



UTM

UNIVERSITI TEKNOLOGI MALAYSIA

Blinky project

Milestone 1 / Group 4

Under supervision of / DR. Afzan Othman

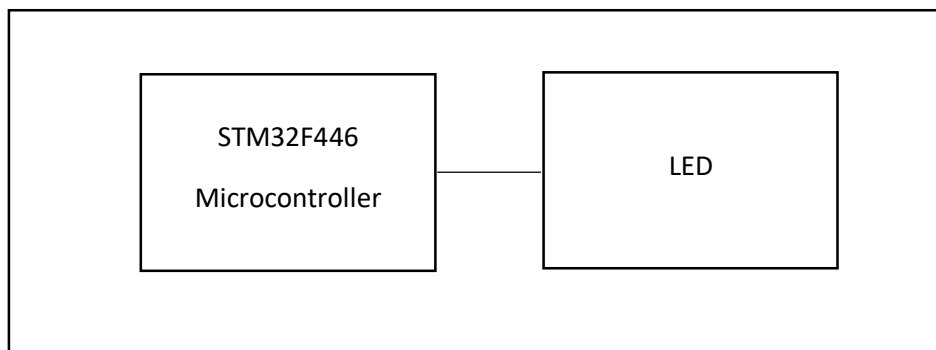
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Introduction

This document explains the LED blinking application on STM32F446 discovery board. STM32F446 discovery board has On-board LED's. We are using Keil IDE to build the LED blinking application. STM32F446 discovery board has on-board ST-link debugger.

Block Diagram



GPIO Configuration

`__HAL_RCC_GPIOA_CLK_ENABLE ()` – This function enables the clock for the PORTA.

```
typedef struct{
```

```
    uint32_t Pin;
```

```
    uint32_t Mode;
```

```
uint32_t Pull; uint32_t
Speed; uint32_t
Alternate;
}GPIO_InitTypeDef;
```

The above structure is GPIO configuration structure, which is used to configure the GPIO pins.

```
/*Configure GPIO pin : PA5 */
GPIO_InitStruct.Pin = GPIO_PIN_5;
GPIO_InitStruct.Mode = GPIO_MODE_OUTPUT_PP;
GPIO_InitStruct.Pull = GPIO_NOPULL;
GPIO_InitStruct.Speed = GPIO_SPEED_FREQ_LOW;
```

The GPIO pin configured in Push pull output mode.

Function Definitions

SystemClock_Config() – This function is used to generate the System clock frequency 180 MHz.

HAL_GPIO_Init() – This function is used to configured the GPIO pin as per user requested configuration.

HAL_GPIO_WritePin() – This function is used to set the pin voltage to HIGH or LOW (3.3V or 0V).

Delay() – This function is used to provide delay. This function uses, systick timer flags to provide the delay.

Application Code

```
int main(void)
{
    /* MCU Configuration-----*/
    /* Reset of all peripherals, Initializes the Flash interface and the Systick. */
    HAL_Init();
    /* Configure the system clock to 180 MHz */
    SystemClock_Config();
    /* Initialize all configured peripherals */
```

```
MX_GPIO_Init();
/* Infinite loop to run blink application */
while (1)
{
    /* Turn On the LED Pin */
    HAL_GPIO_WritePin(GPIOB, GPIO_PIN_13, GPIO_PIN_SET);
    HAL_GPIO_WritePin(GPIOA, GPIO_PIN_5, GPIO_PIN_SET);
    Delay(100); // 100 ms delay
    /* Turn Off the LED Pin */
    HAL_GPIO_WritePin(GPIOB, GPIO_PIN_13, GPIO_PIN_RESET);
    HAL_GPIO_WritePin(GPIOA, GPIO_PIN_5, GPIO_PIN_SET);
    Delay(100); // 100 ms delay } }
```