Functional Description

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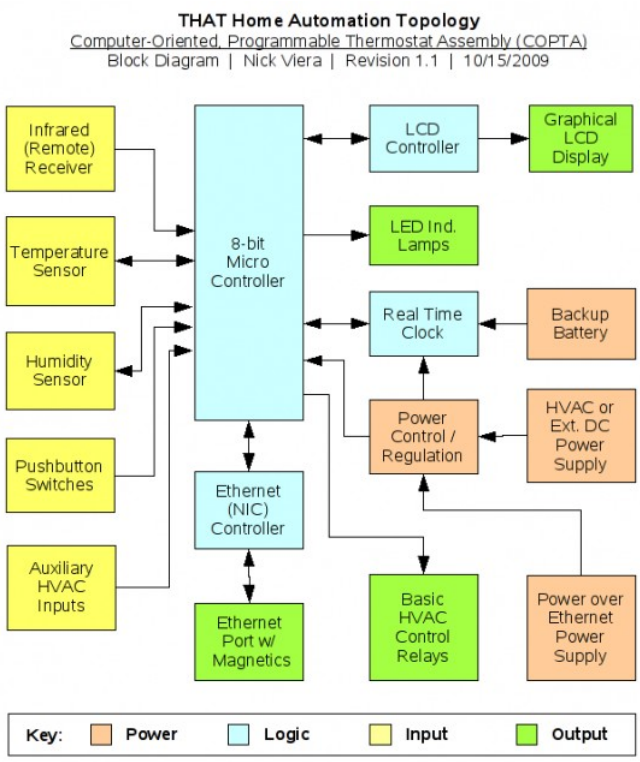
Hardware Overview

The COPTA hardware will be based on an 8-bit microcontroller running in the speed range of 10-20 MHz. Communication in conformance with THAT will be made possible using a hardware Ethernet controller designed for 10/100Base-TX data rates.

Most of the hardware for COPTA falls into the category of general digital I/O. However, some aspects of the design will utilize more advanced communication interfaces, such as synchronous 2-wire serial (I2C) and 3-wire serial (SPI) interfaces. These interfaces will be used for communication between the microcontroller and the temperature, humidity, and Ethernet ICs.

The power supply for this module will comply with THAT System power specifications. All on-board outputs for basic HVAC control will be in the form of mechanical relays capable of switching at least 1A at 24VAC. Other control outputs will be made possible using an external relay module.

The direct user interface, consisting of six (6) pushbuttons, four (4) LEDs, and the LCD screen, will allow for direct control and programming of the thermostat. The current proposed block diagram is shown in figure 1 below.



Software Overview

The base firmware for COPTA will be written using C and assembly programming languages, as necessary. The firmware will implement both the functionality necessary for thermostat operation, and the Ethernet / networking stack necessary for communication with other THAT modules.

Additional software residing on a computer, PDA, cell phone, etc. can allow for the remote control of the

thermostat module. Such software could provide further options for advanced control and integration of the module into a larger system of THAT modules.

Physical Design Concept

The initial design concept for the COPTA module is shown below in figure 2. The drawing is to scale, and displays at the correct size when the outer circle of the thermostat is about 4.5″ in diameter.