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1 #include "MKL25Z4.h"
2 #define S0_PIN 1 // PTA1
3 #define S1_PIN 12 // PTA12
4 #define S2_PIN 4 // PTA4
5 #define S3_PIN 5 // PTA5
6 #define OUT_PIN 4 // PTD4
7 void UART0_init(void);
8 uint8_t s;
9 uint16_t count;
10 void PORTD_IRQHandler(void);
11 void SysTick_Handler(void);
12 uint16_t colour_sample(void);
13 void system(void);
14 void colour_sample_setup(void);
15 void SetFilter(uint8_t t);
16 int main(void) {
17     UART0_init();
18     uint16_t data[4];
19     uint8_t i;
20     system();
21     colour_sample_setup();
22     for(i=0; i<4; i++) {
23         SetFilter(i);
24         data[i]=colour_sample();
25     }
26 }
27
28 void colour_sample_setup(void) {
29     SIM->SCGC5 |= SIM_SCGC5_PORTD_MASK; // sets the clock
30     SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk | SysTick_CTRL_TICKINT_Msk; // SysTick timer to use the processor clock and enable
31     SysTick->VAL = SystemCoreClock / 10000 - 1; //
32     SysTick->LOAD = 0x80000;
33     GPIOD->PDDR |= 0x000000; //making the port D pin as input
34     PORTD->PCR[OUT_PIN] |= 0x000A0100; //change it to the right pin(setting the interrupt for rising edges)
35     NVIC_SetPriority(PORTD_IRQn, 2);

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28 void colour_sample_setup(void){
29     SIM->SCGC5 |= SIM_SCGC5_PORTD_MASK; // sets the clock
30     SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk | SysTick_CTRL_TICKINT_Msk; // SysTick timer to use the processor clock and enable
31     SysTick->VAL = SystemCoreClock / 10000 - 1; //
32     SysTick->LOAD = 0x80000;
33     GPIOD->PDDR |= 0x000000; //making the port D pin as input
34     PORTD->PCR[OUT_PIN] |= 0x000A0100; //change it to the right pin(setting the interrupt for rising edges)
35     NVIC_SetPriority(PORTD_IRQn,2);
36 }
37
38 uint16_t colour_sample(void){
39     count=0;
40     s=1;
41     SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk | SysTick_CTRL_TICKINT_Msk | SysTick_CTRL_ENABLE_Msk; // starting the clock for
42     NVIC_EnableIRQ(PORTD_IRQn);
43     while(s);
44     return count;
45 }
46
47 void SysTick_Handler(void) {
48     s=0;
49     SysTick->CTRL = SysTick_CTRL_CLKSOURCE_Msk | SysTick_CTRL_TICKINT_Msk;
50     SysTick->VAL = SystemCoreClock / 10000 - 1;
51     NVIC_DisableIRQ(PORTD_IRQn);
52     NVIC_ClearPendingIRQ(PORTD_IRQn);
53 }

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58 void system(void) {
59     SIM->SCGC5 |= SIM_SCGC5_PORTA_MASK;
60
61     PORTA->PCR[S0_PIN] &= ~PORT_PCR_MUX_MASK;
62     PORTA->PCR[S0_PIN] |= PORT_PCR_MUX(1);
63     PORTA->PCR[S1_PIN] &= ~PORT_PCR_MUX_MASK;
64     PORTA->PCR[S1_PIN] |= PORT_PCR_MUX(1);
65
66     PORTA->PCR[S2_PIN] &= ~PORT_PCR_MUX_MASK;
67     PORTA->PCR[S2_PIN] |= PORT_PCR_MUX(1);
68     PORTA->PCR[S3_PIN] &= ~PORT_PCR_MUX_MASK;
69     PORTA->PCR[S3_PIN] |= PORT_PCR_MUX(1);
70
71
72     GPIOA->PDDR |= (1UL << S0_PIN) | (1UL << S1_PIN);
73     GPIOA->PDDR |= (1UL << S2_PIN) | (1UL << S3_PIN);
74
75     GPIOA->PSOR |= (1UL << S0_PIN); // S0 to high
76     GPIOA->PSOR |= (1UL << S1_PIN); // S1 to high
77
78 }
79
80 void SetFilter(uint8_t t) {
81     if(t==0) {
82         GPIOA->PSOR |= (1UL << S2_PIN); // S0 to high
83         GPIOA->PSOR |= (1UL << S3_PIN); // S1 to high
84     }
85     else if(t==1) {
86         GPIOA->PCOR |= (1UL << S2_PIN); // S2 to low
87         GPIOA->PCOR |= (1UL << S3_PIN); // S3 to low
88     }
89     else if(t==2) {
90         GPIOA->PSOR |= (1UL << S2_PIN); // S0 to high
91         GPIOA->PCOR |= (1UL << S3_PIN); // S1 to low
92     }

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79 -
80 void SetFilter(uint8_t t){
81     if(t==0){
82         GPIOA->PSOR |= (1UL << S2_PIN); // S0 to high
83         GPIOA->PSOR |= (1UL << S3_PIN); // S1 to high
84     }
85     else if(t==1){
86         GPIOA->PCOR |= (1UL << S2_PIN); // S2 to low
87         GPIOA->PCOR |= (1UL << S3_PIN); // S3 to low
88     }
89     else if(t==2){
90         GPIOA->PSOR |= (1UL << S2_PIN); // S0 to high
91         GPIOA->PCOR |= (1UL << S3_PIN); // S1 to low
92     }
93     else if (t==3){
94         GPIOA->PCOR |= (1UL << S2_PIN); // S0 to low
95         GPIOA->PSOR |= (1UL << S3_PIN); // S1 to high
96     }
97 }
98
99 void UART0_init(void) {
100     SIM->SCGC4 |= 0x0400; /* enable clock for UART0 */
101     SIM->SOPT2 |= 0x04000000;
102     UART0->C2 = 0;
103     UART0->BDH = 0x00;
104     UART0->BDL = 0x0D;
105     UART0->C4 = 0x0F;
106     UART0->C1 = 0x00;
107     UART0->C2 = 0x08;
108     SIM->SCGC5 |= 0x0200;
109     PORTA->PCR[2] = 0x0200;
110 }
111
112

```