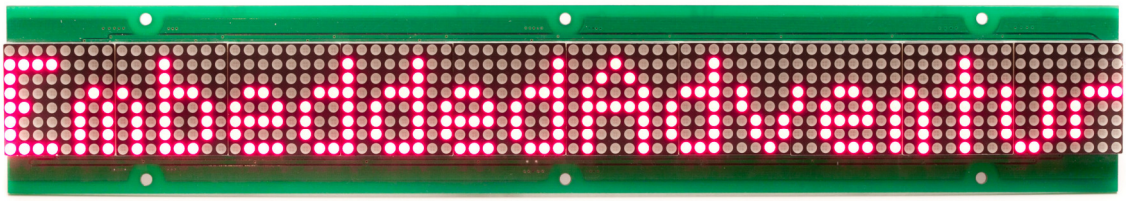
Device: LDP-8008

This document Version: 1.0

Date: July 2010

Description: 80x08 1R1G LED Display Panel



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Introduction

The LDP-8008 is a dual-LED, tri-colour 80 pixel by 8 pixel LED matrix display. Each pixel consists of a red and green LED (commonly referred to as "1R1G"). There are 640 pixels and 1280 individually addressable LED elements. It includes shift-register circuitry such that all 1280 LEDs can be controlled with only 9 microcontroller I/O lines. Pixels can show as black (that is, completely unlit), red, green or orange (red+green).

The LDP-8008 requires dynamic scanning (1/16) 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, or use the Draw PicPack library.

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-8008 has three connections on the back panel.

J1	Input data port (left hand side)
J2	Output data port (right hand side)
J3	Power / ground connection (terminals at centre)

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. This can be achieved by connecting your controller board to the ground connection in the J1 or J2 ports.

LEDs consume large amounts of current, and large amounts of LEDs obviously multiplies this affect. Although the board actually only displays one row at any time, at 30mA each LED, this can still result in 80 LEDs (a fully lit row) consuming nearly 2.5Amps.

Pinouts

J1/J2 pinout as viewed from above

GND	**1**	**2**	A
GND	**3**	**4**	B
GND	**5**	**6**	C
EN	**7**	**8**	D
$\overline{R1}$	**9**	**10**	$\overline{G1}$
NC	**11**	**12**	NC
GND	**13**	**14**	L
GND	**15**	**16**	S

Note that the back of the display does not indicate the pins exactly as described here, however we have shown the pins in this datasheet with overline to clearly indicate they are active LOW.

Controlling the display

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

D	C	B	A	Row Enabled
0	0	0	0	0 (top row)
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7
1	0	0	0	8
1	0	0	1	9
1	0	1	0	10
1	0	1	1	11
1	1	0	0	12
1	1	0	1	13
1	1	1	0	14
1	1	1	1	15 (bottom row)

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

$\overline{R1}$	Data for Red LED in pixel. Active low so set to 0 for lit LED, 1 for dark led
$\overline{G1}$	Data for Green LED in pixel. Active low so set to 0 for lit LED, 1 for dark led
$\overline{S}$	Shift data
L	Latch data

To enable the display:

EN	Enable display (active high)

Using the display

The display is designed to show one row of LEDs of the 16 rows available at any one time. Once that row has been displayed, the next must be shown, and so on. The panel has protective circuitry that prevents the display from being enabled entirely if it is being cycled too slowly. It is possible to run it slow enough to see the cycling of the rows if you wish. The display can be considered as a pixels 0-79 (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 pins $\overline{R1}$ and $\overline{G1}$ as appropriate (pull low to display pixel)
Pulse S low to shift in this pixel
(repeat until all 64 pixels have been shifted in)

Note that pixel x=0 is shifted in first, pixel x=79 is shifted in last.

Once an entire row is shifted in:

Clear EN to turn off display
Set/Clear A,B,C,D 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 $\overline{R1}$ and $\overline{G1}$ which are the connected to the output of the (effective) 64 bit shift register. This means that if two displays are connected together, they can be treated like one display with 160 pixel columns.

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.

Generally we don't recommend lighting seriously large quantities of LEDs all at the same time – it really does use a lot of current (2.5 amps). As such, please make sure all wiring to your power supply can handle this sort of load. Or better yet, use some form of PWM on EN (or simply not leaving the row enabled for the entire time before the next row). This will reduce brightness of the LEDs, increase life-span of the panel, reduce power usage and reduce voltage drop.

This panel requires a 5 volt supply. You will damage the display irreparably if you put a higher voltage through it.