Workshop4 User Manual



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1. Introduction

This user guide introduces Workshop4, the 4D 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 the 4D processor/module 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. (*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 Arduino Compatible Environments section.

To install Workshop4, please refer to Installation section.

1.1. Requirements

The following are required for the installation and use of Workshop4:

• Windows 8 or newer

• Workshop4 IDE Installer

Some older Windows OS's such as ME, Vista, XP and 7 have not been tested for some time and are not supported by Microsoft anymore, however, may still work.

Legacy support updates for the older OS's may not be possible, depending what issues are found. For best results, run a current Windows OS.

Note

It is also possible to run Workshop4 under a VM on Linux or Mac, however it is up to the user to set this up.

Listed are tools recommended during development:

- 4D-UPA
- •gen4-PA
- uUSB-PA5 (w/ gen4-IB if using gen4 and pixxiLCD displays)
- 4D Programming Cable (w/ gen4-IB if using gen4 and pixxiLCD displays)

All are available from **4D Systems**. These hardware tools are used to update the PmmC and upload Workshop4 projects to the graphics processors.

1.2. Installation

After acquiring a copy of the installer, you should be able to run it simply by double clicking the file.

The installation starts by verifying the contents of the setup package.



Once done, the installer will open the Terms and Conditions window. Please read the agreement carefully then tick the checkbox and click on **Next** to continue.

🔹 4D Workshop 4 IDE - InstallAware Wizard — 🗌	
License Agreement Please carefully read the following license agreement.	
4D SYSTEMS PTY LTD TERMS AND CONDITIONS	^
Customer Acknowledgement. The Customer acknowledges	
agreement with these Terms and Conditions by order of downloading	
software product from 4D Systems Pty Ltd. 4D Systems Pty Ltd is the	
trading name of 4D Systems Pty Ltd. This contract is between the	
entity named 'the Customer' and 4D Systems Pty. Ltd. All software is	
supplied on these terms and conditions only and no person in the	
employment or otherwise as agent for 4D Systems has any authority	
to supply software on any other terms and conditions or to vary these	~
\Box I accept the terms of the license agreement	
InstallAware	
< <u>B</u> ack <u>N</u> ext > Cance	4

The installer will then let you select the installation directory. You can skip this step and simply click on **Next**.

🚸 4D Workshop 4 IDE - InstallAware Wizard	-	□ ×
Destination Folder Select folder where setup will install files.		5
Install 4D Workshop 4 IDE to:		
C:\Program Files (x86)\4D Labs\4D Workshop 4 IDE	Change	
Destination Folder Required Disk Space: Remaining Disk Space:	437,344 k 178,994 M	(B 1B
InstallAware	Next >	Cancel

You have an option to install the application for all users or only for the current user, hence yourself. Simply click on **Next** to continue.

📀 4D Workshop 4 IDE - InstallAware Wizard	—		×
Select Program Folder Select the location where you would like to create new shortcuts.		-	5
Setup will add program shortcuts to the Program Folder listed below. a new folder name, or accept the suggested name. Click Next to con Program Folder:	You may tinue.	y type	
4D Workshop 4 IDE			
Install this application for:			
< Back Next	>	Can	cel

If all is set and done to your liking simply continue from this screen by clicking on **Next**. Otherwise, click on **Back** to change what you've set.



It is recommended to stick to the default configurations.

Simply wait for the installation to finish.

Note

💠 4D Worksho	p 4 IDE - InstallAware Wizard — 🗌	
Installing 4 The progra	D Workshop 4 IDE am features you selected are being configured.	
1 6	Please wait while the InstallAware Wizard installs 4D Workshop 4 IDE. This may take several minutes.	
	Status: Folder: C:\Program Files (x86)\4D Labs\4D Workshop 4 IDE\SysImages\Buttons\Slider01\Aqua\Scaled\	
InstallAware ——	< Back Next > Cancel	

After the installation, you are given an option to run Workshop4 IDE after closing the installation window. If you want to do so, leave a check mark on the checkbox. Click on **Finish**.

🔹 4D Workshop 4 IDE - InstallAware Wizard — 🛛 🛛 👋		
	Completing the InstallAware Wizard for 4D Workshop 4 IDE	
	You have successfully completed the InstallAware Wizard for 4D Workshop 4 IDE.	
	Run 4D Workshop 4 IDE now	
	To close this wizard, click Finish.	
	< Back Finish Cancel	

Besides the last window from the installer, a text editor session will open a **README.TXT** file. This file contains the

change log and known issues.

/ README.TXT - Notepad —		
File Edit Format View Help		
Known Issues		^
 On a display with Aero active, the Genie object inspector sometimes has thicker lines around the selected parameter. This is a manifestation of a Windows Aero design issue. It may be possible to fix but it will take time. If 'Crouzet USB adaptor' is inserted Workshop will not start. The adapter does not appear to like 'normal' attempts to open it as a comms port. Remove the adapter before starting Workshop. Windows may produce a 'This program might not have installed correctly' message, the correct answer is 'This program installed correctly'. Hopefully this will be fixed in a future release of Windows. As of version 4.3.0.0 Workshop installs all the serial libraries, and additional support routines, into C:\Program Files (x86)\Arduit \libraries. If you have already installed these libraries in another location you will need to remove them from the other location. 	no	
Workshop 4 Change log		
Workshop 4.3.0.10 Fixed Crash when creating text file Fixed Incorrect help and autocomplete for some functions when using Gen4 Picaso. Added New Picaso Lite displays.		
Workshop4.3.0.8FixedPaste of strings containing cr/lf results in project that cannot be opened later.Changed location of 'hints' to always be to the lower right of the cursorFixedCorrupted screen if opening Magic project from explorer and Magic not licensed.FixedForm and Object names lost if Genie Magic code open and object inspector undocked and docked again.FixedGraphs not produced correctly if non-Solid patterned Lines, Triangles, Rectangles or Panels usedFixedFarshs not produced correctly if non-Solid patterned Lines, Triangles, Rectangles or Panels usedFixedGenie Magic not showing code editing buttons.FixedGenie Magic not showing code editing buttons.FixedI/O error 103 with very large font sizes.FixedCopy/Paste of Winbutton to different project with image loses imageFixedCustom digits not being generated properly when digits=10FixedColour picker allowing non numeric values to be entered causing crash		
Added Arduino generation from within Workshop for Goldelox, Picaso and Diablo Serial Added New Diplays		
Added Ulablolb K19 YmmL with new functions 4Dcompiler 2.8.0.5		~
		*

1.3. Programming Tools Driver Installation

You can find the links of the drivers for each recommended USB to TTL programming solutions on their product pages.

1.3.1. CP210x VCP Driver

This is used for **4D Programming Cable**, **uUSB-PA5-II**, **gen4-PA** and **4D-UPA**. This driver can be downloaded here.

After downloading successfully, save the zipped file into a folder on your system and unzip the file. Launch the appropriate installer based on your computer's architecture.



Continue with the installation prompts by clicking on **Next**.

Device Driver Installation Wizard	
The drivers are now installing	
Please wait while the drivers inst	all. This may take some time to complete.
	< Back Next > Cancel

The installation should finish shortly.

Device Driver Installation Wizard				
	Completing the De Installation Wizard	vice Driver 1		
	The drivers were successfully in:	stalled on this computer.		
	You can now connect your devi came with instructions, please re	ce to this computer. If your device ad them first.		
	Driver Name	Status		
	✓ Silicon Laboratories (sila	Ready to use		
	< <u>B</u> ack	Finish Cancel		

1.3.2. FTDI VCP Driver

The installer for this driver can be found here. This driver is used solely for uUSB-PA5 which has been superseded by the uUSB-PA5-II.

After downloading, save the zipped file into a folder on your system and unzip the file. Launch the installer afterwards.



Accept the agreement and continue with the installation prompts by clicking on Next.

Device Driver In	istallation Wizard			
License Ag	reement	X		
To continue, accept the following license agreement. To read the entire agreement, use the scroll bar or press the Page Down key.				
	IMPORTANT NOTICE: PLEASE READ CAREFULLY BEFORE	^		
This licence agreement (Licence) is a legal agreement between you				
of 2 Seaward Place, Centurion Business Park, Glasgow G41 1HH, Scotland (UK Company Number SC136640) (Licensor or we) for use of driver software provided by the Licensor(Software)				
	BY INSTALLING OR USING THIS SOFTWARE YOU AGREE TO THE	~		
	I accept this agreement Save As Print			
	◯ I don't accept this agreement			
	< Back Next > Ca	ancel		

The installation should finish quickly afterwards.

Device Driver Installation Wizard	d	
	Completing the De Installation Wizard	vice Driver 1
	The drivers were successfully in:	stalled on this computer.
	You can now connect your devi came with instructions, please re	ce to this computer. If your device ad them first.
	Driver Name	Status
	✓ FTDI CDM Driver Packa	Ready to use
	FIDICDM Driver Packa	Ready to use
	< <u>B</u> ack	Finish Cancel

1.4. MicroSD Card Format

The microSD card shall be FAT16-formatted for processors other than GOLDELOX which uses RAW mode. It is recommended to use Workshop4's built-in utility, RMPet when formatting and partitioning a microSD card. Particularly when using uSD cards with capacity greater than 4GB.



The software provides detailed information on the uSD card's current status an easy way to partition the uSD card while considering the read disturb protection of uSD cards.

🔹 4D Systems - RMPET (Removable Media Partition Edit Tool)	- 🗆 X
Drive: K Drive Information Partitioned Drive Size:- 3,980,394,496 Sectors:- 7,774,208 Partition 1 or drive if not Partitioned Formatted:- FAT Capacity:- 3,971,743,744 Freespace:- 3,971,547,136 Cluster Size:- 64K	Select the drive you wish to alter the partition information of 1. To remove the partition table > Click 'Delete Partition Table' 2. To create a partition table > Select the size you want allocated to the FAT16 Partition
Delete Partition Table Partition table Sectors # Type First Size 1 FAT(6) 16,384 7,757,824 (3.70 GB) 2 Empty(0) 0 0 (0 Bytes) Create Partition Table Note: 1st partition starts at sector 16384 to ensure read disturb protection mechanisms will operate Cluster size:- 64K Note: Best performance is obtained when using the maximum possible cluster size. Format Warning! No data will be preserved during this operation.	 Click Create partition Click Create partition To format the drive as FAT16 Select the desired cluster size or leave as the default (maximum) size Click Format To Resize a partition table Delete the partition table as per the above Create a partition table with the new size Note: You do not need to partition or format cards which are going to be used only in RAW mode, on or Goldelox products.

🖍 Note

Cards **MUST** be formatted FAT16 (except GOLDELOX) or RAW to work with 4D Systems models. FAT32, exFAT, NTFS etc will not work. For best results, format and partition your microSD cards using RMPet.

For a more detailed instruction on how to use this utility, please refer to 4D Systems' application note titled:

General Partitioning a microSD into FAT and RAW Components

When using RMPet to format and/or Partition your microSD card, it is best to use a microSD to USB adaptor, or a microSD to SD adaptor into a media slot of your Laptop/PC. The cards need to be formatted on your PC, not on the display module themselves. Many types/brands are available, choose one that best suits your hardware setup.



Note

microSD cards **MUST** be SPI compatible, and it is highly recommended to use Industrial Grade cards to prevent corruption over time due to a phenomenon called Read Disturb, which affects NAND Flash memory. 4D Systems offers such cards, available on our website.

This PC Ŧ Drive Tools Computer View Manage This PC 4 ~ \mathbf{T} 5 V Search Th... 🔎 V Folders (6) USB Drive (E:) Quick access USB Drive Desktop * Desktop Documents 4 Documents Downloads ÷ Downloads Music Pictures 4D Systems * Pictures Videos Space used: 😂 Dropbox (4D Tean Space free: 3.67 GB 3.67 GB Total size: 秀 OneDrive > Devices and drives (3) File system: FAT USB Drive (E:) Local Disk (C:) 💻 This PC BitLocker status: Off 📃 Desktop 174 GB free of 472 GB 3.67 GB free of 3.67 GB Documents Data (Z:) 🖶 Downloads 389 GB free of 458 GB 💧 Music Pictures Videos 🏪 Local Disk (C:) 1 item selected :== 📰 9 items

Afterwards, check if the uSD card mounted successfully. Here, it is shown as drive E:.

2. Creating a New Project

Launch Workshop4 just like any typical Windows application.

```
At launch, Workshop4 will display the Recent page:
```



From here, you have multiple options to create a new project:

• Click on the top left-most icon New.



Click on the Create a new 4D Systems Project button.



• Click on the Create a new Project button to create a project instance based on your last project settings.



Create a new Project Start building a new program using the same settings as you last used (Serial Gen4-uLCD-32DT)



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

You can follow the image above to do the following:

- 1. Filter the list of display by selecting a display category
- 2. Select the display from the list
- 3. Select the desired display orientation
- 4. Confirm the selection

After selecting the display, the environment needs to be selected. Depending on your display you may be prompted to select either:

- a 4D Environment (when the display primarily uses a 4D processor) or;
- an Arduino Compatible Environment (when the 4D display is to be used with an Arduino compatible board or when using 4Duino)
 - Note

IoD products will directly open a suitable Arduino compatible environment after product selection

3.4D Environments

3.1. Designer

Choose the Designer environment to write 4DGL code in its raw form.



The Designer environment provides the user with a simple yet effective programming environment where pure 4DGL code can be written, compiled and downloaded to the range of 4D Systems intelligent display modules.

🚯 🗖 File	↓ Home	Тоо	ls Con	nms Pr	oject						Wo	rkshop 4 ·	- NoNam	ne1*(pixxi	iLCD-25P4	4CT)							-	٥	×
New	Open	Save	Save As	Print	or Cut	Copy	Paste	X Delete	Undo	Redo	Clear All	Next Rockm	Prev	X Set	Find	Replace	Goto	Find Again	Collapse A	II Expand All	Compile	CompinLoad			
D Nol	Name 1* [×				Ciipu	Joard		Undo	/ Redo	1	BOOKIN	IUTK3				ind		couc	rolaing		omplie	1		4 ⊳
<pre></pre>	<pre>#plat # plat # inh # inh</pre>	MODE . erit main gfx_S print repea forev unc	"pixx RUNFLA () () () () () () () () () () () () ()	iLCD-25 SH unce l6bitCo ode(POI o World	<pre>prectrain pressure press Pressure pressure press presson pressure pressure pressure pressure pressure pressure presson pressure pressure pressure pressure pressure press</pre>	and s .fnc"); // / /	<pre>chang // chang // repl // mayb // this</pre>	ge manu lace vi s as ve	ion to ually : ith you lace =11	Flash if orie ir code	to run	from F	lash, re	refer	4D-AN-	-00055									
Insert																						Press F	l for conte	ext sensitiv	ve help

The designer is a very powerful environment, for those used to developing without any form of GUI aid, or for those developing complex systems where no aid is required.

To learn more, please to refer to the Internal Functions Manual for the processor used by the display module and 4DGL Programmer's Reference Manual.

Application Notes are also available for further information.

3.2. ViSi

ViSi was designed to make the creation of graphical displays a more visual experience.



ViSi is a great software tool that allows the user to see the instant results of their desired graphical layout. Additionally, there is a selection of inbuilt dials, gauges and meters that can simply be placed onto the simulated module display. From here each object can have its properties edited, and at the click of a button, all relevant 4DGL code associated with that object is produced in the user program. The user can then write 4DGL code around these objects to utilise them in the way they choose.



To learn more, please to refer to the ViSi User Manual, Internal Functions Manual for the processor used by the display module and 4DGL Programmer's Reference Manual.

Application Notes are also available for further information.

ViSi

3.3. ViSi-Genie

ViSi-Genie is a breakthrough in the way 4D Systems' graphic display modules are programmed. It is an environment like no other, a code-less programming environment that provides the user with a rapid visual experience, enabling a simple GUI application to be 'written' from scratch in literally seconds.



ViSi-Genie does all the background coding, no 4DGL to learn, it does it all for you.

Pick and choose the relevant objects to place on the display, much like the ViSi Environment yet without having to write a single line of code. Each object has parameters that can be set, and configurable events to animate and drive other objects or communicate with external devices.

Simply place an object on the screen, position and size it to suit, set the parameters such as colour, range, and text, and finally select the event you wish the object to be associated with, it is that simple.

Workshop 4 - NoName4*(pixxiLCD-25P4CT, PORTR4 File Home View Tools Comms Project	. (TI) – O ×
New Open Save As Print File Build CopyLoad CopyLoad Build Build Build Build Build Build Build CopyLoad CopyLoad CopyLoad CopyLoad CopyLoad CopyLoad Build Bu	abels Magic Primitives System/Media
	4 Þ
Form0	Object Inspector 83
	Object Form0 ~
	Properties Events Property Value
	Name Form0 Alias Form0
95	Bgtype Color BLACK
ON 055	Image (None)
Insert	Press F1 for context sensitive help

In seconds you can transform a blank display into a fully animated GUI with moving sliders, animated press and release buttons, and much more. All without writing a single line of code!

ViSi-Genie provides the user with a feature-rich rapid development environment, second to none.

Workshop4 PRO adds a professional set of features to the Visi-Genie environment called Genie-Magic. The added features allow the user to add in 4DGL scripts, which can be activated by the display itself, from an interfacing Host, or from an external sensor or device.

These PRO set of features of Genie-Magic allow the User to create an immensely powerful GUI system with a fraction of the effort required by other systems.

To learn more, please to refer to the ViSi-Genie User Manual.

If using ViSi-Genie Magic, information about writing code in 4DGL can be found in the Internal Functions Manual for the processor used by the display module and 4DGL Programmer's Reference Manual.

Application Notes are also available for further information.

3.4. Serial

The Serial environment (SPE) in the Workshop 4 IDE provides the user the ability to transform a 4D Systems Intelligent Display, into a slave serial graphics controller.



This enables the user to use their favourite microcontroller or serial device as the Host, without having to learn 4DGL or program in a separate IDE.

	Workshop 4 - NoName1*(Gen4-uL	CD-24DCT)	- 0 X
New Open Save Save As Print Cut Copy Paste Delete Undo	Clear All Next Prev Set	Find Replace Goto Find Again	<u>م</u>
NoName 1* 🗵	bookingro	- ma	4 Þ
<pre>>1 // *********************************</pre>	m the tools menu. y are formed and their responses, <u>IDE/</u> under the 'Serial Environmen r basis, choose the correct Seria 4D Workshop 4 menu. the second 'Create new project' when Workshop first starts up. y different to Serial Commander f ing will work.	***** // // // // // t // t // 1 // 1 // // i/ // // // // // // // // // // /	
Insert			Press F1 for context sensitive help

Once the display module is configured by the Serial Environment (by downloading what is called the SPE application to the module), commands can be sent from the user's host microcontroller to display primitives, images, sound and video, and can even be used to display ViSi generated graphics and widgets.

The Serial Environment should not be taken as being basic in terms of its capabilities, as it has the full 4DGL command set behind it, but available from the Host rather than from programming the display module itself using the Workshop4 IDE.

Virtually anything created in Designer or ViSi can be designed or controlled from the Serial Environment.

For ease of development for an Arduino compatible modules as host in Serial (SPE), consider using the Arduino Compatible Environments

Please refer to the following reference manuals for a complete listing of all the supported Serial commands for each processor

- DIABLO-16 Serial Command Set Reference Manual
- PIXXI Serial Command Set Reference Manual
- PICASO Serial Command Set Reference Manual
- GOLDELOX Serial Command Set Reference Manual

3.5. Additional Options

Additional Editor options are provided instead of the 4 environments.

This serves to provide a way to create a system or text file that may be used together with the basic environments.

3.5.1. 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.

📀 File	na ∣ ₹ Hom	ie Too	ls									Wor	kshop 4 -	NoNam	e1.inc*						-	0	×
New	Open	Save	Save As	Print	or Cut	Copy	Paste) Delete	Undo	CO Redo	Clear All	e Next	Prev	Set Set	Find	(S) Replace	Soto	Find Again					
		File				Clipbo	ard		Undo	/Redo		Bookm	narks			F	ind						
Not	lame 1.inc*	×																					4 ₽
•1																							
Insert																				Press F1 fe	or context	t sensitiv	/e help
-							_																

3.5.2. Create Text File



The Create Text File option features a plain editor, suitable for writing basic documentation, application notes,

data files or anything else requiring plain text files.

♦		Workshop 4 - NoName2.txt*	× 6 –
New Open Save Save As	Print Cut Copy Paste Delete Undo Rec	do Clear All Next Prev Set Find Replace Goto Find Again	
File	Clipboard Undo/Redo	o Bookmarks Find	
NoName2.txt* 🗵			4 Þ
*1			
Insert			Press F1 for context sensitive help

4. Arduino Compatible Environments

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



If a product under this category is selected, a different set of environments is provided allowing the users to write their Arduino code and customize their 4D graphics user interface at the same time in a single integrated development environment.



4.1. 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.

4.2. 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 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.

4.3. Genie Graphics



This is not an environment as such, but the description explains how to achieve Genie with an Arduino compatible 4D Module, or Kit.

Simply select the base module without the -AR extension from Workshop4 and utilize the standard ViSi-Genie environment with our genieArduino library and use the Arduino IDE for the Arduino development.

5. Common File Menu

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



It provides 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

📋 🛛 File Menu E	Buttons
Button	Description
New	Create a New Project by selecting the target display module and development environment
Open	Open a standard Open file window to browse and load an existing project
Recent	Displays a list of recently accessed files and options to create a new project from scratch or based on last used project setting
Save	Save all modified projects/files
Save As	Save a copy of a previously saved project/file and give it a new name
Zip Project	Make a compressed file out of the project. This is especially useful when sharing projects.
Close	Close the current project. This will open a save prompt in case there are unsaved changes.
Print Setup	Open the Print Setup window that can be used to setup the printer and print properties
Print	Open a Print window that can be used to print the project
Options	Provide an interface to modify the IDE settings and the default options for a NEWLY created projects
Help	Provide links to website, community forum, and other helpful web content
Samples	Provide a list of basic example project from 4D Systems
🔀 Exit	Close Workshop4. This will open a save prompt in case there are unsaved changes.

6. Designer Specific Menus

The Designer environment includes five menus:

ی ا	-			
File	Home	Tools	Comms	Project

6.1. Home Menu

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

File	Home	Tools	Com	ms Pro	oject																	
New	Open S	ave Si	ave As	Print	or Cut	Copy	Paste	X Delete	Undo	Redo	Clear All	Next	Prev	Xo Set	Find	(S) Replace	Goto	Find Again	Collapse All	Expand All	Compile	Comp'nLoad
	1	File				Clipb	oard		Undo/	Redo		Bookm	arks			F	ind		Code Fo	lding	Co	mpile

This ribbon menu contains the following button groups

- File-related buttons
- Code-related buttons
- Bookmark buttons
- Find and Replace Buttons
- Compile Buttons

6.1.1. File-Related Buttons

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



6.1.2. Code-Related Buttons

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



6.1.3. 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.

6.1.4. Find and Replace Buttons

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



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



Use the up and down arrows to look for the previous and next occurrence.

code 🗸 🖑 🛧 🕻 🗋 Whole words 🗋 Case Sensitive	O This file O Files in project O All open files	1 match found
Check Whole Words and Case Sensitive.		
code	• This file Files in project All open files	1 match found

Choose between This file and Files in progress and All Open Files.

code 🗸 🕹 💠 👌 🛛 Whole words 🗋 Case Sensitive

This file Files in project All open files

1 match found

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

DN	NoName 1* 🗵	4 ⊳
1	<pre>#platform "Gen4-uLCD-24DT"</pre>	
2		
3	Alebania MADOT 1 Chiefellanne feat	
5	finnerit "4DGL_16DitColours.inc"	
6	□ func main()	
7		
8	<pre>gfx_ScreenMode(PORTRAIT) ; // change manually if orientation change</pre>	
9		
₽ 0	<pre>print("Hello World") ; // replace with your code</pre>	
12	repeat // maube replace	
13	forever // this as well	
14		
15	endfunc	
16		
code	V 💠 🏠 Whole words Case Sensitive O This file Files in project All open files	
routine	e V Replace Provide Replace all	

Same options as for **Find** apply to this with the addition of **Replace** and **Replace all** buttons.

code 🗸	5 🚭 🕀	Whole words	Case Sensitive	🔾 This file	◯ Files in project	◯ All open files
routine 🗸	✓ <u>R</u> eplace	🥜 Replace <u>a</u> ll				

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

Goto Line	×
New Line?	
OK	Cancel

6.1.5. Code Folding Buttons

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

Collapse All	Expand All					
Code Folding						

This is especially useful for large projects.

6.1.6. Compile Buttons

The **Compile** button launches the compilation of the project, can also be accessed with shortcut key Ctrl + F9. The **Comp'nLoad** compiles and uploads the project to the screen, which has a shortcut key of F9.



Once a project has been loaded, if there are no changes, then the **Comp'nLoad** button will change to a *Download* button.

6.2. Tools Menu

All the tools and utilities useful for the Designer environment are included here.

i	File	Home	Tools	Comms	Project				
G Co	iraphics omposer	USD Tester	PmmC PmmC Loader	RMPet	FileTransfer	Terminal 9600	Terminal	Touch Calibration	4DGL uVGA Link

📋 🛛 Tools Menu	Buttons
Graphics Composer	Open the Graphics Composer tool. This legacy 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.
USD Tester	Open the uSD Tester tool 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.
Phone PmmC Loader	Open the PmmC Loader tool to update the PmmC/Driver for the target display
RMPet	Open the RMPet tool to partition the uSD card. The uSD card must be mounted to the PC.
FileTransfer	Open the File Transter utility allowing read and write operations to a display modules' uSD or external flash via USB-to-Serial connection
Terminal 9600	Open the Terminal tool and connect to the currently <mark>selected port</mark> at 9600 baud
Terminal 115200	Open the Terminal tool and connect to the currently selected port at 115200 baud
Touch Calibration	Load a touch calibration program to <i>resistive</i> display modules connected at selected port
4DGL uVGA Link	Open an interactive window to use mouse/keyboard with the uVGA-II or -III module

6.3. Comms Menu

This menu oversees the communication port:

File	н	ome	Tools	Comms	Project				
	~	Statu	s at 5:51	51 pm pixxiL (F	CD-25P4-f [v2.2] Flash: 16.00 MB)				
Comms									

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

6.4. Project Menu

The Project menu includes different parameters and options

File	Home	Tools	Comms	Project	
RAM	Flash	Allow - Digits on	ve Led and (and leading Custom Dio	Custom blanks iits	Gen4-uLCD-24DT 🗸
Destination		E	nhanceme	nts	Display

There are three areas in this menu.

- Destination,
- Enhancements,
- And display selection.

6.4.1. Destination

This includes the options for the destination of the compiled code (not images/multimedia etc):



Select the **Destination** among two options:

- **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 selected as the destination, the program is lost when the display is turned off. This is for testing during development, to prevent the Flash cycles being used.
- **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 selected as the destination, the program is retained and will be available after power cycling. This should be the default for normal use.

6.4.2. 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.



6.4.3. Display Selection

The third section allows to select the screen.

Clicking on the button opens a new window to select the screen, and adjust the orientation of the module to suit how the module will be mounted:

Change Display	×
<u> </u>	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.

Select the screen from the drop-down list:

Gen4-uLCD-28DT	\sim
Gen4-uLCD-28DT	^
Gen4-uLCD-32D	
Gen4-uLCD-32D-CLB	
Gen4-uLCD-32DT	
Gen4-uLCD-32DCT-CLB	5
Gen4-uLCD-35D	^
Gen4-uLCD-35D-CLB	
Gen4-uLCD-35DT	Υ.

Define the orientation among the four options:



7. ViSi Specific Menus

The ViSi environment includes all the menus available with the Designer environment plus two additional menus: **View** and **Widgets**. The **Project** menu also contains additional selections regarding the destination for Widgets/ media.



7.1. 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 be made.



This window provides a zoom up to 6 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.

7.2. Tools Menu

All the tools and utilities useful for the ViSi environment are included here.

File	Home View Tools Widgets Comms Project
USD Tester	PmmC r Loader RMPet FileTransfer FileTransfer 9600 Terminal Termin
📋 🛛 Tools Menu	J Buttons
USD Tester	Open the uSD Tester tool 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.
PmmC PmmC Loader	Open the PmmC Loader tool to update the PmmC/Driver for the target display
RMPet	Open the RMPet tool to partition the uSD card. The uSD card must be mounted to the PC.
FileTransfer	Open the File Transter utility allowing read and write operations to a display modules' uSD or external flash via USB-to-Serial connection
Terminal 9600	Open the Terminal tool and connect to the currently selected port at 9600 baud
Terminal 115200	Open the Terminal tool and connect to the currently selected port at 115200 baud
Touch Calibration	Load a touch calibration program to <i>resistive</i> display modules connected at selected port
4DGL uVGA Link	Open an interactive window to use mouse/keyboard with the uVGA-II or -III module
Update Bank(s) and Run	See Update Bank(s) and Run (only for DIABLO-16 displays)
Load Inherents into Bank 5	See Load Inherents into Bank 5 (only for DIABLO-16 displays)

Update Bank(s) and Run

When **uSD** is selected as the Destination in the Project Menu, the ViSi 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 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 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 program files present in the uSD card. By default, if the time and date information of a ViSi 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 program files in the uSD card have a newer time and date information.

Load Inherents into Bank 5

This is a tool which loads the widget software related to **Inherent Widgets** when used on a DIABLO-16 processor, into Flash Bank 5. This is only required to be done once. All possible Inherent Widget code is loaded in to Bank 5, whether it is used or not, so this is a one-time operation only. It is then ready to go for whatever Inherent widgets you might add to your application. You will receive an error message (Error 30) on the display if you have not loaded Bank 5 based on what you have programmed into the display.

7.3. Widgets Menu

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

	File	Hom	e View	Tools	Widgets	Comms	Project				
1	Backgrou	inds	Buttons	Digits	Gauges	Inputs	Int/Inh Inputs	Labels	Primitives	System/Media	2
		Q			F						

See Workshop4 Widgets for more information.

7.4. Project Menu

The Project menu for ViSi provides additional toggles for the designation of the widgets/media which are used in the Project, as to if they reside in microSD card storage, or Flash memory.

	File	Home	View	Tools	Wid	gets Comms	Project			
	RAM	Flash Flash	uSD uSD	Bank 0	•	Allow -ve Led a Digits and lead on Custom	nd Custom ding blanks Digits	Fat	Flash Flash	Gen4-uLCD-32DT LANDSCAPE +
Ľ	Destination					Enhance	ments	File Sy	/stem 🛛 🕼	Display

There are four areas in this menu.

- Destination where code will reside,
- Enhancements,
- File System where widgets/media will reside,
- And display selection.

7.4.1. Destination

The following options are for selecting the destination of the compiled code (not images/multimedia etc)

	RAM RAM	Flash Flash	uSD uSD	Bank 0	•	
Destination						

Select the **Destination**:

- **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. This really is for testing while developing, to prevent the Flash cycles being used.
- **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. This should be the default for normal use.
- 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 (PICASO) or Update Bank(s) and Run (DIABLO-) to be uploaded to the display's flash, as seen in the Tools menu. These program loads the user's application from the uSD card at startup and executes it.
- Bank This dropdown simply changes the filename generated when using **uSD** as Destination, for DIABLO-16.

7.4.2. Enhancements

The second section's 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.



This is selectable as some older projects were made before this option was enabled, so it is required to be user selected to retain historical functionality.

7.4.3. File System

The third section contacts the File System selection, which is to state where the multimedia (widgets, images, etc) will be stored on the display module. Not all display modules have both options, as many will either have a microSD card, or Flash Memory – not both. You will need to select the appropriate one based on your display module.



Selecting **Fat** will target the multimedia to be stored on the microSD card. Selecting **Flash** will target the multimedia to be stored on Flash Memory.

Note

Depending on the Widget used in the Project, will determine what type of storage it requires. There are Internal Widgets, Inherent Widgets, and GCI Widgets.

Internal (PmmC) widgets are based in the PmmC and take up code space of the processor (which is the Flash of the processor itself).

Inherent widgets take up External Flash space on PIXXI based modules, or Flash Bank 5 space on DIABLO modules. Both also take up a little code space on the Processor. Note External Flash is an external chip to the processor, often found on PIXXI based modules. Flash Banks are DIABLO specific and are internal to the DIABLO processor itself.

GCI widgets take up External Flash Space or microSD space on PIXXI-, or microSD space on DIABLO-.

To clarify:

If you have Internal Widgets used in your project:

These will be stored on the Processor itself alongside your project code, irrespective if you select **Fat** or **Flash** as the File System, as they are stored internal of the processor.

If you have Inherent Widgets in your project:

If you have the **Fat** option selected for the File System, these widgets are unable to be used as they cannot run from microSD card. If you have **Flash** selected, then these widgets will be stored in External Flash on PIXXI based modules, or in a Flash Bank for DIABLO based modules (inside the DIABLO processor).

If you have **GCI Widgets** in your project:

If **Fat** is selected as the File System, then the widgets will be stored on the microSD card for both PIXXI or DIABLO based modules. If **Flash** is selected as the File System, then the widgets will take up External Flash space on PIXXI-, and for DIABLO it is currently not supported but will be coming soon.

Note

GCI widgets can become large, and External Flash is limited to typically 16MB for 4D Display modules, so there is a very real chance that GCI widgets may not fit in External Flash, and other widget types such as Internal or Inherent may need to be utilised.

It is important to understand the different widget types **BEFORE** designing your project. Be sure to know what the intended storage File System is that will be used, and therefore which widget type is the most appropriate for your intended project.

For more information on widgets, all the types and more specific information about them, please refer to Workshop4 Widgets section.

7.4.4. Display Selection

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



Please refer to **Display Selection** section of Designer Specific Menus for more information.

8. 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.

8.1. Home Menu

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



This ribbon menu contains the following button groups

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

8.1.1. File-Related Buttons

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



8.1.2. Build Buttons

The **Build** button launches the compilation and the generation of the GUI objects, and uploads the project to the display module, and offers to transfer media to uSD/Flash storage. Shortcut Key is Shift+F9

The **(Build)** button will only compile or generate the GUI if required if there have been changes, and then uploads the project to the display module, and offers to transfer media to uSD/Flash storage. Shortcut Key is F9



Additionally, Ctrl+F9 does a forced compile, however this is typically not required in Genie as on the surface it does nothing since the code is all automatically handled in the background. Can be useful if manually editing genie source code however – Advanced users only.

8.1.3. Objects Pane

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

Backgrounds Buttons Digits	Gauges Inputs Int/Inh Inputs Labels Magic Primitives System/Media	6
💑 🍭 📑 🝓	🔶 🐮 🔎	

Please refer to the ViSi-Genie Manual for more information.

8.2. View Menu

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



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



This window provides a zoom up to 6 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.

8.3. Tools Menu

All the tools and utilities useful for the Genie environment are included here.

The tools available depends on the processor of the target display module:

PIXXI-



For DIABLO-16 display modules, the Update Bank(s) and Run button and Load Inherents into Bank 5 tools are

added. For more information regarding these tools, please check the application notes.



For **PICASO** display modules, the **Boot uSD** button is added. For more information regarding this tool, please check the application notes.

PICASO-only Tools					
Boot uSD	Upload the Boot uSD application to the screen, enabling programs to be loaded via microSD card (<i>only for PICASO displays</i>)				

🗀 Common To	🗄 Common Tools							
Renumber	Reallocate the indexes of all the widgets in your application, as during development widgets may be deleted, leaving gaps in the numbering index.							
USD Tester	Open the uSD Tester tool 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.							
Phone PmmC Loader	Open the PmmC Loader tool to update the PmmC/Driver for the target display							
RMPet	Open the RMPet tool to partition the uSD card. The uSD card must be mounted to the PC.							
FileTransfer	Open the File Transter utility allowing read and write operations to a display modules' uSD or external flash via USB-to-Serial connection							
Terminal 9600	Open the Terminal tool and connect to the currently selected port at 9600 baud							
Terminal 115200	Open the Terminal tool and connect to the currently selected port at 115200 baud							
Touch Calibration	Load a touch calibration program to <i>resistive</i> display modules connected at selected port							
4DGL uVGA Link	Open an interactive window to use mouse/keyboard with the uVGA-II or -III module							
Stx GTX	Open the Genie Test eXecutor application providing a host simulator that can display commands being sent and received							

8.4. Project Menu

The **Project** menu includes different parameters and options compared to Designer and ViSi, these will be explained in detail here.



There are four groups of buttons:

- Options for Genie,
- Enhancements,
- File System,
- And display selection.

8.4.1. Genie Options

PICASO and PIXXI share the same Genie options:

Destination	Initial Form	Comms Speed: 9600 👻	Comms	Allow buttons	Max String Length
RAM RAM Flash Flash	Form0 -	Sound Buffer: 1024 👻	Com0 -	to be disabled	— 75 +
	(Genie			

DIABLO on the other hand has an additional option for Program **Destination**.

Destination RAM Run RAM RAM Flash Run Flash USD USD Bank 1 •	Initial Form Form0	Comms Speed: 9600 Sound Buffer: 1024	RX1:PA0 v TX1:PA1 v TX1:PA1 v	Max String Length
	G	enie		

This provide a selection for DIABLO-16's flashbanks.

Destination		
RAM RAM Flash Run uSD uSD	Bank 1	
	Bank 1	ł
	Bank 1	1
	Bank 2	I
	Bank 3	I
	Bank 4	I
	Bank 5	ł

Program Destination						
RAM Run RAM	The display must be connected during Build and the program code will be downloaded to the display's flash memory (Processors Flash, not external flash) once compiled. The user's application will be stored in Flash but will be run from RAM.					
Flash Run Flash	The display must be connected during Build and the program will be downloaded to the display's flash memory (Processors Flash, not external flash) 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 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 (PICASO) or Update Bank(s) and Run (DIABLO-) to be uploaded to the display's flash, as seen in the menu Tools. These program loads the user's application from the uSD card at startup and executes it.					
Bank 0 💌	The additional drop-down menu allows the user to specify the target destination flash bank of the ViSi-Genie program. The DIABLO-16 processor has six flash banks (Bank 0 to Bank 5), each of which has a capacity of 32 kB.					

When using **DIABLO-16** Flashbanks:

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. See the Tools Menu section for more information.

📋 Additional Genie Options	S
Form0	The initial form section allows the user to set which form will show upon boot up.
Comms Speed: 9600 👻	Comms speed is the baud rate at which the serial command interface operates for this specific project. This speed OVERRIDES the default settings found in the Genie tab of the Options page (which are the Default settings for newly created projects only). Changing the comms speed baud rate here will not affect any other project and is the comms speed which is compiled and loaded into the display module.
Sound Buffer: 1024 👻	Define Sound buffer size to set aside RAM 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. These settings override the settings found in the Genie Tab of the Options page (which are the Default settings for newly created projects only). Changing the Sound Buffer Size here will not affect any other project and is the buffer size which is compiled and loaded into the display module.
Comms Com0 TX1:PA0 TX1:PA1	The Comms port selection allows you to change the project specific options for this single project, either utilising the default COM0 for Genie Comms to the host, or COM1 which can have the RX/TX GPIO selected. These settings override the settings found in the Genie Tab of the Options page (which are the Default settings for newly created projects only). Changing the comms port here will not affect any other project and is the comms port which is compiled and loaded into the display module.
Allow buttons to be disabled	Button objects can 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.
Max String Length	Max String Length allows the adjustment of the maximum string length able to be sent over Genie comms from the Host to the display. This may be desired to change if a longer string is required to be sent, however doing so will consume an extra 3 bytes of RAM for each additional character. This is Project specific only, the default length for new projects is adjusted in the Options – Genie tab.

8.4.2. Enhancements

This 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.



This is selectable as some older projects were made before this option was enabled, so it is required to be user selected to retain historical functionality.

8.4.3. File System

The third section contacts the File System selection, which is to state where the multimedia (widgets, images, etc) will be stored on the display module. Not all display modules have both options, as many will either have a microSD card, or Flash Memory – not both. You will need to select the appropriate one based on your display module.



Selecting Fat will target the multimedia to be stored on the microSD card. Selecting Flash will target the multimedia to be stored on Flash Memory.

Note Depending on the Widget used in the Project, will determine what type of storage it requires. There are Internal Widgets, Inherent Widgets, and GCI Widgets. Please see File System section of ViSi Specific Menus for a short discussion of different type of widgets and the storage requirements.

8.4.4. Display Selection

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



Please refer to **Display Selection** section of Designer Specific Menus for more information.

9. Basic/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.

File	Home	View	Tools	Widgets	Comms	Project	
COM 8 V pixxiLCD-25P4-f [v2.2]		COM 5 ~					
			C	omms			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.

10. 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:



11. Workshop4 Widgets

Workshop4 provides a drag n' drop design tool for most of its powerful development environments. This allows user to easily utilise three types of widgets in their projects:

- GCI Widgets
- Internal Functions (PmmC) Widgets
- Inherent Widgets

This offers increased flexibility in creating applications depending on the hardware requirement. These widgets include the following: buttons, sliders, knobs, gauges, LED indicator, LED digit, strings, static labels, media, and images. Additional non-GUI widgets are also available that allows the user to add miscellaneous functionalities like sound, hardware I/O, or supporting resources like fonts, depending on the target processor and environment used. All these widgets are available in the Widgets Menu of the ViSi and ViSi-Genie environment of Workshop4 IDE. Given its high configurability, these widgets can be customized directly on the What You See Is What You Get (WYSIWYG) screen or through the **Object Inspector**.

You can refer to the Workshop4 Widgets Reference Manual for more information.

11.1. Smart Widgets

Workshop4 PRO also adds the ability to use SMART widgets, which are tools to assist the User to create their Buttons, Sliders, Gauges etc.

You can refer to the Smart Widgets User Guide for more information.

12. Revision History

Document Revision					
Revision Number	Date	Content			
1.0	19/11/2012	First Release			
1.1	17/12/2012	Typos on Page 4 fixed			
1.2	04/02/2013	Added new content for Serial and fixed incorrect document references			
1.3	05/07/2013	Amended details about Micro-SD card			
1.4	11/03/2014	Amended details about Program Destination			
2.0	01/05/2017	Updated formatting and contents			
2.1	29/07/2017	Added information on target flash banks			
2.2	05/04/2019	Updated Formatting			
2.3	27/07/2020	Added more information around Project Options vs Options Menu, regarding default settings vs Project specific settings. Added information regarding Fat/Flash designations for widgets and media. Added ViSi options for Update Flash Banks() and Run for DIABLO			
2.4	07/02/2023	Modified for web-based documentation			
2.5	20/03/2024	Updated formatting for resource centre redesign			

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