Device: LDP-3208S

This document Version: 1

Date: 7 April 2014

Matches Hardware Version: 2

Description: Small pitch P2.5 32x08 LED Matrix Display

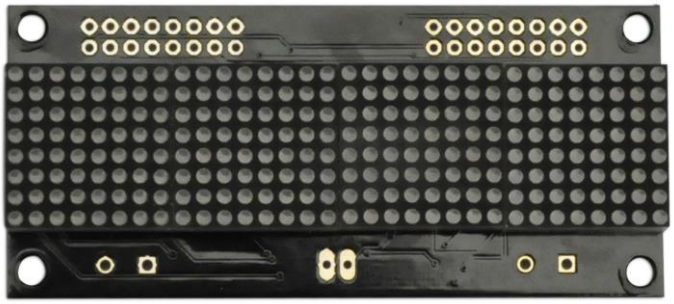

Table of Contents

Introduction

The LDP-3208S is a single colour 32 pixel by 8 pixel LED matrix display based on the TI TLC5920 LED matrix driver chip.

The LDP-3208S requires dynamic scanning (1 of 8 rows lit up at any time) to activate the display. As such, customers may find it easier to use the PLT-1001 series of driver platforms available from Embedded Adventures to drive the LED panel.

Nomenclature

Set in this document means to pull the connection logic HIGH (Vcc). *Clear* in this document means to pull the connection logic LOW or ground.

Connections

The LDP-3208S has two data connections on the back panel.

J1	Input data port (left hand side)
J2	Output data port (right hand side)

Power connectors are available at the bottom of the display. A two-pin 0.1" header allows for 5V and GND connections, and two terminal block connections allow the same from spaded or wired connections.

Power

This panel runs at strictly 5v (+/- 0.5v). The display does not need to run on the same supply as your controller or driver board, however, the must have the same ground connection.

LEDs consume large amounts of current and we have deliberately left the LEDs on the LDP-3208S as super bright as possible.

Although the board actually only displays one row at any time, at 25mA each LED, this can still result in 32 LEDs (a fully lit row) consuming nearly 0.8 Amps.

Power is supplied with either a terminal block or a solder connection, with GND and 5V connections.

Pinouts

J1/J2 pinout is a standard HUB08 pinout; as viewed from above:

GND	**1**	**2**	A
GND	**3**	**4**	B
GND	**5**	**6**	C
$\overline{\text{EN}}$	**7**	**8**	NC
R	**9**	**10**	NC
NC	**11**	**12**	NC
GND	**13**	**14**	$\overline{\text{L}}$
GND	**15**	**16**	S

Pins shown with overline indicate they are active LOW.

NC indicates not connected.

Controlling the display

To display a particular row, the pins A,B,C are used as follows:

C	B	A	Row Enabled
0	0	0	0 (top row)
0	0	1	1
0	1	0	2
0	1	1	3
1	0	0	4
1	0	1	5
1	1	0	6
1	1	1	7 (bottom row)

To set pixels within a row, the following pins are used:

R	Data for Red LED in pixel. Active high so set to 1 for lit LED, 0 for dark led
S	Shift data (clock)
$\overline{L}$	Latch data

To enable the display:

$\overline{EN}$	Enable display (active low)

Using the display

The display is designed to show one row of LEDs of the 8 rows available at any one time. Once that row has been displayed, the next must be shown, and so on.

The display can be considered as a pixels 0-31 (x direction, 0 being the left-most column) and pixels 0-7 (y direction, 0 being the top-most row). As such, in order to display a single row:

Set/Clear pin R appropriate
Pulse S low to shift in this pixel
(repeat until all 32 pixels have been shifted in)

Note that pixel x=0 is shifted in first, pixel x=31 is shifted in last.

Once an entire row is shifted in:

Set EN to turn off display
Set/Clear A,B,C to select the row
Latch the data by pulsing L (set, then clear)
Set EN to turn on the display

To control brightness, PWM may be used on EN, which will also reduce the current consumption.

Multiple displays

The data ports may be daisy-chained from one display to the next – note that all pins are shared except R, which is shifted out at the end of the 32 bit shift register. This means that if two displays are connected together, they can be treated like one display with 64 pixel columns. The PLT-1001v4 firmware supports up to 8 LDP-3208S displays daisy chained together.

Tricks and traps

The LED panel display will consume a lot of current if you display large quantities of pixels. So much so that depending on your power supply, you may see a considerable voltage drop across the supply. If this goes below the specification for your microcontroller, you may cause it to behave erratically. Even if you are within specification, the brown-out reset functionality of your microcontroller may be tripped (see the config fuses for your microcontroller for details). In this situation we suggest you run the panel on a different supply.

This panel requires a 5 volt supply. You will damage the display irreparably if you put a higher voltage through it. Really. The magic smoke will come out and your display will die.