|  |
| --- |
| **北 京 邮 电 大 学**  **实 验 报 告**  **课程名称\_\_\_\_\_\_数字逻辑实验\_\_\_\_\_\_**  **实验名称\_\_\_\_\_\_简单时序电路\_\_\_\_\_\_**  **计算机学院2023211301班 姓名王书翰**  **教师靳秀国 成绩\_\_\_\_\_\_**  **2024年11月4日** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **一、实验目的**  **掌握简单时序电路的设计、分析、测试方法。**  **二、实验器件与设备**  **双J-K触发器：74LS107；**  **双D触发器器：74LS74；**  **四2输入与非门：74LS00；**  **TEC8数字电路实验系统；**  **TBS1102B-EDU双踪示波器。**  **三、实验内容**  **1.双D构成的二进制计数器：按设计接线，将Q0，Q1，Q2，Q3复位；由时钟端CLK输入单脉冲，记录输出状态；由时钟端CLK输入连续脉冲，观测输出波形。**  **（1）状态转移表**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **CLK** | **Q3n** | **Q2n** | **Q1n** | **Q0n** | **Q3n+1** | **Q2n+1** | **Q1n+1** | **Q0n+1** | | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | | **3** | **0** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | | **4** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **1** | | **5** | **0** | **1** | **0** | **1** | **0** | **1** | **1** | **0** | | **6** | **0** | **1** | **1** | **0** | **0** | **1** | **1** | **1** | | **7** | **0** | **1** | **1** | **1** | **1** | **0** | **0** | **0** | | **8** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | | **9** | **1** | **0** | **0** | **1** | **1** | **0** | **1** | **0** | | **10** | **1** | **0** | **1** | **0** | **1** | **0** | **1** | **1** | | **11** | **1** | **0** | **1** | **1** | **1** | **1** | **0** | **0** | | **12** | **1** | **1** | **0** | **0** | **1** | **1** | **0** | **1** | | **13** | **1** | **1** | **0** | **1** | **1** | **1** | **1** | **0** | | **14** | **1** | **1** | **1** | **0** | **1** | **1** | **1** | **1** | | **15** | **1** | **1** | **1** | **1** | **0** | **0** | **0** | **0** |   **（2）波形图**  **1732202101000**  **（3）构成计数器，为递减，**  **2.用74LS107构成一个二进制计数器，重做内容1的实验。**  **3.异步十进制计数器：按设计接线，将Q0，Q1，Q2，Q3复位；由时钟端CLK输入单脉冲，记录输出状态；由时钟端CLK输入连续脉冲，观测输出波形。**  **（1）状态转移表**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **CLK** | **Q3n** | **Q2n** | **Q1n** | **Q0n** | **Q3n+1** | **Q2n+1** | **Q1n+1** | **Q0n+1** | | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | | **2** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | | **3** | **0** | **0** | **1** | **1** | **0** | **1** | **0** | **0** | | **4** | **0** | **1** | **0** | **0** | **0** | **1** | **0** | **1** | | **5** | **0** | **1** | **0** | **1** | **0** | **1** | **1** | **0** | | **6** | **0** | **1** | **1** | **0** | **0** | **1** | **1** | **1** | | **7** | **0** | **1** | **1** | **1** | **1** | **0** | **0** | **0** | | **8** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | | **9** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | **0** |   **（2）波形图**  **1732202754545**  **9949fc9811f2176f0fea606c9fadbeb**  **4.自循环寄存器：**  **(1)用双D触发器74LS74构成一个4位自循环寄存器。方法是第1级的Q端接第2的D端，依此类推，最后第4级的Q端接第1级的D端。4个D触发器的CLK端连接在一起，然后接单脉冲时钟。**    **(2)将Q0，Q1，Q2，Q3清0，再将Q0置1，按单脉冲按钮，观察并记录Q0，Q1，Q2，Q3的值。**  **（1）逻辑电路图** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1732203715371**  **（1）状态转移表**   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **CLK** | **Q3n** | **Q2n** | **Q1n** | **Q0n** | **Q3n+1** | **Q2n+1** | **Q1n+1** | **Q0n+1** | | **0** | **0** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | | **1** | **0** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | | **2** | **0** | **1** | **0** | **0** | **1** | **0** | **0** | **0** | | **3** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** |   **四、实验总结**  **本次简单时序电路的实验让我学会利用D触发器和JK触发器构造一个简单的计数器，这对我在课程中的对计数器的理解与运用帮助很大。这次实验也锻炼了我的排除故障的能力和连接复杂电路图的能力。在做实验时我遇到了某个灯怎样都无法被点亮的情况，为了解决这一问题在老师的指导下我断开了实验电路逐个分析四个JK触发器各自能否正常工作，果然发现了是一片电路芯片出了问题，再解决这个插曲后我便迅速完成了实验。这次的实验中接线的数量也比较多，这让我在接线时要更加专注，同时不能急于求成，要一根一根地接好线。最后在看到自己的波形与参考波形相同时，我感到所有付出都得到了回报。这次我还熟练地运用了将两条波形保存在示波器屏幕上的功能，这让最后呈现的波形图中各个输入信号的波形之间的对比更加明显。最后，我在做这次实验前也进行了充分的预习，虽然出现了仪器存在故障的小插曲，但我在做实验的过程中条理十分清晰，这让我充分意识到实验预习的重要性。** |

|  |
| --- |
|  |

|  |
| --- |
|  |

|  |
| --- |
|  |

|  |
| --- |
|  |

|  |
| --- |
|  |