Preliminary Information

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TOA RADIO MICROPHONE

model WM-3310
WM-3310H

CONTENTS

1. GENERAL DESCRIPTION

The TOA wireless microphone WM-3310 is of lavalier type and is designed to conform with the regulations. It employs an optimized PLL-synthesizer and a compander noise reduction circuit to minimize the influence of ambient RF noise.

2. FEATURES

(1) Up to 6 operating frequencies are made available for selection.
(2) An optimized PLL-synthesizer minimizes the oscillation frequency drift resulting from the ambient temperature or voltage fluctuation.
(3) The sensitivity trim pot control optimizes the system in any locations.
(4) Battery lamp indicates battery consumption to prevent the unit from malfunctioning when the battery level remarkably decreases.
(5) The compressor and low-pass filter on the audio circuit protect the unit against out-of-band energy produced by overload.
(6) Chip components make the unit smaller in size yet more reliable.
(7) 6 frequencies of 169 - 216 MHz

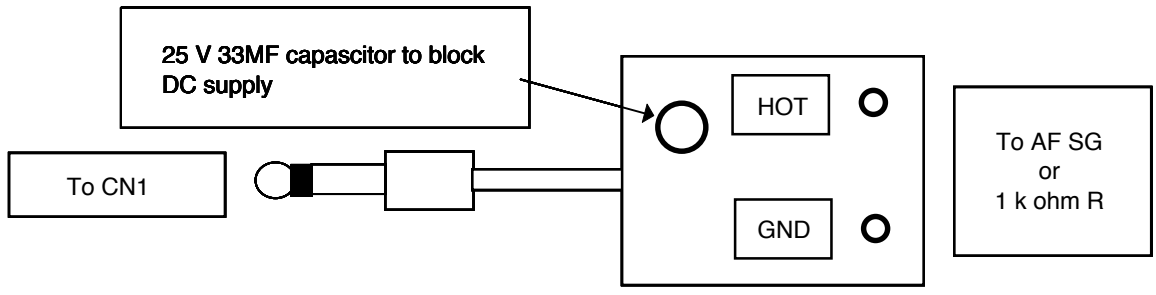
3. SPECIFICATIONS

Model No.	WM-3310
Oscillator	Crystal-controlled PLL-synthesizer
Nominal Frequency	6 frequencies of 169- 216 MHz
RF Power Output	Less than 50mW
Modulation	Frequency Modulation
Nominal Supply Voltage	9.0V
Usable Battery	6LR61(9.0V Alkaline)
Marginal Battery Voltage Level	Approx. 6 V (When the battery voltage falls below this level, the battery lamp begins to flash.)
Antenna	Wired Antenna

4. TEST CONDITIONS

(1) Modulation and Non-modulation

[Modulation]
To perform continuous modulation, connect the plug of the jig supplied with the microphone sample to CN1 and the jig output to an AF signal generator. Then, connect the jig output to an AF oscillator using the shielded or coaxial cable. For connection, refer to the figure below.(Since the phantom power is present at the HOT side of the plug, a capacitor to block a DC current is connected to the HOT side.)

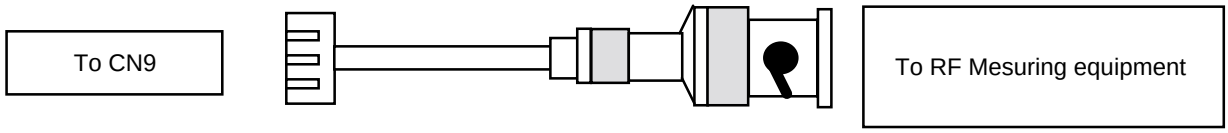


<Fig. 1. Jig>

After connection completion, feed an audio frequency signal continuously through both the HOT and grounding terminals. This permits modulation to be performed.

[[Non-modulation]
Disconnect the AF oscillator from the jig, then connect a 1 kΩ resistor (the same impedance as that of the microphone) to both the HOT and grounding terminals.

(2) Connections for RF Measurement
To measure an RF signal, use the coaxial cable attached to the microphone sample submitted. Connect the 3-pin connector from the coaxial cable to CN9 on the circuit board inside the microphone. (Remove the herical antenna.) Connect the coaxial cable's BNC end to measuring equipment.



<Fig. 2. Coaxial Cable>

(3) Power Supply Connection
The wireless microphone is operated by the battery placed in the battery compartment. To use the external power supply instead of the battery, connect the battery terminals inside the battery compartment to the external power supply.

(4) Sensitivity Control
The wireless microphone is designed to permit adjustment of the microphone input sensitivity depending on the user's speech sound volume. The sensitivity decreases as the control is rotated counterclockwise, and increases as rotated clockwise. The adjustable sensitivity range is from 115 dB to 130 dB (factory-preset to 115 dB).

(5) Tone Squelch Circuit
To prevent noise of a disturbing radio signal from being provided when the microphone receives the disturbing signal, the tone signal is superimposed on the audio signal, and the superimposed signals are modulated.

The receiver always checks the tone signal transmitted from the microphone so that the audio output is not provided from the receiver when it receives an undesired radio signal. The tone signal transmitted from the microphone is set for 32.768 kHz with deviation of 1.7 kHz.

When the carrier is modulated only by the tone signal, the first side band is the level of 31.7 dB (0.0068%) below the carrier power, and the second side band 70 dB below the carrier power. This means that the tone squelch system does not affect the out-of-band power.

(Reference)
FM modulation element of tone signal
Expansion with the Bessel function of instantaneous current i of FM modulated radio wave
i=Io[Jo(mf)sin(Wot)+J1(mf){sin(Wo+Wm)t-sin(Wo-Wm)t}+J2(mf){sin(Wo+Wm)t-sin(Wo-Wm)t}+J3(mf){sin(Wo+Wm)t-sin(Wo-Wm)t}+.....]
Io: Maximum current value
mf: modulation index
Wo: Angular frequency of carrier wave
Wm: Angular frequency of modulation wave
approxmate formula of Bessel function when mf <<1
Jo(mf)=1 J1(mf)=mf/2 J2(mf)=mf2/8 J3(mf)=mf3/48

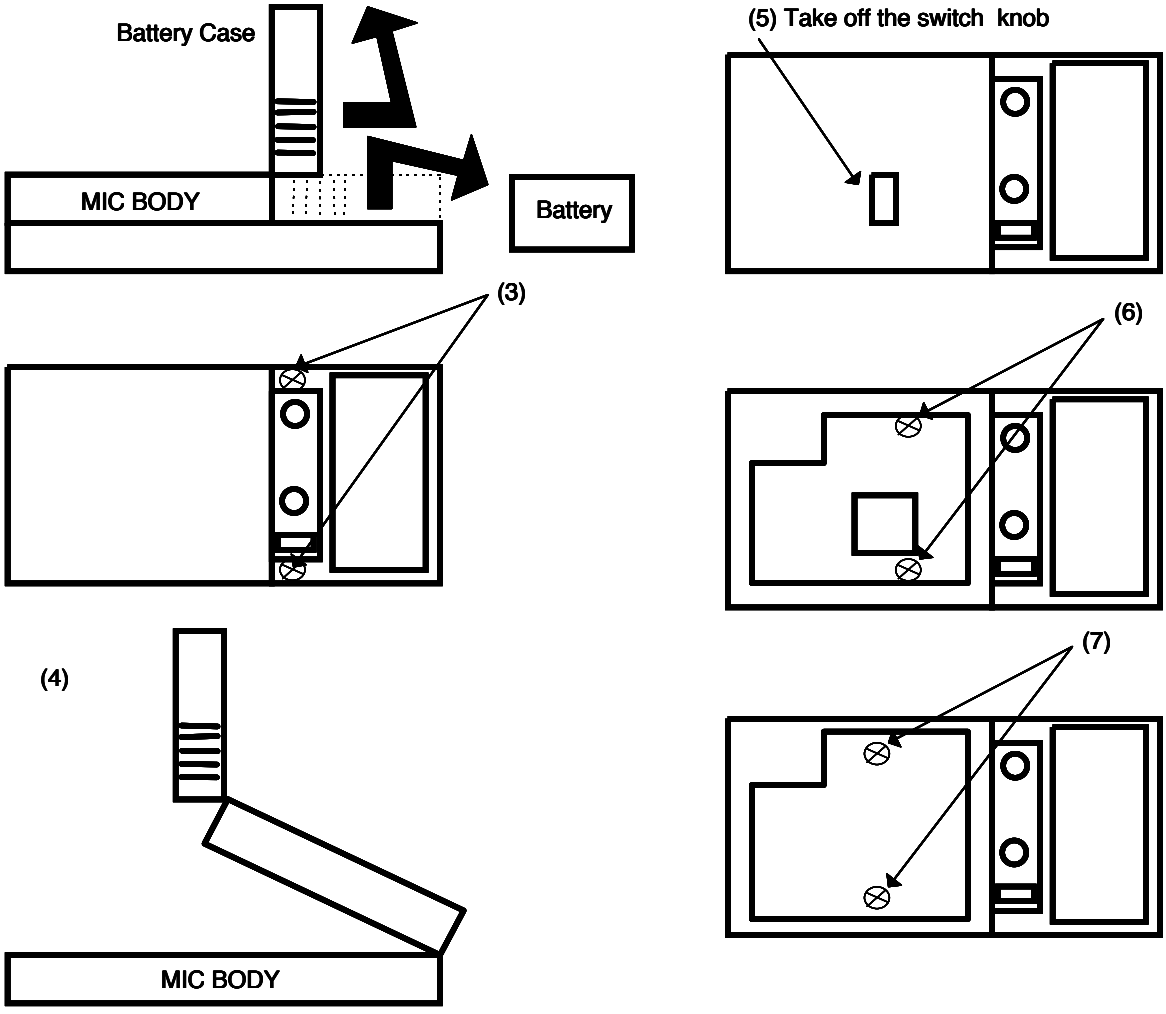
(6) Assembly/Disassembly of the Microphone

<Disassembly>

1. Holding the upper cover, slide the battery case and push it up as shown in the figure.
2. Remove the battery.
3. Remove two screws using a Phllips screwdriver. (The upper cover can now be removed by hand.)
4. Pull the upper cover to remove it.
5. Remove the switch knob.
6. Remove two Phillips screws to remove the upper circuit board.
7. Remove three Phillips screws to remove the lower circuit board.

<Assembly>

To re-assemble the unit, reverse the procedures above.



5. APPEARANCE

[WM-3310]