

Key Benefits of Digital Technologies in Two-Way Radios



Dear Two-Way Radio User:

A “smart” revolution is transforming two-way radios. Digital technology is radically improving functionality and performance in the same way that advancing technology turned the smartphone from a luxury item into a device owned by more than half of American adults.

Digital technology is opening the door to a host of functions for two-way radios, even as it enhances capacity, coverage, audio quality, and battery life. And like modern smartphones, digital two-way radios are more affordable than ever.

This guide describes the capabilities and benefits of the latest digital two-way radios. It explores the differences between analog and digital technology and the benefits of going digital. Plus, it offers advice on how to make the transition. The options have never been greater. And thanks to backward compatibility, the move to digital can easily be phased in over time.

There are many exciting new digital products available. BearCom is delighted to lead the way in assisting organizations around the country as they adopt this progressive technology. Please let us know how we can help you harness the power of digital performance to improve your wireless communications capabilities.

Sincerely,



Jerry Denham
President & CEO, **BearCom**

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The Story of Two Signals

In the beginning, there was analog technology, which uses frequency modulation (FM) to produce a continuous wave with the voice signal. An analog two-way radio works as both transmitter and receiver, with that continuous wave in between. Analog has been the primary technology platform since the initial development of wireless communications. Analog radios have been used for business applications as far back as 1933.

- *Analog Advantages:* The integration of such a simple system into a single computer chip has dramatically reduced the cost of analog radios.
- *Analog Disadvantages:* The analog radio system has many functional limitations, and the technology has been around so long that the scope of possible innovations is virtually exhausted.

Along Comes Digital

Digital two-way radios operate by encoding, transmitting, and decoding sound waves. The signal is represented by binary numbers—1s and 0s—that correspond with voltage values. Inside the radio, the vocoder—an analysis/synthesis system used to reproduce human speech—encodes the transmission. The radio sends the signal, and the vocoder on the receiving end decodes it.

In addition, the software in digital radios contains an algorithm that recognizes the difference between voice and background noise and cancels undesirable audio for clearer, cleaner sound quality.

By proactively transitioning to digital radios now, your organization will enjoy greater benefits immediately, and your fleet is ready for the high-efficiency innovations coming in the future.

“The advent of the digital two-way radio is having a dramatic impact on users of wireless technology. It has opened up a new world of possibilities for significant, innovative enhancements in communication.”

~Mark Crosby, President & CEO
Enterprise Wireless Alliance

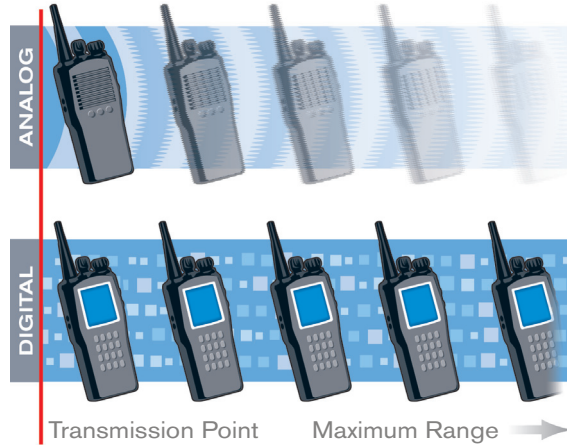


Four Reasons to Go Digital

- Improved Audio Quality
- Enhanced Clarity throughout the Coverage Range
- Greater Efficiency
- Less Battery Drain

1. **Improved Audio Quality:** Digital technology reduces external background noises during transmission, thereby making the digital technology platform ideal for situations such as noisy manufacturing and processing plants, or outside in windy conditions.

2. **Enhanced Clarity throughout the Coverage Range:** While an analog radio is capable of producing a clear signal within its peak performance range, once the signal moves too far from the transmit point, the analog audio will slowly fade out until it is unrecognizable. By contrast, a digital signal stays much stronger and clearer to the limits of the coverage range.



3. **Greater Efficiency:** Digital radios operate in Dual-Capacity Direct Mode (DCDM), which means that radios can share the same channel by alternating time slots. These time slots move incredibly fast, and since they alternate, more simultaneous talking paths are possible on each channel with no degradation. Plus, key information such as unit ID, status buttons, and enhanced text messages can be embedded into a single digital radio channel. In many cases, migrating from analog to digital allows users to increase talk paths without a repeater.

4. **Less Battery Drain:** Since digital radio transmitters are not constantly “on,” radios used in digital mode experience lower current drain in transmit mode than analog radios. The two-slot Time Division Multiple Access (TDMA) protocol cuts transmit time in half, which creates the opportunity to achieve up to 40% battery life improvement.

Moving to Digital

For those switching from analog to digital, there is good news: Digital platforms provide a migration path that allows for simultaneous use of digital and analog radios. Backward compatibility allows organizations to gradually replace analog devices with newer digital models without the added stress of shifting to a new system. Also, many analog radio accessories are compatible with digital devices.

Vertex Standard Introduces eVerge Two-Way Radios

Based on the features, form factor, and design of the popular VX-450 Series of two-way radios, Vertex Standard is now offering the eVerge line, which delivers new choices in digital technologies. The progressive eVerge models help users *evolve and emerge* to better two-way radio communications. The eVerge line is precision-engineered to deliver outstanding value and ease of use without sacrificing quality—giving commercial and industrial users more capabilities and greater flexibility at an affordable price.



eVerge EVX-531

eVerge EVX-534

eVerge EVX-539



The EVX-530 Series is at the heart of the new eVerge digital radio portfolio. Your choice of the EVX-531, EVX-534, and EVX-539 add sensible options to your two-way radio fleet with operating capabilities that can be converted from analog to digital operation. That means you can take a phased migration approach by using your eVerge radio as an analog device now, and then with a simple programming change, switch to digital operation at any time in the future. Or, you have the option to take out-of-the-box delivery in digital mode from the outset.

eVerge—A New Standard of Excellence

Digital-capable eVerge radios offer ideal choices for customers who are looking for clearer audio quality, better coverage, and more privacy without higher equipment costs. These versatile radios are designed to work with existing analog devices for easier conversion. The eVerge EVX-530 Series of two-way radios feature:

- Operation: Analog and digital
- Channels: 32-512
- Power: 5W (VHF & UHF)
- Size/Weight: 4.1"H x 2.3"W x 1.34"D, 9.9 oz.
- Waterproof: IP-57 fully submersible rating
- Call Management: Place direct calls to individuals, groups, or all (in digital mode)



eVerge EVX-531: Easy-to-use, economical design
-32 channels, 2 groups, 3 programmable keys

eVerge EVX-534: Full display for greater flexibility
-512 channels, 32 groups, 7 programmable keys

eVerge EVX-539: Greater functionality with 9 programmable keys
-Direct dialing, stored IDs/contacts, site messaging, and more; 512 channels, 32 groups

The eVerge EVX-534 and EVX-539 display radios deliver enhanced communication and privacy, including:

- **Text Messaging:** Provides an ideal option when voice communications is not practical
- **Auto-Range Transpond System (ARTS) II:** Enables users to monitor their connection status with other users by radio ID

eVerge EVX-5400 Mobile Two-Way Radio

Designed to make mobile radios better with digital capabilities

- Channels: 512
- Power: 5-50W (VHF), 5-45W (UHF)
- Size/Weight: 1.8"H x 6.5"W x 6.1"D, 2.8 lbs.



eVerge EVX-R70 Repeater

Dynamic mixed mode repeater supports both analog and digital operation

- Channels: 16
- Power: 45W (VHF), 40W (UHF), 100% continuous duty
- Size/Weight: 5.2"H x 19"W x 11.7"D, 31 lbs.



Frequently Asked Questions

Features and Functionality

Q: Why should we go digital?

A: The two-way radio market is clearly moving toward digital platforms. One such example is the introduction of the Vertex Standard eVerge line featuring improved audio quality, enhanced coverage, greater efficiency, and added battery life.

Q: Isn't digital more expensive?

A: Digital radios use components that are generally more expensive than analog models; however, the price difference has narrowed dramatically in recent months. In fact, now basic digital systems are often comparably priced to analog.

Q: Is it worth paying a bit more for digital?

A: It's a good idea to evaluate for yourself if the added features that digital delivers are worth the moderate price difference. Many users conclude that improving sound quality over the full radio range is enough by itself to justify the added investment.

The Future of Analog

Q: Will analog radios become extinct?

A: Analog radios are still a popular choice when users don't want or need feature-rich equipment. Analog technologies may remain in use among lower grade consumer models for many years to come.

Q: Are my analog two-way radio accessories compatible with digital models?

A: It depends. Vertex Standard now offers a standardized, universal charger (single and multi-unit models) compatible with most Vertex Standard radios, both analog and digital. Users in mid-migration with mixed fleets benefit with one set of chargers to keep their fleet at peak performance levels. For customers currently using VX-450 radios, it is also possible to share batteries with the EVX-530 Series. However, certain earpieces, headsets, and speaker-mics are optimized for digital models. You should always check the product and packaging for compatibility.

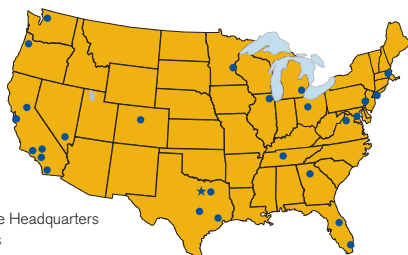
Next Steps

Q: How can I get the best value when selecting digital two-way radios?

A: To save money and get the right two-way radios for your environment, find a provider you can trust. In addition, work with a company that carries high-quality products and has plenty of wireless expertise. To help with your digital migration, you can rely on BearCom.



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