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 quickly and cost effectively, thus reducing time to market. All the 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 function.

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.
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.

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.

Workshop4 Ribbon

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

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.

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

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

**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.
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 boar 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 Mul – 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 mov 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

<table>
<thead>
<tr>
<th>Model</th>
<th>Resolution</th>
<th>Size</th>
<th>Colour</th>
<th>GPIOs</th>
</tr>
</thead>
</table>
| uOLED-96-G2 | 96 x 64 resolution | 0.96"      | OLED          | 2 x GPIOs:
|             |                  | diagonal   |               | 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 |
| uOLED-128-G2| 128 x 128 resolution | 1.5"      | LCD-TFT       |                                           |
| uOLED-160-G2| 160 x 128 resolution | 1.7"      |               |                                           |
| uLCD-144-G2 | 128 x 128 resolution | 1.44"      |               |                                           |

- 4x Mounting tabs with 3mm holes
- Micro-SD Card Slot for Cards up to 8 GB
- Serial Interface for programming and serial communication
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 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. I²C Communication Touch 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 Robots
- Automotive system displays
- GPS navigation systems
- Medical applications
- Home appliances
- Smart Home Automation
- Security and Access control systems
- Gaming equipment
Intelligent Display Modules

**uLCD-24PTU**  **uLCD-28PTU**  **uLCD-32PTU**  **uLCD-32WPTU**

<table>
<thead>
<tr>
<th>Display Size</th>
<th>Resolution</th>
<th>Touch Panel</th>
<th>Colors</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.4&quot; LCD-TFT</td>
<td>240 x 320 VGA</td>
<td>Integrated 4-Wire Resistive Touch Panel</td>
<td>65K true to life</td>
<td>~34g</td>
</tr>
<tr>
<td>2.8&quot; LCD-TFT</td>
<td>240 x 400 VGA</td>
<td></td>
<td></td>
<td>~43g</td>
</tr>
<tr>
<td>3.2&quot; LCD-TFT</td>
<td></td>
<td></td>
<td></td>
<td>~50g</td>
</tr>
<tr>
<td>3.2&quot; Wide LCD</td>
<td></td>
<td></td>
<td></td>
<td>~50g</td>
</tr>
</tbody>
</table>

Additional Features:
- 3.7V LIPO
- Expansion Header
- Dual serial ports, RX0/TX0 and RX1/TX1
- 13 General Purpose IO
- 8 of the GPIOs useable in a parallel bus configuration
- Picaso reset
- Supply Voltage input
- 3.3V DC output
- Audio out

2 x 5 Pin Serial Programming Interface
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.

Features include a 4.3” TFT 480x272 touch screen display, audio, micro-SD card connector, an expansion port along with a series of GPIO, I²C 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
Shields
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!

- 0.96” OLED Display
- 96 x64 pixel resolution

- 1.5” OLED Display
- 128x128 pixel resolution

- 1.6” OLED Display
- 160x128 pixel resolution

- 1.44” LCD Display
- 128x128 pixel resolution

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

- 2.2” LCD-TFT Display
  - 176x220 pixel resolution
  - Resistive Touch
  - SPI interface
  - For Arduino Mini only
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 popular shields, and utilises the Serial Port, along with a single Digital pin from the Arduino.

Compatible with all 4D Sys 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 to connect to all of the 4D Systems display modules with a single 5 pin connection. The Aapter 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 VI Si-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.
<table>
<thead>
<tr>
<th>Module</th>
<th>Display Size</th>
<th>Resolution</th>
<th>Power</th>
<th>Lithium Charge</th>
<th>Flash</th>
<th>Internal Memory</th>
<th>Microcontroller</th>
<th>Operating Temp</th>
<th>Storage Temp</th>
<th>Serial Interfaces</th>
<th>SD Card Slot</th>
<th>RAM</th>
<th>Current @ 5V</th>
<th>ANY Communication</th>
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</thead>
<tbody>
<tr>
<td>128 x 64</td>
<td>0.9&quot;</td>
<td>96 x 64</td>
<td>100 mAh max / 60mA typ</td>
<td>NO</td>
<td>16K</td>
<td>16 Bit</td>
<td>Goldelox</td>
<td>-40°C to +80°C</td>
<td>40°C to +70°C</td>
<td>200mA max</td>
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<td>16 KB</td>
<td>180 mA max</td>
<td>YES</td>
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<tr>
<td>128 x 128</td>
<td>1.5&quot;</td>
<td>128 x 128</td>
<td>200 mA max</td>
<td>YES</td>
<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
<td>YES</td>
</tr>
<tr>
<td>128 x 128</td>
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<td>128 x 128</td>
<td>200 mA max</td>
<td>YES</td>
<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
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<td>35°C to +75°C</td>
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<td>YES</td>
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<td>128 x 128</td>
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<td>128 x 128</td>
<td>200 mA max</td>
<td>YES</td>
<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
<td>YES</td>
</tr>
<tr>
<td>144 x 144</td>
<td>1.44&quot;</td>
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<td>200 mA max</td>
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<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
<td>YES</td>
</tr>
<tr>
<td>160 x 128</td>
<td>1.7&quot;</td>
<td>160 x 128</td>
<td>200 mA max</td>
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<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
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</tr>
<tr>
<td>188 x 272</td>
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<td>240 x 320</td>
<td>200 mA max</td>
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<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
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<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
<td>0°C to +40°C</td>
<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
<td>200 mA max</td>
<td>YES</td>
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<td>128K</td>
<td>RGB</td>
<td>Goldelox</td>
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<td>35°C to +75°C</td>
<td>200mA max</td>
<td>YES</td>
<td>16 KB</td>
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<td>200mA max</td>
<td>YES</td>
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<td>200 mA max</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Display size:**
- 0.96”
- 1.5”
- 1.7”
- 1.44”
- 2”
- 2.4”
- 2.8”
- 3.2”
- 3.2”
- 4.3”

**Display size:**
- 96 x 64
- 128 x 128
- 160 x 128
- 128 x 128
- 128 x 160
- 240 x 320
- 240 x 320
- 240 x 320
- 240 x 400

**Brightness:**
- 100 cd/m²
- 250 cd/m²
- 60 cd/m²
- 150 cd/m²
- 150 cd/m²
- 200 cd/m²
- 150 cd/m²
- 500 cd/m²

**Current at 5V:**
- 180 mA max / 60mA typ
- 200 mA max
- 200 mA max
- 200 mA max
- 200 mA max
- 280 mA max

**Colors:**
- 65K true to life colors
- RGB
- 65K
- RGB
- 65K
- RGB
- 65K
- RGB
- 65K

**Touch:**
- NO
- Integrated 4

**Microprocessor:**
- Goldelox
- Picaso

**Storage Temp:**
- -40°C to +80°C
- 30°C to +70°C
- 35°C to +75°C
- 15°C to +65°C

**SD Card Slot:**
- YES
- YES
- YES

**Direct access to SD Card:**
- YES
- YES
- YES

**DOS compatible File access:**
- YES
- YES
- YES

**DOS compatible file access:**
- YES
- YES
- YES

**Display access:**
- YES
- YES
- YES

**File access:**
- DOS file access (FAT16 format)

**Codeless programming:**
- YES
- YES
- YES

**Serial speed:**
- 300 baud to 600K baud

**Serial Interfaces:**
- 8-bit parallel data transfers
- Adapter to Raspberry Pi

**GPIO:**
- 2 GPIO

**Parallel Interface:**
- 8-bit parallel data transfers

**I²C Dallas 1wire:**
- 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)

**Lithium Charger:**
- NO
- YES

**Adapter to Arduino:**
- YES
- YES

**Adapter to Raspberry Pi:**
- YES
- YES

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