



**4D SYSTEMS**  
*TURNING TECHNOLOGY INTO ART*

## **4D Development Board**

### **4DevBoard**

**DATASHEET**

**Document Date: 5<sup>th</sup> September 2012**  
**Document Revision: 1.0**

# Contents

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<b>1. Description.....</b>	<b>3</b>
<b>2. Features .....</b>	<b>3</b>
<b>3. Hardware Description .....</b>	<b>4</b>
3.1. $\mu$ OLED-96-G2 and $\mu$ LCD-144-G2 Modules .....	4
3.2. $\mu$ OLED-128-G2 and $\mu$ OLED-160-G2 Modules .....	5
3.3. $\mu$ LCD-24PTU, $\mu$ LCD-28PTU, $\mu$ LCD-32PTU and $\mu$ LCD-32WPTU microLCD Modules .....	6
3.4. Speaker – Sound and Music Generation .....	7
3.5. Joystick – 5 Position Multi Switch .....	7
3.6. Power Supply .....	7
3.7. Circuit Prototyping .....	8
3.8. User LED's.....	8
3.9. Jumper Settings.....	8
<b>4. Related Products.....</b>	<b>9</b>
<b>5. Schematic Design .....</b>	<b>10</b>
<b>6. Mechanical Drawing.....</b>	<b>11</b>
<b>7. Specifications and Ratings.....</b>	<b>12</b>
<b>8. Legal Notice .....</b>	<b>13</b>
<b>9. Contact Information.....</b>	<b>13</b>

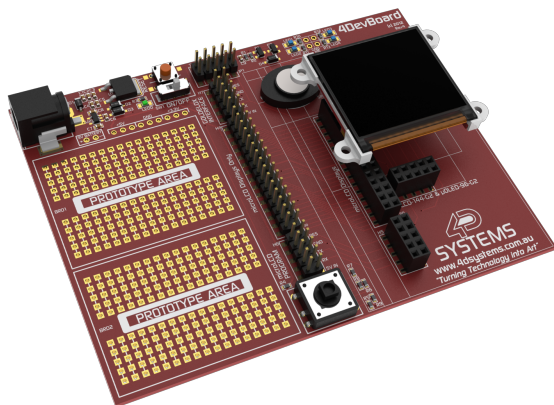
## 1. Description

The 4D Systems Development Board (4DevBoard) is an all-in-one development platform for a majority of the 4D Systems  $\mu$ OLED and  $\mu$ LCD modules. The feature packed board makes an ideal platform for learning and experimenting with the display modules as well as the 4D Systems Workshop 4 software and programming environments.

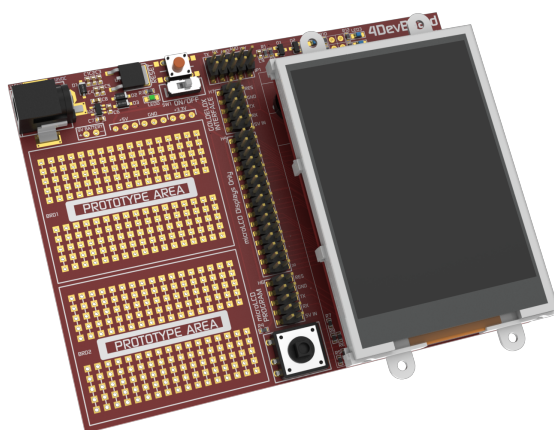
The 4DevBoard is currently compatible with the following modules:

- $\mu$ OLED-96-G2
- $\mu$ OLED-128-G2
- $\mu$ OLED-160-G2
- $\mu$ LCD-144-G2
- $\mu$ LCD-24PTU
- $\mu$ LCD-28PTU
- $\mu$ LCD-32PTU
- $\mu$ LCD-32WPTU

**Note:** As new modules are developed by 4D Systems, they may be compatible with the 4DevBoard, however this cannot be guaranteed.



$\mu$ OLED-128-G2 connected to the 4DevBoard



$\mu$ LCD-32PTU connected to the 4DevBoard

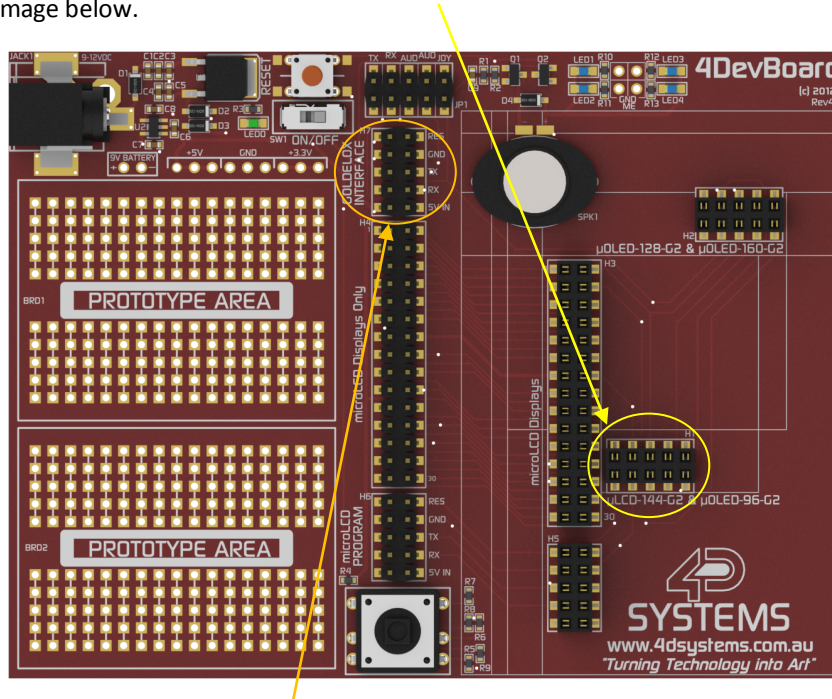
## 2. Features

- On-board DC-Jack (2.5mm centre positive) for wall plug adaptor (9V to 12V DC) with built in switch for automatic battery cut-off to prevent dual connection.
- PCB connections for a 9.0 Volt battery flying lead connector (not included).
- On-board input voltage to 5.0V regulator that can supply up to 1A of current for the display modules and users circuits.
- On-board 3.3 Volt regulator that can supply up to 150mA of current for the users circuits.
- Power Switch and LED indicator.
- 8 Ohms micro speaker with Darlington drive for sound and music.
- Push-button RESET switch.
- 2 x 5-pin male header for programming and interfacing to the users Goldelox Module ( $\mu$ OLED's and  $\mu$ LCD-144-G2) plugged into the 4DevBoard.
- 2 x 5-pin male header for programming the users microLCD Module ( $\mu$ LCD-24PTU/28PTU/32PTU/32WPTU) plugged into the 4DevBoard, along with a 2 x 15-pin male header for interfacing with the users microLCD Module.
- 10-pin female header for  $\mu$ OLED-128-G2 and  $\mu$ OLED-160-G2 modules.
- 10-pin female header for  $\mu$ OLED-96-G2 and  $\mu$ LCD-144-G2 modules.
- 10-pin and 30-pin female headers for  $\mu$ LCD-24PTU/28PTU/32PTU/32WPTU modules.
- 5 position multi-way switch Joystick.
- 10-pin male jumper header for configuration of the 4DevBoard Serial, Audio and Joystick connection.
- 4x User controllable LED's ready to be connected to the users circuit.
- 2x 170 tier solder-less breadboard for quick circuit prototyping (provided separately for user to attach to the 4DevBoard if desired).
- Set of 40 pieces (8 sets of 5 each) of colour coded pluggable jumper-wires. 5 pieces each of following lengths: 2, 5, 10, 15, 20, 25, 50 and 75 mm.
- RoHS Compliant
- Dimensions: 120mm x 90mm x 12.7mm

### 3. Hardware Description


#### 3.1. $\mu$ OLED-96-G2 and $\mu$ LCD-144-G2 Modules

The  $\mu$ OLED-96-G2 and  $\mu$ LCD-144-G2 modules connect to the 4DevBoard on the lower 10-pin female header, as depicted in the image below.



When the display module is attached to the 4DevBoard, the pins of the module are replicated on the upper 10-pin male header.

The pin configuration of this 10-pin male header is as follows:

3.3V OUT		RESET
GND		GND
IO1		TX
IO2		RX
5V OUT		5V IN

**Note:** rather than the display module generating voltage for the 3.3V OUT pin, the 3.3V available on this header comes from the on-board voltage regulator of the 4DevBoard, which can provide a higher current.

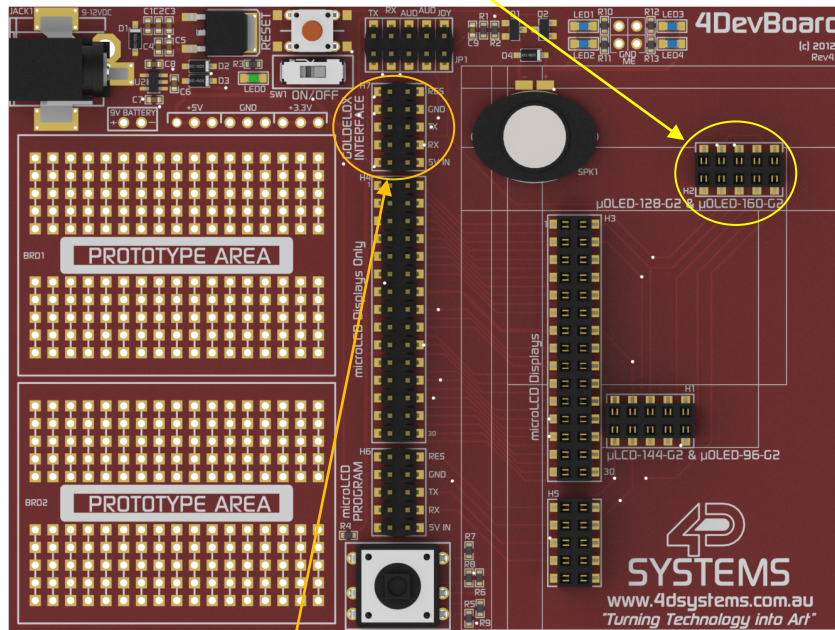
To program the display module, connect your 4D Programming Cable to the right hand side of this 10-pin male header, ensuring you have the cable the correct way around.

**Note:** Failure to connect the module in the correct orientation or if an offset on the pins is made when plugging the module it, may result in a short circuit and damage your display module. Please ensure that the 4DevBoard is disconnected from power when connecting your display module.

For further information on how to program your display module, please refer to the individual datasheet for the display module in question, available from the 4D Systems website, [www.4dsystems.com.au](http://www.4dsystems.com.au)

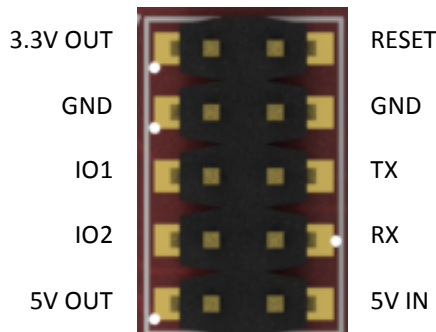
3.2.  $\mu$ OLED-128-G2 and  $\mu$ OLED-160-G2 Modules

The  $\mu$ OLED-128-G2 and  $\mu$ LCD-160-G2 modules connect to the 4DevBoard on the upper 10-pin female header, as depicted in the image below.



When the display module is attached to the 4DevBoard, the pins of the module are replicated on the upper 10-pin male header.

The pin configuration of this 10-pin male header is as follows:



**Note:** rather than the display module generating voltage for the 3.3V OUT pin, the 3.3V available on this header comes from the on-board voltage regulator of the 4DevBoard, which can provide a higher current.

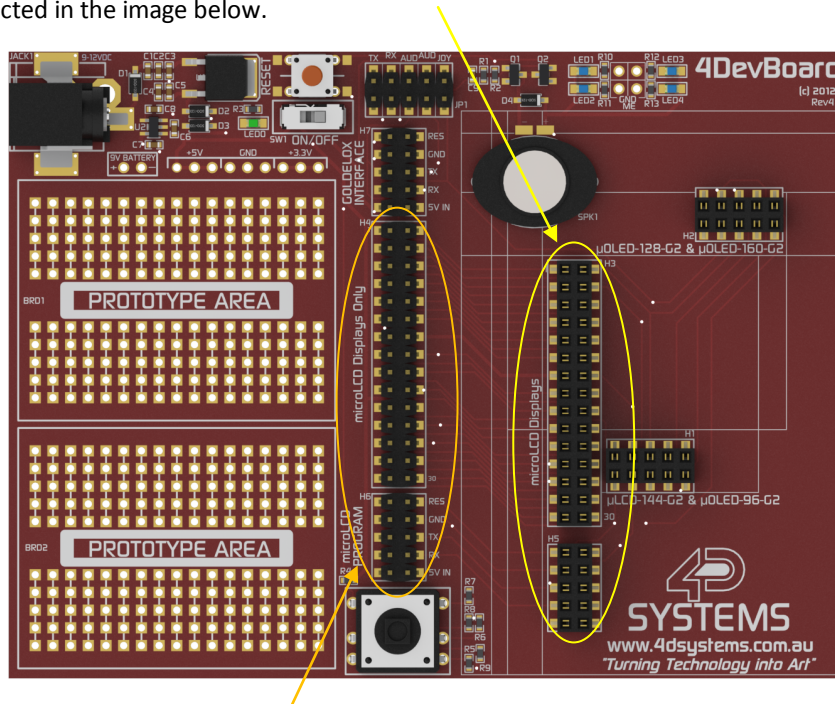
To program the display module, connect your 4D Programming Cable to the right hand side of this 10-pin male header, ensuring you have the cable the correct way around.

**Note:** Failure to connect the module in the correct orientation or if an offset on the pins is made when plugging the module it, may result in a short circuit and damage your display module. Please ensure that the 4DevBoard is disconnected from power when connecting your display module.

For further information on how to program your display module, please refer to the individual datasheet for the display module in question, available from the 4D Systems website, [www.4dsystems.com.au](http://www.4dsystems.com.au)



3.3.  $\mu$ LCD-24PTU,  $\mu$ LCD-28PTU,  $\mu$ LCD-32PTU and  $\mu$ LCD-32WPTU microLCD Modules

The  $\mu$ LCD-24/28/32/32WPTU modules connect to the 4DevBoard on the 10-pin and 30-pin vertical female headers, as depicted in the image below.



When the display module is attached to the 4DevBoard, the pins of the module are replicated on the lower 10-pin and 30-pin male headers.

The pin configuration of this 10-pin male header is as follows:

3.3V OUT		RESET	IO1		SPK-
GND		GND	IO2		SPK+
IO1		TX	IO3		I2C_SCL
IO2		RX	IO4		I2C_SDA
5V OUT		5V IN	IO5		INO
			GND		IN1
			GND		5V OUT
			PA7		AUDIO_IO
			PA6		AUDENB
			PA5		RESET
			PA4		3.3V OUT
			PA3		RX0
			PA2		TX0
			PA1		TX1
			PA0		RX1

**Note:** rather than the display module generating voltage for the 3.3V OUT pin, the 3.3V available on this header comes from the on-board voltage regulator of the 4DevBoard, which can provide a higher current.

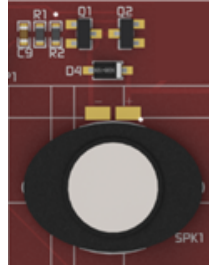
To program the display module, connect your 4D Programming Cable to the right hand side of this 10-pin male header, ensuring you have the cable the correct way around.

**Note:** Failure to connect the module in the correct orientation or if an offset on the pins is made when plugging the module it, may result in a short circuit and damage your display module. Please ensure that the 4DevBoard is disconnected from power when connecting your display module.

For further information on how to program your display module, please refer to the individual datasheet for the display module in question, available from the 4D Systems website, [www.4dsystems.com.au](http://www.4dsystems.com.au)

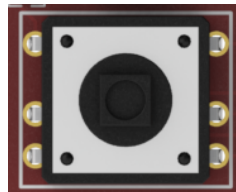
### 3.4. Speaker – Sound and Music Generation

The  $\mu$ OLED-96/128/160-G2  $\mu$ OLED display modules and  $\mu$ LCD-144-G2,  $\mu$ LCD-24/28/32/32WPTU  $\mu$ LCD display modules are capable of generating complex sounds and music from their respective I/O pins. Using a shunt and shorting the relevant AUD pin on the Jumper Header (refer to section 3.9 for further information), audio generation is possible from any of the Display Modules and played out of the on-board speaker on the Development Board.



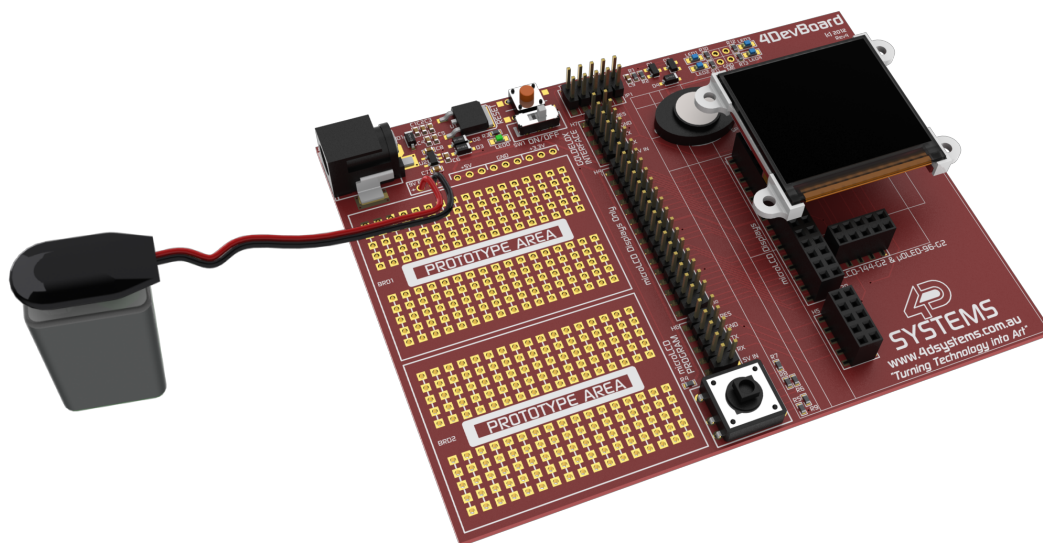
### 3.5. Joystick – 5 Position Multi Switch

The Joystick is a 5 position multi switch and each position connects to a junction of a resistor ladder network that forms a voltage divider, and therefore display modules using the GOLDELOX processor are capable of reading this voltage in with its Analogue to Digital (A2D) converter. The IO1 pin of  $\mu$ OLED-96/128/160-G2 and  $\mu$ LCD-144-G2 display modules can be programmed as an A2D input using the Workshop software suite. Utilising the A2D feature each individual switch position voltage value can be read and decoded. Refer to section 3.9 for further information.



### 3.6. Power Supply

The 4DevBoard can be powered by the 5 Volts supply provided by the 4D Programming Cable or it can be powered by an external wall-plug (9 Volts to 12 Volts DC) centre tap positive. The board also has provisions for soldering a flying lead 9V battery clip. Both the wall plug and the 9V battery clip are not provided.



### 3.7. Circuit Prototyping

The 4DevBoard is supplied with two 170 tier (2 sets of 5 rows x 17 column sockets) solder-less breadboard for circuit prototyping purposes. Each column of 5 sockets has metal strips inside it that connect the sockets together which simplifies hooking up components. It is also supplied with 40 pieces of jumper wires of various lengths that can be used join signals to external components placed on the breadboard.

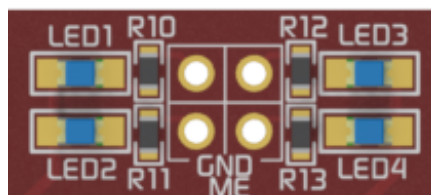
Above the prototyping area are 5V, 3.3V and GND pads to supply power to the users circuit. Wires can be soldered directly into these pads, else a connector with 2.54mm pitch could be soldered also.

### 3.8. User LED's

At the top of the Development Board are 4 LED's which can be driven by the users circuit.

These LED's are connected to 5V via a 1.2K resistor, and are illuminated by connecting the respective pad to GND.

This allows the user to set up a simple circuit to drive these LEDs on the prototyping area, either with a simple switch, a transistor, or even a relay.



### 3.9. Jumper Settings

On the 4DevBoard there is a 10-pin jumper header (JP1), used to configure the Audio, Joystick and Serial Communications between the Display Module and the Development Board.



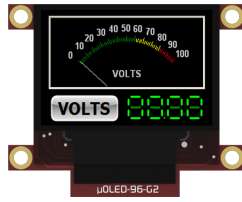
When the shunt is connected between the two relevant pins, the feature of that configuration point is enabled. When disconnected, the feature is disabled.

- **TX** – when the two pins are joined with the shunt, TX0 is connected between the display module and the relevant programming and/or interface header(s) associated with that display.
- **RX** – when the two pins are joined with the shunt, RX0 is connected between the display module and the relevant programming and/or interface header(s) associated with that display.
- **AUD** – the centre AUD configuration shunt joins IO2 of the Display Module to the audio circuit on the Development Board. This is relevant for all display modules, but most relevant for the display modules with a GOLDELOX processor.
- **AUD** – the other AUD configuration shunt joins the AUDIO\_IO of the  $\mu$ LCD-24/28/32/32WPTU to the audio circuit on the Development Board. AUDIO\_IO is a line level signal generated from the Display Module. If AUDENB is enabled on the Display Module (on-board amplifier enable), sound will be played out of the on-board speaker on the Display Module as well as the audio circuit on the Development Board. It is recommended to disable the AUDENB on the display module if the audio circuit on the Development Board is to be used.
- **JOY** – when this shunt is connected, the joystick is attached to IO1 of the display module. It connects to all Display Modules IO1 input, however is only compatible with the display modules with a GOLDELOX processor, as the PICASO processor does not have an A2D input pin. When using the  $\mu$ LCD-24/28/32/32WPTU, leave this shunt disconnected.



### 4. Related Products

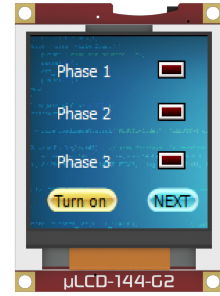
μOLED-96-G2



μOLED-128-G2



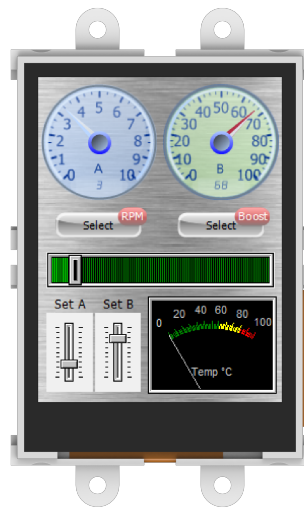
μLCD-144-G2



μOLED-160-G2



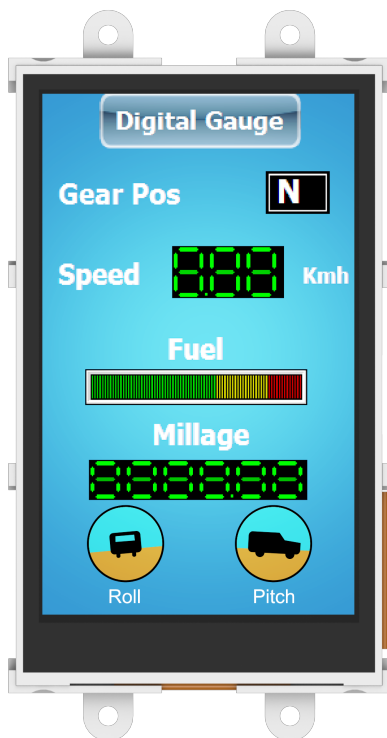
μLCD-24PTU



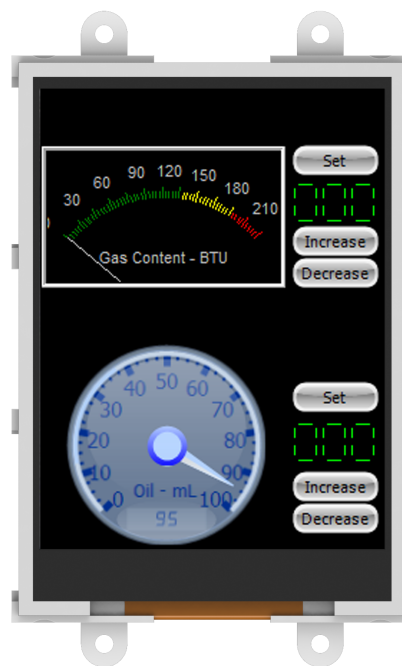
μLCD-28PTU



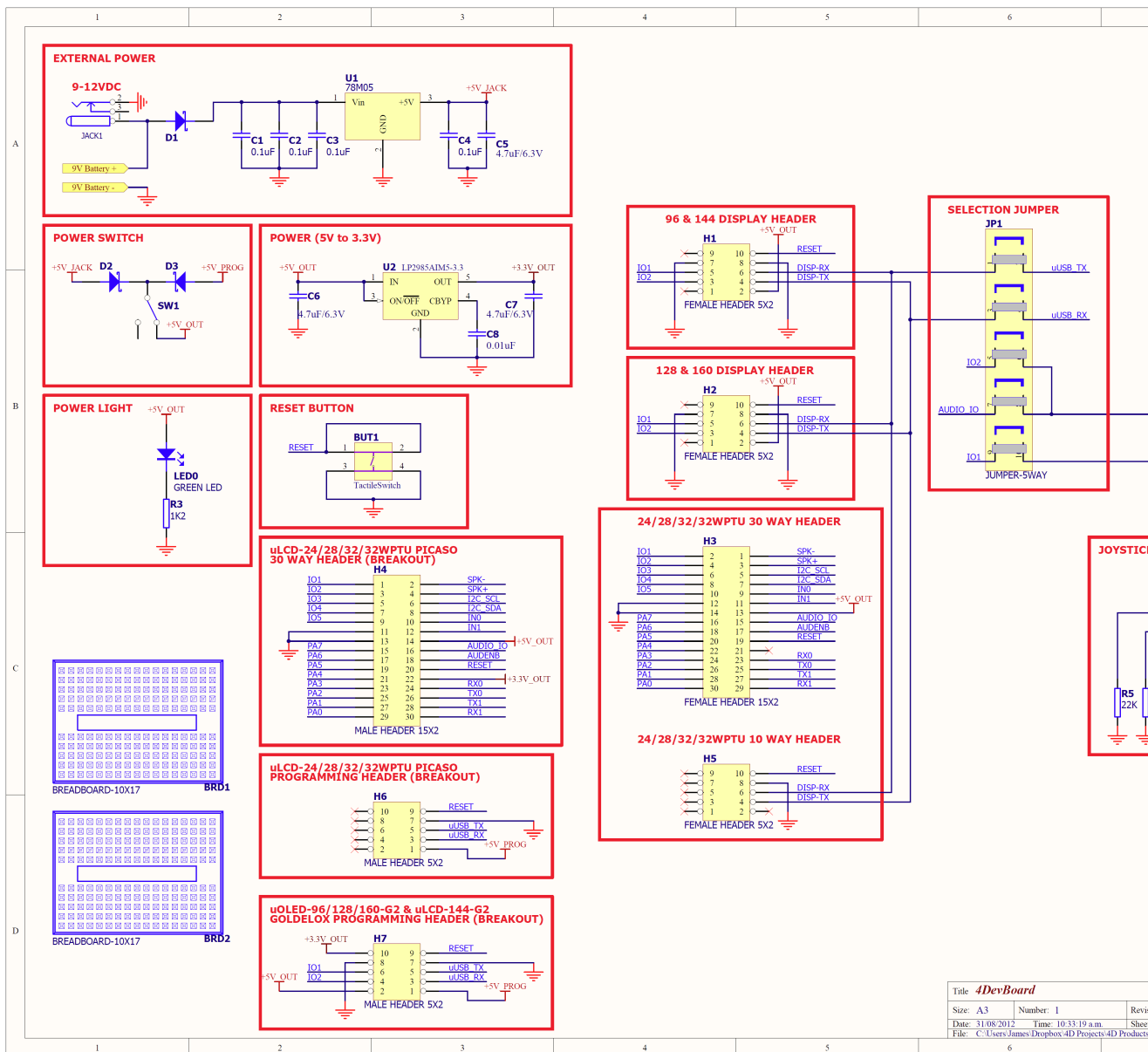
μLCD-32WPTU



μLCD-32PTU

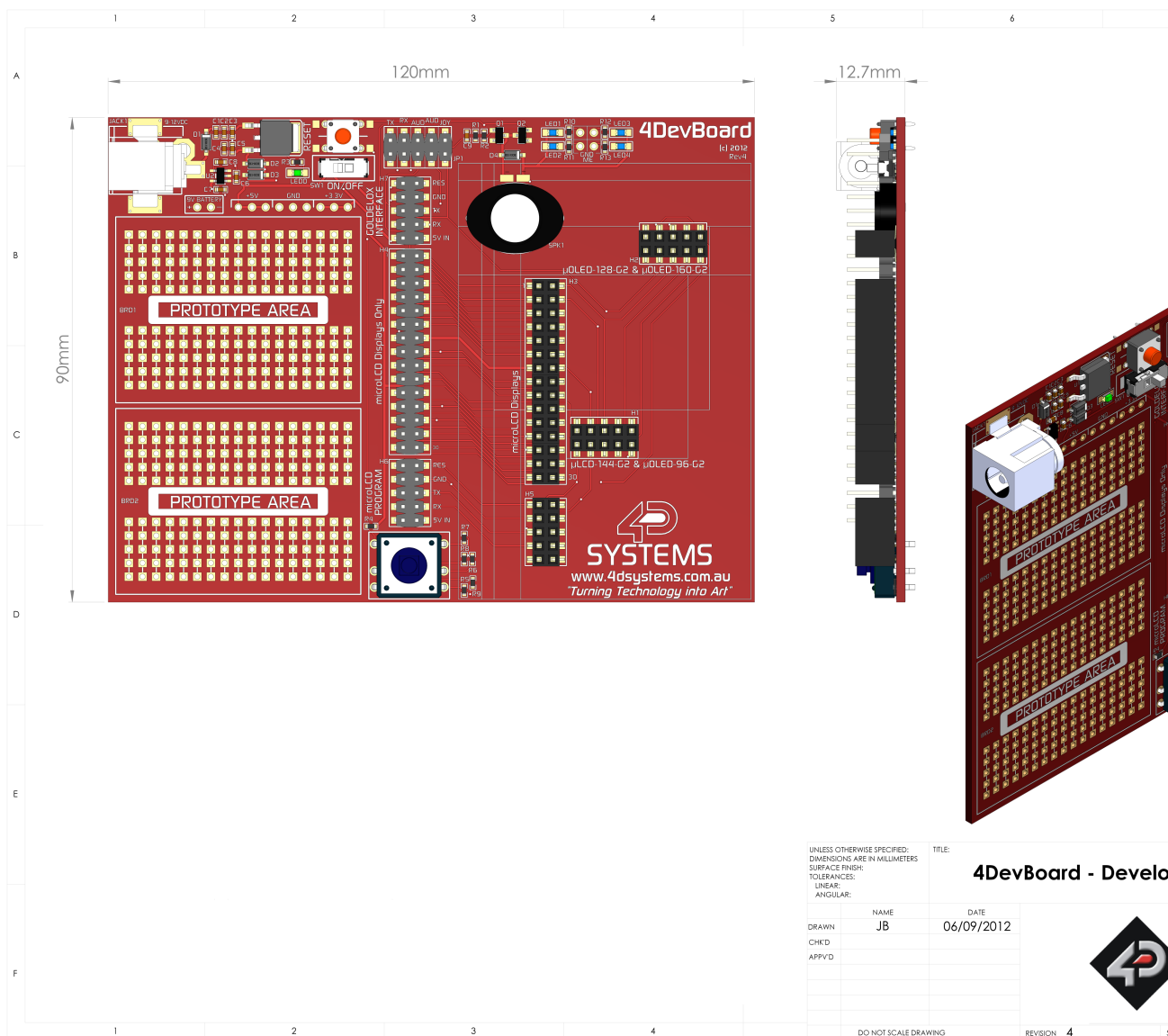


5. Schematic Design



Title <i>4DevBoard</i>		
Size: A3	Number: 1	Rev: 1
Date: 31.08.2012	Time: 10:33:19 a.m.	Sheet: 1
File: C:\Users\James.Droghda\4D Projects\4D Products		

6. Mechanical Drawing



## 7. Specifications and Ratings

RECOMMENDED OPERATING CONDITIONS					
Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage (VCC)		9.0	--	12.0	V
Operating Temperature		-10	--	+70	°C

For specifications relating to the modules used with the 4DevBoard, please refer to their individual datasheets, available from the 4D Systems website, [www.4dsystems.com.au](http://www.4dsystems.com.au)

ORDERING INFORMATION
<b>Order Code:</b> 4DevBoard
<b>Package:</b> 138mm x 100mm x 30mm
<b>Packaging:</b> Module sealed in antistatic foam padded 4D Systems Box

## 8. Legal Notice

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