

# ADJUSTMENT

## 1) Required Test Equipment

The following items are required to adjust radio parameters:

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| <b>1. Regulated power supply</b>             | Supply voltage:5 - 14 VDC<br>Current:3 A or more   |
| <b>2. Digital multimeter</b>                 | Voltage range:FS = Approx. 20 V<br>Current:10A or more<br>Input resistance:High impedance                |
| <b>3. Oscilloscope</b>                       | Measurable frequency:Audio frequency   |
| <b>4. Audio dummy load</b>                   | Impedance:8 $\Omega$<br>Dissipation:1 W or more<br>Jack:3.5 mm $\phi$                                    |
| <b>5. SSG</b>                                | Output frequency:200 MHz or more<br>Output level:-20 dB/0.1 $\mu$ V - 120dB/1V<br>Modulation:AM/FM       |
| <b>6. Spectrum Analyzer</b>                  | Measuring range:Up to 2 GHz or more  |
| <b>7. Power meter</b>                        | Measurable frequency:Up to 200 MHz<br>Impedance:50 $\Omega$ , unbalanced<br>Measuring range:0.1 W - 10 W |
| <b>8. Audio voltmeter</b>                    | Measurable frequency:Up to 100 kHz<br>Sensitivity:1 mV to 10 V   |
| <b>9. Audio generator</b>                    | Output frequency:67 Hz to 10 kHz<br>Output impedance:600 $\Omega$ , unbalanced                           |
| <b>10. Distortion meter<br/>/SINAD meter</b> | Measurable frequency:1 kHz<br>Input level:Up to 40 dB<br>Distortion level:1 % - 100 %                    |
| <b>11. Frequency counter</b>                 | Measurable frequency:Up to 200 MHz<br>Measurable stability:Approx. +/-0.1 ppm                            |
| <b>12. Linear detector</b>                   | Measurable frequency:Up to 200 MHz<br>Characteristics:Flat<br>CN:60 dB or more                           |

### Note

- Standard modulation: 1 kHz +/-3.5 kHz/DEV
- Reference sensitivity: 12 dB SINAD
- Specified audio output level: 200 mW at 8  $\Omega$
- Standard audio output level: 50 mW at 8  $\Omega$
- Use an RF cable (3D2W: 1 m) for test equipment.
- Attach a fuse to the RF test equipment.
- All SSG outputs are indicated by EMF.
- Supply voltage for the transceiver: 13.8 VDC

## 2) Adjustment Mode

The DJ - 190 does not require a serviceperson to manipulate the components on the printed - circuit board, except the trimmer and coil when adjusting frequency. Most of the adjustments for the transceiver are made by using the keys on it while the unit is in the adjustment mode. Because the adjustment mode temporarily uses the channels, frequency must be set on each channel before adjustments can be made. For instructions on how to program the channels, see the "DJ - 190 INSTRUCTION MANUAL" which came with the product. In consideration of the radio environment, the frequency on each channel must be near the value (+/- 1 MHz) listed in the table below. To enter the adjustment mode, turn the power off, hold down both the UP and DOWN keys, and press the POWER key. "chEc" appears on the LCD for about two seconds, and "C" appears indicating the unit is in the adjustment mode.

### Channel frequencies used in the adjustment mode

Channel	Channel function	Frequency
1	Reference frequency adjustment	145 MHz
2	High power adjustment	* 145 MHz
3	Low power adjustment	* 145 MHz
4	Minimum frequency sensitivity adjustment	136 MHz
5	Medium frequency sensitivity adjustment	145 MHz
6	Maximum frequency sensitivity adjustment	173 MHz
7	S-meter (1) adjustment	* 145 MHz
8	S-meter (FULL) adjustment	* 145 MHz
9	Deviation	* 145 MHz
12	Tone 67 Hz test	* 145 MHz
13	Tone 88.5 Hz test	* 145 MHz
14	Tone 250.3 Hz test	* 145 MHz
15	Tone burst test	* 145 MHz
16	Aging (Not required to use)	145 MHz
20	VCO frequency shift change (Do not change).	

\* 162MHz for TA2 Version

### Caution

■ Do not press the **UP** or **DOWN** key while channel 20 is selected in the adjustment mode. Otherwise, the VCO switch frequency will change, causing a malfunction.

### Reference Frequency Adjustment

1. In the adjustment mode, select channel 1 by rotating the main tuning dial.
2. Press the **(PTT)** key to start transmission.
3. Rotate TC101 on the RF circuit board until the value on the frequency counter matches the one displayed on the LCD.
4. On 145.05MHz measure TP near the VCO and adjust L301 to obtain  $1.1V \pm 0.1V$  (if the second decimal point is flashing, the PLL is unlocked).

### High Power Adjustment

1. In the adjustment mode, select channel 2 by rotating the main tuning dial.
2. Hold down the **(F)** key and press the **(H/L)** key to enter the high power mode ("L" at the lower-left of the display disappears).
3. Hold down the **(PTT)** key to start transmission.
4. While watching the reading of the TX power meter, set the output power to the value closest to 5 W by using the **(UP)** or **(DOWN)** keys.
5. When the **(PTT)** key is released, the output power at that time will be stored as the high power setting.

### Low Power Adjustment

1. In the adjustment mode, select channel 3 by rotating the main tuning dial.
2. Hold down the **(F)** key and press the **(H/L)** key to enter the low power mode ("L" appears at the lower-left of the display).
3. Hold down the **(PTT)** key to start transmission.
4. While watching the reading of the TX power meter, set the output power to the value closest to 0.8 W by using the **(UP)** or **(DOWN)** keys.
5. When the **(PTT)** key is released, the output power at that time will be stored as the low power setting.

### Minimum Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 4 by rotating the main tuning dial.
2. Using the **(UP)** or **(DOWN)** key, set the minimum frequency sensitivity.

### Medium Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 5 by rotating the main tuning dial.
2. Using the **(UP)** or **(DOWN)** key, set the medium frequency sensitivity.

### Maximum Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 6 by rotating the main tuning dial.
2. Using the **(UP)** or **(DOWN)** key, set the maximum frequency sensitivity.

### **S-meter (1) Adjustment**

1. In the adjustment mode, select channel 7 by rotating the main tuning dial. The S-meter will show a single star (★).
2. Enter "0" dB  $\mu$  (EMF) with the transceiver tester.
3. Press the (DOWN) key. The transceiver beeps indicating the new setting has been stored successfully.

### **S-meter (FULL) Adjustment**

1. In the adjustment mode, select channel 8 by rotating the main tuning dial. The S-meter will show all six stars (★ ★ ★ ★ ★ ☆).
2. Enter "+20" dB  $\mu$  (EMF) with the transceiver tester.
3. Press the (DOWN) key. The transceiver beeps indicating the new setting has been stored successfully.

### **Deviation**

1. In the adjustment mode, select channel 9 by rotating the main tuning dial.
2. Input a 50 mVrms, 1 KMz signal with your transceiver tester through the external microphone jack.
3. With the tester, put the transceiver in the transmission mode.
4. Using the (UP) or (DOWN) key, set the deviation to the value closest to 4.5kHz. The deviation has three levels namely 0 to 2 which is displayed in the upper right corner of the LCD.

### **Tone 67 Hz Test**

This function is only for checking the tone encoder, not adjusting it.

1. In the adjustment mode, select channel 12 by rotating the main tuning dial.
2. Press the (PTT) key. A 67 Hz tone is automatically sent.
3. Check the deviation with the transceiver tester.

### **Tone 88.5 Hz Test**

1. In the adjustment mode, select channel 13 by rotating the main tuning dial.
2. Press the (PTT) key. An 88.5 Hz tone is automatically sent.
3. Check the deviation with the transceiver tester.

### **Tone 250.3 Hz Test**

1. In the adjustment mode, select channel 14 by rotating the main tuning dial.
2. Press the **(PTT)** key. A 250.3 Hz tone is automatically sent.
3. Check the deviation with the transceiver tester.

### **Tone Burst Test**

This function is only for checking the tone burst, not adjusting it.

1. In the adjustment mode, select channel 15 by rotating the main tuning dial.
2. Press the **(PTT)** key. A 1750 Hz tone burst is automatically sent.
3. Check the deviation with the transceiver tester.

### **Aging**

Perform this aging test only when necessary.

1. In the adjustment mode, select channel 16 by rotating the main tuning dial. The transceiver automatically repeats transmission for a minute and reception for another minute.

### **Note on Adjusting Sensitivity**

Sensitivity is adjusted by applying the optimum voltage from the CPU to the varicap of the tuning circuit. The coil manipulation for L109, L110, L111, and L112 is not required. If any of the coils is accidentally rotated, return it to the default position as described below, before adjusting the sensitivity.

1. Program any frequency within 145MHz +/-1MHz on memory channel 5.
2. Holding down both the **(UP)** and **(DOWN)** key, press the POWER switch to turn the power ON. "chEc" will appear on the LCD for two seconds, and "C" appears.
3. Select channel 5 by rotating the main tuning dial.
4. Using the **(UP)** or **(DOWN)** keys, set the adjustment data to "7F" ("7F" appears in the channel number area on the LCD).
5. Turn the power OFF.
6. Holding down both the **(UP)** and **(DOWN)** key, turn the power ON. When the "C" no longer appears, the transceiver is in the normal status.
7. Set the reception frequency to 145 MHz +/-1MHz. Rotate the coil to maximize the sensitivity.