

Connections

Radio and Industrial Automation



Wireless communication devices such as cell phones have become a part of everyday life. Would anybody over 30 imagined that

If I were to name my favorite pastime, I'd have to say talking about myself. I love it and I think most other people do too. We need, people like us, more listeners and less talkers.

-Hedy Lamarr

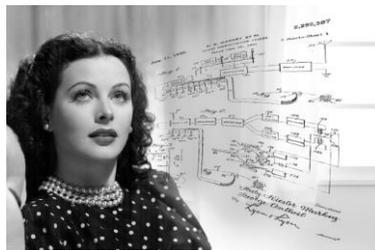
As New England Drives & Controls constantly strives to become a better asset to our customers, our whitepaper series will feature new technologies or helpful insights that may be pertinent to the reader. It is our sincere hope that this information will be beneficial in both relating, and applying content to your industrial needs.

We hope you find this whitepaper series an enjoyable and informative read.

We always welcome your questions and comments.

they would eventually carry a radio that would allow them to communicate around the world, not to mention contain the brains of a supercomputer?

It is easy to expand this thought onto the factory floor. How about a system

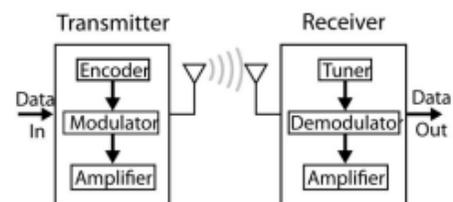


of sensors and other automation products that no longer need to be connected by wire, but can pass their signals, or even communicate digitally with the controller without being physically connected? If you haven't

Been thinking about utilizing radio in automation, you may miss the "wave" you could be riding. (pun intended) There are many wireless automation devices available with many more to come. Radio Frequency (RF) technology should be at the forefront of the factory, as it now can simplify installation,

lessen the cost of equipment, and neaten up a large project.

Radio equipment consists of two components; a transmitter and a receiver.

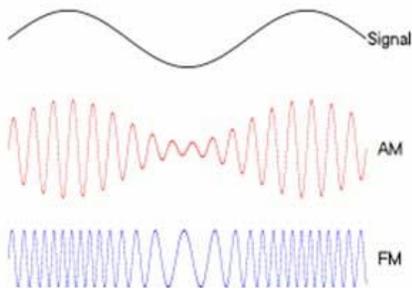


Basically a signal is generated at one unit and "listened" for at another. Most devices can accommodate both tasks, but typically one becomes a server and the other becomes a client. The signal can be Frequency or Amplitude modulated (more on these basics later) and further technology such as frequency hopping can be applied to prevent interference and even add security. It is interesting to note that frequency hopping was invented by Hedy Lamarr in 1941.

If you have never heard of Hedy Lamarr, you may want to read up about her. She was not only an actress, but also a mathematician, scientist, and spy! These all make for a great biography. Frequency hopping is also sometimes referred to as spread spectrum technology (SST) and was initially used to protect torpedoes from being jammed during WWII.



New England Drives
& Controls, Inc.



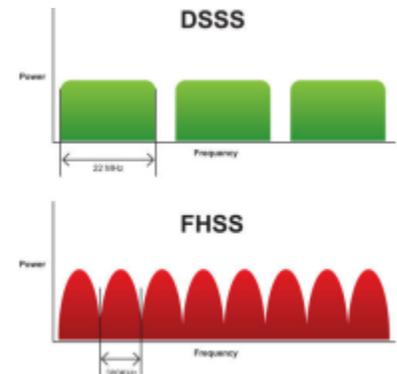
In telecommunications and signal processing, frequency modulation or FM is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave. This contrasts with amplitude modulation or AM, in which the amplitude of the carrier wave varies, while the frequency remains constant.

That's the basic idea, but let's expand to SST, or Frequency Hopping;

Early devices did not employ some of these concepts and initially gave a jaded concept to using it in industrial automation, as well as other commercial applications. We won't even talk about the cost of these early devices. Today the technology is well developed and stable, with a reasonable cost. There are many different SST systems currently in use today. Let's showcase them a bit further:

- DSSS or Direct Sequence Spread Spectrum
- FHSS or Frequency Hopping Spread Spectrum
- OFDM or Orthogonal Frequency Division Multiplexing
- UWB or Ultra-Wide Band
- CM or Chirp Modulation

DS modulation spreads a low level signal over a specific range of frequencies simultaneously. FH transmits a data signal over a different carrier frequency at different times, following a specific pattern. Simple, right? 😊



Now you know how it works, but not knowing this would not make you any less capable of implementing radio into a new or replacement sensor project.

Not only can you connect sensors to the radio, but some sensors are equipped with their own radios, simplifying their application and reducing their costs further. Feel free to contact your sales person or our engineering department with any questions on utilizing this technology in your own application.

We are proud to distribute products supplying radio technology for industrial automation by several of our solutions partners. We can't wait to hear from you!

-Peter Lavoie (Engineering Manager) - K1PCL



**New England Drives
& Controls, Inc.**

Toll Free: 888-275-2092

www.nedrives.com

Sensors

Vision

Lighting & Illumination

Wireless

Machine Safety

**PHOENIX
CONTACT**
INSPIRING INNOVATIONS