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Midterm

Question 6

Diagram

Description automatically generated

Modules:

Clk\_divider:

The clock divider module takes in the onboard clock and outputs a signal at a slower interval to create better timing for the clock itself.

Counter\_minutes:

This module recieves the divided\_clk input and uses that to increment our minutes counter. If the divided\_clk is running at 1Hz then it would count to 60 before incrementing minutes by 1. Once the minutes has incremented passed 59 it will reset output to counter\_hours that it needs to increment. Also the module takes in the time\_set and minute\_set which if the time\_set button is being pressed and the minute\_set button is pressed it will do a forced increment on the minutes.

Counter\_hours:

This module recieves an input from counter\_minutes so that when minutes resets because it hit 60 the hour gets incremented. It will also reset at 12 and output a signal to light up either the AM or PM light. It also works similarl to counter\_minutes in that when the time\_set button is being pushed and the hour\_set is pressed it forces an increment.

Binary\_to\_BCD:

These modules take the binary values from counter\_minutes and counter\_hours and converts them into Binary Coded Decimal to be sent out to the 7-segment displays.

BCD\_to\_7seg:

These modules receive the BCD value from the binary\_to\_BCD module and then lights up the appropriate segments on the display to create the decimal value.

Alarm:

This module recieves inputs from the snooze, alarm\_on/off, alarm\_set, and loud\_soft buttons as well as the hours and minutes values. When the snooze button is pushed this will automatically add 5 minutes to the alarm mintues value. If alarm on/off is set to off it wll not alarm but wil if it is set to on. While alarm\_set is pressed if the hour\_set or minutes\_set is pressed it will force an increment on appropriate value. Also while the alarm\_set button is being pressed the values for alarm\_minutes and alarm\_hours will be sent to the seven segment displays. The loud\_soft button will change the volume level of the alarm accordingly.