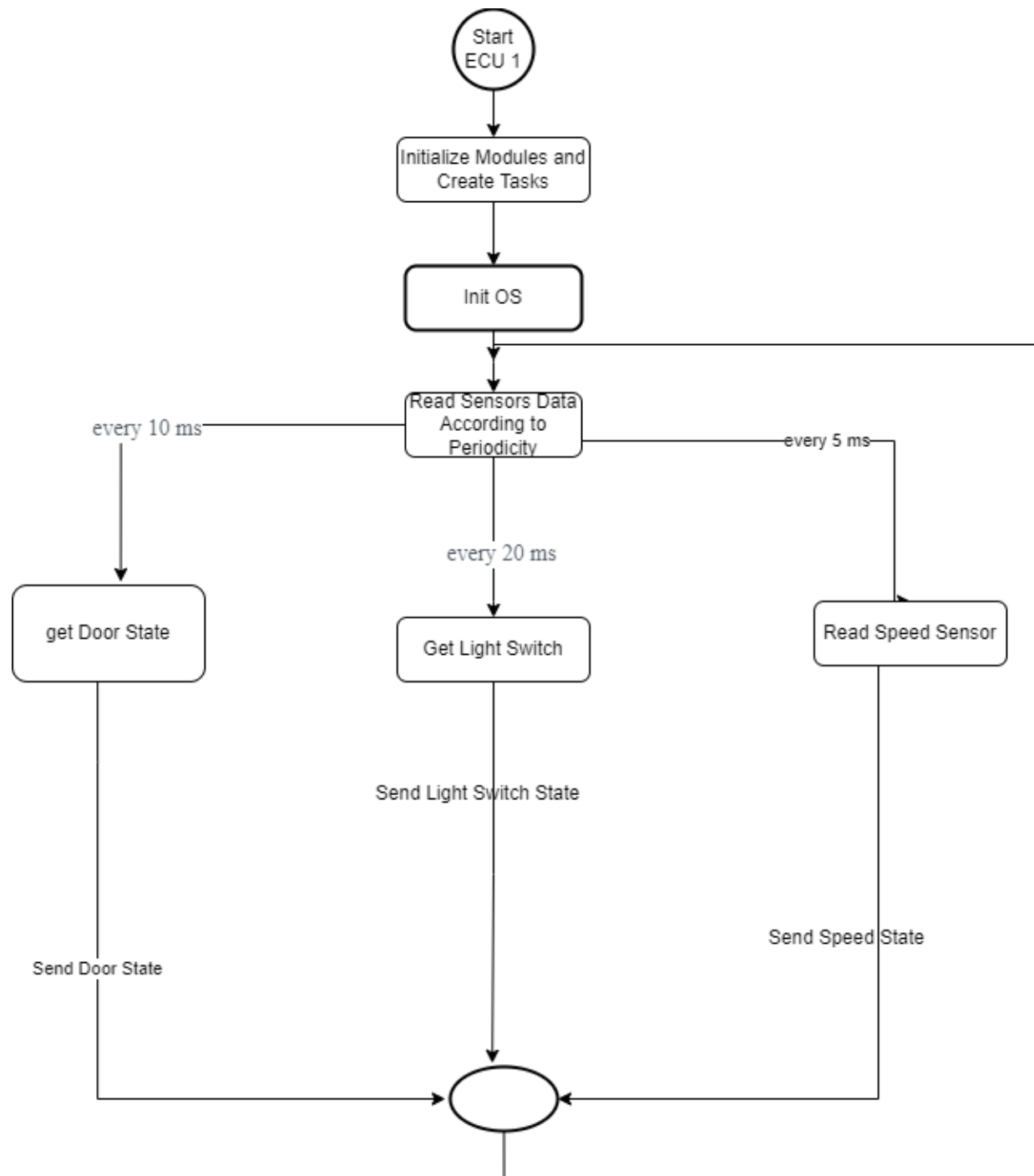


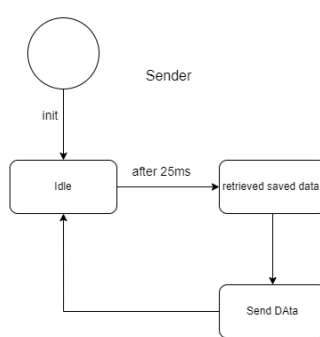
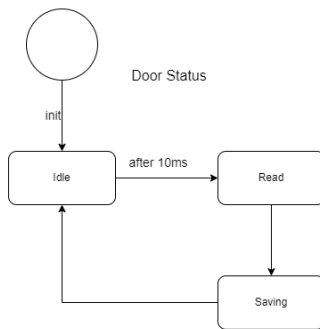
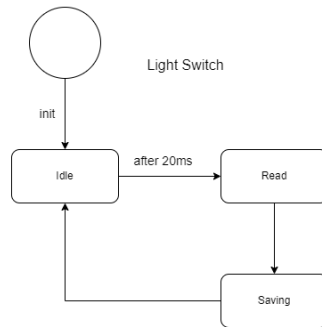
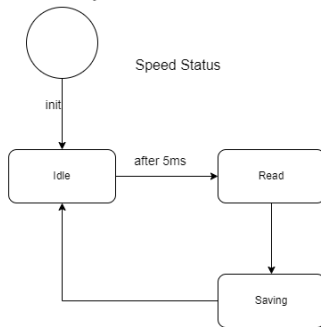
Dynamic Design Report

Module State Machine

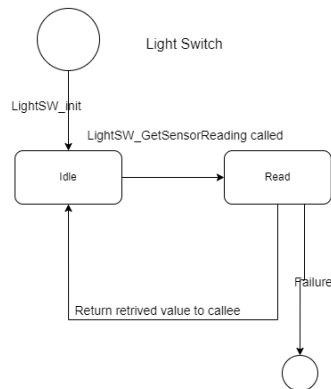
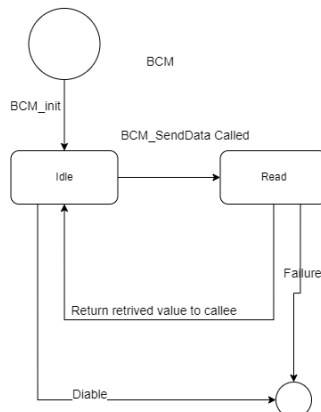
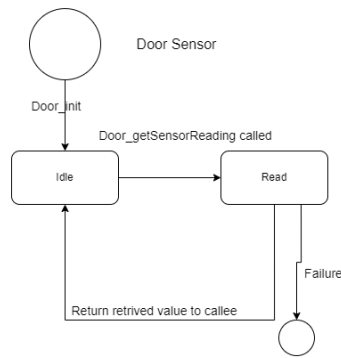
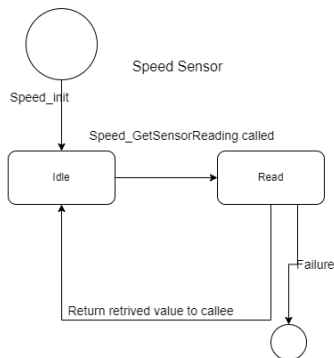


MCU1 State Machine

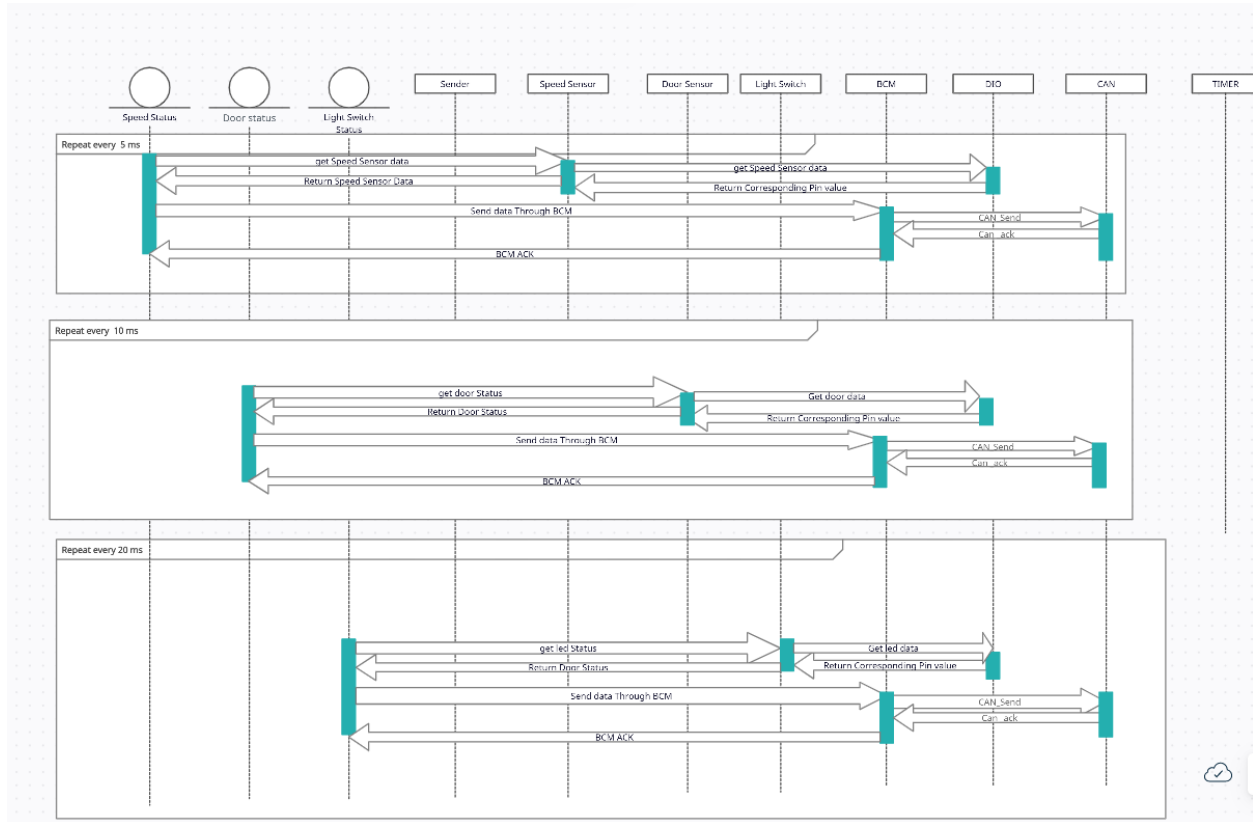
Application Layer Module State Machines :



MHAL Layer Module State Machines :

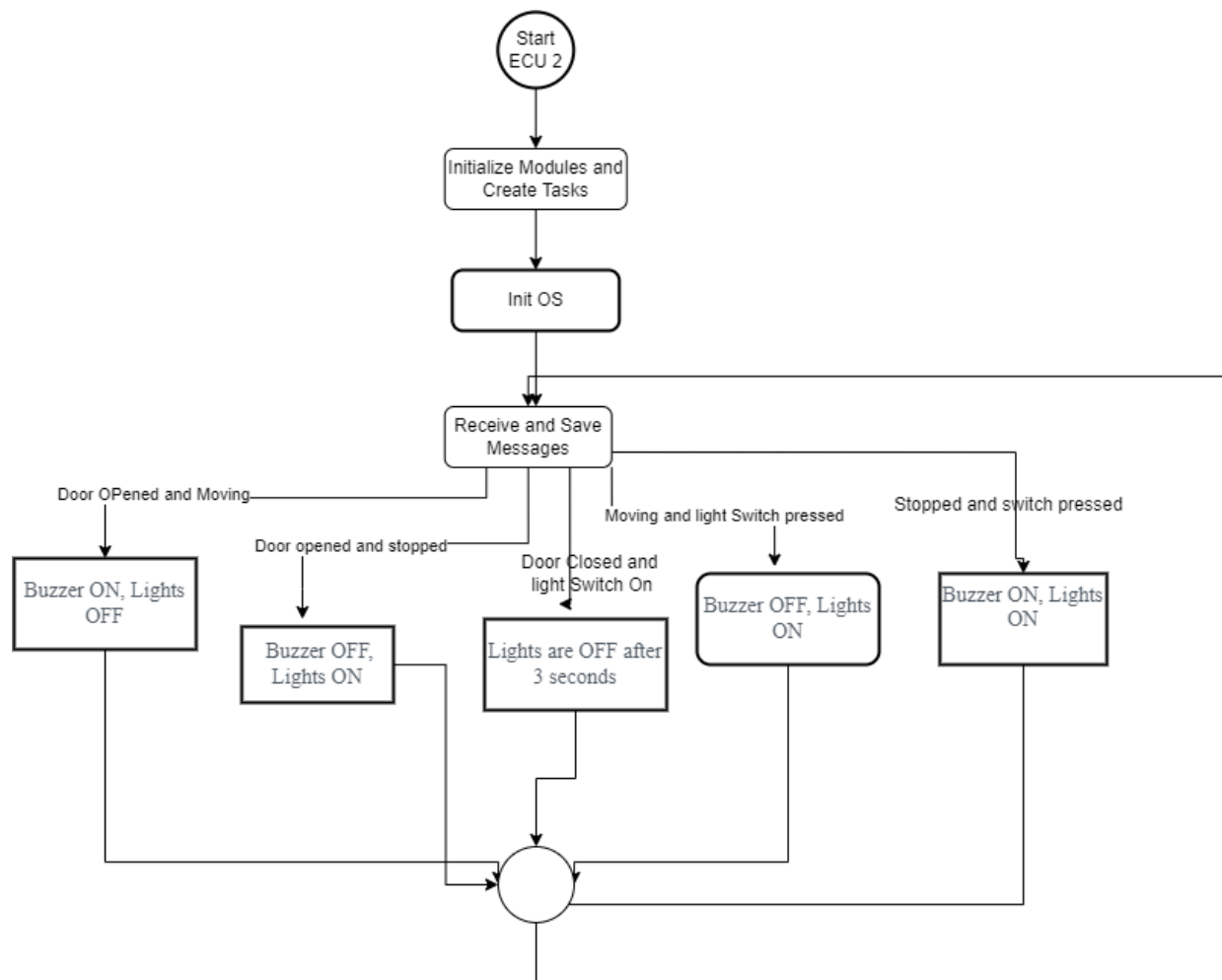


MCU1 Sequence Diagram



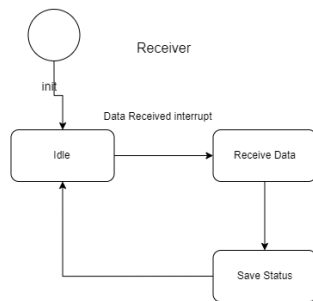
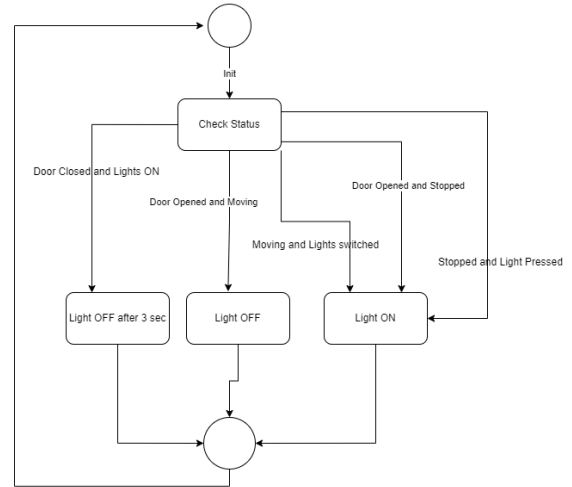
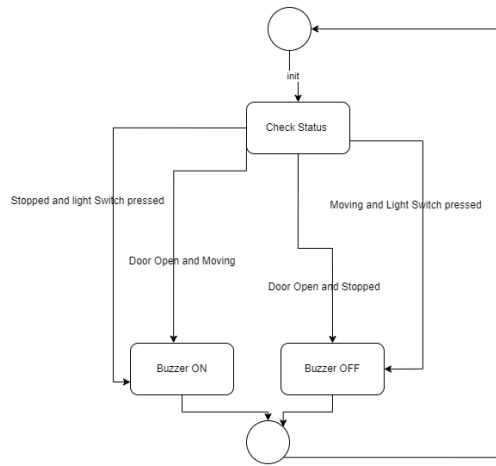
MCU2 :

MCU 2 State Machine

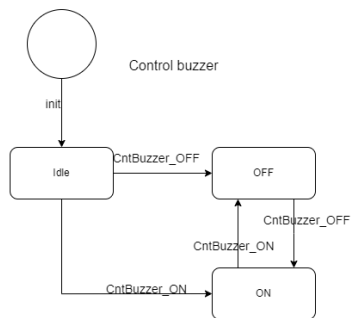
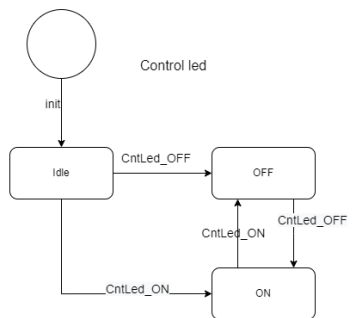


MCU2 State Machine

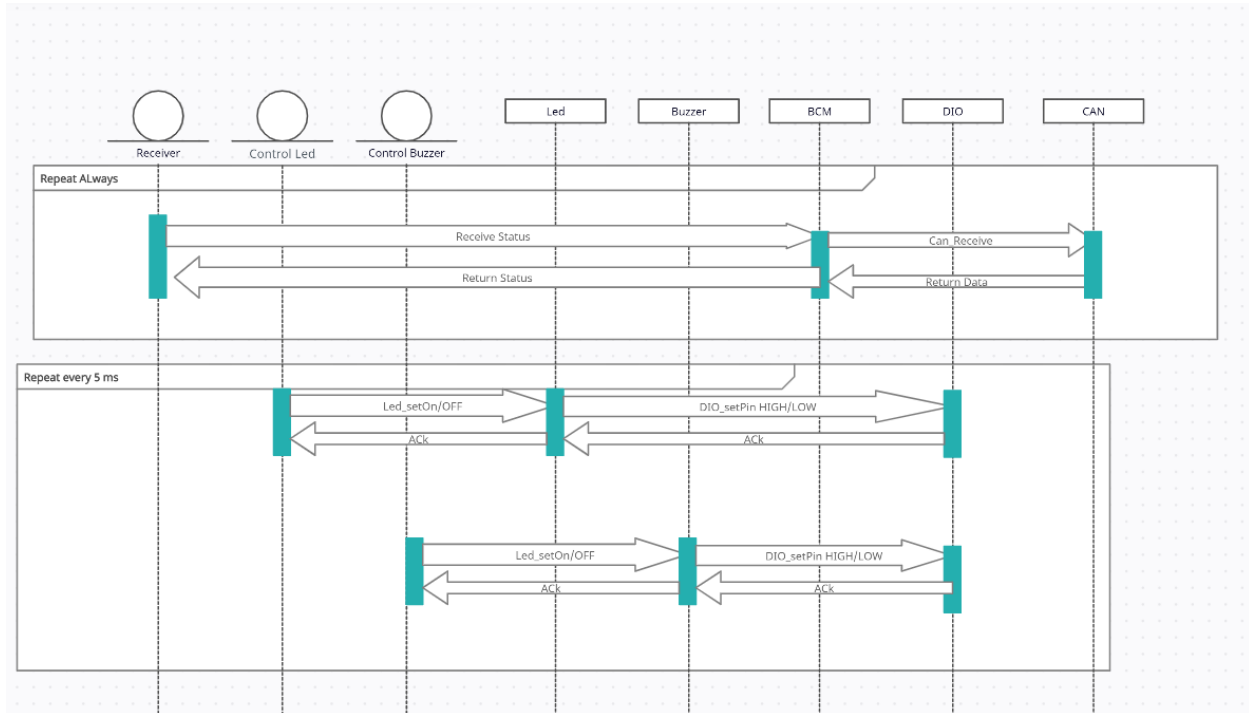
Application Layer Module State Machines :



MHAL Layer Module State Machines :



MCU 2 Sequence Diagram



Bus_Load_Calculations:

Regarding CAN bus load calculation, assuming standard identifier,

CAN frame consist of below field.

1. 1 bit start bit
2. 11 bit identifier
3. 1 bit RTR
4. 6 bit control field
5. 0 to 64 bit data field
6. 15 bit CRC
7. Bit stuffing is possible in the above, for every sequence of 5 consecutive bits of same level. Somewhere around 18 bits in the worst case.
8. 3 bit delimiter, ack etc.
9. 7 bit end of frame
10. 3 bit intermission field after frame So 1 CAN frame contains approximately 125 bit. Given we are using 500 kBit/s bit rate: $\text{bit time} = 1 / \text{bit rate} = 1 / (500 * 1000) \text{ s} = 2 * 10^{-6} \text{ s} = 2 \mu\text{s}$ This means 1 bit will take $2 \mu\text{s}$ to transfer on bus when using 500 kBit/s. So the approximate time to transfer 1 frame is $(2 \mu\text{s/bit} * 125 \text{ bit}) = 250 \mu\text{s}$. Door state every 10 ms = 100 frames every 1000 ms Light switch state every 20 ms = 50 frames every 1000 ms Speed every 5 ms = 200 frame every 1000

ms This is in total 350 frames every 1000 ms Total time on bus is $350 * 250 \mu\text{s}$ Total time is 1000 ms = $1000 * 1000 \mu\text{s}$ Bus load is $((350 * 250) / (1000 * 1000)) * 100 \% = 8.75$