

MicroOLED

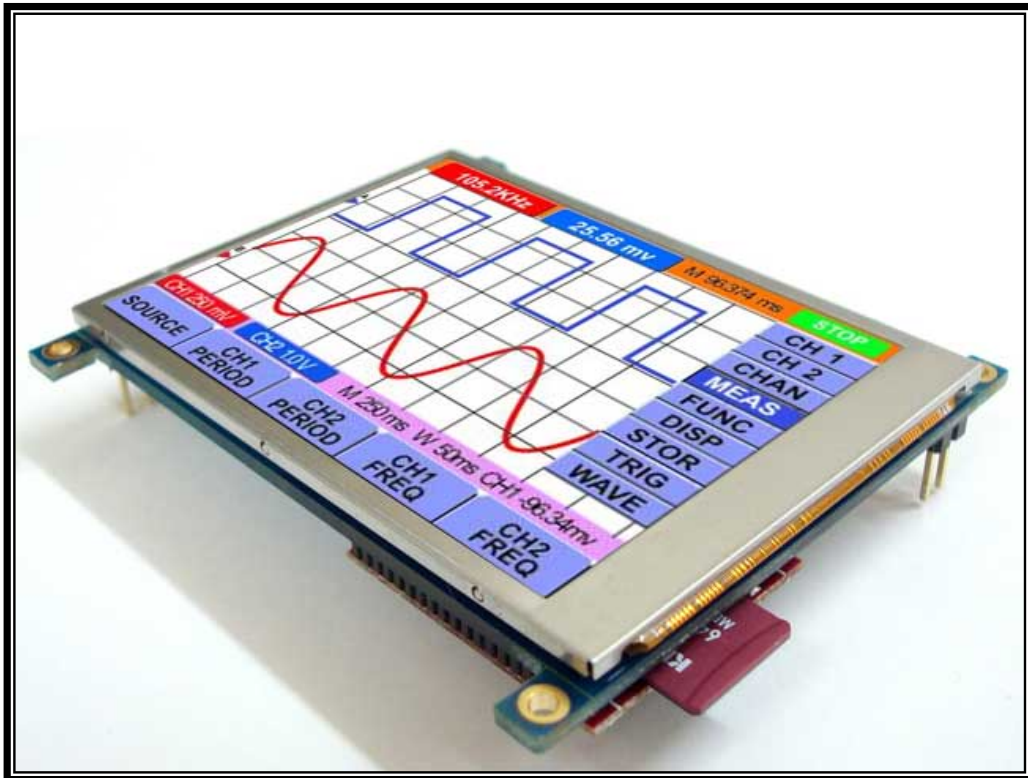
μ OLED 320XX PMD3

with μ SD Card Support

USERS MANUAL

(4DGL Platform)

Revision 1.0



4D Systems



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Table of contents

1.	Introduction	4
2.	Features	5
3.	Circuit Diagram	7
4.	User Interface Pin Description	8
5.	USB-Serial Interface	10
6.	Mechanical Details	11
7.	Specifications & Ratings	12
8.	Available Models & Order Codes	13
9.	Related Products	14

1 Introduction

The **μOLED-320XX-PMD3** series are a compact & cost effective all in one 'SMART' display modules using the latest state of the art Active Matrix OLED (AMOLED) technology with an embedded PICASO graphics controller that delivers 'stand-alone' functionality to any project. The 'easy to learn and use' 4D Graphics Language (4DGL) with vast built in library functions will allow rapid application development.

4DGL is a graphics oriented language, allowing the developer to write applications in a high level language (syntax similar to popular languages such as BASIC, C, Pascal, etc.) and run it directly on the PICASO processor embedded in the **μOLED-320XX-PMD3** modules.

4DGL allows the user to take complete control of all available resources on that hardware platform such as the Serial Port, Graphics AMOLED Display, uSD-Card, I/O pins, etc. This eliminates the need for an external host controller/processor to drive the **μOLED-320XX-PMD3** modules via serial commands. It provides the user complete control over the hardware module allowing them to quickly develop powerful applications.



2 Features

The **μOLED-320XX-PMD3** modules are aimed at being integrated into a variety of different applications via a wealth of features designed to facilitate any given functionality quickly and cost effectively and thus reduce 'time to market'. These features are as follows:

- There are 4 modules in the **μOLED-320XX-PMD3** series:
 - **μOLED-32024-PMD3** :
 - Diagonal : 2.4"
 - Screen Outline : 42.0x52.6 mm, Active Area: 36.7x49.0 mm
 - **μOLED-32024-PMD3T** :
 - Same as **μOLED-32024-PMD3** but with resistive touch screen.
 - **μOLED-32028-PMD3** :
 - Diagonal : 2.83"
 - Screen Outline : 49.1x67.3 mm, Active Area : 43.2x57.6 mm
 - **μOLED-32028-PMD3T** :
 - Same as **μOLED-32028-PMD3** but with resistive touch screen.
- QVGA 240 x RGB x 320 pixel resolution with 256, 65K or 262K true to life colours enhanced AMOLED screen.
- No static image burn-in or smearing effects.
- Near 180 degree viewing angle.
- All modules use the same controller board. PCB Size: 67.7 x 59.54 x 11.0mm.
- Easy 5 pin interface (VCC, TX, RX, GND, RESET) to any 4D micro-USB module such as the **μUSB-MB5** or the **μUSB-CE5**.
- Voltage supply from 3.6V to 5.5V, current @ 60mA nominal when using a 5.0V supply source.

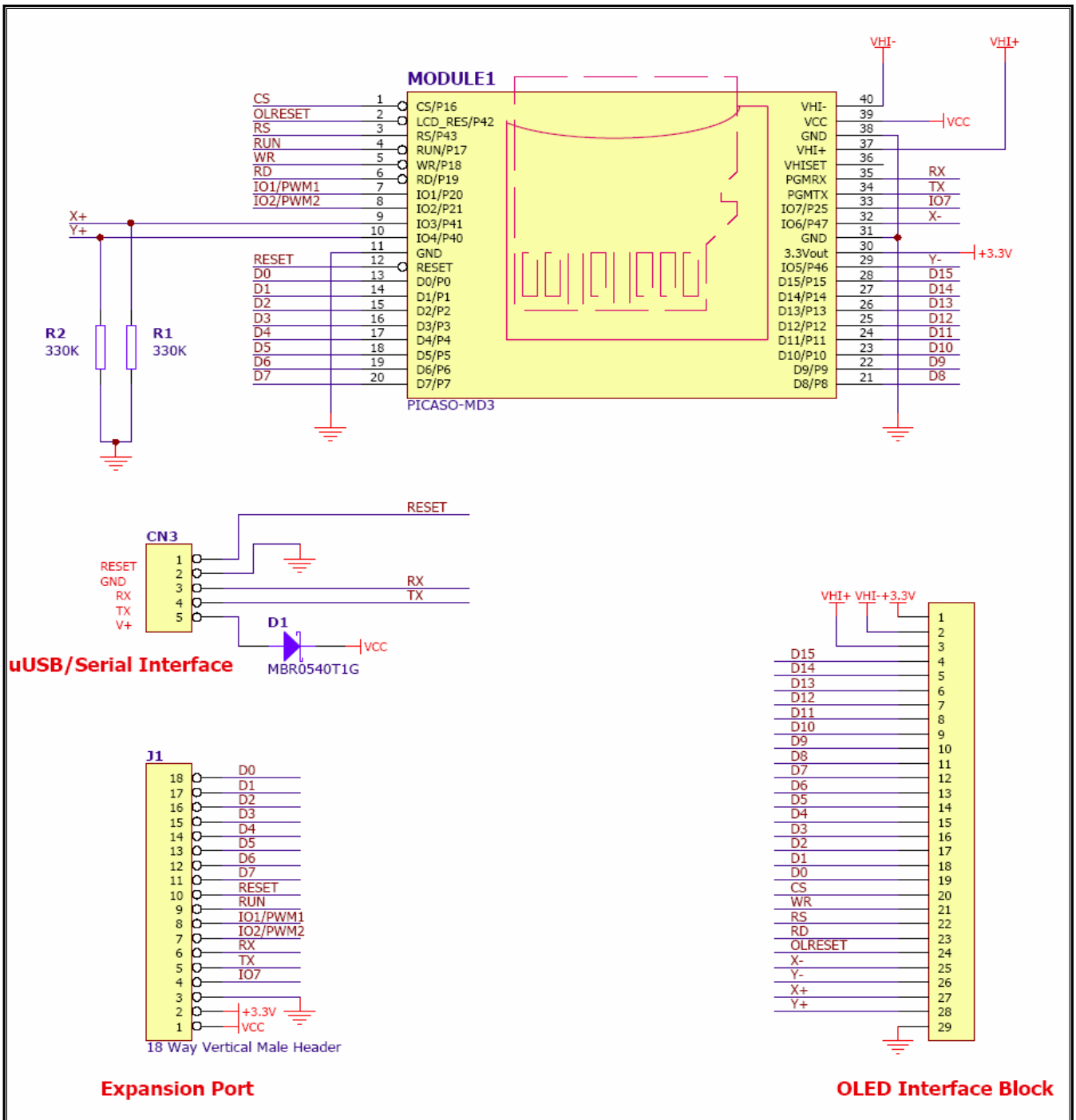
Note: Due to the characteristics of some μSD memory cards the module may require input voltages greater than 4.0 Volts.



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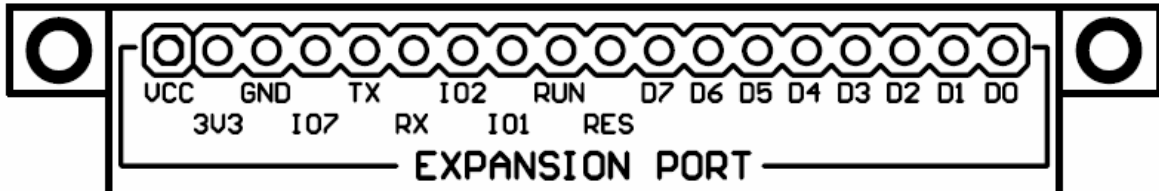
- Powered by the fully integrated **PICASO-MD3** (the 40 pin module is also available as OEM for volume users).
- Onboard micro-SD (**μSD**) memory card adaptor for storing of icons, images, animations, etc. 64Mb to 2Gig μSD memory cards can be purchased separately.
- Built in 4DGL graphics library functions such as: LINE, CIRCLE, RECTANGLE, USER BITMAP, BACKGROUND COLOUR, PUT PIXEL, IMAGE, VIDEO, etc. just to name a few.

3 Circuit Diagram




4 User Interface Pin Description

EXPANSION PORT (for future 4D Add-On modules)		
Pin	Function	Description
1	VCC	This is the V+ input supply via diode protection.
2	3.3V	Regulated 3.3 Volts output, available current max 100mA.
3	GND	Ground.
4	IO7	General Purpose I/O pin.
5	TX	Serial Transmit Pin (Data Out).
6	RX	Serial Receive Pin (Data In).
7	IO2	General Purpose I/O pin.
8	IO1	General Purpose I/O pin.
9	RUN	General Purpose I/O pin.
10	RESET	Module and PICASO RESET signal. Active Low.
11..18	D7..D0	8 bit Data Bus.



Power & Serial Interface		
Pin	Function	Description
5	V+	Main Power Supply input 3.6V to 5.5V. Nominal @ 5Volts.
4	TX	Serial Transmit Pin (Data Out). CMOS levels 0V to 3.3V
3	RX*	Serial Receive Pin (Data In). CMOS levels 0V to 3.3V
2	GND	Ground.
1	RES	External RESET signal for the module and PICASO chip. Open Collector Active Low $\geq 20\mu\text{sec}$.





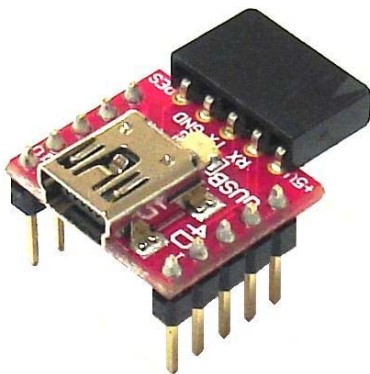
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*** NOTE!**

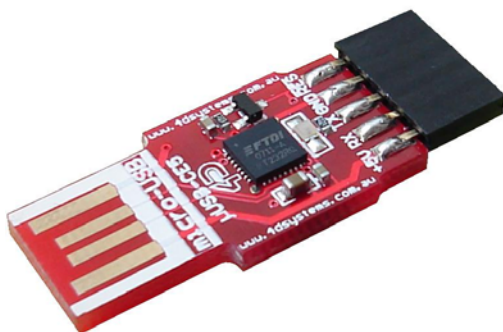
The RX and the TX signals are at 0V to 3.3V levels. If interfacing to a remote system running at voltages greater than 3.6V, say 5.0Volts, then a 100 to 220 Ohms series resistor must be inserted between the remote TX and the μ OLED-32024-PMD3 RX pin. The resistor will prevent excess current damaging the RX pin due to over voltage.

5 USB-Serial Interface

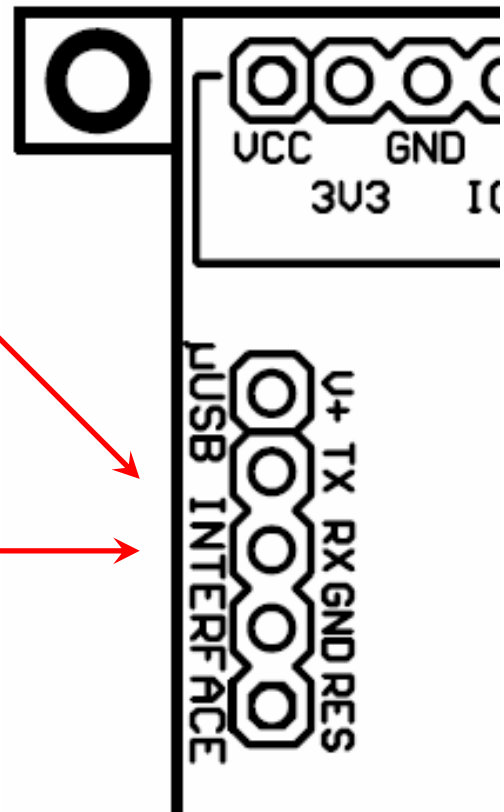
The **μOLED-320XX-PMD3** module needs to be interfaced to a PC for uploading the PICASO chip with user application **4DGL** code. Using a standard USB cable and any one of the 4D Systems micro-USB modules (**μUSB-MB5** or **μUSB-CE5**) as shown below, a PC to **μOLED-320XX-PMD3** connection can be achieved simply. The micro-USB interface is also used for **PmmC** (Personality module micro Code) uploads. The PmmC allows the latest Operating System and 4DGL engine upgrades. The micro-USB module (optional extra), simply connects to the **μOLED-320XX-PMD3** module and captures the USB data and converts it into serial CMOS level (0 to 3.3V) data. The micro-USB modules and drivers are available from your local 4D distributor. This is an optional extra product and is not included with the module.



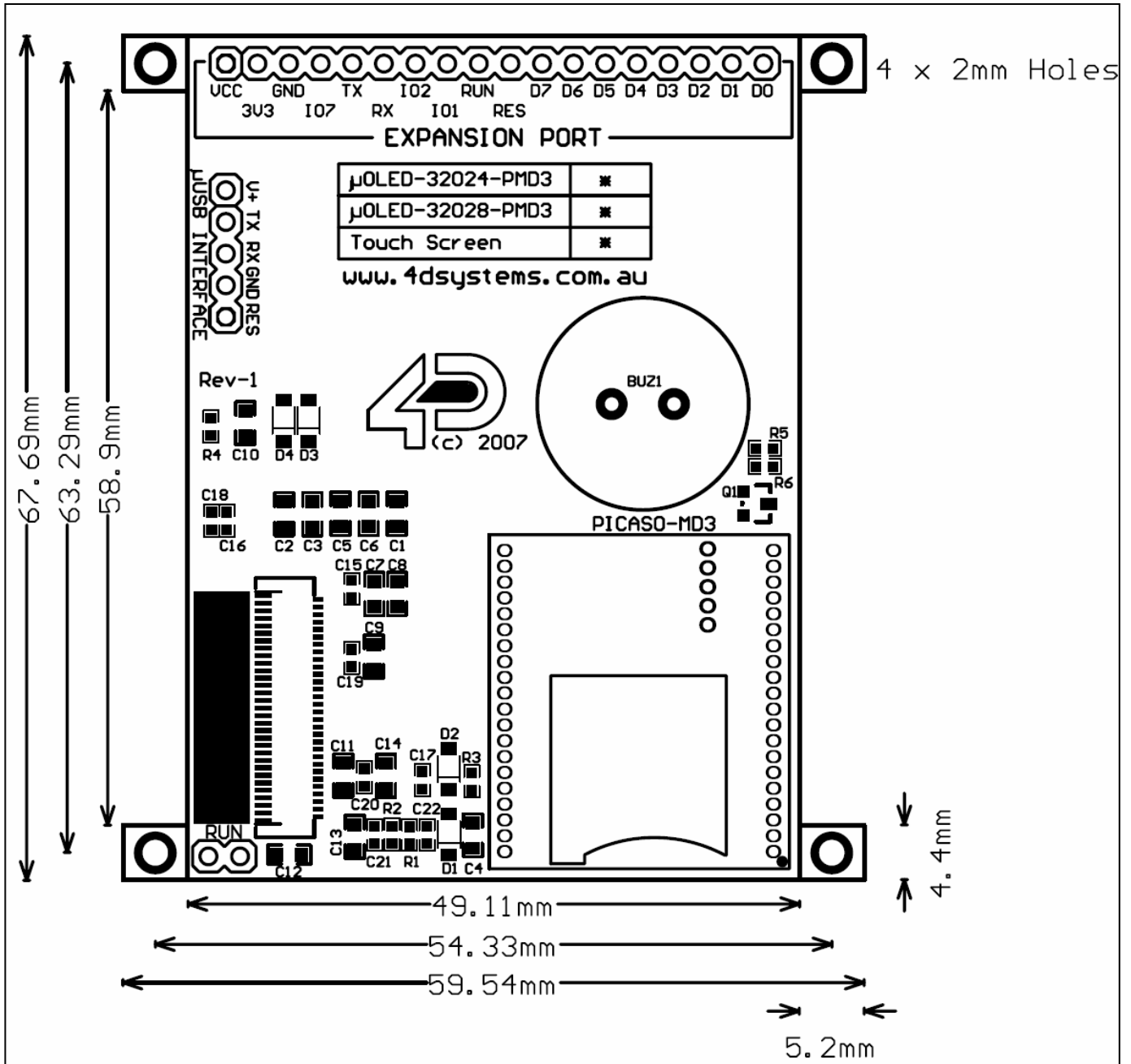
μUSB-MB5



μUSB-CE5



6 Mechanical Details



The module footprint is **67.7mm x 59.54mm x 11.0mm**.

7 Specifications & Ratings

Symbol	Characteristic	Min	Typ	Max	Units
Vdd	Supply voltage	3.6*	5.0	5.5	Volts
I	Current	--	60	190	mA
Top	Operating temp	0	--	70	deg C
Tsto	Storage temp	-30	--	85	deg C
Tpu	Power-up delay	900	1000	1100	msec
L	Luminance	170	200	230	Cd/m ²
VA	Viewing Angle	160	170	179	degrees
Cr	Contrast Ratio	5000:1	10000:1	-	-
LTop	Operational Life Time @30% power consumption to half intensity	20,000	--	--	hours

* NOTE!

Due to characteristics of certain micro-SD memory cards, the module may require supply voltages greater than 4.0 Volts when used with a micro-SD memory card.

8 Available models and Order Codes

- **μOLED-32024-PMD3 :**
 - Diagonal : 2.4"
 - Screen Outline : 42.0x52.6 mm, Active Area: 36.7x49.0 mm
- **μOLED-32024-PMD3T :**
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- **μOLED-32028-PMD3 :**
 - Diagonal : 2.83"
 - Screen Outline : 49.1x67.3 mm, Active Area : 43.2x57.6 mm
- **μOLED-32028-PMD3T :**
 - Same as μOLED-32028-PMD3 but with resistive touch screen.

NOTE!

Both the 2.4" and the 2.83" screens use the same controller board which is designed to the dimensions of the 2.83" display. The 2.4" display on the μOLED-32024-PMD3 and the μOLED-32024-PMD3T modules will appear smaller on the larger controller board.

9 Related Products

▪ **μUSB-MB5**

- micro-USB module, USB to Serial Bridge, Silabs CP2102
- Standard USB miniB connector
- 10 pin header provides the following signals:
 - 5V, 3.3V, GND, Tx, Rx, Suspend,
 - DTR, CTS, RTS, GND
- 5 Volts supply @ 500mA, 3.3 Volts supply @ 100mA
- Additional flow control signals, DTR, CTS, RTS
- Available with an additional 5 pin header for the **μOLED** interface
www.4dsystems.com.au/prod.php?id=18



▪ **μUSB-CE5**

- micro-USB module, USB to Serial Bridge, FTDI Chipset
- Plugs directly into USB port
- 5 pin header provides the following signals:
 - 5V, Rx, Tx, GND, Reset
- 5 Volts supply @ 500mA
www.4dsystems.com.au/prod.php?id=19



▪ **PmmC File for the **μOLED-320XX-PMD3****

- The latest PmmC system file for the module can be downloaded from:
www.4dsystems.com.au/downloads/micro-OLED/uOLED-96-G1/PmmC/

▪ **PmmC Loader PC Software Tool**

- Latest version of **PmmC-Loader** software tool can be downloaded from:
www.4dsystems.com.au/downloads/PmmC-Loader/Software/Windows/
 and the User Guide can be found here:
www.4dsystems.com.au/downloads/PmmC-Loader/Docs/Pdf/

▪ **4DGL Workshop (free download)**

- This is the IDE plus editor plus compiler for all 4DGL user applications. Everything is provided in a single package to write, compile and download 4DGL application code into the target module.

▪ **4D Graphics Composer (free download)**

- Allows downloading of images/animations/movie clips into the micro-SD memory card which can then be recalled and used within 4DGL user application code.
www.4dsystems.com.au/downloads/Graphics_Composer/