

How to achieve GPIO fast toggle in Keil?

Questions:

In Keil environment, when an IO port is configured in push-pull output mode, and it must be toggled quickly. But after running code based on the compiler's optimization level "-O0", it is found that only PA port has a fast toggle rate, other ports not.

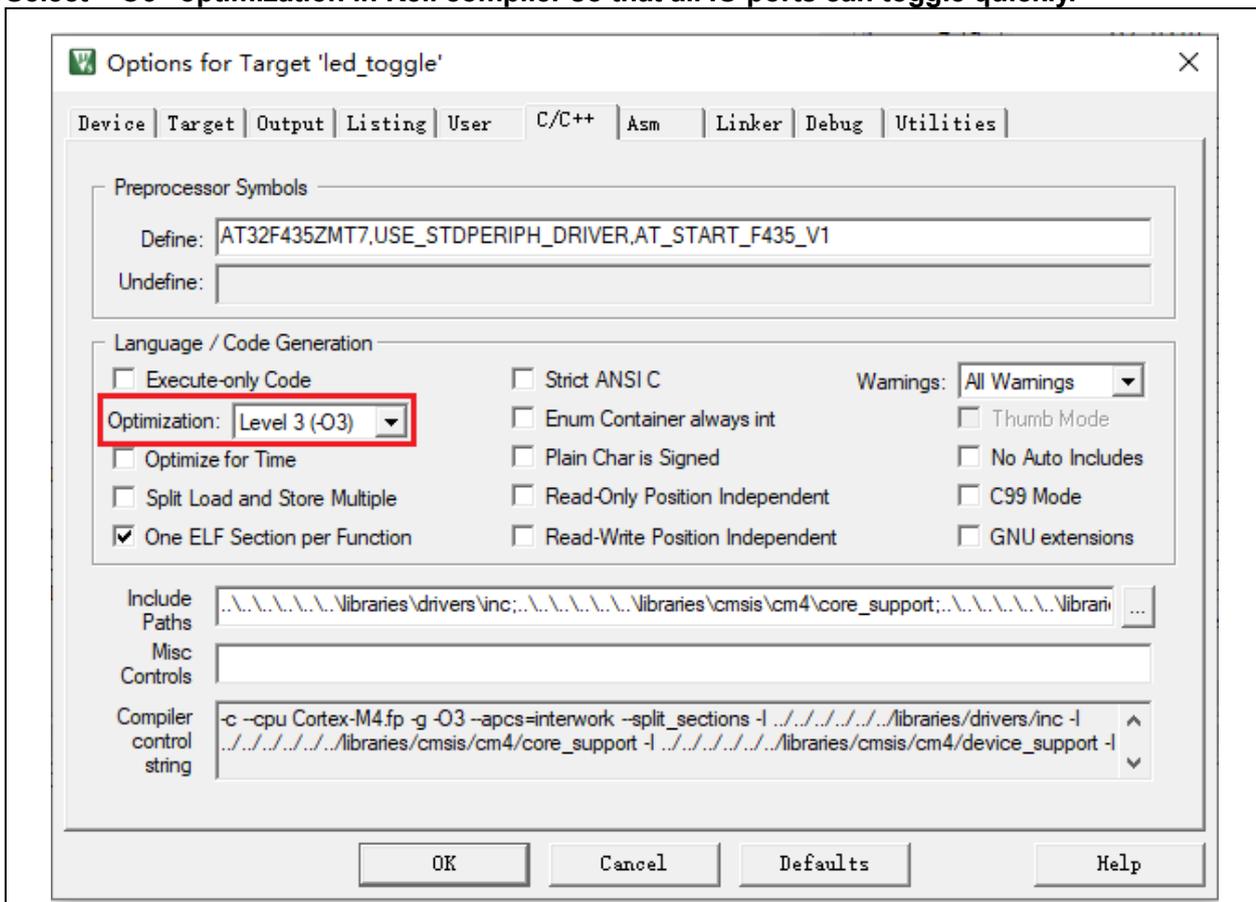
Answer:

Reason:

In Keil environment, if the optimization level "-O0" is selected, it only can optimize the code of PA port without taking into account of other ports. This issue has nothing to do with microcontrollers (they work normally). It is related to Keil C language.

Solution 1:

Select "-O3" optimization in Keil compiler so that all IO ports can toggle quickly.



Solution 2:

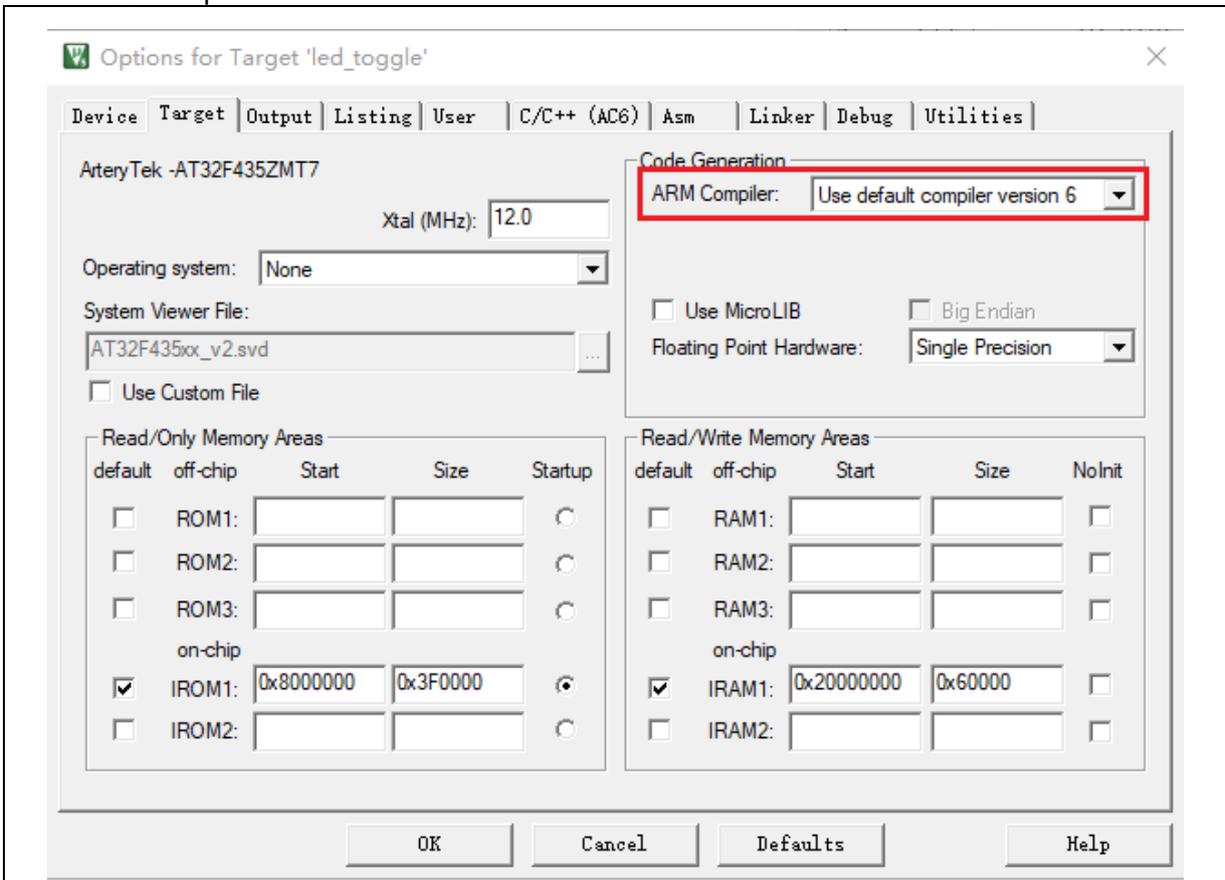
After using “-O3” optimization level, it may be not so convenient for debugging due to the fact that there are not so many debug signals. If so, users can use “#pragma” compiling instruction to specify which codes need “-O3” optimization. This method would not affect other codes.

Example: Pack IO toggle into a function, and then assign “-O3” optimization level to this function.

```
#pragma push
#pragma O3
void Toggle_IO(gpio_type * GPIO_x, uint16_t uGPIO_pins)
{
    GPIO_x->clr = uGPIO_pins;
    GPIO_x->scr = uGPIO_pins;
    GPIO_x->clr = uGPIO_pins;
    GPIO_x->scr = uGPIO_pins;
    GPIO_x->clr = uGPIO_pins;
    GPIO_x->scr = uGPIO_pins;
    GPIO_x->clr = uGPIO_pins;
    GPIO_x->scr = uGPIO_pins;
}
#pragma pop
```

Solution 3

Select AC6 compiler in Keil.



Solution 4:

Switch to IAR for compiling.

Type: MCU application

Applicable products: AT32F421, AT32F435, AT32F437, AT32F425, AT32L021

Main function: None

Other function: None

Document revision history

Date	Revision	Changes
2022.3.4	2.0.0	Initial release

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