

## ALIGNMENT PROCDDURES

This transceiver is completely aligned at the factory and does not require any adjustments for installation. However it is considered as good practice to verify that none of the adjustments are changed.

Do not adjust any circuitry in this radiotelephone unless you understand the circuit operation and have experience in adjusting radiotelephone. Tampering with the radiotelephone may upset the alignment and lower its performance.

### Test Equipment Required:

- Regulated DC power supply, 10 -16V adjustable, 7A
- Audio signal generator, 10Hz~3kHz
- Digital multimeter
- Deviation meter {linear detector}
- Frequency counter, 0~500MHz high impedance
- Oscilloscope
- RF power meter,  $\geq 30W$
- High frequency standard generator, >500MHz
- Tracking generator, >500MHz
- Distortion analyzer
- Audio level meter
- T-coupler
- Sinad meter
- Alignment drivers, etc.
- Or a radio communication test set 2955 (MARCONI INSTRUMENTS)

## ADJUSTMENT PROCEDURE

| Step | Item           | Adjustment                               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|----------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1,   | PLL            | L302, L307                               | RX PD voltage=1.6V TX PD voltage =2V, at CH16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 2    | TX Frequency   | VC2                                      | Adjust VC2 to obtain demanded TX frequency. $\pm 200\text{Hz}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3    | TX Power Hi    | VR5                                      | Adjust VR5 to obtain demanded TX power $23\pm 2\text{W}$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4    | TX Power Low   | VR6                                      | Adjust VR6 to obtain demanded TX power $0.8\pm 0.1\text{W}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 5    | TX Deviation   | VR3                                      | <ol style="list-style-type: none"> <li>1. Inject an audio frequency (AF) <math>-20\text{dBm}</math>.</li> <li>2. Adjust VR3 to obtain maximum TX deviation <math>\leq 5\text{kHz}</math>.</li> <li>3. Check MIC modulation sensitivity, which should be <math>2.5\sim 10\text{ mV}</math></li> </ol>                                                                                                                                                                                                                                    |
| 6    | RX Sensitivity | L10, L11, L12, L13, L14, L19, T1, T2, T3 | <ol style="list-style-type: none"> <li>1. Check RX sensitivity if it is normal.</li> <li>2. Adjust L10, L11, L12, and L13 to obtain the Best frequency response.</li> <li>3. Adjust T1, T2 to obtain the Best the frequency response.</li> <li>4. Adjust L14, L19 to obtain the Best sensitivity.</li> <li>5. Adjust T3 to obtain Best the SINAD and Distortion. When at antenna terminal input <math>1\text{mV}</math> RF signal and modulated with normal test modulation.</li> <li>6. Repeat step 1 to 5.at CH28 and CH3.</li> </ol> |
| 7    | DSC test       |                                          | Check Modulation index for DSC. Modulation rate for DSC. Frequency error (demodulated DSC signal)                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## TROUBLESHOOTING

Before troubleshooting, prepare your unit as follows:

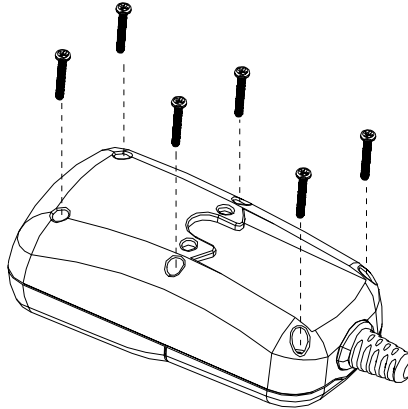
- Connect the power supply.
- Turn volume control fully clockwise so that it is all the way up.

| Item | Symptom                                          | Cause/Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Unit is not able to turn on.                     | <ul style="list-style-type: none"> <li>● Check the power voltage and power switch.</li> <li>● Check to see if regulator IC8 defective.</li> </ul>                                                                                                                                                                                                                                                                                                                                                               |
| 2    | No sound with AF signal applied to pin 6 of IC6. | <ul style="list-style-type: none"> <li>● Check to see if IC1 and /or associated components is Defective.</li> <li>● Check to see if speaker on control circuit VR201, IC10A, IC10B, is defective.</li> </ul>                                                                                                                                                                                                                                                                                                    |
| 3    | Squelch circuit inoperative.                     | <ul style="list-style-type: none"> <li>● Check to see if VR203 is defective.</li> <li>● Check to see if IC4 is defective.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
| 4    | No receiver (RX)                                 | <ul style="list-style-type: none"> <li>● Check to see if IC11 is defective.</li> <li>● Check to see if IC7 audio output at pin 9 is defective.</li> <li>● Check Q12.</li> <li>● Check 21.4MHz output of first mixer Q10.</li> <li>● Check 21.4MHz output of crystal filters F1, F2.</li> <li>● Check 21.4MHz output of first IF amplifier Q11.</li> <li>● Check 450kHz signal from ceramic filter F3.</li> <li>● Check to see if VCO circuit is defective.</li> <li>● Check to see MCU is defective.</li> </ul> |
| 5    | Low receiver sensitivity                         | <ul style="list-style-type: none"> <li>● Check to see if antenna is bad connecting.</li> <li>● Check to see if the output from Q9, Q10, Q11 and F1, F2 is defective.</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| 6    | No transmission (TX)                             | <ul style="list-style-type: none"> <li>● Check to see if the PTT switch is defective.</li> <li>● Check to see if Q13 is defective.</li> <li>● Check to see if power transmit circuit Q1, Q2, Q3 are defective.</li> <li>● Check to see if VCO circuit is defective.</li> <li>● Check PLL control voltage if it reads <math>2 \pm 0.2V</math> at 156.05MHz.</li> </ul>                                                                                                                                           |
| 7    | Poor or no modulation                            | <ul style="list-style-type: none"> <li>● Check to see if the microphone or MIC jack is defective.</li> <li>● Check to see if IC205 and/or its associated components are defective.</li> </ul>                                                                                                                                                                                                                                                                                                                   |
| 8    | Deviation of transmit frequency                  | <ul style="list-style-type: none"> <li>● Check the frequency of 20.950MHz crystal X2.</li> <li>● Adjust VC2 and verify the transmit frequency.</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |

## DISASSEMBLY INSTRUCTIONS

To disassembly follow the procedures below:

- A. Unscrew the 6 Screws of hand MIC.



- B. Unscrew 6 screws for the bottom cabinet of the main UNIT.

