SYSTEM AND METHOD FOR SHORT RANGE WIRELESS COMMUNICATION

This application is a continuation of application Ser. No. 11/022,651 filed Dec. 28, 2004, now allowed, which is incorporated herein by reference in its entirety.

I. FIELD OF THE INVENTION

The present invention relates generally to short range wireless communication and, more specifically, to systems employing magnetic induction data communication networks for short range wireless communication.

II. BACKGROUND OF THE INVENTION

For years, Radio Frequency (RF) systems have been employed to transfer data between communication devices. For example, an RF transmitter may be employed to transmit data to an RF receiver. The growth of RF technology over the years has resulted in an increased use of the services for which the technology may be employed. For example, wireless services for electronic communication devices such as cellular telephones, pagers, personal digital assistants (PDAs), and RF Local Area Networks (LANs) have utilized RF technology to provide data communication. Although the growth of RF technology has resulted in significant benefits in the form of increased services in which the technology can be utilized, it has also resulted in a number of significant problems.

For example, as the growth of the above referenced services continues to increase, RF technology will become less viable, as the technology has a limited frequency spectrum which will eventually be depleted. In addition, RF technology is "far-field" and thus susceptible to eavesdropping and other security issues. Fading, antenna orientation problems, unpredictable maximum range, and higher power requirements are also problems experienced using RF technology.

As an alternative to employing RF technology to transmit and receive data amongst devices, magnetic induction technology may be utilized to transmit and receive the data. Unlike RF technology, magnetic induction technology transmits and receives data by encoding electronic signals into magnetic waves. As magnetic waves typically operate on a much lower frequency than the radio waves utilized in RF-based communication devices such as mobile telephones and ordinary cordless telephones, for example, a minimum amount of interference from other devices is experienced. Operation at a lower frequency also consumes less power than RF technology.

Unfortunately, however, magnetic induction has a significant drawback, that of a limited range of data transmission and reception. For example, the transmission and reception range of systems and networks utilizing magnetic induction is typically no greater than approximately one meter. In addition, in many magnetic induction networks, if the transmitter and receiver antennae are not properly aligned, data transmission can be significantly degraded. As a result of this inability to transmit and receive data over greater distances and the meticulous alignment requirements, conventional magnetic induction data transmission networks are not as effective as they could be.

Therefore, what is needed is a magnetic induction data transmission network including a greater maximum range of data transmission and reception. Such a network should provide more effective and reliable transmission and reception of data between communication devices in the network regardless of the relative position of the communication devices.

III. SUMMARY OF THE INVENTION

It is an object of the present invention to overcome problems of the prior art.

An objective of the present invention is to provide a magnetic induction coil adapted to fit an individual's body to produce a powerful magnetic flux field for more effective and reliable data communication over a greater maximum distance range.

An objective of the present invention is to accommodate for misalignment angles between communication devices in a magnetic induction data transmission network.

An advantage of at least one embodiment of the present invention is the magnetic induction coil may be conveniently opened and closed for ease of donning and doffing.

An advantage of at least one embodiment of the present invention is that the magnetic induction coil includes a coil connector having staggered coil connections to produce a continuous spirally wound coil.

An advantage of at least one embodiment of the present invention is that the master hub can be included in a belt buckle of an individual's belt.

An advantage of the present invention is that the magnetic induction coil may accommodate a variety of sizes of individuals.

The present invention relates to a magnetic induction data transmission network comprising a master hub, at least one sensor node communicatively coupled to the master hub to allow the master hub and the at least one sensor node to communicate, and a magnetic induction coil preferably adapted to be worn about a body part of an individual such as an individual's waist, shoulder, or neck.

The magnetic induction coil is preferably connected to the master hub to allow data reception and transmission. In at least one embodiment of the invention, the magnetic induction coil preferably includes a connector residing at a transection point of the coil. The connector preferably serves as an intermediary between the coil and the hub.

In at least one embodiment of the present invention, a master hub is preferably included in the magnetic induction data transmission network for transmitting and receiving data. The master hub preferably includes an internal microprocessor adapted to communicate with another microprocessor located outside of the network, and a data storage area communicatively coupled to the internal microprocessor for storing data received by the internal microprocessor.

In at least one embodiment of the invention, a magnetic induction coil is adapted to fit a body part of an individual. The coil is comprises N coil turns where $N \geqq 2$, the $N-1$ coil turn being adjacent to and parallel with the Nth coil turn. The coil is transected at a transaction point and a connector is coupled to the coil turns to interconnect the coil turns.

IV. BRIEF DESCRIPTION OF THE DRAWINGS

Like reference numerals in the figures represent and refer to the same element or function throughout.

FIG. **1** illustrates an exemplary magnetic induction data transmission network according to at least one embodiment of the present invention.

FIG. **2***a*-**2***c* illustrate various embodiments of sensor nodes of the present invention.

FIG. **3** depicts a block diagram of a master hub of the present invention.