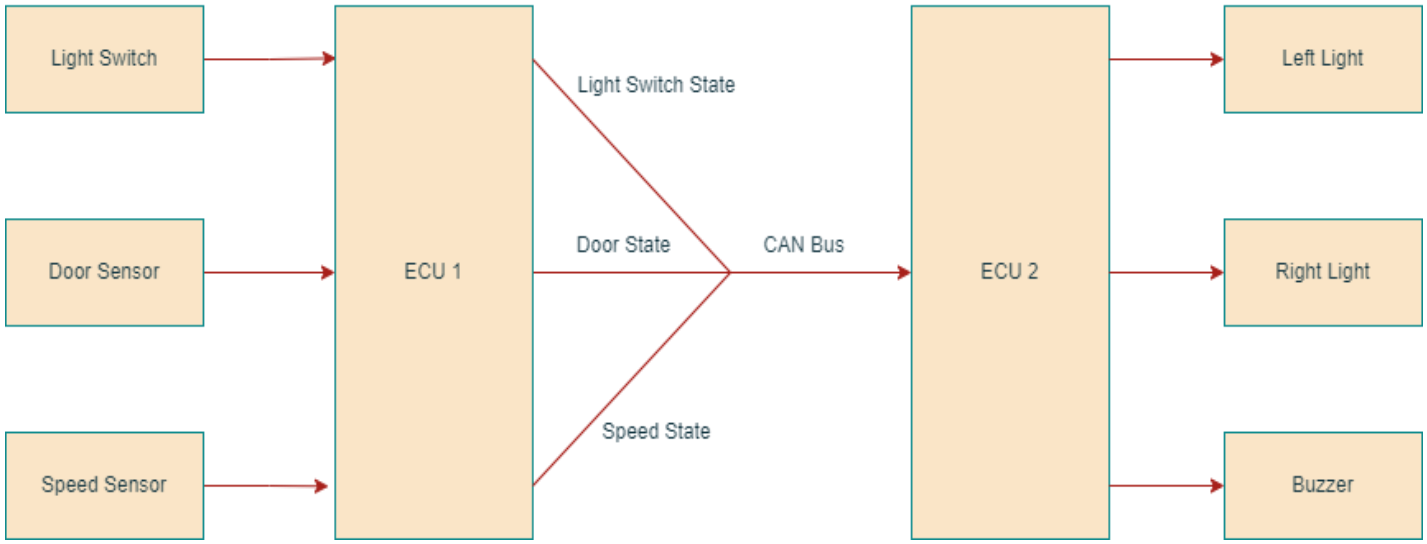
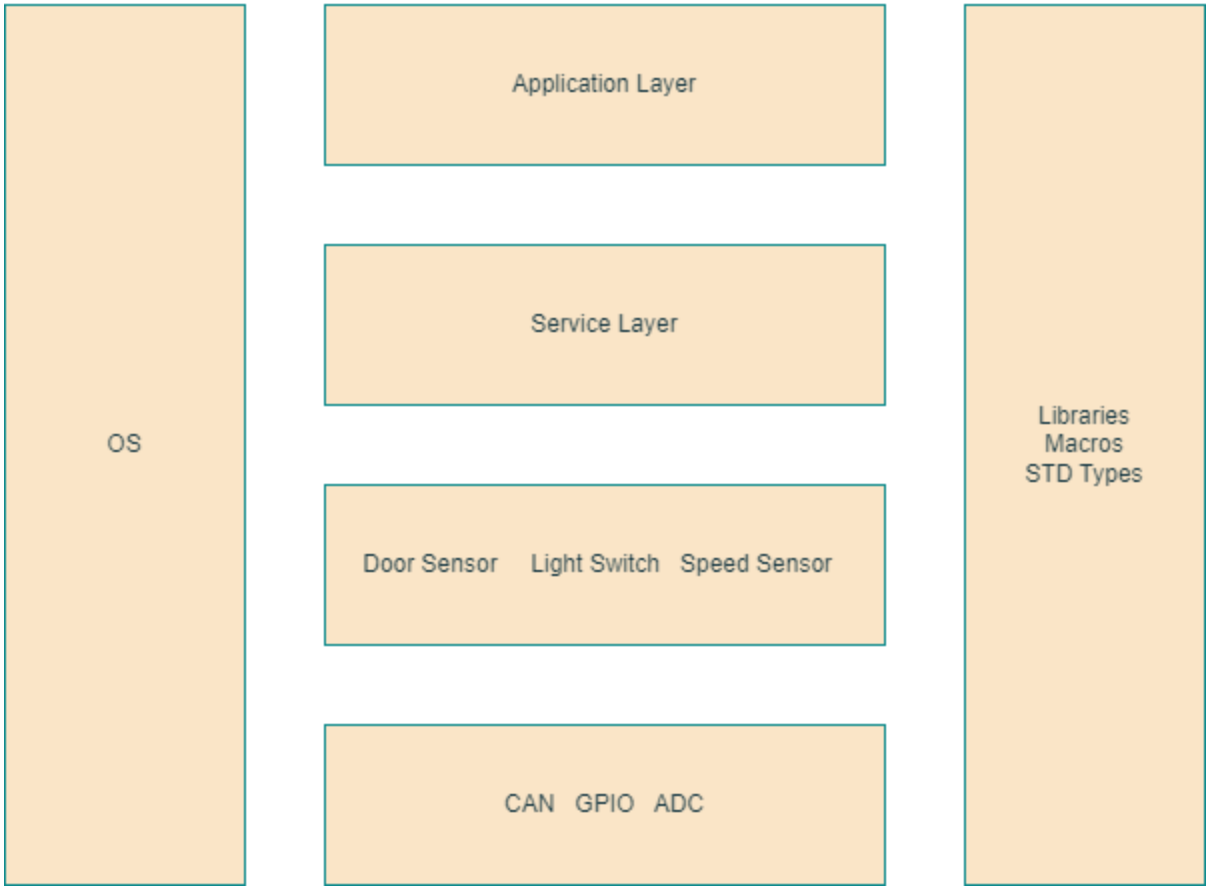
AUTOMOTIVE DOOR DESIGN

Static Design

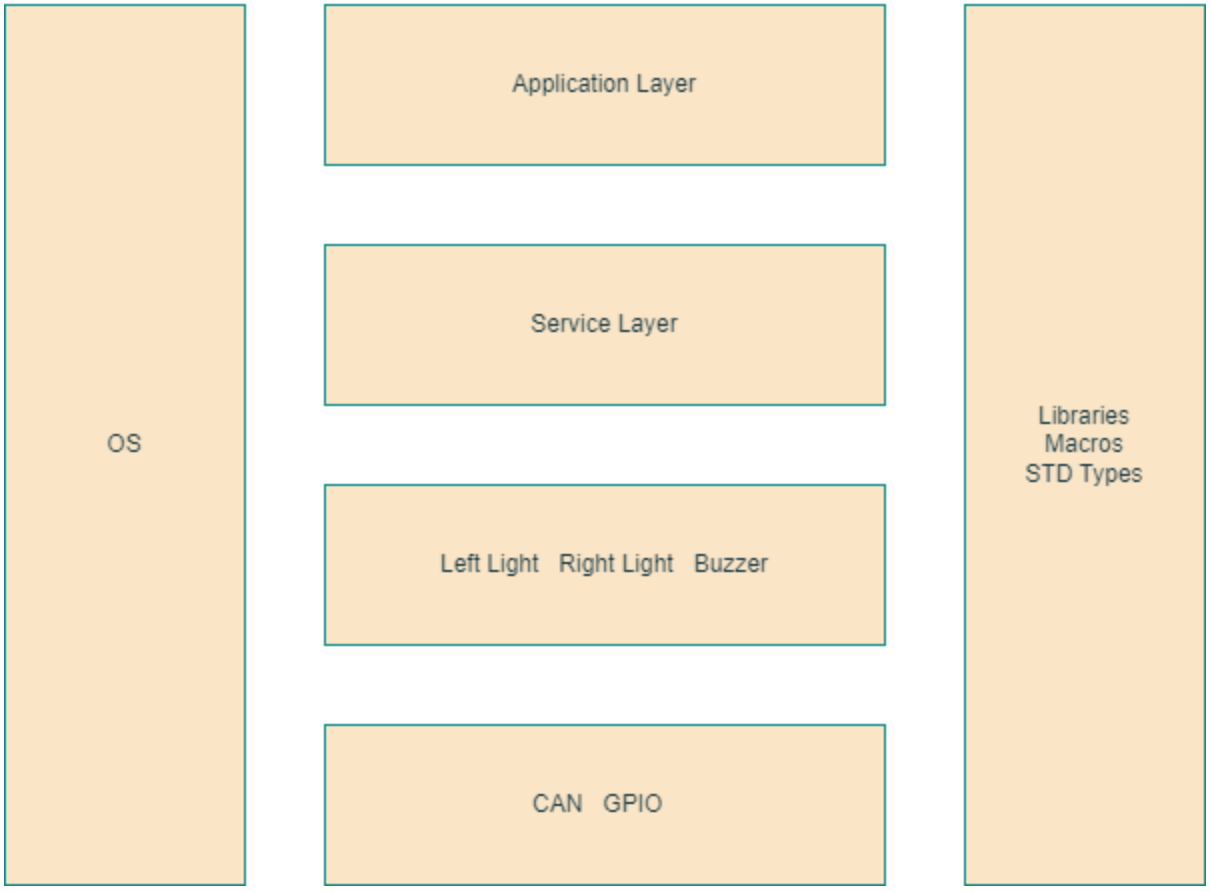
Schematic


Light Switch
Door Sensor
Speed Sensor
ECU 1
Light Switch State
Door State
Speed State
CAN Bus
ECU 2
Left Light
Right Light
Buzzer

ECU 1 Layered Architecture



ECU 2 Layered Architecture



ECU 1 API's

GPIO Functions

void GPIO_Init(const GPIO_Config* ConfigPtr)	
Arguments	const GPIO_Config* ConfigPtr
Return	void
Description	Initialization of GPIO Module

void GPIO_WriteChannel(GPIO_ChannelType Channel, GPIO_LevelType Level)	
Arguments	GPIO_ChannelType Channel, GPIO_LevelType Level
Return	void
Description	Set/Clear GPIO Channel Level

GPIO_LevelType GPIO_ReadChannel(GPIO_ChannelType Channel)	
Arguments	GPIO_ChannelType Channel
Return	GPIO_LevelType
Description	Get GPIO Channel Level

GPIO_LevelType GPIO_FlipChannel(GPIO_ChannelType Channel)	
Arguments	GPIO_ChannelType Channel
Return	GPIO_LevelType
Description	Flip Channel and return new Channel Level

GPIO Types

Port_ID	
Type	Enum
Range	PORTA->PORTF
Description	Contains the Port that each channel belongs to

Pin_ID	
Type	Enum
Range	PIN0->PIN7
Description	Contains the Pin that each channel belongs to

Port_Dir	
Type	Enum
Range	INPUT/OUTPUT
Description	Contains channel direction

Pin_Level	
Type	Enum
Range	HIGH/LOW
Description	Contains current pin level

ADC Functions

void ADC_Init()	
Arguments	void
Return	void
Description	Initialization of ADC Module

void ADC_Start()	
Arguments	void
Return	void
Description	Begin ADC Operation

void ADC_Stop()	
Arguments	void
Return	void
Description	Stops ADC Operation

uint16 ADC_GetChannelValue(ADC_ChannelType Channel)	
Arguments	ADC_ChannelType Channel
Return	uint16
Description	Read ADC Channel Value

ADC Types

ADC_ChannelType	
Type	Enum
Range	A0->A5
Description	Contains the Port that each channel belongs to

CAN Functions

void CAN_Init()	
Arguments	void
Return	void
Description	Initialization of CAN Module

Bool CAN_Send()	
Arguments	void
Return	Bool
Description	Sends a byte of data and returns True if successful/False if unsuccessful

Light Switch Functions

void LightSwitch_Init()	
Arguments	void
Return	void
Description	Initialization of Light Switch Module

LightSwitch_LevelType LightSwitch_ReadLevel()	
Arguments	void
Return	LightSwitch_LevelType
Description	Returns light switch level

Light Switch Types

LightSwitch_LevelType	
Type	Enum
Range	HIGH/LOW
Description	Current light switch level

Door Sensor Functions

void DoorSensor_Init()	
Arguments	void
Return	void
Description	Initialization of Door Sensor Module

DoorSensor_LevelType DoorSensor_ReadLevel()	
Arguments	void
Return	DoorSensor_LevelType
Description	Returns Door Sensor level

Door Sensor Types

DoorSensor_LevelType	
Type	Enum
Range	OPEN/CLOSED
Description	Current Door Sensor level

Speed Sensor Functions

void SpeedSensor_Init()	
Arguments	void
Return	void
Description	Initialization of Speed Sensor Module

uint16 SpeedSensor_Read()	
Arguments	void
Return	uint16
Description	Returns speed sensor reading

ECU 2 API's

GPIO Functions

void GPIO_Init(const GPIO_Config* ConfigPtr)	
Arguments	const GPIO_Config* ConfigPtr
Return	void
Description	Initialization of GPIO Module

void GPIO_WriteChannel(GPIO_ChannelType Channel, GPIO_LevelType Level)	
Arguments	GPIO_ChannelType Channel, GPIO_LevelType Level
Return	void
Description	Set/Clear GPIO Channel Level

GPIO_LevelType GPIO_ReadChannel(GPIO_ChannelType Channel)	
Arguments	GPIO_ChannelType Channel
Return	GPIO_LevelType
Description	Get GPIO Channel Level

GPIO_LevelType GPIO_FlipChannel(GPIO_ChannelType Channel)	
Arguments	GPIO_ChannelType Channel
Return	GPIO_LevelType
Description	Flip Channel and return new Channel Level

GPIO Types

Port_ID	
Type	Enum
Range	PORTA->PORTF
Description	Contains the Port that each channel belongs to

Pin_ID	
Type	Enum
Range	PIN0->PIN7
Description	Contains the Pin that each channel belongs to

Port_Dir	
Type	Enum
Range	INPUT/OUTPUT
Description	Contains channel direction

Pin_Level	
Type	Enum
Range	HIGH/LOW
Description	Contains current pin level

ADC Functions

void ADC_Init()	
Arguments	void
Return	void
Description	Initialization of ADC Module

void ADC_Start()	
Arguments	void
Return	void
Description	Begin ADC Operation

void ADC_Stop()	
Arguments	void
Return	void
Description	Stops ADC Operation

uint16 ADC_GetChannelValue(ADC_ChannelType Channel)	
Arguments	ADC_ChannelType Channel
Return	uint16
Description	Read ADC Channel Value

ADC Types

ADC_ChannelType	
Type	Enum
Range	A0->A5
Description	Contains the Port that each channel belongs to

CAN Functions

void CAN_Init()	
Arguments	void
Return	void
Description	Initialization of CAN Module

Bool CAN_Send()	
Arguments	void
Return	Bool
Description	Sends a byte of data and returns True if successful/False if unsuccessful

uint8 CAN_Receive()	
Arguments	void
Return	uint16
Description	Receives a byte of data

Buzzer Functions

void Buzzer_Init()	
Arguments	void
Return	void
Description	Initialization of Buzzer Driver

void Buzzer_Start()	
Arguments	void
Return	void
Description	Turn Buzzer on

void Buzzer_Stop()	
Arguments	void
Return	void
Description	Turn Buzzer off

Left Light Functions

void LLight_Init()	
Arguments	void
Return	void
Description	Initialization of LeftLight Driver

void LLight_On()	
Arguments	void
Return	void
Description	Turn Left Light on

void LLight_Off()	
Arguments	void
Return	void
Description	Turn Left Light off

Right Light Functions

void RLight_Init()	
Arguments	void
Return	void
Description	Initialization of Right Light Driver

void RLight_On()	
Arguments	void
Return	void
Description	Turn Right Light on

void RLight_Off()	
Arguments	void
Return	void
Description	Turn Right Light off