Smart Sensor Network: Hardware Implementation

IEEE Standard P21451-1

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Abstract

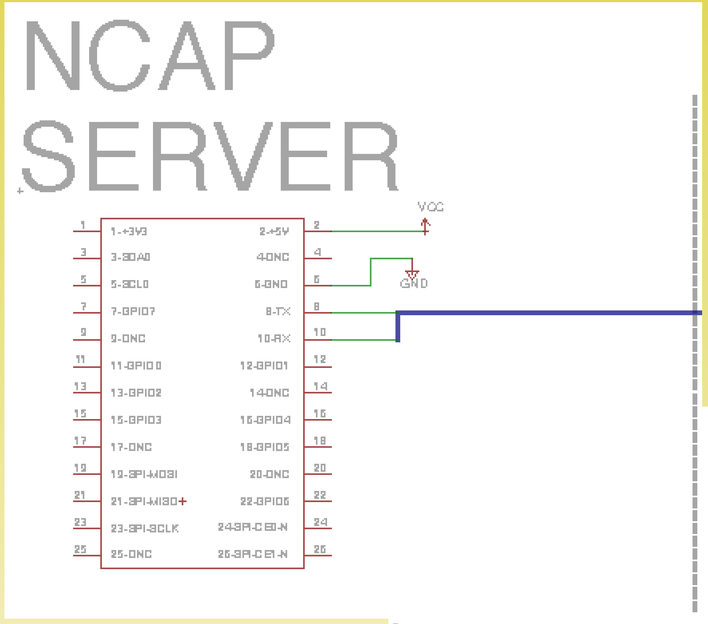
The purpose of this project was to develop a smart sensor network model for a proposed update to IEEE standard P21451-1. The basis of the standard implies the communication between clients, servers, and transducer interface modules (TIMs). The variant of the standard implemented was P21451-1, which defines communication between the nodes. Raspberry Pi's were used to emulate the client, server, and TIM using the Raspian operating system and the internal Idle python compiler. A sensor was connected to a TIM; this sensor was used to measure room temperature ; this data was sent to the client through the server. The TIM also had a fan and a light attached to it as well, to serve as model actuators. The fan and light could be controlled by the client. The client would send a request to the sever to turn the fan or light on or off. The server will then communicate with the TIM by using UART.

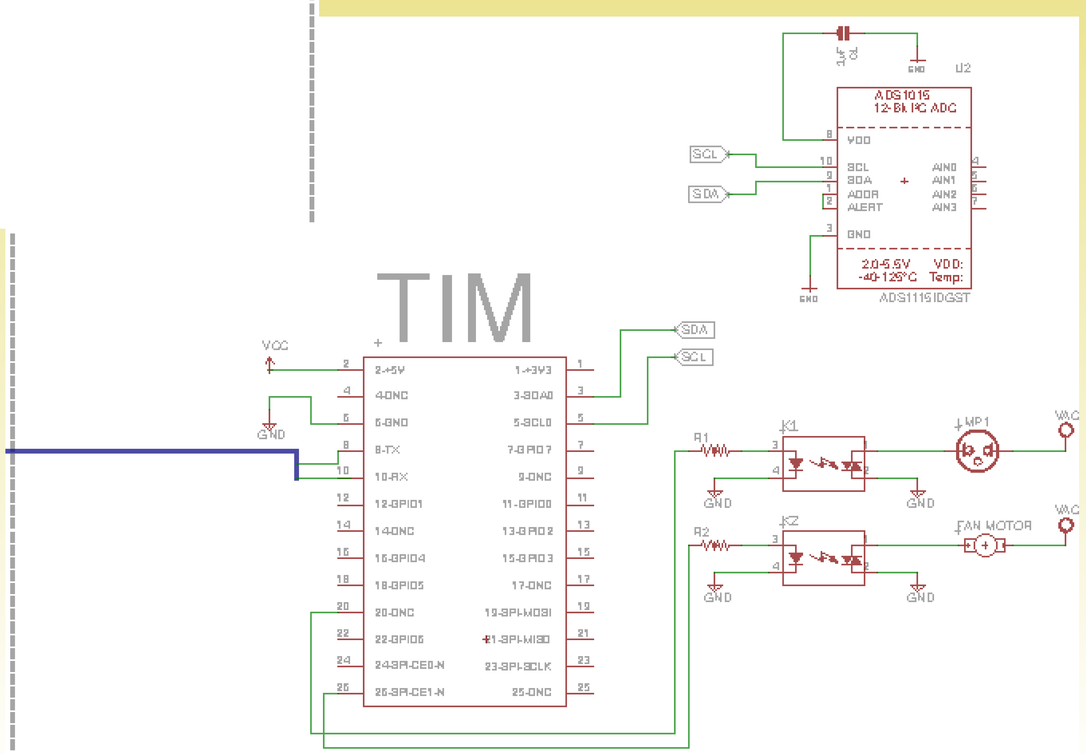
Key Terms

NCAP: Network Capable Application Processor
TIM: Transducer Interface Module
TEDS: Transducer Electronic Data Sheet

Future Work

Future work will focus on including more TIMs that can be used for different purposes, such as opening or closing different objects. Also more servers could be added to prove that multiple servers can communicate together. In addition , wireless communication techniques such as Bluetooth and Zigbee will be used.





References

[1] IEC/ISO/IEEE P21451-1 "Draft Standard for a Smart Transducer Interface for Sensors and Actuators—Common Network Services"

[2] 1451.5-2007 – "IEEE Standard for a Smart Transducer Interface for Sensors and Actuator -- Wireless Communication Protocols and Transducer Electronic Data Sheet (TEDS) Formats"