Preliminary Information

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TOA RADIO MICROPHONE

model WM-3210

CONTENTS

1. GENERAL DESCRIPTION

The TOA wireless microphone WM-3210 is of hand-held 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) Battery lamp indicates battery consumption to prevent the unit from malfunctioning when the battery level remarkably decreases.
(4) The compressor and low-pass filter on the audio circuit protect the unit against out-of-band energy produced by overload.
(5) Chip components make the unit smaller in size yet more reliable.
(6) 6 frequencies of 169 - 216 MHz

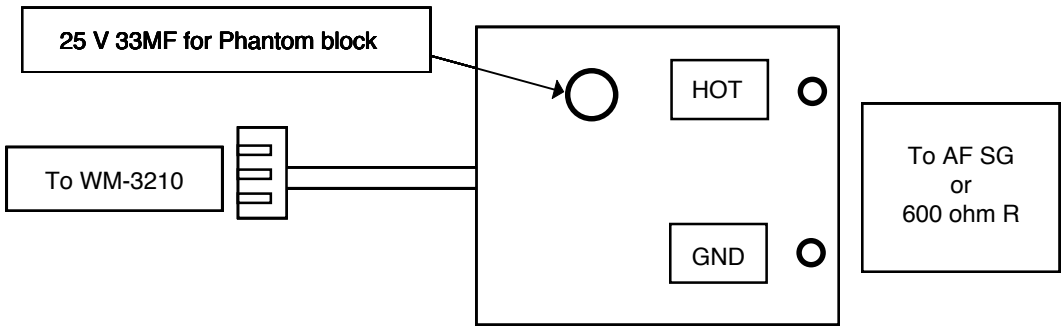
3. SPECIFICATIONS

Model No.	WM-3210
Oscillator	Crystal-contorolled 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	Internal Antenna

4. TEST CONDITIONS

(1) Modulation and Non-modulation

[Modulation]
First remove the windscreen and then the microphone capsule having a 3-pin connector. Connect the same 3-pin connector from the jig (shown below) attached to the microphone sample to the resultant connector inside the microphone. Then, connect the jig output to an AF oscillator using the shielded or coaxial cable. For connection, refer to the figure below.
NOTE. Pin #1: Ground, Pin #2: Ground, Pin #3: Input (HOT)

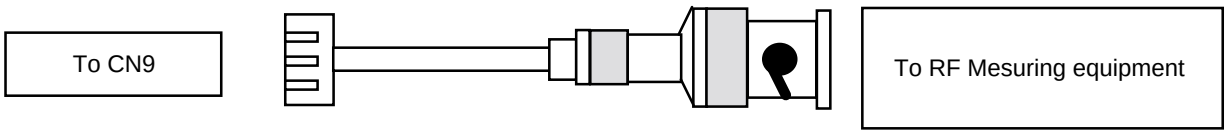


<Fig. 1. Jig>

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 600 Ω 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 antenna wire.) 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)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

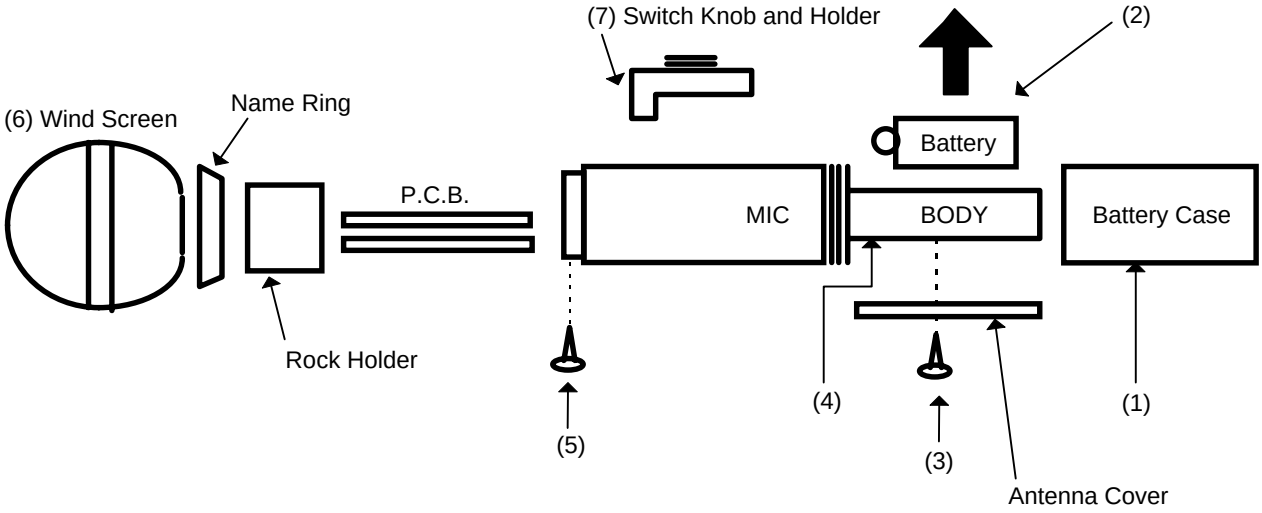
(6) Assembly and Disassembly of the Unit

<Disassembling the unit>

1. Holding the Mic Body, turn the Battery Case (microphone grip) counter-clockwise to remove it.
2. Take out the battery.
3. Using the Phillips screwdriver, remove the screw holding the Antenna Cover to remove the Cover.
4. Using the soldering iron, take off the soldered joint of the antenna cable on the printed circuit board.
5. Remove the windscreen by turning it counter-clockwise.
6. Using the Phillips screwdriver, remove the screw holding the Name Ring, then remove the Name Ring and the microphone's internal lock holder.
7. Remove the Switch Holder.
8. Take the printed circuit board out of the microphone body.

<Assembling the unit>

To re-assemble the disassembled microphone, reverse the procedures above.



5. APPEARANCE