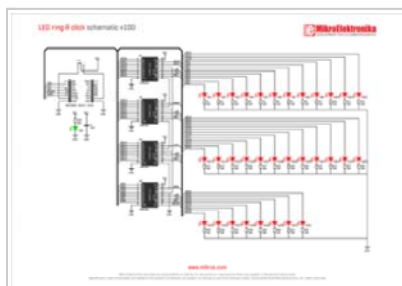


# LED ring R click

From MikroElektronika Documentation

LED ring R click carries a ring of 32 red LEDs driven by four 8-bit 74HC595 serial-in, parallel-out shift registers. The ring is 25 mm in diameter. The click communicates with the target MCU through the mikroBUSTM SPI interface, with RST, CS, SCK, MISO and MOSI pins marked MR#, LAT, CLK, DSOUT, DSIN, respectively. Other LED colors will also be available. The board is designed to use either a 3.3V or 5V power supply only.

## Features and usage notes



Schematic also available in PDF ([http://cdn-docs.mikroe.com/images/9/94/LED\\_ring\\_R\\_click\\_sc](http://cdn-docs.mikroe.com/images/9/94/LED_ring_R_click_sc))

LED ring click is one of several click boards that employ 74HCP595 shift registers to drive LEDs. Rotary click use the same, as well as Bargraph click, 7-Seg click and 7x10 click.

Using 8-bit shift registers to drive an array of LEDs is simply good practice, because it leaves more available pins on the target MCU, allowing you to either use a cheaper, lower pin count main MCU, or use the leftover pins for other purposes.

The end result is a smaller, more cost effective design.

## Programming

The following code snippet demonstrates different ways to communicate with the click and initializes a clockwork pattern with a single LED at a time.

```
1 sbit LRR_LAT at GPIO_ODR.B13;
2 sbit LRR_RST at GPIOC_ODR.B2;
3 #include <stdint.h>
4 #include "led_ring_hw.h"
5
6 void main()
7 {
8
9     uint8_t test_bfr[4];
10    uint8_t i = 0;
11    uint16_t var_time = 500;
12    uint32_t led = 0x00000001;
13
14    // set latch and reset pins as output
15
16    GPIO_Digital_Output(&GPIOD_BASE, _GPIO_PINMASK_13);
17    GPIO_Digital_Output(&GPIOC_BASE, _GPIO_PINMASK_2);
18
19    // initialize SPI
20
21    SPI3_Init_Advanced( _SPI_FPCLK_DIV16, _SPI_MASTER | _SPI_8_BIT |
22                      _SPI_CLK_IDLE_LOW | _SPI_FIRST_CLK_EDGE_TRANSITION |
23                      _SPI_MSB_FIRST | _SPI_SS_DISABLE | _SPI_SSM_ENABLE |
24                      _SPI_SSI_1, _GPIO_MODULE_SPI3_PC10_11_I2);
25
26    led_ring_hal_init();
27    led_ring_start();
28
29    test_bfr[0] = 0xAA;
30    test_bfr[1] = 0xAA;
31    test_bfr[2] = 0xAA;
32    test_bfr[3] = 0xAA;
33
34    led_ring_hal_write(&test_bfr, 4); // demonstration of HAL write function
35    led_ring_latch();
36
37    Delay_ms(1000);
38
39    led_ring_send_32 ( 0xFAFAFAFA ); // demonstration of writing 4 bytes
40
41    Delay_ms(2000);
42    led_ring_send_8 ( test_bfr[0] ); // writing one byte at a time
43    led_ring_send_8 ( test_bfr[0] );
44    led_ring_send_8 ( test_bfr[0] );
45    led_ring_send_8 ( test_bfr[0] );
46
47    while (1)
48    {
49        led_ring_send_32 ( led ); // dot circling faster and faster
50        vDelay_ms(var_time);
51        led = led << 1;
52        if (led == 0)
53        {
54            led = 1;
55            i++;
56        }
57    }
```

## LED ring R click



### LED Ring R click

|                     |                                                                                                                                                                                         |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IC/Module</b>    | Led ring, 74HC595 serial in parallel out shift registers x4                                                                                                                             |
| <b>Interface</b>    | SPI                                                                                                                                                                                     |
| <b>Power supply</b> | 3.3V, 5V                                                                                                                                                                                |
| <b>Website</b>      | <a href="http://www.mikroe.com/click/led-ring-r">www.mikroe.com/click/led-ring-r</a><br>( <a href="http://www.mikroe.com/click/led-ring-r">http://www.mikroe.com/click/led-ring-r</a> ) |

```

%56         if (i == 0)
%57             var_time = 500;
%58         else if (i == 1)
%59             var_time = 250;
%60         else if (i == 2)
%61             var_time = 100;
%62         else if (i == 3)
%63             var_time = 50;
%64         else if ( i == 4 )
%65         {
%66             var_time = 500;
%67             i = 0;
%68         }
%69     }
%70 }
%71 }

```

Code examples that demonstrate the usage of LED Ring click with MikroElektronika hardware, written for mikroC for ARM, PIC, and FT90x are available on Libstock (<http://libstock.mikroe.com/projects/view/1815/led-ring-click>).

## Resources

- LED ring click Libstock example (<http://libstock.mikroe.com/projects/view/1815/led-ring-click>)
- LED ring click product page (<http://www.mikroe.com/click/led-ring-r/>)
- Learn.mikroe.com article about handling shift registers (<http://learn.mikroe.com/leds-bit-shifting-shift-register-tutorial/>)

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