



# Digital Overview



**VXD Series**  
Digital Mobile Radios

## SUMMARY

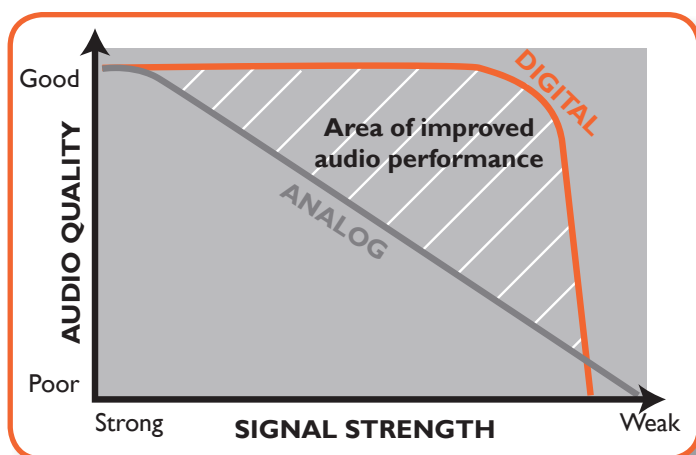
**Do digital:** The two-way radio industry is gradually evolving from analog to digital technology. This change is primarily the result of the radio frequency spectrum becoming overcrowded and causing interference in communications. As the airwaves have become increasingly crowded, there is an increased need for more radio users to share the available spectrum, which is where the need for digital emerges.

**Do digital right:** Converting to a digital radio solution has different criteria to consider compared to an analog radio system. There are protocol differences to understand within digital radio choices that directly impact performance, cost and potentially future system needs. Here are the key points to consider in adopting a digital radio solution.

## DIGITAL ADVANTAGES

### Digital Delivers Improved, Consistent Audio Quality

Digital technology provides better noise rejection and preserves voice quality over a greater range than analog, especially at the farthest edges of the transmission range. Users can hear what is being said more clearly over greater distances since digital voice retains better audio quality than analog as signal strength decreases.



### Digital Transforms Communication

**Greater Privacy than Analog** – No extra encryption hardware is required to ensure private communications when operating in digital mode. When encryption is used, only the intended recipient(s) hear what is transmitted and there is no significant loss in voice quality that analog scrambling can cause.

**Expanded Direct Calling Options** – Get more flexible call control by addressing one radio, a group of radios or all radios with a press of a button. Each digital radio has its own unique ID that can be selectively called by others. No special pre-programming is required making communications more efficient on-the-go.

**Text Messaging for Flexibility** – Digital enables sending/receiving free-form or pre-set text messages. Users are empowered with more communication options when voice communications is not feasible or messages need to be stored for reference.



**DON'T RUN  
OUT OF TIME**

**December 31, 2012**

Get 12.5 kHz compliant by December 31, 2012 to meet the FCC Part 90 narrowband mandate that goes into effect January 1, 2013.

Go digital and prepare for the future – today.

Use the VXD Series digital radios and go a step further to meet the FCC recommendation to convert directly to 6.25 kHz efficient equipment for greater spectrum efficiency.

Get the facts at:  
[www.vertexstandard.com/lmr/fcc](http://www.vertexstandard.com/lmr/fcc)

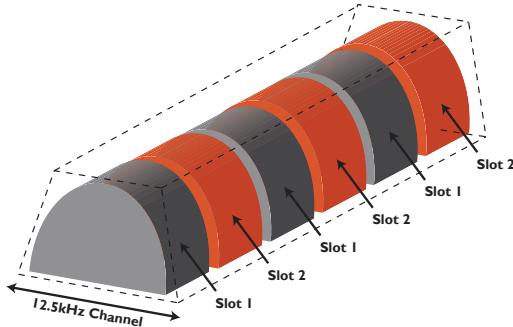
 **Vertex Standard**

# NOT ALL DIGITAL IS THE SAME

## Know the Difference in Digital Protocol

For conventional licensed, commercial digital radio communications, there are two digital protocols available known as TDMA and FDMA. Unlike the analog radio world where a wide variety of radio brands can work together, these two digital protocols are not compatible with each other. It is important to understand the differences where advantages can be realized with TDMA versus the limitations of FDMA.

### TDMA Protocol Time-Division Multiple Access



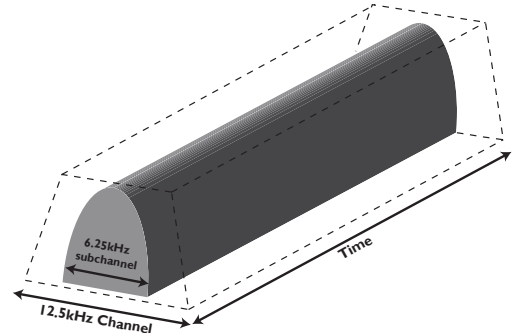
TDMA uses the full 12.5 kHz channel and divides it into two independent slots to achieve 6.25 kHz efficiency. It doubles the calling capacity of one frequency channel. Two digital conversations can take place simultaneously from a single channel. Or, one slot can be used for voice while the other slot is used for data such as text messaging. No relicensing or rebanding is needed and there is no degradation in range performance or additional risk of interference with adjacent channels.

Get two digital voice paths from one 12.5 kHz channel.

### Additional Benefits of TDMA

- **Reduced equipment cost** – No extra repeaters or combining equipment is required to get double the capacity of analog. No extra equipment also means no additional power usage or extra maintenance required.
- **Longer battery life** – Achieve improvement in battery life performance. Since TDMA cuts the call transmit time in half, this directly increases the length of talk time on a single charge.
- **More choices** – TDMA is the most widely used digital mobile radio protocol in the world with more brand choices available for users to operate a more dynamic and flexible digital radio system.

### FDMA Protocol Frequency-Division Multiple Access



FDMA splits a frequency band into narrow sub-channels and does not use the full capacity of the entire 12.5 kHz channel. As a band narrows, there is greater risk of interference, reduced sensitivity and potentially reduced range for overall reduced performance quality. Relicensing or rebanding is necessary, adding more cost to implement.

Only one digital voice path is achieved in one 12.5 kHz channel.

### Other Limitations of FDMA

- **Increased equipment cost** – a dedicated repeater is required for each channel. Combining equipment is also required for multiple frequencies to share a single base-station antenna.
- **Increased licensing cost** – relicensing or rebanding will be necessary to achieve increased capacity.
- **Limited choices** – FDMA provides limited radio options since there are fewer manufacturers offering compatible radios with this protocol.

### KNOW THE DIFFERENCE

	TDMA	FDMA
Achieve spectrum efficiency?	YES	NO
Battery life improvement?	YES	NO
Extra combining equipment required?	NO	YES
Channels to repeater ratio	2:1	1:1
Use existing licenses?	YES	NO
More product and brand choices?	YES	NO

# DO DIGITAL RIGHT

## VXD Series Digital Two-Way Radios

### RIGHT PROTOCOL: TDMA

- Reduce equipment cost
- Double calling capacity without extra licensing
- Enhance battery life performance
- Get more radio choices

### RIGHT RADIO: VXD SERIES

- Consistently clear audio quality
- Integrated voice and text communications
- Submersible and rugged portable, IP 57 rated
- Easy analog conversion for maximum value
- 3 Year warranty

## YOUR CHOICE FOR DIGITAL VXD Series



### VXD-720

- Digital and Analog Modes
- 512 Channels and 512 Groups
- 5 Watts VHF / 4 Watts UHF
- 6 Programmable Keys
- 40-Character Alphanumeric Scrolling Display
- IP 57 Submersible
- 500 mW Audio Output
- AMBE+2™ Digital Vocoder



### VXD-7200

- Digital and Analog Modes
- 512 Channels and 512 Groups
- 45 Watts VHF / 40 Watts UHF
- 4 Programmable Keys
- 40-Character Alphanumeric Scrolling Display
- 3 Watt Internal Audio Output
- 7.5 – 13 Watt External Audio Output
- AMBE+2™ Digital Vocoder



### VXD-R70

- Digital or Analog Mode
- 16 Channels
- 45 Watts VHF; 40 Watts UHF
- AMBE+2™ Digital Vocoder

