Power Line Carrier Communication

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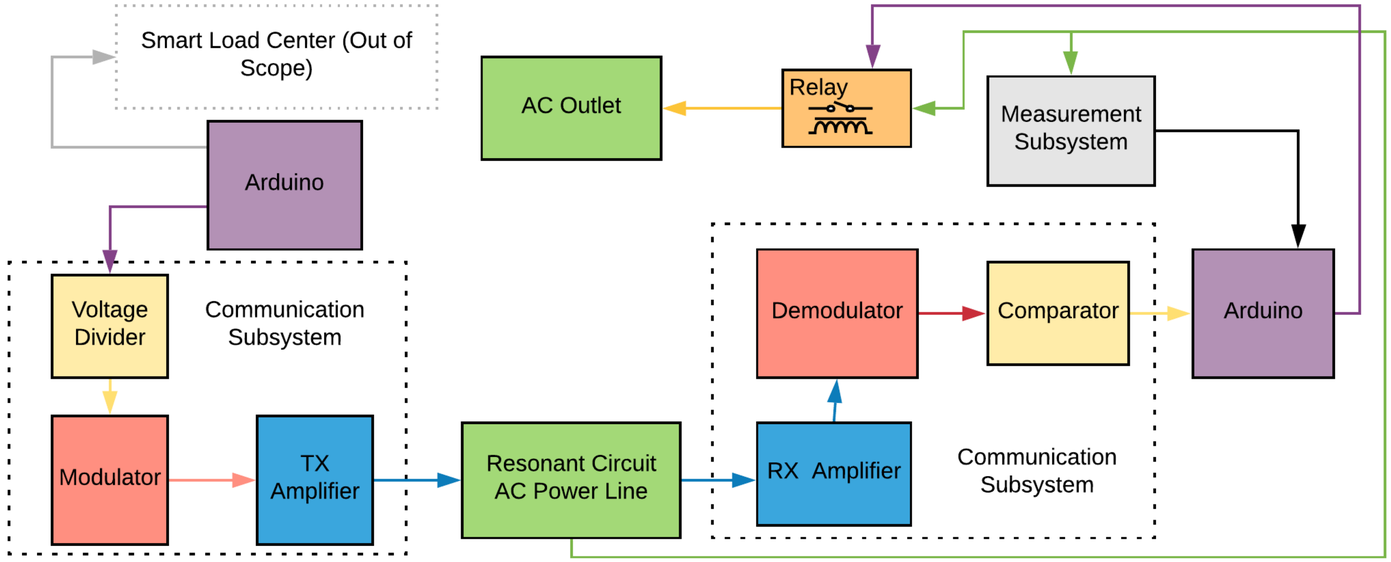
Problem Statement

Utilize frequency-shift keying to send and receive data across a power line. This data will be used to monitor power demand and switch outlet relays.

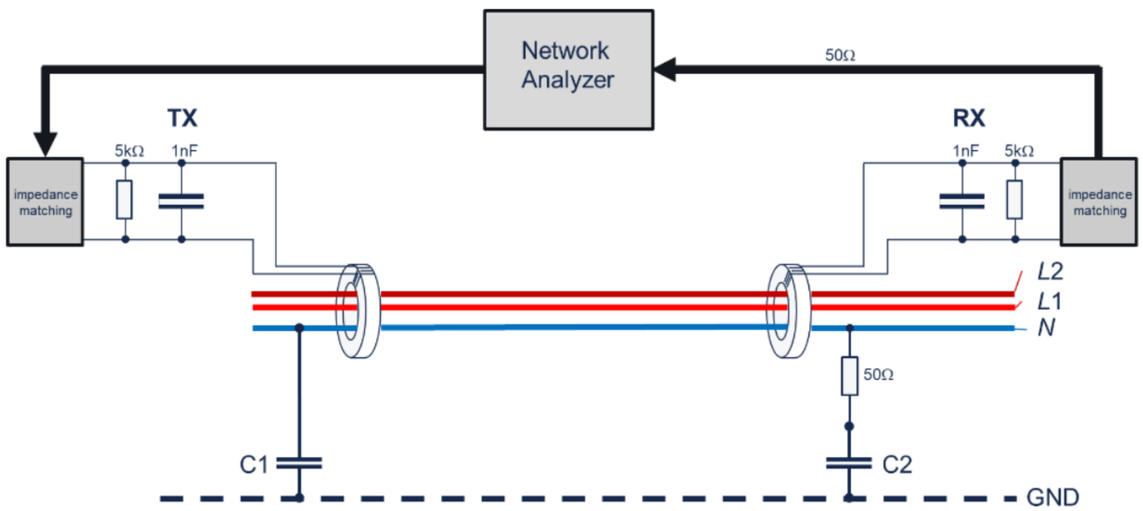
Product Requirements

- Implement frequency-shift keying communication
- Power measurement accuracy of +/- 5%
- Operate using a carrier frequency of 357kHz
- Send data as close as possible to 32kbits/second
- Bit Error Rate must be between 10-25%

System Diagram



PLC Diagram



Design Achievements

- Constructing resonant circuit capable of inducing signals onto power line as well as filtering out extraneous frequencies apparent on power line
- Modulation and demodulation scheme that is able to transmit and receive signals at required frequencies based on binary 1's and 0's
- Matching the resonant circuit and FSK circuits to implement a low noise environment
- Communication protocol created in software for transmit and receive
- CRC error correction of 1 bit of error