S.M.A.R.T.

(SALIENT METHOD for AUTOMATED REMOTE TECHNOLOGY)

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The Plan – Home Automation

- ☐ Lighting control
- ☐ Music Playback
- ☐ S.M.A.R.T. Remote
- ☐ Power management
- ☐ Predict the user's needs
- ☐ Multi-hop wireless signal

Why S.M.A.R.T.

- ☐ Control music and home appliances from one easily useable device
- ☐ Excessive amount of time creating individual playlists
- ☐ Let something else do your thinking for you
- ☐ Know your actual power usage for each appliance
- ☐ Be able to find your lost remote
- ☐ Competitors
  - ◼ Eaton – can only read the status of a device
  - ◼ X10 & Insteon – extensive product line without behavioral recording or suggestive use

Remote Control - Architecture

- Processors:
  - ATMEL86RF230
  - ATMEGA3290PV
  - ATMEGA1284PV
- Board:
  - Custom board including an AVR Raven and a Cypress CapSense Evaluation Board
- Other Components:
  - LCD Character Screen
  - NVRAM

Remote Control – Software (1)

- Zigbee
    - Set channel, lease channels to other modules, store channel and device information
- Slider
    - Read and interpret voltages from capacitive sensor
- Music
    - Select Song, play, pause, stop, change volume, etc.
    - Load next song based on prior use
- LCD
    - Display music, power and temperature information

Remote Control – Software (2)

- NVRAM
  - Partition memory space and create tables for music, temperature and power data
  - Write and Read data
- Power
  - Calculate Total power of all devices
  - Compare with recommended power level
  - Suggest turning off certain devices
- Temperature
  - Calculate average temperature for all devices
- Locator
  - Activate/disable beeping

Computer Interface - Architecture

- Processor:
  - ATMEL86RF230
  - ATMEGA3290PV
  - ATMEGA1284PV
  - AT91SAM7X-256
- Board:
  - AT91SAM-EK Evaluation Board
  - AVR Raven
- Other Components:
  - Computer

Computer Interface - Software

- ☐ Winamp
  - ■ Play, pause, stop, next track, previous track, create & delete playlists and change volume
- ☐ Windows
  - ■ Archive temperature and power data
  - ■ Read song information from a folder and transmit to remote
  - ■ Activate/disable locator beeper on remote
- ☐ Zigbee
  - ■ Set channel
  - ■ Relay messages

Light Module - Architecture

- Processor:
  - ATMEL86RF230
  - ATMEGA3290PV
  - ATMEGA1284PV
- Board
  - Custom board similar to the StevalILL004V2
  - AVR Raven
- Other Components:
  - Hall effect sensor
  - Temperature sensor
  - TRIAC

Light Module - Software

- ☐ Zigbee
  - ■ Lease channel, relay messages, TX/RX
- ☐ Timer
  - ■ 15 minute timer to perform temperature and power readings for transmission to remote
- ☐ Temperature
  - ■ Read and calculate current temperature
- ☐ Power
  - ■ Read and calculate current power consumption
- ☐ Lighting control via remote
  - ■ Dimmer
  - ■ On/Off

Final Product

- ☐ Computer Interface
  - ■ Controls Winamp
  - ■ Communicates with remote wirelessly
- ☐ Light Module
  - ■ Controls dimmer circuit
  - ■ Sends temperature and power stats to remote
- ☐ Remote Control
  - ■ LCD display
  - ■ Touch Pad Sensor
  - ■ Manages Winamp, and light modules
  - ■ Locator beeper