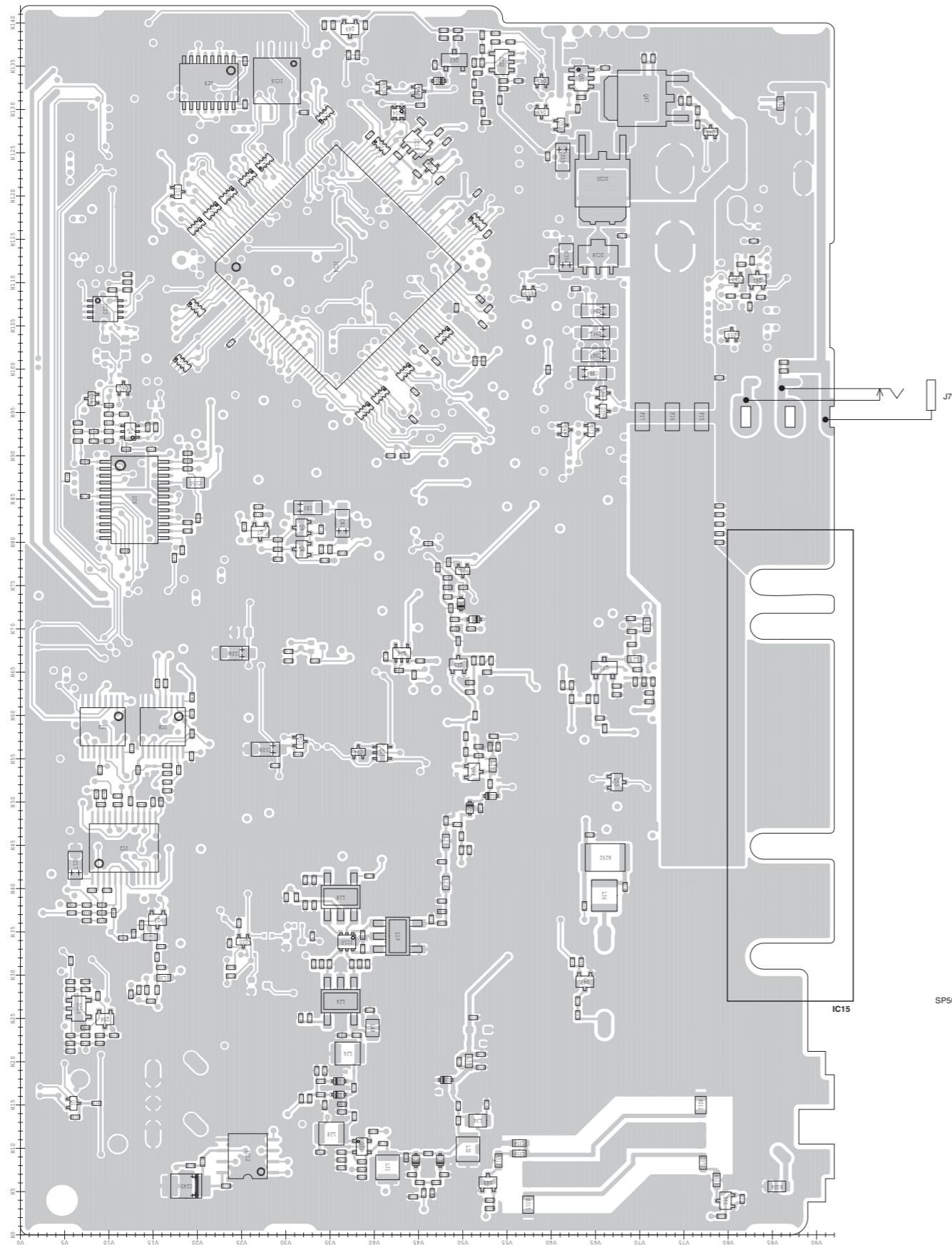
| J1 | |
|----|-----------|
| 20 | DASW NC |
| 19 | PFMF CCK |
| 18 | EMPH CSI |
| 17 | GND CSO |
| 16 | OPT3 NC |
| 15 | OPT2 CIRD |
| 14 | OPT1 CCS |
| 13 | SIGO REM |
| 12 | BUSY NC |
| 11 | NC AFOUT |
| 10 | NC DISC |
| 9 | NC RMUT |
| 8 | NC BEPO |
| 7 | MCIN AFON |
| 6 | NC MMULTI |
| 5 | MCOT NC |
| 4 | PTTO VCC |
| 3 | PTTI +5V |
| 2 | GND GND |
| 1 | NC NC |

| J2 | |
|----|-----------|
| 20 | GND GND |
| 19 | GND CCK |
| 18 | NC CSI |
| 17 | GND CSO |
| 16 | OPT3 NC |
| 15 | OPT2 CIRD |
| 14 | OPT1 CCS |
| 13 | NC NC |
| 12 | NC DAFO |
| 11 | NC NC |
| 10 | VREF DISC |
| 9 | NC NC |
| 8 | DMR NC |
| 7 | NC NC |
| 6 | DMO NC |
| 5 | NC NC |
| 4 | NC 8V |
| 3 | NC +5V |
| 2 | GND GND |
| 1 | D_IF D_IF |

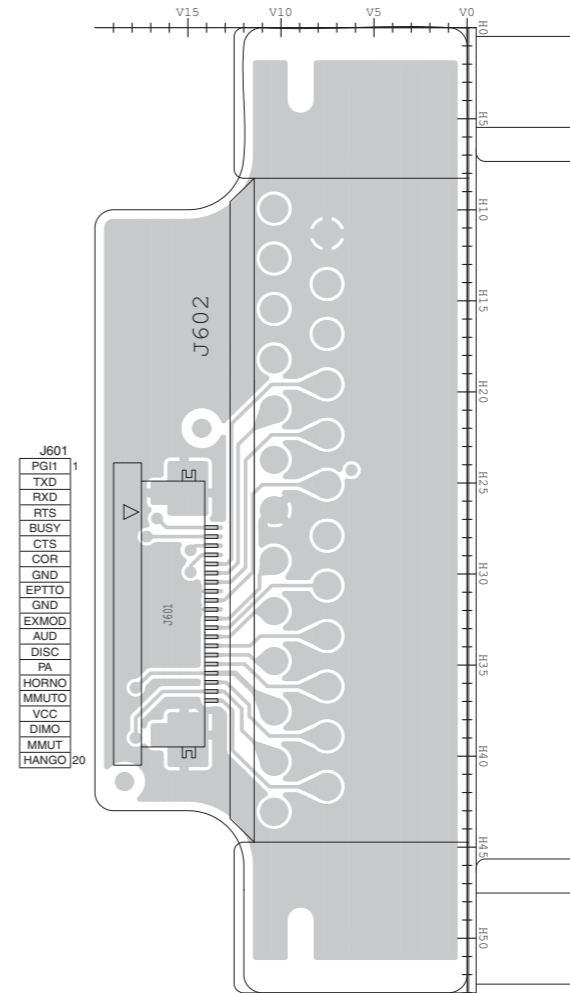
| J10 | |
|-----|-----------|
| 19 | VCC NC |
| 18 | GND 8V |
| 17 | MFDA FMDA |
| 16 | POSW MICE |
| 15 | MCIN MICE |
| 14 | AFO NC |
| 13 | SP- SP- |
| 12 | NC SP+ |
| 11 | SP+ GND |
| 10 | GND GND |

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

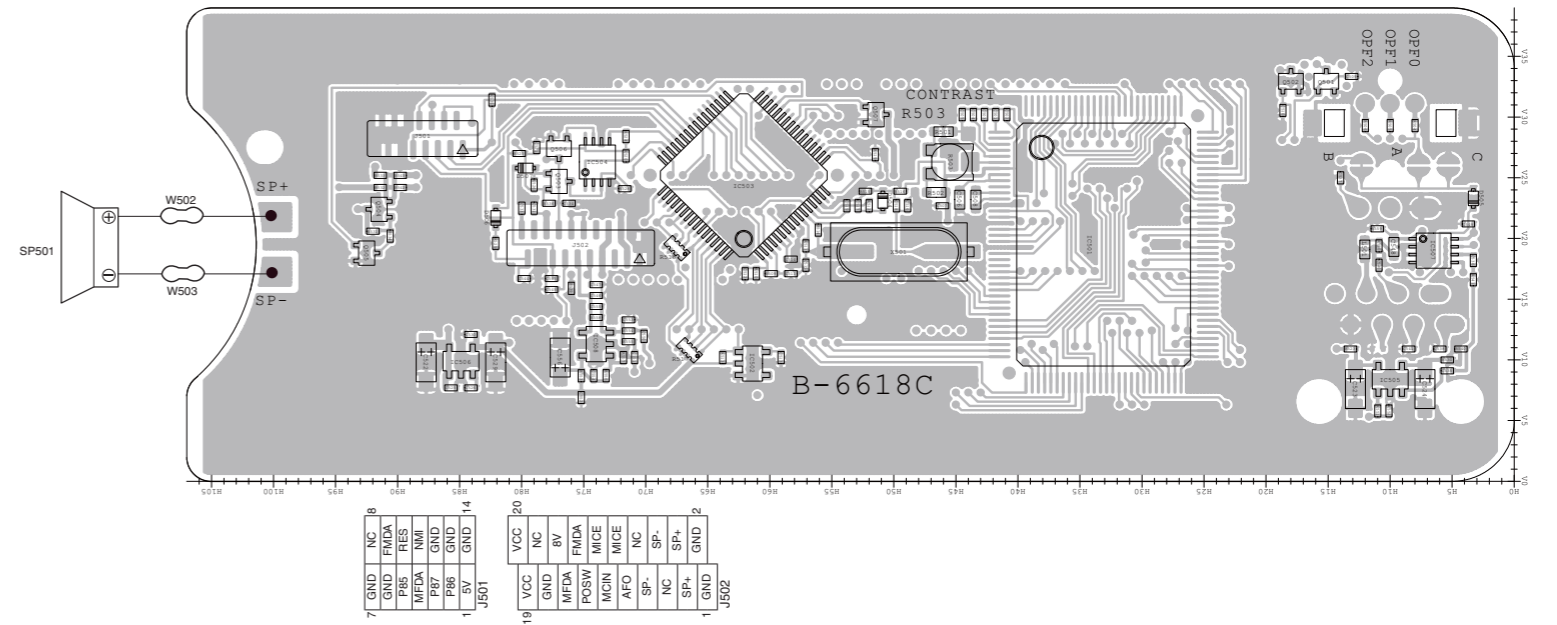
• MAIN-A UNIT (BOTTOM VIEW)



• CONNECT UNIT (BOTTOM VIEW)

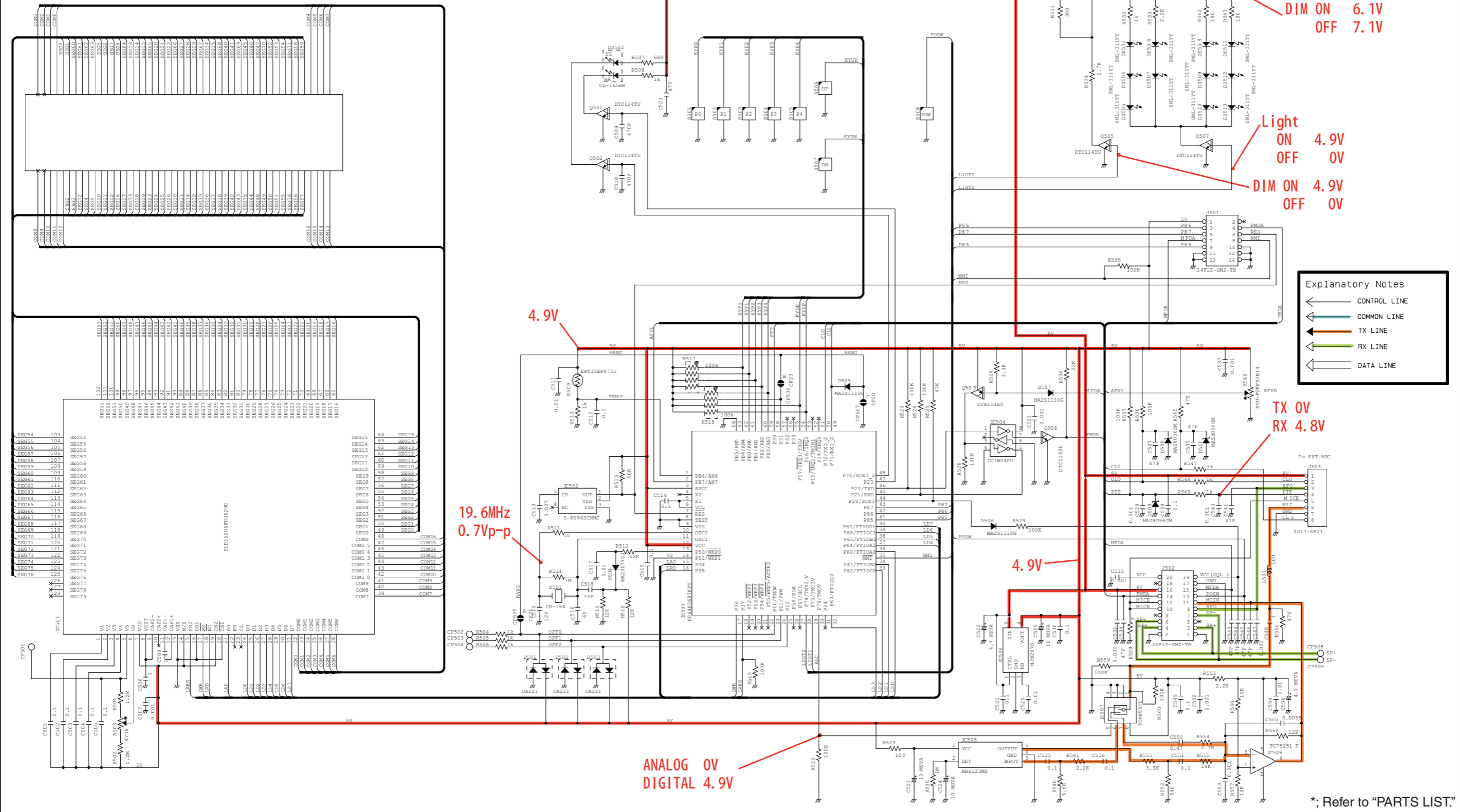


• FRONT UNIT (BOTTOM VIEW)



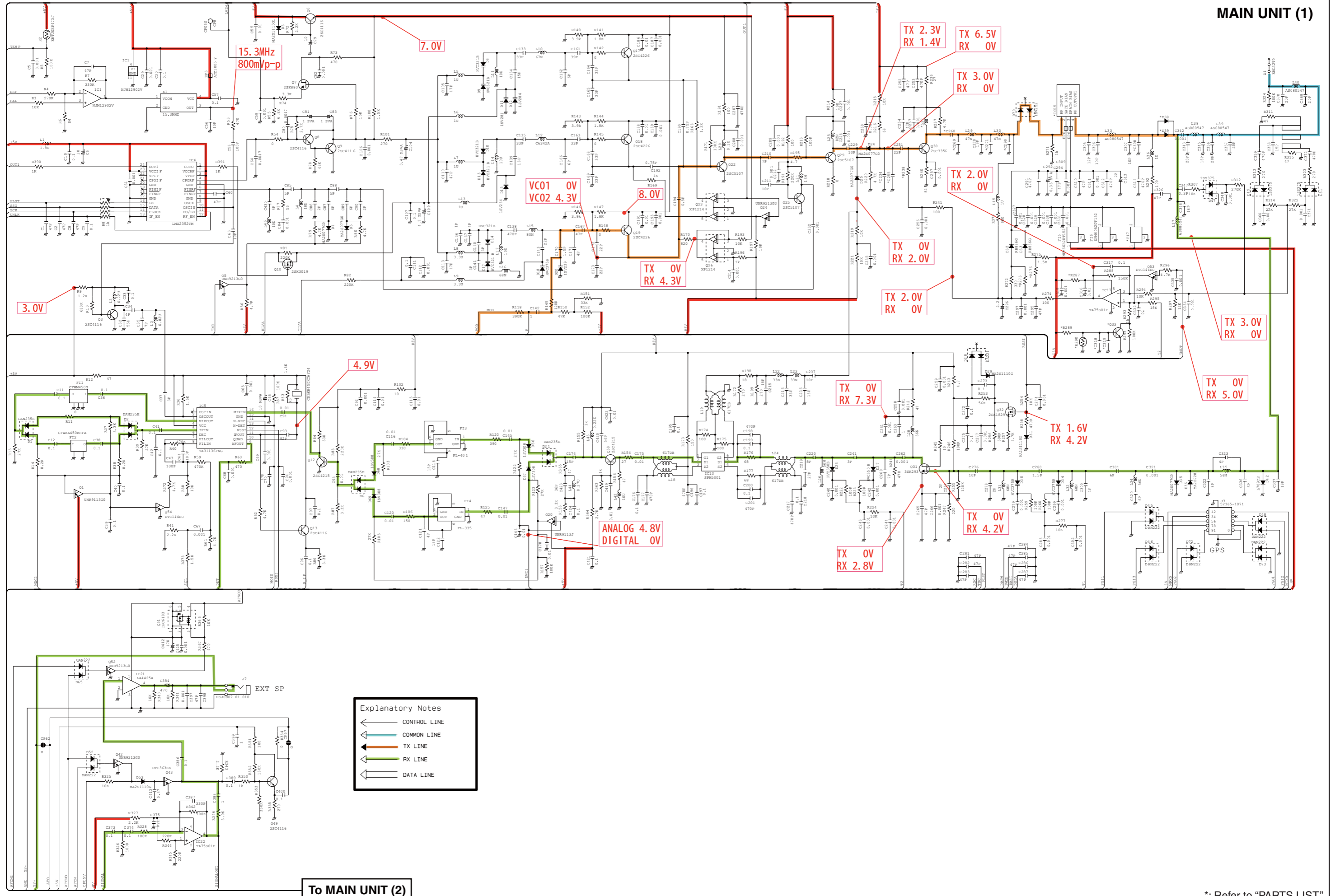
VOLTAGE DIAGRAM

FRONT UNIT



• Other than "MDC compatible"

MAIN UNIT (1)



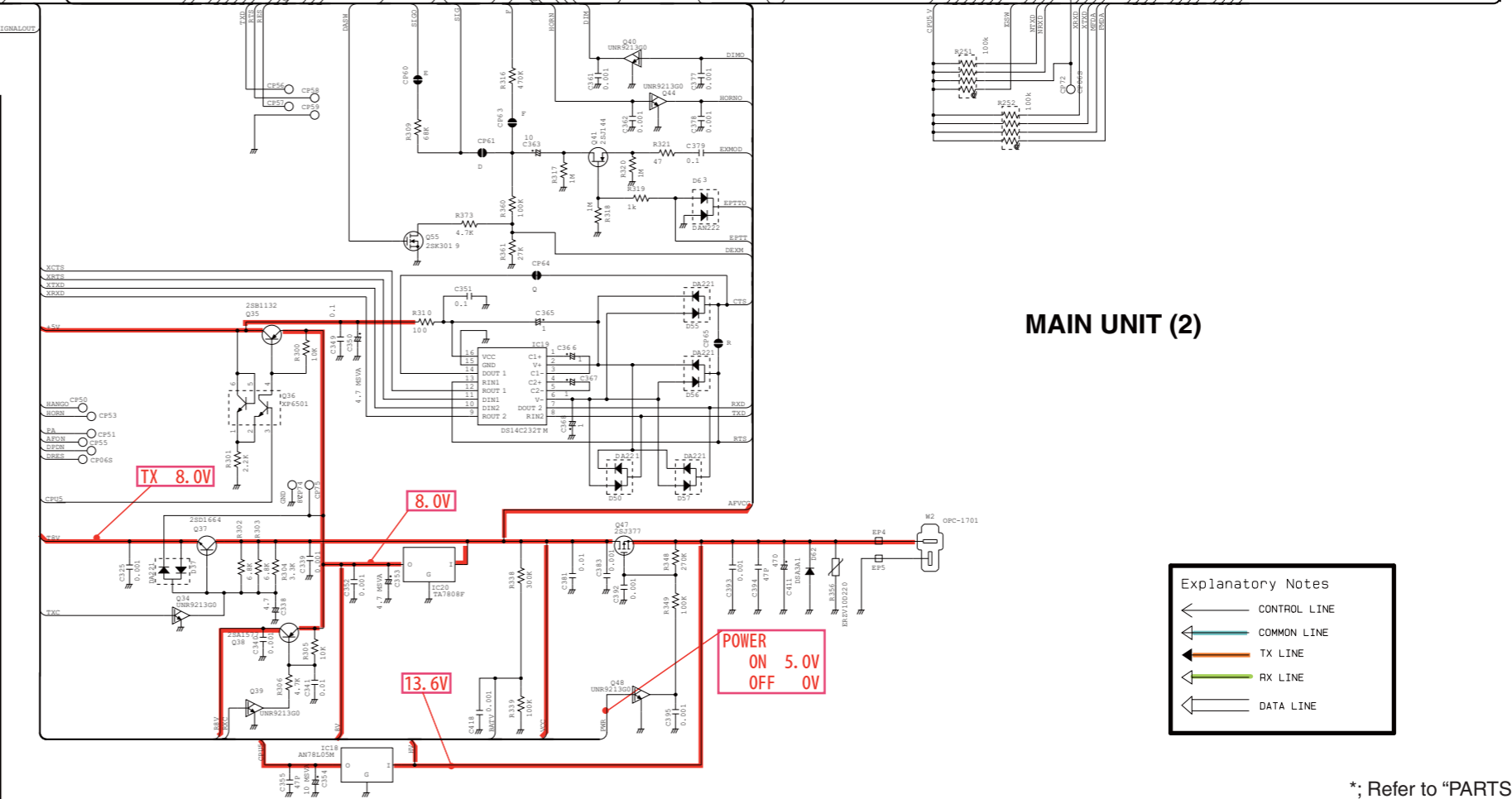
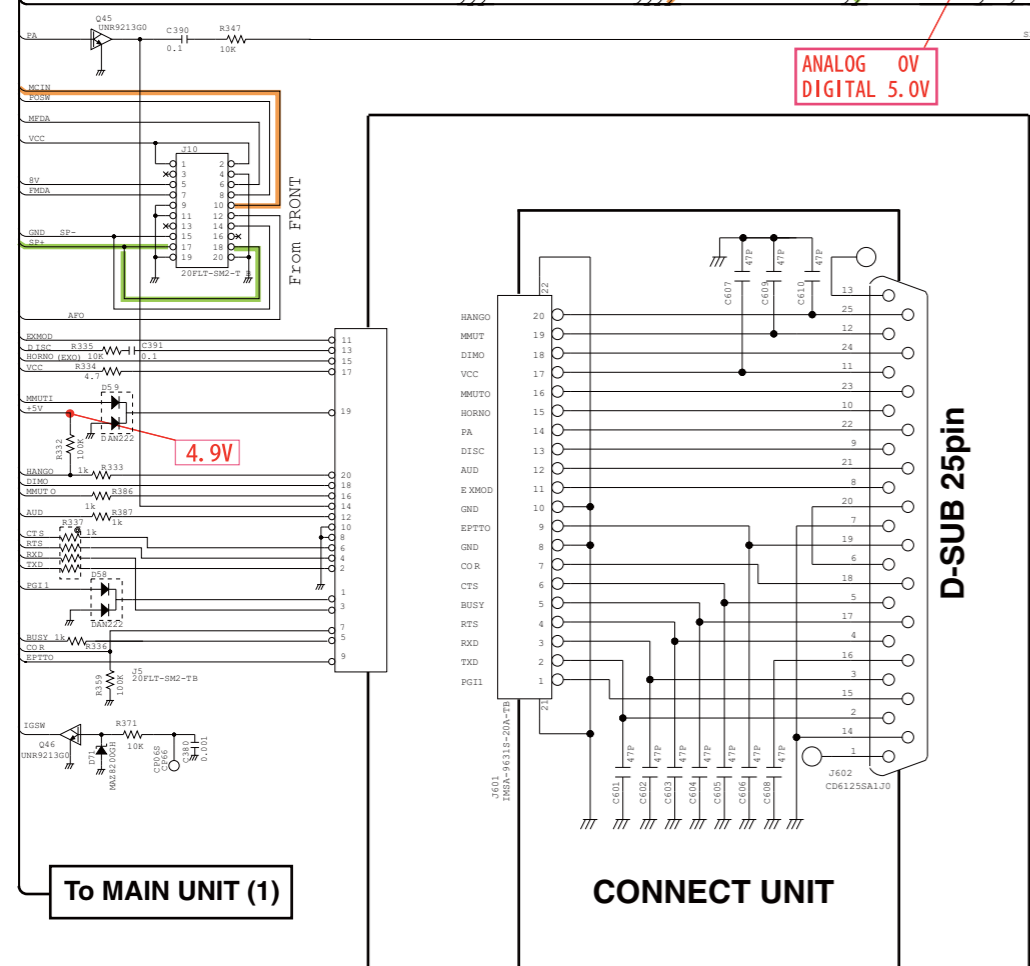
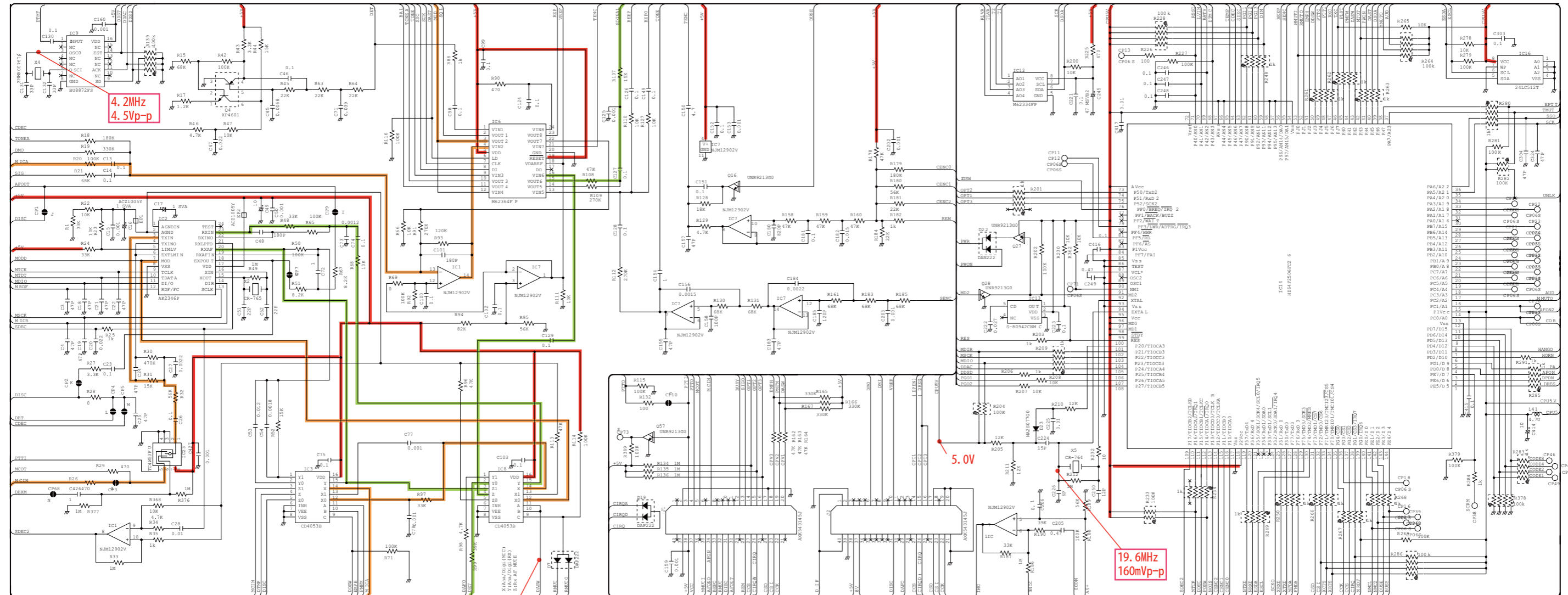
Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

To MAIN UNIT (2)

*; Refer to "PARTS LIST."

• Other than "MDC compatible"

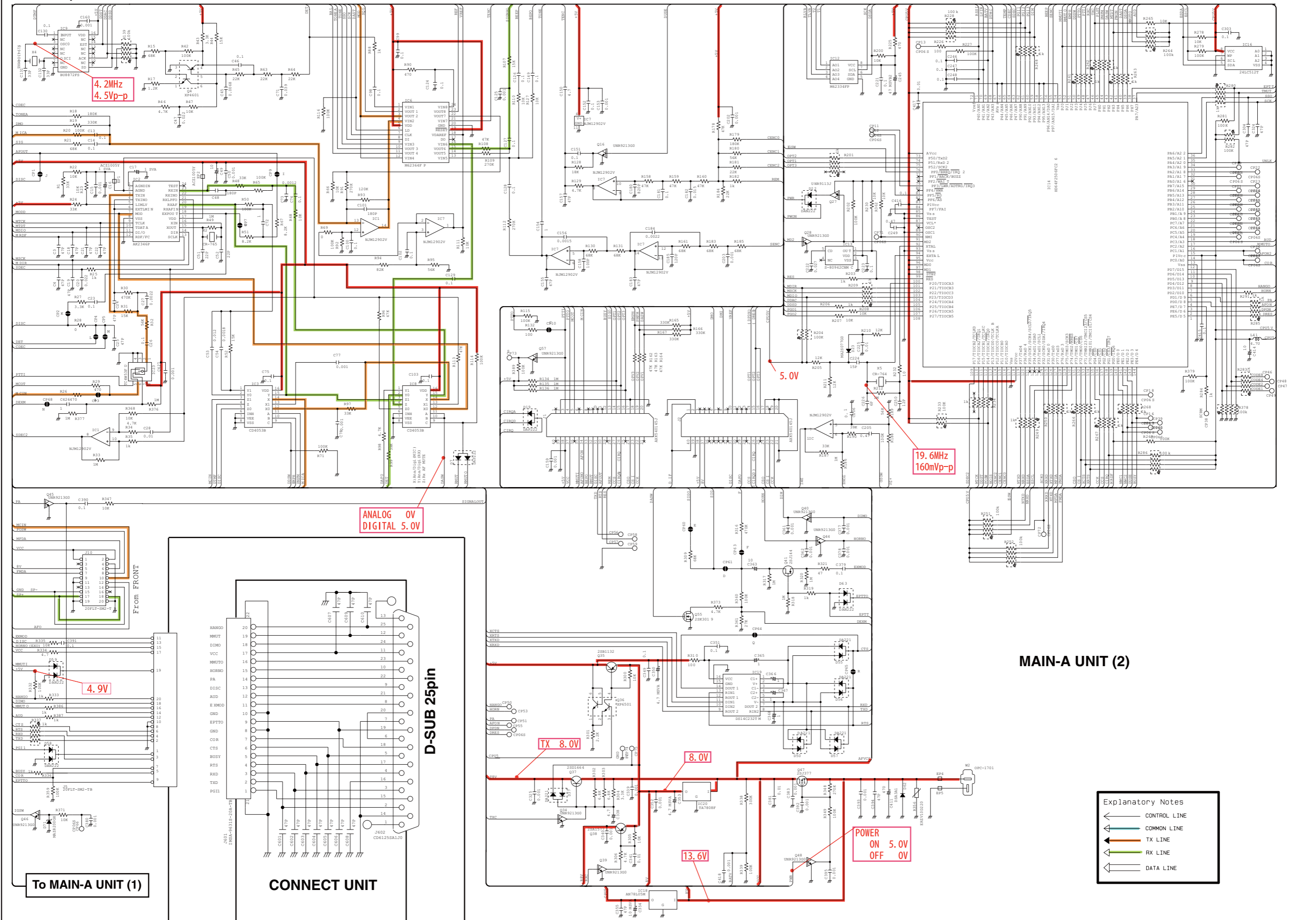


MAIN UNIT (2)

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE

*; Refer to "PARTS LIST"

• MDC compatible



4.2MHz
4.5Vp-p

ANALOG 0V
DIGITAL 5.0V

5.0V

19.6MHz
160mVp-p

4.9V

TX 8.0V

8.0V

13.6V

POWER
ON 5.0V
OFF 0V

MAIN-A UNIT (2)

To MAIN-A UNIT (1)

CONNECT UNIT

D-SUB 25pin

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE



SERVICE MANUAL ADDENDUM

IC-F5061 IC-F5062 IC-F5063 IC-F5061D

CONTENTS

Replacement pages 6-6, 6-7

| MODEL | VERSION | CHANNEL SPACING | TX POWER | MDC | UT-126H already installed | |
|-----------|---------|--------------------|----------|----------------|------------------------------|-----|
| IC-F5061 | USA-01 | 15.0/30.0 kHz | 50 W | Not compatible | No | |
| | USA-02 | | | Compatible | | |
| IC-F5062 | EXP-01 | 12.5/25.0 kHz | 25 W | Not compatible | | |
| | EXP-02 | | | Compatible | | |
| IC-F5063 | EUR-01 | 12.5/20/25.0 kHz | | Not compatible | | |
| | EUR-02 | | | Compatible | | |
| IC-F5061D | USA-01 | 6.25/15.0/30.0 kHz | | 50 W | Compatible | Yes |
| | USA-11 | | | | | |
| | USA-12 | | | | | |

6-4 RECEIVE ADJUSTMENT (For other than F5061D and [USA-02])

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

| ADJUSTMENT | ADJUSTMENT CONDITION | LOCATION | VALUE |
|--|--|--|--|
| RECEIVE SENSITIVITY [BPF C (T1)] [BPF C (T2)] | <p>NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly.</p> <p>1</p> <ul style="list-style-type: none"> • Channel : CH 3 (Except [EXP-02], [EUR-02]) CH 2 ([EXP-02], [EUR-02]) • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz (Except [EXP-02], [EUR-02]) 174.000 MHz ([EXP-02], [EUR-02]) Level : +20 dBμ[†] (-87 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Connect the SINAD meter with an 4 Ω load to the SP jack. | Minimum distortion level |
| S-METER (S3 level) [RSSI] | <p>1</p> <ul style="list-style-type: none"> • Channel : CH 3 • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : +23 dBμ[†] (-84 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Push the [ENTER] key on the connected PC's keyboard to set "S3" level. | |
| (S1 level) | <p>2</p> <ul style="list-style-type: none"> • Set the SSG as; <ul style="list-style-type: none"> Level : -7 dBμ[†] (-114 dBm) • Receiving | Push the [ENTER] key again to set "S1" level. | |
| SQUELCH [SQL] | <p>1</p> <ul style="list-style-type: none"> • Channel : CH 3 • SQL : "2" • Close the squelch by adjusting the value of [SQL] item on the CS-F5060 ADJ's screen. • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : -13 dBμ[†] (-120 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Connect an 4 Ω speaker to the SP jack. | Close the squelch by increase the value of [SQL]. Set the [SQL] to the value that the audio signals just appear. |

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

6-4 RECEIVE ADJUSTMENT (For F5061D and [USA-02])

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

| ADJUSTMENT | ADJUSTMENT CONDITION | LOCATION | VALUE |
|--|---|--|--|
| RECEIVE SENSITIVITY [BPF C (T1)] | <p>NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly.</p> <p>1</p> <ul style="list-style-type: none"> • Channel : CH 3 • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : +20 dBμ[†] (-87 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Connect the SINAD meter with an 4 Ω load to the SP jack. | Minimum distortion level |
| S-METER (S3 level) [RSSI] | <p>1</p> <ul style="list-style-type: none"> • Channel : CH 4 • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 155.000 MHz Level : +23 dBμ[†] (-84 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Push the [ENTER] key on the connected PC's keyboard to set "S3" level. | |
| (S1 level) | <p>2</p> <ul style="list-style-type: none"> • Set the SSG as; <ul style="list-style-type: none"> Level : -7 dBμ[†] (-114 dBm) • Receiving | Push the [ENTER] key again to set "S1" level. | |
| SQUELCH [SQL] | <p>1</p> <ul style="list-style-type: none"> • Channel : CH 4 • SQL : "2" • Close the squelch by adjusting the value of [SQL] item on the CS-F5060 ADJ's screen. • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 155.000 MHz Level : -13 dBμ[†] (-120 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Connect an 4 Ω speaker to the SP jack. | Close the squelch by increase the value of [SQL]. Set the [SQL] to the value that the audio signals just appear. |

[†]; The output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

SERVICE MANUAL ADDENDUM

IC-F5061 IC-F5062 IC-F5063 IC-F5061D

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| MODEL | VERSION | CHANNEL SPACING | TX POWER | MDC |
|-----------|---------|--------------------|----------|----------------|
| IC-F5061 | USA-01 | 15.0/30.0 kHz | 50 W | Not compatible |
| | USA-02 | | | Compatible |
| IC-F5062 | EXP-01 | 12.5/25.0 kHz | 25 W | Not compatible |
| | EXP-02 | | | Compatible |
| IC-F5063 | EUR-01 | 12.5/20/25.0 kHz | 25 W | Not compatible |
| | EUR-02 | | | Compatible |
| IC-F5061D | USA-01 | 6.25/15.0/30.0 kHz | 50 W | Compatible |

[MAIN-A UNIT] (MDC compatible)

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Lists items C37 to C151 with various part numbers and descriptions like ECJ0EC1H030B, ECJ0EB1A104K, etc.

[MAIN-A UNIT] (MDC compatible)

Table with columns: REF NO., ORDER NO., DESCRIPTION, M., H/V LOCATION. Lists items C152 to C263 with various part numbers and descriptions like ECJ0EB1A104K, ECJ0EB1E102K, etc.

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

[CONNECT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------|----|--------------|
| C601 | 4030017420 | S.CER ECJ0EC1H470J | T | 12.7/4.6 |
| C602 | 4030017420 | S.CER ECJ0EC1H470J | T | 15.4/4.6 |
| C603 | 4030017420 | S.CER ECJ0EC1H470J | T | 18.2/4.6 |
| C604 | 4030017420 | S.CER ECJ0EC1H470J | T | 19.6/4.6 |
| C605 | 4030017420 | S.CER ECJ0EC1H470J | T | 20.9/4.6 |
| C606 | 4030017420 | S.CER ECJ0EC1H470J | T | 25.1/4.6 |
| C607 | 4030017420 | S.CER ECJ0EC1H470J | T | 37.5/13.2 |
| C608 | 4030017420 | S.CER ECJ0EC1H470J | T | 16.8/4.6 |
| C609 | 4030017420 | S.CER ECJ0EC1H470J | T | 40.3/13.2 |
| C610 | 4030017420 | S.CER ECJ0EC1H470J | T | 41.7/4.6 |
| J601 | 6510025240 | S.CNR IMSA-9631S-20Y912 | B | 32.2/16.2 |
| J602 | 6510023210 | CNR CD6125SA1J0 <CVI> | | |
| W601 | 8900012711 | CBL OPC-1297A (P0.5,N20,L62) | | |

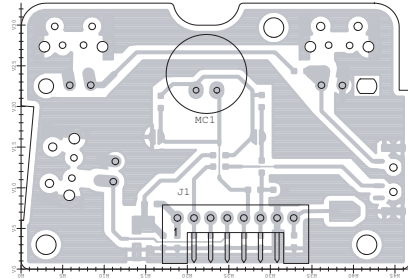
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
 S.=Surface mount

BOARD LAYOUTS

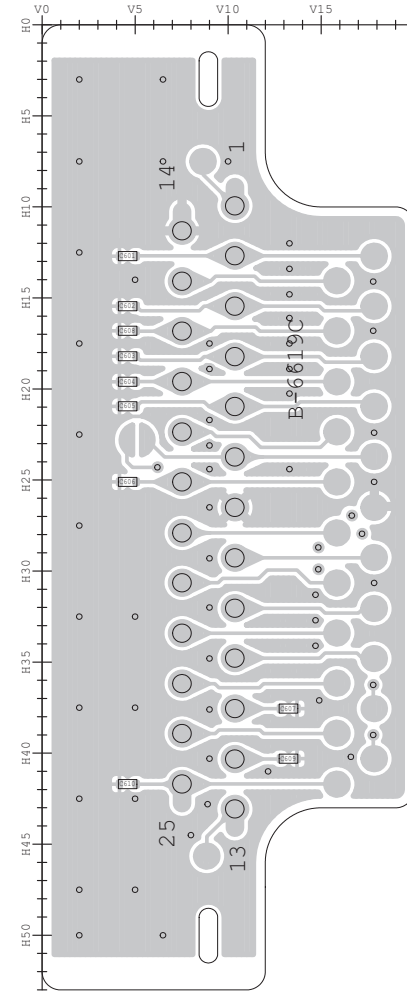
• Other than "MDC compatible"

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

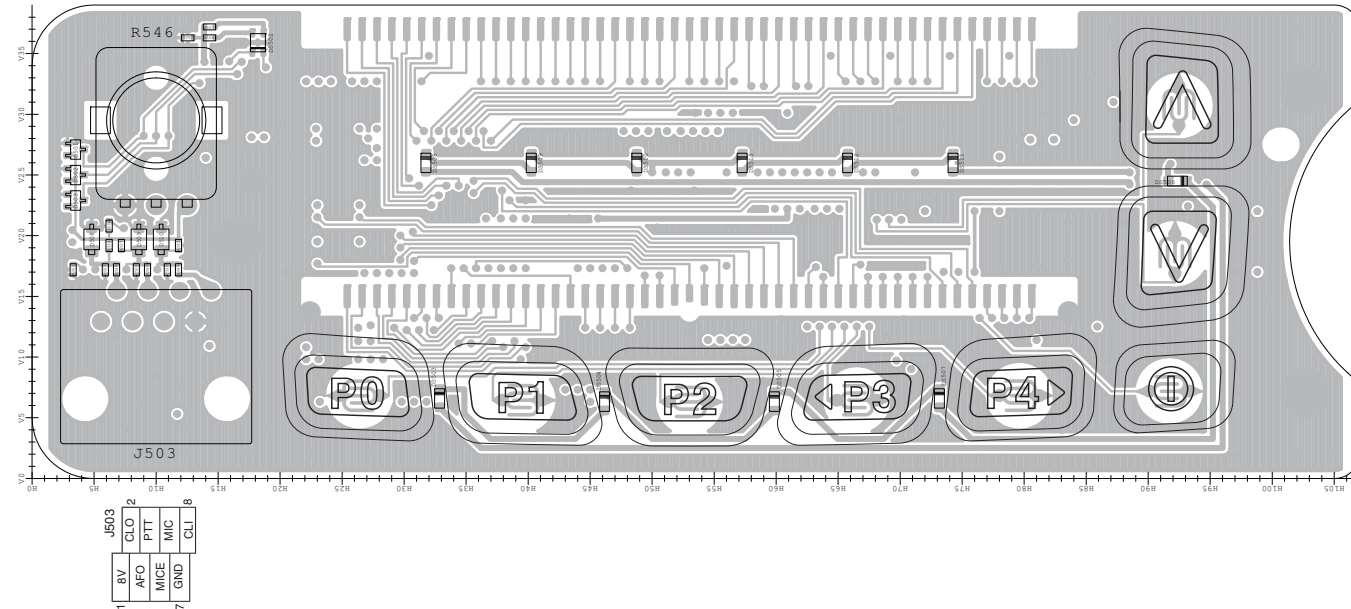
• HM-152 (TOP VIEW)



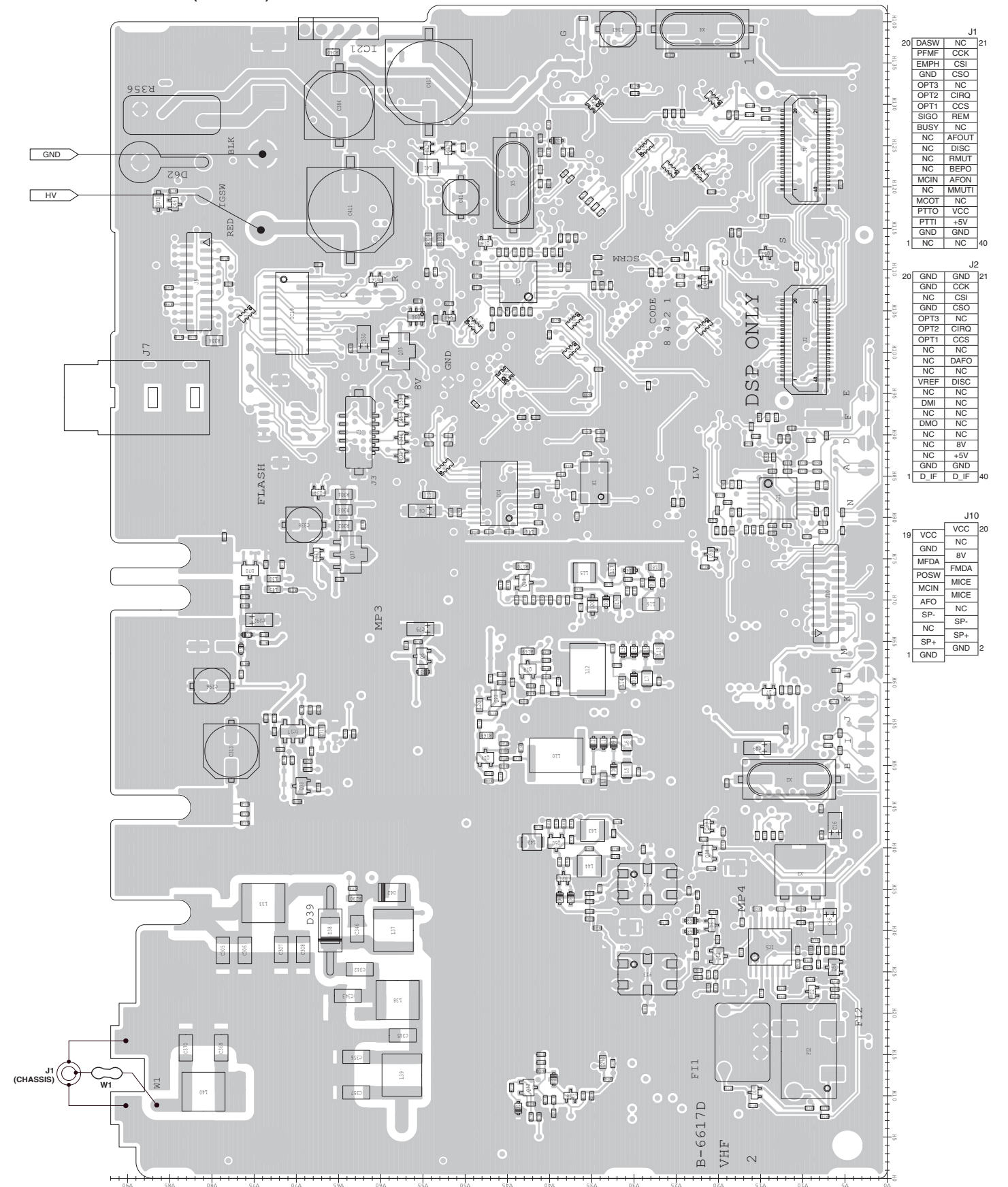
• CONNECT UNIT (TOP VIEW)



• FRONT UNIT (TOP VIEW)



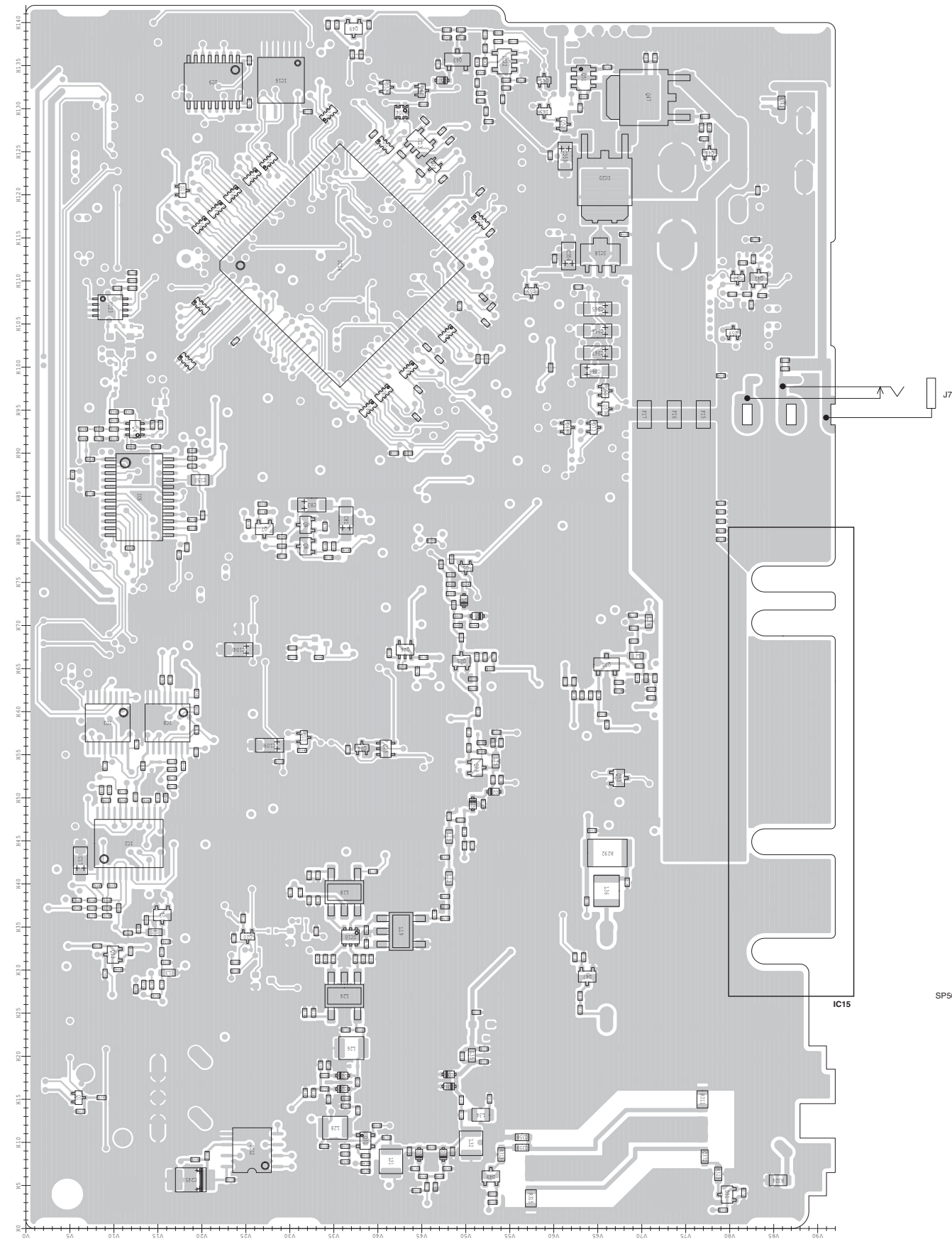
• MAIN UNIT (TOP VIEW)



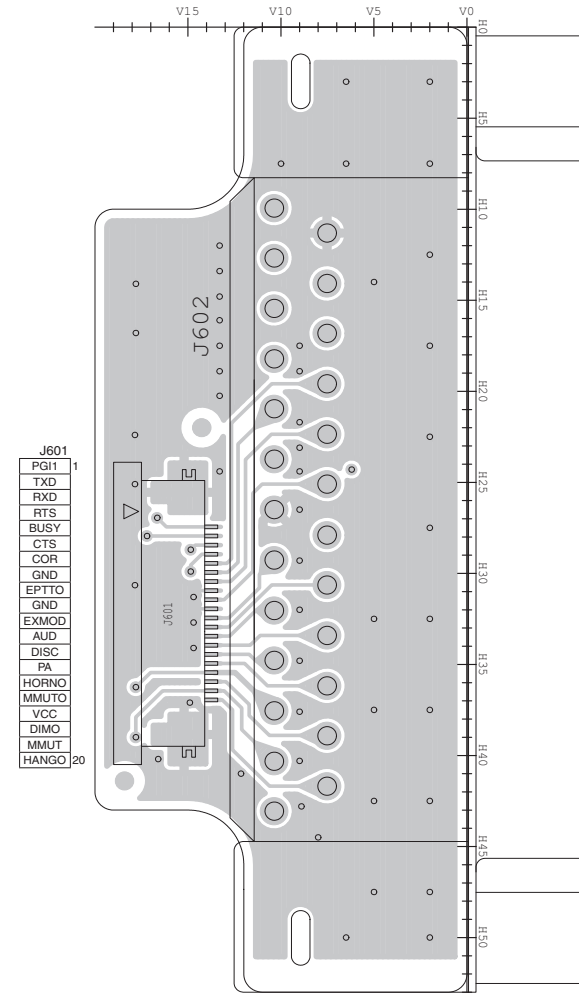
• Other than "MDC compatible"

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

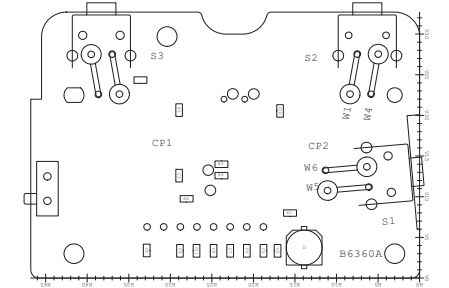
• MAIN UNIT (BOTTOM VIEW)



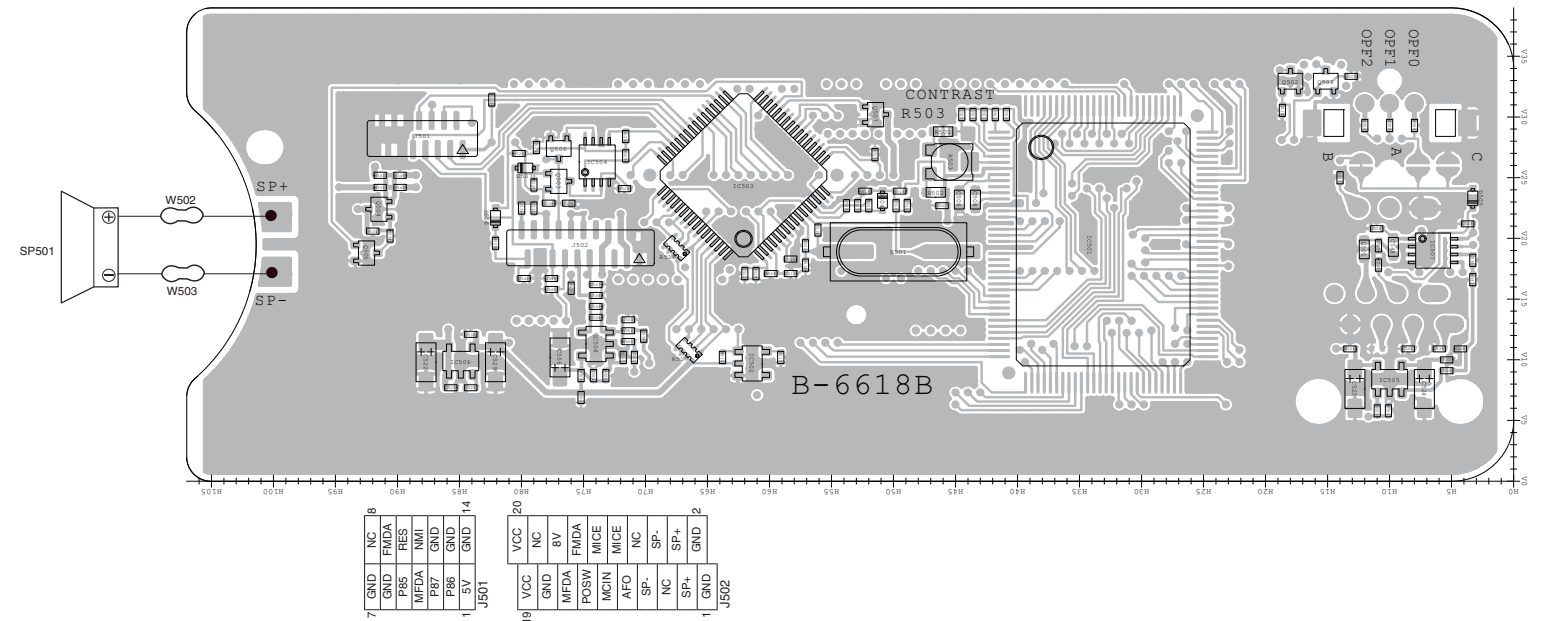
• CONNECT UNIT (BOTTOM VIEW)



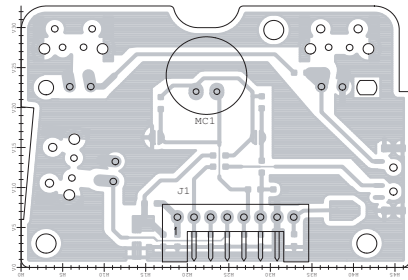
• HM-152 (BOTTOM VIEW)



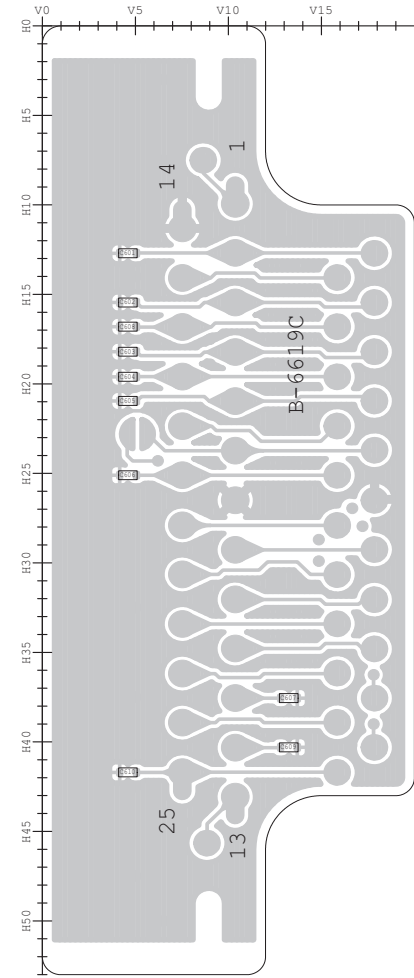
• FRONT UNIT (BOTTOM VIEW)



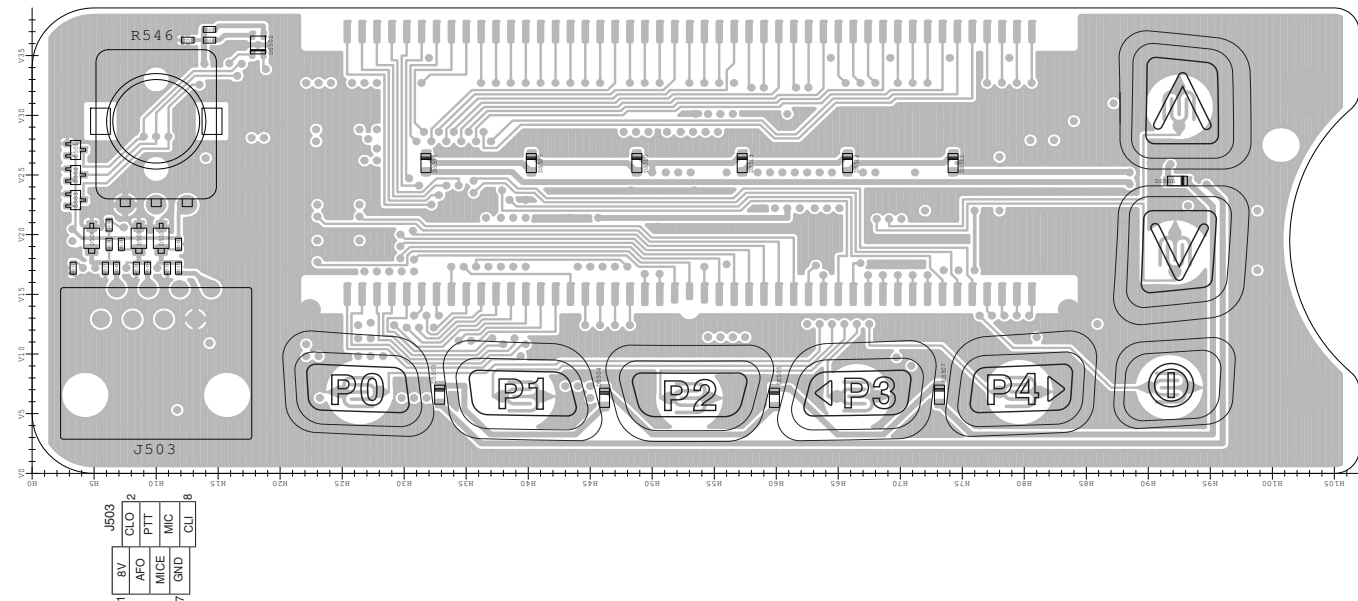
• HM-152 (TOP VIEW)



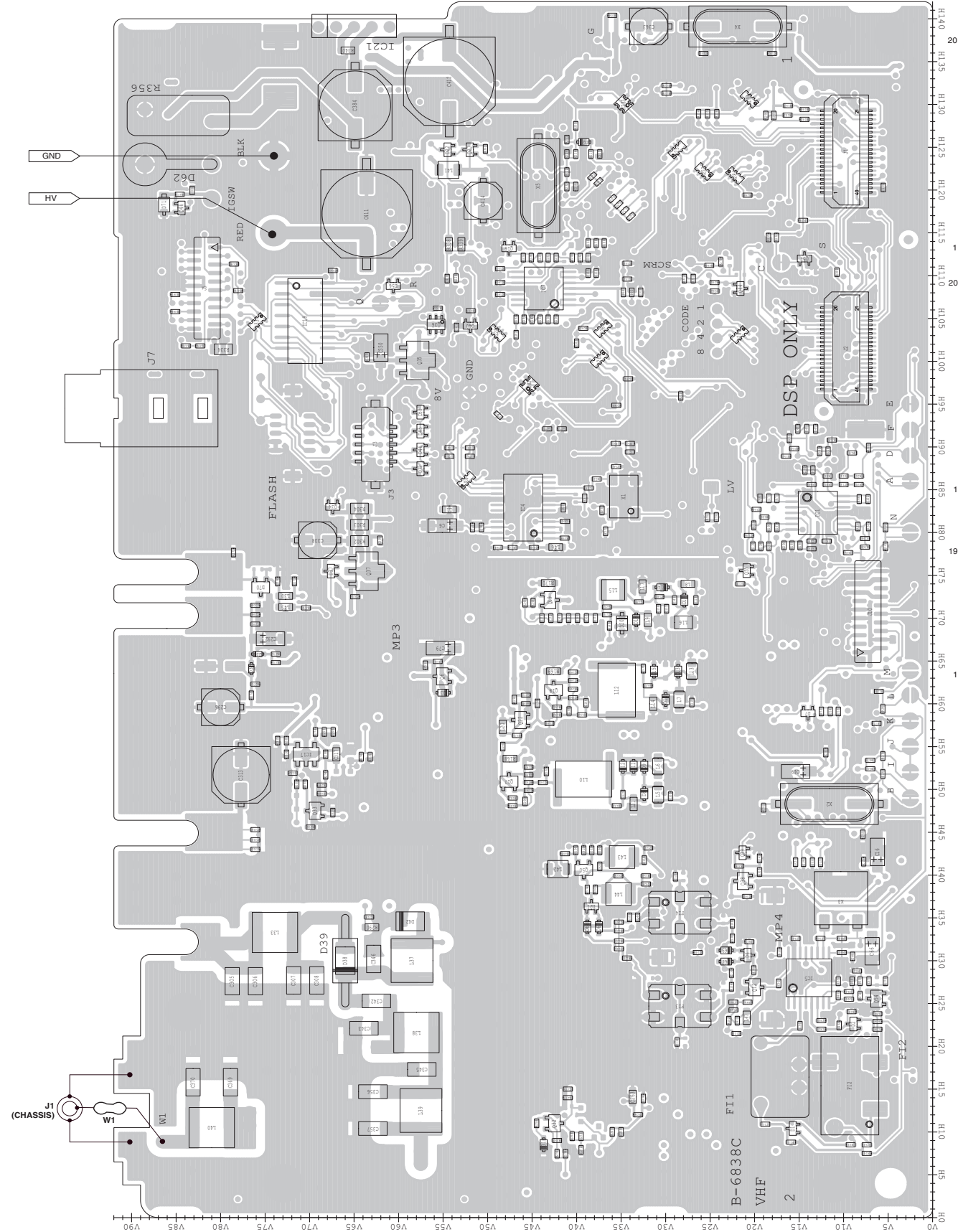
• CONNECT UNIT (TOP VIEW)



• FRONT UNIT (TOP VIEW)



• MAIN-A UNIT (TOP VIEW)



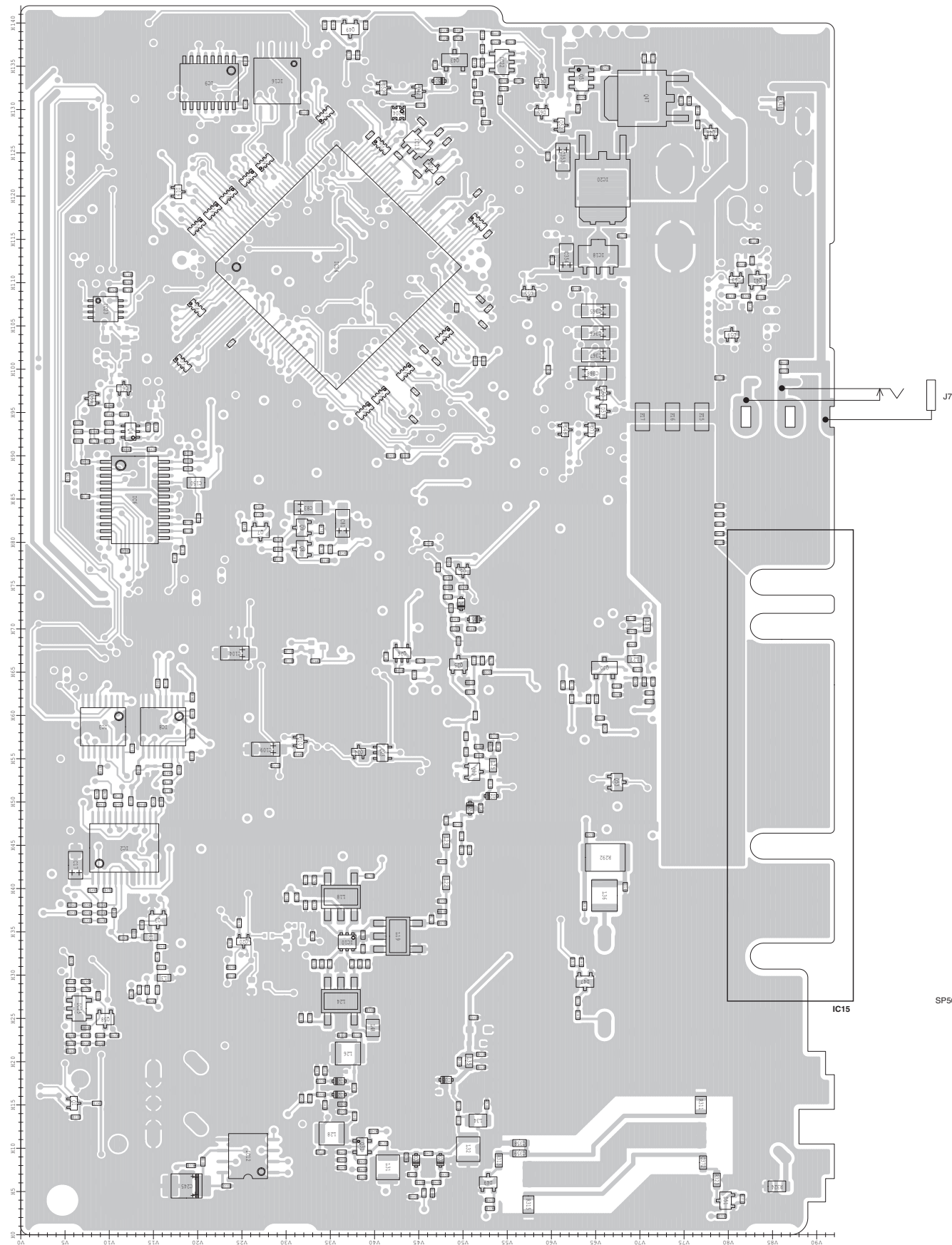
| | | | |
|----|------|--------|----|
| 20 | DASW | NC | J1 |
| 19 | PFMF | CCK | 21 |
| 18 | EMPH | CSI | |
| 17 | GND | CSO | |
| 16 | OPT3 | NC | |
| 15 | OPT2 | CRQ | |
| 14 | OPT1 | CCS | |
| 13 | SIGO | REM | |
| 12 | BUSY | NC | |
| 11 | NC | AFOUT | |
| 10 | NC | DISC | |
| 9 | NC | RMUT | |
| 8 | NC | BEPO | |
| 7 | MCIN | AFON | |
| 6 | NC | MMULTI | |
| 5 | MCOT | NC | |
| 4 | PTTO | VCC | |
| 3 | PTTI | +5V | |
| 2 | GND | GND | |
| 1 | NC | NC | 40 |

| | | | |
|----|------|------|----|
| 20 | GND | GND | J2 |
| 19 | GND | CCK | 21 |
| 18 | NC | CSI | |
| 17 | GND | CSO | |
| 16 | OPT3 | NC | |
| 15 | OPT2 | CRQ | |
| 14 | OPT1 | CCS | |
| 13 | NC | DAFO | |
| 12 | NC | DAFO | |
| 11 | NC | NC | |
| 10 | VREF | DISC | |
| 9 | NC | NC | |
| 8 | DMR | NC | |
| 7 | NC | NC | |
| 6 | DMO | NC | |
| 5 | NC | NC | |
| 4 | NC | 8V | |
| 3 | NC | +5V | |
| 2 | GND | GND | |
| 1 | D_IF | D_IF | 40 |

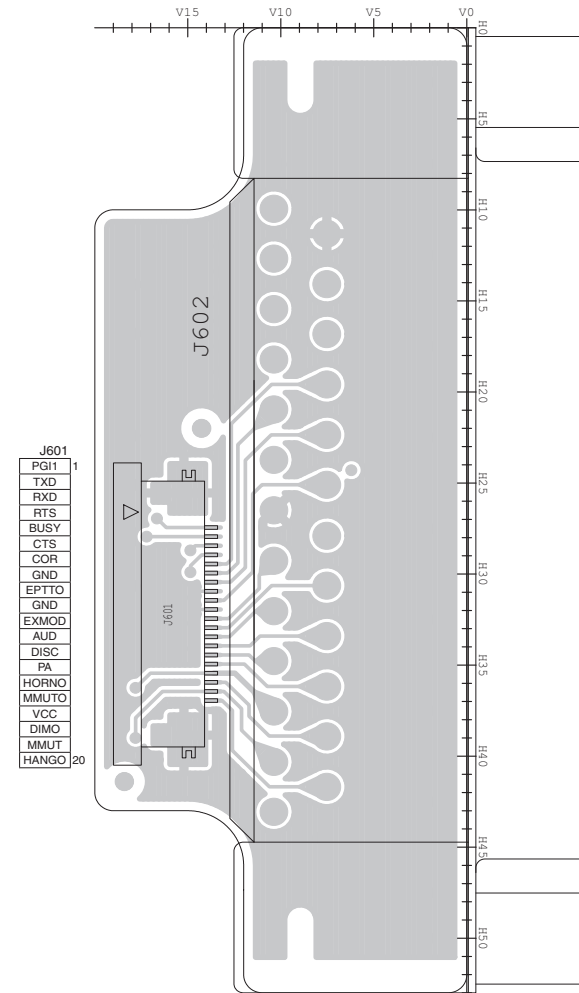
| | | | |
|----|------|------|-----|
| 19 | VCC | NC | J10 |
| 18 | GND | 8V | 20 |
| 17 | MFDA | FMDA | |
| 16 | POSW | MICE | |
| 15 | MCIN | MICE | |
| 14 | AFO | NC | |
| 13 | SP- | SP+ | |
| 12 | NC | SP+ | |
| 11 | SP+ | GND | 2 |
| 10 | GND | GND | |

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

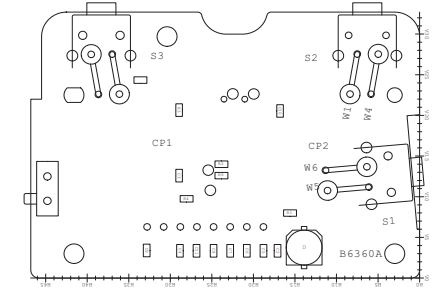
• MAIN-A UNIT (BOTTOM VIEW)



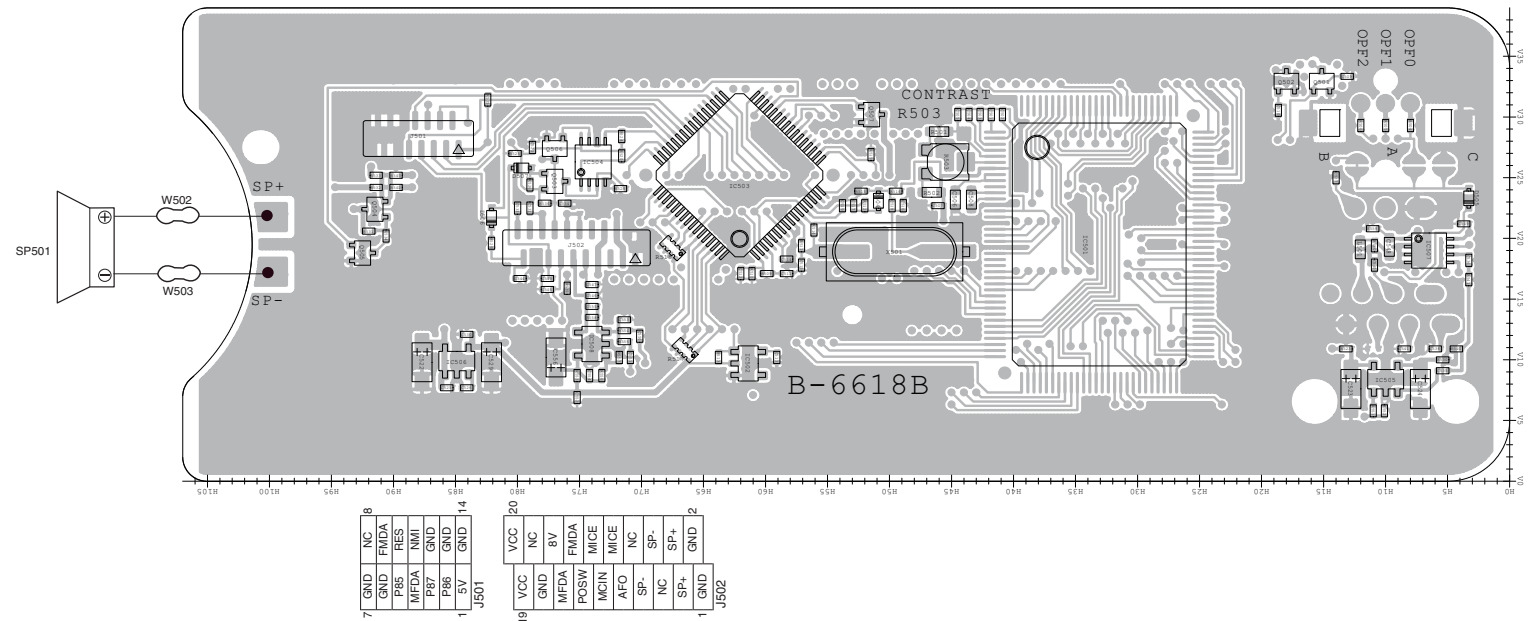
• CONNECT UNIT (BOTTOM VIEW)



• HM-152 (BOTTOM VIEW)

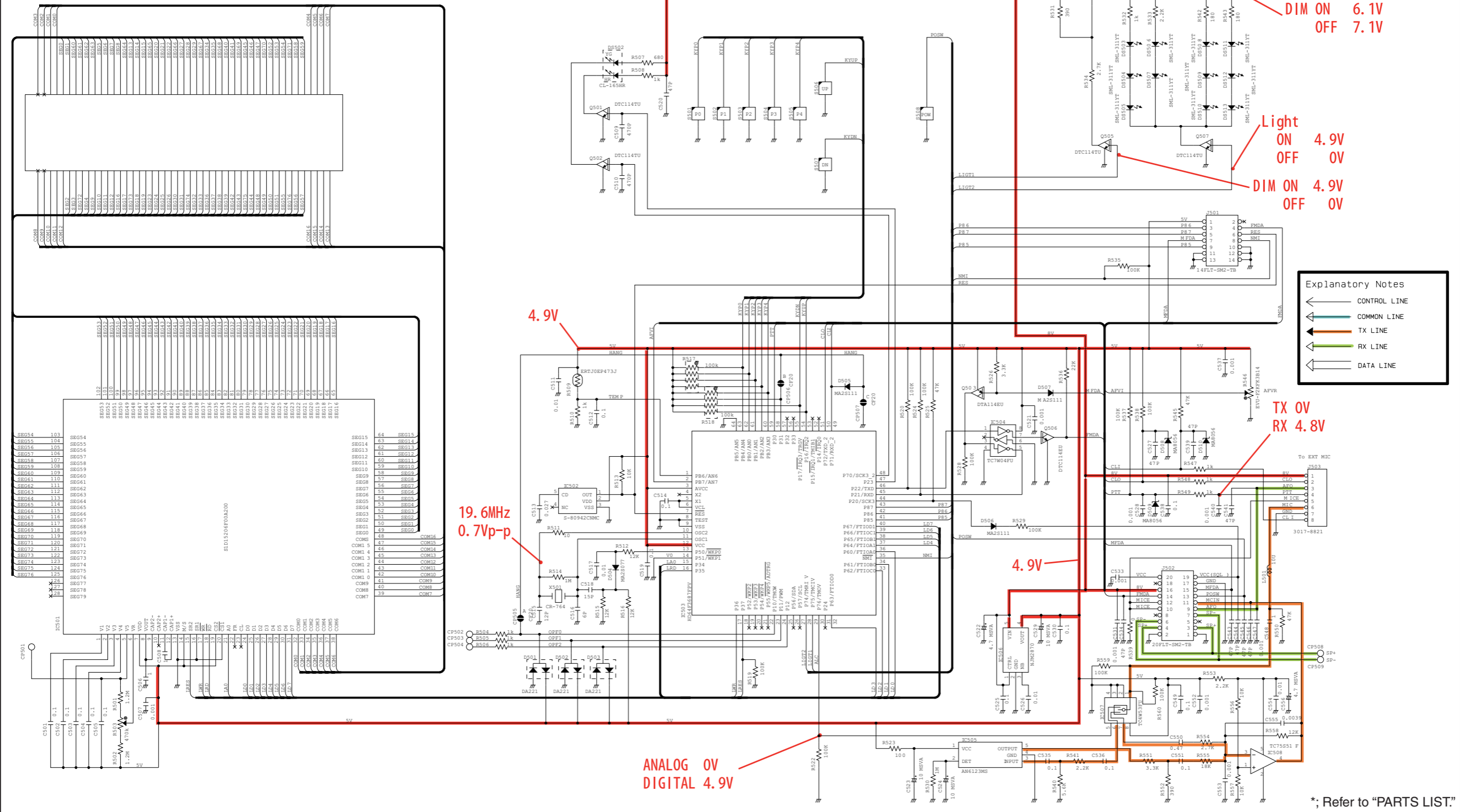


• FRONT UNIT (BOTTOM VIEW)



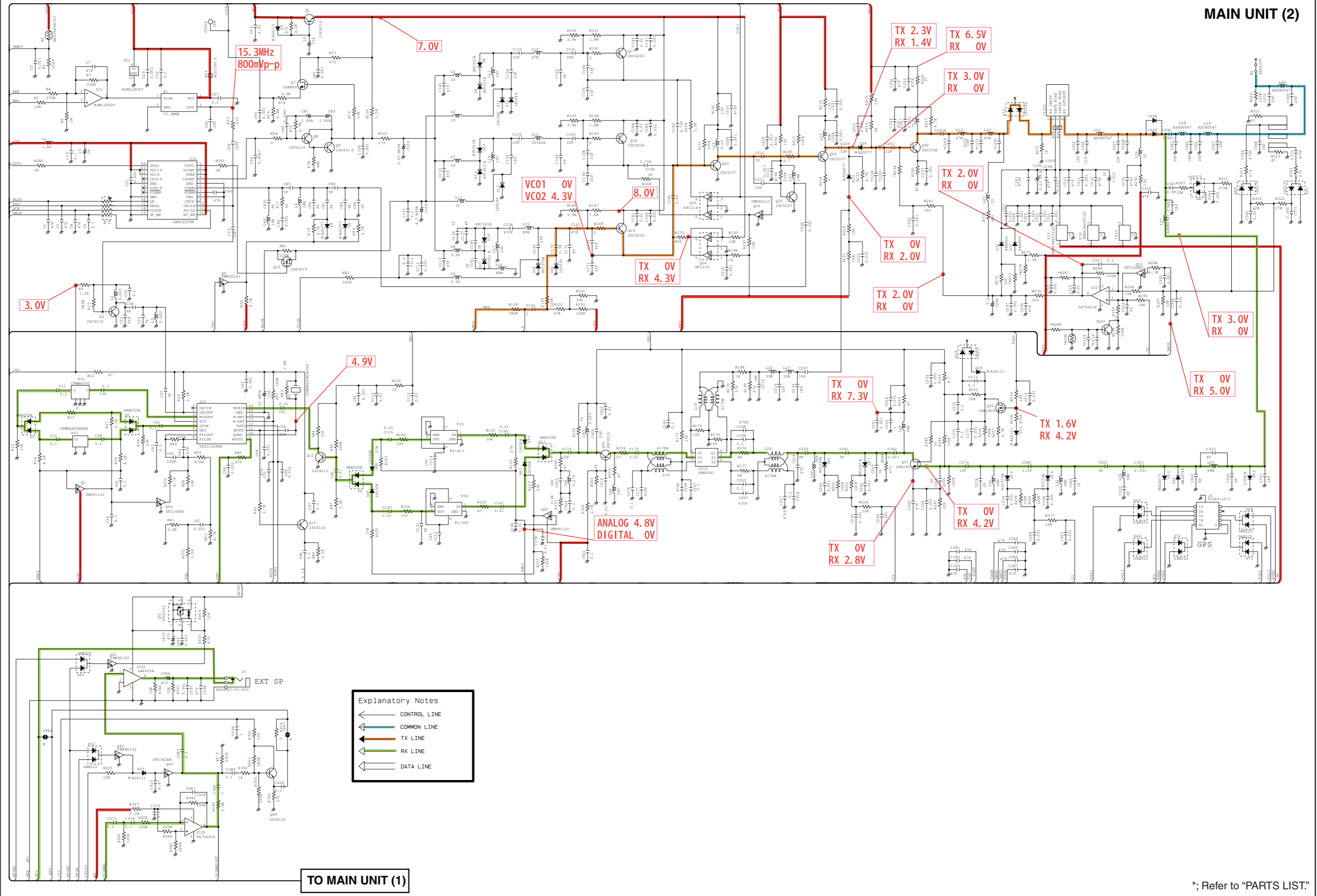
VOLTAGE DIAGRAM

FRONT UNIT



• Other than "MDC compatible"

MAIN UNIT (2)



15.3MHz
800mVp-p

7.0V

VCO1 0V
VCO2 4.3V

8.0V

TX 2.3V
RX 1.4V

TX 6.5V
RX 0V

TX 3.0V
RX 0V

TX 2.0V
RX 0V

TX 0V
RX 2.0V

TX 2.0V
RX 0V

TX 3.0V
RX 0V

TX 0V
RX 5.0V

TX 0V
RX 7.3V

TX 1.6V
RX 4.2V

ANALOG 4.8V
DIGITAL 0V

TX 0V
RX 4.2V

TX 0V
RX 2.8V

3.0V

4.9V

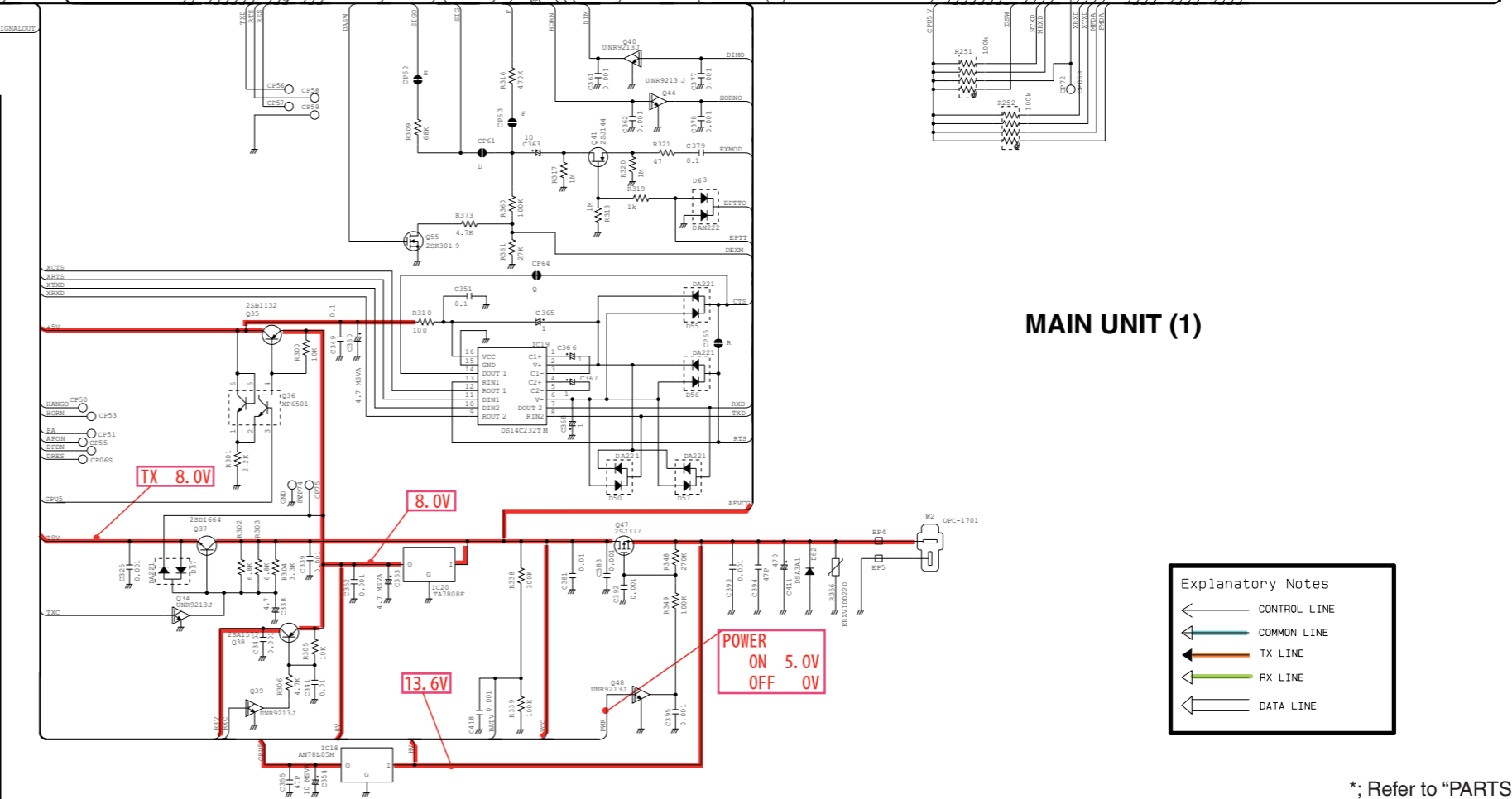
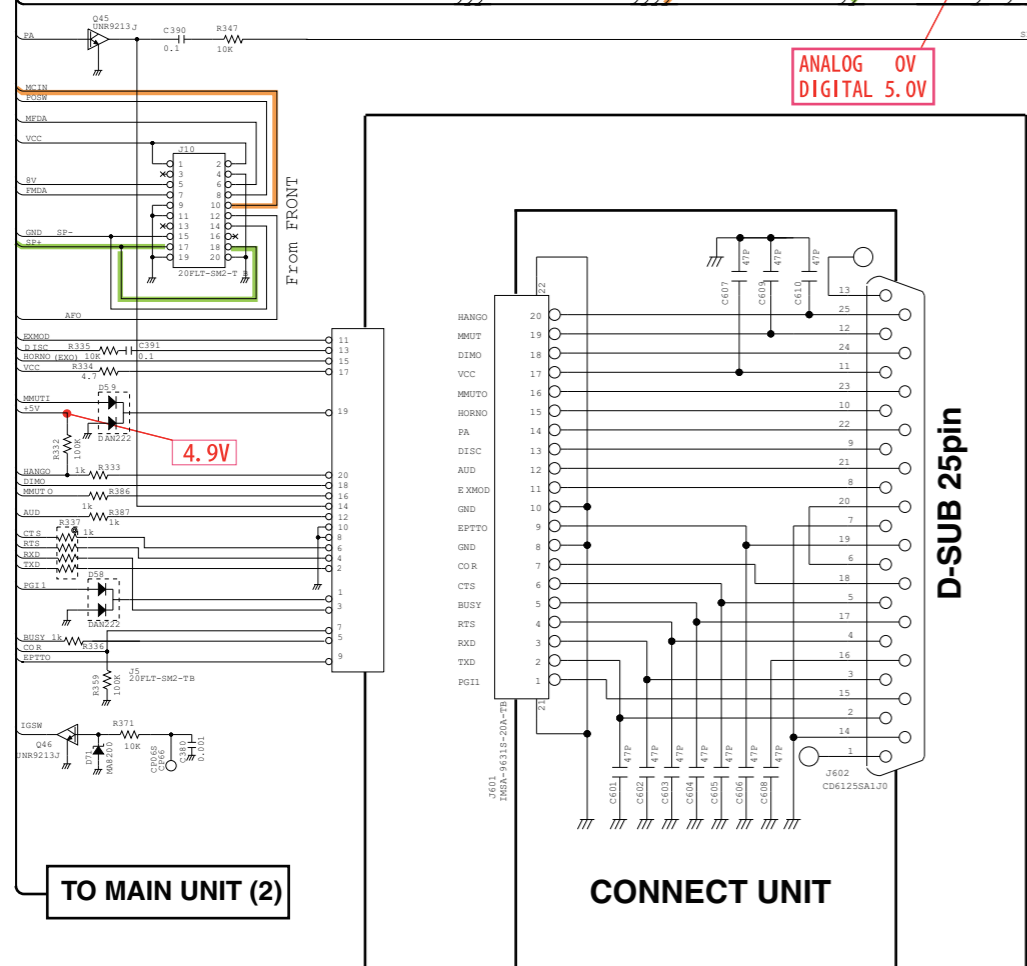
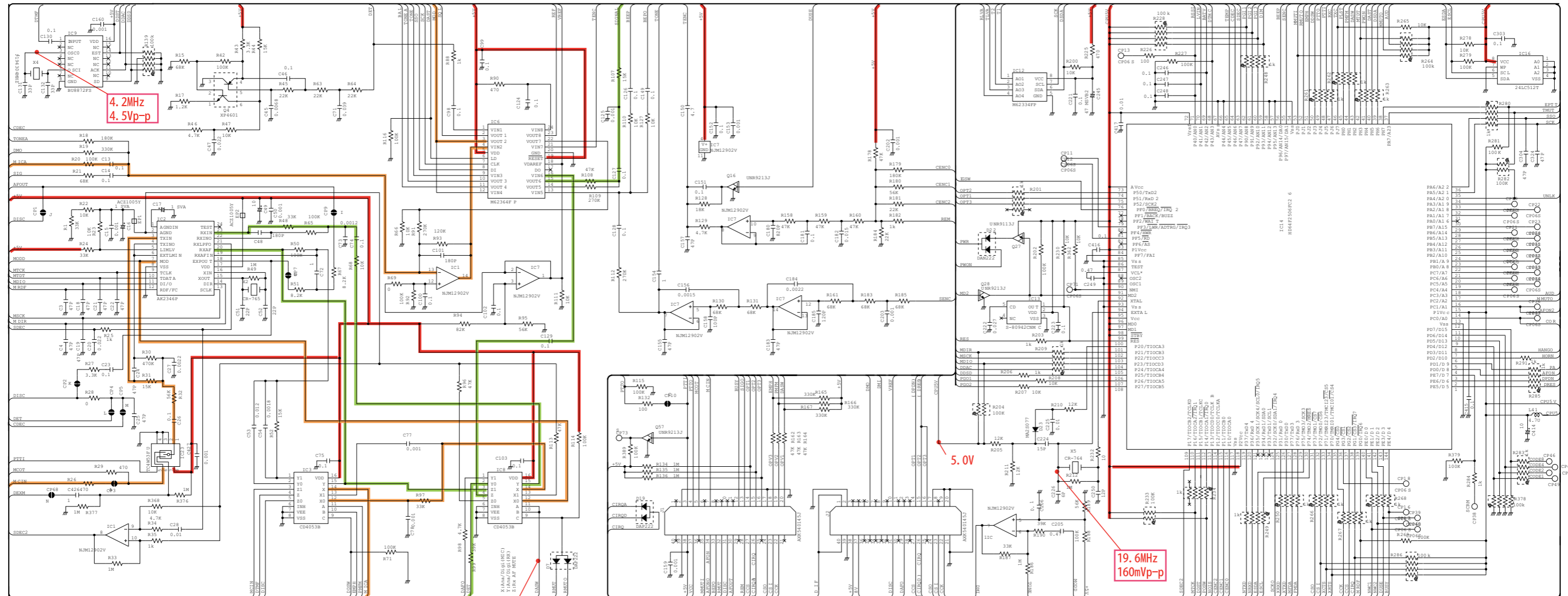
Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

TO MAIN UNIT (1)

*; Refer to "PARTS LIST."

• Other than "MDC compatible"



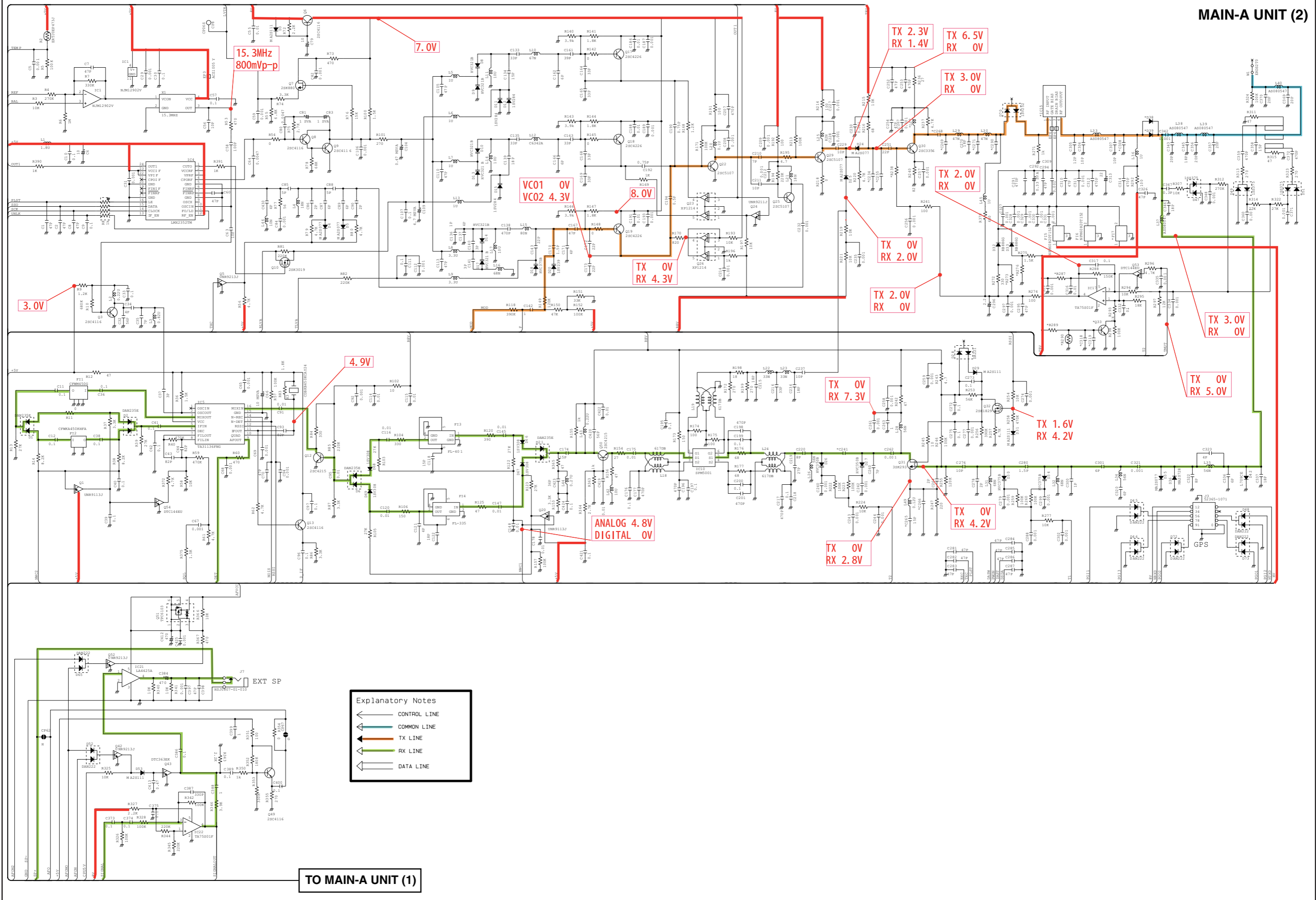
MAIN UNIT (1)

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE

*; Refer to "PARTS LIST"

• MDC compatible

MAIN-A UNIT (2)

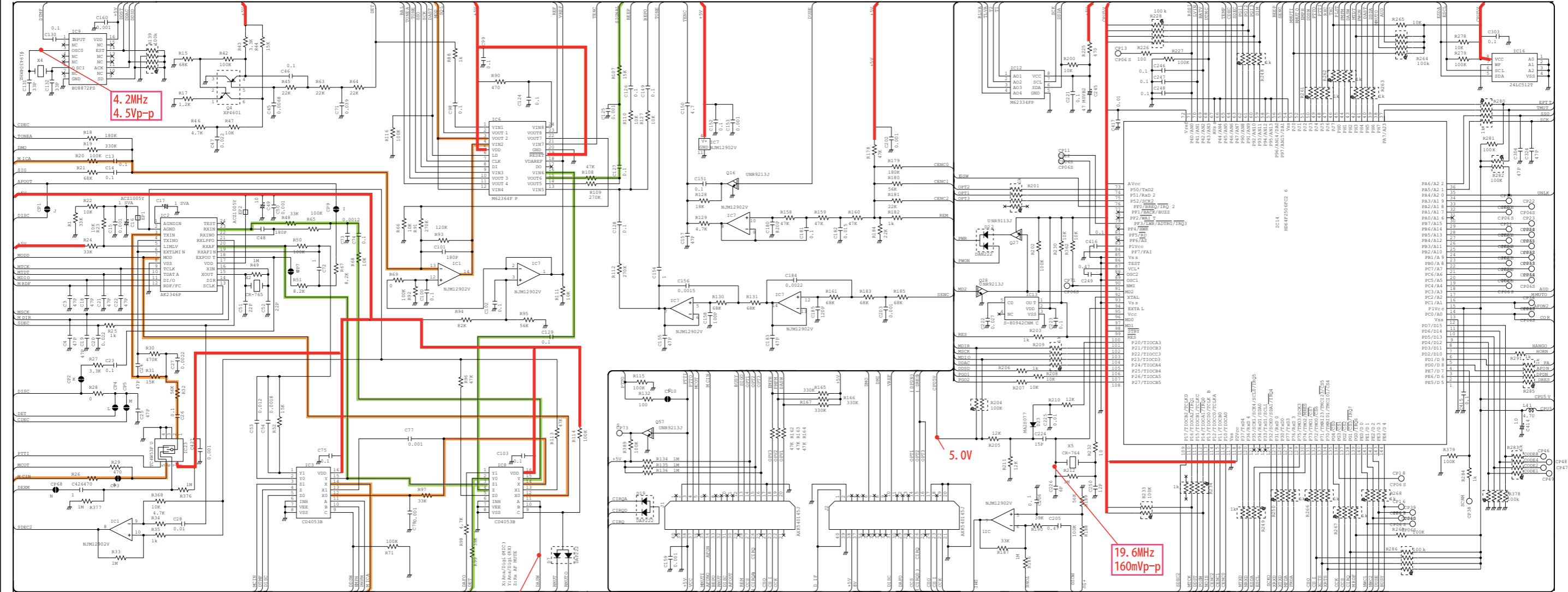


TO MAIN-A UNIT (1)

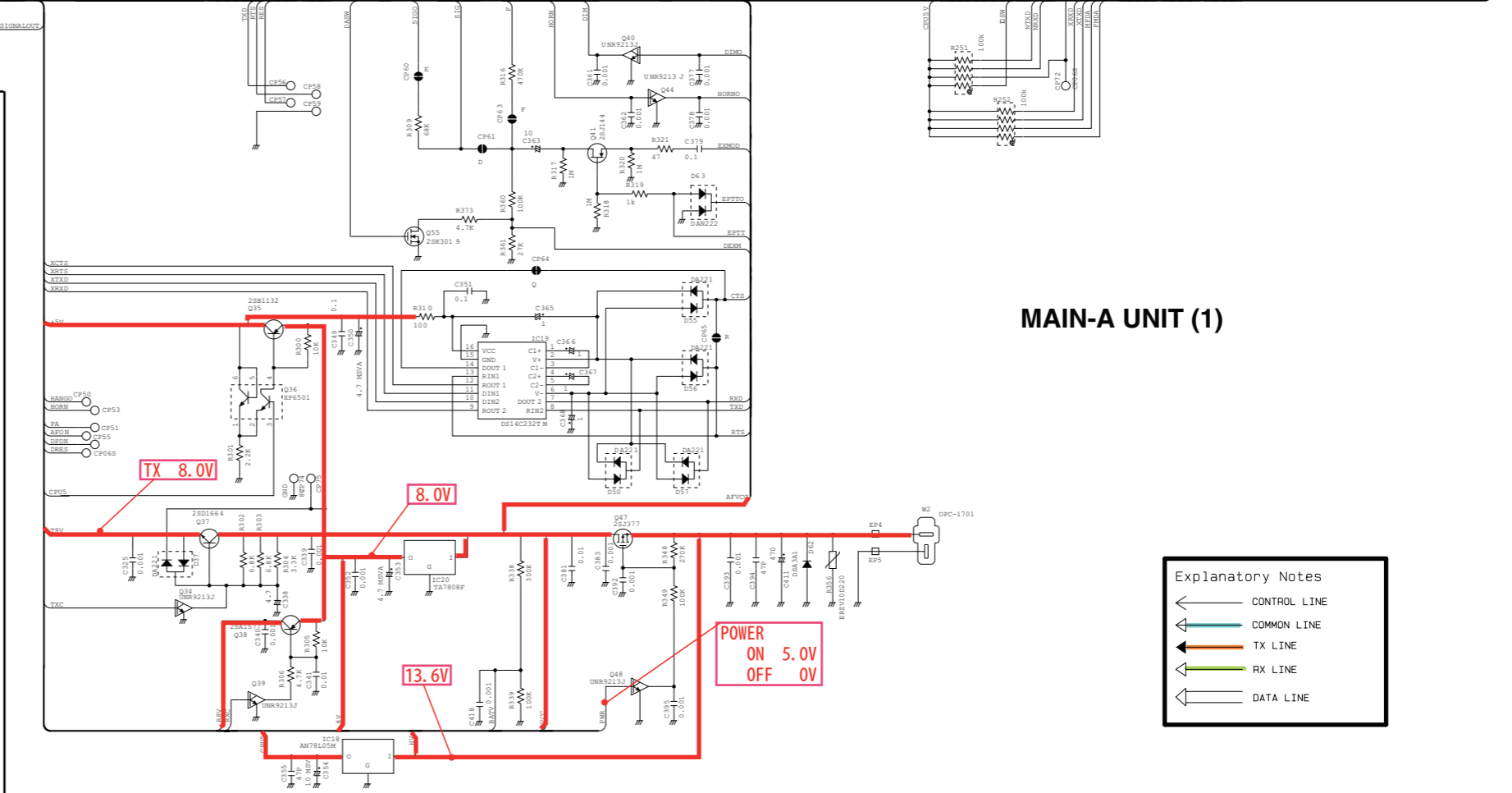
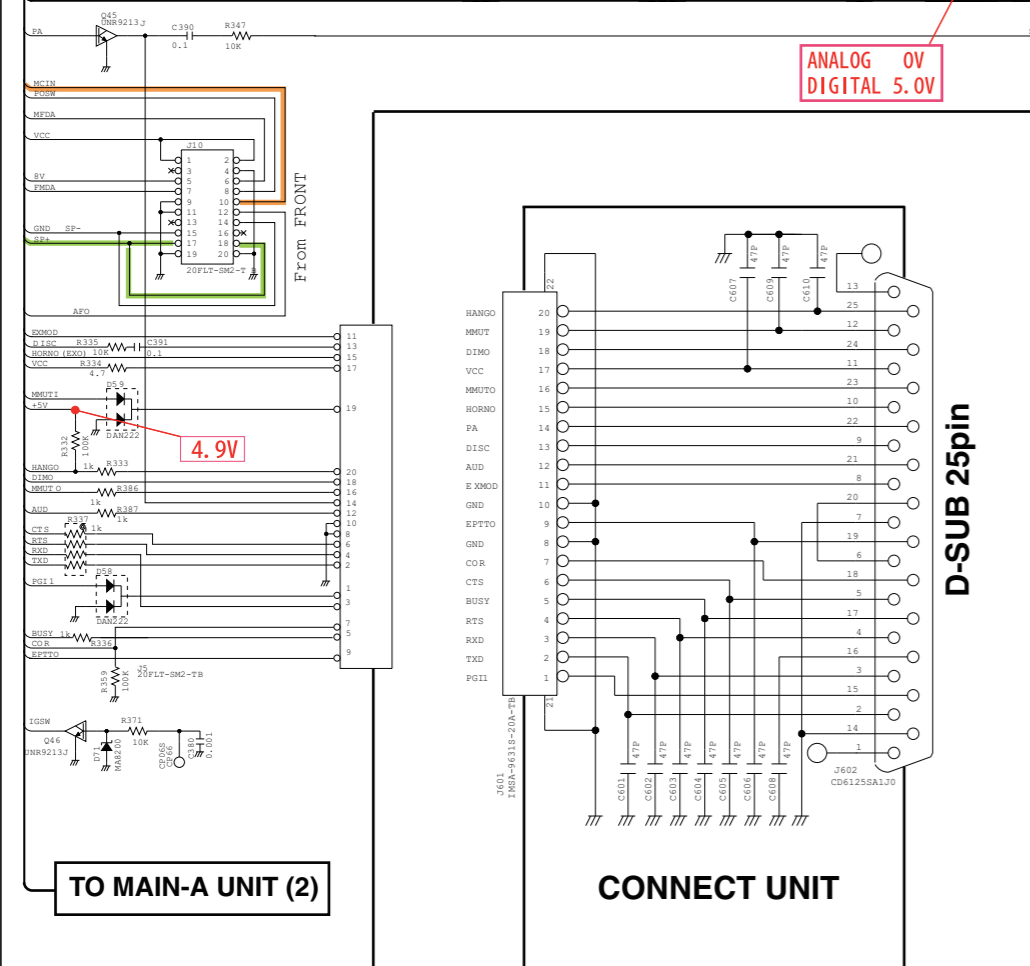
Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

• MDC compatible



MAIN-A UNIT (1)



Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

SERVICE MANUAL ADDENDUM

IC-F5061 IC-F5062 IC-F5063 IC-F5061D

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| VOLTAGE DIAGRAM..... | 17 |

| MODEL | VERSION | CHANNEL SPACING | TX POWER | MDC |
|-----------|---------|--------------------|----------|----------------|
| IC-F5061 | USA-01 | 15.0/30.0 kHz | 50 W | Not compatible |
| | USA-02 | | | Compatible |
| IC-F5062 | EXP-01 | 12.5/25.0 kHz | 25 W | Not compatible |
| | EXP-02 | | | Compatible |
| IC-F5063 | EUR-01 | 12.5/20/25.0 kHz | 25 W | Not compatible |
| | EUR-02 | | | Compatible |
| IC-F5061D | USA-01 | 6.25/15.0/30.0 kHz | 50 W | Compatible |

[CONNECT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------|----|--------------|
| C601 | 4030017420 | S.CER ECJ0EC1H470J | T | 12.7/4.6 |
| C602 | 4030017420 | S.CER ECJ0EC1H470J | T | 15.4/4.6 |
| C603 | 4030017420 | S.CER ECJ0EC1H470J | T | 18.2/4.6 |
| C604 | 4030017420 | S.CER ECJ0EC1H470J | T | 19.6/4.6 |
| C605 | 4030017420 | S.CER ECJ0EC1H470J | T | 20.9/4.6 |
| C606 | 4030017420 | S.CER ECJ0EC1H470J | T | 25.1/4.6 |
| C607 | 4030017420 | S.CER ECJ0EC1H470J | T | 37.5/13.2 |
| C608 | 4030017420 | S.CER ECJ0EC1H470J | T | 16.8/4.6 |
| C609 | 4030017420 | S.CER ECJ0EC1H470J | T | 40.3/13.2 |
| C610 | 4030017420 | S.CER ECJ0EC1H470J | T | 41.7/4.6 |
| J601 | 6510025240 | S.CNR IMSA-9631S-20Y912 | B | 32.2/16.2 |
| J602 | 6510023210 | CNR CD6125SA1J0 <CVI> | | |
| W601 | 8900012711 | CBL OPC-1297A (P0.5,N20,L62) | | |

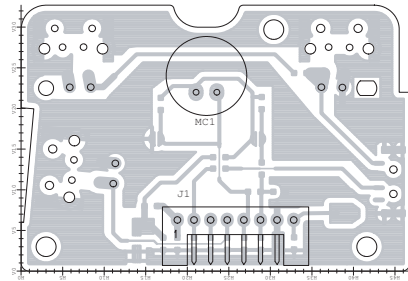
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
 S.=Surface mount

BOARD LAYOUTS

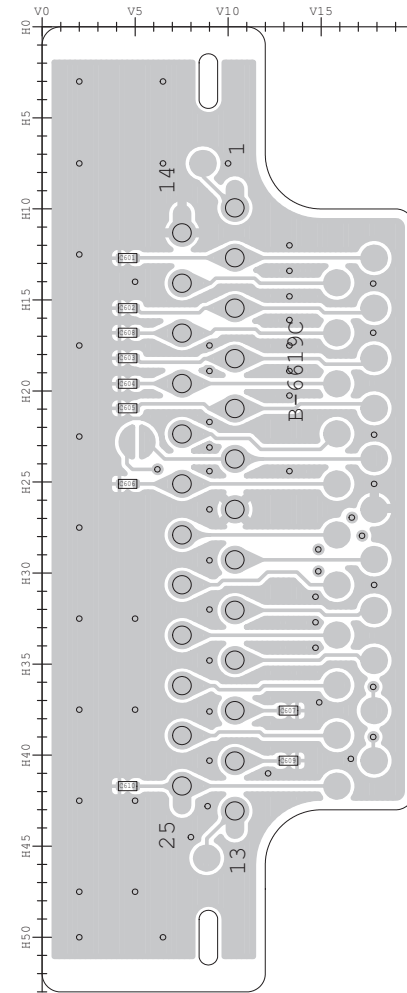
• Other than "MDC compatible"

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

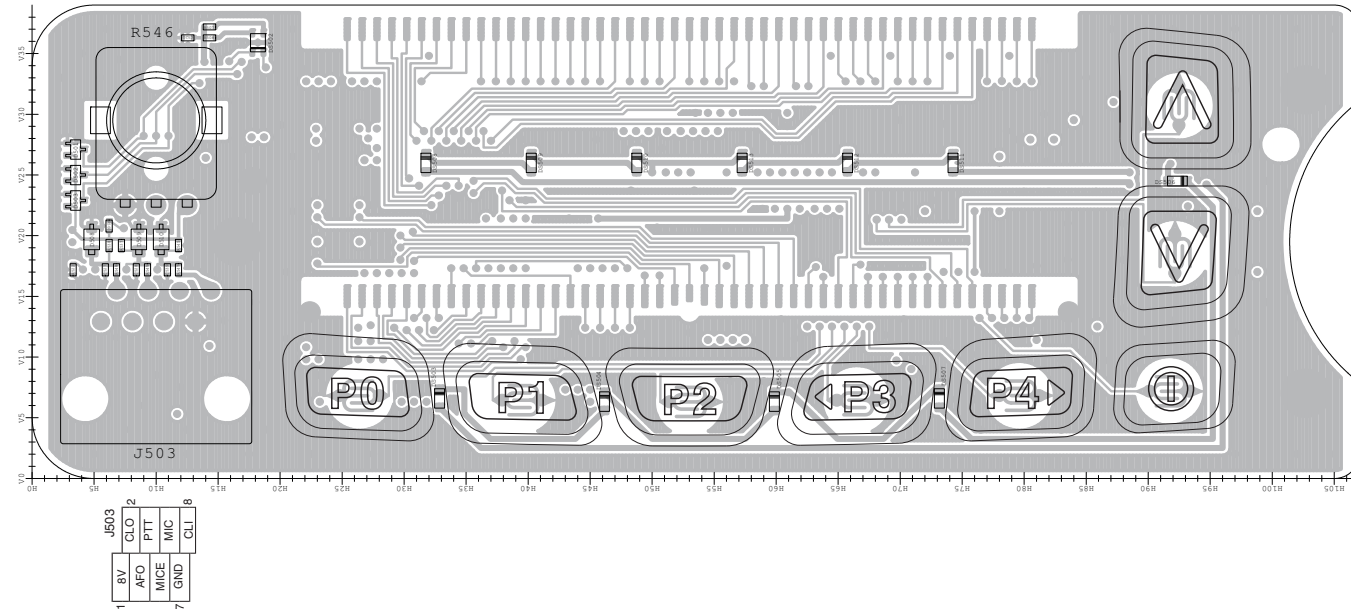
• HM-152 (TOP VIEW)



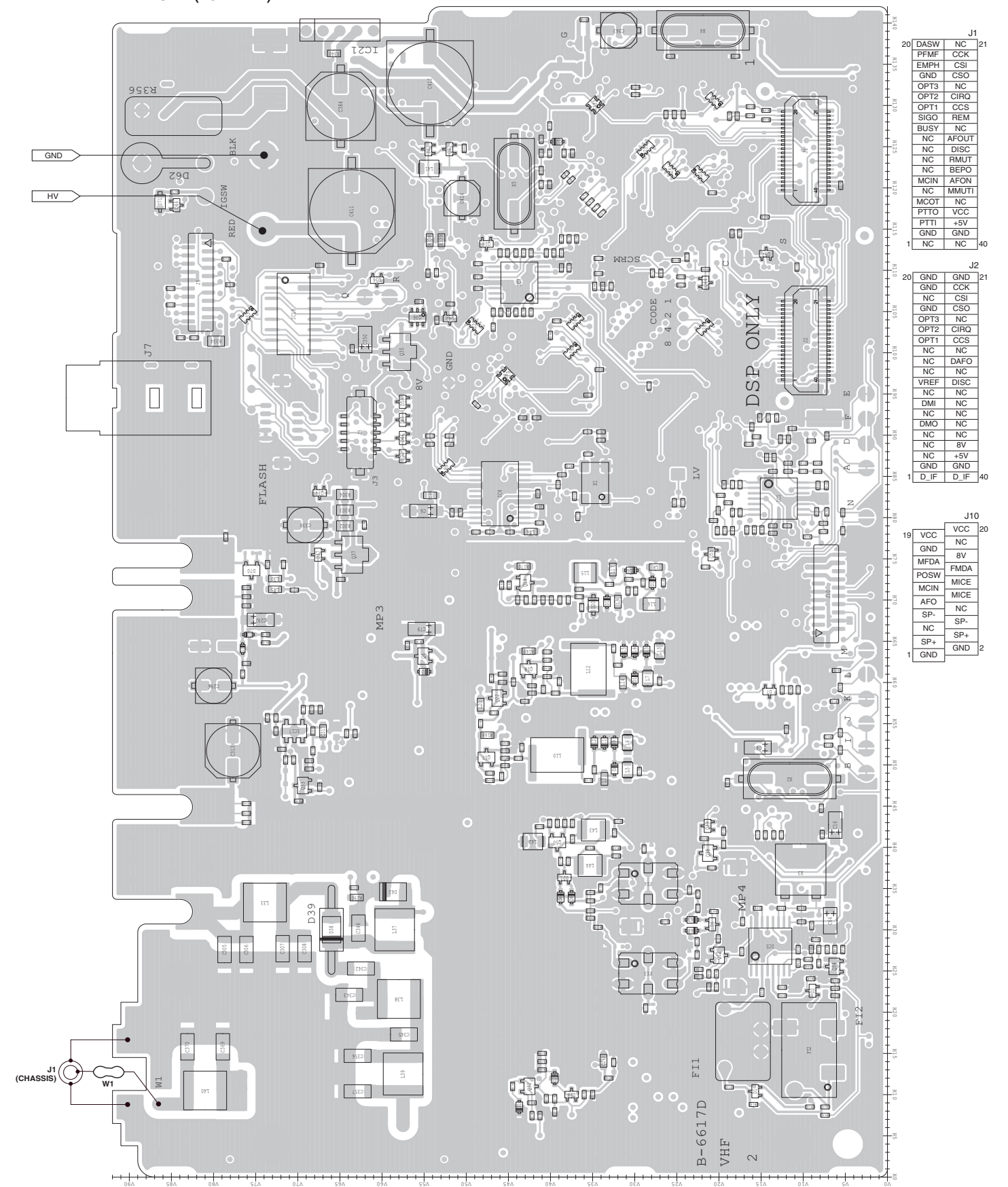
• CONNECT UNIT (TOP VIEW)



• FRONT UNIT (TOP VIEW)



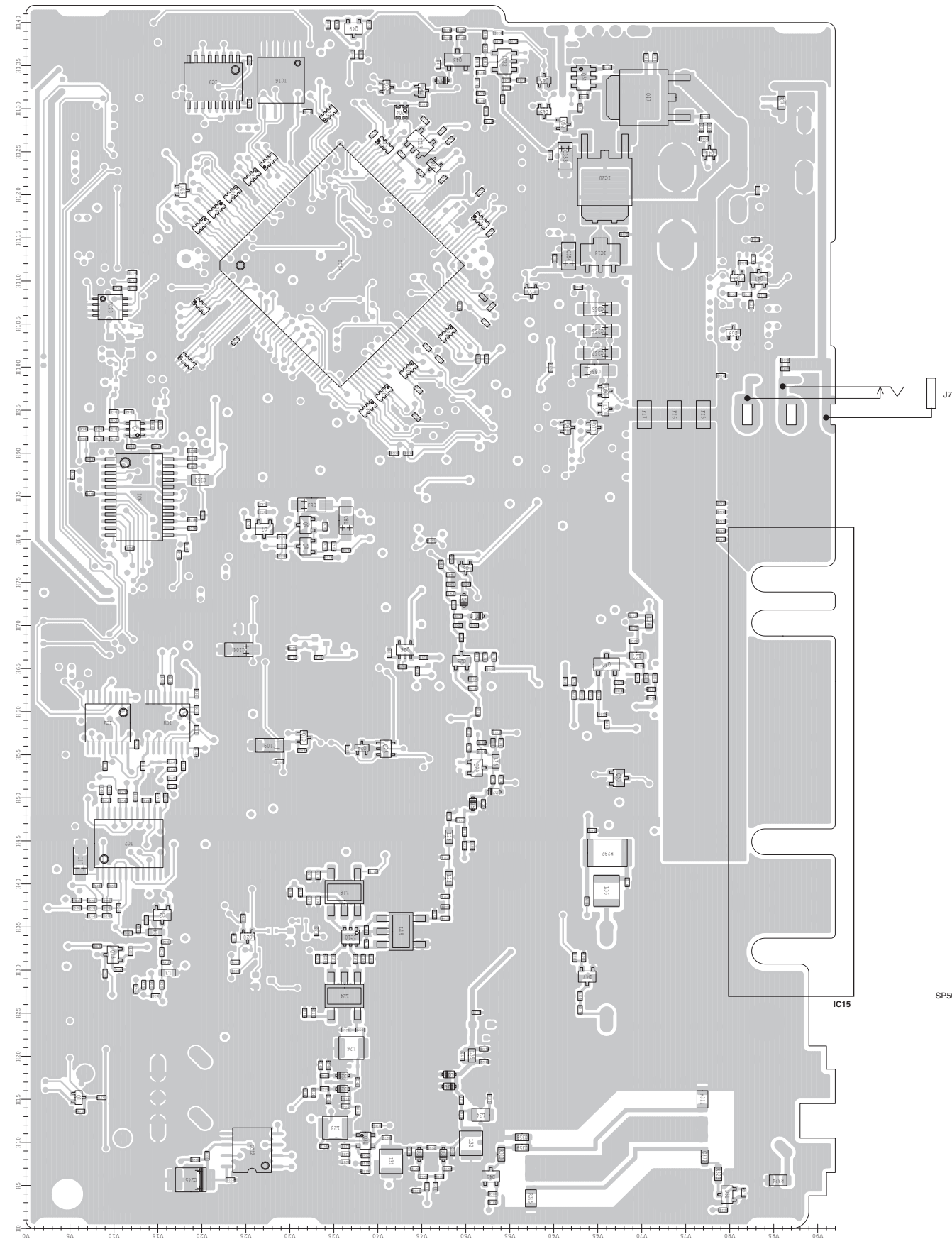
• MAIN UNIT (TOP VIEW)



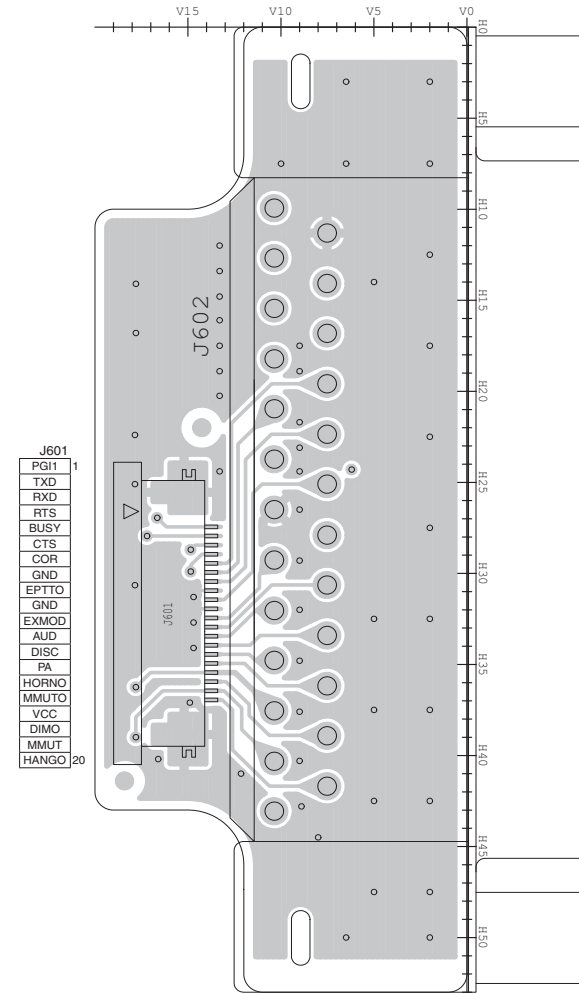
• Other than "MDC compatible"

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

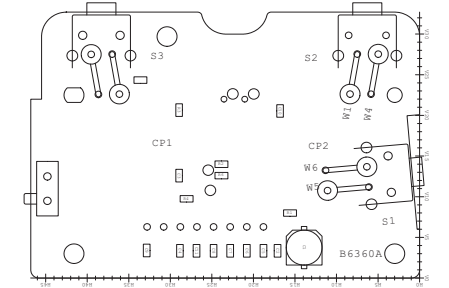
• MAIN UNIT (BOTTOM VIEW)



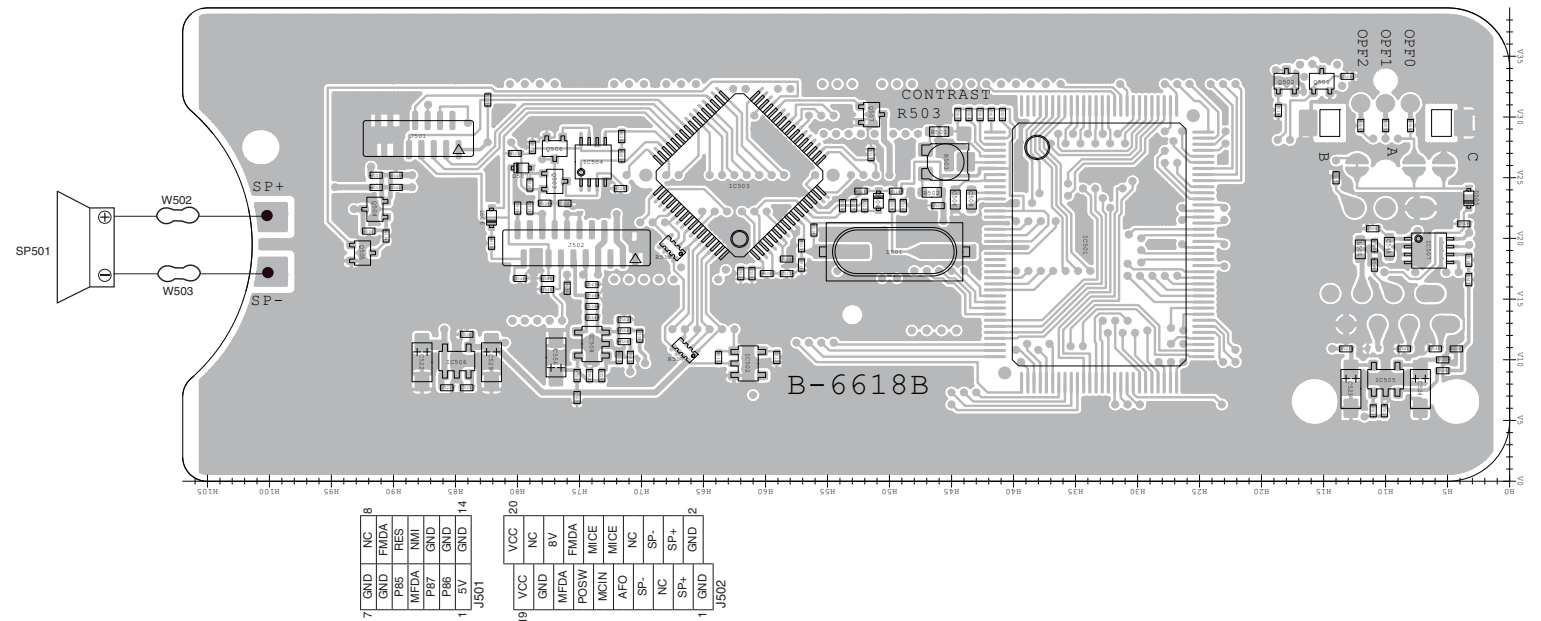
• CONNECT UNIT (BOTTOM VIEW)



• HM-152 (BOTTOM VIEW)



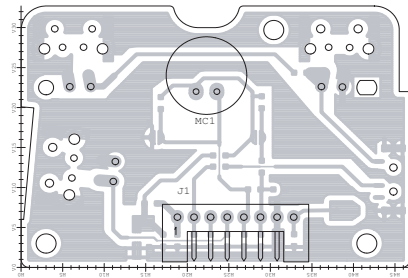
• FRONT UNIT (BOTTOM VIEW)



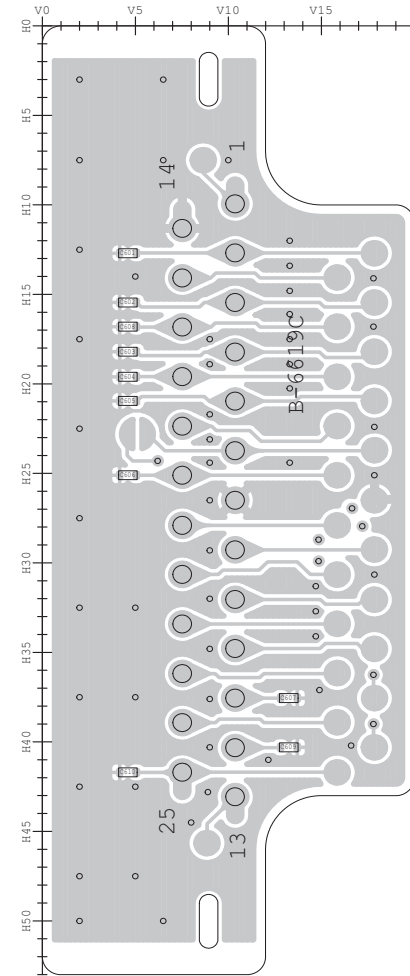
• MDC compatible

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

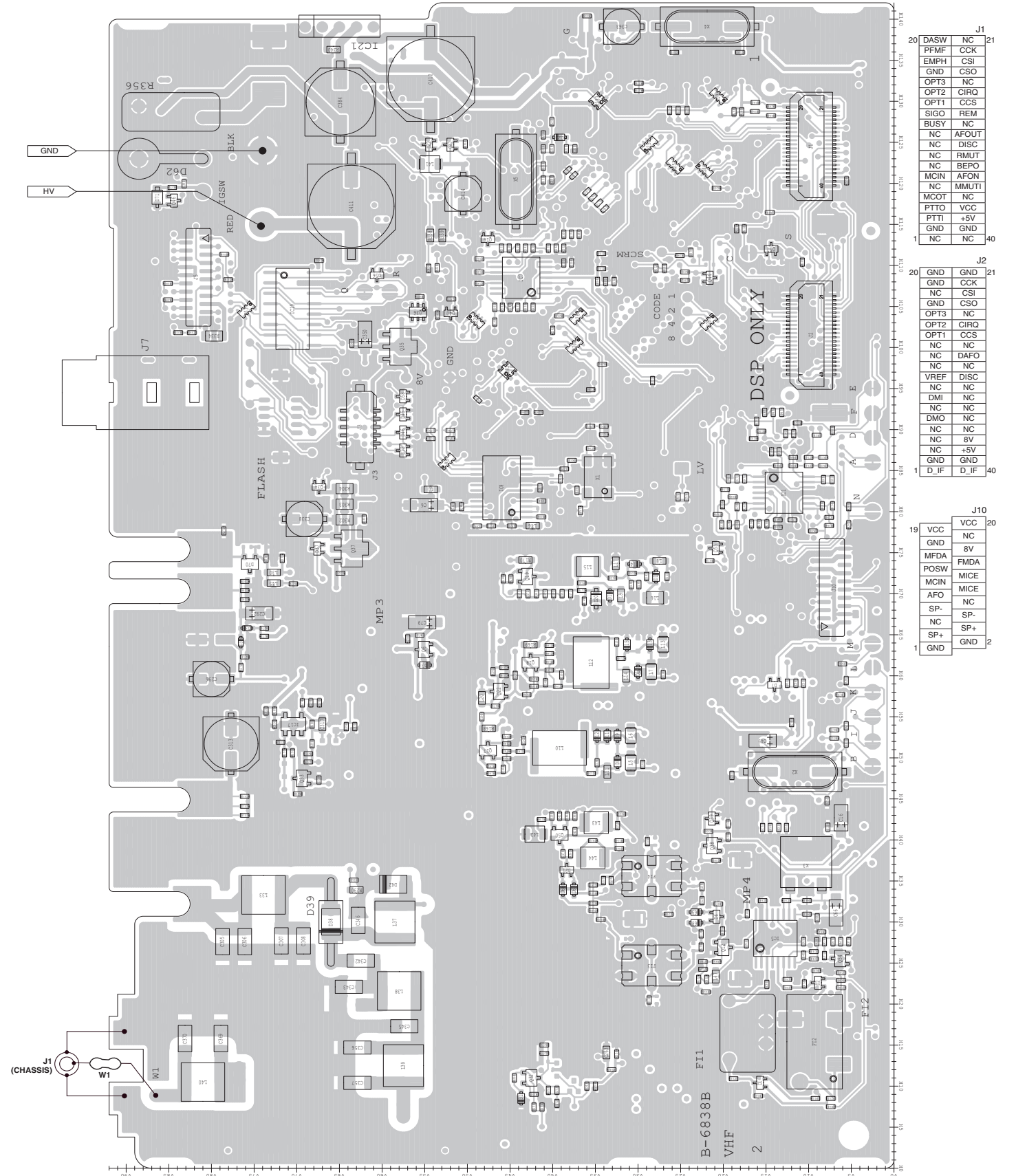
• HM-152 (TOP VIEW)



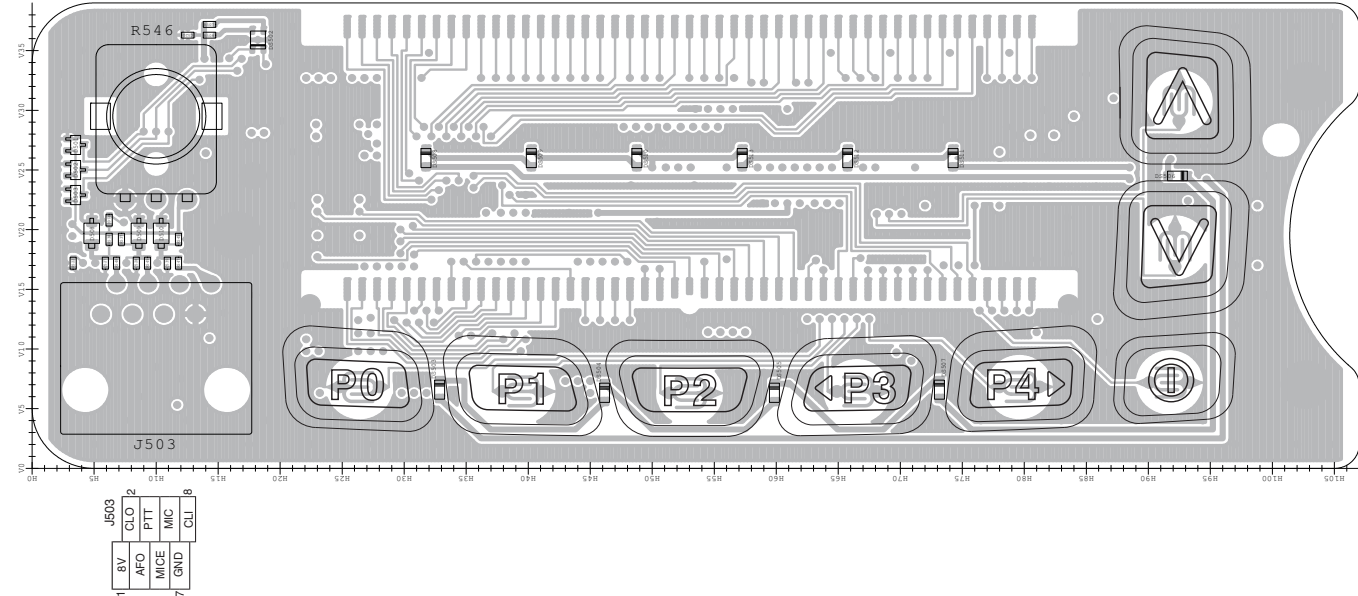
• CONNECT UNIT (TOP VIEW)



• MAIN-A UNIT (TOP VIEW)



• FRONT UNIT (TOP VIEW)



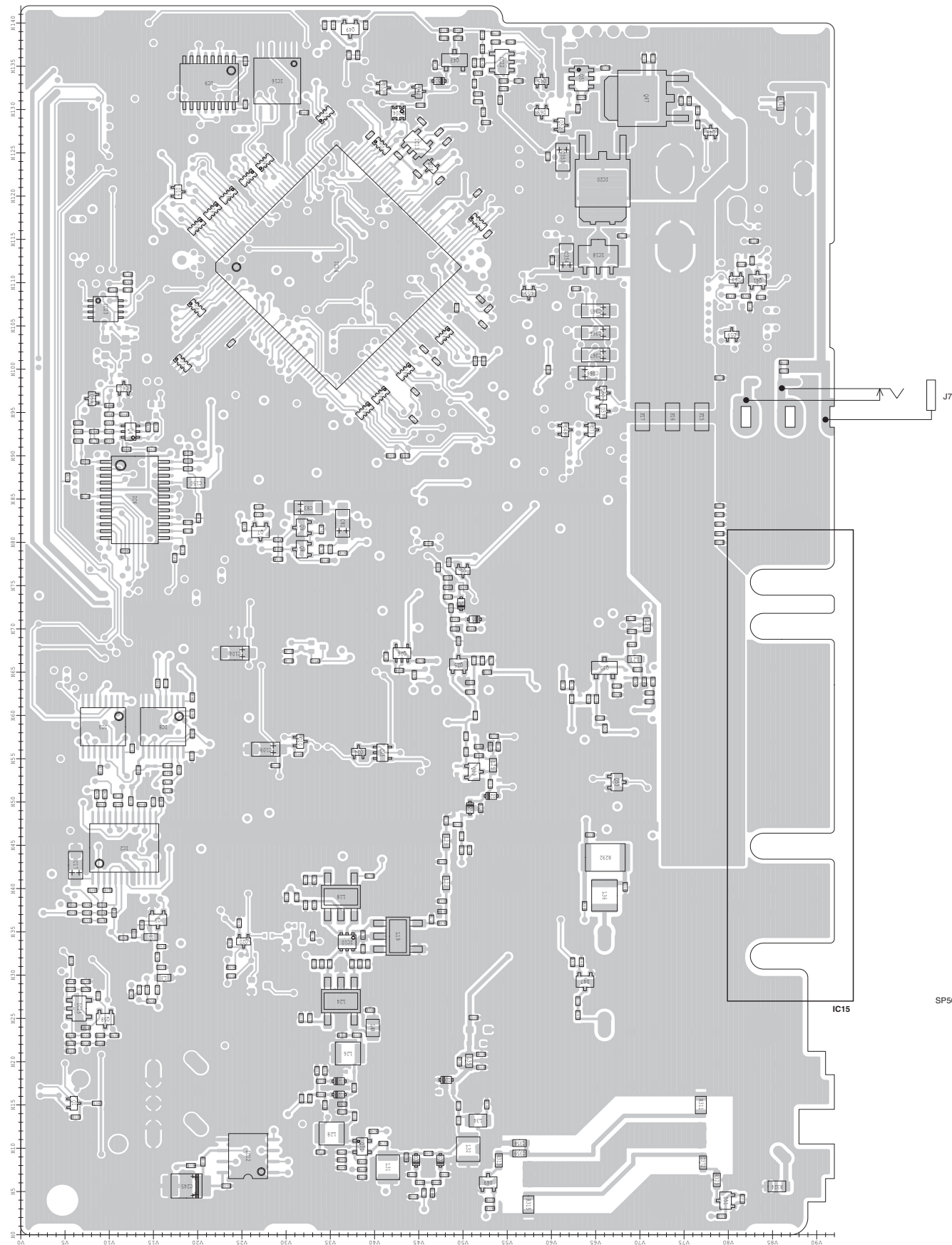
| | | | |
|----|------|--------|----|
| 20 | DASW | NC | J1 |
| | PFMF | CCK | |
| | EMPH | CSI | |
| | GND | CSO | |
| | OPT3 | NC | |
| | OPT2 | CRO | |
| | OPT1 | CCS | |
| | SIGO | REM | |
| | BUSY | NC | |
| | NC | AFOUT | |
| | NC | DISC | |
| | NC | RMUT | |
| | NC | BEPO | |
| | MCIN | AFON | |
| | NC | MMULTI | |
| | MCOT | NC | |
| | PTTO | VCC | |
| | PTTI | +5V | |
| 1 | GND | GND | 40 |
| | NC | NC | |

| | | | |
|----|------|------|----|
| 20 | GND | GND | J2 |
| | GND | CCK | |
| | NC | CSI | |
| | GND | CSO | |
| | OPT3 | NC | |
| | OPT2 | CRO | |
| | OPT1 | CCS | |
| | NC | DAFO | |
| | NC | DAFO | |
| | NC | NC | |
| | VREF | DISC | |
| | NC | NC | |
| | DMR | NC | |
| | NC | NC | |
| | DMO | NC | |
| | NC | NC | |
| | NC | 8V | |
| | NC | +5V | |
| 1 | GND | GND | 40 |
| | D_IF | D_IF | |

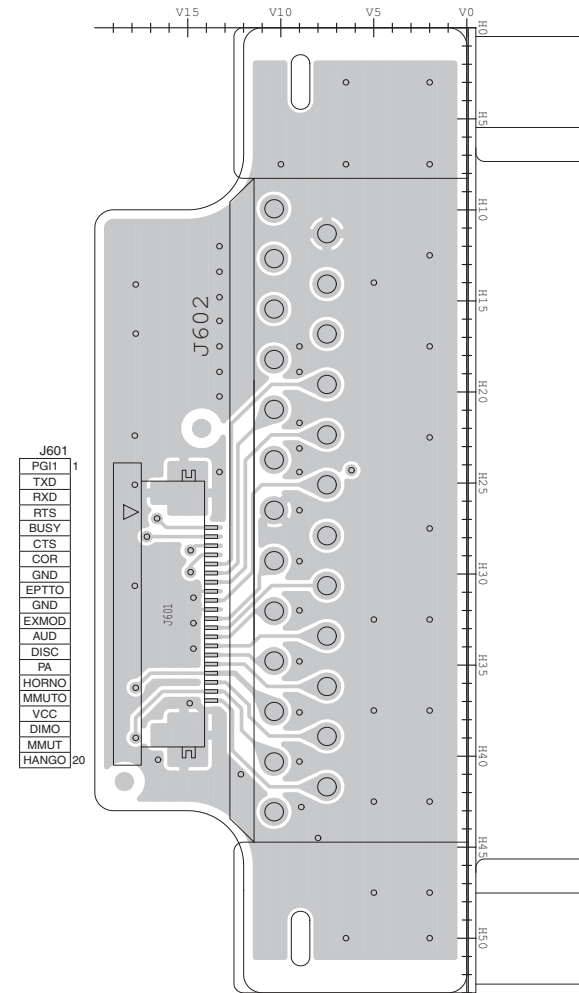
| | | | |
|----|------|------|-----|
| 19 | VCC | NC | J10 |
| | GND | NC | |
| | MFDA | FMVA | |
| | POSW | MICE | |
| | MCIN | MICE | |
| | AFO | NC | |
| | SP- | NC | |
| | NC | SP+ | |
| 1 | GND | GND | 2 |

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

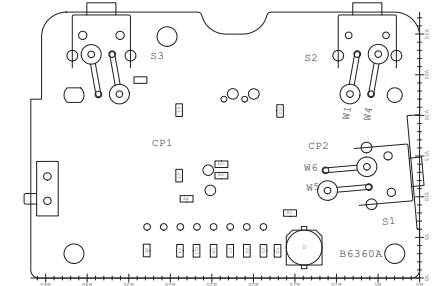
• MAIN-A UNIT (BOTTOM VIEW)



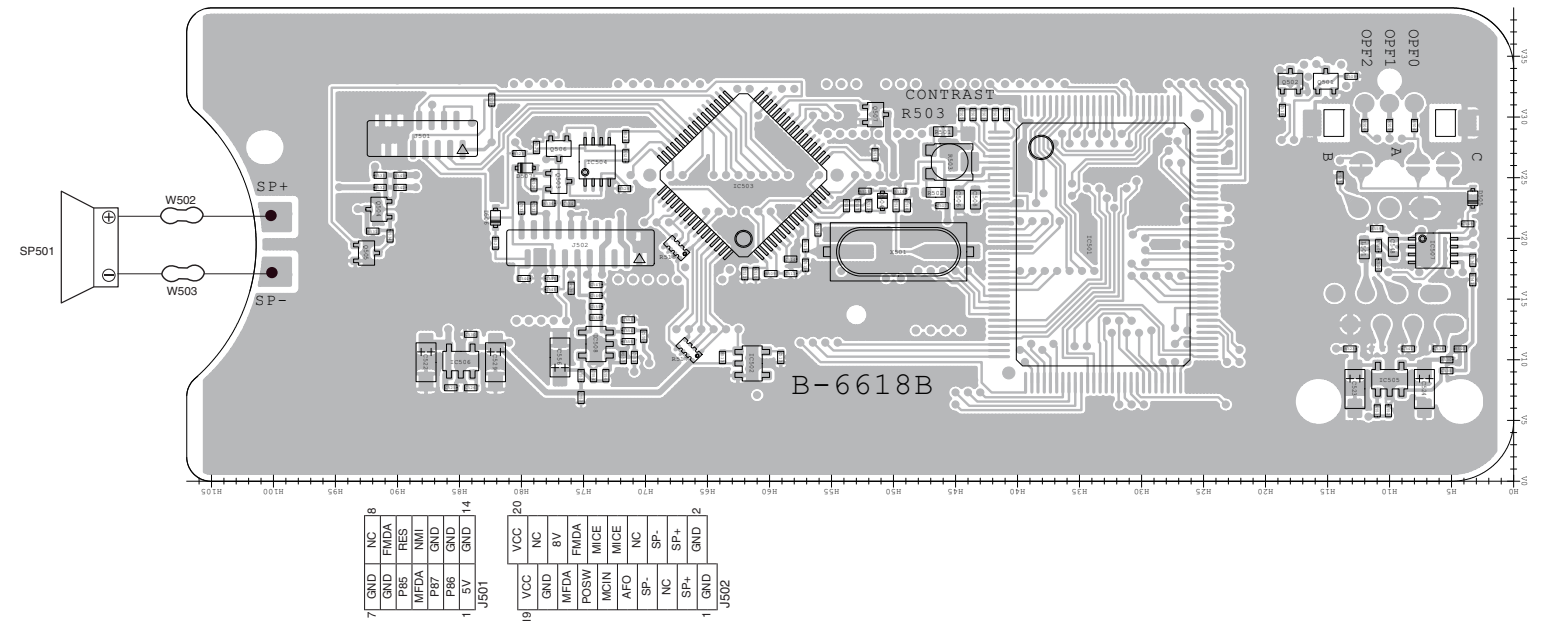
• CONNECT UNIT (BOTTOM VIEW)



• HM-152 (BOTTOM VIEW)

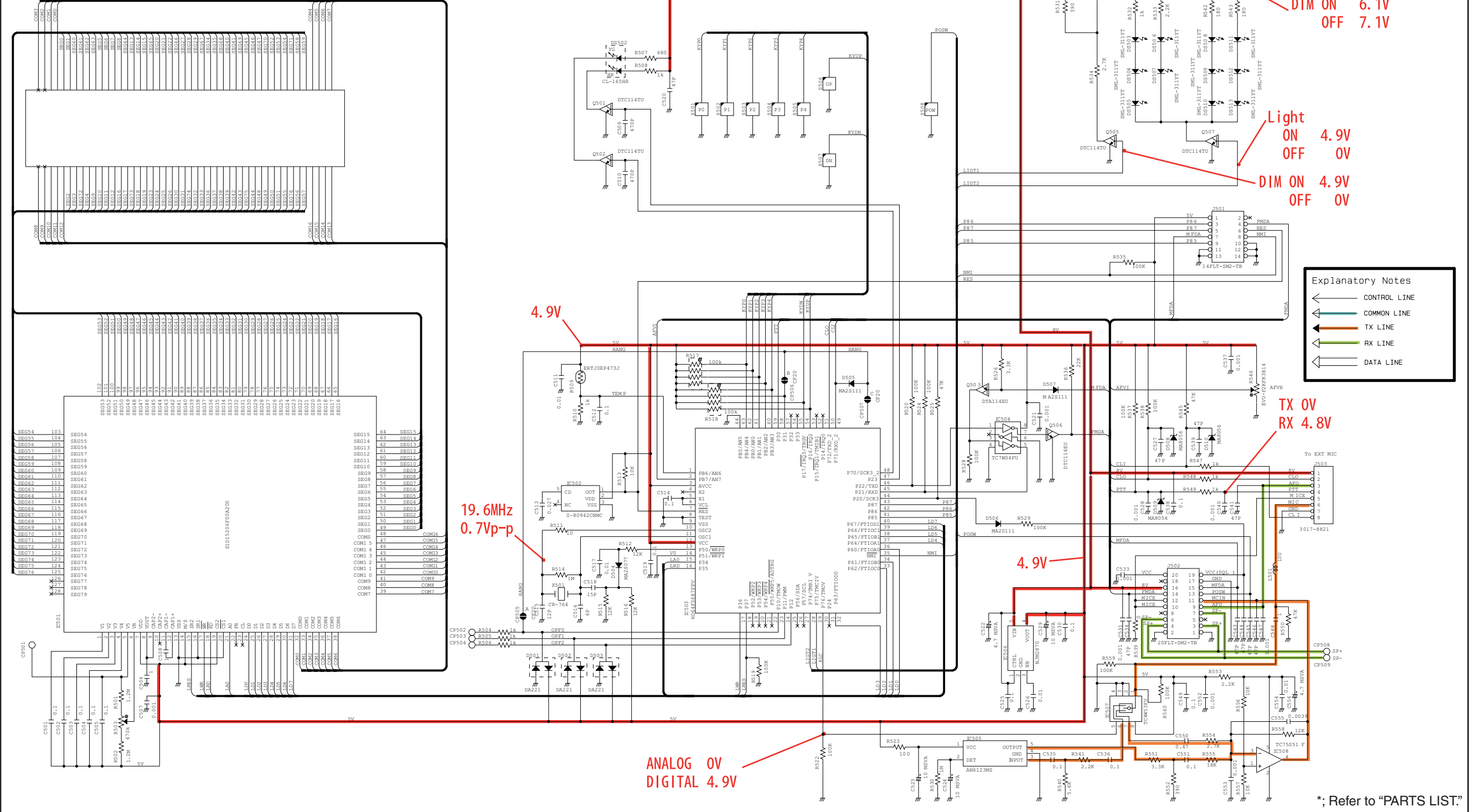


• FRONT UNIT (BOTTOM VIEW)



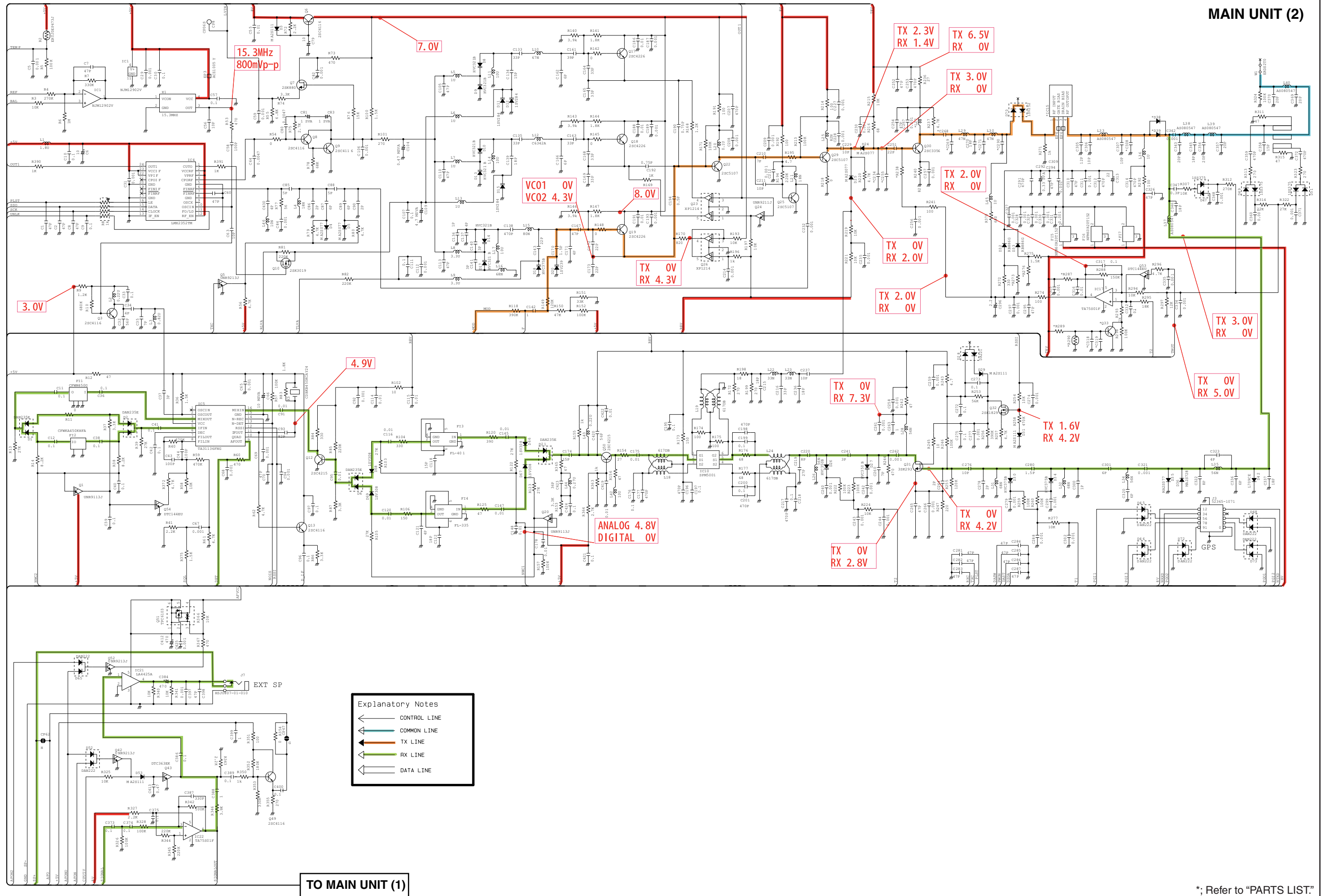
VOLTAGE DIAGRAM

FRONT UNIT



• Other than "MDC compatible"

MAIN UNIT (2)

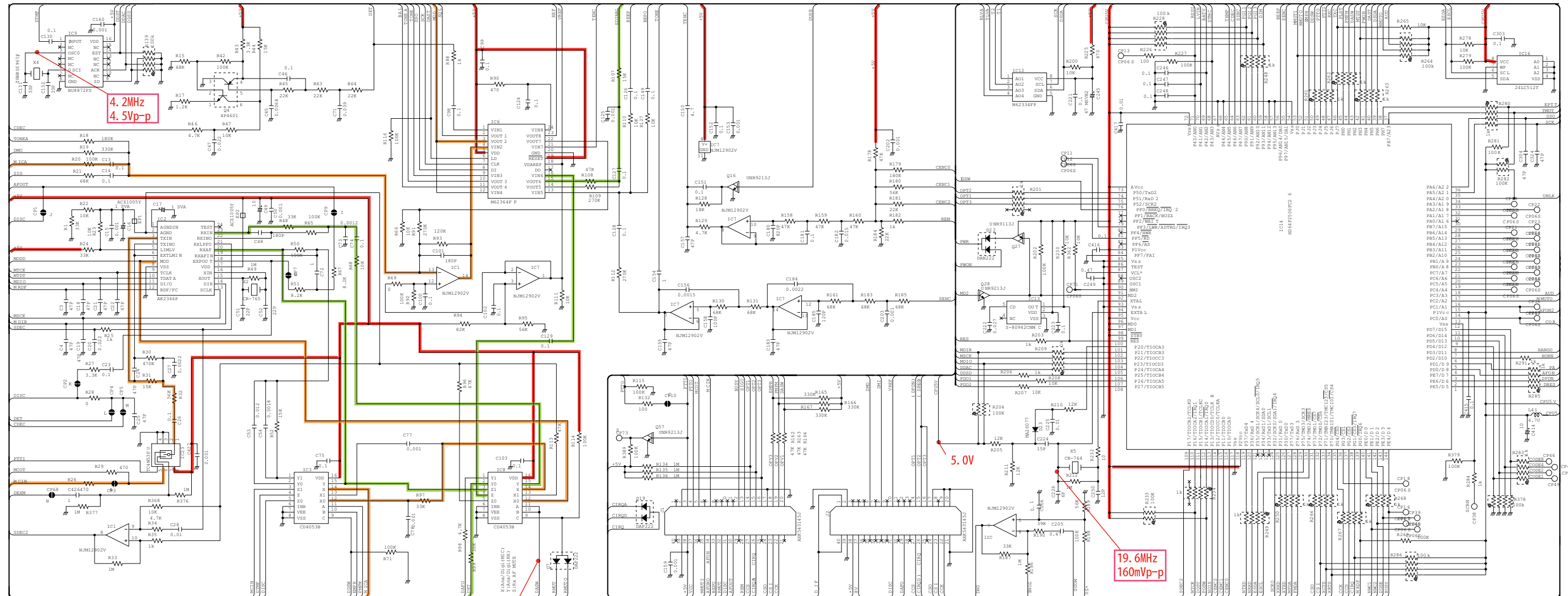


Explanatory Notes

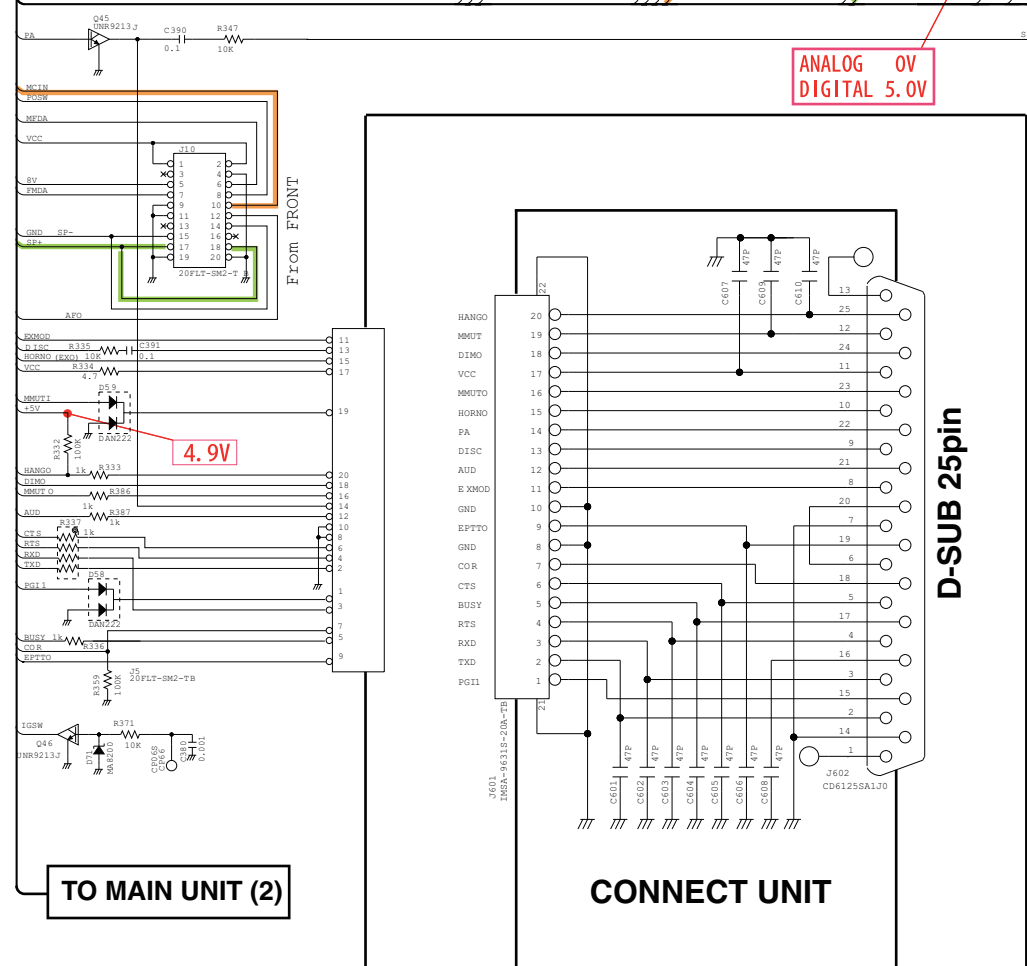
- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

*; Refer to "PARTS LIST."

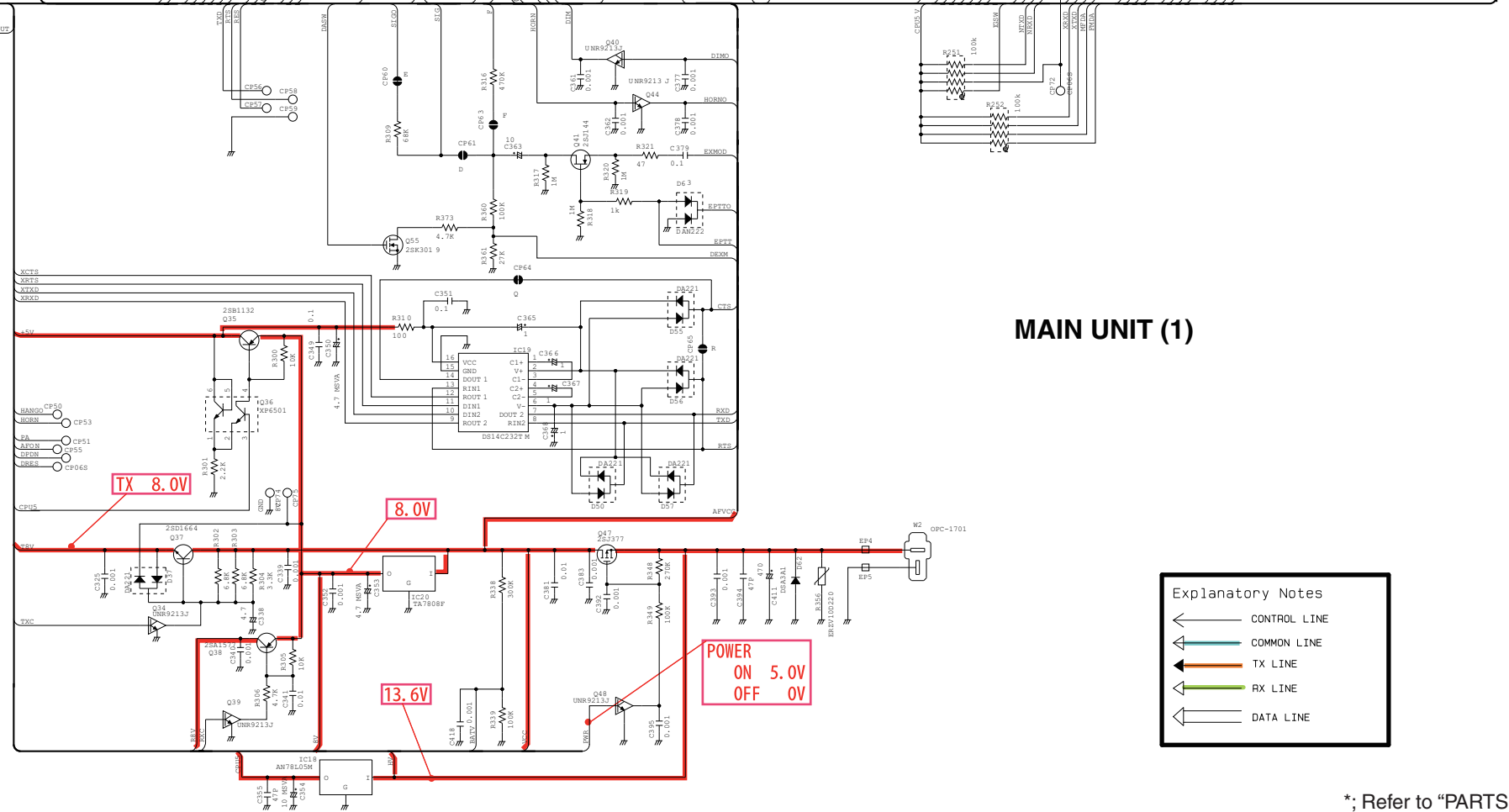
• Other than "MDC compatible"



MAIN UNIT (1)



CONNECT UNIT



TO MAIN UNIT (2)

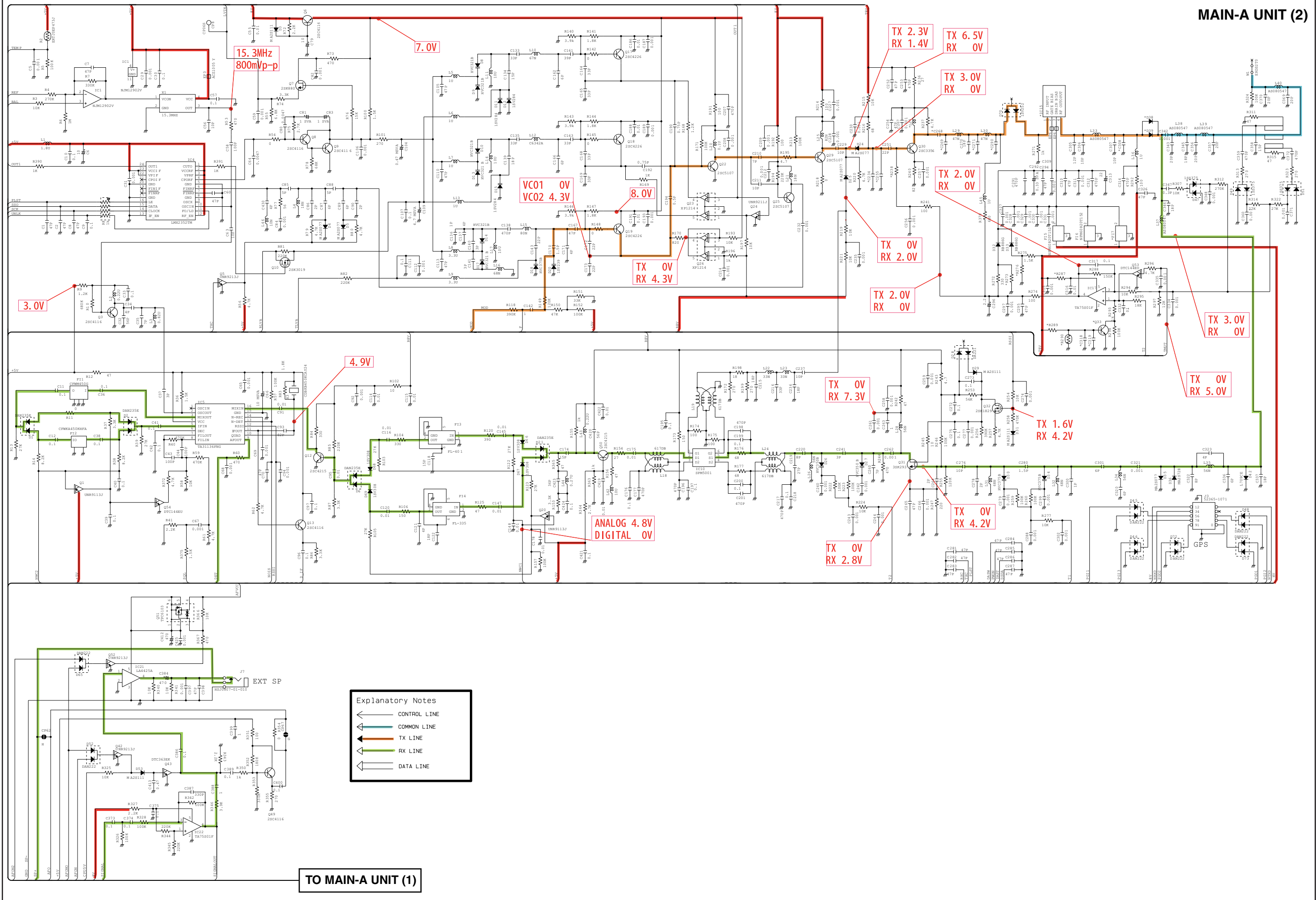
Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

*; Refer to "PARTS LIST"

• MDC compatible

MAIN-A UNIT (2)

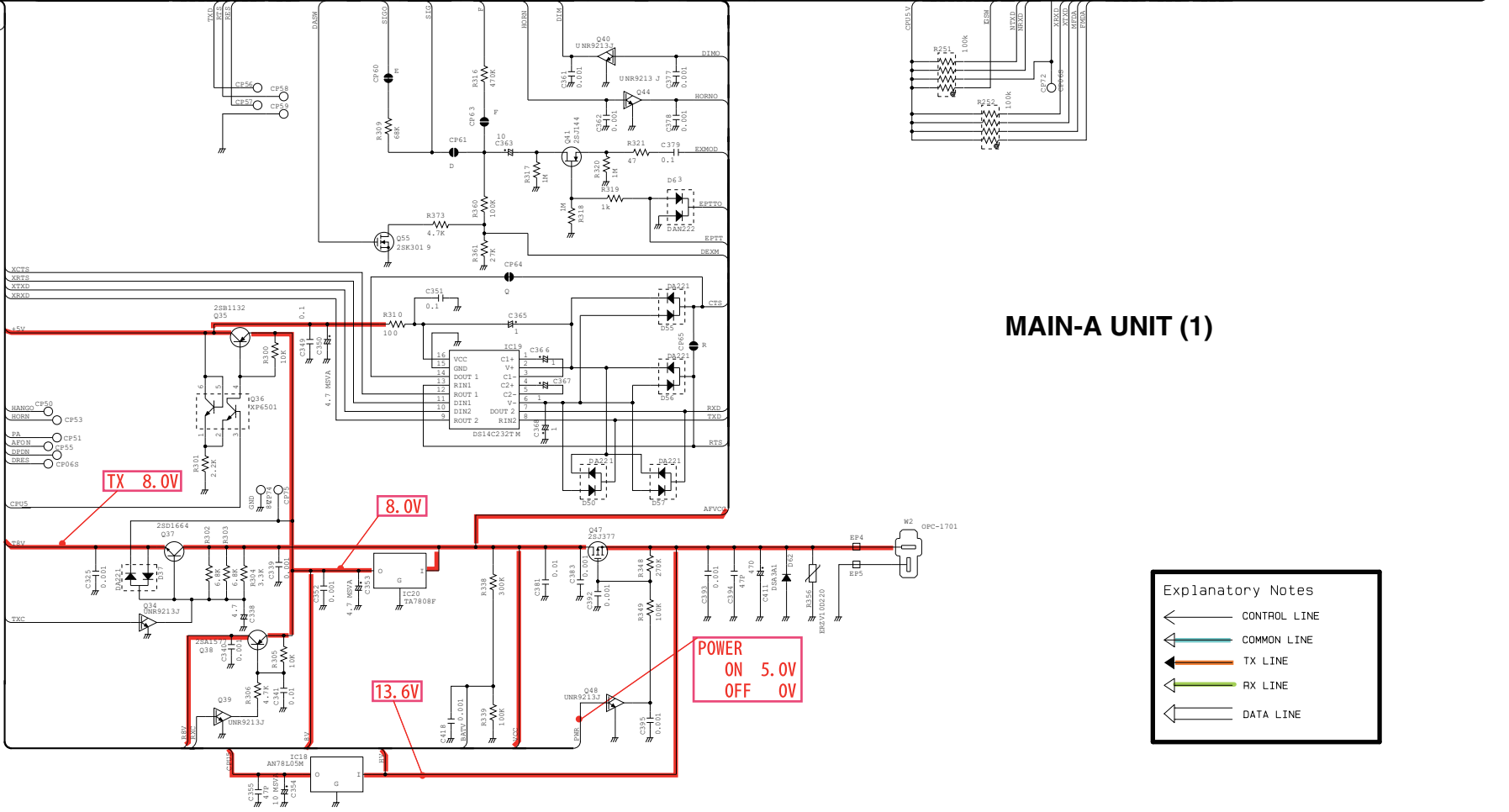
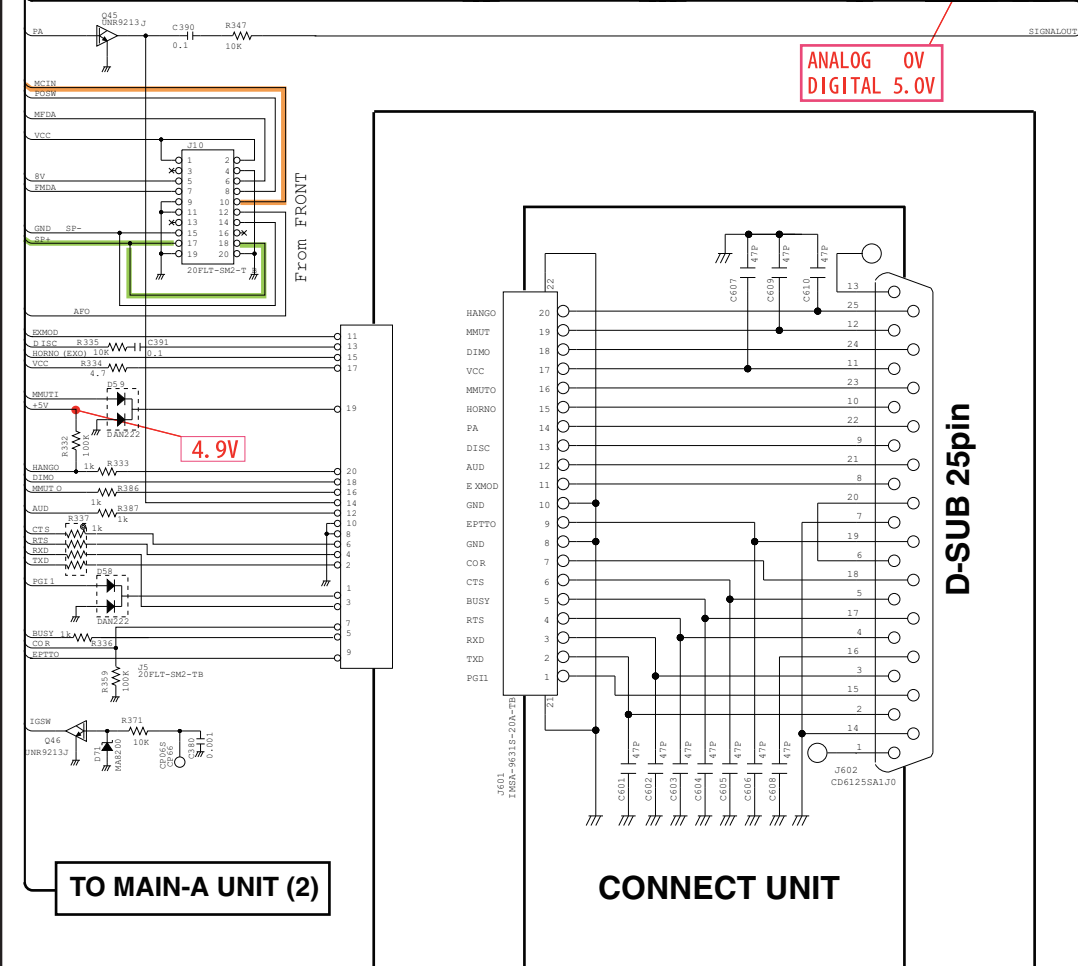
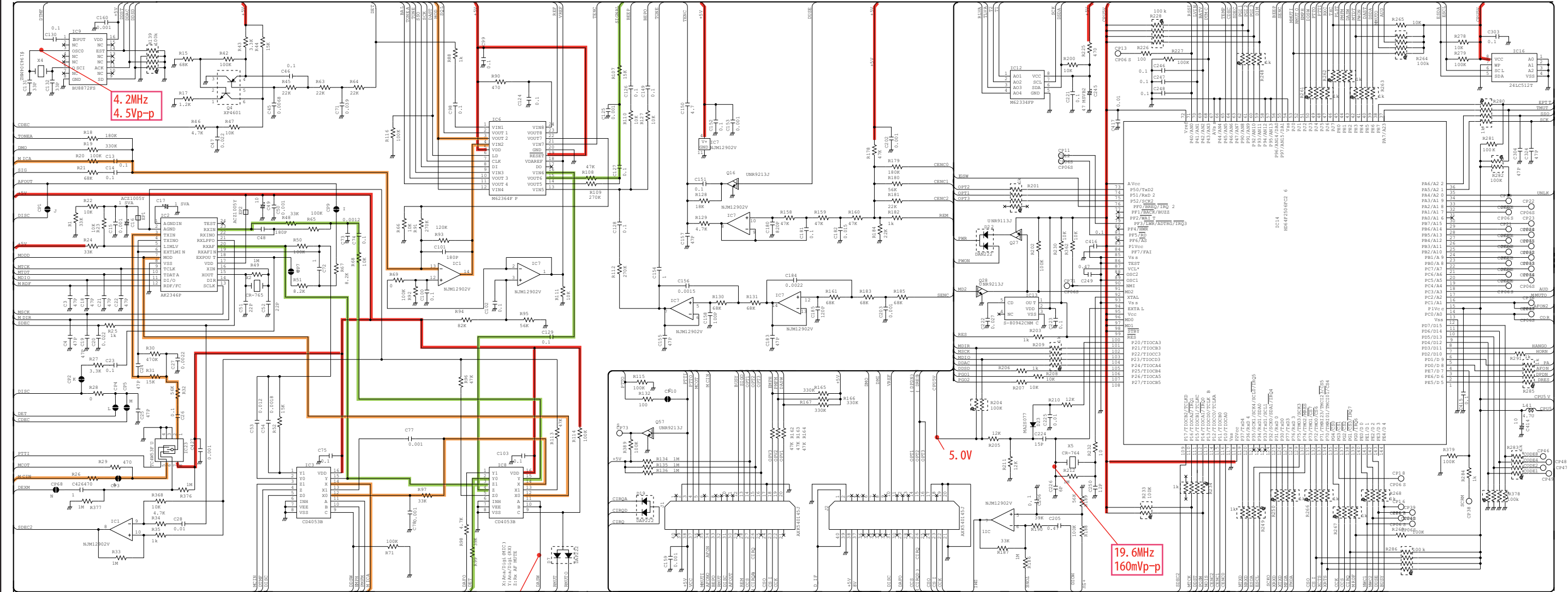


TO MAIN-A UNIT (1)

Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

• MDC compatible



MAIN-A UNIT (1)

Explanatory Notes

| | |
|--|--------------|
| | CONTROL LINE |
| | COMMON LINE |
| | TX LINE |
| | RX LINE |
| | DATA LINE |

Nov. 2007



SERVICE MANUAL ADDENDUM

IC-F5061 IC-F5062 IC-F5063

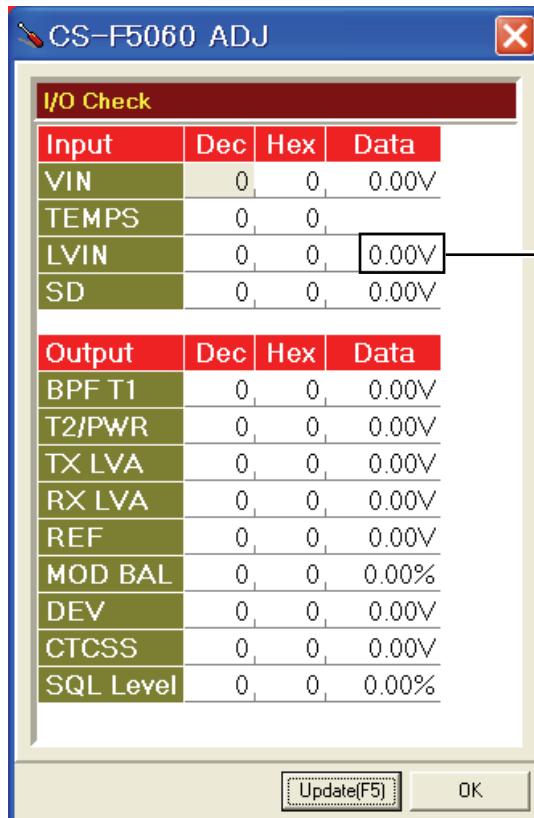
CONTENTS

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| PARTS LIST | 1 |
| FREQUENCY ADJUSTMENT for "B-6617D" | 2 |
| BOARD LAYOUTS | 10 |
| VOLTAGE DIAGRAM | 12 |

6-2 FREQUENCY ADJUSTMENT

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

| ADJUSTMENT | ADJUSTMENT CONDITION | UNIT | OPERATION | VALUE | |
|---|----------------------|---|-----------|---|--------------------|
| PLL LOCK VOLTAGE (adjustment) [RX LVA1] | 1 | Set the preset value of [LV (RX1)], [LV (RX2)] to "210 [4.11V]," and [LV (TX)] "57 [1.11V]" on the adjustment software. | | | |
| | 2 | • Channel : CH 1 • Receiving | PC screen | Click [Reload (F5)] button, then check the "LVIN" item on the CS-F5060 ADJ's screen as below. | 4.11 V |
| | 3 | • Channel : CH 2 • Receiving | | | |
| | 4 | • Channel : CH 3 • Transmitting | | | |
| [TX LVA] | | 1.11 V | | | |
| CONVENIENT: The "PLL LOCK VOLTAGE" can be adjusted automatically. 1: Set the Lock voltage preset; [LV RX1], [LV RX2]) to "210 (4.11 V)," [LV TX] to "57 (1.11 V)," 2: Put the cursor on [RX LVA1], [RX LVA2] and [TX LVA], then push the [ENTER] key on the connected PC's keyboard. | | | | | |
| PLL LOCK VOLTAGE (verify) | 1 | • Channel : CH 3 • Receiving | PC screen | Click [Reload (F5)] button, then check the "LVIN" item on the CS-F5060 ADJ's screen. | 0.8–1.6 V (Verify) |
| | 2 | • Channel : CH 4 • Receiving | | | |
| | 3 | • Channel : CH 2 • Transmitting | | | 3.5–4.5 V (Verify) |
| REFERENCE FREQUENCY [REF] | 1 | • Channel : CH 2 • Connect an RF power meter to the antenna connector. • Transmitting | Top panel | Loosely couple a frequency counter to the antenna connector. | 174.000000 MHz |



PLL LOCK VOLTAGE will be appeared here

NOTE: The above screen is an example only.
Each item's voltage will appear when pushing [Update] button.

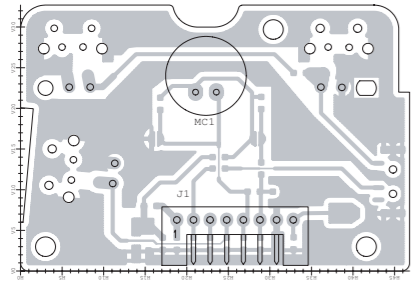
[CONNECT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | M. | H/V LOCATION |
|---------|------------|------------------------------|----|--------------|
| C601 | 4030017420 | S.CER ECJ0EC1H470J | T | 12.7/4.6 |
| C602 | 4030017420 | S.CER ECJ0EC1H470J | T | 15.4/4.6 |
| C603 | 4030017420 | S.CER ECJ0EC1H470J | T | 18.2/4.6 |
| C604 | 4030017420 | S.CER ECJ0EC1H470J | T | 19.6/4.6 |
| C605 | 4030017420 | S.CER ECJ0EC1H470J | T | 20.9/4.6 |
| C606 | 4030017420 | S.CER ECJ0EC1H470J | T | 25.1/4.6 |
| C607 | 4030017420 | S.CER ECJ0EC1H470J | T | 37.5/13.2 |
| C608 | 4030017420 | S.CER ECJ0EC1H470J | T | 16.8/4.6 |
| C609 | 4030017420 | S.CER ECJ0EC1H470J | T | 40.3/13.2 |
| C610 | 4030017420 | S.CER ECJ0EC1H470J | T | 41.7/4.6 |
| J601 | 6510025240 | S.CNR IMSA-9631S-20Y912 | B | 32.2/16.2 |
| J602 | 6510023210 | CNR CD6125SA1J0 <CVI> | | |
| W601 | 8900012711 | CBL OPC-1297A (P0.5,N20,L62) | | |

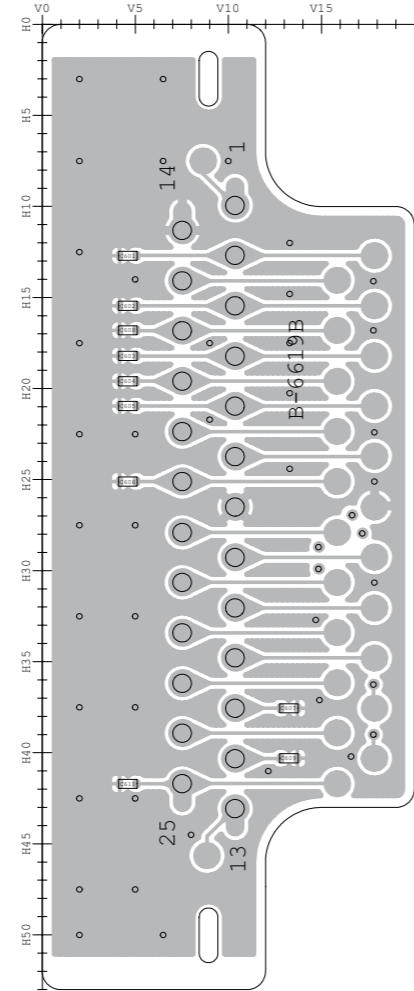
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

BOARD LAYOUTS

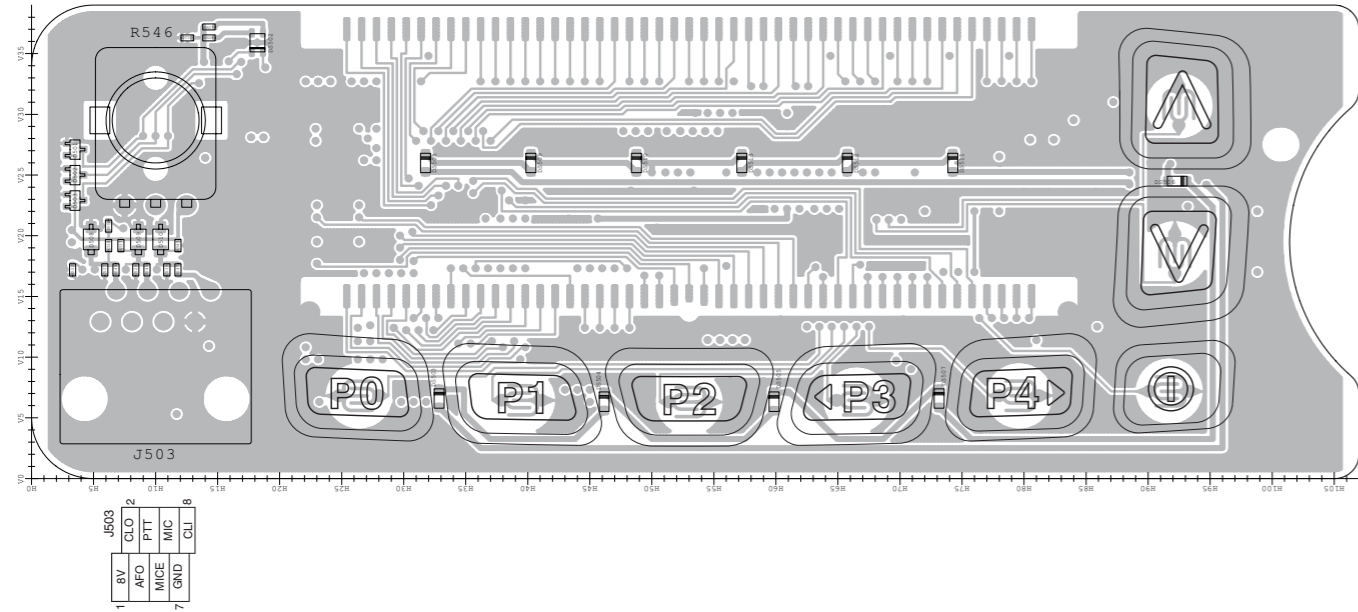
• HM-152 (TOP VIEW)



• CONNECT UNIT (TOP VIEW)

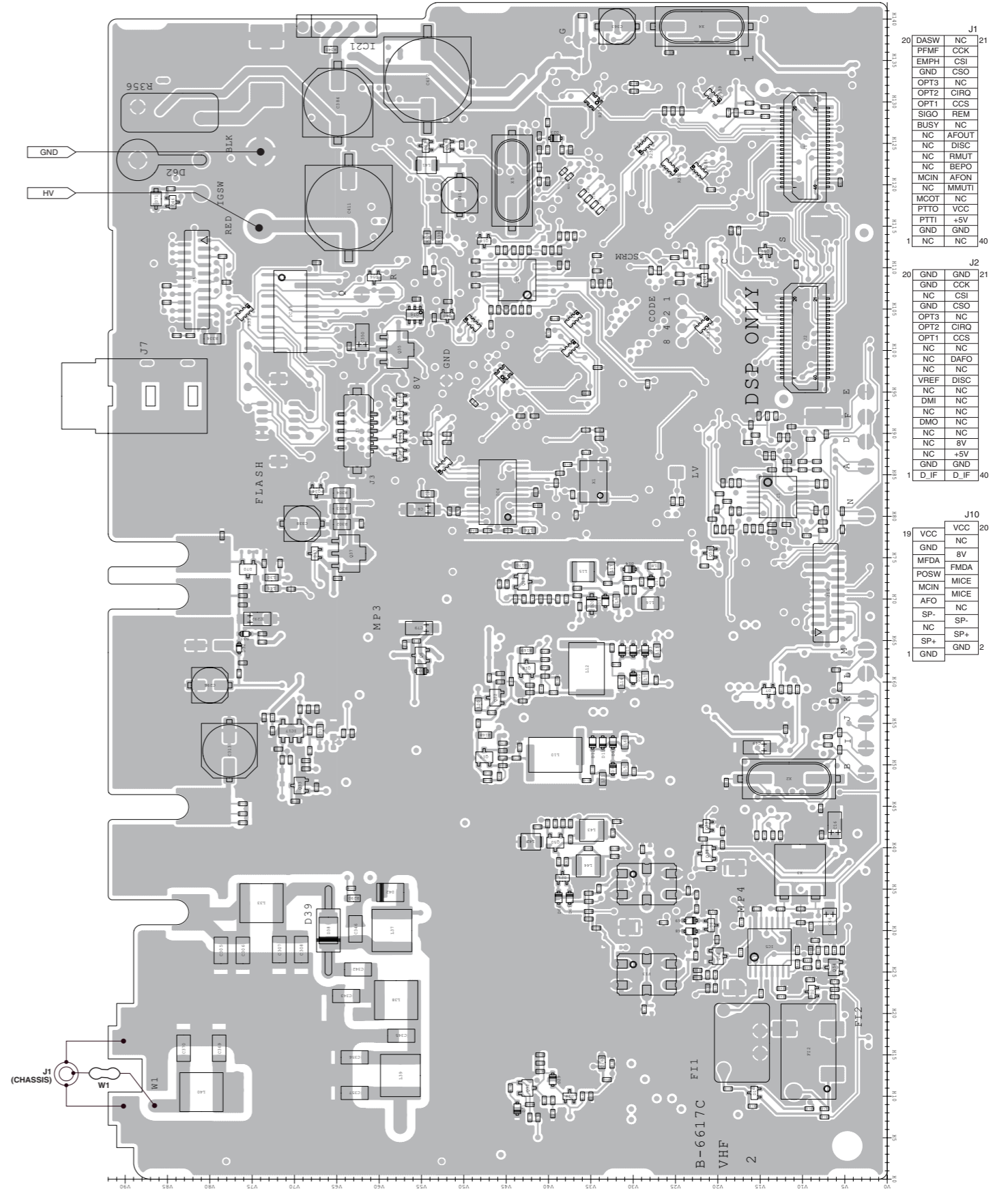


• FRONT UNIT (TOP VIEW)



| | | |
|---|------|------|
| 1 | 8V | J503 |
| 2 | AFO | CL0 |
| 3 | PIT | CL1 |
| 4 | MICE | CL2 |
| 5 | MIC | CL3 |
| 6 | GND | CL4 |
| 7 | | CL5 |
| 8 | | CL6 |

• MAIN UNIT (TOP VIEW)



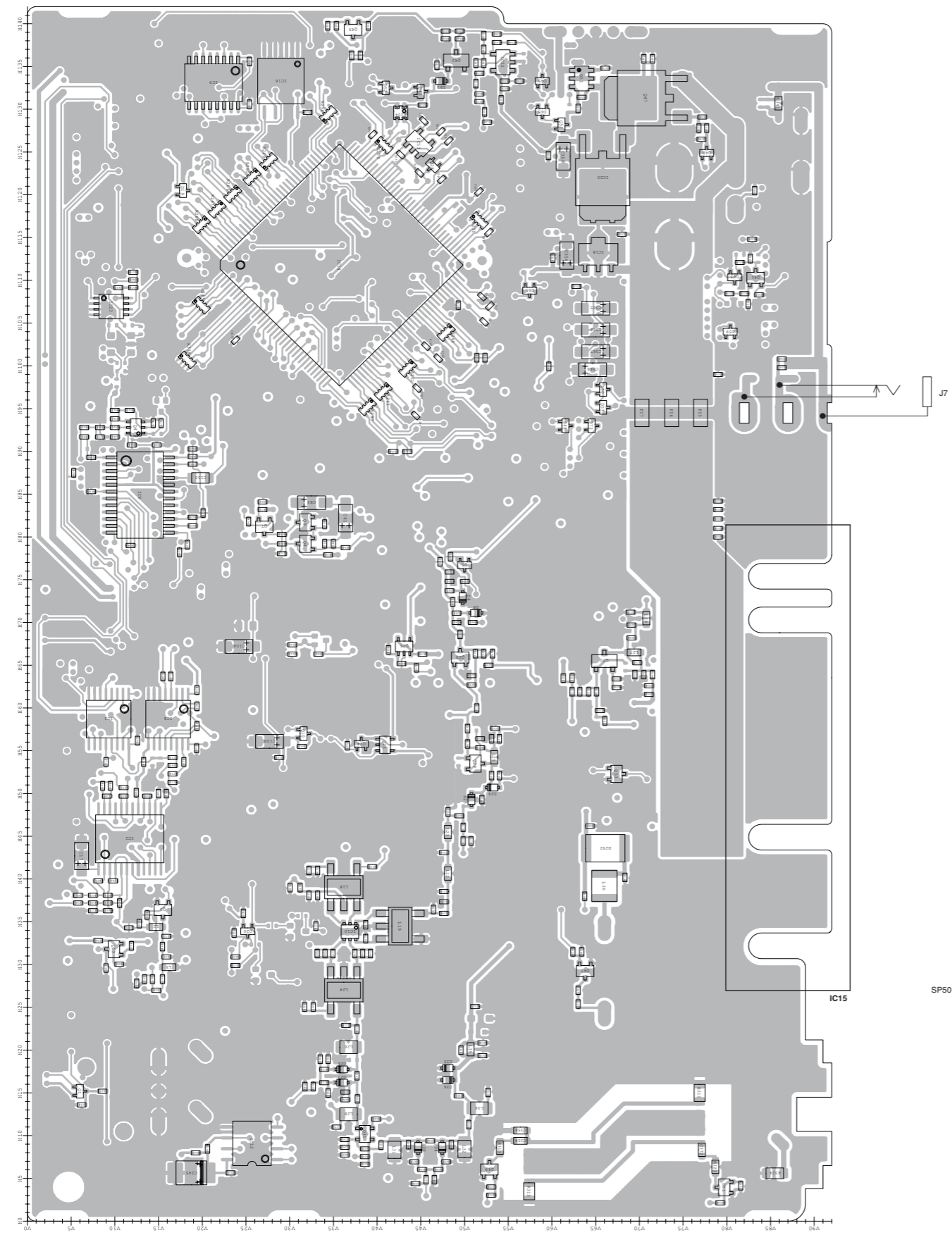
| | | | |
|----|------|-------|----|
| 20 | DASW | NC | J1 |
| | PFMF | CCK | |
| | EMPH | CSI | |
| | GND | CSO | |
| | OPT2 | CIRQ | |
| | OPT1 | CCS | |
| | SIGO | REM | |
| | BUSY | NC | |
| | NC | AFOUT | |
| | NC | DISC | |
| | NC | RMUT | |
| | NC | BEPO | |
| | MCIN | AFON | |
| | NC | MMUTI | |
| | MCOT | NC | |
| | PTTO | VCC | |
| | PTTI | +5V | |
| | GND | GND | |
| | NC | NC | |

| | | | |
|----|------|------|----|
| 20 | GND | GND | J2 |
| | GND | CCK | |
| | NC | CSI | |
| | GND | CSO | |
| | OPT3 | NC | |
| | OPT2 | CIRQ | |
| | OPT1 | CCS | |
| | NC | NC | |
| | NC | DAFO | |
| | NC | NC | |
| | VREF | DISC | |
| | NC | NC | |
| | NC | DMI | |
| | NC | NC | |
| | DMO | NC | |
| | NC | NC | |
| | NC | 8V | |
| | NC | +5V | |
| | GND | GND | |
| | D_IF | D_IF | |

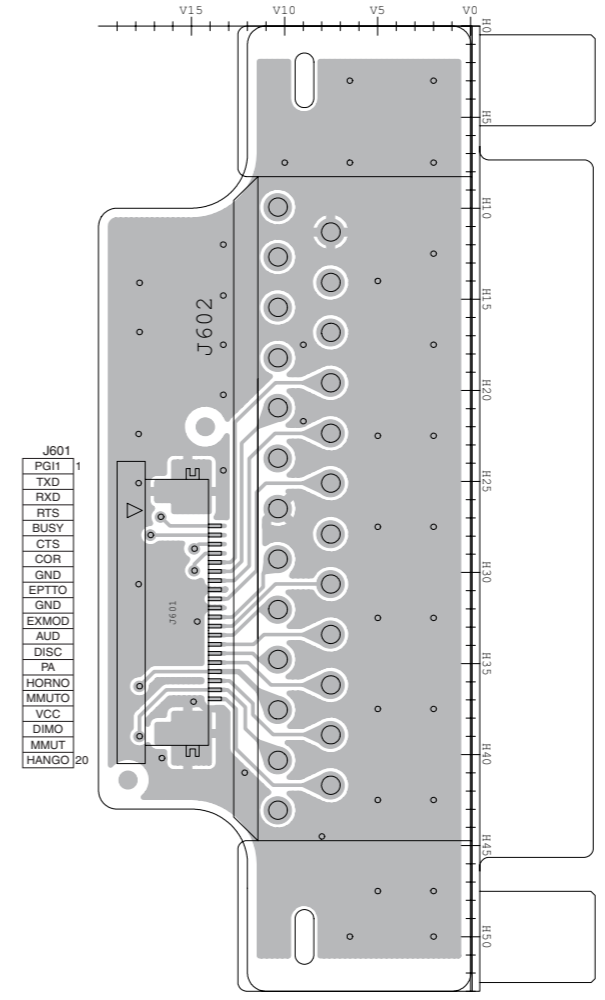
| | | | |
|----|------|------|-----|
| 19 | VCC | VCC | J10 |
| | GND | NC | |
| | MFDA | 8V | |
| | POSW | FMDA | |
| | MCIN | MICE | |
| | AFO | MICE | |
| | SP- | NC | |
| | NC | SP+ | |
| | SP+ | GND | |

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

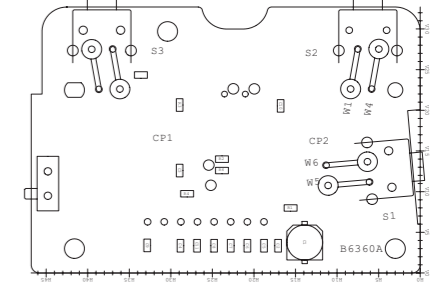
• MAIN UNIT (BOTTOM VIEW)



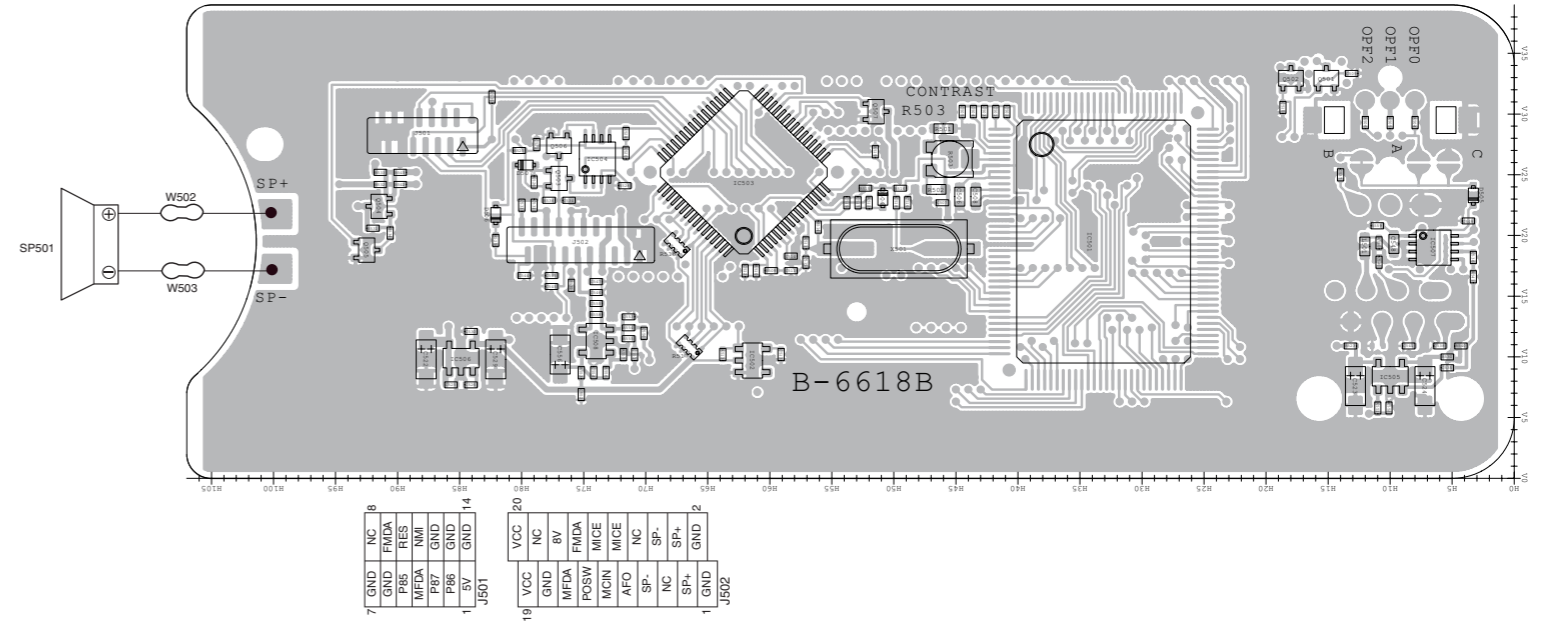
• CONNECT UNIT (BOTTOM VIEW)



• HM-152 (BOTTOM VIEW)



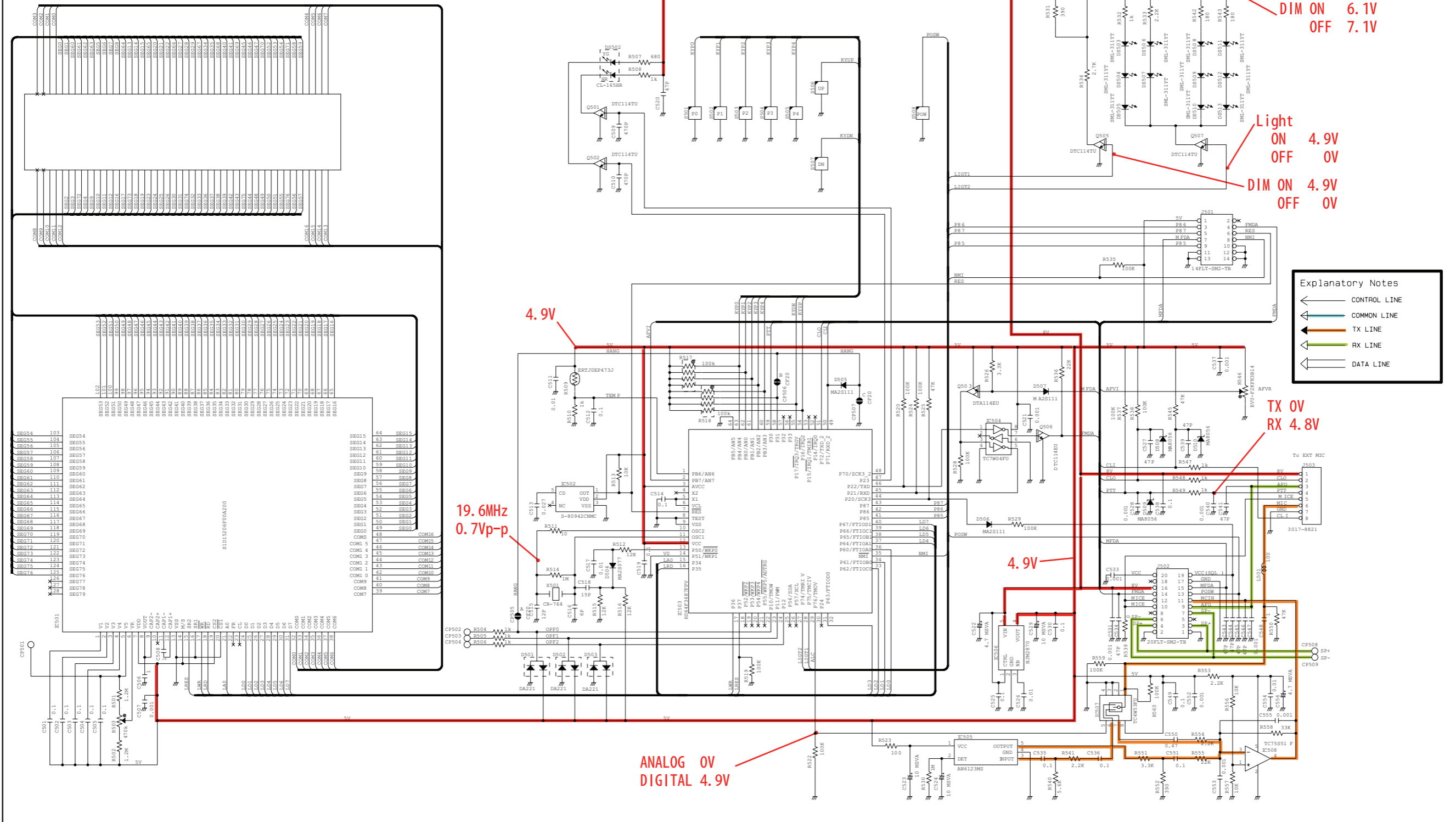
• FRONT UNIT (BOTTOM VIEW)

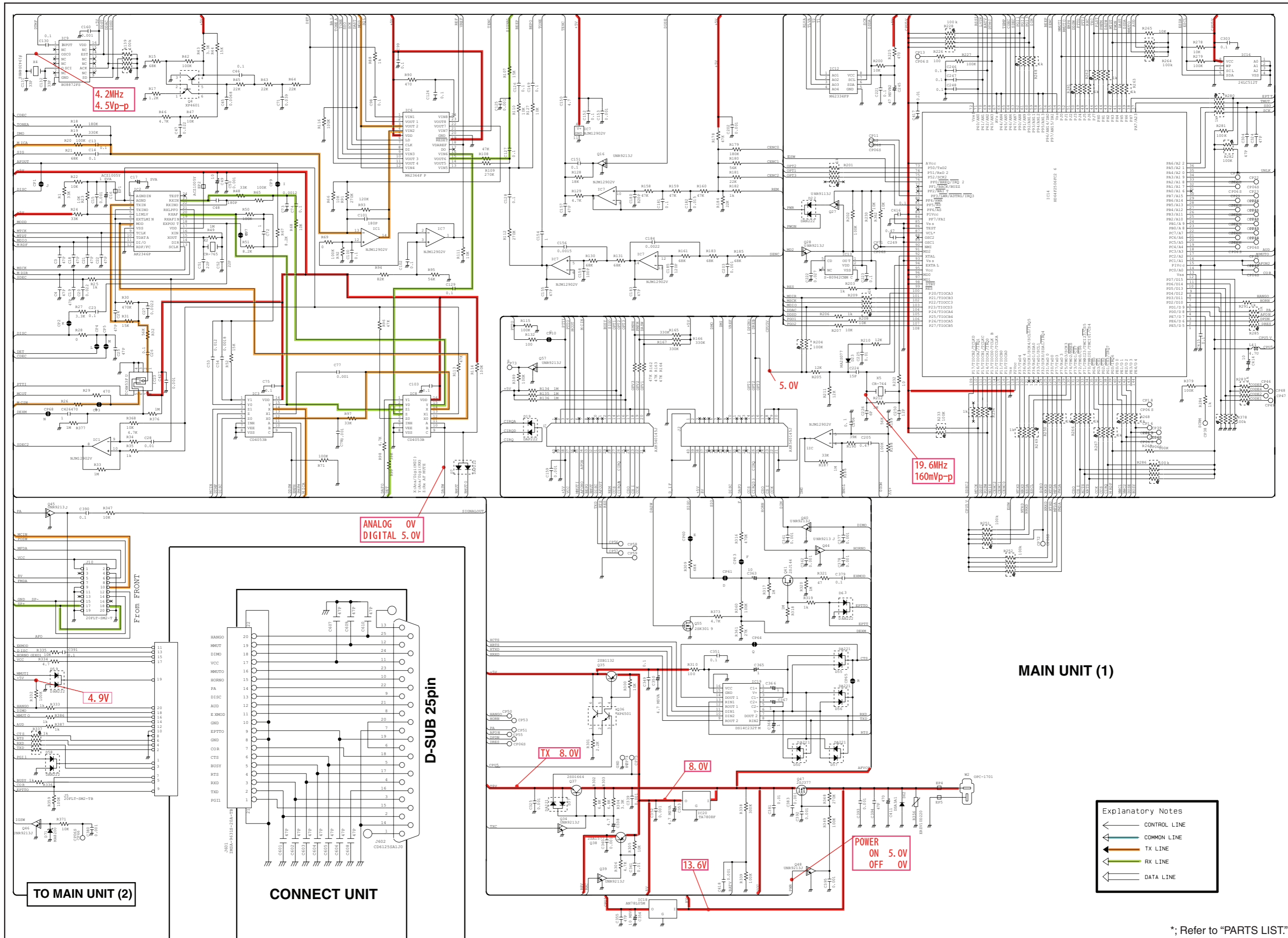


| | | |
|----|------|-------|
| 7 | GND | NC |
| 8 | GND | FRIDA |
| 9 | PRS | RES |
| 10 | MFCA | NMI |
| 11 | PR7 | GND |
| 12 | PR6 | GND |
| 13 | SV | GND |
| 14 | J501 | |
| 15 | VCC | |
| 16 | GND | BV |
| 17 | MFDA | FRIDA |
| 18 | POSW | MICE |
| 19 | MCIN | MICE |
| 20 | AFO | NC |
| 21 | SP- | SP- |
| 22 | NC | SP+ |
| 23 | SP+ | SP+ |
| 24 | GND | GND |
| 25 | J502 | |

VOLTAGE DIAGRAM

FRONT UNIT



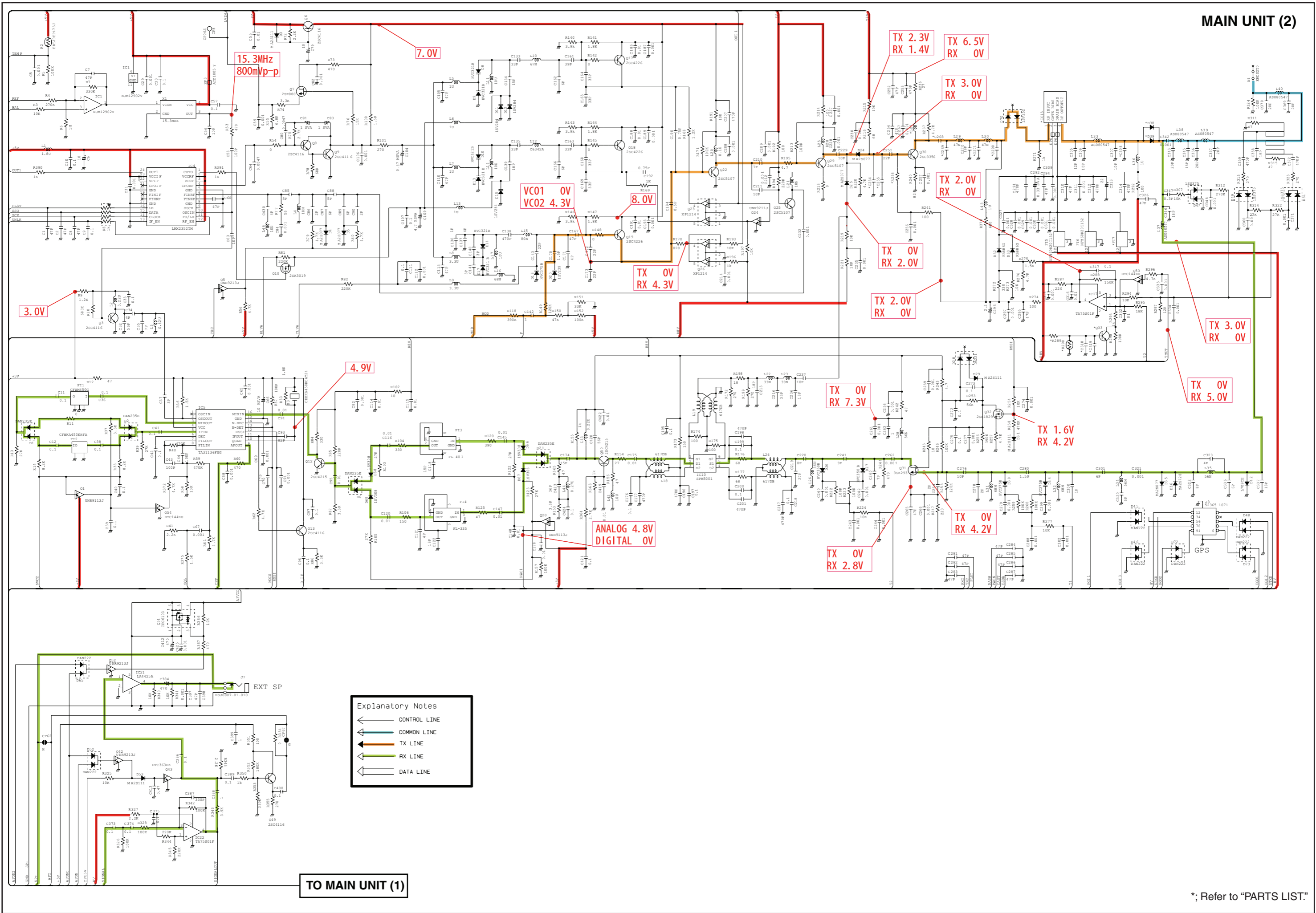


MAIN UNIT (1)

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE

*; Refer to "PARTS LIST"

MAIN UNIT (2)



TO MAIN UNIT (1)

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE

*; Refer to "PARTS LIST."



SERVICE MANUAL

VHF TRANSCEIVERS

IC-F5061

IC-F5062

IC-F5063

S-14319XZ-C1
Feb. 2007

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-F5061/F5062/F5063** VHF TRANSCEIVERS at the time of publication.

| MODEL | VERSION | CHANNEL SPACING | TX POWER |
|----------|---------|------------------|----------|
| IC-F5061 | USA-01 | 15.0/30.0 kHz | 50 W |
| IC-F5062 | EXP-01 | 12.5/25.0 kHz | 25 W |
| IC-F5063 | EUR-01 | 12.5/20/25.0 kHz | |

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 15 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 part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1110003491 S.IC TA31136FNG IC-F5061 MAIN UNIT 5 pieces
8820001210 Screw 2438 screw IC-F5062 Top cover 10 pieces

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

REPAIR NOTES

1. Make sure a 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 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 equipment to the transceiver.

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SECTION 2 INSIDE VIEWS

SECTION 3 DISASSEMBLY INSTRUCTIONS

SECTION 4 OPTIONAL UNITS INSTALLATIONS

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SECTION 9 BOARD LAYOUTS

SECTION 10 BLOCK DIAGRAM

SECTION 11 VOLTAGE DIAGRAM

SECTION 12 HM-152

SECTION 1

SPECIFICATIONS

| | | | [USA] | [EXP] | [EUR] | |
|---|--|---|---|--|--------------------------------------|--|
| GENERAL | • Frequency coverage | | 136–174 MHz | | | |
| | • Type of emission | Wide | 16K0F3E (25.0 kHz) | | | |
| | | Middle | – | | 14K0F3E (20.0 kHz) | |
| | | Narrow | 11K0F3E (12.5 kHz) 8K10F1E/D (12.5 kHz) 4K00F1E/D(6.25 kHz) | 8K50F3E (12.5 kHz) 4K00F1E/D (6.25 kHz) | | |
| | • Number of programable channels | | max. 512 channels (128 zones) | | | |
| | • Antenna impedance | | 50 Ω (nominal) | | | |
| | • Operating temperature range | | –30° to +60°; –22°F to +140°F | | –25°C to +55°C | |
| | • Power supply requirement (negative ground) | | 13.6 V DC (nominal) | 13.2 V DC (nominal) | | |
| | • Current drain (approx.) | RX | Stand-by | 300 mA | | |
| | | | Max.audio | 1200 mA | | |
| TX | | at 25 W | 7 A | | | |
| | | at 50 W | 14 A | | | |
| • Dimensions (projections not included) | | 160 (W) × 45 (H) × 150 (D) mm; 2 3/32 (W) × 4 23/32 (H) × 1 9/32 (D) in | | | | |
| • Weight (with BP-231, approx.) | | 1310 g; 2 lb 14 oz | | | | |
| TRANSMITTER | • Transmit output power | | 50 W | 25 W | | |
| | • Modulation | | Variable reactance frequency modulation | | | |
| | • Max. permissible deviation | Wide | ±5.0 kHz | | | |
| | | Middle | – | | ±4.0 kHz | |
| | | Narrow | ±2.5 kHz | | | |
| | • Frequency error | | ±1.0 ppm | ±1.5 kHz | | |
| | • Spurious emission | | 75 dB typ. | | 0.25 μW (≤1 GHz), 1.0 μW (>1 GHz) | |
| | • Adjacent channel power | Wide | More than 70 dB | | | |
| | | Middle | – | | More than 70 dB | |
| | | Narrow | More than 60 dB | | | |
| | • Audio harmonic distortion | | 3% typ. (with 1 kHz AF 40% deviation) | | | |
| | • FM hum and noise (without CCITT filter) | Wide | More than 40 dB (45 dB typ.) | | – | |
| | | Narrow | More than 34 dB (40 dB typ.) | | – | |
| • Limiting charact of modulation | | 70–100% of max. deviation | | | | |
| • Microphone impedance | | 600 Ω | | | | |
| RECEIVER | • Receive system | | Double-conversion superheterodyne | | | |
| | • Intermediate frequencies | | 1st IF; 46.35 MHz, 2nd IF; 450 kHz | | | |
| | • Sensitivity | | 0.25 μV typ. at 12 dB SINAD | | –4 dBμV (EMF) typ. at 20 dB SINAD | |
| | • Squelch sensitivity (at threshold) | | 0.25 μV typ. | | | |
| | • Adjacent channel selectivity | Wide | More than 80 dB (85 dB typ.) | | | |
| | | Middle | – | | More than 78 dB (83 dB typ.) | |
| | | Narrow | More than 70 dB (75 dB typ.) | | | |
| | • Spurious response | | More than 85 dB (90 dB typ.) | | | |
| | • Intermodulation | | More than 75 dB (77 dB typ.) | | More than 65 dB (70 dB typ.) | |
| | • Hum and noise (without CCITT filter) | Wide | More than 45 dB (50 dB typ.) | | – | |
| Narrow | | More than 40 dB (45 dB typ.) | | – | | |
| • Audio output power | | 4 W typ. at 10% distortion with a 4 Ω load | | | | |
| • Audio output impedance | | 4 Ω | | | | |

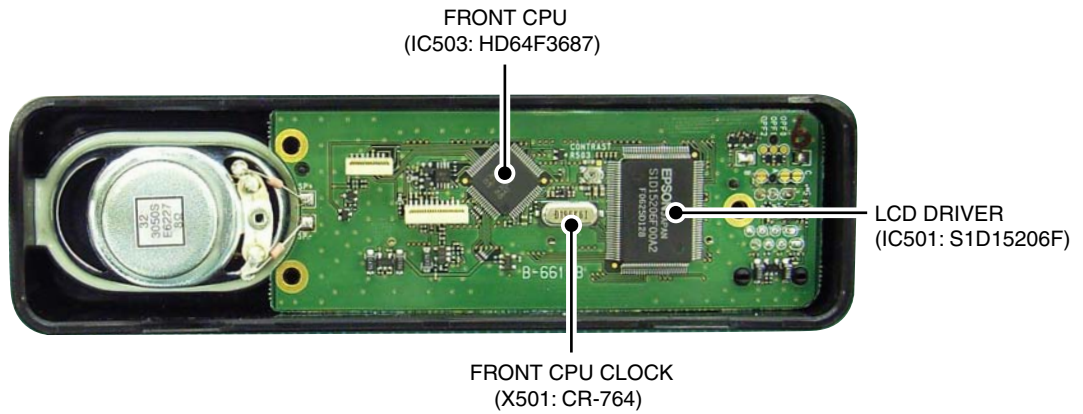
Measurements made in accordance with EIA-152-C/204D, TIA-603 ([USA], [EXP]) or EN 300 086 ([EUR]).

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

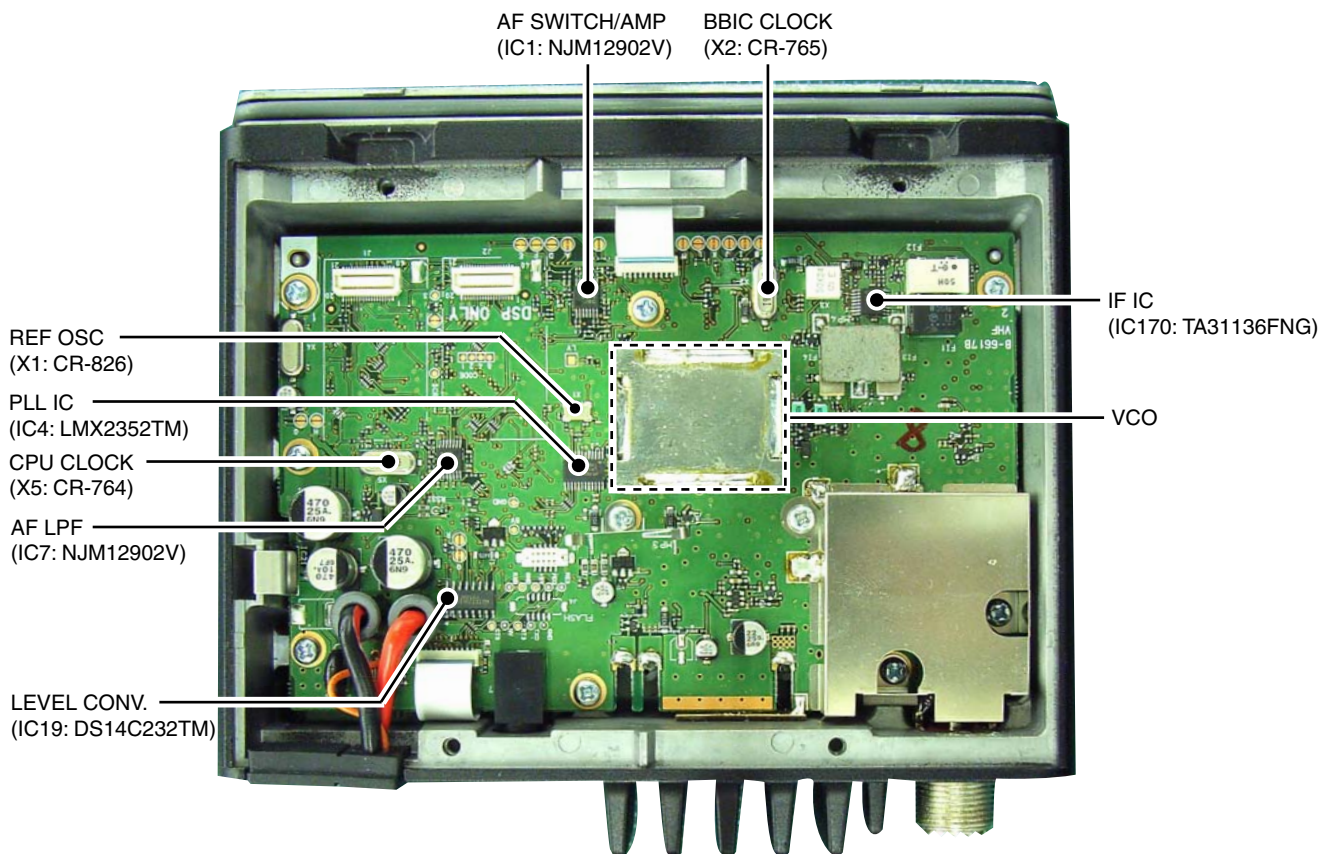
SECTION 2

INSIDE VIEWS

• FRONT UNIT



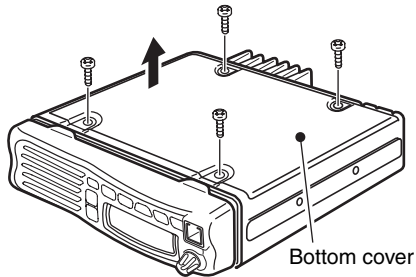
• MAIN UNIT



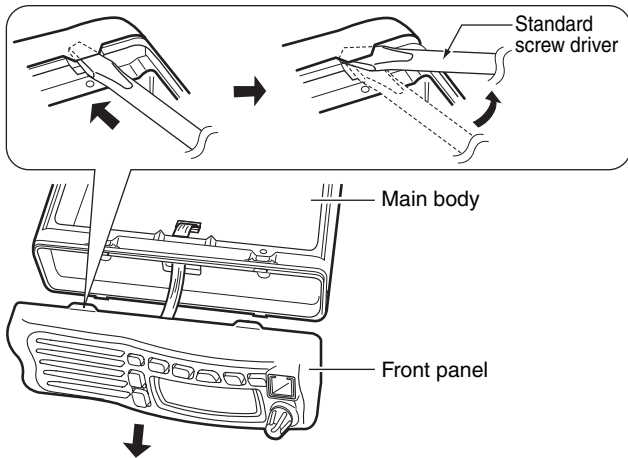
SECTION 3 DISASSEMBLY INSTRUCTION

1. Removing the front panel

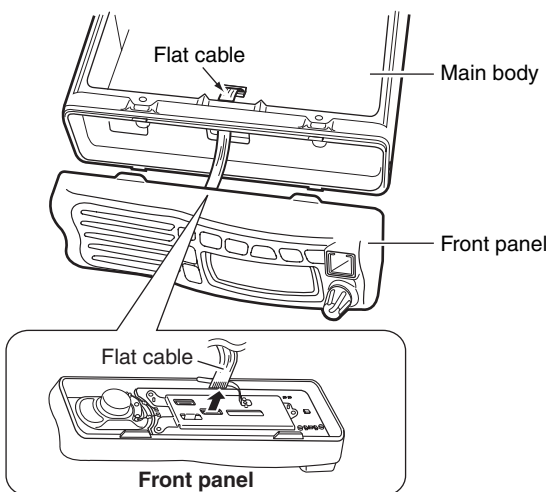
- ① Turn the transceiver's power OFF, then disconnect the DC power cable
- ② Unscrew the 4 bottom screws, then remove the bottom cover from the transceiver in the direction of the arrow.



- ③ Remove the front panel from the main body using a standard cabinet screw driver as shown below.

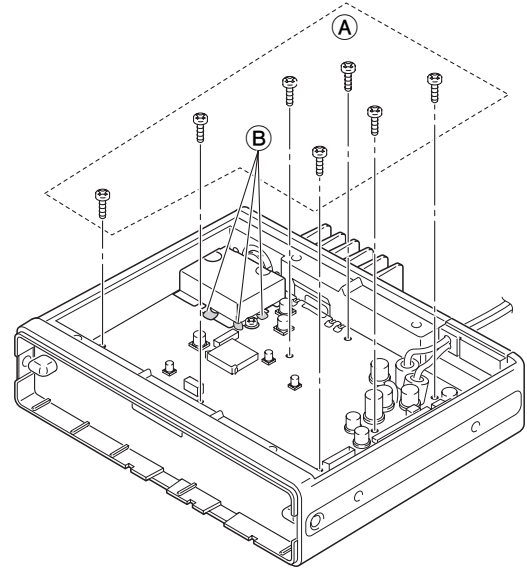


- ④ Disconnect the flat cable from the front panel.

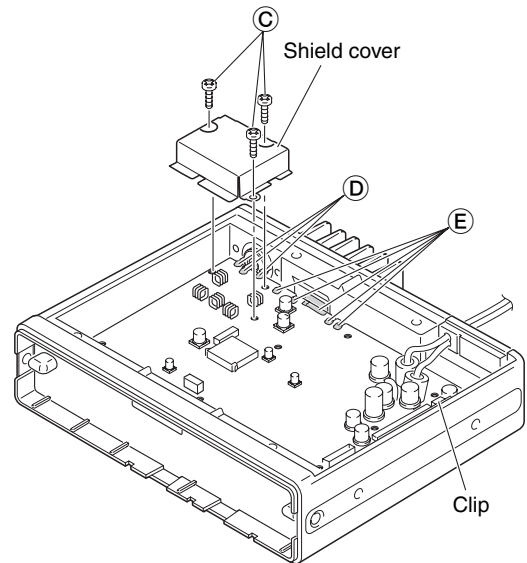


2. Removing the MAIN UNIT

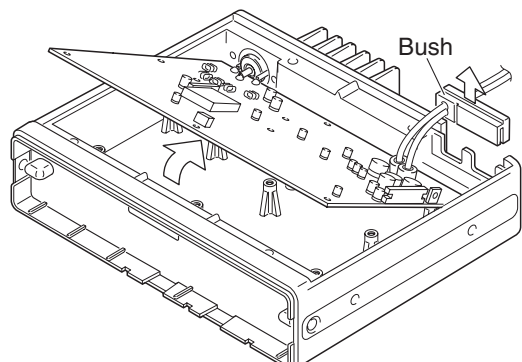
- ① Unscrew 7 screws (A), and unsolder 3 points (B).



- ② Unscrew 3 screws (C) and remove the shield cover.
- ③ Unsolder 3 points (D) (at the antenna connector) and 5 points (E) (at the PA module).
- ④ Remove the clip.



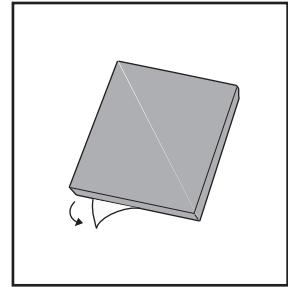
- ⑤ Remove the bush, and remove the MAIN UNIT in the direction of the arrow.



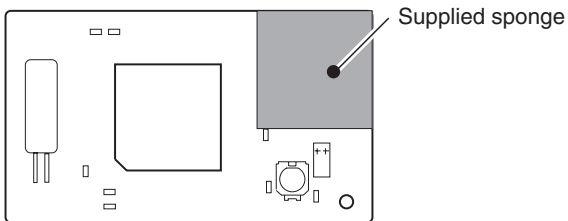
SECTION 4 OPTIONAL UNITS INSTALLATION

BEFORE INSTALLING OPTIONAL UNITS

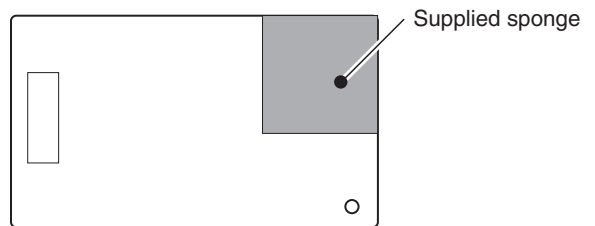
A sponge with an adhesive strip has been added to optional units (UT-96R, UT-108R, UT-109R, UT-110R, UT-119R, UT-119H, UT-124, UT-124R). Remove the bottom protective paper, and attach the sponge to the specified position on the optional units as below.



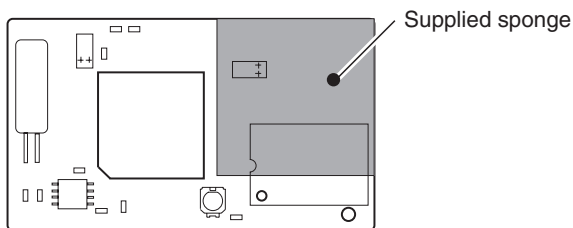
• UT-96R



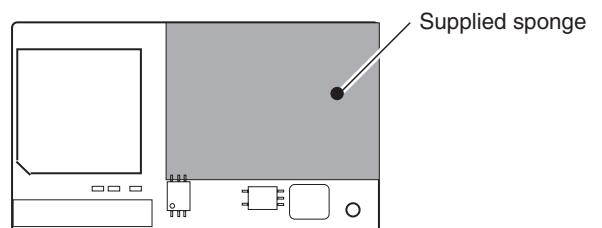
• UT-108R/UT-124/UT-124R



• UT-109R/UT-110R



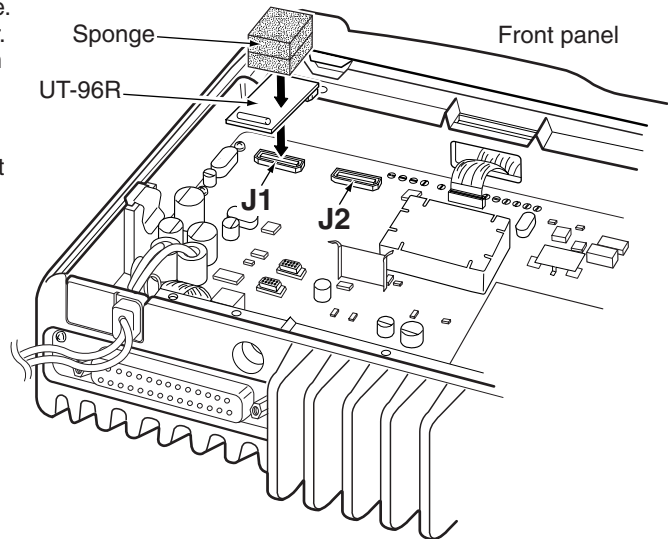
• UT-119R



Optional UT-96R or UT-119H installation

Install the optional UT-96R or UT-119H unit as follows:

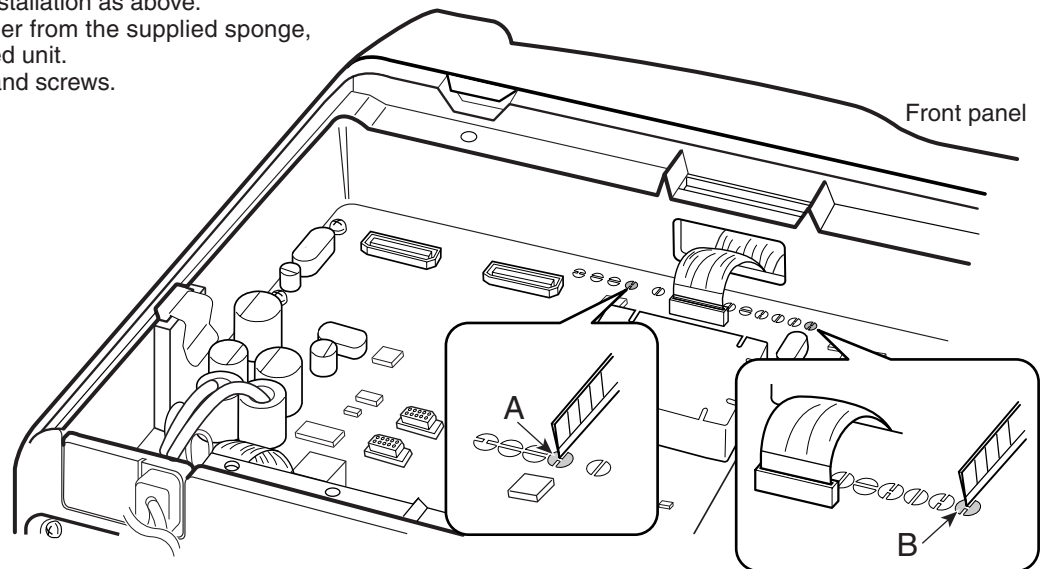
- ① Turn the power OFF, then disconnect the DC power cable.
- ② Unscrew the 4 cover screws, then remove the bottom cover.
- ③ Install the UT-96R to J1 and the UT-119H to J2 as shown in the diagram below.
- ④ Remove the protective paper from the supplied sponge, then attach it on the installed unit.
- ⑤ Replace the bottom cover and screws, then re-connect the DC power cable.



*This illustration describes the UT-96R installation.

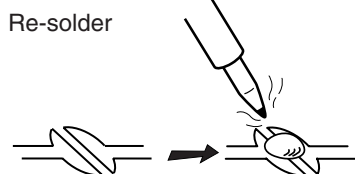
Optional UT-109R or UT-110R installation

- ① Turn the power OFF, then disconnect the DC power cable.
- ② Unscrew the 4 cover screws, then remove the bottom cover.
- ③ Cut the pattern on the PCB at the A (MIC) and B (AF OUT) as shown below.
- ④ Install the scrambler unit to J1 as described in the installation of optional UT-96R installation as above.
- ⑤ Remove the protective paper from the supplied sponge, then attach it on the installed unit.
- ⑥ Replace the bottom cover and screws.



NOTE: When uninstalling the unit

Be sure to re-solder the disconnected points as below when you remove the unit. Otherwise no TX modulation or AF output is available.



5-1 RECEIVER CIRCUITS

RF CIRCUITS

The antenna switching circuit toggles between the receive (RX) line and transmit (TX) line. RF amplifier amplifies the received signals within the frequency coverage.

Received signals from the antenna are passed through Low Pass filter (LPF; L40, C369, C370), TX power detector (D47, D49, D51) and another LPF (L38, L39, C343, C345, C356, C357), then applied to the antenna switching circuit (D38/D39, L37, C337, C346).

The received signals are passed through the antenna switching circuit as an LPF (L37, C337, C346), LPF (L35, C322, C322, C323, C336) and two-staged tuned Bandpass Filter (BPF; D34, L32, C299, C300 and D31, L31, C278, C279), then applied to the RF amplifier (Q31).

The amplified signals are passed through another two-staged tuned BPF (D27, L28, C260–C263, C242 and D26, L26, C219, C220, C240) and applied to the 1st mixer (IC10; pins 4, 5, L18, L19, L24).

1ST IF CIRCUITS

The amplified received signals from the RF circuit are converted into the 1st IF signal, filtered and amplified at the 1st IF circuits.

The received signals from the RF circuits are mixed with 1st Local Oscillator (LO) signal from the RX VCOs, to be converted into the 1st IF signal. The converted 1st IF signal is amplified by 1st IF amplifier (Q50). The amplified 1st IF signal is passed through the 1st IF filter (F13 for analog mode, F14 for digital mode) via filter switches (Q20, D21, D66, D67 on input side; D6, D68, D69 on output side) to suppress unwanted signals. The filtered 1st IF signal is amplified by another 1st IF amplifier (Q12), then applied to the 2nd IF circuits.

2ND IF CIRCUITS

The 1st IF signal is converted into the 2nd IF signal, amplified and demodulated in the IF IC.

The 1st IF signal from the 1st IF amplifier (Q12) is applied to the IF IC (IC5, pin 16). The applied signal is converted into the 2nd IF signal by being mixed with the 2nd LO signal from X1 via tripler (Q3, L3, L2, C32–C35).

The converted 2nd IF signal is output from pin 3, and passed through the 2nd IF filter (F11). The filtered 2nd IF signal is passed through (bypassed) another 2nd IF filter (F12) via filter switches (D1 on input side; D2 on output side). The filtered signal is then applied to the IF IC (IC5, pin 5), and amplified by 2nd IF amplifier. The amplified signal is FM-demodulated by quadrature detector (IC5, pins 10, 11; X3).

The demodulated AF signals are output from pin 9, then applied to the AF circuits.

AF CIRCUITS

The demodulated AF signals from the IF IC are amplified and filtered at AF circuits.

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

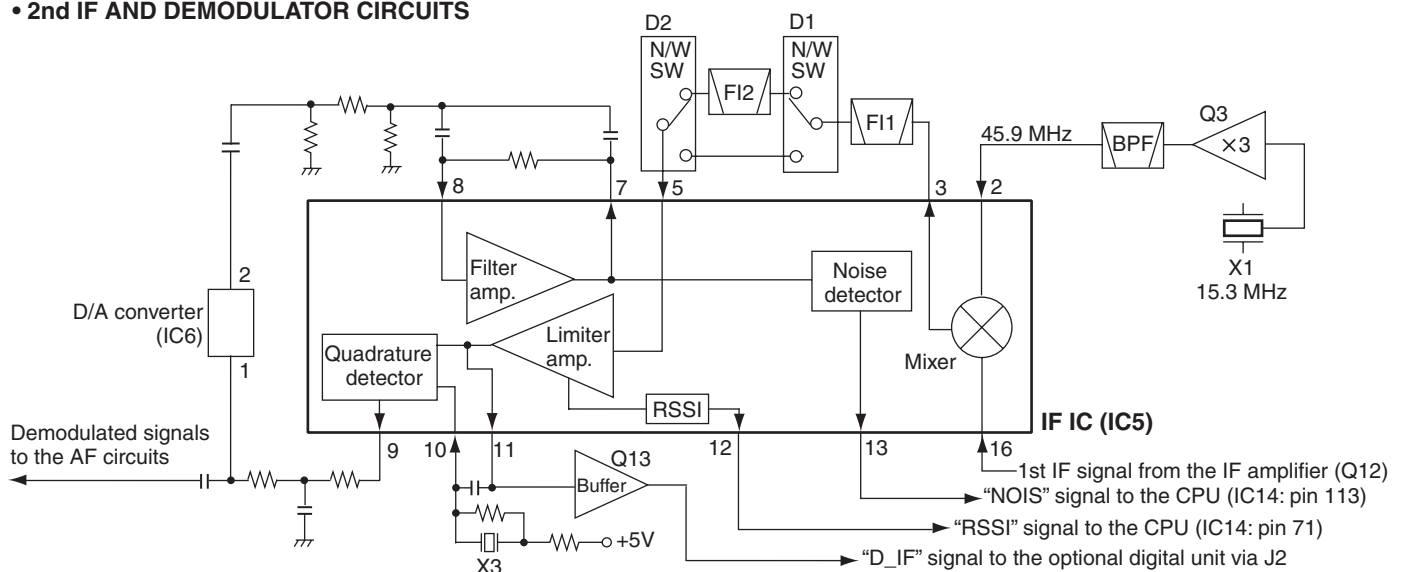
The demodulated AF signals from IF IC (IC5, pin 9) are passed through Digital/Analog switch (IC8, pins 2, 15), and applied to the base band IC (IC2, pin 23).

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

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

The AF signals are then level adjusted at the volume controller section and amplified at the amplifier section, then output from pin 20 (IC2).

• 2nd IF AND DEMODULATOR CIRCUITS



The processed AF signals from the base band IC (IC2) are passed through the AF mute switch (IC8, pins 3, 4) and D/A converter (IC6, pins 15, 16) for level adjustment. The level adjusted AF signals are amplified by AF amplifier (IC22).

The amplified AF signals are then;

- Output from D-sub 25 pin connector (CONNECT UNIT; J602).
- or
- Buffer-amplified by Q49, then applied to connected microphone via FRONT UNIT.
- or
- Applied to the AF power amplifier (IC21, pin 1) to obtain AF output power level, then applied to the internal/external speaker via external speaker jack (J7).

SQUELCH CIRCUITS <NOISE SQUELCH>

The squelch mutes the AF output signals when no RF signals are received. By detecting noise components (30 kHz and higher signals) in the demodulated AF signals, the squelch circuit toggles the AF power amplifier ON and OFF.

A portion of the demodulated AF signals from the IF IC (IC5, pin 9) are applied to the D/A converter (IC6, pin 1) for level adjustment (squelch threshold adjustment). The level-adjusted AF signals are output from pin 2 and passed through the noise filter (IC5, pins 7, 8, R121–R124, C216–C218). The filtered noise signals are amplified the noise components only.

The amplified noise components are converted into the pulse-type signal at the noise detector section, and output from pin 13 as the “NOIS” signal. The “NOIS” signal is applied to the CPU (IC14, pin 113). Then the CPU outputs signal “AFON2” signal from pin 15 to the AF power amplifier controller (Q51, Q52, D65), according to the “NOIS” signal level. The AF power amplifier controller toggles AF power amplifier (IC21) ON and OFF according to the “AFON” signal.

<TONE SQUELCH>

The tone squelch circuit detects tone signals and opens the squelch only when receiving a signal containing a matched sub audible tone. When the tone squelch is in use, and a signal with a mismatched or no sub audible tone is received, the tone squelch circuit mutes the AF signals even when the noise squelch is open.

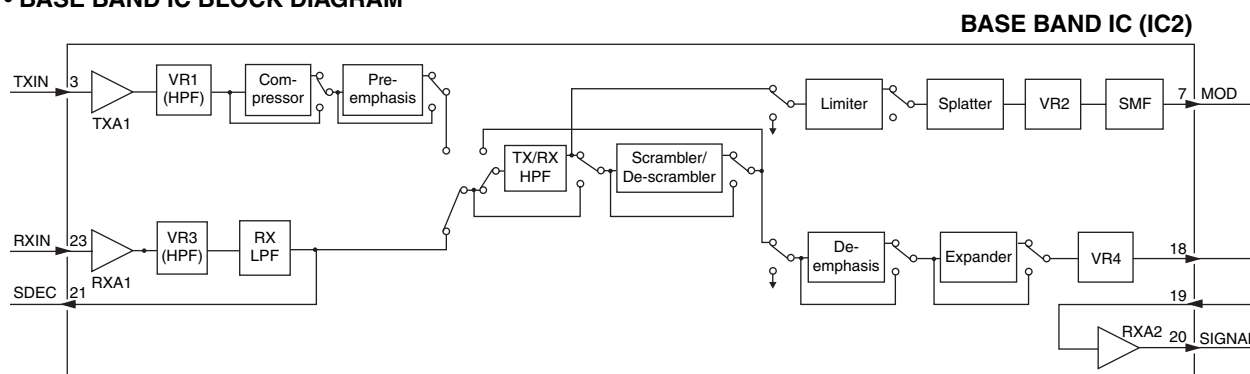
• CTCSS/DTCS

A portion of the demodulated AF signals are passed through the active LPF (Q4, R45, R46, R47, R63, R64, C45, C46, C47, C71) to filters CTCSS/DTCS signal. The filtered signal is applied to the CPU (IC14, pin 64). The CPU compares the applied signal and the set CTCSS/DTCS, then outputs control signal as same as “NOISE SQUELCH.”

• 2/5 TONE AND DTMF

2/5 tone signals in the demodulated AF signals are passed through the LPF in the base band IC (IC2) and output from pin 21, then applied to the CPU (IC14, pin 63) via tone amplifier (IC1, pins 8, 9), and decoded.

• BASE BAND IC BLOCK DIAGRAM



5-2 TRANSMITTER CIRCUITS MICROPHONE AMPLIFIER CIRCUITS

The AF signals from the microphone (MIC signals) are filtered and level-adjusted at the microphone amplifier circuits.

AF signals from the connected microphone (MIC signals) are passed through (bypassed) the ALC (Automatic Level Control) amplifier (FRONT UNIT; IC505, pins 3, 5) via AF switch (FRONT UNIT; IC507, pins 1, 6/7), then applied to the microphone amplifier (FRONT UNIT; IC508, pin 3). The amplified MIC signals are output from pin 4, and applied to the MAIN UNIT.

The MIC signals from the FRONT UNIT are passed through the Int./Ext. MIC switch (IC23, pins 1, 6), and applied to the base band IC (IC2, pin 3) and processed.

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

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

The MIC signals from the base band IC are passed through the digital/analog switch (IC8, pins 12, 14), FM/PM switch (IC3, pins 13, 14), and applied to the AF mixer (IC1, pin 13) where the MIC signals and tone signals are mixed with. The mixed MIC signals are passed through D/A converter (IC6, pins 3, 4) for level adjustment. The level adjusted MIC signals are then applied to the VCO as modulation signals.

MODULATION CIRCUITS

The modulation circuits modulates the VCO oscillating signal using the modulation signals.

The MIC signals from the microphone amplifier circuits are applied to the D20 of TX VCO (Q19, D14, D17, D18, D20) as the modulation signals, and modulate the VCO oscillating signal by changing the reactance of D20.

The FM-modulated VCO output is amplified by buffer-amplifiers (Q22, Q29), then applied to the power amplifiers via D24 as the TX signal.

SIGNALING ENCODE

5/2-TONE, DTMF and CTCSS/DTCS signals are output from the CPU (IC14) and passed through the LPF (IC7) and level converter (IC6), then applied to the AF mixer (IC1, pin 13) and mixed with MIC signals. The mixed tone signals are passed through the D/A converter (IC6, pins 3, 4) for level adjustment. The level adjusted tone signals are applied to the both of TX VCO (Q19, D14, D17, D18, D20) and reference frequency oscillator (X1, pin 1) via the level adjuster (IC1, pins 1, 3).

TX POWER AMPLIFIERS

The transmit signal from the TX VCO is amplified to the transmit output level by the transmit amplifiers.

The TX VCO output signal from buffer amplifier (Q29) is applied to the YGR amplifier (Q30) via the TX/RX switch (D24). The amplified TX signal is passed through the LPF (L29, L30, C269–C271, C290), and applied to the RF power module (IC15, pin 1) and power-amplified to obtain 50 W/25 W (max.) of TX output power.

The power-amplified TX signal is passed through the LPF as a harmonic filter (L33, C305–C308), the antenna switching circuit (D38, D39) and LPF (L38, L39, C343, C345, C356, C357).

The TX signal is also gone through the power detector (D47, D49, D51) and LPF (L40, C369, C370) before being applied to the antenna connector.

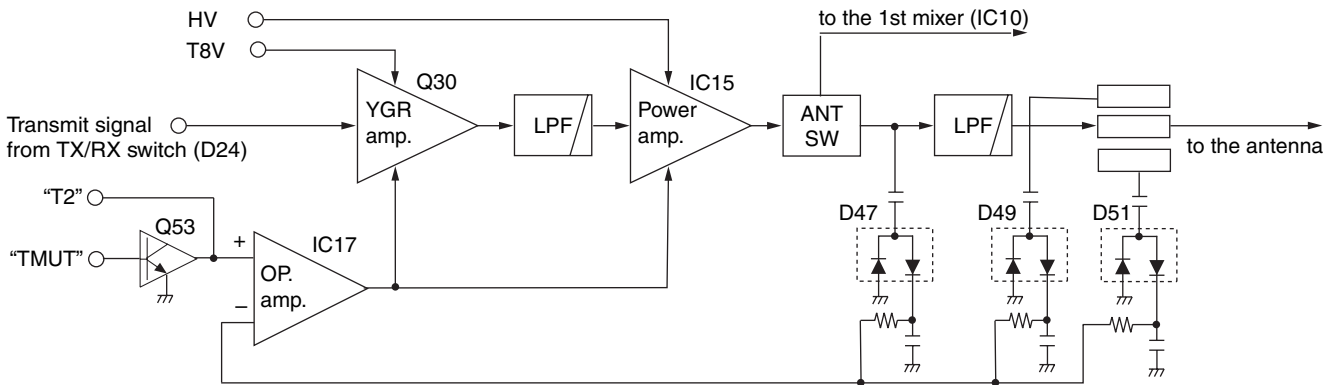
APC CIRCUIT

The APC (Automatic Power Control) circuit prevents the transition of the transmit output power level which is caused by load mismatching or heat effect, etc. At the power detector, a portion of the transmit signal is rectified to produce DC voltage which is in proportion of the transmit power level.

The rectified voltage is applied to the inverted input terminal of the operational amplifier (IC17, pin 3). The TX power setting voltage “T2” from the D/A converter (IC12, pin 2) is applied to the non-inverted input terminal as the reference.

The operational amplifier compares the rectified voltage and reference voltage “T2,” and the difference of the voltage is output from the operational amplifier pin 4, and the output voltage controls the bias of YGR (Q30) amplifier and power module (IC15) for stable transmit output power.

• APC CIRCUIT



5-3 FREQUENCY SYNTHESIZER CIRCUITS
VCO

VCO is a oscillator whose oscillating frequency is controlled by adding voltage (lock voltage).

• RX VCO1 (Q18, D10, D13)

RX VCO1 generates the 1st LO signal for receiving 155–174 MHz signals.

• RX VCO2 (Q17, D8, D9)

RX VCO2 generates the 1st LO signal for receiving 136–155 MHz signals.

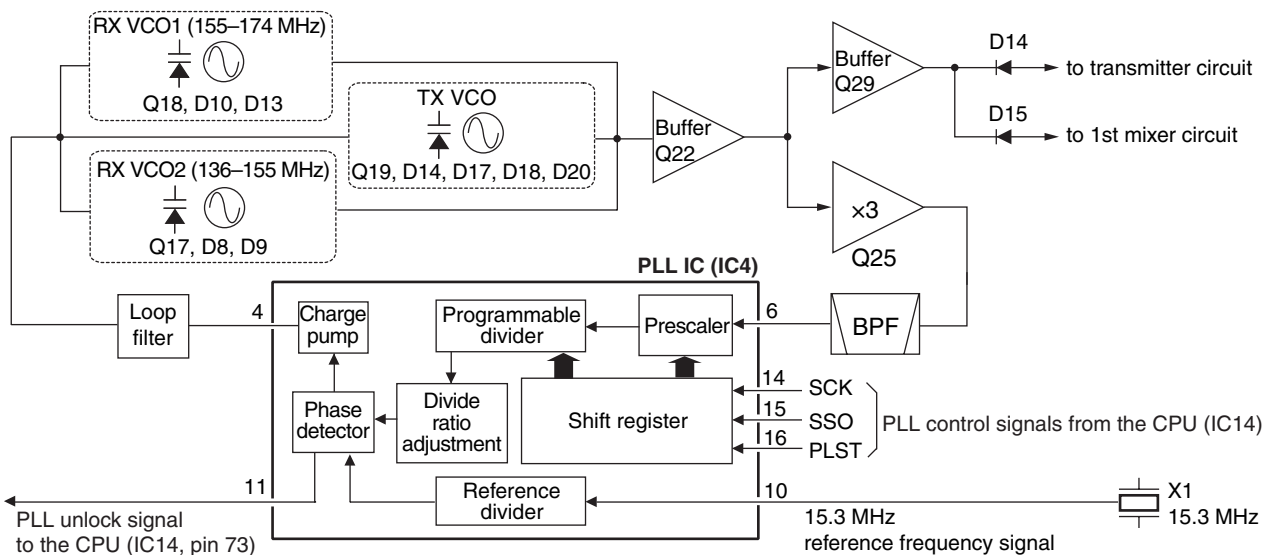
Each output signals are amplified by the buffer amplifiers (Q22, Q29), and applied to the 1st mixer (IC10, pins 4, 5) via TX/RX switch (D25 is ON, D24 is OFF) and LPF (L22, L23, C215, C216, C236, C237), to be mixed with the received signals to produce the 46.35 MHz 1st IF signal.

• TX VCO (Q19, D14, D17, D18, D20)

The output signal is applied to the transmit amplifiers via the buffer amplifiers (Q22, Q29) and TX/RX switch (D24 is ON, D25 is OFF).

A portion of the buffer-amplified VCO output signals from the buffer amplifier (Q22) are applied to the PLL IC (IC4, pin 6) via doubler (Q25) and BPF (Q5, D4, D5, L4, R77, C84–C90).

• PLL CIRCUITS



PLL IC

The PLL circuit provides stable oscillation of the transmit frequency and receive 1st LO frequency. The PLL output frequency is controlled by the divided ratio (N-data) from the CPU.

The applied signals are divided at the prescaler and programmable counter according to the control signals ("SSO," "PLST" and "SCK") from the CPU. The divided signal is phase-compared with the reference frequency signal from the reference frequency oscillator (X1, pin 3), at the phase detector.

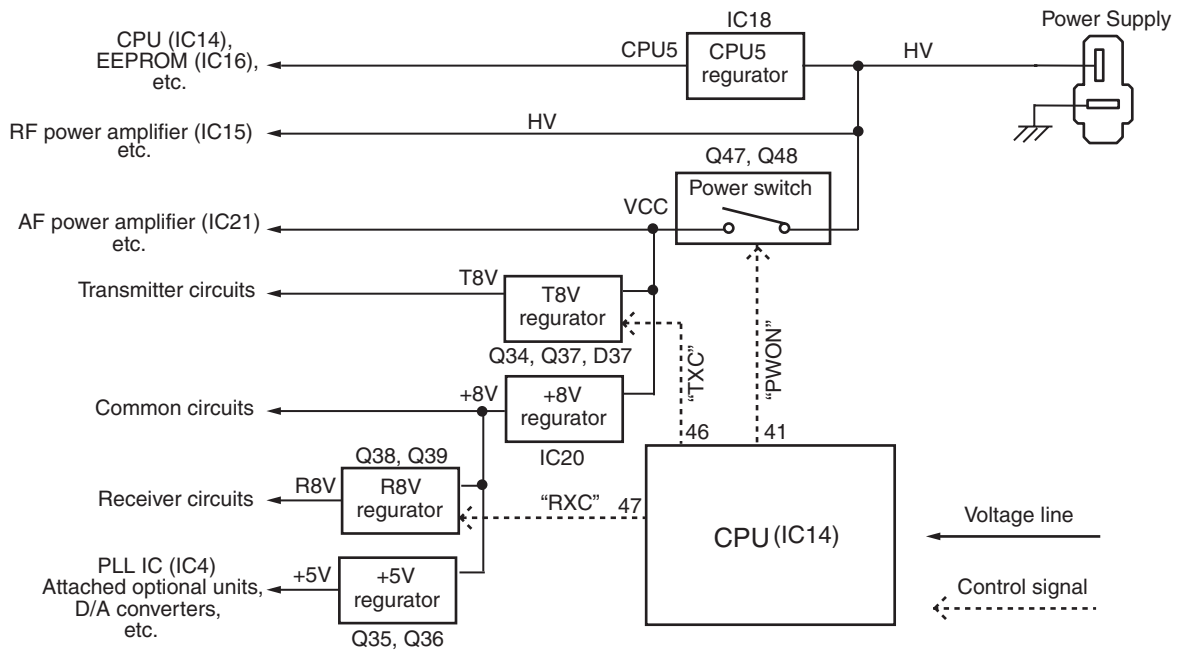
The phase difference is output from pin 4 as a pulse type signal after being passed through the internal charge pump. The output signal is converted into the DC voltage (lock voltage) by passing through the loop filter (Q8, Q9). The lock voltage is applied to the variable capacitors (D10 and D13 of RX VCO1, D8 and D9 of RX VCO2, D14 and D17 of TX VCO), and locked to keep the VCO frequency constant.

If the oscillated signal 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.

5-4 POWER SUPPLY CIRCUITS (MAIN UNIT)

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

• POWER SUPPLY CIRCUITS



5-5 PORT ALLOCATIONS

• CPU (MAIN UNIT; IC14)

| Pin No. | Port Name | Description |
|---------|-----------|---|
| 1 | DSDA | Outputs serial data to the D/A converter (IC20, pin 6). |
| 2 | DAST | Outputs strobe signal to the D/A converter (IC4, pin 6). |
| 3 | SIDE3 | Input port for [Side3] key (S4). "Low"=When the key is pushed. |
| 4-7 | CBIO-3 | Input ports for [ROTARY SELECTOR] (S701). |
| 10 | SSO | Outputs serial data to the PLL IC (IC1, pin 15), D/A converter (IC4, pin 8). |
| 11 | SCK | Outputs serial clock signal to the PLL IC (IC1, pin 14), D/A converter (IC4, pin 8). |
| 13 | PLST | Outputs PLL strobe signal to the PLL IC (RF UNIT; IC1, pin 16). |
| 15 | DASW | Outputs mode (Digital/Analog) switching signal to the D/A converter (IC14, pins 10, 11). |
| 17 | TMUT | Outputs transmit mute signal to the transmit mute switch (RF UNIT; Q606). |
| 18 | NWC2 | Outputs Narrow/Wide mode switching signal to the bandwidth switches (Q26, D32, D33). |
| 19 | NWC1 | Outputs Narrow/Wide mode switching signal to the bandwidth switches (Q27, Q41, Q42, D34, D35). |
| 20 | DDSD | Outputs serial data to the DTMF decode IC (IC10, pin 9). |
| 21 | DDAC | Outputs serial clock signal to the DTMF decode IC (IC10, pin 11). |
| 26 | T5C | Outputs T5V line control signal to the T5V regulator (Q15). "Low"= While transmitting. |
| 27 | R5C | Output R5V line control signal to the R5V regulator (Q16). "Low"= While receiving. |
| 28 | S5C | Output S5V line control signal to the S5V regulator (Q14). "Low"=While power save mode. |
| 29 | PTTSW | Input port for [PTT] switch (S3). "Low"=When the switch is pushed. |
| 30 | SIDE2 | Input port for [Side2] key (S5). "Low"=When the key is pushed. |
| 32 | RMUT | Outputs mute signal to the AF mute switch (D42). |
| 37 | NOIS | Input port for the noise level from the IF IC (IC3, pin 13). |
| 38 | POSW | Input port for power switch (R702) from power controller (D36). |
| 39 | DDST | Outputs strobe signal to the DTMF decode IC (MAIN UNIT; IC10, pin 14). |
| 40 | MTCK | Outputs serial clock signal to the base band IC (MAIN UNIT; IC5, pin 9). |
| 41 | PWON | Outputs VCC line control signal to the power switch (Q30, Q31). "Low"=While the power is ON. |
| 43 | SENC | Outputs single tone encode signal to the LPF (IC17, pin 10). |
| 44 | BEEP | Outputs beep sound to the AF circuits (IC4, pin 13). |
| 45 | SDEC | Input port for decoded 2/5 tone and DTMF signals. |
| 46 | CDEC | Input port for decoded CTCSS/DTCS signal. |
| 47 | ISENS | Input port for power amplifier current detect signal from the current detector (RF UNIT; Q604, Q605). |
| 48 | BATV | Input port for remaining battery power. |
| 49 | LVIN | Input port for VCO lock voltage. |
| 50 | RSSI | Input port for RSSI signal from the IF IC (IC3, pin 12). |
| 55 | EMER | Input port for [Emer] switch (S702). |

| Pin No. | Port Name | Description |
|---------|-----------|--|
| 70 | CSFT | Outputs CPU clock frequency shift signal to the CPU clock oscillator (X2, D38). |
| 71 | DUSE | Outputs CTCSS/DTCS select signal to the CTCSS/DTCS switch (Q34). |
| 73 | UNLK | Input port for PLL unlock detect signal from the PLL IC (IC1, pin 11). |
| 74 | RLED | Outputs RX indicator (DS701) control signal to the LED driver (Q701). |
| 75 | TLED | Outputs TX indicator (DS701) control signal to the LED driver (Q701). |
| 78 | FSDA | Outputs serial data to the expand IC (FRONT UNIT; IC505, pin 3). |
| 79 | FSCL | Outputs serial clock signal to the expand IC (FRONT UNIT; IC505, pin 3). |
| 81 | CIRQ | Input port for external connection detect signal from J1 and J2. |
| 88 | SIDE1 | Input port for [Side1] key (S6). "Low"=When the key is pushed. |
| 89-91 | CENC0-2 | Output CTCSS/DTCS signals to the LPF (IC17, pin 3). |
| 92 | EMPH | Outputs emphasis characteristic change signal to the D/A converter (IC13, pins 9, 10). |
| 93 | MTDT | Outputs serial data to the base band IC (IC5, pin 10). |
| 96 | MSCK | Outputs serial clock signal to the base band IC (MAIN UNIT; IC5, pin 13). |
| 97 | PMFM | Outputs modulation mode switching signal to the PM/FM switch (IC13, pin 11). |
| 98 | ESDA | Outputs serial data to the EEPROM (IC19, pin 5). |
| 99 | ESCL | Outputs serial clock signal to the EEPROM (IC19, pin 6). |
| 100 | RESL | Input port for reset signal from the reset IC (IC8, pin 1). |

• D/A CONVERTER (MAIN UNIT; IC6)

| Pin No. | Port Name | Description |
|---------|-----------|--|
| 1 | T1 | Outputs BPF tuning voltage to the tunable BPF (D23, D24, L31, L32, C120-C122, C125-C127). |
| 2 | T2 | <ul style="list-style-type: none"> • While receiving Outputs BPF tuning voltage to the tunable BPF (D28, D29, L33, L34, C140-C144, C147). • While transmitting Outputs TX power setting voltage to the APC amplifier (RF UNIT; IC601). |
| 3 | TXLVA | Outputs oscillation frequency adjust voltage to the TX VCO (Q3, D10-D12). |
| 4 | RXLVA | Outputs oscillation frequency adjust voltage to the RX VCO1/2 (Q1, D1-D4/Q2, D5-D8). |

SECTION 6 ADJUSTMENT PROCEDURES

6-1 PREPARATION

When adjusting IC-F5060 series transceiver, CS-F5060 CLONING SOFTWARE, CS-F5060 ADJ ADJUSTMENT SOFTWARE (Rev. 1.0 or later), RS-232C cable, JIG cable (modified OPC-1122/U CLONING CABLE; see the page 6-2) and the following test equipments are required.

| EQUIPMENT | GRADE AND RANGE | EQUIPMENT | GRADE AND RANGE |
|---------------------|--|---------------------------------|---|
| DC power supply | Output voltage : 13.6 V DC [USA] 13.2 V DC [EUR], [EXP] | Attenuator | Power attenuation : 50 or 60 dB |
| | Current capacity : More than 1.5 A | | Capacity : 60 W [USA] 30 W [EUR], [EXP] |
| modulation analyzer | Frequency range : DC-300 MHz | External speaker | Input impedance : 4 Ω |
| | Measuring range : 0 to ±10 kHz | | Capacity : 5 W or more |
| Frequency counter | Frequency range : 0.1-300 MHz | Standard signal generator (SSG) | Frequency range : 0.1-300 MHz |
| | Frequency accuracy : ±1 ppm or better | | Output level : 0.1 μV to 32 mV (-127 to -17 dBm) |
| | Sensitivity : 100 mV or better | | |
| RF power meter | Measuring range : 0.1-60 W [USA] 0.1-30 W [EUR], [EXP] | Oscilloscope | Frequency rang : DC-20 MHz |
| | Frequency range : 100-300 MHz | Digital voltmeter | Measuring range : 0.01-20 V |
| | Impedance : 50 Ω | | Input impedance : 50 kΩ |
| | SWR : Better than 1.2 : 1 | | Measuring range : 0.1-10V |

■ SYSTEM REQUIREMENTS (for the ADJUSTMENT SOFTWARE)

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

■ ADJUSTMENT SOFTWARE INSTALLATION

- ① Quit all applications when Windows is running.
- ② Insert the CD into the appropriate CD drive.
- ③ Double-click the "Setup.exe" contained in the 'CS-F5060 ADJ' folder in the CD drive.
- ④ The "Welcome to the InstallShield Wizard for CS-F5060 ADJ" will appear. Click [Next>].
- ⑤ The "Choose Destination Location" will appear. Then click [Next>] to install the software to the destination folder. (e.g. C:\Program Files\lcom\CS-F5060 ADJ)
- ⑥ After the installation is completed, the "InstallShield Wizard Complete" will appear. Then click [Finish].
- ⑦ Eject the CD.
- ⑧ Program group 'CS-F5060 ADJ' appears in the 'Programs' folder of the start menu, and 'CS-F5060 ADJ' icon appears on the desk top screen.

■ STARTING SOFTWARE ADJUSTMENT

- ① Connect the transceiver and PC with RS-232C cable and JIG CABLE.
- ② Turn the transceiver power ON.
- ③ Boot up Windows, and click the program group 'CS-F5060 ADJ' in the 'Programs' folder of the [Start] menu, then CS-F5060 ADJ's window appears.
- ④ Click 'Connect' on the CS-F5060 ADJ's window, then the window shows transceiver's condition and adjustment items as below.
- ⑤ Set or modify adjustment data as specified.

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■ BEFORE STARTING SOFTWARE ADJUSTMENT

Clone the adjustment frequencies and settings into the transceiver, and set the configuration using the CS-F5060 CLONING SOFTWARE before starting the software adjustment. Otherwise, the software adjustment can not be started.

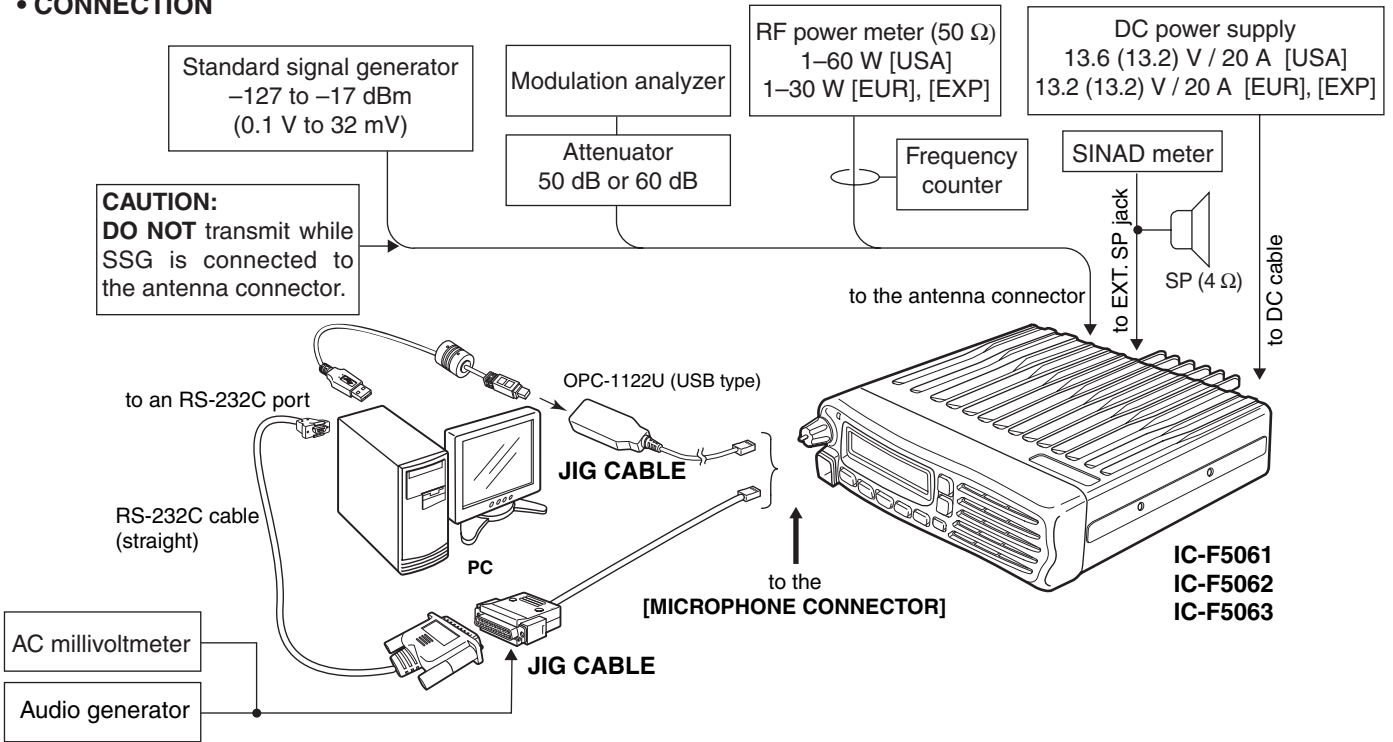
CAUTION!: BACK UP the originally programmed memory data in the transceiver before programming the adjustment frequencies. When program the adjustment frequencies into the transceiver, the transceiver's memory data will be overwritten and lose original memory data at the same time.

• ADJUSTMENT FREQUENCY LIST

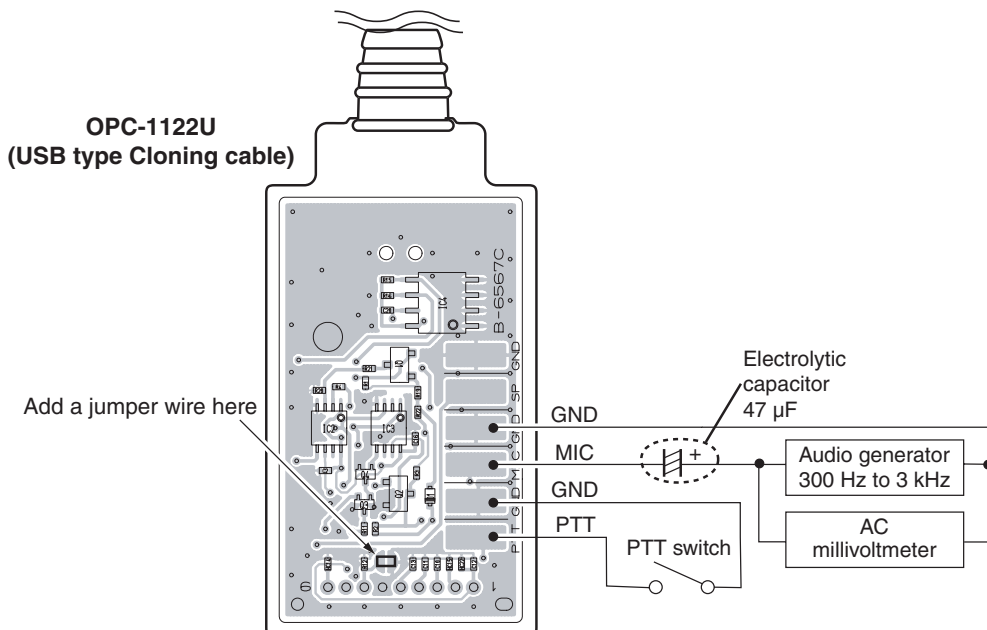
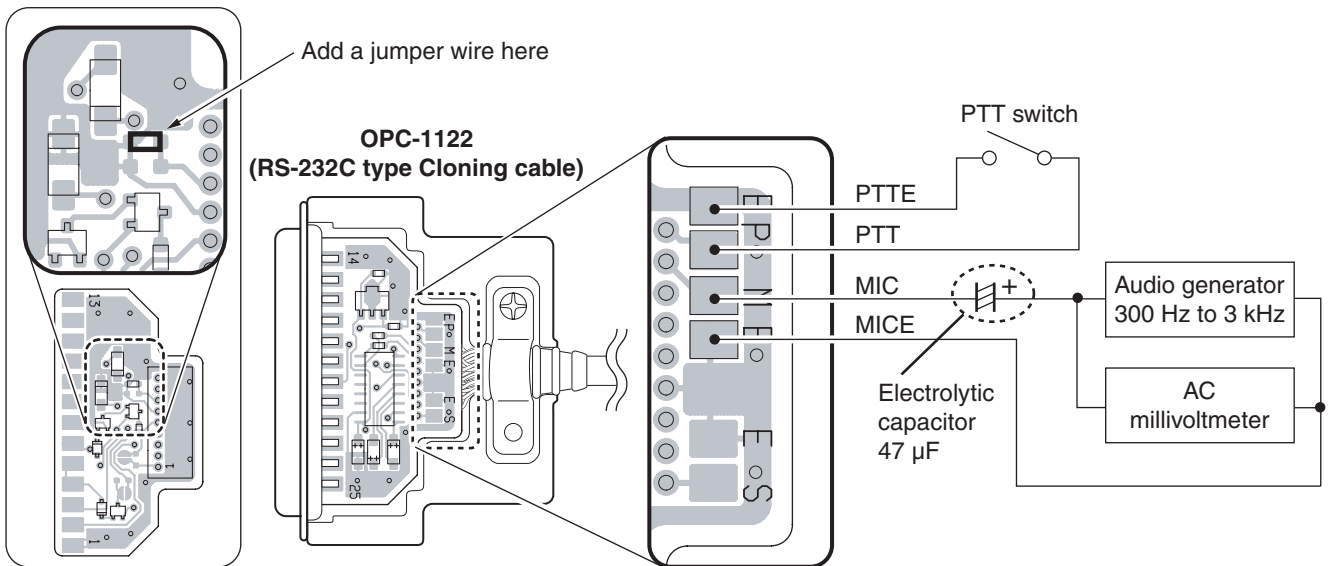
| CH | FREQUENCY | SETTING | CH | FREQUENCY | SETTING |
|----|-------------|--|-----|-------------|---|
| 1 | 154.900 MHz | • TX power : Low1 • Mode : Narrow | 10 | 174.000 MHz | • TX power : Low1 • Mode : Narrow |
| 2 | 174.000 MHz | • TX power : Low1 • Mode : Wide | 11* | 155.000 MHz | • TX power : Low1 • Mode : Middle |
| 3 | 136.000 MHz | • TX power : Low1 • Mode : Wide | 12* | 136.000 MHz | • TX power : High • Mode : Middle |
| 4 | 155.000 MHz | • TX power : Low1 • Mode : Wide | 13* | 174.000 MHz | • TX power : Low2 • Mode : Middle |
| 5 | 136.000 MHz | • TX power : High • Mode : Narrow | 14 | 155.000 MHz | • TX power : Low1 • Mode : Digital |
| 6 | 136.000 MHz | • TX power : Low2 • Mode : Wide | 15 | 136.000 MHz | • TX power : Low1 • Mode : Digital |
| 7 | 155.000 MHz | • TX power : Low1 • Mode : Middle • DTCS : 007 | 16 | 174.000 MHz | • TX power : Low1 • Mode : Digital |
| 8 | 155.000 MHz | • TX power : Low1 • Mode : Narrow | 17 | 136.000 MHz | • TX power : Low1 • CTCSS : 151.4 Hz |
| 9 | 136.000 MHz | • TX power : Low1 • Mode : Narrow | 18 | 136.000 MHz | • TX power : Low1 • Mode : Wide • DTMF : P3 |

*; [EUR] only

• CONNECTION



• JIG CABLE



• ADJUSTMENT SOFTWARE WINDOW

Adjust Utility

Setting

CH No. 1 RX=0.00000, TX=0.00000
 RF Power=High, Mode=Wide
 CH Type=Analog

Adjust

Transmit output power — Power (Hi) 0 [Slider]
 Power (L2) 0 [Slider]
 Power (L1) 0 [Slider]

Modulation balance — (*) BAL (Wide) 0 [Slider]
 (*) BAL (Mid) 0 [Slider]
 (*) BAL (Narrow) 0 [Slider]
 (*) BAL (Digital) 0 [Slider]

FM deviation — (*) MOD (Wide) 0 [Slider]
 (*) MOD (Mid) 0 [Slider]
 (*) MOD (Narrow) 0 [Slider]
 (*) MOD (Digital) 0 [Slider]

CTCSS/DTCS deviation — CTCSS/DTCS 0 [Slider]
 Squelch level — SQL 0 [Slider]
 Reference frequency — REF 0 [Slider]

RX sensitivity (Auto.) — BPF C ALL [Enter] to Sweep
 RX sensitivity (Manu.) — BPF T1 C 0 [Slider] [Enter] to Sweep
 BPF T2 C 0 [Slider] [Enter] to Sweep
 BPF L ALL [Enter] to Sweep
 BPF T1 L 0 [Slider] [Enter] to Sweep
 BPF T2 L 0 [Slider] [Enter] to Sweep
 (*) BPF H ALL [Enter] to Sweep
 BPF T1 H 0 [Slider] [Enter] to Sweep
 BPF T2 H 0 [Slider] [Enter] to Sweep

PLL lock Voltage (Adjustment) — RX LVA1 0 [Slider] [Enter] to Sweep
 RX LVA2 0 [Slider] [Enter] to Sweep
 TX LVA 0 [Slider] [Enter] to Sweep

PLL lock Voltage (Preset) — LV (RX1) 0 0.00V
 LV (RX2) 0 0.00V
 LV (TX) 0 0.00V

S-meter — RSSI 0 [Enter] to Capture

FM deviation (Narrow) — MOD N C 0 [Enter] to Capture
 MOD N L 0 [Enter] to Capture
 MOD N H 0 [Enter] to Capture

FM deviation (Middle) — MOD M C 0 [Enter] to Capture
 MOD M L 0 [Enter] to Capture
 MOD M H 0 [Enter] to Capture

FM deviation (Wide) — MOD W C 0 [Enter] to Capture
 MOD W L 0 [Enter] to Capture
 MOD W H 0 [Enter] to Capture

Digital deviation — MOD D C 0 [Enter] to Capture
 MOD D L 0 [Enter] to Capture
 MOD D H 0 [Enter] to Capture

Digital mode preset — Digital Mode 1

2/5tone, DTMF — S.Tone 0 [Slider]

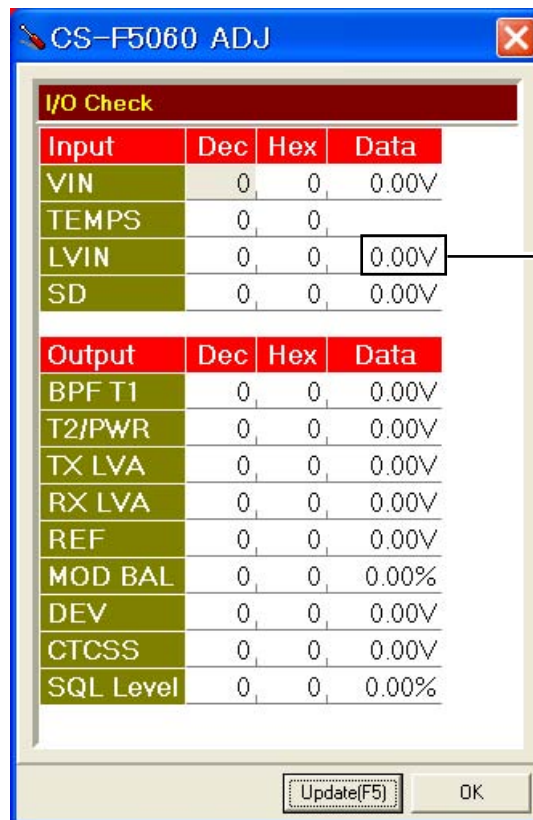
*; DO NOT put the cursor on these items and push the [ENTER] key. Otherwise, some adjustment items will not be adjusted properly.

NOTE: The above screen is an example only. Each transceiver has its own specific values for each setting.

6-2 FREQUENCY ADJUSTMENT

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

| ADJUSTMENT | ADJUSTMENT CONDITION | UNIT | OPERATION | VALUE | |
|--|----------------------|---|-----------|---|--------------------|
| PLL LOCK VOLTAGE (adjustment) [RX LVA1] | 1 | Set the preset value of [LV (RX1)], [LV (RX2)] and [LV (TX)] to "204 [4.00V]" on the adjustment software. | | | |
| | 2 | • Channel : CH 1 • Receiving | PC screen | Click [Reload (F5)] button, then check the "LVIN" item on the CS-F5060 ADJ's screen as below. | 4.00 V |
| | [RX LVA2] | • Channel : CH 2 • Receiving | | | |
| | [TX LVA] | • Channel : CH 2 • Transmitting | | | |
| CONVENIENT: The "PLL LOCK VOLTAGE" can be adjusted automatically. 1: Set the Lock voltage preset ([LV RX1], [LV RX2], [LV TX]) to "204 (4.00 V)." 2: Put the cursor on [RX LVA1], [RX LVA2] and [TX LVA], then push the [ENTER] key on the connected PC's keyboard. | | | | | |
| PLL LOCK VOLTAGE (verify) | 1 | • Channel : CH 3 • Receiving | PC screen | Click [Reload (F5)] button, then check the "LVIN" item on the CS-F5060 ADJ's screen. | 0.8–1.6 V (Verify) |
| | 2 | • Channel : CH 4 • Receiving | | | |
| | 3 | • Channel : CH 3 • Transmitting | | | |
| REFERENCE FREQUENCY [REF] | 1 | • Channel : CH 2 • Connect an RF power meter to the antenna connector. • Transmitting | Top panel | Loosely couple a frequency counter to the antenna connector. | 174.000000 MHz |

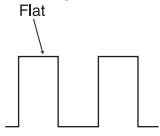


PLL LOCK VOLTAGE will be appeared here

NOTE: The above screen is an example only.
Each item's voltage will appear when pushing [Update] button.

6-3 TRANSMIT ADJUSTMENT

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

| ADJUSTMENT | ADJUSTMENT CONDITION | UNIT | OPERATION | VALUE |
|---|---|------------|--|--|
| OUTPUT POWER [Power (Hi)] | 1 • Channel : CH 5 • Transmitting | Rear panel | Connect an RF power meter to the antenna connector. | 50 W [USA] 25 W [EUR], [EXP] |
| [Power (L2)] | 2 • Channel : CH 6 • Transmitting | | | 25 W [USA] 10 W [EUR], [EXP] |
| [Power (L1)] | 3 • Channel : CH 3 • Transmitting | | | 5.0 W [USA] 2.5 W [EUR], [EXP] |
| MODULATION BALANCE [BAL (Narrow)] | 1 Set the preset value of [MOD N] to "100" on the adjustment software. | | | |
| | 2 • Channel : CH 7 • No audio signals applied to the JIG cable. • Set a modulation analyzer as; HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 • Push [P0] while transmitting. | Rear panel | Connect the modulation analyzer with an oscilloscope to the antenna connector through an attenuator. | Set to square wave form  |
| FM DEVIATION (NARROW) [MOD N C] | 1 • Connect an audio generator to the JIG cable and set as; Frequency : 1.0 kHz Level : 40 mV rms • Set the modulation analyzer to the same condition as "MODULATION BALANCE." • Transmitting • Channel : CH 8 • Transmitting | Rear panel | Connect the modulation analyzer to the antenna connector through an attenuator. | ±2.05 to ±2.15 kHz |
| [MOD N L] | 2 • Channel : CH 9 • Transmitting | | | |
| [MOD N H] | 3 • Channel : CH 10 • Transmitting | | | |
| (WIDE) [MOD W C] | 4 • Channel : CH 4 • Transmitting | | | ±4.05 to ±4.15 kHz |
| [MOD W L] | 5 • Channel : CH 3 • Transmitting | | | |
| [MOD W H] | 6 • Channel : CH 2 • Transmitting | | | |
| (MIDDLE)* [MOD W C] | 7 • Channel : CH 11 • Transmitting | | | ±3.15 to ±3.25 kHz |
| [MOD M L] | 8 • Channel : CH 12 • Transmitting | | | |
| [MOD M H] | 9 • Channel : CH 13 • Transmitting | | | |
| DIGITAL DEVIATION [MOD D C] | 1 Set the preset value of [Digital Mode] to "7" on the adjustment software. | | | |
| | 2 • Attach the UT-119 to J2. (Refer to page 4-2 for the installation) • Channel : CH 14 • Transmitting | Rear panel | Connect the modulation analyzer to the antenna connector through an attenuator. | ±1.41 to ±1.45 kHz |
| [MOD D L] | 3 • Channel : CH 15 • Transmitting | | | |
| [MOD D H] | 4 • Channel : CH 16 • Transmitting | | | |
| CTCSS/DTCS DEVIATION [CTCS/DTCS] | 1 • Channel : CH 17 • No audio signals applied to the JIG cable. • Set the modulation analyzer to the same condition as "MODULATION BALANCE." • Transmitting | Rear panel | Connect a modulation analyzer to the antenna connector through an attenuator. | ±0.68 to ±0.72 kHz |
| 2TONE, 5TONE, DTMF [S.Tone] | 1 • Channel : CH 18 • Transmitting | Rear panel | Connect a modulation analyzer to the antenna connector through an attenuator. | ±1.50 kHz |

*; [EUR] only.

6-4 RECEIVE ADJUSTMENT

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

| ADJUSTMENT | ADJUSTMENT CONDITION | UNIT | LOCATION | VALUE |
|---|--|--|--|---|
| RECEIVE SENSITIVITY [BPF (T1) C] [BPF (T2) C] | NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly. | | | |
| | 1 <ul style="list-style-type: none"> • Channel : CH 3 • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : +20 dBμ[†] (-87 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | SP jack | Connect the SINAD meter with an 4 Ω load to the SP jack. | Minimum distortion level |
| CONVENIENT: The "RECEIVE SENSITIVITY" can be adjusted automatically. 1: Put the cursor on "[BPF C ALL]" and push [ENTER] key. 2: The connected PC tunes BPF's to peak levels automatically. | | | | |
| S-METER (S3 level) [RSSI] | 1 <ul style="list-style-type: none"> • Channel : CH 3 • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : +23 dBμ[†] (-84 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | Push the [ENTER] key on the connected PC's keyboard to set "S3" level. | | |
| (S1 level) | 2 <ul style="list-style-type: none"> • Set the SSG as; <ul style="list-style-type: none"> Level : -7 dBμ[†] (-114 dBm) • Receiving | Push the [ENTER] key again to set "S1" level. | | |
| SQUELCH [SQL] | 1 <ul style="list-style-type: none"> • Channel : CH 3 • Close the squelch by adjusting the value of [SQL] item on the CS-F5060 ADJ's screen. • Connect the SSG to the antenna connector and set as; <ul style="list-style-type: none"> Frequency : 136.000 MHz Level : -14 dBμ[†] (-121 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving | External speaker | Connect an 4 Ω speaker to the SP jack. | Close the squelch by increase the value of [SQL]. Set the [SQL] to the value that the audio signals just appear. |

[†]: The output level of the standard signal generator (SSG) is indicated as the SSG's open circuit.

SECTION 8

MECHANICAL PARTS

[CHASSIS PARTS]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|-----------------------------|------|
| J1 | 6510004880 | MR-DSE-01 | 1 |
| MP1 | 8010020540 | 2979 CHASSIS | 1 |
| MP2 | 8930070860 | O-RING (BM) | 1 |
| MP3 | 8110008960 | 2979 COVER | 1 |
| MP4 | 8930070920 | 2979 D-SUB PLATE | 1 |
| MP5 | 8510018090 | 2979 FILTER CASE | 1 |
| MP8 | 8930048550 | 2177 CLIP | 1 |
| MP9 | 8810008661 | Screw BT B0 3X8 NI-ZC3 (BT) | 10 |
| MP10 | 8810008661 | Screw BT B0 3X8 NI-ZC3 (BT) | 2 |
| MP11 | 8810008661 | Screw BT B0 3X8 NI-ZC3 (BT) | 2 |
| MP12 | 8810009991 | Screw BT B0 3X8 NI-ZK3 (BT) | 4 |
| MP13 | 8810009991 | Screw BT B0 3X8 NI-ZK3 (BT) | 2 |
| MP14 | 8930071670 | 2979 M-PLATE | 1 |
| MP16 | 8930068420 | SPONGE (IS) | 4 |

[CONNECT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|-------------|------|
| J602 | 6510023210 | CD6125SA1J0 | 1 |
| W601 | 8900012711 | OPC-1297A | 1 |

[FRONT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|---------------------------------------|------|
| J503 | 6450002210 | 3017-8821 | 1 |
| DS501 | 5030003020 | L6-0226TVM-3 | 1 |
| SP501 | 2510001400 | 3050S-E6227 | 1 |
| W501 | 8900012711 | OPC-1297A | 1 |
| W502 | 7120000470 | ERDS2T0 | 1 |
| W503 | 7120000470 | ERDS2T0 | 1 |
| EP502 | 8930072220 | SRCN-2979-SP-N-W | 2 |
| MP501 | 8210023480 | 2979 FRONT PANEL (Incl. MP502) | 1 |
| MP502 | 8310068050 | 2979 WINDOW PLATE | 1 |
| MP503 | 8210023270 | 2979 REFLECTOR | 1 |
| MP504 | 8930070840 | 2979 LENS | 1 |
| MP505 | 8610013020 | KNOB N-352 | 1 |
| MP506 | 8930070830 | 2979 KEYBOARD | 1 |
| MP507 | 8930070850 | 2979 VOL RUBBER | 1 |
| MP508 | 8010020760 | 2979 SUB CHASSIS (Incl. MP509, MP515) | 1 |
| MP509 | 8930071350 | 2979 SPRING | 1 |
| MP510 | 8510018080 | 2979 LCD PLATE | 1 |
| MP511 | 8930071600 | INSULATION SHEET (LR) | 2 |
| MP513 | 8930071610 | 2979 LCD FILTER | 1 |
| MP514 | 8930059000 | 2601 SP NET | 1 |
| MP515 | 8610007420 | knob spring NO.6601 | 1 |
| MP516 | 8810010501 | Screw BT B0 3X10NI-ZC3 (BT) | 3 |

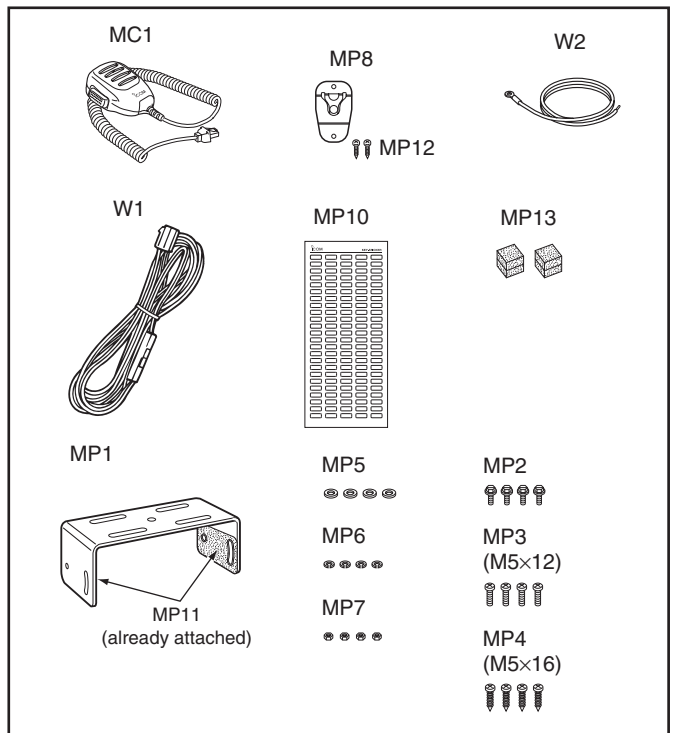
[ACCESSORIES]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------------|-------------------------|----------------------|
| MC1 | Optional product | HM-148 | [USA-01] 1 |
| | Optional product | HM-152 | [EXP-01], [EUR-01] 1 |
| W1 | Optional product | OPC-1132 | [USA-01] 1 |
| | Optional product | OPC-1194A | [EXP-01], [EUR-01] 1 |
| W2 | 8900000730 | OPC-049 | 1 |
| MP1 | 8010020610 | 2979 MOBILE BRACKET | 1 |
| MP2 | 8820000530 | Flange bolt M4X8 NI | 4 |
| MP3 | 8810000471 | Screw PH (+-) M5X12 ZC3 | 4 |
| MP4 | 8810000951 | Screw BT A0 5X16 ZC3 | 4 |
| MP5 | 8850000180 | Flat washer M5 SUS | 4 |
| MP6 | 8850000391 | SPRING WASHER M5 ZC3 | 4 |
| MP7 | 8830000121 | Nut M5 ZC3 | 4 |
| MP8 | 8950005110 | 2289 MIC HANGER | 1 |
| MP10 | 8310068720 | 2979 LCD SEAL | 1 |
| MP11 | 8930059160 | 2601 FELT | 2 |
| MP12 | 8810004700 | Screw BT A0 3X16 SUS | 2 |
| MP13 | 8930072530 | SPONGE (JN) | 2 |

[MAIN UNIT]

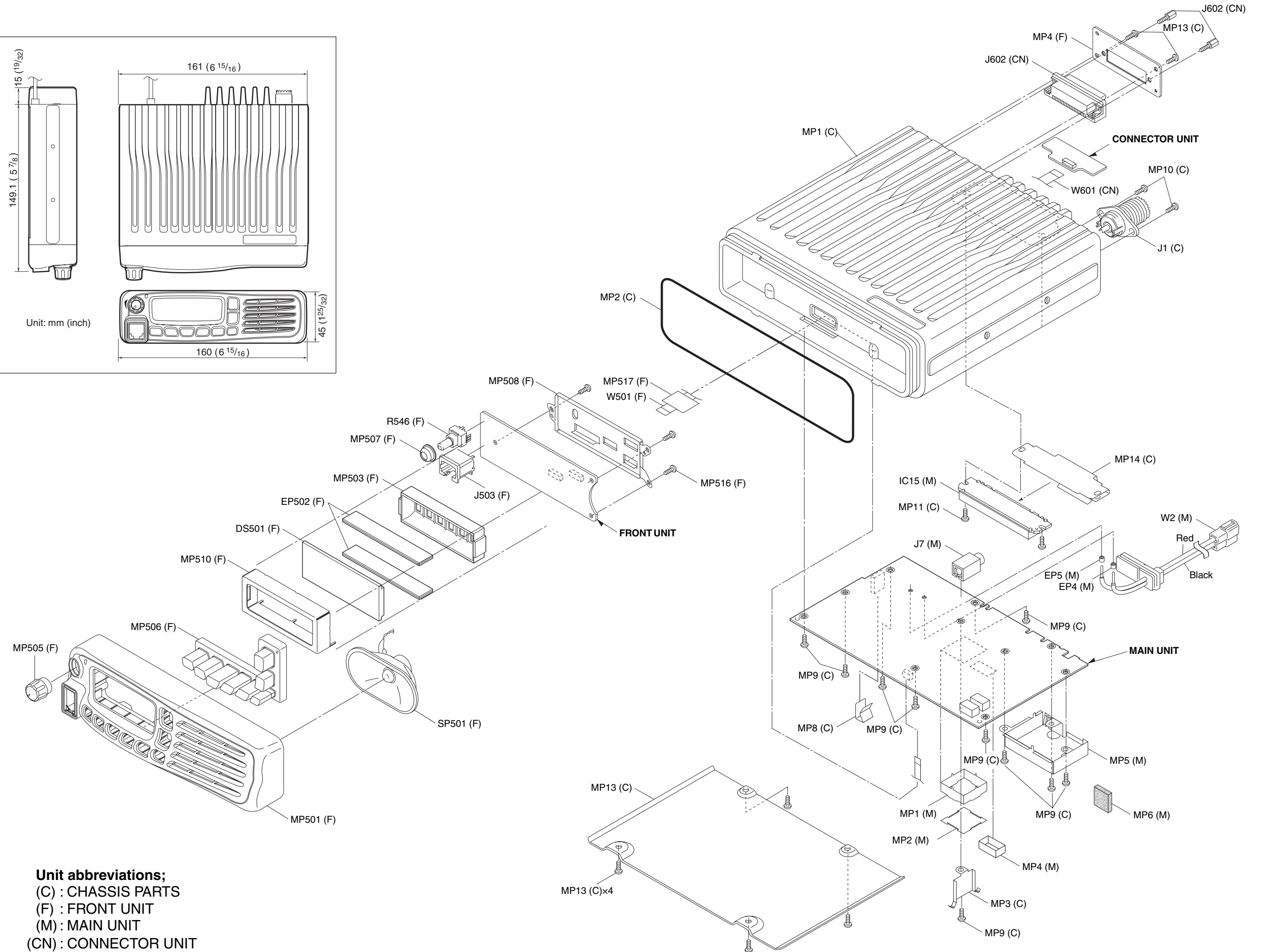
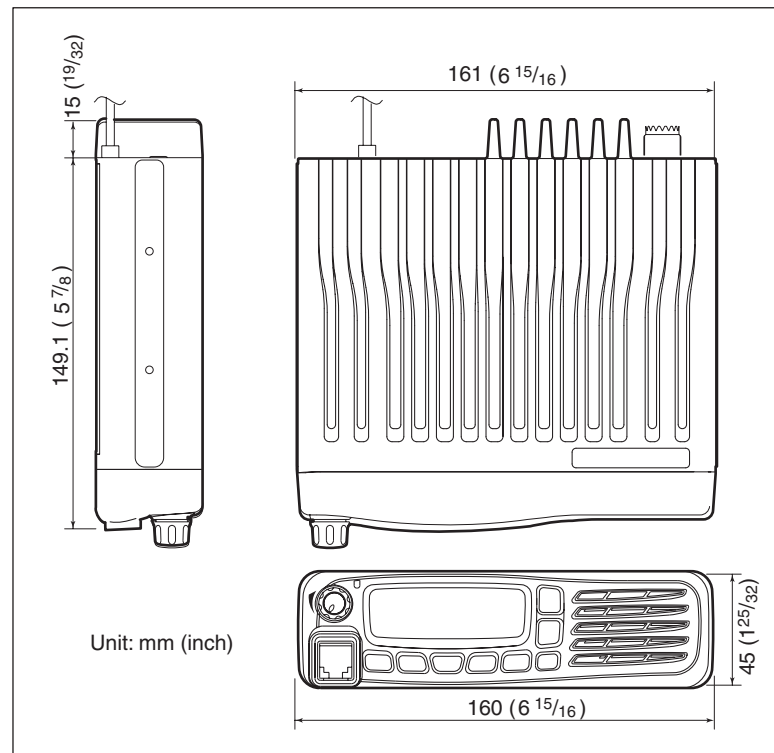
| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|----------------------|------|
| J7 | 6450000140 | HSJ0807-01-010 | 1 |
| W1 | 7120000470 | ERDS2T0 | 1 |
| W2 | 8900016250 | OPC-1701 | 1 |
| EP4 | 6910010280 | HF70BB9.5X10.4X4.9 | 1 |
| EP5 | 6910010280 | HF70BB9.5X10.4X4.9 | 1 |
| EP6 | 6910011560 | HF70BB4.5X5X1.6 | 2 |
| MP1* | 8510018070 | 2979 VCO CASE | 1 |
| MP2 | 8510018060 | 2979 VCO COVER | 1 |
| MP3 | 8930056510 | 2055 SHIELD PLATE | 1 |
| MP4 | 8510002280 | VCO Shield plate (A) | 1 |
| MP6 | 8930072270 | Shield sponge (BV) | 1 |

*: Refer to SECTION 10 BOARD LAYOUTS.



Screw abbreviations

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

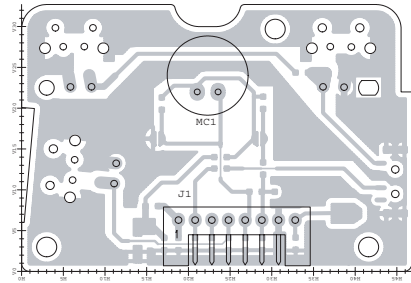


Unit abbreviations;
 (C) : CHASSIS PARTS
 (F) : FRONT UNIT
 (M) : MAIN UNIT
 (CN) : CONNECTOR UNIT

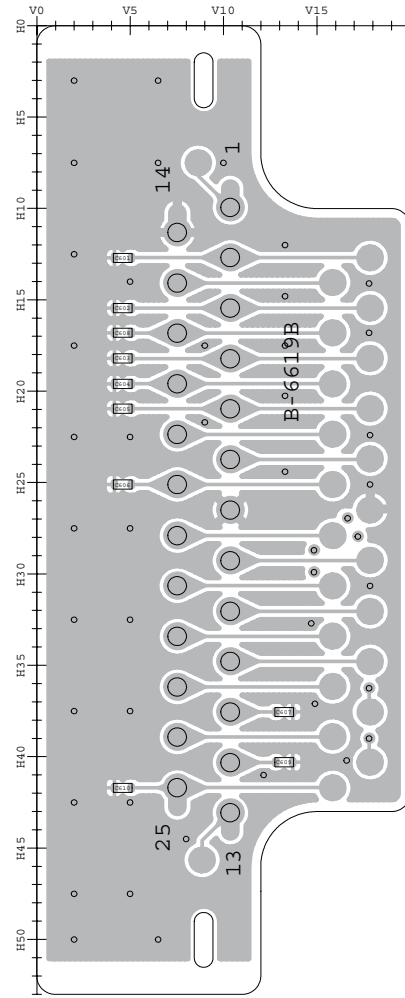
SECTION 9

BOARD LAYOUTS

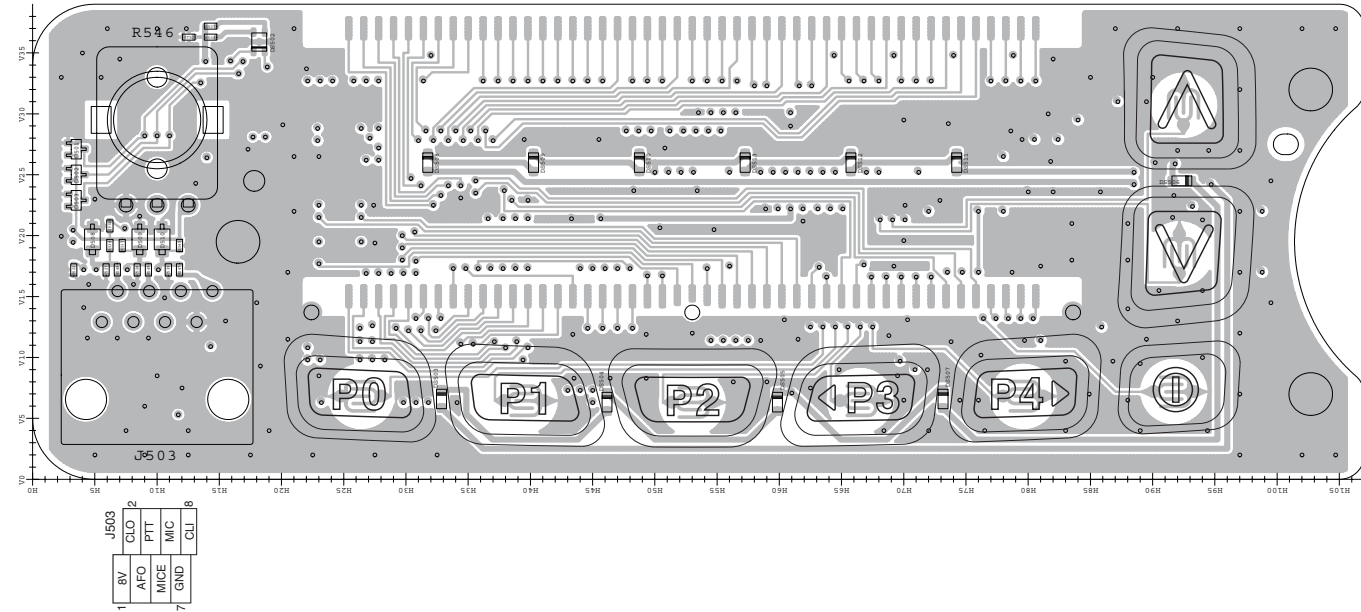
• HM-152 (TOP VIEW)



• CONNECT UNIT (TOP VIEW)

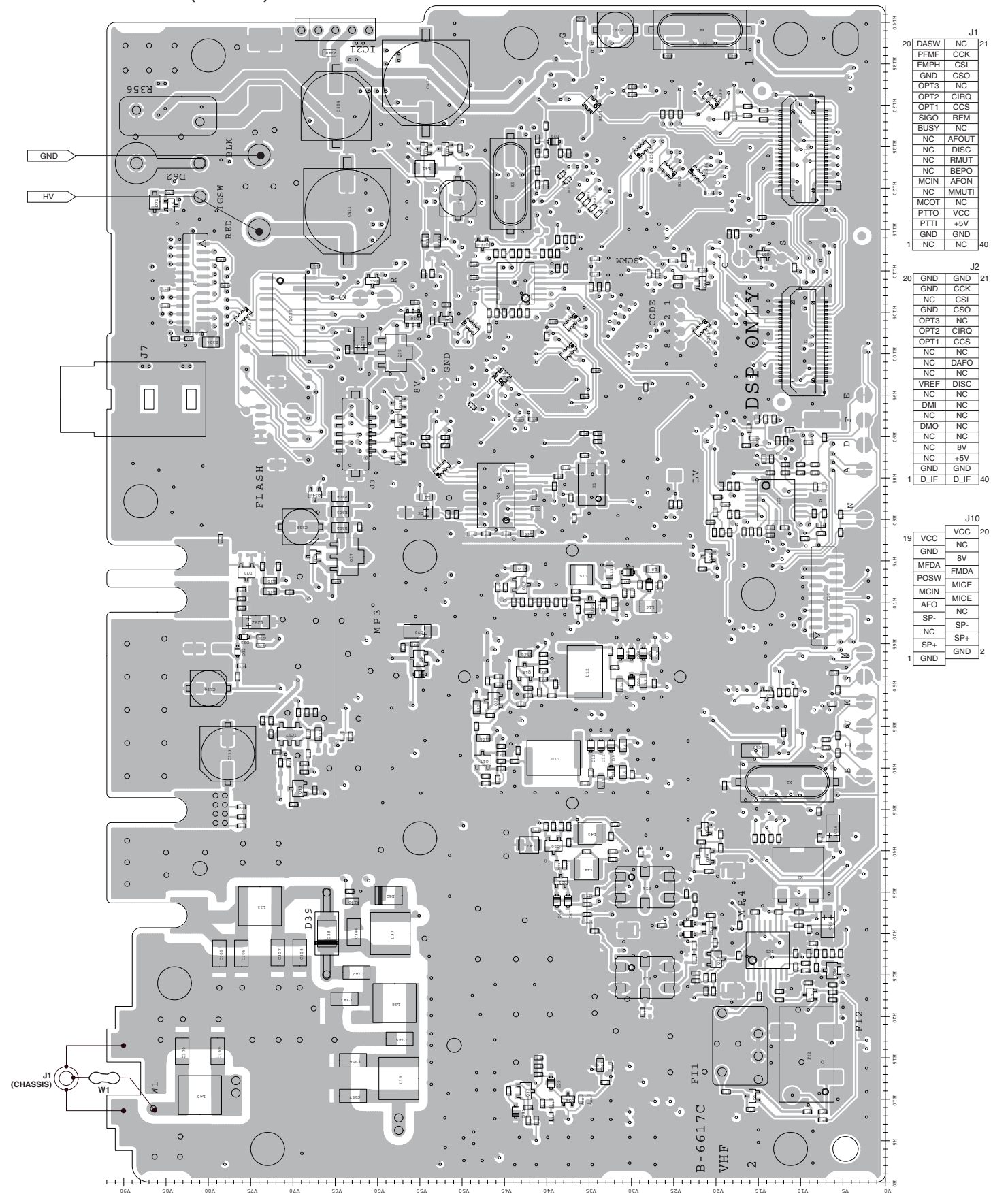


• FRONT UNIT (TOP VIEW)



| | | |
|---|------|------|
| 1 | BV | J503 |
| 2 | AFO | CLO |
| 3 | NICE | PTT |
| 4 | GND | MIC |
| 5 | | CL |
| 6 | | 8 |
| 7 | | |

• MAIN UNIT (TOP VIEW)



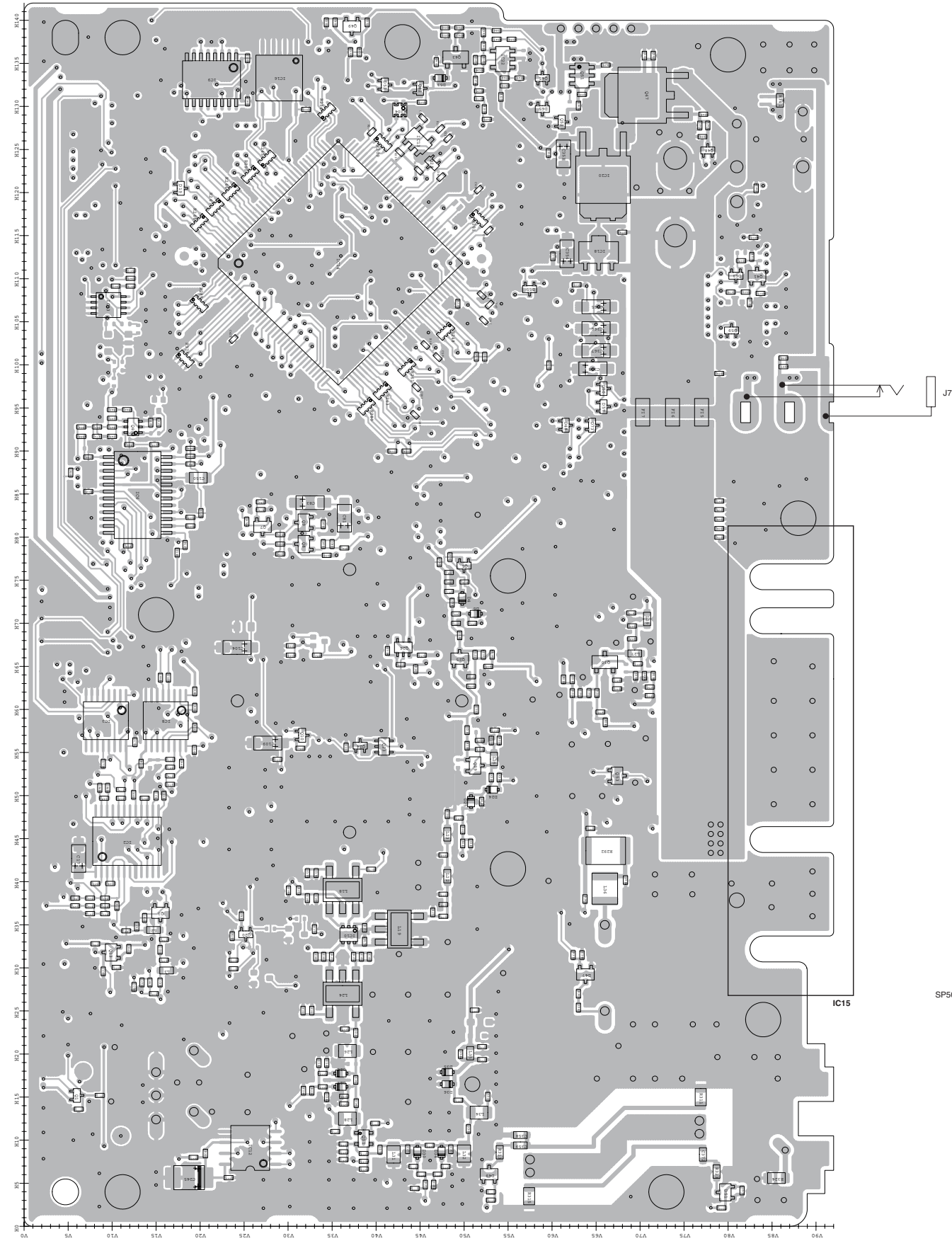
| | | | | |
|----|------|-------|----|----|
| 1 | DASW | NC | J1 | 21 |
| 2 | PFMF | CCK | | |
| 3 | EMPH | CSI | | |
| 4 | GND | CSO | | |
| 5 | OPT3 | NC | | |
| 6 | OPT2 | CIRO | | |
| 7 | SIG0 | REM | | |
| 8 | BUSY | NC | | |
| 9 | NC | AFOU | | |
| 10 | NC | DISC | | |
| 11 | NC | RMUT | | |
| 12 | NC | BEPO | | |
| 13 | MCIN | AFON | | |
| 14 | NC | MMUTI | | |
| 15 | MCOT | NC | | |
| 16 | PTTO | VCC | | |
| 17 | PTTI | +5V | | |
| 18 | GND | GND | | 40 |
| 19 | NC | NC | | |

| | | | | |
|----|------|------|----|----|
| 1 | GND | GND | J2 | 21 |
| 2 | NC | CSI | | |
| 3 | GND | CSO | | |
| 4 | OPT3 | NC | | |
| 5 | OPT2 | CIRO | | |
| 6 | OPT1 | CCS | | |
| 7 | NC | NC | | |
| 8 | NC | DAFO | | |
| 9 | NC | NC | | |
| 10 | VREF | DISC | | |
| 11 | NC | NC | | |
| 12 | DMI | NC | | |
| 13 | NC | NC | | |
| 14 | DMO | NC | | |
| 15 | NC | NC | | |
| 16 | NC | 8V | | |
| 17 | NC | +5V | | |
| 18 | GND | GND | | 40 |
| 19 | D_IF | D_IF | | |

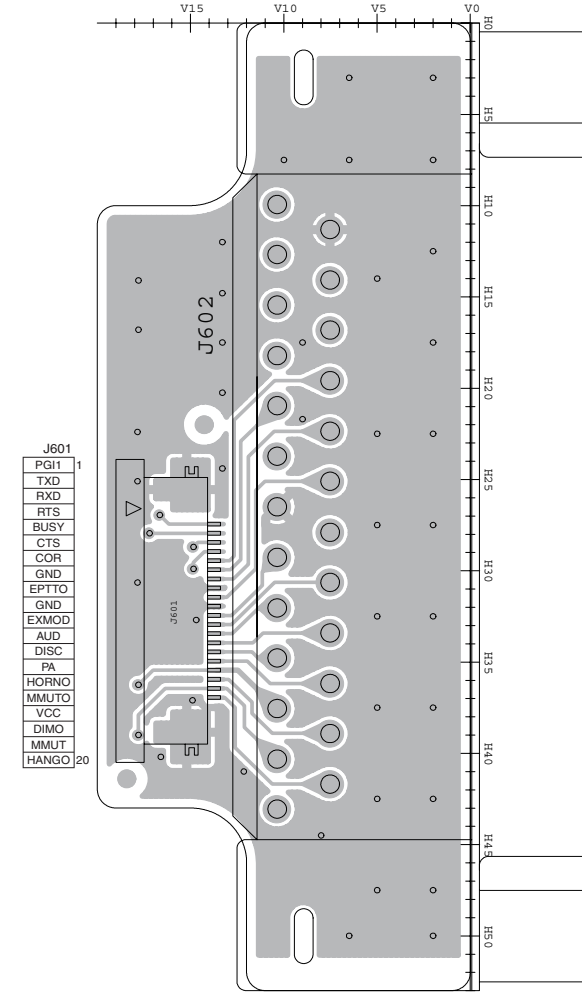
| | | | | |
|----|------|------|-----|----|
| 1 | VCC | VCC | J10 | 20 |
| 2 | GND | NC | | |
| 3 | MFDA | 8V | | |
| 4 | POSW | FMDA | | |
| 5 | MCIN | MICE | | |
| 6 | AFO | NC | | |
| 7 | SP- | NC | | |
| 8 | NC | SP+ | | |
| 9 | SP+ | SP+ | | |
| 10 | GND | GND | | 2 |

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

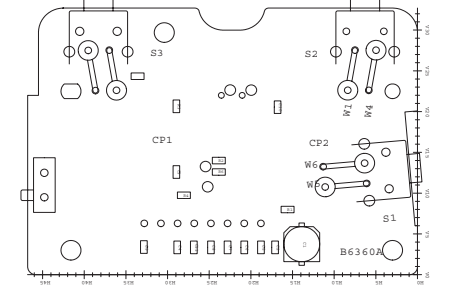
• MAIN UNIT (BOTTOM VIEW)



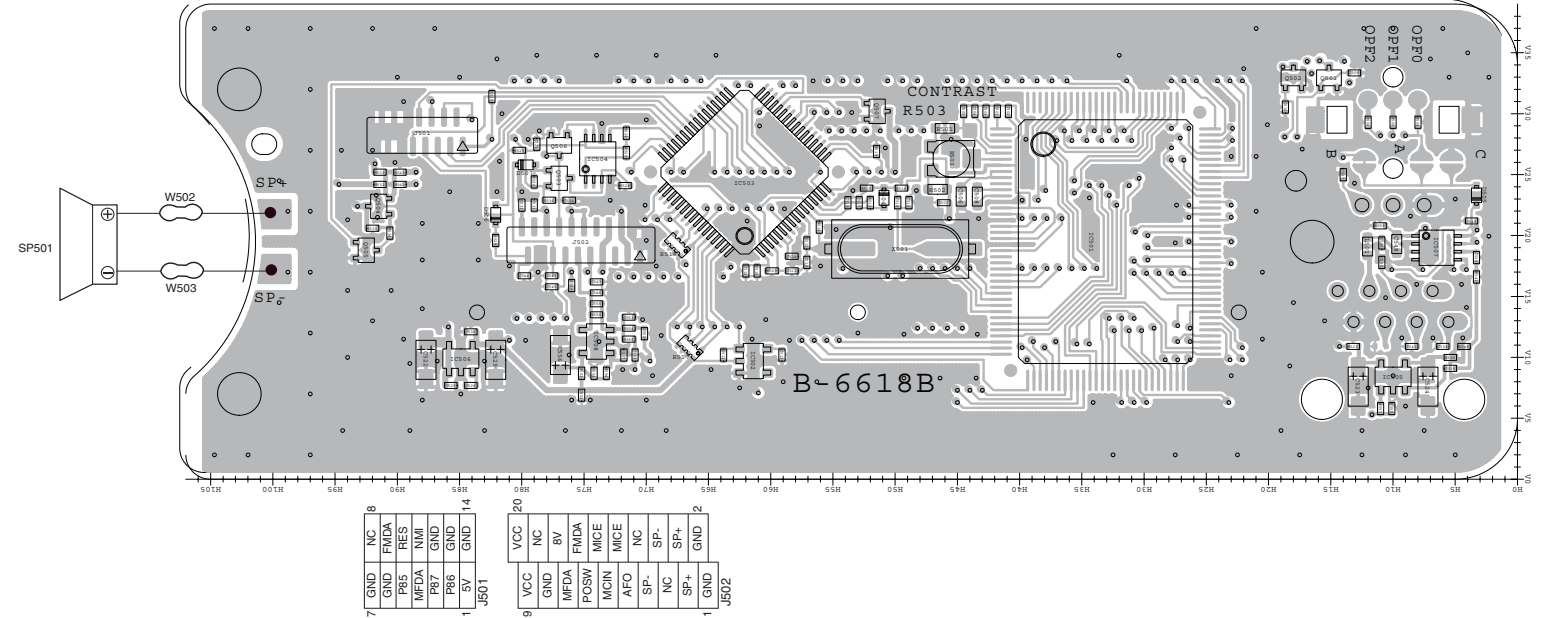
• CONNECT UNIT (BOTTOM VIEW)



• HM-152 (BOTTOM VIEW)

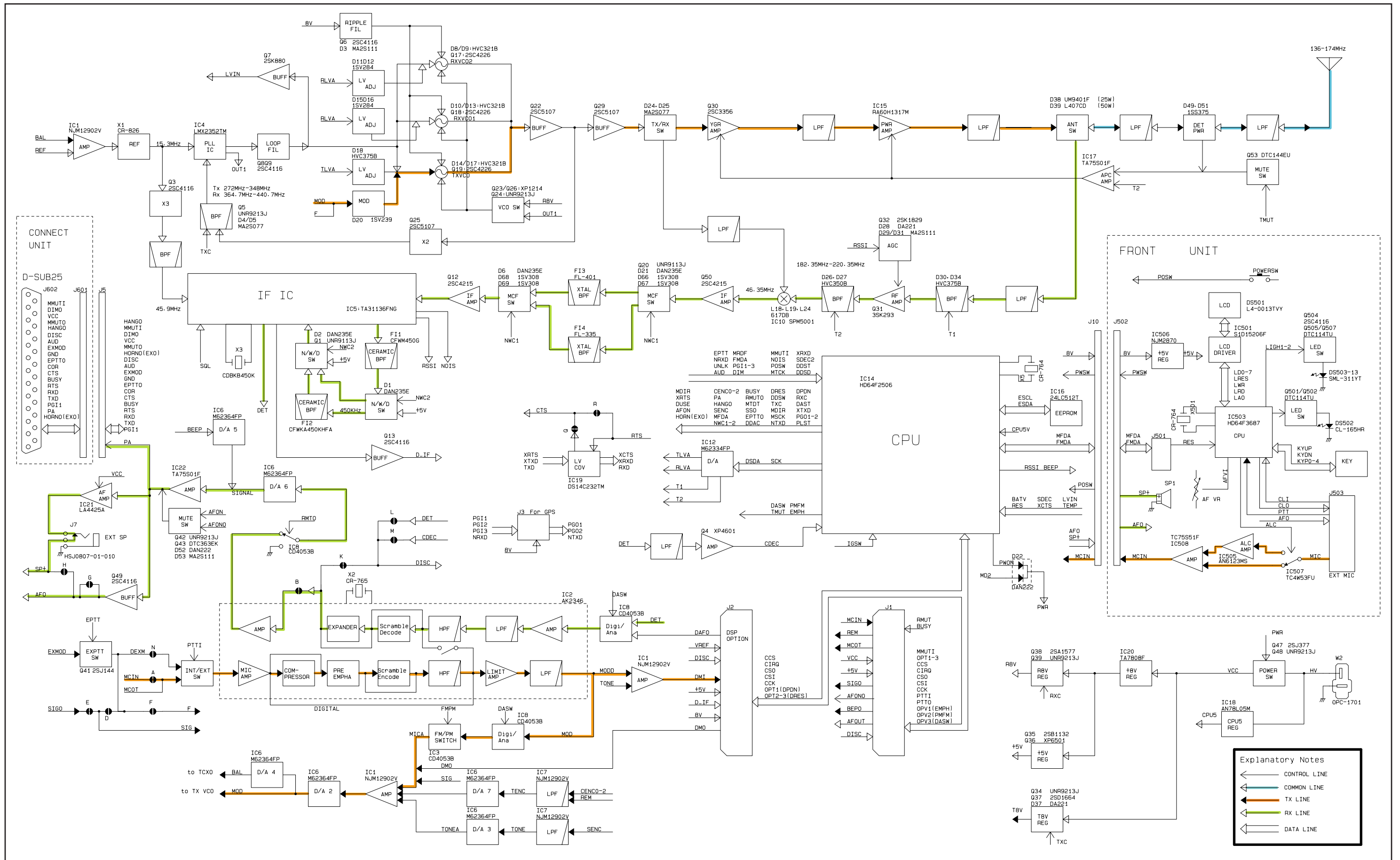


• FRONT UNIT (BOTTOM VIEW)



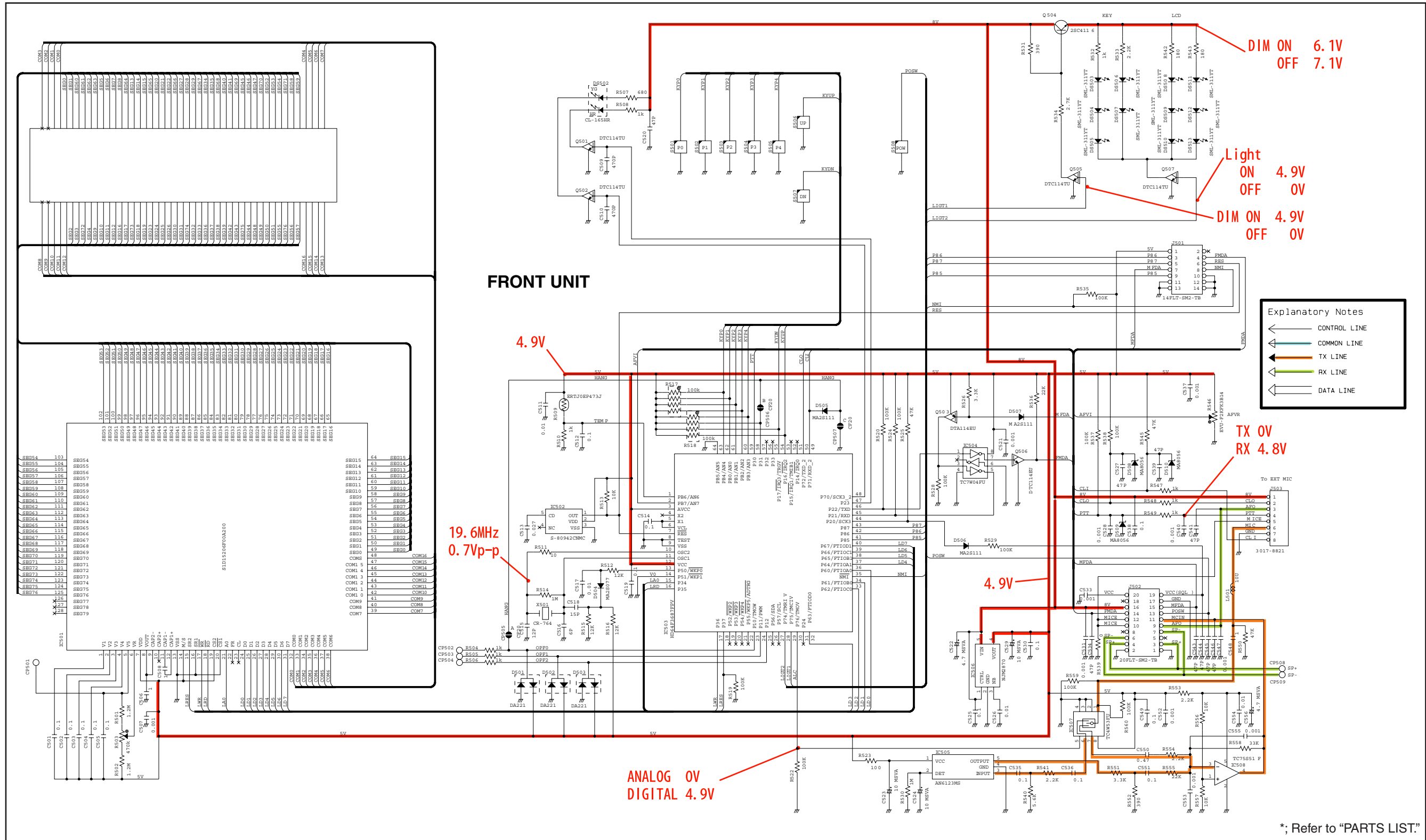
SECTION 10

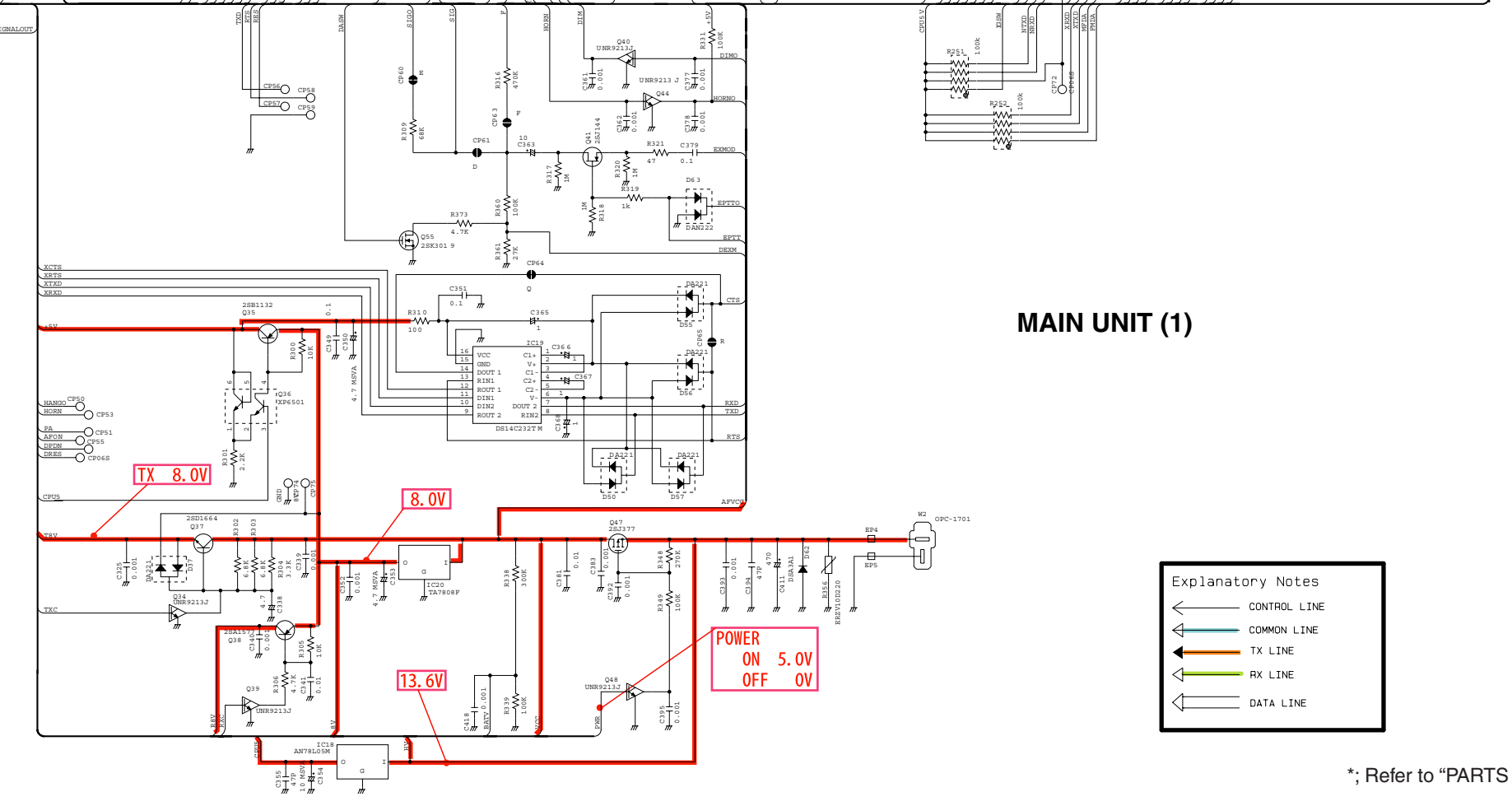
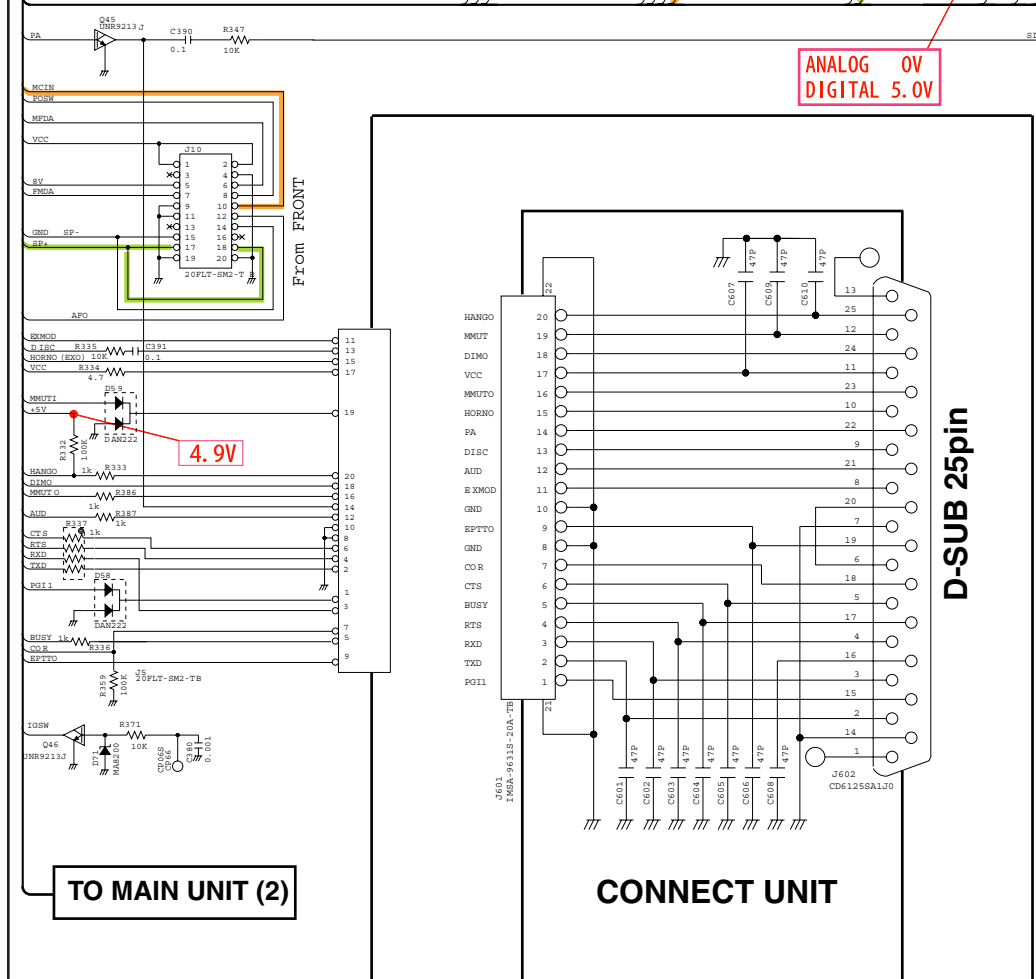
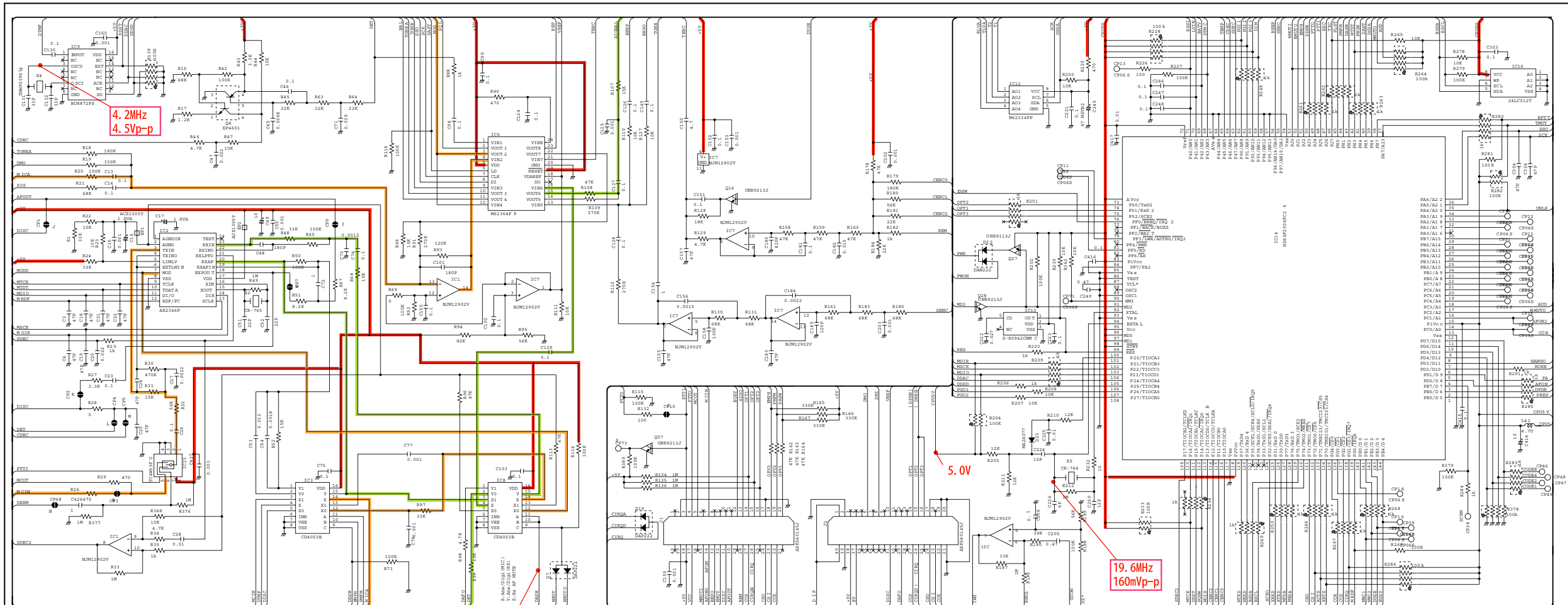
BLOCK DIAGRAM



SECTION 11

VOLTAGE DIAGRAM



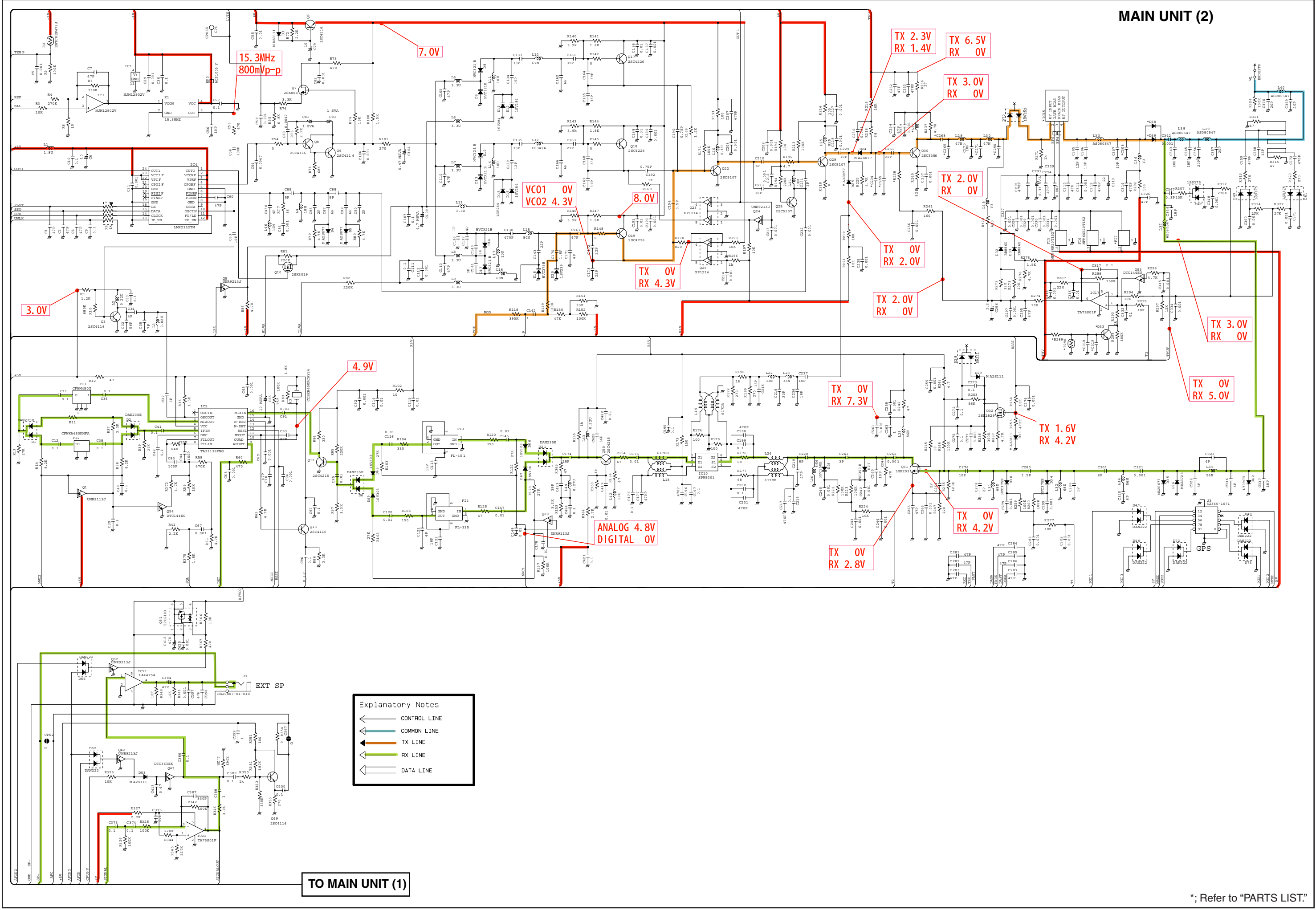


MAIN UNIT (1)

- Explanatory Notes**
- ← CONTROL LINE
 - ← COMMON LINE
 - ← TX LINE
 - ← RX LINE
 - ← DATA LINE

*; Refer to "PARTS LIST"

MAIN UNIT (2)



Explanatory Notes

- ← CONTROL LINE
- ← COMMON LINE
- ← TX LINE
- ← RX LINE
- ← DATA LINE

TO MAIN UNIT (1)

TX 2.3V
RX 1.4V

TX 6.5V
RX 0V

TX 3.0V
RX 0V

TX 2.0V
RX 0V

TX 0V
RX 2.0V

TX 2.0V
RX 0V

TX 3.0V
RX 0V

TX 0V
RX 5.0V

TX 1.6V
RX 4.2V

TX 0V
RX 4.2V

TX 0V
RX 2.8V

TX 0V
RX 7.3V

ANALOG 4.8V
DIGITAL 0V

8.0V

VCO1 0V
VCO2 4.3V

7.0V

15.3MHz
800mVp-p

3.0V

4.9V

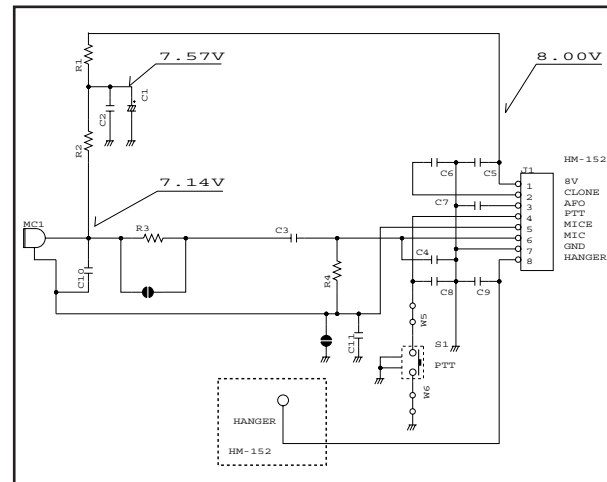
*; Refer to "PARTS LIST."

• ELECTRIC PARTS

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|------------------------|
| R1 | 7030011410 | S.RES ERJ3GE YJ 222 |
| R2 | 7030011410 | S.RES ERJ3GE YJ 222 |
| R3 | 7030011420 | S.RES ERJ3GE YJ 562 |
| R4 | 7030011410 | S.RES ERJ3GE YJ 222 |
| C1 | 4510009230 | S.ELE EEE1HA010SR |
| C2 | 4030018990 | S.CER C1608 JB 1H 102K |
| C3 | 4030019000 | S.CER C1608 JF 1H 104Z |
| C4 | 4030019010 | S.CER C1608 JB 1H 103K |
| C5 | 4030018990 | S.CER C1608 JB 1H 102K |
| C6 | 4030018990 | S.CER C1608 JB 1H 102K |
| C7 | 4030018990 | S.CER C1608 JB 1H 102K |
| C8 | 4030018990 | S.CER C1608 JB 1H 102K |
| C9 | 4030018990 | S.CER C1608 JB 1H 102K |
| C10 | 4030019000 | S.CER C1608 JF 1H 104Z |
| C11 | 4030018990 | S.CER C1608 JB 1H 102K |

• VOLTAGE DIAGRAM



• MECHANICAL PARTS

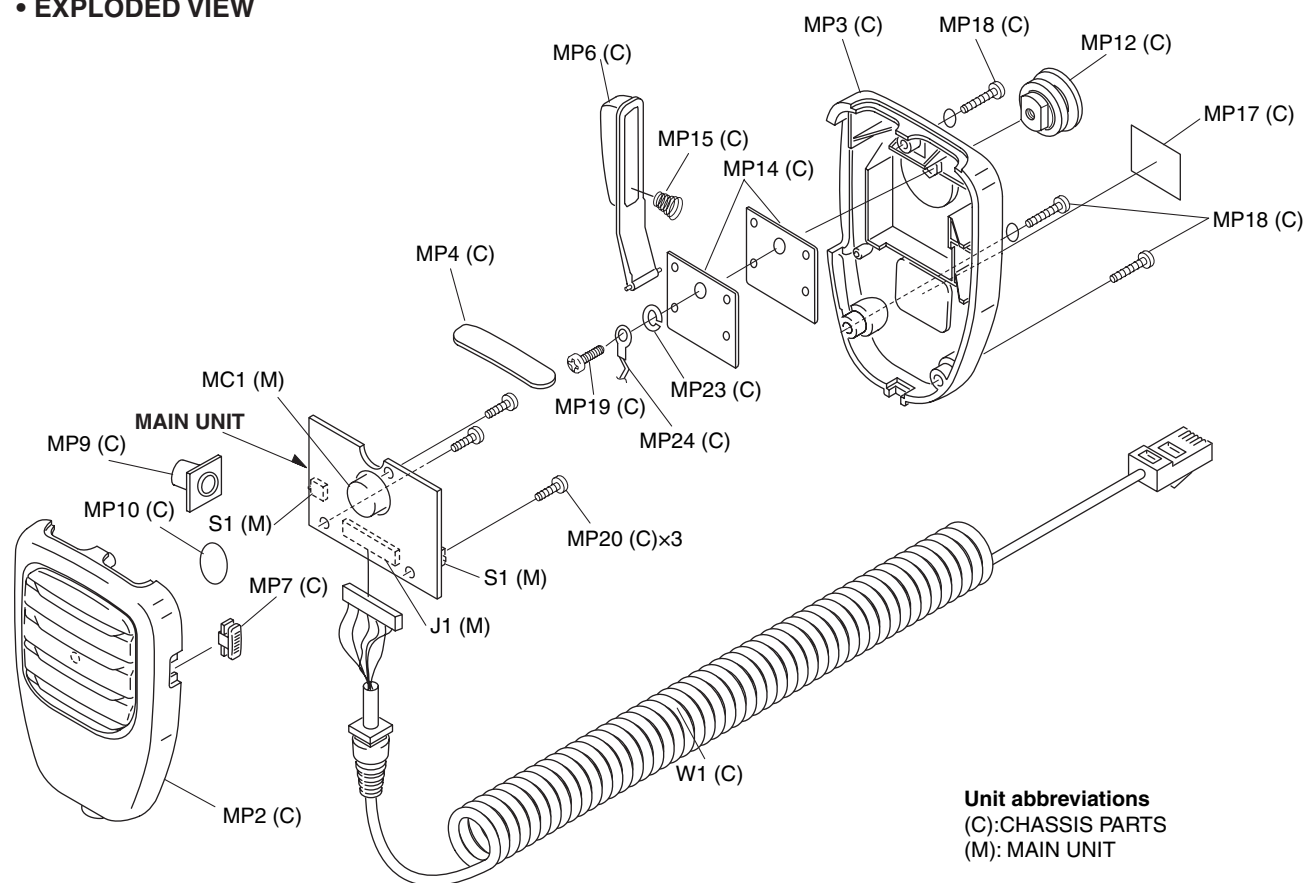
[CHASSIS PARTS]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|-------------------------|------|
| W1 | 8900014230 | OPC-1471 | 1 |
| W2 | 9028540010 | AWG24 L=70 GRAY | 1 |
| MP2 | 8210022100 | 2854 S-FRONT PANEL | 1 |
| MP5 | 8210022120 | 2854 TOP PANEL | 1 |
| MP6 | 8930067080 | 2854 PTT BUTTON | 1 |
| MP7 | 8610012570 | 2854 SW BUTTON | 1 |
| MP8 | 8210022110 | 2854 SIDE PANEL | 1 |
| MP9 | 8930067120 | 2854 PTT RUBBER | 1 |
| MP10 | 8930067140 | 2854 MIC SEAL | 1 |
| MP11 | 8930067180 | 2854 16-KEY | 1 |
| MP12 | 8610012580 | 2854 HANGER KNOB | 1 |
| MP14 | 8930067100 | 2854 WEIGHT | 2 |
| MP15 | 8930067150 | 2854 PTT SPRING | 1 |
| MP17 | 8310066000 | 2854 NAME PLATE (G) | 1 |
| MP18 | 8810010520 | Screw B0 3X16SUS | 3 |
| MP19 | 8810010530 | Screw BiH M4X14 SUS | 1 |
| MP20 | 8810010240 | Screw BT B0 2X6NI | 3 |
| MP23 | 8850002000 | SPRING WASHER M4 SUS | 1 |
| MP24 | 8860001380 | earth lug B3 (M4) BS AG | 1 |

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | QTY. |
|---------|------------|---------------------|------|
| J1 | 6510025100 | CON IL-S-8P-S2L2-EF | 1 |
| MC1 | 7700002720 | MIC F9745AP382-101 | 1 |
| S1 | 2260002890 | SW SKQJLBA010 | 1 |

• EXPLODED VIEW



Unit abbreviations
 (C):CHASSIS PARTS
 (M): MAIN UNIT

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