



模块 9

测验: SysTick 定时器



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问题 1 SysTick 基本原理

- a) I/O 寄存器是 32 位宽，但是 SysTick 计数器有多少位宽？
- b) SysTick 能否向下计数，向上计数，或既能向上也能向下计数？
- c) 什么时候设置 **Count** 标志？
- d) 列出 **Count** 标志从 1 变为 0 的三种方式？

问题 2 创建步进电机输出

设 **Time** 是一个以 **ms** 为单位的任意时间，范围从 1 到 10000，存储为共享全局变量。

`uint32_t Time;`

编写一个 C 程序，将这些方波输出到微控制器的端口 4。

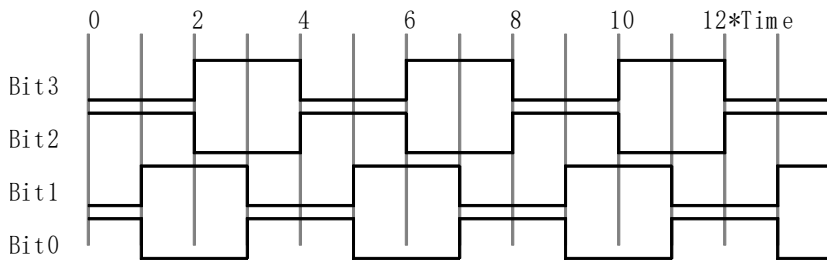


图 1. 步进电机输出

问题 3 RC 型的长电缆

这个问题解决了 SPI 等高速串行传输线上的容性负载问题。两个微控制器的 SPI 端口通过非常长的电缆连接。我们将此电缆模拟为与电容器串联的单个电阻器，如下图所示

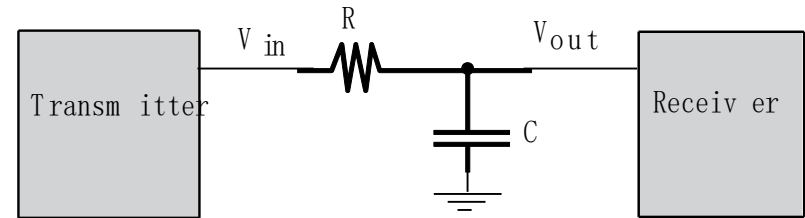


图 2. RC 型的长电缆

考虑发送器输出端的 3.3 V 100 ns 脉冲（标记为 **V_{in}**）

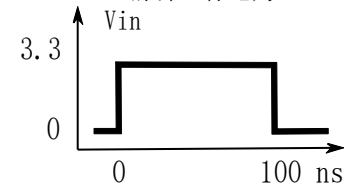


图 3. 100-ns 脉冲

在 100ns 之后，电容器对电路有什么影响？

- A) di / dt 引起大的电压峰值。
- B) 电容表现得像一个短路，导致 V_{out} 为零。
- C) 电容器上存储的电荷被短路到发射器中，引起火花。
- D) 电容器防止数据传输和 SPI 不起作用。
- E) 电容极化，因此它仅在时间 = 0 时影响电路
- F) 100ns 时的 dv / dt 约为 $3.3V / (RC)$

如果 RC 小于 100 ns，则绘制 V_{out} 的草图。

如果 RC 大于 100 ns，则绘制 V_{out} 的草图。

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