uLCD-43P Series

uLCD-43P (Non-touch)

uLCD-43PT (Resistive touch)

uLCD-43PCT (Capacitive touch) [Legacy]

Datasheet

Contents

1. Overview

The **uLCD-43** is an impressive yet cost-effective Intelligent Display Module packed with features, ready to become the GUI for your target application, and capable of being a stand-alone interface controller.

Embedded at the heart of the design is the **PICASO** processor, which is driven by a highly optimised virtual core engine called **EVE** (Extensible Virtual Engine). 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.

The display module is an elegant combination of a **4.3" 480x272** pixel **65K** True colour LCD Screen, audio amplifier and speaker, micro-SD card connector, along with a group of general purpose input/ output pins (GPIOs), including I2C and serial UART communications.

This display module serves as a perfect solution to be deployed at the forefront of any product design, requiring a brilliance of colour, animation, video or images on any application. This **PICASO**-driven Intelligent Display Module is a perfect example of where art meets technology.
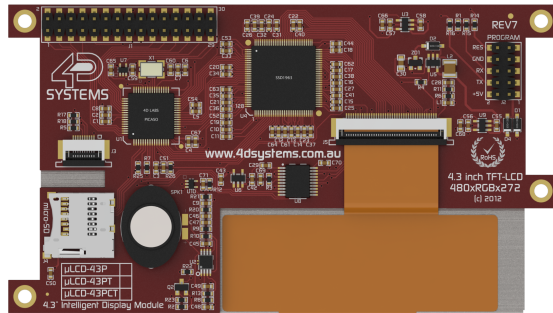
Audio support provided on the display module is supplied by the **PICASO** processor, an onboard audio amplifier and an 8Ω speaker. A simple instruction enables the user to play audio files while continuing the execution of the user application code, such as display updates, touch recognition, communications and much more.

The **microSD** card slot provides the user with expandable memory space suitable for multimedia file retrieval, including images, animations and movie clips, as well as data logging applications.

The module can be programmed in its native 4DGL language (similar to C), using the Workshop4 IDE software tool suite, or it can be configured as a serial slave device to use with your favourite host controller. Freedom is at your fingertips with the intelligent **uLCD-43** display module.

2. Description

The uLCD-43 module demonstrates class and finesse in the microLCD range, featuring a 4.3"
480x272 screen resolution that is the ideal size for displaying detailed graphics for many interactive
touch applications.

Driving the display and peripherals is the PICASO processor, a very capable and powerful chip that
enables stand-alone functionality, programmed using the 4D Systems Workshop4 IDE Software. The
Workshop IDE enables graphic solutions to be constructed rapidly and with ease due to its design
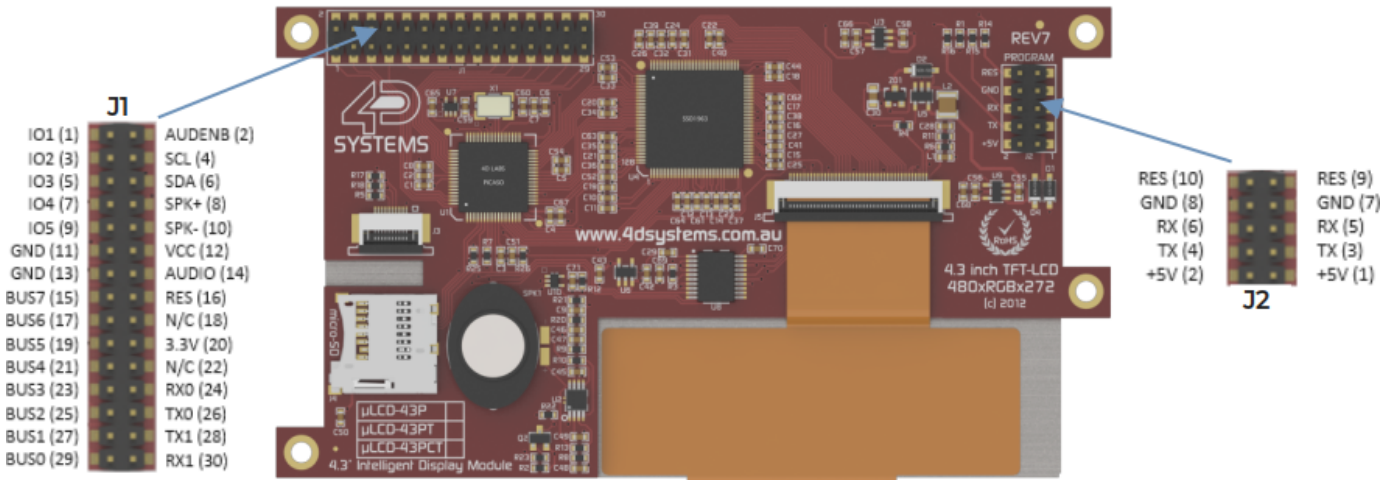being solely for 4D graphics processors.

The module has an array of features including PWM for Sound, Touch Detection, micro-SD memory
storage, general-purpose I/O, serial UART communications, an I2C interface and multiple timers,
amongst many more features.

3. Features

- Low-cost 4.3" LCD-TFT display graphics user interface solution.

- 480 x 272 VGA resolution, RGB 65K true-to-life colours, TFT screen with integrated 4-Wire Resistive Touch Panel (PT Version only) or Capacitive Touch Panel (PCT Version only).

- Easy 5-pin interface to any host device: VCC, TX, RX, GND, RESET

- Powered by the 4D-Labs PICASO processor (also available as a separate OEM IC)

- 14KB of flash memory for user code storage and 14KB of SRAM for user variables, or 14KB shared user code and program variables.

- 2 x Asynchronous hardware serial UART ports (COM0, COM1), TTL interface, with 300 to 600K baud.

- 1 x I2C interface (Master).

- 8 x 16-bit timers with 1-millisecond resolution.

- 13 x General Purpose I/O pins. Supports fast 8-bit parallel data transfer through Upper 8 bits.

- On-board micro-SD memory card adaptor for multimedia storage and data logging purposes. HC memory card support is also available for cards larger than 4GB.

- DOS-compatible file access (FAT16 format) as well as low-level access to card memory.

- A dedicated PWM Audio pin driven by WAV files from a micro-SD card.

- On-board audio amplifier with a tiny 8Ω speaker for sound generation and WAV file playback.

- Built-in extensive 4DGL graphics and system library functions.

- Display full colour images, animations, icons and video clips.

- Supports all available Windows fonts.

- A 30-pin header for I/O expansion and future plug-in daughter boards.

- 4.5V to 5.5V range operation (single supply).

- Module dimensions: 120.0 x 67.3 x ~15.2mm (including headers, see mechanical drawing).

- Weight ~ 79g.

- Display Viewing Area: 94.04 x 53.86mm.

- 4 x 3.0mm PCB holes for mechanical mounting.

- RoHS Compliant.

4. Pin Configuration and Summary

J2 Pin Outs (Programming Header)

Pin	Symbol	I/O	Description
1,2	+5V	P	Main Voltage Supply +ve input pin. Reverse polarity protected. The range is 4.5V to 5.5V, nominal 5.0V.
3, 4	TX	O	Asynchronous Serial Transmit pin, TTL level. Connect this pin to the Receive (Rx) signal of other serial devices. Used in conjunction with the RX pin for programming this micro LCD. This pin is tolerant up to 5.0V levels.
5, 6	RX	I	Asynchronous Serial Receive pin, TTL level. Connect this pin to the Transmit (Tx) signal of other serial devices. Used in conjunction with the TX pin for programming this micro LCD. This pin is tolerant up to 5.0V levels.
7, 8	GND	P	Supply Ground
9, 10	RES	I	Master Reset signal. Internally pulled up to 3.3V via a 10K resistor. An active Low pulse greater than 2 micro-seconds will reset the module. If the module needs to be reset externally, only use open collector-type circuits. This pin is not driven low by any internal conditions. The host should control this pin via one of its port pins using an open collector/drain arrangement.

✏️ Note

I = Input, **O** = Output, **P** = Power

J1 Pin Outs (I/O Expansion Header)

Pin	Symbol	I/O	Description
1	IO1	I/O	General Purpose Input Output 1 Pin
2	AUDENB	I	Audio Enable for Amplifier - HW REV 9.0 and above. Active High and active by default. Previously Not Connected
3	IO2	I/O	General Purpose Input Output 2 Pin
4	SCL	O	I2C Clock Output
5	IO3	I/O	General Purpose Input Output 3 Pin
6	SDA	I/O	I2C Bidirectional Data
7	IO4/BUS_RD	I/O	General Purpose Input Output 4 Pin / Bus Read
8	SPK+	O	Speaker + output, for connection to an external Speaker, HW REV 9.0 and above. Previously Not Connected.
9	IO5/BUS_WR	I/O	General Purpose Input Output 5 Pin / Bus Write
10	SPK-	O	Speaker - output, for connection to an external Speaker, HW REV 9.0 and above. Previously Not Connected.
11	GND	P	Supply Ground
12	+5V	P	Supply Input +ve, 4.0V to 5.5V, 5.0V Nominal
13	GND	P	Supply Ground
14	AUDIO_OUT	O	RAW Audio Output signal for connection to external filter/amplifier, HW REV 9.0 and above. Previously Not Connected.
15	BUS7	I/O	IO Bus (BUS0..7) bit 7
16	RES	I	Master Reset, Active Low (GND) (Refer J2 Pinout)
17	BUS6	I/O	IO Bus (BUS0..7) bit 6
18	N/C	-	Not connected
19	BUS5	I/O	IO Bus (BUS0..7) bit 5
20	3.3V	I	Regulated 3.3 Volts output, maximum available current 150mA to power external circuitry.
21	BUS4	I/O	IO Bus (BUS0..7) bit 4
22	N/C	-	Not connected
23	BUS3	I/O	IO Bus (BUS0..7) bit 3
24	RX0	I	Asynchronous serial port 0 receive pin. COM0 (same as the RX pin on the J2 Programming Header)
25	BUS2	I/O	IO Bus (BUS0..7) bit 2

Pin	Symbol	I/O	Description
26	TX0	O	Asynchronous serial port 0 transmit pin. COM0 (same as the TX pin on the J2 Programming Header)
27	BUS1	I/O	IO Bus (BUS0..7) bit 1
28	TX1	O	Asynchronous serial port 1 transmit pin. COM1
29	BUS0	I/O	IO Bus (BUS0..7) bit 0
30	RX1	I	Asynchronous serial port 1 receive pin. COM1

> ✏️ **Note**
>
> **I** = Input, **O** = Output, **P** = Power

5. Hardware Interface - Pins

The uLCD-43 provides both a hardware and software interface. This section describes in detail the hardware interface pins of the device.

## 5.1. Serial Ports - COM0, COM1 UARTS

The uLCD-43 has two dedicated hardware Asynchronous Serial ports that can communicate with external serial devices. These are referred to as the COM0 and the COM1 serial ports.

The primary features are:

- Full-Duplex 8-bit data transmission and reception.

- Data format: 8 bits, No Parity, 1 Stop bit.

- Independent Baud rates from 300 baud up to 600K baud.

- Single byte transmits and receives a fully buffered service. The buffered service feature runs in the background capturing and buffering serial data without the user application having to constantly poll any of the serial ports. This frees up the application to service other tasks.
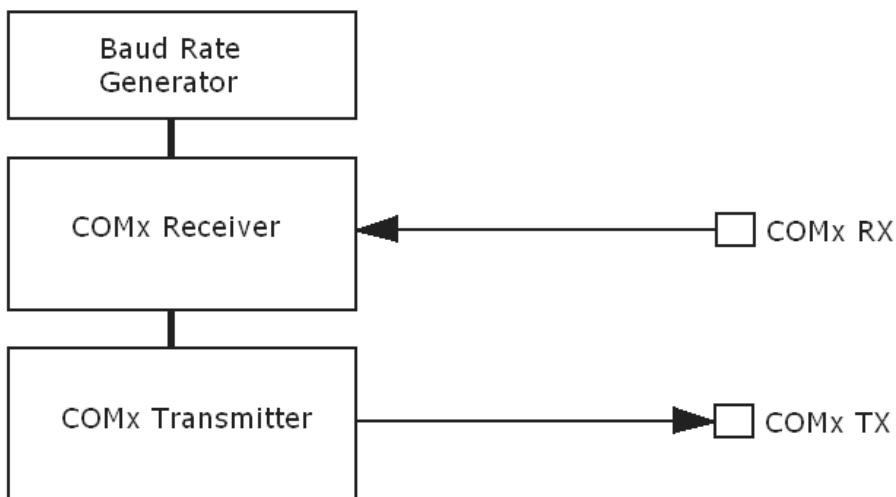
A single-byte serial transmission consists of the start bit, 8-bits of data followed by the stop bit. The start bit is always 0, while a stop bit is always 1. The LSB (Least Significant Bit, Bit 0) is sent out first following the start bit. The figure below shows a single-byte transmission timing diagram.
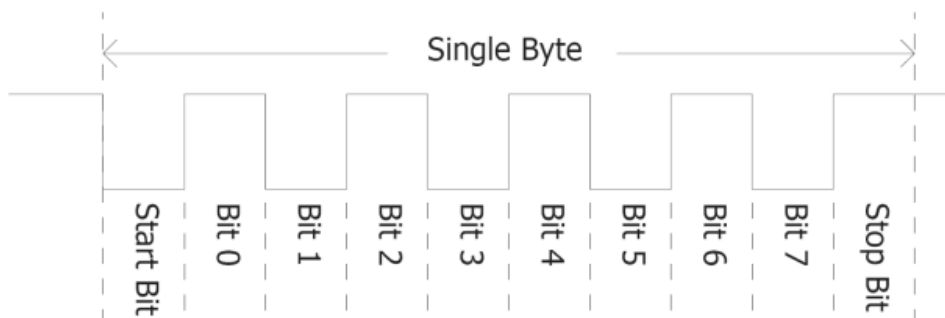
COM0 is also the primary interface for 4DGL user program downloads and chip configuration (PmmC programming). Once the compiled 4DGL application program (EVE byte-code) is downloaded and the user code starts executing, the serial port is then available to the user application. Refer to the PmmC / Firmware Programming section for more details.

TX0 pin (Serial Transmit COM0):

Asynchronous Serial port COM0 transmit pin, TX0. Connect this pin to the external serial device receive (Rx) signal. This pin is 5.0V tolerant.

RX0 pin (Serial Receive COM0):

Asynchronous Serial port COM0 receive pin, RX0. Connect this pin to an external serial device transmit (Tx) signal. This pin is 5.0V tolerant.

TX1 pin (Serial Transmit COM1):

Asynchronous Serial port COM1 transmit pin, TX1. Connect this pin to the external serial device receive (Rx) signal. This pin is 5.0V tolerant.

RX1 pin (Serial Receive COM1):

Asynchronous Serial port COM1 receive pin, RX1. Connect this pin to an external serial device transmit (Tx) signal. This pin is 5.0V tolerant.

5.2. General Purpose I/O

There are 13 general purpose Input/Output (GPIO) pins available to the user. These are grouped as IO1..IO5 and BUS0..BUS7. Power-Up Reset default is all INPUTS.

The 5 I/O pins (IO1..IO5), provide flexibility for individual bit operations while the 8 pins (BUS0..BUS7), known as GPIO BUS, serve collectively for byte-wise operations. The IO4 and IO5 also act as strobing signals to control the GPIO Bus. GPIO Bus can be read or written by strobing a low pulse (50ns duration or greater) the IO4/BUS_RD or IO5/BUS_WR for read or write respectively.

Please refer to the Picaso Internal Functions Manual for detailed information.

IO1-IO3 pins (3 x GPIO pins):

> General purpose I/O pins. Each pin can be individually set for INPUT or an OUTPUT.

IO4/BUS_RD pin (GPIO IO4 or BUS_RD pin):

> General Purpose IO4 pin. Also used for BUS_RD signal to read and latch the data into the parallel GPIO BUS0..BUS7.

IO5/BUS_WR pin (GPIO IO5 or BUS_WR pin):

> General Purpose IO5 pin. Also used for BUS_WR signal to write and latch the data to the parallel GPIO BUS0..BUS7.

BUS0-BUS7 pins (GPIO 8-Bit Bus):

> 8-bit parallel General purpose I/O Bus.

> ✏️ **Note**
>
> All GPIO pins are 5.0V tolerant.

5.3. System Pins

+5V (Module Voltage Input):

J1 pin 12, J2 pins 1/2:

Module supply voltage input pin. This pin must be connected to a regulated supply voltage in the range of 4.5 Volts to 5.5 Volts DC. The nominal operating voltage is 5.0 Volts.

3.3V Out (3.3V Regulated Output):

J1 pin 20:

External circuitry that requires a regulated 3.3V supply can be powered up via this pin. The maximum available current is 250mA (HW Rev 9.0, previously 150mA).

GND (Module Ground):

J1 pins 11/13, J2 pins 7/8:

Device ground pins. These pins must be connected to the ground.

RESET (Module Master Reset):

J1 pin 16, J2 pins 9/10:

Module Master Reset pin. An active low pulse of greater than 2μs will reset the module. Internally pulled up to 3.3V via a 10K resistor. Only use open collector-type circuits to reset the device if an external reset is required.

6. PmmC/Firmware Programming

The PICASO processor used in the uLCD-43 module is a custom graphics processor. All functionality including the high-level commands is built into the chip. This chip-level configuration is available as a Firmware/PmmC (Personality-module-micro-Code) file.

A PmmC file contains all of the low-level micro-code information (analogy of that of a soft silicon) which defines the characteristics and functionality of the device. The ability to program the device with a PmmC file provides an extremely flexible method of customising as well as upgrading it with future enhancements.

A PmmC file can only be programmed into the device via its COM0 serial port. The figure below provides a typical implementation for the PmmC programming interface.
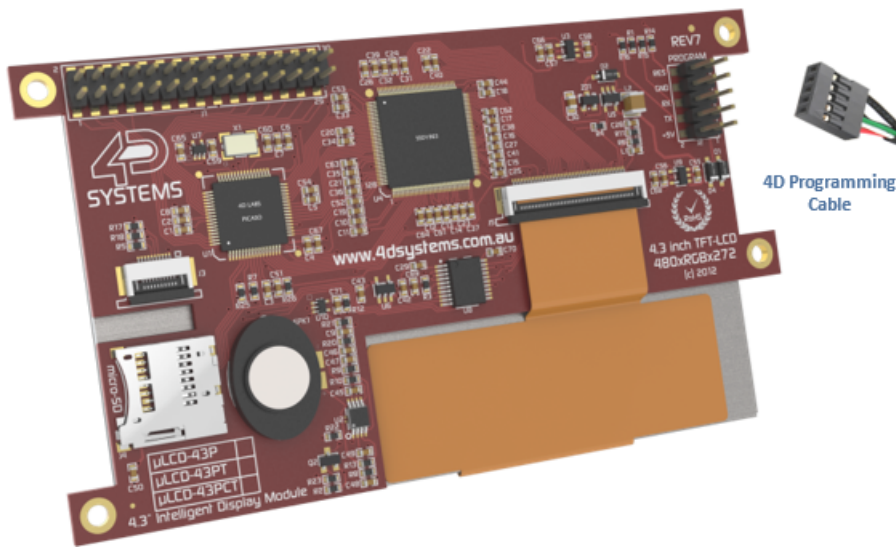
The PmmC file is programmed into the device with the aid of Workshop4, the 4D Systems IDE software (See Workshop4 IDE). To provide a link between the PC and the ICSP interface, a specific 4D Programming Cable is required and is available from 4D Systems.

Using a non-4D programming interface could damage your display, and **void your Warranty**.

7. Module Features

The uLCD-43 module is designed to accommodate most applications. Some of the main features of the module are listed below.

7.1. PICASO Processor

The module is designed around the PICASO Graphics Processor from 4D-Labs.

The PICASO GPU is a smart Controller and the interface to the TFT-LCD displays is almost plug-n-play. All of the data and control signals are provided by the chip to interface directly with the display.

Powerful graphics, text, images, animation and countless more features are built right inside the chip.

For more information read the Picaso Processor datasheet.

7.2. Audio

Audio playback support in the Picaso Processor enables the uLCD-43 to play audio WAV files stored in the micro-SD memory card. PWM audio is generated and made available on the AUDIO pin of the 30-way ZIF connector, ready to interface with an audio amplifier on your application board.

A simple instruction enables the user to play/pause/stop audio files while continuing the execution of the user application code, such as display updates, touch recognition, communications, etc. The audio system also allows real-time pitch change of audio samples.

For a complete list of audio commands please refer to the Picaso 4DGL Internal Functions.

> ✏️ **Note**
>
> The onboard speaker is a small device designed to project into an audio cavity. It is not very loud by itself. To enable louder audio, it is recommended to use a larger external 8Ω speaker.

7.3. SD/SDHC Memory Cards

The Picaso processor uses off-the-shelf standard SDHC/SD/microSD memory cards with up to 2GB capacity usable with FAT16 formatting. For any FAT file-related operations, before the memory card can be used it must first be formatted to FAT16. The formatting of the card can be done on any PC system with a card reader. Select the appropriate drive and choose the FAT16 (or just FAT in some systems) option when formatting. The card is now ready to be used in the Picaso-based application.
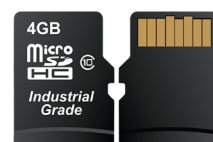
The Picaso processor also supports high-capacity HC memory cards (4GB and above). The available capacity of SD-HC cards varies according to the way the card is partitioned and the commands used to access it.

The FAT partition is always first (if it exists) and can be up to the maximum size permitted by FAT16. Windows 7 will format FAT16 up to 4GB. Windows XP will format FAT16 up to 2GB and the Windows XP command prompt will format FAT16 up to 4GB.

RMPET, a 4D Systems Tool found in the Workshop4 IDE, is capable of repartitioning and formatting microSD cards to be the appropriate type and format for 4D Systems processors. This tool should be used for all cards.

> ✏️ **Note**
>
> - An SPI Compatible SDHC/SD/microSD card MUST be used. Picaso along with other 4D Systems Processors requires SPI mode to communicate with the SD card. If a non-SPI compatible SD card is used, then the processor will not be able to mount the card.
> - Read disturbance is a well-known issue with flash memory devices, such as microSD cards, where reading data from a flash cell can cause the nearby cells in the same memory block to change over time. This issue can be prevented by using industrial-grade microSD cards with read disturb protection. Industrial-grade microSD cards have firmware that actively monitors the read operation and refreshes areas of memory that have high traffic and even move data around to prevent read disturb error from occurring. Furthermore, manufacturers may choose to implement read disturb protection on a specific part of the flash memory only, such that the beginning part of the memory might not be protected. The RMPET utility in Workshop4 is designed to create the first partition at an offset from the start of the microSD card to account for this situation. It is therefore recommended to always partition and format an industrial microSD card using the RMPET utility before using it with 4D Systems processors.
> Many commercial grade cards designed for Cameras etc, do not handle read disturb well at all, and therefore it is always recommended to use an Industrial grade microSD card with 4D modules. 4D offers one that is tried and tested, on our website.

7.4. FAT16

All 4D Systems display modules featuring 4D Labs processors use off-the-shelf standard SDHC/SD/ micro-SD memory cards (SPI Compatible Only) with up to 4GB capacity usable with FAT16 formatting.

For any FAT file-related operations, before the memory card can be used it must first be formatted correctly. Built into Workshop4 is a tool created by 4D, called RMPET (please refer to the Tools menu, in any Environment, inside the Workshop4 IDE). RMPET allows the User to easily partition and format microSD cards, to make their file system ready to be used with 4D Systems modules. The formatting of the card can be done on any PC system with a card reader.

The Picaso Processor also supports high-capacity HC memory cards (4GB and above). The available capacity of SD-HC cards varies according to the way the card is partitioned and the commands used to access it. Refer to the 4D Systems RMPET tool in the Workshop4 IDE.

A Max of 4GB can be used by the FAT16 file system. The FAT partition is always first (if it exists). Any space larger than 4GB will be RAW, and can still be used by your 4D Systems module, using different functions. Please refer to the Application Notes.

8. Display Precautions

- Avoid having to display the same image/object on the screen for lengthy periods. This will cause a burn-in which is a common problem with all types of display technologies. Blank the screen after a while or dim it very low by adjusting the contrast. Better still; implement a screen saver feature.

- Moisture and water can damage the display. Moisture on the surface of a powered display will cause the electrodes to corrode. Wipe off any moisture gently or let the display dry before usage.

- Dirt from fingerprint oil and fat can easily stain the surface of the display. Gently wipe off any stains with a soft lint-free cloth.

- The performance of the display will degrade under high temperatures and humidity. Avoid such conditions when storing.

- Do not tamper with the display flex cable that is connected to the control board. This may affect the connection between the display and the driving circuitry and cause failure.

- Displays are susceptible to mechanical shock and any force exerted on the module may result in deformed zebra stripes, a cracked display cell and a broken backlight

- Always use the mounting holes on the module's corner plates to mount the display.

9. Hardware Tools

The following hardware tools are required for full control of the uLCD-43 module.

9.1. Programming Cable/Adaptor

The 4D Programming Cable and uUSB-PA5 Programming Adaptor are essential hardware tools to program, customise and test the PICASO Processor.

Either the 4D Programming Cable or the uUSB-PA5 Programming Adaptor can be used.

The 4D programming interfaces are used to program a new Firmware/PmmC and for downloading compiled 4DGL code into the processor. They even serve as an interface for communicating serial data to the PC.

The 4D Programming Cable and uUSB-PA5 Programming Adaptor are available from the 4D Systems website.

Using a non-4D programming interface could damage your processor, and **void your Warranty**.

4D Programming Cable
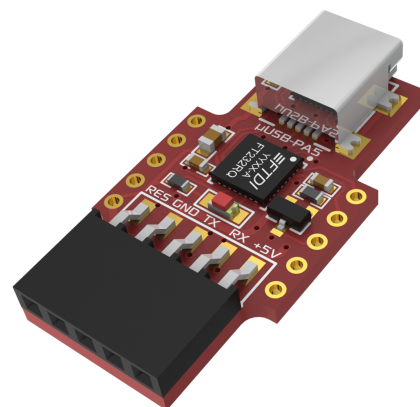
uUSB-PA5-II Programming Adaptor

10. Programming Language

The uLCD-43 uses the PICASO processor, which belongs to a family of processors powered by a highly optimised softcore virtual engine, EVE (Extensible Virtual Engine).

EVE is a proprietary, high-performance virtual machine with an extensive byte-code instruction set optimized to execute compiled 4DGL programs. 4DGL (4D Graphics Language) was specifically developed from the ground up for the EVE engine core. It is a high-level language that is easy to learn and simple to understand yet powerful enough to tackle many embedded graphics applications.

4DGL is a graphics-oriented language allowing rapid application development, and the syntax structure was designed using elements of popular languages such as C, Basic, Pascal and others.

Programmers familiar with these languages will feel right at home with 4DGL. It includes many familiar instructions such as `IF..ELSE..ENDIF, WHILE..WEND, REPEAT..UNTIL, GOSUB..ENDSUB, GOTO,` `PRINT` as well as some specialised instructions `SERIN, SEROUT, GFX_LINE, GFX_CIRCLE` and many more.

- 4DGL Programmers Reference Manual
- Goldelox Internal Functions Manual

To assist with the development of 4DGL applications, the Workshop4 IDE combines a full-featured editor, a compiler, a linker and a downloader into a single PC-based application. It's all you need to code, test and run your applications.

4DGL is available to be written in two of the four environments offered by the Workshop4 IDE, Designer and ViSi. The other two environments, Serial and ViSi-Genie do not directly use 4DGL by the User (Except in Workshop4 Pro, for ViSi-Genie), however, it is present in the background. Serial is an application that runs, and that is written in 4DGL. ViSi-Genie automatically generates 4DGL itself based on what is configured in the GUI.

11. Workshop4 IDE

Workshop4 is a comprehensive software IDE 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 Down-Loader to develop complete 4DGL application code. All user application code is developed within the Workshop4 IDE.


The Workshop4 IDE supports multiple development environments for the user, to cater to different user requirements and skill levels.

- The **Designer** environment enables the user to write 4DGL code in its natural form to program the range of 4D Systems' intelligent displays.

- A visual programming experience, suitably 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.

- 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. This can be extended with additional features when a Workshop4 PRO license is purchased from the 4D Systems website. Extended Advanced features for Visi-Genie are available in the PRO version of WS4. Further details are explained under the Visi Genie section of the Workshop4 documentation.

- A **Serial** environment (aka SPE 'Serial Platform 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 using predefined serial commands.

For more information regarding these environments, refer to the Workshop4 manuals.

The Workshop4 IDE is available from the 4D Systems website.

12. Mechanical Details

Picaso microLCD Display - uLCD-43P/PT/PCT

		NAME	DATE
DRAWN			
CHK'D			
APPV'D			
		JB	28/08/2012
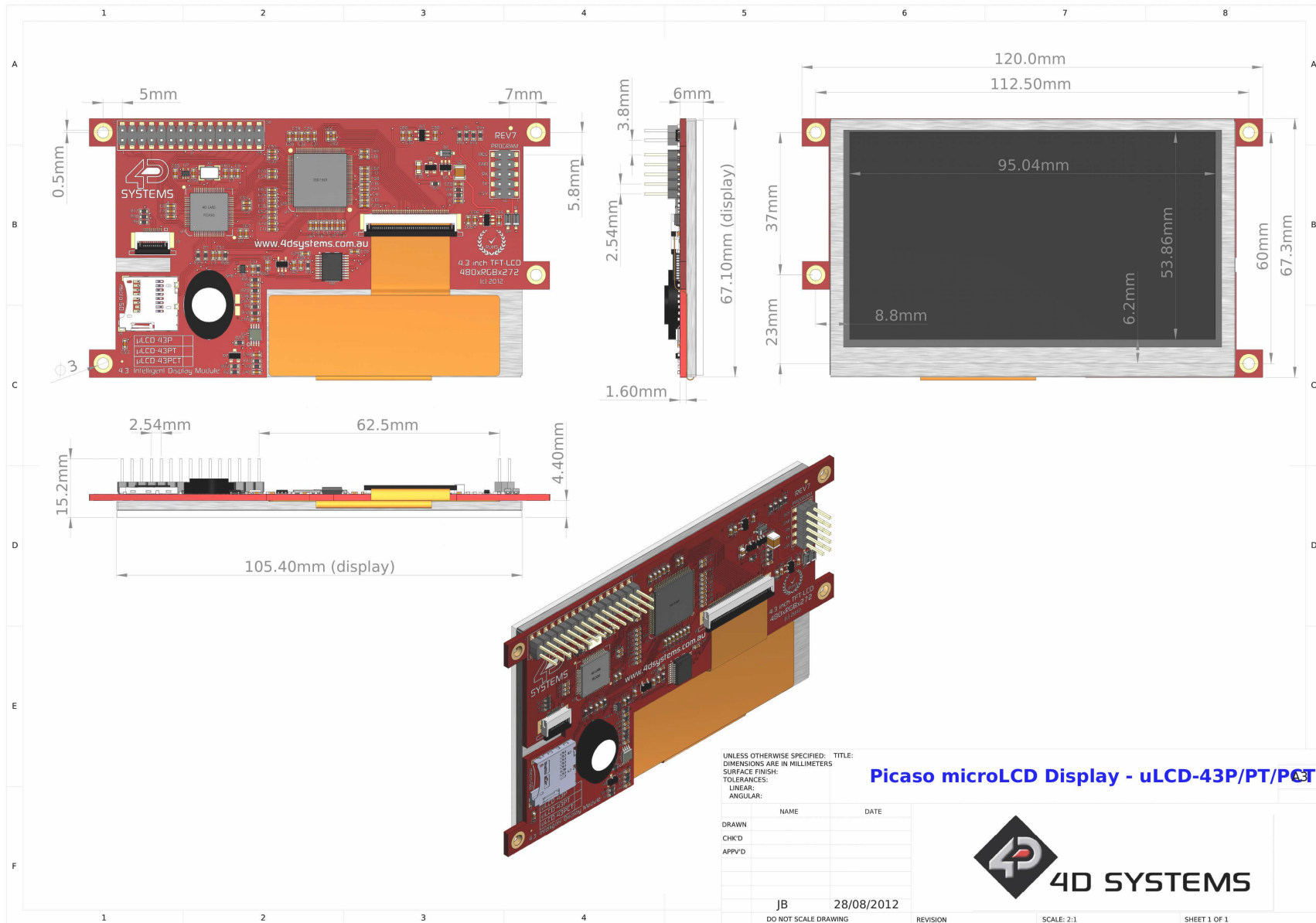
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
   LINEAR:
   ANGULAR:

DO NOT SCALE DRAWING   REVISION   SCALE: 2:1   SHEET 1 OF 1

13. Schematic Diagram

13.1. Revision 9.0
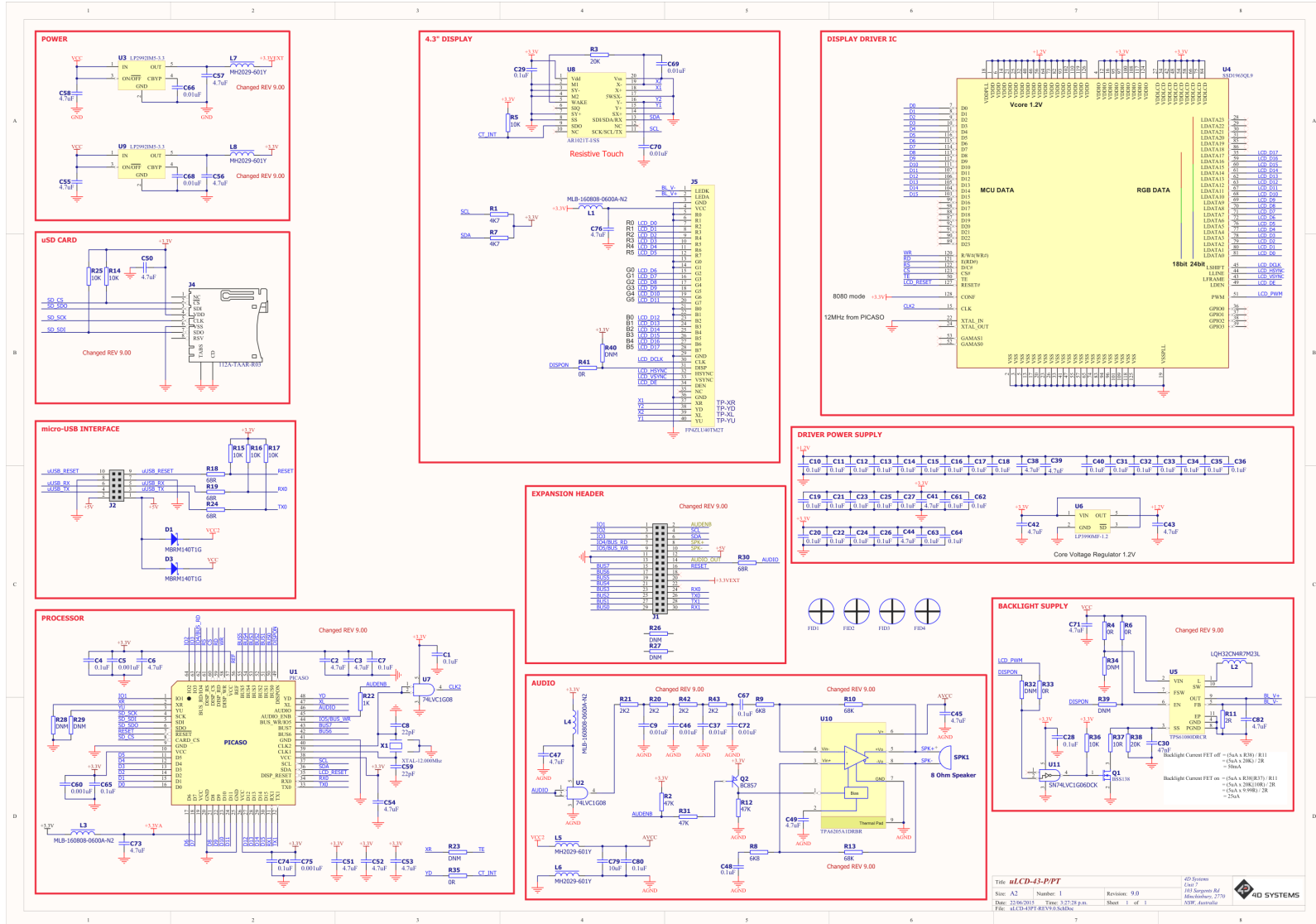
13.2. Revision 10.0

14. Specifications

▦ Absolute Maximum Ratings

Operating ambient temperature	-20°C to +70°C
Storage temperature	-30°C to +80°C
Voltage on any digital input pin with respect to GND	-0.3V to 6.0V
Voltage on SWITCH pin with respect to GND	-0.3V to 6.0V
Voltage on VCC with respect to GND	-0.3V to 6.0V

✎ Note

Stresses above those listed here may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the recommended operation listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

▦ Recommended Operating Conditions

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage (VCC)		4.5	5.0	5.5	V
Processor Voltage (VP)		--	3.3	--	V
Input Low Voltage (VIL)	all pins	VGND	--	0.2VP	V
Input High Voltage (VIH)	non 5V tolerant pins	0.8VP	--	3.3	V
Input High Voltage (VIH)	All GPIO pins, RX0 and TX0 pins	0.8VP	--	5.5	V
Reset Pulse	External Open Collector	2.0	--	--	µs
Operational Delay	Power-Up or External Reset	500	--	3000	ms

Global Characteristics Based on Operating Conditions

Parameter	Conditions	Min	Typ	Max	Units
Supply Current (ICC)	VCC = 5.0V, heavily depends on screen usage conditions, sleep mode	15	230	300	mA
Output Low Voltage (VOL)	VCC = 5.0V, IOL = 3.4mA	--	--	0.4	V
Output High Voltage (VOH)	VCC = 5.0V, IOL = -2.0mA	2.4	--	--	V
Capacitive Loading	All pins	--	--	50	pF
Flash Memory Endurance	PICASO PmmC Programming	--	10000	--	E/W
Display Life	Typical use	30000	--	--	Hours
Touch Screen Endurance (Resistive Touch)	Number of touches/hits with a 12.5mm tip at a rate of 2x per second with 250gf force	--	1M	--	Touches
	Slide stylus on screen, 100gf force, 60mm/s speed with a 0.8mm polyacetal tip stylus pen	--	100K	--	Slides
Touch Screen Transparency	Resistive Touch	82	--	--	%
Touch Screen Operational Force (Resistive Touch)	Only use Finger or Stylus, do not use anything sharp or metal	20	--	100	Gf

⊞ LCD DISPLAY INFORMATION (TN DISPLAY)

Parameter	Conditions	Specification
Display Type	All displays produced before IPS release date in IPS table below, or any modules not specified are therefore TN type displays.	**TN** - TFT Transmissive LCD
Display Size		4.3" Diagonal
Display Resolution		480 x 272 (Landscape/Wide Viewing)
Display Brightness	uLCD-43P (Contrast = 15)	500 cd/m2
	uLCD-43PT (Contrast = 15)	400 cd/m2
	uLCD-43PCT (Contrast = 15)	475 cd/m2
Display Contrast Ratio	Typical	500:1
Display Viewing Angles	Above Centre	70 Degrees
	Below Centre	60 Degrees
	Left of Centre	70 Degrees
	Right of Centre	70 Degrees
Display Viewing Direction		12 O'clock Display (Optimal viewing is from above when in Landscape/Wide mode)
Display Backlighting		2x5 Parallel LED's
Pixel Pitch		0.198 x 0.198mm (Square pixels)
Pixel Density	Number of pixels in 1 row in 25.4mm	128 DPI/PPI

LCD DISPLAY INFORMATION (IPS DISPLAY)

Parameter	Conditions	Specification
Display Type	**uLCD-43P** - Modules produced March 2021 onwards. **uLCD-43PT** - Modules produced from March 2021 onwards.	**IPS** - TFT Transmissive LCD
Display Size		4.3" Diagonal
Display Resolution		480 x 272 (Landscape/Wide Viewing)
Display Brightness	uLCD-43P (Contrast = 15)	600 cd/m2
	uLCD-43PT (Contrast = 15)	510 cd/m2
Display Contrast Ratio	Typical	800:1
Display Viewing Angles	Above Centre	80 Degrees
	Below Centre	80 Degrees
	Left of Centre	80 Degrees
	Right of Centre	80 Degrees
Display Viewing Direction		ALL (wide viewing IPS Display)
Display Backlighting		2x5 Parallel LED's
Pixel Pitch		0.198 x 0.198mm (Square pixels)
Pixel Density	Number of pixels in 1 row in 25.4mm	128 DPI/PPI

15. Revision History

Hardware Revision

Revision Number	Date	Description
7.01	05/02/2013	- Minor improvement to Audio Input signal conditioning - Change in audio speaker used - Removal of J2A header pads - Removal of J2A header pads - Removal of GFX/SGC PCB markings
9.0	14/05/2015	- Audio Amplifier circuitry has been improved to remove background noise. - Additional filtering added on 3.3V supply. - Power circuit has been changed: U3 & U9 are different components now and L7 and L8 have been added. - 30Pin Header 3.3V output can deliver 250mA instead of 150mA. - SD Card circuit has been changed: R26 is now a 10k Pull-Up Resistor, rather than a 1M Pull-Down Resistor. - Additional signals added to the 30-way header to be more in line with signals found on other 4D Products, in place of previously N/C pins. Pins 2, 8, 10, and 14 now have functionality. - Display backlight driver has been changed. - PCB shape and layout changed in a minor way, to be in line with Diablo 4.3". Critical things are still identical in position/size.
10.0	24/05/2017	- Added dual footprints to allow SSD1961 or SSD1963 drivers to be used on this board. Most production will use SSD1961 unless there are supply shortages. Functionality is 99% identical. - Addition of circuitry to aid in EMC hardness. - Some component changes to other brands, no impact to User. - Change of majority of the passives from 0603 to 0402 to bring in line with newer production products, and common components.
	29/01/2020	- Change of 4.7uF 6.3V capacitors to be 10V, to improve longevity.

Datasheet Revision

Revision Number	Date	Description
1.10	13/01/2023	Modified datasheet for web-based documentation

Ordering Information

Order Code:

uLCD-43P - Non Touch

uLCD-43PT - Resistive Touch (least sensitive, best used with stylus touch)

Package: 138mm x 100mm x 30mm

Packaging: Module sealed in antistatic foam padded 4D Systems Box

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[4D Systems](#):
[uLCD-43PCT](#) [SK-43PT-PI](#) [SK-43PT](#) [SK-43PT-AR](#) [uLCD-43PT-Pi](#) [uLCD-43P](#) [uLCD-43PT-AR](#) [uLCD-43PT](#) [uLCD-43](#)