Certification Information:

WMS-11: FCC ID: QM9SPWMS-10

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE CONDITION THAT THIS DEVICE DOES NOT CAUSE HARMFUL INTERFERENCE.

WMS-21: FCC ID: QM9SPWMS-20

THIS SPECIAL PROJECTS WIRELESS TRANSMITTER HAS BEEN CERTIFIED UNDER FCC PART 74.

Licensing Information:

LICENSING OF SPECIAL PROJECTS WIRELESS EQUIPMENT IS THE USER'S RESPONSIBILITY AND LICENSABILITY DEPENDS ON THE USER'S CLASSIFICATION, APPLICATION AND FREQUENCY OF OPERATION.

ANY CHANGES OR MODIFICATIONS TO THE EQUIPMENT, INCLUDING THE AUDIO CABLE WHICH ALSO SERVES AS THE ANTENNA, NOT EXPRESSLY APPROVED BY SPECIAL PROJECTS MAY VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

Thank you for choosing the Special Projects™ WMS-201 Series wireless system! This is a shared operating manual for the WMS-21 Beltpack Transmitter and the WMS-11 VHF Receiver. Please thoroughly go through each section pertaining to the pieces you have.

1. Part Identification

1.1 WMS-21 Beltpack Transmitter

1.2 WMS-11 VHF Receiver

(C1) Power Switch
(C2) Power Indicator
(C3) RF Level Indicator
(C4) Tuner Indicator
(C5) Audio Level Indicator
(C6) Volume Control
(C8) Antenna B
(C9) Balanced Audio Output, XLR jack
(C10) Unbalanced Audio Output, ¼" jack
(C11) Squelch Control (SQ)
(C13) Cable Restraint
(C14) Antenna A

2. Installation of Batteries

The WMS-21 transmitter has been configured for use with a proprietary rechargeable battery. Battery replacement can only be preformed by Special Projects. Recharging will become necessary when the red battery LED is illuminated. Under normal conditions, operating time between charges is 8-12 hours.

2.1 WMS-21 Charger Connection

Before attaching the charger, it is strongly recommended that the WMS-21 be allowed to dry completely. Although the beltpack is designed for use in wet environments, the charger is not. Caution should be used when charging, in an effort to prevent electric shock. Using the supplied charger (xx),

2.2 WMS-21 Battery Charging

Prior to using for the first time, it is recommended that you allow 12 hours for the battery to be conditioned and become fully charged. After this initial charging cycle is completed, normal charging time is 2-4 hours, depending on usage.

3. Receiver Installation

For best results, the receiver (xx) should be placed at least 3 feet / 1 meter above the ground, and at least 3 feet / 1 meter away from walls or metal surfaces. This will improve reception by minimizing RF reflections.
It is important to keep antennas (xx) away from noise sources, i.e. electric motors, neon or fluorescent lights, as well as large metal objects. It is also recommended that the transmitter be at least 3 feet / 1 meter away during operation.

3.1 Antenna Connections

Attach an antenna (xx) to each of the antenna input jacks (xx). Once both antennas are secured and fully extended, position one antenna at a 45° angle from the other. If the antenna is hesitant in moving, loosen the connector, reposition, and then retighten the connector to secure the antennas position.

3.2 Audio Output Connections

There are two audio outputs on the back of the receiver, a balanced microphone-level (xx) and an unbalanced line-level (xx). Connect one end of a microphone cable to the balanced XLR output of the receiver, and connect the other to a microphone input on your mixer. Alternately you can use an unbalanced ¼" cable to connect from the unbalanced output of the receiver to a line-level input on your mixer or amplifier. Each output is isolated, allowing simultaneous feeds to both balanced and unbalanced inputs.

3.3 Power Supply Connection

The WMS-10 VHF Receiver is designed to accept DC input voltage between 12-15 volts, and a current rating of 800mA. Connect the supplied AC adapter to the DC IN (xx) input receptacle on the back of the receiver. Then plug the AC adapter into a standard 110V 60Hz AC outlet.

4. Gain and Volume Controls

4.1 WMS-11 VHF Receiver

Adjust the VOLUME control (xx) until the output level is appropriate in respect to the mixer/amplifier input. Turning the VOLUME control clockwise increases the audio output level. Turning the VOLUME control counter-clockwise decreases the audio output.

The SQ control (xx) is used to adjust the squelch. As the squelch is factory preset for optimum performance, no further adjustment is required. If adjustment is necessary, rotate the SQ control clockwise until the illumination of the RF SIGNAL LEVEL (xx) and the DIVERSITY (xx) indicator are no longer lit.

IMPORTANT: The transmitter must be off in order to correctly perform this adjustment. In general, clockwise rotation decreases noise at low volumes, counter-clockwise rotation increases operating range.

4.2 WMS-21 Beltpack Transmitter

The audio input levels of the transmitter are preset by Special Projects™ to a position that is typical for most use. If you wish to increase or decrease the sensitivity of the microphone input, please contact Special Projects™.

5. Operation

5.1 Turn on the receiver by pressing the POWER button (xx).

5.2 Turn on the transmitter by holding down the ON/OFF (xx) button for 1 second. The POWER (xx) indicator should illuminate green.

5.3 Check that the receiver is obtaining RF signal, as is indicated by the RF SIGNAL LEVEL (xx), and that one of the DIVERSITY indicators (xx) is illuminated.

5.4 Speak into the microphone at a normal level, verifying that the AF SIGNAL LEVEL indicator (xx) occasionally illuminates while you are speaking.

5.5 Using the receiver VOLUME control (xx), increase or decrease the volume until a proper level is obtained at the mixer or amplifier input.

6. Recommendations

6.1 The audio cable for the WMS-20 transmitter also serves as an antenna. The length of cable is cut according to the specific frequency range. Do not alter the physical length or coil the cable in use. Doing so will affect the antenna efficiency of the transmitter, and reduces operating range.

6.2 The transmitter and receiver should be as close as possible, but not less than 3 feet / 1 meter. Position the receiver so that it has the least possible obstructions between it and the transmitter. Line of site is best.

6.3 The receiver antenna should be kept away from metal surfaces. It is recommended that the antenna not be placed within 3 feet / 1 meter of another receiver or antenna.

6.4 A receiver cannot acquire signals from two or more transmitters simultaneously.

6.5 Turn the transmitter off when not in use.

7. Specifications

8. Optional Accessories

9. Warranty

10. Remarks

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this devise does not cause harmful interference.

This device complies with Industry Canada RSS 210. Operation is subject to the following conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including inference which may cause undesired operation.

CAUTION! Electrical shock can result from removal of the receiver cover. Refer servicing to qualified and authorized personnel. No user serviceable parts inside.

CAUTION! Do not expose receiver or charger to rain or moisture.

NOTICE: The circuits inside the transmitter and receiver have been preset for optimum performance and compliance with government regulations. Any attempt to open the transmitter or receiver may cause improper operation, and possible void the warranty.

11. FAQ

12.1 Is UHF better than VHF?

VHF here refers to VHF high band and UHF here refers to UHF high band. The advantage of VHF high band is that the wave propagation through the air is excellent and their ability to pass through non-metallic substances is good. This results in good VHF high band transmission range.

The reduced radio waves propagation of UHF through the air and through non-metallic materials result in less range for comparable radiated power. Another setback for UHF is the increased amount of radio waves reflections by metal objects, resulting in more frequent and more severe dropouts due to multi-path cancellations. This is the reason why UHF non-diversity is not so effective and thus not so advisable. However, diversity is very effective in UHF as the required antenna spacing is minimal.

However, there is certain true that UHF band is less crowded than VHF at the moment, thus it is far less prone to interference.

Another advantage of UHF is that now UHF frequencies are being approved all over the world for wireless microphone usage.

The main economic difference between VHF and UHF is the relatively higher price of the UHF system. This is because it is more difficult and hence more expensive to design and manufacture UHF devices.

12.2 Could two transmitters be used on the same receiver?

No. The working principle of wireless microphone is radio. Just like radio, every transmitter and receiver is allocated a dedicated frequency of operation. When two transmitters of the same frequency work on the same receiver, it will result in interference.

12.3 Antenna Diversity vs. True Diversity

An antenna diversity system is a non-diversity system. The two signals that come in from the two antennas are compared and switched via a simple comparator circuit and the resultant signal is fed into the non-diversity RF circuit for further processing. The rest is non-diversity.

In a true diversity system, two separate tuners processed the two incoming radio signals until the detector circuit before making a comparison by a diversity circuit. It is a much more complex and accurate circuit as compare to that of antenna switching system. True diversity system has a much higher sensitivity than the antenna switching system.

12.4 Non-diversity vs. True Diversity.

Non-diversity receivers are equipped with a single antenna whereas a diversity receiver has two antennas.

In a radio transmission system, radio waves propagate omni-directionally in straight line from the transmitting antenna to the receiving antenna. However, in indoor operation, certain waves may have travel different path, hit some metallic object and reflected to the receiving antenna. The receiving antenna is constantly picking up a varying combination of direct and reflected waves. The direct and reflected waves travel different paths to arrive at the receiving antenna, hence the term multipath. These multipaths result in differing levels, arrival times and phase between the waves. The net resultant is the sum of the direct and reflected waves. These waves can reinforce or cancel each other depending on their relative amplitude and phase. This results in degradation or loss of radio signal at certain points. Cancellation of radio signal could occur when the direct and reflected waves are similar in amplitude and opposite in phase and this could happen even when the transmitter is at a relatively short distance from the receiver.

Diversity refers to the general principle of using two antennas to take advantage of the low probability of simultaneous dropouts at two antennas at two locations. There are various diversity techniques and true diversity refers to receiver which have actually two receiver sections and each section possess an antenna, RF and IF stages.

12.5 What is Pilotone?

The word Pilotone was coined and originally used by Chiayo Electronics in the early 1990s. Pilotone is actually a further refinement of the conventional squelch circuitry used in most radio receivers. A sub-audible tone signal (usually 32.768 KHz) is modulated into the radio carrier along with the audio signal to act as the code of the transmitter. This enables the receiver to identify the desired radio signal. The receiver will un-mote or been triggered on only when it picks up the radio signal of adequate strength and it detects the presence of the Pilotone signal.

This effectively prevents the possibilities of noise from the system when the transmitter signal is lost or when the receiver is on standby state. Turn-on and turn-off delays are incorporated so that the transmitter power switch operates quietly, eliminating the need for a separate mute switch.

12.6 What is the Squelch (SQ) for ?

The squelch control on the back panel of the receiver is preset at the factory, but can be adjusted if one uses the system in a high RF interference area. If there is audio output from the receiver when the transmitter is off, adjust the squelch control (SQ) so the system will receive the signal from your transmitter but " squelch " or eliminate the unwanted background RF noise. This adjustment can cause a reduction in usable range of the wireless transmitter, so set the control to the lowest position that reliably mutes the unwanted RF signal. For example, if you encounter receiving interference (other than an operating TV station), often it can be overcome by adjusting the receiver squelch control (SQ).

12.7 What is a compander system?

The word Compander is coined from the two words Compressor and Expander. Basically, it is a noise reduction system. In a wireless microphone system, the audio signal is compressed at the transmitter in a certain ratio say 2:1 before transmitting. This is to lift it above the inherent noise floor of the RF link. For example, a 110 dB dynamic range signal is thus transmitted with an effective range of only 55 dB, which is above the 60 dB noise floor of the RF link. In the receiver the signal is expanded in an identical but opposite way in a 1:2 ratio to restore the original signal., giving a radio link with an excellent signal-to-noise ratio.

Could one tell the difference between systems with and without compander noise reduction? Yes, a system with no compander noise reduction is has much more background noises when the transmitter is about 20m away from the receiver. A system with compander system operates noise free up until 100m.