Synchronizace pomoci semaforu

Systémové funkce :

```
#include <rtl.h>

 void os_sem_init ( OS_ID semaphore,  U16 token_count );
OS_RESULT os_sem_wait ( OS_ID semaphore,  U16 timeout );
OS_RESULT os_sem_send ( OS_ID semaphore );
```

Příklad :

Task1 a task2 zapisují současně bloky dat do společné část paměti

Hlavní části programu

```
OS_TID tsk1, tsk2;
OS_SEM semaphore1;
u8 buffer_1k[0x3FF] ;                    // spolecna promenna

__task void task1 (void) {
                u16 j=0xff, l=0;
  while (1) {
    os_sem_wait (semaphore1, 1);
                                        for (l=128;l>0; --l ){
                                                buffer_1k[j]= 0xff;
                                                j=(j+1)%0x3FF  ;}

     os_sem_send (semaphore1);
    }}
__task void task2 (void) {
                u16 k=0, m=0;
  while (1) {
    os_sem_wait (semaphore1, 0xFFFF);
                            for (m=128;m>0; --m ){
                                        buffer_1k[k]= 0x11;
                                        k=(k+1)%0x3FF  ;}
    os_sem_send (semaphore1);
  }}
```

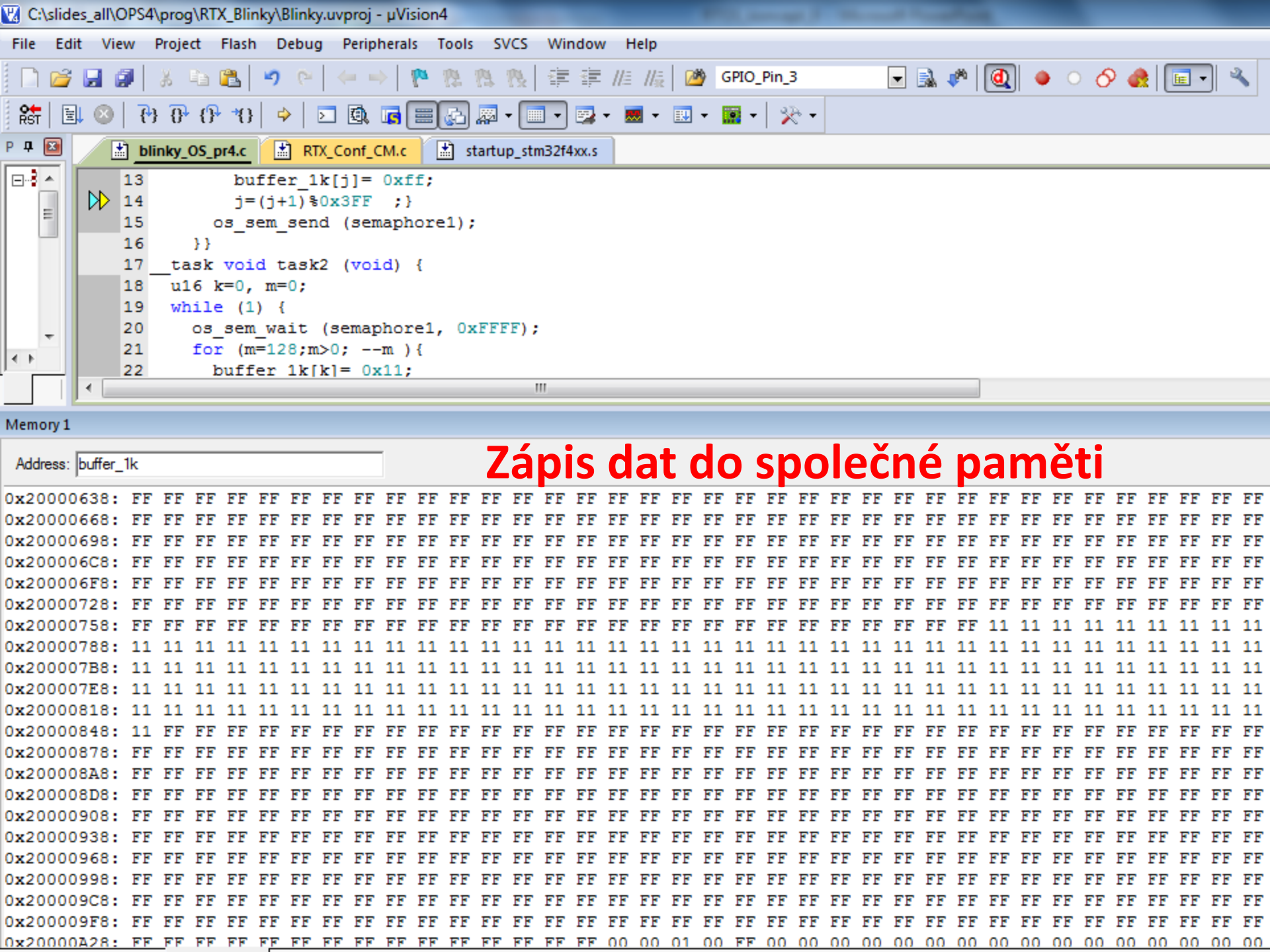
Kritická sekce

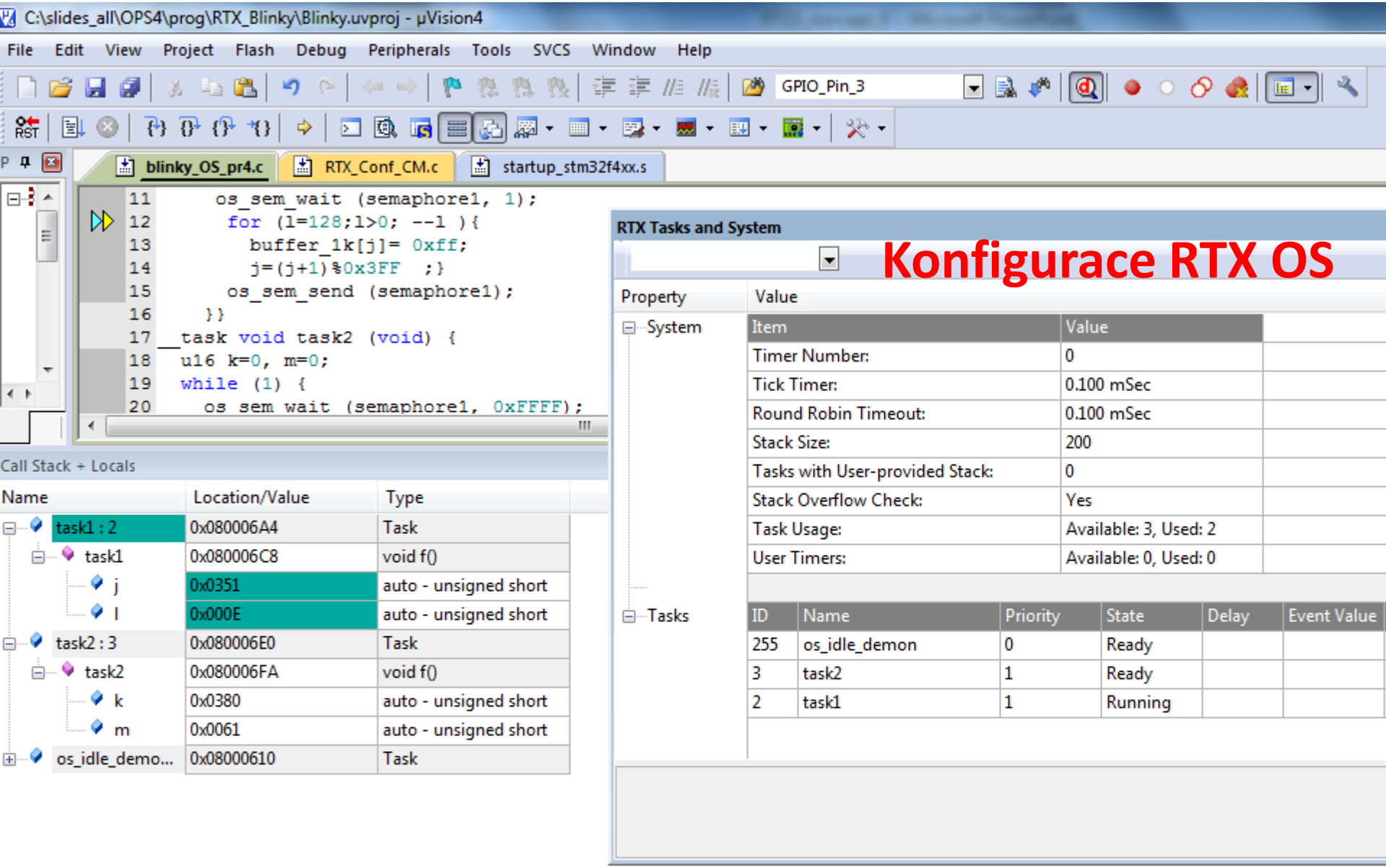
Kritická sekce

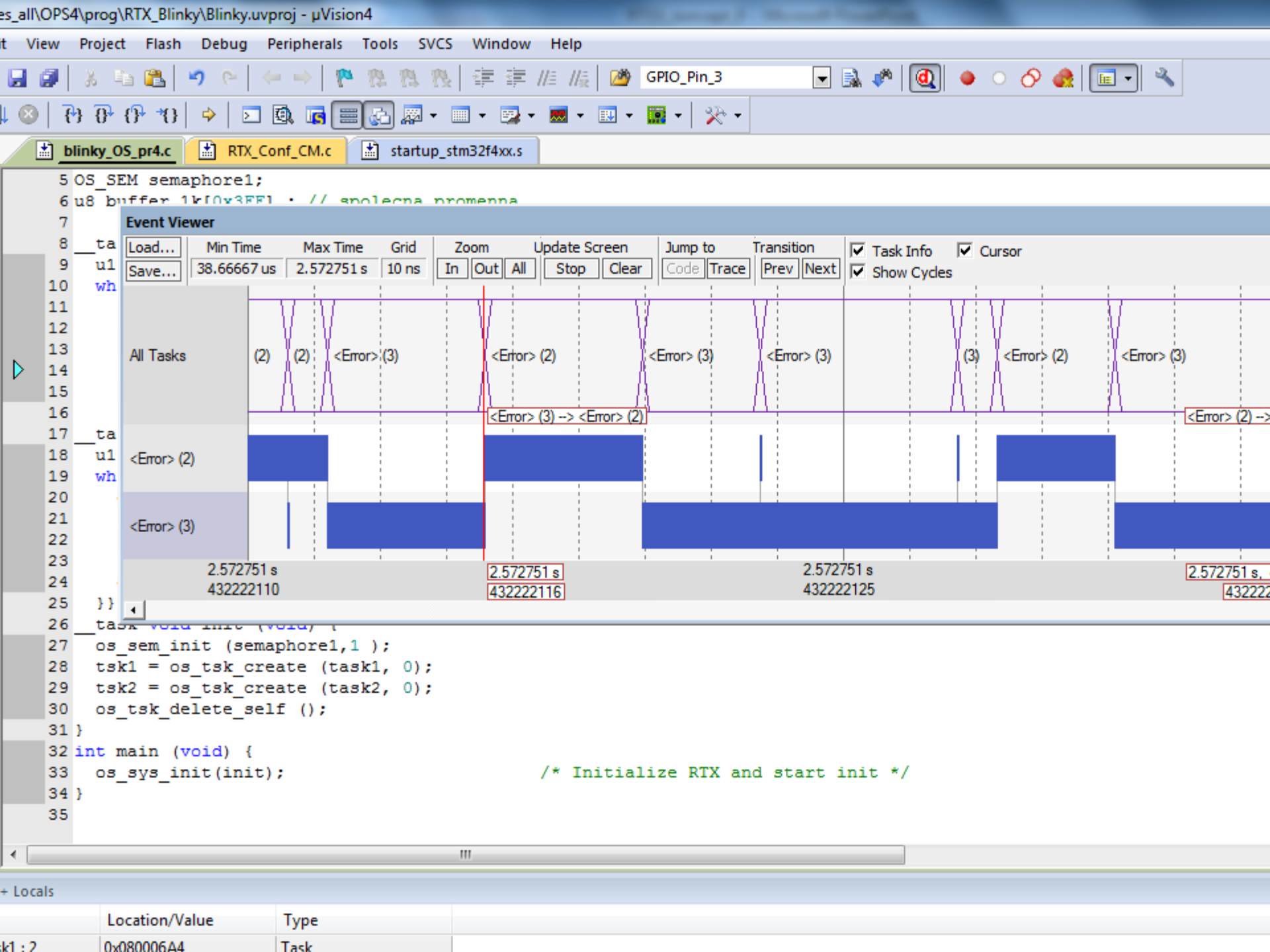
Pomocné části programu

```
#include <RTL.h>
#include "STM32F4xx.h"

__task void init (void) {
  os_sem_init (semaphore1,1 );
  tsk1 = os_tsk_create (task1, 0);
  tsk2 = os_tsk_create (task2, 0);
  os_tsk_delete_self ();
}
int main (void) {
  os_sys_init(init);                    /* Initialize RTX and start init */
}
```


C:\slides_all\OPS4\prog\RTX_Blinky\Blinky.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
GPIO_Pin_3
blinky_OS_pr4.c
RTX_Conf_CM.c
startup_stm32f4xx.s
13 buffer_1k[j]= 0xff;
14 j=(j+1)%0x3FF ;}
15 os_sem_send (semaphore1);
16 }}
17 __task void task2 (void) {
18 u16 k=0, m=0;
19 while (1) {
20 os_sem_wait (semaphore1, 0xFFFF);
21 for (m=128;m>0; --m){
22 buffer_1k[k]= 0x11;
Memory 1
Address: buffer_1k
Zápis dat do společné paměti
0x20000638: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000668: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000698: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200006C8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200006F8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000728: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000758: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 11 11 11 11 11 11 11 11
0x20000788: 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11
0x200007B8: 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11
0x200007E8: 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11
0x20000818: 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11 11
0x20000848: 11 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000878: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200008A8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200008D8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000908: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000938: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000968: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000998: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200009C8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x200009F8: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x20000A28: FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 00 01 00 FF 00 00 00 00 00 00 00 00 00 00 00 00 00


C:\slides_all\OPS4\prog\RTX_Blinky\Blinky.uvproj - µVision4
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
GPIO_Pin_3
blinky_OS_pr4.c
RTX_Conf_CM.c
startup_stm32f4xx.s
11 os_sem_wait (semaphore1, 1);
12 for (l=128;l>0; --l){
13 buffer_1k[j]= 0xff;
14 j=(j+1)%0x3FF ;}
15 os_sem_send (semaphore1);
16 }}
17 __task void task2 (void) {
18 u16 k=0, m=0;
19 while (1) {
20 os_sem_wait (semaphore1, 0xFFFF);
Call Stack + Locals
Name
Location/Value
Type
task1 : 2
0x080006A4
Task
task1
0x080006C8
void f()
j
0x0351
auto - unsigned short
l
0x000E
auto - unsigned short
task2 : 3
0x080006E0
Task
task2
0x080006FA
void f()
k
0x0380
auto - unsigned short
m
0x0061
auto - unsigned short
os_idle_demo...
0x08000610
Task
RTX Tasks and System
Konfigurace RTX OS
Property
Value
System
Item
Value
Timer Number:
0
Tick Timer:
0.100 mSec
Round Robin Timeout:
0.100 mSec
Stack Size:
200
Tasks with User-provided Stack:
0
Stack Overflow Check:
Yes
Task Usage:
Available: 3, Used: 2
User Timers:
Available: 0, Used: 0
Tasks
ID
Name
Priority
State
Delay
Event Value
255
os_idle_demon
0
Ready
3
task2
1
Ready
2
task1
1
Running


es_all\OPS4\prog\RTX_Blinky\Blinky.uvproj - µVision4
View Project Flash Debug Peripherals Tools SVCS Window Help
GPIO_Pin_3
blinky_OS_pr4.c
RTX_Conf_CM.c
startup_stm32f4xx.s
OS_SEM semaphore1;
Event Viewer
Load...
Save...
Min Time
38.66667 us
Max Time
2.572751 s
Grid
10 ns
Zoom
In Out All
Update Screen
Stop Clear
Jump to
Code Trace
Transition
Prev Next
Task Info
Cursor
Show Cycles
All Tasks
(2) (2) <Error> (3)
<Error> (2)
<Error> (3)
<Error> (3)
(3)
<Error> (2)
<Error> (3)
<Error> (3) --> <Error> (2)
<Error> (2)
<Error> (3)
2.572751 s
432222110
2.572751 s
432222116
2.572751 s
432222125
os_sem_init (semaphore1,1);
tsk1 = os_tsk_create (task1, 0);
tsk2 = os_tsk_create (task2, 0);
os_tsk_delete_self ();
int main (void) {
os_sys_init(init);
/* Initialize RTX and start init */
Locals
Location/Value
Type
0x080006A4
Task