Abstract
Home automation systems are an emerging trend that will soon become standard in all modern houses. In order to anticipate and take advantage of this trend, our team has designed a sophisticated automation control panel system based on Texas Instruments’ latest OMAP3 processor.

Introduction
Our system uses a low-cost embedded system called a Beagle Board. This board runs a Linux operating system and a Java Runtime Environment. The control panel uses this Runtime Environment to run the user interface, which features intuitive and easy to use controls.

Objectives
- Design an interactive Human Machine Interface (HMI)
- Obtain and display information for time, weather, room temperature, etc. by interfacing with various hardware devices
- Control household systems such as lighting and climate control

Beagle Board
- Based on OMAP3530 Processor with 256 MB
- Flash memory and 256 MB SDRAM
- DVI-D digital video output
- USB On-the-Go port for hosting multiple USB devices

Design Requirements
- Software
  - Angstrom Linux Operating System
  - Java Swing Development Toolkit for HMI design
  - Obtain weather forecast from internet or radio signals
- Hardware
  - Beagle Board using OMAP3530 Processor
  - Touch Screen Monitor
  - Internet connection via Ethernet

Beagle Board Architecture and Design

Results
- Successful in incorporating climate control, security system, weather information, lighting, video camera and basic control panel settings
- Modular LED Lighting System
- Touch Screen User Interface
- Remote Control using both SSH and VNC
- Video recording using software-based motion detector

Budget
- Beagle Board $150
- Beagle Board Accessories $111
- 7” Touch Screen $407
- Power Hub and Devices $263
- Web Camera $36
- Total $967

Figure 1: System Architecture

Figure 2: Control Panel