

Lab5 PWM and Logic Analyzer Report

姓名：林咏毅

學號：b10901059

Discussions of Work

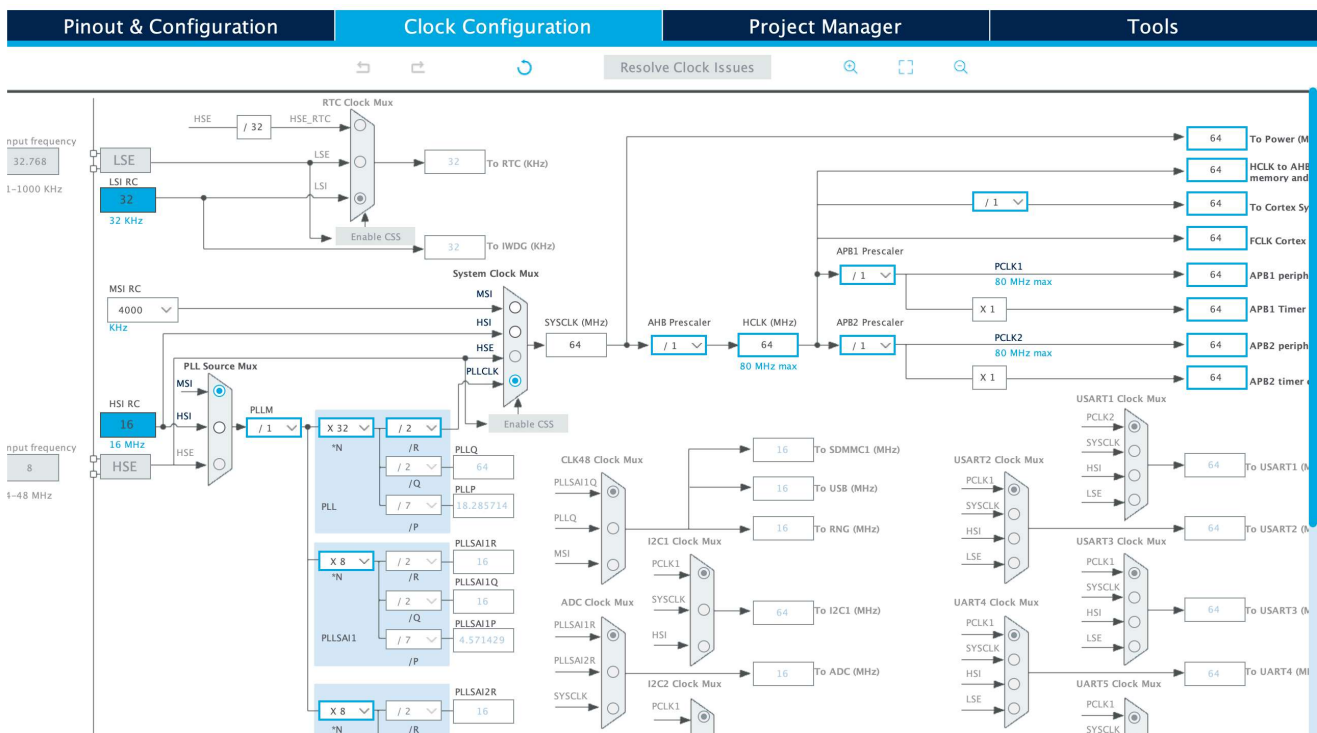
1. Mbed Studio or Stm32cubeide (choose one for your group) projects (in github)

Stm32cubeide

2. A report about your lab steps, PWM waveforms observation using LA and discussions.

The following Step are associated with problem 3 (dead time insertion):

1. adjust bus clock to 64 MHz



- ## 2. change Timer (TIM1)'s Channel 1 to PWM Generation CH1 CH1N

The image shows the STM32CubeMX software interface for configuring a TIM1 timer. On the left, the 'Timers' category is selected, and TIM1 is highlighted. The main window displays the 'TIM1 Mode and Configuration' settings. The 'Mode' tab is active, showing various configuration options for the timer, including Slave Mode, Trigger Source, Clock Source, and six channels, all set to 'Disable'. The 'Configuration' tab is also visible, showing a table of settings: DMA Settings (checked), GPIO Settings (checked), User Constants (checked), and NVIC Settings (checked). Below this, the 'Parameter Settings' section is expanded, showing 'Counter Settings' with values: Prescaler (PSC ... 64-1), Counter Mode (Up), Counter Period... 1000, Internal Clock ... No Division, and Repetition Co... 0.

- ```
3. under Configuration
 - change "Prescaler" to 64-1
 - change "Counter Period" to 1000 (1s)
```

**Pinout & Configuration**
**Clock Configuration**

▼ Software Packs
▼ Pinout

**Categories**    A->Z

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System Core >

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Analog >

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Timers >

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LPTIM1  
LPTIM2  
RTC  
**TIM1**  
TIM2  
TIM3  
TIM4  
TIM5  
TIM6  
TIM7  
TIM8  
TIM15  
TIM16  
TIM17

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Connectivity >

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Multimedia >

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Security >

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Computing >

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Middleware and Software... >

### TIM1 Mode and Configuration

| Mode                       |                         |
|----------------------------|-------------------------|
| CLOCK SOURCE               | Disable                 |
| Channel1                   | PWM Generation CH1 CH1N |
| Channel2                   | Disable                 |
| Channel3                   | Disable                 |
| Channel4                   | Disable                 |
| Channel5                   | Disable                 |
| Channel6                   | Disable                 |
| Combined Channels          | Disable                 |
| Activate-Break-Input       | Disable                 |
| Activate-Break-Input-2     | Disable                 |
| Use ETR as Clearing Source | Disable                 |

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### Configuration

Reset Configuration

DMA Settings
 GPIO Settings

Parameter Settings
 User Constants
 NVIC Settings

Configure the below parameters :

Search (Ctrl+F)

▼ Counter Settings

```

Prescaler (PSC – 16 bit...) 64–1
Counter Mode Up
Counter Period (AutoR... 1000
Internal Clock Divisio... No Division
Repetition Counter (RC... 0
auto-reload preload Disable

```

▼ Trigger Output (TRGO) Param...

```

Master/Slave Mode (M... Disable (Trigger input effect not...
Trigger Event Selectio... Reset (UG bit from TIMx_EGR)
Trigger Event Selectio... Reset (UG bit from TIMx_EGR)

```

4. change "dead time" to 232

Configuration

Reset Configuration

✓ DMA Settings

✓ GPIO Settings

✓ Parameter Settings

✓ User Constants

✓ NVIC Settings

Configure the below parameters :

Search (Ctrl+F)

◀ ▶

i

– DFSDM

Disable

▼ Break And Dead Time manag...

Automatic Output State

Disable

Off State Selection for ...

Disable

Off State Selection for ...

Disable

Lock Configuration

Off

Dead Time

232

▼ Clear Input

5. change "Pulse" to 500 for 50% duty period  
 (500/1000 = 50%)

Configuration

Reset Configuration

✓ DMA Settings

✓ GPIO Settings

✓ Parameter Settings

✓ User Constants

✓ NVIC Settings

Configure the below parameters :

⏪
⏩
i

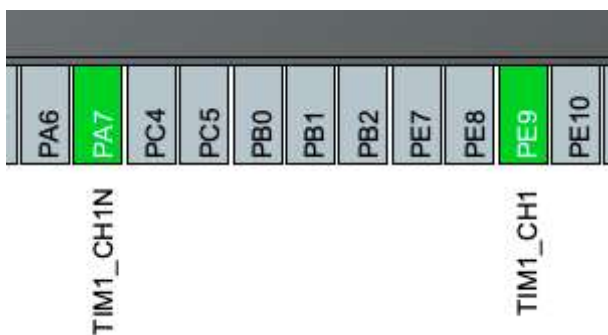
▼ PWM Generation Channel 1 a...

|                        |            |
|------------------------|------------|
| Mode                   | PWM mode 1 |
| Pulse (16 bits value)  | 500        |
| Output compare preload | Enable     |
| Fast Mode              | Disable    |
| CH Polarity            | High       |
| CHN Polarity           | High       |
| CH Idle State          | Reset      |

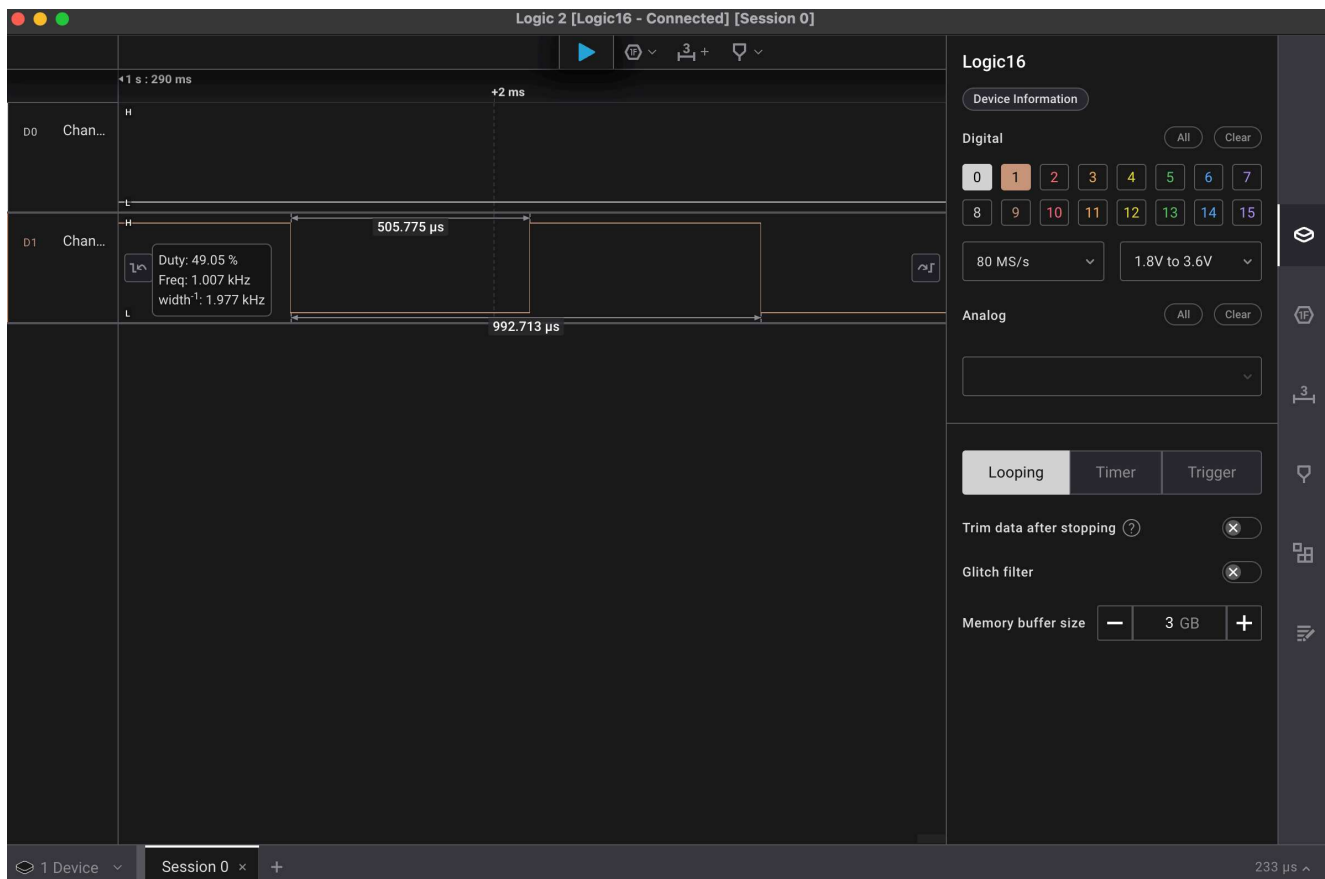
**Pulse (16 bits value)**

Pulse (16 bits value) must be between 0 and 65 535.

6. connect LA to pin "PA7" & "PE9"( PE9 cannot connect)



7. we can only observe "PA7"



3. Discuss how to generate complementary PWM with dead time insertion in STM32 platform.

As describe above, but can only observe PA7 pin.