

Internet Controlled Environment Controller Block Diagram

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Introduction:

The internet controlled environment controller will act as a heating, ventilation, and air conditioning (HVAC) controller using a network-embedded microcontroller that will be updated over the network. This document will thoroughly describe the system block diagram and the flow charts that are used to control the system.

System Block Diagram:

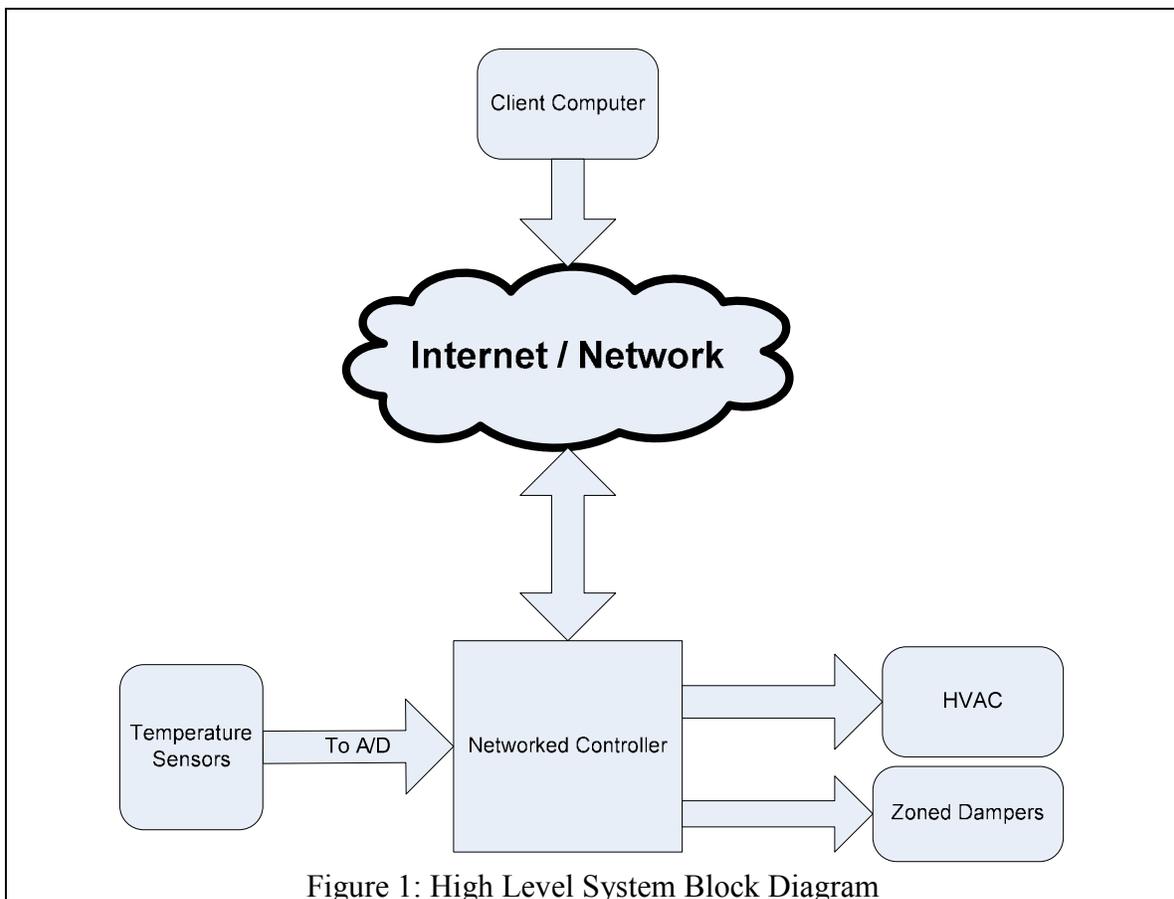


Figure 1: High Level System Block Diagram

The system block diagram in Figure 1 describes the inputs and the outputs of the system. All communication with a user will be done using the network communication interface over the internet. The networked controller will be connected to the network and will be running a web server. When a user wants to see the current temperature or change the desired temperature in a zone of the house, this will all be done using the network interface over the web server. A user will view a web site inside their web browser, and the current temperatures will be displayed on the web page. There will also be a button to increase or decrease the temperature. This process will be described later in this document.

Software Description:

The general software description is shown below in Figure 2. The device will serve two purposes, as an HVAC controller and as a web server. These will be described more thoroughly below.

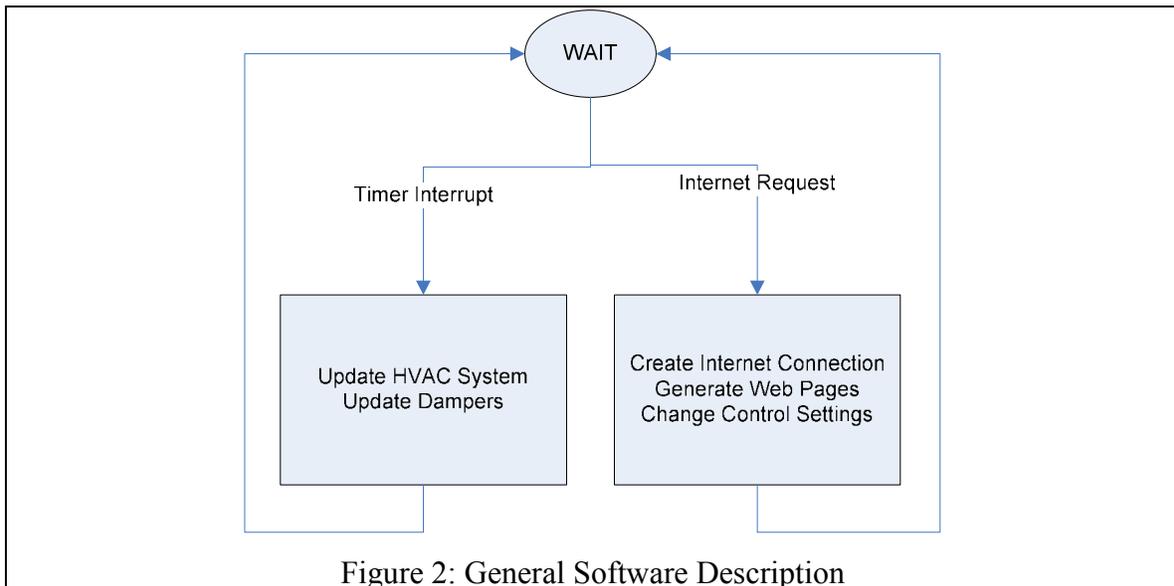


Figure 2: General Software Description

HVAC Controller:

As an HVAC controller, the device will monitor the temperatures and send a signal to the furnace / air conditioning unit to maintain the proper temperatures in the zones. It will also send a signal to the dampers in the zones to modify the air flow to the zones. This will be called using a timer interrupt. When the system is running as an HVAC controller, it will compare the current temperatures in the different zones with the desired temperatures and send a signal to either the furnace or the air conditioning unit. There are three different modes that the HVAC controller will run in, Heating, Cooling, and Off. These modes might change at a later time to make the controller more practical in a real world situation. The software flow charts are described more thoroughly in Figure 3, the HVAC controller software flow charts.

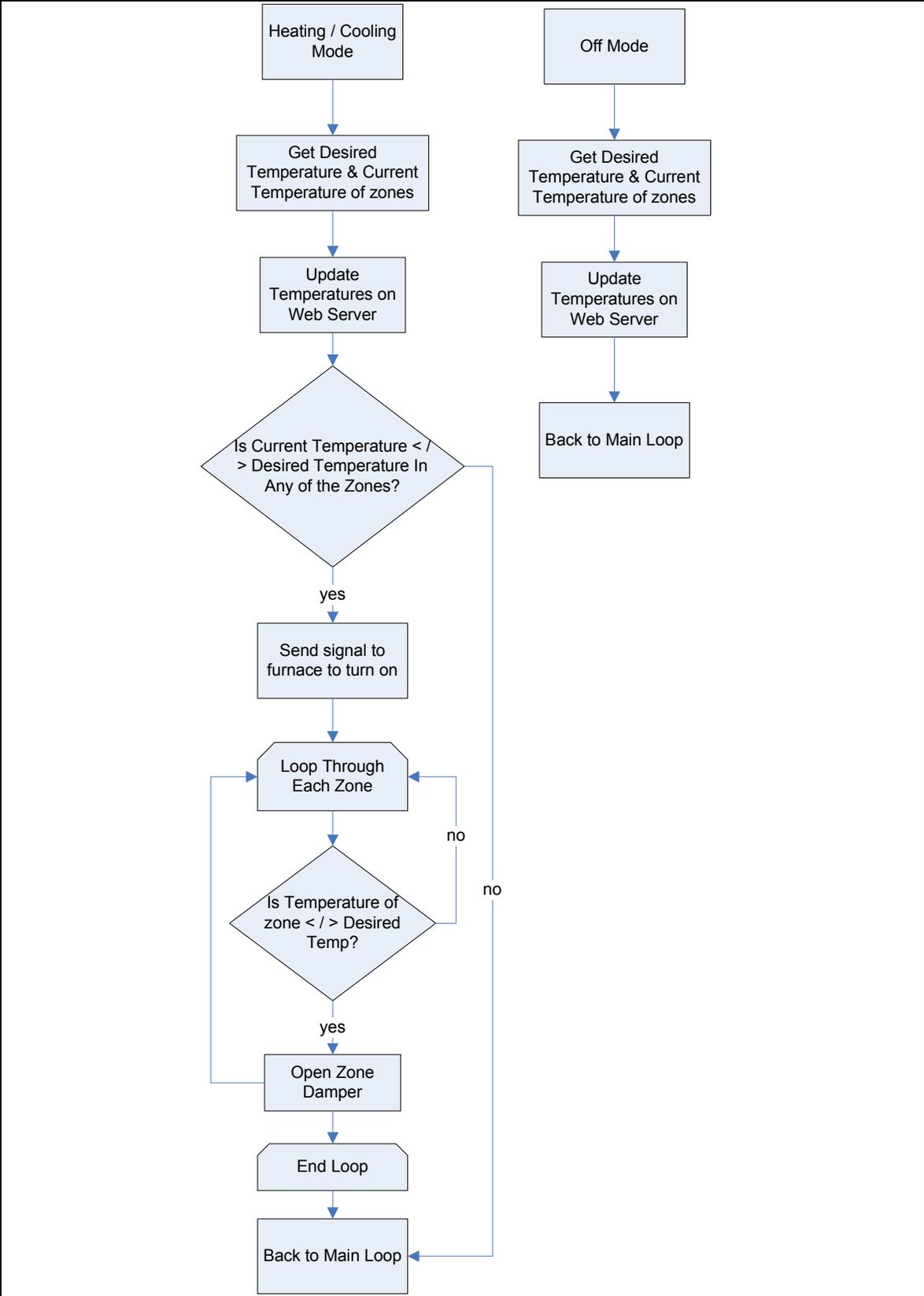
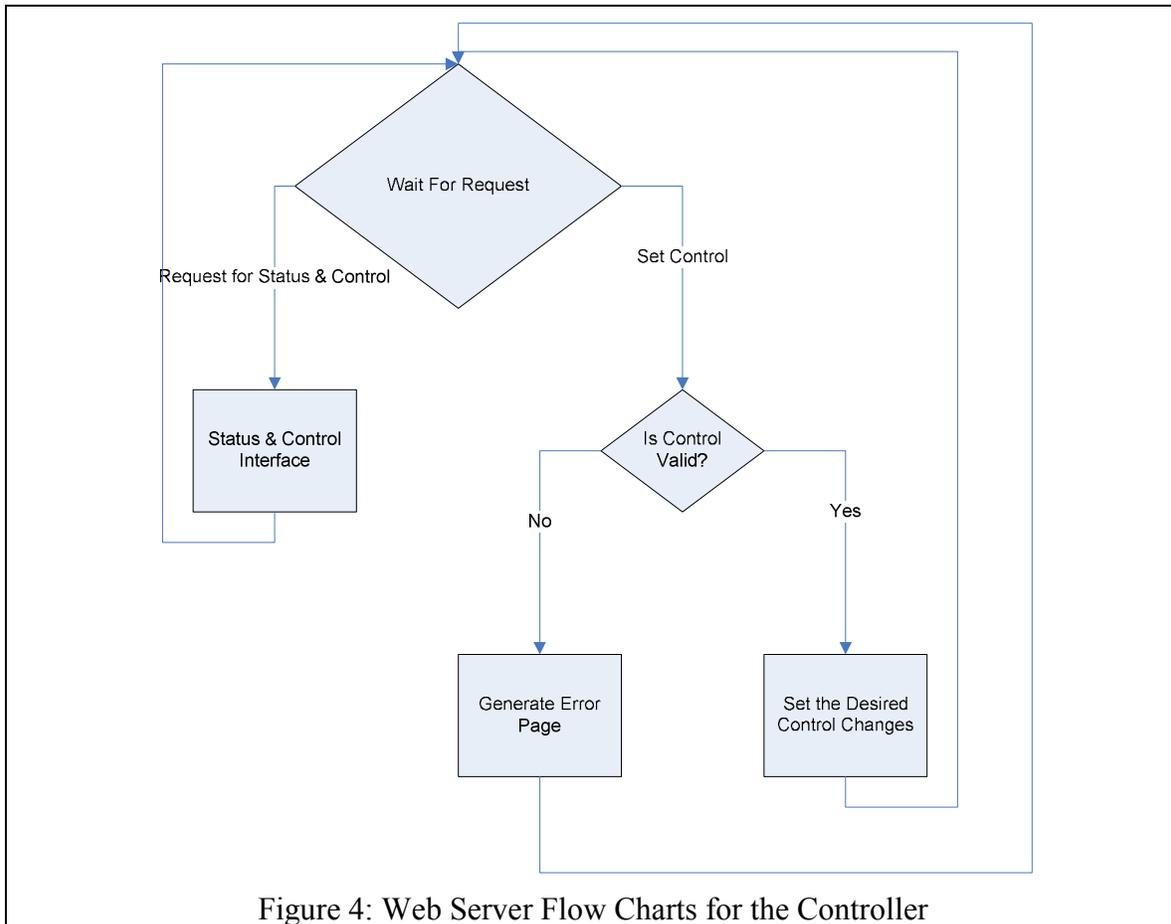


Figure 3: Software Flow Charts for the HVAC Controller

The main loop that is referenced in the software flow charts refers to the software diagram in Figure 2. The main loop is a do-nothing loop that waits for either a timer interrupt to control the HVAC, or until a web server request.

Web Server:



The web server will be running at all times and will be waiting for a request from the user. When a request is sent, usually it will be a request for the status of the device. This will generate a web page with the updated status and control links. After this page is generated, the information is sent to the user and the device moves back into the waiting for request mode. From here, another request can be sent for the status and control page, which would effectively update the current temperatures on the web page that is being sent. A user can also send a control update, which will consist of the user clicking a link that will update the local value of the desired temperature. The web server will be implemented using a program called Boa that will be running on a Linux operating system which will be configured on the device.