Digital Timer

Abstract:

In this report, the design and implementation processes of a digital timer circuit based on the 555 timer are documented. The initial design criteria for the project were

1. To have a three digit output,

2. To have the circuit count from 0:00 to 9:59 and

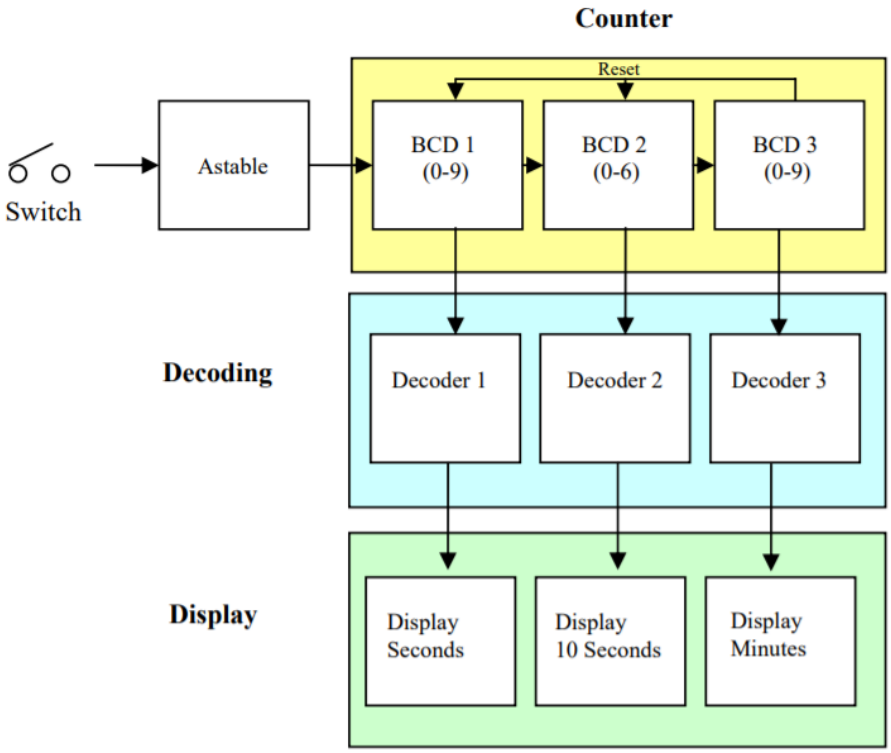
3. To include either an op-amp or 555 timer.

Research was conducted into similar analogue electronic circuits and a suitable starting point of a digital die was identified. Using this starting point, a digital timer circuit was designed using a 555 timer, BCD4510 binary counters and 7 segment display outputs. The proposed circuit was modelled using PSpice and Digital Works, showing that the concepts used in the design were sound. The circuit was then implemented and tested on breadboard before a PCB implementation was prepared.

Theory:

Electronics designers use 555 timers in timing circuits and the binary counter decimal (BCD) integrated counting circuits in order to implement a timer. Though programmable micro-controllers are more commonly used, a simpler solution for three or more digit timers. BCDs are also valid in this application.

Block Diagram:



Conclusion:

Analogue electronics components were investigated and a 555 timer, a BCD counter, a BCD Decoder and a seven segment display were combined to form a digital timer circuit. Different methods were analysed to determine the best technique for creating an efficient timer until one was chosen and the circuit was designed. The chosen circuit was verified through simulation using PSpice and Digital Works. This design was then implemented and modified to suit the needs of the project.