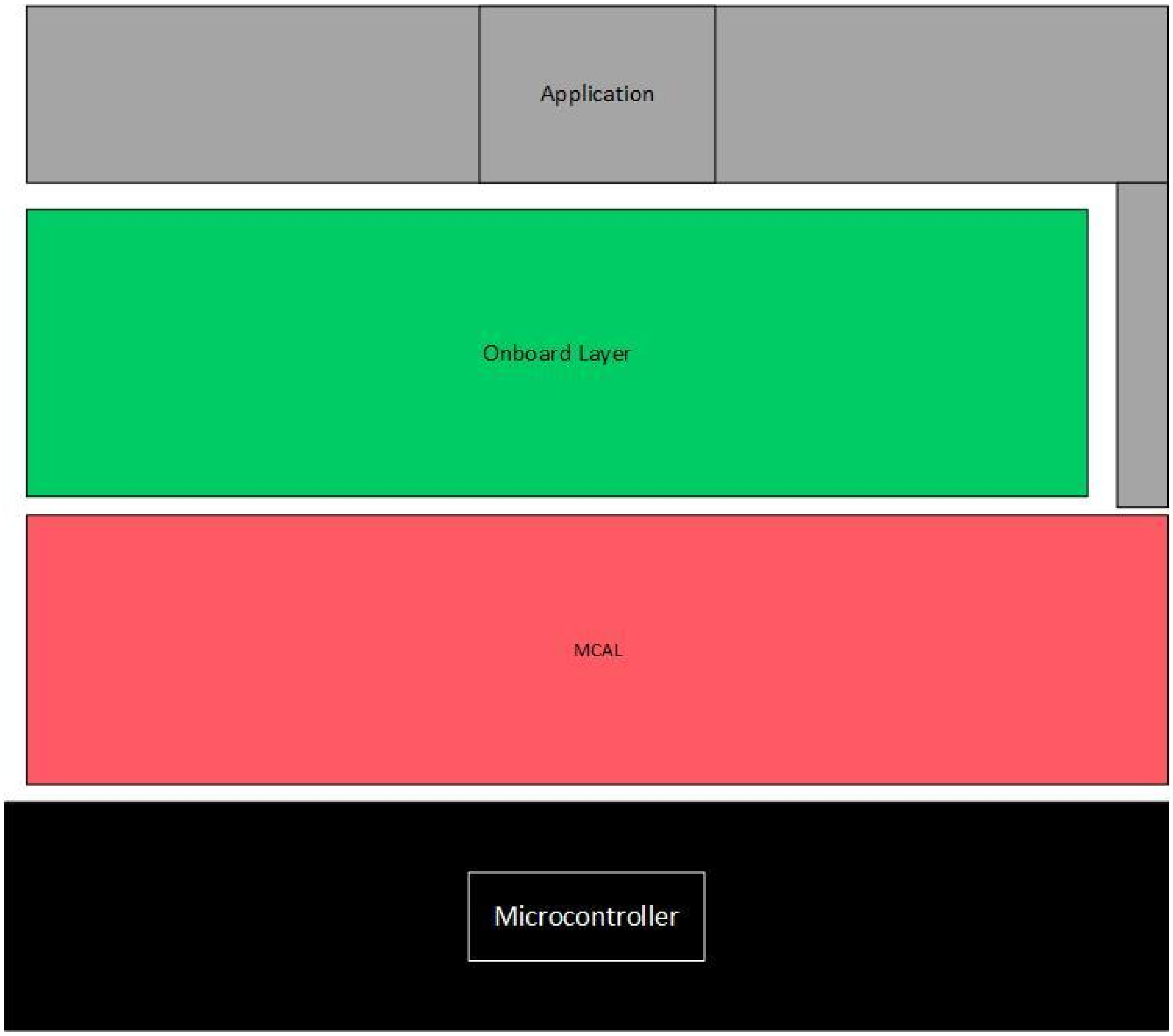
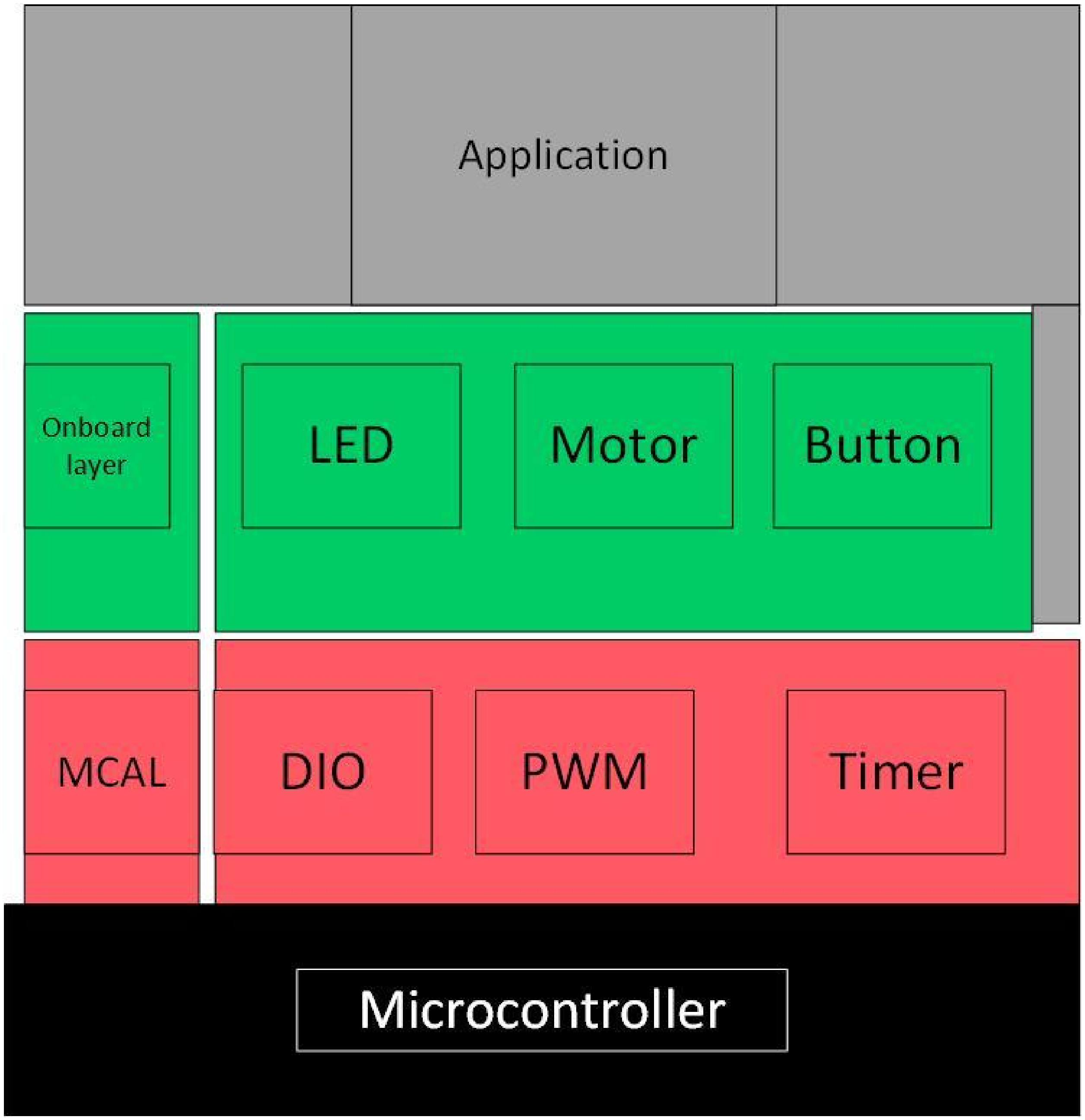
Layered architecture



System modules



APIs

MCAL APIs

DIO API :

Type definitions:

- Dio_ChannelType

Name	Dio_ChannelType
Type	Enumeration
Range	Shall contain all pins ID
Description	Dio_ChannelType
Available via	DIO_Config.h

- Dio_PortType

Name	Dio_PortType
Type	Enumeration
Range	Shall contain all ports ID
Description	Dio_PortType
Available via	DIO_Config.h

- DIO_Errors

Name	DIO_Errors		
Type	Enumeration		
Range	DIO_E_OK	0x00	DIO error OK
	DIO_InvalidPin	0x01	DIO error, invalid pin number.
Description	DIO Errors		
Available via	DIO.h		

- Dio_LevelType

Name	Dio_LevelType		
Type	Enumeration		
Range	STD_LOW	0x00	Physical state 0V
	STD_HIGH	0x01	Physical state 5V or 3.3V.
Description	Dio_LevelType		
Available via	DIO.h		

- Dio_DIRType

Name	Dio_DIRType		
Type	Enumeration		
Range	STD_INPUT	0x00	Set pin as input pin
	STD_OUTPUT	0x01	Set pin as output pin
Description	Dio_DIRType		
Available via	DIO.h		

Services affecting the hardware unit:

- Dio_ReadChannel

Service name	Dio_ReadChannel		

Syntax	DIO_Errors Dio_ReadChannel(
	    Dio_ChannelType ChannelId, Dio_LevelType* level
	);		

Parameters (in)	ChannelId	Channel ID	
	level	Pointer to store the level	STD_HIGH
			STD_LOW
Return	DIO_Errors	DIO_E_OK	
		DIO_InvalidPin	
Description	This Function gets the level of the pin		

  - This function shall return DIO_InvalidPin if pin number is invalid.

- Dio_WriteChannel

Service name	Dio_WriteChannel		

Syntax	DIO_Errors Dio_WriteChannel(
	    Dio_ChannelType ChannelId, Dio_LevelType level
	);		

Parameters (in)	ChannelId	Channel ID	
	level	Value to be set	STD_HIGH
			STD_LOW
Return	DIO_Errors	DIO_E_OK	
		DIO_InvalidPin	
Description	This Function gets the level of the pin		

- This function shall return DIO_InvalidPin if pin number is invalid.

- Dio_ChannelSetDIR

Service name	Dio_ChannelSetDIR		
Syntax	DIO_Errors Dio_ChannelSetDIR(Dio_ChannelType ChannelId, Dio_DIRType dir);		
Parameters (in)	ChannelId	Channel ID	
	dir	Value to be set	STD_INPUT
			STD_OUTPUT
Return	DIO_Errors	DIO_E_OK	
		DIO_InvalidPin	
Description	This Function sets the Direction of the pin		

- This function shall return DIO_InvalidPin if pin number is invalid.

Timer API :

Type definitions:

- Timer_config

Name	Timer_configType
Type	Structure
Description	This is the type of the external data structure containing the overall initialization data for the Timer driver
Available via	timer.h

- Timer_Status

Name	Timer_Status
Type	Enumeration

Range	Timer_S_Ready	0x00	Timer state Ready
	Timer_S_UnInit	0x01	Timer state UnInit
Description	Timer state		
Available via	timer.h		

- Timer_Errors

Name	Timer_Errors		
Type	Enumeration		
Range	Timer_E_OK	0x00	Timer error OK
	Timer_E_TRANSITION	0x01	Timer error TRANSITION
	Timer_E_PARAM_POINTER	0x02	Timer error Parameter Pointer
	Timer_E_INIT_FAILED	0x03	Timer error INIT FAILED
	Timer_E_InvalidValue	0x04	Timer error Invalid value
Description	Timer Errors		
Available via	timer.h		

Services affecting the hardware unit

- Timer_Init

Service name	Timer_Init	
Syntax	Timer_Errors Timer_Init(Timer_configType* config);	
Parameters (in)	config	Pointer to driver configuration
Return	Timer_Errors	Timer_E_OK

		Timer_E_TRANSITION
		Timer_E_PARAM_POINTER
		Timer_E_INIT_FAILED
Description	This Function Initialize the driver	

- This function shall return Timer_E_TRANSITION if timer status is Timer_S_Ready.
- This function shall return Timer_E_PARAM_POINTER if the config pointer is NULL.

- Timer_Set

Service name	Timer_Set	

Syntax	Timer_Errors Timer_Set(
	    Timer_Number Timer_Num, uint16_t Timer_value
	);	

Parameters (in)	Timer_Num	Timer Number
	Timer_value	Value will be stored in timer counter register
Return	Timer_Errors	Timer_E_OK
		Timer_E_TRANSITION
		Timer_E_InvalidValue
Description	This Function Set timer counter with value	

- This function shall return Timer_E_TRANSITION if timer status is Timer_S_UnInit
- This function shall return Timer_E_InvalidValue if the passed value is more than timer capacity.

- Timer_DeInit

Service name	Timer_DeInit
Syntax	Timer_Errors Timer_DeInit(

	Timer_Number Timer_Num);	
Parameters (in)	Timer_Num	Timer Number
Return	Timer_Errors	Timer_E_OK Timer_E_TRANSITION
Description	This Function DeInitialize the driver	

- This function shall return Timer_E_TRANSITION if timer status is Timer_S_UnInit.

PWM API :

Services affecting the hardware unit:

- Set_Duty

Service name	Set_Duty	
Syntax	Timer_Errors Set_Duty(Timer_Number Timer_Num, uint16_t duty);	
Parameters (in)	Timer_Num	Timer Number
	duty	Value will be stored in timer output compare register
Return	Timer_Errors	Timer_E_OK Timer_E_TRANSITION Timer_E_InvalidValue
Description	This Function Set duty cycle in percentage.	

- This function shall return Timer_E_TRANSITION if timer status is Timer_S_UnInit
- This function shall return Timer_E_InvalidValue if the passed value is more than timer capacity.

Onboard APIs

LED API:

No APIs needed for the current requirements.

Motor API:

Type definitions:

- MOTOR_ID_Type

Name	MOTOR_ID_Type
Type	Enumeration
Range	MOTORS_RIGHT / 0x00 / 2 Motors in right side; MOTORS_LEFT / 0x01 / 2 Motors in left side
Description	MOTOR ID Enum
Available via	motor.h

MOTORS_RIGHT	0x00	2 Motors in right side
MOTORS_LEFT	0x01	2 Motors in left side

- MOTOR_DIR_Type

Name	MOTOR_DIR_Type
Type	Enumeration
Range	MOTOR_FORWARD / 0x00 / Forward Direction; MOTOR_BACKWARD / 0x01 / Backward Direction
Description	MOTOR ID Enum
Available via	motor.h

MOTOR_FORWARD	0x00	Forward Direction
MOTOR_BACKWARD	0x01	Backward Direction

Services affecting the hardware unit:

- motorStart

Service name	motorStart	

Syntax	void motorStart(
	    MOTOR_ID_Type motor
	);	

Parameters (in)	motor	Right 0x00, Left 0x01
Return	NONE	
Description	This Function Starts The motor.	

- motorStop

Service name	motorStop	

Syntax	void motorStop(
	    MOTOR_ID_Type motor
	);	

Parameters (in)	motor	Right 0x00, Left 0x01
Return	NONE	
Description	This Function Stops The motor.	

- motorSet_dir

Service name	motorSet_dir	

Syntax	void motorSet_dir(
	    MOTOR_ID_Type motor, MOTOR_DIR_Type dir
	);	

Parameters (in)	motor	Right 0x00, Left 0x01
	dir	Forward 0x00, Backward 0x01
Return	NONE	
Description	This Function Sets the direction of The motor.	

- motorSet_speed

Service name	motorSet_speed

Syntax	void motorSet_speed(
	        MOTOR_ID_Type motor, uint8_t speed
	);	

Parameters (in)	motor	Right 0x00, Left 0x01
	speed	Speed in percentage
Return	NONE	
Description	This Function Sets the speed of The motor.	

- motor_RotateLeft

Service name	motor_RotateLeft

Syntax	void motor_RotateLeft(
	        void
	);

Parameters (in)	NONE
Return	NONE
Description	This Function Rotate to left.

- motor_RotateRight

Service name	motor_RotateRight

Syntax	void motor_RotateRight(
	        void
	);

Parameters (in)	NONE
Return	NONE
Description	This Function Rotate to right.

Button API:

Type definitions:

- Button_configType

Name	Button_configType
Type	Structure
Description	This is the type of the external data structure containing the overall configuration data for the Button API
Available via	Button_Types.h

- Button_LevelType

Name	Button_LevelType		
Type	Enumeration		
Range	BT_PUSH_LEVEL	0x00	Push Level
	BT_RELEASE_LEVEL	0x01	Release Level
Description	Button Level Enum		
Available via	Button_Types.h		

- Button_StateType

Name	Button_StateType		
Type	Enumeration		
Range	BT_PRE_PUSH	0x00	Pre Push Level
	BT_PUSHED	0x01	Pushed Level
	BT_PRE_HOLD	0x02	Pre Hold Level
	BT_HOLD	0x03	Hold Level
	BT_PRE_RELEASE	0x04	Pre Release Level
	BT_RELEASED	0x05	Released Level
	BT_UNDEFINED	0x06	Undefined
Description	Button state Enum		
Available via	Button_Types.h		

- Button_IdType

Name	Button_IdType		
Type	Enumeration		
Range	Button_Start	0x00	Start Button
	Button_Stop	0x01	Stop Button
Description	Button Id Enum		
Available via	Button_Types.h		

Services affecting the hardware unit:

- getButtonState

Service name	getButtonState	
Syntax	Button_StateTyp getButtonState(Button_IdType enmButtonId);	
Parameters (in)	enmButtonId	Start 0x00, Stop 0x01
Return	Button_StateTyp	BT_PRE_PUSH
		BT_PUSHED
		BT_PRE_HOLD
		BT_HOLD
		BT_PRE_RELEASE
		BT_RELEASED
		BT_UNDEFINED
Description	This Function gets the Button state.	

App APIs

App API:

Services affecting the hardware unit:

- appStart

Service name	appStart

Syntax	void appStart(
	        void
	);

Parameters (in)	NONE
Return	NONE
Description	This Function Start the application.