

# IC-M502A ADJUSTMENT PROCEDURES

## 1 PREPARATION

### ■ REQUIRED TEST EQUIPMENT

| EQUIPMENT                           | GRADE AND RANGE                                                                                                 | EQUIPMENT                          | GRADE AND RANGE                                                                        |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------|----------------------------------------------------------------------------------------|
| DC power supply                     | Output voltage : 13.8 V DC<br>Current capacity : 10 A or more                                                   | Audio generator                    | Frequency range : 300–3000 Hz<br>Measuring range : 1–500 mV                            |
| RF power meter<br>(terminated type) | Measuring range : 1–50 W<br>Frequency range : 100–300 MHz<br>Impedance : 50 $\Omega$<br>SWR : Less than 1.2 : 1 | Standard signal<br>generator (SSG) | Frequency range : 0.1–300 MHz<br>Output level : 0.1 $\mu$ V–32 mV<br>(–127 to –17 dBm) |
| Frequency counter                   | Frequency range : 0.1–300 MHz<br>Frequency accuracy : $\pm 1$ ppm or better<br>Sensitivity : 100 mV or better   | Oscilloscope                       | Frequency range : DC–20 MHz<br>Measuring range : 0.01–20 V                             |
| FM deviation meter                  | Frequency range : 30–300 MHz<br>Measuring range : 0 to $\pm 10$ kHz                                             | AC millivoltmeter                  | Measuring range : 10 mV–10 V                                                           |
| DC voltmeter                        | Input impedance : 50 k $\Omega$ /V DC or better                                                                 | External speaker                   | Input impedance : 4 $\Omega$<br>Capacity : 5 W or more                                 |
|                                     |                                                                                                                 | Attenuator                         | Power attenuation : 40 or 50 dB<br>Capacity : 50 W or more                             |

## 2 PLL ADJUSTMENTS

| ADJUSTMENT          |   | ADJUSTMENT CONDITION                                                                                                                                                                                                             | MEASUREMENT |                                                                   | VALUE        | ADJUSTMENT POINT |        |
|---------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------|--------------|------------------|--------|
|                     |   |                                                                                                                                                                                                                                  | UNIT        | LOCATION                                                          |              | UNIT             | ADJUST |
| LOCK VOLTAGE        | 1 | <ul style="list-style-type: none"> <li>Operating channel : chP2 (Frequency : 163.425 MHz)</li> <li>Receiving</li> </ul>                                                                                                          | MAIN        | Connect a digital multi-meter or oscilloscope to check point CP2. | 3.6 V        | MAIN             | L9     |
|                     | 2 | <ul style="list-style-type: none"> <li>Operating channel : chP2 (Frequency : 161.450 MHz)</li> <li>Output power : Low</li> <li>Transmitting</li> </ul>                                                                           |             | Connect a digital multi-meter or oscilloscope to check point CP1. | 3.3 V        |                  | L4     |
| REFERENCE FREQUENCY | 1 | <ul style="list-style-type: none"> <li>Operating channel : ch16</li> <li>Output power : Low</li> <li>Connect an RF power meter or a 50 <math>\Omega</math> dummy load to the antenna connector.</li> <li>Transmitting</li> </ul> | Rear Panel  | Loosely couple the frequency counter to the antenna connector.    | 156.8000 MHz | MAIN             | C12    |

### 3 TRANSMITTER ADJUSTMENTS

| ADJUSTMENT          |   | ADJUSTMENT CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | MEASUREMENT |                                                                               | VALUE    | ADJUSTMENT POINT |        |
|---------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------|----------|------------------|--------|
|                     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | UNIT        | LOCATION                                                                      |          | UNIT             | ADJUST |
| OUTPUT POWER        | 1 | <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• Output power : High</li> <li>• Transmitting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         | Rear Panel  | Connect an RF power meter to the antenna connector.                           | 23.5 W   | MAIN             | R114   |
| FREQUENCY DEVIATION | 1 | <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• Output power : Low</li> <li>• Connect an audio generator to J7 (pin 5) with an AC millivoltmeter and set as: <ul style="list-style-type: none"> <li>Frequency : 1 kHz</li> <li>Level : 30 mV</li> </ul> </li> <li>• Set an FM deviation meter as: <ul style="list-style-type: none"> <li>HPF : OFF</li> <li>LPF : 20 kHz</li> <li>De-emphasis : OFF</li> <li>Detector : (P-P)/2</li> </ul> </li> <li>• Transmitting</li> </ul> | Rear Panel  | Connect an FM deviation meter to the antenna connector through an attenuator. | ±4.3 kHz | MAIN             | R381   |

## 4 RECEIVER ADJUSTMENTS

| ADJUSTMENT  |   | ADJUSTMENT CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MEASUREMENT |                                             | VALUE           | ADJUSTMENT POINT |                             |
|-------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------|-----------------|------------------|-----------------------------|
|             |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | UNIT        | LOCATION                                    |                 | UNIT             | ADJUST                      |
| SENSITIVITY | 1 | <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• [SQUELCH] control:<br/>Max. counterclockwise</li> <li>• Set the internal speaker OFF in the SET mode, and connect a distortion meter with a 4 <math>\Omega</math> load to [EXT SP] receptacle.</li> <li>• Connect an SSG to the antenna connector and set as:<br/>Frequency : 156.800 MHz<br/>Level : 3.2 <math>\mu</math>V*<br/>(-97 dBm)<br/>Modulation : 1 kHz<br/>Deviation : <math>\pm</math>3.5 kHz</li> <li>• Receiving</li> </ul> | MAIN        | Connect a DC volt-meter to check point CP3. | Maximum voltage | MAIN             | L35,<br>L36,<br>L38,<br>L39 |
| SQUELCH     | 1 | <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• [SQUELCH] control:<br/>Max. counterclockwise</li> <li>• Connect an SSG to the antenna connector and set as:<br/>Frequency : 156.800 MHz<br/>Level : 0.40 <math>\mu</math>V*<br/>(-115 dBm)<br/>Modulation : 1 kHz<br/>Deviation : <math>\pm</math>3.5 kHz</li> <li>• Receiving</li> </ul>                                                                                                                                                 | MAIN        | Connect a DC volt-meter to check point CP5. | 1.15 V          | MAIN             | R214                        |

\*This output level of a standard signal generator (SSG) is indicated as SSG's open circuit.