

# Workshop4

**Integrated Development Environment** 

# USER GUIDE

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www.4dlabs.com.au

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# 1. Description

This user guide provides an introduction to Workshop4, the 4D Labs integrated development environment. Workshop4 supports multiple development environments for the user, to cater for different user requirements and skill level.



The **Designer** environment enables the user to write 4DGL code in its natural form to program 4D Labs processors of choice.



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 (PRO however enables 4DGL code for a more powerful user interface), it is all done automatically. Simply lay the display out with the objects required, set the events to drive them and the code is written for the user automatically. ViSi-Genie provides the latest rapid development experience from 4D Labs. (Not available for Goldelox)



A **Serial** environment is also provided to transform display modules powered by 4D Labs processors into a slave serial module, allowing the user to control the display from any host microcontroller or device with a serial port.

Additionally, Workshop4 also offers Arduino compatible environments that allows the user to easily create a project with both a 4D and an Arduino product. More details can be found in <u>Choose Your Arduino Compatible Environment</u>.

To install Workshop4, please refer to the document <u>Workshop4 Installation</u>.



# 2. Workshop4

There is an alias for 4D Workshop on the desktop:

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Dropbox															
Dropbox															
Documents															
Recycle Bin															
5															
Computer	wort	kshop													
_		<b>^</b>													

Launch 4D Workshop by double-clicking on the icon:





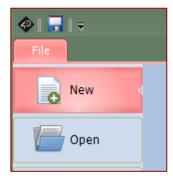
# 3. Create a New Project

Workshop4 opens and displays the Recent page:



To create a new program, there are multiple options:

• Click on the top left-most icon New





- Click on the icon close to Create a new 4D Systems Project on top
- Click on the Create a new Project to create a project instance based on your last project settings.



Note: Another option is displayed on the image above. Create a new 4D Labs Project is an upcoming Workshop4 feature which allows to create a project with a customized display module powered by 4D Labs' processors

Both of the first two options update the main window with the selection of the screen:





Select the screen, here the gen4-uLCD-32DT

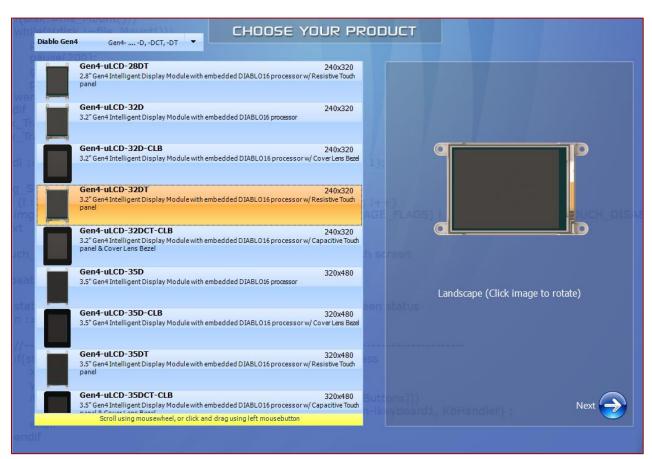


#### The selected screen is displayed:





Orientation is portrait by default. To set it to landscape, just click on the image of the screen to rotate it:



Press Next to proceed:





# 4. Choose Your 4D Environment

The main window now asks for the environment for the project:



Four main environment options are available:

- Designer,
- ViSi,
- ViSi-Genie,
- Serial

...and two editor options:

- Create System File,
- Create Text File.

Each option opens a customised environment with specific commands and controls. Different projects using different modules and environments can be opened simultaneously on Workshop4. The toolbar ribbon will adapt to the project tab that is selected, to suit its environment.



## 4.1. Designer



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

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New	Open	Save	Save As	Print	or Cut	Copy	Paste	X Delete	(D) Undo	Redo	Clear All	) Next	Prev	X Set	Q Find	( Replace	Goto	Find Again	Collapse Al	Expand All	Compile	Comp'nLoad	
		File				Clipb	oard		Undo/	/Redo		Bookm	arks			F	ind		Code	olding	Co	ompile	
▶ 1 2 3 4 5 6 7 8 9 10 11 112 13 14 15 16	<pre>3 4 4 #inherit "4DGL_16bitColours.fnc" 5 6 Func main() 7 8 gfx_ScreenMode(LANDSCAPE); // change manually if orientation change 9 9 9 print("Hello World"); // replace with your code 11 12 12 12 13 1 14 15 1 endfunc </pre>																						
Insert																				Press	F1 for cont	ext sensitive help	

To learn more about Designer, please to refer to the 4DGL Internal Functions Reference Manuals and 4DGL Programmers Reference Manual on the Workshop4 product <u>page</u> and the related application notes on the Application Note <u>page</u>. You can also refer to 4D Systems' <u>application notes</u>.



# 4.2. ViSi



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.

	- 🗆 X
Home View Tools Widgets Comms Project	
Image: Save As       Find       Find<	
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Violviame 1* 🗵	
<pre>placed by platform "Gen4-ulCD-32D1"     // Program Skeleton 1.3 generated 4/25/2017 9:53:31 AM     #inherit "406L_16bitColours.fnc"     #inherit "VisualConst.inc"     #inherit "NollameIConst.inc"     #inherit "NollameIConst.inc"     #unc main()     // var hstrings ; // Handle to access uSD strings, uncomment if required     // var hstrings ; // Handle to access uSD fonts, uncomment if required     // var hstrings ; // Handle to access uSD fonts, uncomment if required     // var hstrings ; // Handle to access uSD fonts, uncomment if required     // var hstrings ; // Handle to access uSD fonts or strings used.     // putstr("Nounting\n");     if (f(if(ie_Nount()))         white((file_Nount()))         white((file_Nount()))         white((file_Nount()))         white((file_Nount()))         wend         endif         endif         endif         endif         endif         endif         // uncomment if transparency required         // gfz_TransparentColour(0x0020); // uncomment if transparency required         // gfz_TransparentColour(NoNomel.dom", "NoNomel.gcn", 1); // Open handle to access uSD fonts, uncomment if required and         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required and         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required and         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if required         // hstrings := file_Open("NoNomel.txf", 'r'); // Open handle to access uSD fonts, uncomment if r</pre>	Form1     (PIS)       Object Inspector     (PIS)       Form Form1     (PIS)       Properties     Face       Face     Face
Inset	Press F1 for context sensitive help

To learn more about ViSi, please to refer to the ViSi User Guide on the Workshop4 product <u>page</u> and the related application notes on the Application Note <u>page</u>. You can also refer to 4D Systems' <u>application notes</u>.



# 4.3. ViSi-Genie



An advanced environment called **ViSi-Genie** doesn't require any 4DGL coding at all, it is all done for the user. By simply laying the display out with the wanted objects and setting the events to drive them, the code is written automatically. ViSi-Genie provides the latest rapid development experience from 4D Labs.

🚸 I 🔜 🗢 Workshop 4 - Ne	Name1*(Gen4-u	ICD-32DT, LANDSCAPE)	– 🗆 X							
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New Open Save Save As Print Save As Print File Build Copy/Load Copy/Load Build	Digits Gauges									
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Form0	Object Inspecto	У	[3]							
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	Color	BLACK								
	Image	(None)								
	Source									
Insert		Press F1 fo	or context sensitive help .;;							

To learn more about ViSi-Genie, please to refer to ViSi-Genie User Guide on the Workshop4 product <u>page</u> and the related application notes on the Application Note <u>page</u>. You can also refer to 4D Systems' <u>application notes</u>.

**Workshop4 PRO** enables advanced features for **ViSi-Genie**, enabling 4DGL code to be used, allowing for increased customisation and flexibility on this already powerful environment. Please refer to the Application Notes for more information on Workshop4 PRO (specifically Genie Magic and Smart Widgets).



# 4.4. Serial



The **Serial** environment is provided to transform the module into a slave serial module, allowing communication and control from virtually any host micro-controller or device with a serial port.

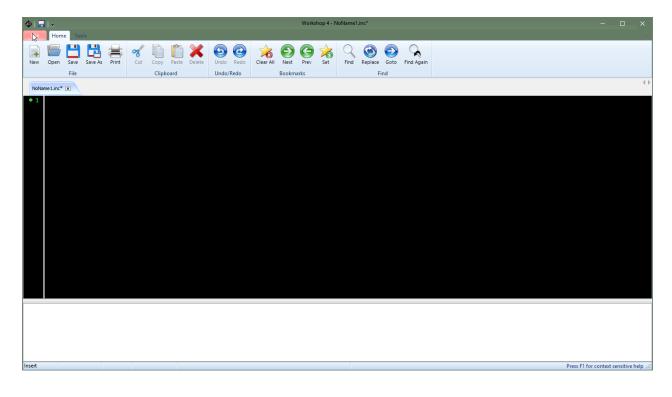
For detail on this environment and steps on how to make your display module run under the Serial environment, please refer to the Serial Command Set Reference Manual on the Workshop4 product <u>page</u> and the related application notes on the Application Note <u>page</u>. You can also refer to 4D Systems' <u>application notes</u>.



# 4.5. Create System File



The **Create System File** option provides an editor for all 4DGL-related projects, so a user can create or edit a 4DGL Include file, 4DGL Library file, a Function or System file. These can then be included in the user's 4DGL code.

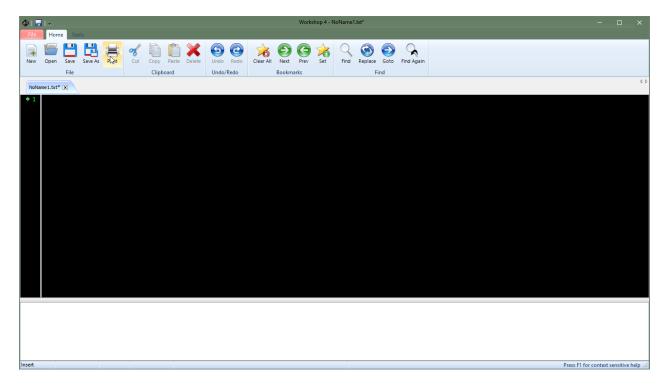




# 4.6. Create Text File



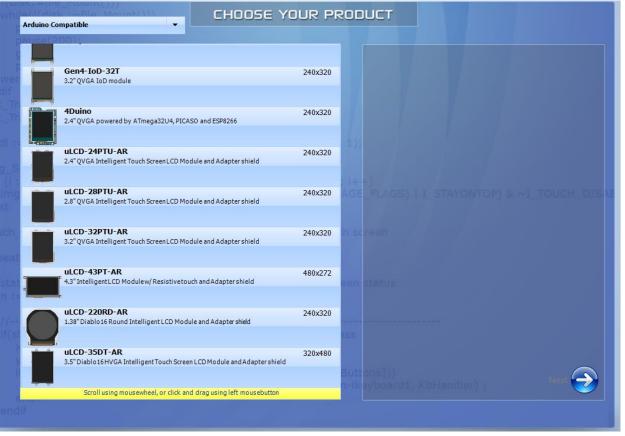
The **Create Text File** environment features a plain editor, suitable for writing basic documentation, application notes, data files or anything else requiring plain text files.





# 5. Choose Your Arduino Compatible Environment

When choosing a 4D Systems product, you can see that there is a product group named **Arduino Compatible** which includes both the Internet of Displays (IoD) Modules and 4Duino. It also includes a wide range of 4D Systems' display modules setup with an Arduino board.



Workshop4 allows the users to write their Arduino code and customize their 4D graphics user interface at the same time in a single integrated development environment.





# 5.1. Basic Graphics



The Arduino compatible Basic Graphics environment enables the user to write Arduino code directly to program this Arduino compatible module. It requires no uSD card and allows graphics primitives to be dragged and dropped on the screen and placed in your code. It utilizes the Serial SPE library for the processor used in the display, and therefore embraces the full set of Serial SPE Commands are available to the User, to produce the Graphical User Interface required.

**5.2. Extended Graphics** 



A visual programming experience, suitably called Arduino compatible Extended Graphics, enables drag-and-drop type placement of Workshop4 objects to assist with Arduino code generation and allows the user to visualize how the display will look while being developed. A uSD card will be required in order to hold the graphics. It utilizes the Serial SPE library for the processor used in the display, and therefore embraces the full set of Serial SPE Commands are available to the User, to produce the Graphical User Interface required.

# 5.3. Genie Graphics



An upcoming feature is an advanced environment called Arduino compatible Genie Graphics which utilizes the popular ViSi-Genie technology that is available in most 4D Systems Intelligent Displays. It utilizes the genieArduino library, and allows rapid development of GUI due to the powerful tools and widgets Workshop4 provides. Simply lay the display out with the objects you want, set the events to drive them and then utilize the genie functions inside the Arduino sketch to read or write information to those objects from the Atmel processor. This is a very clean and rapid development environment.

In the meantime, you can continue developing Genie Arduino applications using the current tools, by simply selecting the base module without the -AR extension, from Workshop4, and utilize the standard ViSi-Genie environment with our Arduino library.



# 6. Common File Menu

The File Menu is the first menu and common to all environments...



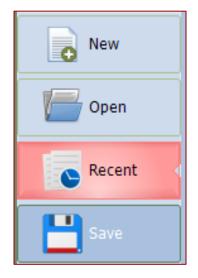
...with various buttons relating to the project that is open (or greyed out if no project is open):

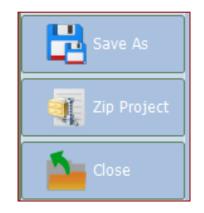
- File-related buttons,
- Print-related buttons,
- And miscellaneous buttons, such as Help, Options and Samples.



# 6.1. File-Related Buttons

The buttons include all the actions related to projects: New, Open, Recent, Save, Save As, Zip Project and Close project.





The options include:

Click **New** to create a new project. A dialogue window asks for the screen and the kind of project.

P	Gen4-uLCD-24D 240x320	
	2.4° Gen4 Intelligent Display Module with embedded DIABL016 processor	
	Gen4-uLCD-24D-CLB 240x320 2.4" Gen4 Intelligent Display Module with embedded DIABL016 processor w/ Cover Lens Bez	
	Gen4-uLCD-24DT 240x320 2,4" Gen4 Intelligent Display Module with embedded DIABL016 processor w/ Resistive Touch	
	2.4 Gen4 intelligent Display Module with embedded DIAbLO16 processor W/ Resistive lough panel	1);
	Gen4-uLCD-28D 240x320 2.8" Gen4 Intelligent Display Module with embedded DIABL016 processor	
		AGE FLAGS)   I STAYONTOP) & ~I TOUCH DI
	Gen4-uLCD-28D-CLB 240x320 2.8" Gen4 Intelligent Display Module with embedded DIABL016 processor w/ Cover Lens Bezz	
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	Gen4-uLCD-32D 240x320	een status
	3.2" Gen4 Intelligent Display Module with embedded DIABL016 processor	
	Gen4-uLCD-32D-CLB 240x320 3.2" Gen4 Intelligent Display Module with embedded DIABL016 processor w/ Cover Lens Bezz	155
Î	Gen4-uLCD-32DT 240x320 3.2" Gen4 Intelligent Display Module with embedded DIABL016 processor w/ Resistive Touch	Buttons]))
	Scroll using mousewheel, or click and drag using left mousebutton	n-ikeyboard1, KoHanoler) ;

Click **Open** to browse and open an existing project. A standard Open window opens.

Open					>
> • 🛧 📙 « Use	ers > Public > Public Documents > 4D Labs	√ Č	Search 4D Labs		P
Organise 🔻 New folde	r			II 🔹 🔟	?
🖈 Ouick access	Name	Date modified	Туре	Size	
M Quick access	4Duino	4/4/2016 9:20 AM	File folder		
💱 Dropbox (4D Team)	4DUpdates	4/27/2017 2:17 PM	File folder		
a OneDrive	Animated Buttons	4/4/2016 9:20 AM	File folder		
onconte	📊 Arduino	4/4/2016 9:20 AM	File folder		
💻 This PC	📊 Diablo Designer	4/27/2017 2:17 PM	File folder		
Activity Network	📊 Diablo Serial	4/4/2016 9:20 AM	File folder		
- WELWOIK	Goldelox Designer	4/4/2016 9:20 AM	File folder		
	Goldelox Serial	4/4/2016 9:20 AM	File folder		
	Goldelox ViSi	4/27/2017 2:17 PM	File folder		
	n Images	4/27/2017 2:17 PM	File folder		
	Picaso Designer	4/4/2016 9:20 AM	File folder		
	Picaso Serial	4/4/2016 9:20 AM	File folder		
	Picaso ViSi	4/27/2017 2:17 PM	File folder		
	Bieses Vici Gania	A/37/2017 2.17 DNA	Eile folder		>
File <u>n</u> a	ime:	~	All files (*.*)		~

Select ViSi-Genie projects among the different kinds listed below to load a ViSi-Genie project:

All files (*.*) 🗸	
Designer projects (*.4dg) Visi projects (*.4dViSi)	
Visi Genie projects (*.4DGenie) 4DGL Misc files (*.inc;*.fnc;*.sys;*.lib)	
4D Display Definitons (*.4DdisplayDef)	l
Basic Arduino projects (*.4dArdBasic) uSD Arduino projects (*.4dArdUsd)	l
Genie Arduino projects (*.4dArdGenie)	l
All files (*.*)	



Click Recent to list the recently accessed files, and click on the project to open it.

♦	Workshop 4 - ColorPicker*(uLCD-32PTU, LANDSCAPE)	×
New		
Open		Recent (Click here to Clear) ColorPicker.4DGenie 8/20/2013 10:30 AM
Recent	WORKSHOP	C:{Users\Public\Documents\4D Labs\Picaso V!Si Genie\ColorPider4DGenie
Sale ColorPicker*	LUE Version 4.4.0.9	CLOCK.4DVISi 11/1/2011 3:43 PM
ColorPicker*		C:\Users\Public\Documents\4D Labs\Picaso VIS\/QLOOC4DVIS
💾 Save As		SPIflashDemo.4dg 3/11/2014 7:59 AM
Zip Project	Create a new 4D Systems Project Start building a new Visi, Genie, Designer or Serial program.	C:\Users\Public\Documents\4D Labs\Diablo Designer\\$PflashDemo.4dg
Close		
Mint Setup	Create a new 4D Labs Project Start building a new Visi, Genie, Designer or Serial program.	
Print	Start building a new Visi, Genie, Designer or Serial program.	
Options		
Pelp 😯	Create a new Project Start building a new program using the same settings as you	
Samples	last used (Arduino Extended Graphics 4Duino)	
🔀 Exit		
	4D SYSTEMS 4D LABS	Scroll using mousewheel, or click and drag using left mousebutton

Click **Save** to save the modified projects.

Click **Save As** to create a copy of already saved project and give it a new name. A standard Save window opens and asks for the location and the name:

🔹 Save As						×
$\leftrightarrow \rightarrow \checkmark \uparrow$	« Users	> Public > Public Documents > 4D Labs	ٽ ~	Search 4D Labs		P
Organise 🔻 New	v folder					?
	1	Name ^	Date modified	Туре	Size	^
> 📌 Quick access		4Duino	4/4/2016 9:20 AM	File folder		
> 🐉 Dropbox (4D Tea	am)	4DUpdates	4/27/2017 2:17 PM	File folder		
> 💪 OneDrive		Animated Buttons	4/4/2016 9:20 AM	File folder		
7 Cheblive		Arduino	4/4/2016 9:20 AM	File folder		
> 💻 This PC		Diablo Designer	4/27/2017 2:17 PM	File folder		
> 💣 Network		Diablo Serial	4/4/2016 9:20 AM	File folder		
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		Goldelox Serial	4/4/2016 9:20 AM	File folder		~
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Save as <u>t</u> ype:	Visi Genie	projects (*.4DGenie)				~
∧ Hide Folders				<u>S</u> ave	Cancel	



Click **Zip Project** to make a compressed file out of the project. This is especially useful when then project is large and contains pictures and videos.

Click **Close** to close the current project. You will be prompted to save the changes to any modified project.



# **6.2.** Print-Related Buttons

The buttons include all the actions related to print:



#### Click Print Setup to setup the printer:

Print Setup			×
Printer			
Name:	Microsoft XPS Document Writer	✓ Properties	
Status:	Ready		
Type:	Microsoft XPS Document Writer v4		
Where:	PORTPROMPT:		
Comment	:		
Paper		Orientation	
Size:	A4 ~	Portrait	
Source:	Automatically select $\checkmark$	A	
Network.		OK Cancel	

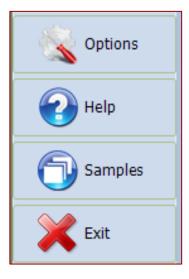


#### Click **Print** to print the project:

Print	×				
Printer					
Name: Microsoft XPS Document Writer	✓ Properties				
Status: Ready	Ready				
Type: Microsoft XPS Document Writer v	Microsoft XPS Document Writer v4				
Where: PORTPROMPT:	PORTPROMPT:				
Comment:					
Print range	Copies				
<ul> <li>All</li> </ul>	Number of copies: 1				
O Pages from: 1 to: 1	Collate				
○ Selection	123 123 Collate				
	OK Cancel				

# 6.3. Miscellaneous Buttons

The Miscellaneous buttons include **Options**, **Help**, **Samples** and **Exit**.





Click **Options** to set the options for the current project:

And the Annual sector	Destaura Ed	iter Friday and	One sector di Stilan	Courie 1		Queial	Charlester		10-1	
Arduino Compiler	Designer Ed	itor Environment	Generated Files	Genie	License	Serial	Shortcuts	Updates	Visi	Warnings
Default Baud Rate	200000 ~	Note: 200,000 baud to accumulated inher 56,000 are not reliab	ent baud rate error							
Default Sound Buffer	1024 ~	boyood al c histi cilde								
	lo com 1 Pins Vin PA0 ~ in PA1 ~	Default com port for on fixed pins, as is C to specify pins when	OM1 for Picaso. For							
Maximum String Length		Each addition byte o This is for 'normal' str If you use unicode st	ings and should be	doubled f	or Unicode		e.			
Mounting message	Mounti	ng\n					e strings can			<b>L</b>
Drive not mounted m	nessage Drive n	not mounted					acters. They one sequence.		ude the	γn
🗸 ОК	X Cancel									

Options include different panes. Select "Environment".

Arduino	Compiler	Designer	Editor	Environment	Generated Files	Genie	License	Serial	Shortcuts	Updates	Visi	Warnings
🗖 Reo	pen Files tha	t were open	when Wor	kshop was close		Resample	Quality					
V Sho	w Hints				<ul> <li>Fastest</li> <li>Scaled</li> </ul>							
V Save	e as Opens E	Both			Box							
🗖 Bad	kup Files whe	en saving			◯ Spline							
🗖 Оре	en files Collap	osed			O Bilinear							
Style:	Office	2010Blue	~	1	<ul> <li>Lanczos</li> </ul>							
				1								
Tab Col	lor											
🗸 ок		X Cano	el									

Select the **Style** among different possibilities.



#### The Image / Video Resample Quality selection brings different options:

- Fastest
- Scaled
- Box
- Spline
- Bilinear
- Bicubic
- Lanczos

Click Help to access help, with links to the 4D website:

To access the 4D systems home page	Workshop 4
Click here to visit 4D Systems	Version: 4.4.0.9
	Copyright: 2015 4D Systems
For Peer help and support	
Click here to visit the 4D Forums	TE COMPTONIC CONTRACTOR FROM PLANT
For manuals and other documentation visit the	
downloads tab on the page for your product	
Click here to visit the 4D Product Pages	
g Tauched(hnd),-1);	
To report documentation errors and other hardware or software issues, raise a case from the contact page	
Click here to open the contact page	
touch Get TOUCH GETVI:	
	arious samples.



#### Click Samples to access examples from 4D, with pre-defined filters:

pause(200); gfx_Cls(); pauseChCl		
Samples were loaded o process for Workshop TransparentColour(0x0020 Transparency(ON); := file_LoadImageControl Show(hndl,ikeyboard1); := ikeyboard1+1; i <= ik ng_SetWord(hndl,i, IMAGE ; := set(TOUCH_ENABLE); :=	<ul> <li>Arduino</li> <li>Arduino</li> <li>Arduino</li> <li>Diablo Designer</li> <li>Diablo Serial - Click to browse</li> <li>Goldelox Designer - Click for filtered browse</li> <li>Goldelox ViSi - Click for filtered browse</li> <li>Goldelox Serial - Click to browse</li> <li>Picaso Designer - Click for filtered browse</li> <li>Picaso ViSi - Click for filtered browse</li> <li>Picaso Serial - Click to browse</li> <li>ViSi Genie Aggic (Picaso/Diablo) - Click to browse</li> </ul>	ONTOP) & ~I_TOUCH_DIS
	seful code and snippets that may come in handy	
Click here to visit t	h <u>e Forum Codebase</u> Diff there's a press	
The 4D website contain:	s a host of application notes	
Click here to visit t	he 4D App Notes	

Click **Exit** to close Workshop4. You will be prompted to save the changes to any modified project.





# 7. Designer Specific Menus

The Designer environment includes five menus:



# 7.1. Home Menu

The **Home** menu is the main menu.



...with three groups of buttons:

- File-related commands,
- Build command,
- And the objects pane.

#### 7.1.1. File-Related Buttons

The file-related buttons include the same commands as seen in the File menu: New, Open, Save, Save As and Print.



#### 7.1.2. Code-Related Buttons

The code related buttons include the standard Windows commands of Cut, Copy, Paste, Delete, Undo and Redo.

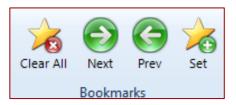






#### 7.1.3. Bookmark Buttons

The bookmark buttons include Set a bookmark, go to Next or Previous bookmark and Clear All bookmarks.



Bookmarks are shown close to the line number:



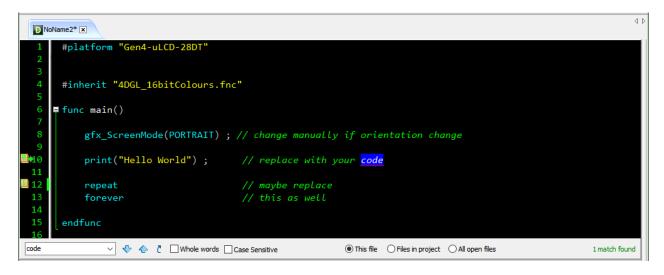
Bookmarks are especially useful for large projects.

#### 7.1.4. Find and Replace Buttons

The find and replace buttons provide the basic features for code.



The Find button prompts for a string and highly it in the code:



Use the up and down arrows to look for the previous and next occurrence. Check **Whole Words** and **Case Sensitive**. Choose between **This file** and **Files in progress** and **All Open Files**.

This file 
 Files in project 
 All open files



The **Replace** button searches for a string and exchanges it with another string:

NoName2* 🗙		4 Þ
1 #plat	form "Gen4-uLCD-28DT"	
3		
	erit "4DGL_16bitColours.fno	
5 6 <b>■ func</b> 7	main()	
· · · ·	<pre>gfx_ScreenMode(PORTRAIT) ;</pre>	// change manually if orientation change
	<pre>print("Hello World") ;</pre>	// replace with your <mark>code</mark>
	repeat	// maybe replace
13 f 14	Forever	// this as well
code	- V 🌵 🖒 🗌 Whole words 🗌	Case Sensitive   This file  Files in project  All open files
routine	✓ ✓ <u>R</u> eplace	

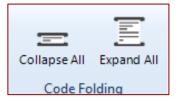
Same options as for Find apply.

The **Goto** button prompts for a line number:

Goto Line	×
New Line?	
OK Cancel	

# 7.1.5. Code Folding Buttons

The code folding buttons allow to collapse or expand a function:



This is especially useful for large projects.

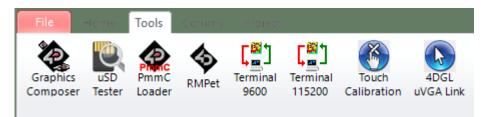


#### 7.1.6. Compile Buttons

The **Compile** button launches the compilation of the project while the **Comp'nLoad** compiles and uploads the project to the screen.



# 7.2. Tools Menu



All the tools and utilities are grouped here:

- Click **PmmC Loader** to start the PmmC Loader utility.
- Click 'Terminal connect 9600' to open the currently selected com port at 9600 baud in the Terminal program.
- Click '**Terminal connect 115200**' to open the currently selected com port at 115200 baud in the Terminal program.
- Click Touch Calibration to calibrate the touch on the display. This tool is not available for all display modules.
- Click **4DGL uVGA Link** to open a window which can interact with the uVGA, enabling a mouse and keyboard to be used with the uVGA(GFX) module. Demo code is available from Workshop4.
- Click **Graphics Composer** to open the Graphics Composer tool. This tool is used for creating graphics for a Designer project. If graphics is needed for a Designer project, it is recommended to use ViSi instead.
- Clik **uSD Tester** to test the uSD card mounted on the display. Before clicking this button, make sure that the uSD card is mounted on the display module.
- Click **RMPet** to partition the uSD card. The uSD card must be mounted to the PC.

#### 7.3. Comms Menu

This menu is in charge of the communication port:

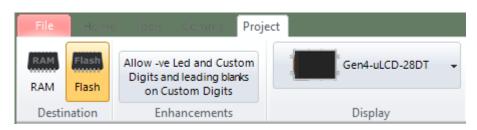


The use of this menu is described at the section Connect the Module.



# 7.4. Project Menu

The Project menu includes different parameters and options...



...with three groups of buttons:

- Destination,
- Display selection.
- And Enhancements

#### 7.4.1. Destination

The first group includes the options for the destination:



Select the **Destination** among two possibilities:

- **RAM** means the display must be connected during build and that the program will be downloaded to the display's RAM memory once compiled. If **RAM** is chosen as the destination, the program is lost when the display is turned off.
- **Flash** means the display must be connected during build and that the program will be downloaded to the display's flash memory once compiled. If **flash** is chosen as the destination, the program is retained and will be available after power cycling.

#### 7.4.2. Enhancements

The second section contains a button for enabling the use of negative values for LED digits and custom digits objects and for enabling the use of leading blanks on custom digit objects.

Allow -ve Led and Custom Digits and leading blanks on Custom Digits

Enhancements



#### 7.4.3. Display Selection

The third section allows to select the screen. Clicking on the button...



#### ... opens a new window to select the screen:

Change Display	×
	Gen4-uLCD-28DT ~
	Orientation Portrait Landscape Portrait Reversed Landscape Reversed Display and options shown for reference purposes only, changes will not affect your code. Cancel

Select the screen from the drop-down list:

Gen4-uLCD-28DT	<
Gen4-uLCD-28DT	~
Gen4-uLCD-32D	
Gen4-uLCD-32D-CLB	
Gen4-uLCD-32DT	
Gen4-uLCD-32DCT-CLB	2
Gen4-uLCD-35D	,
Gen4-uLCD-35D-CLB	
Gen4-uLCD-35DT	Υ.



Define the orientation among the four options:

	Orientation
	Ortrait
	◯ Landscape
	O Portrait Reversed
	O Landscape Reversed
Confirm by clicking on VOK or deny	by clicking on 🗙 Cancel



# 8. ViSi Specific Menus

The ViSi environment includes all the menus available with the Designer environment plus two additional menus: **View** and **Widgets**.

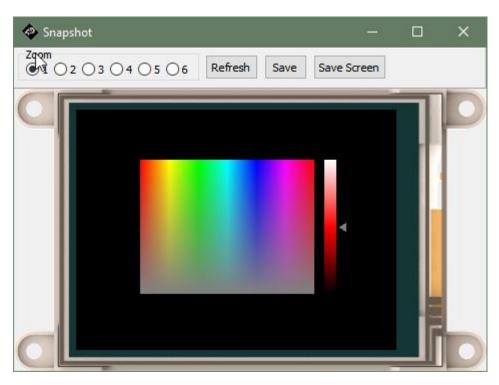


#### 8.1. View Menu

The **View** menu includes one important tool for visualising the form:



Click on **Snapshot** to open a specific window of the form to enable a 1:1 screenshot of the display to me made.



This window provides a zoom up to 4 times. The **Save** button allows to save the screen as an image.

Object Inspector, Form, and Reset View, all relate to the menus and tool bars used in Workshop4. These toolbars and menus can be moved and detached from the side of Workshop4. Object Inspector and Form will bring to front the relevant toolbar when clicked. If required, the toolbars can be reset back to their default location by clicking the Reset View button.

Object Locations enables the user to copy the locations/coordinates of objects on the display, to the clipboard.



### 8.2. Widgets Menu

The Widgets menu includes the objects pane with all the objects available to build the interface:

File Home	View Tools	Widgets	Comms	Project			
Backgrounds But	ttons Digits	Gauges	Inputs	Labels	Primitives	System/Media	b
🛃 🝭 [	+						

The objects –also called widgets–are detailed in the ViSi User Guide.



# 9. ViSi-Genie Specific Menus

ViSi-Genie includes five menus with specific ribbons and options.



ViSi-Genie is codeless and thus completely different from the previous code-based environments, all the menus relating to ViSi-Genie are detailed.

#### 9.1. Home Menu

The **Home** menu is the main menu.

🅹 I 🔚 I 🗸	Workshop 4 - ColorPicker*(Gen4-uLCD-32DT, LANDSCAPE)
File Home View Tools Comms Project	
New Open Save Save As Print Build Copy/Load Copy/Load	Backgrounds Buttons Digits Gauges I/O Inputs Labels Magic Primitives System/Media
File Build	

...with three groups of buttons:

- File-related commands,
- Build command,
- And the objects pane.

#### 9.1.1. File-Related Buttons

The file-related buttons include the same commands as seen in the File menu: New, Open, Save, Save As and Print.



#### 9.1.2. Build Button

The **Build** button launches the compilation and the upload of the project to the screen.





#### 9.1.3. Objects Pane

The objects pane includes all the objects available to build the interface:



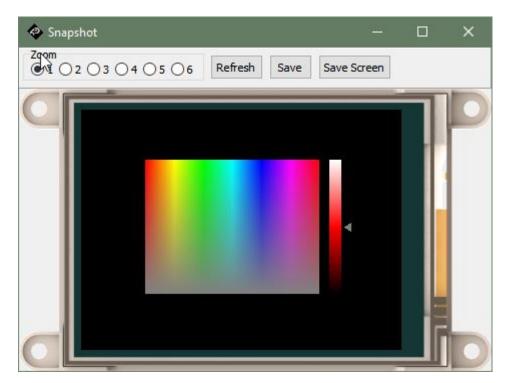
• The objects are detailed on the <u>ViSi-Genie User Guide</u>.

### 9.2. View Menu

The **View** menu includes one important tool for visualising the form:



Click on **Snapshot** to open a specific window of the form.



This window provides a zoom up to 6 times. The Save button allows to save the screen as an image.



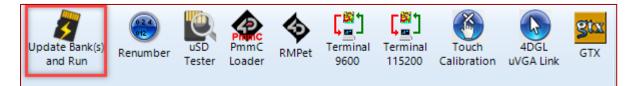
### 9.3. Tools Menu



All the tools and utilities are grouped here:

- Click **Boot uSD** to upload the boot-loader to the screen, enabling programs to be loaded via microSD card.
- Click PmmC Loader to start the PmmC Loader utility.
- Click 'Terminal connect 9600' to open the currently selected com port at 9600 baud in the Terminal program.
- Click 'Terminal connect 115200' to open the currently selected com port at 115200 baud in the Terminal program.
- Click **Touch Calibration** to calibrate the touch on the screen. This tool is not available for all display modules.
- Click **4DGL uVGA Link** to open an interactive window to use mouse/keyboard with the uVGA(GFX) module.
- Click **GTX** to launch the Genie Test Executor debugger.

For Diablo16 display modules, the **Boot uSD** icon is replaced with the **Update Bank(s) and Run** icon.



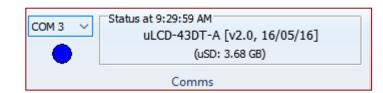
Clicking the GTX button, a new screen will appear with the form and objects defined in the project:

📴 Genie Test eXecutor		—	×
Port: COM 3 V Reset on open 2 Disconnect 7 Contrast	9600 baud		
Active Form           Query         Form0			
Query			
Set			



### 9.4. Comms Menu

This menu is in charge of the communication port:



The use of this menu is described in Connect the Module.

### 9.5. Project Menu

The Project menu includes different parameters and options...

Destination RAM Run RAM Flash Run Flash Slash USD USD Form	al Form m0  Sound Buffer: 1024  Allow buttons to be disabled
	Genie
Allow -ve Led and Custom Digits and leading blanks on Custom Digits Enhancements	Gen4-uLCD-32DT LANDSCAPE

...with three groups of buttons:

- Options for Genie, •
- Parameters and Enhancements •

And display selection.

#### 9.5.1. Genie Options

For Picaso display modules, the first group includes the options for Genie:

Destination	Initial Form
RAM RAM Flash Run USD uSD	Form0 •
	Genie

- Select the **Destination** among three possibilities:
  - Run RAM The display must be connected during Build and the program will be downloaded to the display's flash memory once compiled. The user's application will be stored in Flash, but will be run from RAM.
  - **Run Flash** The display must be connected during Build and the program will be downloaded to the display's flash memory once compiled. The user's application will be stored and run from flash, this uses less memory on the display, but makes programs run slightly slower.
  - uSD The user's application will be built and copied to the uSD card. From the uSD card the application is loaded into RAM and run from there. This option requires the Boot uSD program to be uploaded to the display's flash, as seen in the menu Tools. This Boot uSD program loads the user's application from the uSD card at startup, and executes it. For Diablo, Boot uSD is called Update Bank(s) and Run.



• The initial form section allows the user to set which form will show upon boot up.

For Diablo16 display modules, the first group looks like as shown below.

Destination RAM Run RAM Flash Run Lusd uSD USD	Bank 0
	Bank 0 Bank 1
	Bank 2 Bank 3
Form0	Bank 4 Bank 5

The additional drop-down menu allows the user to specify the target destination flash bank of the ViSi-Genie program. The Diablo16 processor has six flash banks (Bank 0 to Bank 5), each of which has a capacity of 32 kB.

When **Run Flash** is selected, the destination of the ViSi-Genie program is the bank specified in the drop-down menu. In this case, the display module needs to be connected to the PC during build time. The program will then be downloaded to the selected bank and it will run from there. Take note however, that, after the display module is power cycled, the program in Bank 0 always runs first.

On the other hand, when **uSD** is selected, the ViSi-Genie program will be copied to the uSD card. This option does not require the display module to be connected to the PC during build time. However, this option requires the **Update Bank(s)** and **Run** program to be downloaded to Bank 0 of the display's flash memory. The **Update Bank(s)** and **Run** program button is found under the Tools menu.





This **Update Bank(s) and Run** program checks the uSD card for ViSi-Genie program files and copies them to their destination flash banks. Then, by default, the program in Bank 1 is executed. The **Update Bank(s) and Run** program can be modified to run the code in another bank besides Bank 1 if desired.

Note that **Update Bank(s) and Run** program stores the time and date information of ViSi-Genie program files (for all banks) in Bank 0. Every time that the display module is power cycled, **Update Bank(s) and Run** in Bank 0 always runs first and checks the time and date information of the ViSi-Genie program files present in the uSD card. By default, if the time and date information of a ViSi-Genie program file is different from that of the last program file uploaded to the same bank, **Update Bank(s) and Run** automatically updates the specified bank.

It is also possible to modify the **Update Bank(s) and Run** program such that it only updates the target banks only if the corresponding ViSi-Genie program files in the uSD card have a newer time and date information.

#### 9.5.2. Parameters

The second group includes advanced parameters:



- **Comms speed** is the baud rate at which the serial command interface operates
- Define **Sound buffer size** for the amount of memory set aside for buffering wav (sound) files. For simple sound files 1024 bytes should be enough. For complicate sound files to be played whilst video is displaying may need as much as 4096 bytes.
- Button objects have the ability to be shown and hidden accordingly by the host controller. To enable this, click on the "Allow buttons to be disabled" button. Then use the GTX tool to see the appropriate commands for enabling and disabling the buttons.
- The right-most button allows for enabling the use of negative values for LED digits and custom digits objects and for enabling the use of leading blanks on custom digit objects.



#### 9.5.3. Display Selection

The last section allows selecting the screen, useful for converting a program from one display module to another.

Clicking on the button...



#### ... opens a new window to select the screen:

Change Display	×
	Gen4-uLCD-28DT V
	Orientation  Portrait  Landscape  Portrait Reversed  Landscape Reversed  Display and options shown for reference purposes only, changes will not affect your code.  Code.  Code

Select the screen from the drop-down list:

Gen4-uLCD-28DT	<
Gen4-uLCD-28DT	$\wedge$
Gen4-uLCD-32D	
Gen4-uLCD-32D-CLB	
Gen4-uLCD-32DT	
Gen4-uLCD-32DCT-CLB	2
Gen4-uLCD-35D	, 
Gen4-uLCD-35D-CLB	
Gen4-uLCD-35DT	Υ.



Define the orientation among the four options:

	Orientation
	<ul> <li>Portrait</li> </ul>
	🔾 Landscape
	O Portrait Reversed
	O Landscape Reversed
Confirm by clicking on 🔽 OK or deny	by clicking on X Cancel

### **10.** Basic and Extended Graphics Specific Menus

The Arduino compatible Basic and Extended Graphics environments include all the menus available with the ViSi Environment with some additional options for **Arduino Comms** which can be found under **Comms** tab.

ا 🖬 ا 😒	Ŧ						
File	Home	View	Tools	Widgets	Comms	Pr	oject
COM 1	Stati	us at 9:30 De		ot respondi	ng		COM3 (4Duino) V
		C	Comms				Arduino Comms

The Arduino Comms refers to the COM port that the Arduino board is currently using.

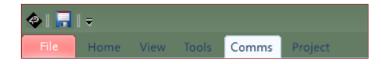
The main difference between the Basic and Extended Arduino environments lies on the available widgets.

Since the Basic Environment is designed to allow users to create projects without the need for a uSD card, it only allows the user to use primitive shapes and objects in the WYSIWYG window. The Extended Graphics on the other hand gives additional support for 4D Graphics.

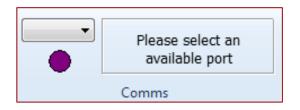


### **11. Connect the Module**

Connect the module to a USB port with the 4D Systems programming cable and select the **Comms** menu:



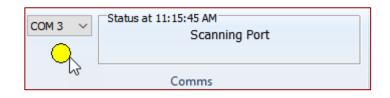
Above the Comms section, the violet light mentions no module is currently connected.



Connect the 4D Systems programming cable/adaptor to the module and plug the cable into the USB port. Click on the drop-down list and select the COM port relating to the 4D Programming cable/adaptor.



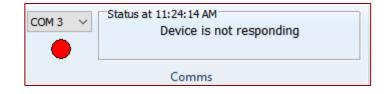
The light turns **yellow** while the connection is being established:



Finally, the light goes blue when the connection is established.

COM 3 ~	Status at 11:15:45 AM Gen4-uLCD-32DCT-CLB-A [v2.0, 16/05/17]
	Comms

The light turns red when no module is attached to the selected port:





### 12. Insert the Micro-SD Card

For Picaso, Picaso Lite, and Diablo16, the micro-SD card shall be FAT16-formatted. Partition can't exceed 4 GB. For Goldelox, the micro-SD card shall not be formatted at all, it requires the SD card to be RAW.

To connect the micro-SD card, either:

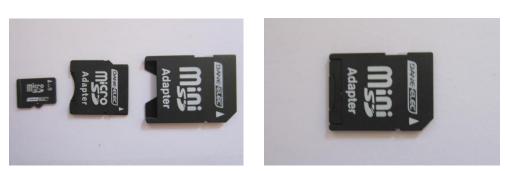
• Insert the micro-SD card into the USB adaptor and plug the USB adaptor into an USB port of the PC.





#### Or

• Insert the micro-SD card into a micro-SD to SD card converter and plug the SD card converter into the SD card slot of the PC.



Check the micro-SD card is mounted, here as drive E:.

1.000			
🕽 🔵 🗢 🖳 🕨 Computer 🕨		👻 🍫 Search Comput	er
Organize 🔻 AutoPlay Eje	ect Properties System properties	Uninstall or change a program »	• • •
★ Favorites	Hard Disk Drives (2)     Local Disk (C:)     Syst GB free of 676 GB	Recovery (D:)	
🤣 Homegroup	Devices with Removable Store     DVD RW Drive (E:)	Removable Disk (F:)	
Local Disk (C:) Recovery (D:) Removable Disk (F:)			
🗣 Network			
Removable Disk (F:) S Removable Disk		al size: 1,86 GB sstem: FAT	

It is highly recommended to use the Workshop4 Tool called **RMPet** when formatting and partitioning your microSD card in your PC, for use in 4D Systems modules.

For Goldelox, if prompted to format the SD card, click no/cancel. Leave the card unformatted and Workshop4 will handle the rest.

# 13. Revision History

Revision	Revision Content	Revision Date
1.0	First Release	19/11/2012
1.1	Typos on Page 4 fixed	17/12/2012
1.2	Added new content for Serial and fixed incorrect document references	04/02/2013
1.3	Amended details about Micro-SD card	05/07/2013
1.4	Amended details about Program Destination	11/03/2014
2.0	Updated formatting and contents	01/052017
2.1	Added information on target flash banks	29/07/2017
2.2	Updated Formatting	05/04/2019

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