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LED ring R click

From MikroElektonika 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 mikroBUS™ 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
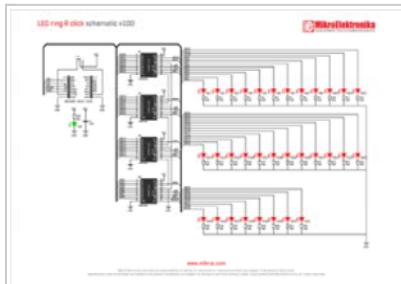
Schematic also available in PDF (http://cdn-docs.mikroe.com/images/9/94/LED_ring_R_click_sc

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.

LED ring R click

LED Ring R click

IC/Module	Led ring, 74HC595 serial in parallel out shift registers x4
Interface	SPI
Power supply	3.3V, 5V
Website	www.mikroe.com/click/led-ring-r (http://www.mikroe.com/click/led-ring-r)

```
1 sbit     LRR_LAT  at   GPIOD_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    // initalize 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_12);
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        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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