



USER GUIDE

4D SYSTEMS

TURNING TECHNOLOGY INTO ART

Workshop 4 User Guide

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1. Description

This user guide provides an introduction to Workshop 4, the 4D Systems integrated development environment. Workshop 4 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 Systems 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, 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 Systems. (Not available for Goldelox)

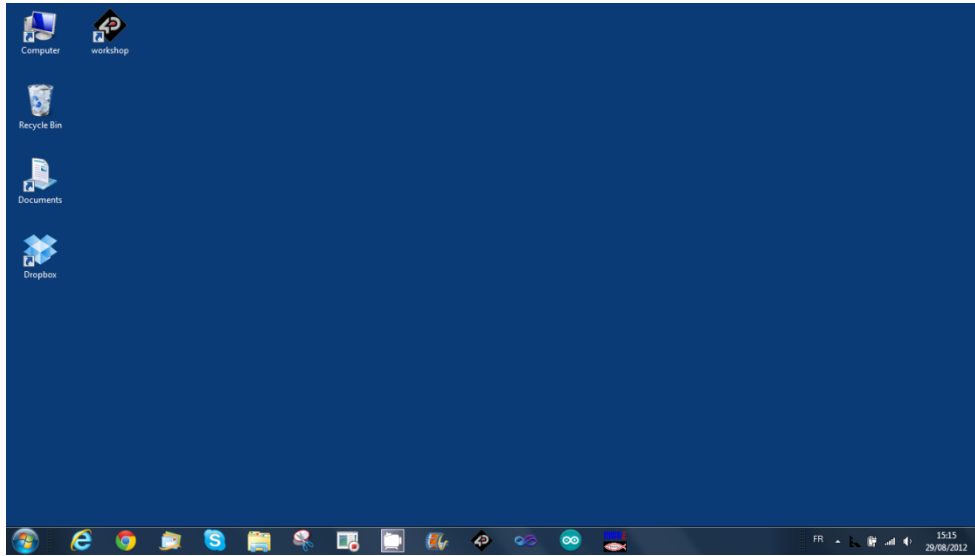


A **Serial** environment is also provided to transform the 4D Systems module into a slave serial module, allowing the user to control the display from any host microcontroller or device with a serial port.

To install Workshop 4, please refer to the document **Workshop 4 Installation**.

2. Workshop 4

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



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



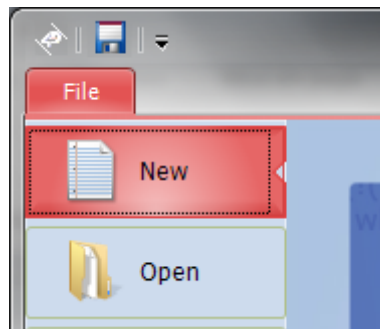
3. Create a New Project

Workshop 4 opens and displays the **Recent** page:



To create a new program, there are multiple options:

- Click on the top left-most icon **New**



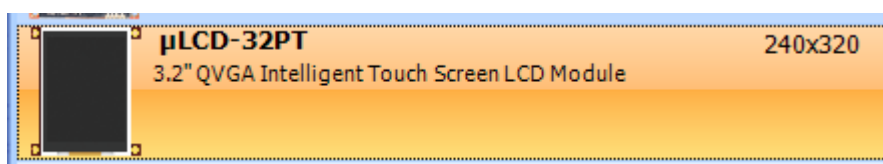
- Click on the upper **Create a New Project** if creating a project from scratch, or click on the lower **Create a New Project** to use the settings and module that was used last time:



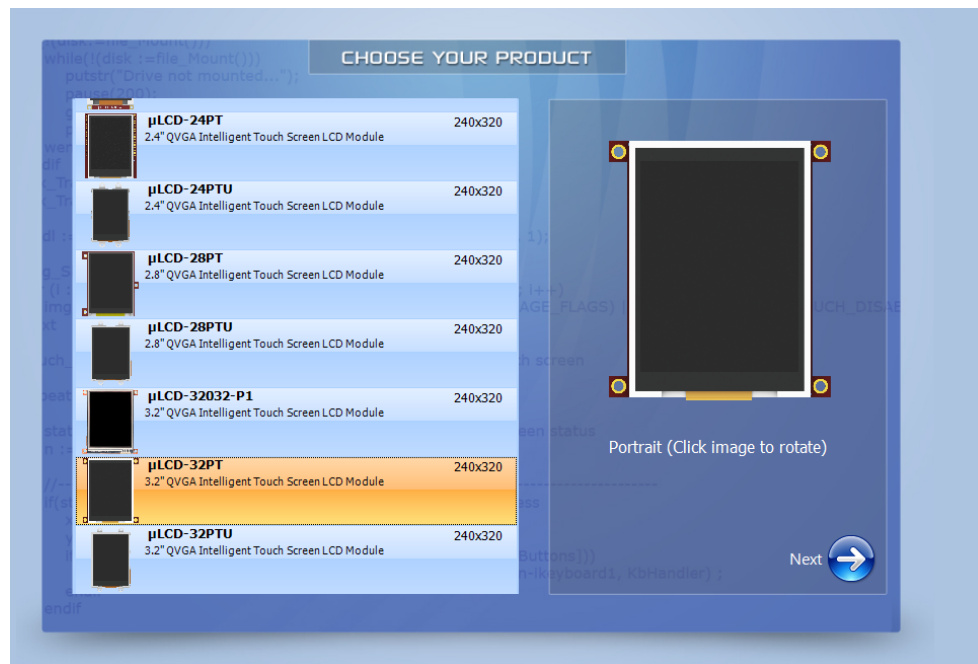
Choose Your Product, simply select the 4D Systems module of choice to start your development:



Select the product, in this case the µLCD-32PT Display Module:



The selected module is displayed on the right hand side:



Orientation is portrait by default.

To set it to landscape, just click on the image of the display to rotate it. Additional clicks rotate the display by 90 degrees:



Press **Next** to proceed:



4. Choose Your 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 open simultaneously on Workshop 4. 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.

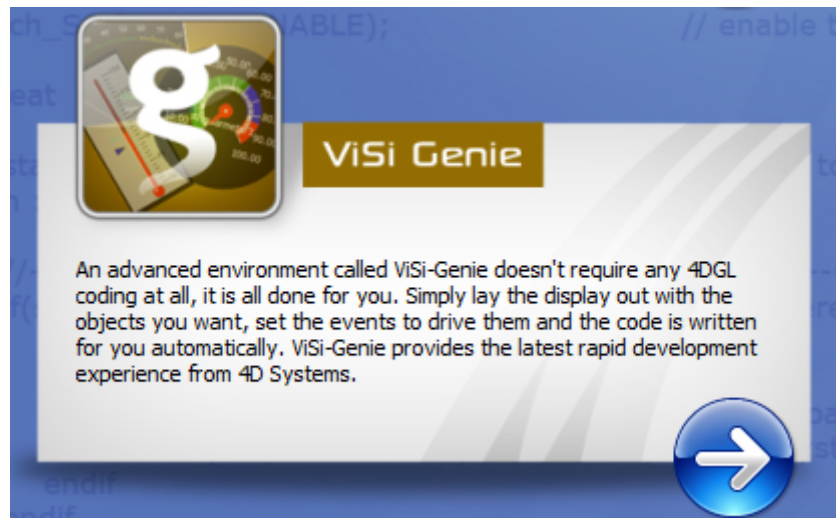
A screenshot of the Workshop 4 IDE interface. The title bar reads 'Workshop 4 - NoName1*(uLCD-32PT)'. The menu bar includes 'File', 'Home', 'Tools', 'Comms', and 'Project'. The toolbar contains various icons for file operations (New, Open, Save, Save As, Print, Save File), editing (Cut, Copy, Paste, Undo, Redo, Clear All, Next, Prev, Set), and development (Find, Replace, Goto, Find Again, Collapse All, Expand All, Compile, Comp'nLoad). The code editor shows the following 4DGL code:

```
1 #platform "uLCD-32PT_GFX2"
2 // Designer
3 #inherit "4DGL_16bitColours.fnc"
4
5 func main()
6
7     gfx_ScreenMode(LANDSCAPE) ; // change manually if orientation change
8
9     print("Hello World") ; // replace with your code
10
11     repeat // maybe replace
12     forever // this as well
13
14 endfunc
15
```

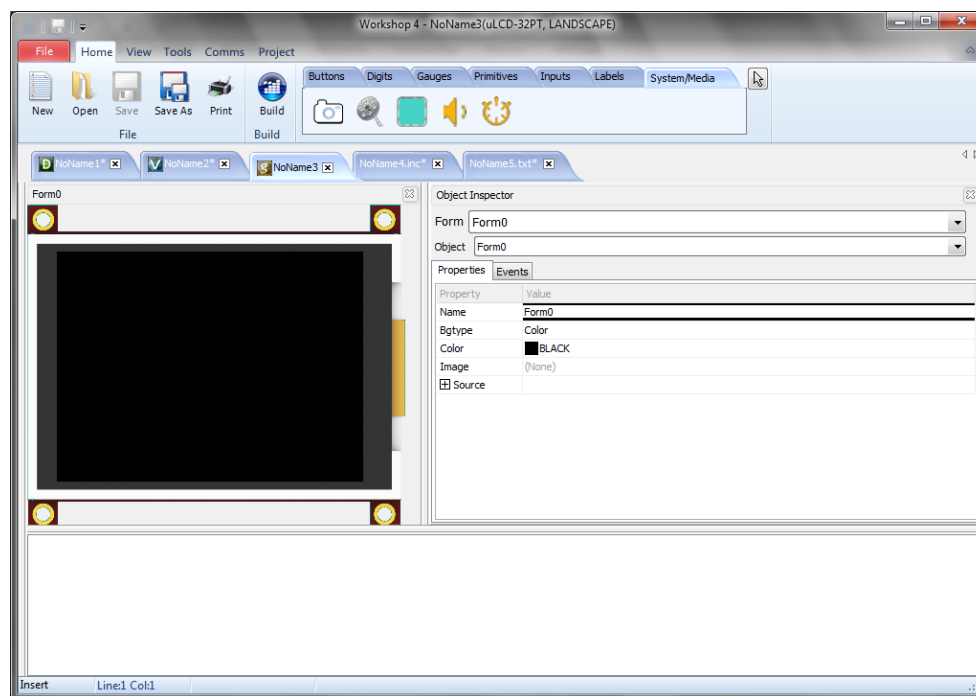
The status bar at the bottom indicates 'Insert' and 'Line2 Col8'.

To learn more about Designer, please refer to Designer User Guide and the related application notes.

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 Systems.



To learn more about ViSi-Genie, please refer to ViSi-Genie User Guide and the related application notes.

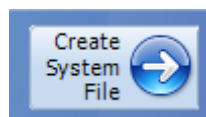
4.4. Serial



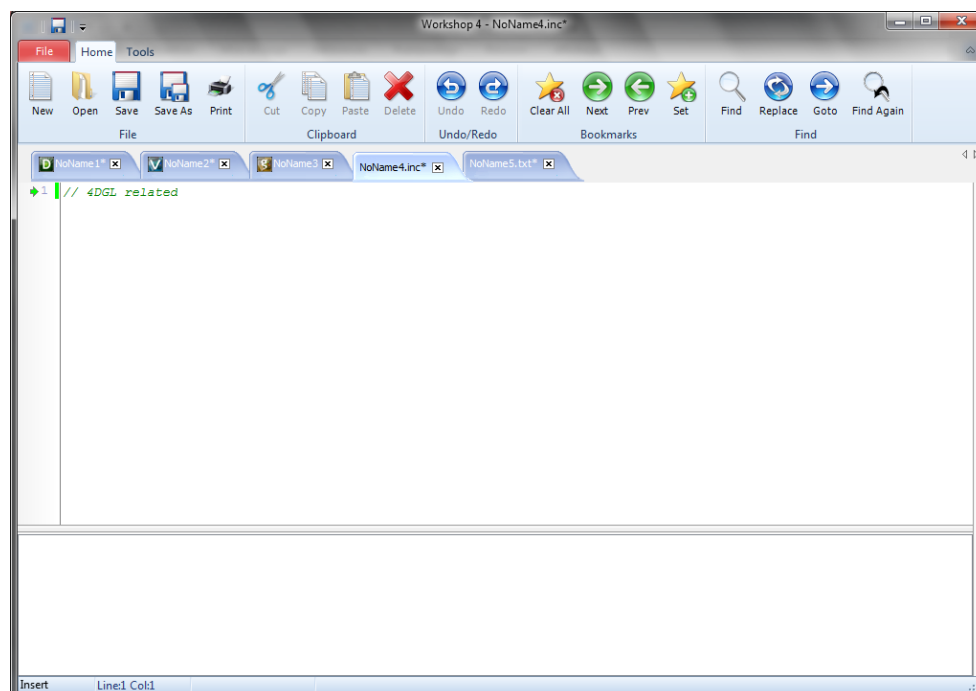
The **Serial** environment is provided to transform the module into a slave serial module, allowing communication and control from virtually any host micro-controller or device with a serial port.

This option is under development and is coming very soon.

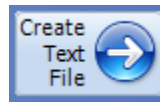
4.5. Create System File



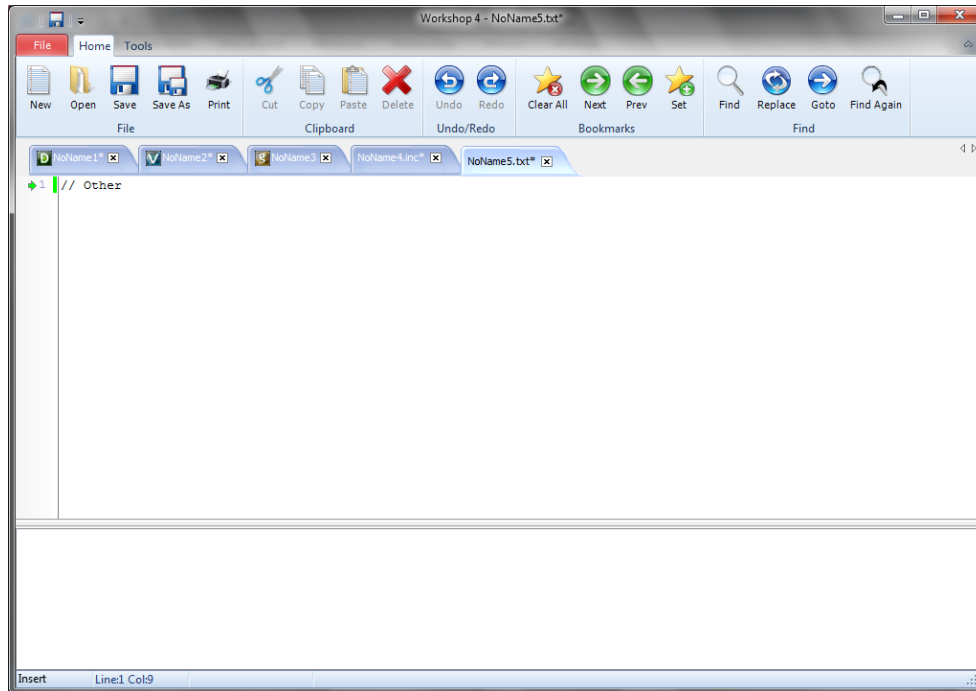
The **Create System File** option provides an editor for all 4DGL-related projects, so a user can create or edit a 4DGL Include file, 4DGL Library file, a Function or System file. These can then be included in the users 4DGL code.



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. Common File Menu

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

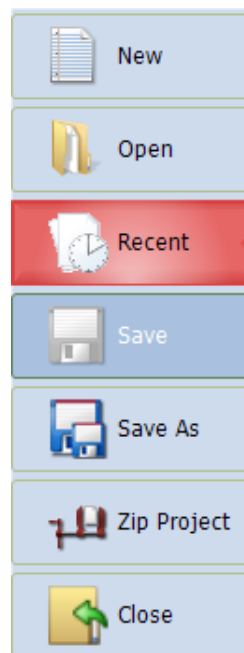


...with various buttons relating to the project that is open (or greyed out if no project is open):

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

5.1. File-Related Buttons

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

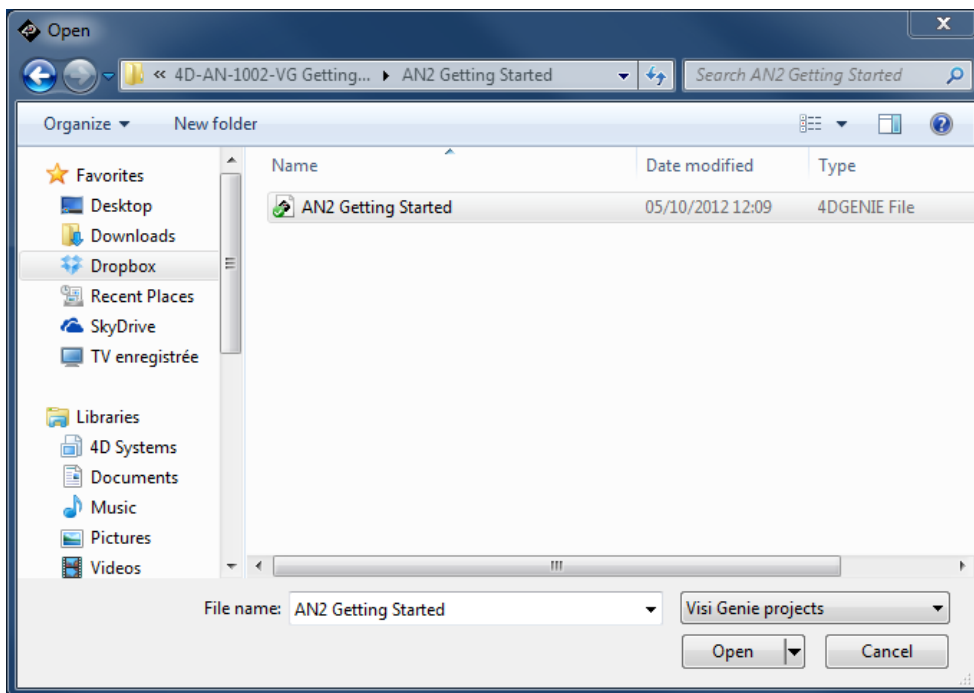


The options include:

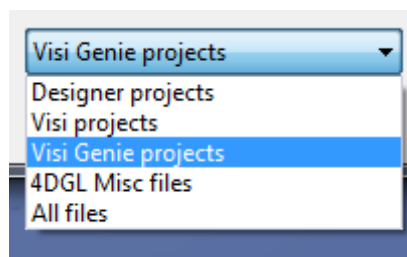
- Click **New** to create a new project. A dialogue window asks for the screen and the kind of project.



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



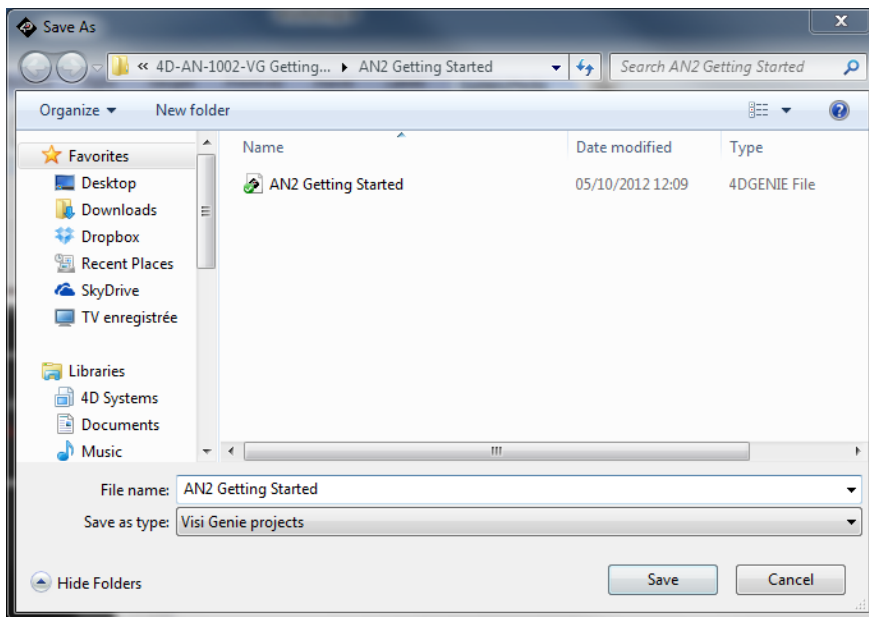
Select **ViSi-Genie projects** among the different kinds listed below to load a ViSi-Genie project:



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

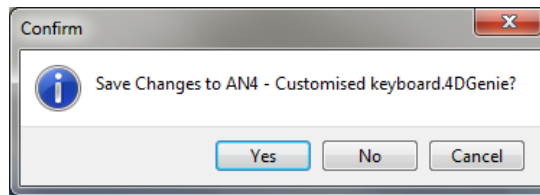


- Click **Save** to save the modified projects.
- Click **Save As** to create a copy of already saved project and give it a new name. A standard Save window opens and asks for the location and the name:



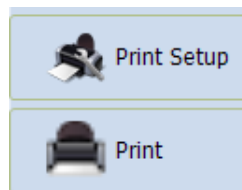
- Click **Zip Project** to make a compressed file out of the project. This is especially useful when the project is large and contains pictures and videos.

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

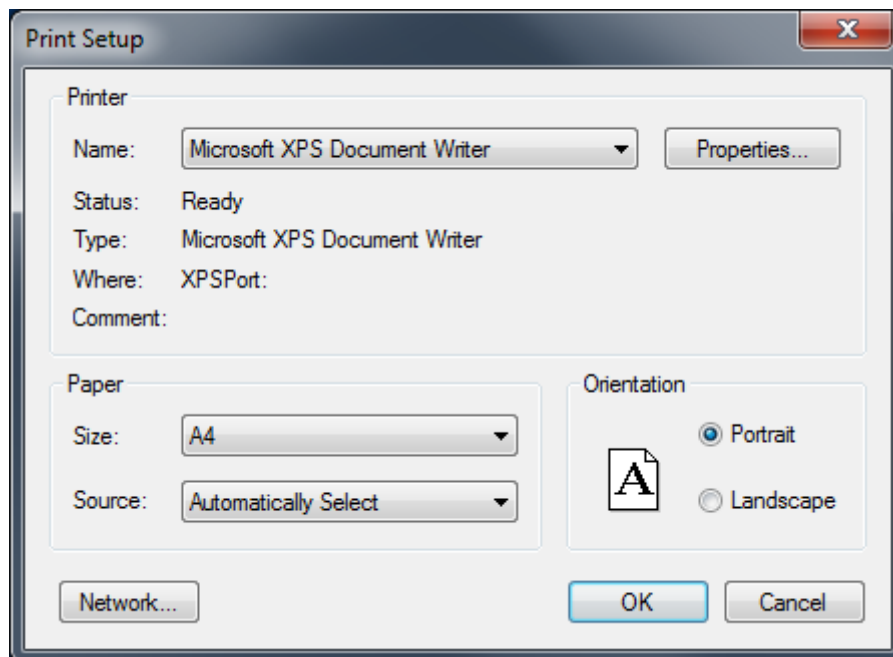


5.2. Print-Related Buttons

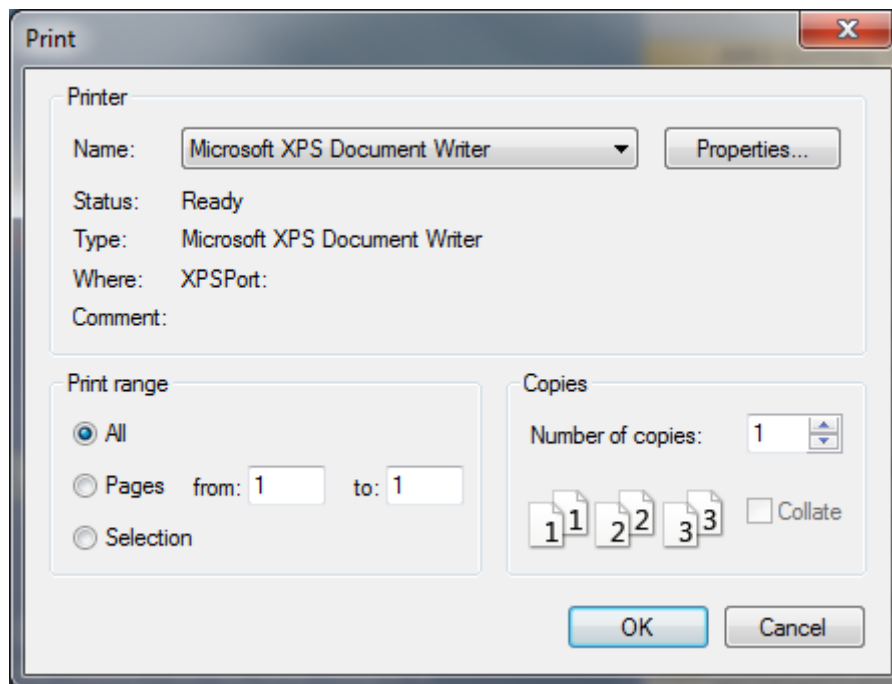
The buttons include all the actions related to print:



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

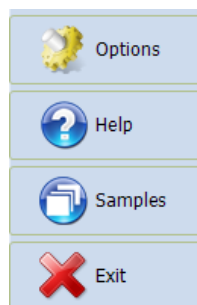


Click **Print** to print the project:

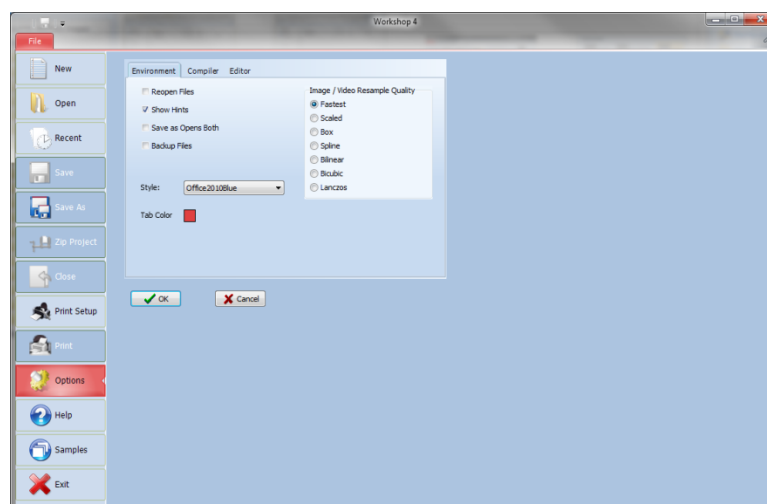


5.3. Miscellaneous Buttons

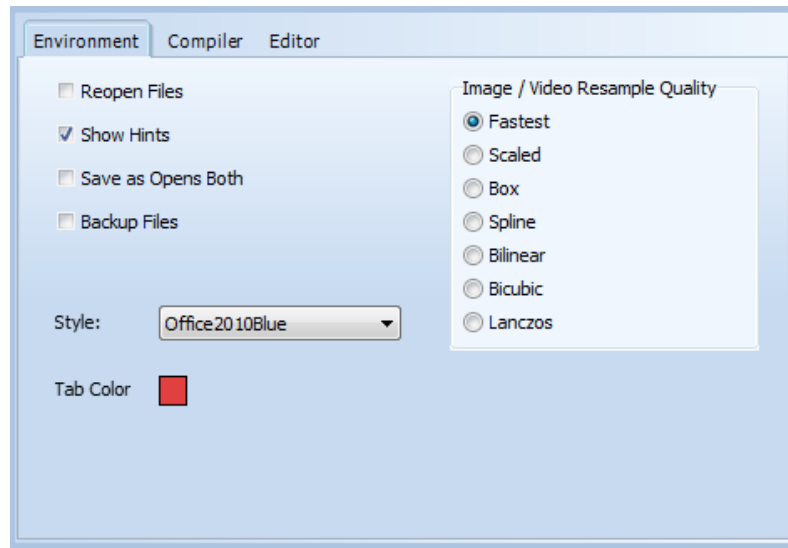
The Miscellaneous buttons include **Options**, **Help**, **Samples** and **Exit**.



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



Options include three panes but only **Environment** is relevant with ViSi-Genie, which is code-less. The Compiler and Editor panes deal with code.

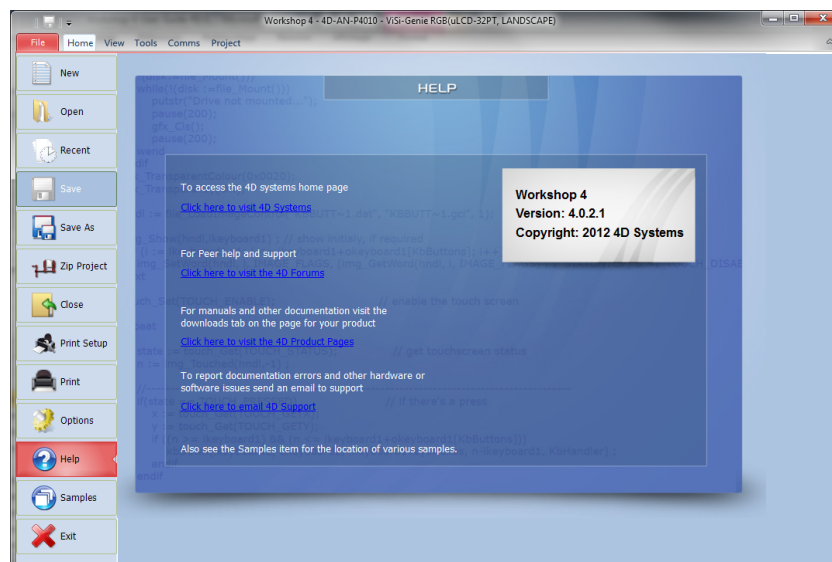


Select the **Style** among different possibilities.

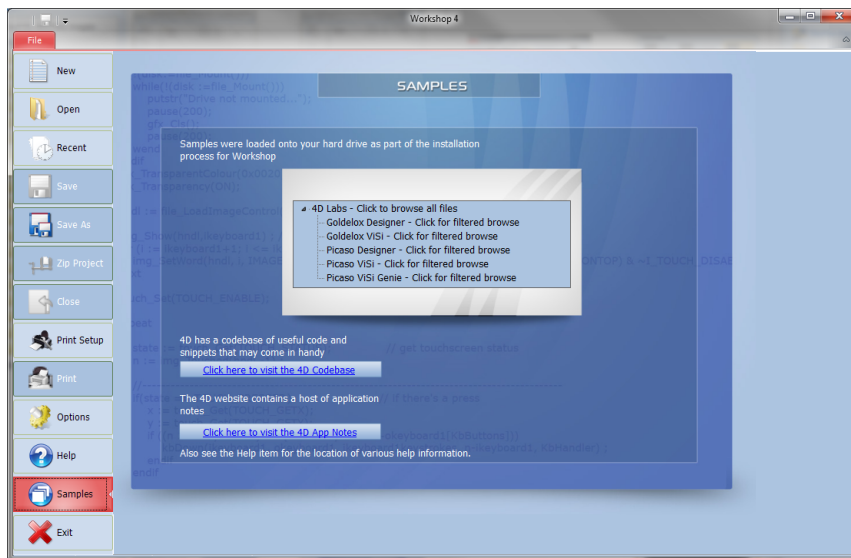
The **Image / Video Resample Quality** selection brings different options:

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

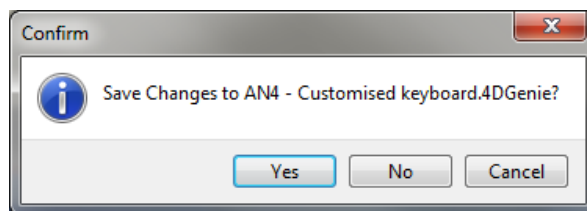
Click **Help** to access help, with links to the 4D Systems website:



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

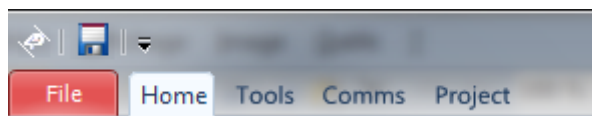


Click **Exit** to close Workshop 4. You will be prompted to save the changes to any modified project.



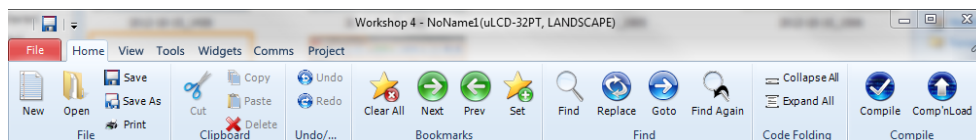
6. Designer Specific Menus

The Designer environment includes five menus:



6.1. Home Menu

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



...with three groups of buttons:

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

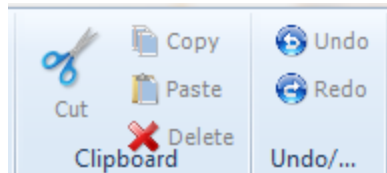
6.1.1. File-Related Buttons

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



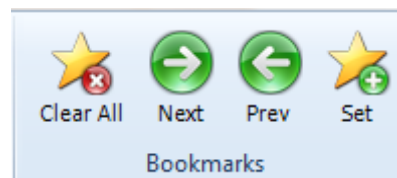
6.1.2. Code Related-Buttons

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

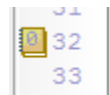


6.1.3. Bookmark Buttons

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:



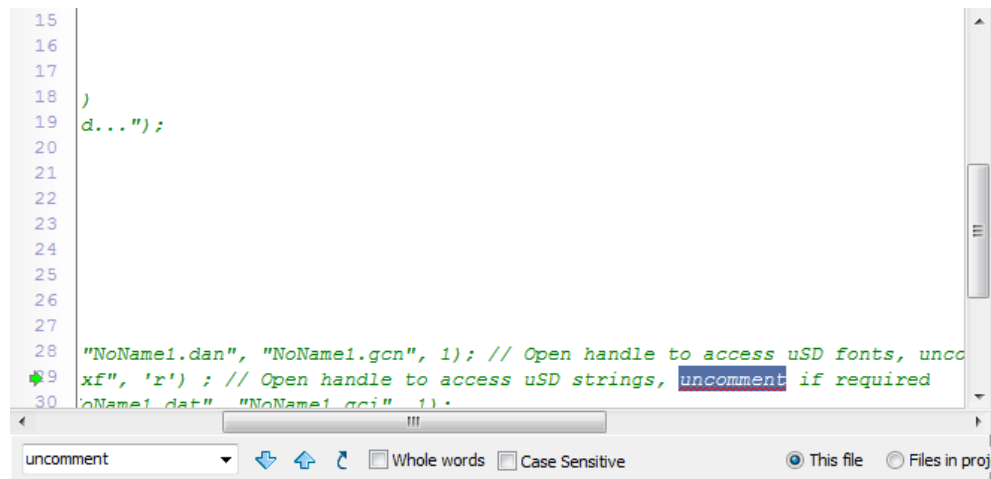
Bookmarks are especially useful for large projects.

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 highly it in the code:



```

15
16
17
18 )
19 d...");
20
21
22
23
24
25
26
27
28 "NoName1.dan", "NoName1.gcn", 1); // Open handle to access uSD fonts, unco
29 xf", 'r') ; // Open handle to access uSD strings, uncomment if required
30 ioName1.dat" "NoName1.gci" 11.

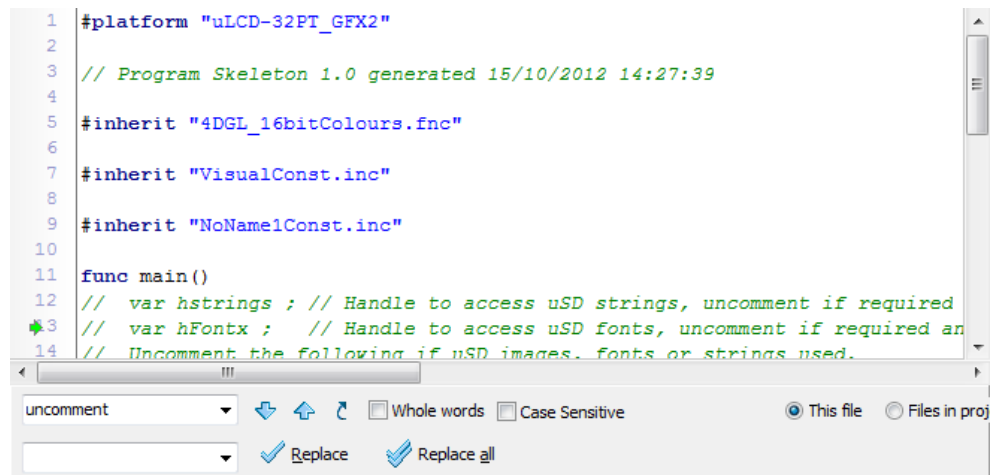
```

uncomment Whole words Case Sensitive This file Files in project

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:



```

1 #platform "uLCD-32PT_GFX2"
2
3 // Program Skeleton 1.0 generated 15/10/2012 14:27:39
4
5 #inherit "4DGL_16bitColours.fnc"
6
7 #inherit "VisualConst.inc"
8
9 #inherit "NoName1Const.inc"
10
11 func main()
12 // var hstrings ; // Handle to access uSD strings, uncomment if required
13 // var hFontx ; // Handle to access uSD fonts, uncomment if required an
14 // Uncomment the following if uSD images, fonts or strings used.

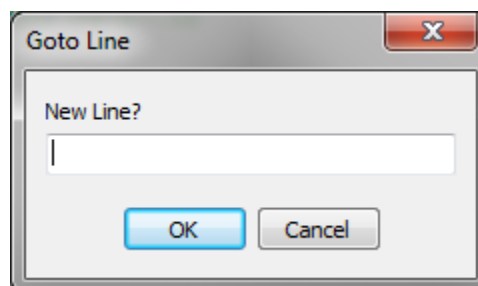
```

uncomment Whole words Case Sensitive This file Files in project

Replace Replace all

Same options as for Find apply.

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



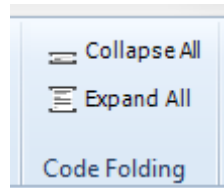
Goto Line

New Line?

OK Cancel

6.1.5. Code Folding Buttons

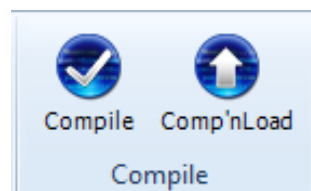
The code folding buttons allow to collapse or expand a function:



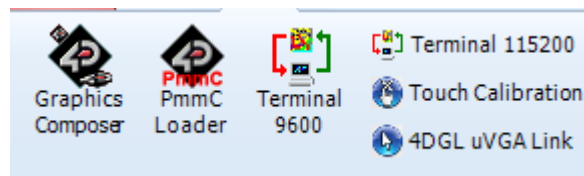
This is especially useful for large projects.

6.1.6. Compile Buttons

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



6.2. Menu Tools

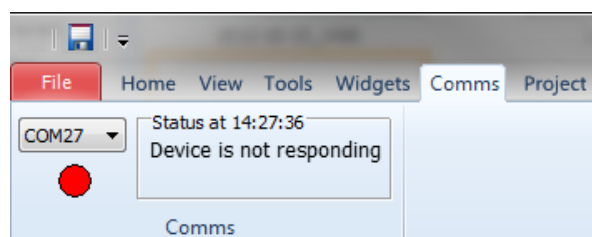


All the tools and utilities are grouped here:

- 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.
- 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 Workshop 4.

6.3. Comms Menu

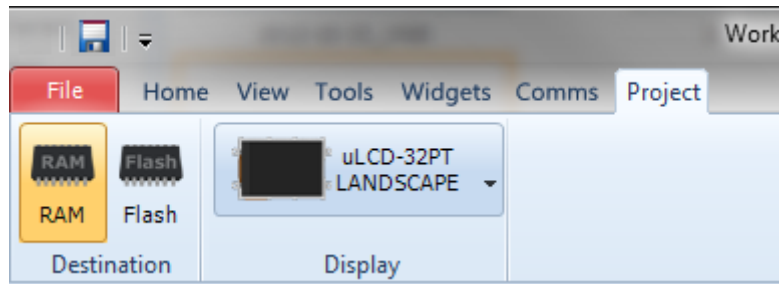
This menu is in charge of the communication port:



The use of this menu is described at the section [Connect the Display](#).

6.4. Project Menu

The **Project** menu includes different parameters and options...

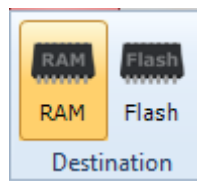


...with two groups of buttons:

- Destination,
- And display selection.

6.4.1. Destination

The first group includes the options for the destination:

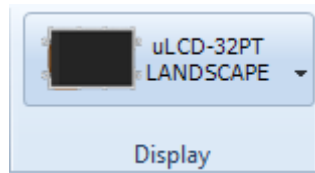


Select the **Destination** among two possibilities:

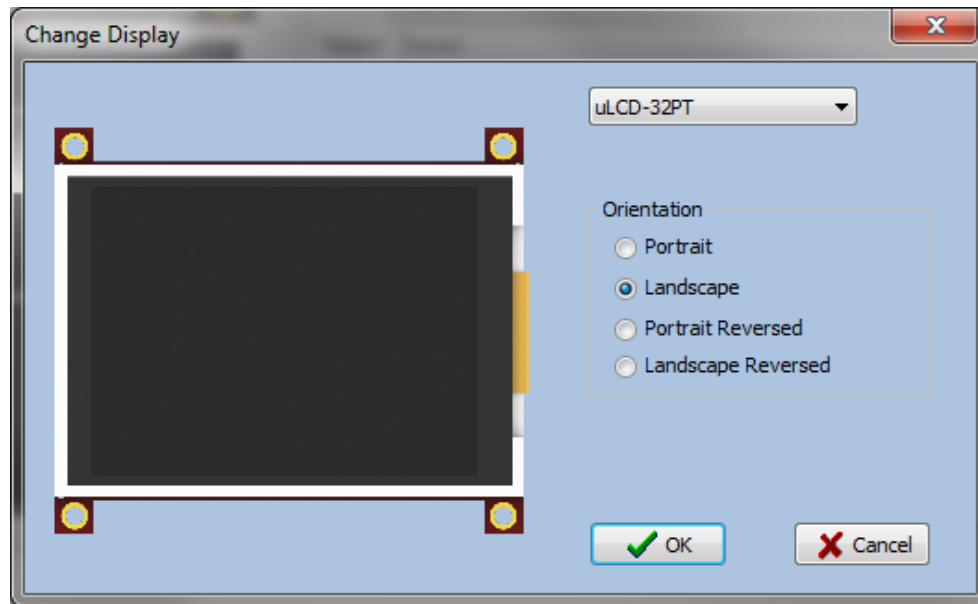
- **RAM** means the display must be connected during build and that the program will be downloaded to the display's RAM memory once compiled.
- **Flash** means the display must be connected during build and that the program will be downloaded to the display's flash memory once compiled.

6.4.2. Display Selection

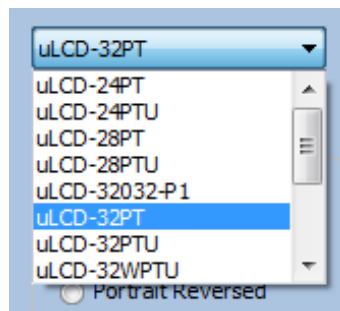
The second section allows to select the screen. Clicking on the button...



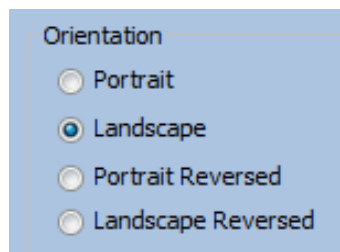
...opens a new window to select the screen:



Select the screen from the drop-down list:



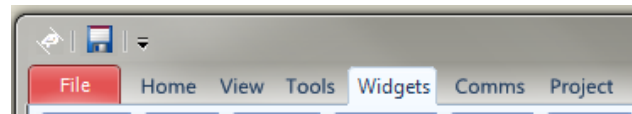
Define the orientation among the four options:



Confirm by clicking on  or deny by clicking on .

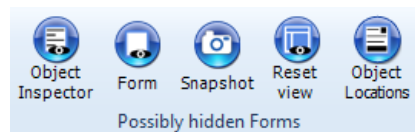
7. ViSi Specific Menus

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

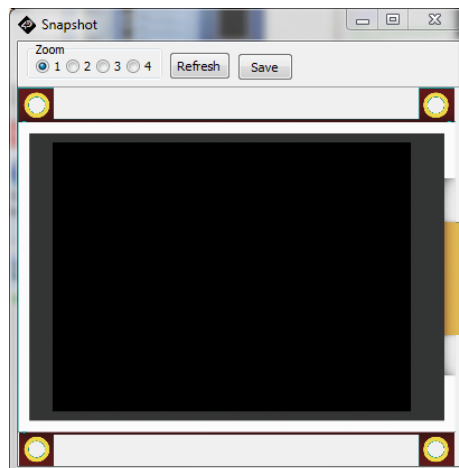


7.1. View Menu

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 me made.



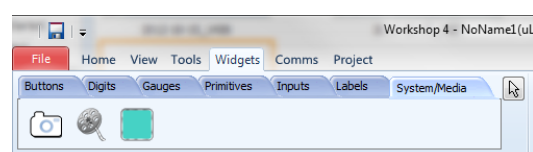
This window provides a zoom up to 4 times. The **Save** button allows to save the screen as an image.

Object Inspector, Form, and Reset View, all relate to the menus and tool bars used in Workshop 4. These toolbars and menus can be moved and detached from the side of Workshop 4. 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. Widgets Menu

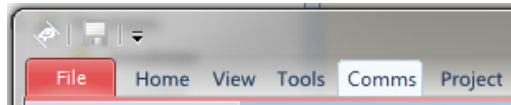
The **Widgets** menu includes the objects pane with all the objects available to build the interface:



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

8. ViSi-Genie Specific Menus

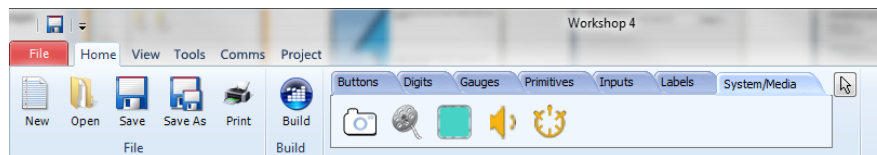
ViSi-Genie includes five menus with specific ribbons and options.



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...



...with three groups of buttons:

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

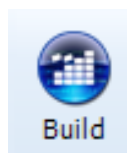
8.1.1. File-Related Buttons

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 Button

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



8.1.3. Objects Pane

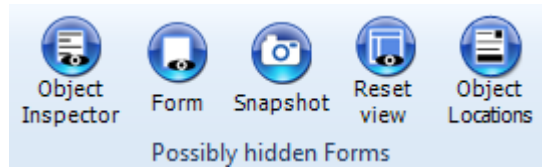
The objects pane includes all the objects available to build the interface:



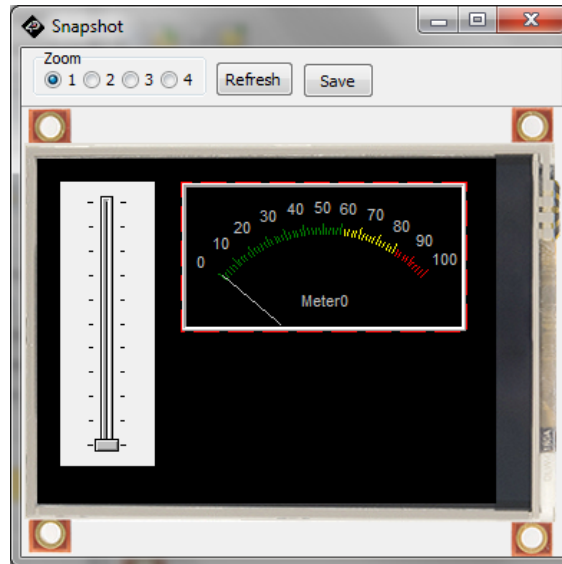
The objects are detailed on the ViSi-Genie User Guide.

8.2. View Menu

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

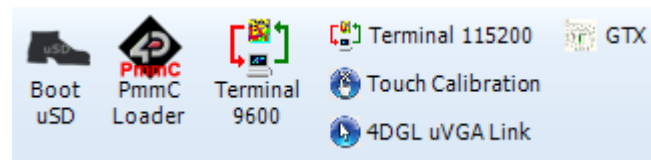


Click on **Snapshot** to open a specific window of the form.



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

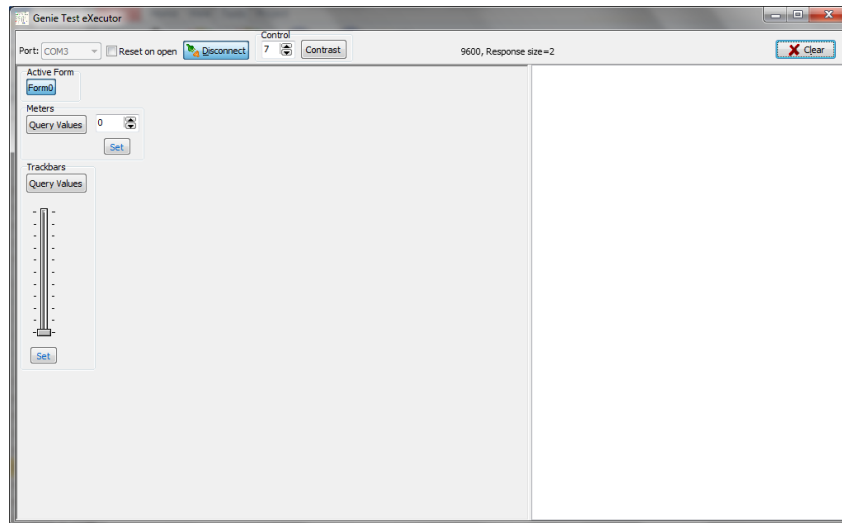
8.3. Menu Tools



All the tools and utilities are grouped here:

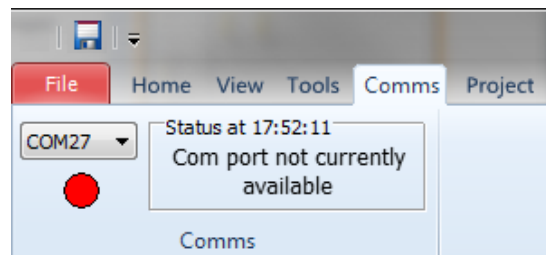
- Click **Boot uSD** to upload the boot-loader to the screen.
- Click **PmmC Loader** to start the PmmC Loader utility.
- Click '**Terminal connect 9600**' to open the currently selected com port at 9600 baud in the Terminal program.
- Click '**Terminal connect 115200**' to open the currently selected com port at 115200 baud in the Terminal program.
- Click **Touch Calibration** to calibrate the touch on the screen.
- 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.

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



8.4. Comms Menu

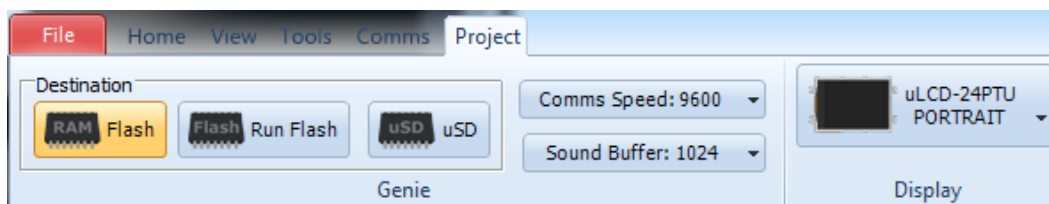
This menu is in charge of the communication port:



The use of this menu is described in section 9 "Connect the Module"

8.5. Project Menu

The **Project** menu includes different parameters and options...

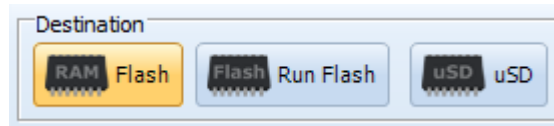


...with three groups of buttons:

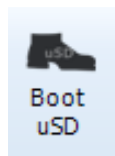
- Options for Genie,
- Parameters,
- And display selection.

8.5.1. Genie Options

The first group includes the options for Genie:

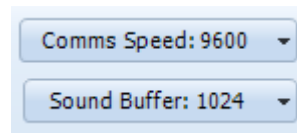


- Select the **Destination** among three possibilities:
 - **Flash** - The display must be connected during Build and the program will be downloaded to the display's flash memory once compiled. The users application will be stored in Flash, but will be run from RAM.
 - **Run Flash** - The display must be connected during Build and the program will be downloaded to the display's flash memory once compiled. The users application will be stored and run from flash, this uses less memory on the display, but makes programs run slightly slower.
 - **uSD** - The users application will be built and copied to the uSD card to be 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 users application from the uSD card at startup, and executes it.



8.5.2. Parameters

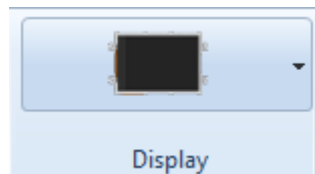
The second group include advanced parameters:



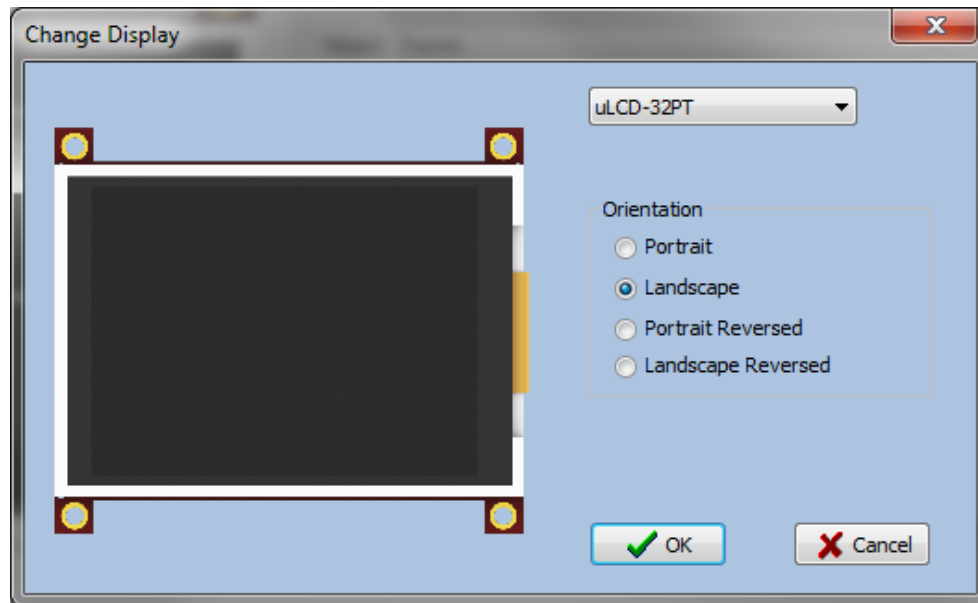
- **Comms speed** Is the baud rate at which the serial command interface operates
- Define **Sound buffer size** for the amount of memory set aside for buffering wav (sound) files. For simple sound files 1024 bytes should be enough. For complicate sound files to be played whilst video is displaying may need as much as 4096 bytes.

8.5.3. Display Selection

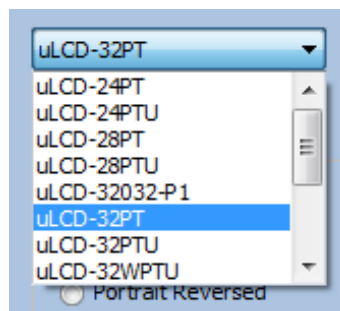
The last section allows selecting the screen, useful for converting a program from one display module to another. Clicking on the button...



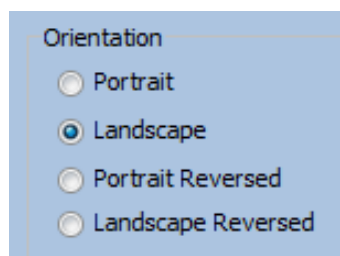
...opens a new window to select the screen:



Select the screen from the drop-down list:



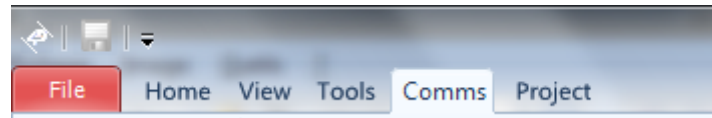
Define the orientation among the four options:



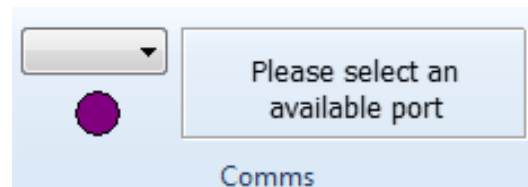
Confirm by clicking on  or deny by clicking on .

9. Connect the Module

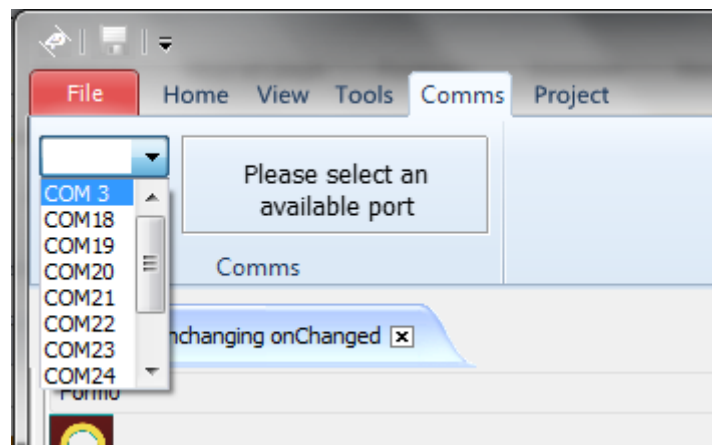
Connect the module to a USB port with the 4D Systems programming cable and select the **Comms** menu:



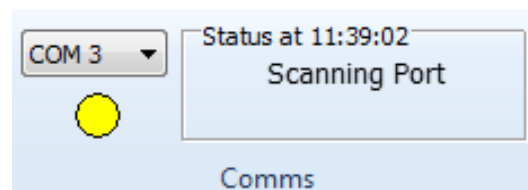
Above the **Comms** section, the **violet** light mentions no module is currently connected.



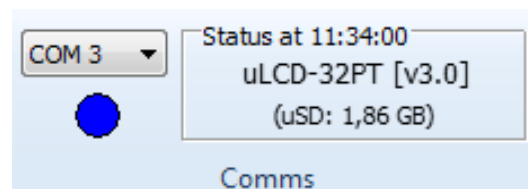
Connect the 4D Systems programming cable/adaptor to the module and plug the cable into the USB port. Click on the drop-down list and select the COM port relating to the 4D Programming cable/adaptor.



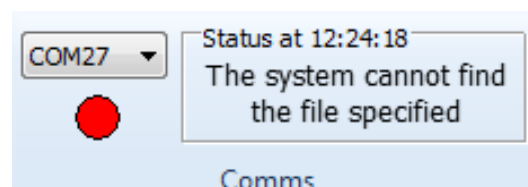
The light turns **yellow** while the connection is being established:



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



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



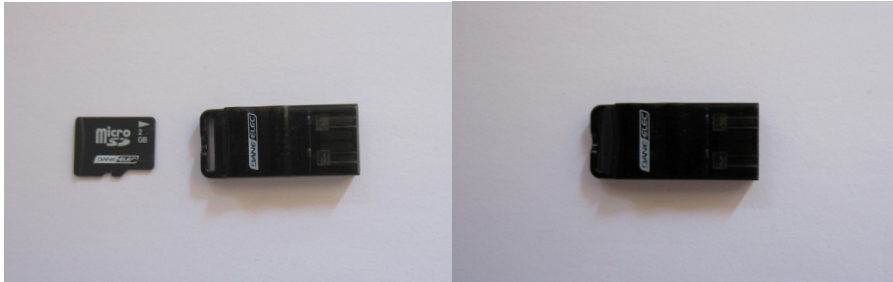
10. Insert the Micro-SD Card

The micro-SD card shall be FAT16-formatted. Partition can't exceed 2 GB.

For more information about formatting the micro-SD card, please check the details in the “Format the Micro-SD Card” chapter, described in the *Workshop 4 Installation* document.

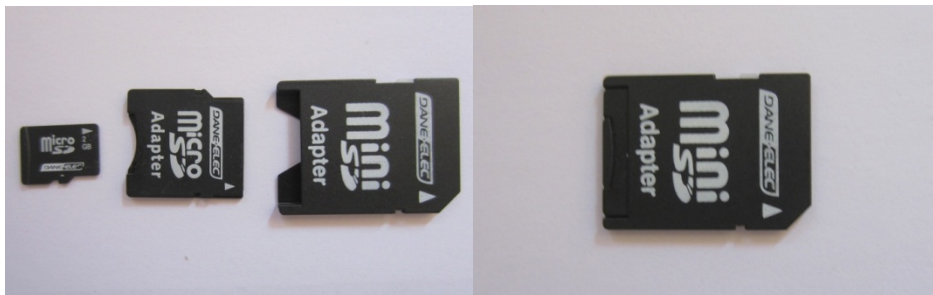
To connect the micro-SD card, either

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

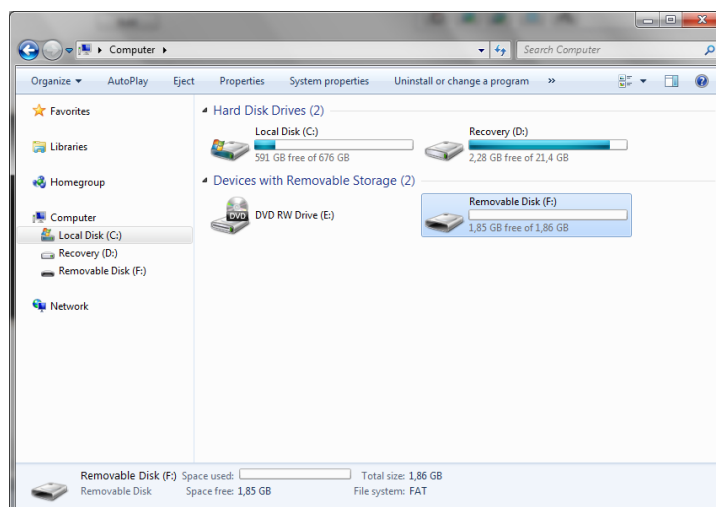


Or

- 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:.



11. Revision History

Revision	Revision Content	Revision Date
1.0	First Release	Nov 19, 2012
1.1	Typos on Page 4 fixed	Dec 17, 2012

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