



# SERVICE MANUAL

UHF TRANSCEIVERS  
(For versions without ANT PCB)

**IC-F2000**

**IC-F2000S**

**IC-F2000T**

---

---

S-15609XZ-C1-1  
March 2020

**Icom Inc.**

---

## INTRODUCTION

We will begin supplying spare units for all versions of the IC-F2000 series described in this service manual. Accordingly, this revised service manual focuses on the spare units that can be supplied, consumable parts and parts that are considered necessary in case of physical damage, instead of those on the individual electronic parts list and mechanical parts list.

This service manual describes the latest technical information for the following versions of the IC-F2000/IC-F2000S/IC-F2000T UHF TRANSCEIVERS at the time of publication.

| MODEL     | VERSION | VERSION NUMBER | FREQUENCY RANGE (MHz) | CHANNEL SPACING (kHz) | KEY TYPE |
|-----------|---------|----------------|-----------------------|-----------------------|----------|
| IC-F2000  | #11     | EUR-09         | 400~470               | 12.5/20/25            | Non      |
|           | #12     | UK-09          |                       | 12.5/25               |          |
|           | #13     | EXP-09         |                       | 12.5/25               |          |
| IC-F2000S | #14     | EUR-09         |                       | 12.5/20/25            | 4-key    |
|           | #15     | UK-09          |                       | 12.5/25               |          |
| IC-F2000T | #16     | EXP-09         |                       | 12.5/25               | 10-key   |
|           | #17     | EUR-09         |                       | 12.5/20/25            |          |
|           | #18     | UK-09          |                       | 12.5/20/25            |          |
|           | #19     | EXP-09         |                       | 12.5/20/25            |          |
| IC-F2000  | #20     | EXP-10         |                       | 12.5/20/25            | 10-key   |
| IC-F2000  | #23     |                | 450~520               | 12.5/25               | Non      |
| IC-F2000S | #24     | EXP-11         |                       | 12.5/25               | 4-key    |
| IC-F2000T | #25     |                |                       | 12.5/25               | 10-key   |
| IC-F2000  | #35     |                | 400~470               | 12.5/25               | Non      |
| IC-F2000S | #36     | AUS-09         |                       | 12.5/25               | 4-key    |
| IC-F2000T | #37     |                |                       | 12.5/25               | 10-key   |
| IC-F2000  | #38     |                | 450~520               | 12.5/25               | Non      |
| IC-F2000S | #39     | AUS-10         |                       | 12.5/25               | 4-key    |
| IC-F2000T | #40     |                |                       | 12.5/25               | 10-key   |
| IC-F2000  | #42     |                | 400~470               | 12.5/25               | Non      |
| IC-F2000S | #43     | USA-07         |                       | 12.5/25               | 4-key    |
| IC-F2000T | #44     |                |                       | 12.5/25               | 10-key   |
| IC-F2000  | #48     |                | 450~512               | 12.5/25               | Non      |
| IC-F2000S | #49     | USA-08         |                       | 12.5/25               | 4-key    |
| IC-F2000T | #50     |                |                       | 12.5/25               | 10-key   |

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

For the following versions, see the IC-F2000/IC-F2000S/IC-F2000T Service Manual (for with ANT PCB).

| MODEL     | VERSION | VERSION NUMBER | FREQUENCY RANGE (MHz) | CHANNEL SPACING (kHz) | KEY TYPE |
|-----------|---------|----------------|-----------------------|-----------------------|----------|
| IC-F2000  | #01     | USA-01         | 400~470               | 12.5                  | Non      |
|           | #02     | EUR-01         |                       | 12.5/20/25            |          |
|           | #03     | UK-01          |                       | 12.5/25               |          |
|           | #04     | EXP-01         |                       | 12.5/25               |          |
| IC-F2000S | #05     | USA-01         |                       | 12.5                  | 4-key    |
|           | #06     | EUR-01         |                       | 12.5/20/25            |          |
|           | #07     | UK-01          |                       | 12.5/25               |          |
|           | #08     | EXP-01         |                       | 12.5/25               |          |
| IC-F2000T | #09     | USA-01         |                       | 12.5                  | 10-key   |
|           | #10     | EUR-01         |                       | 12.5/20/25            |          |
|           | #11     | UK-01          |                       | 12.5/25               |          |
|           | #12     | EXP-01         |                       | 12.5/25               |          |
| IC-F2000  | #21     | USA-02         | 450~512               | 12.5                  | Non      |
| IC-F2000S | #22     | EXP-02         | 450~520               | 12.5/25               |          |
| IC-F2000S | #23     | USA-02         | 450~512               | 12.5                  | 4-key    |
|           | #25     |                |                       | 12.5                  | 10-key   |
| IC-F2000T | #26     | EXP-02         | 450~520               | 12.5/25               |          |
|           | #82     | EXP-03         | 400~470               | 12.5/25               | 10-key   |

---

## SERVICE CAUTION

---

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

**DO NOT** reverse the polarity of the DC power cable when directly connecting to 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 part or order number
2. Component name
3. Equipment model name and unit name
4. Quantity required

### <ORDER EXAMPLE>

8610014711 KNOB N-421-1 IC-F2000 CHASSIS 5 pieces  
0341121103 U F2000 #11 CHASSIS IC-F2000 CHASSIS 1 piece

---

## REPAIR NOTES

---

1. Make sure that the problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until it is disconnected from its power source.
3. **DO NOT** short any circuits or electronic parts.  
**DO NOT** keep power ON for a long time when the transceiver is defective.
4. **NEVER** directly transmit power into any test equipment such as Standard Signal Generator, otherwise the RF power may damage them.
5. **ALWAYS** connect a 30 dB to 40 dB attenuator between the transceiver and such test equipment.
6. **READ** the instructions of the test equipment thoroughly before connecting it to the transceiver.
7. If the front panel and chassis are separated and reassembled, waterproof performance will not be guaranteed unless the specified waterproof check is performed.



---

## TABLE OF CONTENTS

---

|                  |                                 |      |
|------------------|---------------------------------|------|
| <b>SECTION 1</b> | <b>SPECIFICATIONS</b>           |      |
| <b>SECTION 2</b> | <b>INSIDE VIEWS</b>             |      |
| <b>SECTION 3</b> | <b>DISASSEMBLY INSTRUCTIONS</b> |      |
| <b>SECTION 4</b> | <b>ADJUSTMENT PROCEDURE</b>     |      |
| 4-1              | PREPARATION .....               | 4-1  |
| 4-2              | FREQUENCY ADJUSTMENTS .....     | 4-6  |
| 4-3              | TRANSMIT ADJUSTMENTS .....      | 4-8  |
| 4-4              | RECEIVE ADJUSTMENTS .....       | 4-14 |
| 4-5              | AFTER THE ADJUSTMENT .....      | 4-19 |
| <b>SECTION 5</b> | <b>SPARE UNITS AND PARTS</b>    |      |
| <b>SECTION 6</b> | <b>BOARD LAYOUT</b>             |      |
| <b>SECTION 7</b> | <b>BLOCK DIAGRAM</b>            |      |
| <b>SECTION 8</b> | <b>VOLTAGE DIAGRAM</b>          |      |

# SECTION 1

# SPECIFICATIONS

| MODEL     | VERSION | FREQUENCY<br>COVERAGE (MHz) | CORRESPONDING<br>MEASUREMENT STANDARD |                  |
|-----------|---------|-----------------------------|---------------------------------------|------------------|
| IC-F2000  | EUR-09  | 400~470                     | EN 300 086, EN 300 296                |                  |
|           | UK-09   |                             |                                       |                  |
|           | EXP-09  |                             | RSS-119                               |                  |
| IC-F2000S | EUR-09  |                             | EN 300 086, EN 300 296                |                  |
|           | UK-09   |                             |                                       |                  |
|           | EXP-09  |                             | RSS-119                               |                  |
| IC-F2000T | EUR-09  |                             | EN 300 086, EN 300 296                |                  |
|           | UK-09   |                             |                                       |                  |
|           | EXP-09  |                             |                                       |                  |
|           | EXP-10  |                             | RSS-119                               |                  |
| IC-F2000  | EXP-11  | 450~520                     | TIA-603 equivalent                    |                  |
| IC-F2000S |         |                             |                                       |                  |
| IC-F2000T |         |                             |                                       |                  |
| IC-F2000  | AUS-09  | 400~470                     | AS/NZS 4295                           |                  |
| IC-F2000S |         |                             |                                       |                  |
| IC-F2000T |         |                             |                                       |                  |
| IC-F2000  | AUS-10  | 450~520                     |                                       |                  |
| IC-F2000S |         |                             |                                       |                  |
| IC-F2000T |         |                             |                                       |                  |
| IC-F2000  | UAS-07  | 400~470                     |                                       | TIA-603, RSS-119 |
| IC-F2000S |         |                             |                                       |                  |
| IC-F2000T |         |                             |                                       |                  |
| IC-F2000  | USA-08  | 450~512                     | TIA-603                               |                  |
| IC-F2000S |         |                             |                                       |                  |
| IC-F2000T |         |                             |                                       |                  |

## ■ GENERAL

- **Frequency coverage:** See the table shown above.
- **Number of conventional channels:** 16 channels (Non-display type)  
128 channels (4-key and 10-key types)
- **Type of emission:**

|        |                     |                                       |
|--------|---------------------|---------------------------------------|
| Wide   | 16K0F3E (25.0 kHz)  | (EN 300 086, EN 300 296, AZ/NZS 4295) |
| Middle | 14K0F3E (20.0 kHz)  | (EN 300 086, EN 300 296)              |
| Narrow | 11K50F3E (12.5 kHz) | (TIA-603, RSS-119)                    |
|        | 8K50F3E (12.5 kHz)  | (EN 300 086, EN 300 296, AZ/NZS 4295) |
- **Antenna impedance:** 50 Ω (nominal)
- **Operating temperature range:**

|                            |                                 |
|----------------------------|---------------------------------|
| -25°C~+55°C                | (EN 300 086, EN 300 296)        |
| -30°C~+60°C (-22°F~+140°F) | (TIA-603, RSS-119, AZ/NZS 4295) |
- **Power supply voltage:** Specified Icom's battery packs only, 7.5 V DC (negative ground)
- **Current drain (approximate):**

|              |                                                      |
|--------------|------------------------------------------------------|
| Receiving    | 80 mA (stand-by)                                     |
|              | 500 mA (at maximum audio, with the internal speaker) |
| Transmitting | 1300 mA (at 4 W)                                     |
- **Dimensions (projections not included):**

|             |                                                                |
|-------------|----------------------------------------------------------------|
| With BP-278 | 52.2 (W)×111.8 (H)×22.3 (D) mm, 2.1 (W)×4.4 (H)×0.9 (D) inches |
| With BP-279 | 52.2 (W)×111.8 (H)×24.5 (D) mm, 2.1 (W)×4.4 (H)×1.0 (D) inches |
| With BP-280 | 52.2 (W)×111.8 (H)×30.3 (D) mm, 2.1 (W)×4.4 (H)×1.2 (D) inches |
- **Weight (approximate):**

|             |               |
|-------------|---------------|
| With BP-278 | 230 g, 8.1 oz |
| With BP-279 | 240 g, 8.5 oz |
| With BP-280 | 270 g, 9.5 oz |

## ■ TRANSMITTER

|                                         |              |                                         |                                       |
|-----------------------------------------|--------------|-----------------------------------------|---------------------------------------|
| • <b>Output power:</b>                  |              | 4 W                                     |                                       |
| • <b>Modulation:</b>                    |              | Variable reactance frequency modulation |                                       |
| • <b>Maximum permissible deviation:</b> |              |                                         |                                       |
|                                         | Wide         | ±5.0 kHz                                |                                       |
|                                         | Middle       | ±4.0 kHz                                |                                       |
|                                         | Narrow       | ±2.5 kHz                                |                                       |
| • <b>Frequency stability:</b>           |              | ±2.5 ppm                                |                                       |
| • <b>Spurious emissions:</b>            |              | 0.25 µW (≤1 GHz)                        | (EN 300 086, EN 300 296, AZ/NZS 4295) |
|                                         |              | 1.0 µW (>1 GHz)                         | (EN 300 086, EN 300 296, AZ/NZS 4295) |
|                                         |              | 70 dB minimum                           | (TIA-603, RSS-119)                    |
| • <b>Adjacent channel selectivity:</b>  |              |                                         |                                       |
|                                         | Wide, Middle | 70 dB minimum, 74 dB typical            |                                       |
|                                         | Narrow       | 60 dB minimum, 69 dB typical            |                                       |
| • <b>Audio harmonic distortion:</b>     |              |                                         |                                       |
|                                         | Wide, Middle | 1.0% typical at AF 1 kHz 40% deviation  |                                       |
|                                         | Narrow       | 1.5% typical at AF 1 kHz 40% deviation  |                                       |
| • <b>FM hum and Noise:</b>              |              |                                         |                                       |
| With CCITT Filter                       | Wide         | 45 dB minimum, 53 dB typical            | (EN 300 086, EN 300 296)              |
|                                         | Middle       | 43 dB minimum, 51 dB typical            | (EN 300 086, EN 300 296)              |
|                                         | Narrow       | 40 dB minimum, 48 dB typical            | (EN 300 086, EN 300 296)              |
| Without CCITT Filter                    | Wide         | 40 dB minimum, 46 dB typical            | (AZ/NZS 4295)                         |
|                                         | Narrow       | 34 dB minimum, 40 dB typical            | (TIA-603, RSS-119, AZ/NZS 4295)       |
| • <b>Input impedance (Microphone):</b>  |              | 2.2 kΩ                                  |                                       |

## ■ RECEIVER

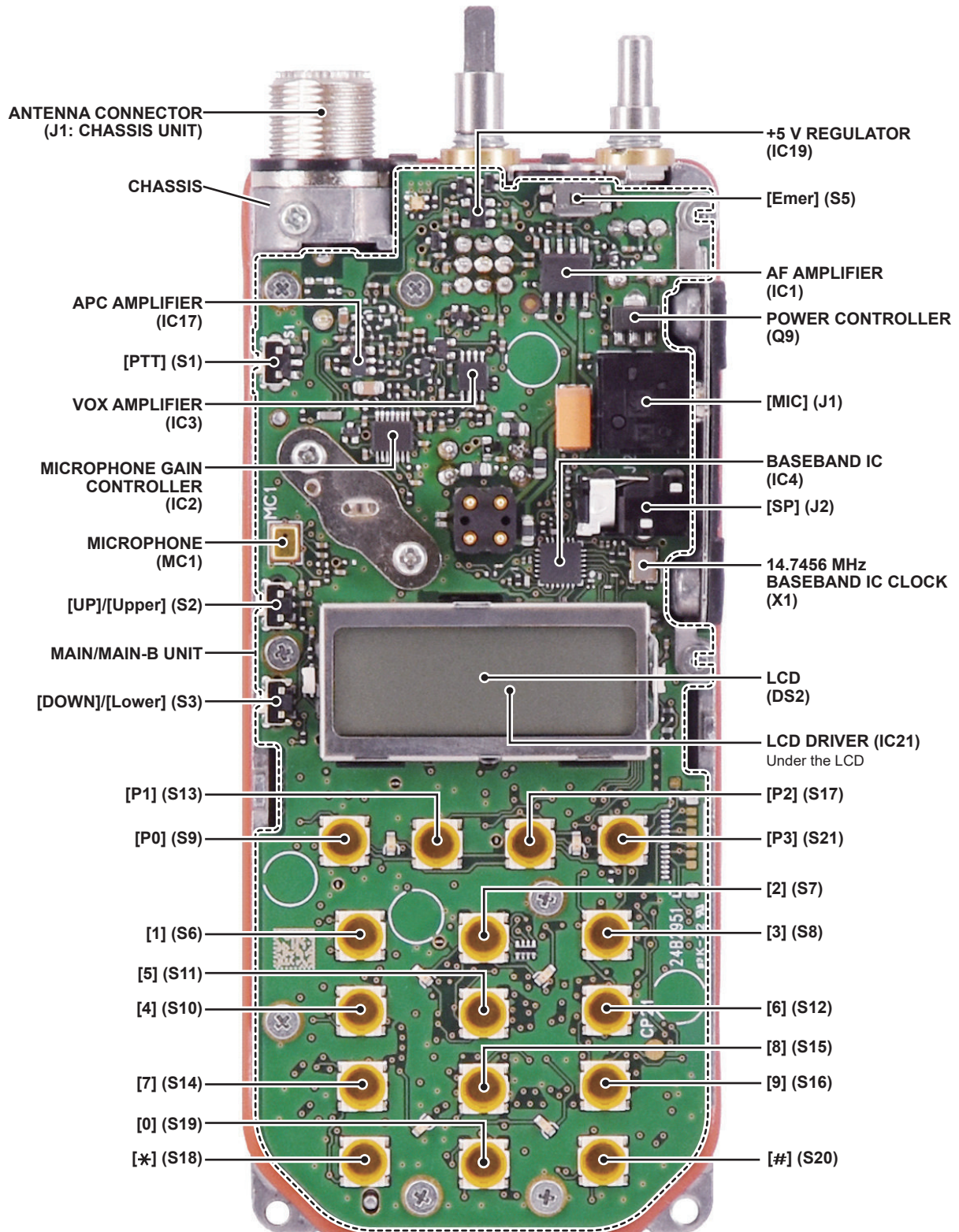
|                                           |                  |                                                    |                                 |
|-------------------------------------------|------------------|----------------------------------------------------|---------------------------------|
| • <b>Intermediate frequencies:</b>        |                  | 1st 46.35 MHz                                      |                                 |
|                                           |                  | 2nd 450 kHz                                        |                                 |
| • <b>Sensitivity:</b>                     |                  | -4 dBµV emf typical at 20 dB SINAD                 | (EN 300 086)                    |
|                                           |                  | 0.25 µV* typical at 12 dB SINAD                    | (TIA-603, RSS-119, AS/NZS 4295) |
| • <b>Squelch sensitivity (threshold):</b> |                  | -8 dBµV emf typical                                | (EN 300 086)                    |
|                                           |                  | 0.25 µV* typical                                   | (TIA-603, RSS-119, AS/NZS 4295) |
| • <b>Adjacent channel selectivity:</b>    |                  |                                                    |                                 |
|                                           | Wide             | 70 dB minimum, 75 dB typical                       |                                 |
|                                           | Middle           | 70 dB minimum, 73 dB typical                       |                                 |
|                                           | Narrow           | 60 dB minimum, 67 dB typical                       |                                 |
| • <b>Spurious response:</b>               |                  | 70 dB minimum                                      |                                 |
| • <b>Intermodulation:</b>                 |                  | 65 dB minimum                                      | (EN 300 086)                    |
|                                           |                  | 70 dB minimum, 73 dB typical                       | (TIA-603, RSS-119, AS/NZS 4295) |
| • <b>Hum and Noise:</b>                   |                  |                                                    |                                 |
| With CCITT Filter                         | Wide             | 45 dB minimum, 52 dB typical                       | (EN 300 086)                    |
|                                           | Middle           | 43 dB minimum, 50 dB typical                       | (EN 300 086)                    |
|                                           | Narrow           | 40 dB minimum, 47 dB typical                       | (EN 300 086)                    |
| Without CCITT Filter                      | Wide             | 40 dB minimum, 46 dB typical                       | (AS/NZS 4295)                   |
|                                           | Narrow           | 34 dB minimum, 40 dB typical                       | (TIA-603, RSS-119, AS/NZS 4295) |
| • <b>Audio output power:</b>              | Internal speaker | 1.5 W typical (at 5% distortion into the 8 Ω load) |                                 |
|                                           | External speaker | 0.4 W typical (at 5% distortion into an 8 Ω load)  |                                 |
| • <b>Output impedance (Speaker):</b>      |                  | 8 Ω                                                |                                 |

\*The input signal strength level of this receive sensitivity is measured at the load end (PD).

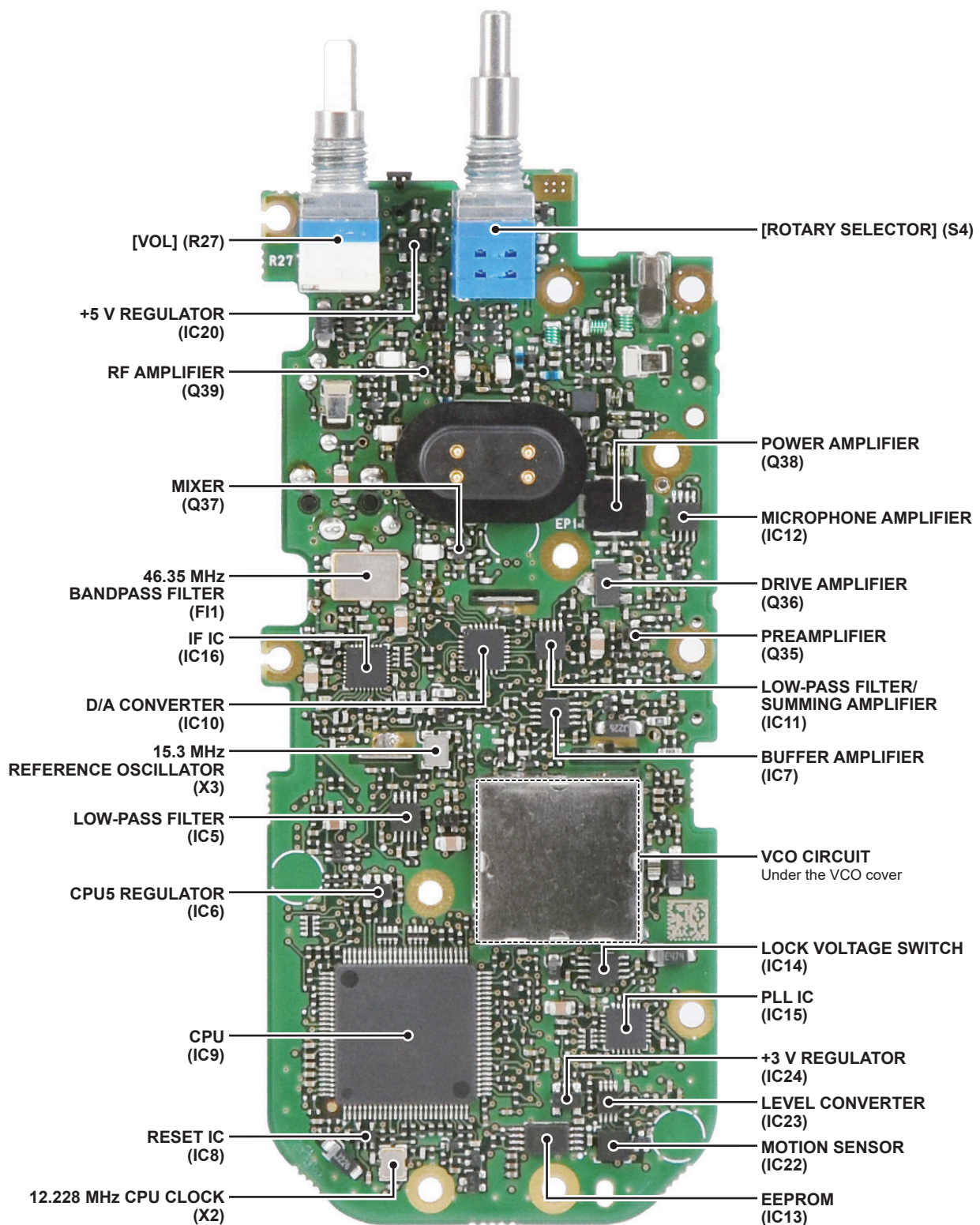
All stated specifications are subject to change without notice or obligation.



## • MAIN/MAIN-A UNIT (TOP VIEW)



• MAIN/MAIN-B UNIT (BOTTOM VIEW)

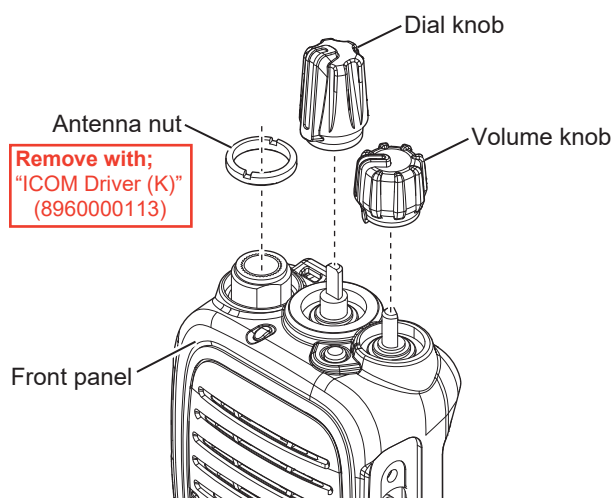




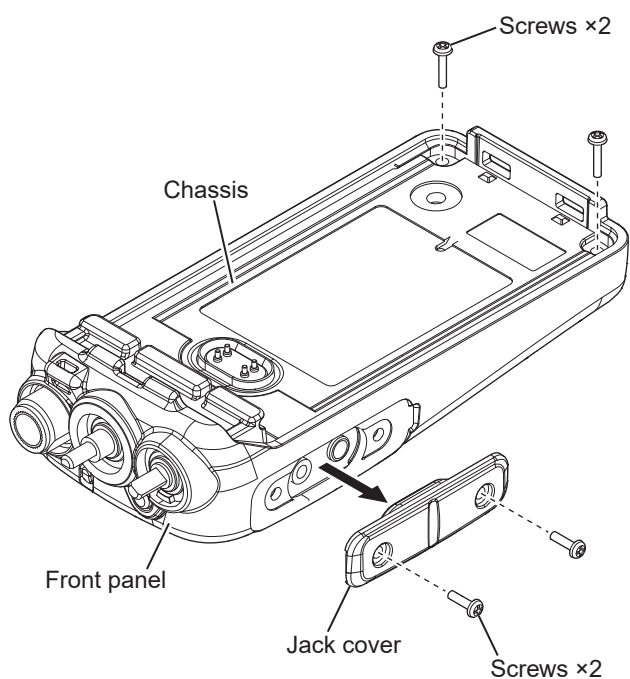
## SECTION 3 DISASSEMBLY INSTRUCTIONS

### 1. REMOVING THE FRONT PANEL

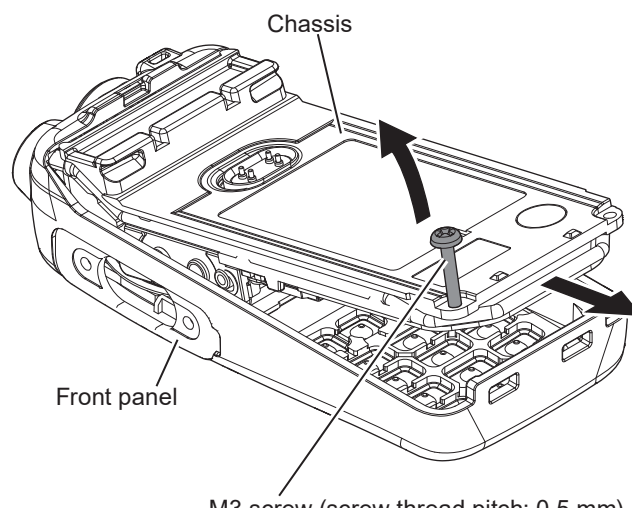
- 1) Remove the dial knob, volume knob and antenna nut from the top of the front panel.



- 2) Remove the 2 screws from the bottom of chassis. Remove the 2 screws from the jack cover, and then remove the jack cover from the front panel.



- 3) Screw just the end the M3 screw into the screw hole in the chassis, and then remove the chassis from the front panel.

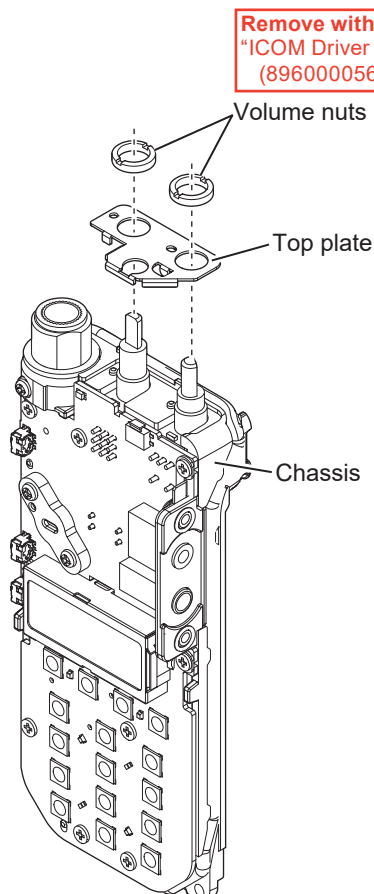


M3 screw (screw thread pitch: 0.5 mm)

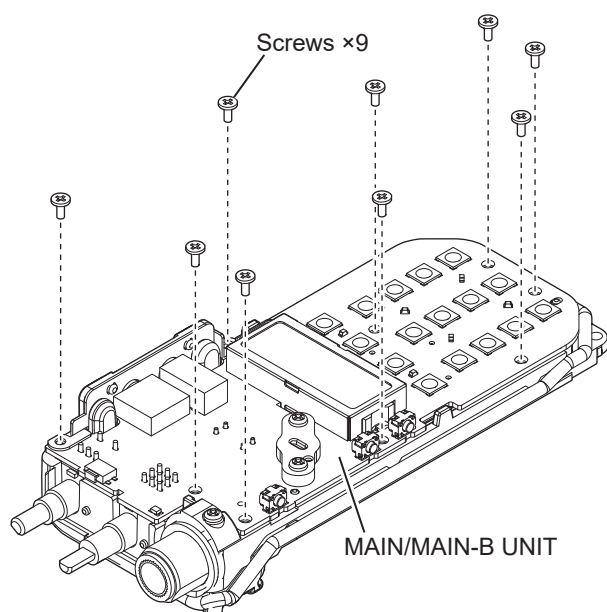
The M3 screws are commercially available. When ordering parts, the following parts are recommended.  
"PH M3×16 SUS" (8810000620)

## 2. REMOVING THE MAIN/MAIN-B UNIT

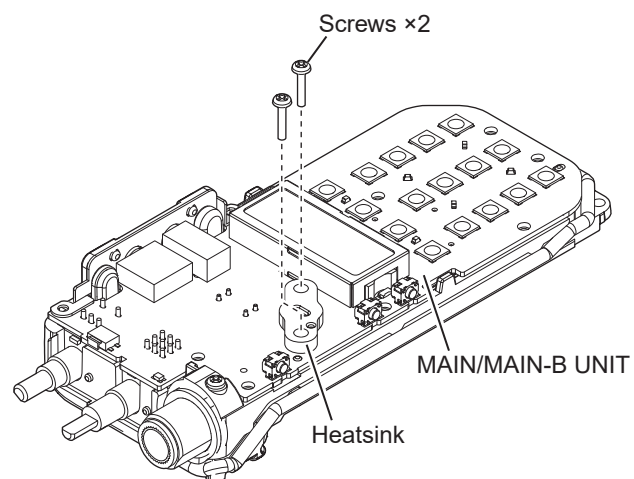
- 1) Remove the 2 volume nuts from the top of the chassis, and then remove the top plate.



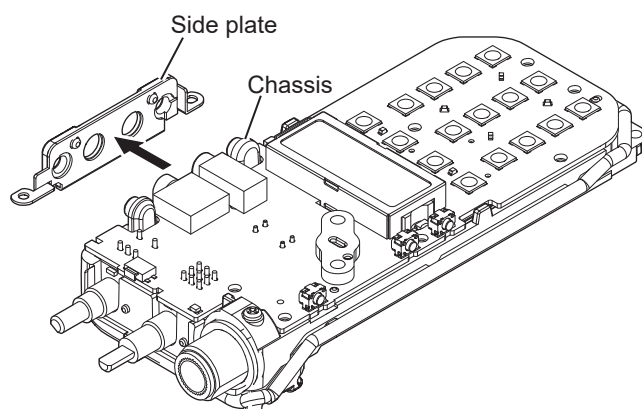
- 2) Remove the 9 screws from the MAIN/MAIN-B UNIT.



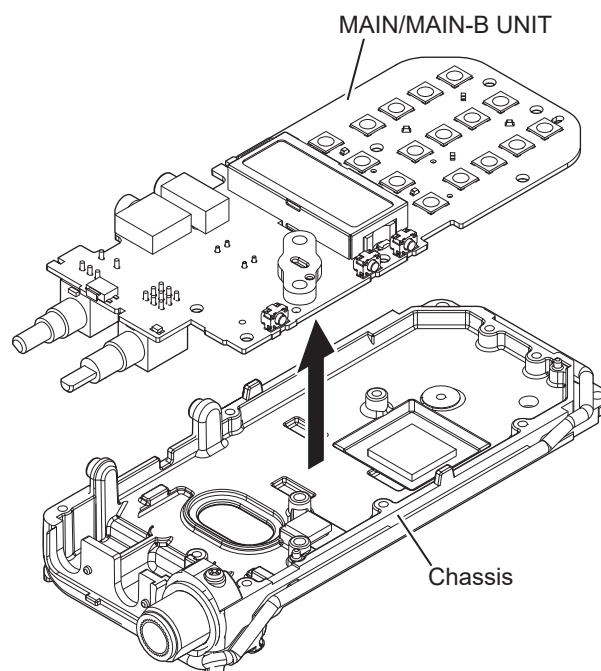
- 3) Remove the 2 screws from the heatsink of MAIN/MAIN-B UNIT.



- 4) Remove the side plate from the chassis.



- 5) Remove the MAIN/MAIN-B UNIT from the chassis.



## SECTION 4 ADJUSTMENT PROCEDURE

### 4-1 PREPARATION

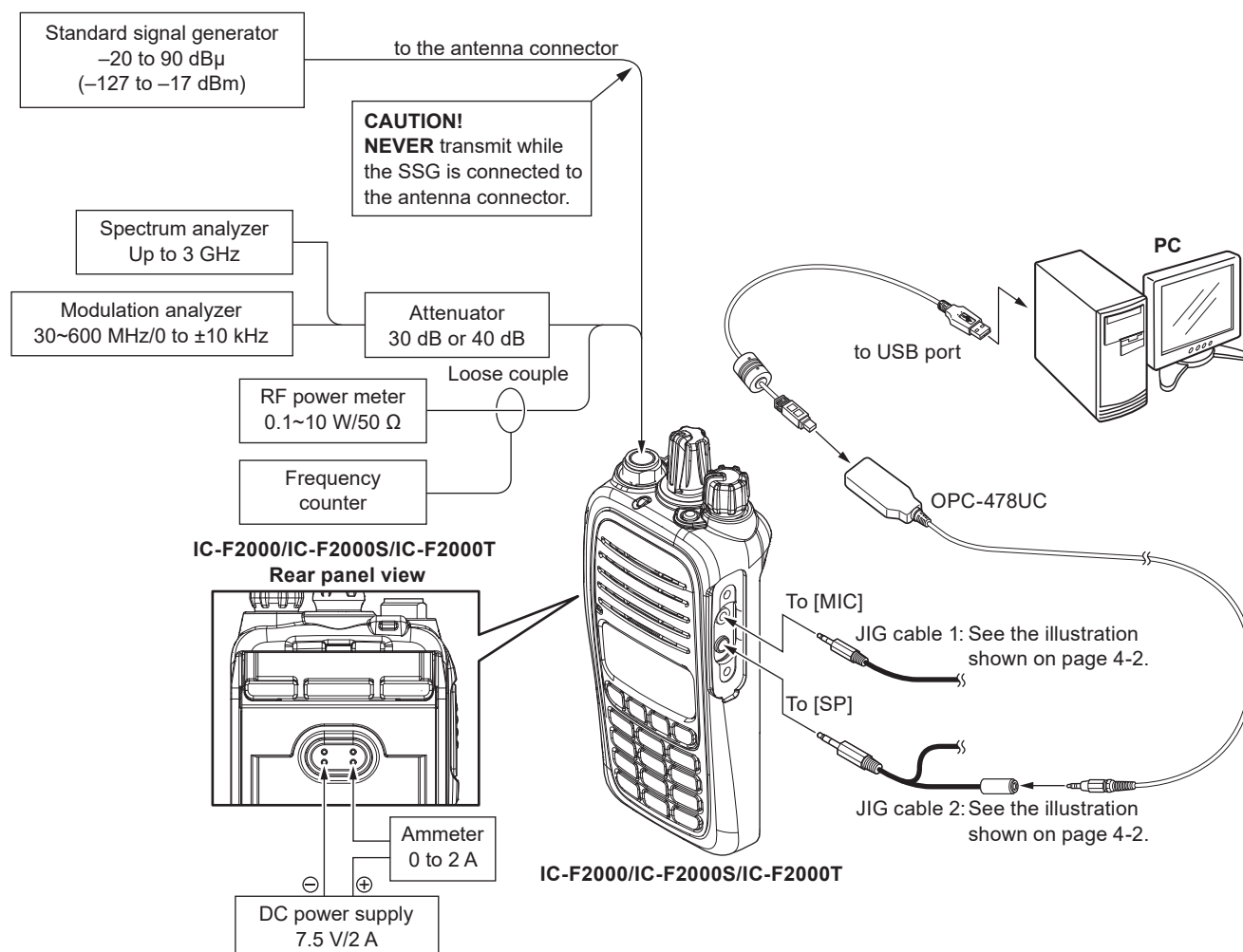
#### ■ REQUIRED EQUIPMENT

| EQUIPMENT                        | GRADE AND RANGE                                                                     | EQUIPMENT                       | GRADE AND RANGE                                                               |
|----------------------------------|-------------------------------------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------|
| Programming software             | CS-F2000 PROGRAMMING SOFTWARE (Revision 1.31 or later)                              | Programming cable               | OPC-478UC                                                                     |
| DC power supply                  | Output voltage: 7.5 V<br>Current capacity: More than 2 A                            | Standard signal generator (SSG) | Frequency range: 0.1~600 MHz<br>Output level: -20 to 90 dBμ (-127 to -17 dBm) |
| RF power meter (50 Ω terminated) | Measuring range: 0.1~10 W<br>Frequency range: 100~600 MHz<br>SWR: Less than 1.2 : 1 | AC millivoltmeter               | Measuring range: 10 mV to 10 V                                                |
| Modulation analyzer              | Frequency range: 30~600 MHz<br>Measuring range: 0 to ±10 kHz                        | Frequency counter               | Range: 0.1~600 MHz<br>Accuracy: ±1 ppm or better                              |
| Attenuator                       | Attenuation: 30 dB or 40 dB<br>Capacity: More than 10 W                             | Distortion meter                | Measuring accuracy: 3% or less at 1 kHz<br>Input level: 50 mV to 10 V         |
| Audio generator (AG)             | Frequency range: 300~3000 Hz<br>Output level: 1~500 mV                              | External speaker                | Input impedance: 8 Ω<br>Rated input power: More than 1 W                      |
|                                  |                                                                                     | Ammeter                         | Measuring range: 0 to 2 A                                                     |
|                                  |                                                                                     | Spectrum analyzer               | Measuring range: Up to 3 GHz                                                  |

#### ■ SAVE THE PROGRAMMING DATA

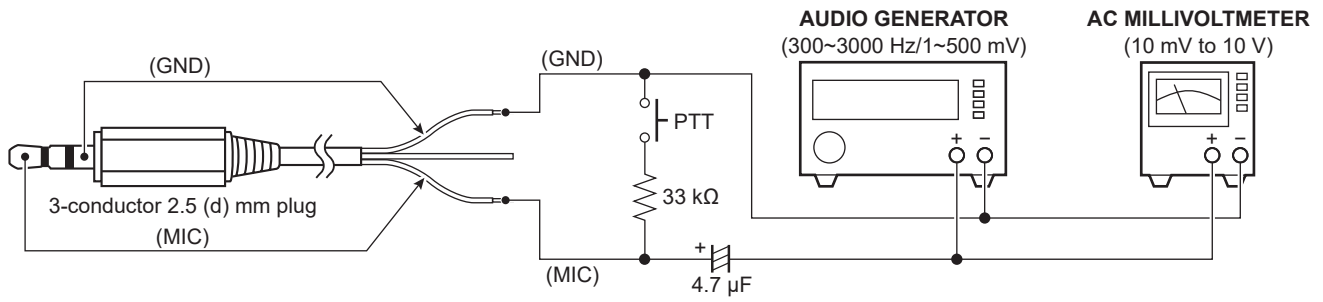
- Adjusting the transceiver will change the programming setting.
- Before adjusting, save the programming data of the transceiver with the programming software.
- ★ After adjusting, write back the programming data.

#### ■ CONNECTIONS

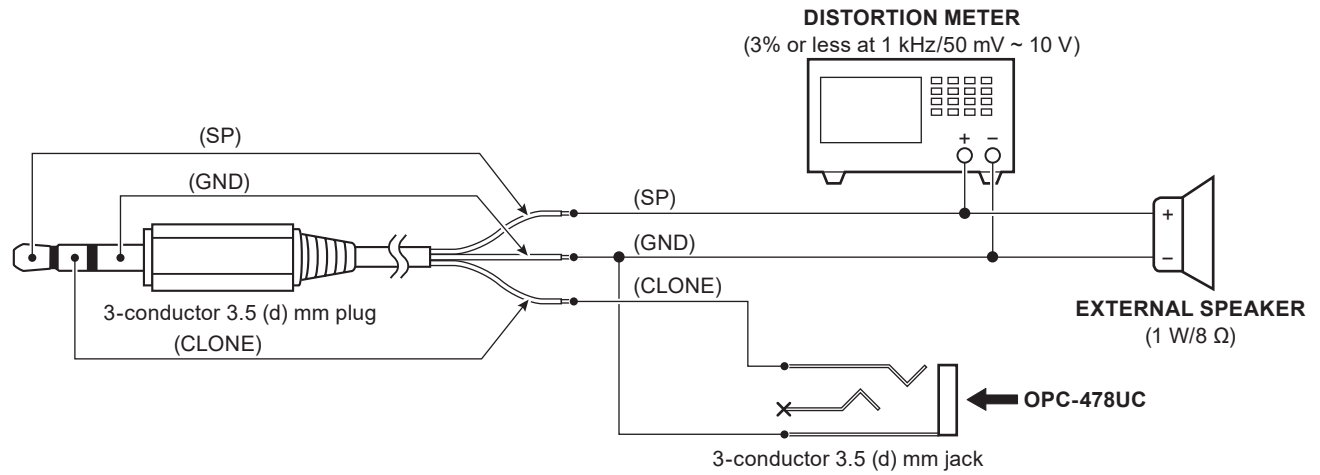


## ■ JIG

### • JIG cable 1



### • JIG cable 2



## ■ ADJUSTMENT CHANNELS

• For 400~470 MHz versions

|       |     |     | Frequency (MHz) |    |           |     |              | C.Tone |    |          |                |     |           |           |  |
|-------|-----|-----|-----------------|----|-----------|-----|--------------|--------|----|----------|----------------|-----|-----------|-----------|--|
| CH    | Atr | Inh | RX              | TX | TX<br>Inh | W/N | SQL<br>Tight | RX     | TX | Text     | Com-<br>pander | TOT | RF<br>PWR | PW<br>Sat |  |
| 1- 1  | AB  |     | 400.000000      | <- |           | N   |              |        |    | 400 H N  |                |     | H         |           |  |
| 1- 2  |     |     | 435.000000      | <- |           | N   |              |        |    | 435 H N  |                |     | H         |           |  |
| 1- 3  |     |     | 470.000000      | <- |           | N   |              |        |    | 470 H N  |                |     | H         |           |  |
| 1- 4  |     |     | 400.000000      | <- |           | N   |              |        |    | 400 L2   |                |     | L2        |           |  |
| 1- 5  |     |     | 435.000000      | <- |           | N   |              |        |    | 435 L2   |                |     | L2        |           |  |
| 1- 6  |     |     | 470.000000      | <- |           | N   |              |        |    | 470 L2   |                |     | L2        |           |  |
| 1- 7  |     |     | 400.000000      | <- |           | N   |              |        |    | 400 L1   |                |     | L1        |           |  |
| 1- 8  |     |     | 435.000000      | <- |           | N   |              |        |    | 435 L1   |                |     | L1        |           |  |
| 1- 9  |     |     | 470.000000      | <- |           | N   |              |        |    | 470 L1   |                |     | L1        |           |  |
| 1- 10 |     |     | 400.000000      | <- |           | W   |              |        |    | 400 W    |                |     | H         |           |  |
| 1- 11 |     |     | 435.000000      | <- |           | W   |              |        |    | 435 W    |                |     | H         |           |  |
| 1- 12 |     |     | 470.000000      | <- |           | W   |              |        |    | 470 W    |                |     | H         |           |  |
| 1- 13 |     |     | 400.000000      | <- |           | M   |              |        |    | 400 M    |                |     | H         |           |  |
| 1- 14 |     |     | 435.000000      | <- |           | M   |              |        |    | 435 M    |                |     | H         |           |  |
| 1- 15 |     |     | 470.000000      | <- |           | M   |              |        |    | 470 M    |                |     | H         |           |  |
| 1- 16 |     |     | 400.000000      | <- |           | N   |              | 67.0   | <- | 400ModJL |                |     | H         |           |  |
| 1- 17 |     |     | 435.000000      | <- |           | N   |              | 67.0   | <- | 435ModJL |                |     | H         |           |  |
| 1- 18 |     |     | 470.000000      | <- |           | N   |              | 67.0   | <- | 470ModJL |                |     | H         |           |  |
| 1- 19 |     |     | 400.000000      | <- |           | N   |              | 151.4  | <- | 400 CT N |                |     | H         |           |  |
| 1- 20 |     |     | 435.000000      | <- |           | N   |              | 151.4  | <- | 435 CT N |                |     | H         |           |  |
| 1- 21 |     |     | 470.000000      | <- |           | N   |              | 151.4  | <- | 470 CT N |                |     | H         |           |  |
| 1- 22 |     |     | 400.000000      | <- |           | W   |              | 151.4  | <- | 400 CT W |                |     | H         |           |  |
| 1- 23 |     |     | 435.000000      | <- |           | W   |              | 151.4  | <- | 435 CT W |                |     | H         |           |  |
| 1- 24 |     |     | 470.000000      | <- |           | W   |              | 151.4  | <- | 470 CT W |                |     | H         |           |  |
| 1- 25 |     |     | 400.000000      | <- |           | M   |              | 151.4  | <- | 400 CT M |                |     | H         |           |  |
| 1- 26 |     |     | 435.000000      | <- |           | M   |              | 151.4  | <- | 435 CT M |                |     | H         |           |  |
| 1- 27 |     |     | 470.000000      | <- |           | M   |              | 151.4  | <- | 470 CT M |                |     | H         |           |  |
| 1- 28 |     |     | 400.000000      | <- |           | N   |              | 007N   | <- | 400 DT N |                |     | H         |           |  |
| 1- 29 |     |     | 435.000000      | <- |           | N   |              | 007N   | <- | 435 DT N |                |     | H         |           |  |
| 1- 30 |     |     | 470.000000      | <- |           | N   |              | 007N   | <- | 470 DT N |                |     | H         |           |  |
| 1- 31 |     |     | 400.000000      | <- |           | W   |              | 007N   | <- | 400 DT W |                |     | H         |           |  |
| 1- 32 |     |     | 435.000000      | <- |           | W   |              | 007N   | <- | 435 DT W |                |     | H         |           |  |
| 1- 33 |     |     | 470.000000      | <- |           | W   |              | 007N   | <- | 470 DT W |                |     | H         |           |  |
| 1- 34 |     |     | 400.000000      | <- |           | M   |              | 007N   | <- | 400 DT M |                |     | H         |           |  |
| 1- 35 |     |     | 435.000000      | <- |           | M   |              | 007N   | <- | 435 DT M |                |     | H         |           |  |
| 1- 36 |     |     | 470.000000      | <- |           | M   |              | 007N   | <- | 470 DT M |                |     | H         |           |  |
| 1- 37 |     |     |                 |    |           |     |              |        |    |          |                |     |           |           |  |
| 1- 38 |     |     |                 |    |           |     |              |        |    |          |                |     |           |           |  |
| 1- 39 |     |     |                 |    |           |     |              |        |    |          |                |     |           |           |  |
| 1- 40 |     |     |                 |    |           |     |              |        |    |          |                |     |           |           |  |
| 1- 41 |     |     | 400.050000      | <- | i         | N   |              |        |    | 40005 N  |                |     | H         |           |  |
| 1- 42 |     |     | 435.050000      | <- | i         | N   |              |        |    | 43505 N  |                |     | H         |           |  |
| 1- 43 |     |     | 469.950000      | <- | i         | N   |              |        |    | 46995 N  |                |     | H         |           |  |
| 1- 44 |     |     | 400.050000      | <- | i         | W   |              |        |    | 40005 W  |                |     | H         |           |  |
| 1- 45 |     |     | 435.050000      | <- | i         | W   |              |        |    | 43505 W  |                |     | H         |           |  |
| 1- 46 |     |     | 469.950000      | <- | i         | W   |              |        |    | 46995 W  |                |     | H         |           |  |
| 1- 47 |     |     | 400.050000      | <- | i         | M   |              |        |    | 40005 M  |                |     | H         |           |  |
| 1- 48 |     |     | 435.050000      | <- | i         | M   |              |        |    | 43505 M  |                |     | H         |           |  |
| 1- 49 |     |     | 469.950000      | <- | i         | M   |              |        |    | 46995 M  |                |     | H         |           |  |



## ■ ADJUSTMENT CHANNELS (CONTINUED)

• For 450~512/520 MHz versions

| CH    | Attr | Inh | Frequency (MHz) |    |        |     | SQL Tight | C.Tone |    | Text     | Com-pander | TOT | RF PWR | PW Sa |
|-------|------|-----|-----------------|----|--------|-----|-----------|--------|----|----------|------------|-----|--------|-------|
|       |      |     | RX              | TX | TX Inh | W/N |           | RX     | TX |          |            |     |        |       |
| 1- 1  | AB   |     | 450.000000      | <- |        | N   |           |        |    | 450 H N  |            |     | H      |       |
| 1- 2  |      |     | 485.000000      | <- |        | N   |           |        |    | 455 H N  |            |     | H      |       |
| 1- 3  |      |     | 520.000000      | <- |        | N   |           |        |    | 520 H N  |            |     | H      |       |
| 1- 4  |      |     | 450.000000      | <- |        | N   |           |        |    | 450 L2   |            |     | L2     |       |
| 1- 5  |      |     | 485.000000      | <- |        | N   |           |        |    | 485 L2   |            |     | L2     |       |
| 1- 6  |      |     | 520.000000      | <- |        | N   |           |        |    | 520 L2   |            |     | L2     |       |
| 1- 7  |      |     | 450.000000      | <- |        | N   |           |        |    | 450 L1   |            |     | L1     |       |
| 1- 8  |      |     | 485.000000      | <- |        | N   |           |        |    | 485 L1   |            |     | L1     |       |
| 1- 9  |      |     | 520.000000      | <- |        | N   |           |        |    | 520 L1   |            |     | L1     |       |
| 1- 10 |      |     | 450.000000      | <- |        | W   |           |        |    | 450 W    |            |     | H      |       |
| 1- 11 |      |     | 485.000000      | <- |        | W   |           |        |    | 485 W    |            |     | H      |       |
| 1- 12 |      |     | 520.000000      | <- |        | W   |           |        |    | 520 W    |            |     | H      |       |
| 1- 13 |      |     | 450.000000      | <- |        | M   |           |        |    | 450 M    |            |     | H      |       |
| 1- 14 |      |     | 485.000000      | <- |        | M   |           |        |    | 485 M    |            |     | H      |       |
| 1- 15 |      |     | 520.000000      | <- |        | M   |           |        |    | 520 M    |            |     | H      |       |
| 1- 16 |      |     | 450.000000      | <- |        | N   |           | 67.0   | <- | 450Mod3L |            |     | H      |       |
| 1- 17 |      |     | 485.000000      | <- |        | N   |           | 67.0   | <- | 485Mod3L |            |     | H      |       |
| 1- 18 |      |     | 520.000000      | <- |        | N   |           | 67.0   | <- | 520Mod3L |            |     | H      |       |
| 1- 19 |      |     | 450.000000      | <- |        | N   |           | 151.4  | <- | 450 CT N |            |     | H      |       |
| 1- 20 |      |     | 485.000000      | <- |        | N   |           | 151.4  | <- | 485 CT N |            |     | H      |       |
| 1- 21 |      |     | 520.000000      | <- |        | N   |           | 151.4  | <- | 520 CT N |            |     | H      |       |
| 1- 22 |      |     | 450.000000      | <- |        | W   |           | 151.4  | <- | 450 CT W |            |     | H      |       |
| 1- 23 |      |     | 485.000000      | <- |        | W   |           | 151.4  | <- | 485 CT W |            |     | H      |       |
| 1- 24 |      |     | 520.000000      | <- |        | W   |           | 151.4  | <- | 520 CT W |            |     | H      |       |
| 1- 25 |      |     | 450.000000      | <- |        | M   |           | 151.4  | <- | 450 CT M |            |     | H      |       |
| 1- 26 |      |     | 485.000000      | <- |        | M   |           | 151.4  | <- | 485 CT M |            |     | H      |       |
| 1- 27 |      |     | 520.000000      | <- |        | M   |           | 151.4  | <- | 520 CT M |            |     | H      |       |
| 1- 28 |      |     | 450.000000      | <- |        | N   |           | 007N   | <- | 450 DT N |            |     | H      |       |
| 1- 29 |      |     | 485.000000      | <- |        | N   |           | 007N   | <- | 485 DT N |            |     | H      |       |
| 1- 30 |      |     | 520.000000      | <- |        | N   |           | 007N   | <- | 520 DT N |            |     | H      |       |
| 1- 31 |      |     | 450.000000      | <- |        | W   |           | 007N   | <- | 450 DT W |            |     | H      |       |
| 1- 32 |      |     | 485.000000      | <- |        | W   |           | 007N   | <- | 485 DT W |            |     | H      |       |
| 1- 33 |      |     | 520.000000      | <- |        | W   |           | 007N   | <- | 520 DT W |            |     | H      |       |
| 1- 34 |      |     | 450.000000      | <- |        | M   |           | 007N   | <- | 450 DT M |            |     | H      |       |
| 1- 35 |      |     | 485.000000      | <- |        | M   |           | 007N   | <- | 485 DT M |            |     | H      |       |
| 1- 36 |      |     | 520.000000      | <- |        | M   |           | 007N   | <- | 520 DT M |            |     | H      |       |
| 1- 37 |      |     |                 |    |        |     |           |        |    |          |            |     |        |       |
| 1- 38 |      |     |                 |    |        |     |           |        |    |          |            |     |        |       |
| 1- 39 |      |     |                 |    |        |     |           |        |    |          |            |     |        |       |
| 1- 40 |      |     |                 |    |        |     |           |        |    |          |            |     |        |       |
| 1- 41 |      |     | 450.050000      | <- | i      | N   |           |        |    | 45005 N  |            |     | H      |       |
| 1- 42 |      |     | 485.050000      | <- | i      | N   |           |        |    | 48505 N  |            |     | H      |       |
| 1- 43 |      |     | 519.950000      | <- | i      | N   |           |        |    | 51995 N  |            |     | H      |       |
| 1- 44 |      |     | 450.050000      | <- | i      | W   |           |        |    | 45005 W  |            |     | H      |       |
| 1- 45 |      |     | 485.050000      | <- | i      | W   |           |        |    | 48505 W  |            |     | H      |       |
| 1- 46 |      |     | 519.950000      | <- | i      | W   |           |        |    | 51995 W  |            |     | H      |       |
| 1- 47 |      |     | 450.050000      | <- | i      | M   |           |        |    | 45005 M  |            |     | H      |       |
| 1- 48 |      |     | 485.050000      | <- | i      | M   |           |        |    | 48505 M  |            |     | H      |       |
| 1- 49 |      |     | 519.950000      | <- | i      | M   |           |        |    | 51995 M  |            |     | H      |       |

**CONVENIENT:** The programming files for the adjustment channels described on page 4-3 and 4-4 are available.

Right-click the clip icon (  ) below, and select "Save Embedded File to Disk."

• For 400~470 MHz versions

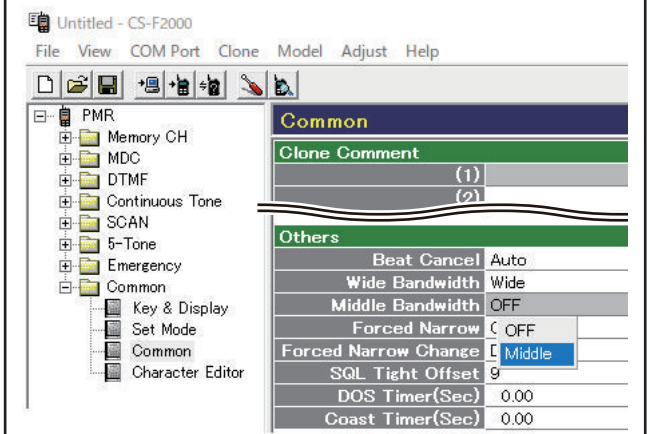


• For 450~512/520 MHz versions



**For [EUR] and [UK]:**

When adjusting and verifying the middle band, change the Middle bandwidth to "Middle," as shown below.



## ■ ADJUST UTILITY

Click to open the "I/O Check window"

Adjust Utility

Memory channel designation (for manual adjustment and verification)

ADJUST CHANNEL

TX OUTPUT POWER

MODULATION BALANCE

FM DEVIATION

CTCSS/DTCS DEVIATION

SQUELCH

REFERENCE FREQUENCY

S-METER

AUTO ADJUST CHANNEL

TX OUTPUT POWER

MODULATION BALANCE

FM DEVIATION

CTCSS/DTCS DEVIATION

RX SENSITIVITY

PLL LOCK VOLTAGE

Setting

CH No. 1 RX=450.05000, TX=450.05000 RF Power=High, Mode=Narrow

Adjust

Power (Hi) 143 [#####]

Power (L2) 108 [#####]

Power (L1) 82 [#####]

BAL (Wide) 79 [#####]

BAL (Mid) 79 [#####]

BAL (Narrow) 79 [#####]

MOD (Wide) 98 [#####]

MOD (Mid) 99 [#####]

MOD (Narrow) 99 [#####]

TONE (Wide) 92 [#####]

TONE (Mid) 94 [#####]

TONE (Narrow) 94 [#####]

SQL 65 [#####]

REF 132 [#####]

BPF T1 62 [#####]

BPF T2 74 [#####]

RX LVA 97 [#####]

TX LVA 76 [#####]

RSSI 66 [Enter] to Capture

Password

Memory channel designation (for automatic adjustment)

Auto Adjust Setting

CH No. FL 1 RX=450.05000, TX=450.05000

CH No. FC 2 RX=485.05000, TX=485.05000

CH No. FH 3 RX=511.95000, TX=511.95000

Auto Adjust

Power Start [Enter] to Prepare

Power FL [#####]

Power FC [#####]

Power FH [#####]

BAL Start [Enter] to Prepare

BAL FL [#####]

BAL FC [#####]

BAL FH [#####]

MOD Start [Enter] to Prepare

MOD FL [#####]

MOD FC [#####]

MOD FH [#####]

TONE Start [Enter] to Prepare

TONE FL [#####]

TONE FC [#####]

TONE FH [#####]

BPF Start [Enter] to Prepare

BPF T2 FL [#####]

BPF T1 FL [#####]

BPF T2 FC [#####]

BPF T1 FC [#####]

BPF T2 FH [#####]

BPF T1 FH [#####]

RX LVA Start [Enter] to Prepare

RX LVA FL [#####]

RX LVA FH [#####]

LV (RX LVA FL) 51 1.00V

LV (RX LVA FH) 255 5.00V

TX LVA Start [Enter] to Prepare

TX LVA FL [#####]

TX LVA FH [#####]

LV (TX LVA FL) 51 1.00V

LV (TX LVA FH) 194 3.80V

If the window below appears, the utility is password-protected.  
Ask the person who set the password.  
Enter the password to open the "Adjust Utility" window.

Adjust Read Password

Enter Password for Adjust Read

OK Cancel

## 4-2 FREQUENCY ADJUSTMENTS

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                             |    | TRANSCIEVER'S<br>CONDITION | OPERATION                                                             | ADJUSTMENT<br>ITEM | VALUE                                                                                     |
|----------------------------------------|----|----------------------------|-----------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------|
| PLL LOCK<br>VOLTAGE<br>- Preparation - | 1  | —                          | • Set the preset memory channel numbers on the adjust utility window. | [CH No. FL]        | 1                                                                                         |
|                                        |    |                            |                                                                       | [CH No. FC]        | 2                                                                                         |
|                                        |    |                            |                                                                       | [CH No. FH]        | 3                                                                                         |
|                                        | 2  |                            | • Verify or set the preset value on the adjust utility window.        | [LV (RX LVA FL)]   | 1.0 V                                                                                     |
|                                        |    |                            |                                                                       | [LV (TX LVA FL)]   |                                                                                           |
|                                        |    |                            |                                                                       | [LV (RX LVA FH)]   | For 400~470 MHz versions: 2.75 V                                                          |
|                                        |    |                            |                                                                       |                    | For 450~512/520 MHz versions: 255<br>(The value is the fixed setting value for the item.) |
|                                        |    |                            |                                                                       | [LV (TX LVA FH)]   | 3.8 V                                                                                     |
| - Adjustment -<br>(RX Band low)        | 3  | —                          | • Connect the RF power meter to the antenna connector.                | [RX LVA Start]     | Push [ENTER]<br>(Enters the Adjustment mode)                                              |
|                                        | 4  | • Receiving                |                                                                       | [RX LVA FL]        | Push [ENTER]<br>(Automatic adjustment)                                                    |
|                                        | 5  | —                          |                                                                       | [RX LVA Start]     | Push [ENTER]<br>(Saves the value)                                                         |
| (RX Band high)                         | 6  | • Receiving                |                                                                       | [RX LVA FH]        | Push [ENTER]<br>(Automatic adjustment)                                                    |
|                                        | 7  | —                          |                                                                       | [RX LVA Start]     | Push [ENTER]<br>(Saves the value)                                                         |
| (TX Band low)                          | 8  | —                          |                                                                       | [TX LVA Start]     | Push [ENTER]<br>(Enters the Adjustment mode)                                              |
|                                        | 9  | • Transmitting             |                                                                       | [TX LVA FL]        | Push [ENTER]<br>(Automatic adjustment)                                                    |
|                                        | 10 | —                          |                                                                       | [TX LVA Start]     | Push [ENTER]<br>(Saves the value)                                                         |
| (TX Band high)                         | 11 | • Transmitting             |                                                                       | [TX LVA FH]        | Push [ENTER]<br>(Automatic adjustment)                                                    |
|                                        | 12 | —                          |                                                                       | [TX LVA Start]     | Push [ENTER]<br>(Saves the value)                                                         |

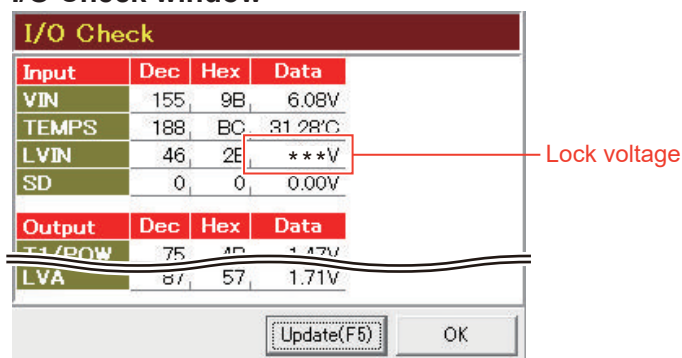
Continued on the next page...

## 4-2 FREQUENCY ADJUSTMENTS (CONTINUED)

- 1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.
- 2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                                                        | TRANSCEIVER'S CONDITION | OPERATION                                                                                                                                                                                                                                                                  | ADJUSTMENT ITEM                              | VALUE                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <b>PLL LOCK VOLTAGE</b><br>- Verification -<br>(RX Band low)<br>(RX Band high)<br>(TX Band low)<br>(TX Band high) | 13                      | <ul style="list-style-type: none"> <li>Click  button to display the "I/O Check" window as shown below.</li> <li>Click [Update (F5)] to re-load the latest value for each item.</li> </ul> | <b>[LVIN]</b><br>(On the "I/O Check" window) | <b>For 400~470 MHz versions:</b> 0.9~1.1 V<br><br><b>For 450~512/520 MHz versions:</b> 0.8~1.2 V                           |
|                                                                                                                   | 14                      |                                                                                                                                                                                                                                                                            |                                              | <b>For 400~470 MHz versions:</b> 2.55~2.95 V<br><br><b>For 450~512/520 MHz versions:</b> Less than 4.0 V                   |
|                                                                                                                   | 15                      |                                                                                                                                                                                                                                                                            |                                              | <b>For 400~470 MHz versions:</b> 0.9~1.1 V<br><br><b>For 450~512/520 MHz versions:</b> 0.8~1.2 V                           |
|                                                                                                                   | 16                      |                                                                                                                                                                                                                                                                            |                                              | 3.6~4.0 V                                                                                                                  |
| <b>REFERENCE FREQUENCY</b><br>- Adjustment -<br>(Band high)<br>- Verification -<br>(Band low)<br>(Band center)    | 1                       | <ul style="list-style-type: none"> <li>Loosely couple the frequency counter to the antenna connector.</li> </ul>                                                                                                                                                           | <b>[REF Data]</b>                            | <b>For 400~470 MHz versions:</b> 470.000000 MHz (±500 Hz)<br><b>For 450~512/520 MHz versions:</b> 520.000000 MHz (±500 Hz) |
|                                                                                                                   | 2                       |                                                                                                                                                                                                                                                                            |                                              | <b>For 400~470 MHz versions:</b> 400.000000 MHz (±500 Hz)<br><b>For 450~512/520 MHz versions:</b> 450.000000 MHz (±500 Hz) |
|                                                                                                                   | 3                       |                                                                                                                                                                                                                                                                            |                                              | <b>For 400~470 MHz versions:</b> 435.000000 MHz (±500 Hz)<br><b>For 450~512/520 MHz versions:</b> 485.000000 MHz (±500 Hz) |

### • I/O Check window



| I/O Check |     |     |         |
|-----------|-----|-----|---------|
| Input     | Dec | Hex | Data    |
| VIN       | 155 | 9B  | 6.08V   |
| TEMPS     | 188 | BC  | 31.28°C |
| LVIN      | 46  | 2E  | ***V    |
| SD        | 0   | 0   | 0.00V   |
|           |     |     |         |
| Output    | Dec | Hex | Data    |
| TX/POW    | 75  | 4D  | 1.47V   |
| LVA       | 87  | 57  | 1.71V   |

Update(F5) OK

(The values shown above are only examples.  
Each transceiver has own values.)

### 4-3 TRANSMIT ADJUSTMENTS

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                     |    | TRANSCIVER'S<br>CONDITION     | OPERATION                                                                        | ADJUSTMENT<br>ITEM | VALUE                                                                                                                                                |
|--------------------------------------------------------------------------------|----|-------------------------------|----------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TX OUTPUT<br/>POWER</b><br>- Preparation -                                  | 1  | —                             | • Set the preset memory channel numbers on the adjust utility window.            | [CH No. FL]        | 1                                                                                                                                                    |
|                                                                                |    |                               |                                                                                  | [CH No. FC]        | 2                                                                                                                                                    |
|                                                                                |    |                               |                                                                                  | [CH No. FH]        | 3                                                                                                                                                    |
| - Adjustment -<br>(High power,<br>Band low)                                    | 2  | —                             | • Connect the RF power meter to the antenna connector.                           | [Power Start]      | Push [ENTER]<br>(Enters the Adjustment mode)                                                                                                         |
|                                                                                | 3  | • Transmitting                |                                                                                  | [Power FL]         | 4.0 W                                                                                                                                                |
|                                                                                | 4  | —                             |                                                                                  | [Power Start]      | Push [ENTER]<br>(Saves the value)                                                                                                                    |
| (High power,<br>Band center)                                                   | 5  | • Transmitting                |                                                                                  | [Power FC]         | 4.0 W                                                                                                                                                |
|                                                                                | 6  | —                             |                                                                                  | [Power Start]      | Push [ENTER]<br>(Saves the value)                                                                                                                    |
| (High power,<br>Band high)                                                     | 7  | • Transmitting                |                                                                                  | [Power (FH)]       | 4.0 W                                                                                                                                                |
|                                                                                | 8  | —                             |                                                                                  | [Power Start]      | Push [ENTER]<br>(Saves the value)                                                                                                                    |
| (L2 power,<br>Band low)                                                        | 9  | • CH No.: 4<br>• Transmitting |                                                                                  | [Power (L2)]       | 2.0 W                                                                                                                                                |
| (L1 power,<br>Band low)                                                        | 10 | • CH No.: 7<br>• Transmitting |                                                                                  | [Power (L1)]       | 1.0 W                                                                                                                                                |
| - Verification -<br>(High power,<br>Band low)                                  | 11 | • CH No.: 1<br>• Transmitting |                                                                                  | —                  | 3.0~5.0 W                                                                                                                                            |
| (High power,<br>Band center)                                                   | 12 | • CH No.: 2<br>• Transmitting | —                                                                                | —                  | 1.0~3.0 W                                                                                                                                            |
| (High power,<br>Band high)                                                     | 13 | • CH No.: 3<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (L2 power,<br>Band low)                                                        | 14 | • CH No.: 4<br>• Transmitting |                                                                                  |                    | 0.5~2.0 W                                                                                                                                            |
| (L2 power,<br>Band center)                                                     | 15 | • CH No.: 5<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (L2 power,<br>Band high)                                                       | 16 | • CH No.: 6<br>• Transmitting |                                                                                  |                    | 0.5~2.0 W                                                                                                                                            |
| (L1 power,<br>Band low)                                                        | 17 | • CH No.: 7<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (L1 power,<br>Band center)                                                     | 18 | • CH No.: 8<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (L1 power,<br>Band high)                                                       | 19 | • CH No.: 9<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| <b>FLOWING<br/>CURRENT</b><br>- Verification -<br>(High power,<br>Band low)    | 1  | • CH No.: 1<br>• Transmitting | • Connect the ammeter between the transceiver and the DC power supply.           | —                  | Less than 1.7 A                                                                                                                                      |
| (High power,<br>Band center)                                                   | 2  | • CH No.: 2<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (High power,<br>Band high)                                                     | 3  | • CH No.: 3<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| <b>SPURIOUS<br/>EMISSIONS</b><br>- Verification -<br>(High power,<br>Band low) | 1  | • CH No.: 1<br>• Transmitting | • Connect the spectrum analyzer to the antenna connector through the attenuator. | —                  | Less than 70 dBc* <sup>1</sup><br><br>Less than 0.25 $\mu$ W* <sup>2</sup><br>( $\leq 1$ GHz)<br>Less than 1.0 $\mu$ W* <sup>2</sup><br>( $> 1$ GHz) |
| (High power,<br>Band center)                                                   | 2  | • CH No.: 2<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |
| (High power,<br>Band high)                                                     | 3  | • CH No.: 3<br>• Transmitting |                                                                                  |                    |                                                                                                                                                      |

Continued on the next page...

\*<sup>1</sup>For only [USA].

\*<sup>2</sup>For other than [USA].

### 4-3 TRANSMIT ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                              |                                              | TRANSCIVER'S<br>CONDITION                | OPERATION                                                                                                                                                                                                                                                                                                                                         | ADJUSTMENT<br>ITEM     | VALUE                                        |
|-----------------------------------------|----------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------|
| <b>FM DEVIATION</b><br>- Preparation -  | 1                                            | • Set [Mic Gain] to "2" in the Set mode. |                                                                                                                                                                                                                                                                                                                                                   | <b>[Mic Gain]</b>      | 2                                            |
|                                         | 2                                            | —                                        | • Set the preset memory channel numbers on the adjust utility window.                                                                                                                                                                                                                                                                             | <b>[CH No. FL]</b>     | 1                                            |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[CH No. FC]</b>     | 2                                            |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[CH No. FH]</b>     | 3                                            |
| <b>- Adjustment - Narrow (Band low)</b> | 3                                            | —                                        | • Connect the modulation analyzer to the antenna connector through the attenuator, and set it to:<br>HPF: OFF<br>LPF: 20 kHz<br>De-emphasis: OFF<br>Detector: (P-P)/2<br><br>• Connect the audio generator and AC millivoltmeter to [MIC] through the JIG cable 1, and set it to:<br>Frequency: 1 kHz<br>Waveform: Sine wave<br>Level: 150 mV rms | <b>[MOD Start]</b>     | Push [ENTER]<br>(Enters the Adjustment mode) |
|                                         | 4                                            | • Transmitting                           |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD FL]</b>        | ±2.10 kHz<br>(±0.05 kHz)                     |
|                                         | 5                                            | —                                        |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         | <b>(Band center)</b>                         | 6 • Transmitting                         |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD FC]</b>        | ±2.10 kHz<br>(±0.05 kHz)                     |
|                                         |                                              | 7 —                                      |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         | <b>(Band high)</b>                           | 8 • Transmitting                         |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD FH]</b>        | ±2.05 kHz<br>(±0.05 kHz)                     |
|                                         |                                              | 9 —                                      |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         | <b>Wide*<sup>3</sup> (Band low)</b>          | 10 • CH No.: 10<br>• Transmitting        |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD (Wide)]</b>    | ±4.10 kHz<br>(±0.05 kHz)                     |
|                                         | <b>Middle*<sup>4</sup> (Band low)</b>        | 11 • CH No.: 13<br>• Transmitting        |                                                                                                                                                                                                                                                                                                                                                   | <b>[MOD (Mid)]</b>     | ±3.30 kHz<br>(±0.05 kHz)                     |
|                                         | <b>MODULATION BALANCE</b><br>- Preparation - | —                                        | • Set the preset values and memory channel numbers on the adjust utility window.                                                                                                                                                                                                                                                                  | <b>[TONE FL]</b>       | 90                                           |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[TONE FC]</b>       |                                              |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[TONE FH]</b>       |                                              |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[TONE (Narrow)]</b> | 255                                          |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[CH No. FL]</b>     | 16                                           |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[CH No. FC]</b>     | 17                                           |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   | <b>[CH No. FH]</b>     | 18                                           |
| <b>- Adjustment - Narrow (Band low)</b> | 2                                            | —                                        | • Connect the modulation analyzer to the antenna connector through the attenuator, and set it to:<br>HPF: OFF<br>LPF: 20 kHz<br>De-emphasis: OFF<br>Detector: (P-P)/2<br><br>• No audio signal is applied to [MIC].                                                                                                                               | <b>[BAL Start]</b>     | Push [ENTER]<br>(Enters the Adjustment mode) |
|                                         | 3                                            | • Transmitting                           |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL FL]</b>        | ±1.00 kHz<br>(±0.05 kHz)                     |
|                                         | 4                                            | —                                        |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         | <b>(Band center)</b>                         | 5 • Transmitting                         |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL FC]</b>        | ±1.00 kHz<br>(±0.05 kHz)                     |
|                                         |                                              | 6 —                                      |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         | <b>(Band high)</b>                           | 7 • Transmitting                         |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL FH]</b>        | ±1.00 kHz<br>(±0.05 kHz)                     |
|                                         |                                              | 8 —                                      |                                                                                                                                                                                                                                                                                                                                                   | <b>[BAL Start]</b>     | Push [ENTER]<br>(Saves the value)            |
|                                         |                                              |                                          |                                                                                                                                                                                                                                                                                                                                                   |                        |                                              |

Continued on the next page...

\*<sup>3</sup>No adjustment or verification is necessary for [USA].

\*<sup>4</sup>No adjustment or verification is necessary for [USA] and [AUS].



### 4-3 TRANSMIT ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                       |   | TRANSCIVER'S<br>CONDITION      | OPERATION                                                                                                                                                                                                                                                                                                                                                                                                 | ADJUSTMENT<br>ITEM | VALUE           |
|----------------------------------------------------------------------------------|---|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| <b>FM DEVIATION</b><br>- Verification -<br><b>Narrow</b><br>(Band low)           | 1 | • CH No.: 1<br>• Transmitting  | <ul style="list-style-type: none"> <li>Connect the audio generator and AC millivoltmeter to [MIC] through the JIG cable 1, and set it to:<br/>Frequency: 1 kHz<br/>Waveform: Sine wave<br/>Level: 150 mV rms</li> </ul>                                                                                                                                                                                   | —                  | ±1.8~±2.45 kHz  |
| (Band center)                                                                    | 2 | • CH No.: 2<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 3 | • CH No.: 3<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| <b>Wide</b> <sup>*3</sup><br>(Band low)                                          | 4 | • CH No.: 10<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    | ±3.6~±4.9 kHz   |
| (Band center)                                                                    | 5 | • CH No.: 11<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 6 | • CH No.: 12<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| <b>Middle</b> <sup>*4</sup><br>(Band low)                                        | 7 | • CH No.: 13<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    | ±2.8~±3.92 kHz  |
| (Band center)                                                                    | 8 | • CH No.: 14<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 9 | • CH No.: 15<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| <b>MODULATION SENSITIVITY</b><br>- Verification -<br><b>Narrow</b><br>(Band low) | 1 | • CH No.: 1<br>• Transmitting  | <ul style="list-style-type: none"> <li>Connect the modulation analyzer to the antenna connector through the attenuator, and set it to:<br/>HPF: OFF<br/>LPF: 20 kHz<br/>De-emphasis: OFF<br/>Detector: (P-P)/2</li> <li>Connect the audio generator and AC millivoltmeter to [MIC] through the JIG cable 1, and set it to:<br/>Frequency: 1 kHz<br/>Waveform: Sine wave<br/>Level: 15.0 mV rms</li> </ul> | —                  | ±1.10~±1.90 kHz |
| (Band center)                                                                    | 2 | • CH No.: 2<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 3 | • CH No.: 3<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| <b>Wide</b> <sup>*3</sup><br>(Band low)                                          | 4 | • CH No.: 10<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    | ±2.20~±3.80 kHz |
| (Band center)                                                                    | 5 | • CH No.: 11<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 6 | • CH No.: 12<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| <b>Middle</b> <sup>*4</sup><br>(Band low)                                        | 7 | • CH No.: 13<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    | ±1.75~±3.05 kHz |
| (Band center)                                                                    | 8 | • CH No.: 14<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |
| (Band high)                                                                      | 9 | • CH No.: 15<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                 |

Continued on the next page...

<sup>\*3</sup>No verification is necessary for [USA].

<sup>\*4</sup>No verification is necessary for [USA] and [AUS].

### 4-3 TRANSMIT ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                             |    | TRANSCIVER'S<br>CONDITION      | OPERATION                                                                                                                                                                                                       | ADJUSTMENT<br>ITEM | VALUE                                        |
|------------------------------------------------------------------------|----|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------------------|
| <b>CTCSS/DTCS<br/>DEVIATION</b><br>- Preparation -                     | 1  | —                              | • Set the preset memory channel numbers on the adjust utility window.                                                                                                                                           | [CH No. FL]        | 19                                           |
|                                                                        |    |                                |                                                                                                                                                                                                                 | [CH No. FC]        | 20                                           |
|                                                                        |    |                                |                                                                                                                                                                                                                 | [CH No. FH]        | 21                                           |
| <b>- Adjustment -<br/>Narrow<br/>(Band low)</b>                        | 2  | —                              | • No audio signal is applied to [MIC].                                                                                                                                                                          | [TONE Start]       | Push [ENTER]<br>(Enters the Adjustment mode) |
|                                                                        | 3  | • Transmitting                 |                                                                                                                                                                                                                 | [TONE FL]          | ±0.35 kHz<br>(±0.05 kHz)                     |
|                                                                        | 4  | —                              |                                                                                                                                                                                                                 | [TONE Start]       | Push [ENTER]<br>(Saves the value)            |
| <b>(Band center)</b>                                                   | 5  | • Transmitting                 |                                                                                                                                                                                                                 | [TONE FC]          | ±0.35 kHz<br>(±0.05 kHz)                     |
|                                                                        | 6  | —                              |                                                                                                                                                                                                                 | [TONE Start]       | Push [ENTER]<br>(Saves the value)            |
| <b>(Band high)</b>                                                     | 7  | • Transmitting                 |                                                                                                                                                                                                                 | [TONE FH]          | ±0.35 kHz<br>(±0.05 kHz)                     |
|                                                                        | 8  | —                              |                                                                                                                                                                                                                 | [TONE Start]       | Push [ENTER]<br>(Saves the value)            |
| <b>Wide*<sup>3</sup><br/>(Band low)</b>                                | 9  | • CH No.: 22<br>• Transmitting |                                                                                                                                                                                                                 | [TONE (Wide)]      | ±0.70 kHz<br>(±0.05 kHz)                     |
| <b>Middle*<sup>4</sup><br/>(Band low)</b>                              | 10 | • CH No.: 25<br>• Transmitting |                                                                                                                                                                                                                 | [TONE (Mid)]       | ±0.55 kHz<br>(±0.05 kHz)                     |
| <b>CTCSS<br/>DEVIATION</b><br>- Verification -<br>Narrow<br>(Band low) | 1  | • CH No.: 19<br>• Transmitting | • Connect the modulation analyzer to the antenna connector through the attenuator, and set it to:<br>HPF: OFF<br>LPF: 15 kHz<br>De-emphasis: OFF<br>Detector: (P-P)/2<br>• No audio signal is applied to [MIC]. | —                  | ±0.25~±0.50 kHz                              |
| <b>(Band center)</b>                                                   | 2  | • CH No.: 20<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |
| <b>(Band high)</b>                                                     | 3  | • CH No.: 21<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |
| <b>Wide*<sup>3</sup><br/>(Band low)</b>                                | 4  | • CH No.: 22<br>• Transmitting |                                                                                                                                                                                                                 |                    | ±0.50~±0.90 kHz                              |
| <b>(Band center)</b>                                                   | 5  | • CH No.: 23<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |
| <b>(Band high)</b>                                                     | 6  | • CH No.: 24<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |
| <b>Middle*<sup>4</sup><br/>(Band low)</b>                              | 7  | • CH No.: 25<br>• Transmitting |                                                                                                                                                                                                                 |                    | ±0.40~±0.75 kHz                              |
| <b>(Band center)</b>                                                   | 8  | • CH No.: 26<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |
| <b>(Band high)</b>                                                     | 9  | • CH No.: 27<br>• Transmitting |                                                                                                                                                                                                                 |                    |                                              |

Continued on the next page...

\*<sup>3</sup>No adjustment or verification is necessary for [USA].

\*<sup>4</sup>No adjustment or verification is necessary for [USA] and [AUS].

### 4-3 TRANSMIT ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                                       | TRANSCEIVER'S<br>CONDITION                     | OPERATION                                                                                                                                                                                                             | ADJUSTMENT<br>ITEM | VALUE           |
|--------------------------------------------------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| <b>DTCS<br/>DEVIATION</b><br>- Verification -<br><b>Narrow</b><br>(Band low)                     | 1 • CH No.: 28<br>• Transmitting               | • No audio signal is applied to [MIC].                                                                                                                                                                                | —                  | ±0.25~±0.50 kHz |
| (Band center)                                                                                    | 2 • CH No.: 29<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 3 • CH No.: 30<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| <b>Wide</b> <sup>*3</sup><br>(Band low)                                                          | 4 • CH No.: 31<br>• Transmitting               |                                                                                                                                                                                                                       |                    | ±0.50~±0.90 kHz |
| (Band center)                                                                                    | 5 • CH No.: 32<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 6 • CH No.: 33<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| <b>Middle</b> <sup>*4</sup><br>(Band low)                                                        | 7 • CH No.: 34<br>• Transmitting               |                                                                                                                                                                                                                       |                    | ±0.40~±0.75 kHz |
| (Band center)                                                                                    | 8 • CH No.: 35<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 9 • CH No.: 36<br>• Transmitting               |                                                                                                                                                                                                                       |                    |                 |
| <b>5 TONE,<br/>2 TONE, DTMF<br/>DEVIATION</b><br>- Verification -<br><b>Narrow</b><br>(Band low) | 1 • CH No.: 1<br>• Transmitting <sup>*5</sup>  | • Connect the modulation analyzer<br>to the antenna connector through<br>the attenuator, and set it to:<br>HPF: OFF<br>LPF: 15 kHz<br>De-emphasis: OFF<br>Detector: (P-P)/2<br>• No audio signal is applied to [MIC]. | —                  | ±1.06~±2.12 kHz |
| (Band center)                                                                                    | 2 • CH No.: 2<br>• Transmitting <sup>*5</sup>  |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 3 • CH No.: 3<br>• Transmitting <sup>*5</sup>  |                                                                                                                                                                                                                       |                    |                 |
| <b>Wide</b> <sup>*3</sup><br>(Band low)                                                          | 4 • CH No.: 10<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    | ±2.12~±4.23 kHz |
| (Band center)                                                                                    | 5 • CH No.: 11<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 6 • CH No.: 12<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    |                 |
| <b>Middle</b> <sup>*4</sup><br>(Band low)                                                        | 7 • CH No.: 13<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    | ±1.70~±3.39 kHz |
| (Band center)                                                                                    | 8 • CH No.: 14<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    |                 |
| (Band high)                                                                                      | 9 • CH No.: 15<br>• Transmitting <sup>*5</sup> |                                                                                                                                                                                                                       |                    |                 |

Continued on the next page...

<sup>\*3</sup>No verification is necessary for [USA].

<sup>\*4</sup>No verification is necessary for [USA] and [AUS].

<sup>\*5</sup>When the embedded programming file (described in page 4-4) is used for the adjustment, DTMF code transmission can be made by pushing [Emer] twice.

### 4-3 TRANSMIT ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                            | TRANSCIVER'S<br>CONDITION        | OPERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ADJUSTMENT<br>ITEM | VALUE           |
|---------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| <b>TX SIGNAL-TO-<br/>NOISE RATIO</b><br>-Verification-<br><b>Narrow</b><br>(Band low) | 1 • CH No.: 1<br>• Transmitting  | <ul style="list-style-type: none"> <li>Connect the modulation analyzer to the antenna connector through the attenuator, and set it to:<br/>HPF: 50 Hz<br/>LPF: 20 kHz<br/>De-emphasis: OFF<br/>Detector: (P-P)/2</li> <li>Connect the audio generator and AC millivoltmeter to [MIC] through the JIG cable 1, and set it to:<br/>Frequency: 1 kHz<br/>Waveform: Sine wave</li> <li>Adjust the audio generator output level so that the modulation analyzer shows 60% of the maximum deviation of the selected transmit passband width (Narrow, Wide or Middle).</li> <li>Toggle the audio generator output ON and OFF.</li> </ul> | —                  | More than 34 dB |
| (Band center)                                                                         | 2 • CH No.: 2<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |
| (Band high)                                                                           | 3 • CH No.: 3<br>• Transmitting  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |
| <b>Wide</b> <sup>*3</sup><br>(Band low)                                               | 4 • CH No.: 10<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    | More than 40 dB |
| (Band center)                                                                         | 5 • CH No.: 11<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |
| (Band high)                                                                           | 6 • CH No.: 12<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |
| <b>Middle</b> <sup>*4</sup><br>(Band low)                                             | 7 • CH No.: 13<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    | More than 38 dB |
| (Band center)                                                                         | 8 • CH No.: 14<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |
| (Band high)                                                                           | 9 • CH No.: 15<br>• Transmitting |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                 |

<sup>\*3</sup>No verification is necessary for [USA].

<sup>\*4</sup>No verification is necessary for [USA] and [AUS].

## 4-4 RECEIVE ADJUSTMENTS

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                        | TRANSCIEVER'S<br>CONDITION                                                                                                                                                                                                                            | OPERATION                                                             | ADJUSTMENT<br>ITEM | VALUE                                        |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------|----------------------------------------------|
| <b>RECEIVE<br/>SENSITIVITY</b><br>- Preparation - | <b>NOTE:</b> "RECEIVE SENSITIVITY" must be adjusted before "S-METER" and "SQUELCH." Otherwise, "S-METER" and "SQUELCH" will not be adjusted properly.<br>When "RECEIVE SENSITIVITY" is re-adjusted, "S-METER" and "SQUELCH" must be also re-adjusted. |                                                                       |                    |                                              |
|                                                   | 1                                                                                                                                                                                                                                                     | • Set [SQL Level] to "2" in the Set mode.                             | [SQL Level]        | 2                                            |
|                                                   | 2                                                                                                                                                                                                                                                     | —                                                                     | [CH No. FL]        | 41                                           |
|                                                   |                                                                                                                                                                                                                                                       | • Set the preset memory channel numbers on the adjust utility window. | [CH No. FC]        | 42                                           |
| <b>- Adjustment -<br/>(T2 Band low)</b>           |                                                                                                                                                                                                                                                       |                                                                       | [CH No. FH]        | 43                                           |
|                                                   | 3                                                                                                                                                                                                                                                     | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Enters the Adjustment mode) |
|                                                   | 4                                                                                                                                                                                                                                                     | • Receiving                                                           | [BPF T2 FL]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 5                                                                                                                                                                                                                                                     | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |
| <b>(T1 Band low)</b>                              | 6                                                                                                                                                                                                                                                     | • Receiving                                                           | [BPF T1 FL]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 7                                                                                                                                                                                                                                                     | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |
| <b>(T2 Band center)</b>                           | 8                                                                                                                                                                                                                                                     | • Receiving                                                           | [BPF T2 FC]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 9                                                                                                                                                                                                                                                     | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |
| <b>(T1 Band center)</b>                           | 10                                                                                                                                                                                                                                                    | • Receiving                                                           | [BPF T1 FC]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 11                                                                                                                                                                                                                                                    | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |
| <b>(T2 Band high)</b>                             | 12                                                                                                                                                                                                                                                    | • Receiving                                                           | [BPF T2 FH]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 13                                                                                                                                                                                                                                                    | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |
| <b>(T1 Band high)</b>                             | 14                                                                                                                                                                                                                                                    | • Receiving                                                           | [BPF T1 FH]        | Push [ENTER]<br>(Automatic adjustment)       |
|                                                   | 15                                                                                                                                                                                                                                                    | —                                                                     | [BPF Start]        | Push [ENTER]<br>(Saves the value)            |

Continued on the next page...

\*3No adjustment or verification is necessary for [USA].

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

#### 4-4 RECEIVE ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                               | TRANSCEIVER'S<br>CONDITION        | OPERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ADJUSTMENT<br>ITEM | VALUE                                                              |
|------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------|
| <b>RECEIVE<br/>SENSITIVITY</b><br>- Verification -<br><b>Narrow</b><br><b>(Band low)</b> | 16<br>• CH No.: 41<br>• Receiving | <ul style="list-style-type: none"> <li>Connect the distortion meter and external speaker to [SP] through the JIG cable 2.</li> <li>Connect the SSG to the antenna connector, and set it as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>400.050 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>450.050 MHz<br/> Level: Set to the level so that the distortion meter shows 12 dB SINAD.<br/> Modulation: 1 kHz<br/> Deviation: ±1.5 kHz </li> </ul> | —                  | Less than -10 dBμ <sup>†</sup><br>(-117 dBm)<br>(SSG output level) |
| <b>(Band center)</b>                                                                     | 17<br>• CH No.: 42<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>435.050 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>485.050 MHz </li> </ul>                                                                                                                                                                                                                                                                   |                    |                                                                    |
| <b>(Band high)</b>                                                                       | 18<br>• CH No.: 43<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>469.950 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>519.950 MHz </li> </ul>                                                                                                                                                                                                                                                                   |                    |                                                                    |
| <b>Wide*<sup>3</sup></b><br><b>(Band low)</b>                                            | 19<br>• CH No.: 44<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>400.050 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>450.050 MHz<br/> Deviation: ±3.0 kHz </li> </ul>                                                                                                                                                                                                                                          |                    |                                                                    |
| <b>(Band center)</b>                                                                     | 20<br>• CH No.: 45<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>435.050 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>485.050 MHz </li> </ul>                                                                                                                                                                                                                                                                   |                    |                                                                    |
| <b>(Band high)</b>                                                                       | 21<br>• CH No.: 46<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/> <b>[400~470 MHz versions]</b><br/>469.950 MHz<br/> <b>[450~512/520 MHz versions]</b><br/>519.950 MHz </li> </ul>                                                                                                                                                                                                                                                                   |                    |                                                                    |

Continued on the next page...

\*<sup>3</sup>No verification is necessary for [USA].

<sup>†</sup>The output level of the standard signal generator (SSG) is measured at the load end (PD).



## 4-4 RECEIVE ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                               | TRANSCIVER'S CONDITION                                                                      | OPERATION                                                                                                                                                                                                                                                                                                                                                                                                 | ADJUSTMENT ITEM | VALUE                                             |
|------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------|
| <b>S-METER*<sup>6</sup></b>              | <b>NOTE:</b> When "RECEIVE SENSITIVITY" is re-adjusted, "S-METER" must be also re-adjusted. |                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                   |
| - Preparation -                          | 1                                                                                           | —                                                                                                                                                                                                                                                                                                                                                                                                         | [RSSI]          | Push [ENTER]<br>(Enters the Adjustment mode)      |
| - Adjustment -<br>(S3 Level)             | 2                                                                                           | <ul style="list-style-type: none"> <li>CH No.: 42</li> <li>Receiving</li> </ul> <ul style="list-style-type: none"> <li>Set the SSG as:</li> <li>Frequency:<br/>[400~470 MHz versions]<br/>435.050 MHz</li> <li>[450~512/520 MHz versions]<br/>485.050 MHz</li> <li>Level†: +23 dBμ (-84 dBm)</li> <li>Modulation: 1 kHz</li> <li>Deviation: ±1.5 kHz</li> </ul>                                           | [RSSI]          | Push [ENTER]<br>(Automatic adjustment)            |
| (S1 Level)                               | 3                                                                                           | <ul style="list-style-type: none"> <li>Set the SSG as:</li> <li>Level†: -7 dBμ (-114 dBm)</li> </ul>                                                                                                                                                                                                                                                                                                      | [RSSI]          |                                                   |
| <b>SQUELCH</b>                           | <b>NOTE:</b> When "RECEIVE SENSITIVITY" is re-adjusted, "SQUELCH" must be also re-adjusted. |                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                                                   |
| - Preparation -                          | 1                                                                                           | • Set [SQL Level] to "2" in the Set mode.                                                                                                                                                                                                                                                                                                                                                                 | [SQL Level]     | 2                                                 |
| - Adjustment -<br>Narrow<br>(Band low)   | 2                                                                                           | <ul style="list-style-type: none"> <li>CH No.: 41</li> <li>Receiving</li> </ul> <ul style="list-style-type: none"> <li>Connect the SSG to the antenna connector, and set it as:</li> <li>Frequency:<br/>[400~470 MHz versions]<br/>400.050 MHz</li> <li>[450~512/520 MHz versions]<br/>450.050 MHz</li> <li>Level†: -14 dBμ (-121 dBm)</li> <li>Modulation: 1 kHz</li> <li>Deviation: ±1.5 kHz</li> </ul> | [SQL]           | Adjust to the value where the squelch just opens. |
| - Verification -<br>Narrow<br>(Band low) | 3                                                                                           | <ul style="list-style-type: none"> <li>CH No.: 41</li> <li>Receiving</li> </ul> <ul style="list-style-type: none"> <li>Set the SSG as:</li> <li>Level†: -10 dBμ (-117 dBm)</li> </ul>                                                                                                                                                                                                                     | —               | Squelch opens.                                    |
| (Band center)                            | 4                                                                                           | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                                                |                 | Squelch closes.                                   |
|                                          | 5                                                                                           | <ul style="list-style-type: none"> <li>CH No.: 42</li> <li>Receiving</li> </ul> <ul style="list-style-type: none"> <li>Set the SSG as:</li> <li>Frequency:<br/>[400~470 MHz versions]<br/>435.050 MHz</li> <li>[450~512/520 MHz versions]<br/>485.050 MHz</li> <li>Level†: -10 dBμ (-117 dBm)</li> </ul>                                                                                                  |                 | Squelch opens.                                    |
|                                          | 6                                                                                           | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                                                |                 | Squelch closes.                                   |
| (Band high)                              | 7                                                                                           | <ul style="list-style-type: none"> <li>CH No.: 43</li> <li>Receiving</li> </ul> <ul style="list-style-type: none"> <li>Set the SSG as:</li> <li>Frequency:<br/>[400~470 MHz versions]<br/>469.950 MHz</li> <li>[450~512/520 MHz versions]<br/>519.950 MHz</li> <li>Level†: -10 dBμ (-117 dBm)</li> </ul>                                                                                                  |                 | Squelch opens.                                    |
|                                          | 8                                                                                           | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                                                |                 | Squelch closes.                                   |

Continued on the next page...

\*<sup>3</sup>No verification is necessary for [USA].

\*<sup>6</sup>No adjustment is necessary for Non-display versions.

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

#### 4-4 RECEIVE ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                             |    | TRANSCIEVER'S<br>CONDITION  | OPERATION                                                                                                                                                                                                                                                                                                                                                                      | ADJUSTMENT<br>ITEM | VALUE           |
|------------------------------------------------------------------------|----|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| <b>SQUELCH</b><br>- Verification -<br>Wide* <sup>3</sup><br>(Band low) | 9  | • CH No.: 44<br>• Receiving | • Set the SSG as:<br>Frequency:<br><b>[400~470 MHz versions]</b><br>400.050 MHz<br><b>[450~512/520 MHz versions]</b><br>450.050 MHz<br>Deviation:   ±3.0 kHz<br>Level†:      -10 dBμ (-117 dBm)                                                                                                                                                                                | —                  | Squelch opens.  |
|                                                                        | 10 |                             | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                     |                    | Squelch closes. |
| (Band center)                                                          | 11 | • CH No.: 45<br>• Receiving | • Set the SSG as:<br>Frequency:<br><b>[400~470 MHz versions]</b><br>435.050 MHz<br><b>[450~512/520 MHz versions]</b><br>485.050 MHz<br>Level†:      -10 dBμ (-117 dBm)                                                                                                                                                                                                         |                    | Squelch opens.  |
|                                                                        | 12 |                             | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                     |                    | Squelch closes. |
| (Band high)                                                            | 13 | • CH No.: 46<br>• Receiving | • Set the SSG as:<br>Frequency:<br><b>[400~470 MHz versions]</b><br>469.950 MHz<br><b>[450~512/520 MHz versions]</b><br>519.950 MHz<br>Level†:      -10 dBμ (-117 dBm)                                                                                                                                                                                                         | Squelch opens.     |                 |
|                                                                        | 14 |                             | • Turn OFF the SSG output.                                                                                                                                                                                                                                                                                                                                                     | Squelch closes.    |                 |
| <b>RECEIVE AUDIO<br/>DISTORTION</b><br>- Verification -                | 1  | • CH No.: 41<br>• Receiving | • Set the SSG as:<br>Frequency:<br><b>[400~470 MHz versions]</b><br>400.050 MHz<br><b>[450~512/520 MHz versions]</b><br>450.050 MHz<br>Level†:      +60 dBμ (-47 dBm)<br>Deviation:   ±1.5 kHz<br>• Connect the distortion meter to [SP]<br>through the JIG cable 2<br>• Adjust the AF volume so that the<br>distortion meter shows the AF<br>output level to 0.35 W (1.67 V). | —                  | Less than 5%    |

Continued on the next page...

\*<sup>3</sup>No verification is necessary for [USA].

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

#### 4-4 RECEIVE ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                       |   | TRANSCIVER'S<br>CONDITION   | OPERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ADJUSTMENT<br>ITEM | VALUE           |
|----------------------------------------------------------------------------------|---|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| <b>RX SIGNAL-TO-<br/>NOISE RATIO</b><br>- Verification -<br>Narrow<br>(Band low) | 1 | • CH No.: 41<br>• Receiving | <ul style="list-style-type: none"> <li>Connect the SSG to the antenna connector, and set it as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>400.050 MHz<br/>[450~512/520 MHz versions]<br/>450.050 MHz<br/>Level†: +60 dBμ (−47 dBm)<br/>Modulation: 1 kHz<br/>Deviation: ±1.5 kHz</li> <li>Connect the distortion meter and external speaker to [SP] through the JIG cable 2.</li> <li>Adjust the AF volume so that the distortion meter shows the AF output level to 0.2 W (1.26 V).</li> <li>Toggle the SSG modulation ON and OFF.</li> </ul> | —                  | More than 34 dB |
| (Band center)                                                                    | 2 | • CH No.: 42<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>435.050 MHz<br/>[450~512/520 MHz versions]<br/>485.050 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |                    |                 |
| (Band high)                                                                      | 3 | • CH No.: 43<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>469.950 MHz<br/>[450~512/520 MHz versions]<br/>519.950 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |                    |                 |
| <b>Wide*<sup>3</sup></b><br>(Band low)                                           | 4 | • CH No.: 44<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>400.050 MHz<br/>[450~512/520 MHz versions]<br/>450.050 MHz<br/>Deviation: ±3.0 kHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |                    | More than 40 dB |
| (Band center)                                                                    | 5 | • CH No.: 45<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>435.050 MHz<br/>[450~512/520 MHz versions]<br/>485.050 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |                    |                 |
| (Band high)                                                                      | 6 | • CH No.: 46<br>• Receiving | <ul style="list-style-type: none"> <li>Set the SSG as:<br/>Frequency:<br/>[400~470 MHz versions]<br/>469.950 MHz<br/>[450~512/520 MHz versions]<br/>519.950 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |                    |                 |

Continued on the next page...

\*<sup>3</sup>No verification is necessary for [USA].

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

## 4-4 RECEIVE ADJUSTMENTS (CONTINUED)

1) Select an adjustment item using [↑]/[↓]/[←]/[→] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [Space]/[Back Space] on the PC's keyboard.

| ADJUSTMENT                                                                                     |   | TRANSCIVER'S<br>CONDITION   | OPERATION                                                                                                                                                                                                                                                                                                                  | ADJUSTMENT<br>ITEM | VALUE             |
|------------------------------------------------------------------------------------------------|---|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------|
| <b>RX SIGNAL-TO-<br/>NOISE RATIO</b><br>- Verification -<br>Middle* <sup>4</sup><br>(Band low) | 7 | • CH No.: 47<br>• Receiving | • Set the SSG as:<br>Frequency:<br>[400~470 MHz versions]<br>400.050 MHz<br>[450~512/520 MHz versions]<br>450.050 MHz<br>Deviation: ±2.4 kHz                                                                                                                                                                               | —                  | More than 38 dB   |
| (Band center)                                                                                  | 8 | • CH No.: 48<br>• Receiving | • Set the SSG as:<br>Frequency:<br>[400~470 MHz versions]<br>435.050 MHz<br>[450~512/520 MHz versions]<br>485.050 MHz                                                                                                                                                                                                      |                    |                   |
| (Band high)                                                                                    | 9 | • CH No.: 49<br>• Receiving | • Set the SSG as:<br>Frequency:<br>[400~470 MHz versions]<br>469.950 MHz<br>[450~512/520 MHz versions]<br>519.950 MHz                                                                                                                                                                                                      |                    |                   |
| <b>HOWLING</b><br>- Verification -                                                             | 1 | • CH No.: 42<br>• Receiving | • Connect the SSG to the antenna connector, and set it as:<br>Frequency:<br>[400~470 MHz versions]<br>435.050 MHz<br>[450~512/520 MHz versions]<br>485.050 MHz<br>Level†: +60 dBμ (−47 dBm)<br>Modulation: OFF<br>• Disconnect any JIG cable from [SP].<br>• Set [VOL] to the maximum clockwise position.                  | —                  | No howling occurs |
| <b>FLOWING<br/>CURRENT</b><br>- Verification -<br>(At maximum<br>audio output)                 | 1 | • CH No.: 42<br>• Receiving | • Connect the ammeter between the transceiver and the DC power supply.<br>• Set the SSG as:<br>Frequency:<br>[400~470 MHz versions]<br>435.050 MHz<br>[450~512/520 MHz versions]<br>485.050 MHz<br>Level†: +60 dBμ (−47 dBm)<br>Modulation: 1 kHz<br>Deviation: ±1.5 kHz<br>• Set [VOL] to the maximum clockwise position. | —                  | Less than 400 mA  |
| (At stand-by)                                                                                  | 2 | —                           | • Disconnect any test instruments from the antenna connector, [SP], and [MIC].<br>• Verify that the squelch is closed.                                                                                                                                                                                                     |                    | Less than 95 mA   |

\*<sup>3</sup>No verification is necessary for [USA].

\*<sup>4</sup>No verification is necessary for [USA] and [AUS].

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

## 4-5 AFTER THE ADJUSTMENT

After adjusting, write back the programming data (described in ■ SAVE THE PROGRAMMING DATA).

## SECTION 5

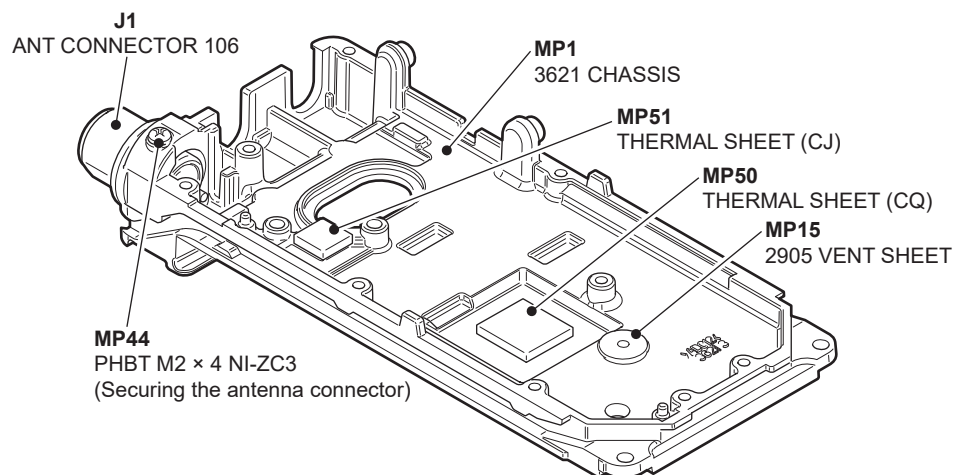
## SPARE PARTS AND UNITS

### ■ ASSEMBLED CHASSIS UNIT

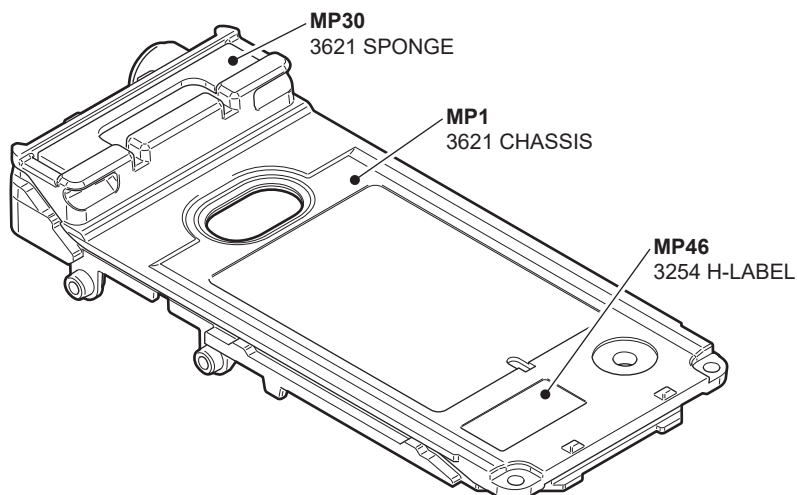
| Spare unit name     | Order Number | Applicable Versions                                 | Remarks |
|---------------------|--------------|-----------------------------------------------------|---------|
| U F2000 #11 CHASSIS | 0341121103   | #11~#19, #21, #23~#25,<br>#35~#40, #42~#44, #48~#50 | —       |

See the illustrations below for the individual parts in the unit.

#### <Front view>



#### <Back view>

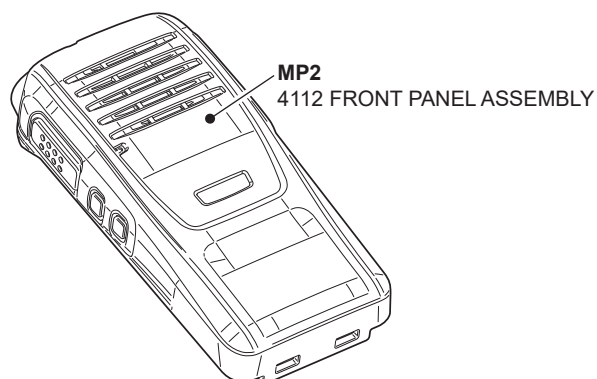


## ■ ASSEMBLED FRONT PANELS

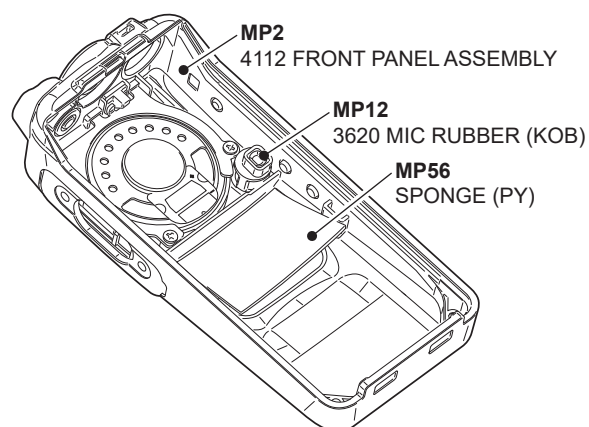
| Spare unit name      | Order Number | Applicable Versions                   | Remarks     |
|----------------------|--------------|---------------------------------------|-------------|
| U F2000 #11 F.PANEL  | 0341121102   | #11~#13, #23, #35, #38, #42, #48      | No-Key type |
| U F2000S #14 F.PANEL | 0341121402   | #14~#16, #24, #36, #39, #43, #49      | 4-Key type  |
| U F2000T #17 F.PANEL | 0341121702   | #17~#19, #21, #25, #37, #40, #44, #50 | 10-Key type |

See the illustrations below for the individual parts in the unit.

### <U F2000 #11 F.PANEL: Front view>

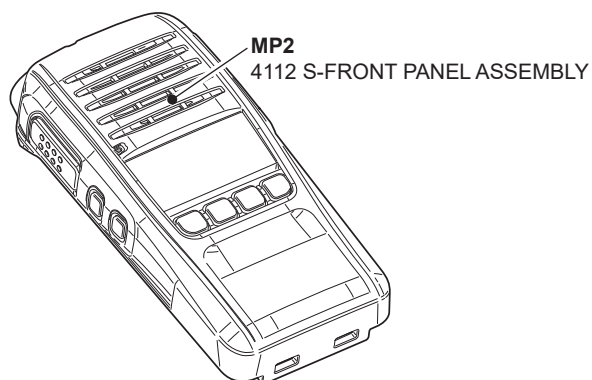


### <U F2000 #11 F.PANEL: Back view>

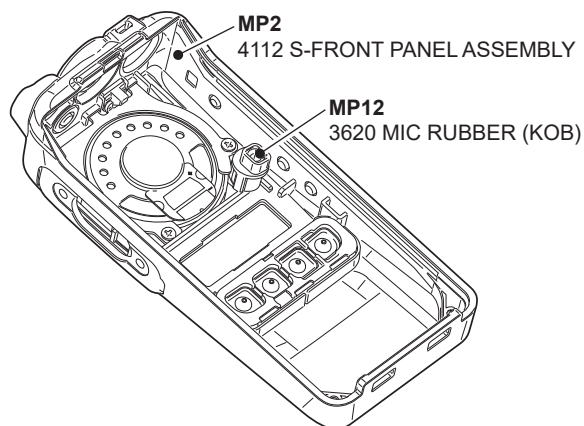


Continued on the next page...

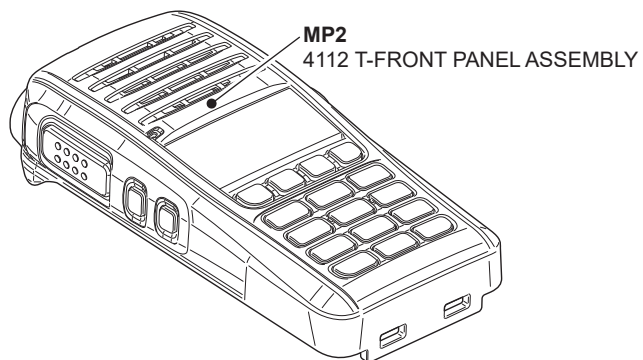
**<U F2000S #14 F.PANEL: Front view>**



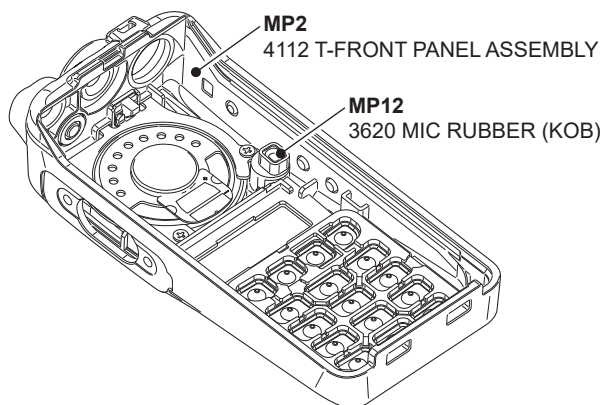
**<U F2000S #14 F.PANEL: Back view>**



**<U F2000T #17 F.PANEL: Front view>**



**<U F2000T #17 F.PANEL: Back view>**





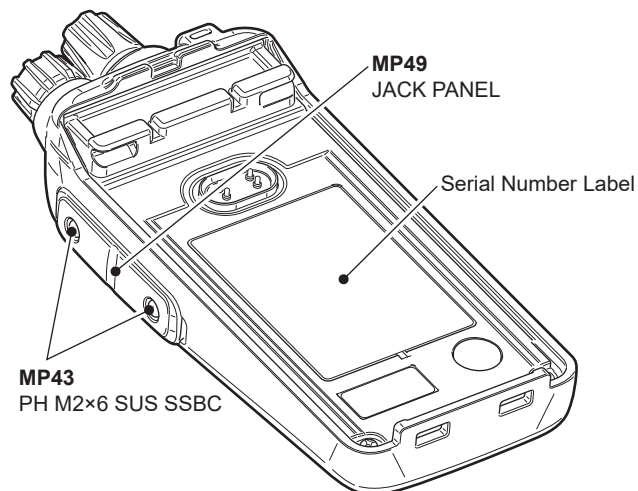
## ■ ASSEMBLED MAIN UNIT

| Spare unit name    | Order Number | Applicable Version | Remarks     |
|--------------------|--------------|--------------------|-------------|
| U F2000 #11 U.SET  | 0341121101   | #11                | No-Key type |
| U F2000 #12 U.SET  | 0341121201   | #12                |             |
| U F2000 #13 U.SET  | 0341121301   | #13                |             |
| U F2000S #14 U.SET | 0341121401   | #14                | 4-Key type  |
| U F2000S #15 U.SET | 0341121501   | #15                |             |
| U F2000S #16 U.SET | 0341121601   | #16                |             |
| U F2000T #17 U.SET | 0341121701   | #17                | 10-Key type |
| U F2000T #18 U.SET | 0341121801   | #18                |             |
| U F2000T #19 U.SET | 0341121901   | #19                |             |
| U F2000T #21 U.SET | 0341122101   | #21                |             |
| U F2000 #23 U.SET  | 0341122301   | #23                | No-Key type |
| U F2000S #24 U.SET | 0341122401   | #24                | 4-Key type  |
| U F2000T #25 U.SET | 0341122501   | #25                | 10-Key type |
| U F2000 #35 U.SET  | 0341123501   | #35                | No-Key type |
| U F2000S #36 U.SET | 0341123601   | #36                | 4-Key type  |
| U F2000T #37 U.SET | 0341123701   | #37                | 10-Key type |
| U F2000 #38 U.SET  | 0341123801   | #38                | No-Key type |
| U F2000S #39 U.SET | 0341123901   | #39                | 4-Key type  |
| U F2000T #40 U.SET | 0341124001   | #40                | 10-Key type |
| U F2000 #42 U.SET  | 0341124201   | #42                | No-Key type |
| U F2000S #43 U.SET | 0341124301   | #43                | 4-Key type  |
| U F2000T #44 U.SET | 0341124401   | #44                | 10-Key type |
| U F2000 #48 U.SET  | 0341124801   | #48                | No-Key type |
| U F2000S #49 U.SET | 0341124901   | #49                | 4-Key type  |
| U F2000T #50 U.SET | 0341125001   | #50                | 10-Key type |

<Viewing example: 10-Key type Front view>



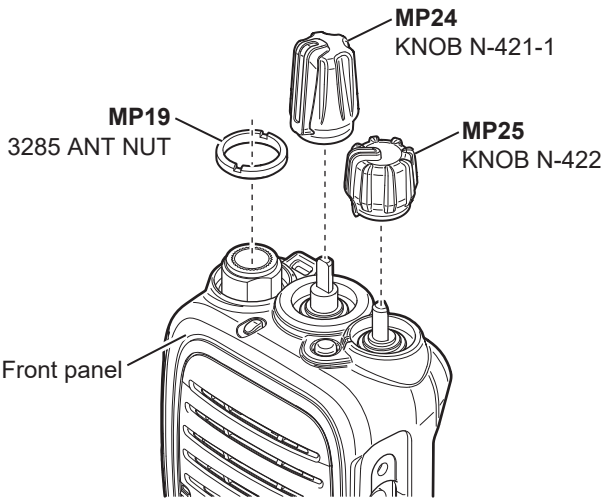
<Viewing example: 10-Key type Back view>



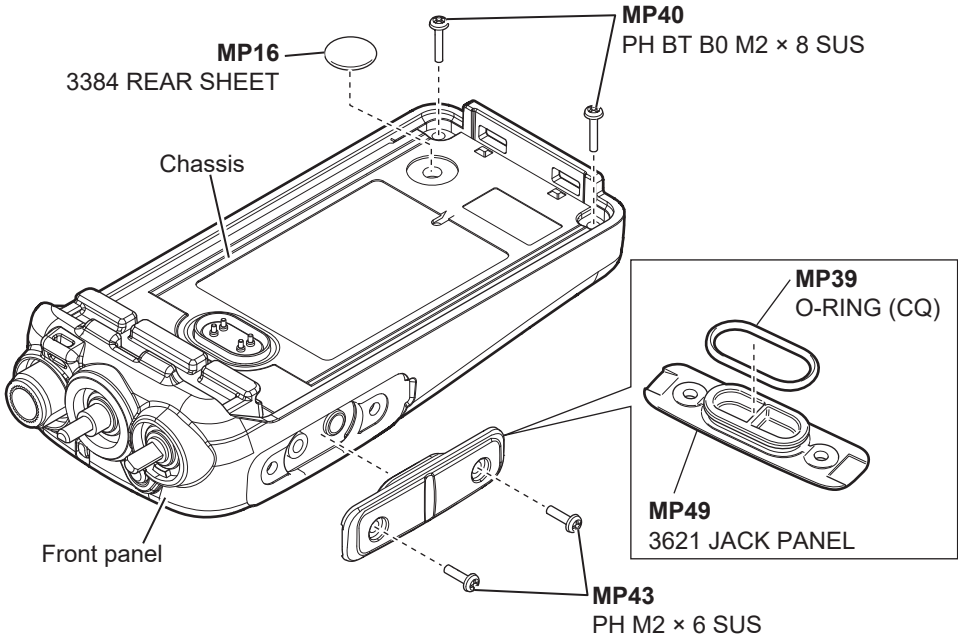
**NOTE:** The serial number label is attached, and the corresponding ESN has already been programmed into the spare unit assembly.

■ SPARE PARTS INFORMATION

|             | Reference Number | Parts name   | Order number | Applicable versions                              |
|-------------|------------------|--------------|--------------|--------------------------------------------------|
| Antenna nut | MP19             | 3285 ANT NUT | 8830003440   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| Dial knob   | MP24             | KNOB N-421-1 | 8610014711   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| Volume knob | MP25             | KNOB N-422   | 8610014720   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |



|            | Reference Number | Parts name          | Order number | Applicable versions                              |
|------------|------------------|---------------------|--------------|--------------------------------------------------|
| Rear sheet | MP16             | 3384 REAR SHEET     | 8930084870   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| O-ring     | MP39             | O-RING (CQ)         | 8930085330   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| Screw      | MP40             | PH BT B0 M2 × 8 SUS | 8810010850   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| Screw      | MP43             | PH M2 × 6 SUS       | 8810007391   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |
| Jack cover | MP49             | 3621 JACK PANEL     | 8210029630   | #11~#19, #21, #23~#25, #35~#40, #42~#44, #48~#50 |

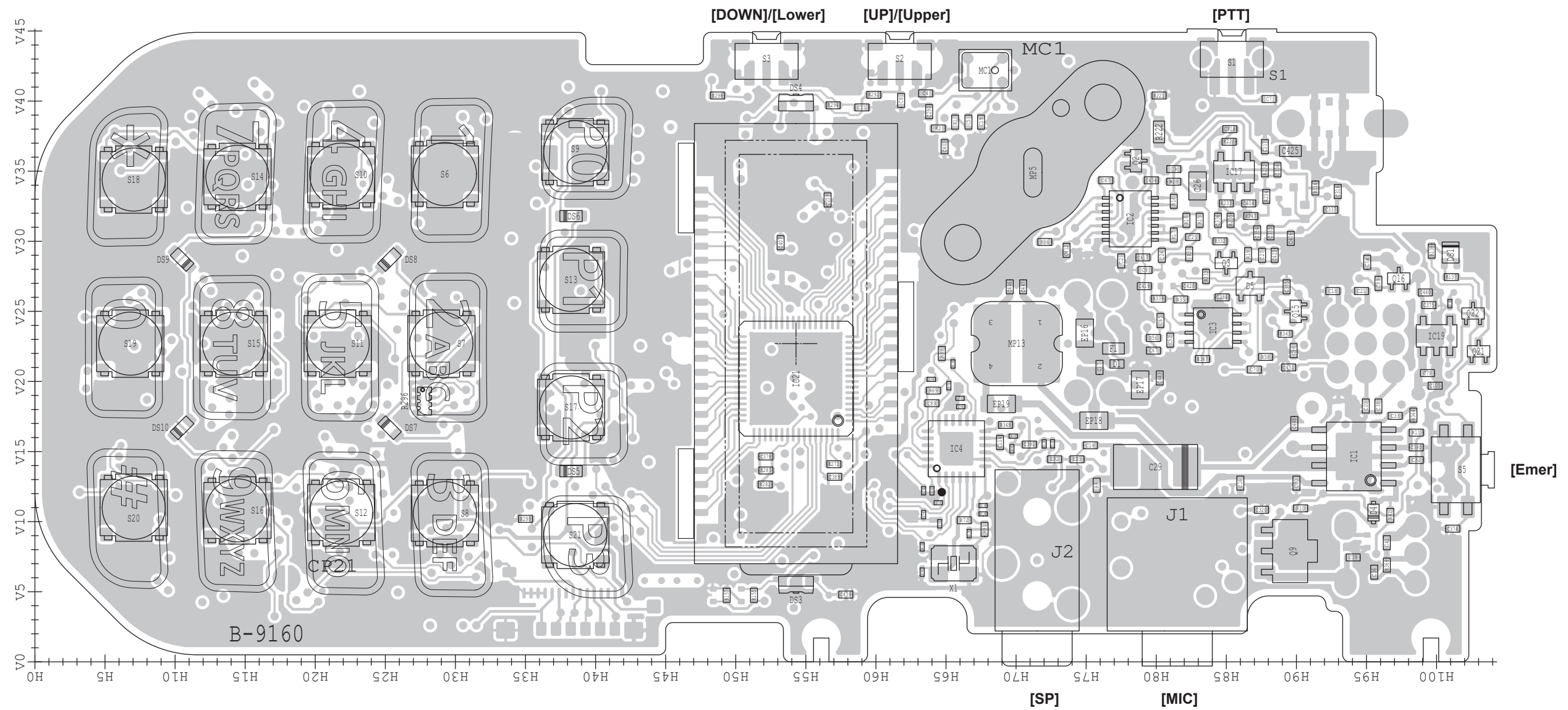


**NOTE:** MP16 should be attached after passing the Air-Leak test. If you do not have the Air-Leak tester, you can attach it without the test. However, no guarantee is given to the transceiver for waterproof protection in this case.  
Ask your distributor about the Air-Leak test or the Air-Leak tester for details.

## BOARD LAYOUT

The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

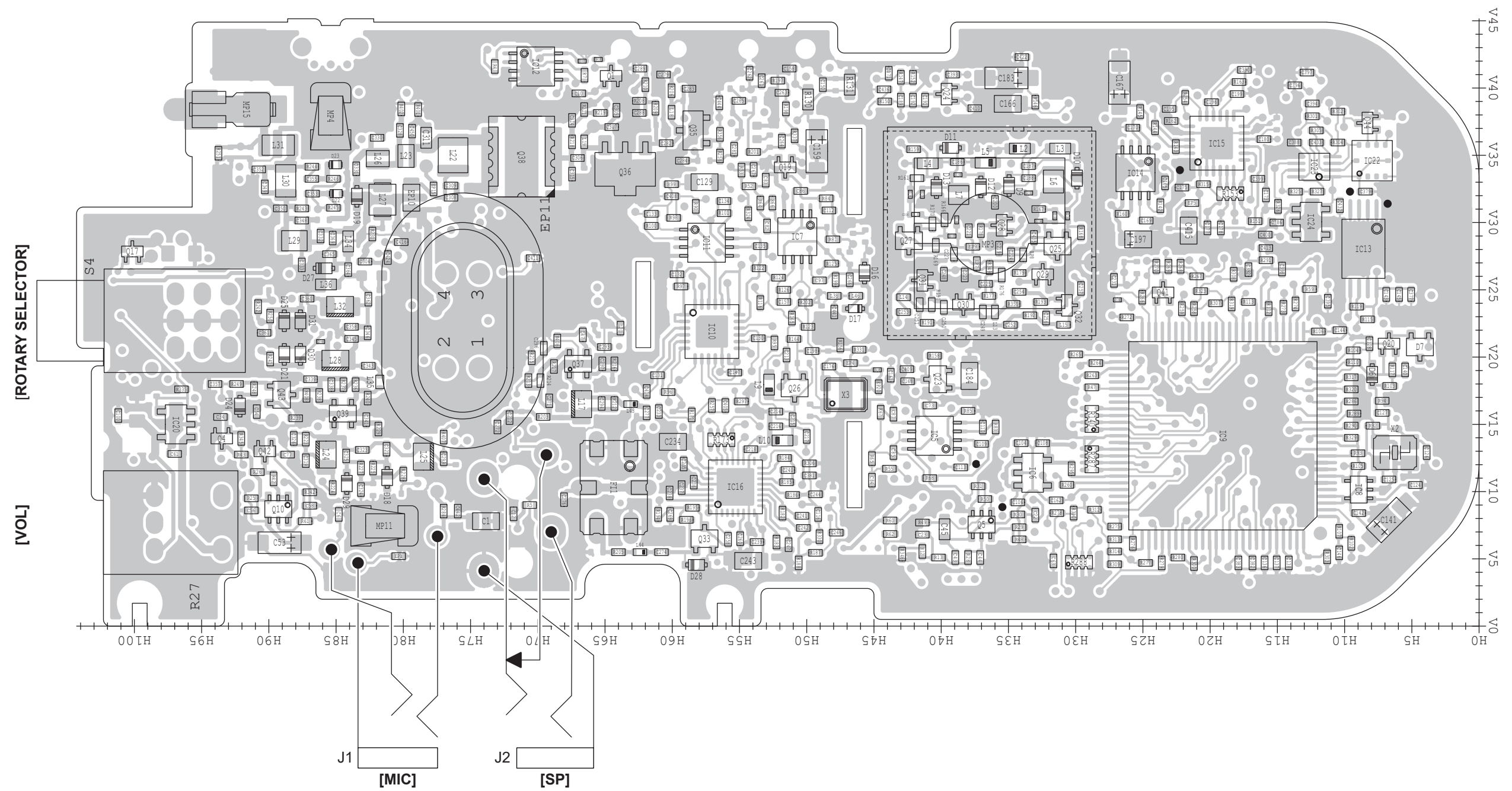
- **MAIN/MAIN-B unit (B-9160: Top view)**



See the PARTS LIST H/V location on the PARTS LIST for location details.

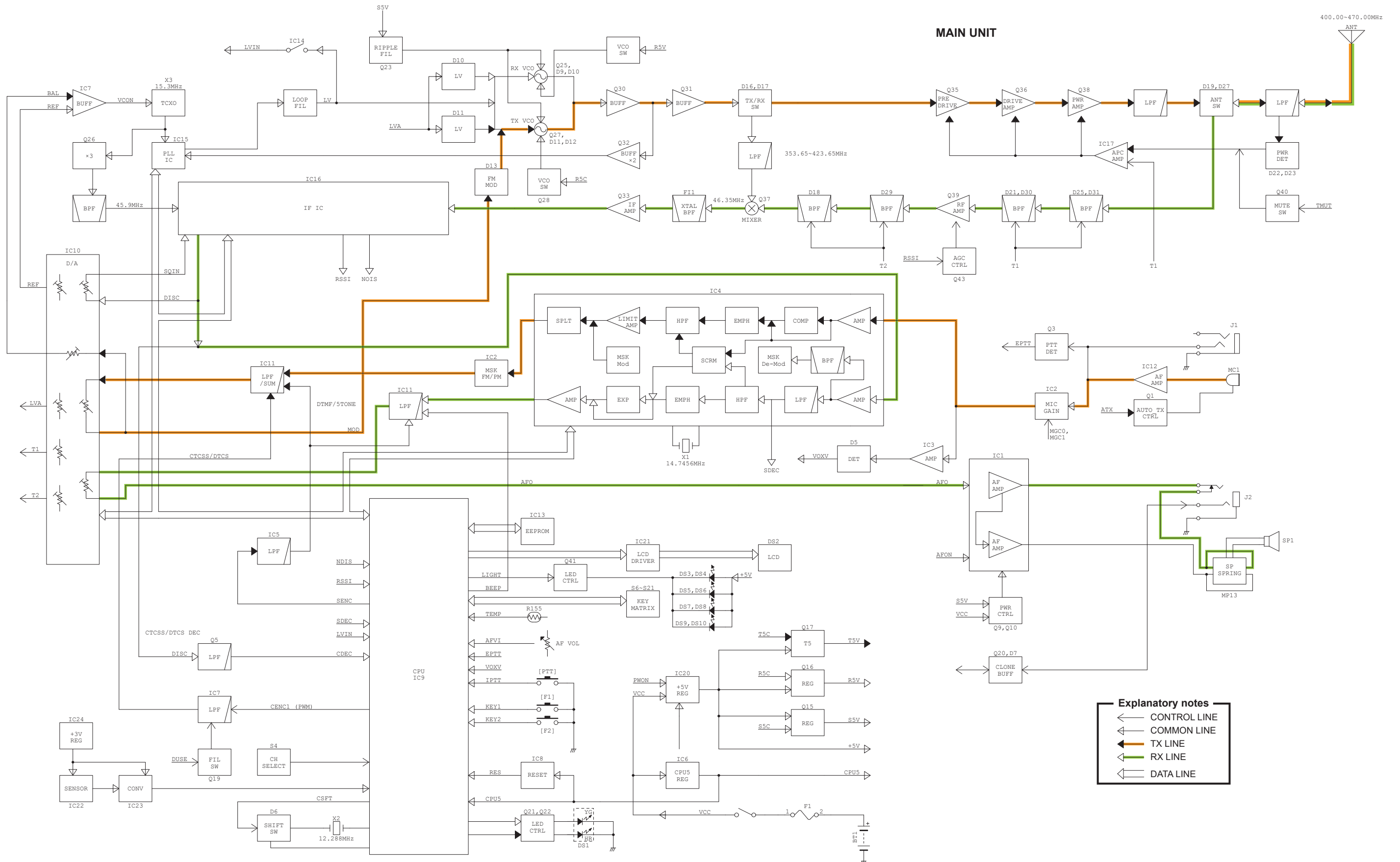
The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

- **MAIN/MAIN-B unit (B-9160: Bottom view)**

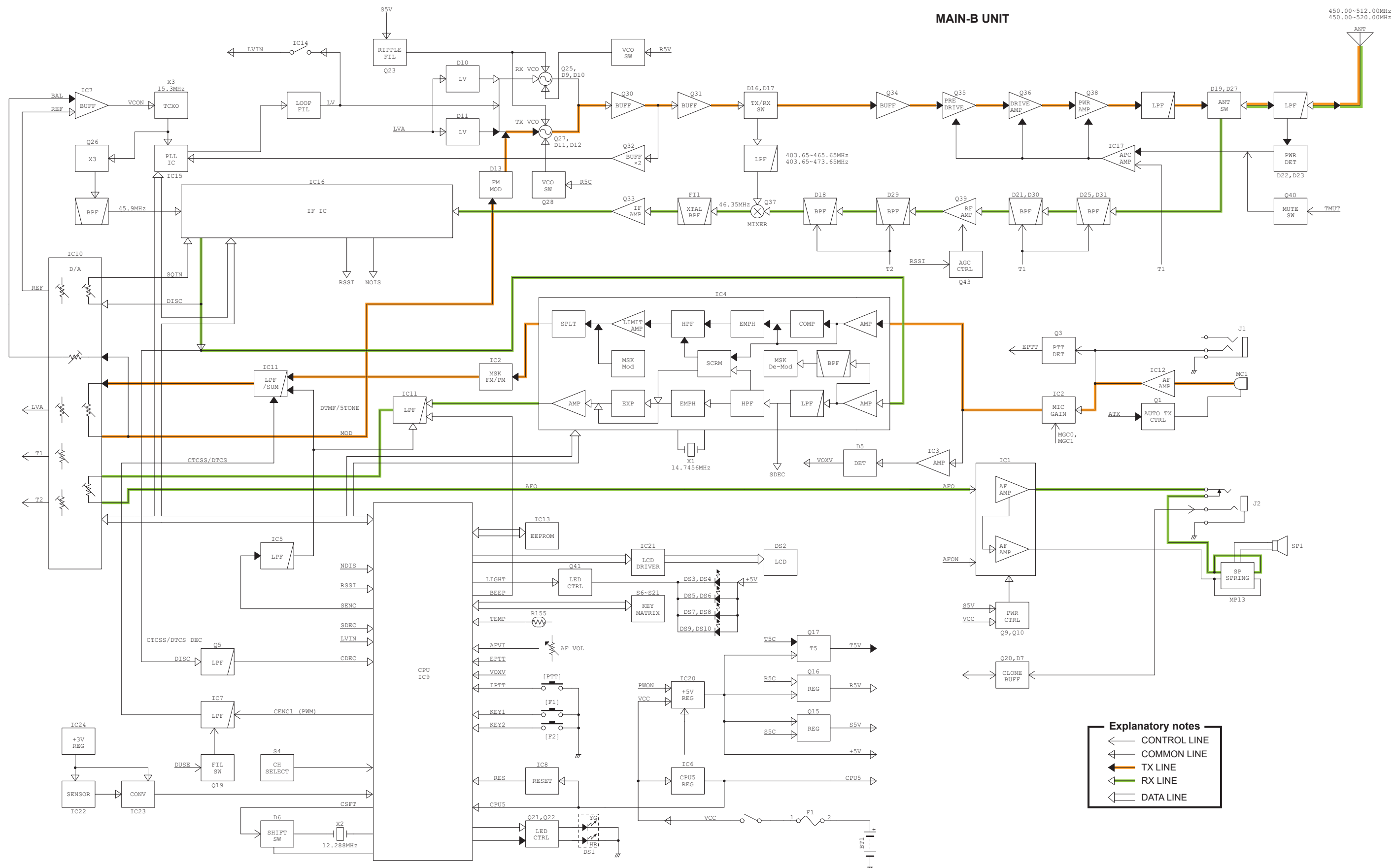


## BLOCK DIAGRAM

- **MAIN unit (for #11~#19, #21, #35~#37, and #42~#44)**



- **MAIN-B unit (for #23~#25, #38, #40, and #48~#50)**





## VOLTAGE DIAGRAM

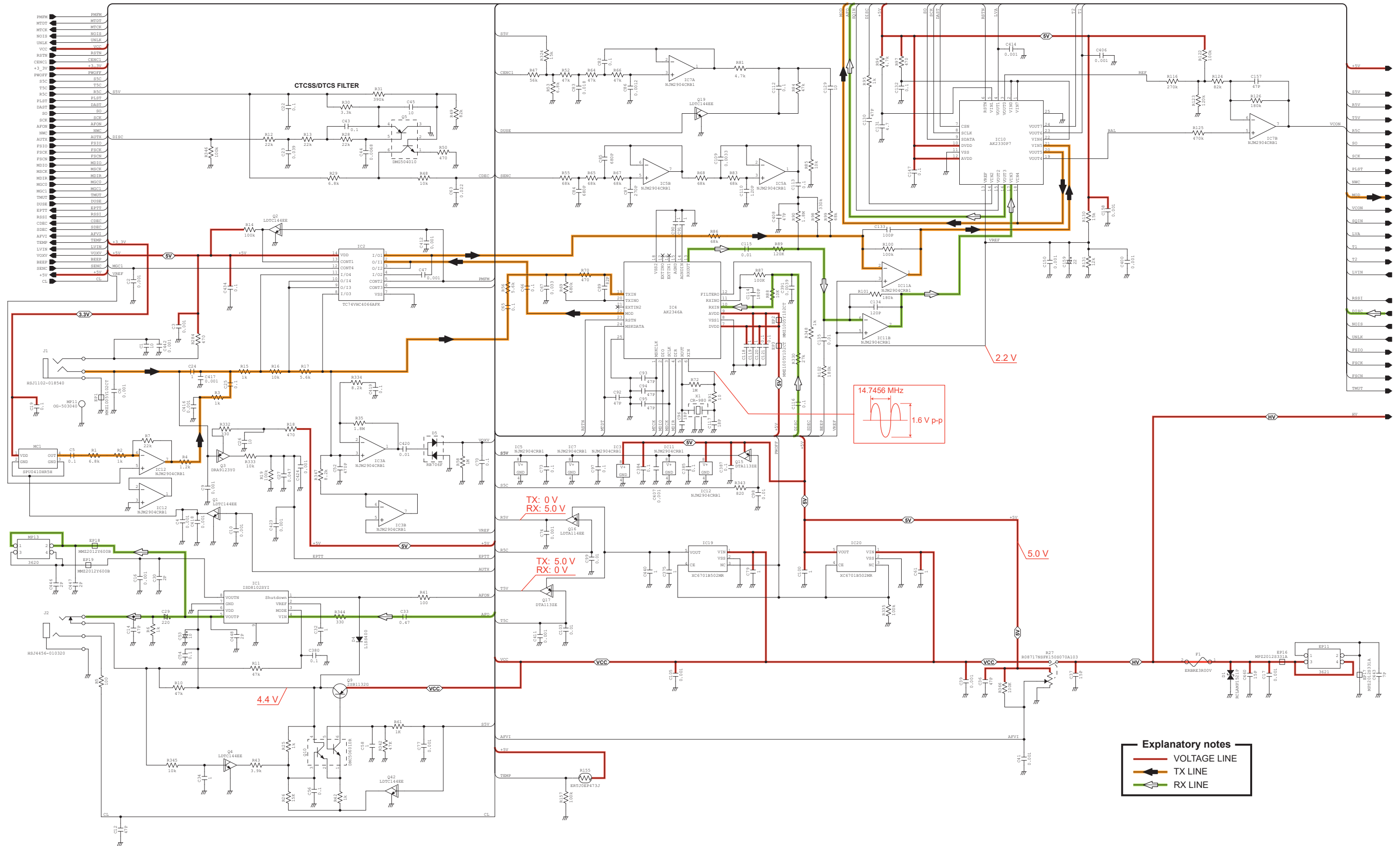
The image shows a complex circuit board layout for a radio receiver. The layout includes various components such as integrated circuits (ICs), resistors, capacitors, and transistors. The components are interconnected by a network of lines, which are color-coded to represent different signal paths: red for voltage lines, orange for TX (transmit) lines, and green for RX (receive) lines. The layout is organized into several functional blocks, including a PLL (Phase-Locked Loop) section, a TX VCO (Transmit Variable Frequency Oscillator) section, an RX VCO (Receive Variable Frequency Oscillator) section, an IF AMP (Intermediate Frequency Amplifier) section, a MIX (Mixer) section, an RF AMP (Radio Frequency Amplifier) section, and an AGC (Automatic Gain Control) section. A small inset in the bottom left corner shows a sine wave with a frequency of 15.3 MHz and an amplitude of 1.1 V p-p. The layout also includes a legend for the color-coded lines and a list of components and their values.

**Explanatory notes**

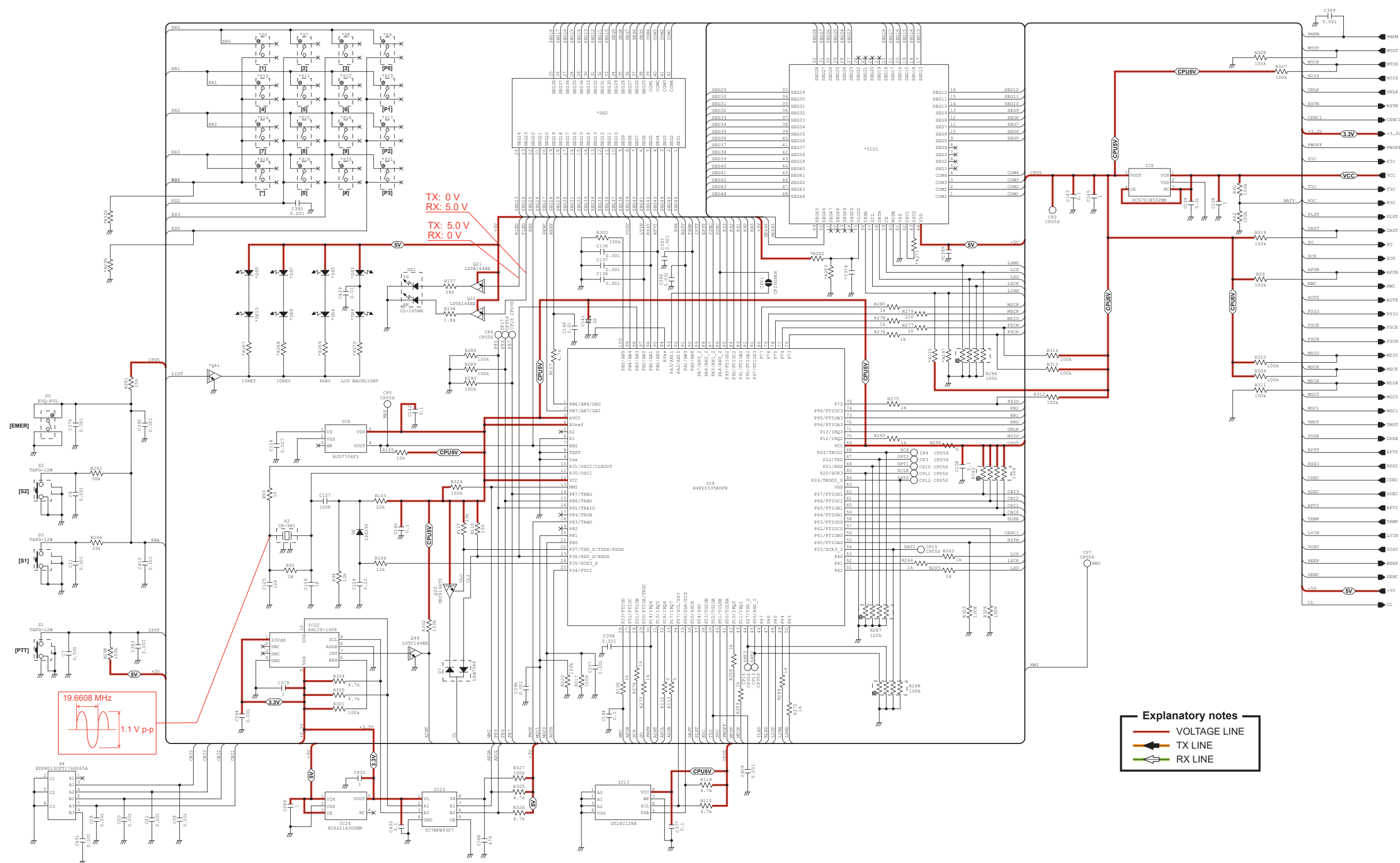
- VOLTAGE LINE
- TX LINE
- RX LINE



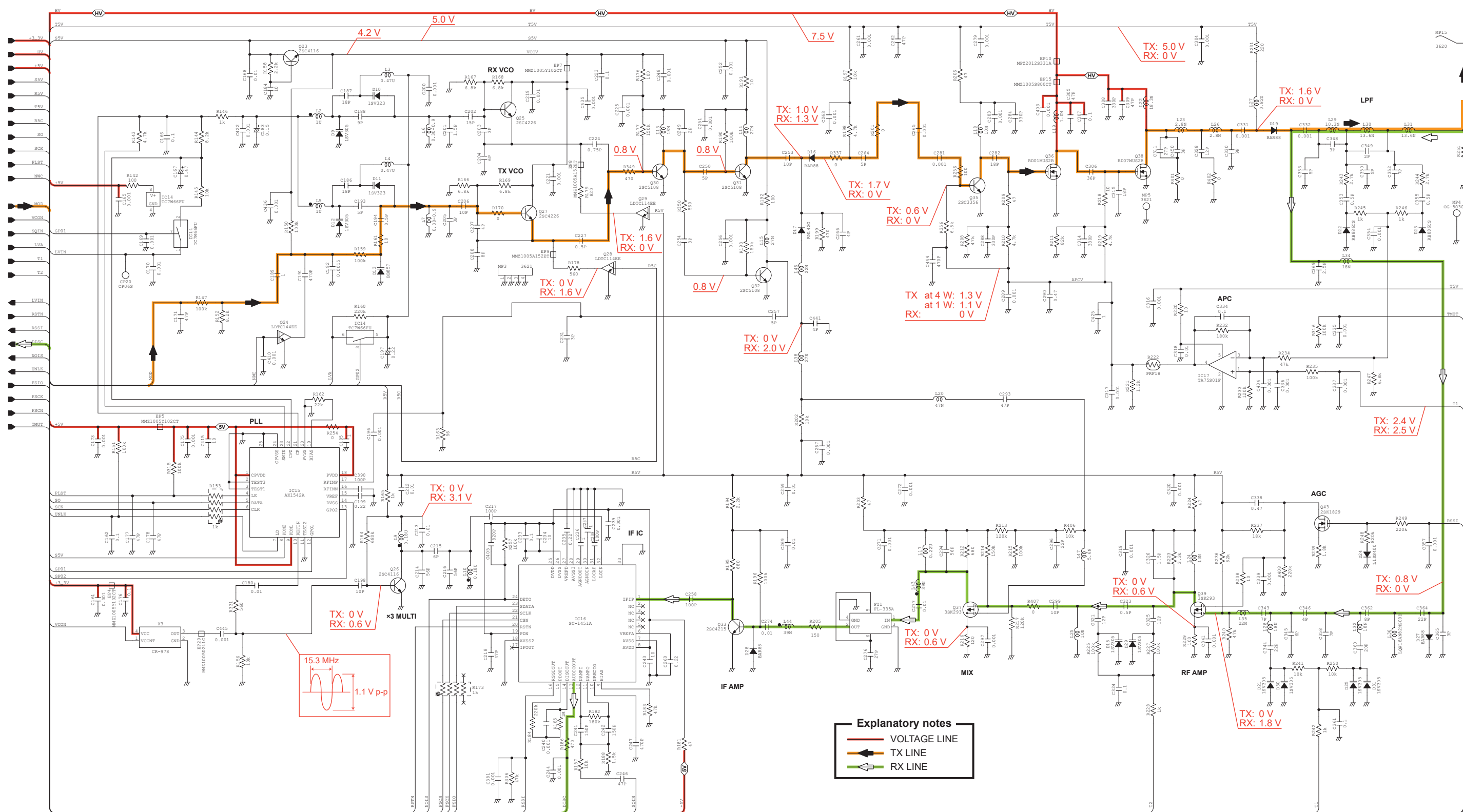
• MAIN unit (for #11~#19, #21, #35~#37, and #42~#44: 2/3)



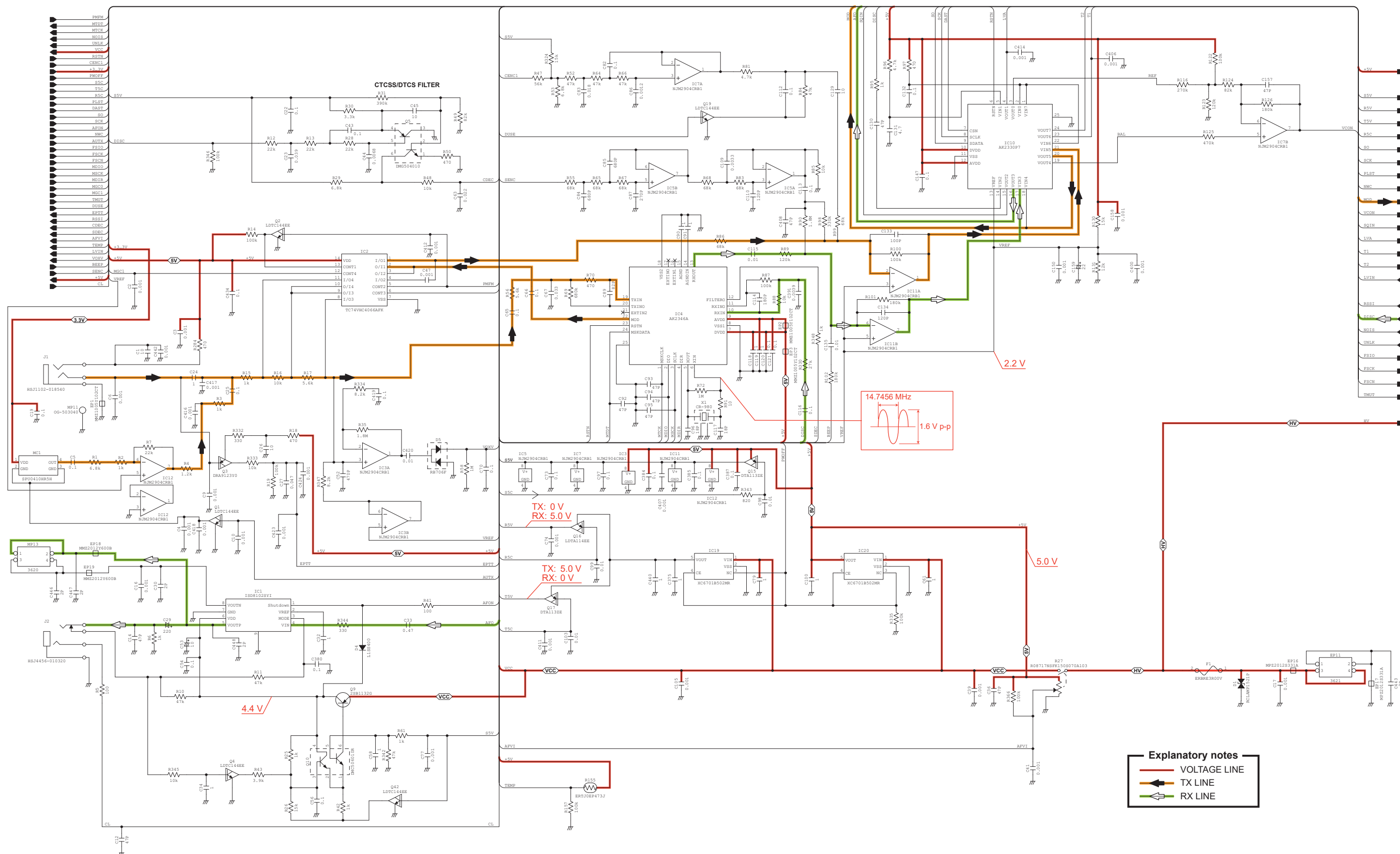
- **MAIN unit (for #11~#19, #21, #35~#37, and #42~#44: 3/3)**



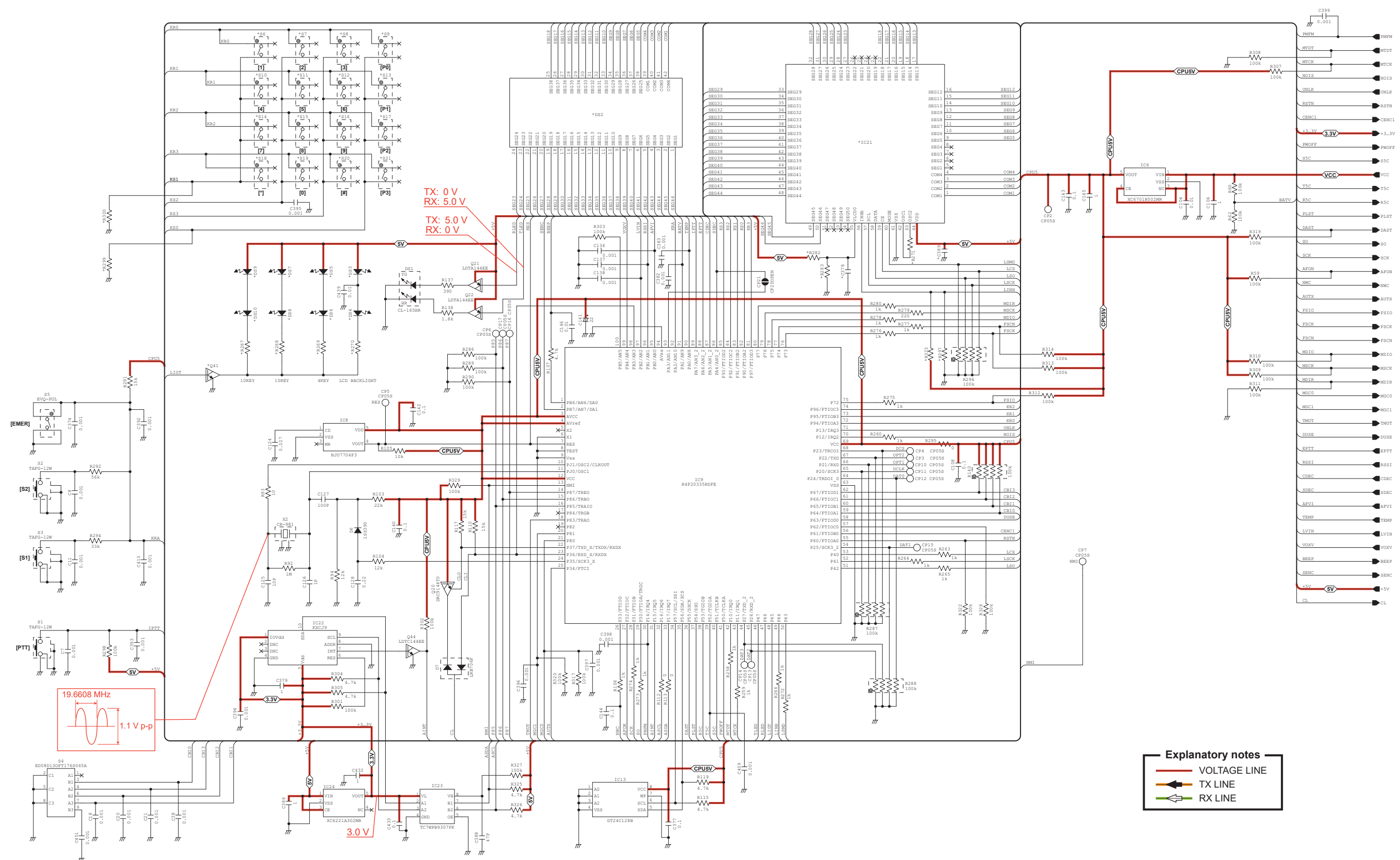
- **MAIN-B unit (for #23~#25, #38, #40, and #48~#50: 1/3)**



- **MAIN-B unit (for #23~#25, #38, #40, and #48~#50: 2/3)**



- MAIN-B unit (for #23~#25, #38, #40, and #48~#50: 3/3)



If you have any inquiries regarding service, contact your distributor. The contact number or E-mail address of your distributor can be found on our website.

<https://www.icomjapan.com/>

Count on us!