

BLUETOOTH

Bluetooth is a system by which electronically connected equipment can communicate. The system is wireless and operates using RF receivers and transmitters in the industrial, scientific and medical devices (ISM) band between 2.402 to 2.480GHz. Each set of equipment is given a set of addresses by its manufacturer or which are set locally and will automatically connect with other devices in the vicinity which have the proper addresses to form a piconet.

Once the devices have recognized each other and formed a piconet, they can take turns, one-way at a time communication (half-duplex) at 432.6Kbps or form an asymmetrical link where one device uses 721Kbps and the slower one uses 57.6Kbps. If the devices need to transmit at the same time (full-duplex), Bluetooth can be used to send data both ways at 64Kbps.

Since many devices use the ISM band (some cell phones, paging systems, garage door openers, etc.), it is necessary to take measures to conserve spectrum usage and discriminate against interference. Bluetooth transmits using 1mW which effectively limits the communication range to about 10m – thus limiting its effective interference to other spectrum users and protecting other piconets of equipment with the same addresses. Bluetooth uses spread spectrum, frequency hopping at 1600 frequency changes per second to produce a spread spectrum signal that effectively discriminates against fixed frequency interference. In addition, the pseudo orthogonal signals of other adjacent Bluetooth systems cause little interference. That is, the likelihood of two signals randomly hopping in frequency 1600 times a second trying to use the same frequency at the same time is negligible. In addition, simple error-correcting software can take care of any short period of interference.

So Bluetooth has several advantages over most other wireless communications systems. It requires no operator intervention or adjustment. It will connect any compatible equipment together if they are in close proximity. It is local, adaptable to a wide range of equipment and data transfer requirements. And it is relatively immune to interference and causes little or no interference to other systems operating in the same area.

Brian Lawrence Appointed NARTE's New Executive Director

Brian Lawrence, the former managing director of ETS-Lindgren in the United Kingdom, takes over from Russ Carstensen as the executive director at NARTE in August this year. Russ announced his intention to retire earlier this year, and will hand the reins to Brian after a short transition period to help him get oriented.

Brian has a career spanning more than 40 years in the electromagnetic compatibility field. He has lived and worked in both the U.K. and the U.S. and has developed many contacts throughout Asia and Europe.

"Although I started my career as a scientist and engineer, I quickly found myself more and more involved in marketing after moving to the U.S. in 1973," Brian told NARTE NEWS. "I have known of NARTE's excellent work for many years and am delighted to now be a part of the organization. I am confident that my experience can make a significant contribution to their future growth."

"Russ has led us very well for seven years and brought NARTE to the place it is today," says Stephen Berger, president of NARTE. "With his retirement, we started an international search and are very pleased to bring someone of Brian's talent and experience to lead NARTE into its future."

"Brian joins the association at a pivotal time," Stephen says. "Given the rapid changes in technological innovation in telecommunications, NARTE is challenged to stay current and relevant to the needs of the industry".

Brian currently lives with his wife Kathy in a small village about 30 miles north of London. Before relocating back to the U.K. in 2000, Brian and Kathy had lived in the Chicago area, San Diego and Connecticut.

"We will be staying here for the immediate future," says Brian, "but we intend to move back to the U.S. within the next year or two. Meanwhile, modern telecommunications and the



What is a Telecommunications Engineer?

by Russell V. Carstensen, PE, NCE

Over the years I have been drawn into numerous debates over wired and wireless systems. The debates seem to consistently follow two themes: that wired telecommunications are dead and that wireless technology is different. Both technologies employ telecommunications engineers but claim that there is the “true faith.” Even though the same degree titles are awarded, technology has changed substantially in the 40 years I have been practicing as an engineer. This leads me to raise the point that if the degrees are the same, what is different? The following paragraphs reflect what I know to be correct about telecommunications engineering. The question is whether this reflects your reality. Please read my thoughts and let me know if I am on track.

Telecommunications Defined

In my research for this article, I looked first at what telecommunications is. The definitions currently in use seem to follow my old logic. For example, telecommunications engineering focuses on the transmission of information across a channel such as a coax cable optical fiber or free space. Transmissions across free space require information to be encoded in a carrier wave in order to shift the information to a carrier frequency suitable for transmission. Popular analog modulation techniques include amplitude modulation and frequency modulation. The choice of modulation affects the cost and performance of a system and these two factors must be balanced carefully by the engineer.

Once the transmission characteristics of a system are determined, telecommunications engineers design the transmitters and receivers needed for such systems. These two are sometimes combined in a single transceiver. A key consideration in the design of transmitters is their power consumption as this is closely related to their signal strength. If the signal strength of a transmitter is insufficient, the signal's information will be corrupted by noise.

Internet will allow us to maintain and develop contacts and ensure that all our commitments are met.

“While we are here, I believe there are a number of interesting opportunities for NARTE to introduce certification programs to Europe, and I will be starting right away with some leads that have developed in the U.K. Once programs are running in the U.K., it will be easier to expand into other Western European countries.

“With the globalization of industries, it is more and more important that engineers appreciate what is going on in the different global markets. By introducing NARTE to Europe, we can act as a conduit for the exchange of ideas and information between the communities.”

Brian ends by saying, “We have active certification programs running in Japan and there has been an initial interest in Singapore that needs to be fostered. The longer term goal in Asia will be to get NARTE programs up and running in China, Korea and Taiwan, then we will have a truly global presence”.