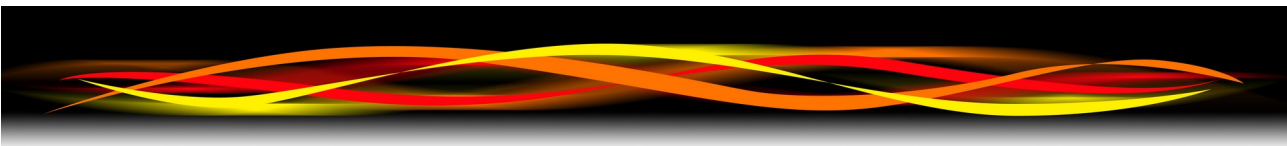


Newflow

NANO

**Visual C|CURE (v5)
Manual**





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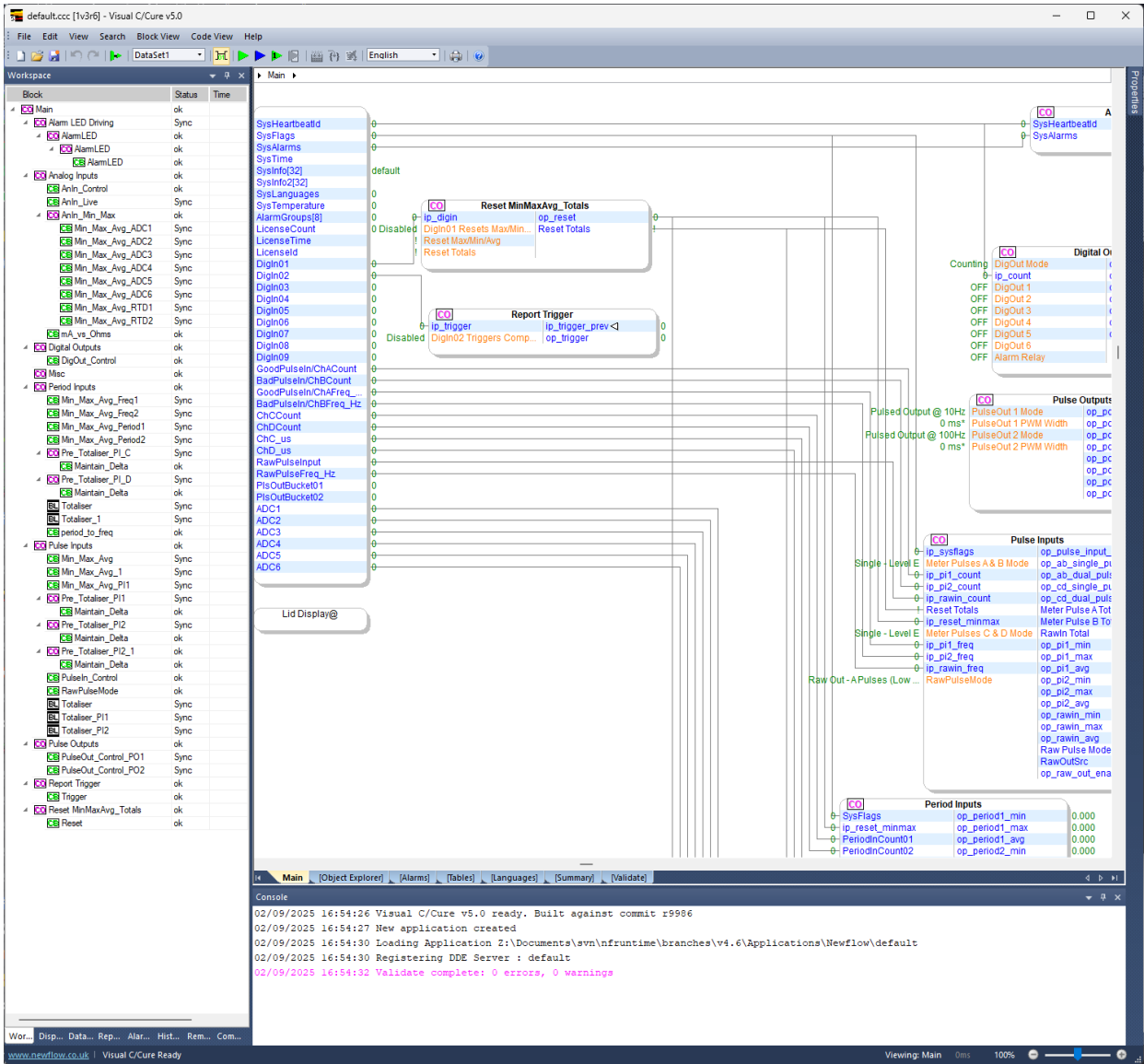


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1 Brief Description

Visual C||Cure is a Rapid Application Development (RAD) package, allowing software applications to be designed and written for the target hardware using an intuitive graphical environment.

Applications can be written and tested on a PC platform, without the need for any target hardware.

Remote targets can be fully managed, allowing application and firmware updates to be sent over the local network or Internet.

Live debugging of remote targets allows for a very powerful development system, helping developers and support engineers to support new and existing target installations.

Other features includes:-

- report designer
- alarms
- display configuration
- data charts
- field communications configuration
- multi-language support

2 Installing onto a PC

To install Visual C||Cure onto a PC, run the .MSI installer and follow the prompts.

Each copy of Visual C||Cure requires a license in order to use.

The first time the software is run, it will display an About box, showing a serial number and blank registration key. Contact your supplier with your serial number and they will provide you with a registration key, which should be entered into the relevant box.

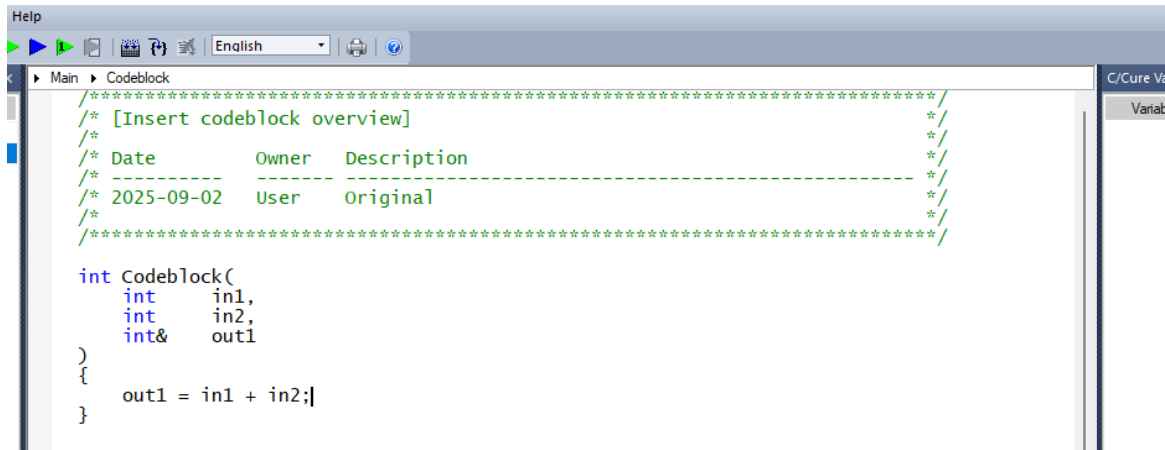
Once a valid key has been entered, the software will load.

3 How to Write An Application

All C||Cure applications are written using the Visual C||Cure development environment. This is a fully featured editor that allows C code to be entered and data flow to be defined using a graphical environment.

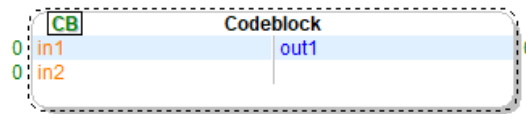
Applications are based on hierarchical containers (which can hold other containers and/or codeblocks) and codeblocks (which can only contain C code, as described in [7 - C||Cure Syntax](#)).

To create an application, C code is written into one or more codeblocks.

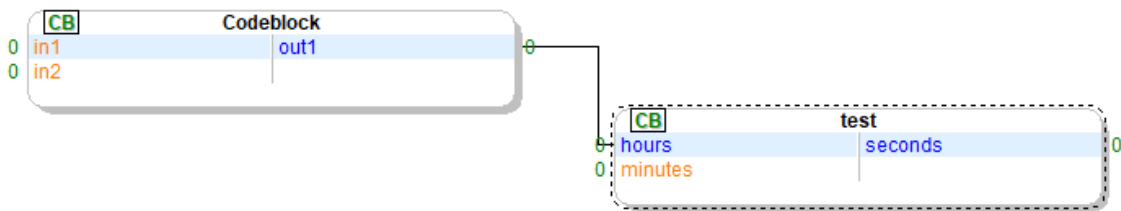


```
Help
Main > Codeblock
/* [Insert codeblock overview]
/*
/* Date      Owner  Description
/* -----
/* 2025-09-02  User   Original
/*
/*
/*
int Codeblock(
int  in1,
int  in2,
int& out1
)
{
    out1 = in1 + in2;
}
```

These codeblocks are then shown as graphical blocks within one (or more) containers, with codeblock inputs and outputs converted to “pins”.



Outputs from codeblocks and containers can then be “wired” to the inputs of other codeblocks and containers denoting the “flow of data” through the application.

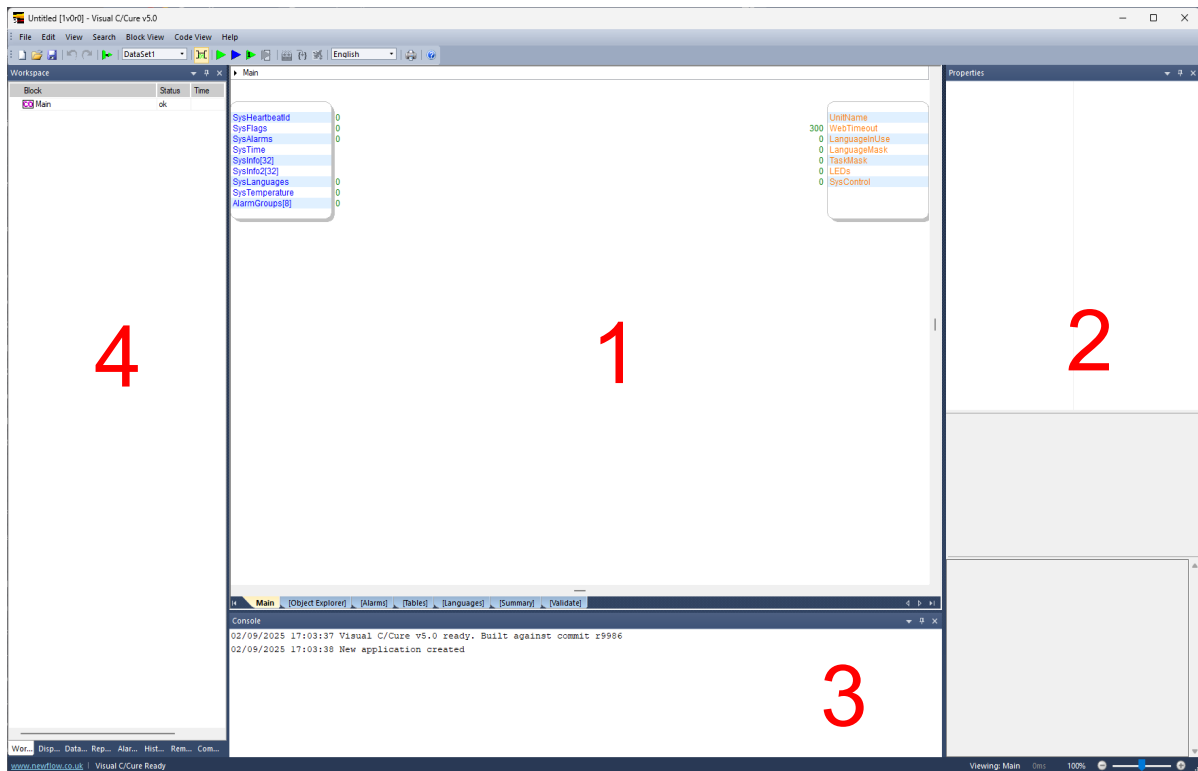


The pin colour denotes whether the data is persistent (orange) or not (blue). See [6.13 - Wrapped / Persistent / Unconnected Pins](#) for more information.

NOTE: to ensure predictability, you can only connect input and output pins of the same data type and array size.

4 Editor Environment

The default editor layout shows 4 main windows:-



- 1) Main editing window, where containers and codeblocks can be created, edited, moved, deleted and “wired” together. Using the tabs, Alarms, Tables, Languages, Version History and Diagnostics can also be viewed.
- 2) Properties window, where the parameters of input and output pins can be viewed or modified.
- 3) Console window, where messages generated by the editor are displayed.
- 4) Information section, where other information windows are housed. These include Workspace, Displays, Comms, Datamaps, Reports/Live Screens, Alarms, Remote Targets and Historical Data. Each of these will be covered in later sections.

The editor is highly configurable, such that all windows can be detached from the main editor window, and left floating, pinned to a different area of the editor or even hidden from view.

5 Making a Basic Application

To demonstrate the use of the editor, it is best to show how to create a simple application.

The steps taken will be:-

- 1) Create a blank application
- 2) Specify the type of target to use
- 3) Create some containers and codeblocks
- 4) Wire the data pins together
- 5) Test the application

5.1 Create a blank application

Select File | New.

This will create a brand new blank application.

5.2 Specify the type of target to use

The NANO hardware is available in a range of different formats. For example, the analog board may not be fitted. It is therefore possible to specify the “type” of target intended for a particular application.

The basic types are:-

- CPU only
- Digital I/O only
- Analogue and Digital I/O

Other types may be available depending upon the installed version of Visual C||Cure.

To specify the target type, select File | Properties.

In the “Target Device” list, select “Nano_Digital_Only”, then click OK.

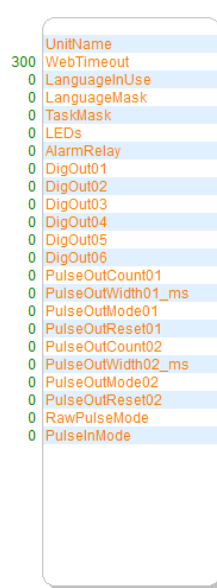
NOTE: the other properties shown (Application Password and Device Properties) will be covered later.

The main editor window will now show a list of pins on the left hand side, providing the top level container access to the hardware inputs from the target.

Scrolling the main editor window to the right will also show a list of pins on the right hand side. This shows the list of hardware outputs for the target.



Hardware Inputs



Hardware Outputs

5.3 Create some containers and codeblocks

Now the application has some data to “use”, it can be manipulated in any way possible.

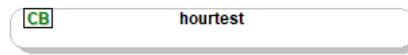
For this simple example, an application will be made to check the time and trigger a digital output pin on each hour.

Right click on the main editor window, and select New | New Codeblock.

A new codeblock, called Codeblock, will be made. The codeblock can be renamed at any time by changing this Name property in the properties window.

The codeblock can be moved around the editor window, as required, by left-clicking on the codeblock's name and dragging with the mouse.

In the properties window, change the name of the codeblock to “hourtest”.



Now double-click on the codeblock, and the editor window will change to show the C code editor, with a new comments section and empty C function called hourtest().

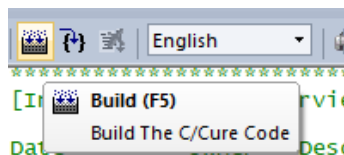
```
Man > hourtest
1  /*-----*/
2  /* [Insert codeblock overview] */
3  /*-----*/
4  /* Date      Owner   Description */
5  /*-----*/
6  /* 2025-09-02 MPF3   Original */
7  /*-----*/
8  /*-----*/
9
10 int hourtest()
11 {
12     |
13 }
14
```

The input and output parameters now need to be specified, so change the first line to:-

```
int hourtest(    double time,
                int    &hour_trigger)
```

This specifies that our codeblock is to have one input (of type double) called time, and one output (of type int) called hour_trigger. The '&' symbol denotes the variable is to be an output variable.

Click on the Build icon (or press F5, or select Code View | Build), and the editor will check the syntax for any errors.



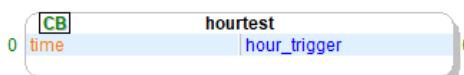
If any errors are found, they will be reported in red on the console and the cursor placed on the error. The check only reports the first error found, therefore the build check should be repeated to ensure no other errors exist.

In this case, two warnings will be shown to highlight that variables have been created but not used. These can be ignored for the moment.

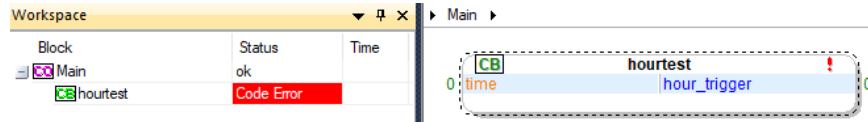
Once the codeblock builds without error, click back on the Main editor window using the tab strip at the bottom.



The codeblock will now have changed to reflect the new input / output parameters.



If any errors remain in a codeblock, the codeblock's status (as shown in the workspace tab) will be shown as "Code error", and a red '!' indicator is shown, such as:-



Now click back on the "hourtest" tab, enter the following code between the braces and click Build to check the syntax:-

```
{
    int minute = nftimeminute(time);
    if (minute == 0)
        hour_trigger = 1;
}
```

This code uses the standard library routine nftimeminute() to return the minute value from an encoded date / time value (see [7.4 - Data types](#)).

If this value is 0, then the output "hour_trigger" is set to a 1.

Note that there is no need to set the output pin to a 0, since, by default, all output pins are non-persistent, meaning they are automatically reset to zero at the start of each cycle (see [6.13 - Wrapped / Persistent / Unconnected Pins](#)).

5.4 Wire the data pins together

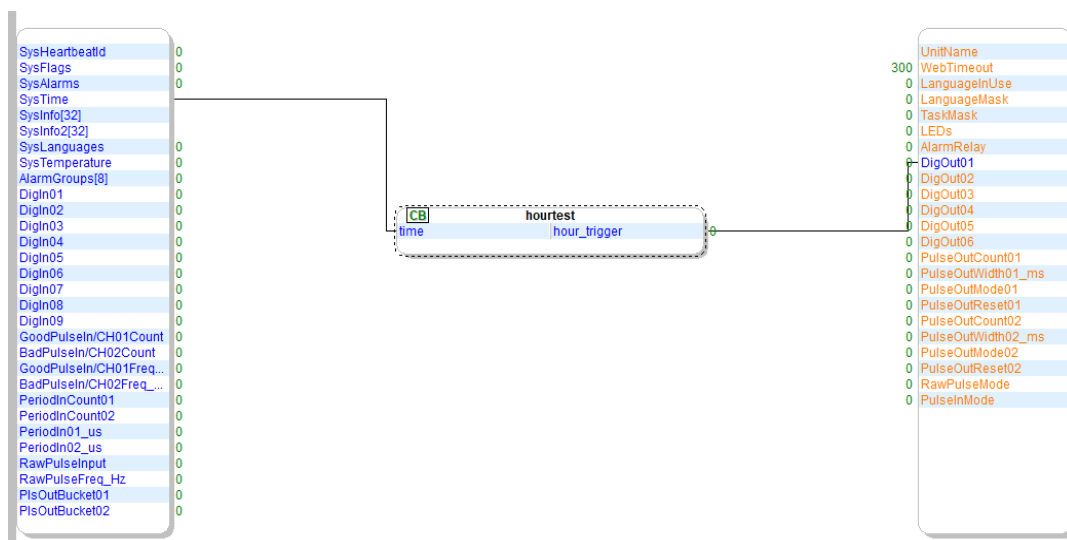
Now that the application function has been written, the input and output pins need to be wired up.

Click on the Main tab, and then left-click and drag the "SysTime" hardware input and place it on the "time" input of the codeblock.

Note that when dragging a pin around, a "not allowed" symbol (⊘) will be shown whenever the pin cannot be connected. Pins can only be connected under the following conditions:-

- a) only pins of the same data type and array size may be connected together (to ensure the predictability of the application)
- b) input pins cannot be connected together, and output pins cannot be connected together
- c) output pins can be connected to multiple input pins

Now click on the "hour_trigger" output pin and connect it to, as an example, the "DigOut01" hardware output.



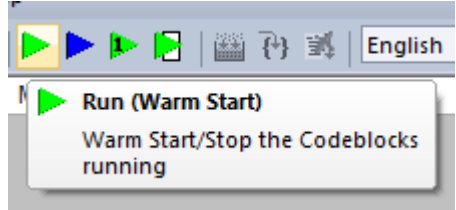
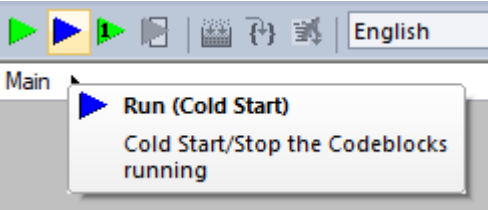
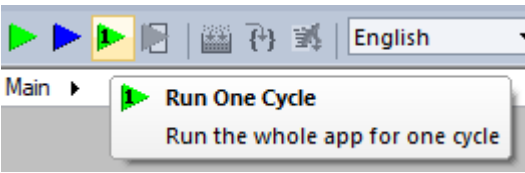
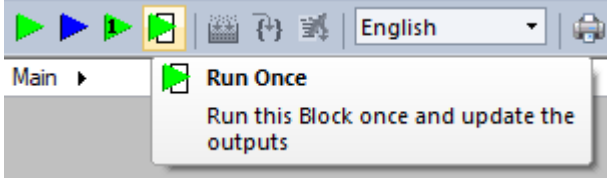
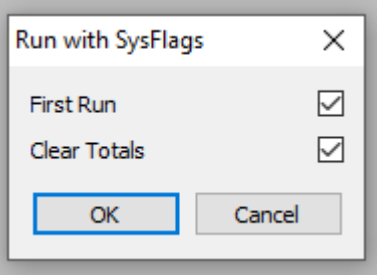
This now means that time input of the hourtest codeblock uses the data value output by "SysTime", and "DigOut01" gets its value from the hour_trigger output.

5.5 Test the application

Another useful feature of the Visual C||Cure editor is the ability to run/debug an application without the need for physical hardware. There are some limitations to this as there no "real" data exists to feed the hardware inputs, but the top level inputs can be manually set to simulate various test cases.

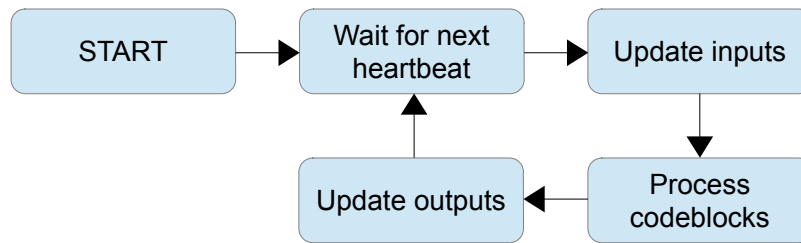
5.5.1 Run the entire application

The application can be run is one of five ways:-

| | |
|--|--|
| <p>Run (Warm Start)</p> <p>This starts running the application keeping all existing database values.</p> <p>Click the button again to stop the application.</p> |  |
| <p>Run (Cold Start)</p> <p>This starts running the application, but resets all database values to their "default" values.</p> <p>The "Cold Start" flag in the SysFlags pin is also set.</p> <p>Click the button again to stop the application.</p> |  |
| <p>Run One Cycle</p> <p>This runs the entire application for a single "warm" cycle.</p> |  |
| <p>Run Once</p> <p>This option is only available when a container or codeblock is selected.</p> <p>This runs the selected block for a single "warm" cycle.</p> |  |
| <p>Run with SysFlags...</p> <p>This option is only available from the menu Block View Run with SysFlags...</p> <p>Choosing this option brings up a window allowing various bits of the SysFlags input to be set.</p> <p>Click OK to start the application.</p> <p>The application will then continue in 'Run (Warm Start)' mode</p> |  |

When the application runs, the system performs the following actions for every calculation cycle:-

- 1) Wait for the next "heartbeat" (which occurs every 500ms).
- 2) Update the inputs to each codeblock / container.
- 3) Process the codeblocks.
- 4) Update the outputs from each codeblock / container.

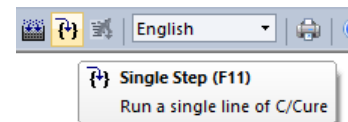


So, for this example application, the top level inputs will update with the SysHeartbeatId input counting up from 0, and the SysTime input showing the current date and time. The hourtest codeblock is then processed, and, finally, the output pins are all updated.

Note that the data for any linked pins will also be updated on all containers and codeblocks, so the "time" input of the hourtest codeblock will also show the same as SysTime (since they have been connected together).

5.5.2 Codeblock Single Step

To debug a codeblock itself, it is possible to Single Step through the code.



To demonstrate, double-click on the hourtest codeblock, and then click on the Single Step button (or press F11, or select Code View | Step).

A blue rectangle to the left of the code indicates which line the debugger is currently on, and the right hand window changes to list all the variables of the current function. Whenever a variable is updated in the right hand window, it is shown in red to highlight that it has changed. This is especially useful when there are a lot of variables.

Notice that the hour_trigger and minute variables are both at '0', as they are non-persistent.

Select Single Step again and the minute variable will be updated to reflect the current minute.

NOTE: If single stepping the application locally on the PC, the application must be running or have been run otherwise the SysTime input will show zero, not show the current date and time. If in Debug mode, the values will update live. Either way the input variables can still be manually changed, allowing codeblocks to be tested with any set of test inputs.

Single Step again and codeblock will either move to the end bracket (if minute is not zero), or on to the line which sets the hour_trigger output.

To simulate a new hour, the minute variable can be manually changed. Single step until the indicator is on the line "if (minute == 0)", and then double-click on the minute variable in the right hand window. Enter a new value (i.e. zero) into the pop-up window, and click OK. This now overrides the previous value returned from nftimeminute(). Single stepping through will now run the "hour_trigger = 1" line, and the hour_trigger variable will be updated accordingly.

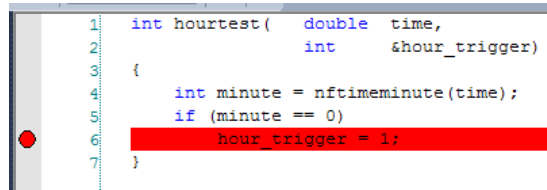
To stop debugging immediately, click on the Stop Debug button (or select Code View | Stop).

To run the codeblock to completion (or till the next breakpoint), press F8 (or select Code View | Run).

5.5.3 Codeblock Breakpoints

The debug engine also allows breakpoints to be set in codeblocks when the application is running locally.

To set a breakpoint, double-click on the grey margin of the code editor on the relevant line. A red circle will be shown and the line will be highlighted in red, as shown below:-



```
1 int hourtest( double time,
2             int &hour_trigger)
3 {
4     int minute = nftimeminute(time);
5     if (minute == 0)
6     hour_trigger = 1;
7 }
```

To remove a breakpoint, double-click on the grey margin of the code editor on the relevant line again and the red circle and the line highlight will be removed.

When the codeblock is running, the code will stop if a breakpoint is met. You can then single step (F11), continue (F8) or stop debugging as required.

NOTE: Breakpoints are not supported when in Remote Debug mode.

NOTE: Breakpoints are not stored in the application file when saved.

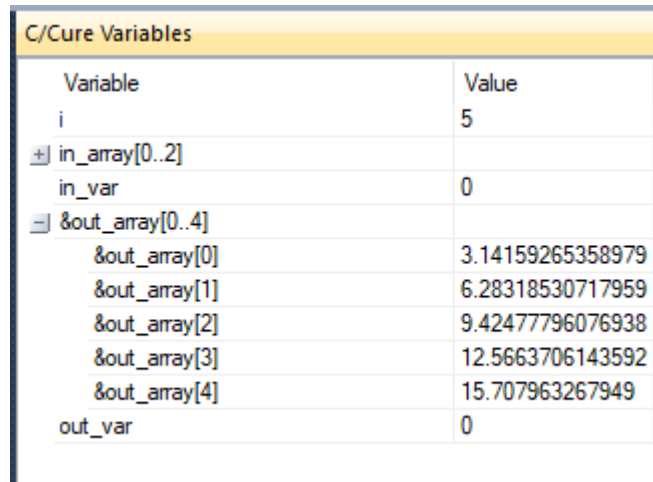
NOTE: Breakpoints are not stored when the codeblock tab is closed (but are stored if the tab is left open but switched away from).

5.5.4 Codeblock Variables

When debugging a codeblock, the Properties pane shows the value of any variables.

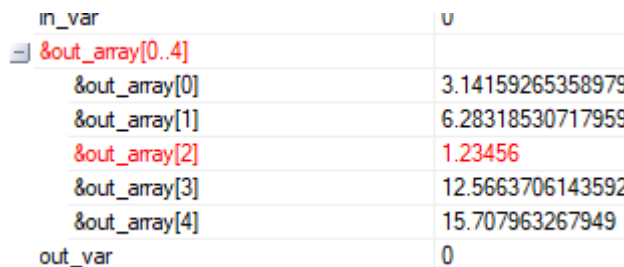
Array variables are grouped and can be expanded/collapsed.

Output variables are prefixed with an ampersand symbol (&).



| Variable | Value |
|--------------------|------------------|
| i | 5 |
| ± in_array[0..2] | |
| in_var | 0 |
| ± &out_array[0..4] | |
| &out_array[0] | 3.14159265358979 |
| &out_array[1] | 6.28318530717959 |
| &out_array[2] | 9.42477796076938 |
| &out_array[3] | 12.5663706143592 |
| &out_array[4] | 15.707963267949 |
| out_var | 0 |

On each single step, any variable value changes are highlighted in red.

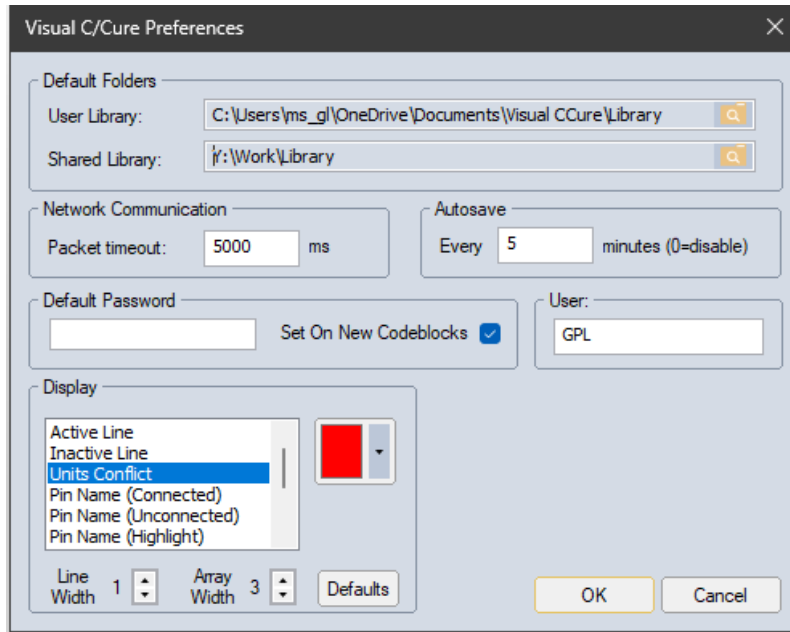


| Variable | Value |
|--------------------|------------------|
| in_var | 0 |
| ± &out_array[0..4] | |
| &out_array[0] | 3.14159265358979 |
| &out_array[1] | 6.28318530717959 |
| &out_array[2] | 1.23456 |
| &out_array[3] | 12.5663706143592 |
| &out_array[4] | 15.707963267949 |
| out_var | 0 |

6 Editor Features

6.1 System Preferences

Various system wide preferences can be configured by selecting File | Visual CCure Preferences.

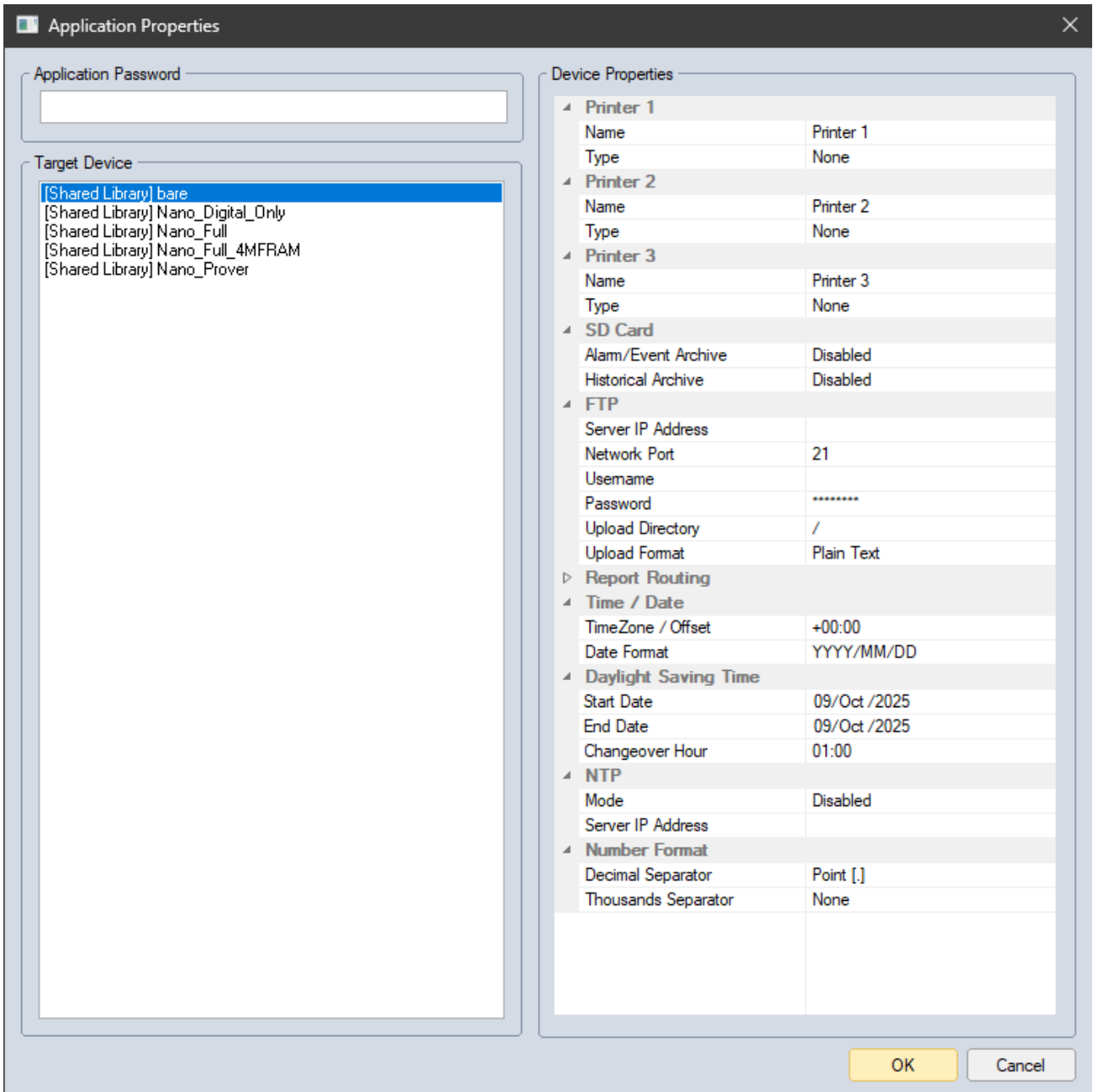


Below is a list of the available preferences:-

| | |
|-----------------------|---|
| Default Folders | These define the User and Shared paths used by the library system. See 6.10 - Librarian for more information. |
| Network Communication | This sets the network timeout (in milliseconds) when attempting to communicate with remote targets. |
| Autosave | This sets the autosave interval (in minutes). A setting of 0 will disable the autosave feature. |
| Default Password | This sets the default security password. If the “Set On New Codeblocks” option is enabled, all newly created codeblocks will have this password assigned to them. See 6.11 - Security for more information. |
| User | Sets the username to be added to the optional log file entries when the application is saved. |
| Display | These settings allow various system colours and line widths to be customised. |

6.2 Application Properties

Selecting File | Properties brings up the Properties dialog for the current application.



Here it is possible to specify the following:-

| | |
|----------------------|--|
| Application Password | <p>This is the top-level application password. Once set, this password is required to load up the application into Visual C Cure.</p> <p>This is not the same password as can be set for containers and codeblocks. See 6.7 - Codeblocks and 6.8 - Containers for more information.</p> |
| Target Device | <p>This list sets the top-level hardware inputs and outputs available to the application.</p> |

| | |
|-------------------|--|
| Device Properties | <p>This allows the default settings for various system wide options to be specified, as follows:-</p> <p>Printer 1, 2 and 3</p> <p>The name of the printer can be set along with the connection method.</p> <ul style="list-style-type: none"> • Serial : use an ASCII serial printer. (valid option for Printer 1 only) Settings for the Serial Port and Baud Rate can be set. • Network : use a Postscript printer. Settings for Network Port (default is 9100) and Scaling Factor can be set. • None : no default printer. <p>SD Card</p> <p>Archiving options for Alarms/Events and Historical data can be set.</p> <p>FTP</p> <p>Settings for the Server IP Address, Network Port, Username, Password, Upload Directory and Upload Format (Plain Text, TSV, TFX/Plain Text or TFX/TSV) are provided.</p> <p>Report Routing</p> <p>Options are provided of where the report should be sent when generated (as well as to internal storage). Options are Printer 1, 2 or 3, SD Card or FTP by selecting the required tickboxes. NOTE: multiple destinations can be selected, for example, Printer 2 and SD Card.</p> <p>Time/Date</p> <p>TimeZone/Offset</p> <p>If a preset list has been coded in the application, this list will be shown. If not, the hour offset can be entered.</p> <p>Date Format between YYYY/MM/DD, MM/DD/YYYY or DD/MM/YYYY can be selected.</p> <p>Daylight Saving Time</p> <p>Start Date, End Date and Changeover Hour can be entered</p> <p>NTP</p> <p>Options of Disabled, Automatic Sync, Sync On Startup or Sync On Startup & Automatic can be selected</p> <p>Server IP Address can also be entered.</p> <p>Number Format</p> <p>Decimal Separator of Point [.] or Comma [,] can be selected</p> <p>Thousand Separator of No Separator, Point [.,], Comma [.,] or Space [] can be selected.</p> |
|-------------------|--|

6.3 Panning / Scrolling

The main editor window can be scrolled left/right and up/down using the relevant scrollbar.

Alternatively, use the mouse scroll wheel to scroll the window up/down and Shift + scroll wheel to scroll left/right.

Finally, when dragging a container/codeblock or pin around the screen, when you reach the edge of the editor window, the view will automatically scroll up/down/left/right depending on which edge you are next to.

6.4 Zooming

The main editor window can be zoomed in and out to best fit the user's working preferences.

Simply hold down the Ctrl key and use the mouse wheel to zoom in and out. Alternatively, the window can be zoomed to “pre-defined” settings, as follows:-

Ctrl+1 Actual Size resets to 100% zoom
Ctrl+2 Fit Page sets the zoom level to show all containers and codeblocks
Ctrl+3 Fit Width sets the zoom such the entire width of the application can be viewed

All these functions are also available through the View | Zoom menu.

6.5 Resizing

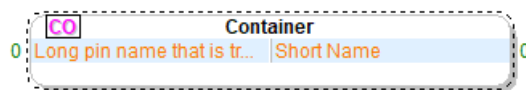
The “sheet size” of the application can be adjusted.

Use the scroll bars to show the right or bottom edge of the white page in the main window. Hover the mouse over the white / grey line and the cursor will change to a left/right or up/down arrow. Now left click and drag the page to increase / decrease the page size.

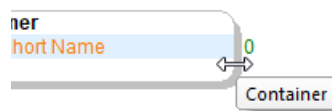
The bottom right corner also acts as a resize point, allowing the page to be resized in both directions at once.

Note that each container has its own adjustable sheet size. The minimum size the screen can be reduced to is dependant on the blocks on the sheet.

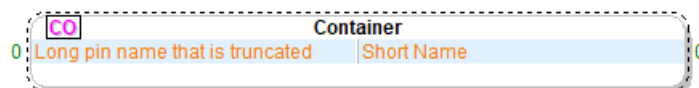
The width of any container or codeblock can also be adjusted. Consider the following container:-



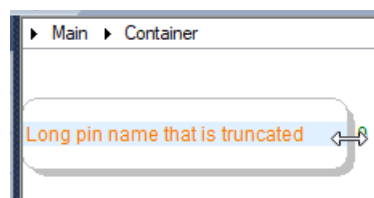
If you hover of the left or right edge, the resize cursor will appear.



You can then resize the container as required:-



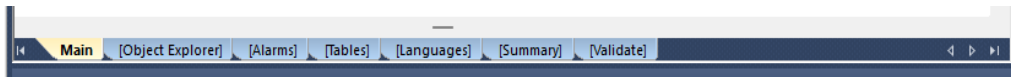
For containers, you can also resize the Input and Output blocks within the container to achieve the same result.



Again, each container and codeblock can be resized independently.

6.6 Editor Tabs

At the bottom of the main editor window is a tab-strip, showing the currently opened codeblocks and containers as well as various “system” tabs as explained below.



These tabs can be used to view the relevant codeblock or container, and the item currently being viewed can be closed by clicking on the 'X' icon next to the item's name.

Note the most left hand tab cannot be closed as no 'X' appears, it can only be clicked away from.

6.6.1 [Object Explorer]

The Object Explorer tab gives an overview of all input pins, output pins and comments within the application. The list of items can be filtered by item type and text filter.

| Item Filter: | | Inputs, Outputs, Persistent, Containers, Code Blocks, Comms Blocks, Comments | | | Text Filter: |
|--------------|-----------------|--|-----------------|--------|--------------|
| Block | Pin | Units | DataSet1 [Base] | Groups | |
| [Main] | AlarmRelay | | 0 | | |
| [Main] | DigOut02 | | 0 | | |
| [Main] | DigOut03 | | 0 | | |
| [Main] | DigOut04 | | 0 | | |
| [Main] | DigOut05 | | 0 | | |
| [Main] | DigOut06 | | 0 | | |
| [Main] | LanguageInUse | | 0 | | |
| [Main] | LanguageMask | | 0 | | |
| [Main] | LEDs | | 0 | | |
| [Main] | PulseInMode | | 0 | | |
| [Main] | PulseOutCount01 | | 0 | | |
| [Main] | PulseOutCount02 | | 0 | | |
| [Main] | PulseOutCount03 | | 0 | | |

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The following columns are shown:-

| | |
|-------|--|
| Block | Shows the hierarchical pathname to the block. Double-clicking on the name will load up the relevant container and highlight the relevant block. |
| Pin | Shows the pin name. Arrays items are individually listed. Double-clicking on the pin name will load up the relevant container and highlight the relevant pin. |
| Units | Shows the current units value for the pin. Clicking on the cell will show a drop-down list of units (as defined in the UNITS table) and the user can pick a new unit value if required. Alternatively, if the pin's unit is linked to the value of another pin, the source pin name will be shown at the end of the unit value. See 6.14 - Units . |

| | |
|------------|--|
| Dataset(s) | <p>Shows the current default value for a persistent pin.</p> <p>Clicking on the item will allow the user to change the value.</p> <p>This item will be greyed out for all output pins.</p> <p>Extra dataset columns can be added/removed/renamed/cloned by right-clicking on the header strip.</p> <p>By default, all pins are set to copy the value from the base dataset (denoted by <Base>).</p> <p>However, each dataset can have its own set of default values for each input pin. Right-clicking on the item and selecting “Unlink from <Base>” will copy the current base value into the dataset and then allow the user to change the value as required.</p> <p>Conversely, right-clicking on the item and selecting “Link to <Base>” will reset the value back to <Base>.</p> |
| Groups | <p>Shows the current groups the pin is a member of.</p> <p>See 6.12 - Pin Properties for more information on groups.</p> |

The Item Filter can be used to limit what type of pins are shown. The following options are available:-

| | |
|----------------|---------------------------|
| Inputs | Show input pins. |
| Outputs | Show output pins. |
| Non Persistent | Show non-persistent pins. |
| Persistent | Show persistent pins. |
| Wrapped | Show wrapped pins. |
| Containers | Show container pins. |
| Code Blocks | Show code block pins. |
| Comms Blocks | Show comms link pins. |
| Comments | Show comments. |

The Text Filter can be used to show only pins or comments that include specific text.

Note that the Item Filter and Text Filter work in conjunction with each other so, for example, selecting only “Comments” in the Item Filter and entering “abc” in the Text Filter will only show Comments containing the text “abc”, and no other items.

Clicking on the column headers will also allow the values to be sorted in ascending or descending order.

6.6.2 [Alarms]

The Alarms tab gives an overview of all the output pins that have been configured as an alarm source.

| Block | I/O | Groups |
|--|-----------------------|--------|
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | FLASH Fail | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | FRAM Fail | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | I/O Comms Fail | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | FTP Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Real Time Clock Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Printer 1 Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Printer 2 Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Printer 3 Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | RAM Fail | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | SD Card Error | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Printer Spool Full | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | System Restart | 1 |
| LP_Application.Heartbeat_Watchdog.Heartbeat_Watchdog | Task Fail | 1 |
| LP_Application.LP_Main.Flow_Calcs.array_split_10 | Mass Total Rollover | 1 |

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Main [Object Explorer] **[Alarms]** [Tables] [Languages] [Summary] [Validate]

Double-clicking on the Block entry will load up the relevant container and highlight the relevant block. Double-clicking on the I/O entry will load up the relevant container and highlight the relevant pin.

The Groups column is for information only. The groups that the alarm is assigned to can only be changed on the relevant pin itself

Whenever any such pin is non-zero, an alarm will be raised and logged in the Alarm Log. See [8.6 - Alarms](#) for more information.

6.6.3 [Tables]

To allow more human readable content to be applied to an application, string lookup tables can be configured.

The Tables tab shows the existing tables along with their current entries.

| Entry | Name | English |
|-------|------|---------|
| 0 | None | |
| 1 | Odd | |
| 2 | Even | |

ADPSEL
ALARMGROUPS
ALARMSEL
FTPFORMATS
GROUPS
HISTORICALS
LANGUAGES
SERIAL_BAUD_RATES
SERIAL_DATA_BITS
SERIAL_PARITY
SERIAL_PORTS
SERIAL_STOP_BITS

New Table Rename Table Remove Table Add Entry Copy Code
Import Export Usage (0) Delete Entry

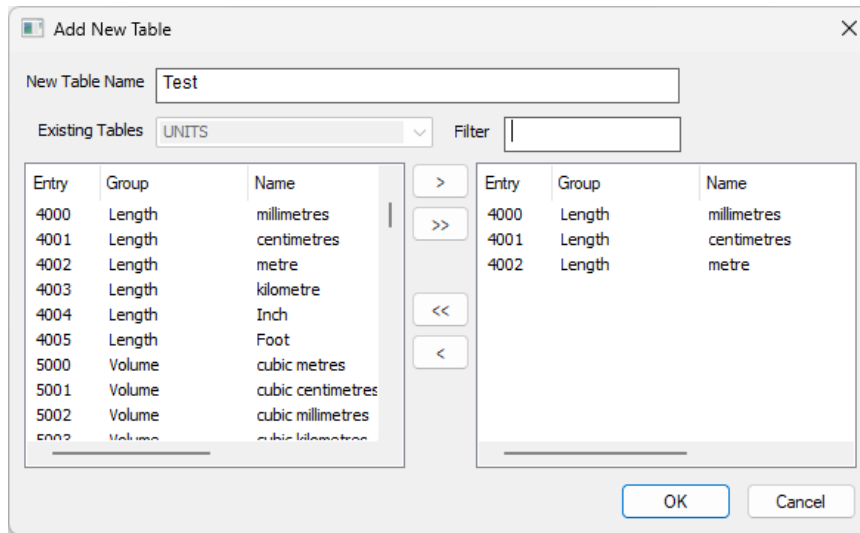
Main [Object Explorer] [Alarms] **[Tables]** [Languages] [Summary] [Validate]

At the bottom are buttons to Add, Rename and Delete whole tables and Add, Delete, Import and Export table entries. Note that the default system tables cannot be deleted or renamed – as such, when they are selected, the Delete and Rename buttons are greyed out.

The Usage button text shows how many pins are currently set to use the selected table. Clicking on the Usage button lists, in the console, all the places the selected table is used.

The right-hand list shows the integer values along with any table entries base text. There will also be a column for each configured languages into which alternate text can be entered. (see [6.6.4 - \[Languages\]](#))

To add a new table, click on the “New Table” button. This brings the “Add New Table” dialog when you must enter a unique table name. You also have the option of copying some or all of an existing table into the new table. When ready, click OK to add the new table. If no existing table is referenced, the boxes underneath will be empty.



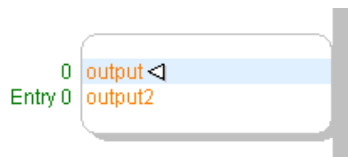
This table can now be used to replace any pin's data value with the relevant lookup string. For example if we had the following table:-

| Test Table | Entry | Name | English |
|------------|-------|--------------|---------|
| UNITS | 0 | Entry 0 | |
| USERS | 1 | Another item | |
| ZONES | 4 | Item #4 | |

Now consider a container as follows:-



Click on the "output2" output pin and select "Test Table" from the Table drop down list in the Properties window. The output2 pin value of "0" will now be used to look up item "0" in the "Test Table" table, and the string value is displayed (rather than the integer value):-



If the value of output2 is changed (by double-clicking on the pin), the list of available string values (as defined by the chosen table) is shown (rather than an integer / double edit box), and the new setting can be chosen accordingly.

When values are displayed on pins with a table set, any value without an associated lookup entry will simply display the value itself.

As can be seen, there are various system tables already defined:-

| | |
|-------------|---|
| ADPSEL | Specifies the text used to ADP and Significant Figures. See 6.15 - Significant Figures / ADP . |
| ALARMGROUPS | Specifies the names of the alarm groups. See 8.6 - Alarms . |
| ALARMSEL | Specifies the text used to indicate alarm pin status. See 8.6 - Alarms . |
| FTPFFORMATS | Specifies the report upload formats available. See 11.6.5.3 - FTP . |

| | |
|-------------------|---|
| GROUPS | <p>Specifies the available system groups. By default, the following are defined:-</p> <p>VCC_UNITSELECT Show this pin as a “Units” source. See 6.14 - Units. VCC_ADPSELECT Show this pin as a “SigFig/ADP” source. See 6.15 - Significant Figures / ADP. VCC_ALARMSELECT Show this pin as an “Alarm” source. See 8.6 - Alarms. VCC_COMMPORTSELECT Show this pin as a “Comms Port” source. TOTALS Specifies the pin value is to be retained during a “Cold Start - Keep Totals” restart. See 11.6.10 - Reboot. CUSTOMERKEYS Reserved for future use. METROLOGY Specifies that writes to this pin can only occur if the NMI/MET hardware link is active. The pin value is also included in the Metrology checksum.</p> |
| HISTORICALS | <p>Specifies the names for the Historical Zones.</p> <p>See 8.8 - Historical for more information.</p> |
| LANGUAGES | <p>Specifies the names of the configured languages.</p> <p>See 6.6.4 - [Languages].</p> |
| SERIAL_BAUD_RATES | <p>Specifies the pre-defined baud rate values for use with comms link serial ports.</p> |
| SERIAL_DATA_BITS | <p>Specifies the pre-defined data bits values for use with comms link serial ports.</p> |
| SERIAL_PARITY | <p>Specifies the pre-defined parity settings for use with comms link serial ports.</p> |
| SERIAL_PORTS | <p>Specifies the pre-defined values for use with comms link serial ports. Using this table, along with the VCC_COMMPORTSELECT group above, allows a pin to specified as a serial comms port.</p> <p>Using the VCC_COMMPORTSELECT group enables the system to flag “in use” comms ports when changing port via the website and prevent multiple links attempting to use the same port.</p> |
| SERIAL_STOP_BITS | <p>Specifies the pre-defined stop bits values for use with comms link serial ports.</p> |
| SYSDISP | <p>Specifies the available options when adding a Live Menu in the Displays editor.</p> <p>See 8.2 - Displays for more information.</p> |
| SYSINFO | <p>Specifies the available entries in the top-level SysInfo input pin.</p> |
| SYSINFO2 | <p>Specifies the available entries in the top-level SysInfo2 input pin.</p> |
| SYSLANG | <p>If configured, shows the available system strings used on the website.</p> <p>Setting up language entries for this table allows the website system text to be localised for multiple world regions.</p> |
| UNITS | <p>Specifies the available Units.</p> <p>See 6.14 - Units for more information.</p> |
| USERS | <p>Specifies the list of user names (and their associated access levels).</p> <p>There are only 6 levels available, with the lowest level '0' having the least restriction.</p> <p>Only the names themselves can be altered.</p> <p>See 8.2 - Displays for more information.</p> |

| | |
|-------|--|
| ZONES | Specifies the list of report zone names. See 8.5 - Reports / Live Screens for more information. |
|-------|--|

6.6.4 [Languages]

The Languages tab shows all pins and display menus in the application and a column for each configured language. For example:-

| Pin Filter: | Inputs, Outputs, Non Persistent | | |
|-------------|---------------------------------|-------------|-------|
| Block | Pin | English | Test |
| [Main] | SysAlarms | | |
| [Main] | SysFlags | | Flags |
| [Main] | SysHeartbeatId | Cycle Count | SysId |
| [Main] | SysTime | Date/Time | |

Languages can be added/removed/renamed by right-clicking on the header strip. A maximum of sixteen languages can be added, so seventeen in total (the [Base] language plus an extra sixteen).

By default, a new language has blank entries for all items.

Clicking on a language cell allows the user to change the text alias for that language.

Leaving an entry blank allows the text alias to "default" to either the base language or the pin/menu name itself (if no text alias exists in the base language).

From the example above, the following text aliases would be used:-

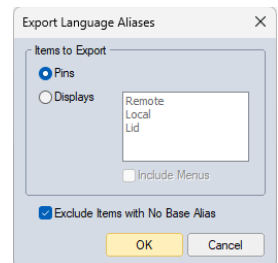
| Pin | English | Test |
|----------------|-------------|-----------|
| SysAlarms | SysAlarms | SysAlarms |
| SysFlags | SysFlags | Flags |
| SysHeartbeatId | Cycle Count | SysId |
| SysTime | Date/Time | Date/Time |

Similar to the Object Explorer, the pins can be filtered by type or string search.

Importing and exporting of language data is also possible (by the right-click menu on the appropriate language column header).

Data is exported as a CSV file and the user can chose to export all pins, or only those contained in a particular display tree. Pins with no base alias can also be excluded.

The CSV file can then be edited and imported back into the application to allow bulk updating of the pins aliases.



6.6.5 [Summary]

The Summary tab shows the current release notes for the application. These notes can be edited and any changes will be stored next time the application is saved.

6.6.6 [Validate]

The Validate tab provides an overview of any issues detected in the design of the application. This might include, for example, invalid or missing pin references, library block issues or report resource usage.

| Item | Description | Info #1 | Info #2 |
|---------------------------|-------------|------------------|---------|
| Alarms | OK | | |
| ▶ Comms | 1 warning | | |
| ▶ Containers / Codeblocks | 1 warning | | |
| ▶ Datamaps | OK | 1 warning hidden | |
| ▶ Displays | 10 errors | | |
| ▶ Historicals | OK | | |
| ▶ Reports | OK | | |
| ▶ Resource Usage | OK | | |
| ▶ Tables | OK | | |

Refresh Validate complete: 10 errors, 3 warnings (1 hidden) Copy to clipboard

Main Run_Control [Object Explorer] [Alarms] [Tables] [Languages] [Summary] [Validate]

The description column gives an explanation of the check. **RED** is used to denote an error, **ORANGE** for a warning, **GREEN** means no issue has been found and **BLACK** means information only.

In most instances, double-clicking on an item will navigate to the relevant item in the application.

Below lists the sections checked and the possible messages:-

6.6.6.1 Alarms

| | |
|----------------------|--|
| Duplicate alarm name | The alarms shown in the Info boxes have the same name, which may be confusing. |
|----------------------|--|

6.6.6.2 Comms

| | |
|---|--|
| Invalid comms name | The name of the comms link contains invalid characters which would prevent it from being saved to the library. |
| No datamap has been selected | The comms link has been designed to have a datamap assigned to it but none has been selected. |
| Invalid start address | The poll shown in the Info #1 column has an invalid start address. |
| Invalid address count | The poll shown in the Info #1 column has an invalid address count. |
| Invalid address(es) in use | The poll shown in the Info #1 column references an address that does not exist in the comms link datamap. |
| Invalid pin name Invalid pin reference for <x> Missing dynamic pin group <x> Units conflict Library: File missing Library: In sync | See relevant entry in 6.6.6.3 - Containers / Codeblocks . |
| Library: Out of sync | See relevant entry in 6.6.6.3 - Containers / Codeblocks . If the comms link utilises a datamap, additional information is provided showing the sync status of the comms core and the comms datamap. |

6.6.6.3 Containers / Codeblocks

| | |
|---------------------------------|--|
| Invalid pin name | The pin shown contains invalid characters. |
| Invalid pin reference for ADP | The pin shown in the Info #2 column references a SigFig/ADP lookup pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid pin reference for UNITS | The pin shown in the Info #2 column references a UNITS lookup pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Library: File missing | The block shown in the Info #2 column references a library file that does not exist. The Info #1 column shows if the 'record checksum' property is set and the current checksum of the block. |
| Library: In sync | The block shown in the Info #2 column is in sync with the library file. The Info #1 column shows if the 'record checksum' property is set and the current checksum of the block. |
| Library: Out of sync | The block shown in the Info #2 column is out-of-sync with the library file. The Info #1 column shows if the 'record checksum' property is set and the current checksum of the block. |
| Container paper size too small | The block shown in the Info #2 column has an invalid paper size. |
| Error in child codeblock | This container is locked but is flagged as having a child codeblock with a code error. |
| Missing dynamic pin group ADP | The pin shown in the Info #2 column references a SigFig/ADP lookup pin. However, the SigFig/ADP pin itself does not have the ADPSELECT group ticked. The Info #1 column gives that to the invalid SigFig/ADP pin. |
| Missing dynamic pin group UNITS | The pin shown in the Info #2 column references a UNITS lookup pin. However, the UNITS pin itself does not have the UNITSELECT group ticked. The Info #1 column gives that to the invalid UNITS pin. |
| Units conflict | The pins shown in the Info columns have a units setting that conflicts with each other. |

6.6.6.4 Datamaps

| | |
|-----------------------|--|
| Invalid pin reference | The address shown in the Info #2 column uses a pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid array index | The address shown in the Info #2 column uses an invalid array index. The Info #1 column gives the path of the missing pin. |

| | |
|---------------------------------|--|
| <p>Duplicate pin</p> | <p>The pin (and possible array index) shown are used multiple times in the datamap.</p> <p>This may be intentional so this is only flagged as a warning.</p> <p>Note that any invalid pins are not tested for duplicates.</p> <p>To hide duplicate pins from the warning count, set the preference under View Validate Hide Duplicate Pins. If this is set, an indication of how many warnings are hidden is shown as well as how many remain.</p> |
| <p>Duplicate tagname</p> | <p>The tagname show is duplicated. The address of first use is shown in the Info #2 column.</p> <p>Note that this condition is only checked for in the specific TAGNAMES datamap.</p> |

6.6.6.5 *Displays*

| | |
|--|---|
| <p>Invalid pin reference</p> | <p>The display item shown in the Info #2 column uses a pin that does not exist.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid array index</p> | <p>The display item shown in the Info #2 column uses an invalid array index.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid Ident pin reference</p> | <p>The display item shown in the Info #2 column uses a non-existent IDENT pin.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid Ident array index</p> | <p>The display item shown in the Info #2 column uses an invalid array index for the IDENT pin.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid Active pin reference</p> | <p>The display item shown in the Info #2 column uses a non-existent ACTIVE pin.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid Active array index</p> | <p>The display item shown in the Info #2 column uses an invalid array index for the ACTIVE pin.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid Active value</p> | <p>The display item shown in the Info #2 column uses a table on the ACTIVE pin but the active value does not exist in the specified table.</p> <p>The Info #1 column gives the path of the missing pin.</p> |
| <p>Invalid screen report</p> | <p>The display item shown in the Info #2 column uses a screen report that does not exist.</p> <p>The Info #1 column gives the name of the missing report.</p> |

6.6.6.6 *Historicals*

| | |
|--------------------------------------|--|
| Invalid pin reference | The index shown in the Info #2 column uses a pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid array index | The index shown in the Info #2 column uses an invalid array index. The Info #1 column gives the path of the missing pin. |
| Invalid Trigger pin reference | The TRIGGER pin does not exist. The Info #1 column gives the path of the missing pin. |

6.6.6.7 *Reports*

The first item in the Reports section is “Zone Info”. It simply shows all the report zones along with a list of all reports that use that zone.

| | |
|--|---|
| Missing pin reference | The placement shown in the Info #2 column does not have a pin defined. |
| Invalid pin reference | The placement shown in the Info #2 column uses a pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid Active pin reference | The ACTIVE pin of the placement shown in the Info #2 column uses a pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid Line Active pin reference | The ACTIVE pin of the report line shown in the Info #2 column uses a pin that does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid Trigger pin reference | The TRIGGER pin does not exist. The Info #1 column gives the path of the missing pin. |
| Invalid Visible pin reference | The VISIBLE pin does not exist. The Info #1 column gives the path of the missing pin. |
| Report uses too many data slots | A report can store a maximum of 240 data “slots”, where each slot can store 1 double, 1 integer or 8 bytes of a string. The data configured for the report has been calculated to exceed this limit and so not all data will be stored. The Info #1 column gives details of the slot usage. |
| Trigger pin not set | The TRIGGER pin for the report has not been set. |

6.6.6.8 *Resource Usage*

This section details the database resource usage, showing how many DOUBLE and INTEGER variables are currently used by the application.

Non-volatile variables are listed separately (as these are stored in FRAM which has limited capacity), along with a percentage usage in relation to the hardware target chosen for the application.

If the non-volatile usage is above 90% this is classed as a “warning” and highlighted in **ORANGE**.

If the non-volatile usage is above 100% this is classed as an “error” and highlighted in **RED**.

The number of alarms defined is also shown.

6.6.6.9 Tables

This section shows any tables that are not referenced in the application but are defined in the Tables tab. If all tables are used, the Description column will display **OK**.

| | |
|--------------|--|
| Unused table | The table is not referenced by any pin in the application. |
|--------------|--|

6.7 Codeblocks

Codeblocks allow developers to add C code to their applications.

Creating a new codeblock can be done by right-clicking on the main editor window and selecting New | New Codeblock or selecting Edit from the toolbar and choosing New Block | New Codeblock. Alternatively with the pointer in the main editor window you can simply press 'c'.

Codeblocks can be deleted, copied and pasted, and stored in the library.

Note that the ordering of the input and output pins is set by the order the function parameters are defined in the source code.

See [7 - C||Cure Syntax](#) for more information on the format and coding style used by codeblocks.

A list of currently opened codeblocks (and containers) is shown in the tab-strip at the bottom of the main editor window.

The following codeblock properties are available on the Properties window:-

| | |
|-----------------|---|
| Name | Name of the codeblock. |
| Library | If linked to a library, this will show the library this codeblock was loaded from. If not linked, this field will be blank. |
| Library Path | If linked to a library, this will show the library path and filename of the codeblock. If not linked, this field will be blank. |
| Version | If linked to a library, this will show the library version of the codeblock. If the block shows as Out of Sync this shows the library version that the local copy is being compared against. If not linked, this field will be blank. |
| Checksum | This shows the current md5 checksum calculated for the codeblock. |
| Record Checksum | If checked, this codeblock and its checksum will be listed in the Constants Log. |
| Password | Allows the codeblock's password to be changed |
| Timeout (ms) | Shows the current timeout before the codeblock will be forcefully stopped from executing. This can be used to prevent any single set of code from consuming too much processing time. |

NOTE: At the bottom of the Properties window there are two areas. The top one has a brief description of the property line selected. The lower one allows notes to be entered regarding the block selected.

6.8 Containers

Containers allow a hierarchical structure to be used within an application.

They can contain codeblocks, other containers, comment blocks or a mixture.

Creating a new container can be done by right-clicking on the main editor window and selecting New | New Container or selecting Edit from the toolbar and choosing New Block | New Container. Alternatively with the pointer in the main editor window you can simply press 'C'.

This will create a new empty container, with no input or output pins.

The default container name will be "Container", or, if such a container already exists, "Container_X" where X is a number chosen not to clash with any other containers at the current hierarchical level.

Input and output pins can be added to the current container by right-clicking on any empty space in the editor window, and selecting New | New Input Pin or New Output Pin (or pressing 'i' or 'o' or selecting Edit | New Input Pin or New Output Pin).

Similarly, input and output pins can be added to a specific container by right-clicking on the required container, and selecting New | New Input Pin or New Output Pin.

Unlike codeblocks, the ordering of the input and output pins can be adjusted by right-clicking on the relevant pin and selecting Move Up (or pressing 'u' or File | Edit | Move Up) or Move Down (or pressing 'd' or File | Edit | Move Down).

Double-clicking on a container will drill down into that section of the application, with a list of currently opened containers (and codeblocks) shown at the bottom of the main editor window.

Container pins can be edited as described in [6.12 - Pin Properties](#).

Separator pins can also be added to split input/output pins into groups.

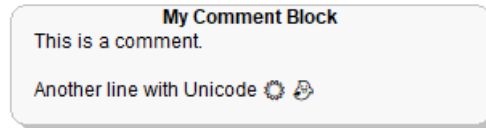
The following container properties are available on the Properties window:-

| | |
|-------------------|---|
| Name | Name of the container. |
| Library | If linked to a library, this will show the library this container was loaded from. If not linked, this field will be blank. |
| Library Path | If linked to a library, this will show the library path and filename of the container. If not linked, this field will be blank. |
| Version | If linked to a library, this will show the library version of the container. If the container shows as Out of Sync this shows the library version that the local copy is being compared against. If not linked, this field will be blank. |
| Checksum | This shows the current md5 checksum calculated for the container. |
| Record Checksum | If checked, this container and its checksum will be listed in the Constants Log. |
| Password | Allows the container's password to be changed. |
| Iterations | Specifies how many times the container should be run per application cycle. |
| Iteration Control | Specifies an output which, when non-zero, will abort the above iterations. |

NOTE: At the bottom of the Properties window there are two areas. The top one has a brief description of the property line selected. The lower one allows notes to be entered regarding the container selected.

6.9 Comments

Free text comment blocks can be added to any container.



Creating a new comment block can be done by right-clicking on the main editor window and selecting New | New Comment (or pressing 'm' or selecting Edit | New Block | New Comment).

The comment name can be changed using the Properties window.

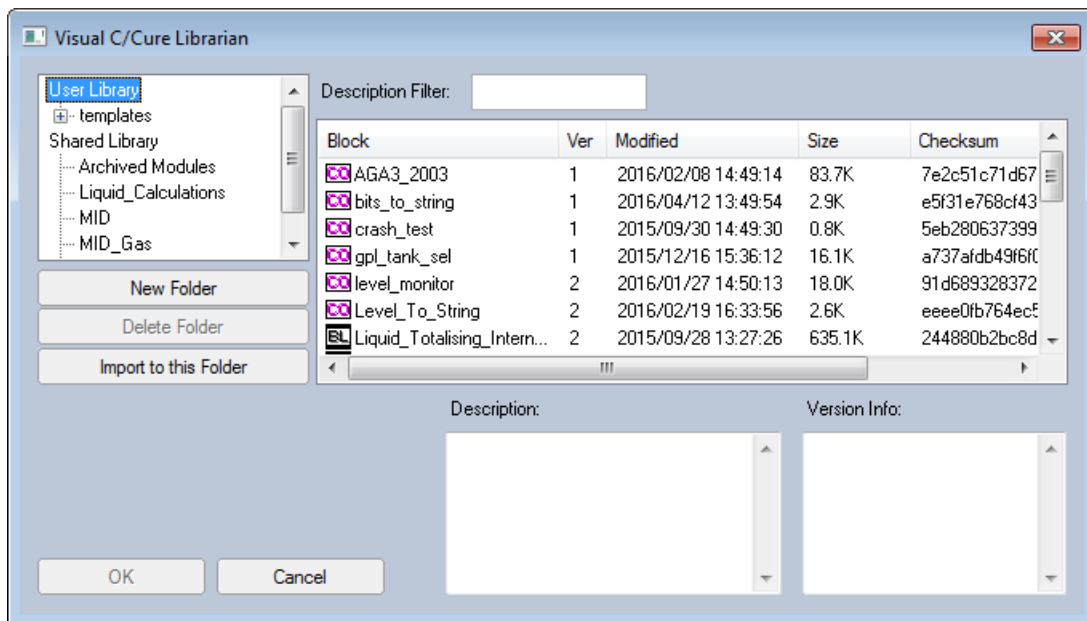
At the bottom of the Properties window there are two areas. The top one has a brief description of the property line selected. In this instance the only Name line is available.

The lower one allows notes to be entered regarding the block selected. This information is shown inside the Comment Block in the application.

NOTE: This is useful as a note, reminder or to help describe the function of a block or area of the application.

6.10 Librarian

Visual C||Cure has the ability to store codeblocks and containers in a library, so that they may be re-used either within the same application or in completely different applications altogether.

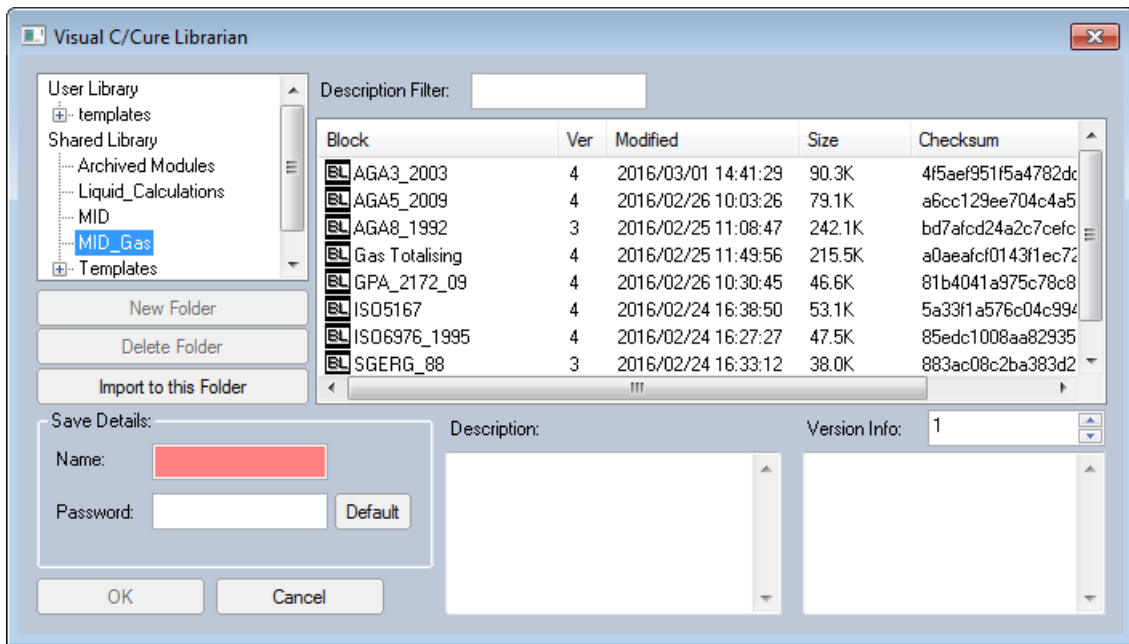


The left hand side shows a tree view of the library folders. Folders can be added / removed from the User Library (see [6.1 - System Preferences](#)).

Library blocks can be imported into any of the library folders using the "Import to this Folder" button.

6.10.1 Saving to the library

Once a codeblock or container has been written, it can be saved to the library by right-clicking on the codeblock / container and selecting Save To Library.



Select the required library directory on the left side of the window. Folders can only be added or removed in the User Library area using the "New Folder" and "Delete Folder" buttons. Modifications to the Shared Library folder structure must be performed outside the Visual C|Cure program. Library blocks can be imported into any of the library folders using the "Import to this Folder" button.

Enter the name under which to save the item.

Alternatively, an existing library item can be selected if the user wishes to overwrite the existing item with the codeblock / container to be saved.

At this point, a password can be applied to the item to be saved. The "Default" button will copy the password as set in the system preferences dialog (see [6.1 - System Preferences](#) for more information).

The item version can also be adjusted. By default, the version will be 1 for new library items, or one more than the current version for existing library items.

An optional description and version summary can also be added at this point.

Click OK to save the item to the library.

If no such item already exists in the library, the application item will now be saved to the library.

If however, the item name matches an existing library item, the user will be prompted if they wish to overwrite the existing library item. Selecting Yes will replace the library item with the application item. A green tick will show in the top right hand corner of the application item to signify that the block is now in sync with the library.

Selecting No will cancel the saving and leave the library and application items unchanged and unlinked.

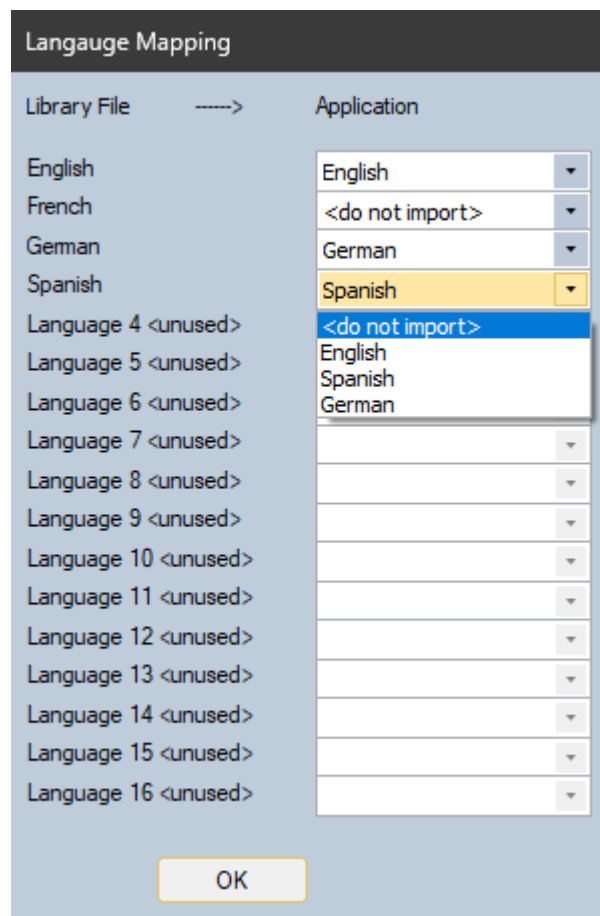
6.10.2 Loading from the library

Once stored in a library, items can be added to the current container by right-clicking on the editor window and selecting New | Block from Library (or pressing 'l' or selecting Edit | New Block | Load Block from Library...). This will bring up the librarian window.

Select the required library directory on the left side of the window, and select the required library item from the right-hand list.

Click OK to add a new copy of the library item to the application.

NOTE: If adding an item that was saved to the library using Visual C||Cure v5 or higher, an additional Language Mapping dialog will appear. This allows the stored languages in the library item to be mapped to the appropriate language in the application. There is also a '<do not import>' option for each stored language if no suitable application language is available or if the stored languages are not required.



Visual C||Cure v4 and earlier did not have the ability to store multiple languages in the library items.

6.10.3 Link to existing library file

It is also possible to link an existing container or codeblock to an existing library file by right-clicking on the editor window and selecting Link To Library... (or selecting Edit | Link To Library...). This will bring up the librarian window.

NOTE: The librarian will only show library containers when linking containers and library codeblocks when linking codeblocks.

Select the required library directory on the left side of the window, and select the required library item from the right-hand list.

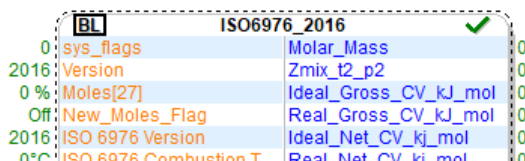
Click OK to link the existing container/codeblock to the selected library item.

This does not change the existing application block, it simply connects the block with the library. The sync status will be automatically updated to reflect whether the current block is in or out of sync with the library. See [6.10.4 - Sync Status](#).

6.10.4 Sync Status

When added to an application, a copy of the library item is used, but a link to the library is maintained and is used to check that the application item and the library item are still in sync.

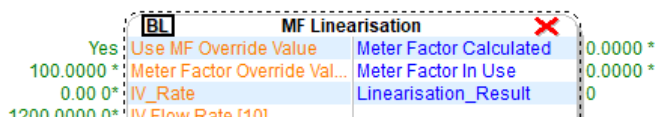
A green “✓” symbol, denotes that the application item and library item are in sync.



| ISO6976_2016 | | | |
|--------------|-----------------------|-----------------------|---|
| 0 | sys_flags | Molar_Mass | 0 |
| 2016 | Version | Zmix_t2_p2 | 0 |
| 0% | Moles[27] | Ideal_Gross_CV_kj_mol | 0 |
| Off | New_Moles_Flag | Real_Gross_CV_kj_mol | 0 |
| 2016 | ISO 6976 Version | Ideal_Net_CV_kj_mol | 0 |
| 0°C | ISO 6976 Combustion T | Real_Net_CV_kj_mol | 0 |

If the library item is ever updated, or the user changes the copy loaded into the application, the relevant codeblock or container will be flagged as “out of sync”.

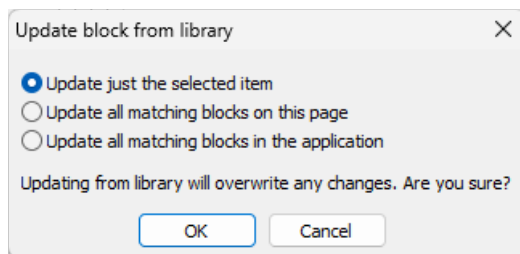
This “out of sync” information is shown in the Workspace tab (under the Status column) as well as on the codeblock / container itself (by a red “X” in the top right corner of the item):-



| MF Linearisation | | | |
|------------------|------------------------------|-------------------------|----------|
| Yes | Use MF Override Value | Meter Factor Calculated | 0.0000 * |
| 100.0000 * | Meter Factor Override Val... | Meter Factor In Use | 0.0000 * |
| 0.00 0* | IV_Rate | Linearisation_Result | 0 |
| 1200 0000 0* | IV Flow Rate (100) | | |

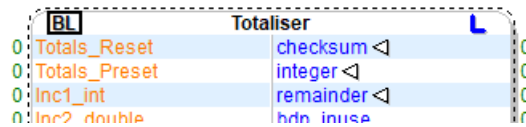
The user then has the option to re-sync the application codeblock / container with the version located in the library. This can be achieved by right-clicking on the container or codeblock and selecting Update From Library (or selecting Edit | Update From Library).

When updating from the library, the user is shown the following dialog:-



This allows bug fixes and updates in commonly used code to be easily detected and updated, either for a single block, an entire page or across the whole application.

One further status indicator is a blue “L” symbol.



This indicates the block is linked to a library file but the file is missing from the library.

6.11 Security

To protect developers' Intellectual Property, several levels of security are available for each application:-

| | |
|----------------------|---|
| File encryption | <p>All application files are encrypted when stored on either the PC or within the target.</p> <p>This encryption is based on the widely adopted AES standard (http://en.wikipedia.org/wiki/Advanced_Encryption_Standard).</p> |
| Application password | <p>By default, new applications are not protected, allowing anyone to open the application using Visual C Cure.</p> <p>Using the application properties dialog, the developer can set a password that must be entered to allow Visual C Cure to access the application when loaded.</p> <p>See 6.2 - Application Properties for more information.</p> |
| Codeblock password | <p>Each codeblock can be configured to have its own password.</p> <p>A default password can be set, and all new codeblocks can be configured to use this password by default, using the Visual C Cure Preferences dialog (see 6.1 - System Preferences).</p> <p>If a codeblock has a password applied to it, and that password matches the default password, then it will be automatically viewable.</p> <p>However, if the passwords do not match, then the letters “BL” (meaning BLOCKED) will be shown in the top left corner of the codeblock. Double-clicking on the codeblock will prompt for the password to be entered.</p> <p>The password can be added or changed using the Password property in the Properties window.</p> <p>NOTE: Passwords can only be removed or changed once you have access to the block, that is, if there is already a password assigned, it must have been entered correctly.</p> |
| Container password | <p>Like codeblocks, each container can also be configured to have its own password.</p> <p>Passwords can be added or changed in the same way as codeblocks.</p> |

6.12 Pin Properties

All input and output data pins can be configured to suit the application being written.

Clicking on any pin will display its properties in the Properties window, as well as highlighting any other pins it is connected to.

Below is a definition of all the available properties, as shown in the Properties window:-

| | |
|-----------------------|--|
| Name | Name of the pin (as defined by the input/output pins of the codeblock or container). |
| Languages | Text alias strings for each configured language. The user can edit the aliases here or via the [Languages] system tab (see 6.6.4 - [Languages]). |
| Data Type | Sets the data type for the pin:- double floating point number int whole number text fixed length character string See 7.4 - Data types for further information. |
| Base Type [read-only] | Shows the basic data type of this pin. This is the value to specify when feeding this pin into a codeblock. |
| Text Length | Shows the maximum string size of a text item, or of each text element if this pin is an array. This property is greyed out if the data type is not set as Text. |
| Dimension | A value of 1 denotes a single data point. Any value > 1 will convert the data point into a data array, with the dimension value setting the number of items in the array. |
| Units | Sets the units associated with the pin. See 6.14 - Units for further information. |
| SigFig / ADP | Sets the number of significant figures for a value or the number of digits shown "After the Decimal Place". This does not affect the calculations, only the displaying of data values. See 6.15 - Significant Figures / ADP for further information. |
| Alarm | Specifies if this pin is to act as an alarm source. Inactive pin is not an alarm source Active an alarm will be set when the pin is non-zero Any pins in the VCC_ALARMSELECT group (see Groups below) will also be listed. Selecting any one of these will set the pin to be Active, but only trigger an alarm when the selected alarm pin is non-zero. See 8.6 - Alarms for more information. |

| | |
|--------------|---|
| Alarm Groups | <p>Eight alarm groups are available, and are used to combined alarms.</p> <p>When any alarm is set, its corresponding Alarm Group bit is also set to 1. These bits are then presented as a top-level input array and can be used in the application as required.</p> <p>For example, there may be 10 alarms defined in the application. A digital output needs to be set when any one of 5 particular alarms are set. In which case, select Alarm Group 1 on the required alarms, and then wire the AlarmGroup[0] input to DigOut1.</p> <p>If any of the 5 alarms get set, then the Alarm Group 1 bit will be set, resulting in Digital Output 1 being set.</p> |
| Wrap | <p>Specifies that an output pin will be fed back as an input pin for the next cycle.</p> <p>See 6.13 - Wrapped / Persistent / Unconnected Pins for more information.</p> <p>This property is greyed out for codeblock pins and container input pins.</p> |
| Reset to X | <p>This option only applies to persistent pins, otherwise it is greyed out.</p> <p>Selecting this option will cause the pin to be reset to a fixed value (see below) at the end of each cycle.</p> <p>This can useful when a one-off trigger needs to be activated (e.g. to run a user initiated report).</p> |
| Reset Value | <p>When "Reset to X" is checked, this sets the reset value.</p> |
| Table | <p>Specifies the string lookup Table to be used for this pin, causing the pin value to be shown as a string rather than a number.</p> <p>If set to <inherit>, the current in-use table is shown next to the property name. It is taken from the parent pin feeding it. If the pin is not connected, no table will be assigned. There are exceptions to this such as if the parent pin is inheriting it's table from another lower pin, more than it's parent.</p> <p>See 6.6.3 - [Tables] for more information.</p> |
| Field Table | <p>If the pin is an array (Dimension > 1) this specifies the string lookup Table to be used for this pin's fields.</p> <p>If set to <inherit>, the current in-use field table is shown next to the property name. It is taken from the parent pin feeding it. If the pin is not connected, no field table will be assigned. There are exceptions to this such as if the parent pin is inheriting it's field table from another lower pin, more than it's parent.</p> <p>See 6.6.3 - [Tables] for more information.</p> |
| Groups | <p>Lists the available system / user-defined groups that can be selected for this pin. Groups may be added via the "GROUPS" table.</p> <p>See 6.6.3 - [Tables] for more information.</p> |
| Date/Time | <p>This option only applies to pins with a "double" data type.</p> <p>Specifies that this data pin holds an encoded date/time value and should be displayed as such.</p> |
| IP Address | <p>Specifies that this data pin holds an IP address and should be displayed as such.</p> <p>Note that the data type must be a 4 element integer array.</p> |
| Persistent | <p>Specifies (or shows) whether this pin's data is persistent.</p> <p>See 6.13 - Wrapped / Persistent / Unconnected Pins for more information.</p> |

| | |
|-------|---|
| Value | <p>Shows the current / default value(s) for this pin.</p> <p>Both the raw value and the 'formatted' value (after any SigFig/ADP setting has been applied) are shown.</p> <p>If the pin is an array, then each array item will be listed (up to the first 100 items).</p> <p>If this is an unconnected pin, the pin value can be changed by clicking on the value cell.</p> <p>When running in DEBUG mode, the live pin values are displayed here.</p> |
|-------|---|

6.13 **Wrapped / Persistent / Unconnected Pins**

To guarantee predictable operation, the C||Cure computing engine is modelled on the behaviour of state machines, in that the output values are solely determined by the input values. All previous values of any outputs are forgotten, and so any fixed set of input values will produce the same set of output values, regardless of any previous calculations.

To achieve this all output pins on any codeblock are, unless marked persistent, reset to zero at the start of each computation cycle.

Outputs will only be changed if the application code specifically changes them via a codeblock.

However, some values (e.g. user specified inputs, counters, etc) do need to be "remembered" between cycles. To cater for this, pins can be configured to operate in one of the following ways:-

6.13.1 **Wrapped**

Wrapped pins only apply to container outputs, and are used when container output data values need to be copied from one cycle to the next.

Selecting the "Wrap" option on an output pin of a container will generate a dummy input pin.

At the end of each computation cycle, the values of any wrapped output pins are then copied to the relevant dummy input pin, thus allowing the output data to be used as input data on the next cycle.

Wrapped pins are denoted by a "◁" symbol, as shown on a container symbol:-



... or within the container itself:-



6.13.2 **Persistent**

To complement wrapped pins, persistent pins do not get reset to zero at the start of each cycle.

By default, the "Persistent" option is always set for unconnected input pins (i.e. those that are not fed by another pin and can only be changed through a comms link or the web interface).

Output pins can also be marked as persistent, in which case they will not be reset to zero at the start of each cycle and will retain their current value unless overwritten.

Persistent data is stored in non-volatile memory and, therefore, the data values are retained when the unit is power cycled.

NOTE: non-volatile memory is limited so this should be taken into consideration when designing applications. In many cases, a wrapped pin can be used in place of a persistent pin.

6.13.3 Unconnected

The “Persistent” option can be unticked for both input and output pins, in which case the pin value is *not* stored in non-volatile memory but is retained from one cycle to the next. However, on a power-cycle, the pin value will be reset to zero.

This mode is useful for pins being fed by a comms link, since the data does not need to be retained on a power-cycle.

6.14 Units

The Visual C||Cure editor allows for any data pin to have an associated unit.

Although designed with S.I. units in mind, the units themselves are just another string taken from the UNITS table, and so any string values can be used.

The source of the unit value for a pin is specified via the pin's Units pull-down list in the Properties window. This pull-down list will be populated from the following sources:-

| | |
|---------------------|--|
| <inherit> | The pin will set the pin to inherit the units from the parent pin feeding it. If the pin is not connected, no unit will be assigned. There are exceptions to this such as if the parent pin is inheriting it's unit from another lower pin, more than it's parent. |
| Units table | All lookup entries from the UNITS table will be shown in the Units pull-down list. |
| VCC_UNITSELECT pins | <p>To allow for full flexibility, the unit for a pin (call it PIN_A) can be derived via another pin (call it PIN_B).</p> <ul style="list-style-type: none">(a) Create a table (or use an existing table) containing the list of custom units to be used by PIN_A.(b) For PIN_B, select the above table in the Table pull-down list.(c) For PIN_B, check the VCC_UNITSELECT group. This will add PIN_B to the Units pull-down list on the Properties window.(d) Finally, for PIN_A select PIN_B from the Units pull-down list. <p>The units for PIN_A will now be derived from PIN_B's lookup table, and so whenever PIN_B's value changes, its lookup string will change and thus PIN_A's unit will change accordingly.</p> <p>This allows the user to make dynamic units in an application – useful if the units are configurable depending on the location the device / application is to be installed.</p> |

If using <inherit> or a VCC_UNITSELECT pin, the current in-use unit is shown next to the property name.

6.15 Significant Figures / ADP

To reduce the amount of data shown on the screen at any one time, any pin can be configured to limit the number of decimal places shown.

Note that this does not affect the calculation resolution, simply the values as they are shown on the screen.

The source of the SigFig/ADP value for a pin is specified via the pin's SigFig/ADP pull-down list in the Properties window. This pull-down list will be populated from the following sources:-

| | |
|--------------------|--|
| <inherit> | The pin will inherit the SigFig/ADP value from the parent pin feeding it. If the pin is not connected, no SigFig/ADP will be assigned. There are exceptions to this such as if the parent pin is inheriting its SigFig/ADP from another lower pin, more than its parent. |
| 0...15 ADP | The pin will display exactly this number of digits after the decimal place. Values will be truncated or padded with zeros accordingly. |
| <variable> | The pin will display a variable number of digits after the decimal place, but strip off any trailing zeros. |
| 1...15 SigFig | The pin will show 1...15 significant figures for the entire number. |
| VCC_ADPSELECT pins | <p>To allow for full flexibility, the SigFig/ADP setting for a pin (call it PIN_A) can be derived via another pin (call it PIN_B).</p> <p>(a) For PIN_B, check the VCC_ADPSELECT group. This will add PIN_B to the SigFig/ADP pull-down list on the Properties window.</p> <p>(b) For PIN_A, select PIN_B from the SigFig/ADP pull-down list.</p> <p>The SigFig/ADP value for PIN_A will now be taken from PIN_B's value, and so whenever PIN_B's value changes, the SigFig/ADP setting for PIN_A will change accordingly.</p> |

If using <inherit> or a VCC_ADPSELECT pin, the current in-use SigFig/ADP value is shown next to the property name.

6.16 Datasets

By default, an application holds one set of default values for all persistent pins. This is called "Base" and can be seen in the Object Explorer (see [6.6.1 - \[Object Explorer\]](#)).

Visual C||Cure allow alternate sets of data to be defined, allowing the same basic application to be used for multiple situations where the settings differ.

The user can switch between datasets in the editor by using the drop-down list in the icon bar. Doing so will update the values shown in the application.

7 C||Cure Syntax

A C||Cure codeblock can contain one or more functions, sequentially laid out. The last function will be taken as the main one and functions can call each other upwards only. For example:-

```
double foo()
{
    return 1.234;
}

int main()
{
    double d = foo();
}
```

The C||Cure language itself (as the name suggests) is closely based on the C programming language. The main differences are described below.

7.1 Variable Declaration

Unlike native C, all variables are initialised to zero unless an explicit initialiser is used.

Arrays can be fully initialised to a non-zero value using the following:-

```
int a[5] = { 123 };
```

In this case, all five array elements would contain the value 123.

Standard array initialisation can still be used as follows:-

```
int a[5] = { 11, 22, 33, 44, 55 };
int b[5] = { 123, 456 };          /* b[2]...b[4] initialise to zero */
```

7.2 Function Calls

To reduce complexity, user functions cannot be used within multi-term expressions.

For example, in standard C, the following is valid:-

```
int foo()
{
    return -1;
}

int mainfunc()
{
    double d = foo() * 2.5;
}
```

However, in C||Cure this must be split into two lines, as follows:-

```
int foo()
{
    return -1;
}

int mainfunc()
{
    double d = foo();
    d *= 2.5;
}
```

7.3 Pointers

The C||Cure engine does **not** support pointers. This is to ensure the code runs in a predictable “secure” environment.

However, functions can be defined with “output arguments”, specified by the addition of the '&' character, indicating a C call by reference. For example:-

```
int test(int input_num, double input_fp, double& out1, double& out2)
{
    out1 = input_num * input_fp;
    out2 = input_num / input_fp;
}
```

Using this method, a function can take multiple input parameters, perform code based on those inputs, and then set the output parameters accordingly, all without the need for pointers.

7.4 Data types

Only 32bit signed integers and 64bit doubles are supported.

Time / date values are stored as an encoded double (containing year, month, day, hour, minute, second and milliseconds).

Text strings are also supported, although the implementation is limited. A “text” variable can be defined using arrays of integers, with each integer containing 4 bytes. UTF-8 strings are supported, although note that the text length of a pin describes the number of bytes, not characters. Since the UTF-8 standard can use up-to four bytes to define a single character, care should be taken to allow enough space for the required string. See <https://en.wikipedia.org/wiki/UTF-8> for more information.

7.5 Unsupported C syntax

The following elements are unsupported:-

- static
- struct
- union
- typedef
- #include
- #define, #if, #ifdef, etc

7.6 Standard Library Functions

Below is a list of the standard library functions provide by C||Cure:-

7.6.1 Maths Functions

| | |
|--------------------------------|---|
| double fabs(double x) | Returns the absolute value x. There is no error return. |
| int int(double x) | Returns the integer portion of x. |
| double exp(double x) | Returns the exponential value of x. |
| double log10(double x) | Returns the base 10 logarithm of x. |
| double log(double x) | Returns the base e logarithm of x. |
| double ln(double x) | Returns the base e logarithm of x. |
| double pow(double x, double y) | Returns the value of xy. |
| double sqrt(double x) | Returns the square root of x. |

| | |
|----------------------------------|---|
| double fmin(double x, double y) | Returns minimum value of x and y. |
| double fmax(double x, double y) | Returns maximum value of x and y. |
| int isinf(double x) | Returns -1 if x is negative infinity. Returns 1 if x is positive infinity. |
| int isnan(double x) | Returns 0 if x is a valid double value. Returns 1 if x is an invalid double value. |
| double pi() | Returns the value of π . |
| double sin(double x) | Returns the sine of x. |
| double cos(double x) | Returns the cosine of x. |
| double tan(double x) | Returns the tangent of x. |
| double asin(double x) | Returns the arc sine of x. |
| double acos(double x) | Returns the arc cosine of x. |
| double atan(double x) | Returns the arc tangent of x. |
| double atan2(double y, double x) | Returns the arc tangent of y/x. |
| double sinh(double x) | Returns the hyperbolic sine of x. |
| double cosh(double x) | Returns the hyperbolic cosine of x. |
| double tanh(double x) | Returns the hyperbolic tangent of x. |
| int atoi(int[] x) | Converts the string stored in int array x to an integer. |
| double atof(int[] x) | Converts the string stored in int array x to a double. |

7.6.2 Time / Date Functions

| | |
|--------------------------------|---|
| int nftime(double dTime) | Decodes and returns the number of seconds since 01-01-2010 00:00:00 from a double encoded time. |
| int nftimeyear(double dTime) | Decodes and returns the year from a double encoded time. The full year is returned, e.g. 2007. |
| int nftimemonth(double dTime) | Decodes and returns the month from a double encoded time. January = 1, December = 12. |
| int nftimeday(double dTime) | Decodes and returns the day from a double encoded time. The value will be between 1 and 31. |
| int nftimehour(double dTime) | Decodes and returns the hour from a double encoded time. The value will be between 0 and 23. |
| int nftimeminute(double dTime) | Decodes and returns the minute from a double encoded time. The value will be between 0 and 59. |
| int nftimesecond(double dTime) | Decodes and returns the second from a double encoded time. The value will be between 0 and 59. |
| int nftimems(double dTime) | Decodes and returns the milliseconds from a double encoded time. The value will be between 0 and 999. |

| | |
|---|---|
| double nbuildtime(int nYear, int nMonth, int nDay, int nHour, int nMin, int nSec) | Creates and returns an encoded double time and date as specified in the arguments. |
| int nfsettime(int nYear, int nMonth, int nDay, int nHour, int nMin, int nSec) | <p>Sets the system time as specified by the arguments.</p> <p>Returns 1 (TRUE) or 0 (FALSE) depending on whether a valid time was specified.</p> <p>Example, to set the time to 1st December 2021 10:30:00:- nfsettime(2021, 12, 1, 10, 30, 0);</p> |

7.6.3 String Functions

| | |
|--|--|
| int nfgettableentry(string x, string y) int nfgettableentry(int[] x, int[] y) | <p>Attempts to find the index of string y in table x.</p> <p>If table x does not exist in the application, or string y is not found within the table, the function returns -1.</p> |
| int nfstrcmp(int[] x, int[] y) | nfstrcmp behaves as per the standard C strcmp() function, but takes int array strings. |
| int nfstrcmp(int[] x, int[] y) | nfstrcmp behaves as per the standard C strcmp() function, but takes int array strings. |
| int[] nfsprintf("format", ...) | nfsprintf aims to follow all the usual rules of the C printf(), but will return the resulting string as an int array. |

7.6.4 Debug Functions

| | |
|----------------------------|---|
| int printf("format", ...) | <p>printf will send output to the console in Visual C Cure. It aims to follow all the usual rules of the C printf(). Known differences are:-</p> <ul style="list-style-type: none"> • A '\n' is appended to every printf if one isn't already present. <p>Returns the number of characters printed.</p> |
| int nfevent("format", ...) | <p>nfevent behaves a printf() above, but will store the resulting string in the Application Event Log.</p> <p>Returns the number of characters printed.</p> |

7.6.5 Licensing Functions

| | |
|------------------------------|---|
| int nfcisvalid(int x, int y) | Check if a license is currently valid. x (currently unused) denotes the license index. If y is non-zero, then the license manager will consider a license to be valid even if the current license count is ≤ 0 . Returns 1 if a license was valid. Otherwise returns 0. |
| int nfcuse(int x, int y) | Consume a license. x (currently unused) denotes the license index. If y is non-zero, then the license manager will allow a license to be released even if the current license count is ≤ 0 . Returns 1 if a license was consumed. Otherwise returns 0. |
| int nfcset(int[] x, int[] y) | Add/set licensing information. String x (containing an encrypted license key) is decrypted using string y as the key. The result data is passed to the internal license manager for decoding. Always returns 0. |

8 Information Tabs

The left hand window of the Visual C||Cure Editor contains a number of information / configuration tabs, through which many ancillary functions of an application can be configured.

Each tab can be moved or hidden to suit the user's needs. Tabs can be shown / hidden via View | Bars and then selecting / deselecting the tabs as required.

8.1 Workspace

The Workspace tab shows a hierarchical tree of all the containers, codeblocks and comment blocks within the application.

Any password protected codeblocks or containers will not show their hierarchical contents unless the default Visual C||Cure password (see [6.1 - System Preferences](#)) matches the password of the relevant item or the block has been opened with it's correct password.

Below is a list of the information columns:-

| | |
|-----------------------|--|
| Block | Shows the name of the container, codeblock or comment block. |
| Status | Indicates the status of the block:- ok Block is not in the library. Code Error Codeblock (or codeblock in a locked container) has a syntax error. No Library File Library block for this item is missing. Sync Block is in sync with the library. Out of Sync Newer version of this block is available in the library. |
| Time | Shows the cycle time (in milliseconds) for the block. This item only updates when running in Remote Debug mode (see 12 - Remote Debug). |
| Inst's (Instructions) | Shows the number of instructions executed in the block. This item only updates when running in Run mode or Remote Debug mode (see 12 - Remote Debug). |
| Iter's (Iterations) | Shows the number of iterations (if any) this block performed. Codeblocks do not support iterations and will be greyed out. This item only updates when running in Run mode or Remote Debug mode (see 12 - Remote Debug). |

8.2 Displays

The Displays tab allows the user to setup or edit the hierarchical menus and display items that will be available via a "remote" link (e.g. web server or XML comms), "local" HMI panel or "lid" display.

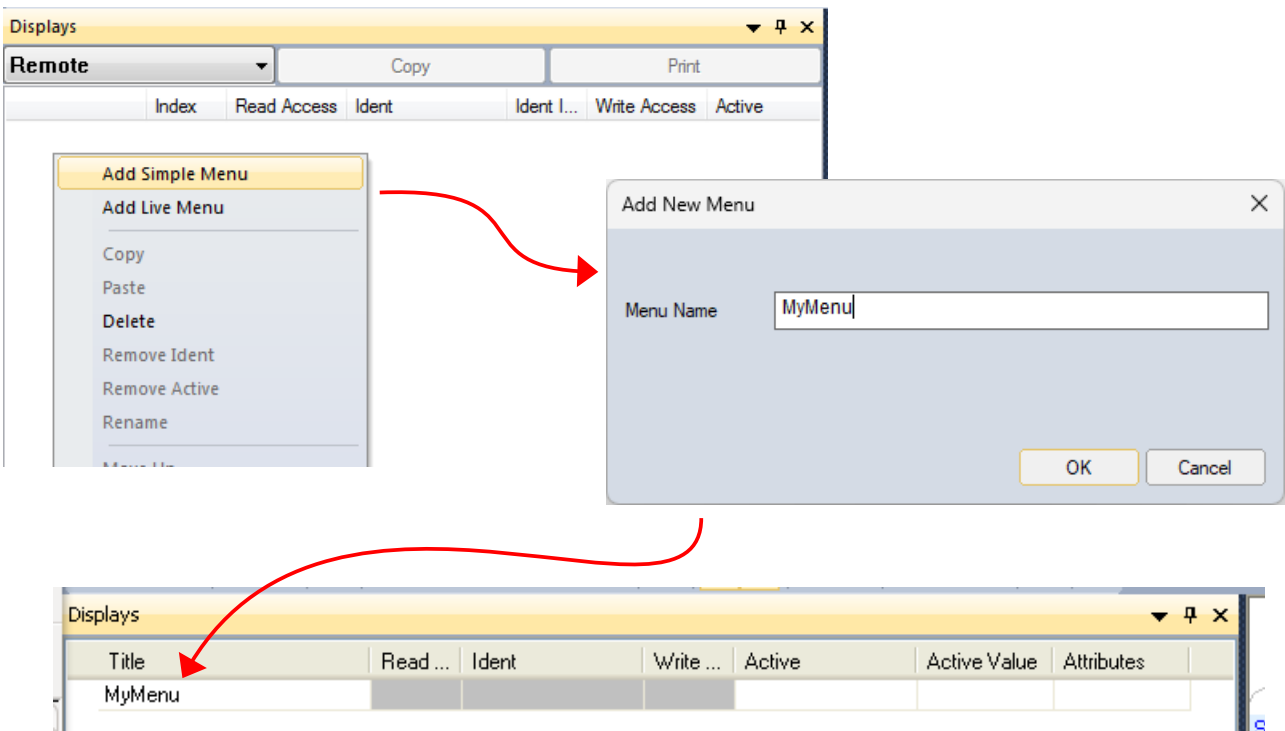
NOTE: for detailed information on each particular display link, refer to the Visual C||CURE Comms Links document (reference NFVCCL).

The following features are supported:-

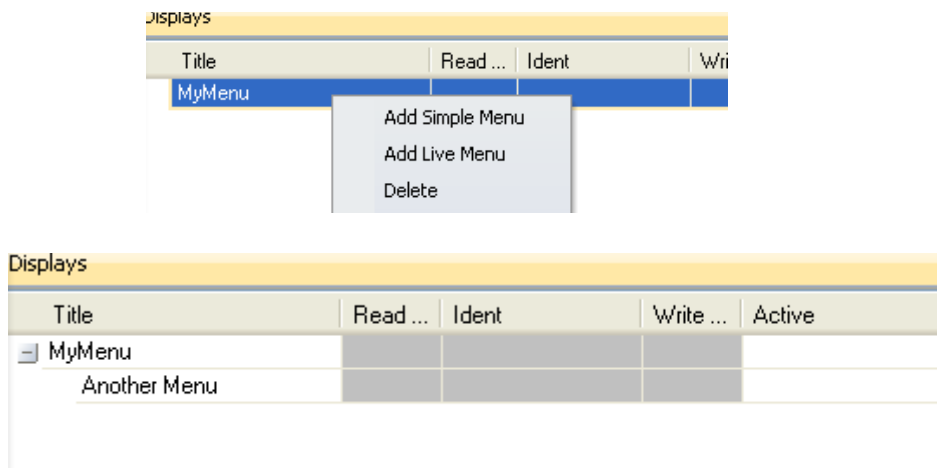
| | |
|--------------|--|
| Simple menus | Simple menus are the standard type of menu, allowing sub-menus or display items. |
| Live menus | Live menus enable a page of "live" data to be displayed, based on an existing Report layout (see 8.5 - Reports / Live Screens). Live menus cannot contain sub-menus. |

| | |
|----------------------------------|--|
| Read / Write user access control | Any display item can be configured to restrict both read and write access to a particular access level (or above). |
| Control / Status items | Display items can be configured to show the value of a "status" data pin when reading, but send changes to an alternative "control" data pin when writing. |
| Active / Inactive menus | All menus and display items can be setup with an "active" trigger pin (and value). When specified, the menu / display item will only be visible when the relevant active pin matches the configured active value. If no active pin is specified, the menu / display item will always be visible. |

To add a new top-level menu, select the relevant "remote" or "local" display tree from the drop-down menu. Then right-click on the empty space in the tab and select Add Simple Menu. Enter the menu name and click OK.

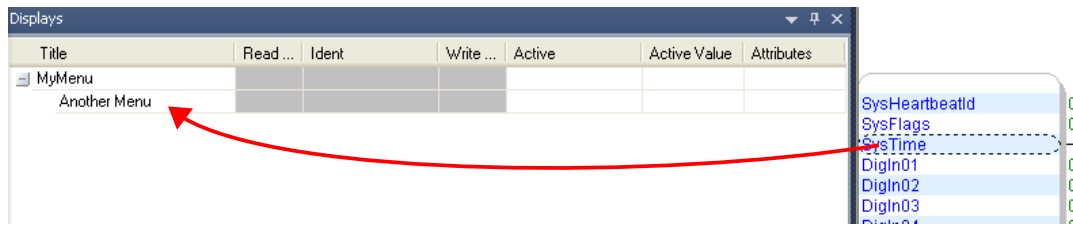


To add a sub-menu, right-click on an existing menu entry and select Add Simple Menu. Enter the menu name and click OK.

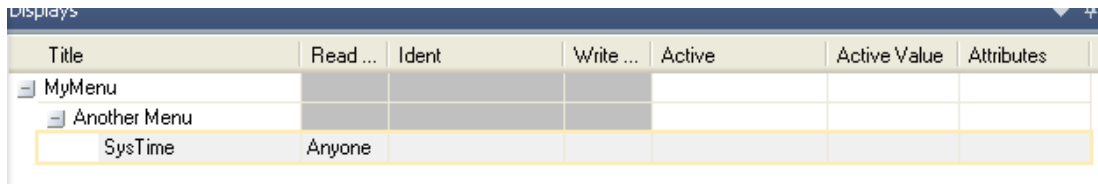


Once created, menus and sub-menus are also listed in the Languages tab (see [6.6.4 - \[Languages\]](#)), allowing menu text to be displayed in the currently selected language.

To add a display item to a menu, navigate within the application editor window to the relevant application container or codeblock that has the required pin (or locate the pin in the Object Explorer window), and drag the pin onto the relevant menu item.



This will insert the selected data pin into the target menu.



If an array pin is drag-and-dropped, the user will get the option to add each array item to the display tree. If only a single item is chosen, the item's Index spinner can be used to select the required item in the array.

All menus and display items can be moved up and down within the hierarchy. Right-clicking on an item will show the options:-

- Move Up (shortcut 'u') Moves the item up one slot
- Move Down (shortcut 'd') Moves the item down one slot
- Move Parent (shortcut 'l') Moves the item left / up one hierarchical level
- Move Child (shortcut 'r') Moves the item right / down one hierarchical level

If multiple items are selected within the same menu, they can be moved up/down together.

Items can be deleted using right-click Delete. Note that deleting a menu will also delete any of its children.

Data items can be "located" within the application via right-click Locate or by double-clicking the display item.

Below is a list of the information columns:-

| | |
|-------------|--|
| Title | Shows the name of the menu / display item. Menu names can be changed by clicking on the title cell and entering new text as required. Display item names are either the pin name or base pin alias (if set). |
| Index | For array pins, this specifies the array index to be used when reading data. This will be blank for non-array pins. |
| Read Access | This defaults to level 5 (Anyone), so any user with access level 5 (or greater access) will be able to see this item. The access level can be changed via the drop-down list. The access levels are defined using the USERS table (see 6.6.3 - [Tables]). |

| | |
|--------------|--|
| Ident | <p>For user-configurable input pins, the Ident sets the pin to be written when changing data.</p> <p>By default, the Ident is the same as the original pin, but this can be changed by dragging another pin onto the Ident cell.</p> <p>The Ident can also be removed (so that the display item cannot be written to) by using right-click Remove Ident.</p> |
| Ident Index | <p>For array pins, this specifies the array index to be used when writing data.</p> <p>This will be blank for non-array pins.</p> |
| Write Access | <p>This defaults to level 1 (Admin), so any user with access level 1 (or greater access) will be able to change this item.</p> <p>The access level can be changed via the drop-down list.</p> <p>The access levels are defined using the USERS table (see 6.6.3 - [Tables]).</p> |
| Active | <p>Dragging a pin onto the Active cell sets that pin as the active trigger.</p> <p>When used, the pin will only be shown on the display if the pin's current value matches the active value (see below).</p> <p>The Active pin can be removed by right-click Clear Active.</p> |
| Active Index | <p>For array pins, this specifies the array index to be used when looking up the value..</p> <p>This will be greyed out for non-array pins.</p> |
| Active Value | <p>If an active pin has been configured, this sets the integer value at which the display item becomes "active". This can either be a number (value can be changed using the up / down spinner buttons) or text (value can be changed using the pull down list) obtained from a linked table.</p> <p>The active value can be changed using the up / down spinner buttons.</p> |
| Attributes | <p>This is a general purpose string field that allows the user to assign each display item its own custom "attribute" string.</p> <p>See 8.2.1 - Display Attributes for more information on currently supported system attributes.</p> <p>The attribute string is also transmitted when using XML comms <Displays> and <Live_Displays> requests.</p> |

8.2.1 Display Attributes

Each entry in a display tree can contain its own attributes string. This can be entirely custom to the application writer and can be accessed via the XML comms link.

Alternatively, there are several "reserved" keywords that are used by the local panel and/or the web server to provide certain enhanced features.

The web server contains the ability to show a mimic of the local panel, and will attempt to recreate the layout of the local panel. This is not always possible due to rendering technologies between the PC and Local Panel. The local panel mimic on the web server will always display in the Base language (normally English), this is to allow remote assistance to be given to the user

The table below lists the relevant attributes, along with a description and whether the attribute is supported by the web server, local panel or lid.

8.2.1.1 Menu Items

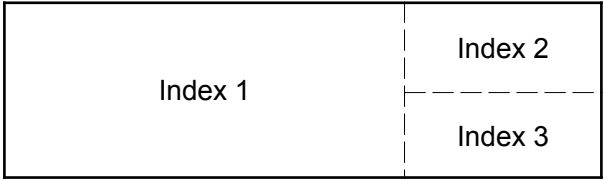
| Attribute | Description | Web Server | Local Panel | Lid | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--|------------|-------------|-----|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|
| size | <p>Specifies the layout of the screen by setting the number of rows and columns, using the format "size=<rows>x<cols>".</p> <p>Panels are laid out / numbered left-to-right, then top-to-bottom.</p> <p>For example, "size=4x6" sets the screen to 4 columns and 6 rows, with the individual panels laid out as:-</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td></tr> <tr><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr><td>13</td><td>14</td><td>15</td><td>16</td></tr> <tr><td>17</td><td>18</td><td>19</td><td>20</td></tr> <tr><td>21</td><td>22</td><td>23</td><td>24</td></tr> </table> <p>If no size attribute is specified, the display defaults to 2 columns and 4 rows.</p> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Y | Y | N |
| 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | 6 | 7 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 10 | 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 14 | 15 | 16 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 18 | 19 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 22 | 23 | 24 | | | | | | | | | | | | | | | | | | | | | | | | | |
| fs | <p>Sets the default font sizes (big and small for Title, Value and Units), using the format "fs=<TB>, <TS>, <VB>, <VS>, <UB>, <US>" where:-</p> <p><TB> Title big font size (default = 26) <TS> Title small font size (default = 14) <VB> Value big font size (default = 26) <VS> Value small font size (default = 20) <UB> Units big font size (default = 26) <US> Units small font size (default = 14)</p> <p>Any missing values will fallback to the system defaults.</p> <p>For example "fs=16, 10, , , 18, 14" sets the Title and Units font sizes, but leaves the Value font sizes as the defaults.</p> <p>Another example is "fs=18" which just sets the the Title big font size and leaves the all other font sizes as their defaults.</p> <p>If no fs attribute is specified, all font size use their defaults.</p> <p>Note that these font sizes can be overridden for individual items using the "st" parameter below.</p> | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | |

| Attribute | Description | Web Server | Local Panel | Lid |
|-----------|--|------------|-------------|-----|
| bg | <p>Sets the background colour for the page using a 6 digit hex RGB value.</p> <p>For example "bg=ff0000" sets the background to red.</p> <p>The default is white (ffffff).</p> | Y | Y | Y |
| cols | <p>By default, the screen contains only a single column of data items.</p> <p>This option can be used to set the number of columns and their percentage widths.</p> <p>The widths are set using a list of comma separated percentages. The number of percentages given sets the number of columns to create.</p> <p>A maximum of 10 columns can be specified.</p> <p>For example "cols=25, 50, 25" creates three columns, 25% wide, 50% wide and 25% wide.</p> | Y | N | N |
| clog | <p>Specifies how to show/hide this item on the Constants Log report.</p> <p>ha (H)ide (A)lways hi (H)ide when item (I)nactive hc (H)ide when item's (C)hildren inactive</p> | Y | N | N |

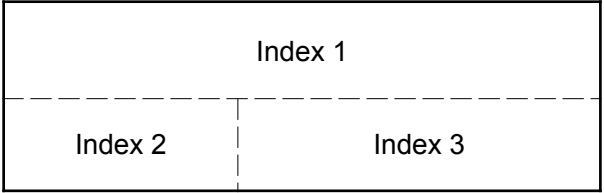
| Attribute | Description | Web Server | Local Panel | Lid |
|------------|---|------------|-------------|-----|
| chart | <p>Defines this menu to be displayed as a chart on the lid display.</p> <p>The first four database items are used to determine the chart appearance and values.</p> <p>Item 1 Used for the value of the chart.</p> <p style="padding-left: 40px;">This item's pin name is displayed one the first line of the lid display, with the chart shown beneath it.</p> <p>Item 2 Used for set the minimum value shown on the chart.</p> <p style="padding-left: 40px;">This item is optional and, if missing, the minimum will default to 0.</p> <p>Item 3 Used for set the maximum value shown on the chart.</p> <p style="padding-left: 40px;">This item is optional and, if missing, the maximum will default to 100.</p> <p>Item 4 Used for set the chart update time in application cycles (each cycle being 500ms).</p> <p style="padding-left: 40px;">For example, a setting of 1 will update the chart every ½ second. A setting of 120 will update the chart every minute.</p> <p style="padding-left: 40px;">This item is optional and, if missing, will default to 1.</p> <p>The chart automatically scales the value to fit on the display, with the minimum value at the bottom and the maximum value at the top.</p> <p>If the minimum or maximum values are changed, the chart will automatically redraw itself to adjust to the new min/max values.</p> <p>If the current chart value lies outside the min/max range, the letters "OR" ('O'utside 'R'ange) will be displayed at the top-right corner.</p> <p>Note that alarms are not displayed on the lid when the chart is in use.</p> | N | N | Y |
| appstatus | <p>Defines this menu to be displayed in the header.</p> <div style="text-align: center; border: 1px solid gray; padding: 5px; margin: 10px 0;"> C8A0308399A3 This is STATUS#1 </div> <div style="text-align: center; border: 1px solid gray; padding: 5px; margin: 10px 0;"> Home </div> <hr style="border-top: 1px dashed gray;"/> <p>The first "active" item within the menu is displayed on the left side of the header (to the right of the hostname).</p> | Y | N | N |
| appstatus2 | <p>Defines this menu to be displayed in the header.</p> <div style="text-align: center; border: 1px solid gray; padding: 5px; margin: 10px 0;"> This is STATUS#2 2023/01/13 11:57:25 </div> <div style="text-align: center; border: 1px solid gray; padding: 5px; margin: 10px 0;"> </div> <hr style="border-top: 1px dashed gray;"/> <p>The first "active" item within the menu is displayed on the right side of the header (to the left of the datetime).</p> | Y | N | N |

8.2.1.2 Database Items

| Attribute | Description | Web Server | Local Panel | Lid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|--|------------|---|---------------|--|---------------------|--|-------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------------|---|---|---|---|---------------------|---|---|---|---|--|---|---|---|---|--|---|---|---|---|---|---|---|---|----|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|
| id | <p>Sets the location and type of panel used to display the database item contents, using the format "id=<start>, <end><options>".</p> <p>The <start> value specifies the start panel to use.</p> <p>The <end> value can be used to specify the end panel, which allows multiple rows and/or columns to be spanned.</p> <p>Both values are optional. If no value is specified, the next sequential panel is used as the start position, and if only one value is given, this sets the start position and no row/column spanning occurs.</p> <p>For example, using the 4x6 layout above, specifying "id=1, 21" will create a single panel covering positions 1, 5, 9, 13, 17 and 21. Whereas specifying "id=10, 15" will create a single panel covering the middle 4 positions 10, 11, 14 and 15.</p> <p>On the Local Panel, the "whole panel" can be specified using "id=*".</p> <p>The <options> section allows the "type" of panel to be specified.</p> <table border="0"> <tr> <td>b</td><td>Create an "empty" edit panel ... no title, value or units</td><td></td><td></td><td></td></tr> <tr> <td>e</td><td>Create an "empty" panel</td><td>N</td><td>Y</td><td>N</td></tr> <tr> <td>t</td><td>Show the item title (including array field names)</td><td>Y</td><td>Y</td><td>N</td></tr> <tr> <td>n</td><td>Show the item name (item name only, no array field names)</td><td>Y</td><td>Y</td><td>Y</td></tr> <tr> <td>i</td><td>Show the item field (array field name only, no item name)</td><td>Y</td><td>Y</td><td>Y</td></tr> <tr> <td>v</td><td>Show the item value</td><td>Y</td><td>Y</td><td>Y</td></tr> <tr> <td>u</td><td>Show the item units</td><td>Y</td><td>Y</td><td>Y</td></tr> <tr> <td>a</td><td>Create an "auto-edit" screen - when the screen loads, the relevant data entry keyboard is displayed and the user is prompted to enter data</td><td>Y</td><td>Y</td><td>N</td></tr> <tr> <td>f</td><td>When editing, force a value to be entered (i.e. no zero or empty string)</td><td>Y</td><td>Y</td><td>N</td></tr> <tr> <td>p</td><td>Show the item as a password (shows '*' instead)</td><td>Y</td><td>N</td><td>N</td></tr> <tr> <td>px</td><td>Enter hidden pin code ('x' hidden digits - shows '*' instead)</td><td>N</td><td>Y</td><td>N</td></tr> <tr> <td>Px</td><td>Enter visible pin code ('x' visible digits)</td><td>N</td><td>Y</td><td>N</td></tr> <tr> <td>r</td><td>Item value is displayed without any number formatting (e.g. thousands separators)</td><td>Y</td><td>N</td><td>N</td></tr> <tr> <td>T</td><td>Set the "toggle accept" item when showing a toggle pin (see the 'tg' parameter below)</td><td>Y</td><td>Y</td><td>N</td></tr> </table> <p>If no options are given, the panel defaults to 'tvu'.</p> | b | Create an "empty" edit panel ... no title, value or units | | | | e | Create an "empty" panel | N | Y | N | t | Show the item title (including array field names) | Y | Y | N | n | Show the item name (item name only, no array field names) | Y | Y | Y | i | Show the item field (array field name only, no item name) | Y | Y | Y | v | Show the item value | Y | Y | Y | u | Show the item units | Y | Y | Y | a | Create an "auto-edit" screen - when the screen loads, the relevant data entry keyboard is displayed and the user is prompted to enter data | Y | Y | N | f | When editing, force a value to be entered (i.e. no zero or empty string) | Y | Y | N | p | Show the item as a password (shows '*' instead) | Y | N | N | px | Enter hidden pin code ('x' hidden digits - shows '*' instead) | N | Y | N | Px | Enter visible pin code ('x' visible digits) | N | Y | N | r | Item value is displayed without any number formatting (e.g. thousands separators) | Y | N | N | T | Set the "toggle accept" item when showing a toggle pin (see the 'tg' parameter below) | Y | Y | N | | | |
| b | Create an "empty" edit panel ... no title, value or units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| e | Create an "empty" panel | N | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Show the item title (including array field names) | Y | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| n | Show the item name (item name only, no array field names) | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| i | Show the item field (array field name only, no item name) | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| v | Show the item value | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| u | Show the item units | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a | Create an "auto-edit" screen - when the screen loads, the relevant data entry keyboard is displayed and the user is prompted to enter data | Y | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f | When editing, force a value to be entered (i.e. no zero or empty string) | Y | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| p | Show the item as a password (shows '*' instead) | Y | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| px | Enter hidden pin code ('x' hidden digits - shows '*' instead) | N | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Px | Enter visible pin code ('x' visible digits) | N | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| r | Item value is displayed without any number formatting (e.g. thousands separators) | Y | N | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | Set the "toggle accept" item when showing a toggle pin (see the 'tg' parameter below) | Y | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fg | <p>Sets the foreground colour for Title, Value and Units text, using 6 digit hex RGB values.</p> <p>A choice of 1, 2 or 3 values can be specified, as follows:-</p> <table border="0"> <tr> <td>fg=<c></td><td>Use colour <c> for Title, Value and Units</td></tr> <tr> <td>fg=<c1>, <c2></td><td>Use colour <c1> for Title and Units text Use colour <c2> for Value text</td></tr> <tr> <td>fg=<c1>, <c2>, <c3></td><td>Use colour <c1> for Title text Use colour <c2> for Value text Use colour <c3> for Units text</td></tr> </table> <p>The default is black (000000).</p> | fg=<c> | Use colour <c> for Title, Value and Units | fg=<c1>, <c2> | Use colour <c1> for Title and Units text Use colour <c2> for Value text | fg=<c1>, <c2>, <c3> | Use colour <c1> for Title text Use colour <c2> for Value text Use colour <c3> for Units text | Y | Y | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fg=<c> | Use colour <c> for Title, Value and Units | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fg=<c1>, <c2> | Use colour <c1> for Title and Units text Use colour <c2> for Value text | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| fg=<c1>, <c2>, <c3> | Use colour <c1> for Title text Use colour <c2> for Value text Use colour <c3> for Units text | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| bg | Sets the background colour for the panel using a 6 digit hex RGB | Y | Y | Y | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|----|---|---|---|---|
| | <p>value.</p> <p>For example "bg=ff0000" sets the background to red.</p> <p>The default is light grey (d3d3d3).</p> | | | |
| st | <p>Sets the style of the Title, Value and Units text, using the format "<code>st=<ts><to>, <vs><vo>, <us><uo></code>".</p> <p><code><ts></code> Sets the font size for the Title text <code><to></code> Sets the options for the Title text <code><vs></code> Sets the font size for the Value text <code><vo></code> Sets the options for the Title text <code><us></code> Sets the font size for the Units text <code><uo></code> Sets the options for the Title text</p> <p>The available options are as follows:-</p> <p><code>b</code> Show in bold <code>c</code> Centre text <code>i</code> Show in italics <code>s</code> Show with strike-through <code>u</code> Show with underline</p> <p>The size and options sections are optional for all 3 settings.</p> <p>For example "<code>st=26bc</code>" sets the Title text to 26pt, bold and centred and leaves the Value text and Units text as default.</p> <p>Using "<code>st=26bc, , u</code>" sets the Title text to 26pt, bold and centred, leaves the Value text as default and adds underlining to the Units text.</p> | Y | Y | N |
| tg | <p>A group of 3 items can be combined to create a single "toggle" pin.</p> <p>Each single toggle pin has 3 slots, and a layout "style" is specified to determine the look and feel of the toggle pin.</p> <p>When displayed on the local panel, all 3 items are shown in a single panel, and can be toggled on/off by pressing the panel.</p> <p>The format is "<code>tg=<style><slot><options>, <bit>, <bg>, <fg></code>".</p> <p><code><style></code> Layout style <code><slot></code> Slot number with the layout <code><options></code> What text to display:- <code>t</code> Show pin Title <code>v</code> Show pin Value <code>u</code> Show pin Units <code>vu</code> Show pin Value and Units <code><bit></code> Bit number to toggle <code><bg></code> Panel background colour when the toggle is "on" <code><fg></code> Text foreground colour when the toggle is "on"</p> <p>Two styles are currently supported:-</p> <p><code>a</code> Index 1 : Full height, 70% width Index 2 : 50% height, 30% width Index 3 : 50% height, 30% width</p>  | Y | Y | N |

b Index 1 : 50% height, full width
 Index 2 : 50% height, 40% width
 Index 3 : 50% height, 60% width



The default colours are:-

| | Toggle "off" | Toggle "on" |
|-------------------|------------------------|-------------------|
| Background | cccccc (light grey) | 00ff00 (green) |
| Foreground | 808080 (grey) | 000000 (black) |

The <bit>, <bg> and <fg> settings should only be set on the first item in the group.

tg (cont)

For example, consider the following item attributes:-

```
[item1] id=3 tg=b1v, 0, ff0000, 808080
```

- Use style 'b', slot 1
- Show the pin Value
- Set/clear toggle bit 0
- Use a toggle "on" background colour of ff0000 (red)
- Use a toggle "on" foreground colour of 808080 (grey)

```
[item2] id=3 tg=b2t
```

- Use style 'b', slot 2
- Show the pin Title

```
[item3] id=3 tg=b3t
```

- Use style 'b', slot 3
- Show the pin Title

```
[item4] id=4 tg=b1v, 1, ff0000, 808080
```

- Start next toggle item ...

When the toggle "accept" item is selected (see the "id" parameter above), the on/off value of bit 0 will be written to the ident pin for item 1.

There is also the option of just using the combined layout, but not the "toggle" feature. To achieve this, simply omit the toggle bit values.

sort

Sets the sort type when editing database items with an associated table list.

If no sort option is specified, the list of choices is presented in the order of increasing index values, but the user can also be shown the list sorted in various ways.

Take, for example, the following table:-

| Value | Text |
|-------|-----------------------|
| -1 | First entry |
| 3 | Another entry in here |
| 99 | Invalid choice |

| | | | |
|---|---|---|--|
| | | | |
| | | | |
| Y | N | N | |

| | | | | | | | | | | | | |
|----------------------------|--|----------------------------|--|---------|--|---------|---|---------|---|--|--|--|
| | <p>This can be displayed using the following sort options:-</p> <table border="1"> <tr> <td><no sort option specified></td> <td> Default table order:- <ul style="list-style-type: none"> • First Entry • Another entry in here • Invalid choice </td> </tr> <tr> <td>sort=re</td> <td> Reverse table order:- <ul style="list-style-type: none"> • Invalid choice • Another entry in here • First Entry </td> </tr> <tr> <td>sort=az</td> <td> Alphabetical order:- <ul style="list-style-type: none"> • Another entry in here • First Entry • Invalid choice </td> </tr> <tr> <td>sort=za</td> <td> Reverse alphabetical order:- <ul style="list-style-type: none"> • Invalid choice • First Entry • Another entry in here </td> </tr> </table> | <no sort option specified> | Default table order:- <ul style="list-style-type: none"> • First Entry • Another entry in here • Invalid choice | sort=re | Reverse table order:- <ul style="list-style-type: none"> • Invalid choice • Another entry in here • First Entry | sort=az | Alphabetical order:- <ul style="list-style-type: none"> • Another entry in here • First Entry • Invalid choice | sort=za | Reverse alphabetical order:- <ul style="list-style-type: none"> • Invalid choice • First Entry • Another entry in here | | | |
| <no sort option specified> | Default table order:- <ul style="list-style-type: none"> • First Entry • Another entry in here • Invalid choice | | | | | | | | | | | |
| sort=re | Reverse table order:- <ul style="list-style-type: none"> • Invalid choice • Another entry in here • First Entry | | | | | | | | | | | |
| sort=az | Alphabetical order:- <ul style="list-style-type: none"> • Another entry in here • First Entry • Invalid choice | | | | | | | | | | | |
| sort=za | Reverse alphabetical order:- <ul style="list-style-type: none"> • Invalid choice • First Entry • Another entry in here | | | | | | | | | | | |
| nolog | When used with writeable items, specifies that no Event Log entry should be stored. | Y | Y | N | | | | | | | | |
| span | <p>Sets the number of columns this item should span.</p> <p>Only applicable if the "cols" attribute has been set for this screen.</p> | Y | N | N | | | | | | | | |
| date | Specifies that this item is to be shown as a date, according to the current system date format. | Y | N | N | | | | | | | | |
| report | <p>Allows the contents of a report to be displayed on the local panel.</p> <p>The report is specified using the format "report='<report_name>'".</p> <p>If the specified report is a "live screen", the report will be generated using a snapshot of the current live database. Otherwise the most recent matching report is extract from flash storage and used to generate the report text.</p> <p>On the local panel itself, when the relevant panel is pressed, the report text is displayed, along with up/down scroll buttons, allowing the operator to view the entire report. An exit button allows the operator to hide the report.</p> <p>Note that this assumes the item has been correctly configured as a button.</p> | Y | Y | N | | | | | | | | |
| qrcode | <p>Used to display a QR code in the panel, using the format "qrcode='<report_name>' ", where <report_name> sets the name of the report to use to generate the QR code contents.</p> <p>As per the "report" parameter above, if the specified report is a "live screen", the report will be generated using a snapshot of the current live database. Otherwise the most recent matching report is extract from flash storage and used to generate the report text.</p> | Y | Y | N | | | | | | | | |
| ppb | <p>The size of a QR code depends on the quantity of text held within the code. More text results in a bigger QR code.</p> <p>Depending on the configured report, the pixels-per-bit (ppb) can be set to increase/decrease the size of the QR code image to allow it to fit within the available panel size.</p> <p>For example, "ppb=2" creates the QR code using 2 pixels-per-bit.</p> | Y | Y | N | | | | | | | | |

| | | | | |
|--------|--|---|---|---|
| | This parameter is optional and the default setting is 4. | | | |
| list | <p>Creates a selection list for this item, with one list item for each of the valid table entries for this database item.</p> <p>Long lists are supported via Up/Down buttons.</p> <p>The attribute format is:-</p> <p>"list=<items>, <bg_unsel>, <fg_unsel>, <bg_sel>, <fg_sel>"</p> <p>items number of items to show per page bg_unsel background colour when item not selected fg_unsel foreground colour when item not selected bg_sel background colour when item is selected fg_sel foreground colour when item is selected</p> <p>For example "list=5, 0000ff, fffffff, ff0000, 00ff00" creates a list with 5 items per page, with a Blue background / White foreground when not selected, and a Red background / Green foreground when selected.</p> | N | Y | N |
| alarms | <p>Flags that this item, when pressed, will display the Alarms screen.</p> <p>Note that this only works on the Local Panel ... on the Website, you can just press the existing "Alarms" button on the web page header.</p> | N | Y | N |

8.3 Communications

Communications forms an essential part of any embedded system.

The Visual C||Cure editor provides a powerful comms configuration system that is able to support any number and type of comms links. The comms links themselves are highly configurable, supporting multiple polls per link, and multiple data items per poll.

Please refer to the separate Visual C||CURE Comms Links document (reference NFVCCL) for a detailed explanation on creating and configuring the various available comms links.

8.4 Datamaps

The datamaps window allows the user to map comms link items to database pins.

Please refer to the separate Visual C||CURE Comms Links document (reference NFVCCL) for a detailed explanation on creating and configuring the various available comms links.

8.5 Reports / Live Screens

8.5.1 Overview

A customisable report/screens editor is provided, allowing text, images and data pins to be stored / viewed together in a single page of information.

Any number of reports and live screens can be added to an application.

Reports can be triggered to be stored using the output of any data pin within the application. They are kept on the target using non-volatile storage, and can be retrieved from a remote target via a suitable comms link or via Remote Debug.

Different "zones" are provided to allow for more / less frequent reports.

16 report zones are available, each of which is designed to provide a maximum number of reports being stored at a certain frequency, as follows:-

| Zones | Suggested Usage | # Slots | Maximum Average Trigger Rate |
|--------------|------------------|---------|---|
| Large 1...6 | Yearly reports | 1500 | Once every minute. |
| Small 7...16 | Monthly reports | 250 | Once every 5 minutes. |
| 98 | Print Only | N/A | Used for sending instant reports to a printer. |
| 99 | Snapshot reports | 1 | This is a temporary report stored in RAM. No maximum trigger rate applies. |

The Maximum Average Trigger Rate must be respected to guarantee a 25 year life for the target hardware in worst case conditions.

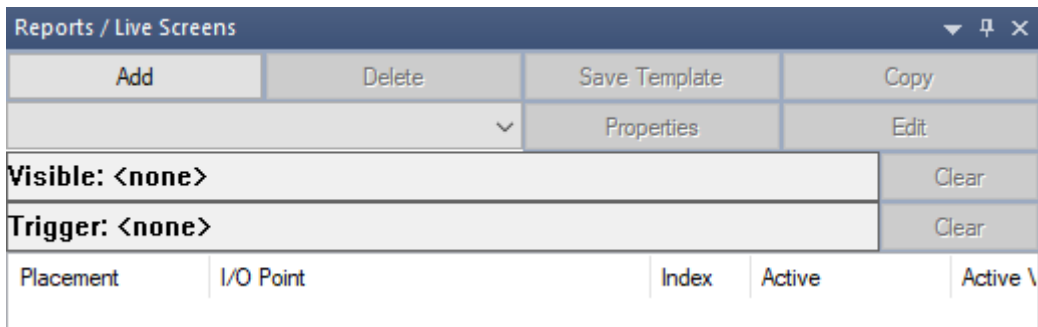
Caution : FLASH memory technology is used to store the report data. This technology has a limited “lifetime”, so to prevent damaging the FLASH memory, each report slot should not be written **on average** more than as specified in the above table. Hardware faults due to over-use of the FLASH memory will invalidate any warranty. Usage counters are stored in non-volatile memory to allow monitoring over the lifetime of the device.

Live screens (unlike reports) are not kept historically on the target. As the name suggests, they are for viewing “live” data and must be added to the displays tree to be viewed (see [8.2 - Displays](#) for more information).

Note that, since they can only be used for viewing data, any user-configurable input pins cannot be changed using a live screen.

8.5.2 Report Management

The Reports / Live Screens window allows reports to be selected from a drop-down list, added, removed, edited and saved to the library.

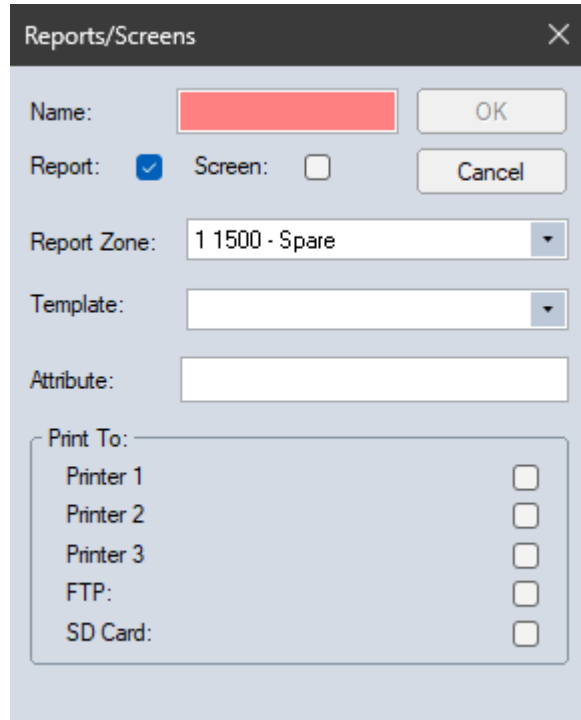


The following controls are shown:-

| | |
|---------------|--|
| Add | Adds a new report / live screen. |
| Delete | Deletes the selected report / live screen. |
| Save Template | Saves the selected report / live screen to the library as a template. All saved reports are listed in the Template drop-down list on the Reports/Screens properties dialog, when a new report is added. |
| Copy | This copies the report layout to the clipboard in HTML format, useful for documentation purposes. |
| Properties | Shows the Reports/Screens properties dialog for the selected report. |
| Edit | Opens the report editor tab for the selected report. |

| | |
|---------|--|
| Visible | Shows the data pin to be used to control if this report is visible via the website. The visibility is set by dragging an application data pin onto the control. Whenever this data pin is non-zero, the report will be visible in the display menu structure. |
| Trigger | Shows the data pin to be used as the report trigger. The trigger is set by dragging an application data pin onto the control. Whenever this data pin is non-zero, the report will be stored as per the report properties. |

Clicking on the Add button brings up the Reports/Screens properties dialog.



Below is an explanation of the available options:-

| | |
|-------------|---|
| Name | Enter unique report / live screen name. This is also how live screens are referred to on the displays tree and website, and how reports are listed under the System Logs web page. |
| Report | Selects whether this can be used a report. |
| Screen | Selects whether this can be used a live screen. |
| Report Zone | Selects the report zone to use. |
| Template | Selects the library template (if any) to use for this report. |
| Attribute | Sets the report attribute(s) for this report. See below. |
| Print To | Sets the default printer(s) that this report should be sent to whenever generated. |

Report attributes

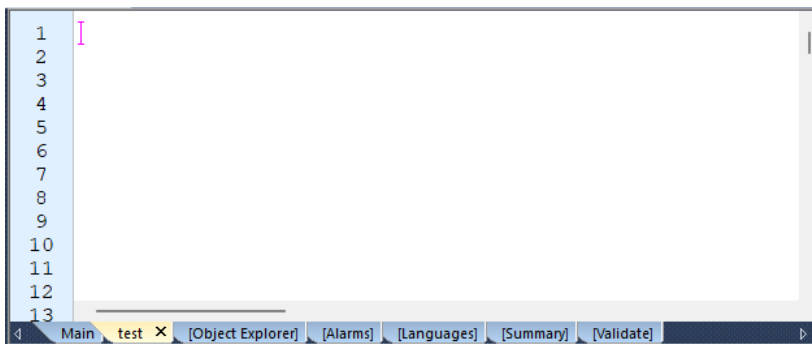
| dl | <p>List of download formats for the report.</p> <p>One or more of the following can be set:-</p> <p>text Plain text format tsv Tab Separated Value format tfx FlowCal TFX format pdf PDF format</p> <p>The default type is "text,pdf".</p> <p>For example, to download as pdf only use dl=pdf or to download as text and tsv, use dl=text,tsv</p> | | | | | | | | | | | | | | | | | | |
|-----------|---|-----------|------|---------|---|-----|-----|---|----|-----|----|----|----|----|----|----|----|----|----|
| file | <p>Specify the filename format when the report is uploaded via FTP.</p> <p>The various format options are detailed in the FTP Upload Directory section (see 11.6.5.3 - FTP).</p> <p>If not defined, it will default to %r-%+ . <ext> where <ext> is the extension type for the report being generated (e.g. tsv, txt).</p> | | | | | | | | | | | | | | | | | | |
| fs | <p>Set the font size when printing the report to Postscript printers.</p> <p>The following table shows approximately (depending on the printer) how many rows and columns can be printed at various font sizes:-</p> <table border="1" data-bbox="679 869 1257 1151"> <thead> <tr> <th>Font Size</th> <th>Rows</th> <th>Columns</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>100</td> <td>144</td> </tr> <tr> <td>8</td> <td>78</td> <td>108</td> </tr> <tr> <td>10</td> <td>64</td> <td>86</td> </tr> <tr> <td>12</td> <td>54</td> <td>72</td> </tr> <tr> <td>14</td> <td>46</td> <td>62</td> </tr> </tbody> </table> <p>The default font size is 10.</p> <p>For example, fs=12 or fs=6</p> | Font Size | Rows | Columns | 6 | 100 | 144 | 8 | 78 | 108 | 10 | 64 | 86 | 12 | 54 | 72 | 14 | 46 | 62 |
| Font Size | Rows | Columns | | | | | | | | | | | | | | | | | |
| 6 | 100 | 144 | | | | | | | | | | | | | | | | | |
| 8 | 78 | 108 | | | | | | | | | | | | | | | | | |
| 10 | 64 | 86 | | | | | | | | | | | | | | | | | |
| 12 | 54 | 72 | | | | | | | | | | | | | | | | | |
| 14 | 46 | 62 | | | | | | | | | | | | | | | | | |
| type | <p>Sets the (optional) report type.</p> <p>fctfx Specify the report can be extracted in FlowCal TFX format via the XML comms link.</p> <p>qrcode Specify the report should be shown as a QR code.</p> <p>For example, type=qrcode</p> | | | | | | | | | | | | | | | | | | |

| | |
|--------------|--|
| <p>ident</p> | <p>This attribute can be used to show additional information about a report when being shown in a list of reports on the website or via the xmlcomms link.</p> <p>By default, the report name and date-stamp are normally displayed but the value of one of the report placements can also be shown to help identify a particular report.</p> <p>The attribute consists of three sections, denoting prefix, value and suffix as follows:-</p> <p><code>ident='<prefix>', '<placement>', '<suffix>'</code></p> <p>The <code><prefix></code> section specifies the text to be added before the placement value.</p> <p>The <code><placement></code> section specifies the report placement name from which to take the value to be displayed.</p> <p>The <code><suffix></code> section specifies the suffix text to be added after the placement value.</p> <p>Note that all sections must be present but can be empty.</p> <p>For example, if the report (called "Prove Report") contained a placement called Meter Run, you should use the attribute:-</p> <p><code>ident=' -MR', 'Meter Run', ''</code></p> <p>If the report meter run value was 7 then this would produce a report listing entry of:-</p> <p>2019/08/12 15:44:54 (Prove Report -MR7)</p> |
|--------------|--|

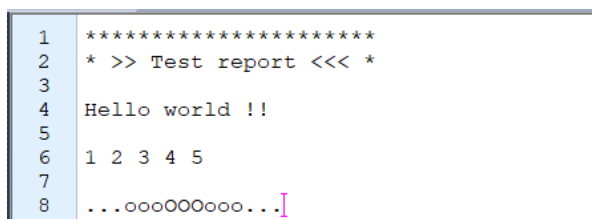
8.5.3 Report Editor

The editor allows the user to enter background text, insert images and configure data pins.

Any new report starts as a blank page:-

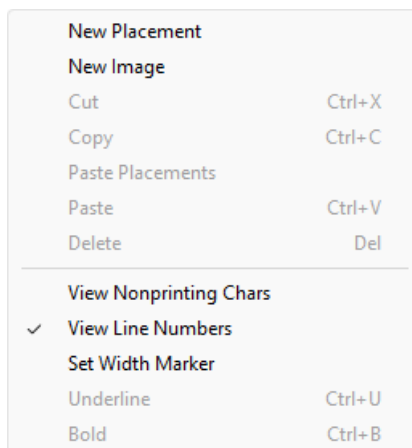


Background text can be added to suit the needs of the user.



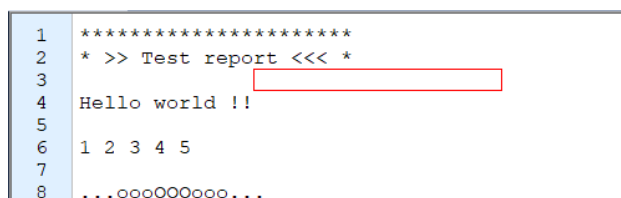
The text font size can be zoomed in/out by holding the Ctrl key and using the mouse wheel.

Right-clicking brings up a dialog as follows:-



8.5.3.1 Placements

To add data pins, a “placement” needs to be added for each item of data that is to appear on the report. Right-click in the report editor, select New Placement and a new placement box will appear under the cursor.

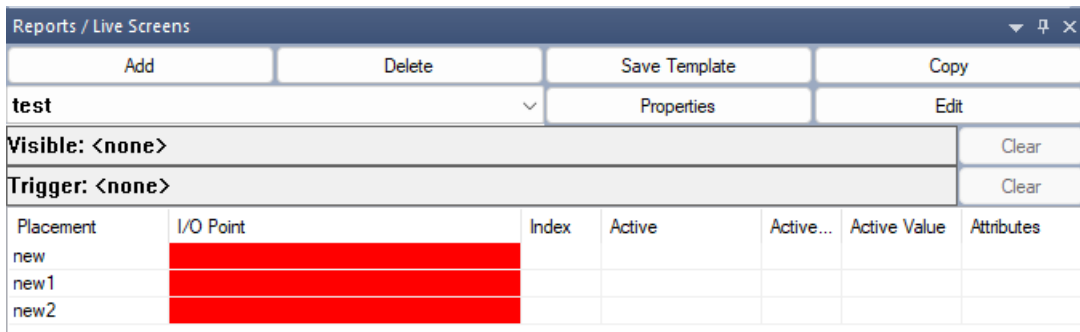


This box can be dragged around the report editor screen by selecting it (border changes to red) and dragging with the left mouse button pressed, to the required position. Multiple placements can be moved together by dragging a box around them all (so that they all turn red), then dragging the group with the left mouse button pressed,

The following placement properties can also be changed via the Properties window:-

| | |
|---------------|--|
| Name | Sets the name of the placement. |
| SigFig/ADP | Allows the Significant Figures / "After Decimal Place" value to be overridden. Setting to <inherit> takes the SigFig/ADP value from the application pin property. See 6.15 - Significant Figures / ADP for more information. |
| Width | Sets the number of characters shown for the placement. |
| Leading Zeros | Specifies whether to pad to the field width with leading zeros. |
| Left Align | Specifies whether to align the data with the left edge of the placement. |
| Bold | Specifies whether to show the value in bold text. |
| Underline | Specifies whether to show the value in underlined text. |
| Date Format | <p>Specifies if, and how, to format this value as a date.</p> <p>Note that this setting only applies if the application data pin has been configured as a Date/Time pin (see 6.12 - Pin Properties).</p> <p>If left blank, the default format will be the target default (as set via the web server or suitable comms link).</p> <p>The following default formats are available:-</p> <pre>%Y/%m/%d %H:%M:%S %Y/%m/%d %H:%M %Y/%m/%d %Y/%d/%m %H:%M:%S %Y/%d/%m %H:%M %Y/%d/%m %H:%M:%S %H:%M</pre> <p>Custom formats can be created using the following:-</p> <pre>%a Abbreviated weekday name %A Full weekday name %b Abbreviated month name %B Full month name %c Date and time representation appropriate for locale %d Day of month as decimal number (01-31) %H Hour in 24-hour format (00-23) %I Hour in 12-hour format (01-12) %j Day of year as decimal number (001-366) %m Month as decimal number (01-12) %M Minute as decimal number (00-59) %p Current locale's A.M./P.M. indicator for 12-hour clock %S Second as decimal number (00-59) %U Week of year as decimal number, with Sunday as first day of week (00-53) %w Weekday as decimal number (0-6; Sunday is 0) %W Week of year as decimal number, with Monday as first day of week (00-53) %x Date representation for current locale %X Time representation for current locale %y Year without century, as decimal number (00-99) %Y Year with century, as decimal number %Z, %z Either the time-zone name or time zone abbreviation; no characters if time zone is unknown %% Percent sign</pre> |

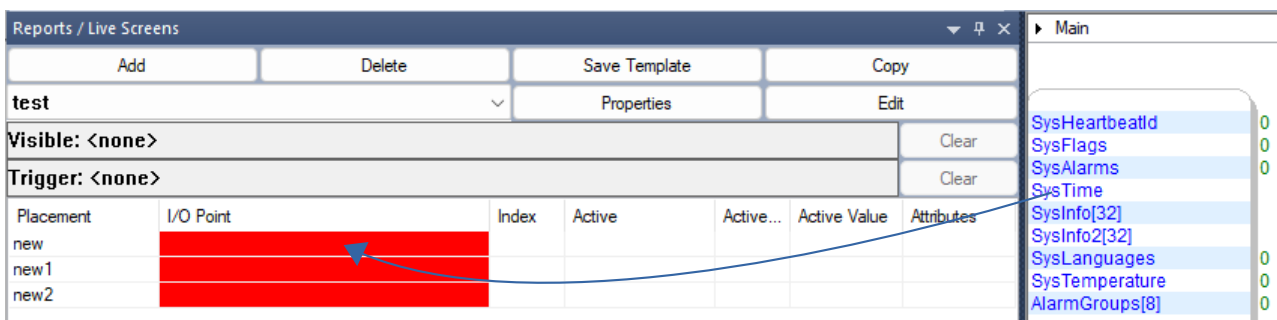
Multiple placement points can be added and positioned as required, and each placement on the report is listed in the Report / Live Screens window.



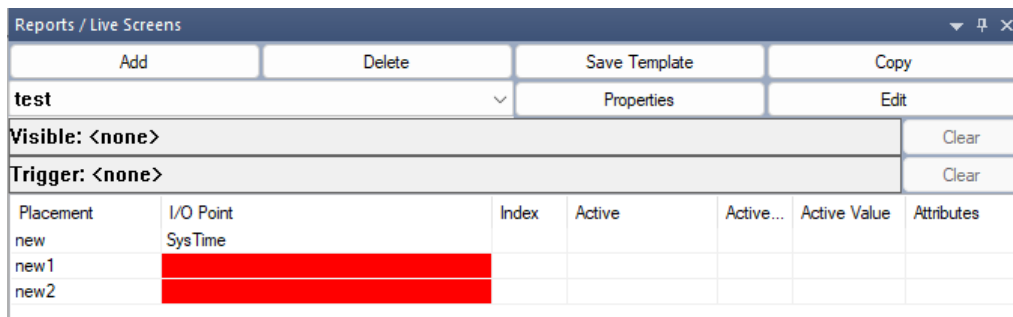
The user now needs to associate the required application data pin with the relevant placement.

Placements with a missing or invalid I/O point are highlighted in red.

Navigate the application hierarchy, select the container tab that shows the required data pin and simply drag-and-drop that data pin onto the relevant placement.



This will then associate the data pin with the placement, and use that data pin's value on the report whenever the report is triggered.



Dragging an array onto a placement will prompt the user if they wish to add the entire array.

If Yes is chosen, pins are added in order from the array over-writing the next placements listed until the bottom of the placements list is reached, or all the array elements have been placed.

If No is chosen, only the first pin in the array is added.

Alternatively when dragging an array, hold down the Ctrl key to bypass the prompt and only added the first pin in the array.

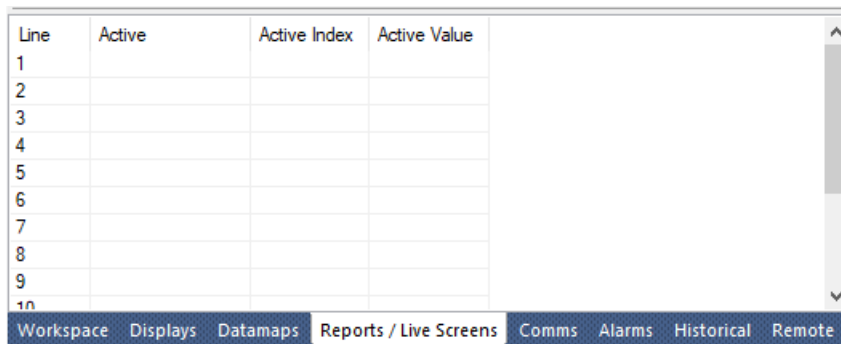
Note that the Object Explorer can also be used to locate and drag pins onto placement items.

Below is a list of the information columns:-

| | |
|-----------|--|
| Placement | Shows the placement name. |
| I/O Point | Shows the path to the application pin assigned to the placement. |
| Index | For array items, shows the array index to be used. |

| | |
|--------------|--|
| Active | <p>An active pin can also be set for each placement item, such that the placement item will only be shown on the report / live screen provided the active pin value matches the active value set for that placement.</p> <p>Application pins can be drag-and-dropped onto this column. Dropping an array will prompt the user if they wish to add the entire array, in the same way as dropping an array pin onto a placement.</p> |
| Active Value | <p>If an active pin has been set, this field will either show a number or, if the pin has a table assigned to it, the table text.</p> <p>When the active pin value matches the value in this field, the I/O Point assigned to this placement will be visible.</p> |
| Attributes | <p>This is a general purpose string field that allows the user to assign each placement its own custom "attribute" string.</p> <p>The attribute contents do not affect the application or target device in any way, but allow a host to be informed of any user-defined information that relate to the placement.</p> <p>This attribute string is only transmitted when using XML comms.</p> |

Entire report lines can also be assigned active pins, by drag-and-dropping application data pins onto the active line list at the bottom of the Reports / Live Screens window.

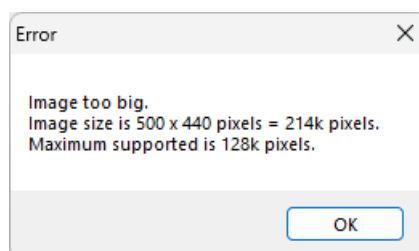


When the report / live screen is generated, the report lines will be shown or hidden according to the active pin (plus array index where applicable) and its associated active value. This allows for not only the Placement to be visible or hidden but also the background text on the line too.

8.5.3.2 Images

To add an image, right-click in the report editor, select the "New Image" option. This brings up a File Open dialog, filtered to show all supported images files (BMP, GIF, JPG, PNG). The user can select the relevant image to insert into the report.

NOTE: no image scaling is possible and this feature is only intended to support small images. As such, there is a limit on the image size that can be imported. This is set to a maximum of 128,000 pixels. So an image that was 500 pixels high and 440 pixels wide would not be allowed. The following warning is displayed for any such image:-



8.5.3.3 View Non-printing Characters

Enabling this option displays all non-printing characters (e.g. space, carriage return).

8.5.3.4 View Line Numbers

Enabling this option shows the line numbers to the left of the Report Editor.

8.5.3.5 Set Width Marker

Selecting this option sets the vertical dotted line to the current text column.

This can be used to ensure all report text/image/etc are contained within a certain page width, or to help ensure columns of data line up.

8.5.4 Report storage

Reports that are stored in the large or small zones are limited to 240 value “slots”, with each slot capable of holding either one double, one integer or up-to eight text bytes.

Any report placement data that exceeds this limit will be ignored and shown as zero when the report is generated.

Note that text strings can also be stored in a report (by dragging a text pin onto the placement I/O point). However, depending on the allocated string size of the I/O point, a string may consume more than one of the 240 possible data values.

A warning will be displayed when a report exceeds the 240 slot storage limit. The [Validate] tab can also be useful as (when refreshed), shows the current usage.

This limit does not apply for “live screen” type reports.

8.6 Alarms

Application generated alarms are fully supported by the editor. Any data pin can be configured to raise an alarm. On the pin properties, simply check the Alarm tick box.

At this point if the pin's value goes from zero to non-zero, an “alarm set” entry will be stored in the alarm log.

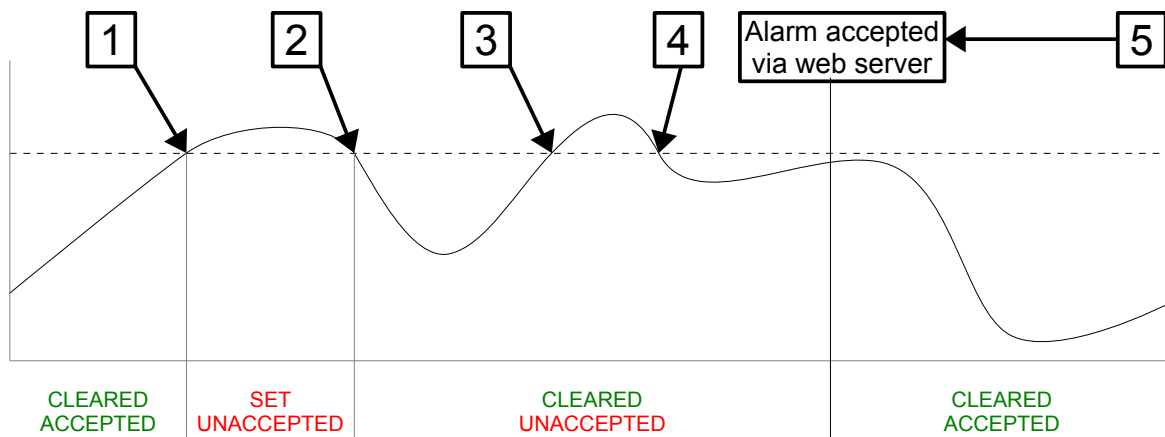
When the pin value goes back to zero, an “alarm cleared” entry is stored in the alarm log.

When the alarm itself is accepted (either via Remote Debug mode, the web server or a comms link), an “alarm accepted” entry is stored in the alarm log.

To prevent fleeting alarms from filling up the alarm log, “alarm set” entries are not stored if the alarm has previously been set but not yet accepted.

The diagram below shows the various stages of alarm handling.

The graph shows a temperature input, with the dotted line denoting a “high temperature” trigger value. The alarm status is currently CLEARED and ACCEPTED.



The following stages occur:-

1. Temperature goes above trigger value. Alarm is not currently set or unaccepted, so an “alarm set” entry is stored in the alarm log. Alarm status is SET and UNACCEPTED.
2. Temperature falls below trigger value. Alarm is currently set, so an “alarm cleared” entry is stored in the alarm log. Alarm status is now CLEAR but still UNACCEPTED.
3. Temperature goes above trigger value again. Since the alarm is currently unaccepted, no new “alarm set” entry is logged. Alarm status is still CLEAR but still UNACCEPTED.
4. Temperature goes below trigger value again. Since the alarm is currently unaccepted, no new “alarm cleared” entry is logged. Alarm status is still CLEAR but still UNACCEPTED.
5. Alarm condition is accepted via the web server. An “alarm accepted” entry is stored in the alarm log. Alarm status is now CLEAR and ACCEPTED.

Each entry in the alarm log is timestamped, allowing the user to trace the alarm history.

See also [12.2 - Remote Alarms / Events](#).

8.7 Remote

This tab provides a list of any local and remote targets that can be accessed for remote debugging or software updates.

| IP Address | Device ID | Application Name | Application Version | DataSet | Firmware | I/O Firmware |
|--------------|---------------------|------------------------|---------------------|---------|------------------|-----------------|
| | | AMR LACT 4v6 | 4v6r113 | Base | 3v5r0-5460 | HW 2.00 SW 2.05 |
| | LACT MicroCube | AMR LACT 4v6 | 4v6r113 | Base | 3v5r0-5460 | HW 2.00 SW 2.05 |
| | NEFG #1 | AMR LACT 4v7 | 4v7r25 | Base | 3v5r5-5629 | HW 2.00 SW 2.05 |
| 10.0.101.1 | C8A030838DED | AMR TankPro 0v5 | 0v5r531 | Base* | 4v5r0-6401M-BETA | HW 2.00 SW 2.04 |
| 10.0.150.111 | TANK-Pro | AMR TankPro 0v6 | 0v6r48 | Base* | 4v5r0-6406-BETA | HW 2.00 SW 2.04 |
| 10.0.11.11 | TANK-Pro | AMR TankPro 0v6 | 0v6r45 | Base* | 4v5r0-6403-BETA | HW 2.00 SW 2.05 |
| 10.0.150.123 | LACT MicroCube | LACT-Pro Meter App 5v4 | 5v4r0 | Base | 4v5r0-6406-BETA | HW 2.00 SW 2.05 |
| | TPMicro3AMR20130... | ProveIt-MicroCube | 1v0r11 | Base | 3v1r21-5521 | HW 2.00 SW 2.05 |

Each target has the ability to announce its existence on the local network, and all running Visual C||Cure environments will detect these announcements and automatically add the target to this list.

Remote targets (i.e. those on an external network, such as the Internet, rather than the local network) can also be manually added to the list, but the target details must be manually polled for (using right-click Poll for Details).

Remote targets will be displayed in grey until “Poll for Details” has been run on that target and comms was established.

Below is a list of the information columns:-

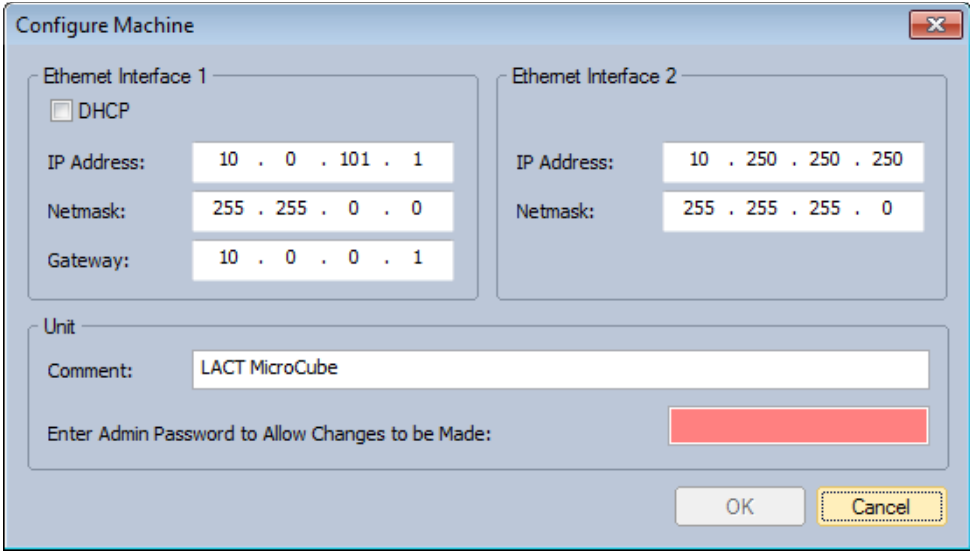
| | |
|---------------------|--|
| IP Address | Shows the IP address. |
| Device ID | Shows the hostname. |
| Application Name | Shows the name of the application installed. |
| Application Version | Shows the application version. |
| DataSet | Shows the dataset currently in use. See 6.16 - Datasets for more information. |
| Firmware | Shows the system firmware version. |
| I/O Firmware | Shows the I/O firmware version. |
| System ID | Shows the unique ID. |

| | |
|----------|---|
| ETH Port | Shows the network port used to establish comms to the relevant IP address. The target hardware supports two network ports, and, if both are connected and configured correctly, it may be possible to see two entries in the list for a single target (one entry for each port but with different IP addresses). |
| Comment | Shows the current comment for the target. This can be changed via the right-click Configure dialog (see below). |

Various commands can be sent to the targets listed, allowing the user to (for example) install new applications, system firmware, I/O firmware or reboot a target.

All these commands can be accessed by right-clicking on a target (or targets) and selecting one of the following:-

| | |
|------------------------|---|
| Poll for Details | Sends a “get information” message to all selected target(s). A pop-up window will open, showing the list of selected targets. Each target will then be polled and its details updated in the list. If a time-out occurs to any target, the line will be greyed out. |
| Refresh Local Machines | Sends a “get information” message to all local targets. |
| Remote Debug | Starts a remote debugging session with the target. See 12 - Remote Debug for more information. |
| Start Web Interface | Opens a web browser and points to the IP address of the select target. This is only available if a single target has been selected. |

| | |
|------------------------------|---|
| <p>Configure</p> | <p>Opens the network configuration window to allow the network settings and unit comment of the target to be set.</p>  <p>Network port 1 can be set to DHCP or Static IP mode.</p> <p>Network port 2 is fixed in Static IP mode.</p> <p>A general purpose “comment” field can also be set.</p> <p>Finally an administrator password for the target must be entered.</p> <p>Click OK to send the new settings to the target.</p> <p>Note : this operation relies on broadcasts, so no feedback is given to confirm that action has been successfully completed. It is recommended that the user double-check that the target device reappears in the remote targets list.</p> <p>Note : RFC950 (http://tools.ietf.org/html/rfc950) states that the IP Address for the two network ports must occupy separate subnets. Care must be taken especially when DHCP is used.</p> |
| <p>Strobe Ident Lights</p> | <p>This command can be used to identify a target.</p> <p>When sent, this command causes the selected target's red/green user lights to flash orange for 5 seconds.</p> |
| <p>Add/Remove Machine(s)</p> | <p>Opens a dialog box allowing the user to add or remove remote targets.</p> |
| <p>Restart</p> | <p>This sub-menu has three options available:-</p> <p>Warm Start Restarts the target retaining all current persistent values.</p> <p>Cold Start Keep Totals As per Warm Start, but only those persistent pins contained in a group called TOTALS will have their values retained. All other persistent pins will be reset back to their default value (as defined by the application).</p> <p>Cold Start Clear Totals Restarts the target resetting all persistent pins back to their default value (as defined by the application).</p> <p>When selected, a pop-up dialog is shown, confirming the IP address of the target. Any administrator password for the target must also be entered.</p> <p>Click OK to restart the target.</p> |

| Install/Retrieve Files sub-menu | |
|---|--|
| Install Loaded Application | Installs the currently loaded application to the target. See 10 - Installing Applications for more information. |
| Get a Backup of the Running Application | Obtains a backup of the application installed in the target. See 13 - Backing Up Applications for more information. |
| Get Kernel Log | Using this option, the user is able to retrieve the Operating System event log. This is not required in normal operation, and is only required for debugging purposes. This is only available if a single target has been selected. |
| Update Firmware | Enables the user to install new system firmware to the target. See 14 - Updating Firmware for more information. |
| Update I/O Firmware | Enables the user to install new I/O firmware to the target. See 14 - Updating Firmware for more information. |

8.8 Historical

The target hardware has the ability to store the history of a number of data points on a per minute (or per trigger) basis, or whenever any alarm or event occurs.

The "Events" tab allows 13 items to be stored whenever any alarm or event occurs. These items can then be viewed or downloaded via the web browser.

For historical / trending data, there are four available sets as follows:-

| Set | Storage size | Notes |
|-------|--------------|--|
| 1...3 | 20000 slots | Stored in flash so are retained on restart |
| 4 | 172800 slots | This set allows data to be stored on every cycle (i.e. twice per second) for 24 hours, allowing for detailed analysis of application data. However, to enable this, the data is stored in RAM and so will be lost on restart. |

To setup the historical data slots, simply drag the required data pins from the application onto any of the free slots.

If an array is dragged, a prompt will ask if the whole array is to be added.

If No is chosen, a single slot will be used, with the array index value defaulting to 0. At this point, the array index can be adjusted to select the required array item using the up / down spinner.

If Yes is chosen, all the array items (up to a maximum of 13 items) will be added starting at the current slot (overwriting any existing data pins), with the index setting automatically incrementing to select the relevant array item.

Alternatively, individual pins can be dragged from the Object Explorer.

Note that only double and integer values are supported, so text pins cannot be stored.

The Trigger setting allows the application itself to determine when to store a new historical slot. Simply drag a pin from the application onto the Trigger cell. Whenever this pin is non-zero, a new historical slot will be stored.

To clear the trigger, click on the Clear button. This resets the storage trigger to the default "per minute" setting.

For Sets 1-3, a Maximum Average Trigger Rate of once every 5 seconds must be respected to guarantee a 25 year life for the target hardware in worst case conditions.

Caution : FLASH memory technology is used to store the historical data. This technology has a limited “lifetime”, so to prevent damaging the FLASH memory, each historical slot should not be written **on average** more than once per day. Hardware faults due to over-use of the FLASH memory will invalidate any warranty. Usage counters are stored in non-volatile memory to allow monitoring over the lifetime of the device.

9 Configuring Targets without Visual C||Cure

For many end-users who just want to install / backup applications, Visual C||Cure is overkill.

To this end, an alternative tool, called NANOconf, is available.

This utility allows users to install and backup applications without having to open up the application itself (therefore further protecting the Intellectual Property contained within the application).

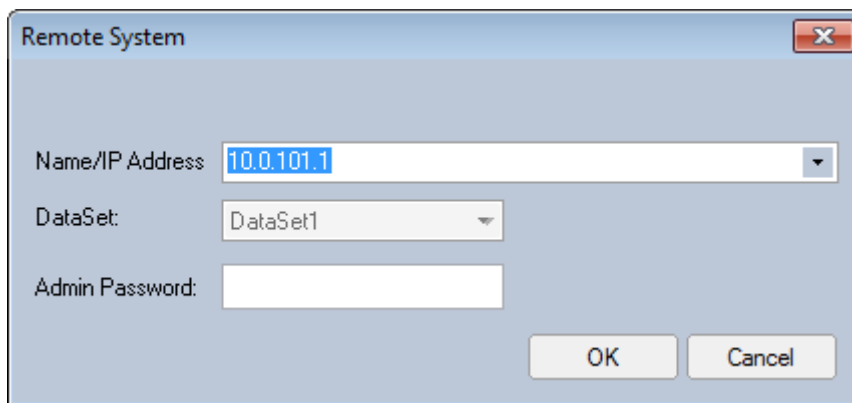
Please contact your supplier for more information.

10 Installing Applications

Once an application is loaded into Visual C||Cure (either by opening an existing application, or writing and saving a new application), it can be installed onto a target.

From the Remote tab, select the required target, right-click and select Install Loaded Application (or select File | Install Application to a Target...).

At this point the Remote System dialog window will be shown:-



Confirm the IP address of the target to update, select the DataSet to be used, and then enter any admin password for the target.

Now click OK, and Visual C||Cure will:-

1. Connect to the target
2. Stop any existing application
3. Transfer the loaded application
4. Restart the target using the new application

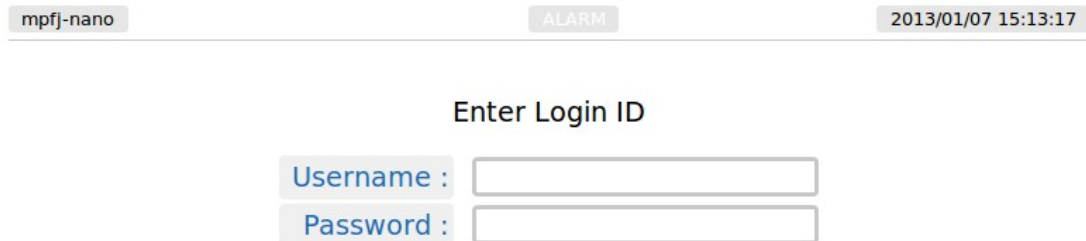
The Remote tab can be used to confirm the progress of the installation, with the App column text updating to show the current progress.

11 Web server

By default, each target contains a built-in web server, which displays an HTML view of the application's configured display tree (see [8.2 - Displays](#)).

11.1 Login Page

Pointing a browser at the target's IP address will bring up the login screen.



A valid username and password can now be entered. Pressing the Enter key will then send the login details to the target. If login is successful, the Home page will be shown.

11.2 Language Support

If multiple languages have been configured in the application, an additional “globe” icon will be displayed in the top right corner of the web page.

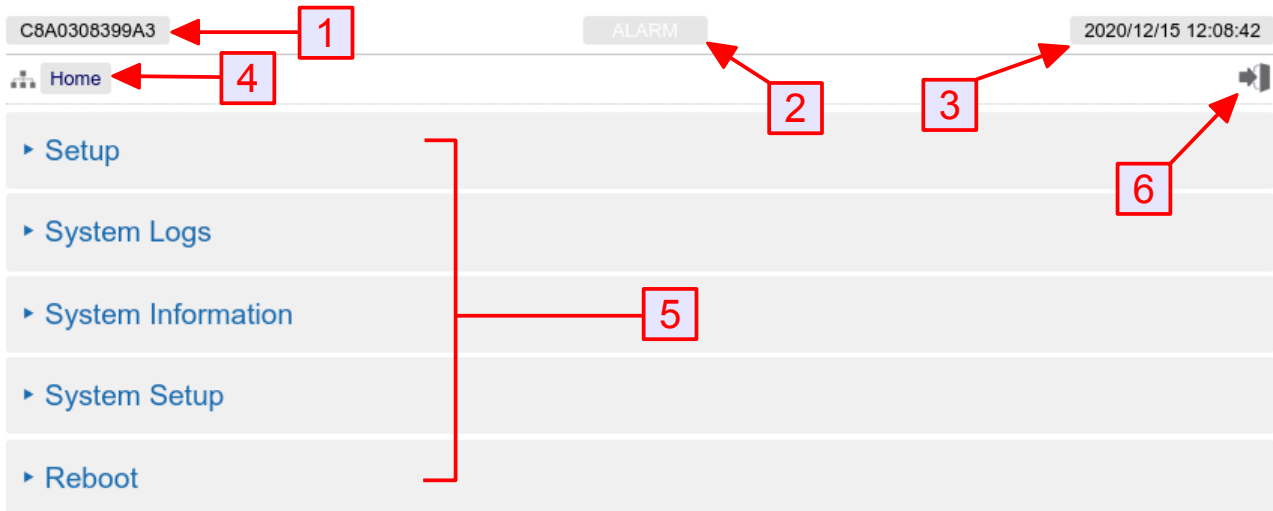


Hovering over this icon will present a drop-down list of available languages. Selecting a language will reload the current web page using any relevant translations configured in the Languages tab (see [6.6.4 - \[Languages\]](#)).


This feature covers menu names, pin names and system text allowing the entire website to be localised as required.

11.3 Home Page

The Home page shows various system items, along with any application display menus and various system menus. Below is an example page, but note that different menu items may be shown depending on how the application has been designed / configured.



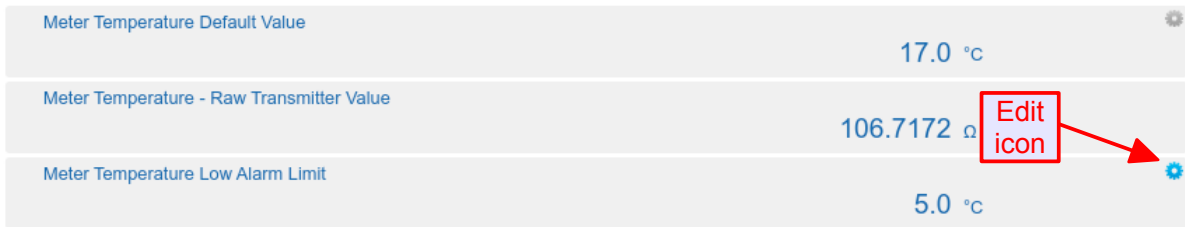
The following items are shown:-

| | | |
|---|-----------------------------|--|
| 1 | Target hostname | This shows the current hostname of the unit. If a hostname has not been set, the system ID will be displayed instead. |
| 2 | Alarm indicator | Clicking on this item will jump to the Alarms page. The colour of the alarm indicator shows the current alarm status:- Flashing red There are unaccepted alarms. Solid red There are only accepted alarms, but not all have cleared. Grey There are no alarms present. See 11.4 - Alarms for more information. |
| 3 | Time / Date | Clicking on this item will jump to the Time / Date settings page (see 11.6.3 - Time / Date Settings). |
| 4 | Navigation breadcrumb trail | This shows the Sitemap icon (see 11.5 - Sitemap) and the hierarchical location of the current page. For example:-  Clicking on any of the breadcrumb items will jump to the relevant page. |
| 5 | Application display menu(s) | Any display menus specified in the application will be shown. The application can be configured with a mix of User menus (see 8.2 - Displays) and System menus (see 11.6 - System Menu). |
| 6 | Logout | Clicking on this icon will log out the current user. |

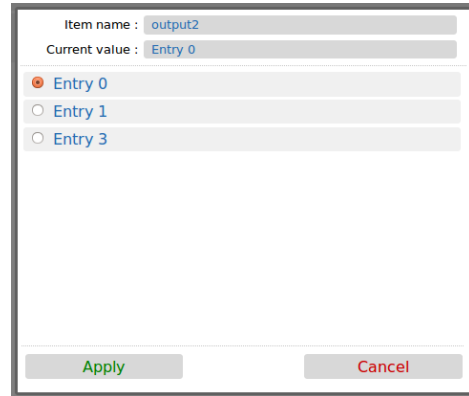
Clicking on any menu item will navigate into the menu and display the sub-menu items or data point items, as configured in the application's displays tree.

If data point items can be changed (and the user has the security permission to do so), the Edit icon will be displayed.

If the item can be edited, but the user does not have the correct permissions, the Edit icon will be greyed out.



Clicking on this icon will bring up the relevant edit window (number, string or list):-



11.4 Alarms

The Alarms page lists any currently active alarms, along with the time-stamp of when the alarm was set.



Alarms shown in red are currently set and have not been accepted.

Alarms shown in orange have been accepted but the alarm has not yet cleared.

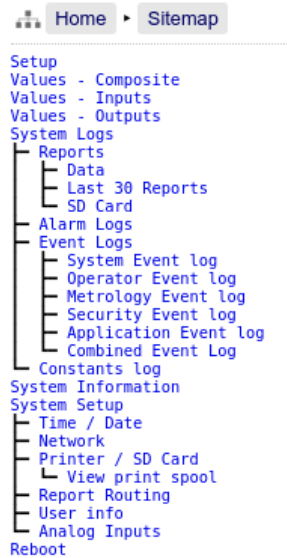
See [8.6 - Alarms](#) for more details.

Clicking on the Accept icon will accept the relevant alarm.

Clicking on the icon for “Accept All” will accept all unaccepted alarms.

11.5 Sitemap

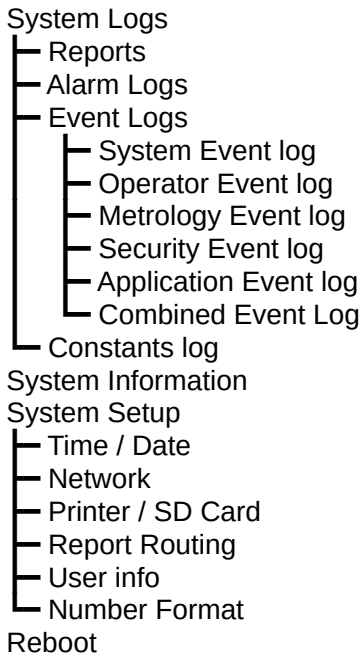
Clicking on the Sitemap icon on any webpage will take the user directly to the Sitemap screen. This allows quick direct access to the web pages configured for the application.



11.6 System Menus

The displays editor in Visual C||Cure allows various system menus (as described below) to be added to the display tree.

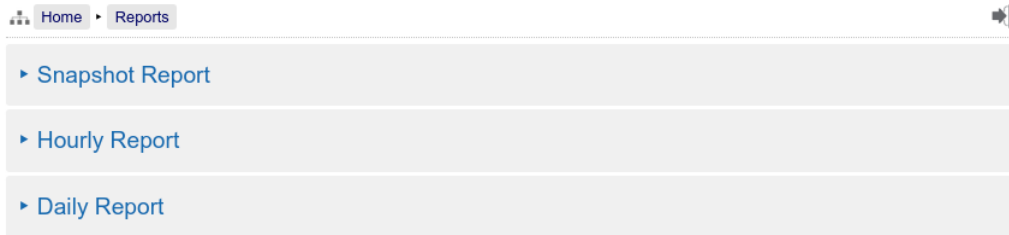
If no system menus are added by the application designer, a default set of system menus will be shown in the following layout:-



11.6.1 System Logs

11.6.1.1 Reports

All configured application reports are listed here, for example:-

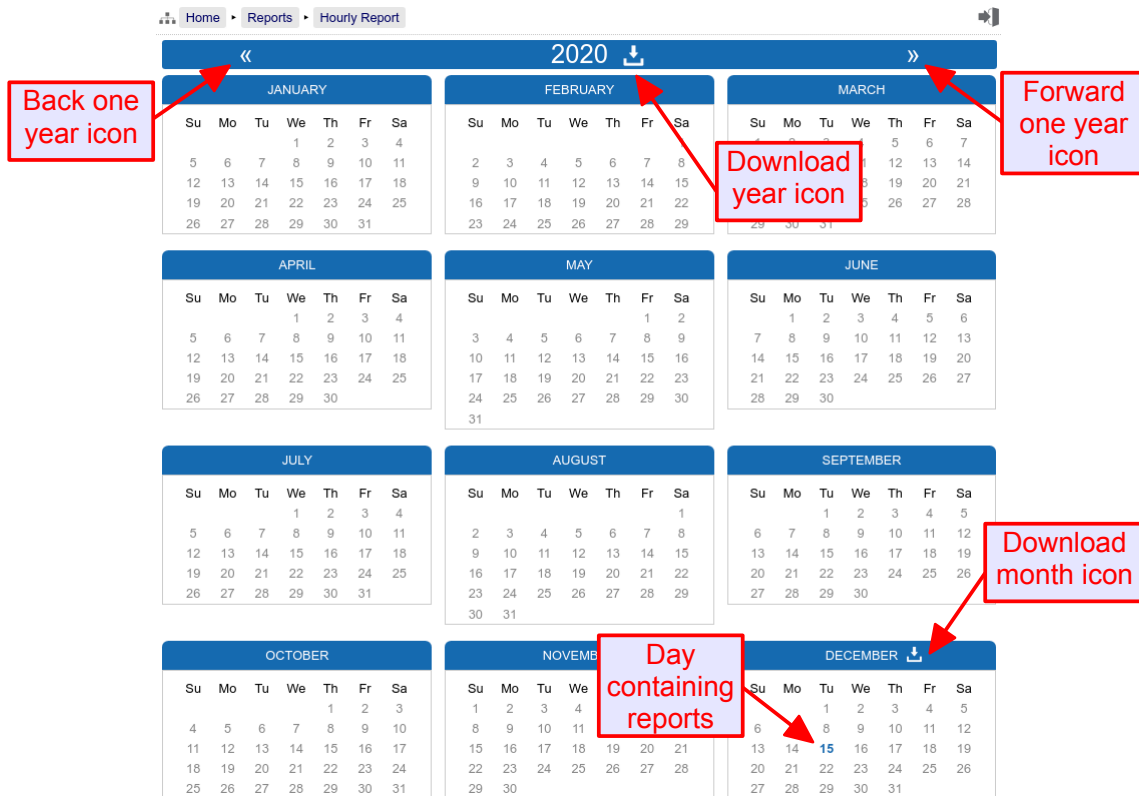


Clicking on a report item will then load up a calendar view.

The year can be changed by clicking on the left and right arrow icons in the header.

The entire set of matching reports for the year can be downloaded in a single ZIP archive by clicking on the download icon shown next to the year.

The entire set of matching reports for any particular month can be downloaded in a single ZIP archive by clicking on the download icon shown next to the month name.



Any days containing a matching report will be shown in blue. If a calendar day contains no matching reports, it will be shown in grey.

In the example above, only the 15th December contains an Hourly report.

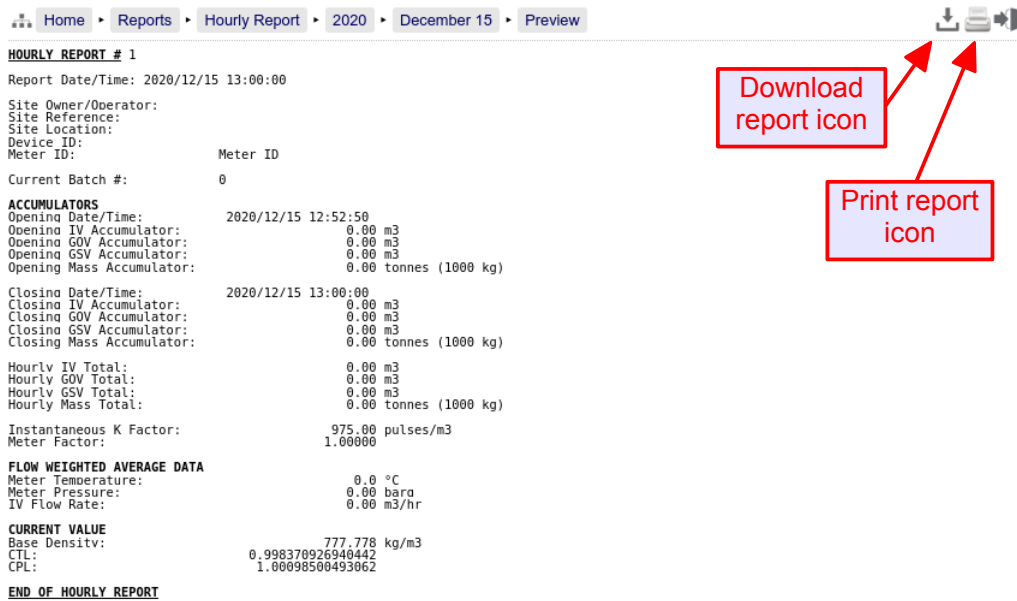
Clicking on a day with reports will open a new page listing the timestamps for all matching reports.



The day can be changed by clicking on the left and right arrow icons in the header.

The entire set of matching reports for the day can be downloaded in a single ZIP archive by clicking on the download icon shown next to the date.

Clicking on a particular report item will display a copy of the report itself.



The screenshot shows a web interface for an hourly report. At the top, there is a breadcrumb trail: Home > Reports > Hourly Report > 2020 > December 15 > Preview. In the top right corner, there are icons for download, print, and share. Two red callout boxes with arrows point to these icons: one labeled 'Download report icon' pointing to the download icon, and another labeled 'Print report icon' pointing to the print icon. The main content of the report is as follows:

```
HOURLY REPORT # 1
Report Date/Time: 2020/12/15 13:00:00
Site Owner/Operator:
Site Reference:
Site Location:
Device ID:
Meter ID:
Current Batch #: 0

ACCUMULATORS
Opening Date/Time: 2020/12/15 12:52:50
Opening IV Accumulator: 0.00 m3
Opening GSV Accumulator: 0.00 m3
Opening GSV Accumulator: 0.00 m3
Opening Mass Accumulator: 0.00 tonnes (1000 kg)

Closing Date/Time: 2020/12/15 13:00:00
Closing IV Accumulator: 0.00 m3
Closing GSV Accumulator: 0.00 m3
Closing GSV Accumulator: 0.00 m3
Closing Mass Accumulator: 0.00 tonnes (1000 kg)

Hourly IV Total: 0.00 m3
Hourly GSV Total: 0.00 m3
Hourly GSV Total: 0.00 m3
Hourly Mass Total: 0.00 tonnes (1000 kg)

Instantaneous K Factor: 975.00 pulses/m3
Meter Factor: 1.00000

FLOW WEIGHTED AVERAGE DATA
Meter Temperature: 0.0 °C
Meter Pressure: 0.00 barg
IV Flow Rate: 0.00 m3/hr

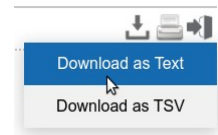
CURRENT VALUE
Base Density: 777.778 kg/m3
CTL: 0.998378926948442
CPL: 1.00098508493062

END OF HOURLY REPORT
```

The report can be printed to the Web Printer by clicking on the Print icon in the header.

The report can be downloaded by clicking the Download icon in the header.

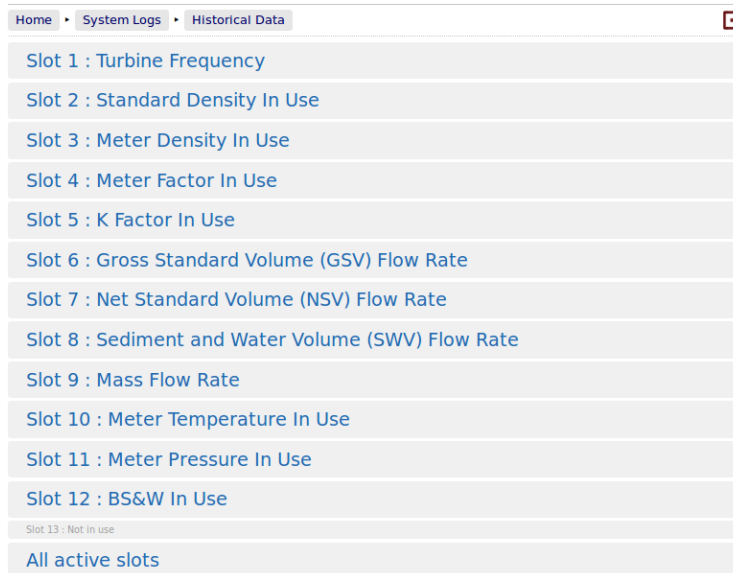
If configured in the application, various report download options may be shown in a drop-down box. If no drop-down is shown, a plain text file will be downloaded.



The screenshot shows a dropdown menu with two options: 'Download as Text' and 'Download as TSV'. A mouse cursor is hovering over the 'Download as Text' option. Above the dropdown, there are icons for download, print, and share.

11.6.1.2 Historical Data

The Historical Data page shows a list of all the application's Historical Data pins (see [8.8 - Historical](#)).

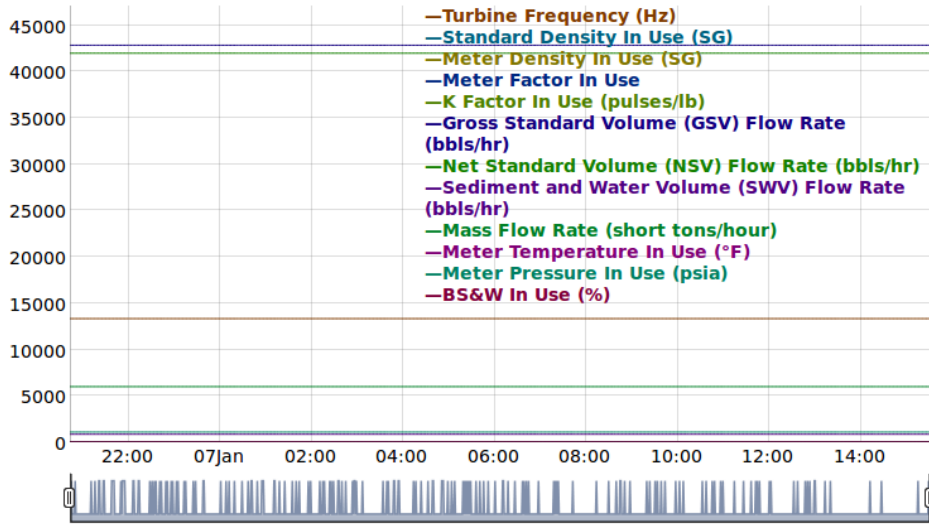


The screenshot shows the 'Historical Data' page. At the top, there is a breadcrumb trail: Home > System Logs > Historical Data. Below this, there is a list of 12 pin slots, each with a label and a blue link. The slots are:

- Slot 1 : Turbine Frequency
- Slot 2 : Standard Density In Use
- Slot 3 : Meter Density In Use
- Slot 4 : Meter Factor In Use
- Slot 5 : K Factor In Use
- Slot 6 : Gross Standard Volume (GSV) Flow Rate
- Slot 7 : Net Standard Volume (NSV) Flow Rate
- Slot 8 : Sediment and Water Volume (SWV) Flow Rate
- Slot 9 : Mass Flow Rate
- Slot 10 : Meter Temperature In Use
- Slot 11 : Meter Pressure In Use
- Slot 12 : BS&W In Use
- Slot 13 : Not in use

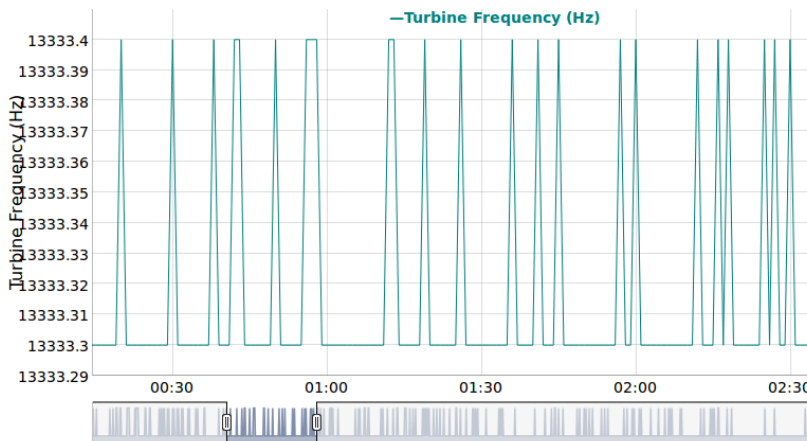
At the bottom of the list, there is a link labeled 'All active slots'.

Clicking on any of the pin slots will show a chart of the data stored for that slot.



- Show Series:**
- Turbine Frequency (Hz)
 - Standard Density In Use (SG)
 - Meter Density In Use (SG)
 - Meter Factor In Use
 - K Factor In Use (pulses/lb)
 - Gross Standard Volume (GSV) Flow Rate (bbls/hr)
 - Net Standard Volume (NSV) Flow Rate (bbls/hr)
 - Sediment and Water Volume (SWV) Flow Rate (bbls/hr)
 - Mass Flow Rate (short tons/hour)
 - Meter Temperature In Use (°F)
 - Meter Pressure In Use (psia)
 - BS&W In Use (%)

By default, the entire available time range is displayed. However this can be adjusted using the slider handles at the bottom of the chart. This allows the user to narrow or expand the time range displayed, and slide the time window left / right.



The “All Active Slots” item displays a chart showing all the data slots.

The check boxes at the foot of the chart allow individual data series to be show / hidden.

11.6.1.3 Alarm Logs

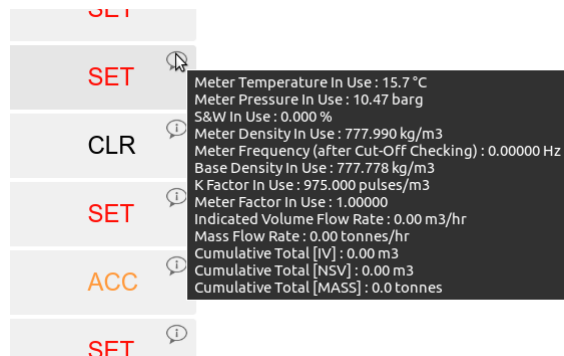
Similar to the Reports, the Alarm Logs page shows a calendar view of all alarm log items stored on the target. Clicking on a valid date will show a list of alarm events for that day.



The target is able to store a maximum of 1000 alarm log entries, at which point new alarm entries overwrite the oldest entries.

The list can be printed by clicking on the Printer icon or downloaded using the Download icon.

If configured in the application (refer to the “Events” tab in [8.8 - Historical](#)), each entry may also show an “Additional Log Values” (or ALVs) icon. If you hover over this icon, a pop-up box will be displayed showing a set of up-to 13 data points snapshot at the time of the alarm.



11.6.1.4 Event Logs

The Event Logs page shows a list of event log types.



| Type | Description | Maximum Entries |
|-----------|--|-----------------|
| System | Any system event such as changing date/time, installing new application or firmware, restarts, network changes. | 1000 |
| Operator | Changes to the application values made by end-users during normal operation of the unit. | 2500 |
| Metrology | Changes to any application values either:- a) contained in the “Metrology” group (see 6.6.3 - [Tables]) b) have “Metrology” write access defined in the Displays tree | 1000 |
| Security | Login/logout events via the website or XML comms link. | 1000 |

| | | |
|-------------|---|------|
| Application | Information logged via the nfevent() function (see 7.6.4 - Debug Functions). | 1000 |
| Combined | This shows a list of the last 30 events of any type. | - |

Apart from the Combined Event Log, clicking on a particular event type shows a calendar view (similar to the Alarm Logs page) of all relevant event log items stored on the target. Clicking on a valid date will show the list of events for that day.

The screenshot below shows an example of the System Event log.

Note that ALVs also supported in all event logs.



The target is able to store a maximum number of event log entries, as per the table above. When the log is full, new events overwrite the oldest entries of that event type.

The list can be printed by clicking on the Printer icon or downloaded using the Download icon.

11.6.1.5 Constants Log

The Constants Log page shows a list of the current values of all persistent pins contained in the application display tree.

Also shown is list of System Information and Software Checksums as defined in [11.6.2 - System Information](#).

Items marked as [INACTIVE] at the beginning of the line are currently hidden from the application menus but are still included for reference purposes.

The [CSUM] at the end of the line indicates that item can only be changed when logged in with Metrology level access and the NMI/MET hardware link is active.

Constants log generated at 2020/12/16 08:55:53

NOTE : Items Marked [CSUM] Are Included In The Metrology Checksum

```
[System Information]
System ID                      C8A0308399A3
System Firmware                4v7r8423-A+
I/O Firmware                   HW 2.03 SW 2.08
Metrology Firmware             lv1
System O/S                     5.7.7
Expansion Board Date           15/10/12 14:07:23
Expansion Board Ident         151012 83XK keithley.cla
Application Name               Liquid Flow Computer
Application Version            0v8r196
Dataset                       Metric*
Application Checksum           B0314CE8E4C66062
Metrology Checksum            321C2B61CB48C15D
Constants Checksum            497325EA56785871
-----
[Software Checksums]
Composite Checksum            10399E3C215F09AB
XMLLink Ident Setting        5A265A5C0F172A11E065AB7E06E5FA73
Heartbeat Watchdog          D2382A50AFC35844DD9B33F50F1C2CE9
T23 24 1980 with CPL        038EE3CB346EAF7586430F579E63235A
T5 6 1980 with CPL          157BC6420CA36B892486ED7A3B0DE269
T5 6 23 24 1960 with CPL    CD170BBB4095E0C2205749D28A523007
T53 54 1980 with CPL        EC9B4B5B615F483083350A2A6888F0D1
TP27 2007                   7B47A2CE20BCAB801ED7EC8C112BF9B
Ch11 2012                   21C8DDFDE1A07A5E45DEBE2736660A2D
LP FlowHandler No Alarms     70E097A784498002B5F96914C1842708
KF Linearisation            31802DCD1DC23E23AF6345EFCBBDD0E1
Totaliser                   281EE714633B1E805D06623BB61936774
PID Control                  61AC8C33F176BCB498178B99CFAA4A02
-----
[Menu : Operation|Product In Use]
Product In Use [Product 1]                                     Product 1

[Menu : System|Initial Setup]
Metrology Mode                      Strict MID                                     [CSUM]
Prover Type                          Standalone Prover
Enable Promass Communications?        No
[INACTIVE] Meter Factor Method        Use Baseline/Proved Meter Factors

[Menu : System|Initial Setup|Site/Location Setup]
Site Owner/Operator
Site Reference
Site Location
Device ID
Atmospheric Pressure                1.01325 bara                                     [CSUM]

[Menu : System|Initial Setup|Site/Location Setup|Security Setup]
Security Method                      None
[INACTIVE] PIN Code                  1234
```

The list can be printed by clicking on the Printer icon or downloaded using the Download icon.

11.6.2 System Information

The System Information page shows a list of various system information items.


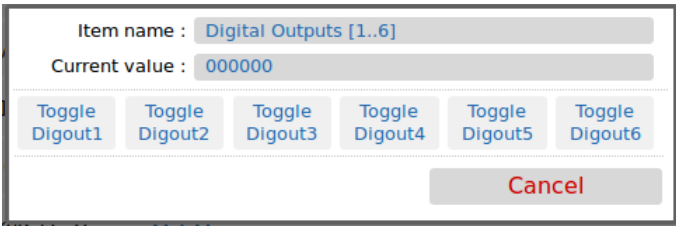
Below a screenshot of the first few lines:-

The screenshot shows a web interface with a breadcrumb trail 'Home > System Information' and a refresh icon. Below is a table of system information:

| | |
|-----------------------|--------------------------|
| System Uptime | 0 days, 00:17:29 |
| System ID | C8A0308399A3 |
| System Firmware | 4v7r8413-B |
| I/O Firmware | HW 2.03 SW 2.08 |
| Metrology Firmware | 1v1 |
| System O/S | 5.7.7 |
| Expansion Board Date | 15/10/12 14:07:23 |
| Expansion Board Ident | 151012 83XK keithley.cla |
| Application Name | default |
| Application Version | 1v2r11 |

The following items are shown:-

| | |
|-----------------------|--|
| System Uptime | Elapsed time since the unit was last powered on or rebooted. |
| System ID | The unique ID of the target. |
| System Firmware | The system firmware version. |
| I/O Firmware | If applicable, the I/O firmware version of the target. |
| Metrology Firmware | The Metrology firmware version. |
| System O/S | The Operating System version. |
| Expansion Board Date | If applicable, the calibration date of the expansion board |
| Expansion Board Ident | If applicable, the identification string of the expansion board |
| Application Name | The name of the application. |
| Application Version | The application version. |
| Dataset | The name of the dataset current in use. If any of the dataset values have been changed since the application was installed, an asterisk will be shown at the end of the name. |
| Application Checksum | The application checksum. When Visual C Cure saves an application, it is possible to set the Application Version number manually. However, when the application is saved, a checksum value is calculated that is unique to the layout, connectivity and content of the application. Any changes to the application will cause the checksum to change. This provides an additional verification method, for example, when performing Factory Acceptance Tests. |

| | | | | | | | | | | | |
|------------------------------|---|--------------------|------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|------------------------------|-----------------------------------|------------------------|----------------------------------|
| Metrology Checksum | <p>The checksum of the current values of the application's persistent pins that are either:-</p> <ul style="list-style-type: none"> (a) Contained in the Metrology group (b) Have been added to the "Remote" displays tree and have "Metrology" security write access | | | | | | | | | | |
| Constants Checksum | <p>The checksum of the current values of the application's persistent pins that are changeable via the "Remote" displays tree.</p> | | | | | | | | | | |
| Software Checksums | <p>If applicable, this sub-menu lists the checksums of any Metrology blocks. The first entry is a composite value that combines all the other checksums into a single value to allow the user to quickly check if any block has changed.</p> <p>For example:-</p>  <table border="1" data-bbox="491 607 1417 898"> <tr> <td>Composite Checksum</td> <td>10399E3C215F09AB</td> </tr> <tr> <td>TP27_2007 (Count = 1)</td> <td>7B47A2CE20BCAB801ED7EC8CB112BF9B</td> </tr> <tr> <td>Ch11_2012 (Count = 1)</td> <td>21C8DDFDE1A07A5E45DEBE2736660A2D</td> </tr> <tr> <td>KF Linearisation (Count = 1)</td> <td>31802DCD1DC23E23AF6345EFFCBBDDDE1</td> </tr> <tr> <td>Totaliser (Count = 16)</td> <td>281EE714633B1E8D5D6623BB61936774</td> </tr> </table> | Composite Checksum | 10399E3C215F09AB | TP27_2007 (Count = 1) | 7B47A2CE20BCAB801ED7EC8CB112BF9B | Ch11_2012 (Count = 1) | 21C8DDFDE1A07A5E45DEBE2736660A2D | KF Linearisation (Count = 1) | 31802DCD1DC23E23AF6345EFFCBBDDDE1 | Totaliser (Count = 16) | 281EE714633B1E8D5D6623BB61936774 |
| Composite Checksum | 10399E3C215F09AB | | | | | | | | | | |
| TP27_2007 (Count = 1) | 7B47A2CE20BCAB801ED7EC8CB112BF9B | | | | | | | | | | |
| Ch11_2012 (Count = 1) | 21C8DDFDE1A07A5E45DEBE2736660A2D | | | | | | | | | | |
| KF Linearisation (Count = 1) | 31802DCD1DC23E23AF6345EFFCBBDDDE1 | | | | | | | | | | |
| Totaliser (Count = 16) | 281EE714633B1E8D5D6623BB61936774 | | | | | | | | | | |
| Profile | <p>This item shows the application cycle time (in milliseconds). Four values are shown:-</p> <p>Min the minimum cycle time since power-on. Last the cycle time for the last cycle completed. Avg the average cycle time since power-on. Max the maximum cycle time since power-on.</p> <p>Clicking on the Edit icon allows the user to reset the profile information.</p> | | | | | | | | | | |
| Digital Inputs | <p>If Digital Inputs are configured in the application, this item shows the current values.</p> | | | | | | | | | | |
| Digital Outputs | <p>If Digital Outputs are configured in the application, this item shows the current settings.</p> <p>The outputs can be temporarily over-written by clicking on the Edit icon, which brings up the following dialog:-</p>  <p>Clicking on the toggle items will change the Digital Output setting (over-writing the application's value).</p> <p>Click Cancel to close the dialog and return control of the Digital Outputs back to the application.</p> | | | | | | | | | | |
| Pulse Outputs Buckets | <p>If Pulse Outputs are configured in the application, this item shows the number of pulses still to be output from the hardware.</p> | | | | | | | | | | |

11.6.3 Time / Date Settings

11.6.3.1 Time / Date

The following system settings are shown:-

| | |
|---------------------|---|
| TimeZone | If configured in the application, this line will show the currently selected Time Zone. |
| Time Offset (HH:MM) | Shows the current time offset (in hours:minutes). |
| Date Format | Shows the current date format. The following are available:- YYYY/MM/DD e.g. 2012/11/26 DD/MM/YYYY e.g. 26/11/2012 MM/DD/YYYY e.g. 11/26/2012 |
| Date | Shows the current date (using the format defined above). |
| Time | Shows the current time. |

All settings can be changed by administrator users by clicking on the relevant Edit icon.

11.6.3.2 Daylight Saving Time

Shows whether the Daylight Saving function is enabled or disabled on the target.

If the start date or end date are invalid or the same, the function will be disabled.

| | |
|-----------------|---|
| Start Date | Shows the start date to enter daylight savings. |
| End Date | Shows the end date to exit daylight savings. |
| Changeover Hour | Shows the hour at which to enter/exit daylight savings. |

All settings can be changed by administrator users by clicking on the relevant Edit icon.

11.6.3.3 NTP Service

When enabled, the unit time can be synchronised against any NTP server.

The automatic check occurs at 03:33 every day. The exact second within the minute is not fixed and varies from machine to machine to avoid all machines trying to access the NTP server at the same time.

The time is not updated if the time difference is less than ½ second or greater than 15 minutes.

| | |
|-----------|---|
| Mode | Shows whether the NTP (Network Time Protocol) service is enabled or disabled on the target. The following options are available:- Disabled NTP service is disabled. Automatic Sync NTP is checked at 03:33 every day. Sync On Startup NTP is checked only when the unit is powered on or restarts. Sync On Startup & Automatic NTP is checked when the unit is powered on or restarts and at 03:33 every day. |
| Server | Specifies the IP address of the NTP server to use. |
| Last Sync | Shows when the NTP service last performed a successful sync, along with the time adjustment applied. |

| | |
|-------------|--|
| Manual Sync | <p>Allows the user to perform a manual sync.</p> <p>Note that, using this option, the time will always be updated regardless of the time difference.</p> |
|-------------|--|

All settings can be changed by administrator users by clicking on the relevant Edit icon.

11.6.4 Network

11.6.4.1 Ethernet Settings

The Network page shows the current network settings for both network ports.

The settings can be changed by administrator users by clicking on the relevant Edit icon.

If DHCP is chosen as the IP Method, the current in-use settings values are shown, but greyed out as they are for information only.

Changed values are shown in red and are only enacted after the “Apply” item has been clicked.

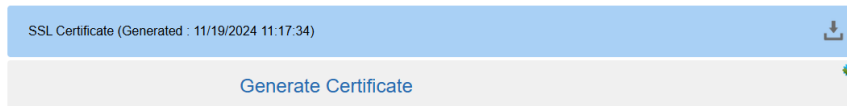
In order to correctly apply changes to the networking, all changes must be made before clicking the “Apply” item.

Once “Apply” has been clicked, the network will re-configure itself at once.

11.6.4.2 Support Tunneling

If set to Enabled, a dedicated port is opened back to the factory. This allows factory support to be given without the need of complicated network setup. The factory is then able to update or change the application and firmware. It is also possible to backup the existing unit. This still allows the end user to be in control of who can access the unit.

11.6.4.3 SSL Certificate



Encryption is supported by several of the available communication links.



For this to operate correctly, a SSL certificate must be generated using the “Generate Certificate” option.

Once generated, the certificates creation date is displayed for information purposes.

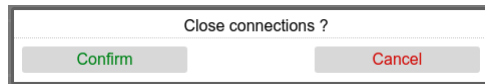
A download icon is also provided to allow the unit’s public key to be obtained allowing the unit to be enrolled in other communications system.

11.6.4.4 Connection Info

If there are any Ethernet comms links configured in the application, the Connection Info section will be visible. This shows any active connection for each comms link. For example:-

| Connection Info | |
|------------------|---|
| XML Link | 10.225.1.233:592 <-> 10.225.1.165:54048  |
| Modbus_TCP_Slave | No connections  |

Each link has an Edit icon. Clicking on this icon will bring up a dialog box that allows the user to forcibly close all connections for that link.



11.6.5 Printers / SD Card / FTP

11.6.5.1 Printers

The target hardware supports either serial printers or Ethernet Postscript printers.

Serial printers must be connected to Serial Port 1.

The Baud Rate and Flow Control settings can be configured by any administrator users.

Network printers must have a valid IP address and network port configured. A scaling value can also be applied.

The "Print Test Page" item can be used to test the network printer settings have been entered correctly. This will send a rectangular box of asterisks (80 columns wide by 69 rows high) to the printer, and the scaling value can be used to ensure all 4 sides are visible on the printout.

The "Print Spool" item shows the number of printer jobs waiting to be printed. Clicking on the Edit icon will show a list of all pending printer jobs. Administrator users can delete printer jobs if required.

11.6.5.2 SD Card

| | |
|-----------------------|--|
| Status | Shows the status of the SD Card. To install / remove an SD Card, click on the Edit icon and select the relevant option. |
| Archive Alarms/Events | Sets how often the alarms and events logs are stored to the SD Card. The logs are stored in a ZIP archive in a directory structure of:- <Year> / <Month> / <Date> / <Filename> The options are Daily, Weekly, Monthly or Disabled. |
| Archive Historicals | Sets how often the historical trending data is stored to the SD Card. The data is stored in a ZIP archive in a directory structure of:- <Year> / <Month> / <Date> / <Filename> The options are Daily, Weekly, Monthly or Disabled. |

11.6.5.3 FTP

| | |
|-------------------|--|
| Server IP Address | Specifies the IP address of the FTP server to use. |
| Port | Specifies the network port to use. Setting the port to 0 (zero) will disable the FTP service. |
| Username | Specifies the login username. |
| Password | Specifies the login password. |

| <p>Upload Directory</p> | <p>Specify the directory path format when data is uploaded via FTP.</p> <p>The FTP filename is defined using the “file” report attribute (see 8.5.2 - Report Management).</p> <p>Multiple fields can be joined to create a custom path based on (for example) report name, time, date, device ID.</p> <p>Fields can be embedded within the FTP path, and will be expanded accordingly.</p> <p>The following fields are available:-</p> <p>%d Day (01 to 31) %D Date in current format (%Y%m%d / %d%m%Y / %m%d%Y) %e Seconds since epoch (decimal) %E Seconds since epoch (hexadecimal) %H Hour (00 to 23) %I Device ID %m Month (01 to 12) %M Minute (00 to 59) %r Report name %s Device Serial Number %S Second (00 to 59) %T Time (%H%M%S) %y Year without century (00 to 99) %Y Year with century %+ Date and Time (%D%T) %% Literal '%' character</p> <p>Examples</p> <p>Text report named "Daily" created on 1st February 2018 at 13:30:00. Device serial number is C8A0308399A3.</p> <table border="1" data-bbox="459 1120 1439 1288"> <thead> <tr> <th>File path format</th> <th>Generated filename</th> </tr> </thead> <tbody> <tr> <td>/Site123/%Y</td> <td>/Site123/2018/Daily-20180201133000.txt</td> </tr> <tr> <td>/Site123/%Y/%r</td> <td>/Site123/2018/Daily/Daily-20180201133000.txt</td> </tr> <tr> <td>/%s/Reports</td> <td>/C8A0308399A3/Reports/Daily-20180201133000.txt</td> </tr> </tbody> </table> | File path format | Generated filename | /Site123/%Y | /Site123/2018/Daily-20180201133000.txt | /Site123/%Y/%r | /Site123/2018/Daily/Daily-20180201133000.txt | /%s/Reports | /C8A0308399A3/Reports/Daily-20180201133000.txt |
|-------------------------|---|------------------|--------------------|-------------|--|----------------|--|-------------|--|
| File path format | Generated filename | | | | | | | | |
| /Site123/%Y | /Site123/2018/Daily-20180201133000.txt | | | | | | | | |
| /Site123/%Y/%r | /Site123/2018/Daily/Daily-20180201133000.txt | | | | | | | | |
| /%s/Reports | /C8A0308399A3/Reports/Daily-20180201133000.txt | | | | | | | | |
| <p>Upload Format</p> | <p>Sets the upload format when sending reports.</p> <p>Plain Text Send report in plain text. TSV Send report in Tab Separated Values format. TFX/Plain Text If the report supports it, send report as FlowCal TFX file. Otherwise send as plain text. TFX/TSV If the report supports it, send report as FlowCal TFX file. Otherwise send as TSV file.</p> | | | | | | | | |

| | |
|----------------|---|
| Send Test File | <p>This option allows the user to test the FTP settings.</p> <p>It attempts to connect to the FTP server, login and transfer a test text file.</p> <p>A dialog box opens up to show the progress of the test.</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">FTP Test</p> <hr/> <pre> Sending Test File ... Connecting to server 66.220.9.51, port 21 220 Welcome to the most popular FTP hosting service! Save on hardware, sof USER mpfj 331 User name ok, need password. PASS ***** 230 User mpfj logged on. CWD /mpfj 250 CWD command successful. "/mpfj" is current directory. TYPE I 200 Type set to I PASV 227 Entering Passive Mode (66,220,9,51,40,173). STOR ftptest-20201215093249.txt 150 Connection accepted 226 Transfer complete QUIT 221 Bye </pre> <div style="text-align: right; margin-top: 10px;"> Close </div> </div> |
|----------------|---|

11.6.6 Report Routing

The Report Routing page allows any application reports to be routed to any of the configured printers, SD Card or FTP.

Each report is shown with its current routing selection.

The first item is always “Web Printer” which selects the routing for the Print icon seen on several of the system web pages.

Clicking on the Edit icon opens up a dialog bow showing each available routing destination and a tick box per item. Tick the destinations as required and click Apply.

When a report is then generated, the report is sent to each of the selected destinations.

Item Name : Hourly Report

Current value : Printer 1

- Printer 1
- Printer 2
- Printer 3
- SD Card
- FTP

Apply
Cancel

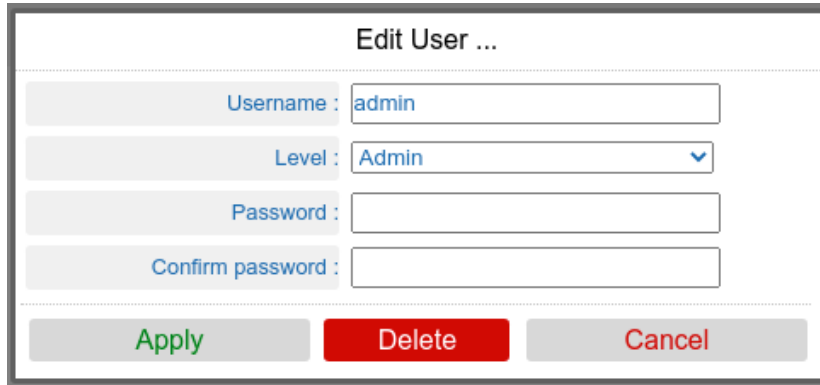
11.6.7 User Info

The User Info page shows a list of currently configured users.

admin ⚙

Add new user

User details can be viewed by clicking on the relevant Edit icon.



The following details can be changed:-

| | |
|----------|---|
| Username | Sets the username. All usernames must be unique. |
| Level | Sets the access level of the user. Six access levels are available, and the names of the access levels are defined by the application via the “USERS” table (see 6.6.3 - [Tables]). |
| Password | To change the password, enter the new password into both password boxes. |

Administrator users can edit any user's details or delete a user.

Administrator users can also add a new user by clicking on the “Add new user ...” item and enter the required user details.

Non-administrator users can only edit their own username or password.

11.6.8 Number Format

This page allows the number format to be customised to allow for different regional settings.



The following settings are available:-

| | |
|---------------------|---|
| Decimal Separator | Sets the decimal separator character. Point Use a decimal point, e.g. 123.456 Comma Use a comma, e.g. 123,456 |
| Thousands Separator | Sets the thousands separator character. None Use no separator, e.g. 1234567 Comma Use a comma, e.g. 1,234,567 Point Use a decimal point, e.g. 1.234.567 Space Use a space, e.g. 1 234 567 |
| | |

These settings is retained on power cycles and new application installations.

11.6.9 Analog Inputs

If the application is configured to use analog inputs (and/or RTD inputs), their current values are shown here.

Clicking on the Edit icon allows the user to perform in-line calibration of the analog inputs.

During calibration, a low and high scale can be set. These are only implemented upon acceptance.

A “default” option is also present, which removes any previous in-line calibration values, and returns the relevant input to using its raw values. A prefix asterisk (*) denotes that the raw values are in use.

11.6.10 Reboot

The Reboot page allows administrator users to reboot the target remotely.

Clicking on one of the reboot options will bring up a confirmation dialog to prevent accidental rebooting.



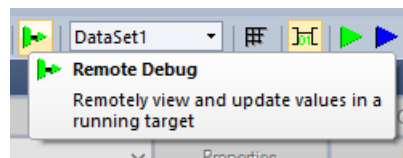
The following reboot options are available:-

| | |
|--------------------|--|
| Warm | Restarts the target retaining all current persistent pin values. |
| Cold | Restarts the target resetting all persistent pins back to their default value (as defined by the application). |
| Cold (Keep Totals) | Similar to a Cold reboot, but all persistent pins contained in a group called “TOTALS” will have their values retained. All other persistent pins will be reset back to their default value (as defined by the application). |
| Defaults | As Cold reboot, but both network ports are reset to factory default. |

12 Remote Debug

Once an application has been installed into a target, it is possible to remotely connect to the target and debug the application live on the target.

Click on the Remote Debug icon (or right-click in the Remote tab and select Remote Debug or select File | Remote Debug a Target...).



A pop-up dialog will prompt the user for the IP address of the target and the application password. Enter these and then click OK.

The target will be contacted and a copy of the application (contained within the target) will be downloaded into the Visual C||Cure editor.

At this point, the editor can be used to drill down into the application, view the live values of all data pins, and even change data values on-the-fly.

Any data changes will be sent back to the target.

Note that the data values displayed are not those calculated by Visual C||Cure on the PC, rather they are the live values taken from the remote target's database itself.

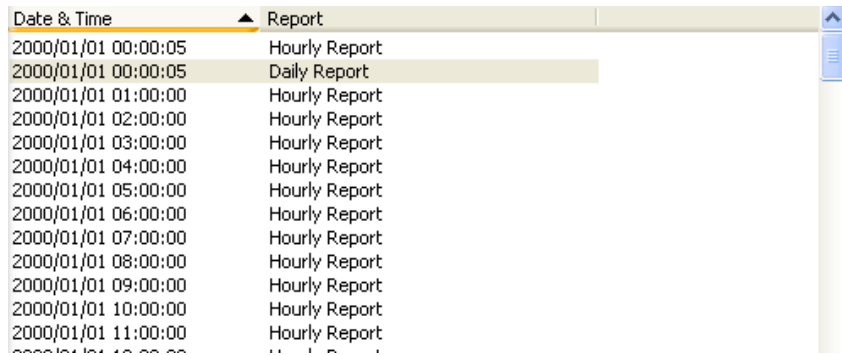
One very powerful feature of the Remote Debug engine is the ability to Single Step codeblocks on the remote target.

If the user enters a codeblock and selects Single Step, the editor will perform the standard Single Step functions as outlined in [5.5.2 - Codeblock Single Step](#).

Clicking on the Remote Debug icon (or right-click in the Remote tab and select Remote Debug or select File | Remote Debug a Target...) will disconnect the Remote Debug link.

12.1 Remote Reports

When in remote debug mode, the Remote tab also shows the list of available reports that are currently stored on the target.

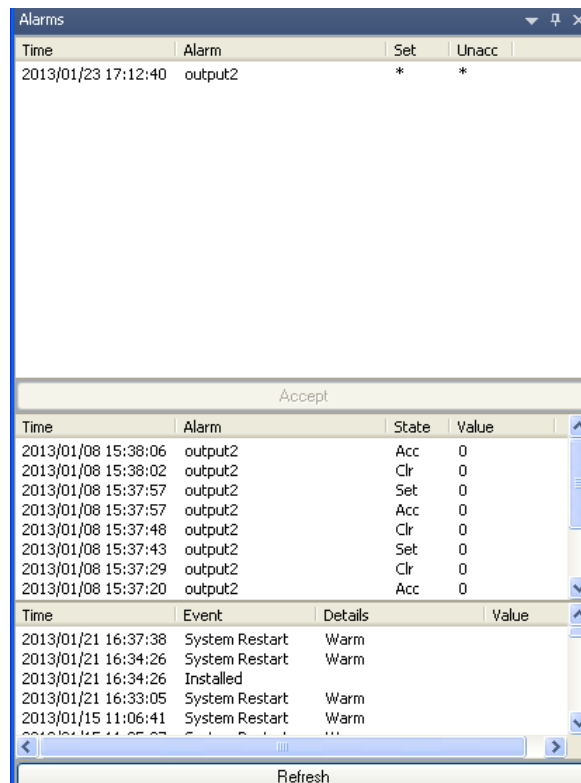


| Date & Time | Report |
|---------------------|---------------|
| 2000/01/01 00:00:05 | Hourly Report |
| 2000/01/01 00:00:05 | Daily Report |
| 2000/01/01 01:00:00 | Hourly Report |
| 2000/01/01 02:00:00 | Hourly Report |
| 2000/01/01 03:00:00 | Hourly Report |
| 2000/01/01 04:00:00 | Hourly Report |
| 2000/01/01 05:00:00 | Hourly Report |
| 2000/01/01 06:00:00 | Hourly Report |
| 2000/01/01 07:00:00 | Hourly Report |
| 2000/01/01 08:00:00 | Hourly Report |
| 2000/01/01 09:00:00 | Hourly Report |
| 2000/01/01 10:00:00 | Hourly Report |
| 2000/01/01 11:00:00 | Hourly Report |

Double-clicking on any of these reports will load the report data and display the report in the main editor window.

12.2 Remote Alarms / Events

In remote debug mode, the Alarms tab shows a list of the application alarms (and whether they are SET and/or UNACCEPTED), along with a log of all the alarms and event entries stored on the target.



| Time | Alarm | Set | Unacc |
|---------------------|---------|-----|-------|
| 2013/01/23 17:12:40 | output2 | * | * |

| Accept | | | |
|---------------------|---------|-------|-------|
| Time | Alarm | State | Value |
| 2013/01/08 15:38:06 | output2 | Acc | 0 |
| 2013/01/08 15:38:02 | output2 | Clr | 0 |
| 2013/01/08 15:37:57 | output2 | Set | 0 |
| 2013/01/08 15:37:57 | output2 | Acc | 0 |
| 2013/01/08 15:37:48 | output2 | Clr | 0 |
| 2013/01/08 15:37:43 | output2 | Set | 0 |
| 2013/01/08 15:37:29 | output2 | Clr | 0 |
| 2013/01/08 15:37:20 | output2 | Acc | 0 |

| Time | Event | Details | Value |
|---------------------|----------------|---------|-------|
| 2013/01/21 16:37:38 | System Restart | Warm | |
| 2013/01/21 16:34:26 | System Restart | Warm | |
| 2013/01/21 16:34:26 | Installed | | |
| 2013/01/21 16:33:05 | System Restart | Warm | |
| 2013/01/15 11:06:41 | System Restart | Warm | |

Double-clicking on any of the alarms or alarm log entries will locate and display the relevant alarm pin in the editor window.

This assists the user in quickly diagnosing the cause of any unexpected alarms.

Alarms can be accepted by selecting the relevant alarm and clicking on the Accept button at the bottom of the alarm list.

The Refresh button can be used to query the target for up-to-date Alarm / Event data.

13 Backing Up Applications

Visual C||Cure allows the user to retrieve an application and setup configuration of a target.

Right-click in the Remote tab and select Get a Backup of the Running Application.

A pop-up dialog will prompt the user for the IP address of the target and the target admin password. Enter these and then click OK.

The target will be contacted and the application and current setup will be extracted.

The user will then be prompted for a filename to save the extracted application.

The saved application will contain:-

- The original application as installed on the target
- A copy of the persistent pin values
- A copy of the current system setup (e.g. time/date settings, users, printer settings)

14 Updating Firmware

To assist the long term support provided for the targets, it is possible to update both the system firmware and the I/O firmware remotely.

Update files may be provided by your supplier.

To install such update files, right-click in the Remote tab and select either Update Firmware (to update the system firmware) or Update I/O Firmware.

A pop-up dialog will prompt the user for the IP address of the target and the target admin password. Enter these and then click OK.

The user will then be prompted to select the relevant update file.

Once selected, Visual C||Cure will:-

1. Connect to the target
2. Stop any existing application
3. Transfer the firmware update
4. Restart the target

The update progress will be shown in the App column text on the Remote tab.