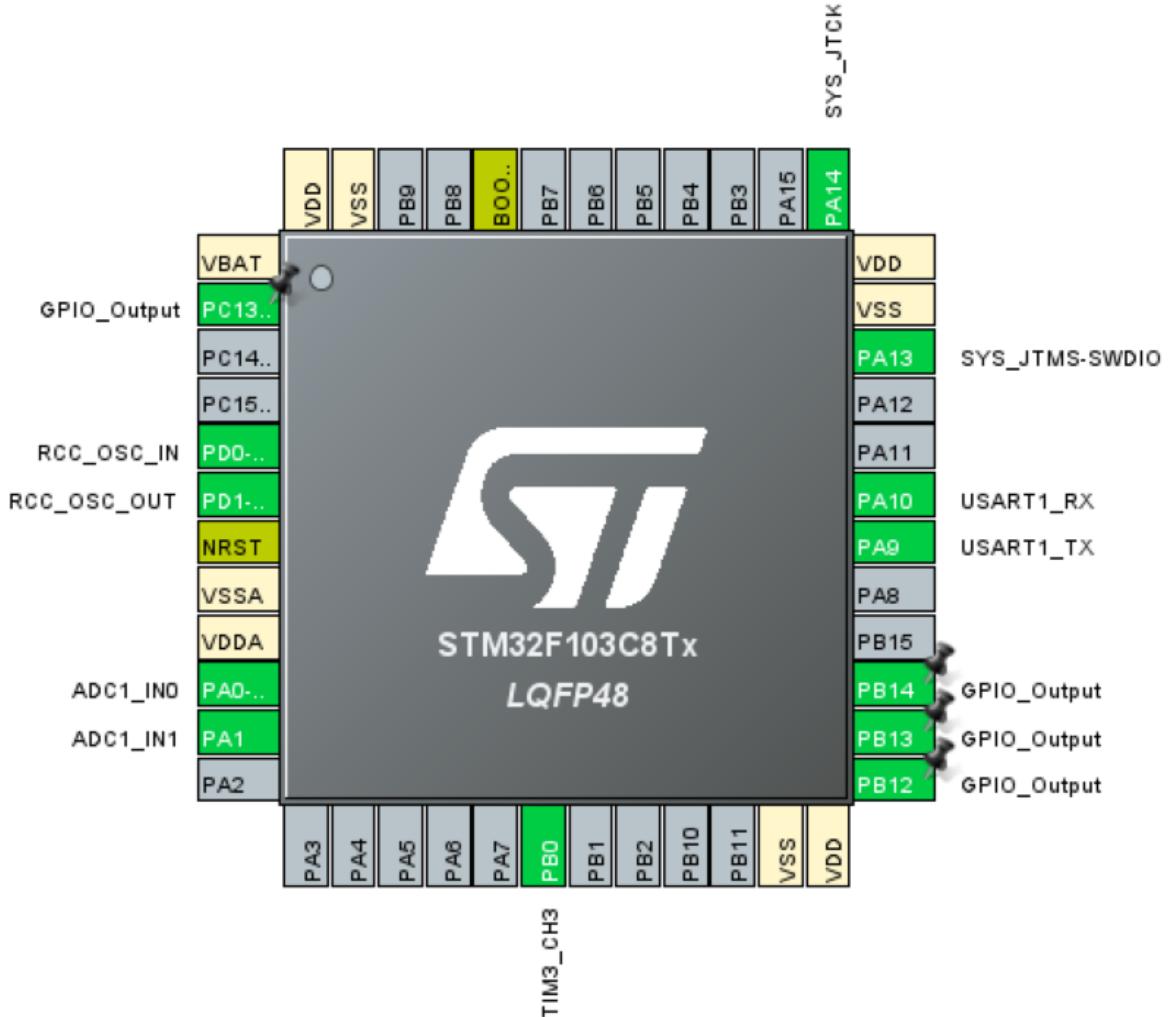


STM32 Cube MX 配置清单

根据接口文档进行的配置

引脚	功能	外设	状态	备注
PA0	土壤湿度	ADC1_IN0	✓	必须接 3.3V
PA1	光敏传感器	ADC1_IN1	✓	必须接 3.3V
PA9	蓝牙 TX	USART1_TX	✓	
PA10	蓝牙 RX	USART1_RX	✓	
PB0	风扇 PWM	TIM3_CH3	✓	注意复用功能
PB12	DHT11 数据	GPIO	⚠	需外部上拉，3.3V 电平
PB13	水泵继电器	GPIO	✓	
PB14	风扇继电器	GPIO	✓	
PC13	系统 LED	GPIO	✓	低电平点亮
PA13	SWDIO	调试	✓	保留
PA14	SWCLK	调试	✓	保留



1. 时钟树

HSE: 8 MHz
 PLL Source Mux: HSE
 PLLMUL: ×9
 系统时钟源选择: PLLCLK
 系统时钟 (SYSCLK) 设置到最大值: 72 MHz
 HCLK: 72 MHz
 PCLK1: 36 MHz (APB1 总线时钟)
 PCLK2: 72 MHz (APB2 总线时钟)

最终配置:

- SYSCLK: 72 MHz
- HCLK: 72 MHz
- PCLK1: 36 MHz
- PCLK2: 72 MHz

2. 系统核心

- SYS: Debug → Serial Wire
- RCC: HSE → Crystal/Ceramic Resonator

3. GPIO

- PB12: GPIO_Output, Open Drain, Pull-up, Medium speed, High level (DHT11 数据线)
- PB13: GPIO_Output, Push Pull, No pull, Low speed, Low level (继电器控制引脚)
- PB14: GPIO_Output, Push Pull, No pull, Low speed, Low level (继电器控制引脚)
- PC13: GPIO_Output, Push Pull, Pull-up, Low speed, High level (系统 LED)

4. 定时器 (风扇PWM)

- TIM3: Channel3 → PWM Generation CH3
- 参数: Prescaler=71, Counter Period=999

5. 串口 (蓝牙 HC-05)

- USART1: Asynchronous
- 波特率: 9600

6. ADC (土壤湿度和光敏传感器)

- ADC1: IN0 和 IN1 启用
- Scan Conversion Mode: Enabled
- Continuous Conversion Mode: Enabled
- DMA Continuous Requests: Enabled
- Number Of Conversion: 2
- Rank1: Channel 0, 239.5 Cycles
- Rank2: Channel 1, 239.5 Cycles

7. DMA (ADC 数据传输)

- ADC1: 一个DMA请求
- Mode: Circular
- Data Width: Half Word (Both Peripheral and Memory)
- Memory Increment Address: Enable

8. 项目管理

1. Project:

- Project Name: SmartPlantGuard
- Toolchain/IDE: CMake

2. Code Generator:

- Generate peripheral initialization as a pair of '.c/.h' files per peripheral