

EE 142 Project I : Air Conditioner System Design

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DUE ON November 18, 2011

Please make sure that all your designs and print-outs are obtained using the simulator package, Xilinx Project Navigator. A simple tutorial for it is available on the website. Also you can get a CD of this software from the lab manager Mr. Yalçın Turgay (yalcin.turgay@boun.edu.tr, 359-6923), in the Network and Electrical Measurement Laboratory. Please check your operating system of your computer whether it is appropriate for the version of the simulator package. You should sent your work to course e-mail address (boun.ee142@gmail.com) before the deadline of the project. Demonstration date will be announced on future days.

Project Goals

- 1- Start designing a digital system using digital components.
- 2- Get familiar with common combinational components such as MUX's and adders.

Project Description

You are going to design a simple air conditioner system using schematic part of the Xilinx ISE 10.1 Software in this project. A general block of the design is given in Figure 1.

An external device (Temperature sensor) measures the analog temperature signal and converts it to digital in order to digital processing.

The data that come from the sensor is 8 bit BCD coded 2 digit temperature measurement. The data is input to a logic block to be compared with the 2 user-set temperature thresholds, T_{low} and T_{high} (In the block diagram given below, the thresholds have been set arbitrarily as, $T_{low}=20$, $T_{high}=25$). If the temperature exceeds T_{high} , the cooling module is on; if it falls down under T_{low} , the heating system works and otherwise the air conditioner stands-by. Furthermore, these outputs will be connected to different warning lamps and each of these lamps will be activated when related output of each module is on.

There are also display modules in order to show the measured temperature value. The data come from the sensor is also an input of the display module. At first, you should design a BCD to 7-Segment code converter in order to drive the display accurately. You are also responsible for learning how a 7-segment display works. Actually, there are two different displays for the 2 decimal digits, and an additional display will be used to show the unit of temperature (ie. Celsius).

1. Design all parts of the design at the gate level so you are limited to use only logic gates. (MUX is available)
2. You have to complete the project yourself with all requirements.
3. Cheating is strictly forbidden. If any similar project is detected, this will dramatically affect both your grade and future. See the course syllabus for a description of **Cheating and Plagiarism**
4. You will have an oral exam on your presentation day. You will be responsible for all the project steps.

Deadline

You have to return the report of this project on November 18, 2011. At the same time, send an e-mail to Engin Afacan (engin.afacan@gmail.com), to set up a time slot for you to do your simulation demonstration in the Network and Electrical Measurement Laboratory.

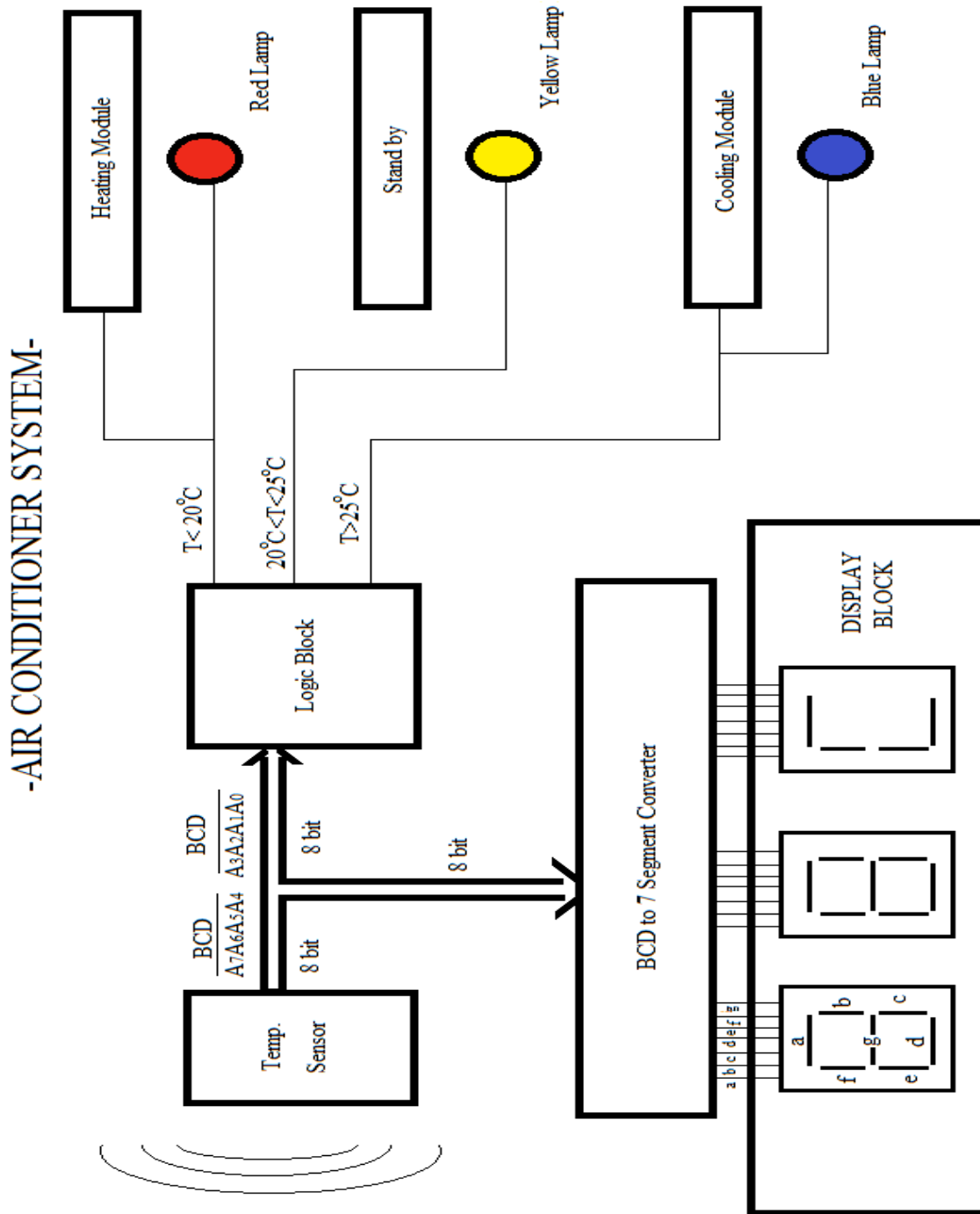


Figure 1. Block Diagram of the system