Automotive door control system design

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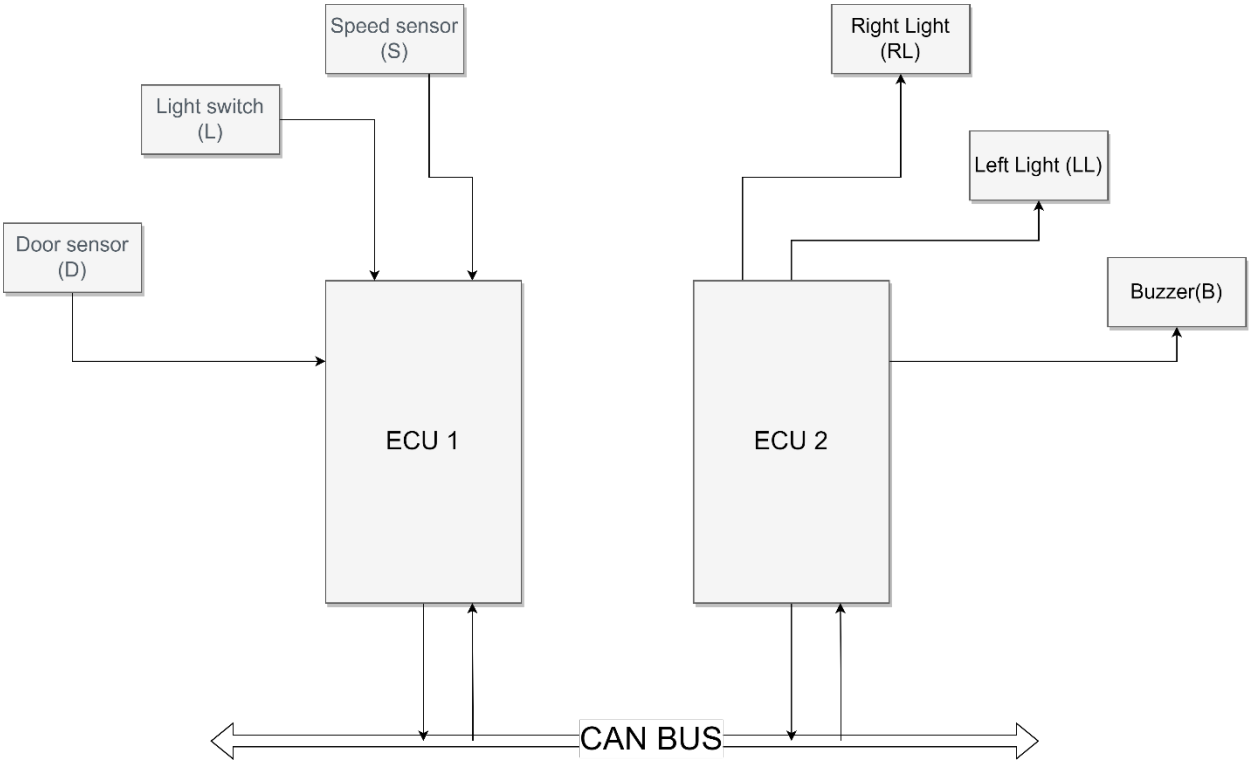
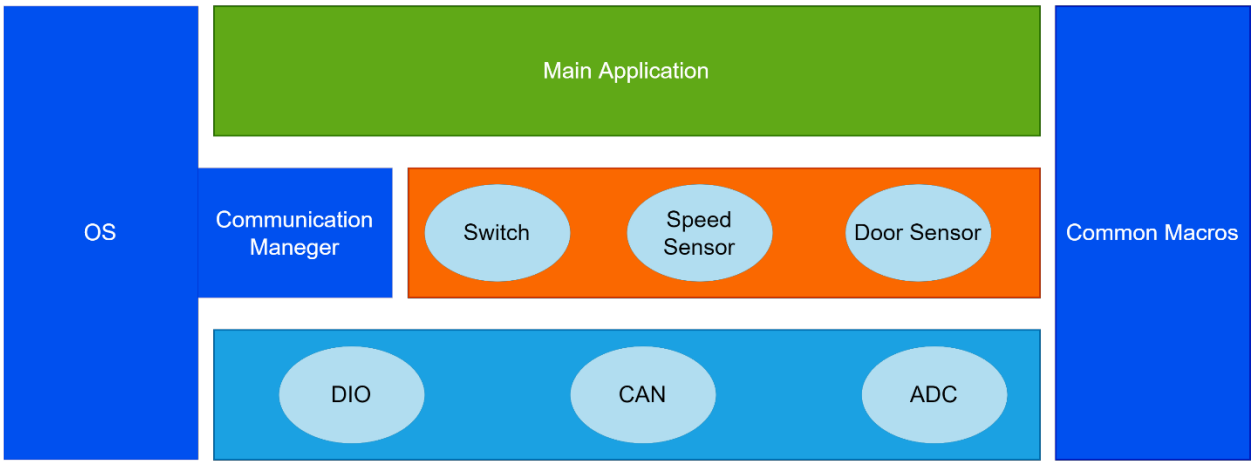
Block Diagram

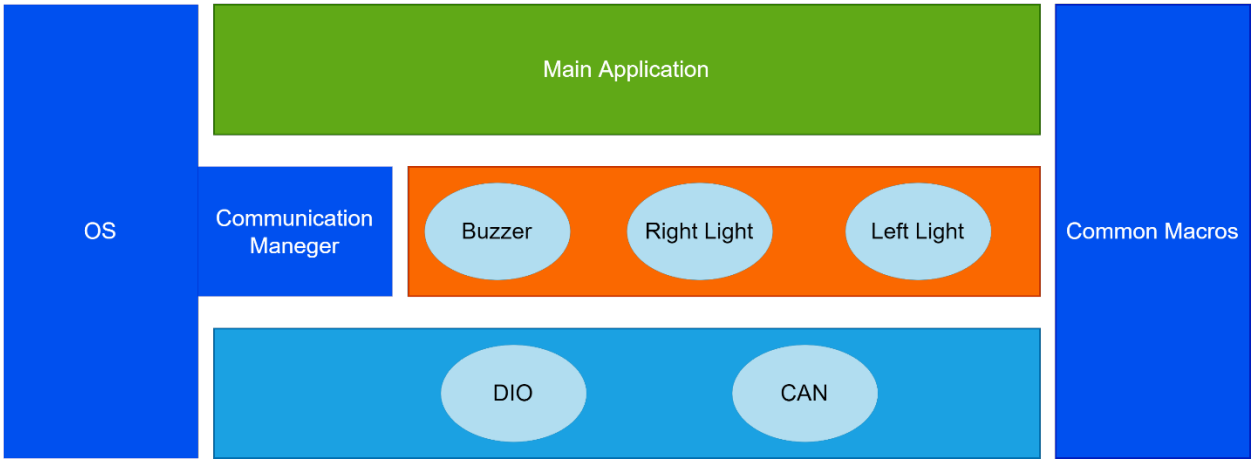


Layered Architecture

ECU 1



ECU 2



Components and Modules

ECU 1		ECU 2	
Components	**Modules**	**Components**	**Modules**
Light Switch Sensor Door Sensor Speed Sensor	Communication-manager DIO ADC CAN Speed Sensor Module Door Sensor Module Light Switch Module	Buzzer Lights	Communication-manager DIO CAN Buzzer Module Lights Module

API Documentation

ECU 1 APIs				
API Name	**Module**	**Args**	**Return**	**Description**
CAN_Init(void)	CAN	Void	Void	Initialize CAN Module
CAN_Send(u8 Sensor, bool State)	CAN	u8 Sensor – 0 -> 2 bool State – 0 -> 1	Void	Send status message to Communication Manager Sensor: 1- SPEED - 0 2- LIGHT - 1 3- DOOR - 2 State: 1- HIGH - 1 2- LOW - 0
DIO_Init(void)	DIO	Void	Void	Initialize DIO Module
DIO_read(bool Port, u8 Pin)	DIO	bool Port – 0 -> 1 u8 Pin – 0 -> 15	bool State – 0 -> 1	Read from sensors Port: 1- Port 0 – 0 2- Port 1 – 1 Pin: a variable to hold the number of pin to be read/set State: 1- HIGH – 1 2- LOW – 0
DIO_Write(bool Port, u8 Pin, bool State)	DIO	bool Port – 0 -> 1 u8 Pin – 0 -> 15 bool State – 0 -> 1	Void	Set or reset a certain pin.
light_sensor_init(void)	Light Switch	Void	Void	Initialize Light Sensor Module

light_sensor_read(void)	Light Switch	Void	bool State – 0 -> 1	Read the state of the light switch
door_sensor_init(void)	Door Sensor	Void	Void	Initialize Door Sensor Module
door_sensor_read(void)	Door Sensor	Void	bool State – 0 -> 1	Read the state of the door sensor
speed_sensor_init(void)	Speed Sensor	Void	Void	Initialize Speed Sensor Module
speed_sensor_read(void)	Speed Sensor	Void	bool State – 0 -> 1	Read the state of the speed sensor

ECU 2 APIs

API Name	Module	Args	Return	Description
CAN_Init(void)	CAN	Void	Void	Initialize CAN Module
CAN_Recieve(void)	CAN	Void	u8 Sensor – 0 -> 2 bool State – 0 -> 1	Receive status message to Communication Manager Sensor: 1- SPEED - 0 2- LIGHT - 1 3- DOOR - 2 State: 1- HIGH - 1 2- LOW - 0
DIO_Init(void)	DIO	Void	Void	Initialize DIO Module
DIO_read(bool Port, u8 Pin)	DIO	bool Port – 0 -> 1 u8 Pin – 0 -> 15	bool State – 0 -> 1	Read from sensors Port: 1- Port 0 – 0 2- Port 1 – 1 Pin: a variable to hold the number of pin to be read/set State: 1- HIGH – 1 2- LOW – 0
DIO_Write(bool Port, u8 Pin, bool State)	DIO	bool Port – 0 -> 1 u8 Pin – 0 -> 15 bool State – 0 -> 1	void	Set or reset a certain pin.
light_init(void)	Lights	Void	Void	Initialize Lights Module
light_setState(void)	Lights	bool State – 0 -> 1	Void	Set the state of the lights
buzzer_init(void)	Buzzer	Void	Void	Initialize Buzzer Module
buzzer_setState(void)	Buzzer	bool State – 0 -> 1	Void	Set the state if the buzzer