

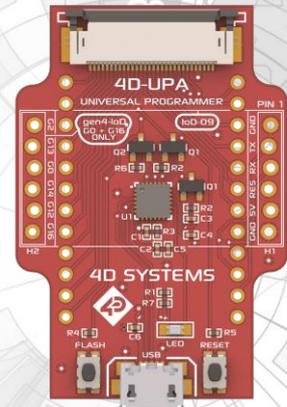


**4D SYSTEMS**  
TURNING TECHNOLOGY INTO ART

## 4D Universal Programming Adaptor

# DATASHEET

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4D-UPA

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Please refer to the 4D Systems website for the latest  
Revision of this document

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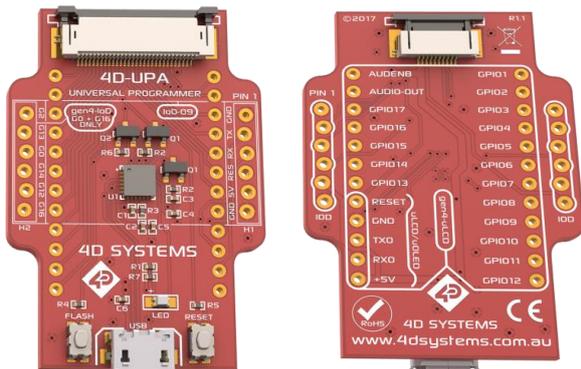
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## 1. Description

This datasheet covers the 4D-UPA (Universal Programming Adaptor) which is compatible with multiple 4D display modules. It is included in most Starter Kit (SK) packs but can be sold separately and is a quick and easy way to interface to the 4D display modules.

The 4D-UPA (Universal Programmer Adaptor) is a universal programmer designed to replace all current 4D programmers, such as the uUSB-PA5, uUSB-PA5-II, gen4-PA, gen4-IoD-PA, and the 4D Programming Cable. It can be used for programming gen4-uLCD display modules, gen4-IoD display modules, IoD-09TH display modules, pixxiLCD modules, uLCD and uOLED display modules. It can also be used for interfacing to a breadboard for prototyping, or for interfacing to virtually any host. Some older products are still best suited for other 4D programmers, so they may be included in some Starter Kits instead of this 4D-UPA – consult the Product Page of the Starter Kit in question.

The 4D-UPA has a 30-way FFC connector at the top of the module, for connecting to gen4-uLCD-xx display modules and pixxiLCD modules. On the opposite side is a 10 way FFC connector, for connecting to gen4-IoD-xx display modules. Located centrally in the larger rectangular outline, are pads associated with the gen4-uLCD-xx modules. These break out all the signals which come to/from the gen4-uLCD-xx modules. 5 of the signals are the universal 4D RESET/GND/TX/RX/5V signals, these are located together to enable interfacing/programming of the uLCD and uOLED display modules, such as the uLCD-43DT and uOLED-128G2. The outer 2 sets of 6 holes are for mounting and programming the IoD-09TH display module. The IoD-09TH pads are slightly offset, enabling a simple 'friction fit' interface to the 4D-UPA, no soldering or headers are required - although headers can be soldered if needed.



4D-UPA	DIABLO16	PICASO	PIXXILCD
GPIO1	PA3	IO1	IO1 / IO7
GPIO2	PA2	IO2	IO2 / IO6
GPIO3	PA1	IO3	IO3*
GPIO4	PA0	IO4	IO4*
GPIO5	PA9	BUS5	IO5*
GPIO6	PA8	BUS4	-
GPIO7	PA7	BUS3	-
GPIO8	PA6	BUS2	-
GPIO9	PA5	BUS1	-
GPIO10	PA4	BUS0	-
GPIO11	PA10	BUS6	-
GPIO12	PA11	BUS7	-
GPIO13	PA12	IO5	-
GPIO14	PA13	RX1	-
GPIO15	PA14	TX1	-
GPIO16	PA15	I2C_SCL	-
GPIO17	N/C	I2C_SDA	-

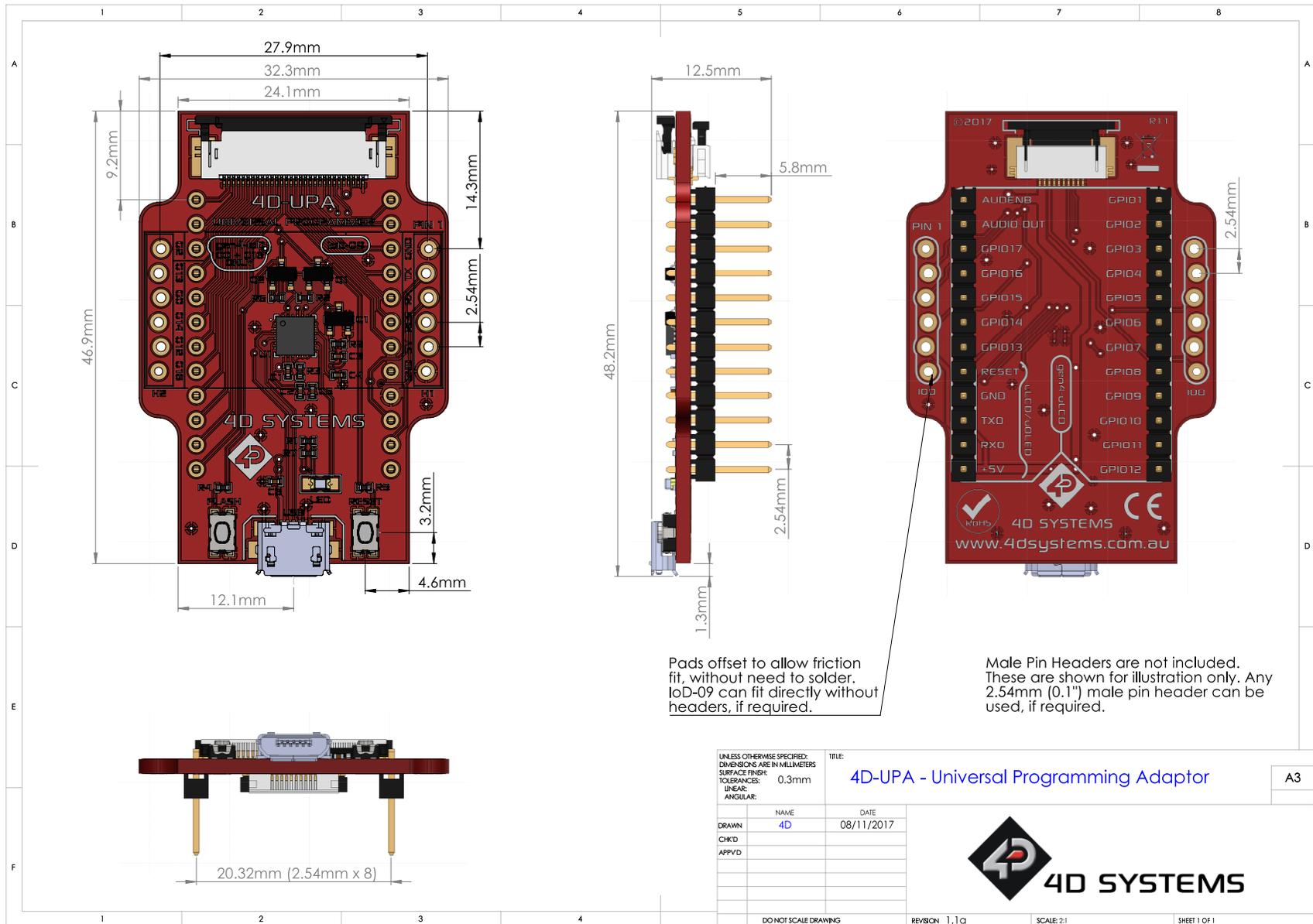
Note (\*): Please take note of the PixxiLCD pinout, not all PixxiLCD modules utilise all the GPIO, most Pixxi-28 based modules will have IO1 and IO2 broken out, which are accessible from the GPIO1 and GPIO2 marked pads on the UPA, and most Pixxi-44 based modules will have IO7 (GPIO1) and IO6 (GPIO2). Sometimes modules will break out extra GPIO, however please check the individual module datasheet for specific information.

The Flash and RESET buttons (shown as ESP-RESET on REV 1.3 and higher boards) are for the gen4-IoD and IoD-09 range of products only. They have no impact or effect on gen4-uLCD, uLCD, uOLED or pixxiLCD products.

The 4D-UPA utilises the Silicon Labs CP2104 USB to Serial Bridge IC. More information about this can be found from the Silicon Labs website. A link to the driver is available on our website.

- USB 2.0 compliant Full Speed 12Mbps maximum speed.
- Hardware or Xon/Xoff handshaking supported, 300bps to 2Mbps
- UART supports 5, 6, 7, 8 data bits, 1, 1.5, 2 stop bits, odd/even/mark/space and no parity
- Supports Windows 2000 and above, MAC (OSX-8 and above) and Linux (2.4 kernel and above)
- USB powered
- -10 to +60 degrees Celsius temp range

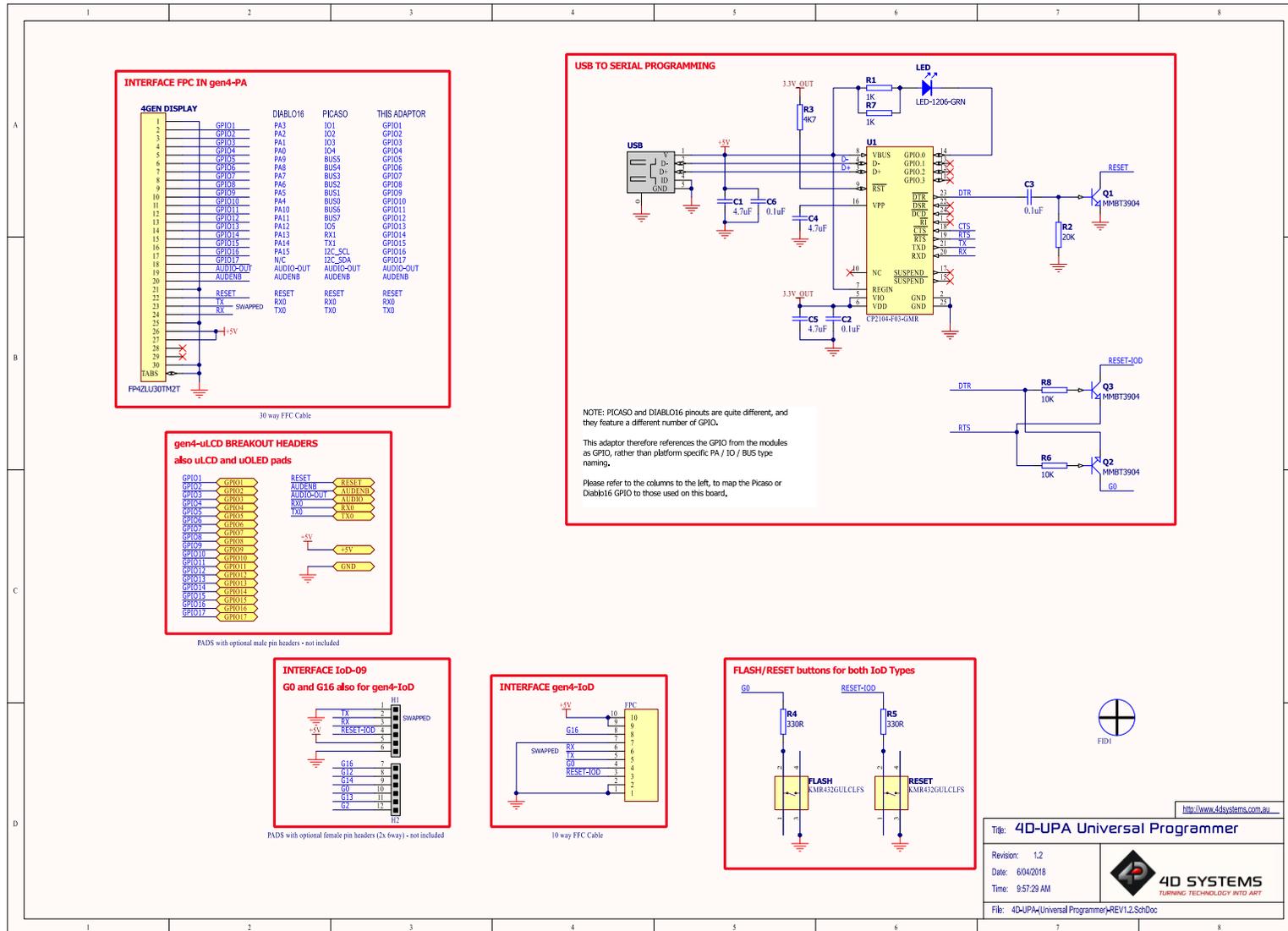
## 2. Mechanical Dimensions



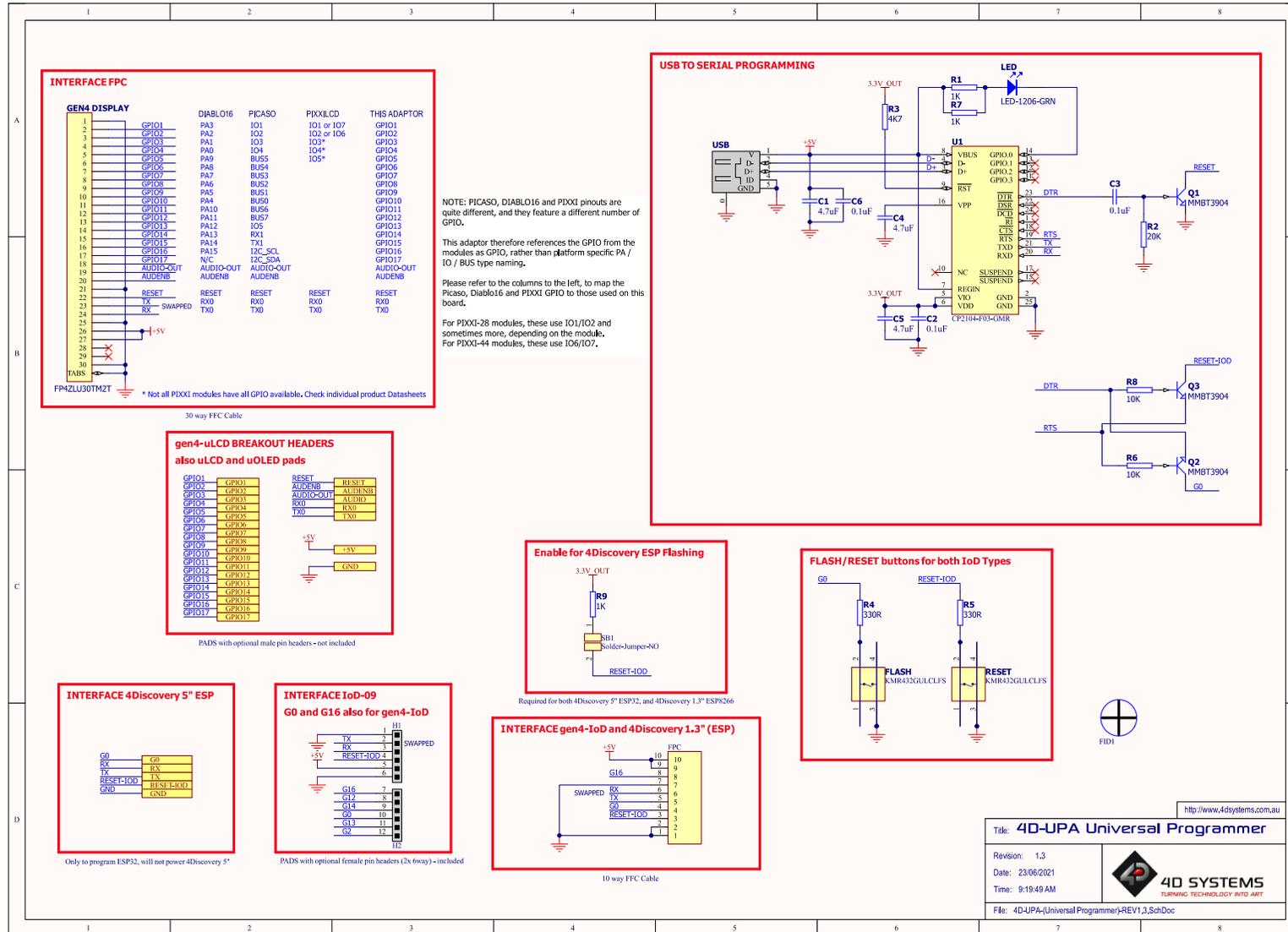
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: 0.3mm LINEAR: ANGULAR:		TITLE: <b>4D-UPA - Universal Programming Adaptor</b>	A3
DRAWN: CHK'D: APP'VD:	NAME: <b>4D</b>	DATE: 08/11/2017	
DO NOT SCALE DRAWING		REVISION: 1.1 CI	SCALE: 2:1
			SHEET 1 OF 1



### 3. Schematic Diagram HW REV 1.2



## 4. Schematic Diagram HW REV 1.3



## 5. Programming Modes

The following pictures show how to connect the 4D-UPA to various hardware and display modules.



Figure 1. Connection of an IoD-09TH Display module to 4D-UPA with a microUSB Cable.



Figure 2. Typical connection of gen4 display module (gen4-uLCD-43DCT-CLB) to 4D-UPA



Figure 3. gen4 display (gen4-uLCD-43DCT-CLB), connected to the 4D-UPA using a 30-way FFC cable, and Jumper wires connecting to the Arduino Adaptor Shield, on top on an Arduino. This is utilising GPIO1 and GPIO2 pins, mapped through to being a different UART/COM port on the gen4 display (Diablo processor), so not to cause a conflict with the USB chip on the UPA.

When connecting another device (such as an Arduino – shown in the previous Figure 3) to the 5-way interface pins on the 4D-UPA, while connecting a 4D Display module to the 30-way FFC, the connection to the other device (Arduino for example) utilises the UART0 serial port on the gen4 display. This is also used by the USB controller to program the gen4 display module. Therefore, each time you program to the display module, the 5-way cable needs to be disconnected to the other device (Arduino for example) so the serial UART will not have conflicts and fail. Alternatively, separately wiring to other GPIO pins on the 4D-UPA to utilise the UART1/2/3 etc (as is available on selected gen4 display modules) will allow this conflict to be avoided, due to utilising a separate UART. Adjustments to the settings in Workshop4 to utilise comms to a different UART, is required. The ViSi Genie Settings was changed for the previous set-up to work.

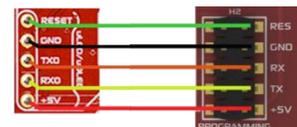
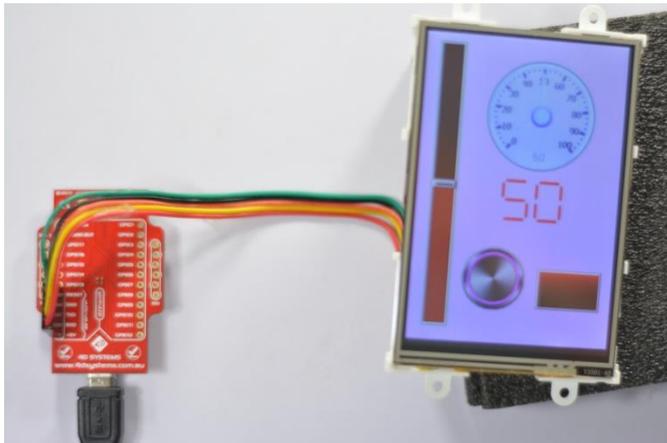
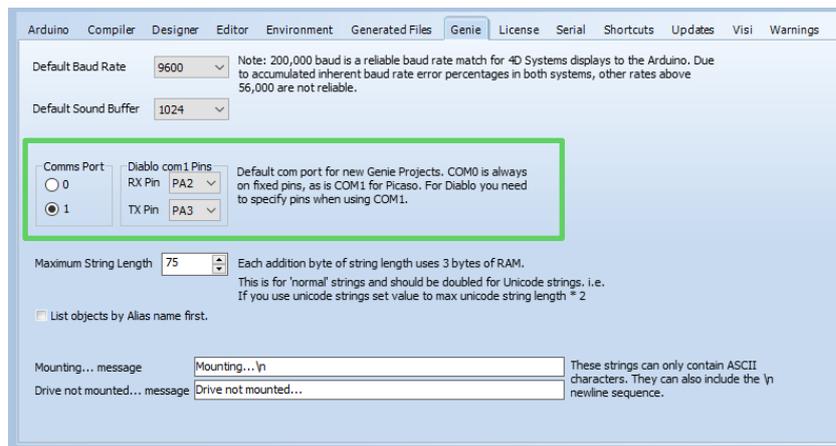


Figure 4. 4D-uLCD Display (uLCD-35DT) connected to the 4D-UPA.

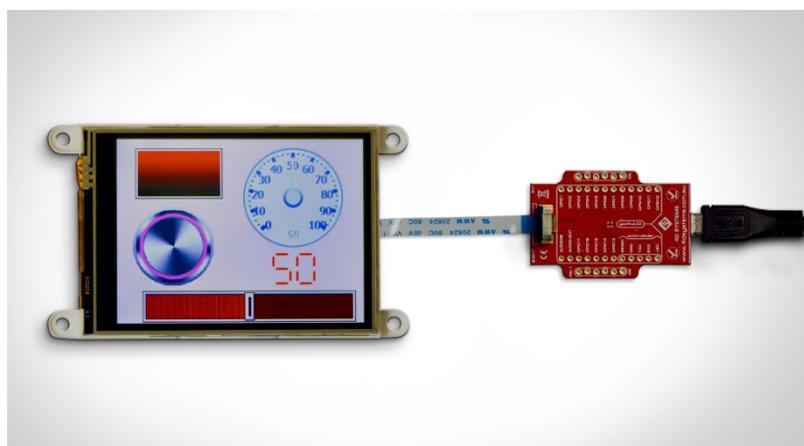


Figure 5. gen4-IoD Display (gen4-IoD-32T) connected to the 4D-UPA

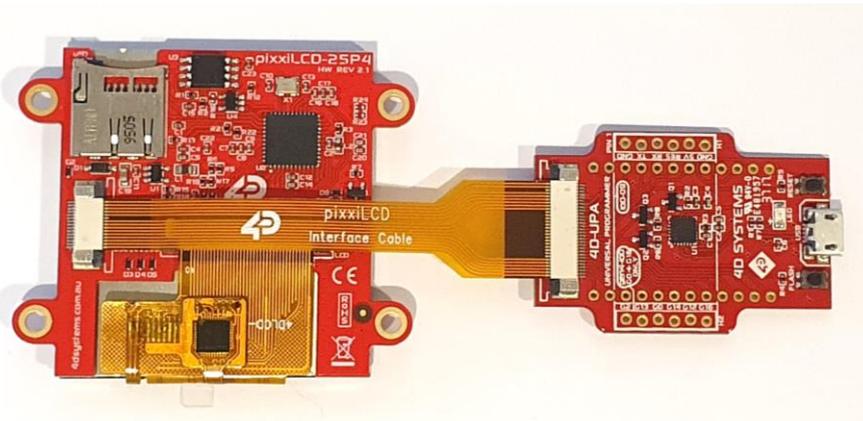


Figure 6. pixxiLCD-25P4 Display connected to the 4D-UPA using the PixxiLCD FFC cable

## 6. FFC Cable information

The FFC cables supplied by 4D Systems (included with products) have the following specifications:

For gen4-uLCD products

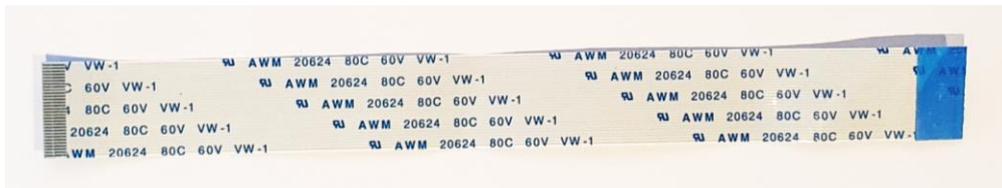
**30 Pin** Flexible Flat Cable, 150mm Long, 0.5mm (0.02") pitch

Cable Type: AWM 20624 80C 60V VW-1

Heat Resistance 80 Degrees Celsius

Connections on the opposite side at each end (Type B)

Note: Some different length cables are available by contacting 4D Systems sales directly



For gen4-loD products

**10 Pin** Flexible Flat Cable, 150mm Long, 0.5mm (0.02") pitch

Cable Type: AWM 20624 80C 60V VW-1

Heat Resistance 80 Degrees Celsius

Connections on the opposite side at each end (Type B)

PixxiLCD products use a custom FPC (not FFC) which converts the 30 way from the 4D-UPA into 15 way, for connecting to the pixxiLCD display modules. These are custom designed and have no standard replacement option off the shelf. For replacements, please contact 4D Systems Sales.



## 7. Hardware Revision History

Revision Number	Date	Description
1.2	31/08/2017	Initial Public Release Version
1.3	19/07/2020	Minor change to incorporate a jumper to enable 4Discovery modules to have their ESP WiFi programmed. No change to standard functionality.

## 8. Datasheet Revision History

Revision Number	Date	Description
1.0	13/09/2017	Initial Draft
1.1	16/11/2017	Updated the Mechanical Dimensions
1.2	20/11/2017	Formatting change
1.3	29/11/2017	Formatting Change
1.4	09/04/2018	Addition of headers
1.5	05/03/2019	Cosmetic Changes to 4D-UPA Datasheet
1.6	17/12/2020	Minor changes and addition of REV 1.3 hardware information
1.7	23/06/2021	Minor addition of references to Pixxi-44 IO numbering, as its different to Pixxi-28 numbering, when mapping to GPIO labels on the UPA. Added images of FPC's.
1.8	28/10/2021	Minor addition regarding Flash and Reset buttons, into the main description

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