Big LED Matrix

- The top four pins of the headers connect to anodes of LEDs in lines one to three; subsequent pins continue this pattern for lines four to twelve.
- The cathodes of all LEDs connect to a pin from six available STP16C596 ICs, which are constant current LED sink drivers.
- Each IC can manage 16 outputs; however, with 384 LEDs total, cathodes are connected in parallel across every fourth line.
- By controlling supply voltage across groups of lines sequentially, all LEDs can be lit without noticeable flicker due to rapid switching—this is known as multiplexing.

The data sheet indicates that these ICs use 16-bit serial-in parallel-out (SIPO) shift registers feeding into a storage register. Each shift register consists of D-type flip-flops that store bits based on clock signals. Rising clock edges set input states onto outputs; if inputs are low during rising edges, outputs reflect that state. In a 16-bit shift register setup, flip-flops are cascaded so that output from one connects to the input of another. This allows shifting bits through multiple cycles using minimal GPIO pins from microcontrollers. Using SIPO shift registers enables control over multiple outputs with only two pins—crucial for devices with limited GPIO resources.