```c
/* ***************************************************************** */
/*                                                                 */
/*   Nome do arquivo:       board.h                                */
/*                                                                 */
/*   Descrição:             Arquivo header contendo as definicoes de    */
/*                          pinos e mascaras utilizadas durante o       */
/*                          projeto                                */
/*                                                                 */
/*   Autores:               Gustavo Lino e Giácomo Dollevedo            */
/*   Criado em:             31/03/2020                             */
/*   Ultima revisão em:     03/06/2020                             */
/* ***************************************************************** */


#ifndef SOURCES_BOARD_H_
#define SOURCES_BOARD_H_

/* system includes */
#include <MKL25Z4.h>

/* FDRMKL25Z RGB LED pins defintions */
#define RED_LED_PORT_BASE_PNT    PORTB /* peripheral port base pointer */
#define RED_LED_GPIO_BASE_PNT    PTB   /* peripheral gpio base pointer */
#define RED_LED_PIN            (uint32_t) 18u
#define GREEN_LED_PORT_BASE_PNT  PORTB /* peripheral port base pointer */
#define GREEN_LED_GPIO_BASE_PNT  PTB   /* peripheral gpio base pointer */
#define GREEN_LED_PIN         (uint32_t) 19u
#define BLUE_LED_PORT_BASE_PNT   PORTD /* peripheral port base pointer */
#define BLUE_LED_GPIO_BASE_PNT   PTD   /* peripheral gpio base pointer */
#define BLUE_LED_PIN          (uint32_t) 1u





/*Mascaras de ativação de pinos de portas como saída ou entrada*/

#define uiPin0MaskEnable        0x01
#define uiPin0MaskDisable       0xFFFFFFFE
#define uiPin1MaskEnable        0x02
#define uiPin1MaskDisable       0xFFFFFFFD
#define uiPin2MaskEnable        0x04
#define uiPin2MaskDisable       0xFFFFFFFB
#define uiPin3MaskEnable        0x08
#define uiPin3MaskDisable       0xFFFFFFF7

#define uiPin4MaskEnable        0x010
#define uiPin4MaskDisable       0xFFFFFFEF
#define uiPin5MaskEnable        0x020
#define uiPin5MaskDisable       0xFFFFFFDF
#define uiPin6MaskEnable        0x040
#define uiPin6MaskDisable       0xFFFFFFBF
#define uiPin7MaskEnable        0x080
#define uiPin7MaskDisable       0xFFFFFF7F

#define uiPin8MaskEnable        0x100
#define uiPin8MaskDisable       0xFFFFFEFF
#define uiPin9MaskEnable        0x200
#define uiPin9MaskDisable       0xFFFFFDFF


#define uiSetPinAsGPIO       0x100
#define uiSetClockPort       0x0200

/*CLOCK PORT ENABLE*/
#define PORTA_CLOCK_GATE    0x0200
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```c
67   #define PORTB_CLOCK_GATE        0x0400
68   #define PORTC_CLOCK_GATE        0x0800
69   #define PORTD_CLOCK_GATE        0x1000
70   #define PORTE_CLOCK_GATE        0x2000
71
72   #define MUX_ALT3   0x300
73   #define MUX_ALT4   0x400
74
75
76   /* Configuração dos set-up para utilziar o LCD
77    *
78    * Quando LCD_RS = LCD_RS_HIGH => Registrador de dados é selecionados
79    * Quando (LCD_RS = LCD_RS_LOW => Registrador de instruções é selecionado.
80    */
81
82
83   #define LCD_GPIO_BASE_PNT       PTC
84
85   #define LCD_RS_PIN              8U
86   #define LCD_RS_DIR              kGpioDigitalOutput
87   #define LCD_RS_ALT              kPortMuxAsGpio
88
89   #define LCD_ENABLE_DIR          kGipioDigitalOutput
90   #define LCD_ENABLE_ALT          kPortMuxAsGpio
91
92   #define LCD_RS_HIGH             0x0100
93   #define LCD_RS_DATA             LCD_RS_HIGH
94
95   #define LCD_RS_LOW              0x0000
96   #define LCD_RS_CMD              LCD_RS_LOW
97
98   #define LCD_RS_WAITING    0xFFFFEFF
99
100  #define LCD_ENABLED             uiPin9MaskEnable
101  #define LCD_DISABLED            uiPin9MaskDisable
102
103
104  #define LCD_DATA_DIR            kGpioDigitalOutput
105  #define LCD_DATA_ALT            kPortMuxAsGpio
106
107  #define LCD_DATA_DB0_PIN        0U
108  #define LCD_DATA_DB1_PIN        1U
109  #define LCD_DATA_DB2_PIN        2U
110  #define LCD_DATA_DB3_PIN        3U
111  #define LCD_DATA_DB4_PIN        4U
112  #define LCD_DATA_DB5_PIN        5U
113  #define LCD_DATA_DB6_PIN        6U
114  #define LCD_DATA_DB7_PIN        7U
115
116  /* Configuracao dos setups para utilizar o D7S*/
117
118  #define D7S_GPIO_CONFIG   0x3CFF
119
120  /* formato letras display 7 seg */
121  /* DP  g   e   d   c   b   a*/
122
123  #define DISP_0    0x003F
124  #define DISP_1    0x0006
125  #define DISP_2    0x005B
126  #define DISP_3    0x004F
127  #define DISP_4    0x0066
128  #define DISP_5    0x006D
129  #define DISP_6    0x007D
130  #define DISP_7    0x0007
131  #define DISP_8    0x007F
132  #define DISP_9    0x006F
133  #define DISP_A    0x0077
```

```c
134    #define DISP_B     0x007C
135    #define DISP_C     0x0039
136    #define DISP_D     0x005E
137    #define DISP_E     0x0079
138    #define DISP_F     0x0071
139    #define DISP_DP    0x0080
140    #define DISP_CLEAR 0xFFFFFF00
141    #define DISP_ALL   0x00FF
142
143    /* Final das definições do LCD para a placa */
144
145    /* Configuracao dos setups para utilizar o Timer/PWM*/
146
147    #define TPM1_CLOCK_GATE   0x2000000
148
149    #define MCGIRCLK_SELECT   0x3000000
150
151
152    #define PWM_EVERY_CLOCK   0x08
153
154
155
156    /* Final das definições do LCD para a placa */
157
158    /*Configuração dos set-ups para utilziar o Tacometro*/
159    #define SET_LTPMR0     0X01
160    #define TPM_EXTERNAL_CLOCK  0x10
161    #define TPM_MAX_VALUE_COUNT  0x0FFFF
162    #define TPM0CLKSEL_AS_CLKIN1 0x01000000
163
164    /*          TEMPERATURE SENSOR DIODE DEFINITIONS          */
165
166    #define  THERMOMETER_PORT_BASE_PNT  PORTE              /* peripheral port base pointer */
167    #define  THERMOMETER_GPIO_BASE_PNT  PTE               /* peripheral gpio base pointer */
168    #define  THERMOMETER_PIN        21U                   /* thermometer pin */
169    #define  THERMOMETER_DIR        (GPIO_INPUT << TERMOMETER_PIN)
170    #define  THERMOMETER_ALT        0x00u
171
172    /*          END OF TEMPERATURE SENSOR DIODE DEFINITIONS    */
173
174
175    /* REVISAO PWM - AULA 12 */
176
177    #define DISABLE_COUNTER   0xFFFFFFE7
178    #define PWM_UP_COUNTING   0xFFFFFFDF
179    #define EDGE_ALIGNED_HIGH_TRUE 0xFFFFFFAB
180    #define CLEAR_16   0xFFFF0000
181
182    #define CLOCK_DIVIDER_1   0x1F8
183    #define CLOCK_DIVIDER_2   0x1F9
184    #define CLOCK_DIVIDER_4   0x1FA
185    #define CLOCK_DIVIDER_8   0x1FB
186    #define CLOCK_DIVIDER_16   0x1FC
187    #define CLOCK_DIVIDER_32   0x1FD
188    #define CLOCK_DIVIDER_64   0x1FE
189    #define CLOCK_DIVIDER_128   0x1FF
190
191    /* REVISAO TACOMETRO - AULA 14 */
192
193    #define TPM0_CLOCK_GATE   0x800000
194    #define TPM0CLKSEL_AS_CLKIN0  0xFEFFFFFF
195
196
197    #endif /* SOURCES_BOARD_H_ */
```