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Topic - Various wireless Connectivity

Subject - Microcontroller & Embedded System

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* Various wireless Connecting -

* NFC -

Near field communication technology has taken off in a big way. It is incorporated into many payment cards, ticketing and the like enable to swift and very easy transaction to be made.

NFC technology is also used in many other area where short range secure communication need to be made and can even be incorporated into mobile phones and other devices.
NFC technology is being incorporated in many new application. Its short range is a key to its operation and success, operating over only short distance, this gives a large degree of inherent security.

NFC, near field communication is a non-contact technology and as such does not require physical electrical contact to be made.

What is NFC?

NFC is a standard based technology

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used to provide short range wireless connectivity technology that carry secure two-way interaction b/w electronic devices. Communication are established in a simple way, not requiring set-up by users as in the case of many other wireless communication. As such NFC enables users to perform contactless transaction access digital content and connect electronic devices by touching device together.

NFC, Near field communication provides contactless communication up to distance of about 4 or 5 centimetres. In this way there communication are inherently more secure b/c devices normally come into contact and hence communicate when the users intends this.

NFC utilises inductive-coupling at frequency of 13.56 MHz - a license free allocation in the HF portion of the radio spectrum.

NFC is a form of RFID, but it has a specific standards governing its operation interface etc. This means that NFC equipments and elements from a variety of manufacturers can be used together.

NFC

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NFC Application. —

Near field Communication NFC lends itself ideally to a whole variety of applications. These include -

* Payment Cards.
* Ticketing
* Mobile Phones, PDAs etc.
* Check-out Cash registers or "Point-of-Sale" equipment.
* Turnstiles.
* Vending Machines.
* Parking Meters
* ATMs
* Application around the office and home, e.g. garage doors etc.

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ZIGBEE

Zigbee is an IEEE 802.15.4-based Specification for a Suite of high level Communication Protocols used to Create personal area Network with Small, low power digital radio, Such as for home automation, medical devices data Collection, and other low-power low-bandwidth needs, designed for Small Scale projects which need wireless Connection. Hence, Zigbee is a low power, low data rate, and close proximity (ie, personal Area) wireless ad hoc Network. The technology defined by the Zigbee Specification is intended to be Simpler and less expensive than other wireless personal area Network (WPANs) Such as Bluetooth or more General wireless Networking Such as wifi. Application include, wireless light Switches home energy monitors, traffic managment System, and other consumer and Industrial equipment that requires short-range. Low rate wireless data transfer.

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Its low power Consumption limits transmission distance to 10-100 metre Line-of-Sight, depending on power output and environmental characteristic. [2] Zigbee devices can transmit data over long distance by passing data through a mesh network of intermediate devices to each more distant ones. Zigbee is typically used in low data rate Applications that require long battery life and Secured by 128 bit Symmetric encryption keys. Zigbee has a defined rate of 250 KBit/s best Suited for intermittent data transmission form a Sensor or input devices.

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Zigbee was Conceived in 1998 Standardized in 2003, and revised 2006. The name refers to the waggle dance of honey bees after their Return to the beehive.

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Bluetooth is a wireless technology Standard used for Exchanging data between fixed and mobile devices over short distance using short-wavelength UHF radio waves in the industrial, Scientific and Medical radio bands, from 2400 to 2.485 GHz, and building personal area Network (PANs). It was originally Conceived as a wireless alternative to RS-232 data Cables.

Bluetooth is managed by a Bluetooth Special Interest Group (SIG), which which has more than 35,000 member Companies in the area of Telecommunication, Computing, Networking, and Consumer electronics. The IEEE Standardized Bluetooth as IEEE 802.15.1, but NO longer Maintains the Standard. The Bluetooth SIG oversees development of the Specification, manages the qualification Program, and protects the trademarks[3]. A manufacturer must meet Bluetooth device[4]. A Network of patients apply to the technology. which are -

P.T.O

Licensed to Individual qualifying devices As of 2009, Bluetooth integrated circuit chips ship approximately 920 million unit annually.

Bluetooth Low Energy

Bluetooth Low Energy (Bluetooth LE colloquially BLE formerly marketed as Bluetooth Smart[2]) is a wireless Personal area area network technology designed and marketed by the Bluetooth Special marked Interest Group (Bluetooth SIG) aimed at Novel applications in the health care, fitness beacons.[2] Security, and home entertainment Industries.[2] Compared to Classic Bluetooth, Bluetooth Low Energy is intended to provide Considerably reduced power Consumption and cost while maintaing a Similar. Communication range. Mobile operating System including iOS, Android, windows Phone and BlackBerry as well as macOS Linux, window 8 and. Window 10, Natively Support Bluetooth.

WiFi

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WiFi

Wifi (/waifai/)[1] is a family of wireless networking technologies, based on the IEEE 802.11 family of standards which are commonly used for local area networking of devices and internet access. Wifi is a trademark of the non-profit Wifi Alliance, which restricts the use of the term Wifi Certified to to products that successfully complete Interoperability Certification testing. [2][3][4] As of 2010, the Wi-Fi Alliance consisted of more than 375 companies from around the world [5] As of 2009, Wi-Fi integrated 500 million units yearly. [6] Devices that can use Wi-Fi technologies include desktops and laptops, smartphone and tablets, Smart Tvs, Printer, digital audio players, digital Cameras, Car and drones.

Wi-Fi uses multiple parts of the IEEE 802 protocol family, and is designed to interwork seamlessly with its wired sibling Ethernet. Compatible devices can network through wireless access point to each other as well as to wired and the Internet. The different various of Wi-Fi are specified by various IEEE 802.11

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Protocol Standards, with the different radio technologies determining radio bands, and the maximum ranges, and speeds that may be achieved. Wi-fi mostly commonly uses the 2.4 gigahertz (120mm) UHF and 5 gigahetz (60mm) SHF ISM radio bands: these bands are subdivided into multiple channels. Channels can be shared between Networks but only one transmitter can locally transmit on a channel at any moment in time.

Wifi's wavebands have relatively high absorption and work best for line-of-sight use. many common obstructions such as wall, Pillars, home appliance etc. may greatly reduce range, but this also helps minimze interference between different Network in crowed environments. An access point (or hot) often has a range of about 20 Metre (490-foot) Range outdoors. Hotspot Coverage can be as shall as a single room with walls that block radio waves, or as large as many overlapping access points with Roaming permitted between them. Over time the speed and spectral efficiency of Wi-Fi has increased. As of 2019, at close Range, some versions of wi-fi running on suitable hardware, can achieve speed of over 1 Gbit/s (gigabit per second).