



**MX416**

**Wireless Digital Microphone**  
**User's Guide & Operating Manual**

**REV. X0 25 June 25, 2007**

<http://www.avalonrf.com/>

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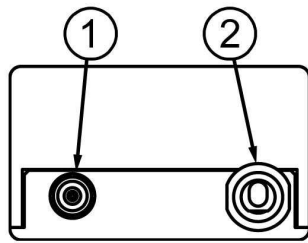
## 1. General

The MX416 rugged digital microphone is intended for use in short range wireless audio transmission applications for police, homeland security etc. The RF output power is approx. 250mW and typical line-of-sight operating range is over 3 miles (depends on various factors).

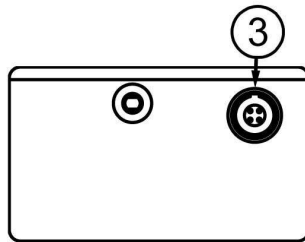
The MX416 works as a pair. The transmitter is very small and completely self-contained with a microphone and a Li-Ion battery built-in. The battery is capable of running the MX416 continuously for over 7 hours. The receiver is powered by an external dc supply and has a output for driving a 16 ohm headset speaker.

The MX416 offers the following features:

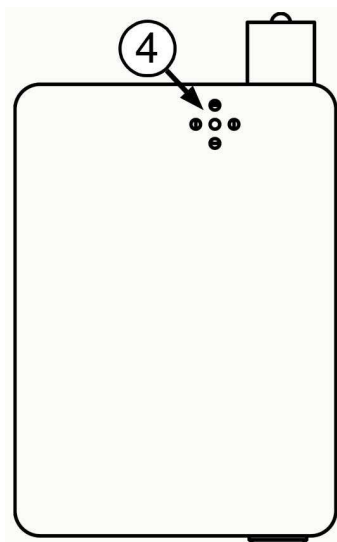
- A secure digital audio link with very short delay.
- UHF frequencies that provide better radio signal penetration through walls and obstacles
- Low Power and light weight



Top View	
1	Antenna – MCX Connector
2	Power On/Off switch



Bottom View	
3	Transmitter - Battery Charger Connector Receiver - I/O Connector



Front View	
4	Microphone (Transmitter only)

**Figure A – MX416 Controls and Connectors**

### MX416-T (Transmitter)

#### **1.1 Charging Port**

The charging connector is a 4-pin size 00B LEMO connector. A separate wall mount charger is provided thereby avoiding the need for a cradle.

#### **1.2 RF Output/ Antenna**

The MX416 has a 50 Ohm RF output through a MCX jack. An antenna is included for each unit.

### MX416-R (Receiver)

#### **1.3 I/O Connector**

This is also a 4-pin size 00B LEMO connector. It has 2 pins for power and speaker/audio output.

#### **1.4 RF Input/ Antenna**

This MCX jack is an rf input connector for an antenna. A short omni whip (supplied) can be used for short distances up to a few hundred feet or a high gain omni (or directional antenna if the application permits) can be connected using a adaptor cable (optional).

## **2. Specifications**

### **2.1 User Interface - On/Off Switch.**

The MX416 has an on/off switch. This shuts off power to the entire transmitter/ receiver.

### **2.2 Setup.**

Since the MX416 works as a pair, it is shipped with a sticker indicating the operating frequency e.g- 650 MHz. If you have ordered multiple sets, please ensure the correct pair is used. The user has to connect the antennas, power & audio cables & the link is ready to work. There is no specific setup procedure.

### **2.3 Electrical Interface.**

The transmitter has the following interfaces:

#### **2.3.1 Charger Input**

- a) The charger input is actually a battery charger connection. The external wall mount battery charger is connected to this jack.
- b) This input is switched and protected against reverse polarity.
- c) Charging is performed in the power "off" position.

#### **2.3.2 Microphone**

- a) The MX416 uses an electret microphone and is built into the case.
- b) For volume orders, provision for connection of an external microphone can be made.

#### **2.3.3 RF output to antenna.**

- a) The RF output connector is a 50  $\Omega$  (ohm) MCX receptacle.
- b) The RF output power is approx. 250 mW (transmit).

The receiver has the following interfaces:

### 2.3.4 Power Input

- a) The receiver works on unregulated dc power of 6 – 14 V DC. Current consumption is only 150 mA.

### 2.3.5 Speaker Output

- a) The MX416 receiver is capable of supplying 30mW into a 16 ohm headset speaker.
- b) If an external amplifier will be used, the speaker/audio signal should be terminated by a parallel combination of a 22 ohm resistor and a 0.1uF capacitor. If you need assistance with this arrangement, please call Avalon RF Engineering and we will gladly help.

## 2.4 Interconnecting.

The interface to the transmitter is:

LEMO ECG.00B.304.CLN  
or Equivalent



Pin Number	Function
1	Power/Charge Return (-)
2	N/C (No Connection)
3	N/C (No Connection)
4	Power/Charger Input (+)

**Figure B – Battery Charger Input**

The receiver interface is:

**LEMO ECG.00B.304.CLN  
or Equivalent**



Pin Number	Function
1	Power/Signal Return (-)
2	Speaker/ Audio output
3	N/C (No Connection)
4	Power Input (+)

**Figure C – I/O Interface**



## 2.5 Mechanical

### 2.5.1 Mounting.

Mounting can be done in one of the following methods:

a) Clamping.

Clamping (or hard mounting) is the recommended method and the only method of mounting in all fixed installations or when operating from >10V.

Clamping is also the preferred method of mounting in mobile installations where most electrical interfaces are used.

b) Velcro<sup>®</sup> to a flat surface.

The MX416 may be mounted using Velcro<sup>®</sup> if it is required to be detached frequently. However, in this case it must be operated from a 9V battery.

2.5.2 Mechanical Data.

- a) Size 2.37" x 1.68" x 0.97 (see Figure D)  
60mm x 43mm x 25mm
- b) Weight <5.6 oz.  
<158 gram
- c) Shipping weight <32 oz.  
<900 gram

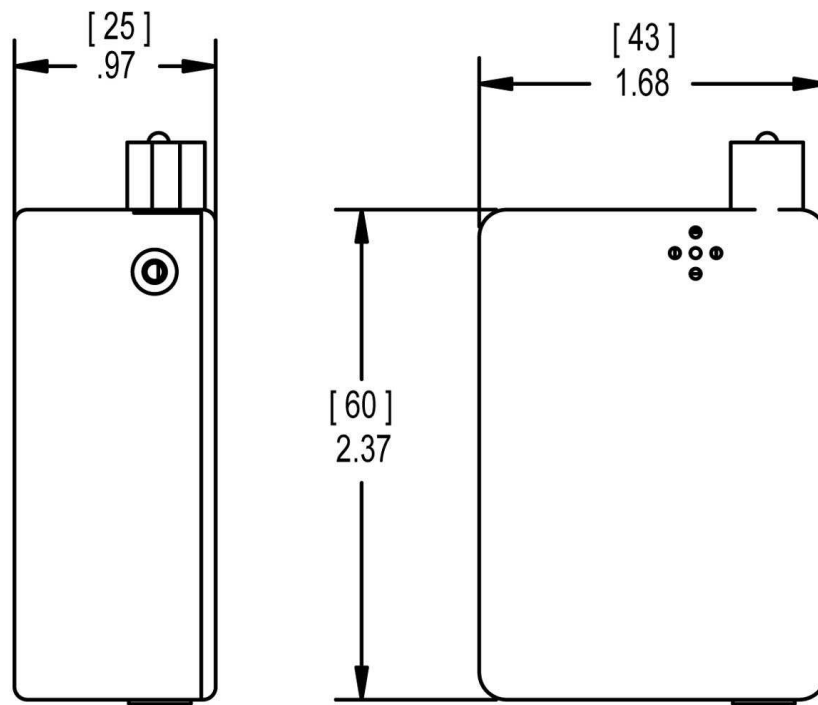


Figure D – MX416 Mechanical Outline

## 2.6 Environmental Conditions.

The RT423 is designed to meet the following environmental conditions:

- 2.6.1 Operating temperature -4° to 122° F  
-20° to 50° C
- 2.6.2 Storage temperature -13° to 150° F  
-25° to 65° C
- 2.6.3 Vibration 1.5G, from 10Hz to 2KHz, sine wave, 3 axis
- 2.6.4 Shock 15G, 25msec, half sine wave, three axis
- 2.6.5 Humidity 5 to 95%, non-condensing
- 2.6.6 Inclination Any
- 2.6.7 Altitude -1500 feet to 15,000 feet  
-450 meter to 4,500 meters

### 3. Operating the transceiver.

Before applying power, make sure all connectors and all antennas are properly connected.

#### NOTE

**The transmitter will not transmit unless it has an antenna.**

The transmitter has only 1 operator control (the on/off switch) and no indicators (to allow for covert applications). The receiver also has the same control and no indicators.

This product was primarily designed for covert/ secure communication applications and therefore may seem to be lacking some features. For OEM applications, please contact Avalon RF with your requirements.

Follow the guidelines below to optimize the operating distance/range:

- a) The transmit antenna's location is vital to a radio link. Keep the transmit antenna completely clear of any metal object or carbon composite materials. If the transmitter is placed on a person's body, the transmit antenna should be placed to clear the body, particularly the head.
- b) To get the optimum range, the transmit antenna should be located as high above the ground as the application permits.
- c) The receive antenna should be generally in view of the transmit antennas radiation pattern. If you have any doubts or concerns, please call Avalon RF Engineering at (619) 401-1967.
- d) Do not place the antennas in the vicinity of other antennas even though they may be on different bands.

## **4. Ordering information**

### **4.1 Base model.**

#### **MX416**

The user may order this set with a allocated frequency by specifically requesting it or the unit will be shipped with a frequency in the ISM band.

All units come with the following standard accessories:

- 4.1.1 Omni directional  $\frac{1}{4}$  wavelength whip antenna
- 4.1.2 A wall mount battery charger for the transmitter and a 3 ft cable with flying leads for the power and audio output.
- 4.1.3 User guide & operating manual (this manual).

## **4.2 Options.**

### 4.2.1 T.B.D

## **4.3 Recommended accessories.**

### 4.3.1 Antennas

- a) AX402 – 2 dBi Half Wave Omni antenna for mounting on external equipment (also improves range)
- b) AX410LP - 10 dBi UHF Log Periodic antenna for receive/ transmit for fixed installation or if the direction of the mobile unit will be known.

### 4.3.2 Cables

T.B.D.

### 4.3.3 Battery packs

- a) BAT80 – 14.4V/80WH Li-Ion battery pack with charger and power cable to transceiver. It will run an MX416-T (transmitter) for 16 hours.
- b) BAT92 – 14.4V/92WH Li-Ion battery pack with charger and power cable to transceiver. It will run an MX416-T for 20 hours.