Freescale MQX RTOS Example Guide

lwsem_lite example

This document explains the lwsem_lite example, what to expect when running it and a brief introduction to the API.

The example

The lwsem_lite example code shows how lightweight semaphores works. The code is written in a way that two different semaphores are synchronized to ensure mutual exclusion of a common memory space.

Running the example

The user only needs to do compilation of MQX libraries, ksdk library and the example without any further step.

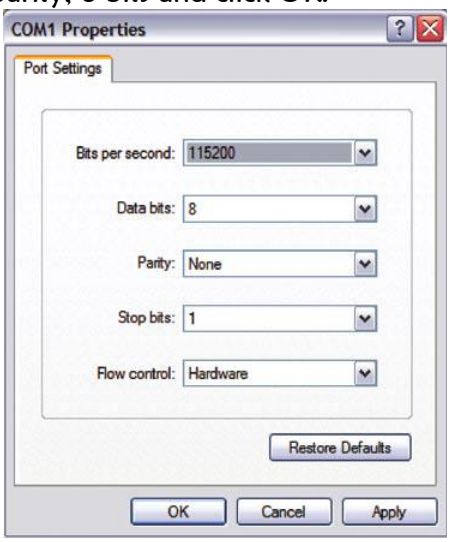
If the platform supports floating point, you have to disable floating point in <MQX_folder>\rtos\mqx\config\mcu\<board>\mqx_sdk_config.h:

```
#define MQXCFG_ENABLE_FP          0
#define MQXCFG_ALLOCATOR  MQX_ALLOCATOR_LWMEM
```

And rebuild MQX library.

Start HyperTerminal on the PC (Start menu->Programs->Accessories->Communications). Make a connection to the serial port that is connected to the board (usually will be COM1).

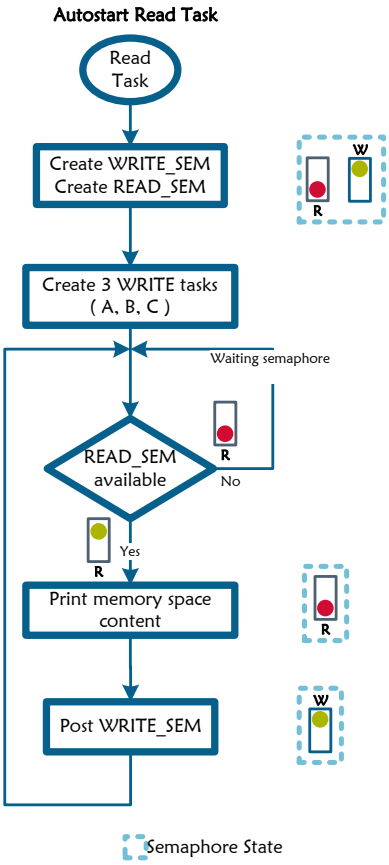
Set it for 115200 baud, no parity, 8 bits and click OK.



Explaining the example

The light weight semaphores example uses four tasks:

- 1 read_task
- 3 write_task



read_task flow chart

The read_task starts by creating two lightweight semaphores (WRITE_SEM and READ_SEM) that govern the access to a data memory location (FIFO.Data). The WRITE_SEM starts enabled, while the REA_SEM is disabled.

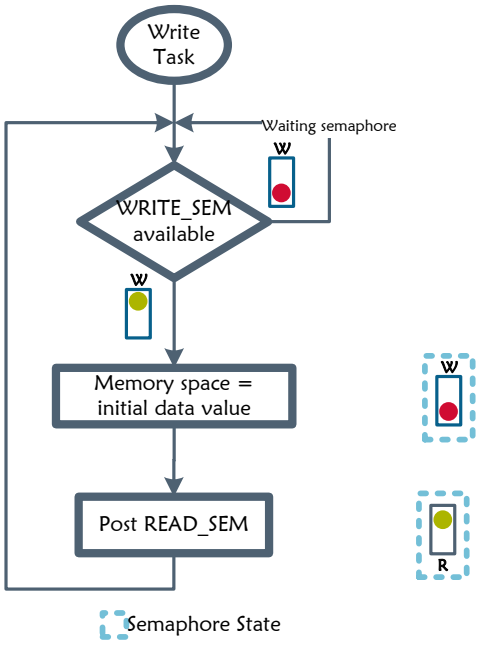
```
Result = _lwsem_create(&fifo.READ_SEM, 0);
Result = _lwsem_create(&fifo.WRITE_SEM, 1);
        Parameters:
          &fifo.READ_SEM = pointer to the lightweight semaphore to create
          0 = Initial semaphore counter
```

Then 3 write task are created with initial_data equal to 'A', 'B', 'C' correspondingly.

If the READ_SEM is available (_lwsem_wait), the read_task prints on the HyperTerminal whatever the shared memory space contains.

```
Result = _lwsem_wait(&fifo.READ_SEM);
putchar('\n');
putchar(fifo.DATA);
```

Finally the WRITE_SEM is posted
_lwsem_post(&fifo.WRITE_SEM);



write_task flow chart

The write task verifies if the WRITE_SEM is available (_lwsem_wait), then writes at the shared memory space, task initial_value.

```
Result  = _lwsem_wait(&fifo.WRITE_SEM)
fifo.DATA = (uchar)initial_data;
```

Finally the READ_SEM is posted

```
_lwsem_post(&fifo.READ_SEM);
```

The following figure shows how the tasks behave in the lwsem example.