

INDUSTRIAL ELECTRONICS

TERM PROJECT

DESIGN OF A SIGNALING SYSTEM IN A TYPICAL PUBLIC BUS

Important Dates:

Check Date: April 19, 2010

Due Date: May 10, 2010

⇒ *Always check web page for recent due date changes.*

You are required to submit printed copy of your report. No e-mail submissions are accepted.

Best working project that satisfies specifications will receive 20% additional grade.

LATE SUBMISSIONS WILL NOT BE ACCEPTED!! (NO EXCUSE)

1 OBJECTIVE

The objective in this project is to design a signaling system in a bus-operated public transportation system where passengers signal the driver when they try to get off the bus, by pushing a stop switch (normally open push button switch) located in close proximity of the doors as depicted in Figure 1.

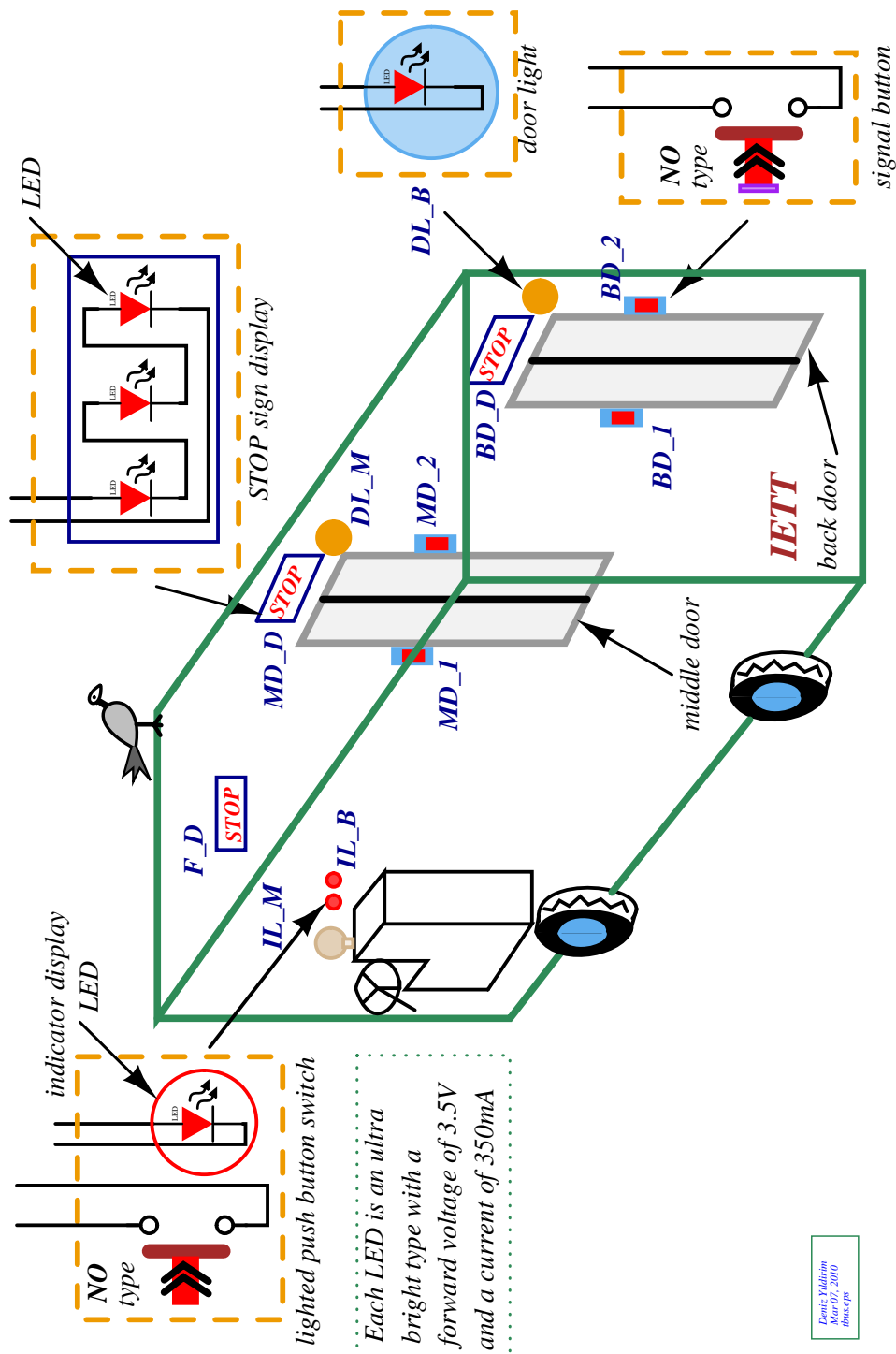


Figure 1: Signaling system in a typical public bus.

2 DESCRIPTION OF THE SYSTEM

- BD_1 : Back door signal button 1
- BD_2 : Back door signal button 2
- MD_1 : Middle door signal button 1
- MD_2 : Middle door signal button 2
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- BD_D : Back door STOP sign display
- MD_D : Middle door STOP sign display
- F_D : Front side STOP sign display
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- IL_M : Middle door indicator light display
- IL_B : Back door indicator light display
- DB_M : Middle door driver signal button
- DB_B : Back door driver signal button

Passengers get off the bus either from the middle or back doors. Each door has two signal buttons and one *STOP* sign display right above the door. Signal buttons are momentary-type normally-open push button switches and *STOP* sign display is illuminated by three series-connected ultra-bright LEDs (using regular LEDs are not acceptable). There is another *STOP* sign display that is located in front of the bus.

Two push button lighted indicator light displays, one for the back door and one for the middle door, provide visual indication for the driver and each one contains a single ultra-bright LED and normally open push button switch. When a passenger pushes any one of the signal buttons of a door, the *STOP* sign of that door along with the *STOP* sign in front of the bus are illuminated and a bell sound (one second long) must be heard. At the same time, the indicator display of that door on the driver side begins flashing with a frequency of 1 Hz, i.e., 0.5 s ON - 0.5 s OFF.

When driver pushes the flashing lighted switch to open the door, *STOP* signs are turned off and flashing indicator display turns into a steady light (no flashing – light is on). When driver pushes the steady lighted switch one more time, the door of that switch is closed and indicator display is turned off. A warning sound (one second long) must also be activated half a second before opening and half a second before closing of each door.

There is a light source located right above each door to assist passenger when they get off the bus during nighttime. This light source consists of two ultra bright white power LEDs (each LED at least one watt or higher). Light must be turned on whenever the driver opens the door and it must stay on for the duration of door opening. Once the door is closed this light must be turned off two seconds after door closing. This light system must be activated during the nighttime only – no light output is necessary during daytime operation.

The system voltage in a bus is 24 VDC battery voltage. If any other voltage is used in your drawings, you have to show how you obtain them and construction of these circuits is necessary.

3 SIMULATION

For the values selected in previous section, simulate the entire circuit that you proposed. Show that your circuit is working properly by simulating for different operating conditions.

Include simulation file/schematic in your report.

4 CONSTRUCTION AND TESTING

Build the entire circuit following the safety guidelines. Check the connections and apply power to your circuit. Verify the operation of the circuit by monitoring the light outputs at different operating conditions.

5 REPORT

Prepare your final report explaining all the steps that are involved in the design, construction and testing phases. Reports must obey the guidelines outlined in course web page otherwise grade penalty will result in.