Project 2

Smart Home

Layers
Report

Layers Structure

Application
ECUAL
MCAL
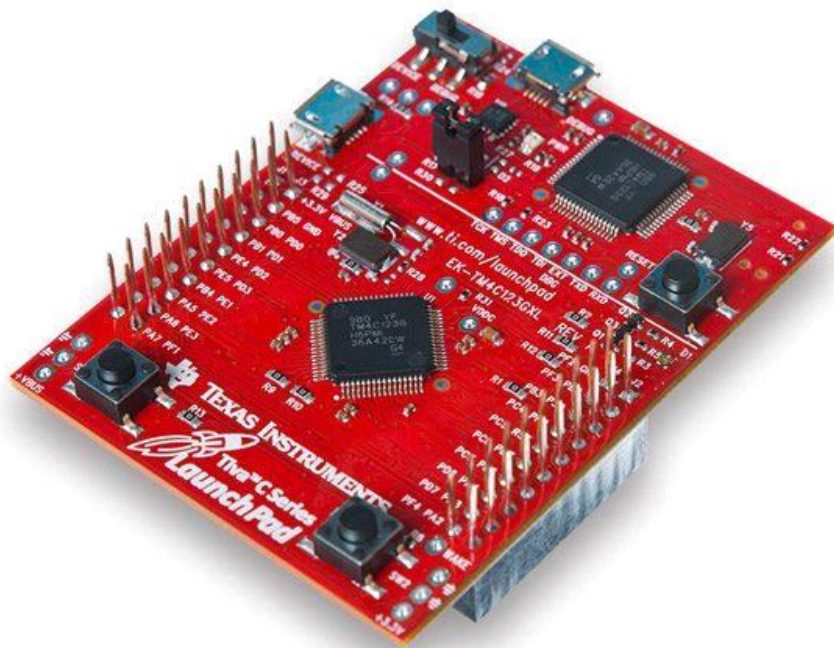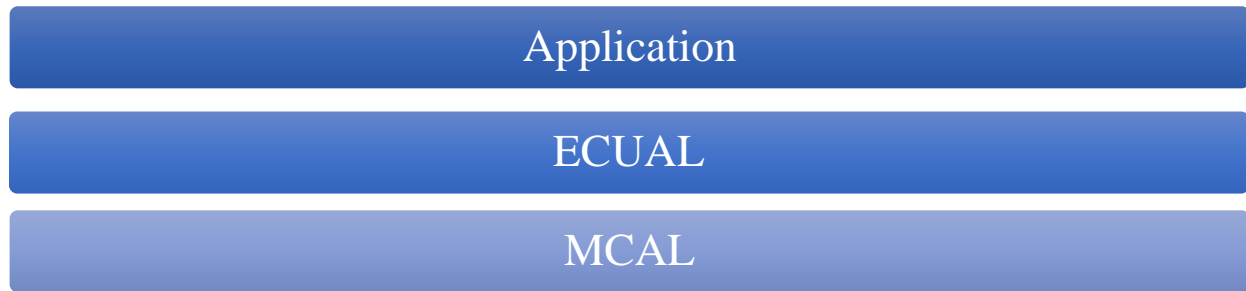
MCAL Drivers

ADC Driver

Type Definitions

Name	ADC_Channel
Type	Enum
Values	AN0
	AN1
	AN2
	AN3
	AN4
	AN5
	AN6
	AN7
	AN8
	AN9
	AN10
	AN11

Function Definitions

Name	ADC_init	
Input	ADC_Channel	Channel
Return	void	
Description	Initialization of the ADC selected by the ADC_Channel	

Name	ADC_read	
Input	ADC_Channel	Channel
Return	uint16	
Description	Returns value read by the selected ADC Channel.	

DIO Driver

Type Definitions

Name	Dio_LevelType
Type	Enum
Values	STD_LOW
	STD_HIGH

Name	Dio_PinDirectionType
Type	Enum
Values	DIO_PIN_IN
	DIO_PIN_OUT

Name	Dio_PortName	
Type	Enum	
Values	PORTA	
	PORTB	
	PORTC	
	PORTD	
	PORTE	
	PORTF	

Name	Dio_IntType	
Type	Enum	
Values	FALLING_EDGE	
	RISING_EDGE	
	BOTH_EDGES	
	LOW_LEVEL	
	HIGH_LEVEL	

Function Definitions

Name	DIO_Init	
Input	Dio_PortName	port_name
	uint8	pins_mask
Return	void	
Description	Connect the clock to the required port and configure it as digital I/O	

Name	DIO_SetPinDirection	
Input	Dio_PortName	port_name
	uint8	pins_mask
	Dio_PinDirectionType	pins_direction
Return	void	
Description	Set required pins as inputs or outputs.	

Name	DIO_SetPinPullUp	
Input	Dio_PortName	port_name
	uint8	pins_mask
Return	Void	
Description	Set internal pull up resistor of required pins	

Name	DIO_SetPinPullDown	
Input	Dio_PortName	port_name
	uint8	pins_mask
Return	Void	
Description	Set internal pull down resistor of required pins	

Name	DIO_ReadPort	
Input	Dio_PortName	port_name
	uint8	pins_mask
Return	uint8	
Description	Return value of the pins selected by pins_mask in the port selected by port_name	

Name	DIO_WritePort	
Input	Dio_PortName	port_name
	uint8	pins_mask
	Dio_LevelType	pins_level
Return	void	
Description	Change pins selected by pins_mask in the port selected by port_name to the value pins_level	

Name	DIO_FlipPort	
Input	Dio_PortName	port_name
	uint8	pins_mask
Return	void	
Description	Toggle value of the pins selected by pins_mask in the port selected by port_name	

Name	DIO_EnableExtInt	
Input	Dio_PortName	port_name
	uint8	pins_mask
	Dio_IntType	int_source
Return	void	
Description	Enable external interrupt for required pins based on interrupt source	

PWM Driver

Type Definitions

Name	PWMChannel
Type	Enum
Values	PWM0
	PWM1
	PWM2
	PWM3
	PWM4
	PWM5
	PWM6
	PWM7

Name	PWMModule	
Type	Enum	
Values	PWMModule0	
	PWMModule1	

Function Definitions

Name	PWM_Init	
Input	PWMModule	module
	PWMChannel	channel
	uint16	period
	uint16	duty
Return	void	
Description	Initialize PWM channel selected by the "channel" parameter And determine the period and duty cycle.	

Name	PWM_SetDuty	
Input	PWMModule	module
	PWMChannel	channel
	uint16	duty
Return	void	
Description	Sets the duty cycle of the selected PWM channel.	

UART Driver

Type Definitions

Name	UARTNUM
Type	enum
Values	uart0
	uart1
	uart2
	uart3
	uart4
	uart5
	uart6
	uart7

Name	PARITY
Type	enum
Values	Parity_OFF
	Parity_ON

Name	INTERRUPT
Type	enum
Values	Interrupt_OFF
	Interrupt_ON

Function Definitions

Name	UART_Init	
Input	UARTNUM	UartNum
	uint32	BaudRate
	PARITY	Parity
	INTERRUPT	interrupt
Return	void	
Description	Initializes selected UART. Enables priority and sets the clock.	

Name	UART_Available	
Input	UARTNUM	UartNum
Return	unit8	
Description	Checks if receive FIFO is empty or not.	

Name	UART_Read	
Input	UARTNUM	UartNum
Return	unit8	
Description	Reads the value received to the selected UART	

Name	UART_Write	
Input	UARTNUM	UartNum
	uint8	data
Return	void	
Description	Sends the value to selected UART.	

Name	UART_Print	
Input	UARTNUM	UartNum
	Pointer to const char	Str
Return	void	
Description	Sends String to selected UART.	

ECUAL Drivers

Button Driver

Type Definitions

Name	InputMode
Type	Enum
Values	PULL_DOWN
	PULL_UP

Function Definitions

Name	Button_Init	
Input	Dio_PortName	port_name
	uint8	pins_mask
	InputMode	mode
Return	void	
Description	Initialized the port selected by port_name and set the direction of selected pins by pins_mask to input then set internal pull up/down resistor of selected pins based on selected mode	

Name	Button_ActOnRisingEdge	
Input	Dio_PortName	port_name
	uint8	pin_Number
	Pointer to void Function	pAction
Return	void	
Description	Read pin number of the button selected by pin_Number from port selected by port_name and take required action selected by pAction pointer to function when button is pressed.	

Name	Button_ActOnFallingEdge	
Input	Dio_PortName	port_name
	uint8	pin_Number
	Pointer to void Function	pAction
Return	void	
Description	Read pin number of the button selected by pin_Number from port selected by port_name and take required action selected by pAction pointer to function when button is released.	

Name	Button_ActOnHighLevel	
Input	Dio_PortName	port_name
	uint8	pin_Number
	Pointer to void Function	pAction
Return	void	
Description	Read pin number of the button selected by pin_Number from port selected by port_name and take required action selected by pAction pointer to function while button is on high level state	

Name	Button_ActOnLowLevel	
Input	Dio_PortName	port_name
	uint8	pin_Number
	Pointer to void Function	*pAction
Return	void	
Description	Read pin number of the button selected by pin_Number from port selected by port_name and take required action selected by pAction pointer to function while button is on low level state	

LCD Driver

Function Definitions

Name	LCD_sendCommand	
Input	uint8	command
Return	void	
Description	Send commands to LCD.	

Name	LCD_displayCharacter	
Input	uint8	data
Return	void	
Description	Prints Characters sent to LCD	

Name	LCD_displayString	
Input	Pointer to const char	Str
Return	void	
Description	Calls LCD_displayCharacter to print Strings sent to LCD.	

Name	LCD_init	
Input	void	
Return	void	
Description	Initialize the LCD to work on selected ports in LCD.h file.	

Name	LCD_clearScreen	
Input	void	
Return	void	
Description	Clear the displayed data on the LCD.	

Name	LCD_displayStringRowColumn	
Input	uint8	row
	uint8	col
	Pointer to const char	Str
Return	void	
Description	Prints string starting from the selected row and column.	

Name	LCD_goToRowColumn	
Input	uint8	row
	uint8	col
Return	void	
Description	Makes the cursor points to the selected row and column.	

Name	LCD_intgerToString	
Input	int	data
Return	void	
Description	Converts integer data to string then displays it on the LCD using LCD_displayString	

Name	LCD_displayCharacter4bit	
Input	uint8	data
Return	void	
Description	Prints Characters sent to LCD.	

Name	LCD_sendCommand4bit	
Input	uint8	command
Return	void	
Description	Send commands to LCD.	

RGB LED Driver

Type Definitions

Name	LED_RGB_Color	
Type	Enum	
Values	dark	0x00
	red	0x02
	blue	0x04
	pink	0x06
	Green	0x08
	Yellow	0x0A
	Sky	0x0C
	White	0x0E

Function Definitions

Name	RGB_LED_Init	
Input	Void	
Return	Void	
Description	Initializes the internal RGB LED of the board.	

Name	RGB_LED_Set_Color	
Input	LED_RGB_Color	color
Return	Void	
Description	Sets the color of RGB LED.	

Name	RED_LED_PWM_Init	
Input	void	
Return	void	
Description	Initializes PWM of red LED	

Name	GREEN_LED_PWM_Init	
Input	void	
Return	void	
Description	Initializes PWM of green LED	

Name	BLUE_LED_PWM_Init	
Input	void	
Return	void	
Description	Initializes PWM of blue LED	

Name	RED_LED_Set_Intensity	
Input	uint16	Intensity
Return	void	
Description	Sets the intensity of the red LED.	

Name	GREEN_LED_Set_Intensity	
Input	uint16	Intensity
Return	void	
Description	Sets the intensity of the green LED.	

Name	BLUE_LED_Set_Intensity	
Input	uint16	Intensity
Return	void	
Description	Sets the intensity of the blue LED.	

Stepper Motor Driver

Function Definitions

Name	StepperMotor_Init	
Input	Void	
Return	Void	
Description	Initializes Stepper Motor to work on the selected port.	

Name	StepperMotor_ClkWise	
Input	Float32	cycle
Return	void	
Description	Change the values of the selected pins in the selected port to rotate the stepper motor in CW direction	

Name	StepperMotor_AntiClkWise	
Input	Float32	cycle
Return	Void	
Description	Change the values of the selected pins in the selected port to rotate the stepper motor in CCW direction	

Name	StepperMotor_Stop	
Input	void	
Return	void	
Description	Stops the Stepper Motor	

Temperature Sensor Driver

Function Definitions

Name	LM35TS_init	
Input	ADC_Channel	Channel
Return	void	
Description	Initializes ADC Channel to be connected to External Temperature Sensor.	

Name	LM35TS_read	
Input	ADC_Channel	Channel
Return	uint16	
Description	Read the value measured by the temperature sensor.	

Name	InternalTempSensor_read	
Input	Void	
Return	Uint16	
Description	Reads the measured temperature of the internal temperature sensor.	

Servo Driver

Function Definitions

Name	Servo_Init	
Input	PWMModule	module
	PWMChannel	channel
	uint16	initial_angle
Return	void	
Description	Initializes the PWM of Servo Motor.	

Name	Servo_SetDegree	
Input	PWMModule	module
	PWMChannel	channel
	uint16	angle
Return	void	
Description	Sets the angle of Servo Motor	