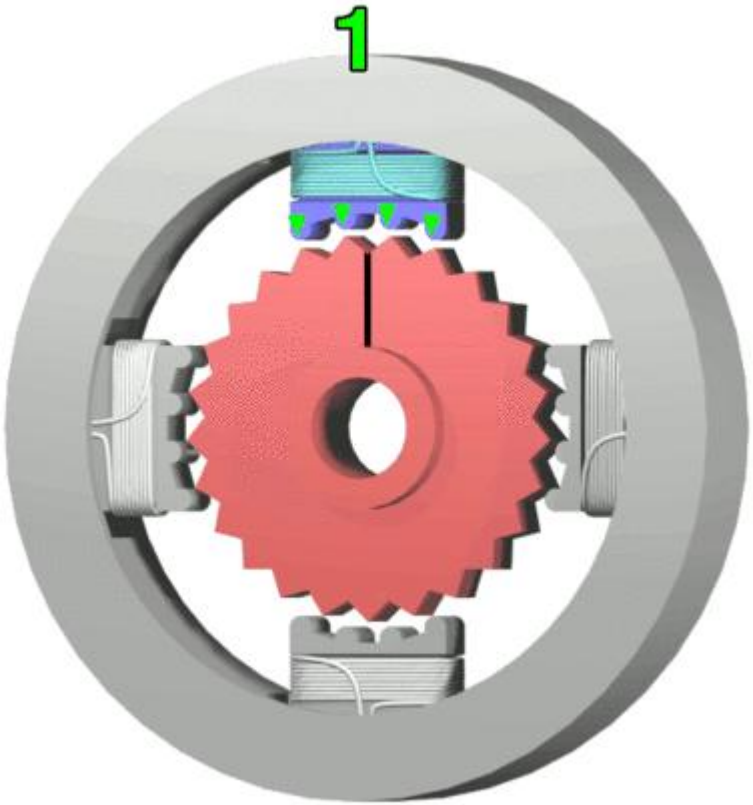
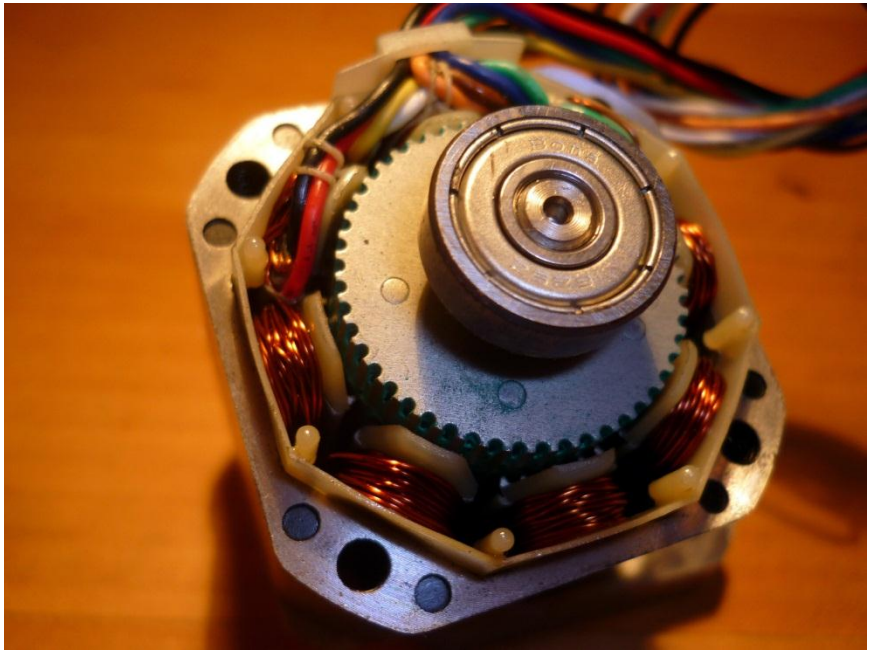
RTX Kernel projekt č. 1

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

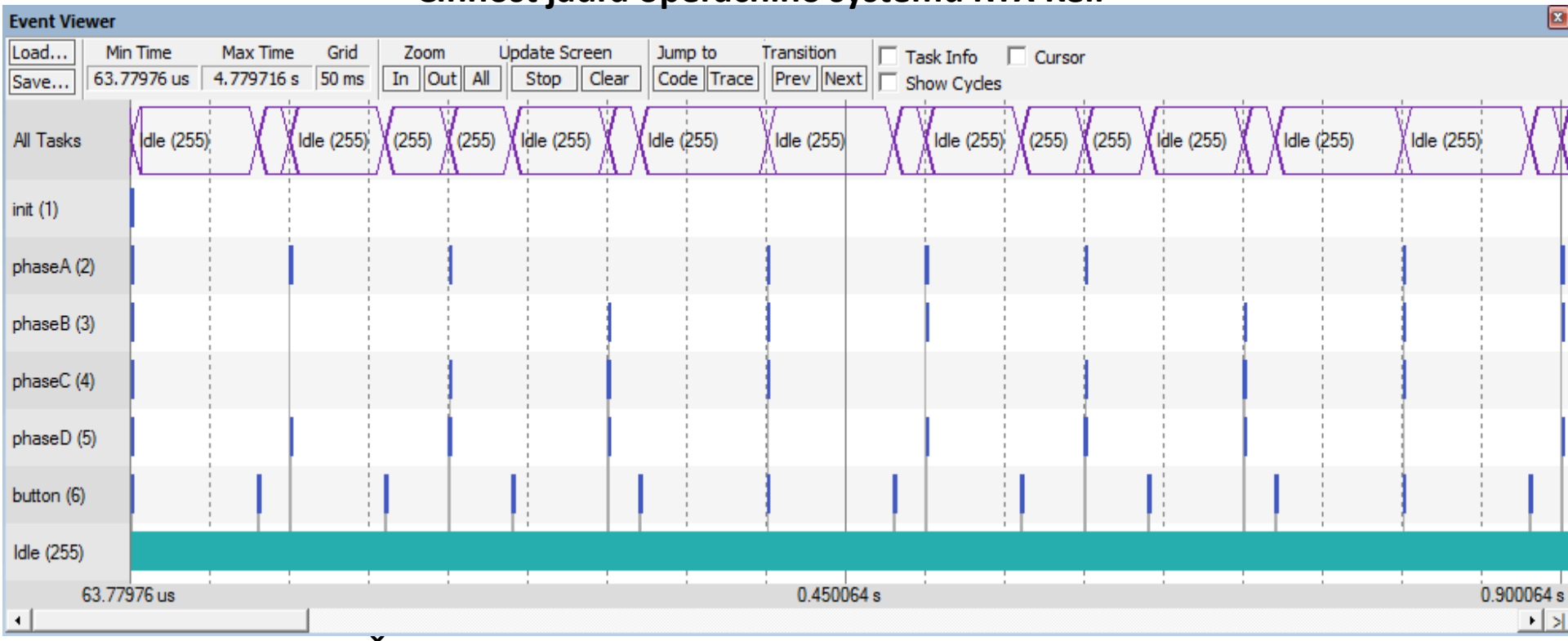
```
__task void button (void) {
 for (;;) {
      in1 = GPIOA->IDR ;
      in1 &= 1 ;
  os_dly_wait (8);
      in2 = GPIOA->IDR ;
      in2 &= 1 ;
      if ( in1 == in2) dir =in1 ;
      if (dir==1) {++step;
      if ( step>60) step = 5 ;} }}
```

```
Int  main (void) {

  LED_init ();
  os_sys_init(init);
}
```

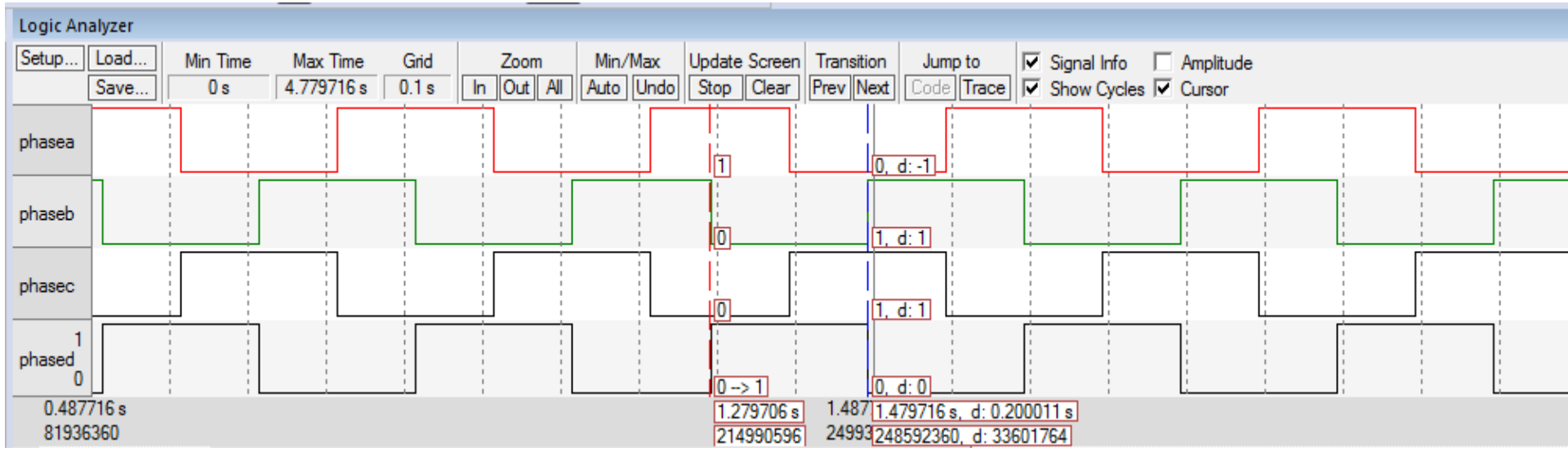
základní definice programu

```
#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