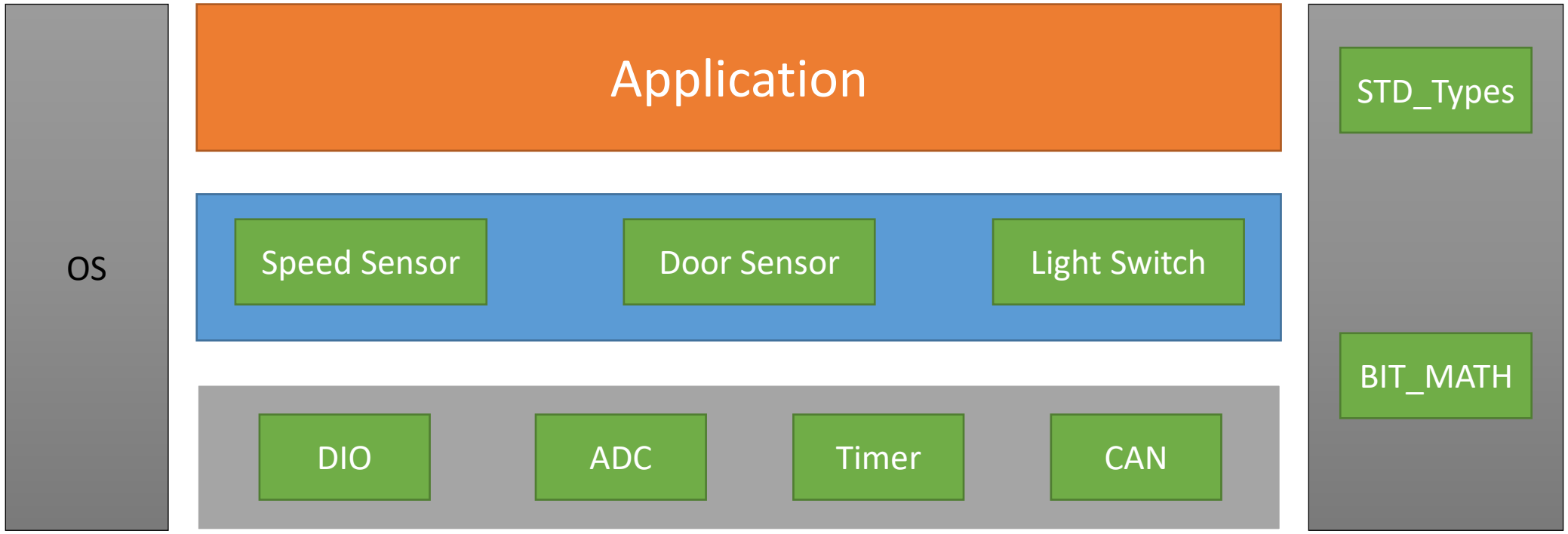
Automotive Door Control System Design

(static Design)

Layered Architecture ECU 1



DIO APIs

Function Name	DIO_Init()	
API Type	Initialization	
Arguments (Inputs)	DIO_Port DIO_Channel DIO PinDirction	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the DIO module	

DIO APIs

Function Name	DIO_Read()	
API Type	Getter	
Arguments (Inputs)	DIO_Port DIO_Channel	
Arguments (Outputs)	DIO_PinLevel	
Return	E_OK	0
	E_NOK	1
Description	Get value of channel	

DIO APIs

Function Name	DIO_Write()	
API Type	Setter	
Arguments (Inputs)	DIO_Channel DIO_PinLevel	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Write value on the channel (LOW or HIGH)	

Name	DIO_Port
Type	Typedef of enum
Range	{PORTA to PORTF}
Description	Number of Ports

Name	DIO_Channel
Type	Typedef of enum
Range	{PIN0 to PIN7}
Description	Number of Pins

Name	DIO_PinLevel
Type	Typedef of enum
Range	{LOW to HIGH}
Description	The level signal on the channel

Name	DIO_PinDirctiion
Type	Typedef of enum
Range	{INPUT to OUTPUT}
Description	The Direction of The channel

Timer APIs

Function Name	TIMER_Init()	
API Type	initilaization	
Arguments (Inputs)	*Configptr	TIMER_ConfigType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the timer module	

Function Name	TIMER_Start()	
API Type	Function	
Arguments (Inputs)	Channel	TIMER_ChannelType
	Value	TIMER_ValueType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Start the timer	

Function Name	TIMER_Stop()	
API Type	initilaization	
Arguments (Inputs)	Channel	TIMER_ChannelType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Stop the timer	

Name	TIMER_ChannelType
Type	Unit8_t
Description	Timer Channel

Name	TIMER_ValueType
Type	Uint8_t
Description	Tick number for reading or setting

Name	TIMER_ConfigType
Type	Structure
Description	The configuration set required for init the timer module

ADC APIs

Function Name	ADC_Init()	
API Type	initilaization	
Arguments (Inputs)	*Configptr	ADC_ConfigType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the ADC module	

Function Name	ADC_Read()	
API Type	Getter	
Arguments (Inputs)	Channel	ADC_CannelType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	To get value from ADC	

Name	ADC_ChannelType
Type	Unit8_t
Description	Timer Channel

Name	ADC_ConfigType
Type	Structure
Description	The configuration set required for init the ADC module

CAN APIs

Function Name	CAN_Init()	
API Type	initilaization	
Arguments (Inputs)	*Configptr	CAN_ConfigType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the CAN module	

Function Name	CAN_SetBaudrate()	
API Type	Function	
Arguments (Inputs)	Controller	Uint8_t
	Baudrate	Uint16_t
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Set the baudrate	

Function Name	CAN_SendData()	
API Type	Function	
Arguments (Inputs)	Data	Uint32_t
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Send data over can	

Function Name	CAN_ReceiveData()	
API Type	Getter	
Arguments (Inputs)	void	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Receive data from can	

Name	Data
Type	Unit32_t
Description	Storage data to send

Name	CAN_ConfigType
Type	Structure
Description	The configuration set required for init the ADC module

Speed Sensor APIs

Function Name	SS_Init()	
API Type	Initialization	
Arguments (Inputs)	None	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Speed Sensor	

Function Name	SS_ReadValue()	
API Type	Getter	
Arguments (Inputs)	ADC_Channel	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Get State of speed sensor	

Light Switch APIs

Function Name	LS_Init()	
API Type	Initialization	
Arguments (Inputs)	None	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Light Switch	

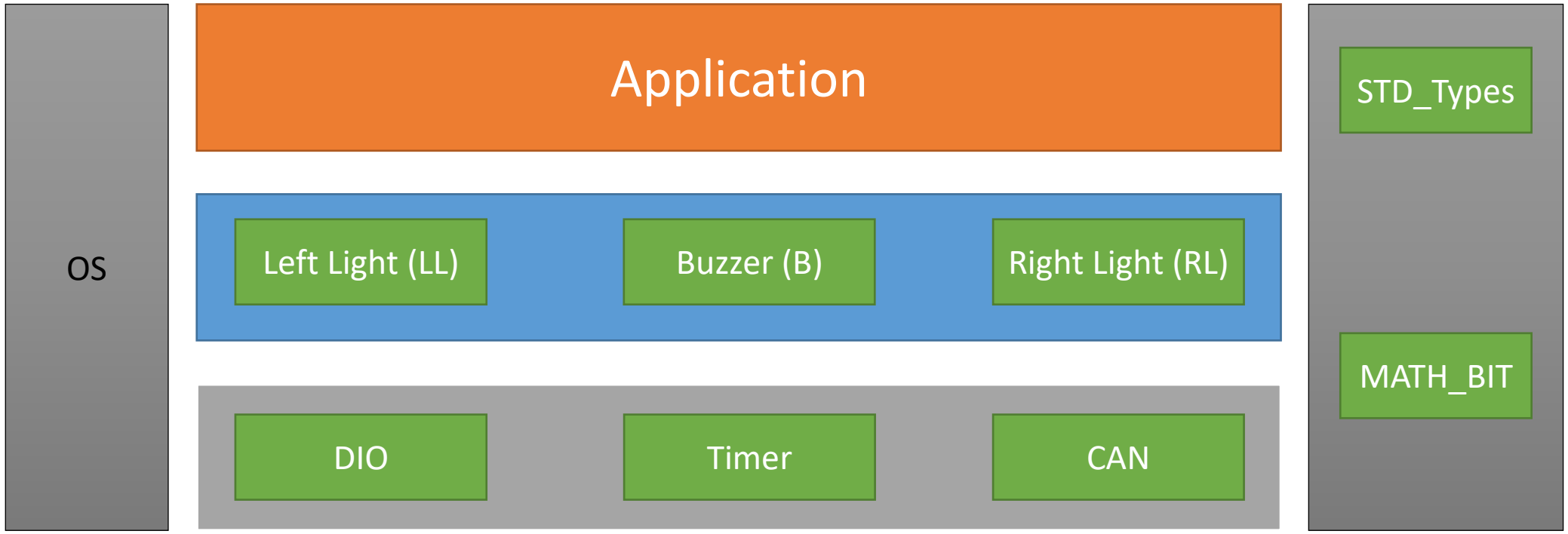
Function Name	LS_GetState()	
API Type	Getter	
Arguments (Inputs)	DIO_Channel	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Get State of Light Switch	

Door Sensor APIs

Function Name	DS_Init()	
API Type	Initialization	
Arguments (Inputs)	None	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Door Sensor	

Function Name	DS_GetState()	
API Type	Getter	
Arguments (Inputs)	DIO_Channel	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Get State of Door Sensor	

Layered Architecture ECU 2



DIO APIs

Function Name	DIO_Init()	
API Type	Initialization	
Arguments (Inputs)	DIO_Port DIO_Channel DIO PinDirction	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the DIO module	

DIO APIs

Function Name	DIO_Read()	
API Type	Getter	
Arguments (Inputs)	DIO_Port DIO_Channel	
Arguments (Outputs)	DIO_PinLevel	
Return	E_OK	0
	E_NOK	1
Description	Get value of channel	

DIO APIs

Function Name	DIO_Write()	
API Type	Setter	
Arguments (Inputs)	DIO_Channel DIO_PinLevel	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Write value on the channel (LOW or HIGH)	

Name	DIO_Port
Type	Typedef of enum
Range	{PORTA to PORTF}
Description	Number of Ports

Name	DIO_Channel
Type	Typedef of enum
Range	{PIN0 to PIN7}
Description	Number of Pins

Name	DIO_PinLevel
Type	Typedef of enum
Range	{LOW to HIGH}
Description	The level signal on the channel

Name	DIO_PinDirctiion
Type	Typedef of enum
Range	{INPUT to OUTPUT}
Description	The Direction of The channel

Timer APIs

Function Name	TIMER_Init()	
API Type	initilaization	
Arguments (Inputs)	*Configptr	TIMER_ConfigType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the timer module	

Function Name	TIMER_Start()	
API Type	Function	
Arguments (Inputs)	Channel	TIMER_ChannelType
	Value	TIMER_ValueType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Start the timer	

Function Name	TIMER_Stop()	
API Type	initilaization	
Arguments (Inputs)	Channel	TIMER_ChannelType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Stop the timer	

Name	TIMER_ChannelType
Type	Unit8_t
Description	Timer Channel

Name	TIMER_ValueType
Type	Uint8_t
Description	Tick number for reading or setting

Name	TIMER_ConfigType
Type	Structure
Description	The configuration set required for init the timer module

CAN APIs

Function Name	CAN_Init()	
API Type	initilaization	
Arguments (Inputs)	*Configptr	CAN_ConfigType
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the CAN module	

Function Name	CAN_SetBaudrate()	
API Type	Function	
Arguments (Inputs)	Controller	Uint8_t
	Baudrate	Uint16_t
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Set the baudrate	

Function Name	CAN_SendData()	
API Type	Function	
Arguments (Inputs)	Data	Uint32_t
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Send data over can	

Function Name	CAN_ReceiveData()	
API Type	Getter	
Arguments (Inputs)	void	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Receive data from can	

Name	Data
Type	Unit32_t
Description	Storage data to send

Name	CAN_ConfigType
Type	Structure
Description	The configuration set required for init the ADC module

Left Light APIs

Function Name	LL_Init()	
API Type	Initialization	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Left Light	

Function Name	LL_ON()	
API Type	Getter	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn On left light	

Function Name	LL_OFF()	
API Type	Function	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn off left light	

Right Light APIs

Function Name	RL_Init()	
API Type	Initialization	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Right Light	

Function Name	RL_OFF()	
API Type	Function	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn Off Right light	

Function Name	RL_ON()	
API Type	Function	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn On Right light	

Buzzer APIs

Function Name	Buzzer_Init()	
API Type	Initialization	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Initialization the Buzzer	

Function Name	Buzzer_OFF()	
API Type	Function	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn Off Buzzer	

Function Name	Buzzer_ON()	
API Type	Function	
Arguments (Inputs)	DIO_Port DIO_Pin	
Arguments (Outputs)	None	
Return	E_OK	0
	E_NOK	1
Description	Turn On Buzzer	