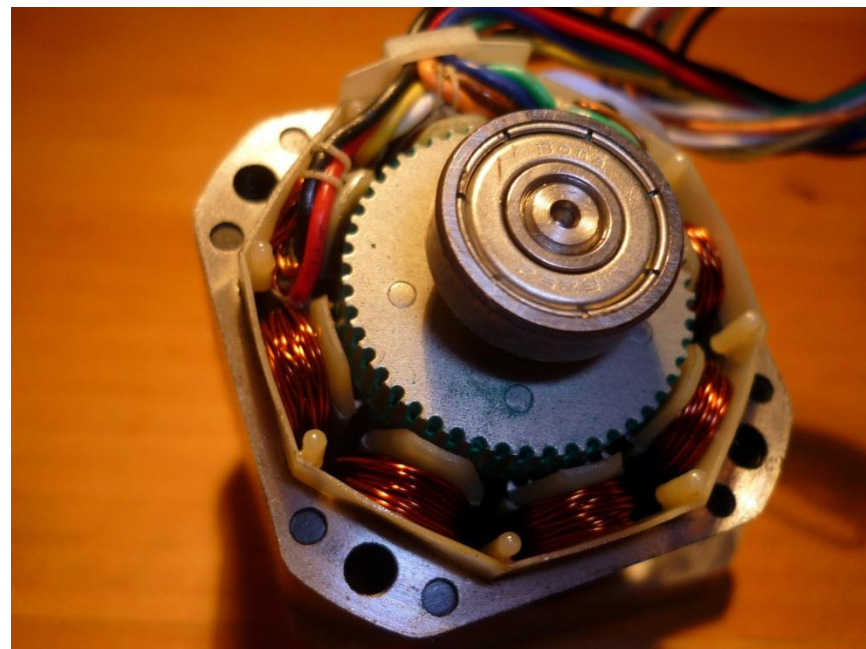
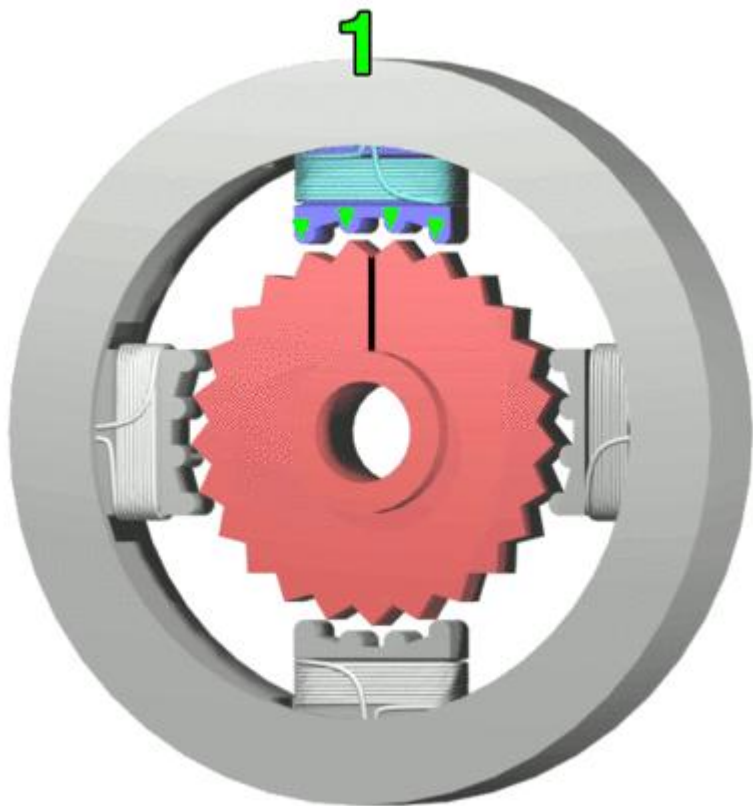


RTX Kernel projekt č. 1

pro STM32F407VG microcontroller a kit STM32F4-Discovery

Program simuluje chod krokového motoru. Čtyři blikající led diody představují chod budíčů fází A, B, C a D motoru. Motor pracuje s polovičním krokem.



Hlavní části programu

```
void signal_func (OS_TID task) {
```

```
    os_dly_wait (step);
```

```
    os_evt_set (0x0001, task);
```

```
    os_dly_wait (step); }
```

```
__task void phaseA (void) {
```

```
    for (;;) {
```

```
        os_evt_wait_and (0x0001, 0xffff);
```

```
        LED_On (LED_A); phasea=1 ;
```

```
        if ( dir) signal_func (t_phaseB);
```

```
            else signal_func (t_phaseD);
```

```
            LED_Off(LED_A); phasea=0;}}
```

```
__task void phaseB (void) {
```

```
    for (;;) {
```

```
        os_evt_wait_and (0x0001, 0xffff);
```

```
        LED_On (LED_B); phaseb=1 ;
```

```
        if ( dir) signal_func (t_phaseC);
```

```
            else signal_func (t_phaseA);
```

```
            LED_Off(LED_B); phaseb=0; }
```

```
}
```

```
__task void phaseC (void) {
```

```
    for (;;) {
```

```
        os_evt_wait_and (0x0001, 0xffff);
```

```
        LED_On (LED_C);  phasec=1 ;
```

```
        if ( dir) signal_func (t_phaseD);
```

```
            else signal_func (t_phaseB);
```

```
            LED_Off(LED_C) ;phasec=0 ;}}
```

```
__task void phaseD (void) {
```

```
    for (;;) {
```

```
        os_evt_wait_and (0x0001, 0xffff);
```

```
        LED_On (LED_D); phased=1 ;
```

```
        if ( dir) signal_func (t_phaseA);
```

```
            else signal_func (t_phaseC);
```

```
            LED_Off(LED_D); phased=0 ;}}
```

další části programu

```
__task void button (void) {
```

```
for (;;) {
```

```
    in1 = GPIOA->IDR ;
```

```
    in1 &= 1 ;
```

```
    os_dly_wait (8);
```

```
    in2 = GPIOA->IDR ;
```

```
    in2 &= 1 ;
```

```
    if ( in1 == in2) dir =in1 ;
```

```
    if (dir==1) {++step;
```

```
    if ( step>60) step = 5 ;} }}
```

```
Int main (void) {
```

```
    LED_init ();
```

```
    os_sys_init(init);
```

```
}
```

základní definice programu

```
#include <RTL.h>
#include "stm32f4xx.h"          /* STM32F4xx Definitions */
#include "LED.h"

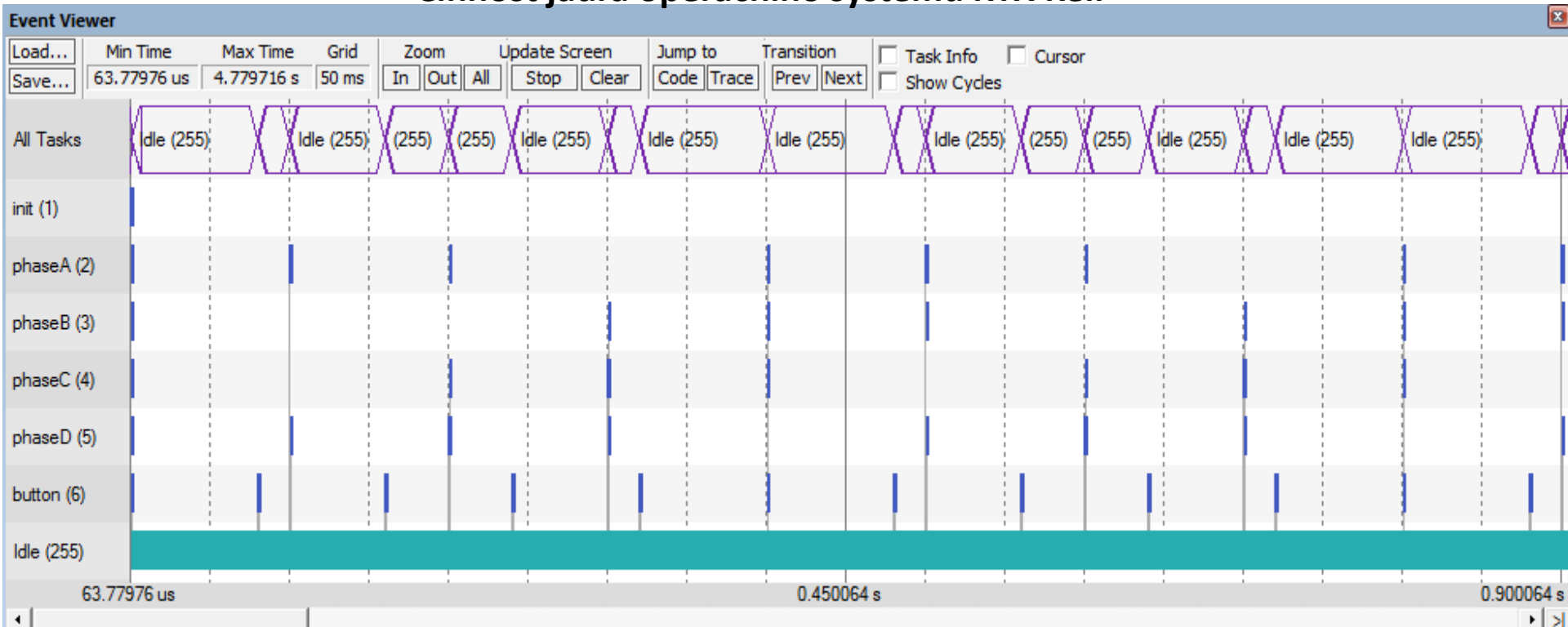
OS_TID t_phaseA, t_phaseB, t_phaseC, t_phaseD, t_button;

#define LED_A  0
#define LED_B  1
#define LED_C  2
#define LED_D  3
u16 in1, in2, step=10, dir=0 ;
unsigned int phasea=0 ; phaseb=0 ; phasec=0 ; phased=0 ;

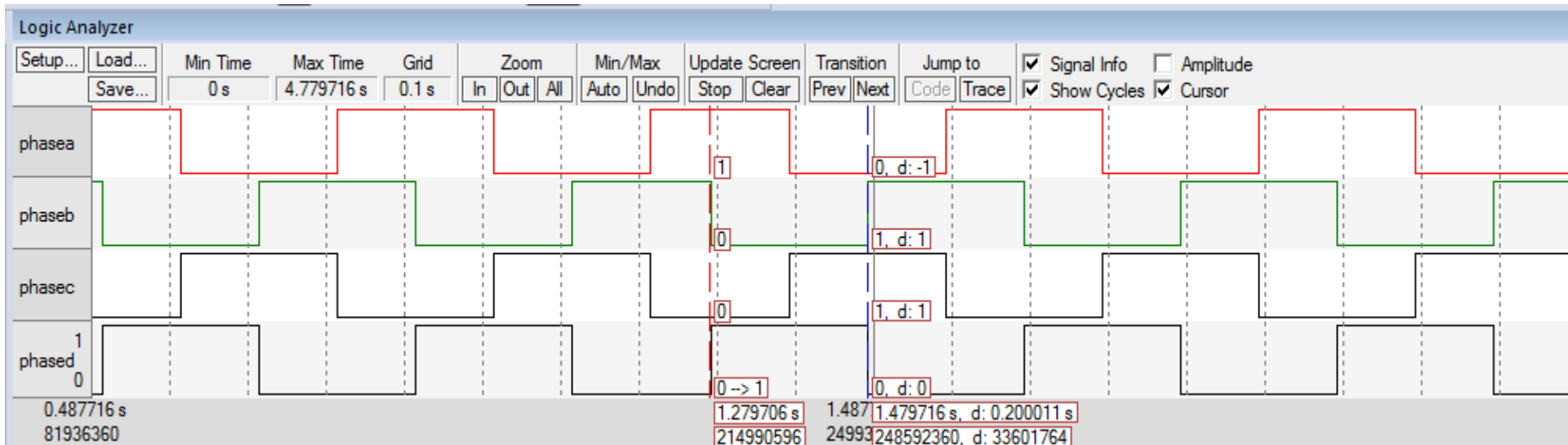
__task void init (void) {
    RCC->AHB1ENR |= 1UL;
    GPIOA->MODER  &= ~(3UL << 2*0) ;    // vstup PA0
    GPIOA->PUPDR  &= ~(3UL << 2*0);

    t_phaseA = os_tsk_create (phaseA, 0); /* start task phaseA */
    t_phaseB = os_tsk_create (phaseB, 0); /* start task phaseB */
    t_phaseC = os_tsk_create (phaseC, 0); /* start task phaseC */
    t_phaseD = os_tsk_create (phaseD, 0); /* start task phaseD */
    t_button  = os_tsk_create (button, 0); /* start scan button */
    os_evt_set (0x0001, t_phaseA);      /* send signal event to task phaseA */
    os_tsk_delete_self ();
}
```

Činnost jádra operačního systému RTX Keil



Činnost budičů krokového motoru



Nastavení RTX Keil pro obsluhu programu

RTX Tasks and System

Property	Value							
System	Item	Value						
	Timer Number:	0						
	Tick Timer:	10.000 mSec						
	Round Robin Timeout:	50.000 mSec						
	Stack Size:	200						
	Tasks with User-provided Stack:	0						
	Stack Overflow Check:	Yes						
	Task Usage:	Available: 7, Used: 5						
	User Timers:	Available: 0, Used: 0						
Tasks	ID	Name	Priority	State	Delay	Event Value	Event Mask	Stack Load
	255	os_idle_demon	0	Running				0%
	6	button	1	Wait_DLY	2			32%
	5	phaseD	1	Wait_AND		0x0000	0x0001	32%
	4	phaseC	1	Wait_DLY	2			36%
	3	phaseB	1	Wait_DLY	2			36%
	2	phaseA	1	Wait_AND		0x0000	0x0001	32%