
Wireless Microphone System
WM-1000
Product Manual
PYRAMID
COMMUNICATIONS

Forward

Scope of this manual

This manual contains the specifications, functional description, operating instructions, schematic, parts locator and parts list for the WM-1000 Wireless Microphone System. This manual is intended for use by qualified service technicians to aid them with installation, interfacing, alignment and trouble shooting of the WM-1000 when used with other land mobile radios.

Note: Any modifications not expressly approved by Pyramid Communications may void the user's authority to operate the equipment.

Service manual revisions

Component changes, additions and deletions may occur in the circuit design to improve operation and will be reflected in future releases of this service manual. Specifications and circuit changes are subject to change without prior notice or obligation by Pyramid Communications.

FCC information

FCC ID: LRUWM1000, LRUWB1000

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Statement

The WM-1000 has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95-1-1992 and had been tested in accordance with the measurement procedures specified in IEEE 1528-2013, OET Bulletin 65 Supp. C and EN/IEC 62209.

To maintain compliance with RF exposure limits, a 20cm separation distance must be maintained between the WB-1000 and any persons.

Industry Canada information

IC ID: 2390A-WM1000, 2390A-WB1000

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante

This radio transmitter 2390A-WM1000 & 2390A-WB1000 have been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio 2390A-WM1000 & 2390A-WB1000 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Approved Antenna: 2.2dBi (valued used for ¼ dipole antenna) 50 Ohm, RP-SMA Whip Antenna

RF Exposure Statement

The WM-1000 has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95-1-1992 and had been tested in accordance with the measurement procedures specified in IEEE 1528-2013, OET Bulletin 65 Supp. C and EN/IEC 62209.

To maintain compliance with RF exposure limits, a 20cm separation distance must be maintained between the WB-1000 and any persons.

Pour maintenir la conformité avec les limites d’exposition aux radiofréquences, une distance de séparation de 20 cm doit être maintenue entre le WB-1000 et toutes les personnes.

Specifications

Physical
Handheld Size: 4.3” x 2.6” x 1.5”
Handheld Weight: 6 oz.
Base Size 3.8 “ x 2.75” x 2.75”
Base Weight: 5 oz.
Construction: ABS Plastic

Power & Audio
Battery: 3.7V Lithium Polymer Battery, 2000mAH
Speaker: 1.6 Watt Internal Speaker
External Audio Output: 3.5mm Headphone Connector

Transmitter
Frequency Range: 902 - 928 MHz, Frequency Hopping Spread Spectrum (Fixed Channel)
RF Power Output: +13.1dBm
Data Rate: 150 Kbps

Receiver
Frequency Range: 902 - 928 MHz
Receiver IF bandwidth: 300 kHz
Receiver sensitivity (BER) −102.5 dBm at 150 kbps, GFSK

Functional Description

The WM-1000 is a state of the art spread spectrum unlicensed radio system that provides extended coverage for mobile radio users. This portable radio system integrates with your existing mobile radio to give users handheld coverage when outside of their vehicle. With no license required, the WM-1000 offers ease of implementation when compared to traditional SMR vehicular repeater systems.

The WM-1000 is used as mobile extender in cross-band operation: the link is 915 MHz ISM Band utilizing a traditional simplex mode of communications where the handheld WM-1000 unit can either transmit or receive at any one time. The mobile radio that the WM-1000 is connected to can be Lo-band, VHF, UHF trunking or conventional. Proper care must be taken to prevent interference between the mobile's higher power transmitter and the repeater receiver. Proper antenna placement is important even in this cross-band operation.

Pyramid's patented Smart Trunking II™ access gives portable radio users feedback of the handshake status of their tethered mobile radio to system call status. This ensures that the portable user has complete visibility of the trunking status to the main radio system. Sub audible signaling between the WM-1000 and the WB-1000 negotiate the trunking access regardless of trunking format, EDAC'S™, LTR™, P25™, Nexedge™,, MOTOTRBO™ AND IDAS™. When channel access is granted the WM-1000 user

The WM-1000 System can be configured to operate in one of two modes. First, the WM-1000 can be configured to be uniquely paired to the WB-1000 base in the vehicle. This provides private secure communications to your vehicle mounted mobile radio. If you work together with other users on a regular basis, the WM-1000 can be configured to work in group mode. This allows handheld users to communicate with each other on a common channel. The WB-1000 base units ESPIITM structure works to establish one priority vehicle on the scene to handle traffic to and from the dispatch channel.

Cradle/Docking Station Features:
WB-1000 is a dedicated base and charger that interfaces seamlessly to most popular mobile radios. When the WM-1000 transmits, the WB-1000 receives the transmission and in real time keys the Mobile Radio retransmitting the conversation back to dispatch. When the mobile receives a transmission, the WB-1000 base retransmits back to the WM-1000, extending the range of the wireless microphone equal to your mobile two way radio.

WM-1000 User Functions

WB-1000 Installation

Before installing the WB-1000, ensure that the mobile radio is properly aligned per the manufacturer's tuning instructions. Additionally, ensure that the WB-1000 jumper switches are properly configured for use with the particular mobile radio that it will be connected to:

SW2: RS-232

SW3: RS-485

SW4: Emergency Operation

Visit www.pyramidcomm.com for up to date installation guides on your specific mobile radio.

Make the connections between the mobile radio and the WB-1000 cable as follows:

Pin 1: Ground. Connect to the radio's chassis or ground plane.

Pin 2: Mobile transmit audio. Connect to the mobile transmit audio path or tone input. If connected to the mobile mic input, ensure that the WB-1000 is programmed for flat (common data). If connected after pre-emphasis, ensure that the WB-1000transmit audio path is programmed for pre-emphasis. Pin 2 is AC coupled and has an output impedance of 600 or 2.2Kohms (determined by J2). RV3 sets the transmit audio output level and J1 sets the adjustment range between 0-5VPP (J1 open) or 0-100mVPP (J1 shorted).

Pin 3: Remote enable/disable. Connect to the radio's auxiliary output or a separate switch to remotely enable or disable the repeater. If this line goes high to activate the repeater, ensure that JP1 is set to the "+" position. If this line goes to ground, set JP1 to the "-" position. J8 has two positions to add a pull up (+) or pull down (-) resistor to this line if used with an open collector or dry contact output.

Pin 4: Mobile PTT output. Connect to mic PTT on the mobile radio, or a line that goes active low to trans mit. Pin 4 is an open drain output rated at 2A at 15VDC.

Pin 5: 12 VDC input. Connect to the radios 12V switched supply or a point capable of supplying at least 2A of current.

Pin 6: Mobile receive audio. Connect this line to the mobile receive audio path before the volume control. If pin 6 is connected to the mobile discrimminator, ensure that the SVR-P250 receive path is programmed for de-emphasis (common data). If connected after de-emphasis, program the receive path for flat. Pin 6 is AC coupled and high impedance (>15K ohm). RV5 sets the receive audio level sensitivity; this input should be between 30mVPP and 5VPP. J7 sets the gain of the receive input amp. If open, the input has a maximum gain of one; if installed, the input has a maximum gain of

Pin 7: Mobile COR detect. This line is used to indicate when the SVR-P250 should repeat the transmission to the handheld. Connect to a logic point in the radio that indicates proper tone and carrier have been detected or the audio unmute line. If this line goes more positive during an unmute condition, program the mobile COR line as active high (common data). If the line goes more negative during an unmute condition, program the mobile COR line as active low. The input from pin 7 is high impedance and does not have to go rail to rail. The SVR-P250 uses a voltage comparator as a COR threshold detector and is factory set at 1.6VDC. The COR input must go at least 0.5VDC on either side of this threshold.

Pin 8: Local mic audio. If programmed for local mic repeat, the SVR-P250 will go into transmit mode and repeat the audio from this line whenever the mobile radio is keyed by the local mic. Connect this line to the mobile transmitter audio path before limiting or filtering. This input is AC coupled and high impedance (>5.6Kohms). The input level at this pin should be 300mV to 5VPP. RV2 sets the local mic sensitivity. If the mic high line has sufficient drive for this input, install J4 and leave pin 8 unconnected. J6 sets the gain of the local mic input amp. If open, the maximum gain is one; if installed, the maximum gain is 10.

Pin 9: On-Air detect.
Trunking: Connect to a point in the radio that indicates the mobile transmitter is actually on the air.

This is not the same as mic PTT. If pin 9 goes positive during transmit, program the on-air detect line for active high (common data). If pin 9 goes to ground during transmit, program the on air detect line for active low.

Conventional: Used for local mic repeat indication from the mobile. Connect pin 9 to pin 4 of the SVR-P250 and program the on-air detect line for active low. Solder jumper J5 will connect pin 9 to pin 4 (PTT output) and can be used on conventional systems only.

Pin 10: Emergency Output. Connect to the Emergency input on the mobile radio. On Motorola radios, the Emergency input opens from ground on activation and jumper J13 should be in the “NC” position.
On all other radios, the Emergency input pulls to ground on activation and jumper J13 should be in the “NO” position.

Install the WB-1000 in the vehicle using an AMPS mounting bracket hardware. Install the unit where it will be easily visible by the driver and will not interfere with the drivers vision or constitute a hazard during a vehicle collision. The WB-1000 mounts in the bracket using the four 8-32 x ¼” machine screws. Do not use longer screws to mount the WB-1000 to the bracket or damage may result.

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