Supervisory Control And Data Acquisition

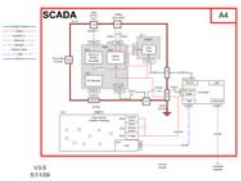
LPRDS-ETS 2009

Functionality

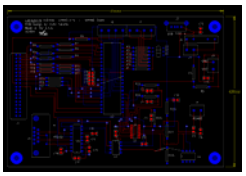
- Acquire voltage, current and temperature sensor data
- Monitor sensor data to control system states
- Display current data on a website
- Display system state on LCD display and Demonstration board

Hardware Design

- fitPC computer
- PICs placed in EDS, RPI, ESS to collect sensor data
- SCADA PIC board for controlling display



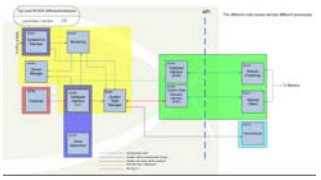
Hardware System Diagram



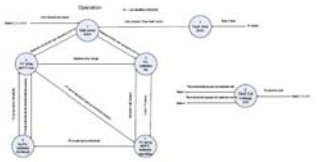
PIC Board Layout

Software Design

- Used Object Oriented Design techniques
- Code written in C++
- LCD4Linux used for LCD
  - Plugin, coded in C, used for display of data
- Webpage displays current database data
- PICs programmed in C



Software System Diagram



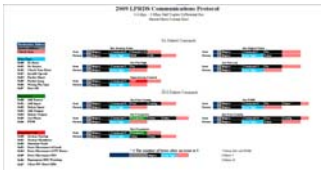
System States

Implementation

Hardware

- Communication through SCADA board
- Board converts RS232 from fitPC into RS485
- A/D converters on PIC convert sensor data
- LCD Display connected to computer by USB
- Demo Manager connected by ribbon cable to SCADA Board

Final Board in Enclosure



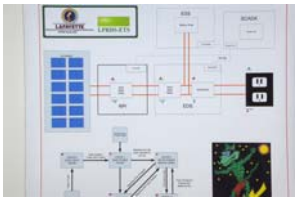
LPRDS Protocol

Custom Parts Designed:

Parts designed	Parts purchased
PIC Board	fitPC
Demo Display	picoLCD Display

Software

- Website written in PHP
- Classes for input management, faults, system state management, demo display, data monitoring, and communication



Demo Display

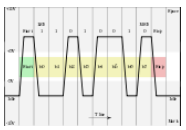
Demo Display showing LCD

Conclusion

- SCADA met basic requirements of collecting data, monitoring it, and displaying it on a website
- SCADA met requirement for have a display which shows system in action
- Requirements for measuring power factor and phase angle were not met
- Voltage and current data is not displayed on the LCD

Next Steps:

- Implement graphing of data on website
- Show these graphs on the LCD display
- Write software for monitoring of safety circuitry and alarm state
- Display sensor data on LCD



RS-232 Communication

LPRDS Website

Demonstration:

- We showed that SCADA can collect and display data on the website
- The demo board's LEDs, and the LCD state, changed as the state was changed

LAFAYETTE
Department of Electrical and Computer Engineering
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