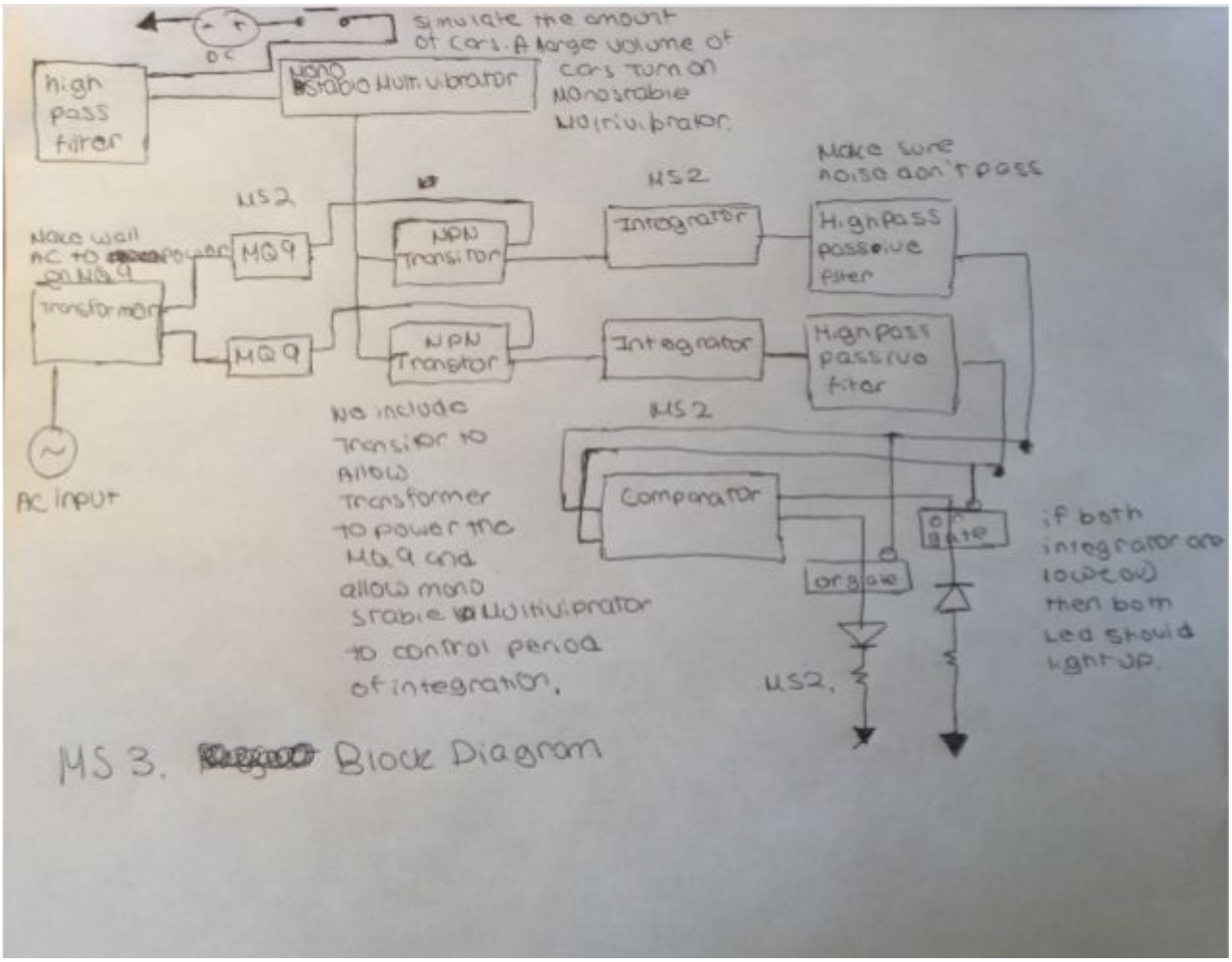
Project Plan Assignment: Vincent Lin, Jack Jiang, Saaif Ahmed

Project Description



The circuit uses two gas sensors to detect Carbon Monoxide (CO) gas concentration over a given time period. That time period is controlled by an Monostable multivibrator driver which tunes the period of signal integration. The monostable in turn is controlled by the car traffic. A high traffic will enable the monostable while a low traffic will get filtered out. The two integrated values give the amount of CO concentration over a given time for each of the sensors. From then comparing those values we send an output to determine which of the two sensors represents a less polluted road to travel on. The MQ9s are powered by the transformed AC voltage from the wall.

What is the purpose of the project?

Who is the user? Why did you choose this project?

Our project attempts to increase the quality of life through Urban Infrastructure. We chose this project to address a real concern for urban city residents. In highly populated cities with lots of car traffic, studies indicate there is a real risk of CO poisoning in bikers who ride down streets populated with many vehicles. Our project would provide information to pedestrians about which street would have the highest pollution (CO concentration) and direct them to a better option of travel.

Milestones

Outline your goals and deadlines for at least the upcoming Milestone. Try to fill out as much as you can for the other Milestones so the TA can give you advice.

Milestone 1 (Date:)

We did not do Milestone 1

Milestone 2 (Date: 2/18/20)

Technical Goals:

- Astable Multivibrator that drives enable input to sensors and control signal (PWM) to integrators for period of integration.
- Integrator op amps that gathers the analog output from the gas sensors for a time period as controlled by PWM (user defined)
- Comparator that drives an output which determines which road is safest to travel on.
- Keeping the leds on during the down time of the integrators.

Milestone 3 (Date: 4/15/20)

- High Pass, Passive filter. It turns on the circuit if and only if many cars pass by in a given time frame.
- High pass filter to filter out noise from the MQ9s
- Transformer to inputs. Design ability for circuit to be connected to a larger power grid and not just a lab supply. And/or lower sensor voltages for so that integrators can be connected to a lower supply.
- Transistor attached to the output of the MQ9 and the 555 timer so that the MQ9 can be powered by wall outlet

Reason for update (if applicable)

-We cut the output 1(leds) in MS2 because it was trivial and does not add anything new.

Parts List

*List an expected number of parts you will need that **are not in your circuits kit**. List the cost of parts you want to purchase.*

- Two MQ9 gas sensors ($10) - *Already purchased*
- Another breadboard ~($10)

What potential issues do you foresee with this design?

- The LEDs won't stay on when the integrator is down
- When both integrator outputs are 0V, the comparator will still only light up one led, maybe both need to light up?
- The different sub circuits won't work as expected when put together
- Inability to test our circuits (maybe we put the circuit near a car exhaust?)

What skills and concepts do you need to learn to do this?

- How to construct transformer and get filters to work
- AC to DC conversion and potentially DC to AC conversion?

What is your plan if this design does not work?

We will attempt to reduce the number of output which will reduce the complexity of the circuit. If transformers don't work or cannot be physically implemented, we will just use the input from MS2. If filters don't work, we will cut it down to one filter to reduce complexity of the circuit and focus on that one filter to get it to work.

Who will be your end-user?

- Urban city governments to monitor pollution and direct traffic.
- Cyclists to avoid highly polluted paths.
- Individuals; if we remove output 2 and one of the MQ9 to test pollution in an environment.

Checklist:

A TA must check each of these items to pass the plan. Be prepared to answer each of these questions with justification.

☐ Can the project be completed in the given time?

☐ Do the milestones provide a reasonable pace for the project?

☐ Does the project align well with the learning objectives of the course?

☐ Does the project use at least two building blocks from each Milestone?

☐ Does the block diagram match the desired functionality?

☐ Is the circuit size and cost reasonable?

☐ Can at least 4 Milestone Concepts apply to the design?

Team Signatures

_____SA_____

_____JJ_____

_____VL_____

TA Signature

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