LED Arrayed Micro-Display

(LKM1-10)

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Introduction
A light-emitting diode (LED) is a semiconductor light source. Because of LED high efficiency and small size, the LED display is the most common usage. For example, message boards and destination displays on buses are two common use of LED display. If the LED-display can be small in size, more powerful and higher efficiency, the LEDoS (on Silicon) micro display will be an important application in the future.

A circuit to control 30 x 30 high luminosity LED arrayed micro-displays with a small device size was built. The 30x30 LED-display has 900 pixels. The objective of the project is to control the LEDoS arrayed micro-displays to display words and pictures.

Methodology
Hardware
All the signals of the corresponding words are pre-set in the micro-controller memory. The “Data” and “Select” signal from MCU are connected to “Data Control board” and the “Select Control board” separately. The control will analyze the input signal and output a corresponding voltage. This output pins will then connect to the “pin re-arrange board. The purpose of the “pin re-arrange board” is to separate the “Data” and “Select” signal from the “Data Control Board” and “Select Control Board” so that we can connect the data and select to the LEDoS display correctly.

The Micro controller that used in this project is Arduino.

The whole system of the driving circuit

Software
The Arduino (Micro controller) generated saw tooth waveforms to control the two scanning functions, one is called data scan and one is called select scan. The select scan will turn on row by Each row will turn on for 0.0005 second. During the row is turning on, the data scan will move from the left border to right border, a set of corresponding columns will turn on under the enquired pattern. This process will repeat 30 times to complete a scan on the display.

Results
The words and pictures can be show on LEDoS after using the driving circuit. The brightness of the LEDoS is satisfied. The dead and bright pixels are avoided. The words “H”, “K”, “U”, “S”, “T” can be showed on the LEDoS display. A shift function is implemented to shift the word “HKUST” from right to left.