

Digital Systems

In the European summer of 1895, Italian inventor Guglielmo Marconi successfully managed to transmit a telegraphic message over a distance of 2.4 kilometres. And so, the man who history refers to as “the father of long distance radio transmission” gave to the world a platform of unimaginable possibilities.

From these humble beginnings, radio has evolved and branched out into multiple areas that have touched all our lives. From Wireless LAN's through to Paging Receivers, Mobile Telephones through to Trunked Radios and the many seemingly endless variations in between.

Two-way radios are now entering an exciting phase of evolution with the emergence of new Digital Modulation and Channel Access schemes.

Digital Two-Way Radio technology can offer several advantages over traditional analogue technology.

Connectivity

Base Stations in Digital Systems can generally be connected together using an IP Network.

This allows a system to be designed and built using the same technology that most businesses already have in place to connect their computer and PABX systems together. Not only is a shared IP network more cost effective, but also it can take over many of the radio switching functions that would normally require specialized hardware and software in an analogue system.

Security

As a general rule, speech in an analogue radio system is very difficult to secure. In a digital system, speech is coded electronically and then transmitted as a data stream representation (similar to computer-type traffic), with open or proprietary encryption layers added to make it significantly more secure than analogue.

In the event a digital radio is stolen, all mainstream digital standards support Radio Stun/Kill/Revive functions that make them inoperable so that they are useless to unauthorised users.

Background Noise Reduction

Due to their vocoding architecture, digital radio systems will often reduce or even ignore loud background noises. This means that the voice can be clearly heard by all users, even though the transmission may be coming from a noisy environment such as a truck, factory or outside wind noise.

Versatility

Digital systems are versatile in the way they transport data and present this to standard external interfaces such as RS232 and Ethernet. This makes integration into other business systems far simpler and cheaper than analogue. Depending on system design, some digital systems support the simultaneous transmission of voice and slow speed data.

Radio Channel Efficiency

All modern digital systems now operate in 12.5KHZ channel bandwidth, with some providing a voice path in 6.25KHZ, which is half of that required by analogue. This conservation of bandwidth will become important in the future as radio channels become a scarce commodity and the cost rises in accordance with the supply and demand equation.

Challenges of Digital Radio

As with all technologies, there are advantages, disadvantages, misconceptions and general confusion over which technology fits a particular customer application. This is not helped by the, sometimes outlandish, claims of vendors, which further blur the landscape as to what is practicable and affordable versus what is fanciful.

For example, there can be multiple issues of compatibility, functionality and interoperability amongst various brands of equipment depending on which particular portions of the digital radio standard they have implemented. Many functions are “planned” which is a far cry from a released, tested and supported product.

Finding the optimum solution

As a company that is vendor independent, AA Radio has adopted the position that the technology of choice should be decided by the operational and business requirements of the customer, and not by the commercial interests of any particular vendor.

With over 120 years of radio system design, implementation and support experience in our management team, AA Radio is uniquely positioned to help guide our customers through the digital maze and we pride ourselves on the delivery of high quality dependable solutions that provide value throughout the entire life cycle.

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