4D SYSTEMS
TURNING TECHNOLOGY INTO ART

*gen*4 Arduino Display Module Kits
All gen4 sizes (Picaso and Diablo16)

Compatible with:

2.4", 2.8", 3.2", 3.5", 4.3", 5.0" and 7.0" Picaso and Diablo16 gen4 Display Modules

DATASHEET

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Contents

gen4 Arduino Display Module Kits – AR Kits

1. Description

This datasheet covers all -AR kits (Arduino Kits) for the gen4 range of Intelligent Display modules, for all sizes. It is an overview only, and specific information about the gen4 Display Module or the parts in the kit, can be found in their individual datasheets.

An Arduino kit is a normal gen4 display module, such as a gen4-uLCD-32DT, which has been kitted with an Arduino Adaptor Shield and a few other accessories (listed below), to make connection to an Arduino board simple.

In a typical -AR kit will be the following parts:
- Gen4 Intelligent Display Module
- Arduino Adaptor Shield
- 30-way FFC cable
- Gen4-IB (Interface Board)
- 5-way Interface Cable

Starter Kits are also available, which include a microSD card and Programming Adaptor, which extend the functionality of the kit significantly.

The Arduino Adaptor Shield is a simple shield which fits directly on top of your favourite Arduino board, and provides a simple 5-way interface to the 4D display module.

The 30-way FFC cable is used to connect the gen4 Display Module to the gen4-IB.

The 5-way Interface Cable is used to connect the gen4-IB to the Arduino Adaptor Shield.

The gen4 display modules can be configured in a number of ways using the 4D Systems Workshop4 IDE. There are 4 different environments available in the Workshop4 IDE, allowing you to have the gen4 Display Module as a slave which takes commands from your Arduino, though to programming the display module directly and designing advanced graphics which interface to the Arduino.

Communication to the Display Module is performed via the Arduino's hardware serial port. On some Arduinos, there is only 1 serial port available which is utilised for the USB port and IDE serial monitor. This can be used, however software serial is also possible with a simple jumper change, allowing the hardware serial to be utilised for logging, diagnostics and programming of the Arduino itself.

A single digital on the Arduino is utilised for an external reset for the display. Please refer to the Arduino Adaptor Shield datasheet for more info.

Power for the display is supplied from the Arduino's 5V bus. In most cases, no external power is required for the Display Module as all power is supplied from the Arduino, via the Adaptor Shield. The Arduino DC Jack may be required to supply the Arduino with power if the USB supply of the PC is insufficient.

In some cases, the display may be required to be powered separately to the Arduino, which the Arduino Adaptor Shield allows. Some Arduino boards have very small 5V regulators on board, and these are not sufficient to power some of the gen4 display modules, even if a DC Barrel jack is used into the Arduino. Please refer to the Datasheet for the 4D Arduino Adaptor Shield for more information.

As detailed on the next page, the gen4-IB board is a simple interface that converts the 30-way FFC cable into the 5 signals used for the Arduino interface. The remaining signals from the gen4 display module are not accessible through this interface board. If a Starter Kit (SK) is purchased, then a gen4-PA (Programming Adaptor) board is included, which is a USB programmer for the gen4 range of display modules, and also breaks out all of the signals from the display.

If you have existing 4D Products, and have a uUSB-PA5 or uUSB-PA5-II, or even a 4D Programming Cable, then you can use these programming devices via the gen4-IB board supplied with this kit, and program the gen4 display module directly, without the need of a gen4-PA board.

For a detailed listing of the capabilities of the display module in this Arduino Pack, please refer to the datasheet for the display itself, available from the 4D Systems website, www.4dsystems.com.au.

2. Hardware Connection Overview

The following pictures illustrate how to connect the parts of the AR kit together. Note, the display module illustrated below is the gen4-uLCD-24DT. The kit you have will obviously determine what display you have. This is just an example.
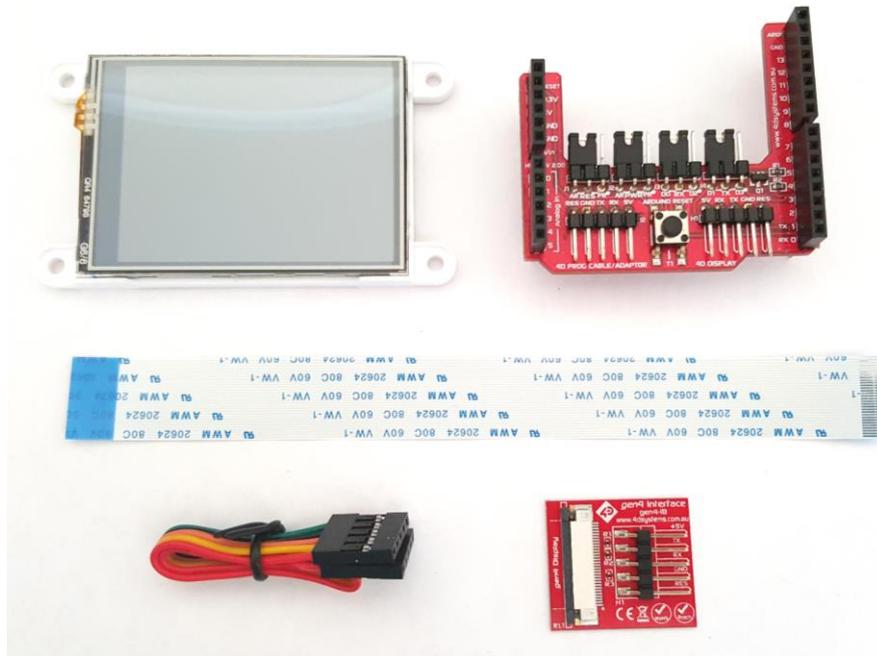

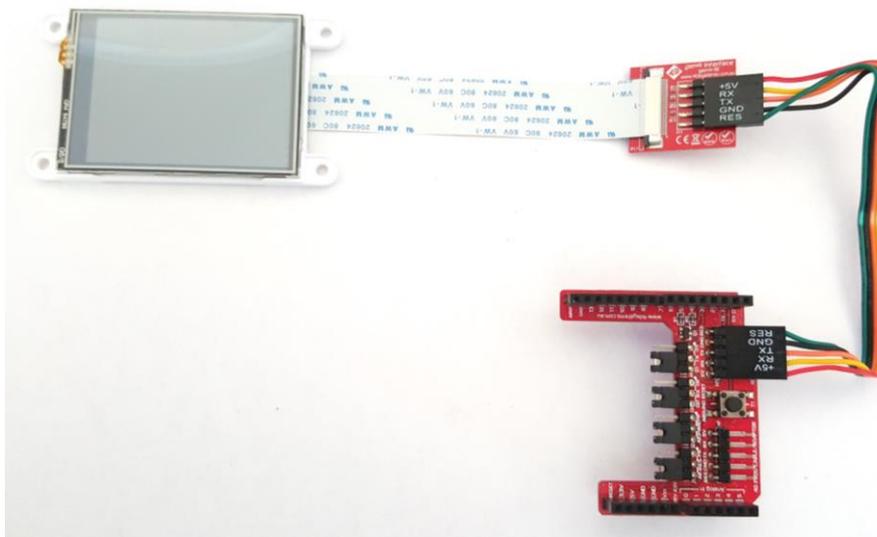Figure 1. Components in a typical gen4 AR Kit.

Figure 2. Components in the AR Kit connected together. Arduino Adaptor Shield shown then connects on top of the customers Arduino board (not included).

gen4 Arduino Display Module Kits – AR Kits

3. Advanced Hardware Options

The display module (gen-uLCD-xx) is a very capable and powerful piece of hardware, which can be reconfigured beyond the boundaries of the Arduino.

With the use of the 4D Systems Workshop4 IDE Software, the display module can be configured and programmed independently of the Arduino environment.

If you wish to investigate the capabilities of the gen4 display module and reconfigure the display module, please refer to the Datasheet for that display module specifically, available from the 4D systems website, www.4dsystems.com.au. A lot more information is available inside the display modules datasheet than what is discussed in this datasheet.

You can easily bring the module back to its default factory firmware/configuration by using the Workshop 4 IDE Software.

To take advantage of the 4D Systems Workshop4 Software, a 4D Programming Adaptor is required, which is available from the 4D Systems website, or from a 4D Systems distributor. These are also available in various Starter Kits.

The Workshop4 IDE enables the display module to be configured using 4 different environments.
- The **Designer** environment enables the user to write 4DGL code in its natural form to program the display module.
- A visual programming experience, suitably called **ViSi**, enables click-and-place type placement of objects to assist with 4DGL code generation and allows the user to visualise how the display will look while being developed.
- An advanced environment called **ViSi-Genie** doesn't require any 4DGL coding at all, it is all done automatically for you. Simply lay the display out with the objects you want, set the events to drive them and the code is written for you automatically. ViSi-Genie is a rapid development platform, which can be extended further with the purchase of a Workshop4 Pro license, available from the 4D Systems website.
- A **Serial** environment is also provided to transform the display module into a slave serial module, allowing the user to control the display from any host microcontroller or device with a serial port. This is the default configuration when the display module is shipped.

Designer and **ViSi** allow you to program and write your own protocol to communicate between the Arduino and the Display Module, and write 4DGL code directly into the display module to create advanced GUI's and graphics.

ViSi-Genie has a set protocol as outlined in the documentation associated with it (Available from the Workshop4 Product page of the website), and 4D Systems has developed an Arduino Library specifically for the ViSi-Genie environment, to enable a rapid development platform. The library is available for download from the gen4 display modules AR product page on the 4D Systems Website, www.4dsystems.com.au.

The **Serial** environment loads an application (SPE) onto the display module which enables commands from the Arduino to communicate directly with the display module and get it to perform specific actions. 4D Systems has developed a library specifically for this environment also, which is available for download from the gen4 display modules AR product page on the 4D Systems Website, www.4dsystems.com.au.

4. Hardware Revision History

Revision Number	Date	Description
0.1	xx/xx/2015	Internal Use Only
1.0	27/01/2016	Initial Public Release Version

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