

Lab 2:

The purpose of this lab is to just implement the introduction code to blink an LED using RTOS.

Lab 4:

TI-RTOS › Products › SYSBIOS › BIOS - Basic Runtime Options

Welcome System Overview Runtime Error Handling Device Support Advanced

Library Selection Options

SYS/BIOS library type

- ☒ Instrumented (Asserts and Logs enabled)
- ☐ Non-instrumented (Asserts and Logs disabled)
- ☐ Custom (Fully configurable)
- ☐ Debug (Fully configurable)

The library options above allow you to select between several variations of SYS/BIOS libraries depending on your application's requirements. All options except Debug are aggressively optimized with minimal debug content.

☒ Enable Asserts

☒ Enable Logs

Custom Compiler Options: `seed=2 --program_level_compile -o3 -g --optimize_with_debug`

Dynamic Instance Creation Support

☒ Enable Dynamic Instance Creation

A savings in code and data size can be achieved by disabling dynamic instance creation.

Runtime Memory Options

System (Hwi and Swi) stack size: 1024

Heap size: 0

Heap section: null

☐ Use HeapTrack

The heap configured above is used for the standard C malloc() and free() functions or when the 'heap' argument to Memory_alloc() is NULL.

Threading Options

☒ Enable Tasks (When disabled, the Task module is not configurable)

☒ Enable Software Interrupts (When disabled, the Swi module is not configurable)

☒ Enable Clock Manager (When disabled, the Clock module is not configurable)

C Standard Library Lock: GateMutex

Platform Settings

These settings should reflect the hardware platform that runs your application.

CPU clock frequency (Hz): 80000000

Problems *Live Session *Execution Graph *CPU Load: Graph

	Type	Time	Error	Master	Message	Event	EventClass	Da
1..	i	3789719637		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
1..	i	4042366412		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
1..	i	4295012862		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
1..	i	4547659637		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
1..	i	4800311600		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	5052952887		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	5305604837		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	5558251625		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	5810898087		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	6063544862		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	6316196800		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	6568838087		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	
2..	i	6821490050		CORT...	[./rtos_lab4.c:107] LED TO...	Log_L_info	Info	

Lab 5:

Outline Resource Explorer CCS App Center Getting Started main.c empty.cfg

TI-RTOS Products SYSBIOS Scheduling Hwi - Instance Settings

Module Instance Advanced

Portable Hwis

Hwi_TIMER2 Add ... Remove

Required Settings

Handle Hwi_TIMER2

ISR function ledToggle

Interrupt number 39

Additional Settings

Argument passed to ISR function 0

Interrupt priority -1

Event Id -1

☒ Enable at startup

Masking options MaskingOption_SELF

TI-RTOS Properties cfg Script

TI-RTOS Products SYSBIOS BIOS - Basic Runtime Options

Library Selection Options

SYS/BIOS library type

☐ Instrumented (Asserts and Logs enabled)

☐ Non-instrumented (Asserts and Logs disabled)

☒ Custom (Fully configurable)

☐ Debug (Fully configurable)

The library options above allow you to select between several variations of SYS/BIOS libraries depending on your application's requirements. All options except Debug are aggressively optimized with minimal debug content.

☒ Enable Asserts

☒ Enable Logs

Custom Compiler Options =2 --program_level_compile -o3 -g --optimize_with_debug

Threading Options

☒ Enable Tasks (When disabled, the Task module is not configurable)

☒ Enable Software Interrupts (When disabled, the Swi module is not configurable)

☒ Enable Clock Manager (When disabled, the Clock module is not configurable)

C Standard Library Lock GateMutex

Dynamic Instance Creation Support

☒ Enable Dynamic Instance Creation

A savings in code and data size can be achieved by disabling dynamic instance creation.

Runtime Memory Options

System (Hwi and Swi) stack size 1024

Heap size 0

Heap section null

☐ Use HeapTrack

The heap configured above is used for the standard C malloc() and free() functions or when the 'heap' argument to Memory_alloc() is NULL.

Platform Settings

These settings should reflect the hardware platform that runs your application.

CPU clock frequency (Hz) 80000000

Lab 6:

The screenshot displays the Code Composer Studio (CCS) interface for a TI-RTOS project. The top panel shows the Project Explorer with the 'blink_TM4C_SW1' project selected. The middle panel shows the 'Instance Settings' for the 'LED_Swi' instance, configured with 'Handle: LED_Swi', 'Function: ledToggle', 'Interrupt priority: -1', and 'Initial trigger: 0x0'. The bottom panel shows the 'Instance Settings' for the 'Hwi_TIMER2' instance, configured with 'Handle: Hwi_TIMER2', 'ISR function: Timer_ISR', 'Interrupt number: 39', and 'Masking options: MaskingOption_SELF'. The bottom-most panel shows the 'Execution Graph' for the 'CORTEX_M4_0.Swi' task, with a timeline showing the execution of 'Post', 'Start', 'Stop', and 'Task.ti_sysbios_knl_Idle_loop_E0@200022c4'.

workspace_v9 - blink_TM4C_SW1/empty.cfg - C:\Users\perez\workspace_v9 - Code Composer Studio

File Edit View Project Tools Run Scripts Window Help

Project Explorer

- blink_TM4C Using BIOS
- blink_target_HWI
- blink_TM4C_SW1 (Active - Debug)
- Binaries
- Includes
- Debug
- targetConfigs
- EK_TM4C123GXL.cmd
- main.c
- src
- empty.cfg [TI-RTOS]
- button
- button_with_interrupt
- collector_CC1350_LAUNCHXL_tirtos_ccs
- EHHH
- empty_EK_TM4C123GXL_TI
- empty_min_EK_TM4C123GXL_TI

Resource Explorer

CCS App Center Getting Started main.c empty.cfg empty.cfg Load.c

TI-RTOS Products SYSBIOS Scheduling Swi - Instance Settings

Module Instance Advanced

Swi

LED_Swi

Add ...

Remove

Required Settings

Handle LED_Swi

Function ledToggle

Interrupt priority -1

Initial trigger 0x0

Thread Context

Argument 0 0

Argument 1 0

Variables Express... Registers Breakp... Outline

type filter text

- BIOS
- Clock
- Defaults
- Diags
- Error
- HeapMem
- Hwi
 - Hwi_TIMER2
- Log
- LoggingSetup
- Main
- Memory
- Program
- Semaphore
- Swi

Debug Problems RTOS Object View (ROV) Live Session

Type	Time	Error	Master	Message	Event	EventClass	Data1	Data2	SeqNo	Logger	Module	Domain	Process	PID	Local Time	Arg1	Arg2	Arg3	Arg4	Arg5	Arg6	Arg7	Arg8	Block Arg
1	0		CORT_	LD_ready: task 0x200022c4...	Task_LD_ready	Unknown	ti_sy...		0	SYSLBL_	ti.sysb...	ti.sysb...				0	0x2...	0x5...	0x0	0x0				
2	35825		CORT_	LM_switch: oldtask 0x0, old...	CtxChg	TSK	ti_sy...		1	SYSLBL_	ti.sysb...	ti.sysb...			1433	0x0	0x0	0x2...	0x5...					
3	500009725		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	0	Load	ti.sysb...	ti.sysb...			20000389	0x1	0x0	0x2...	0x5...					
4	500026050		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		2	SYSLBL_	ti.sysb...	ti.sysb...			20001042	0x2...	0x2...	0xf	0x0					
5	500037550		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		3	SYSLBL_	ti.sysb...	ti.sysb...			20001502	0x2...	0x2...	0x2	0x0					
6	500055425		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	0	Main	xdcrn...	xdcrn...					20002217	0x2...	0x84	0x2...	0x1					
7	500061075		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		4	SYSLBL_	ti.sysb...	ti.sysb...			20002443	0x2...								
8	1000011875		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	1	Load	ti.sysb...	ti.sysb...			40000475	0x1								
9	1000027225		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		5	SYSLBL_	ti.sysb...	ti.sysb...			40001089	0x2...	0x2...	0xf	0x0					
10	1000038725		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		6	SYSLBL_	ti.sysb...	ti.sysb...			40001549	0x2...	0x2...	0x2	0x0					
11	1000045875		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	1	Main	xdcrn...	xdcrn...					40001835	0x2...	0x84	0x2...	0x2					
12	1000051525		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		7	SYSLBL_	ti.sysb...	ti.sysb...			40002061	0x2...								
13	1500019375		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	2	Load	ti.sysb...	ti.sysb...			60000775	0x1								
14	1500028175		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		8	SYSLBL_	ti.sysb...	ti.sysb...			60001127	0x2...	0x2...	0xf	0x0					
15	1500039675		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		9	SYSLBL_	ti.sysb...	ti.sysb...			60001587	0x2...	0x2...	0x2	0x0					
16	1500046825		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	2	Main	xdcrn...	xdcrn...					60001873	0x2...	0x84	0x2...	0x3					
17	1500052475		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		10	SYSLBL_	ti.sysb...	ti.sysb...			60002099	0x2...								
18	2000026150		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		11	SYSLBL_	ti.sysb...	ti.sysb...			80001046	0x2...	0x2...	0xf	0x0					
19	2000037650		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		12	SYSLBL_	ti.sysb...	ti.sysb...			80001506	0x2...	0x2...	0x2	0x0					
20	2000044800		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	3	Main	xdcrn...	xdcrn...					80001792	0x2...	0x84	0x2...	0x4					
21	2000050450		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		13	SYSLBL_	ti.sysb...	ti.sysb...			80002018	0x2...								
22	2000058800		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	3	Load	ti.sysb...	ti.sysb...			80002352	0x1								
23	2500026175		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		14	SYSLBL_	ti.sysb...	ti.sysb...			100001047	0x2...	0x2...	0xf	0x0					
24	2500037675		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		15	SYSLBL_	ti.sysb...	ti.sysb...			100001507	0x2...	0x2...	0x2	0x0					
25	2500044825		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	4	Main	xdcrn...	xdcrn...					100001793	0x2...	0x84	0x2...	0x5					
26	2500050475		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		16	SYSLBL_	ti.sysb...	ti.sysb...			100002019	0x2...								
27	2500066275		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	4	Load	ti.sysb...	ti.sysb...			100002651	0x1								
28	3000026175		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		17	SYSLBL_	ti.sysb...	ti.sysb...			120001047	0x2...	0x2...	0xf	0x0					
29	3000037675		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		18	SYSLBL_	ti.sysb...	ti.sysb...			120001507	0x2...	0x2...	0x2	0x0					
30	3000044825		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	5	Main	xdcrn...	xdcrn...					120001793	0x2...	0x84	0x2...	0x6					
31	3000050475		CORT_	LD_end: swi: 0x20002264...	Stop	SWI	ledT...		19	SYSLBL_	ti.sysb...	ti.sysb...			120002019	0x2...								
32	3000072875		CORT_	LS_cpuLoad: 1%	Load	CPU	CPU	1.00	5	Load	ti.sysb...	ti.sysb...			120002915	0x1								
33	3500026200		CORT_	LM_post: swi: 0x20002264...	Post	SWI	ledT...		20	SYSLBL_	ti.sysb...	ti.sysb...			140001048	0x2...	0x2...	0xf	0x0					
34	3500037700		CORT_	LM_begin: swi: 0x2000226...	Start	SWI	ledT...		21	SYSLBL_	ti.sysb...	ti.sysb...			140001508	0x2...	0x2...	0x2	0x0					
35	4000044850		CORT_	[./main.c:132] LED TOGGLE...	Log_L_info	Info	6	Main	xdcrn...	xdcrn...					140001794	0x2...	0x84	0x2...	0x7					

Showing 47 records

workspace_v9 - blink_TM4C_SW1/empty.cfg - C:\Users\perez\workspace_v9 - Code Composer Studio

File Edit View Project Tools Run Scripts Window Help

Project Explorer

- blink_TM4C Using BIOS
- blink_target_HWI
- blink_TM4C_SW1 (Active - Debug)
- Binaries
- Includes
- Debug
- targetConfigs
- EK_TM4C123GXL.cmd
- main.c
- src
- empty.cfg [TI-RTOS]
- button
- button_with_interrupt
- collector_CC1350_LAUNCHXL_tirtos_ccs
- EHHH
- empty_EK_TM4C123GXL_TI
- empty_min_EK_TM4C123GXL_TI

Resource Explorer

CCS App Center Getting Started main.c empty.cfg empty.cfg Load.c

TI-RTOS Products SYSBIOS Scheduling Hwi - Instance Settings

Module Instance Advanced

Portable Hwis

Hwi_TIMER2

Add ...

Remove

Required Settings

Handle Hwi_TIMER2

ISR function Timer_ISR

Interrupt number 39

Additional Settings

Argument passed to ISR function 0

Interrupt priority -1

Event Id -1

☒ Enable at startup

Masking options MaskingOption_SELF

Variables Express... Registers Breakp... Outline

type filter text

- BIOS
- Clock
- Defaults
- Diags
- Error
- HeapMem
- Hwi
 - Hwi_TIMER2
- Log
- LoggingSetup
- Main
- Memory
- Program
- Semaphore
- Swi

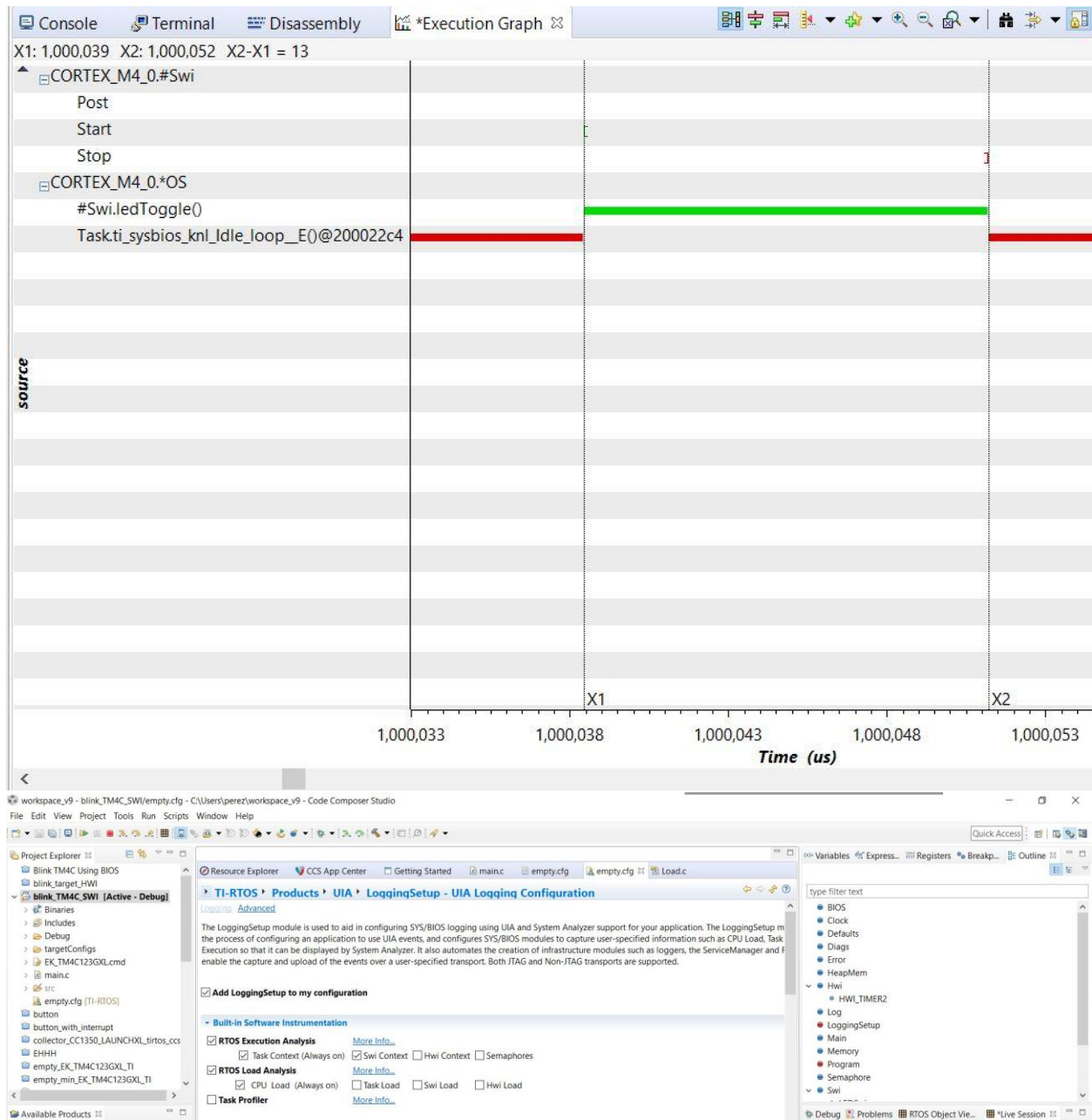
Debug Problems RTOS Object View (ROV) Live Session Execution Graph

CORTEX_M4_0.Swi

- Post
- Start
- Stop

CORTEX_M4_0.OS

- #Swi.ledToggle()
- Task.ti_sysbios_knl_Idle_loop_E0@200022c4



Lab 7:

The screenshot displays the TI-RTOS RTOS Object View (ROV) and the Clock - Instance Settings configuration window.

RTOS Object View (ROV) Table:

Processor	Master	Message	Event
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:146] LED TOGGLED [3] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:146] LED TOGGLED [4] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:137] LED BENCHMARK = [11] TM4C...	Log_L_info
CORTEX_M4_0		[./main.c:146] LED TOGGLED [5] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:146] LED TOGGLED [6] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:137] LED BENCHMARK = [11] TM4C...	Log_L_info
CORTEX_M4_0		[./main.c:146] LED TOGGLED [7] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:146] LED TOGGLED [8] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load
CORTEX_M4_0		[./main.c:137] LED BENCHMARK = [11] TM4C...	Log_L_info
CORTEX_M4_0		[./main.c:146] LED TOGGLED [9] TIMES	Log_L_info
CORTEX_M4_0		LS_cpuLoad: 0%	Load

Clock - Instance Settings:

Module: **TI-RTOS** > Products > **SYSBIOS** > Scheduling > Clock - Instance Settings

Module: **ledToggleCik**

Required Settings:

- Handle: ledToggleCik
- Function: ledToggle
- Initial timeout: 1
- Period: 1
- ☒ Start at boot time when instance is created

Thread Context:

- Argument: null

TI-RTOS ▸ Products ▸ SYSBIOS ▸ Scheduling ▸ Clock - Module Settings

☒ Add the Clock support module to my configuration

Time Base

☒ Internally configure a Timer to periodically call Clock_tick()
☐ Application code calls Clock_tick()
☐ The Clock module is disabled

When the Clock Manager is enabled, the Time Base setting will follow the user's configuration.
When the Clock Manager is disabled, the Time Base setting will be internally forced to "The Clock module is disabled".
See the SYS/BIOS "Enable Clock Manager" setting under [Threading Options](#).

Scheduling

Swi priority: 15
The priority above sets the priority for all Clock functions independent of their period.
Higher numbers have higher priority.

Timer Control

Tick period (us): 500000
Timer Id: ANY
Tick mode: Unnecessary timer ticks will be suppressed

TI-RTOS Properties | **cfg Script**

X1: 11,000 X2: 11,501 X2-X1 = 500

source

CORTEX_M4_0.#Swi

Post

Start

Stop

CORTEX_M4_0.*OS

X1

X2

Lab 8:

Resource Explorer CCS App Center Getting Started main.c empty.cfg empty.cfg Hwi.c

TI-RTOS Products SYSBIOS Scheduling Task - Module Settings

The Task module allows you to create one or more prioritized threads, each with a separate stack, that can block on one or more events.

☒ Add the Task threads module to my configuration

Global Task Options

Number of priorities 16

All blocked function null

☒ Initialize stack

☒ Check for task stack overflow

☐ Delete terminated tasks

Default Task Options

Default stack size 2048

Default stack section .bss:taskStackSection

Default stack heap null

Idle Task Options

☒ Enable Idle Task

☒ Idle Task is vital

Idle Task stack size 2048

Idle Task stack section .bss:taskStackSection

Resource Explorer CCS App Center Getting Started main.c empty.cfg empty.cfg Hwi.c

TI-RTOS Products SYSBIOS Synchronization Semaphore - Instance Settings

Module Instance Advanced

Semaphores

LEDsem Add ... Remove

Required Settings

Handle LEDsem

Initial count 0

Semaphore type

☒ Counting (FIFO)

☐ Binary (FIFO)

☐ Counting (priority-based)

☐ Binary (priority-based)

Event Support

These options are only available when [Event](#) support is enabled by the [Semaphore module](#).

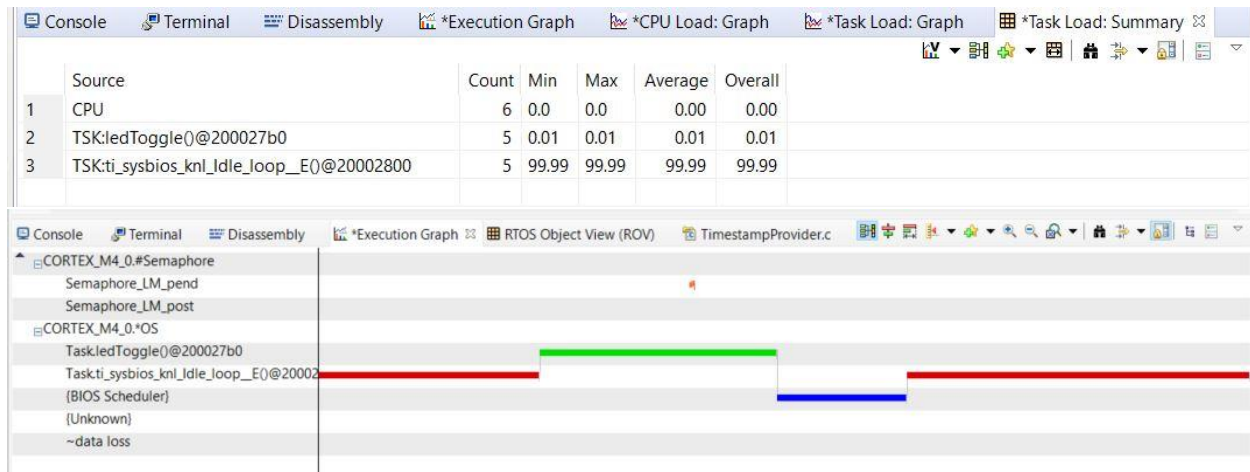
Event instance null Event Id Event_Id_00

The screenshot displays a real-time monitoring interface with multiple panels. The top panel shows a list of system events with columns for Message, Event, EventClass, Data1, Data2, SeqNo, Logger, Module, Domain, Process, PID, Local Time, Arg1, Arg2, and Arg3. The events include semaphore operations (LM_post, LM_ready, LM_switch, LM_pend, LD_block), task management (Task_LD_ready, Task_LD_block), and system loads (LS_taskLoad, LS_cpuLoad). The bottom panel shows the RTOS Object View (ROV) with a tree on the left and a table on the right. The tree lists various system components like BIOS, Boot, Clock, Diags, Event, GateHwi, GateMutex, HeapMem, Hwi, Idle, Load, LoggerStopMode, Queue, QueueDescriptor, Registry, Semaphore, Startup, Swi, SysMin, System, Task, and Timer. The table displays details for selected objects, including address, label, event, eventId, mode, count, pendedTasks, priority, fcn, arg0, arg1, stackSize, stackBase, curCoreId, and affinity.

Message	Event	EventClass	Data1	Data2	SeqNo	Logger	Module	Domain	Process	PID	Local Time	Arg1	Arg2	Arg3
4,0 LM_post: sem: 0x20002d38, count: 0	Semaphore_LM_post	Unknown			96	SYSBL...	ti.sysb...	ti.sysbi...			291112325	0x2...	0x0	
4,0 LD_ready: tsb: 0x200027b0, func: 0x2c39, pri...	Task_LD_ready	Unknown	ledT...		97	SYSBL...	ti.sysb...	ti.sysbi...			291112640	0x2...	0x2...	C
4,0 LM_switch: oldtsk: 0x20002800, oldfunc: 0x5...	CtxChg	TSK	ledT...		98	SYSBL...	_ti.uis...	ti.sysbi...			291113319	0x2...	0x5...	0x
4,0 [./main.c:134] LED TOGGLED [16] TIMES	Log_L_info	Info			15	Main ...	xdc.ru...	xdc.ru...			291113750	0x2...	0x86	0x
4,0 LM_pend: sem: 0x20002d38, count: 0, timeo...	Semaphore_LM_pend	Unknown			99	SYSBL...	ti.sysb...	ti.sysbi...			291114003	0x2...	0x0	0x
4,0 LD_block: tsb: 0x200027b0, func: 0x2c39	Task_LD_block	Unknown	ledT...		100	SYSBL...	ti.sysb...	ti.sysbi...			291114349	0x2...	0x2...	
4,0 LM_switch: oldtsk: 0x200027b0, oldfunc: 0x...	CtxChg	TSK	ti_sy...		101	SYSBL...	_ti.uis...	ti.sysbi...			291114894	0x2...	0x2...	0x
4,0 LS_taskLoad: 0x200027b0,1575,20000389,0x...	Load	TSK	ledT...	0.01	42	Load ...	ti.sysb...	ti.sysbi...			300009751	0x2...	0x6...	0x
4,0 LS_taskLoad: 0x20002800,19998814,200003...	Load	TSK	ti_sy...	99.99	43	Load ...	ti.sysb...	ti.sysbi...			300009994	0x2...	0x1...	0x
4,0 LS_cpuLoad: 0%	Load	CPU	CPU	0.00	44	Load ...	ti.sysb...	ti.sysbi...			300010293	0x0		
4,0 LM_post: sem: 0x20002d38, count: 0	Semaphore_LM_post	Unknown			102	SYSBL...	ti.sysb...	ti.sysbi...			311112326	0x2...	0x0	
4,0 LD_ready: tsb: 0x200027b0, func: 0x2c39, pri...	Task_LD_ready	Unknown	ledT...		103	SYSBL...	ti.sysb...	ti.sysbi...			311112641	0x2...	0x2...	C
4,0 LM_switch: oldtsk: 0x20002800, oldfunc: 0x5...	CtxChg	TSK	ledT...		104	SYSBL...	_ti.uis...	ti.sysbi...			311113320	0x2...	0x5...	0x
4,0 [./main.c:134] LED TOGGLED [17] TIMES	Log_L_info	Info			16	Main ...	xdc.ru...	xdc.ru...			311113719	0x2...	0x86	0x
4,0 LM_pend: sem: 0x20002d38, count: 0, timeo...	Semaphore_LM_pend	Unknown			105	SYSBL...	ti.sysb...	ti.sysbi...			311113972	0x2...	0x0	0x
4,0 LD_block: tsb: 0x200027b0, func: 0x2c39	Task_LD_block	Unknown	ledT...		106	SYSBL...	ti.sysb...	ti.sysbi...			311114318	0x2...	0x2...	
4,0 LM_switch: oldtsk: 0x200027b0, oldfunc: 0x...	CtxChg	TSK	ti_sy...		107	SYSBL...	_ti.uis...	ti.sysbi...			311114863	0x2...	0x2...	0x
4,0 LS_taskLoad: 0x200027b0,1543,20000611,0x...	Load	TSK	ledT...	0.01	45	Load ...	ti.sysb...	ti.sysbi...			320010362	0x2...	0x6...	0x
4,0 LS_taskLoad: 0x20002800,19999068,200006...	Load	TSK	ti_sy...	99.99	46	Load ...	ti.sysb...	ti.sysbi...			320010605	0x2...	0x1...	0x
4,0 LS_cpuLoad: 0%	Load	CPU	CPU	0.00	47	Load ...	ti.sysb...	ti.sysbi...			320010904	0x0		
4,0 LM_post: sem: 0x20002d38, count: 0	Semaphore_LM_post	Unknown			108	SYSBL...	ti.sysb...	ti.sysbi...			331112327	0x2...	0x0	
4,0 LD_ready: tsb: 0x200027b0, func: 0x2c39, pri...	Task_LD_ready	Unknown	ledT...		109	SYSBL...	ti.sysb...	ti.sysbi...			331112642	0x2...	0x2...	C
4,0 LM_switch: oldtsk: 0x20002800, oldfunc: 0x5...	CtxChg	TSK	ledT...		110	SYSBL...	_ti.uis...	ti.sysbi...			331113321	0x2...	0x5...	0x
4,0 [./main.c:134] LED TOGGLED [18] TIMES	Log_L_info	Info			17	Main ...	xdc.ru...	xdc.ru...			331113720	0x2...	0x86	0x
4,0 LM_pend: sem: 0x20002d38, count: 0, timeo...	Semaphore_LM_pend	Unknown			111	SYSBL...	ti.sysb...	ti.sysbi...			331113973	0x2...	0x0	0x
4,0 LD_block: tsb: 0x200027b0, func: 0x2c39	Task_LD_block	Unknown	ledT...		112	SYSBL...	ti.sysb...	ti.sysbi...			331114319	0x2...	0x2...	
4,0 LM_switch: oldtsk: 0x200027b0, oldfunc: 0x...	CtxChg	TSK	ti_sy...		113	SYSBL...	_ti.uis...	ti.sysbi...			331114864	0x2...	0x2...	0x

address	label	event	eventId	mode	count	pendedTasks
0x20002d38	LEDsem	none	n/a	count...	0	Label: ledToggleTask, priority: 1, pendState: Waiting forever

address	label	priority	mode	fcn	arg0	arg1	stackSize	stackBase	curCoreId	affinity
0x200027b0	ledToggleTask	1	Blocked	ledToggle	0x0	0x0	2048	0x20000...	n/a	n/a
0x20002800	ti.sysbios.knl.TaskIdleTask	0	Running	ti_sysbios_knl_Idle_loop_E	0x0	0x0	2048	0x20000...	n/a	n/a



Lab 9:

Part A & B

TI-RTOS ▸ Products ▸ SYSBIOS ▸ Scheduling ▸ Hwi - Instance Settings

Module Instance Advanced

Portable Hwis

Timer_2A_INT Add ... Remove

Required Settings

Handle Timer_2A_INT

ISR function Timer_ISR

Interrupt number 39

Additional Settings

Argument passed to ISR function 0

Interrupt priority -1

Event Id -1

☒ Enable at startup

Masking options MaskingOption_SELF

TI-RTOS ▸ Products ▸ SYSBIOS ▸ Synchronization ▸ Mailbox - Instance Settings

Module Instance Advanced

Mailboxes

LED_Mbx Add ... Remove

Required Settings

Handle LED_Mbx

Size of messages (chars) 4

Max number of messages 2

Event Synchronization

The events below can be used to synchronize with threads that need to wait for messages to arrive in the mailbox (reader event) or for space to become available in the mailbox for a new message to be posted (writer event). These options are only available when [Event](#) support is enabled by the [Semaphore module](#).

Reader event null Event id Event_Id_00

Writer event null Event id Event_Id_00

Message Memory Management

Heap null

Buffer section null

Buffer pointer null

Buffer size (chars) 0

TI-RTOS ▶ Products ▶ SYSBIOS ▶ Synchronization ▶ Queue - Instance Settings

Module [Instance](#)

Queues		Required Settings	
LED_Queue	<div>Add ... Remove</div>	Handle	LED_Queue

TI-RTOS ▶ Products ▶ SYSBIOS ▶ Synchronization ▶ Semaphore - Instance Settings

Module [Instance](#) [Advanced](#)

Semaphores		Required Settings	
mailbox_queue_Sem QueSem	<div>Add ... Remove</div>	Handle	mailbox_queue_Sem
		Initial count	0
		Semaphore type	<div><input checked="" type="radio"/> Counting (FIFO) <input type="radio"/> Binary (FIFO) <input type="radio"/> Counting (priority-based) <input type="radio"/> Binary (priority-based)</div>
Event Support			
These options are only available when Event support is enabled by the Semaphore module .			
Event instance		null	Event Id
			Event_Id_00

TI-RTOSProductsSYSBIOSynchronizationSemaphore - Instance Settings

ModuleInstanceAdvanced

Semaphores

mailbox_queue_Sem

QueSem

Add ...

Remove

Required Settings

Handle

QueSem

Initial count

0

Semaphore type

☒ Counting (FIFO)

☐ Binary (FIFO)

☐ Counting (priority-based)

☐ Binary (priority-based)

Event Support

These options are only available when [Event](#) support is enabled by the [Semaphore module](#).

Event instance

null

Event Id

Event_Id_00

ModuleInstanceAdvanced

Tasks

ledToggleTask

mailbox_queue_Task

Add ...

Remove

Required Settings

Handle

ledToggleTask

Function

ledToggle

Priority

1

Use the vital flag to prevent system exit until this thread exits

☒ Task is vital

Stack Control

Stack size

2048

Stack memory section

.bss:taskStackSection

Stack pointer

null

Stack heap

null

Thread Context

Argument 0

0

Argument 1

0

Environment pointer

null

TI-RTOScfa Script

TI-RTOS ▸ Products ▸ SYSBIOS ▸ Scheduling ▸ Task - Instance Settings

Module Instance Advanced

Tasks

ledToggleTask
mailbox_queue_Task

Add ...
Remove

Required Settings

Handle mailbox_queue_Task
Function mailbox_queue
Priority 2

Use the vital flag to prevent system exit until this thread exits
☒ Task is vital

Stack Control

Stack size 2048
Stack memory section .bss:taskStackSection
Stack pointer null
Stack heap null

Thread Context

Argument 0 0
Argument 1 0
Environment pointer null

TI-RTOS cfa Script

Lab 10:

The screenshot displays the TI-RTOS IDE interface with the following components:

- Resource Explorer:** Shows files like CCS App Center, Getting Started, main.c, and empty.cfg.
- Breadcrumb Navigation:** TI-RTOS > Products > SYSBIOS > BIOS - Basic Runtime Options
- Navigation Links:** Welcome, System Overview, Runtime, Error Handling, Device Support, Advanced.
- Library Selection Options:**
 - SYS/BIOS library type:
 - ☐ Instrumented (Asserts and Logs enabled)
 - ☐ Non-instrumented (Asserts and Logs disabled)
 - ☒ Custom (Fully configurable)
 - ☐ Debug (Fully configurable)
 - Description: The library options above allow you to select between several variations of SYS/BIOS libraries depending on your application's requirements. All options except Debug are aggressively optimized with minimal debug content.
 - Enable Asserts: ☒
 - Enable Logs: ☒
 - Custom Compiler Options: =2 --program_level_compile -o3 -g --optimize_with_debug
- Dynamic Instance Creation Support:**
 - ☒ Enable Dynamic Instance Creation

A savings in code and data size can be achieved by disabling dynamic instance creation.
- Runtime Memory Options:**
 - System (Hwi and Swi) stack size: 1024
 - Heap size: 4096
 - Heap section: null
 - ☐ Use HeapTrack
 - Description: The heap configured above is used for the standard C malloc() and free() functions or when the 'heap' argument to Memory_alloc() is NULL.
- Threading Options:**
 - ☒ Enable Tasks (When disabled, the Task module is not configurable)
 - ☒ Enable Software Interrupts (When disabled, the Swi module is not configurable)
 - ☒ Enable Clock Manager (When disabled, the Clock module is not configurable)
- Platform Settings:**
 - Description: These settings should reflect the hardware platform that runs your application.
 - CPU clock frequency (Hz): 40000000
- Bottom Panel:** RTOS Object View (ROV) and Load.c
- Table:** A table with columns: address, label, buf, minBlockAlign, sectionName, totalSize, totalFreeSize, largestFreeSize. The first row contains values: 0x20002e38, (empty), 0x20002..., 8, (empty), 0x100, 0xe0, 0xe0.