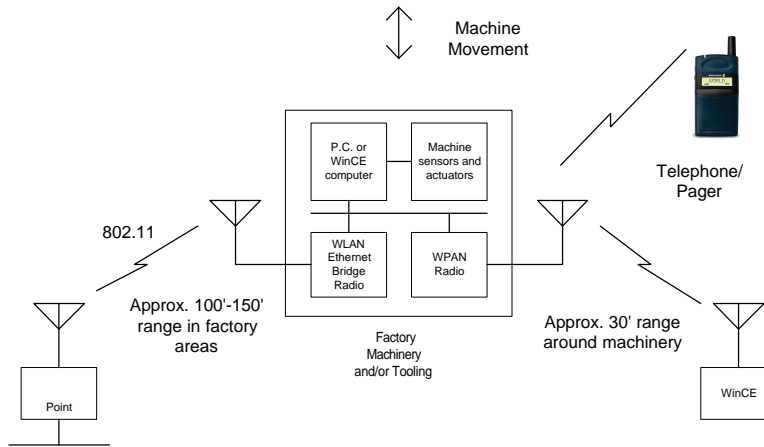


Response To IEEE WPAN Study Group Call For Applications

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WPAN Factory and Business Applications

WLAN and WPAN Connections to Factory Machinery

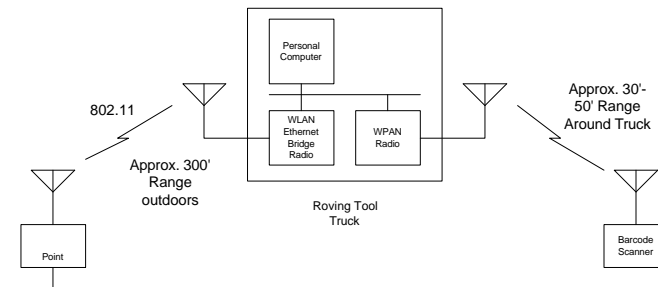


Submission

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WLAN and WPAN Connections to Factory Tool Trucks and Fork Lifts

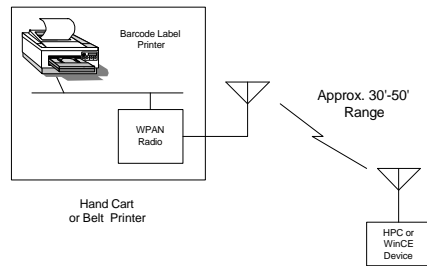


Submission

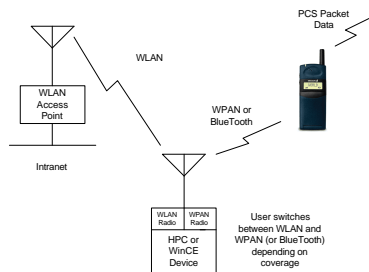
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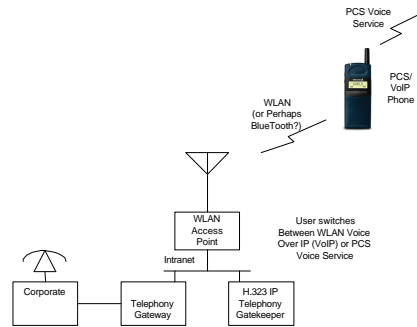
Factory Barcode Labeling



Radio Switching Between WLAN and WPAN Dependant on Wireless Network Availability



PCS and Wireless PBX application using PCS Carrier Voice Service and WLAN Voice Over IP (VoIP)



Description of WPAN Architecture

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Number of devices in a Personal Area Network (PAN)?
The network topology?
Architecture? (master-slave or peer-to-peer).

- Most often used configuration - 2 devices (one master, one slave).
- One device in the PAN configured as a “master” (Optional).
- Able to support 8 or more slave devices.
- If “master” fails, a slave can be configured as a master.
- Peer-to-peer communication enabled when out of RF range of a master device, or when no master device is found within WPAN area.

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Types of devices in the WPAN network (e.g. PDA, bar
code scanner, printer, etc.)?

- Windows CE devices.
- Hand-Held Personal Computers (HPC).
- Barcode scanners (may be part of WinCE device or HPC).
- Text Readers - paperback size, accomodates up to ~ 4,000 pages of text and graphics. (i.e. RocketBook product at www.rocketbook.com).
- Personal Communication Service (PCS) wireless phones.
- 802.11 Access Point ? (multiple radios ?)
- IP Telephony (VoIP) wireless phones.

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How is the WPAN network initiated?

- Radios programmed with node or WPAN network IDs, WPAN access IDs pre-programmed into an ID table. The WPAN radios bind together depending on pre-programmed ID table(s). Adding/deleting IDs and Radio binding takes place without re-booting client each time a change occurs.
- 40 bit, 128 bit (option) encryption (DES?) key used as a means of RF link binding authentication.

How do client devices attach and detach from the network. Is human intervention required?

- Client devices must support an Operating System (OS) (i.e. WinCE, Win95/97, linux, etc.)
- Network interface devices provide interface conversion to dumb devices (i.e. serial port, parallel port, USB, etc.)
- Upper layer protocols are used to “network” with other clients.
- Human intervention is required for client device interconnections.

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Data traffic flow?
Type of data?
How much data?
How often?

- Transport Protocols - TCP and UDP with IP.
- Traffic flow, type, and amount is dependant on application.
 - VoIP (G.723.1 low-bit-rate speech coder for multimedia communications operating at 5.3 or 6.3 Kb/s).
 - Optional G.711 (pulse code modulation [PCM] audio codec, 3.1 Khz bandwidth at 48, 56, and 64 Kb/s).
 - HTML (web)
 - e-mail synchronization
 - Printers
 - Barcode data
 - Data base synchronization
 - etc.

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How much latency in the message transfer is
acceptable?

- Keep data latency as low as possible (less than 50 ms?)
- One potential application - VoIP, is latency sensitive).
- Low latency never hurt devices which can tolerate high latency.

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WPAN interface to a larger network (e.g. an 802.11 network)?
If so, how should these networks be inter-connected?

- Gateway devices to inter-connect with BlueTooth devices.
- Gateway devices to inter-connect with IEEE 802.11 (if 802.11 std. not used as part of WPAN std.).

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Is there a need to send data between two (or more) PANs?
Should two PANs within range of one another interact?
How should WPANs inter-communicate/connect when within range?
Should inter-communicating WPANs configure themselves into one network
or only communicate between masters, for example?

- There may be a need to inter-connect with two or more WPANs
- Interaction between WPANs enabled via node ID table(s) and frequency hopping pattern(s) selected.
- WPAN master node to WPAN master node inter-communication.
- Peer to single master if the peer(s) from one WPAN move out of range of one WPAN and into range of another WPAN (with recognized node ID and hopping pattern).

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RF Range

- Very short RF range for WPAN applications (up to 50 feet)
- Able to up-shift to higher power to communicate with WLAN when desired

Battery Power Consumption

- Must consume much less battery power than current WLAN PCMCIA devices do.
- HPC, WinCE, etc. devices do not have a large batteries.
- Would like to have HPC, WinCE, etc. devices able to use the WPAN radio for a full 8 hours without battery recharge or replacement.