



SmartEar

Noise Reduction and Hearing
Protection Communication Earpiece



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Noise Reduction and Hearing Protection Communication Earpiece, first self research & development multi-function micro tactical earpiece in China, integrates the function of built-in noise processing, environment sound amplification and intelligent hearing protection, which guarantees the clear and reliable communication in any noise environment for army, SWAT, and armed police, enhances the awareness ability to the surrounding environment in hence to avoid the potential risk. It also has the function of continuous noise reduction and intelligent hearing protection, which makes the user against to the harm of continuous noise and impulsive noise, refrains from instant or permanent hearing loss, makes the user to fulfill task efficiently and get much survival, and greatly improves the user's life quality after retiring.

Components

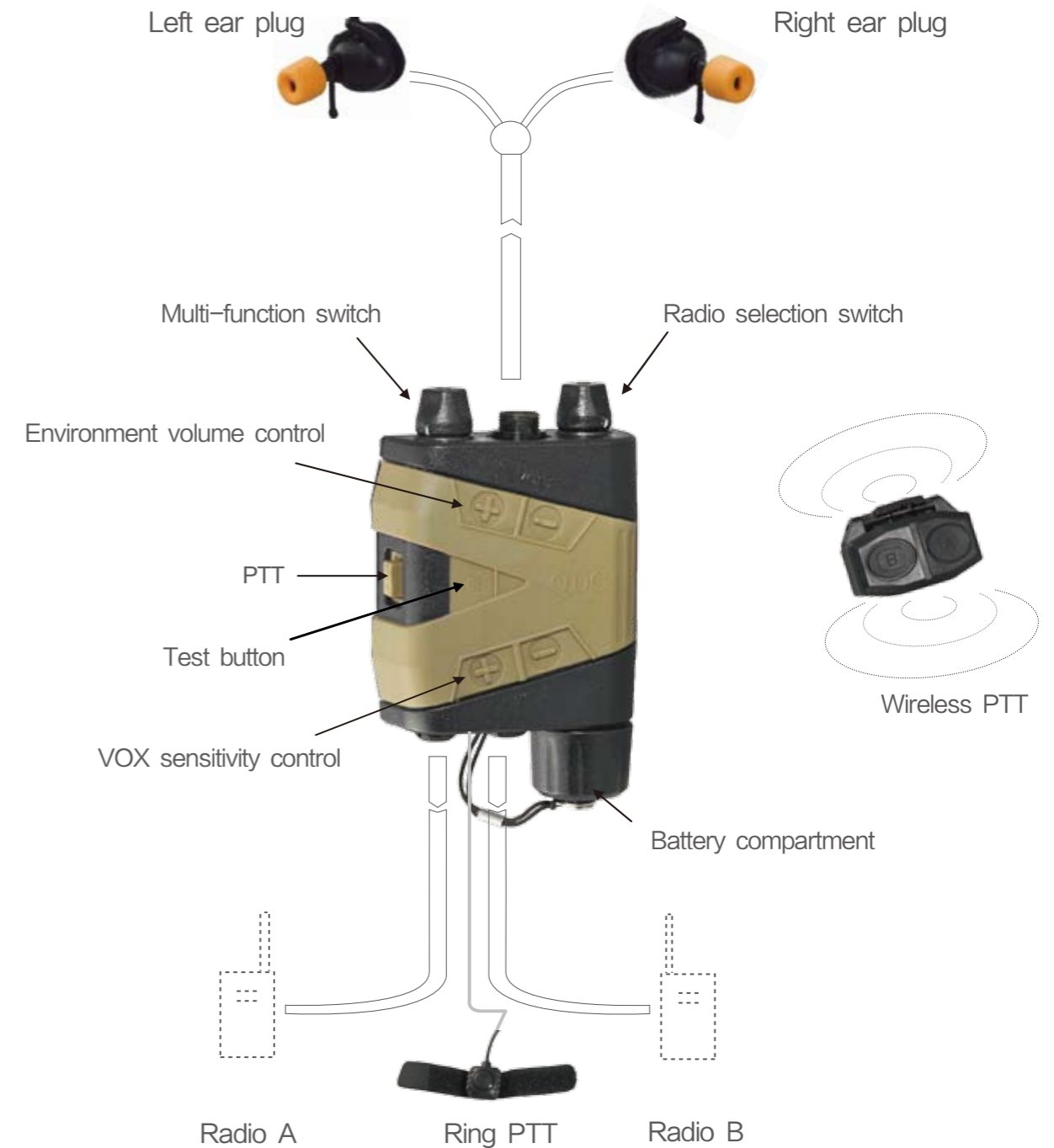


Features

- Natural hearing with sense of direction, and digital normal communication capability
- Automatic digital active noise reduction (ANR)
- When needed, amplify environment sound (bionic ear)
- Automatic adaptive high-level hearing protection
- Protect from harmful impulse and continuous noise, without reducing listening and communications capability
- Compatible with a variety of helmets, gas masks, respirators, self-contained breathing apparatus and nuclear biochemical protective equipment
- Monitor and communicate on two radios/intercoms simultaneously (dual model)
- Prevent temporary and permanent hearing loss
- Noise canceling pickup
- Compatible with a variety of communication systems
- Voice activated transmission (VOX) function based on rugged external digital signal processor
- Simple operation, small size, light weight
- Comply with military standards - waterproof (IP-67)
- Automatic seal leak detection
- NFMI (near field magnetic inductive) wireless PTT (standard)
- Finger PTT (option)
- VOX function



Constitution



Solution

1. What's the definition of "completely in the ear" ?

No external microphone needed. Communications transmit to the user's eardrum when using the SmartEar. The user's eardrum can be better protected with the combination of passive noise reduction and active noise reduction. Voice sent by radio or broadcasting reaches the user's sealed ear tunnel in front of eardrum. SmartEar is completely aware of the environment sound via its external microphone, and compatible with helmet, eyes protection device or other chemical, radioactive protective equipment.

2. Can SmartEar prevent the damage caused by the improvised explosive device?

SmartEar can make the user avoid the damage of hazard noise generated by the improvised explosive device. An explosions test did by Wright Patterson at American Air Force Base Research Laboratory in Ohio shows that when exposed to shock caused by improvised explosive devices, the ordinary earmuff turns to take off the ears, which may leave the ear exposed to extremely dangerous noise and shock wave. The properly inserted SmartEar holds tightly and provides more protection to the ear. Instantaneous shock experiment to SmartEar at the peak 197dB has also been done.

3. What types of communication system SmartEar can be used?

SmartEar designs with software adjustable audio interface. It adapts to most military, commercial radios and radio systems. SmartEar has two intercoms for two-way radios. SmartEar in double unit type supports three groups intercoms or radio systems.

4. Is SmartEar suitable for parachute?

Troops who use SmartEar have successfully performed the fixed rope and high altitude low opening parachute operations. Throughout the free fall, the user can use the tactical radios and external ring type PPT device to communicate. Under the canopy, the user can communicate in natural speech sounds or through tactical radios.

5. Conventional protection earmuffs with built-in microphone might reduce the real spatial perception. How about SmartEar?

The microphone of SmartEar located in compact sensor housing in the user's ear. As there is no cover to the external ear (pinna), space listening hasn't been significantly reduced, which makes the users can discern sound position maximally.

6. Can SmartEar be compatible with a protective mask, helmets and other wearing equipment?

Yes, the biggest advantage for SmartEar is small, completely inside the ear. When wearing the SmartEar, the earplug (with sensor) is placed in the ear canal, earpiece cable is behind the ear, without effect for wearing any military tactical equipment, including protective masks, helmets, protective glasses or SCBA / Aqualung. The unique design of this system will not interfere with weapons targeting.



7. How does SmartEar protect hearing?

Hearing protection is fully automatic. When earplugs inserted correctly, the system will be able to protect your hearing when needed, and simultaneously provide the best space perception. Intercom and radio systems can be fully operated when the system protects your hearing from impulse or ambient noise. The voice can be transmitted to the eardrum by using high-quality foam earplugs. SmartEar can enhance the hearing ability by increasing or decreasing the environment sound, which is very useful when needed. For example, increase the environment sound before broking into the house or listening to the working status on the post. You can also reduce the ambient sound in high noise in order to reduce stress to have a rest.

8. Can SmartEar support external power supply?

Yes, typical external power supply is the radio system. When connects to an external power source, SmartEar switches to an external power supply, when disconnected, it immediately switches to the internal battery power mode.

9. Does SmartEar have different sizes earplugs?

The specially designed foam earplugs have five different sizes: extra small, small, medium, large and extra large. These dimensions are able to meet the needs of most users.

10. Can the user swim wearing SmartEar?

The SmartEar is tested that complies with IP-67 (30 minutes in the depth of 1 meter underwater). Connector or protective cap must be paired and then immersed in water. It shall be flushed with clear water and then stored after immersed into the salty water. Foam earplugs shall be always attached to the sensor acoustic pipe.

11. What's the meaning of forced de-noising?

Press the "TEST" button on the control box, the system will start forced de-noising function, suppress environment noise in high-level.

Safety Protection

Adaptive normal conversation (listening to the voices of the surrounding environment)

In quiet environment, the user of SmartEar can normally listen to the voices of the surrounding environment. External microphone picks up sound, and transmits to the eardrum through the speaker. Users can adjust the volume control to reduce interference sound, or amplify the sound in order to hear more clearly. It is very helpful to amplify sound at the outpost, deployment, or when entering the enemy war zone. When receiving the radio communications, it is beneficial to decrease the surrounding environment sound.

SmartEar has full stereo sound, high-quality sound recovery function. The selected wireless link devices all have nature directional function (binaural) in listening aspect, which provides the user sound perception in critical situations.

Prevent continuous noise

With the increase of noise, when it exceeds 85 dB (A), SmartEar gradually activates sound attenuation, firstly to reduce the volume of the ambient sound. When the noise becomes stronger, and the ambient sound turns off, the active noise reduction system eliminates the low-frequency noise rumble. This technology can effectively eliminate noises from armored vehicles, large locomotives and helicopter. Digital ANR (Active Noise Reduction) with total attenuation greater than 30 dB (A) adopts speaker transmitting reverse waves to the ear canal. This is usually enough to drive heavy armored vehicles eight hours on asphalt track, without the risk of hearing damage, and also do not violate the general provisions of the EU for labor protection.

Prevent the impulse noise

New research (refers to School of Medicine Kissin University of Dr DE Fleischer) shows that: guns or explosion impulse noise is the biggest threat to the permanent hearing loss. SmartEar has instant isolation mechanism to impulse noise. Digital processor monitoring sound waves samples one by one at the rate of 64000 times per second, when noise increased to reach above the predefined threshold, normal communication would instantly shut down. As the intensity of the sound pulse fall, SmartEar is open at the same speed as shutting down. Users can listen to the sound of gunfire at an acceptable level. It quickly and properly enlarges the environment sound, which makes the user can hear the shells landing, echo and conversations at the surroundings. Traditional analog equipment requires a long time to open and close, which reduces the awareness ability in critical situation.

Communication in the fighting

SmartEar, in the ear canal, picks up the user's voice in the interior of the hearing protector, using digital signal processor, reverts vague voice picked up by microphone to normal voice, and then transfers to the intercom, as a result, improves the clarity, hence the receiver can identify the speaker's voice.

Validate hearing protection function

Many traditional hearing protectors reduce the performance when has glasses, helmet, beard and gas mask, which is usually affected by the seal and air leakage between the wearer's head. SmartEar hasn't any interference to the above circumstances. SmartEar can also automatically test the seal degree via the foam in electronic measurement method when the system opens. Once detects leakage, warning signal reminds the user reinsert the foam earplug. This is the unique function for SmartEar to ensure the safety of the user.



Performance Parameters

Technical Specification

Operation Temperature	-30 °C ~ 50 °C
Storage Temperature	-40 °C ~ 70 °C
Signal Processing Mode	DSP
PNR+ANR	>30dB
Power Supply Mode	Battery
Waterproof	IP67
Comply with	MIL-STD-810F
Comply with	FCC/IC/CE

Wireless PTT Specification

Operation Principle	NFMI
Modulated Method	2-level CPFSK
Operation Range	<150cm
Battery Type	CR2050
Battery Lifetime	6 months
Stand-by Current	< 200uA
Operation Current	< 6mA
Low Battery Warning	LED
Dustproof and Waterproof	IP67

