



# 4D SYSTEMS

TURNING TECHNOLOGY INTO ART

## Intelligent Display Modules



### Intelligent Display Modules

The 4D Systems' Intelligent Display Modules can be integrated into a variety of different applications via a wealth of features designed to facilitate any given functionality quick and cost effectively, thus reducing time to market. All the 4D Systems Intelligent Display Modules integrate the easy-to-learn-and-use 4D Graphics Language (4DGL) that allows rapid application development with its vast built-in library function.

### Codeless Designer

A visual programming experience, called ViSi, enables drag-and-drop type placement of objects to assist with 4DGL code generation and allows the user to visualise how the display will look while being developed.

## Single Chip Graphics Solutions

### Graphics Processors

The 4D Systems' GOLDELOX and PICASO graphics processors bring a new and exciting concept to the industry. Both processors are fully configurable and will interface with the majority of popular LCD and OLED displays by implementing a set of integrated high-level graphics and I/O functions.

### Graphics Oriented Programming

The 4DGL language has been designed to facilitate the rapid development of graphic oriented applications for the PICASO and GOLDELOX processors without the need for a separate host controller and serial command interface.

[www.4dsystems.com.au](http://www.4dsystems.com.au)



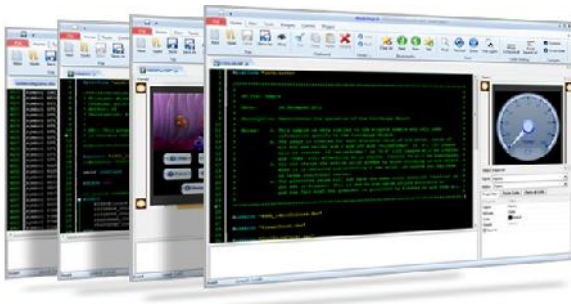
# Software

## Workshop4 IDE - Free Development Environment



## Visual programming with ViSi Genie

ViSi-Genie is the latest breakthrough, offers truly 'codeless' style of display configuration and programming



## Ease of Use

Workshop4 has been upgraded with a completely new look and feel, with logical sequence of steps to start new projects, along with clean programming environments



## Workshop4 Ribbon

Workshop4 features a Ribbon at the top, reducing clutter and allowing logical grouping of functions.



## Clear Documentation

All new documentation has been produced for the new and current 4D System modules and Software. Documents are up to date, clean and easy to use.



## ZIP Project

Workshop4 projects can be easily zipped up and transported to another PC or sent via e-mail. The new Zip Project feature, saves the hassle of hunting out the files in Windows Explorer.

# Workshop4 IDE – Free Development Environment

Workshop4 is a comprehensive software IDE for Microsoft Windows that provides an integrated software development platform for all of the 4D family of processors and modules. The IDE combines the Editor, Compiler, Linker and Downloader to develop complete 4DGL application code. All user application code is developed within the Workshop4 IDE.



Designer

This environment enables the user to write 4DGL code in its natural form to program the display module

Workshop4 includes four development environments, for the user to choose based on application requirements or even user skill level.



ViSi-Genie

An advanced environment that does not require any 4DGL coding at all. It is all done automatically for you. Simply lay the display out with the objects you want (similar to ViSi), set the events to drive them and the code is written for you automatically.



ViSi

A visual programming experience that enables drag-and-drop type placement of objects to assist with 4DGL code generation and allows the user to visualise how the display will look while being developed.



Serial

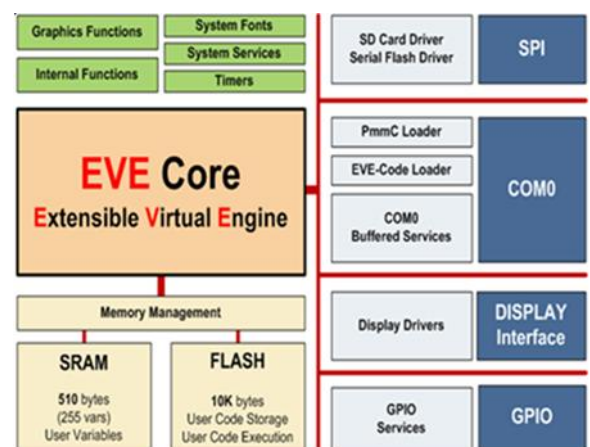
The Serial Environment allows 4D Systems modules to be loaded with a Serial Application, which transforms the module into a Serial Slave to virtually any Serial Host Controller.

# GOLDELOX

## Embedded Graphics Processor

The **GOLDELOX** chip is designed to work with minimal design effort and all of the data and control signals are provided by the chip to interface directly to the display. Simply choose your display and interface it to the GOLDELOX on your application board offers enormous advantage in terms of reduced development time and cost saving takes away all of the burden of low level design.

- Supports 80-Series 8 bit wide CPU interface OLED/LCD displays
- 10KB FLASH Memory, 510Bytes RAM
- EVE uses 1/10th of the code-space compared to most other processor implementations
- 1 x Asynchronous hardware serial port
- Dedicated SPI to communicate with the micro-SD Card
- micro-SD/SDHC card support
- 2 x GPIOs
  - ⇒ Digital Input / Digital Output
  - ⇒ A/D Conversion 8/10 bits
  - ⇒ Dallas 1-Wire Support
  - ⇒ Sound Generation, RTTL Tun
  - ⇒ Joystick – 5 Position Mult -switch
- 1 x 32 bit free running System timer with 1ms resolution
- 4 x 16 bit timers with 1ms resolution
- 128 High Level Internal Functions

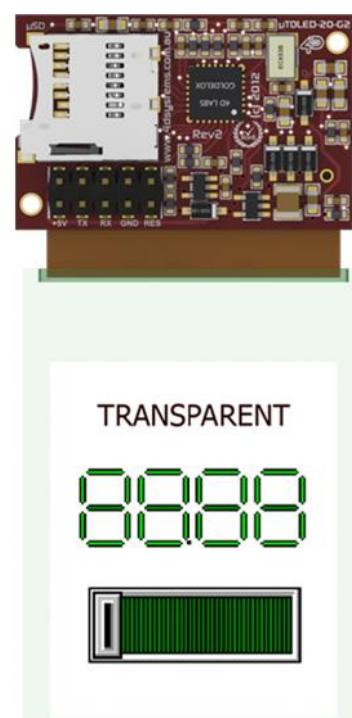


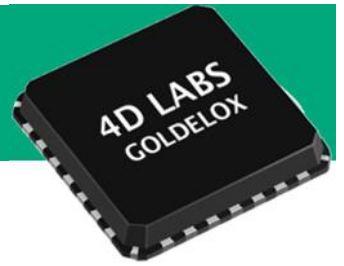
## μTOLED-20-G2

The **μTOLED-20-G2** has an impressive **Transparent 2-inch PMOLED** display that exhibits the power and capabilities of the GOLDELOX process:

Combining a resolution **160x128** pixels with **65K** True to Life colours, the **μTOLED-20-G2** delivers amazing colours and features perfect for any application requiring a transparent intelligent display supports **micro-SD** memory cards via the on-board micro-SD connector. This provides the user with expandable memory space suitable for multi file retrieval; such as images, animations and movie clips, as well as data logging application

Supports up to 2GB micro-SD as well as micro-SDHC memory cards starting from 4GB and above





# Intelligent Display Modules

μOLED-96-G2

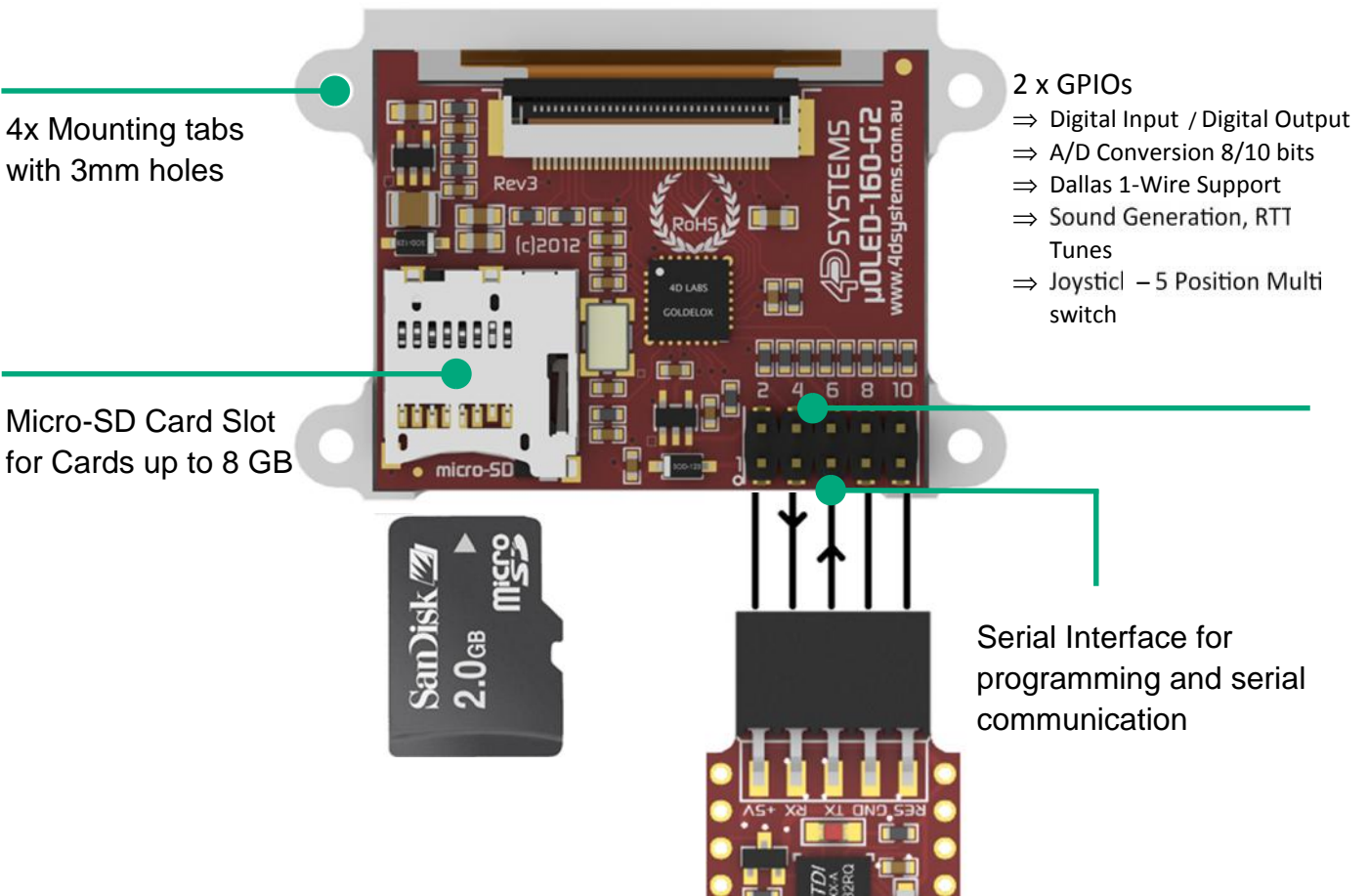
μOLED-128-G2

μOLED-160-G2

μLCD-144-G2



96 x 64 resolution	128 x 128 resolution	160 x 128 resolution	128 x 128 resolution
0.96" diagonal size	1.5" diagonal size	1.7" diagonal size	1.44" diagonal size
OLED			LCD-TFT
65K true to life colours			
2 x GPIO			
Digital I/O ; A/D converter with 8/10 bit resolution ; Complex sound generation ; Dedicated RTTTL tune engine ; Multi-Switch Joystick, Buttons ; Dallas 1-Wire			
Weight ~ 5g	Weight ~11g	Weight ~ 13g	Weight ~ 10g

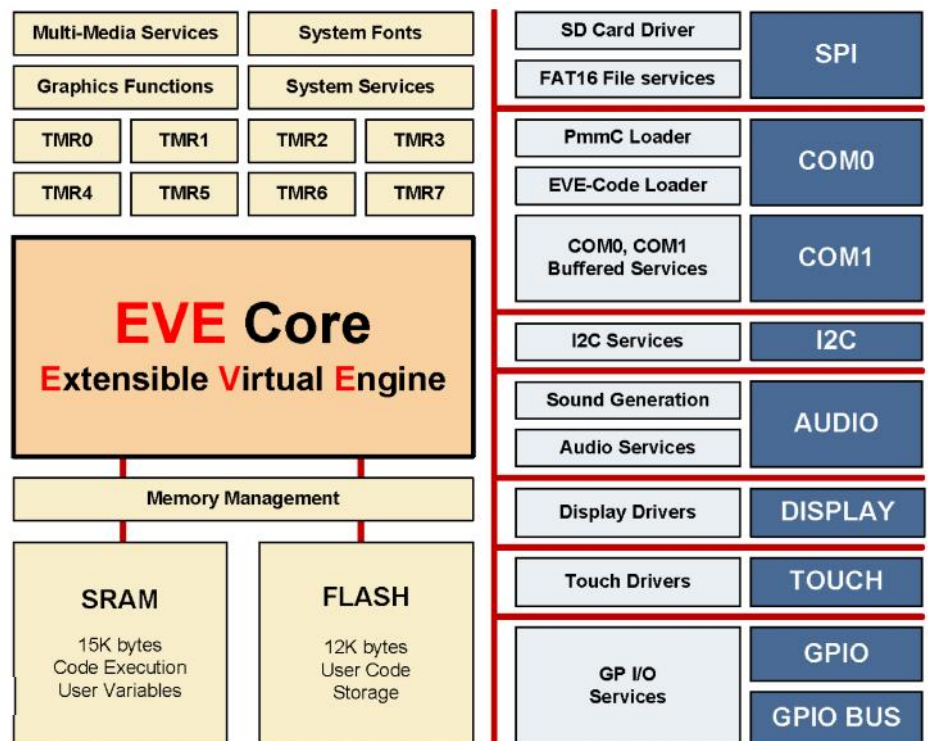


# PICASO

## Embedded Graphics Processor

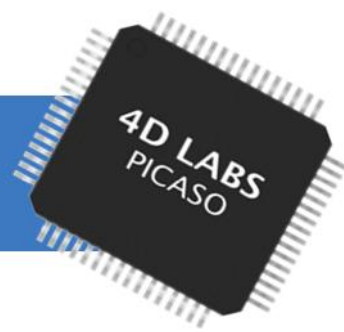
The **PICASO** chip is designed to work with minimal design effort and all of the data and control signals are provided by the chip to interface directly to the display. Simply choose your display and interface it to the **PICASO** on your application board. This offers enormous advantage in terms of reduced development time and cost saving and takes away all of the burden of low level design.

1. Supports 80-Series 16 bit wide CPU interface OLED/ LCD displays
2. 14KB FLASH Memory, 14KB RAM
3. EVE uses ~1/10th of the code-space compared to most other processor implementations
4. 2 Asynchronous hardware serial ports
5. Dedicated SPI to communicate with the micro-SD Card
6. micro-SD/SDHC card support
7. DOS compatible file access (FAT16)
8. Dedicated 16-bit PWM audio output to play WAV files
9. 4-Wire Resistive Touch panel interface
10. I<sup>2</sup>C Communication Bus



### Application:

- General purposes embedded graphics
- Elevator control systems
- Point of sale terminals
- Electronic gauges and meters
- Test and measurement and general purpose instrumentation
- Industrial control and Robotics
- Automotive system displays
- GPS navigation system
- Medical applications
- Home appliances
- Smart Home Automatic
- Security and Access control systems
- Gaming equipment



# Intelligent Display Modules

uLCD-24PTU

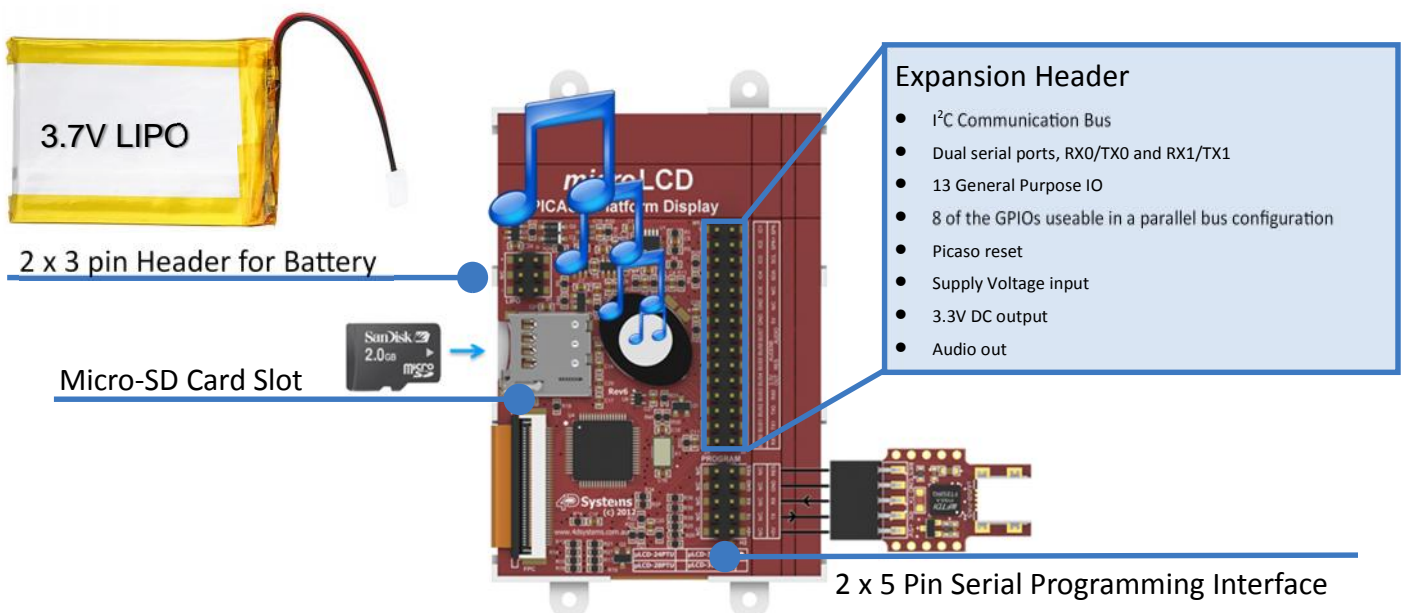
uLCD-28PTU

uLCD-32PTU

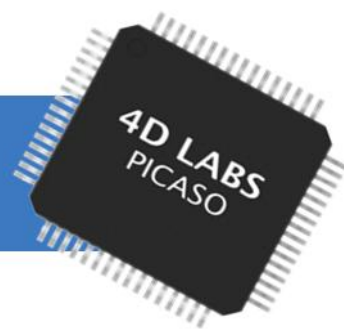
uLCD-32WPTU



240 x 320 VGA resolution		240 x 400 VGA resolution	
2.4" LCD-TFT display	2.8" LCD-TFT display	3.2" LCD-TFT display	3.2" Wide LCD-TFT display
Integrated 4-Wire Resistive Touch Panel			
65K true to life colours			
Lithium Polymer battery support, with built in battery charger and automatic change-over			
Weight ~ 34g	Weight ~ 43g	Weight ~ 50gm	Weight ~ 50gm



# PICASO



## μLCD-43 [P/PT/PCT]

The **μLCD-43** serves as the perfect solution to be deployed at the forefront of any product design, requiring a brilliance of colour, animation or images on a 4.3" widescreen display

An extensive range of hardware and software peripherals have been integrated into the design, to give the user freedom to adapt the module to suit almost any application

- ⇒ μLCD-43-P (Non Touch version)
- ⇒ μLCD-43-PT (Resistive Touch version)
- ⇒ μLCD-43-PCT (Capacitive Touch version)

Features include a 4.3" TFT 480x272 touch screen display, audio, micro-SD card connector, an expansion port along with a series of GPIO, I<sup>2</sup>C pins and serial comms.



## μVGA-III

The μVGA-III is an Intelligent VGA Graphics Engine packed with plenty of features, ready to become the GUI for your next target application

It is the perfect choice for many applications that require a front end smart graphics interface.



- PICASO Graphics Processor
- VGA Interface with cable included
- micro-SD Card Slot
- Dedicated Line-Level PWM Audio Output
- 2 x 5 Pin Serial Programming Interface
- 2 x 15 pin Header for Expansion, on the rear
- DOS compatible file access (FAT16)
- Dual serial UART ports, RX0/TX0 and RX1/TX1
- I2C Communication Bus
- SPI Communication Bus for uSD Storage
- 13 General Purpose IO
- 8 x 16 bit timers with 1ms resolution
- 8 of the GPIOs useable in a parallel bus configuration
- 4 x Mounting Tabs with 3mm holes
- Light Weight at only ~ 17gm



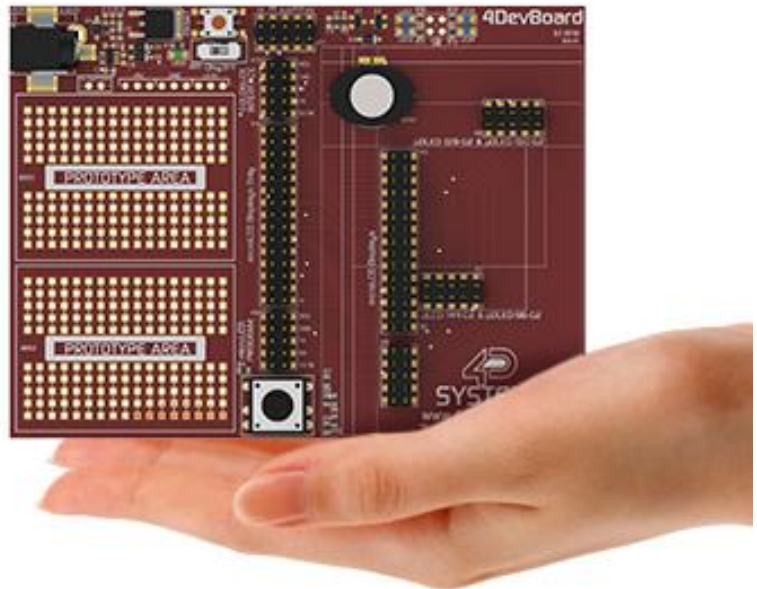
# Development

## 4DevBoard

The 4DevBoard is a compact and low-cost all-in-one development platform for the following display modules:

- uOLED-96-G2
- uOLED-128-G2
- uOLED-160-G2
- uLCD-144-G2
- uLCD-24PTU
- uLCD-28PTU
- uLCD-32PTU
- uLCD-32WPTU

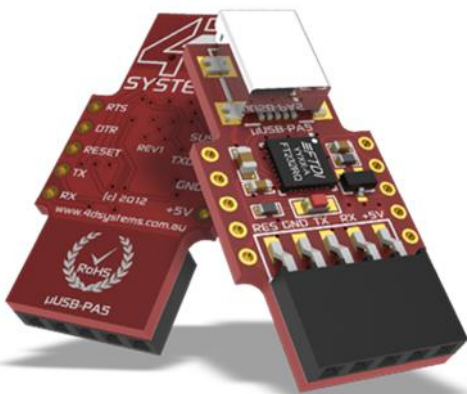
The feature-packed board makes an ideal platform for learning and experimenting with 4D Systems display modules.



## μUSB-PA5

The microUSB Programming Adaptor (μUSB-PA5) is a USB to RS-232 bridge converter. It uses a mini-B type USB connector to connect to your PC and is based on the FTDI FT232RQ.

- USB 2.0 compliant Full Speed 12Mbps
- Hardware or Xon/Xoff handshaking supported
- 300bps to 3Mbps
- Supports Windows, MAC and Linux
- -40 to +85 deg C temp range



## 4D Programming

The 4D Programming Cable is a USB to Serial-TTL UART converter cable. It incorporates the Silabs CP2102 USB to Serial UART bridge.

- USB 2.0 compliant Full Speed 12Mbps
- Hardware or Xon/Xoff handshaking supported
- 300bps to 1Mbps
- Supports Windows, MAC and Linux
- -40 to +85 deg C temp range



## Arduino Display Modules and Shields

The 4Display-Shields provide an easy way of interfacing 4D Systems display modules to the Arduino-Duemilanove/Duo, the Arduino-Mega and many other Arduino compatible boards. Even libraries are provided and ready to use. Embedding a graphical user interface to your Arduino Project has never been easier!



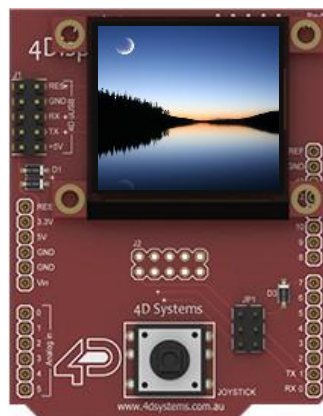
Arduino Libraries for Picaso and Goldelox available!

### 4Display-Shield



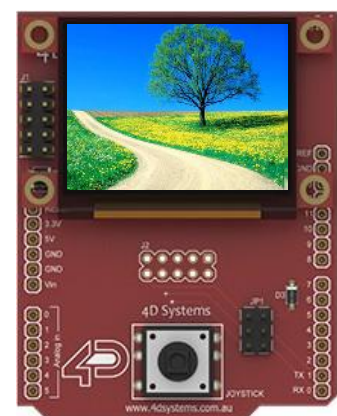
- 0.96" OLED Display
- 96 x64 pixel resolution

### 4Display-Shield-128



- 1.5" OLED Display
- 128x128 pixel resolution

### 4Display-Shield-160



- 1.6" OLED Display
- 160x128 pixel resolution

### 4Display-Shield-144



- 1.44" LCD Display
- 128x128 pixel resolution

### 4Display-Shield-22



- 2.2" LCD-TFT Display
- 176x220 pixel resolution
- Resistive Touch
- SPI interface

### 4DLCDM-22



- 2.2" LCD-TFT Display
- 176x220 pixel resolution
- Resistive Touch
- SPI interface
- For Arduino Mini only

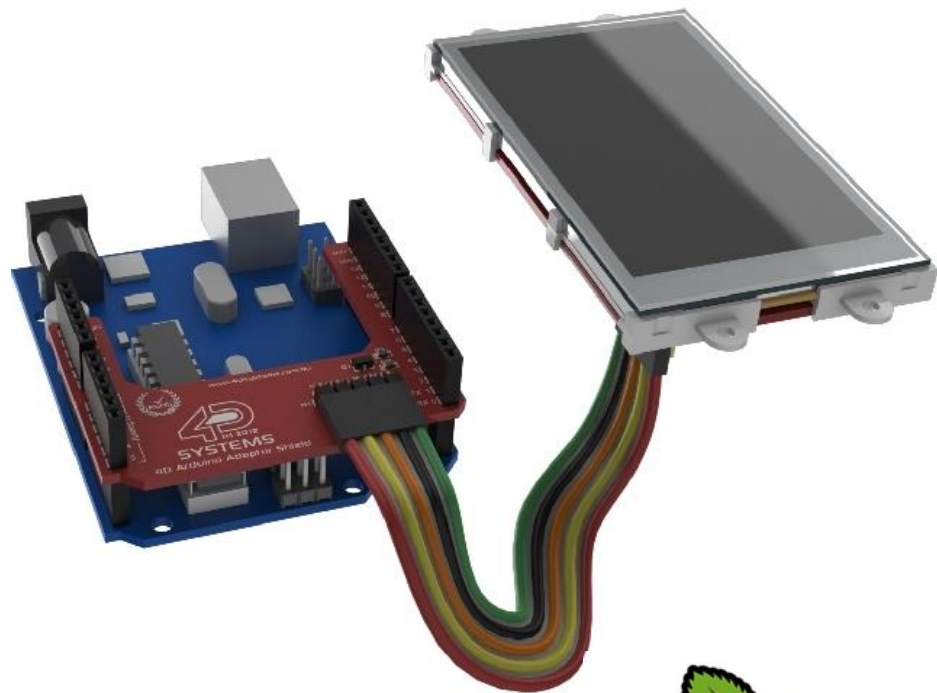
# Adapter



## Arduino Adaptor Shield

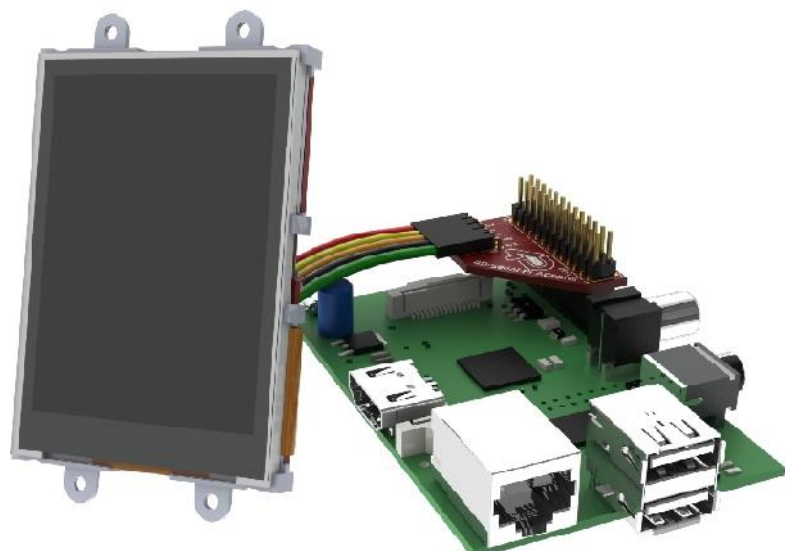
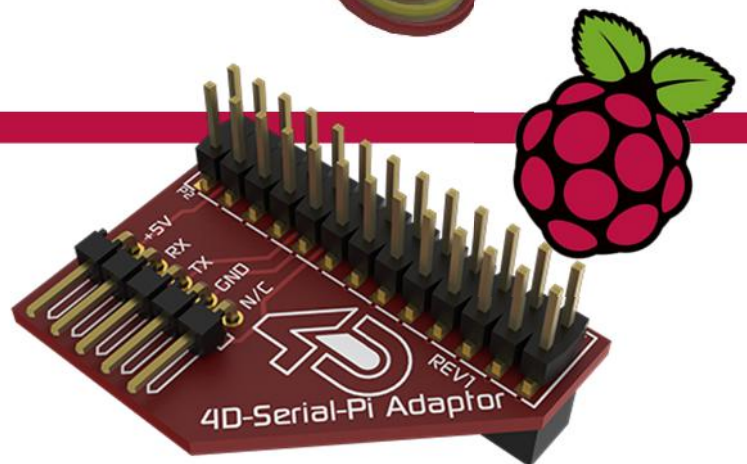
The 4D Arduino Adaptor Shield is a simple Arduino Shield designed to provide a serial interface in a convenient form-factor, enabling the Arduino to connect to a majority of the 4D Systems display modules with a single 5 pin connection. The Adaptor Shield is compatible with many popular shields, and utilises the Serial Port, along with a single Digital pin from the Arduino.

Compatible with all 4D System Display Modules



## 4D Serial Pi Adaptor

The 4D Raspberry Pi Serial Adaptor Shield is a simple adaptor board designed to provide a serial interface in a convenient form-factor, enabling the Raspberry Pi to connect to all of the 4D Systems display modules with a single 5 pin connection. The Adaptor features a pass through header design, enabling existing Raspberry Pi products to connect to the Raspberry Pi, as if this adaptor was not installed. The 4D Serial Pi Adaptor utilises only the serial port on the Raspberry Pi. A comprehensive ViSi-Genie library is provided to communicate with the Raspberry Pi, allowing the ViSi-Genie events to be easily understood by the Raspberry Pi and the user's code.





	GOLDELOX					PICASO				
<b>Module</b>	HOLED-96-G2	HOLED-128-G2	HOLED-160-G2	µLCD-144-G2	µTOLED-20-G2	µLCD-24PTU	µLCD-28PTU	µLCD-32PTU	µLCD-32WPTU	µLCD-43 P/PT/PCT
Display size	0.96"	1.5"	1.7"	1.44"	2"	2.4"	2.8"	3.2"	3.2"	4.3"
Resolution	96 x 64	128 x 128	160 x 128	128 x 128	128 x 160	240 x 320	240x320	240 x 320	240 x 400	480x272
Brightness		100 cd/m <sup>2</sup>		250 cd/m <sup>2</sup>	60 cd/m <sup>2</sup>	150cd/m <sup>2</sup>	150cd/m <sup>2</sup>	200cd/m <sup>2</sup>	150cd/m <sup>2</sup>	500 cd /m <sup>2</sup>
Current at 5V			180 mA max / 60mA typ			200 mA max	200 mA max	200 mA max	200 mA max	280 mA max
Colours			65K true to life colours			RGB 65K	RGB 65K	RGB 65K	RGB 65K	RGB 65K
Touch			NO			Integrated 4-Wire Resistive Touch Screen				Resistive / Capacitive / Non touch
Microprocessor			Goldelox			16 Bit - Picaso				
Storage Temp			-40°C +80°C			-30°C +70°C				
Operation Temp			-35°C to +75°C			-15°C to +65°C				
RoHS			YES			YES				
SD Card Slot			YES			YES				
Direct access to SD Card sectors			DOS compatible file access (FAT16 format) as well as low level access to card memory (sectors)			DOS compatible file access (FAT16 format) as well as low level access to card memory (sectors)				
Power			4V – 5.5V DC			4V – 5.5V DC				
Lithium Charger			NO			YES				
Flash			10KB of flash memory for user code storage and 510 bytes of RAM for user variables (255 x 16bit vars) & (plus up to 8GB on SD Card)			14KB of Flash memory for user code storage and 14KB of SRAM for user variables (plus up to 8GB on SD Card)				
I <sup>2</sup> C			Dallas 1Wire			YES				
GPIO			2 GPIO			13 x General Purpose I/O pins. Upper 8 bits can be used as an I/O Bus for fast 8-bit parallel data transfers				
SPI			Used for SD Card Slot			Used for SD Card Slot				
Codeless programming			YES			YES				
One IDE for all fuctions			YES			YES				
Serial speed			300 baud to 600K baud			300 baud to 600K baud				
Serial Interfaces			1			2				
8-bit parallel data transfers			NO			YES				
Adapter to Raspberry PI			YES			YES				
Adapter to Arduino			YES			YES				

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