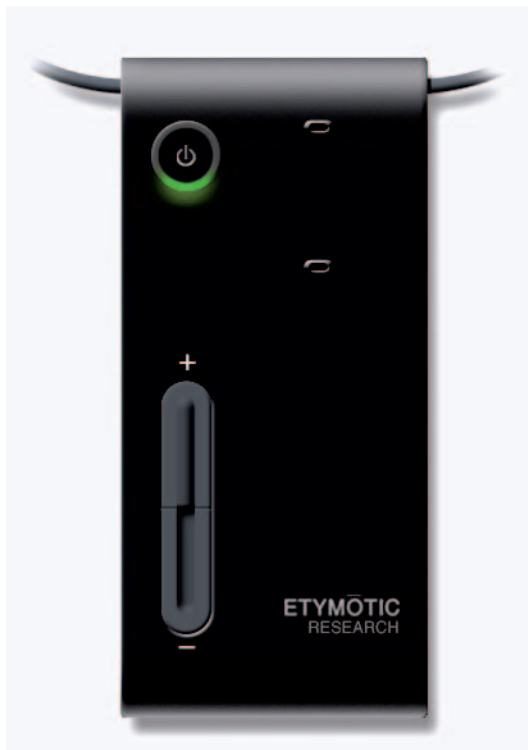


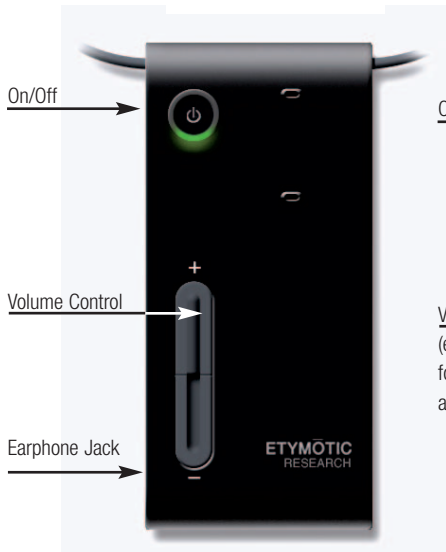
Companion Mics™

User Guide

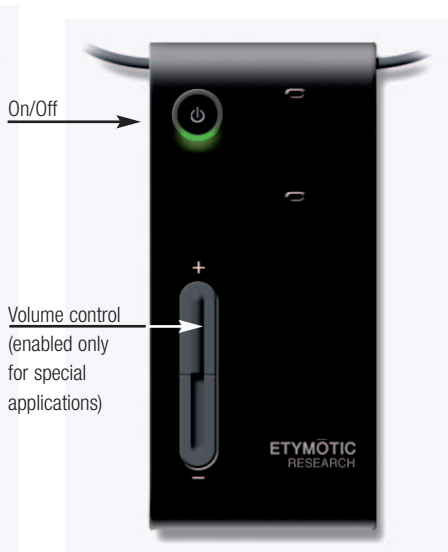


ETYMOTIC RESEARCH, INC.

Listener Unit



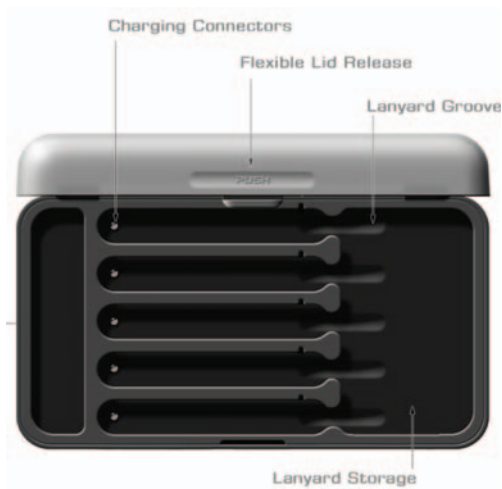
Talker Units



Etymotic Research
High fidelity, Noise-
isolating Earphones



Charging Unit



DESCRIPTION

The Companion Mics™ system was developed for persons who have significant difficulty understanding conversation in background noise such as restaurants and public places. This system enables one, two or three talkers (four on special order) to speak to a single listener.

The microphones in this system give a ten-to-one decrease in the relative noise level that is heard by the listener, which should make it possible to carry on a normal conversation, even for a listener with severe-to-profound loss of ability to hear in noise. Battery life is 8-10 hours between charges, which gives ample time for most applications. A complete charge takes 2-3 hours.

INSTRUCTIONS

STARTUP

- Place units next to each other.
- Turn on all units that will be used.
 - **Talker Units:** Press and hold the On/Off button until the green light blinks (approximately 1 second).
 - **Listener Unit:** Press and hold On/Off button until the green light blinks (approximately 1 second).
- Wait until all lights glow steadily, indicating proper communication with each other.

USE

Instructions for the Listener:

- Plug the earphone into the earphone jack on the Listener Unit (identified by a clear clasp on neck cord).
- Adjust the volume control for a comfortable level.
- Place the unit around the neck.
- Adjust the neck cord so the unit rests comfortably under the chin.

- Adjust the volume control after all Talker Units are on. The Listener should be able to hear each Talker clearly, as if the Talkers were speaking into the Listener's ear.

Instructions for Talkers:

- Place Talker Units (identified by a black clasp on neck cord) around the neck and adjust the cord so the unit rests comfortably just under the chin.

VOLUME CONTROL (Up/Down Switch)

The overall volume is adjusted on the Listener Unit only.

For ease of identification, the top of the button (Up) has a ridge, the bottom part of the button (Down) has a groove. Holding the Up/Down button continuously increases or decreases the volume by four steps per second.

TEMPORARY DISCONNECT

Talkers can temporarily disconnect their units by pressing the On/Off button on the Talker Unit until the green light blinks (approximately one second). A tone in the earphone of the Listener Unit announces the disconnect. (If a disconnect occurs accidentally, the light on that Talker Unit will blink to signal the disconnect.)

Reconnect

To reconnect a Talker Unit, the Listener should press the On/Off button on the Listener Unit for 1-2 seconds.

Interference

If there is severe RF interference, complete recovery from the interference can be obtained by the following three steps:

1. Turn on any Talker Units whose green lights are not already steady or blinking.
2. Turn off the Listener Unit by pressing the On/Off button for 1-2 seconds.

3. Turn the Listener Unit back on by pressing the button for 1-2 seconds.

The units should reconnect in 8 seconds or less.

OPERATING DISTANCE

Under line-of-sight conditions out in the open, the units may operate over a distance of 150 feet or more. Indoors, where there are reflections, the units should maintain communication over a distance of 15 to 20 feet even if the Listener and Talkers occasionally turn their backs to each other.

BATTERY CHARGING

To recharge, place units in the Charging Case. Note that a yellow light will illuminate on each unit. A complete charge takes 2-3 hours. It is not possible to overcharge the units. They can be left in the charger indefinitely without damaging the system. Battery life between full charges is 8-10 hours or longer.

HOW DOES THE COMPANION MICS SYSTEM WORK?

The Companion Mics system establishes a direct communication line between the Talkers' microphones and the Listener's receiver, which essentially bypasses the noise and reverberation of the local acoustic environment. Circuits in the Companion Mics system operate in the 2.4 GHz band, the same frequency used by today's cordless phones. Rather than using a single frequency, where a competing signal might interfere, a frequency-hopping technique is used. By jumping quickly from frequency to frequency in a pseudo-random manner among 79 frequencies, the chance of interference from microwave ovens, other Companion Mics systems or Bluetooth is minimized, so that 10 or more sets can operate with little audible interference even if they are all in the same room. When the units are first turned on, the Listener Unit starts its repeating

sequence of frequency hops while each Talker Unit waits for one or another of those frequencies until it receives a transmission containing the identification code from the Listener Unit. The units then lock together jumping from frequency to frequency. This process is repeated until all Talker Units lock on. Once all units are in communication with each other, the LED lights stop blinking and the Talkers are heard by the Listener. From then on, each Talker Unit is in constant communication with the Listener Unit. Volume control adjustments on the Listener Unit are sent to the Talker Units to set their microphone gain for optimum performance. The “lock up” sequence normally takes less than 8 seconds, but—rarely—may take as long as a minute if heavy interference is present.

SPECIFICATIONS

Operating Voltage: 3.4 to 4.2 Volts

Power Consumption: Approximately 80 mA

Battery Life: 8-10 hours or more (three Talker units)

14-16 hours with single Talker unit

Charging Time: Typically 2-3 hours from “empty”

Environmental Performance: Operating -10 to +45 oC

Charging 0 to +35 oC

Storage -10 to +45 oC

Radio Performance: 20 meters (66 feet) min in free space

Audio Performance:

Frequency Bandwidth: 8 kHz (7 kHz for two-way system)

Acoustic Gain (relative to speech at 40 inches): 16 dB default +/- 25 dB VC range

Acoustic Gain (Mic to coupler (Zwislocki)): -4 dB default +/- 25 dB VC range

Total Harmonic Distortion: < 2%

End-to-end Delay: 22-32 mS (low interference environments)

30-40 mS (four microphone systems)

Earphone Minimum Output Impedance: 23 Ohms

Telecoil Minimum Output Impedance: 23 Ohms

Max Voltage Swing at Receiver Output: 1.95-2.00 Vpp

Antenna: Internal

Microphone: Noise-canceling electret condenser

VARIATIONS

A two-unit “walkie talkie” operation is available on special order. This contains two “Listener” units as combination Listener-Talker units. A fourth Talker Unit is available on special order.

FCC AND OTHER INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to 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.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. Some equipment operates at frequencies that may cause interference to nearby TVs and VCRs; to minimize or prevent such interference, the system base should not be placed near or on top of a TV, PC monitor, or VCR; and, if interference is experienced, moving the desk station farther away from the TV or VCR will often reduce or eliminate the interference. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the system off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Increase the separation between the equipment and receiver.
2. Consult the dealer or an experienced radio TV technician for help.

FCC Health and Safety Information: Your device is a radio transmitter and receiver. It is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government. The FCC has established criteria for the amount of radio frequency energy various products may produce depending on their intended usage. This product has been evaluated and found to comply with the FCC’s exposure criteria. For body worn operation, the FCC RF exposure guidelines were also met when used with the accessories supplied or designed for this product. Use of other accessories may not ensure compliance with FCC RF exposure guidelines and should be avoided.

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate this device.

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Companion Mics is a trademark of Etymotic Research, Inc. The Companion Mics system is covered by U.S. patent: #5,966,639 and other patents pending.

