2015

Temperature Measurement of Server Room

Eric Cobbinah
Virginia Commonwealth University

Faida Matabaro
Virginia Commonwealth University

Michael Tu
Virginia Commonwealth University

James McAdams
Virginia Commonwealth University

Follow this and additional works at: https://scholarscompass.vcu.edu/capstone

Part of the Electrical and Computer Engineering Commons

© The Author(s)

Downloaded from
https://scholarscompass.vcu.edu/capstone/48
Temperature Measurement of Server Room

Overview
- Data center managers need to carefully monitor the temperature in them. If a server overheats, then the equipment could be damaged and data lost.
- Currently a MAX31865 chip can be used to run up to 8 temperature measurement devices.
- Using more devices would allow more detailed monitoring for isolated hot areas.

Background
- Temperature Monitoring System
  - Connect with up to 64 resistive temperature devices (RTD’s).
  - Read and store the temperature measurement.
  - Allow the measurements to be accessed remotely through a network.

System Structure
- Temperature Reading
  - Temperature changes the resistance of the RTD’s.
  - The MAX31865 integrated circuit (IC) reads the resistance of the connected RTD.
  - The IC converts the resistance, as a percentage of the reference resistance, to a binary code.
  - It then sends this data, on request, to the Raspberry Pi.

Software
- Changes current RTD number based on the system clock time.
- Sends RTD number to line select circuit
- Activates and reads MAX31865 chip
- Converts RTD readings to temperature
- Tags temperature calculations with RTD number and time
- Establishes Raspberry Pi as server so that the data can be accessed over a network

Control System
- System controlled by a Raspberry Pi computer
  - Selects the current RTD being read.
  - Receives RTD data from the reader (MAX31865) through SPI communication.
  - Calculates temperature from the resistance data.
  - Acts as network server to provide access to the data.

Line Select Circuit
- Receives current RTD code from Raspberry Pi
- Circuit logic turns on the relay for the current RTD line

Conclusion
- System allows data center temperatures to be monitored more closely.
- Better coverage with more temperature devices.
- Access to data over a network.