

ADJUSTMENT

1) Required Test Equipment

The following items are required to adjust radio parameters:

1. Regulated power supply	Supply voltage: Current:	5 - 14 VDC 3 A or more
2. Digital multimeter	Voltage range: Current: Input resistance:	FS = Approx. 20 V 10A or more High impedance
3. Oscilloscope	Measurable frequency:	Audio frequency
4. Audio dummy load	Impedance: Dissipation: Jack:	8 Ω 1 W or more 3.5 mm ϕ
5. SSG	Output frequency: Output level: Modulation:	200 MHz or more -20 dB/0.1 μ V - 120dB/1V AM/FM
6. Spectrum Analyzer	Measuring range:	Up to 2 GHz or more
7. Power meter	Measurable frequency: Impedance: Measuring range:	Up to 200 MHz 50 Ω , unbalanced 0.1 W - 10 W
8. Audio volmeter	Measurable frequency: Sensitivity:	Up to 100 kHz 1 mV to 10 V
9. Audio generator	Output frequency: Output impedance:	67 Hz to 10 kHz 600 Ω , unbalanced
10. Distortion meter /SINAD meter	Measurable frequency: Input level: Distortion level:	1 kHz Up to 40 dB 1 % - 100 %
11. Frequency counter	Measurable frequency: Measurable stability:	Up to 200 MHz Approx. +/-0.1 ppm
12. Linear detector	Measurable frequency: Characteristics: CN:	Up to 200 MHz Flat 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 Ω
- Standard audio output level: 50 mW at 8 Ω
- 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-191 does not require a serviceperson to manipulate the components on the printed-circuit board, except the trimmer when adjusting reference frequency and deviation. 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-191 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	130 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
10	DTMF (1) test	145 MHz
11	DTMF (D) test	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).	-

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.

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)** and **(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 0.5 W by using the **(UP)** and **(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)** and **(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)** and **(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)** and **(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 μ (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 μ (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. Rotate the VR2 on the printed - circuit board of the transceiver until the deviation is set to 4.5 KHz.

DTMF (1) Test

This function is only for checking the DTMF code, not adjusting it.

1. In the adjustment mode, select channel 10 by rotating the main tuning dial.
2. Press the **(PTT)** key. DTMF code "1" is automatically sent and you will hear the monitoring tone from the speaker.
3. Check the deviation with the transceiver tester.

DTMF (D) Test

1. In the adjustment mode, select channel 11 by rotating the main tuning dial.
2. Press the **(PTT)** key. DTMF code "D" is automatically sent and you will hear the monitoring tone from the speaker.
3. Check the deviation with the transceiver tester.

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 145 MHz +/-1 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)** and **(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 +/-1. Rotate the coil to maximize the sensitivity.