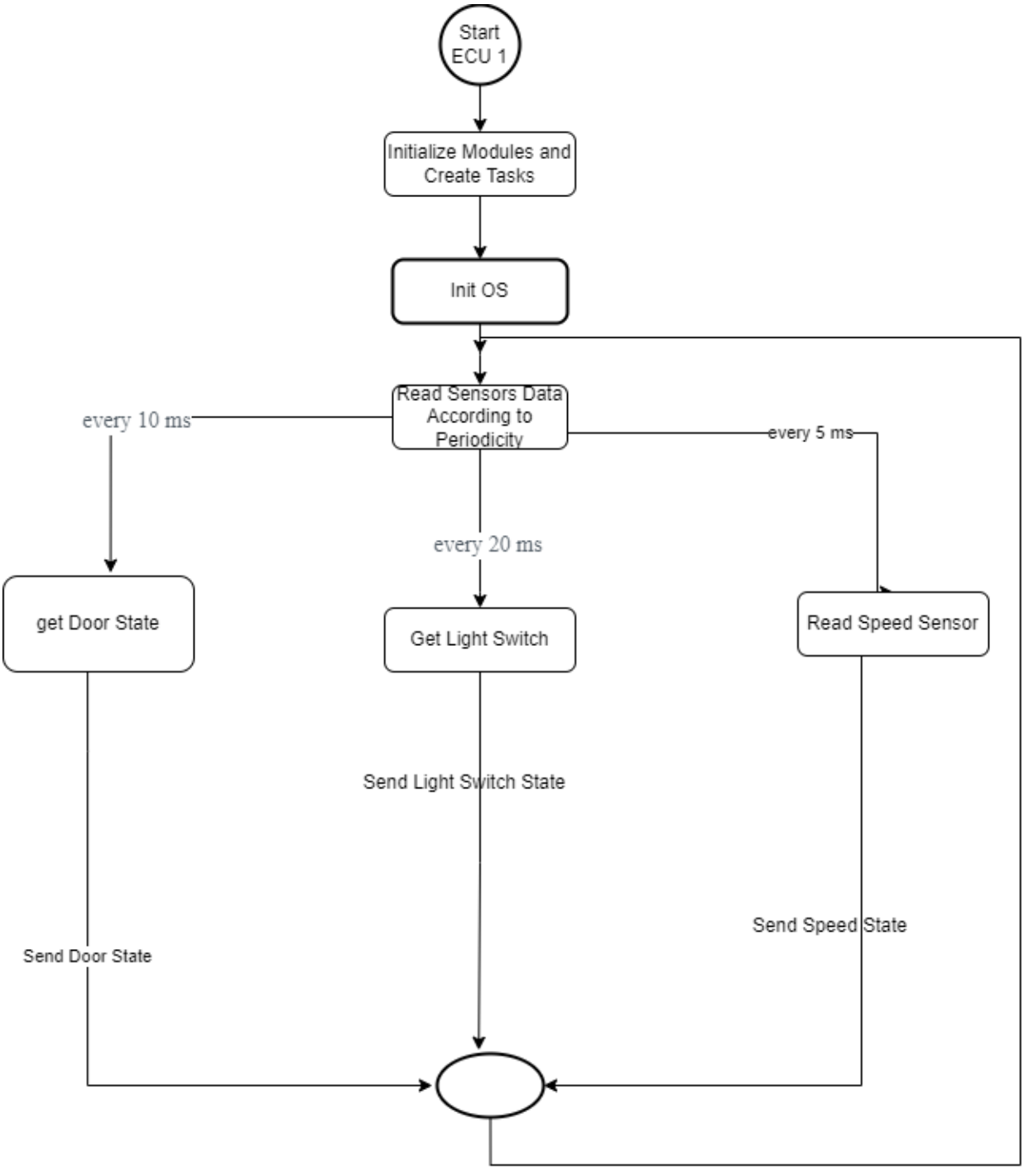
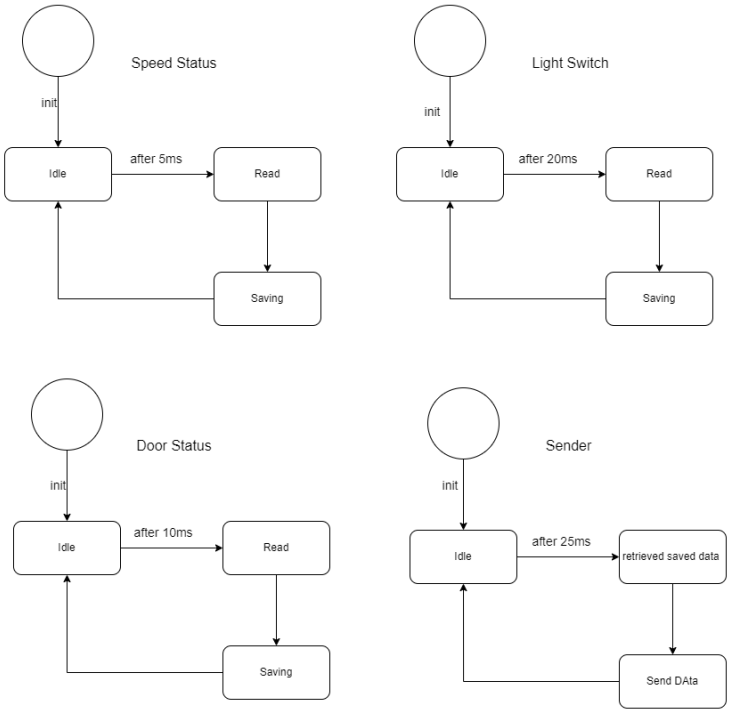
Dynamic Design Report

Module State Machine

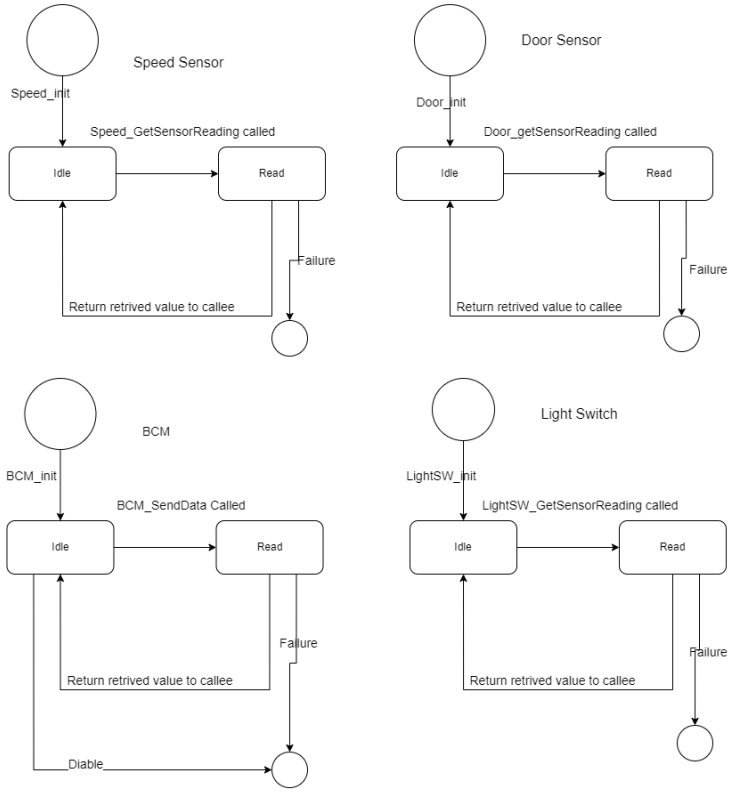


MCU1 State Machine

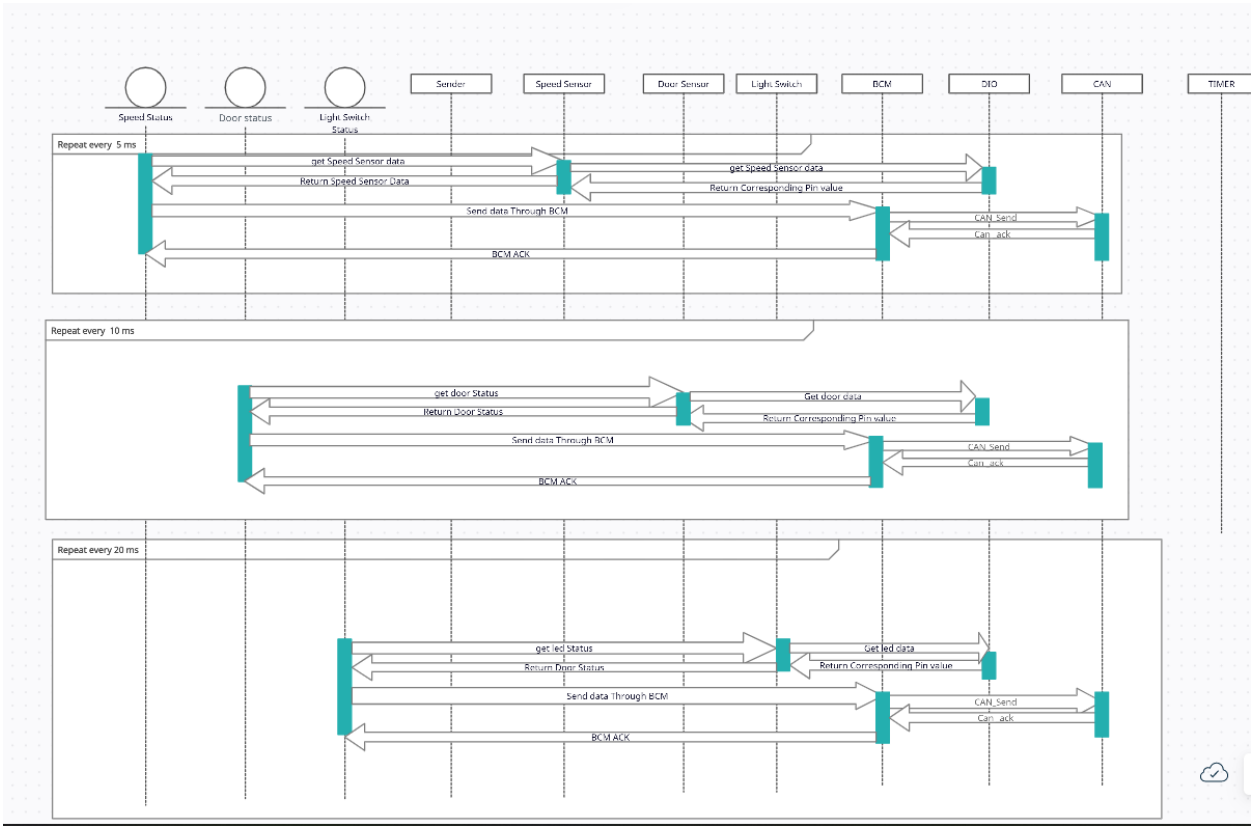
Application Layer Module State Machines :



MHAL Layer Module State Machines :

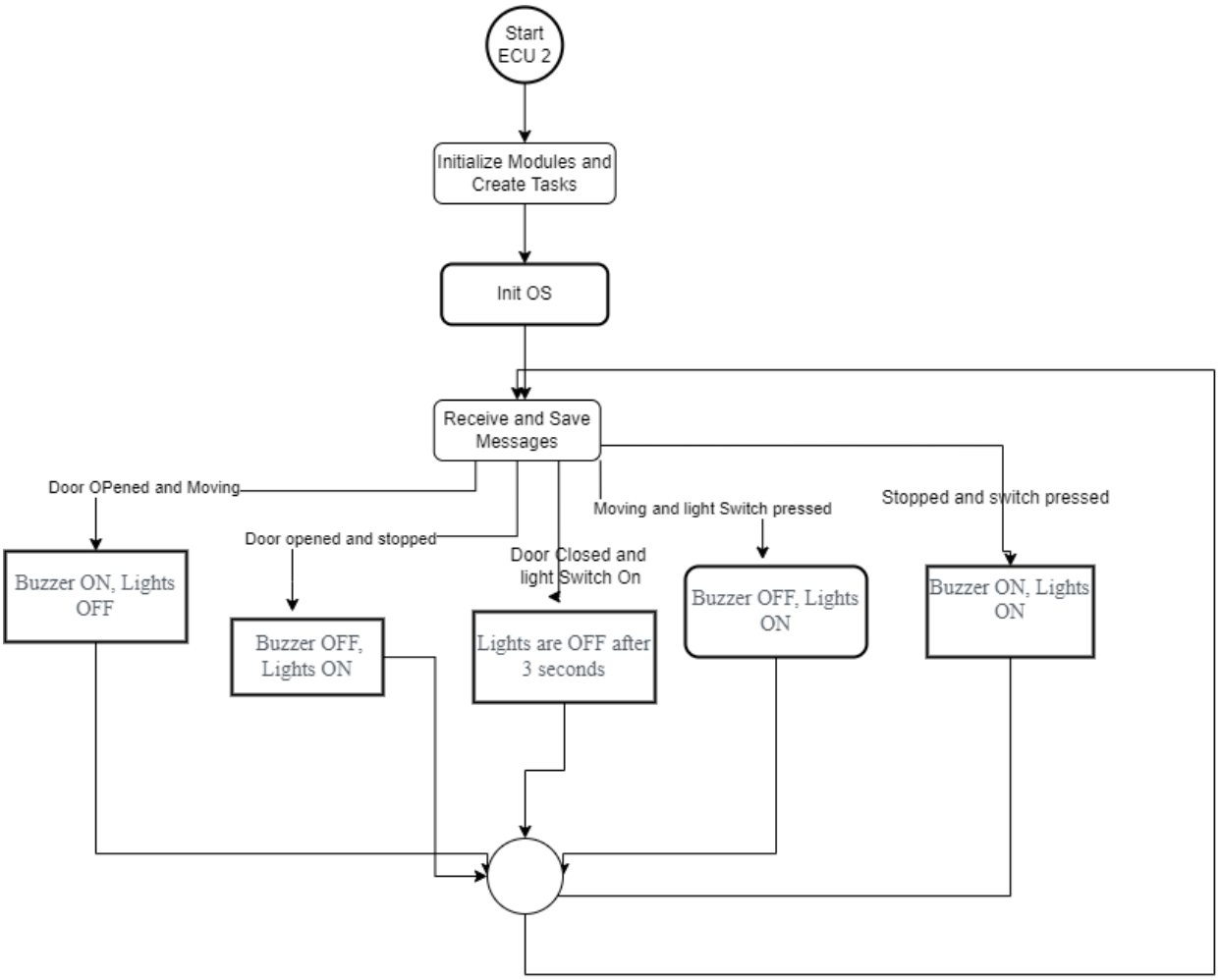


MCU1 Sequence Diagram



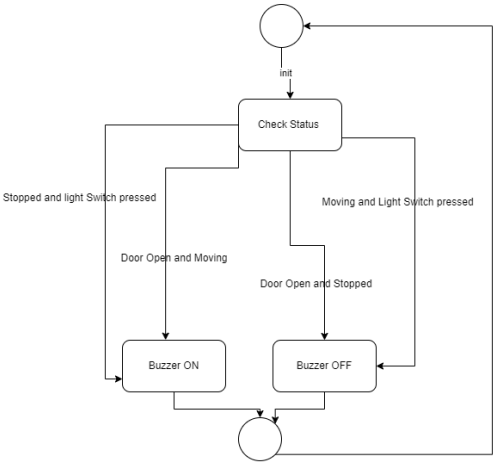
MCU2 :

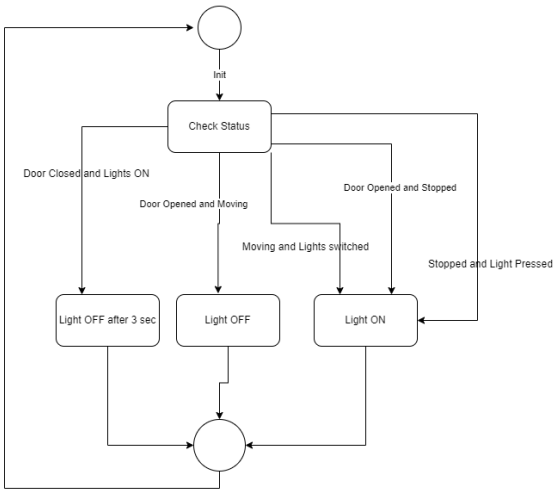
MCU 2 State Machine

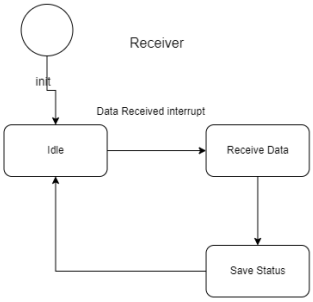


MCU2 State Machine

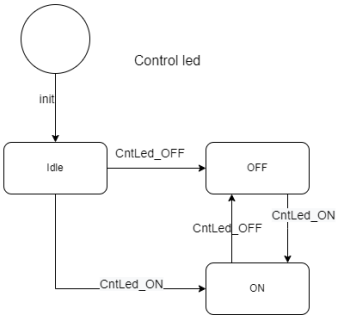
Application Layer Module State Machines :

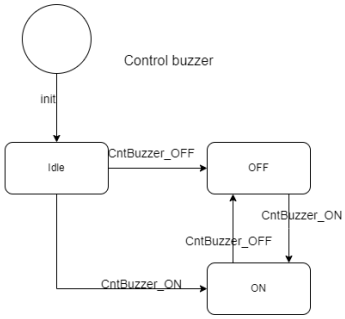




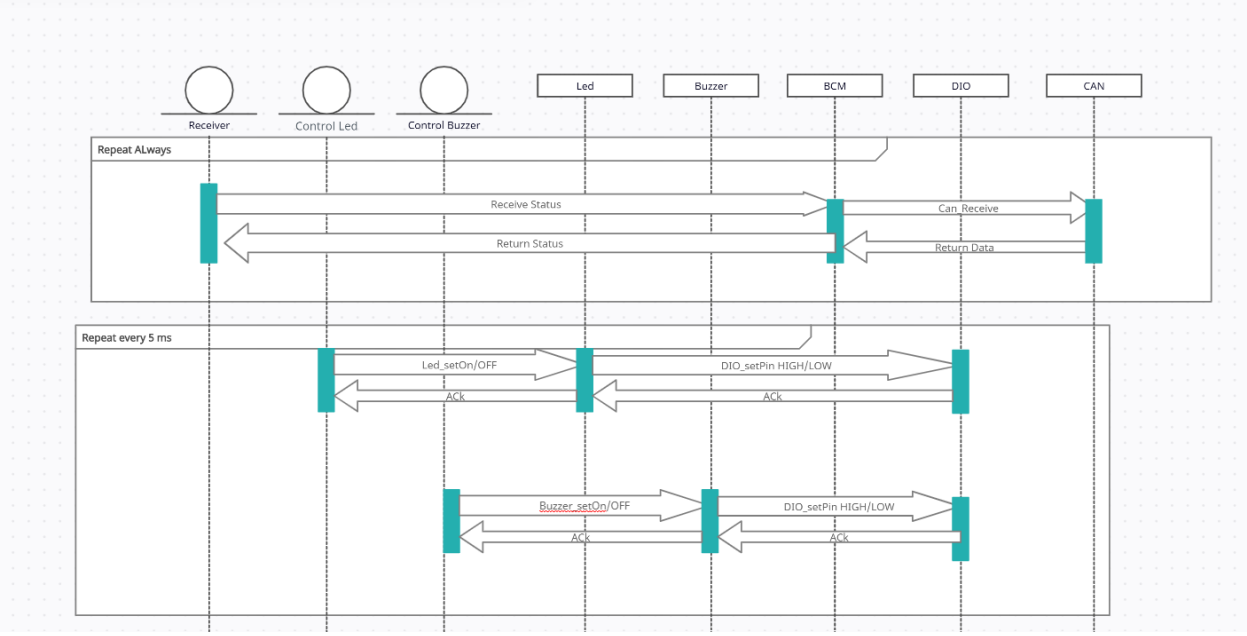


MHAL Layer Module State Machines :





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: bit time = 1 / bit rate = 1 / (500 * 1000) s = 2 * 10-6 s = 2 µs This means 1 bit will take 2 µs to transfer on bus when using 500 kBit/s. So the approximate time to transfer 1 frame is (2 µs/bit * 125 bit) = 250 µs. 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 µs Total time is 1000 ms = 1000 * 1000 µs Bus load is ((350* 250) / (1000 * 1000)) * 100 % = 8.75