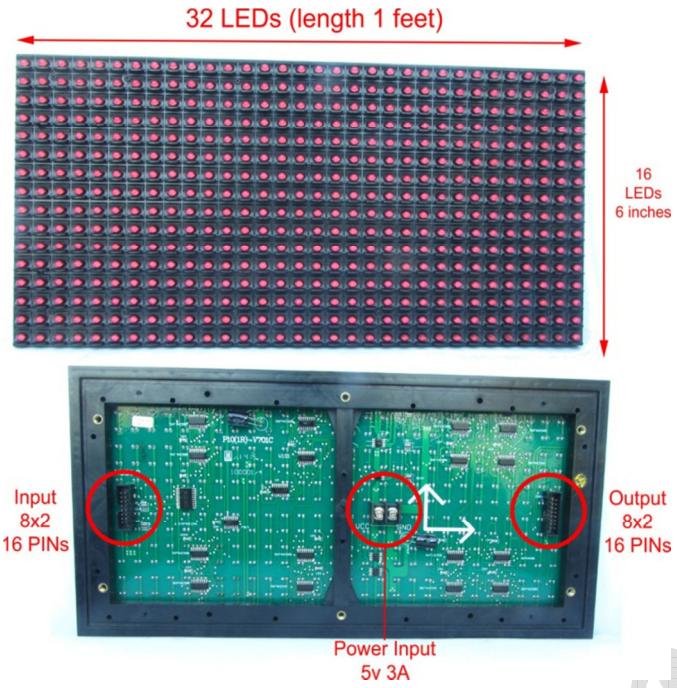
P10 LED PANEL
32X16 PIXELS



This modular LED display panel can be used to make any kind of large outdoor LED display panels by arranging modules in horizontal and vertical manner. One panel has a width of 12 inches and height of 6 inches. Display has a resolution of 32x16 pixels thus there are total 512 LEDs. It has good quality plastic cabinet that makes it suitable for outdoor use. The module has whole control circuit built in and has a simple interface requiring only seven line connections with controller board. Can be easily interfaced with low cost MCUs like AVR ATmega8 ATmega16 etc.

Working Principle

Controlling large amount of LED with limited control lines uses two principles or techniques

1. Serial to parallel conversion
2. Persistence of vision

To convert serial data coming from MCU a shift register is used. In these modules **75HC595** ic is used. This IC is a 8 bit serial in parallel out IC.

It has main four lines for interface.

1. Shift clock
2. Store clock
3. Data

To shift 8 bits of data to it, the first bit of data (i.e. bit 0) is put on DATA line. For example if this bit is 0 then DATA line is pulled LOW or if this bit is 1 then data line is pulled high (+5v).

Once valid data is put on the DATA line, the shift clock line is made high, and then made low. This transfers the bit on data line to the IC from the MCU.

In the same way all 8 bits are transferred to the IC.

In the display panel, 16 such shift registers are cascaded. So you need to transfer 8x16=128 bits to control 128 LEDs.

You may wonder if there are 512 LEDs on the board but we are only sending data for 128 LEDs, how it is gonna work?

Here comes the technique of persistence of vision that is employed in all electronic displays (even TVs).

In this display we only show ¼ of the total image in one frame, next frame show other ¼ image. In the same way 4 frames are required to show complete image. These sub frames are switched at such fast speed that human eyes sees complete picture.

As you can see in the image below, 16 lines of the display are divided into four groups. So first line is group 1 then after 3 more lines the 5th line is again group 1. So 512/4 = 128 LEDs. So in each group there are 128 LEDs, that is why we need to transfer 128 bits to control these 128 LEDs.

1	Group 1
2	Group 2
3	Group 3
4	Group 4
5	Group 1
6	Group 2
7	Group 3
8	Group 4
9	Group 1
10	Group 2
11	Group 3
12	Group 4
13	Group 1
14	Group 2
15	Group 3
16	Group 4

There are two line named A and B on the panel connecter. The logic level on these pins decides which group is selected. Only the LEDs on the selected line glow according to the 128 bits of data received from the MCU.

A	B	Group Selected
0	0	1
0	1	2
1	0	3
1	1	4

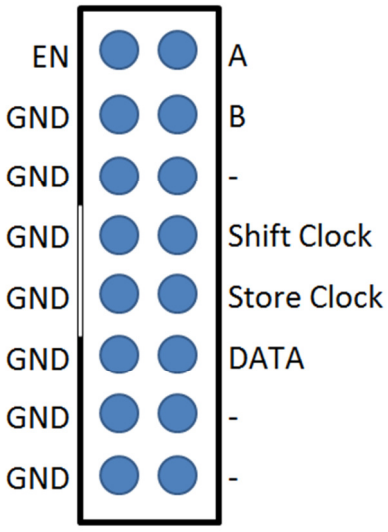
So if you select group 1 by setting A=0 and B=0 following lines are selected
1,5,9 and 13

So the data that you will send using serial interface will be shown on these LEDs.

Then you quickly need to switch the group to 2 and transfer data for those lines.

In the same way transfer data to the lines belonging to group 3 and 4. This will make the whole picture of the frame.
But this switching should be so fast that human eye cannot see it. Normally 400 Hz switching frequency is best. As it will make you able to 100 complete frames per second.

PIN Configuration



Power Supply
5v 1.5 ampere DC

Warning
Do not supply power in wrong polarity ! It will damage the module!