
Microphone array board support library

Library for controlling the XMOS microphone array ref design 1v0.

Features

The microphone array board support library has the following features:

- button and led interface

Typical Resource Usage

This following table shows typical resource usage in some different configurations. Exact resource usage will depend on the particular use of the library by the application.

Configuration	Pins	Ports	Clocks	Ram	Logical cores
Default	13	3 (1-bit), 1 (4-bit), 2 (8-bit)	0	~1.3K	≤ 1

Software version and dependencies

This document pertains to version 2.2.0 of this library. It is known to work on version 14.3.0 of the xTIMEcomposer tools suite, it may work on other versions.

This library depends on the following other libraries:

- lib_i2c (>=4.0.0)

Related application notes

None available.

1 Scope of library

This library provides a unified interface to the Ethernet Microphone Array, WiFi Microphone Array and Smart Mic Array base board. The library provides support for configuring the clocks, interacting with the buttons and driving the LEDs of those boards.

2 Intended use

The board support interface can be accessed via the `mic_array_board_support.h` header:

```
#include "mic_array_board_support.h"
```

You also have to add `mic_array_board_support` to the `USED_MODULES` field of your application Makefile.

3 API

3.1 Functions

Function	mabs_button_and_led_server	
Description	A task to handle the LEDs and buttons of a microphone array board. This task can be combined with other tasks.	
Type	[[combinable]] void mabs_button_and_led_server(server interface mabs_led_button_if lb[n_lb], static const unsigned n_lb, mabs_led_ports_t &leds, in port p_buttons)	
Parameters	lb	An array of client interfaces.
	n_lb	The number of client tasks connected to this server.
	leds	The structure containing the ports used to drive the LEDs.
	p_buttons	The port to which the buttons are mapped.

Function	mabs_init_pll	
Description	Configure the PLL for the specified board.	
Type	void mabs_init_pll(client i2c_master_if i2c, mabs_board_t board)	
Parameters	i2c	The i2c bus used to configure the audio codec.
	board	Specifies the type of board being used.

3.2 Interfaces

Type	mabs_led_button_if	
Description	This interface is used to set the brightness of the LEDs and create events on button presses.	

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Type	mabs_led_button_if (continued)	
Functions	Function	set_led_brightness
	Description	Sets the bightness of an LED.
	Type	void set_led_brightness(unsigned led, unsigned brightness)
	Parameters	led The address of the led to set the brightness of. brightness The buffer containing data to write.
	Function	set_led_ring_brightness
	Description	Sets the bightness of the outer ring of LEDs.
	Type	void set_led_ring_brightness(unsigned brightness)
	Parameters	brightness The brightness value of outer LEDs
	Function	button_event
	Description	Button event notification. This notification will fire when any button is pressed or re- leased.
	Type	[[notification]] slave void button_event(void)
	Function	get_button_event
	Description	Gets the latest button event.
	Type	[[clears_notification]] void get_button_event(unsigned &button, mabs_button_state_t &pressed)
	Parameters	button The address of the button that caused the event. pressed The state the button that caused the event.

3.3 Supporting types

Type	mabs_button_state_t
Description	This type is used to describe an event on a button.
Values	BUTTON_PRESSED Button is depressed. BUTTON_RELEASED Button is released.

Type	mabs_board_t
Description	Supported board types.
Values	ETH_MIC_ARRAY WIFI_MIC_ARRAY SMART_MIC_BASE

Type	mabs_led_ports_t
Description	Structure to describe the LED ports.
Fields	out port p_led0to7 LED 0 to 7. out port p_led8 LED 8. out port p_led9 LED 9. out port p_led10to12 LED 10 to 12. out port p_leds_oen LED Output enable (active low).

4 Known Issues

No known issues.

5 Microphone array board support library change log

5.1 2.2.0

- ADDED: Support for SmartMic base board 1V0
- CHANGE: Update the supported hardware revision of xCORE Microphone Array to 1V3
- CHANGE: Update the supported hardware revision of xCORE WiFi Microphone Array to 1V1

5.2 2.1.0

- CHANGE: Allow the mabs_button_and_led_server task to be combined. As a combinable task cannot currently support an ordered select + default case, the timer case is now run with a constant minimum period to ensure that any other tasks combined with it are not starved.

5.3 2.0.0

- ADDED: Support for the xCORE WiFi Microphone Array board 1V0
- CHANGE: Updated API to avoid conflicts in global namespace
- Changes to dependencies:
 - lib_i2c: Added dependency 3.1.3
 - lib_logging: Added dependency 2.0.1
 - lib_xassert: Added dependency 2.0.1

5.4 1.0.0

- CHANGE: Update to button/LED server to support multiple clients
- ADDED: Outer LED ring interface call

5.5 0.2.2

- CHANGE: Update to source code license and copyright

5.6 0.2.1

- ADDED: MCLK presence and rate detection to 1v0 hardware test

5.7 0.2.0

- CHANGE: Updated documentation

5.8 0.1.0

- Initial Release