Air Conditioner System Design

By : Team 4

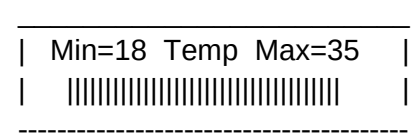
Contents

Flowchart Table

Detailed Requirements

System Requirements:

1- When system start LCD prompt welcome message for 1 second, then display the default temp is 20, the message appears for 1 second
2- ask to set initial temperature for 0.5 second and disappear.
3- display range of temperature min=18, max=35
4- button_1 and button_2 used for increment and decrement respectively.
5- each button press the temperature on the screen is update



6- Once button_3 is pressed the temperature is set and LCD display current temp a nd display buzzer shape if temperature > set temperature & buzzer ON
7- once button_4 is press back to step_2 (readjust mode),stop buzzer if it was working add timeout
8- if button_5 is press mean reset temperature to its default and display Temp value is resettled to 20 degree
9- after set mode all buttons are not allowed except button_4 and button_5 and display error message for 0.5 second (the operation is not allowed)-add timeout

1. Button_1 : Increment
2. Button_2 : Decrement
3. Button_3 : Set temperature
4. Button_4 : Adjust temperature
5. Button_5 : Reset to default

Layered architecture

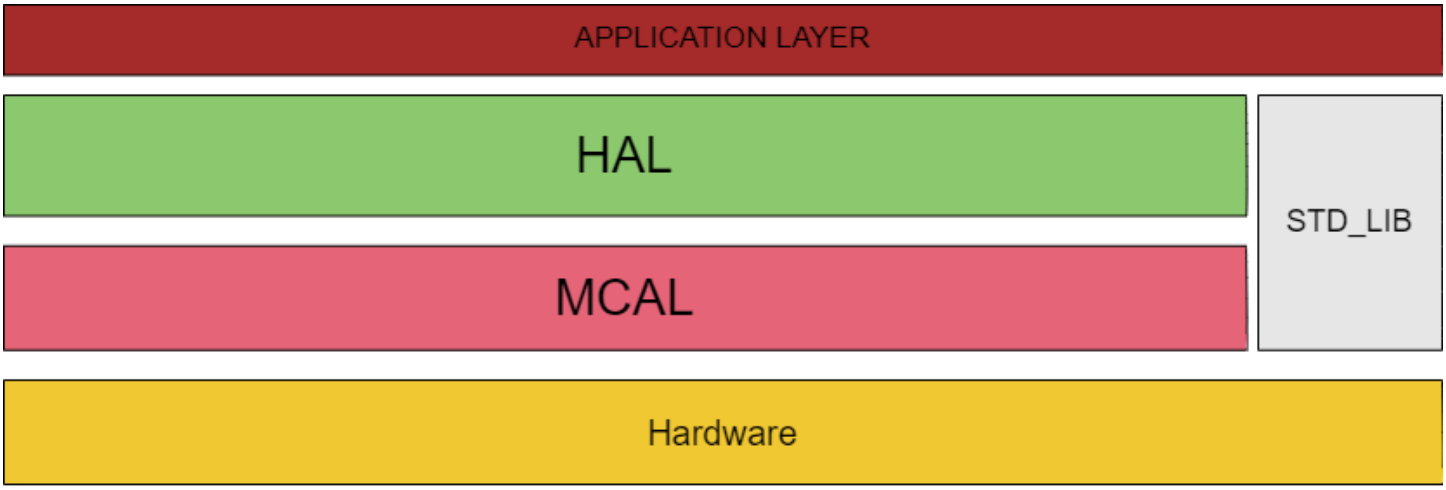


Figure 1 Desgin_arch

System modules

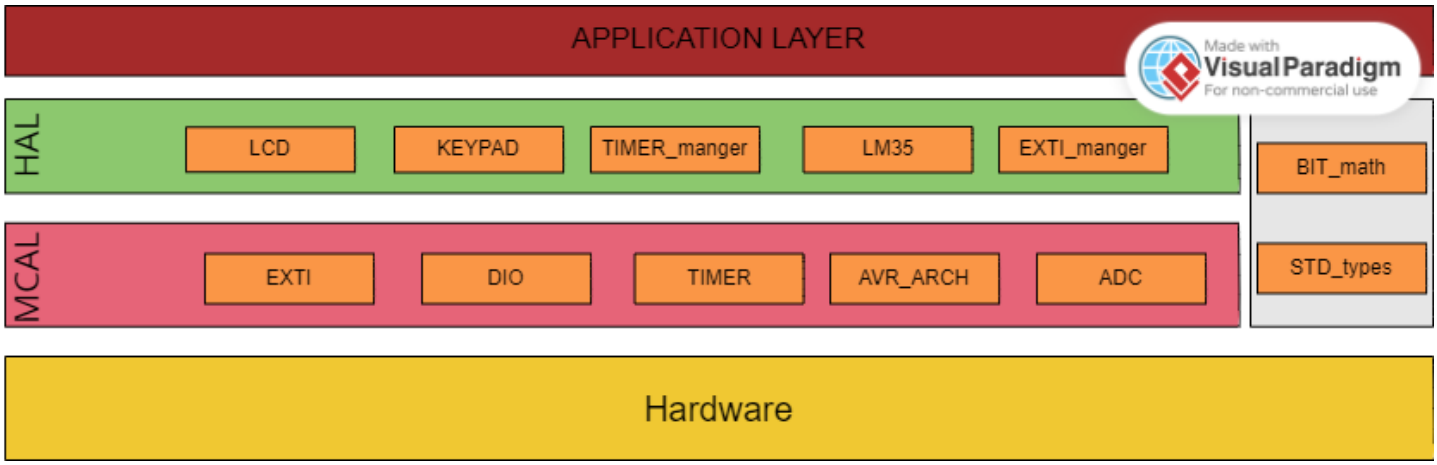
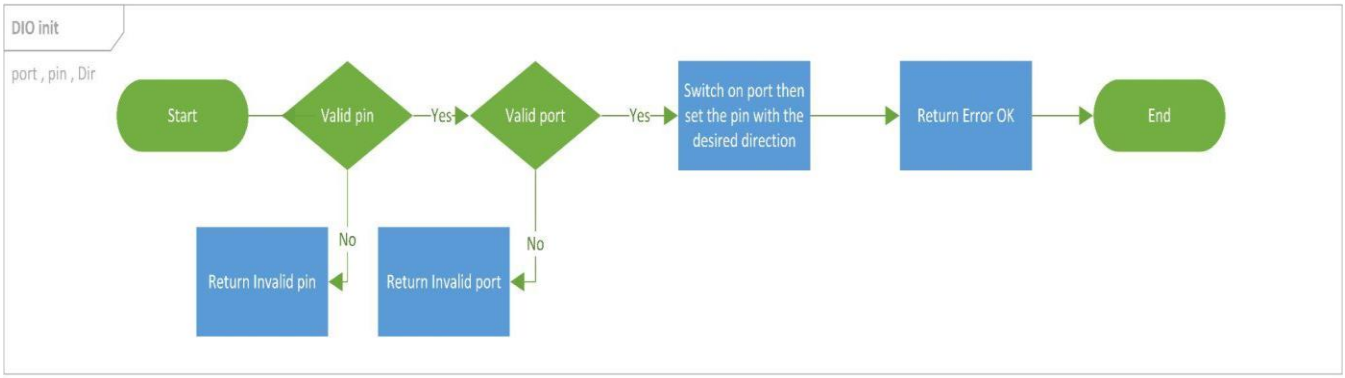


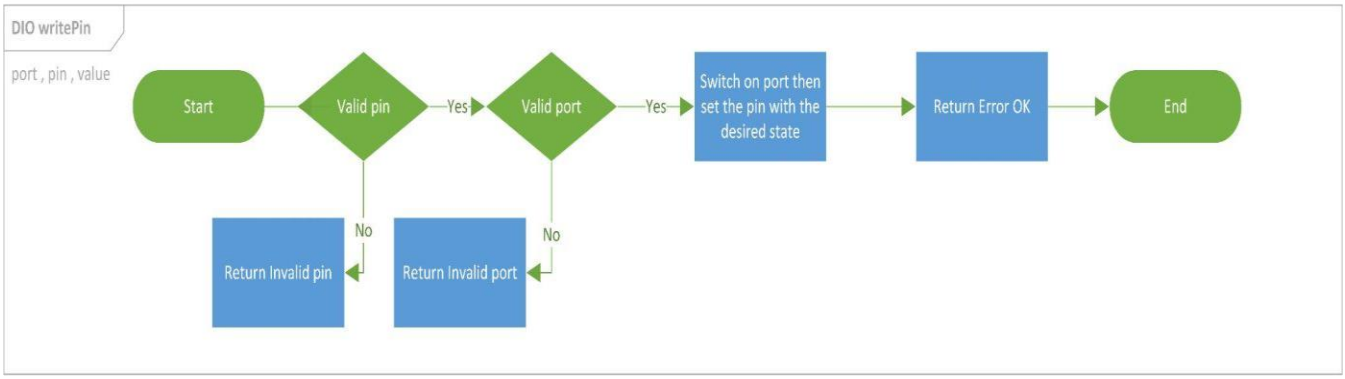
Figure 2 Air_Conditioner_Desgin_Arch

MCAL

DIO API :

Flowcharts:





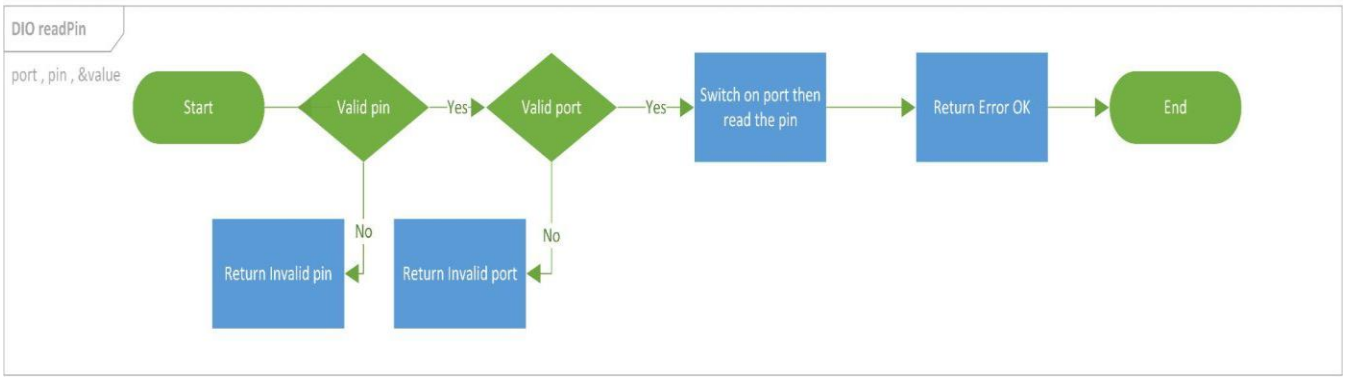


Figure 3 DIO_APIs Flowchar

ADC API :

Flowcharts:

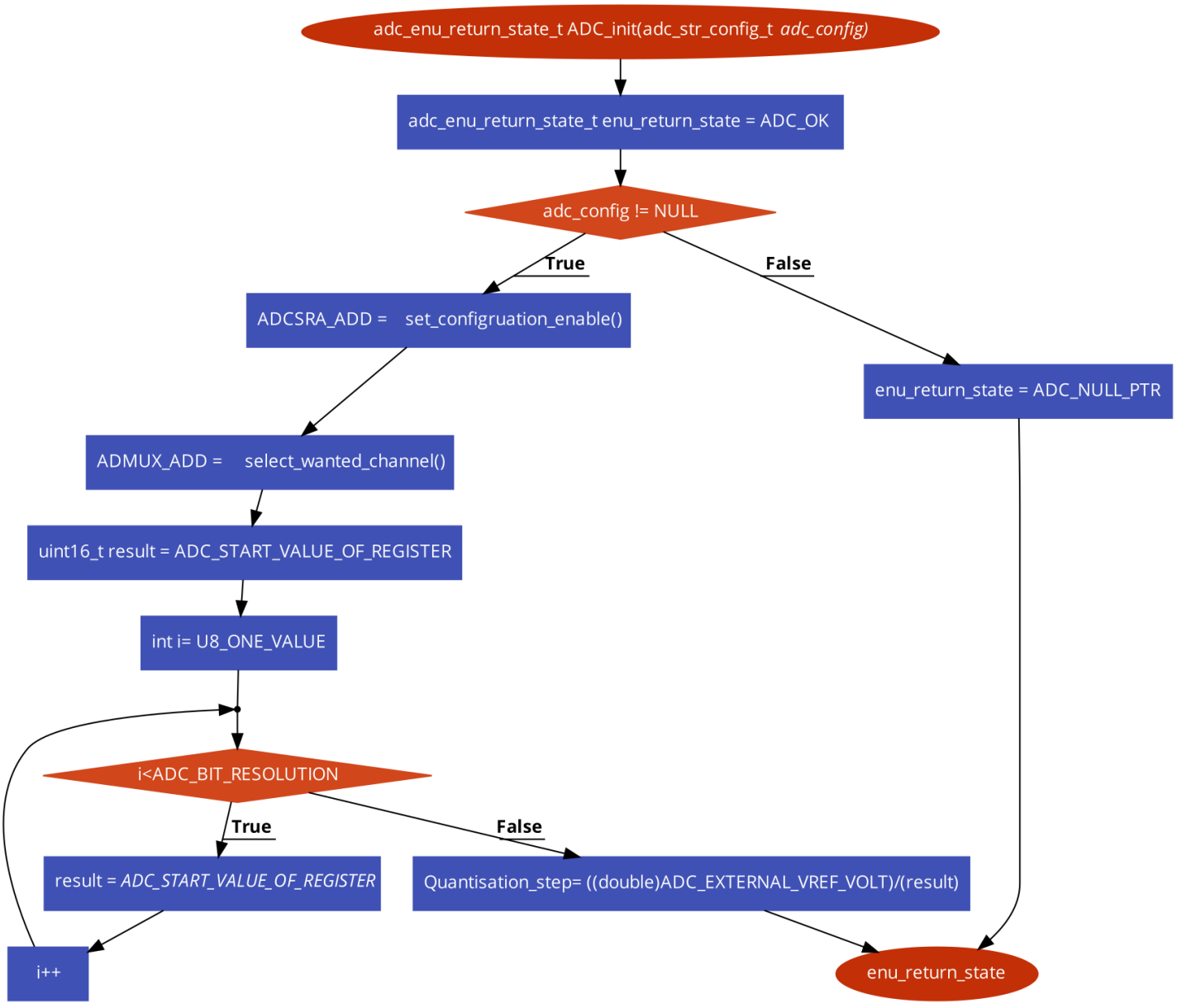


Figure 4 ADC_init()

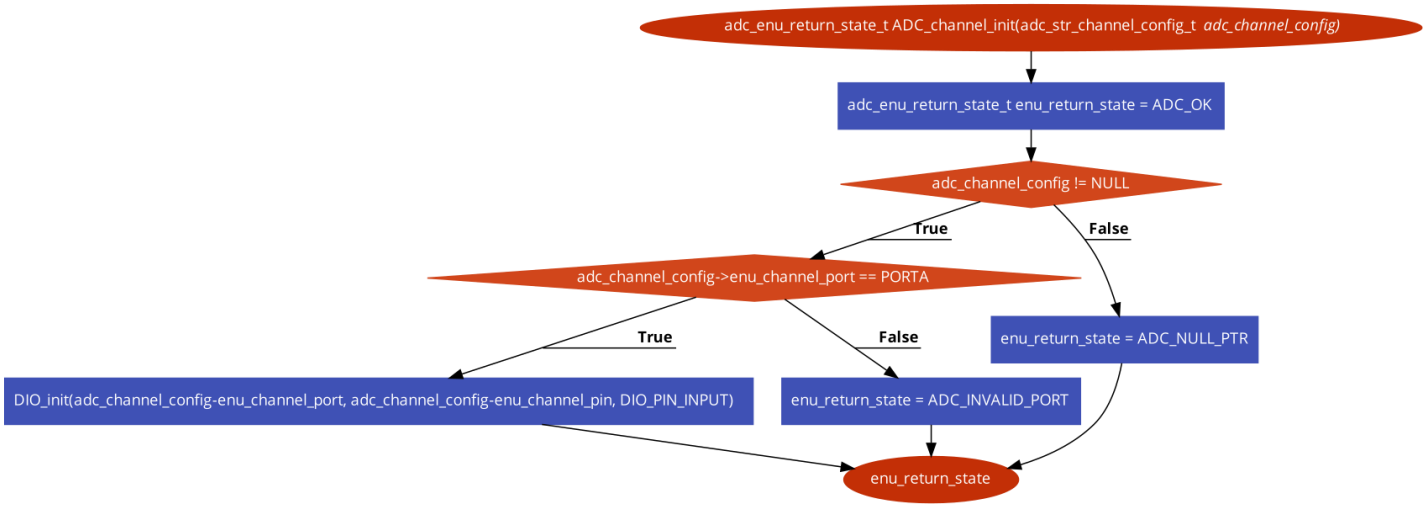


Figure 5 ADC_channel_init()

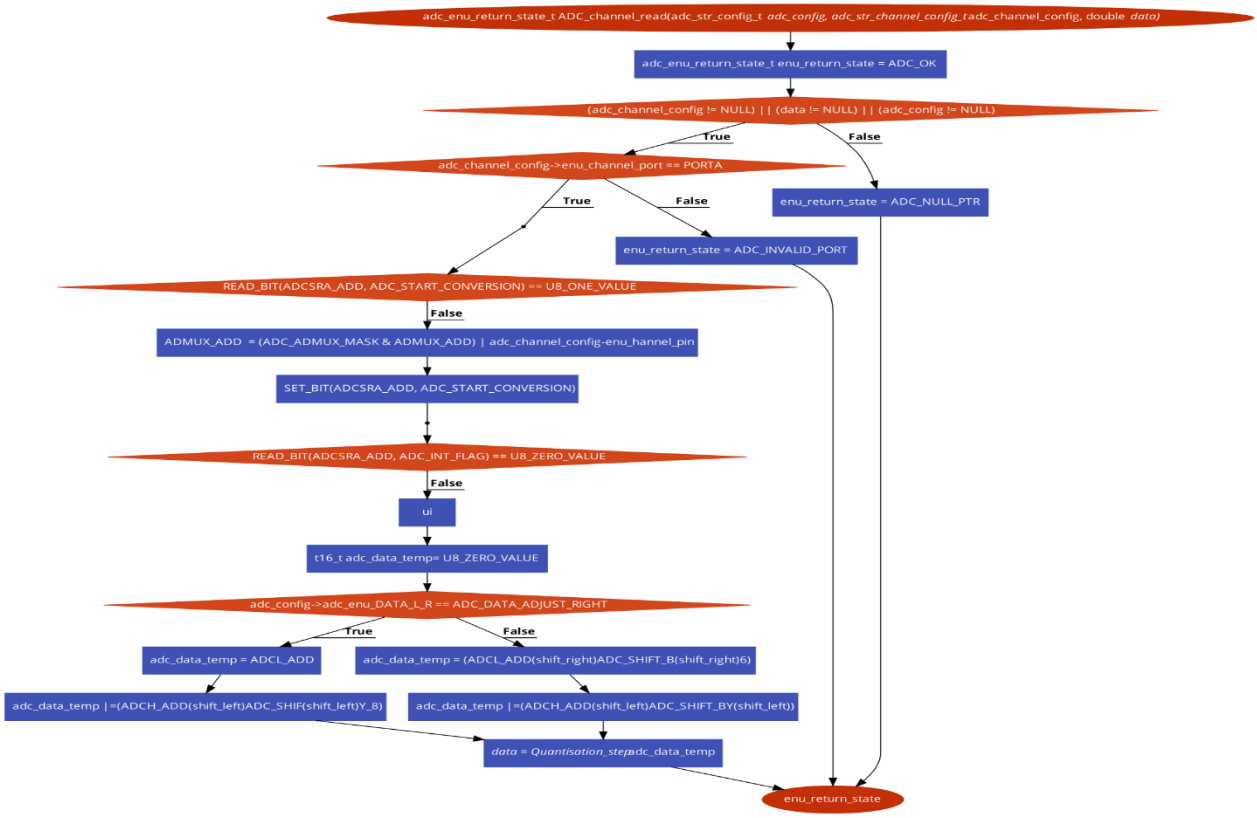


Figure 6 ADC_channel_read()

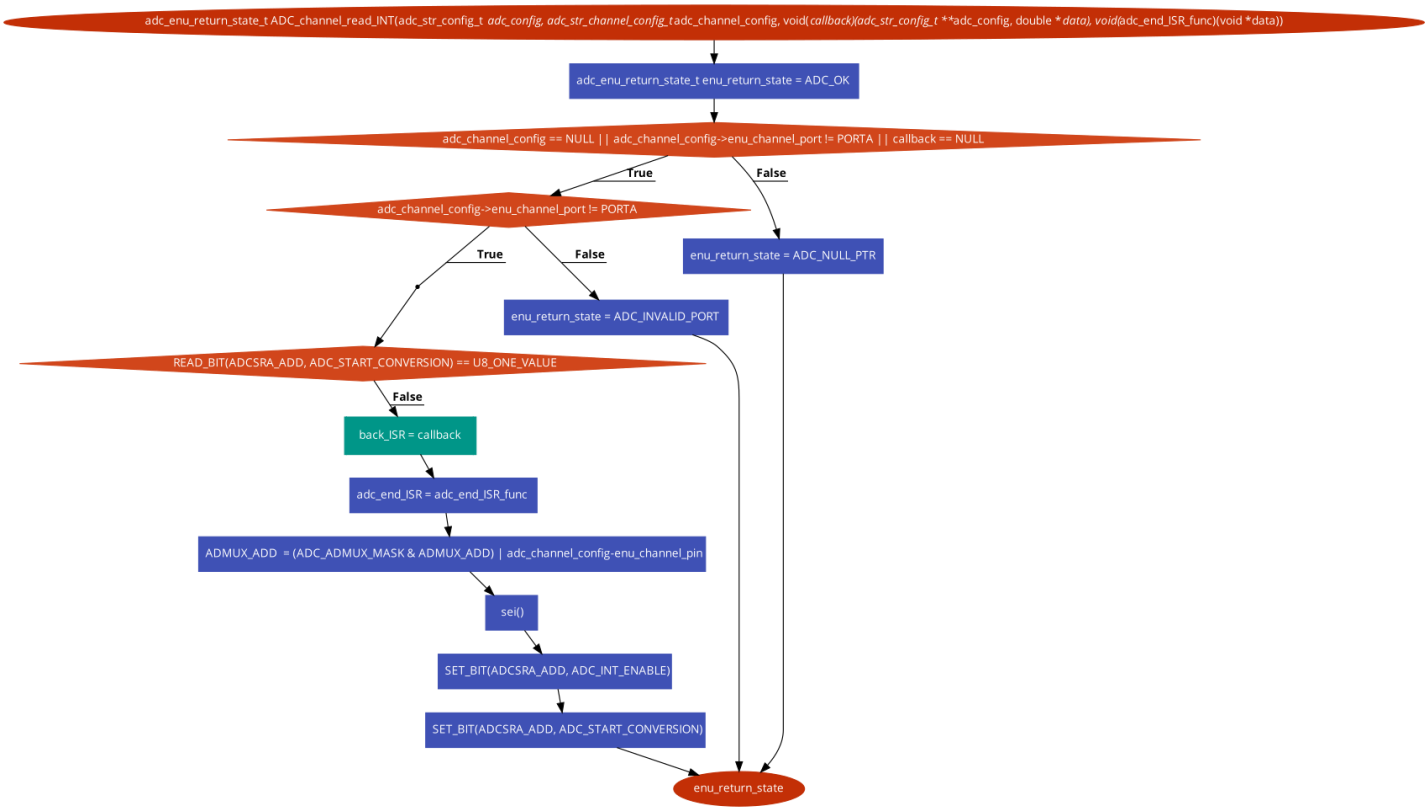


Figure 7 ADC_channel_read_INT()

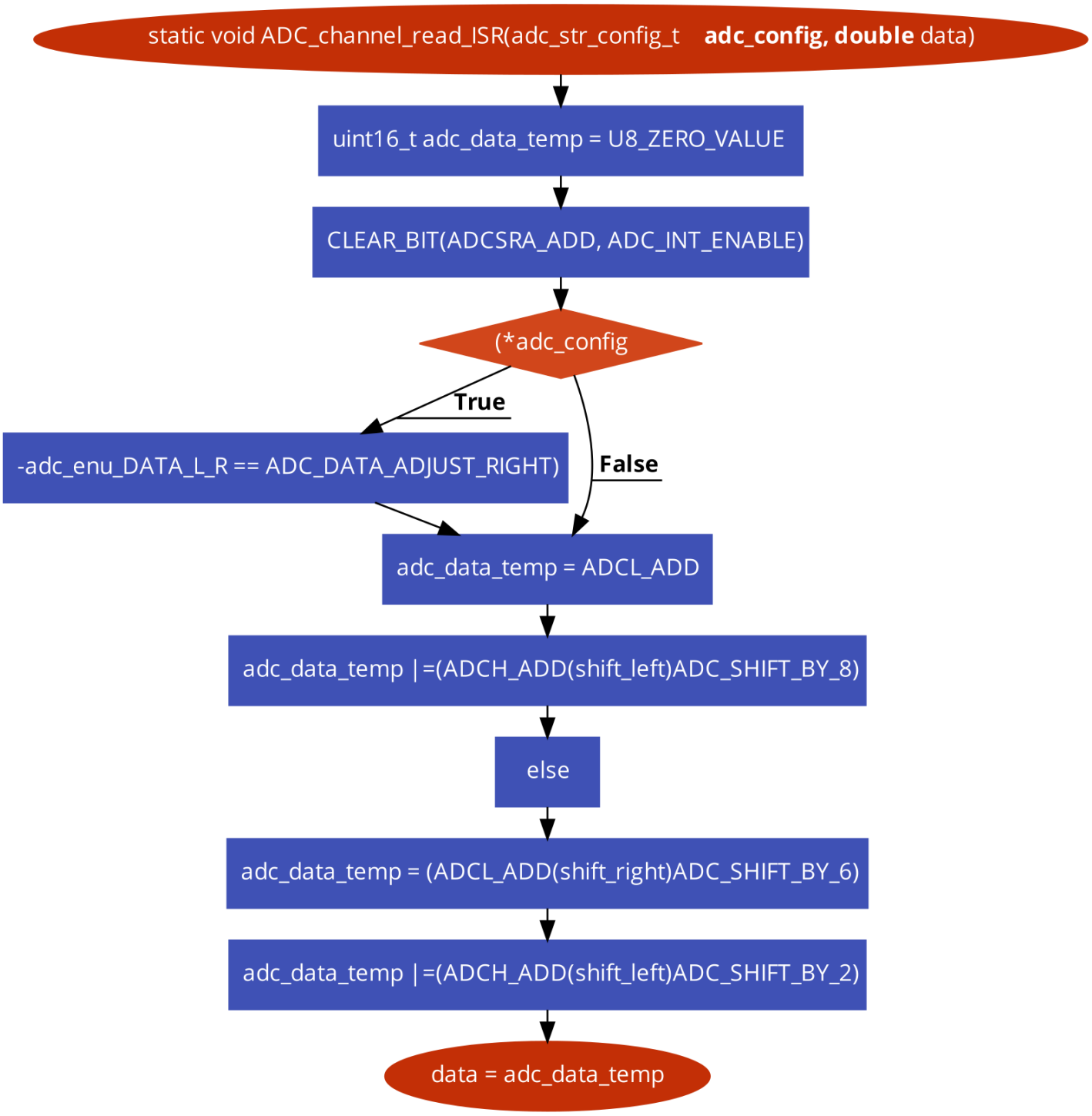


Figure 8 ADC_channel_read_ISR()

TIMER API :

Flowcharts:

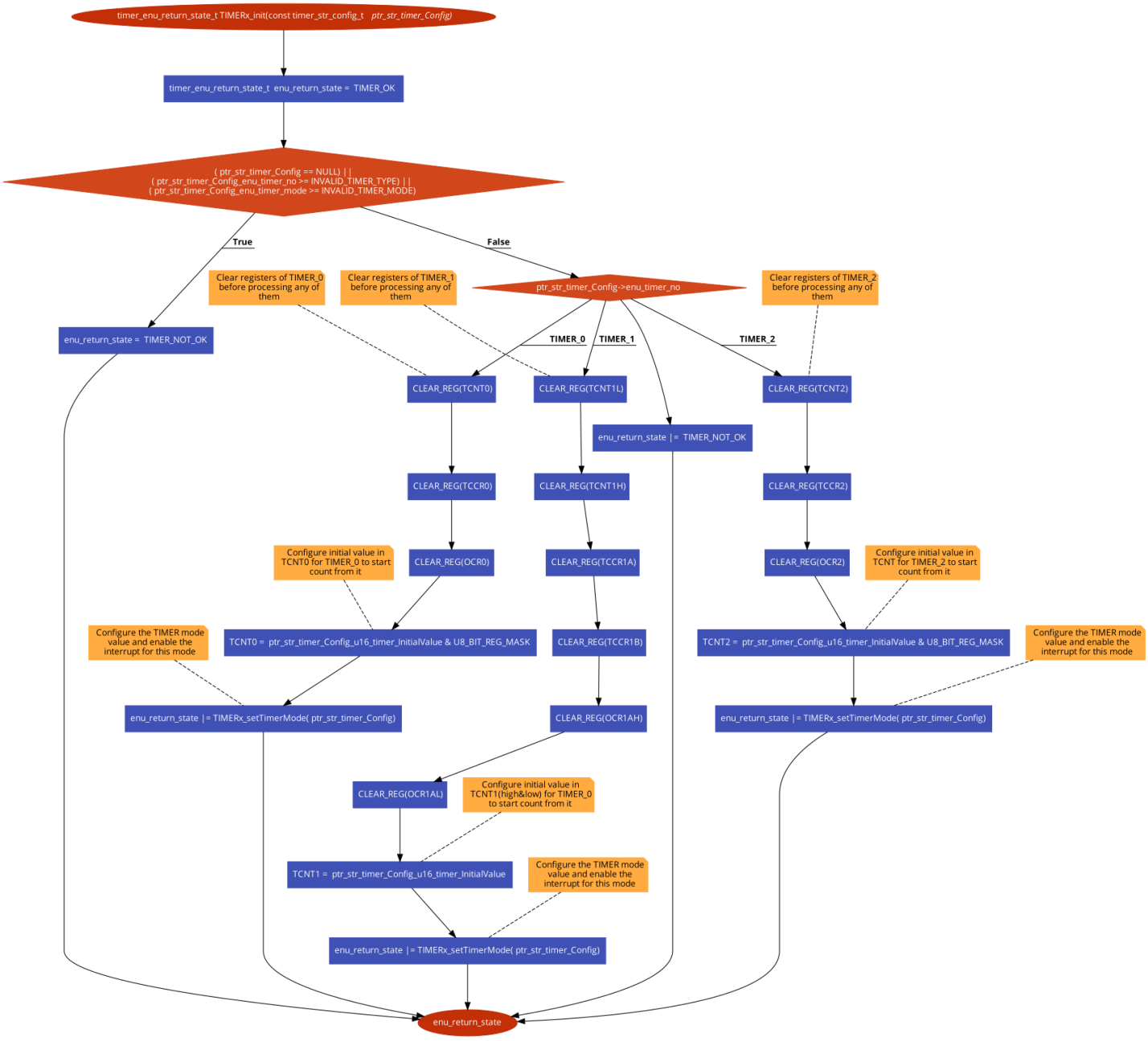


Figure 9 TIMERx_init

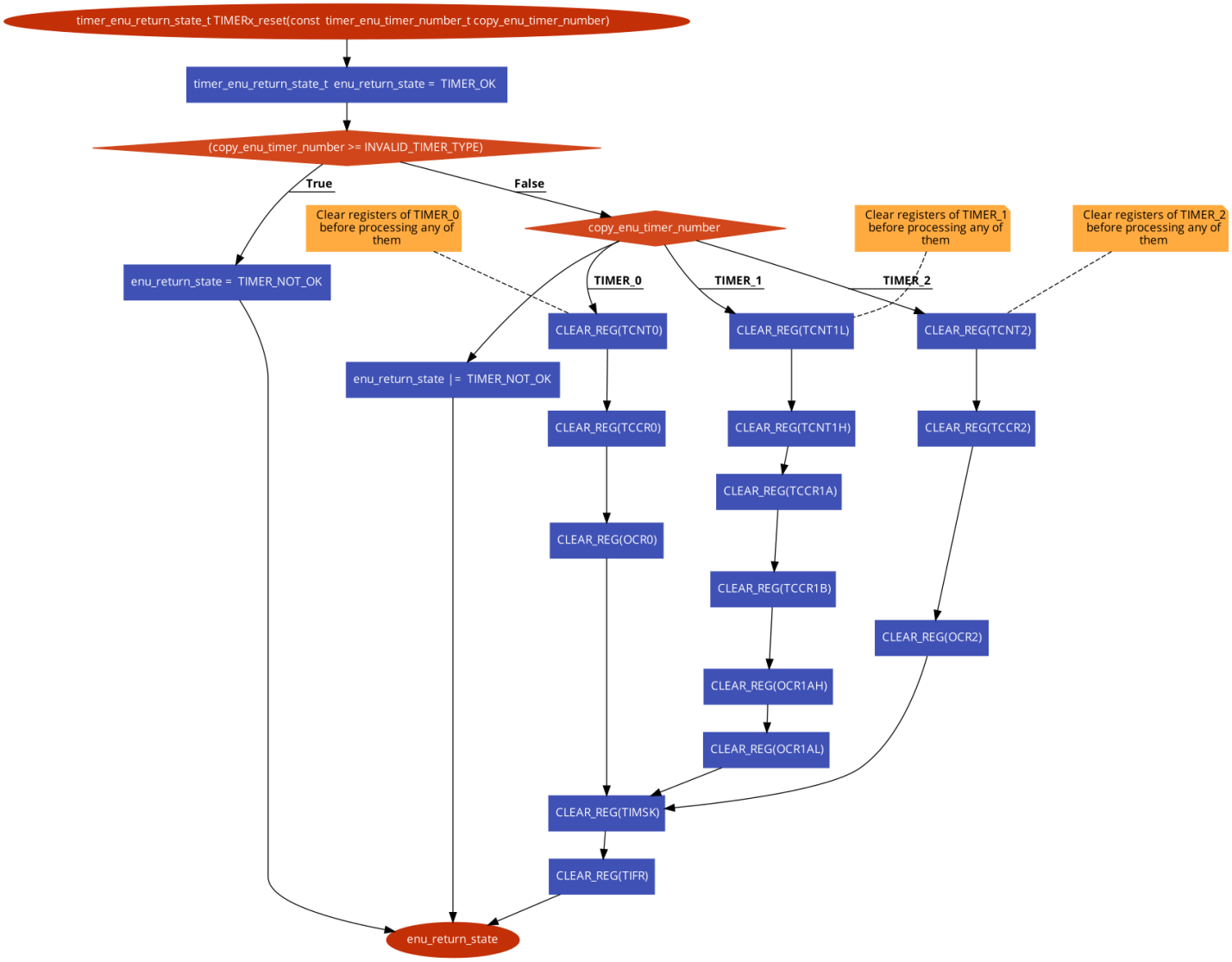


Figure 10 TIMERx_reset()

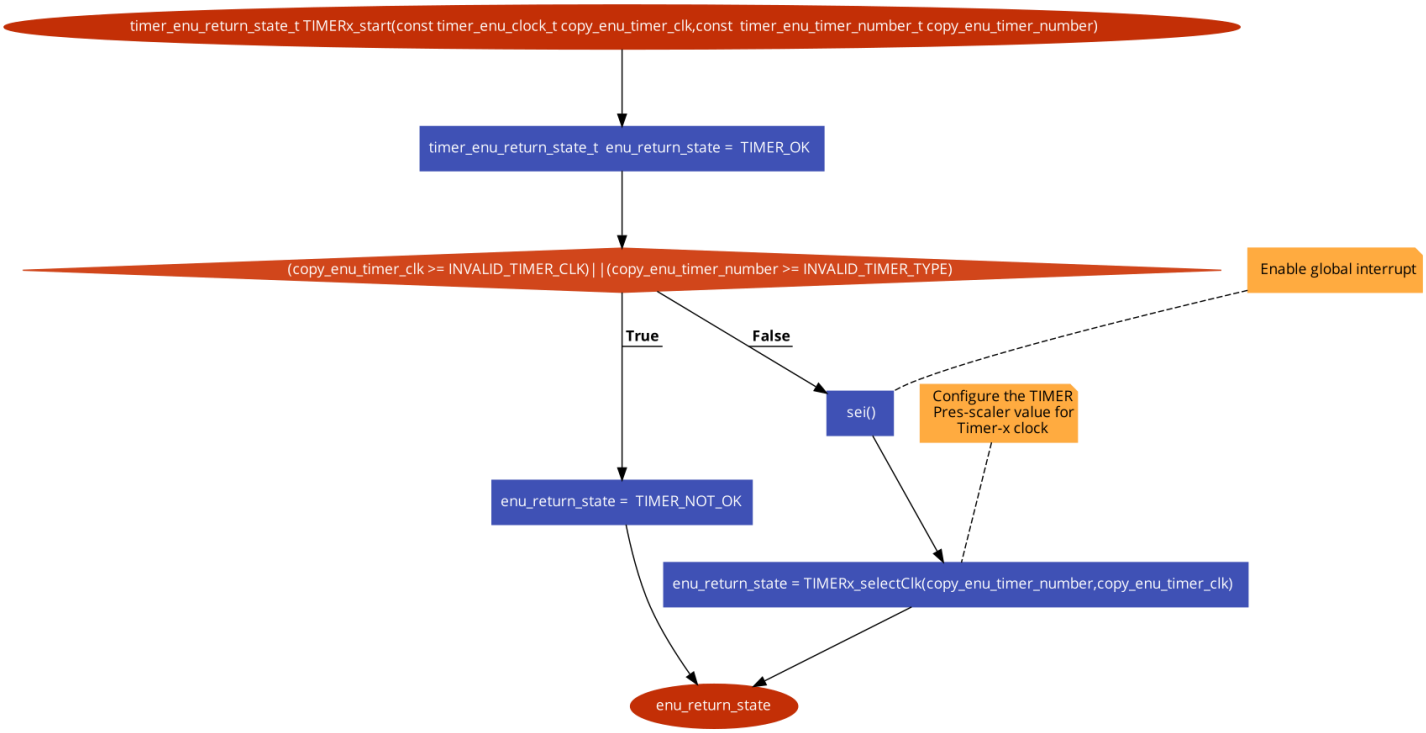


Figure 12 TIMERx_start()

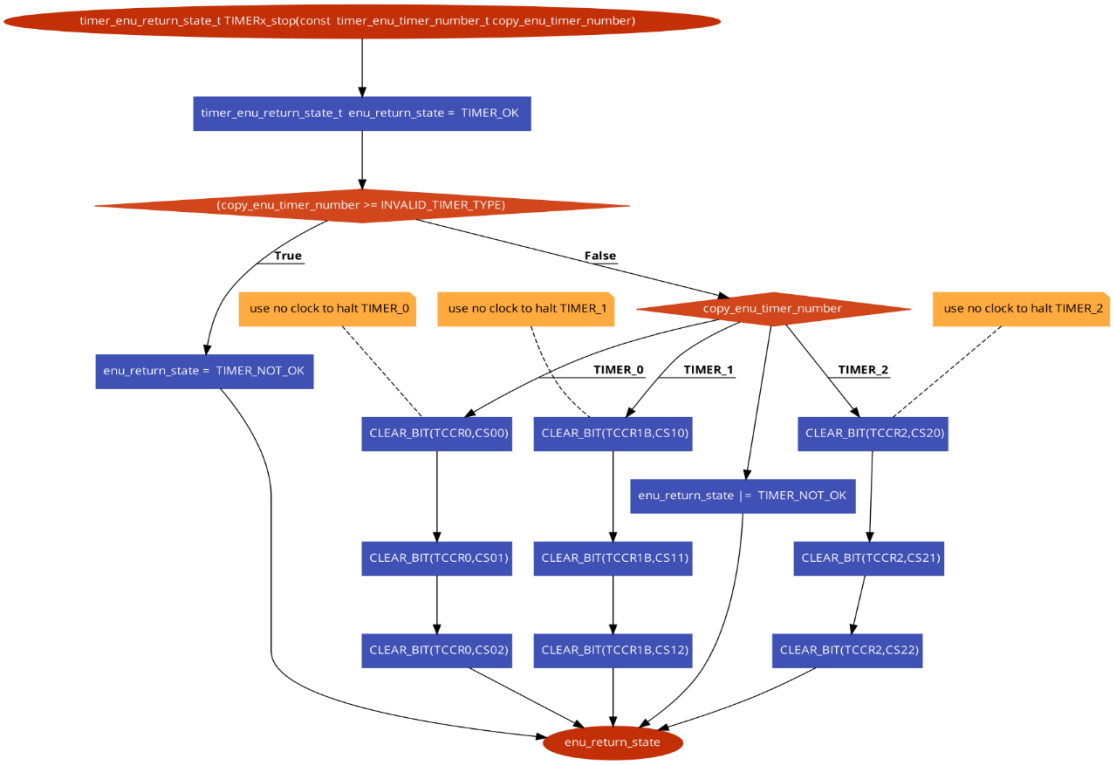


Figure 11 TIMERx_stop()

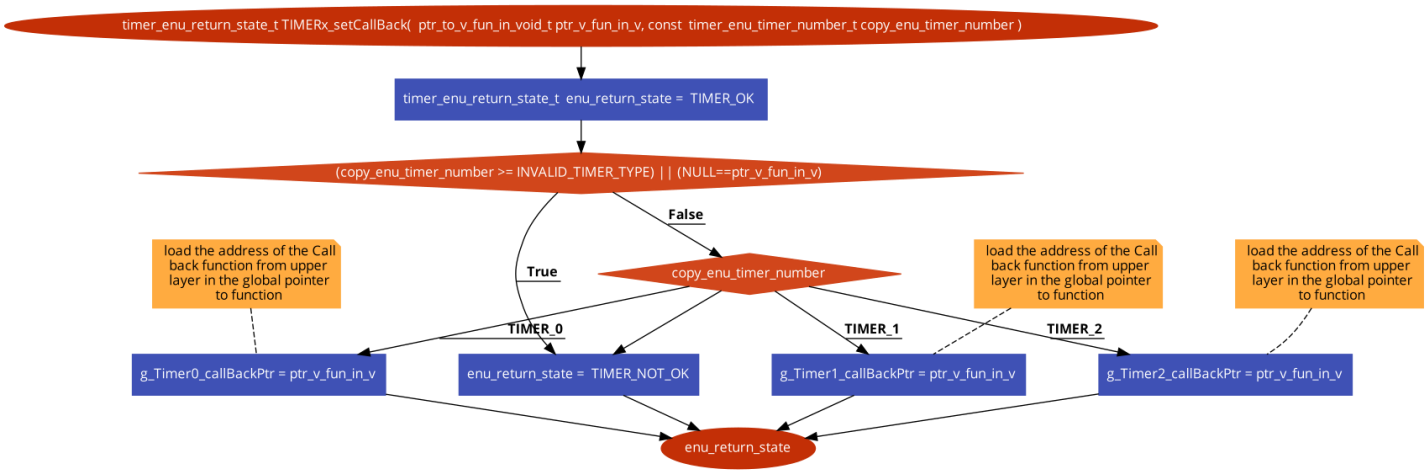


Figure 13 TIMERx_setCallBack()

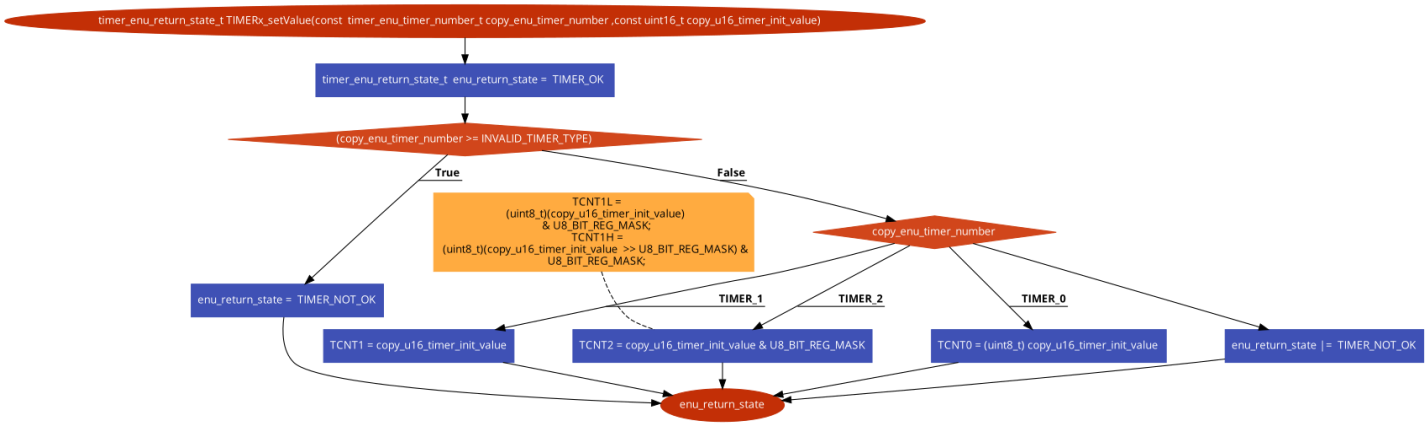


Figure 15 TIMERx_setValue

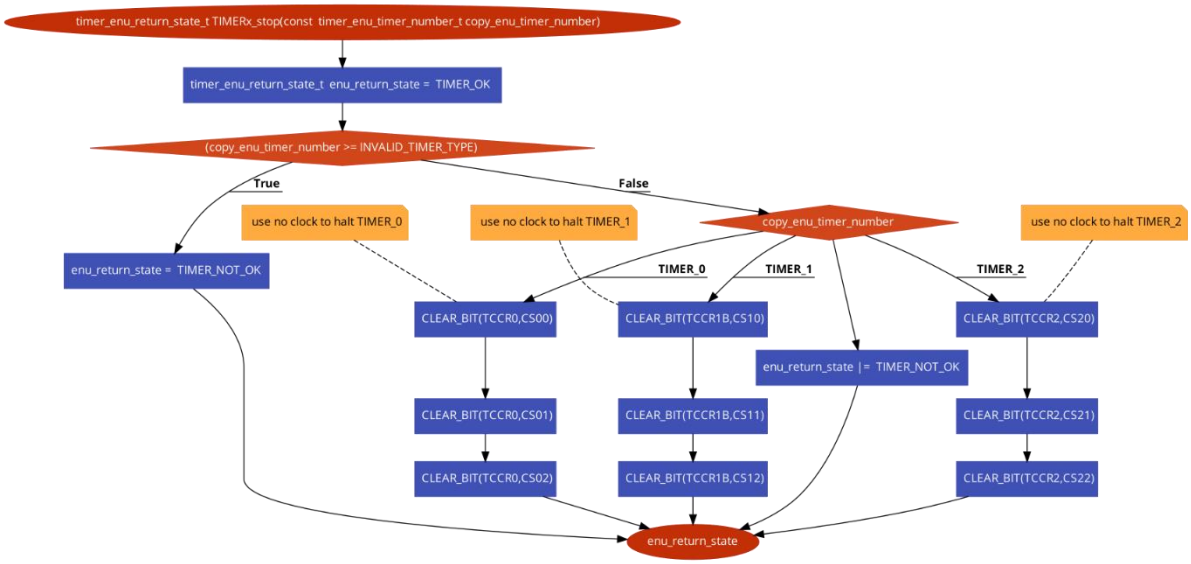


Figure 14 TIMERx_setValue()

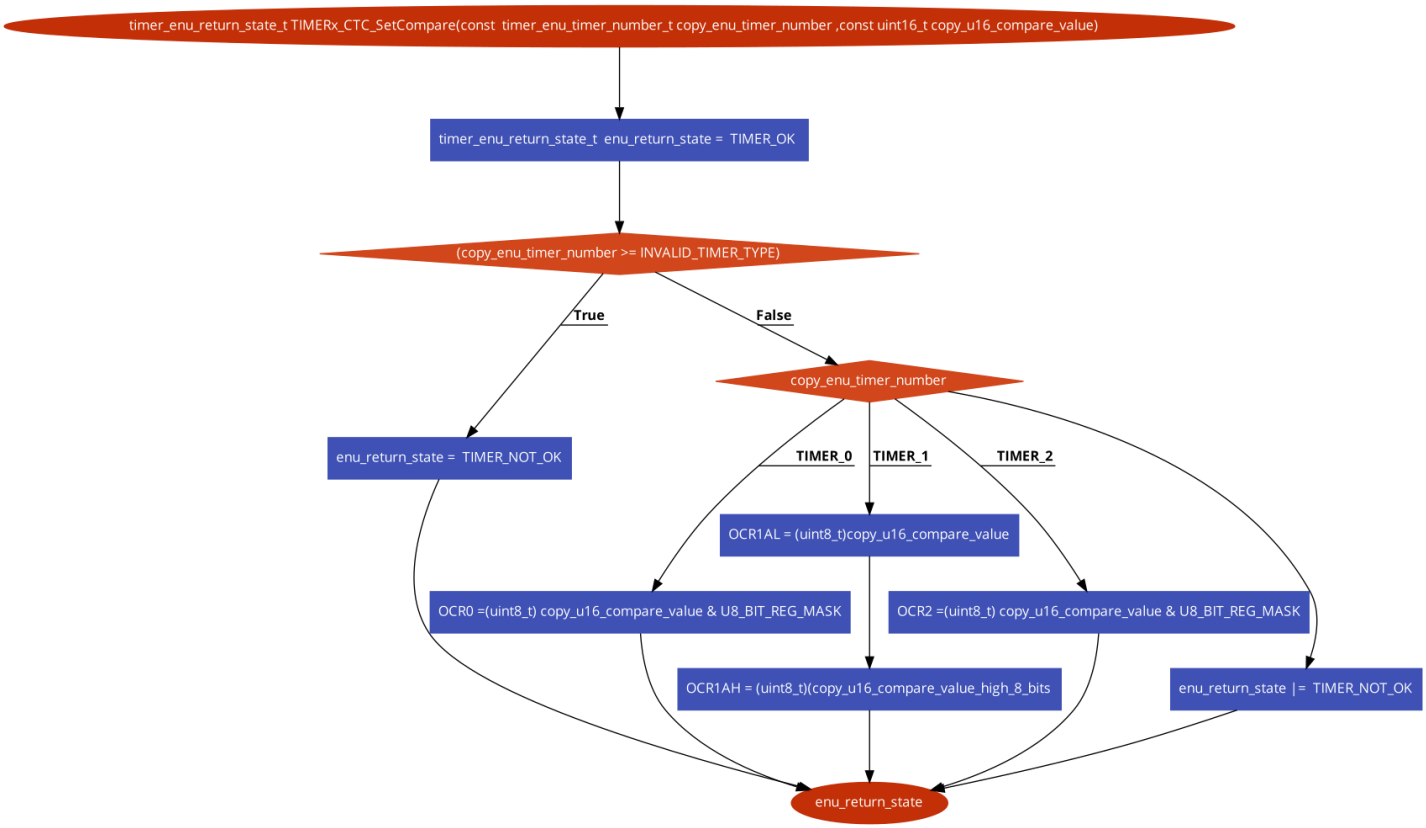


Figure 16 TIMERx_CTC_SetCompare()

HAL

BUZZER API:

Flowcharts:

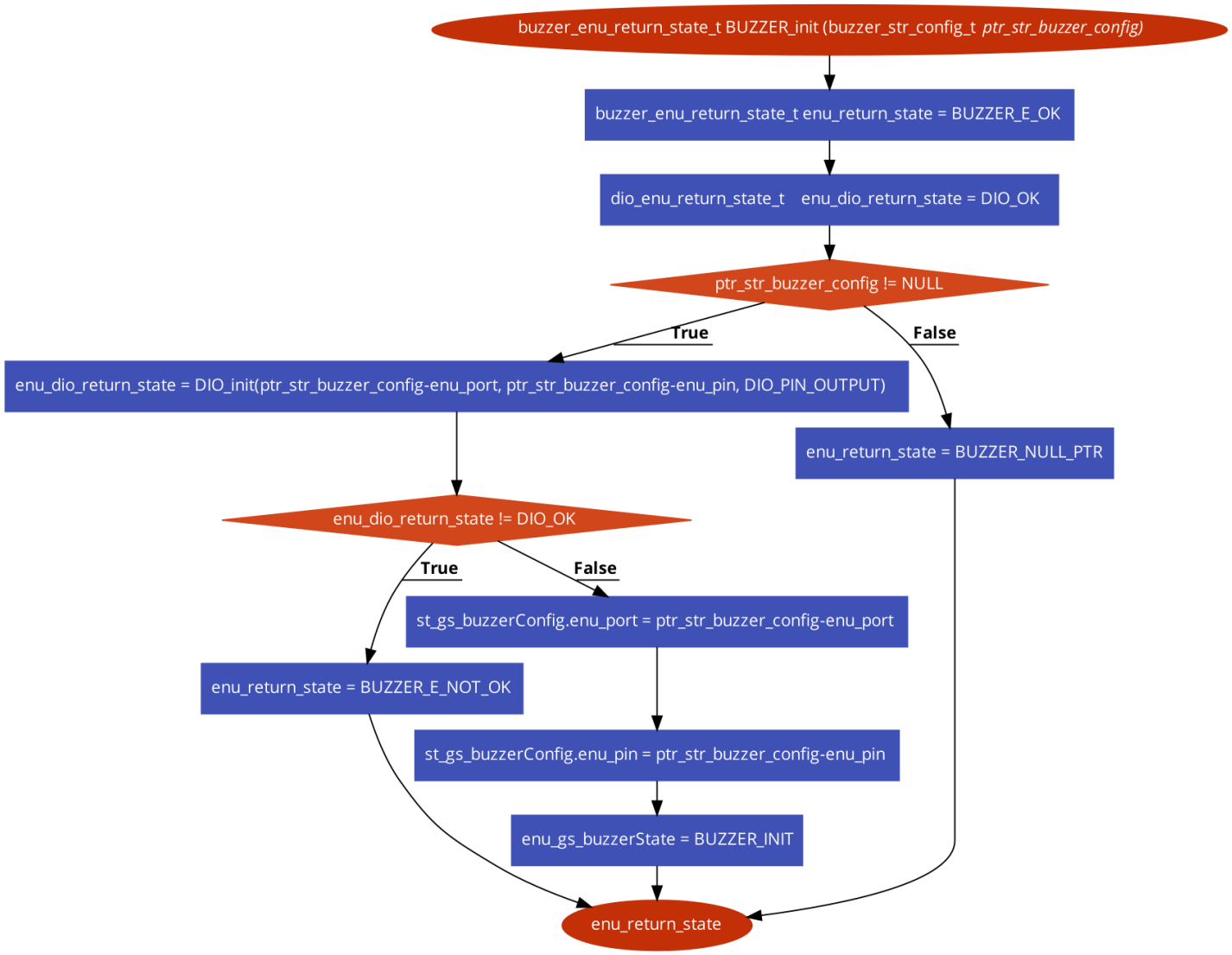


Figure 17 BUZZER_init()

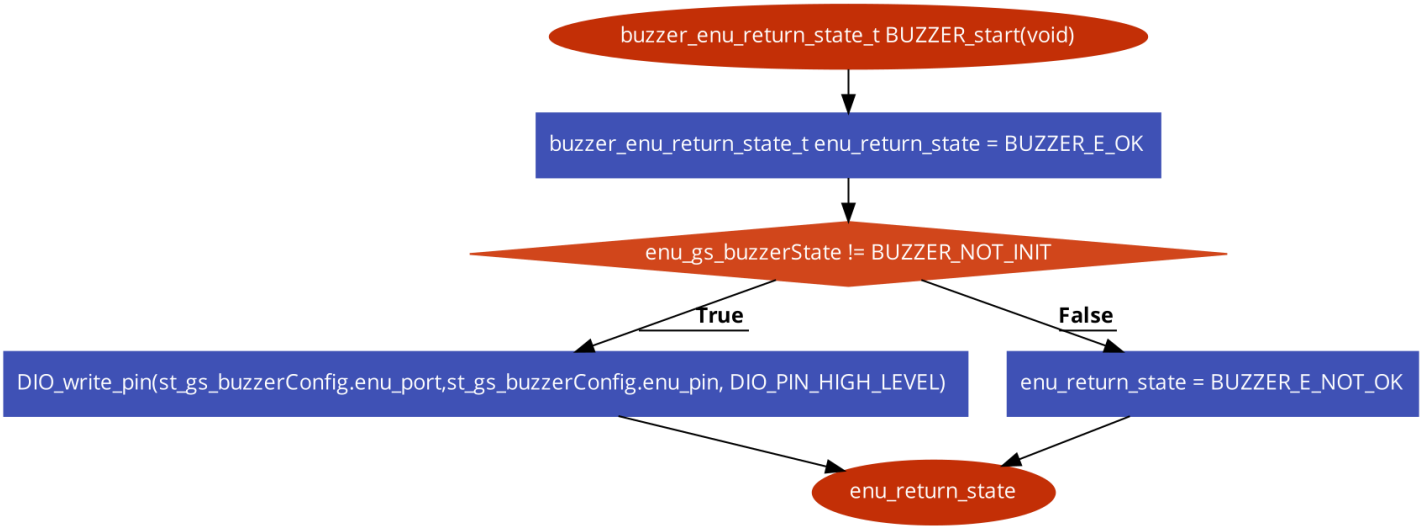


Figure 18 BUZZER_start()

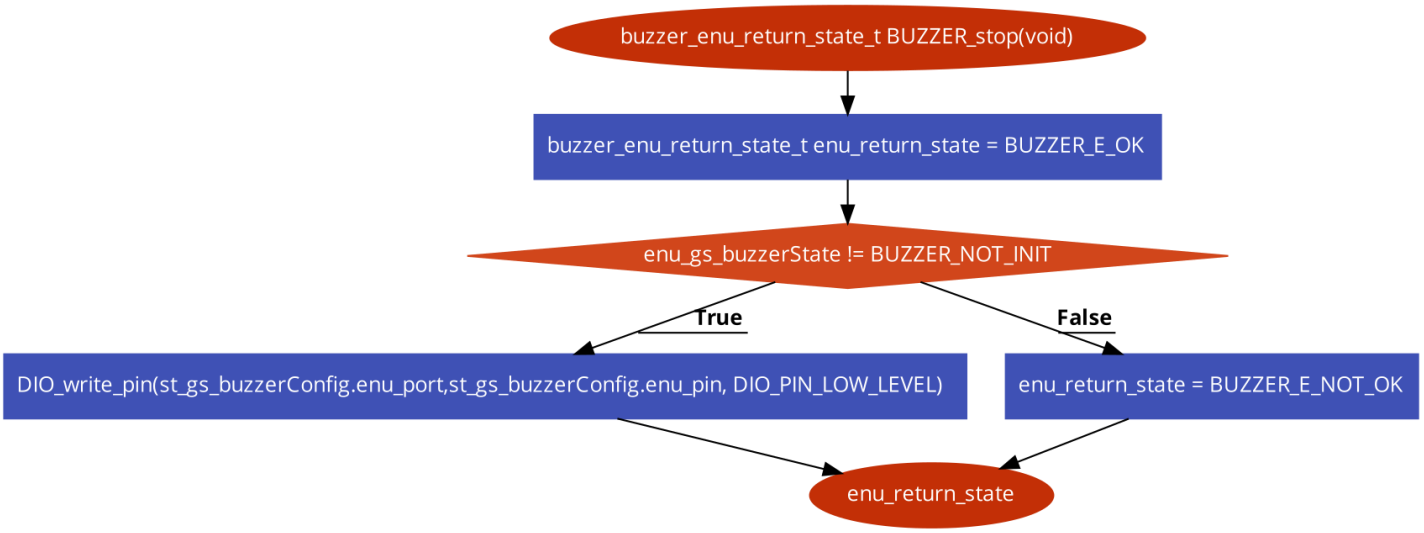


Figure 19 BUZZER_stop()

LCD API:

Flowcharts:

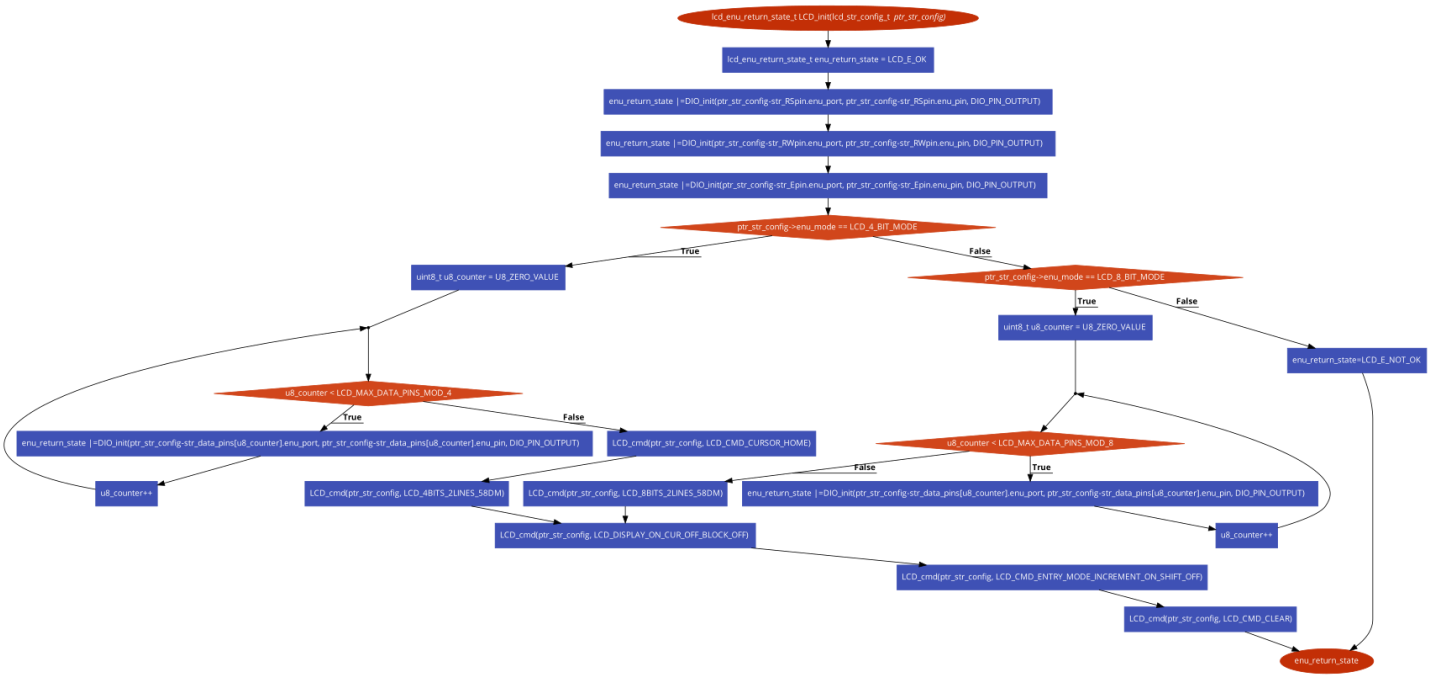


Figure 21 LCD_init ()

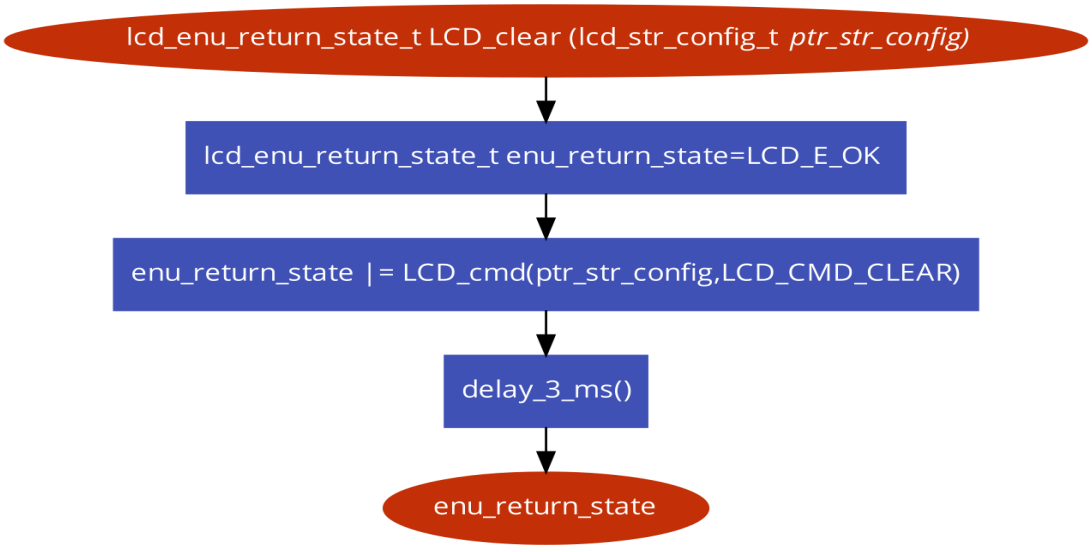


Figure 20 LCD_clear()

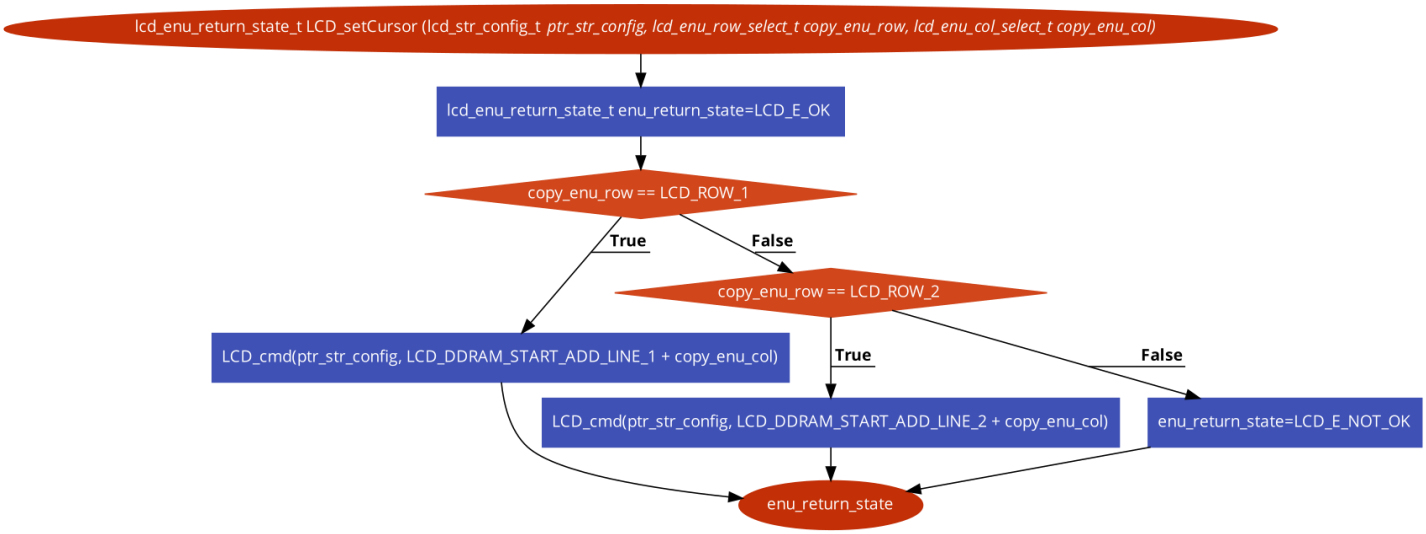


Figure 23 LCD_setCursor()

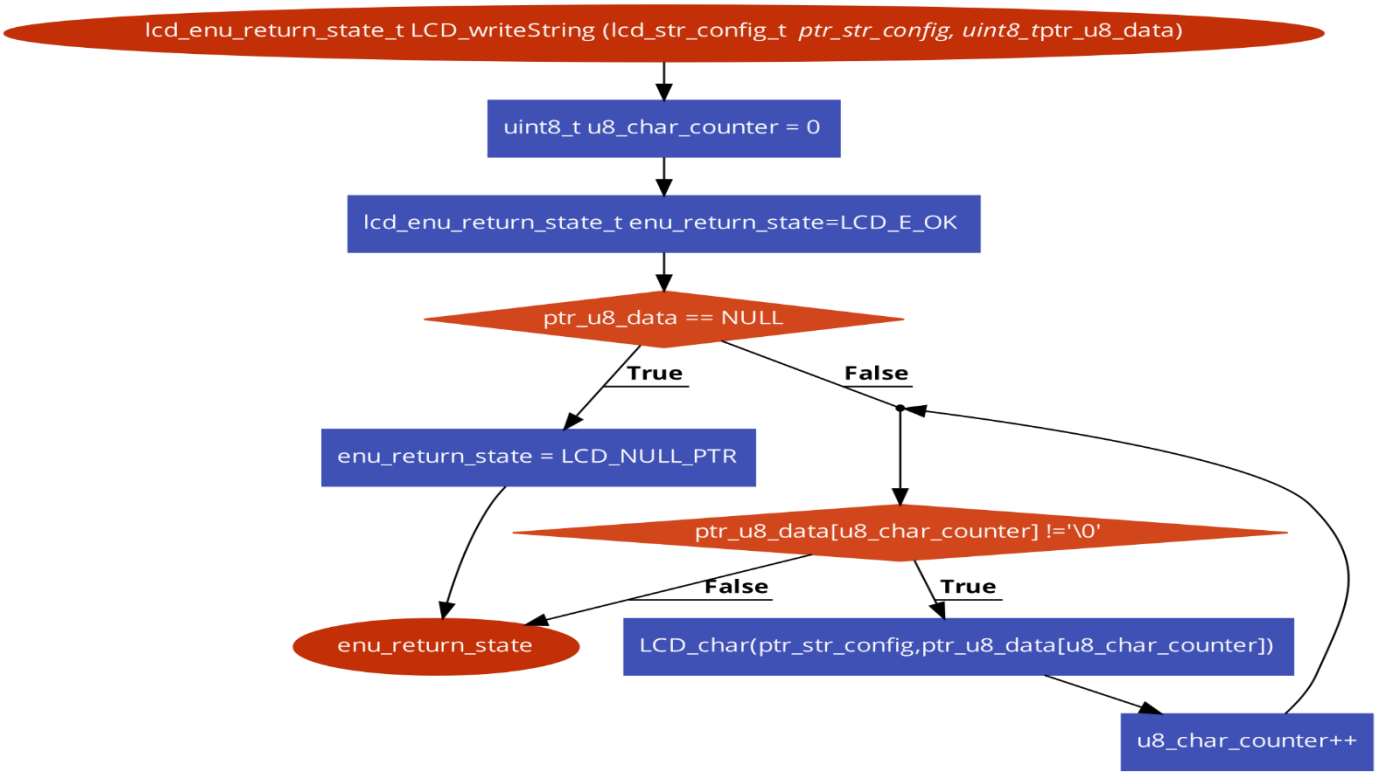


Figure 22 LCD_writeString()

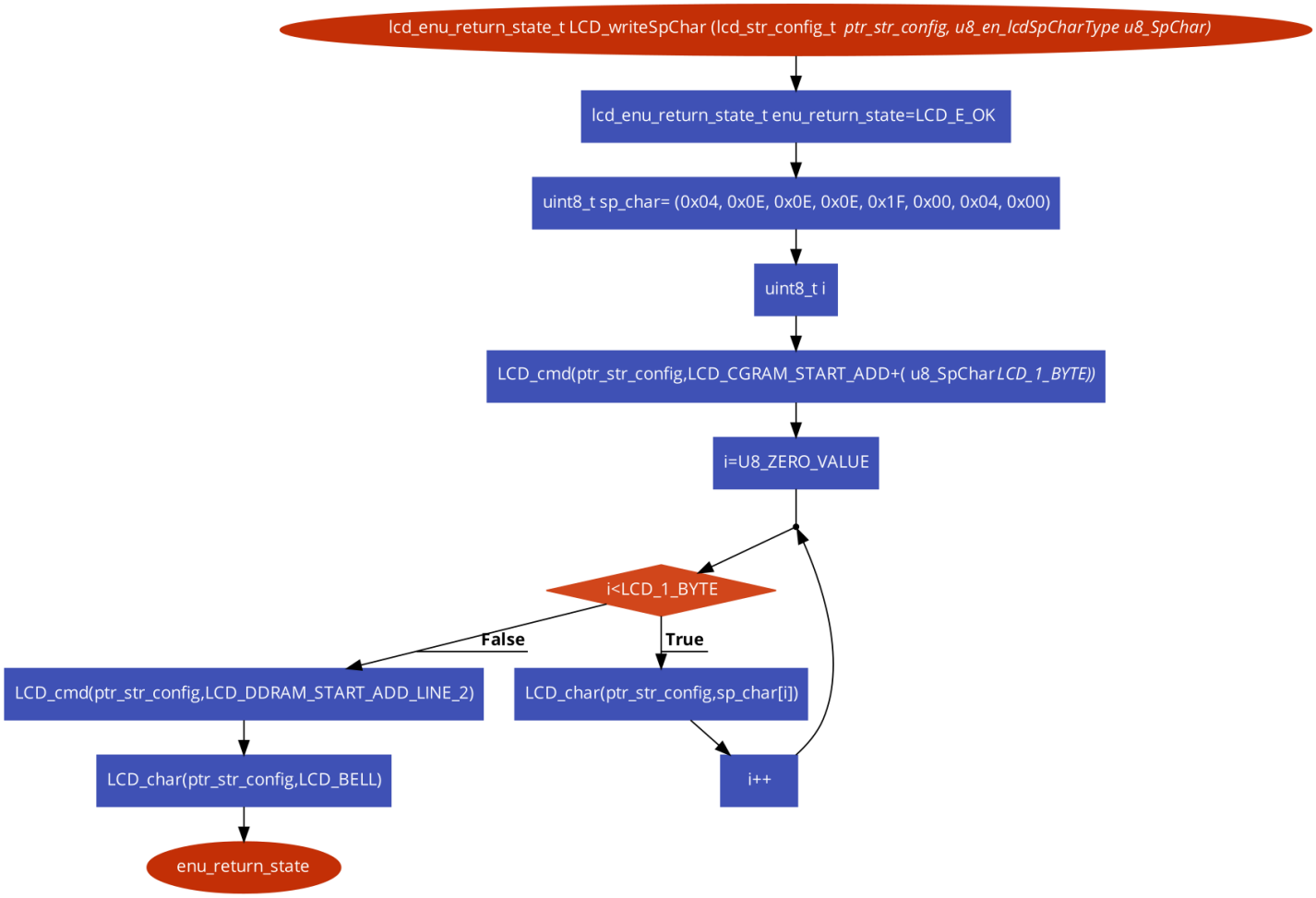


Figure 24 LCD_writeSpChar()

LM35 API :

Flowcharts:

Figure 25 LM35_INIT()

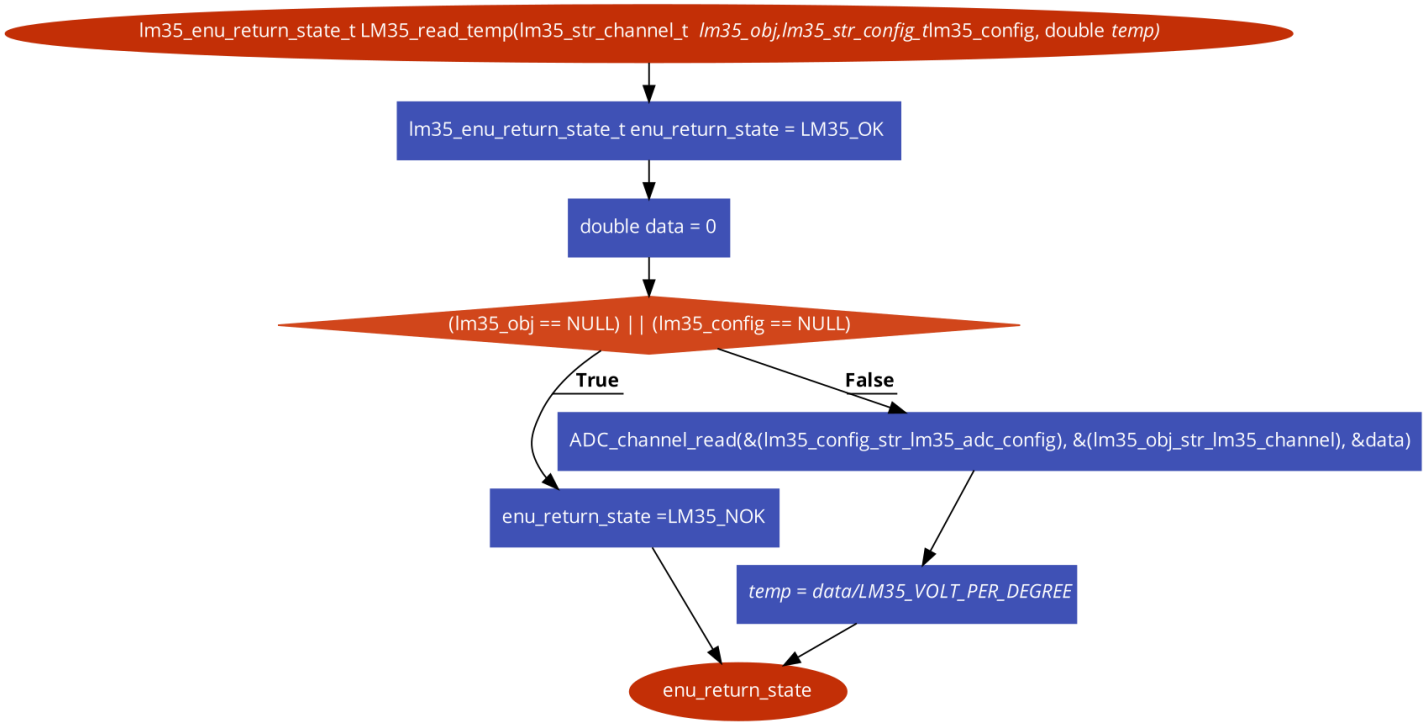


Figure 26 LM35_read_temp()

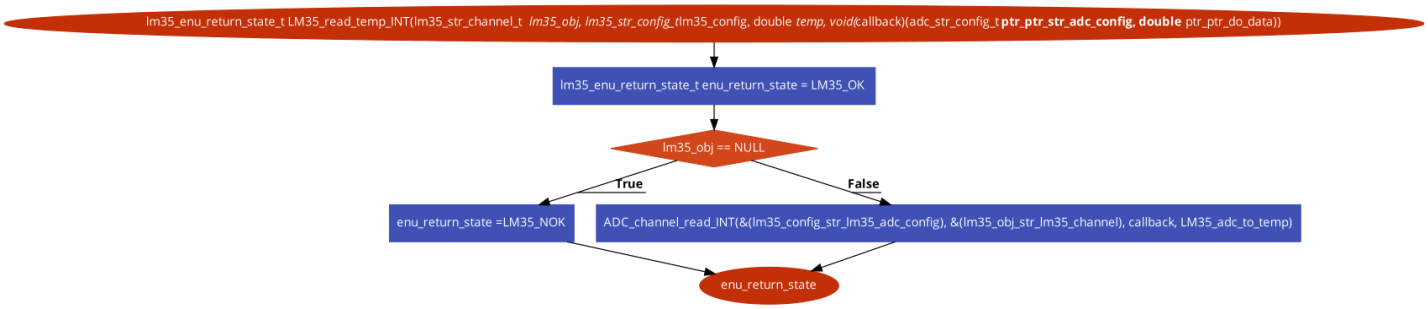


Figure 27 LM35_read_temp_INT()

Timer Manager API :

Flowcharts:

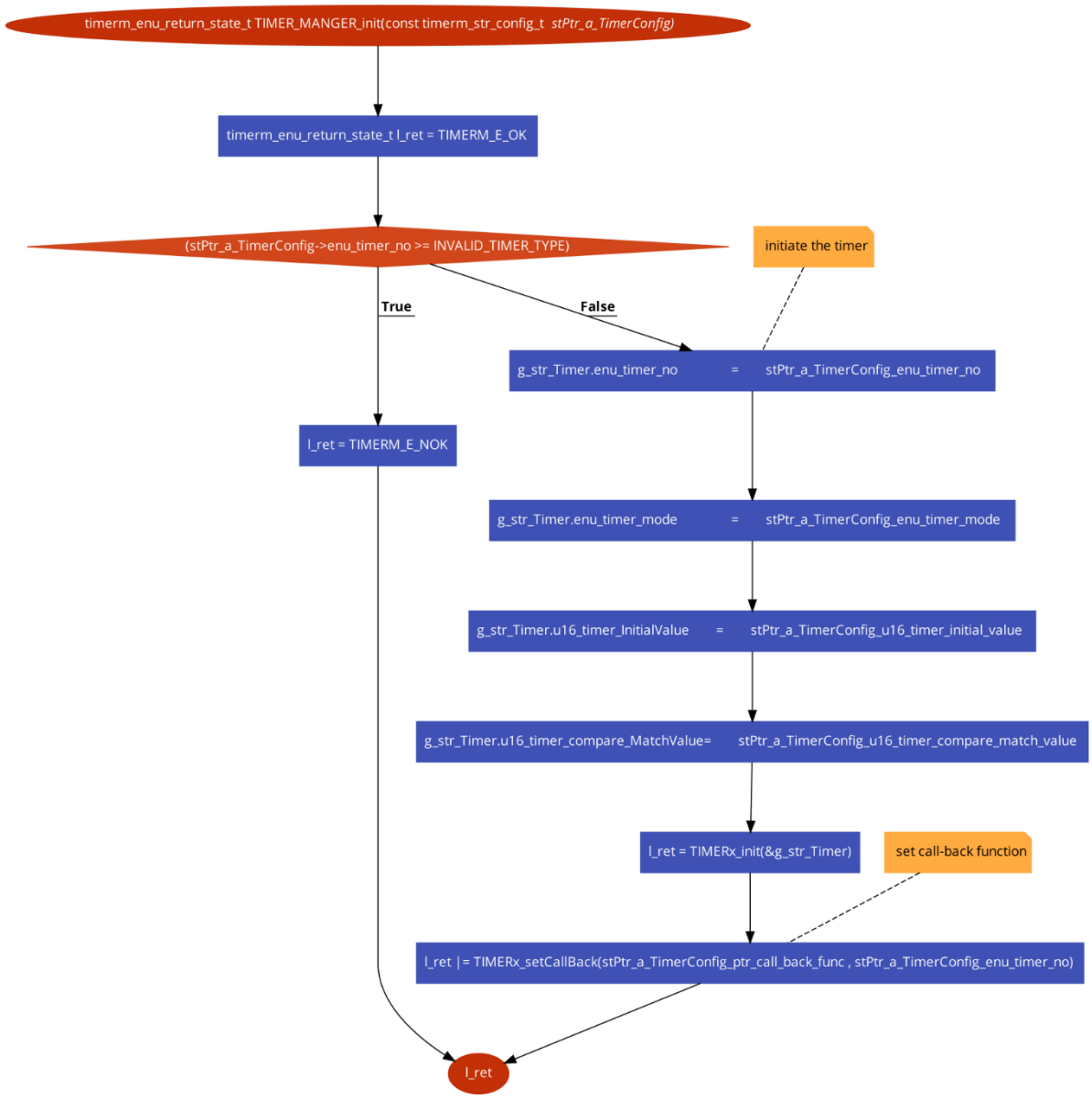


Figure 28 TIMER_MANGER_init()

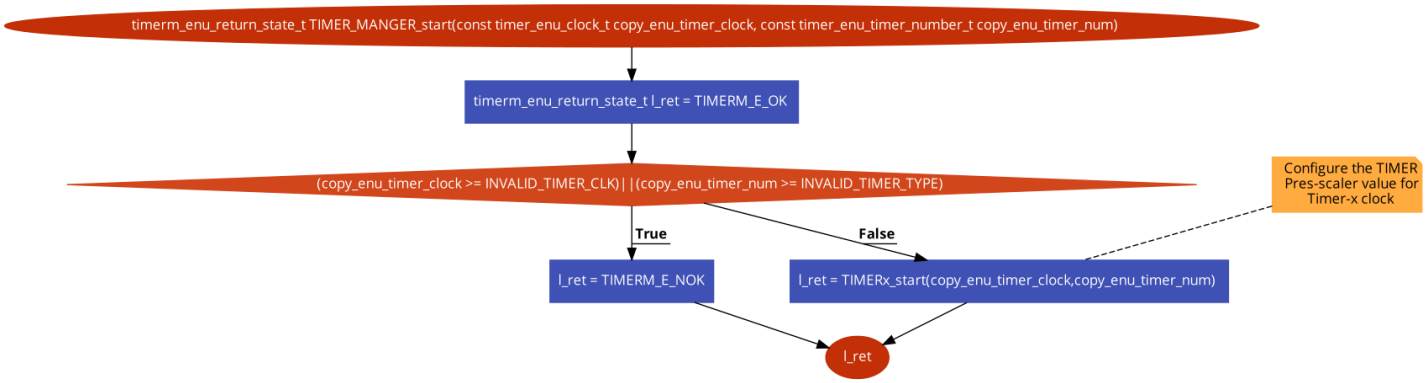


Figure 29 TIMER_MANGER_start()

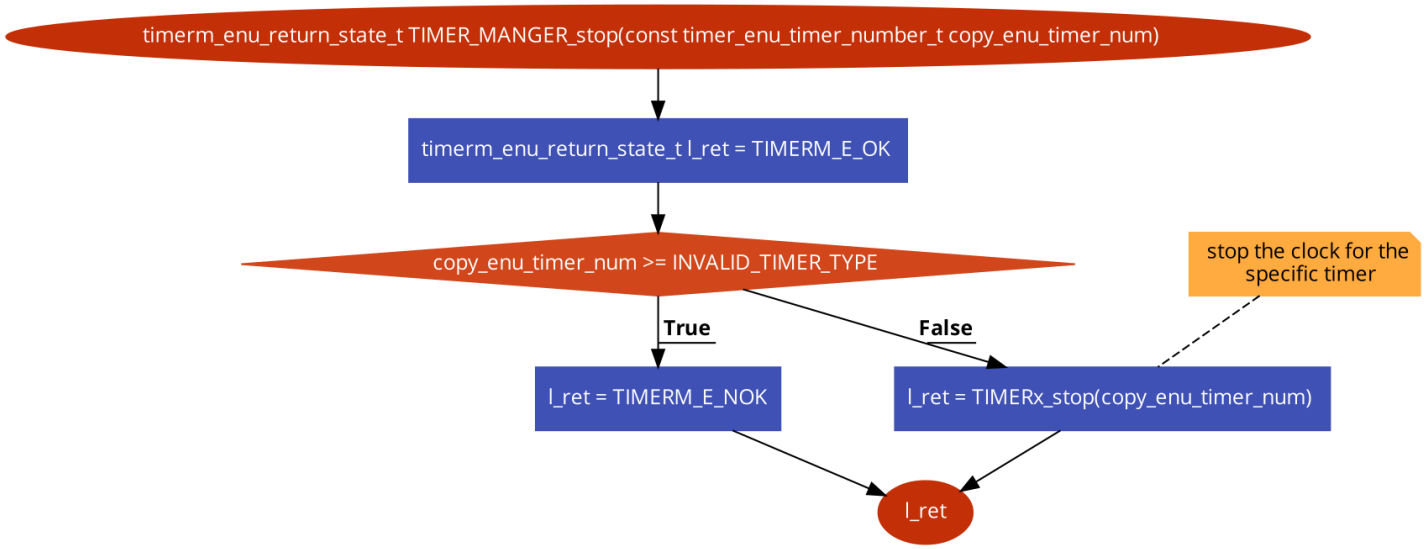


Figure 31 TIMER_MANGER_stop()

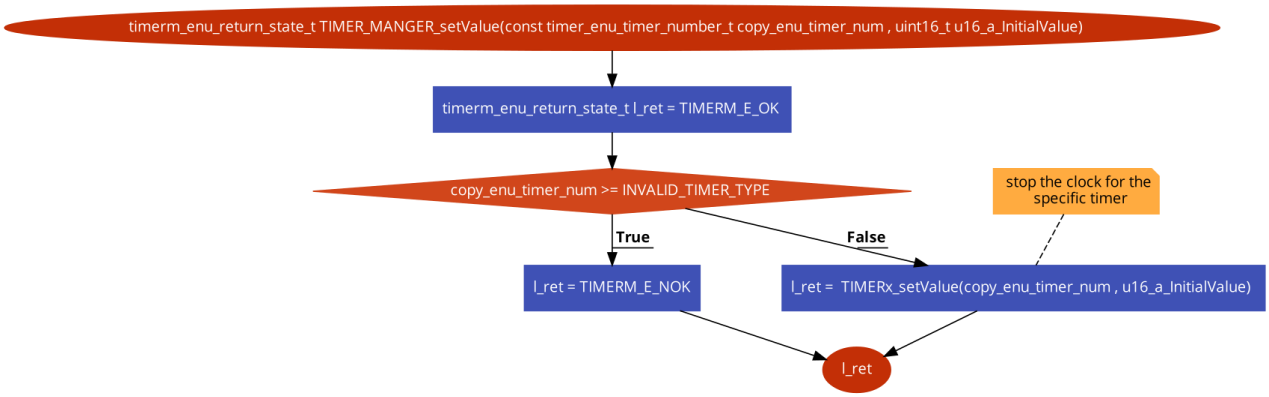


Figure 30 TIMER_MANGER_setValue()

KEYPAD API:

Flowcharts:

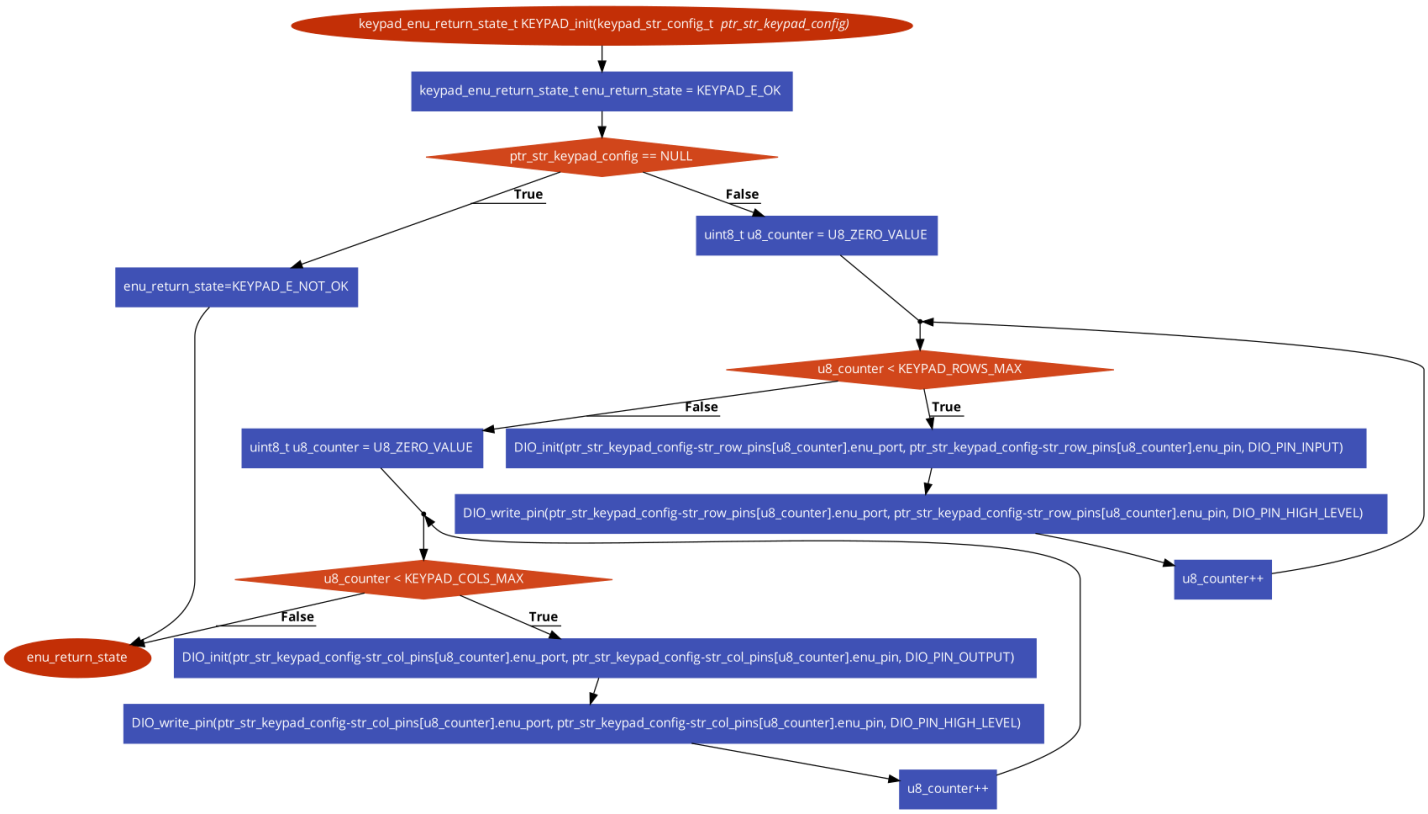


Figure 32 KEYPAD_init()t

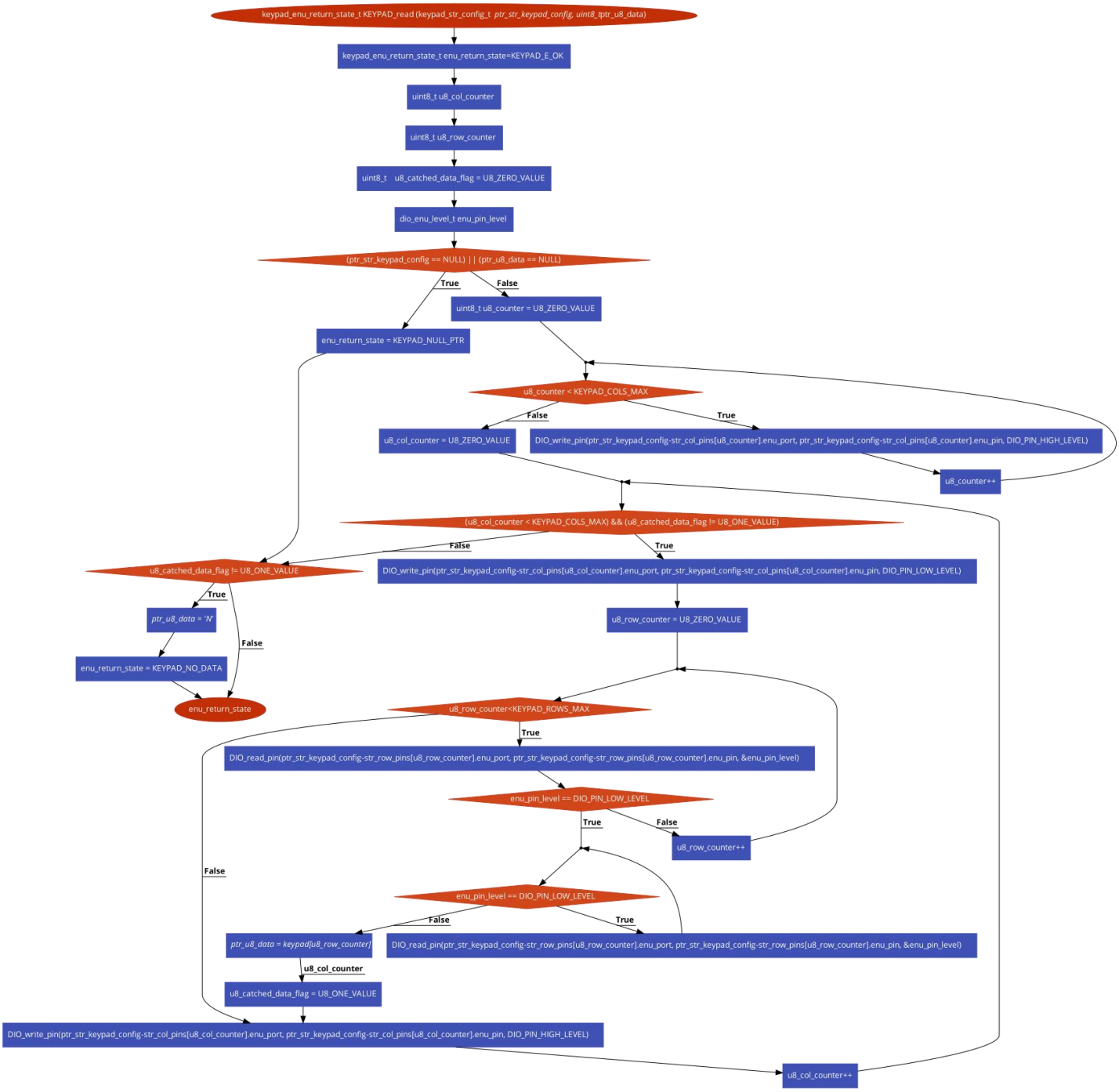


Figure 33 KEYPAD_read()

App

App API:

Flowcharts:

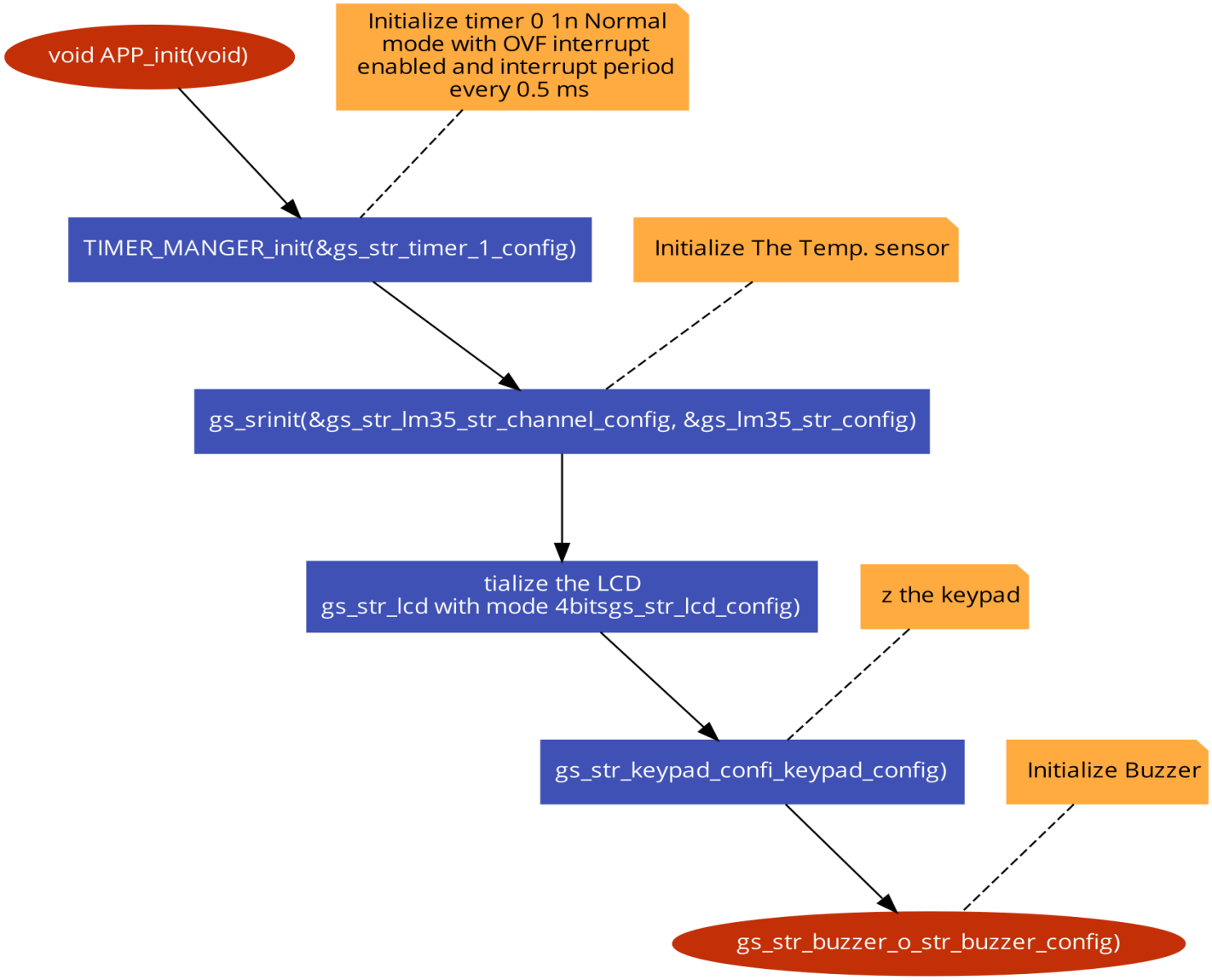


Figure 34 APP_init()

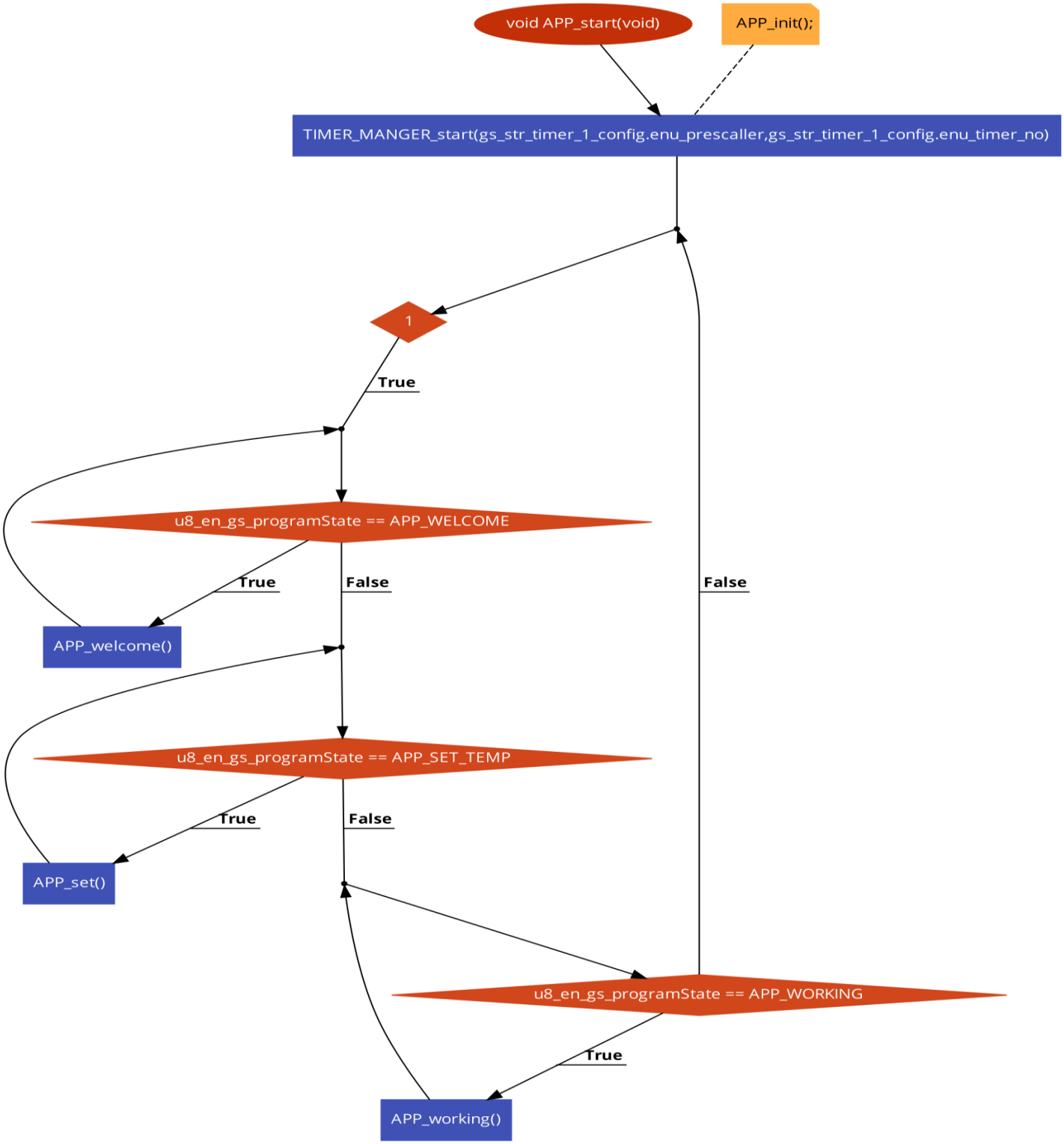


Figure 35 APP_start()

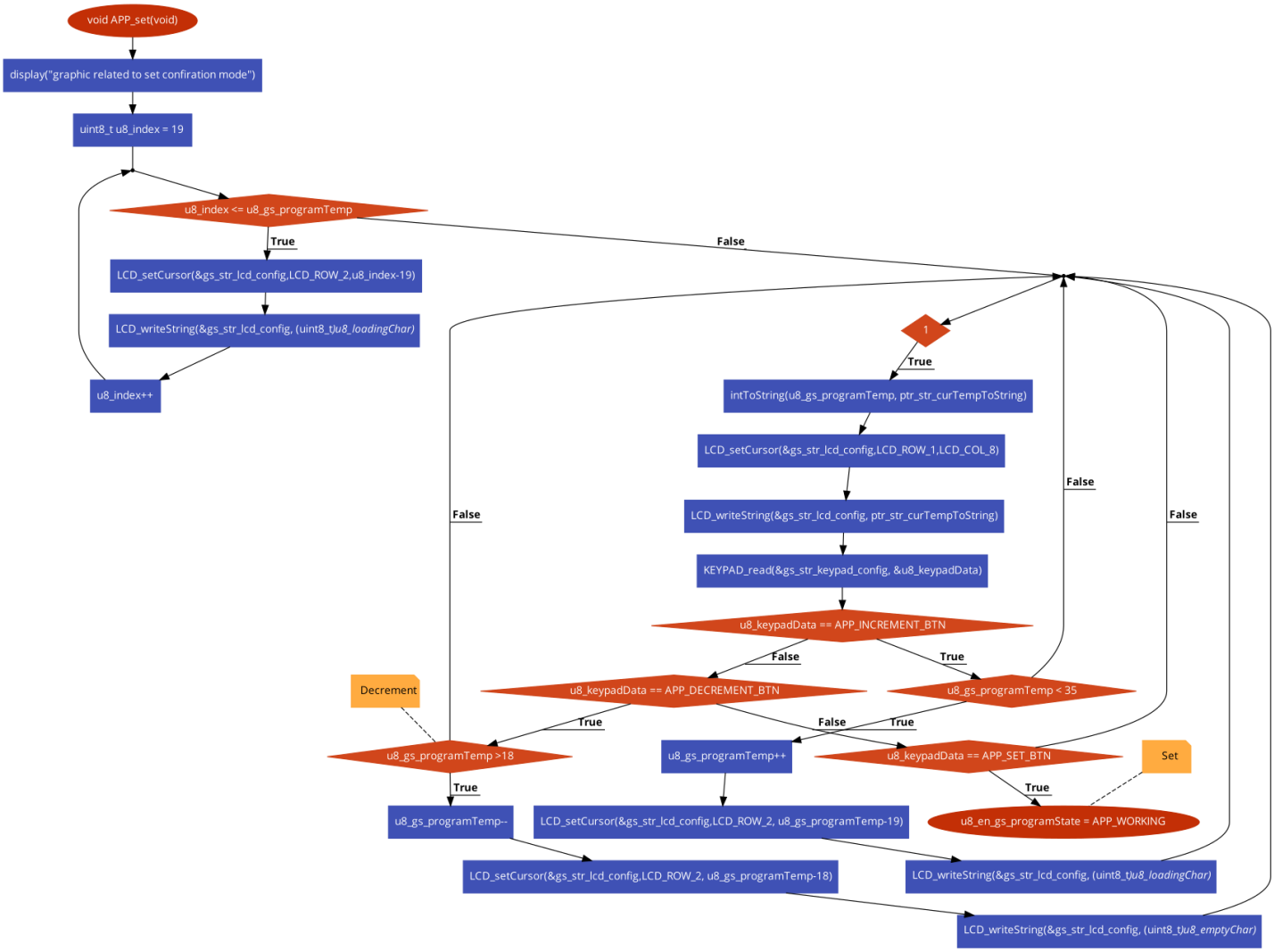


Figure 36 APP_set()

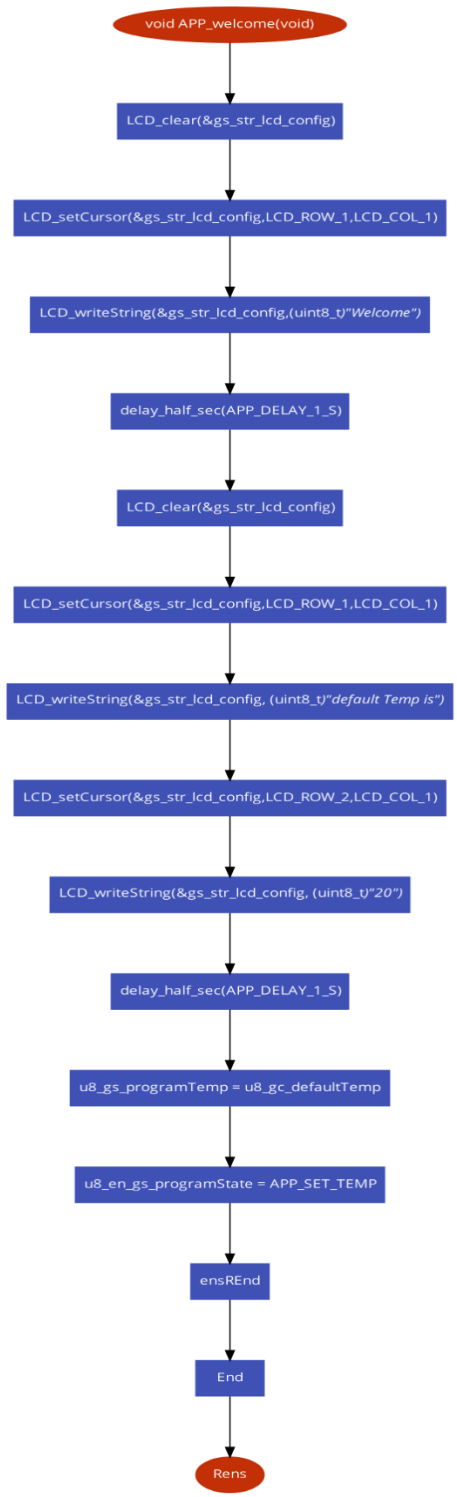


Figure 37 APP_welcome()

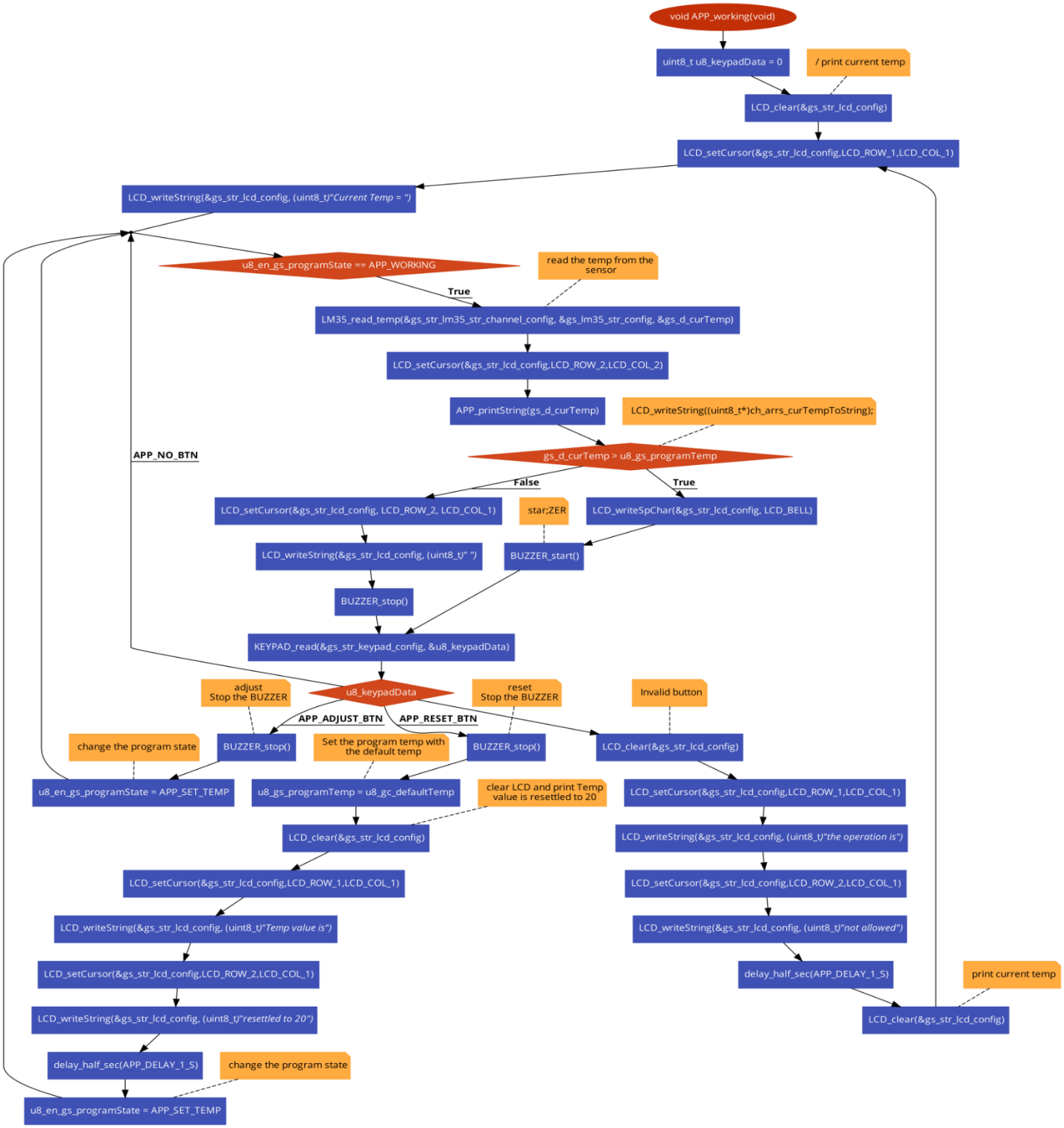


Figure 38 APP_working()

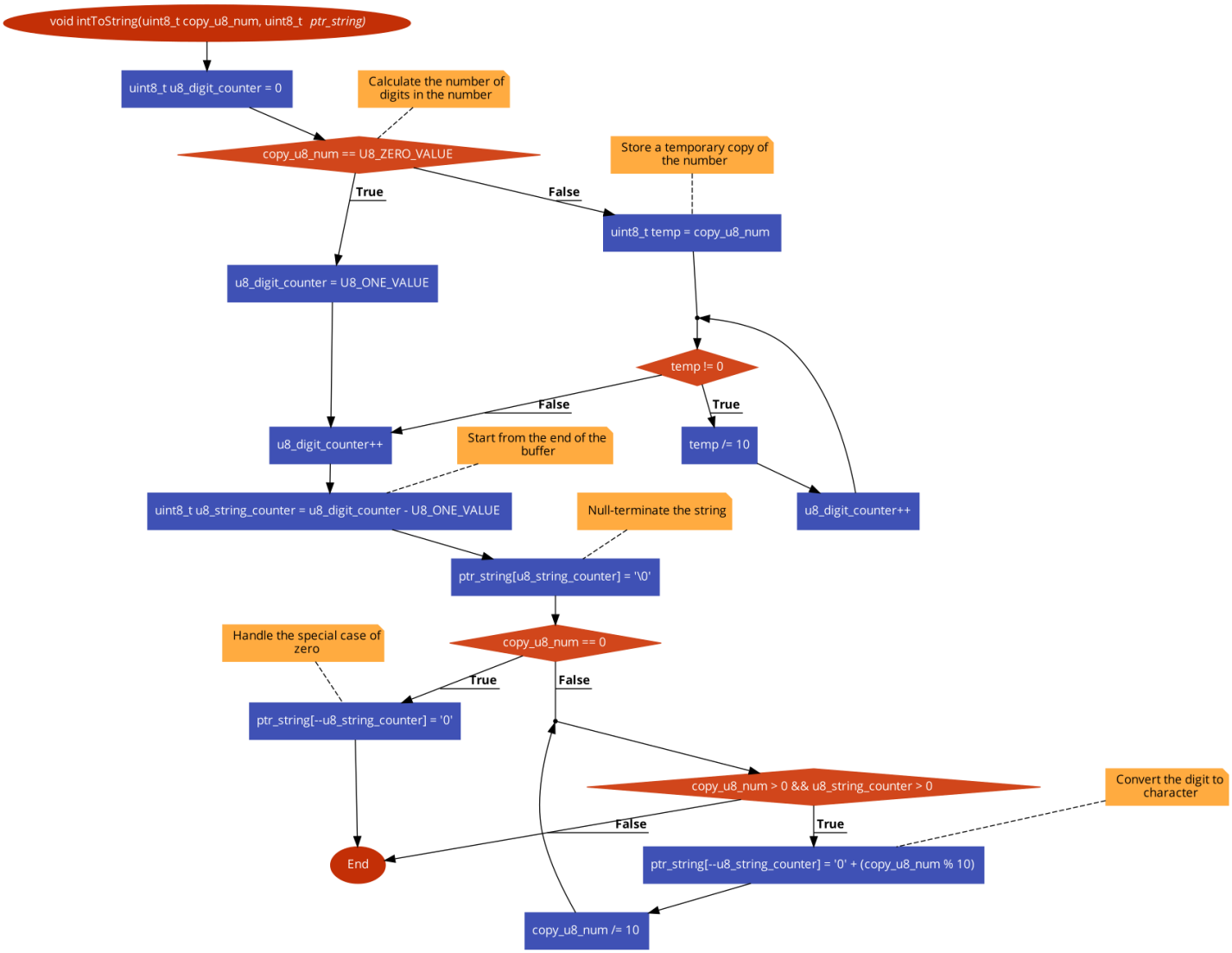


Figure 39 intToString()