



Firmware Disclaimer Information

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# ATM Compare match output説明

在比较匹配输出模式 (`compare match output`) 下，比较器 A或P 分别将计数器与对应的 CCRA 或 CCRP 寄存器设置值进行比较，当比较结果相同时触发 CCRA 或 CCRP 中断，同时输出指定波形(输出不变/输出 Low/输出 High/输出翻转)。比较匹配输出模式适用于通用计时、Buzzer 输出等功能需求场合。

在比较匹配输出模式下，TM 功能引脚的功能说明如下表。

| 引脚名称(n为TM 编号) | 功能                       |
|---------------|--------------------------|
| ATCKn         | 输入引脚，外部时钟输入，可作为 ATM 的时钟源 |
| ATPn          | 输出引脚，根据设定输出指定信号          |
| ATPnB         | 输出引脚，ATPn的反向输出           |

## example 说明

此范例演示了ATM 的compare match output模式的使用

## 程序说明

### 1. config sys clock

ATM clock 来自系统时钟，因此系统时钟一定要配置正确

### 2. config ATM to compare match mode

- 范例设置：时钟源为  $F_{sys}/4$ , count = 500

$$T = 1/(F_{sys}/4) * count$$

- 4M :  $T = 1/(4/4) * count = 500 \text{ us}$
- 8M :  $T = 1/(8/4) * count = 250 \text{ us}$
- 12M :  $T = 1/(12/4) * count = 166 \text{ us}$

- 范例设置：输出引脚不反相，ATM 输出脚初始状态为Low，符合匹配条件翻转 IO

ATPn 在 ATM0\_Enable();后为Low，根据T反转ATPn

若设置输出引脚反相，ATM 输出脚初始状态为Low，符合匹配条件翻转 IO，则ATPn 在 ATM0\_Enable();后为High(包括初始状态下的所有状态反相后输出)，根据T反转ATPn

### 3. config output pin

### 4. enable ATM

### 5. enable Interrupt : Non-required

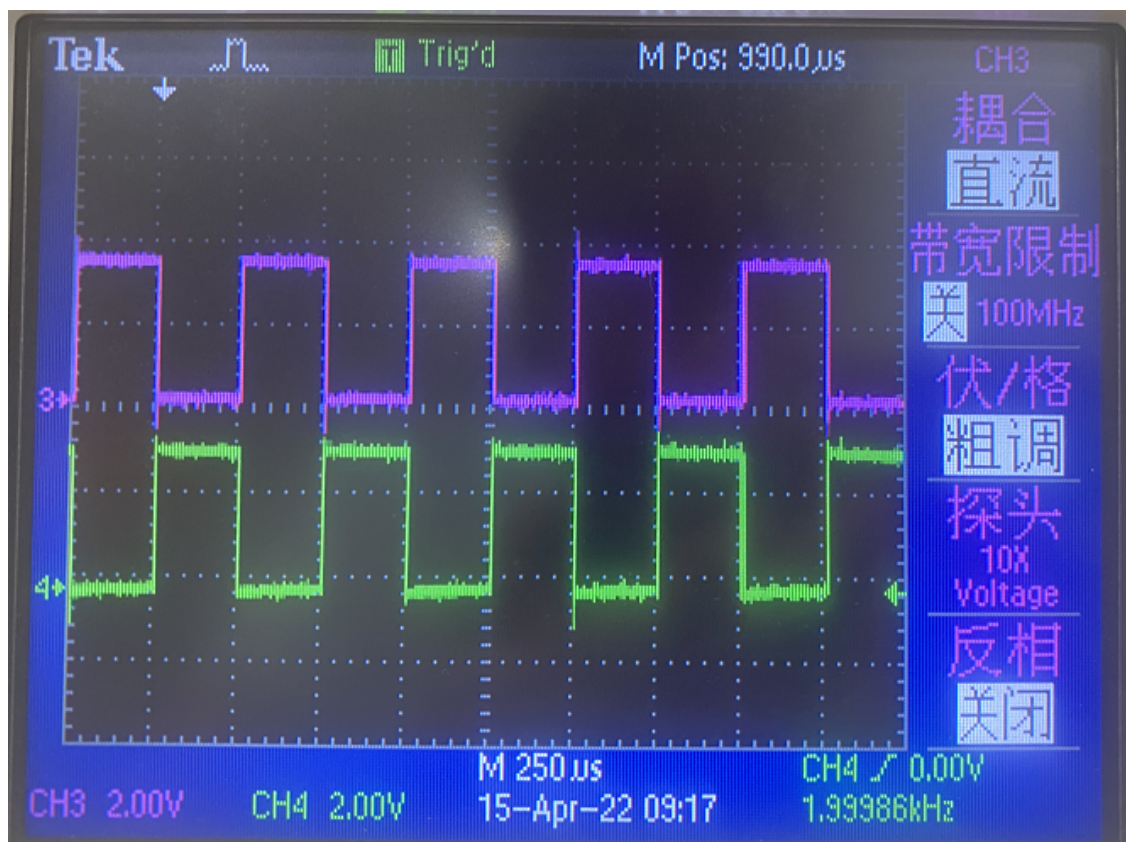
根据需求设定

## 现象说明

连接 e-link 和目标板，将程序下载到 MCU 并运行

通过示波器测量 ATPn 或者 ATPnB 即可看到对应的输出波形

ATPnB 为 ATPn 的反相输出，下图为 8 MHz 下 ATPB 和 ATP 的波形提供参考



## FAQ

### 1. compare match output模式与timer模式有啥区别

两者的差异仅仅在于compare match output会输出信号到引脚，而Timer不会有任何信号输出到引脚，可将对应引脚作为普通 IO 使用