Automotive Door Control System Design

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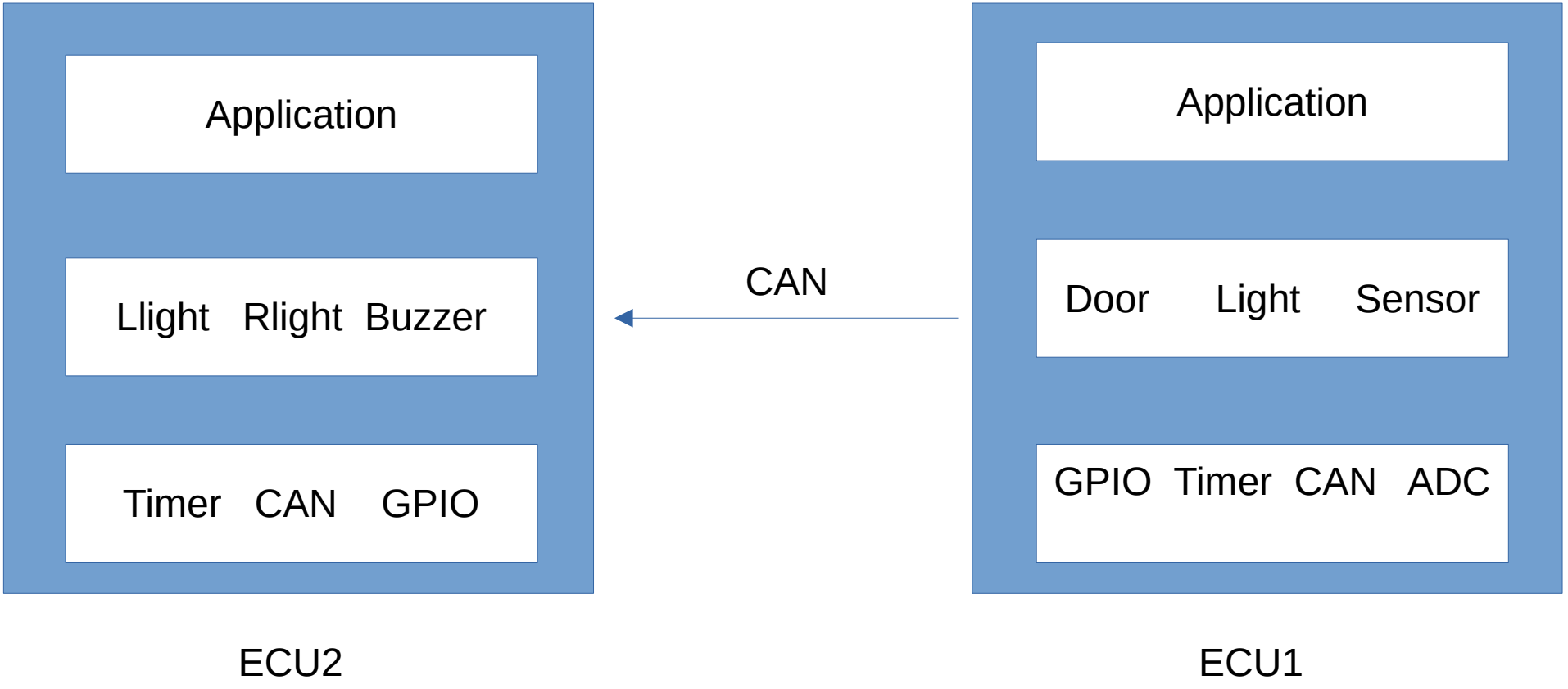
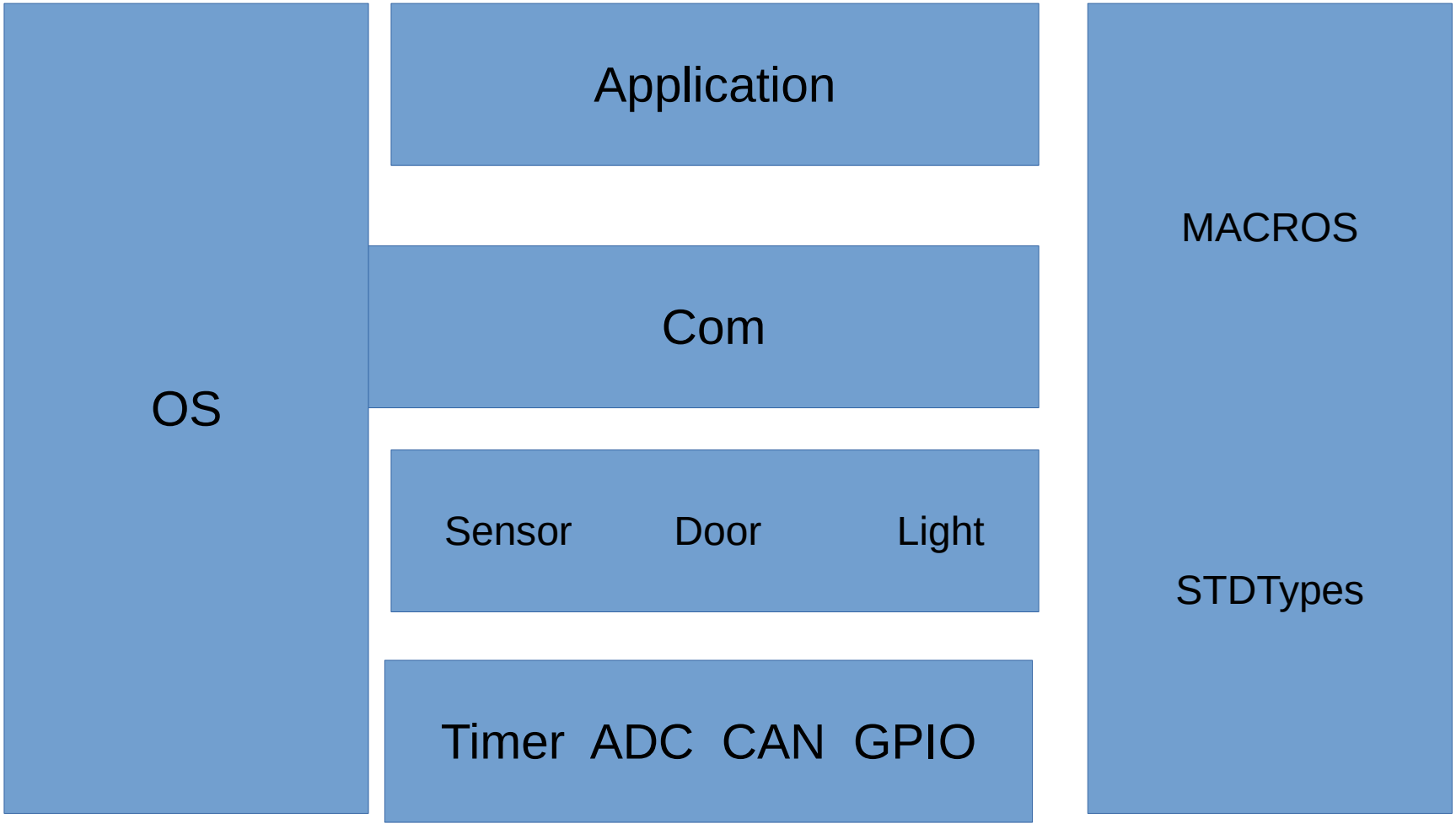
Static Design

Layered Architecture for ECUs




Application
MACROS
OS
Com
Sensor
Door
Light
STDTypes
Timer
ADC
CAN
GPIO

ECU1

GPIO APIs

Function Name	GPIO_Init()
API Type	Init
Inputs	GPIO_Pin GPIO_Port GPIO_Mode
Outputs	None
Return	OK N_OK
Description	Initialization The GPIO

Function Name	GPIO_Read()
API Type	Getter
Inputs	GPIO_Pin GPIO_Port
Outputs	GPIO_Pin_Level
Return	OK N_OK
Description	Read The GPIO Pin Level

Function Name	GPIO_Write()
API Type	Setter
Inputs	GPIO_Pin GPIO_Port GPIO_Level
Outputs	None
Return	OK N_OK
Description	Set The GPIO Pin Level

Name	GPIO_Port
Type	uint8
Range	PORTA to PORTF
Description	Numeric of GPIO port

Name	GPIO_Pin
Type	uint8
Range	PIN0 to PIN7
Description	Numeric of GPIO pin

Name	GPIO_Level
Type	uint8
Range	High LOW
Description	Level of Pin (5v / 0v)

Timer APIs

Function Name	Timer_Init()
API Type	Init
Inputs	Struct * timer_config
Outputs	None
Return	OK N_OK
Description	Init The Timer

Function Name	Timer_Start()
API Type	Setter
Inputs	Timer_Channel Timer_Value
Outputs	None
Return	OK N_OK
Description	Start the timer

Function Name	Timer_Stop()
API Type	Setter
Inputs	Timer_Channel
Outputs	None
Return	OK N_OK
Description	Stop the timer

Name	Timer_Channel
Type	uint8
Range	0 to 12
Description	Channel of timer

Name	Timer_Value
Type	uint32
Range	Based on the resolution of timer
Description	Set the value of the timer

Name	timer_config
Type	Structure
Range	Based on the structure elements
Description	Configure the timer parameter for initializing the timer.

ADC APIs

Function Name	ADC_Init()
API Type	Init
Inputs	Struct *ADC_Config
Outputs	None
Return	OK N_OK
Description	Initialization The ADC

Function Name	ADC_Read()
API Type	Getter
Inputs	ADC_Channel
Outputs	ADC_value
Return	OK N_OK
Description	Read The ADC value

Name	ADC_config
Type	Structure
Range	Based on the structure elements
Description	Configure the ADC parameter for initializing the ADC.

Name	ADC_Channel
Type	uint8
Range	Based on the number of ADC channels
Description	Set the Channel of ADC

CAN APIs

Function Name	CAN_Init()
API Type	Init
Inputs	Struct *CAN_Config
Outputs	None
Return	OK N_OK
Description	Initialization The CAN

Function Name	CAN_Send_Data()
API Type	Getter
Inputs	Data
Outputs	None
Return	OK N_OK
Description	Send The data by CAN

Function Name	CAN_Receive_Data()
API Type	Getter
Inputs	none
Outputs	None
Return	OK N_OK
Description	Receive The data by CAN

Name	CAN_config
Type	Structure
Range	Based on the structure elements
Description	Configure the CAN parameter for initializing the CAN.

Door APIs

Function Name	Door_Init()
API Type	Init
Inputs	None
Outputs	None
Return	OK N_OK
Description	Initialization of The Door sensor

Function Name	Door_Read()
API Type	Getter
Inputs	None
Outputs	None
Return	OK N_OK
Description	Read The value of the Door sensor

Light Switch APIs

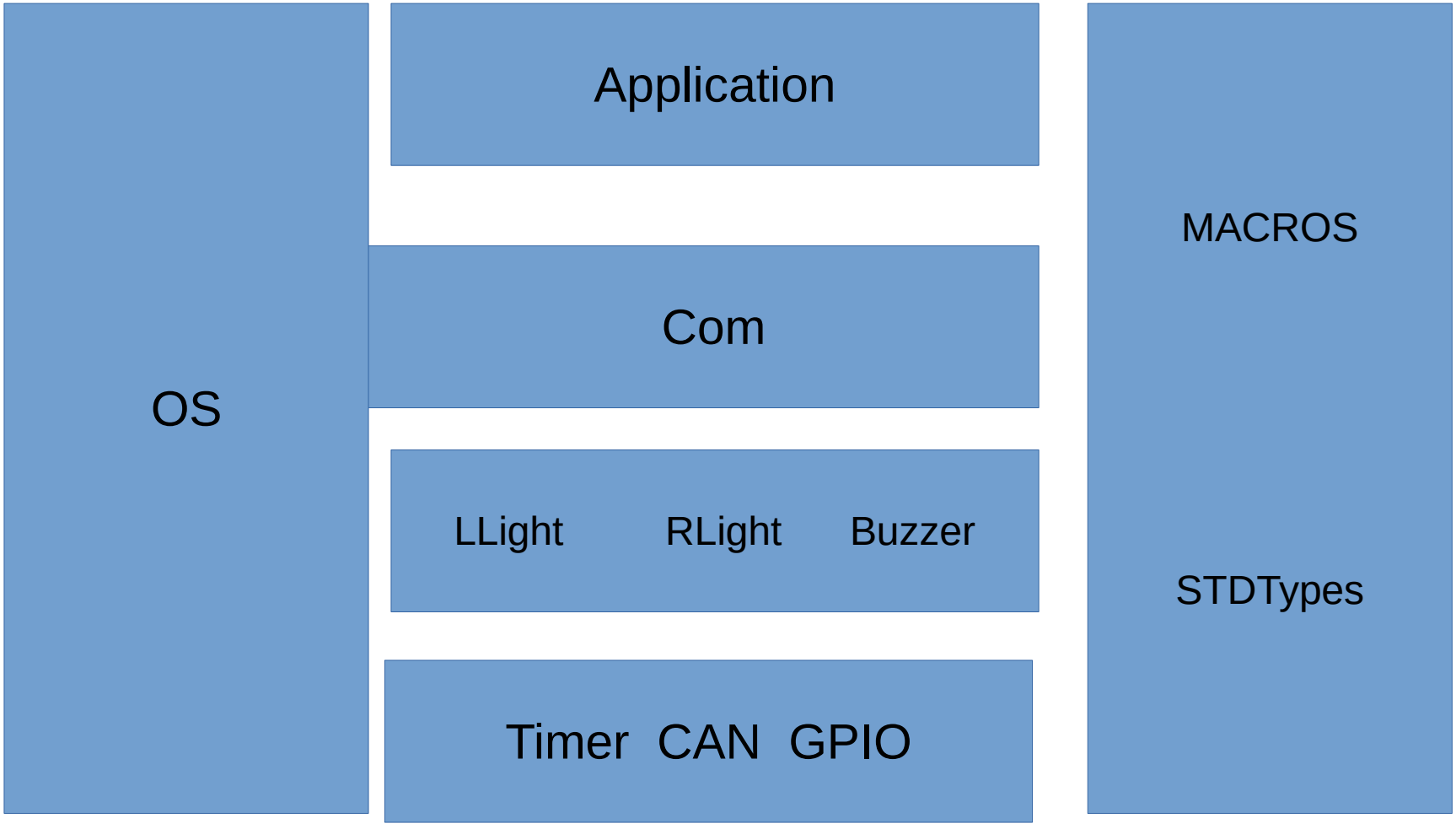
Function Name	Light_Init()
API Type	Init
Inputs	None
Outputs	None
Return	OK N_OK
Description	Initialization of The Light Switch

Function Name	Light_Read()
API Type	Getter
Inputs	None
Outputs	None
Return	OK N_OK
Description	Read The value of the Light Switch

Speed Sensor APIs

Function Name	Speed_Init()
API Type	Init
Inputs	None
Outputs	None
Return	OK N_OK
Description	Initialization of The Speed Sensor

Function Name	Speed_Read()
API Type	Getter
Inputs	None
Outputs	None
Return	OK N_OK
Description	Read The value of the Speed


Application
MACROS
Com
OS
LLight
RLight
Buzzer
STDTypes
Timer
CAN
GPIO

ECU2

GPIO APIs

Function Name	GPIO_Init()
API Type	Init
Inputs	GPIO_Pin GPIO_Port GPIO_Level
Outputs	None
Return	OK N_OK
Description	Initialization The GPIO

Function Name	GPIO_Read()
API Type	Getter
Inputs	GPIO_Pin GPIO_Port
Outputs	GPIO_Pin_Level
Return	OK N_OK
Description	Read The GPIO Pin Level

Function Name	GPIO_Write()
API Type	Setter
Inputs	GPIO_Pin GPIO_Port GPIO_Level
Outputs	None
Return	OK N_OK
Description	Set The GPIO Pin Level

Name	GPIO_Port
Type	uint8
Range	PORTA to PORTF
Description	Numeric of GPIO port

Name	GPIO_Pin
Type	uint8
Range	PIN0 to PIN7
Description	Numeric of GPIO pin

Name	GPIO_Level
Type	uint8
Range	High LOW
Description	Level of Pin (5v / 0v)

Timer APIs

Function Name	Timer_Init()
API Type	Init
Inputs	Struct * timer_config
Outputs	None
Return	OK N_OK
Description	Init The Timer

Function Name	Timer_Start()
API Type	Setter
Inputs	Timer_Channel Timer_Value
Outputs	None
Return	OK N_OK
Description	Start the timer

Function Name	Timer_Stop()
API Type	Setter
Inputs	Timer_Channel
Outputs	None
Return	OK N_OK
Description	Stop the timer

Name	Timer_Channel
Type	uint8
Range	0 to 12
Description	Channel of timer

Name	Timer_Value
Type	uint32
Range	Based on the resolution of timer
Description	Set the value of the timer

Name	timer_config
Type	Structure
Range	Based on the structure elements
Description	Configure the timer parameter for initializing the timer.

CAN APIs

Function Name	CAN_Init()
API Type	Init
Inputs	Struct *CAN_Config
Outputs	None
Return	OK N_OK
Description	Initialization The CAN

Function Name	CAN_Send_Data()
API Type	Setter
Inputs	Data
Outputs	None
Return	OK N_OK
Description	Send The data by CAN

Function Name	CAN_Receive_Data()
API Type	Getter
Inputs	none
Outputs	None
Return	OK N_OK
Description	Receive The data by CAN

Name	CAN_config
Type	Structure
Range	Based on the structure elements
Description	Configure the CAN parameter for initializing the CAN.

Right Light APIs

Function Name	RLight_Init()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Initialization of The Right Light

Function Name	RLight_ON()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Set The Right Light

Function Name	RLight_OFF()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Clear The Right Light

Left Light APIs

Function Name	LLight_Init()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Initialization of The Left Light

Function Name	LLight_ON()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Set The Left Light

Function Name	LLight_OFF()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Clear The Left Light

Buzzer APIs

Function Name	Buzzer_Init()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Initialization of The Buzzer

Function Name	Buzzer_ON()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Set The Buzzer

Function Name	Buzzer_OFF()
API Type	Init
Inputs	GPIO_Port GPIO_Pin
Outputs	None
Return	OK N_OK
Description	Clear The Buzzer