

Cascaded Counter

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Abstract

The aim of this practical is to design and build the frequency counter using 4518 .

A cascaded counter connects two or more counters in series, where the carry output of one counter acts as the clock input for the next stage. This arrangement effectively multiplies the individual counting ranges, allowing for a much larger overall count range than a single counter alone can provide.

Cascaded counters are commonly used in digital systems for applications such as digital clocks and multi-digit displays.

1 AIM

To design and build the frequency counter using 4518.

2 APPARATUS

- IC 4518(x3)
- Jumper wires
- Breadboard
- POWER SUPPLY
- dip switch
- LEDs and resistors
- Signal generator

3 circuit diagram

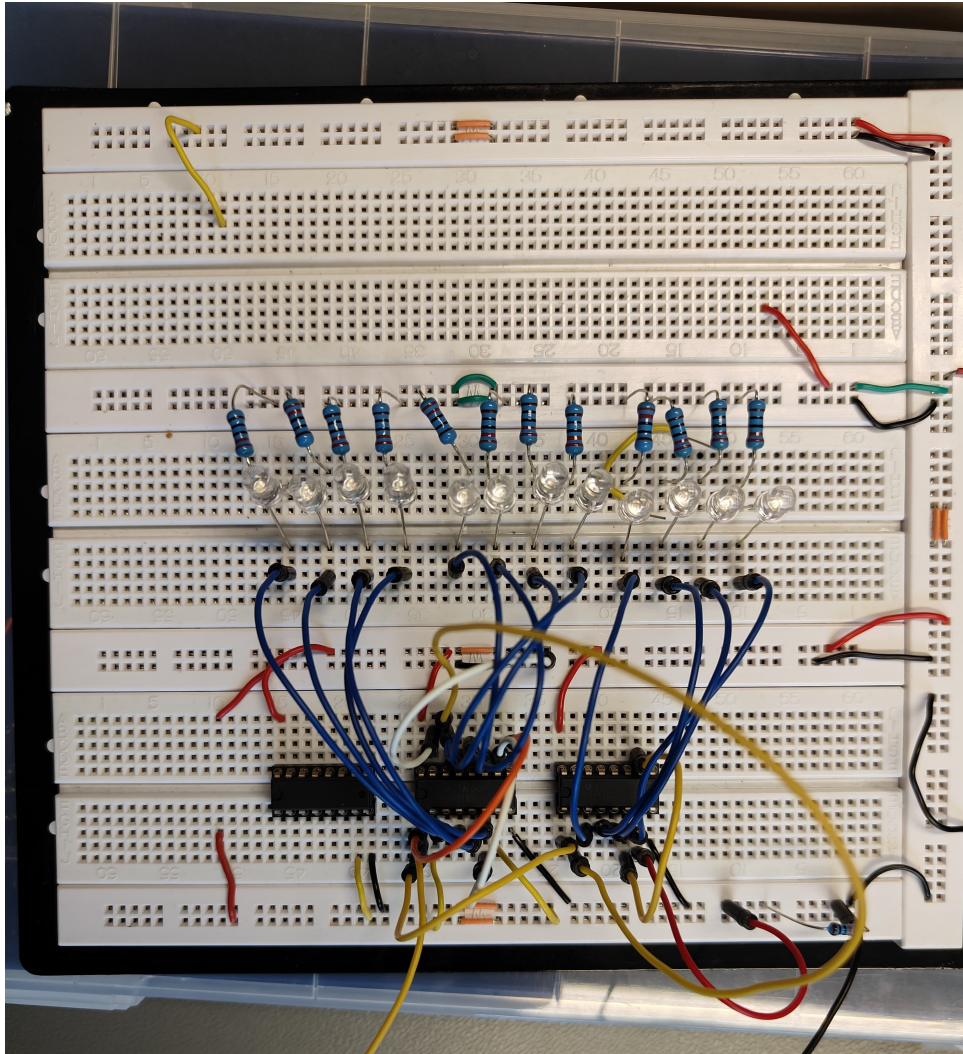


Figure 1: Frequency Counter Circuit on a Breadboard

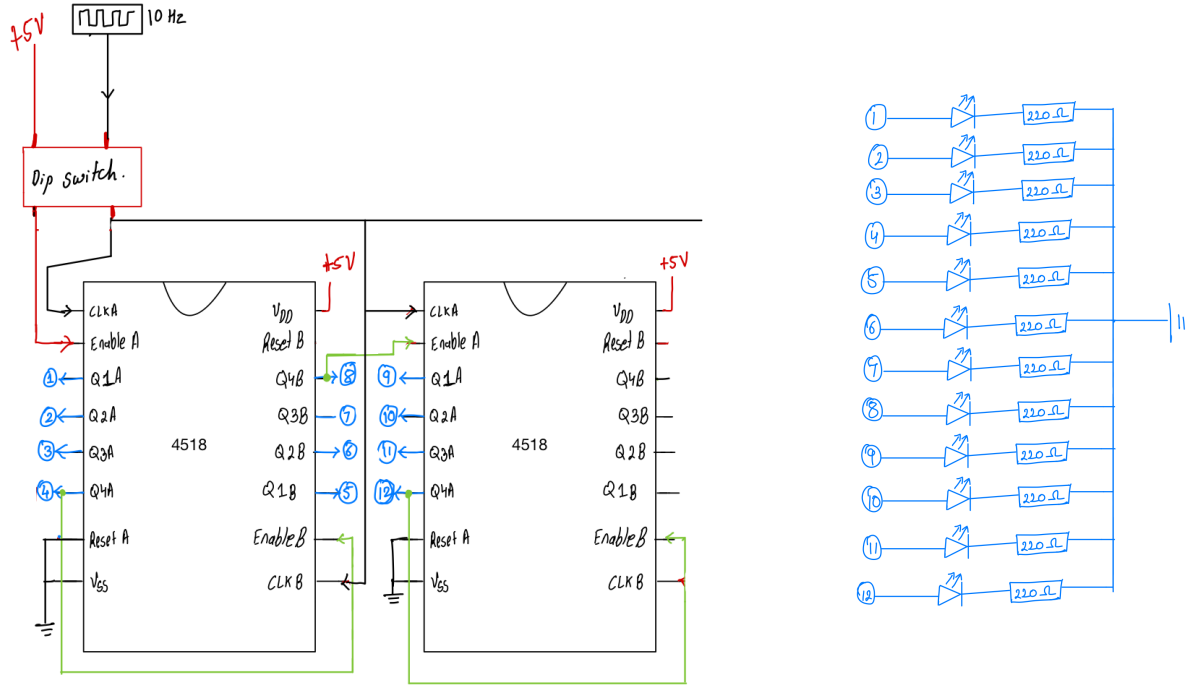


Figure 2: A frequency counter pin-out circuit diagram.

4 Working

In this project, three 4-bit decade counters are cascaded to form a single counting system. The working principle is as follows:

- **Counter 1** receives the external clock pulses and counts from 0 to 9.
- When **Counter 1** completes its count (rolls over from 9 to 0), it generates a carry output which increments **Counter 2**.
- **Counter 2** thus counts the number of times **Counter 1** completes a full cycle. It also counts from 0 to 9.
- Similarly, when **Counter 2** rolls over, it sends a carry to **Counter 3**, which counts these events.

One can also see that one enable A of the first counter is connected to the +5V supply, which means that the first counter is always enabled. The enable B of the first counter is connected to the MSB of the first counter so then the first counter has counted to 9 only then the second counter will be enabled. The same is the case with the second and third counters. The enable A of the second counter is connected to the MSB of the second counter on first IC so then the second counter has counted to 9 only then the third counter will be enabled.

5 RESULTS

The frequency counter was successfully built and tested. The output was observed on the LEDs, which displayed the count in binary format. One can count from 0 to 999 with this setup, as the three cascaded counters provide a total count range of 1000 (from 000 to 999).