

# Robot Arm

CubeMX - Code generation manual

# 1. Pin settings

STM32CubeMX arm.ioc: STM32F407VGTx STM32F407G-DISC1



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arm.ioc - Pinout & Configuration

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System Core

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Timers

Connectivity

Multimedia

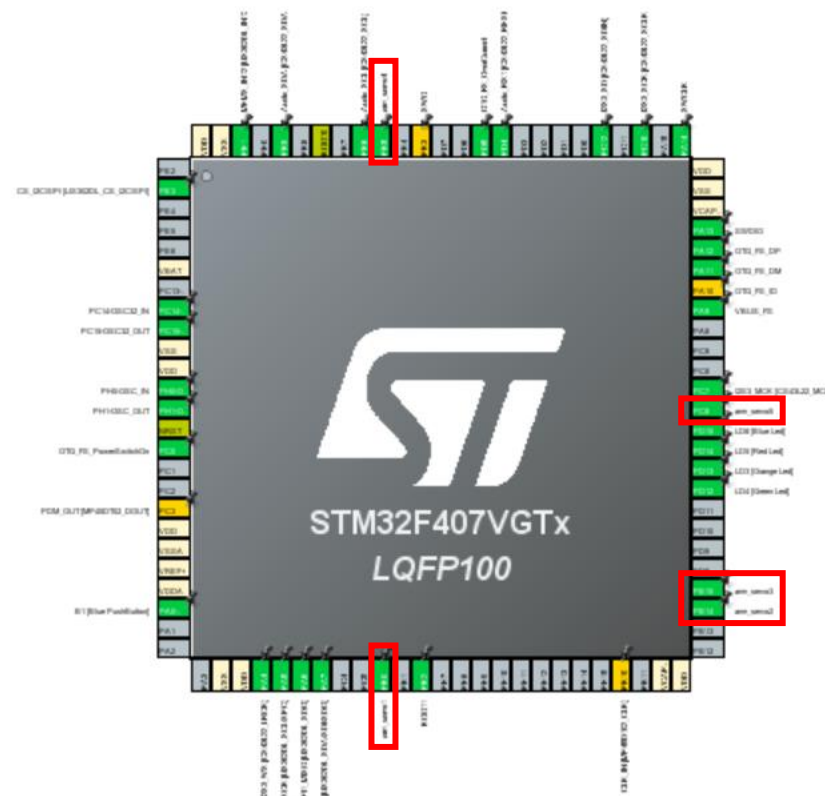
Security

Computing

Middleware

Pinout view

System view



PC6 – TIM3\_1

PB5 – TIM3\_2

PB0 – TIM3\_3

PB14 – TIM12\_1

PB15 – TIM12\_2

## 2. Timer mode settings

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▲ TIM4

▲ TIM5

TIM6

TIM7

▲ TIM8

TIM9

TIM10

TIM11

✓ TIM12

TIM13

TIM14

TIM3 Mode and Configuration

Mode

Slave Mode Disable

Trigger Source Disable

Clock Source Internal Clock

Channel1 PWM Generation CH1

Channel2 PWM Generation CH2

Channel3 PWM Generation CH3

Channel4 Disable

Combined Channels Disable

☐ Use ETR as Clearing Source

☐ XOR activation

☐ One Pulse Mode

Configuration

Reset Configuration

✓ NVIC Settings

✓ DMA Settings

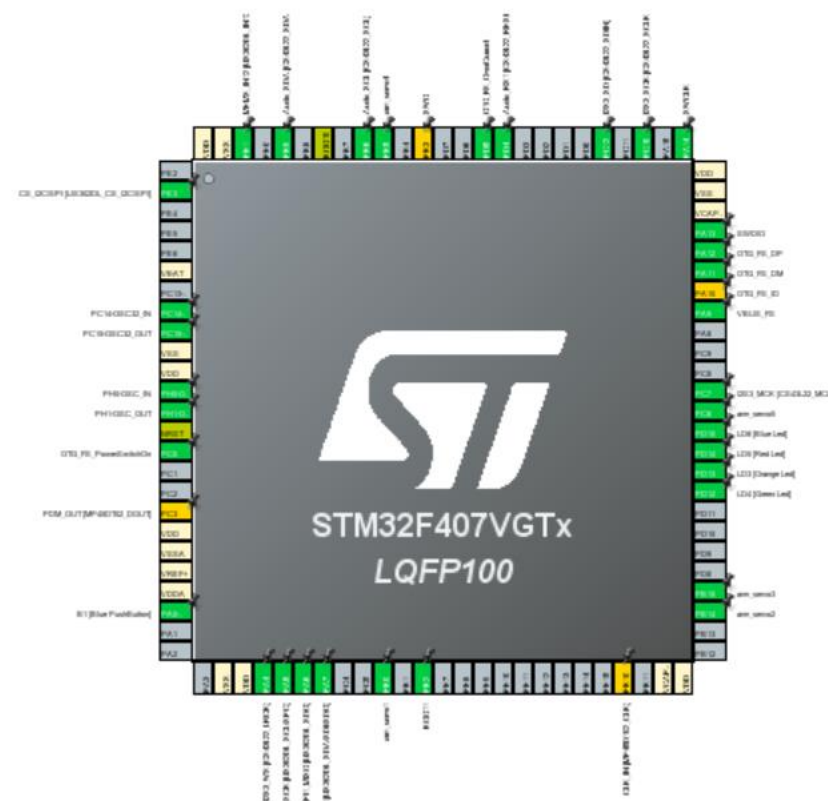
✓ GPIO Settings

Parameter Settings

User Constants

Pinout view

System view



# 3. Timer parameter settings – Counter settings

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TIM3 Mode and Configuration

Mode

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✓ NVIC Settings

✓ DMA Settings

✓ GPIO Settings

✓ Parameter Settings

✓ User Constants

Configure the below parameters :

Search (Ctrl+F)



Counter Settings

Prescaler (PSC - 16 bits v... 335

Counter Mode Up

Counter Period (AutoRelo... 9999

Internal Clock Division (CK... No Division

auto-reload preload Disable

> Trigger Output (TRGO) Parameters

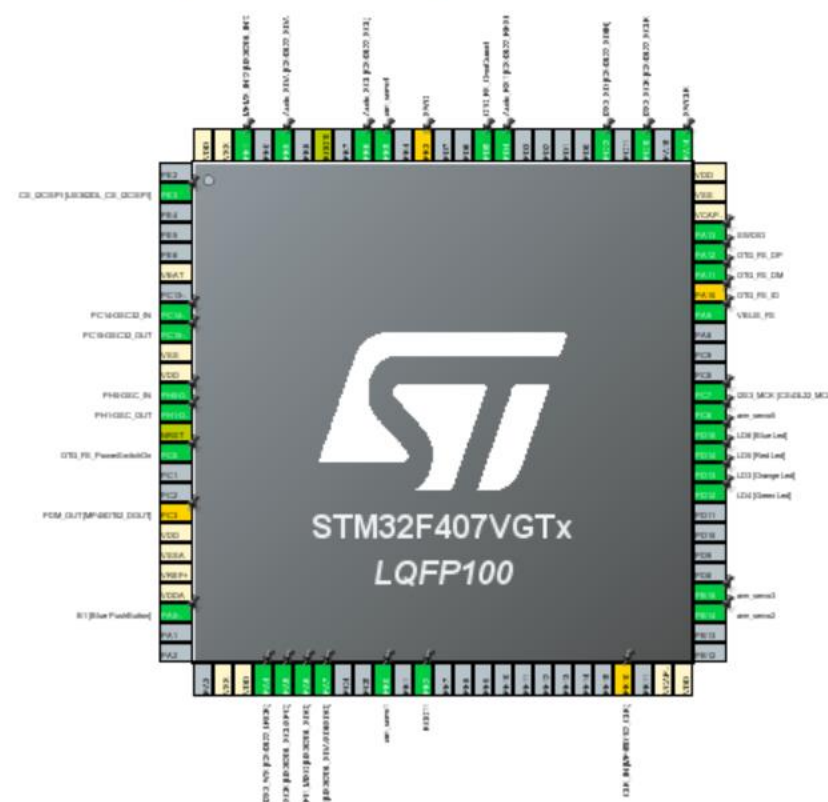
> PWM Generation Channel 1

> PWM Generation Channel 2

> PWM Generation Channel 3

Pinout view

System view



# 3. Timer parameter settings – PWM generation channel settings

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TIM3 Mode and Configuration

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✓ NVIC Settings

✓ DMA Settings

✓ GPIO Settings

✓ Parameter Settings

✓ User Constants

Configure the below parameters :

Search (Ctrl+F)

> Counter Settings

> Trigger Output (TRGO) Parameters

✓ PWM Generation Channel 1

Mode

PWM mode 1

Pulse (16 bits value)

230 → PWM 초기값

Output compare preload

Enable

Fast Mode

Disable

CH Polarity

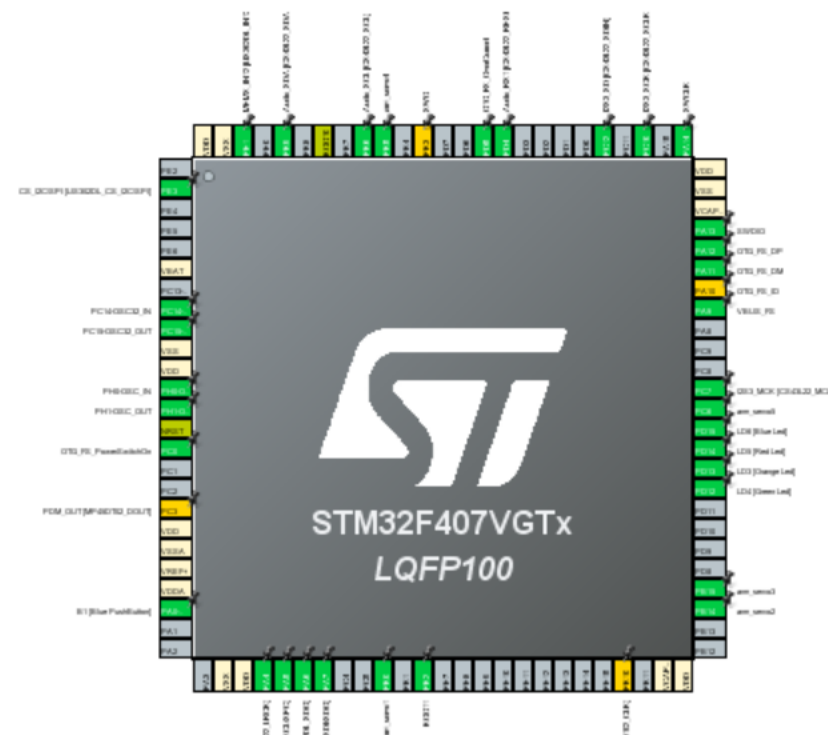
High

> PWM Generation Channel 2

> PWM Generation Channel 3

Pinout view

System view



\* Channel 2,3 과 TIM12의 channel 1,2 도 설정해주기



# 4. Timer parameter settings – PWM generation channel settings

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arm.ioc - Project Manager

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Code Generator

Advanced Settings

Project Settings

Project Name  
arm

Project Location  
C:\Users\user\Desktop\lab\self-driving contest\example-arm

Application Structure  
Basic ☐ Do not generate the ma...

Toolchain Folder Location  
C:\Users\user\Desktop\lab\self-driving contest\example-arm\arm\

Toolchain / IDE  
TrueSTUDIO ☒ Generate Under ...

Linker Settings

Minimum Heap Size 0x200

Minimum Stack Size 0x400

Mcu and Firmware Package

Mcu Reference  
STM32F407VGTx

Firmware Package Name and Version

## 5. Project manager - Code generator

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Project

STM32Cube MCU packages and embedded software packs

- ☐ Copy all used libraries into the project folder
- ☒ Copy only the necessary library files
- ☐ Add necessary library files as reference in the toolchain project configu...

Generated files

- ☒ Generate peripheral initialization as a pair of '.c/.h' files per peripheral
- ☐ Backup previously generated files when re-generating
- ☒ Keep User Code when re-generating
- ☒ Delete previously generated files when not re-generated

HAL Settings

- ☐ Set all free pins as analog (to optimize the power consumption)
- ☐ Enable Full Assert

Template Settings

Select a template to generate customized code

Settings...

Code Generator







Advanced Settings

# 6. Generate code

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☐ Enable Full Assert

Template Settings

Select a template to generate customized code

Settings...



# Robot Arm

TrueSTUDIO - manual

- PWM

(timer number, channel number)

```
HAL_TIM_PWM_Start(&htim3,TIM_CHANNEL_1);  
HAL_TIM_PWM_Start(&htim3,TIM_CHANNEL_2);  
HAL_TIM_PWM_Start(&htim3,TIM_CHANNEL_3);  
HAL_TIM_PWM_Start(&htim12,TIM_CHANNEL_1);  
HAL_TIM_PWM_Start(&htim12,TIM_CHANNEL_2);
```

→ PWM을 시작을 알리는 함수 구문

```
TIM3->CCR1=MOTOR_PWM[0];  
TIM3->CCR2=MOTOR_PWM[1];  
TIM3->CCR3=MOTOR_PWM[2];  
TIM12->CCR1=MOTOR_PWM[3];  
TIM12->CCR2=MOTOR_PWM[4];
```

→ CCR값을 변화시켜 servo motor의 각도를 변경