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# ZIGBEE WIRELESS VEHICULAR IDENTIFICATION AND AUTHENTICATION SYSTEM

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# TOPICS

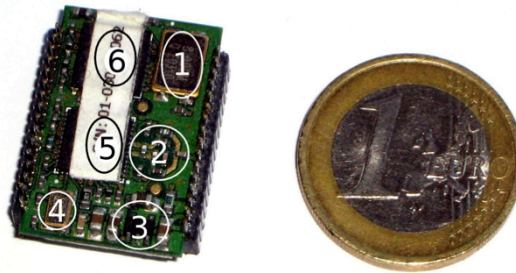
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- Zigbee
- Radio Frequency Identification (RFID)
- System Model
- System Operation
- System Implementation

# ZIGBEE

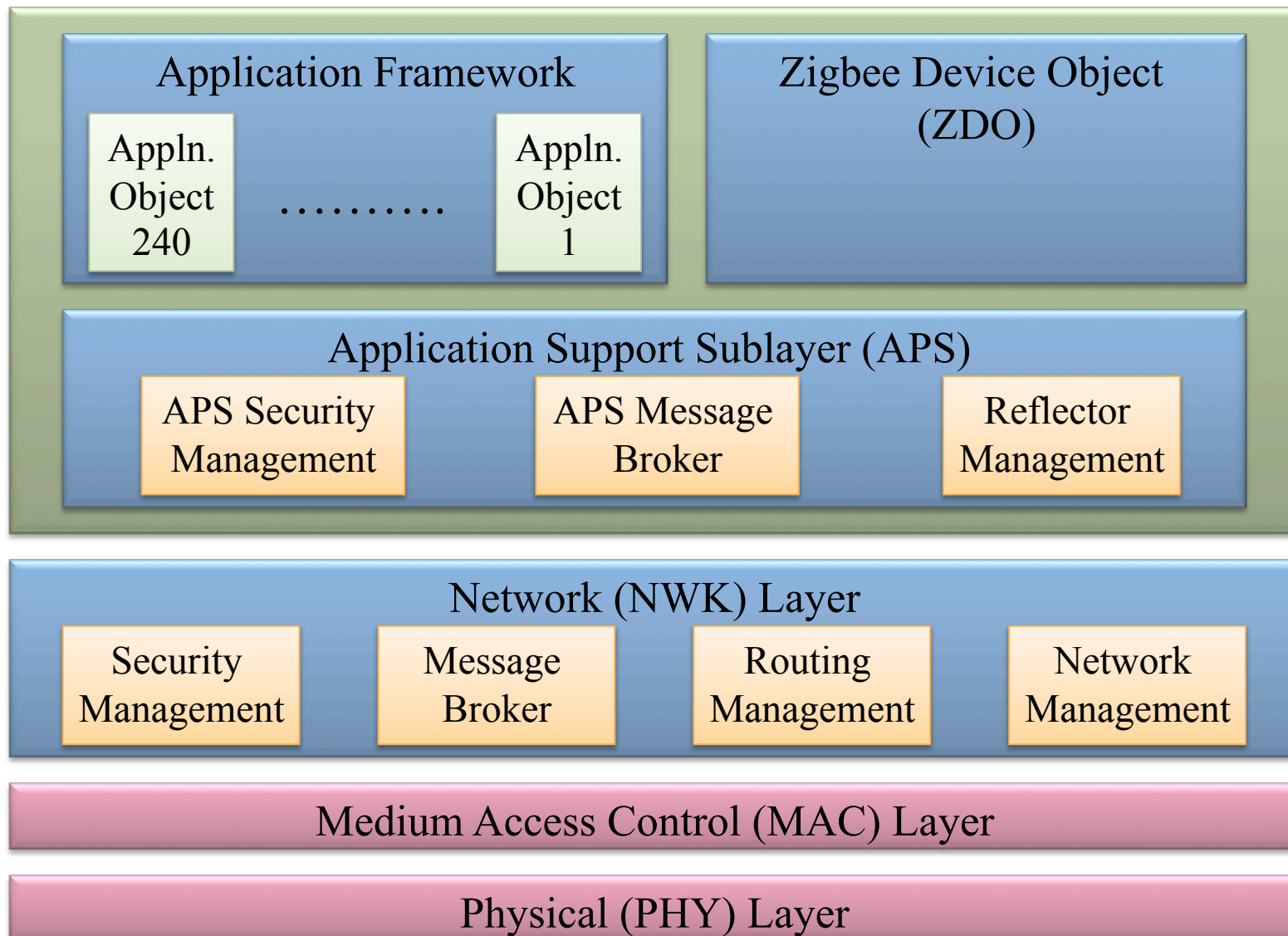
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- Communication protocol
- Based on IEEE 802.15.4 standard
- Low power
- 868 MHz (Europe), 915 MHz (USA & Australia), and 2.4 GHz
- Zigbee devices : Zigbee Coordinator, Zigbee Router and Zigbee End Device



<http://en.wikipedia.org/wiki/ZigBee>

# ZIGBEE STACK ARCHITECTURE



# RFID

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## RF tags

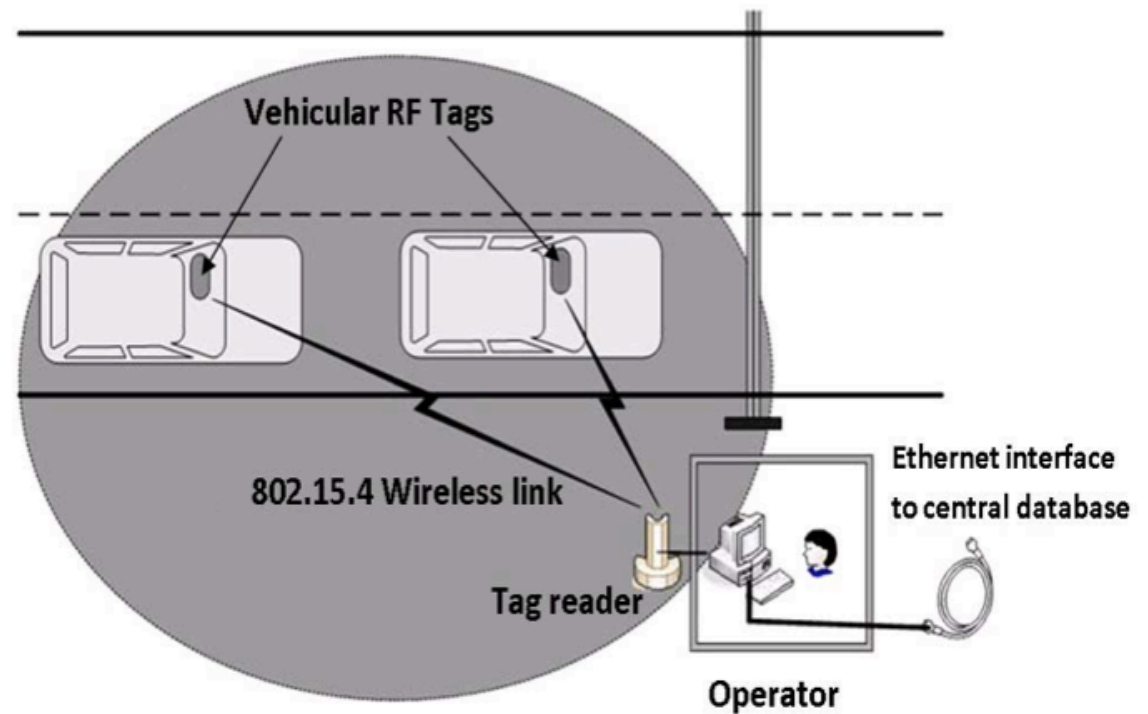
- Can store data
- Data can be written or read
- Active, semi-passive or passive

**RF readers** can read RF tags

**RF writers** can write to RF tags

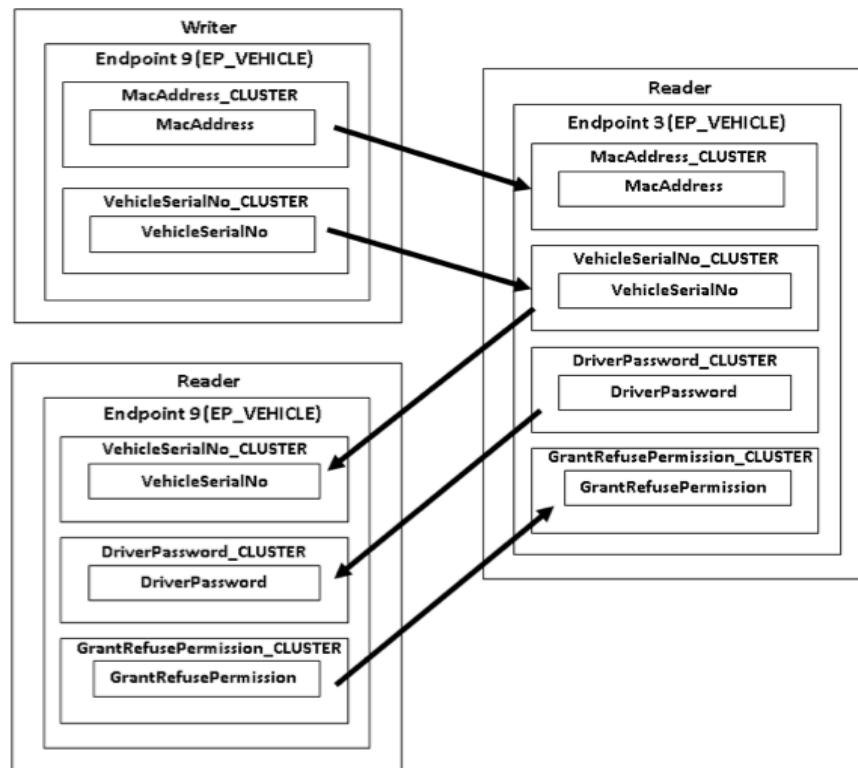
# SYSTEM MODEL

- RF tag
- RF reader/writer
- RS 232
- Ethernet
- Laptop/Desktop
- Central Database

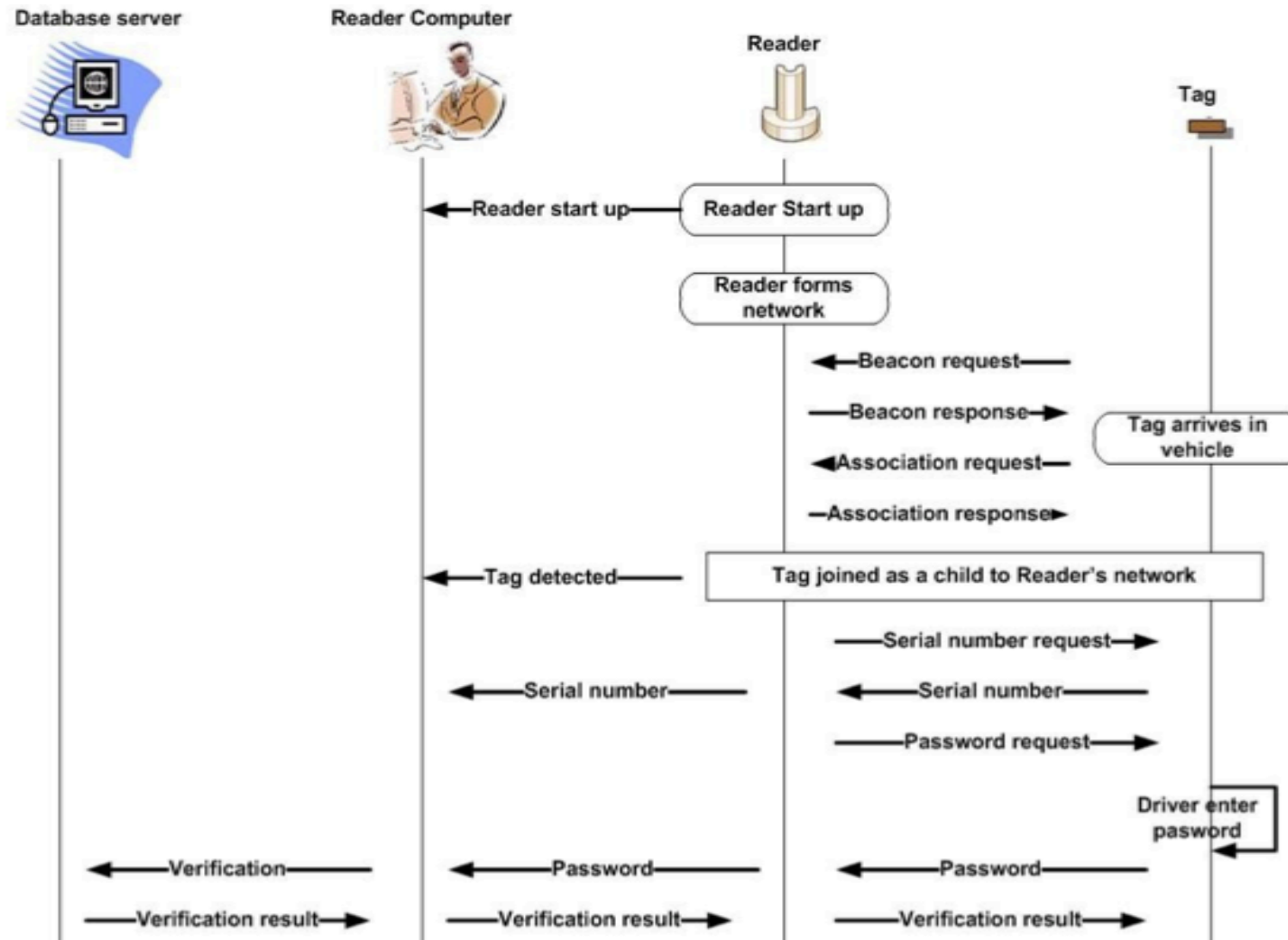


# SYSTEM OPERATION

- RF reader/writer – Zigbee Coordinator
- RF tag – Zigbee End Device
- Device Profile – Vehicle Identification Device profile

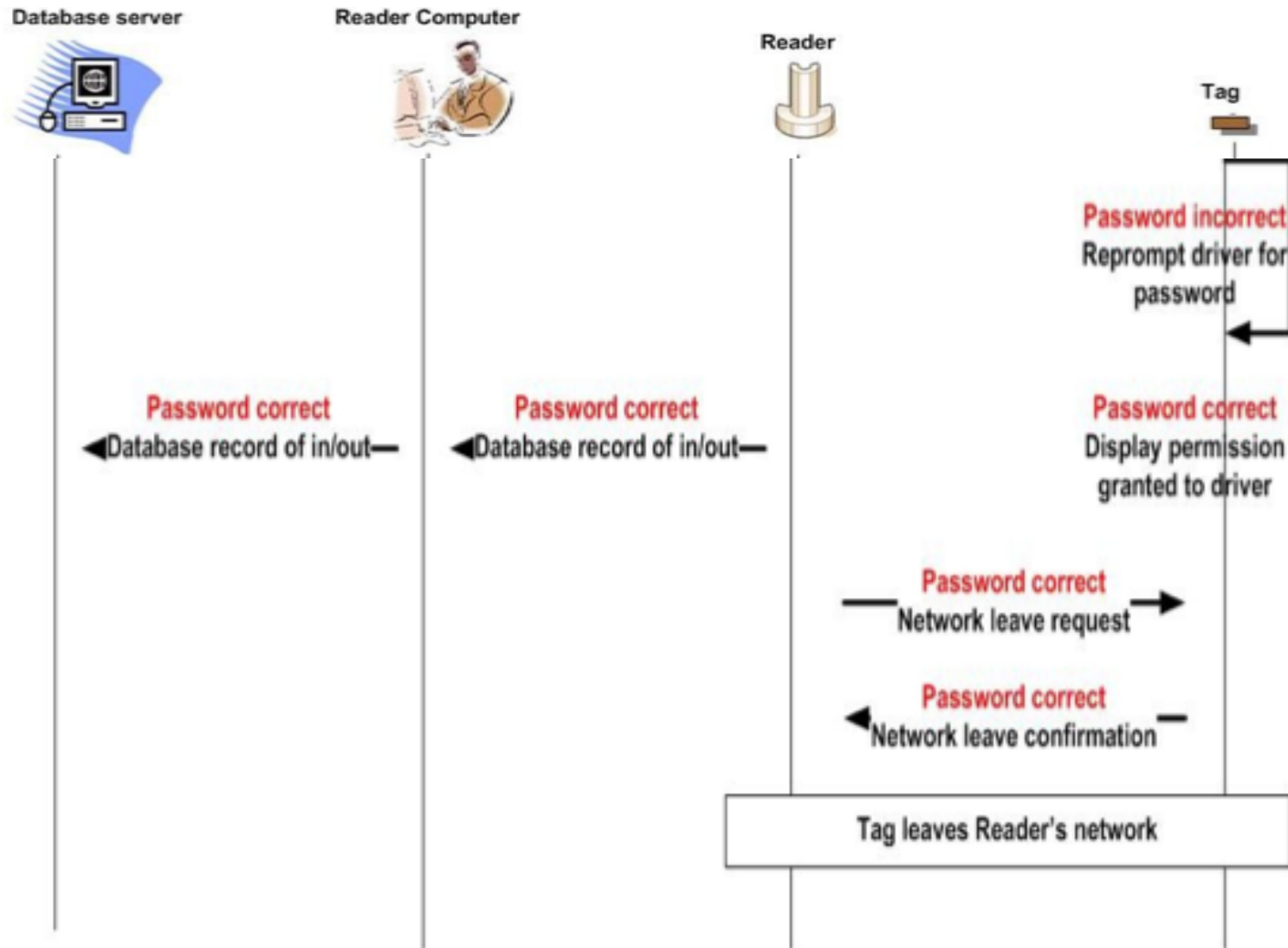


# SYSTEM OPERATION



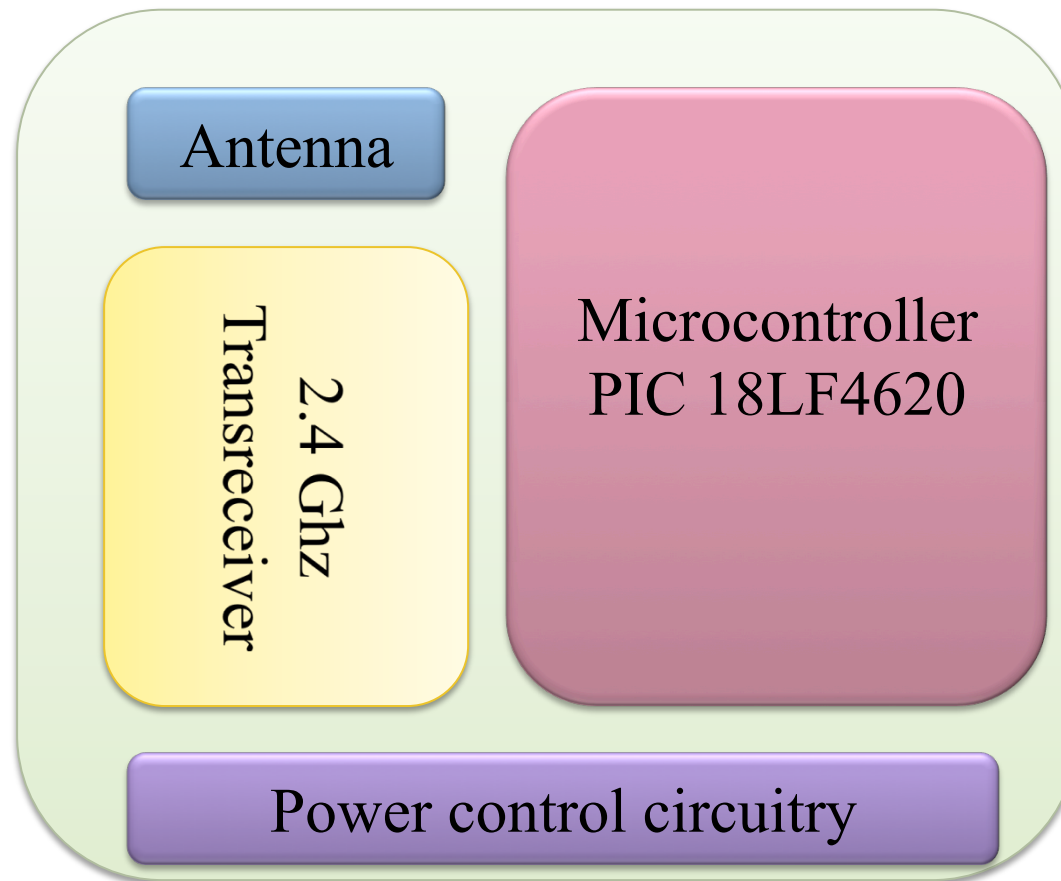


# SYSTEM OPERATION



# SYSTEM IMPLEMENTATION

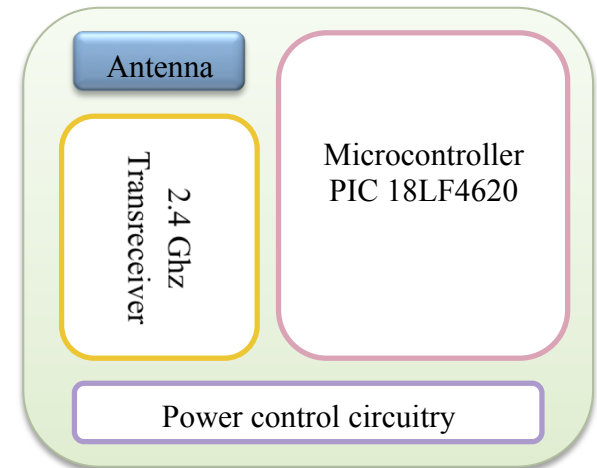
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# SYSTEM IMPLEMENTATION

## Antenna

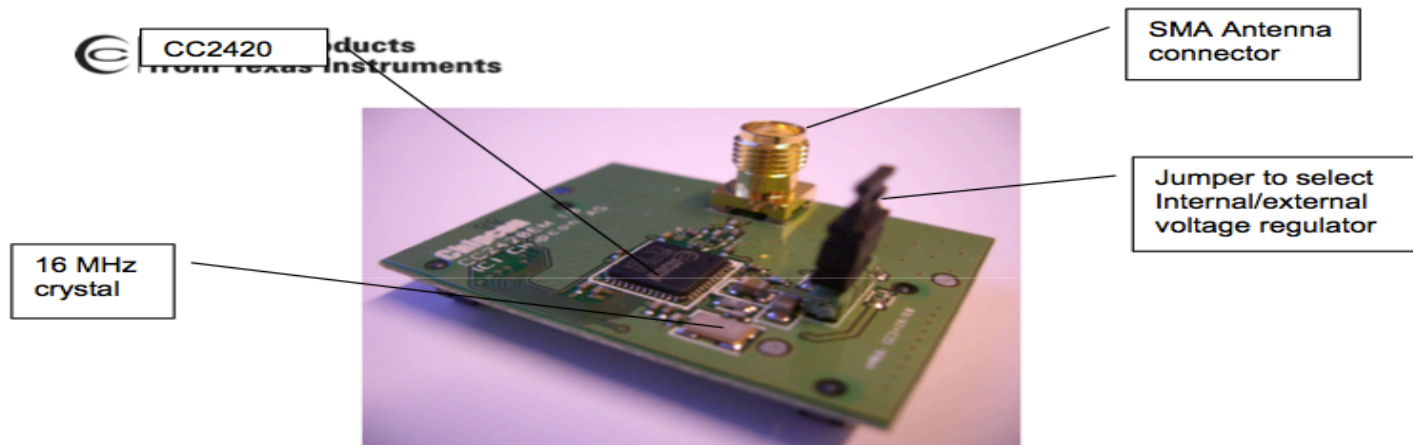
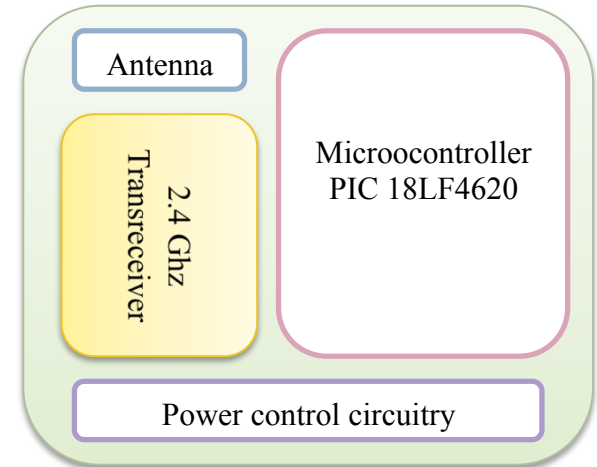
- Inverted F-type PCB antenna
- Wire Monopole



# SYSTEM IMPLEMENTATION

## Transceiver

- Chpicon AS CC2420
- Frequency : 2.4 to 2.4835 GHz
- Data rate : 250 kbps
- Modulation : Direct Sequence Spread Spectrum

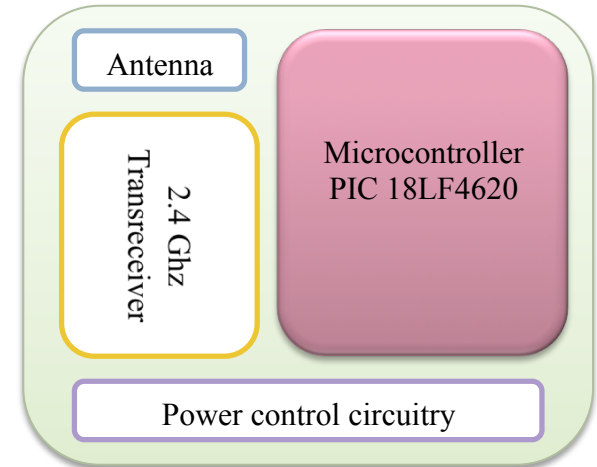


<http://focus.ti.com/lit/ug/swru044/swru044.pdf>

# SYSTEM IMPLEMENTATION

## Microcontroller

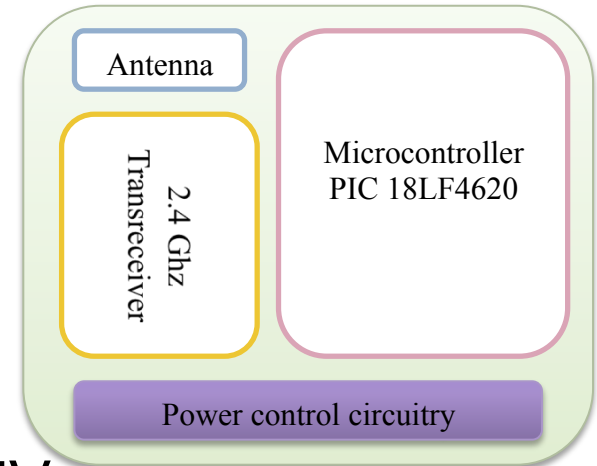
- Microchip Inc.'s PIC18LF4620
- Zigbee protocol stack provided
- 3 wire SPI, I2C, USART
- 10 bit A2D converter
- Security : Advanced Encryption Standard



# SYSTEM IMPLEMENTATION

## Power control circuitry

- 3.3V needed
- RF tag - car battery
- RF reader/writer - mains
- MC 7805 converts voltage(12 or 9) to 5V
- MAX 882 converts 5V to 3.3 V



# CONCLUSION

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- System Model
- System Operation
- System Implementation

# REFERENCES

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- <http://en.wikipedia.org/wiki/ZigBee>
- [www.microchip.com](http://www.microchip.com)
- <http://ww1.microchip.com/downloads/en/DeviceDoc/39626e.pdf>
- Zigbee Specification, Zigbee Document 2\_08006r03ZB\_CSG

