

DefendEar® Digital

Custom-Fit Hearing Protection

PRODUCTS GUIDE



DIGITAL Hearing Protection by **Westone®**

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Westone®

Since 1959, Westone has made the finest custom earpieces for hearing healthcare, hearing protection, and music performance and enjoyment. DefendEar hearing protection products are handcrafted in the USA at our ISO 9001:2008 manufacturing facility. For more information on which DefendEar product is ideally suited for your specific application, please contact us:

Phone: 800.525.5071 / 719.540.9333

Website: westone.com/defendear

E-mail: defendear@westone.com



DefendEar® DIGITAL Technology

The DefendEar™ Digital line includes the Digital 1, Digital 2, and Hunter models. All DefendEar Digital models feature CENS™ digital technology, developed from the ground up by shooting and hunting enthusiasts for superior noise attenuation and situational awareness.



CENS™ Digital Signal Processing (DSP)

By using advanced digital tuning algorithms, loud sounds are suppressed while quiet sounds are enhanced by employing complex compression curves and 8-band equalization. The performance of this DSP-powered system is impossible to replicate with typical analog/passive hearing protection. The DefendEar Digital delivers a level of safety and performance attainable only through advanced DSP.



Westone Custom-Fit Technology

Fully custom earpieces are cast, sculpted, and finished by hand from actual impressions of your ears, resulting in the best fit and acoustic seal possible. These lightweight earpieces have a consistent fit, which results in repeatable protection that stays in place during high activity and movement.



Made in the USA

Meticulously built by a staff of dedicated artisans and lab techs, Westone's USA products exhibit a level of craftsmanship that truly embodies America's rich history of handmade artistry.





Superhuman Hearing – Situational Awareness

The DefendEar Digital can amplify quiet sounds up to 24 decibels while still limiting digital pass-through of gunshot noise to safe levels. An advanced digital circuit using the latest in DSP technology allows you to detect the subtle rustling of game from long distances or the burst from the trap launching a clay target outside your periphery. At the same time, when the digital unit detects sound above unsafe decibel levels it limits amplification to a safe maximum output between 82-86 dB*.



OtoBlast™ Silicone

DefendEar Digital custom earpieces are handcrafted using OtoBlast, Westone's proprietary medical grade premium silicone. Soft and flexible, yet extremely durable, OtoBlast offers a high level of noise reduction and hours of comfort.



Slick-Sil AM**

DefendEar Digital custom earpieces are coated with Slick-Sil AM, the latest in anti-microbial coatings. This chemically bonded process is proven to be 99.9% effective against bacteria, germs, and other pathogens. Slick-Sil's soft, low-friction finish not only lasts the lifetime of the earpiece but also ensures comfortable fit.

*Depending on selected program for Digital 2 and Hunter models.

DefendEar® DIGITAL Custom-Fit

No earpiece offers better protection and comfort than one custom molded and hand finished specifically for your ears. Westone's 50+ years of crafting custom earpieces means superior performance and protection from your DefendEar Digital.



Ear Impression



Final Earpiece



For more information on custom earpieces and the impression-taking process, contact our Custom Concierge: <http://www.westone.com/hhc/index.php/custom-concierge>

DefendEar® DIGITAL Modular Design

With all of the DefendEar Digital's circuitry housed in a removable module, you can easily upgrade or replace the electronic module or your custom earpiece itself — a flexible, cost-effective system for long-term firearm hearing protection.



Custom Silicone Earpiece

handcrafted in medical grade Oto-Blast™ Silicone — soft, durable, and available in a myriad of colors with Slick-Sil AM anti-microbial coating

Microphone

miniature electric mic picks up sound in all directions and preserves spatial awareness

Modular Design

field-removable electronics allows for easy cleaning, servicing, or upgrades



CENS™ Digital Electronics

onboard CENS™ Digital Signal Processing with sophisticated compression algorithms suppresses loud shots while enhancing quieter sounds for truly super-human hearing

Volume Control

amplifies low-level sounds for heightened awareness while still suppressing gun fire

312 Zinc Air Battery

available at most drug stores and pharmacies

Balanced Armature Driver

micro-sized, super-efficient speakers deliver clear, articulated sound

Mode Button

tailor DSP operation to your current environment with multiple modes on the Digital 2 and Hunter models

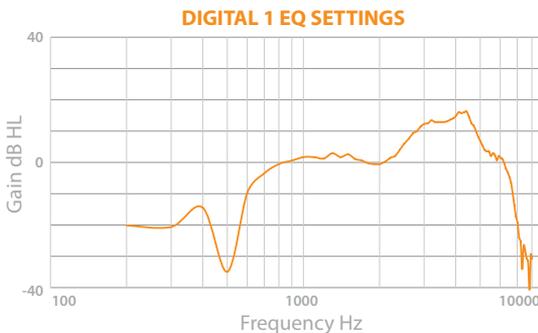
DefendEar® Digital 1

The Digital 1 provides a single mode of operation for excellent all-around noise suppression and ambient amplification for a variety of shooting environments.



Made specifically for shooting sports and high impact noise situations. Exceptionally accurate and lightning fast, DefendEar Digital active, digital circuitry delivers unsurpassed amplification for situational awareness and appropriate noise attenuation when you pull the trigger.

MODULAR DESIGN DefendEar Digital field-removable electronics allows for easy cleaning, service repairs, or future upgrades.



IPIL 37.3/44/42 (see page 16)

Digital 1 NRR 26



IDEAL FOR

- Recreational shooting
- Clay target
- Wingshooting
- Game hunting
- Competition shooting

FEATURES

- Digital Compression and Signal Processing circuit
- Volume Control
- Low Battery Warning

Sheriff's Office Firearms Instructor – Eric Muller



“DefendEar Digital hearing protection allows the shooter to assume any shooting position with any weapon system with no fear of knocking off or having to re-adjust the hearing protection.”

Shooting under a car...no problem, transitioning from strong side to weak side with a rifle...no problem, running around in a gas mask or helmet...no problem, if your ears don't get in the way of what you are doing neither will DefendEar electronic noise suppressors.

When I first started wearing DefendEar Digital hearing protection I was concerned that sticking something in my ear for an all day shooting competition or a full day of instructing at the range was going to be uncomfortable. I couldn't have been more wrong. The professional staff at Westone Laboratories Inc. created a molded product specifically for my ear. I find my DefendEar hearing protection not only more comfortable than earmuffs but also more useable as I am not constantly taking them off and on to relieve the pressure on my head, like I was with conventional earmuffs.

When hunting, I can listen for my dogs or game without having to adjust a headset, or constantly take them off to wipe off the sweat like I did with muff style hearing protection. While using my DefendEar I can wear a wide brimmed hat, something I could never do with conventional ear muffs.

DefendEar Digital electronic noise suppressors offer the shooter more natural sounds (animal or human), opposed to ear muff style designs which are directional; allowing the shooter to choose between better hearing from the front or rear, depending on product design. With DefendEar Digital molded hearing modules the sound travels to your inner ear the same as it would without the modules in your ear. The shooter is offered a natural “surround sound” hearing experience.

Shooter Profile

NAME Eric Muller

CREDENTIALS WA State Firearms Instructor



Sponsored Shooters – Heckler & Koch Shooting Team



Jason Koon

Koon came to competitive shooting after a background competing in archery and bull riding. Starting as a junior shooter, he quickly became one of the top five shooters in the U.S. His methodical, accuracy-based approach allowed him to master competitive bull's-eye shooting, which ultimately helped him transition into action pistol shooting. Koon holds several national records and is a frequent winner of national, regional, and state shooting championships across multiple types of shooting. Koon is notable in his ability to compete in many different shooting sports at a high level. Koon will serve as team captain.

Shooter Profile

NAME Jason Koon

CREDENTIALS Heckler & Koch Shooting Team

OTHER INTERESTS Running, boxing, Jiu Jitsu, and spending time with his family

John Rasmussen

A USPSA Master Class shooter, John first began shooting competitively while in the Air Force. After leaving the military, he transitioned into law enforcement where he currently serves as a deputy sheriff, helicopter pilot, and lead firearms instructor at his agency.

"Whether instructing a class of police recruits, or competing in a USPSA match, I need hearing protection that delivers reliable, effective sound reduction, yet still allows me to hear what's going on around me. DefendEar delivers what I demand, and is comfortable to wear all day long."



Shooter Profile

NAME John Rasmussen

CREDENTIALS Heckler & Koch Shooting Team

OTHER INTERESTS Running, 3-Gun, and spending time with his family

DefendEar® Digital 2

The Digital 2 offers two user selectable DSP programs by pressing a button at the top of the digital module.



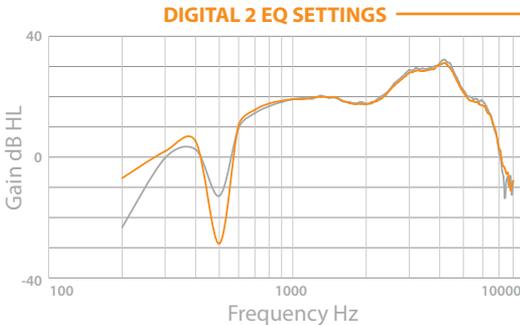
The DefendEar Digital 2 offers two modes for either clay or game shooting scenarios:



GAME MODE suppresses intermittent gunshots while amplifying ambient sound for communication and environmental awareness.

CLAY MODE is optimized for suppressing continuous gunshots, allowing more flexible noise suppression while still amplifying ambient sounds.

DUAL MODE BUTTON



IPIL 37.3/44/42 (see page 16)

Digital 2 NRR 26

IDEAL FOR

- Recreational shooting
- Clay target
- Wingshooting
- Game hunting
- Competition shooting

FEATURES

- Digital Compression and Signal Processing circuit
- Volume Control
- Low Battery Warning

- PROGRAM 1 (Game Mode)
- PROGRAM 2 (Clay Mode)

DefendEar® Digital Hunter

The Digital Hunter offers two user selectable DSP programs by pressing a button at the top of the digital module.



The DefendEar Hunter boosts low-level sounds for detecting game moving through leaves and undergrowth and a second mode to reduce wind noise typical in the open range and in hunting stands:

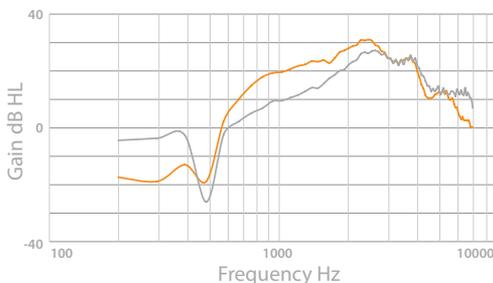


DUAL MODE BUTTON

NORMAL MODE gunshot noise suppression and ambient sound amplification for communication and environmental awareness.

WIND REDUCTION MODE increases the amount of wind noise suppression — ideal for open field hunting and other severe conditions.

HUNTER EQ SETTINGS



Digital Hunter NRR 26

IDEAL FOR

- Recreational shooting
- Clay target
- Wingshooting
- Game hunting
- Competition shooting
- Large caliber firearms
- Windy shooting conditions

FEATURES

- Digital Compression and Signal Processing circuit
- Volume Control
- Low Battery Warning

- PROGRAM 1 (Normal Mode)
- PROGRAM 2 (Wind Reduction Mode)

Sporting Clay Instructor – Kevin Gregory



I am thoroughly impressed by the sensitivity, comfort, and durability of my DefendEar Digital hearing protection. The dual-setting allows me to customize my DefendEar for optimum use whether in the field or on the course.

While instructing, it is great to have the ability to hear questions and comments from my clients without the distraction of other shooters. We can converse in a normal tone with no need for raising our voices.

DefendEar is so sensitive that it can detect the sound of the trap machine releasing the target.

When pheasant hunting, it is amazing to clearly hear the slightest sound as the bird flushes while having the blast of the gun completely blocked.

The latest DefendEar technology protects your hearing while enhancing your shooting experience.

Shooter Profile

NAME Kevin Gregory

CREDENTIALS NCSA Certified Instructor, Quail Run Sports



Customize Your Gear: **Color Options**

Choose at least one or up to three colors for each earpiece.
Choose a single door color for your module. Default color is black.

Available Earpiece Colors

Choose at least one or up to three colors for each earpiece.



Blue



Red



Classic Yellow



Forest Green



White



Grey



Black



Purple



Orange



Pink



Yellow



Green



Beige



Clear



Camo Brown



Brown



Camo Green



Classic Camo



Urban Camo



Desert Camo

Did you know?

When customizing your earpiece, you can choose up to three different colors to create a “swirl” effect.

Available Door Colors

Choose one door color for each module. Each earpiece can have a different door color.



Blue



Red



Yellow



Green



Orange



Black



Clockwise from top: black earpieces with orange doors; red, white, and blue "swyrl" earpieces with red doors; yellow earpieces with black doors.



Clockwise from top: classic camo with black doors; urban camo earpieces with black doors; gray earpieces with green doors.



Not all hearing protection is created equal.



You've seen NRR shown on nearly all hearing protection sold in the US, but what does it mean?

As it turns out, because of the way NRR is tested, it doesn't reveal the attenuation of gunshot noise by hearing protectors. Hearing protectors function non-linearly with the high SPL of gunshot noises. This is one reason why the ANSI S12.42-2010 standard was created — the metric from that standard for impulsive noise reduction is IPIL, or Impulsive Peak Insertion Loss. The IPIL is not the same as the NRR, and there are no rules of thumb for converting NRR to IPIL.

Very few HPDs on the market have been tested for IPIL, because it's not yet required by law. However, in order to show the confidence that Westone has in their products, we have tested our products for IPIL.

The graph to the right depicts the actual attenuation with IPIL compared to the assumed attenuation using NRR.

DefendEar® IPIL Rating

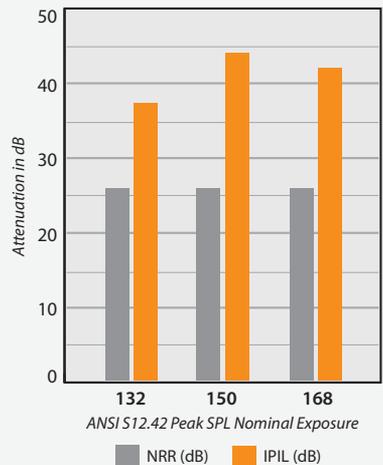
DEFENDEAR DIGITAL 1, 2 AND HUNTER

Exposure level: 132 dB SPL / IPIL: 37.3 dB

Exposure level: 150 dB SPL / IPIL: 44 dB

Exposure level: 168 dB SPL / IPIL: 42 dB

Attenuation Metric Comparison: IPIL vs. NRR



DefendEar DIGITAL® Features

MODEL		MAX dB	MAX GAIN	ATTACK TIME	RELEASE TIME	DSP	ADVANTAGES
DIGITAL 1		84	20	4 ms (<i>fast</i>)	1 channel: 128 ms - 512 ms; 3 channels: 512 ms - 1024 ms	4 channels	Excellent all-around noise suppression and ambient amplification before limiting; for a variety of shooting environments
DIGITAL 2	GAME MODE	86	20	4 ms (<i>fast</i>)	128 ms - 512 ms	4 channels	Two stage limiting suppresses intermittent gunshots while amplifying ambient sound for communication and awareness of game sounds
	CLAY MODE	82	20	4 ms (<i>fast</i>)	512 ms - 1024 ms	4 channels	Longer release time optimized for suppressing repeated gunshots (e.g., Olympic trap, 3-gun), allowing flexible noise suppression while amplifying ambient sounds
HUNTER	NORMAL MODE	82	24	4 ms (<i>fast</i>)	128 ms - 512 ms	4 channels	Gunshot noise suppression and strongest ambient sound amplification before limiting; maximum awareness of game sounds
	WIND MODE	82	20	4 ms (<i>fast</i>)	128 ms - 512 ms	4 channels	Features wind noise suppression—ideal for open field hunting and wind-exposed target shooting

- DefendEar Digital Series electronics provide situation-specific hearing enhancement, maintaining safe output levels.
- Otoblast silicone earpiece provides excellent noise reduction (NRR 26, IPIL rated*).

What's in the box?

- Monitor Vault carrying case
- Cleaning cloth
- 6 Zinc Air 312 batteries
- Oto-Ease lubricant
- Oto-Cleans cleaning solution
- Battery tool / cleaning loop
- DefendEar patch
- Instructional DVD



Accessories



Battery Door Removal Tool

A tool to assist in removing the battery door. Used to change or replace battery door.



Battery Pack

Six pack of batteries designed for DefendEar products.



DED Battery Tool

Magnetic tool for removing battery and wax loop for cleaning earpiece.



DefendEar Patch

Embroidered DefendEar sew-on patch for clothing.



Oto-Clens

Cleaning spray for removing bacteria from earpieces.



Monitor Vault Belt Loop

Keep your earpieces secure with the monitor vault belt loop.



Oto-Ease

Greaseless lubricant that helps ease the insertion of earpieces.



Microfiber Cleaning Cloth

Cloth to assist in cleaning earpieces.

*Westone OtoBlast material compatibility tested according to MIL-STD-810F by an independent NIST-NVLAP / OSHA NRTL / DSCC / NCC CB / A2LA accredited laboratory. OtoBlast has passed testing according to ISO Standard 10993: Biological Evaluation of Medical Devices Part 10, Tests for Irritation & Delayed Hypersensitivity, Biological Evaluation of Medical Devices Part 5, Tests for In Vitro Cytotoxicity

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