

# **HAMPEL SOFTWARE ENGINEERING**

**TEMPLATE**

**HAMPEL SOFTWARE ENGINEERING**

**Version 2.4.0 (2022-10-25)**

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The Release Automation Tools (RAT) help automate the validating, testing, documenting, building, packaging and publishing of your projects. Built-in support for Git lets you trigger our tools from your repository, via GitLab CI/CD or Azure DevOps amongst others.

For a more detailed overview of what these tools do, see <https://rat.hampel-soft.com/>, where you can find information on the available tools, how we automate them using GitLab CI, when the next scheduled webinars are on, and how you can run those tools on your own servers using a commercial license for RAT.

# 1. PROJECT DESCRIPTION

This application template showcases our UI framework for applications with graphical user interfaces. We use this template as a container which loads the project-specific DQMH modules dynamically from a configuration file.

## 1.1. UI FRAMEWORK

The UI framework helps us with:

- reusing UI management code
- project-specific UI layouts
- displaying a fancy splash screen
- populating the Runtime Menu dynamically
- populating a navigation module dynamically
- generating an event log for debugging

...and much more!

The UI framework is built on top of the HSE Libraries and consists of a collection of DQMH modules and a few helper VIs.

### 1.1.1. FRAMEWORK MODULES

These DQMH modules are designed to be reused, hence they are generic and not part of the project-specific code of an application:

- Event Manager
- UI Manager
- Navigation

### 1.1.2. FRAMEWORK VIS

In order to dynamically load DQMH modules and to achieve some of the UI framework functionality, the following VIs are part of the framework, too:

#### STARTUP VI

The /startup.vi is used to run the application. It...

- shows a splash screen
- reads the main configuration (containing the list of modules to load)
- loads the UI Manager and the Event Manager modules
- loads a list of project modules (no static linkage)
- calls the “configure” requests of all the modules
- displays the front panel of the UI Manager module

## PROJECT VIS

These are project-related or project-specific VIs that are supplied by the UI Framework but can or have to be modified for each project.

- /Project/Project.lvlib: Contains the project-specific VIs
- /Project/PROJECT\_InitLogging.vi: Starts the hse-logger
- /Project/PROJECT\_Name-constant.vi: Name of the project
- /Project/PROJECT\_RunTimeMenu.rtm: Run-Time Menu for the application
- /Project/PROJECT\_SplashScreen.vi: Splash Screen
- /Project/PROJECT\_StartupSteps.ctil: List of steps for the startup.vi to execute
- /Project/PROJECT\_UserCredentials.vi: List of users for the built-in login feature

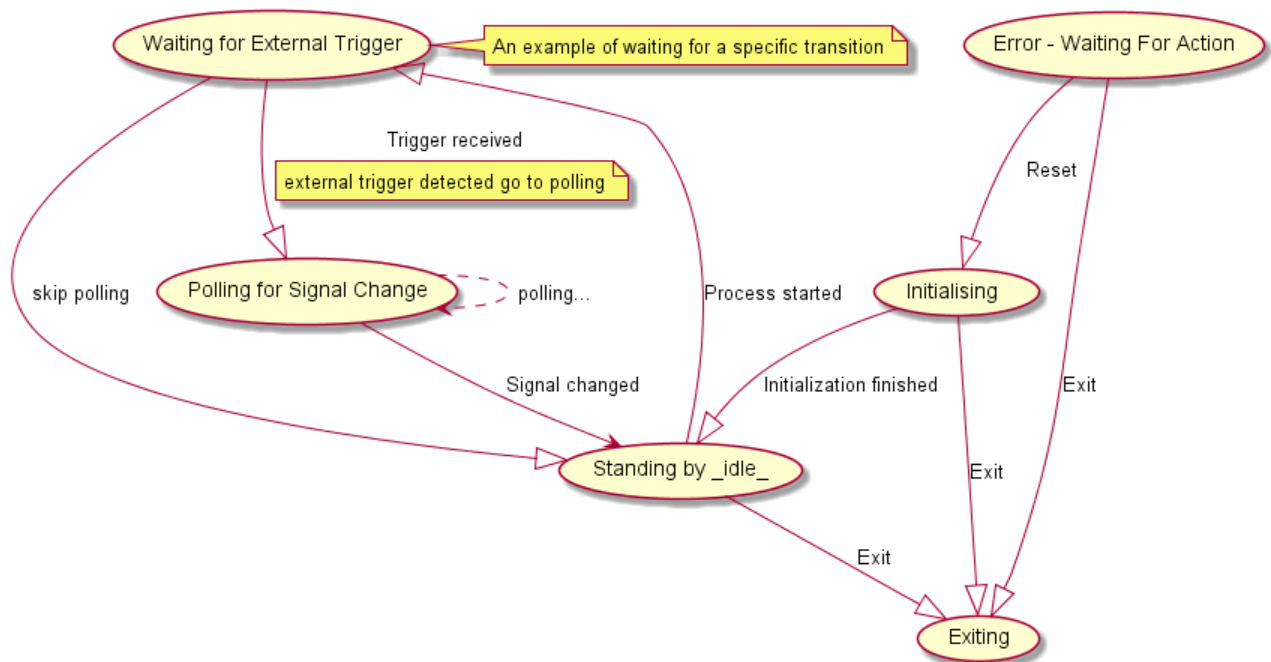
## 1.2. PROJECT-SPECIFIC DQMH MODULES

In order for DQMH modules to be compatible with our application template, these modules need to implement our HSE DQMH flavour.

## 2. STATE MACHINES

### 2.1. STATEMACHINE

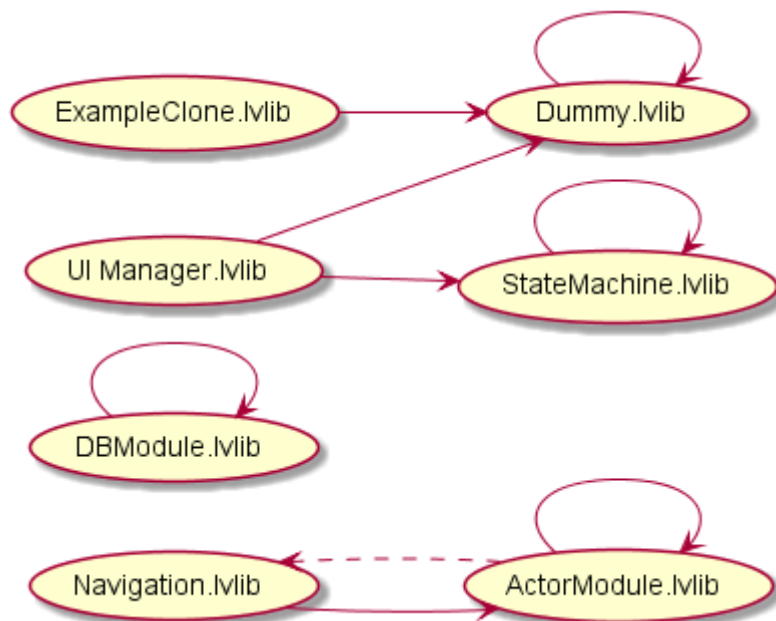
#### 2.1.1. MAIN.VI



## 3. CALLING DEPENDENCY DIAGRAMS

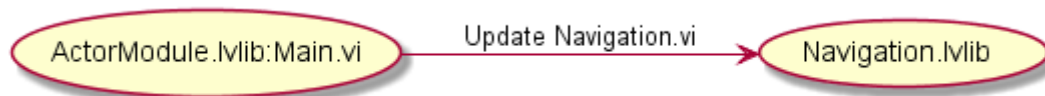
### 3.1. OVERVIEW

#### 3.1.1. PROJECT

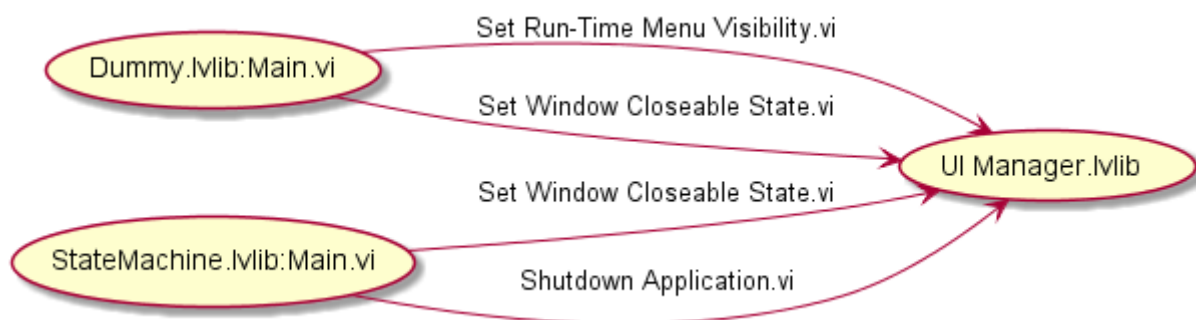


### 3.2. CALLERS

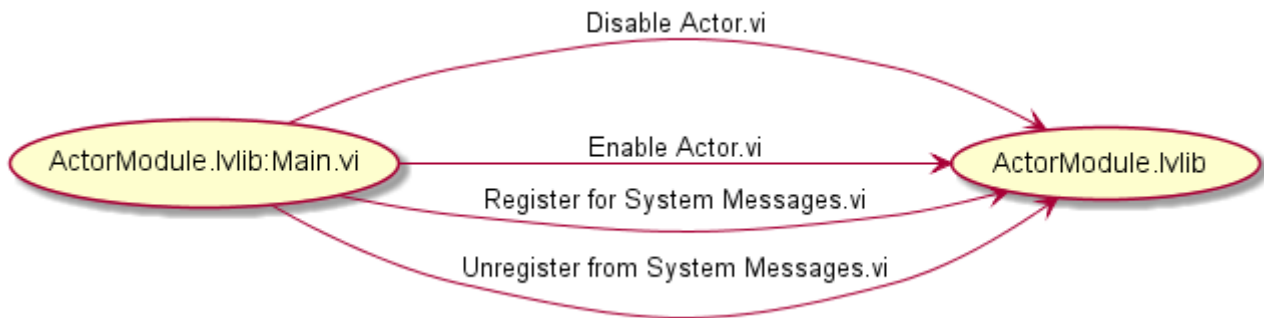
#### 3.2.1. NAVIGATION.LVLIB



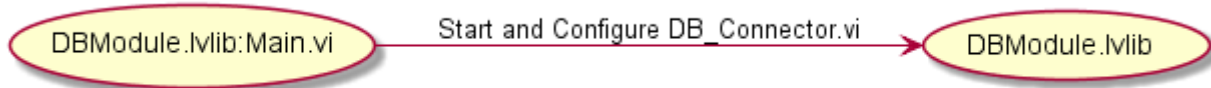
#### 3.2.2. UI MANAGER.LVLIB



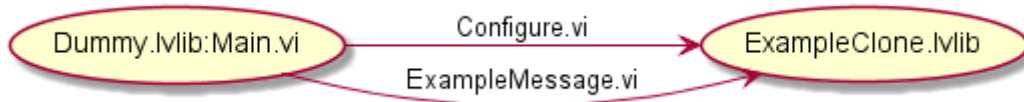
### 3.2.3. ACTORMODULE.LVLIB



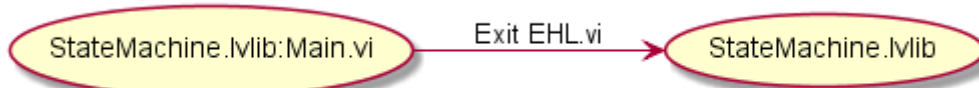
### 3.2.4. DBMODULE.LVLIB



### 3.2.5. EXAMPLECLONE.LVLIB



### 3.2.6. STATEMACHINE.LVLIB



## 3.3. LISTENERS

### 3.3.1. NAVIGATION.LVLIB



# APPENDIX A: DQMH

DQMH modules documentation

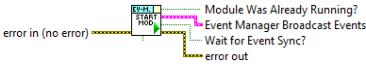
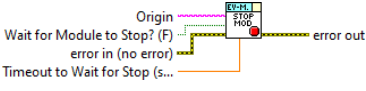
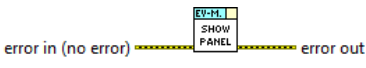
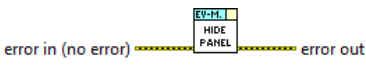
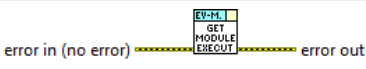
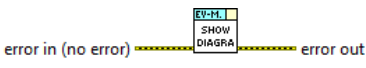
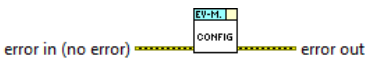
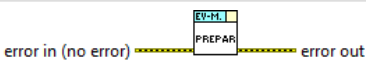
## A.1. EVENT MANAGER.LVLIB

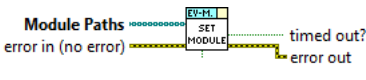

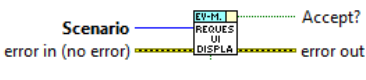

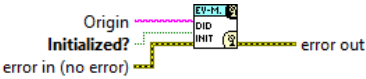

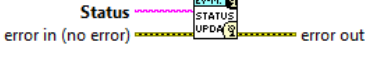

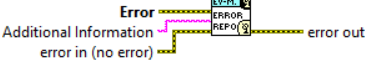

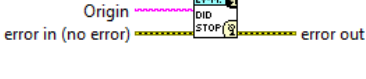



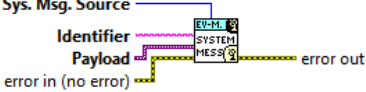

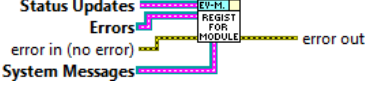
**Type:** Singleton

**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.1.1. EVENT LIST



Table 1. Events

| Name                        | Type | Connector pane  | Description   | S. | R. | I. |
|-----------------------------|------|---|---|----|----|----|
| Start Module                |      |    | Launches the Module Main.vi.  |    |    |    |
| Stop Module                 |      |   | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |
| Show Panel                  | →    |  | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                  | →    |  | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status | →    |  | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                | →    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).   |    |    |    |
| Configure                   | →    |  | Triggers the auto-configuration of the module.  |    |    |    |
| Prepare                     | →    |  | Prepares the front panel for display  |    |    |    |

| Name                           | Type  | Connector pane   | Description   | S. | R. | I. |
|--------------------------------|---|--|---|----|----|----|
| Set Modules                    |    | <br>Module Paths<br>error in (no error)    timed out?    error out                    | Tells the Event Manager module which modules are loaded so Event Manager can register for their broadcasts.   |    |    |    |
| Request UI Display             |    | <br>Scenario<br>error in (no error)    error out    Accept?                           | Requests the module to display its UI as specified in <b>Scenario</b>: "managed" => in the UI Manager's subpanel "stand-alone" => as a separate window  |    |    |    |
| Module Did Init                |    | <br>Origin<br>Initialized?<br>error in (no error)    error out                        | No description found (add content in vi description)  |    |    |    |
| Status Updated                 |    | <br>Status<br>error in (no error)    error out  | No description found (add content in vi description)  |    |    |    |
| Error Reported                 |    | <br>Error<br>Additional Information<br>error in (no error)    error out               | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string. |    |    |    |
| Module Did Stop                |    | <br>Origin<br>error in (no error)    error out                                       | No description found (add content in vi description)  |    |    |    |
| Update Module Execution Status |  | <br>Running?<br>error in (no error)    error out                                    | No description found (add content in vi description)  |    |    |    |
| System Message                 |  | <br>Sys. Msg. Source<br>Identifier<br>Payload<br>error in (no error)    error out   | Sends a HSE-generic broadcast message, consisting of an Identifier, a variant Payload and Source information.   |    |    |    |
| Register for module events     |  | <br>Status Updates<br>Errors<br>System Messages<br>error in (no error)    error out | Register for the given module events  |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.1.2. MODULE RELATIONSHIP



Table 2. Requests callers

| Request Name                | Callers  |
|-----------------------------|--|
| Configure                   | Test Event Manager API.vi  |
| Get Module Execution Status | Event Manager.lvlib:Obtain Broadcast Events for Registration.vi<br>Event Manager.lvlib:Start Module.vi |
| Hide Panel                  | Test Event Manager API.vi  |
| Prepare                     | Test Event Manager API.vi  |
| Register for module events  | Event Manager.lvlib:Register Modules in Event Manager—helper.vi  |
| Request UI Display          | Test Event Manager API.vi  |
| Set Modules                 | Test Event Manager API.vi  |
| Show Diagram                | Test Event Manager API.vi  |
| Show Panel                  | Test Event Manager API.vi  |

Table 3. Broadcasts Listeners

| Broadcast Name                 | Listeners                 |
|--------------------------------|---------------------------|
| Error Reported                 | Test Event Manager API.vi |
| Module Did Init                | Test Event Manager API.vi |
| Module Did Stop                | Test Event Manager API.vi |
| Status Updated                 | Test Event Manager API.vi |
| System Message                 | Test Event Manager API.vi |
| Update Module Execution Status | Test Event Manager API.vi |

Table 4. Used requests

| Module              | Requests  |
|---------------------|---|
| Event Manager.lvlib | Register for module events.vi<br>Stop Module.vi |

Table 5. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.1.3. MODULE START/STOP CALLS

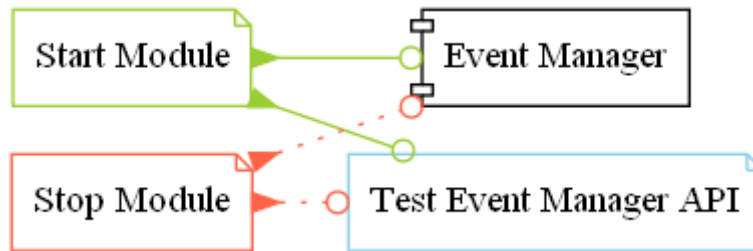


Table 6. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | Event Manager.lvlib:Load Module.vi<br>Test Event Manager API.vi |
| Stop Module  | Event Manager.lvlib:Handle Exit.vi<br>Test Event Manager API.vi |

### A.1.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module Event Manager.lvlib use the following custom errors:

Table 7. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

## A.2. NAVIGATION.LVLIB

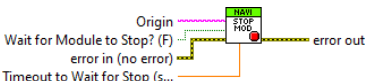
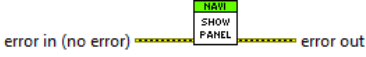

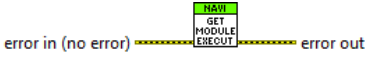
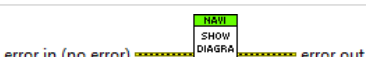





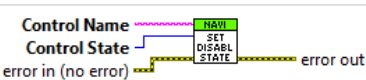
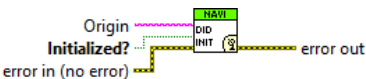
**Type:** Singleton


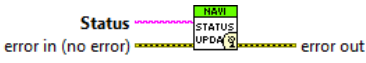

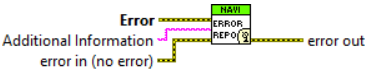

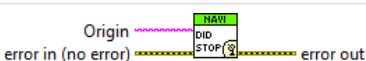







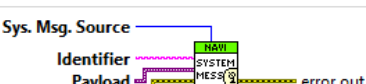
**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.2.1. EVENT LIST

Table 8. Events

| Name         | Type | Connector pane | Description                  | S. | R. | I. |
|--------------|------|----------------|------------------------------|----|----|----|
| Start Module |      |                | Launches the Module Main.vi. |    |    |    |

| Name                        | Type | Connector pane  | Description   | S. | R. | I. |
|-----------------------------|------|---|---|----|----|----|
| Stop Module                 |      |    | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |
| Show Panel                  | →    |    | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                  | →    |    | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status | →    |   | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                | →    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).   |    |    |    |
| Configure                   | →    |  | Self-configuration (triggered automatically from main.vi)   |    |    |    |
| Prepare                     | →    |  | Prepares the frontpanel for display.  |    |    |    |
| Update Navigation           | →    |  | <p><b>Note:</b> This VI was renamed by the DQMH Rename Event utility. Make sure the VI Description is updated to reflect the new event name, then delete this comment.</p> <p>Send information for updating the Sidebar to some state.</p>  |    |    |    |
| Select Listbox Element      | →    |  | Shows a selection for the listbox element identified by name and index  |    |    |    |
| Set Visibility              | →    |  | Shows or hides a control  |    |    |    |
| Set Disabled State          | →    |  | Enables or disables a control identified by <b>Control Name</b>   |    |    |    |
| Module Did Init             | ↻    |  | Send the Module Did Init event to any VI registered to listen to this module's broadcast events.  |    |    |    |

| Name                           | Type  | Connector pane  | Description   | S. | R. | I. |
|--------------------------------|---|---|---|----|----|----|
| Status Updated                 |    |  <p><b>Status</b><br/>error in (no error) error out</p>  | Send the Status Updated event to any VI registered to listen to events from the owning module.  |    |    |    |
| Error Reported                 |    |  <p><b>Error</b><br/>Additional Information<br/>error in (no error) error out</p>                            | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string. |    |    |    |
| Module Did Stop                |    |  <p><b>Origin</b><br/>error in (no error) error out</p>  | Send the Module Did Stop event to any VI registered to listen to this module's broadcast events.  |    |    |    |
| Update Module Execution Status |    |  <p><b>Running?</b><br/>error in (no error) error out</p>  | Broadcast event to specify whether or not the module is running.  |    |    |    |
| Button Pressed                 |    |  <p><b>name</b><br/><b>action</b><br/>error in (no error) error out</p>                                      | Broadcasts the pressed button and optional data.  |    |    |    |
| Sub-Control Pressed            |    |  <p><b>Name</b><br/><b>NewVal</b><br/><b>OldVal</b><br/>error in (no error) error out</p>                   | Broadcast the pressed sub-control and data related to the sub-control.  |    |    |    |
| System Message                 |  |  <p><b>Sys. Msg. Source</b><br/><b>Identifier</b><br/><b>Payload</b><br/>error in (no error) error out</p> | Sends a HSE-generic broadcast message, consisting of an Identifier, a variant Payload and Source information.   |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.2.2. MODULE RELATIONSHIP

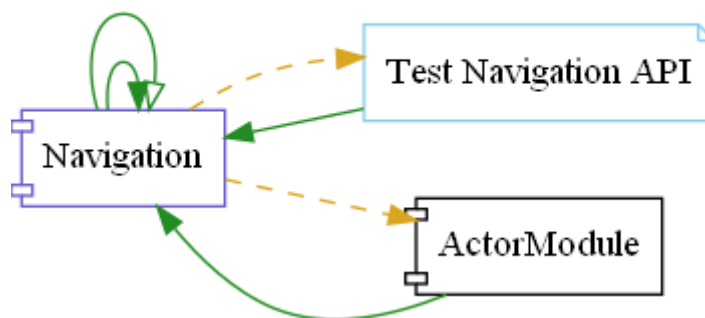


Table 9. Requests callers

| Request Name                | Callers  |
|-----------------------------|--|
| Configure                   | Test Navigation API.vi   |
| Get Module Execution Status | Navigation.lvlib:Obtain Broadcast Events for Registration.vi<br>Navigation.lvlib:Start Module.vi |
| Hide Panel                  | Test Navigation API.vi   |
| Prepare                     | Test Navigation API.vi   |
| Select Listbox Element      | Test Navigation API.vi   |
| Set Disabled State          | Test Navigation API.vi   |
| Set Visibility              | Test Navigation API.vi   |
| Show Diagram                | Test Navigation API.vi   |
| Show Panel                  | Test Navigation API.vi   |
| Update Navigation           | ActorModule.lvlib:Main.vi  |

Table 10. Broadcasts Listeners

| Broadcast Name                 | Listeners   |
|--------------------------------|---|
| Button Pressed                 | Test Navigation API.vi                              |
| Error Reported                 | Test Navigation API.vi                              |
| Module Did Init                | Test Navigation API.vi                              |
| Module Did Stop                | Test Navigation API.vi                              |
| Status Updated                 | Test Navigation API.vi                              |
| Sub-Control Pressed            | Test Navigation API.vi<br>ActorModule.lvlib:Main.vi |
| System Message                 | Test Navigation API.vi                              |
| Update Module Execution Status | Test Navigation API.vi                              |

Table 11. Used requests

| Module           | Requests       |
|------------------|----------------|
| Navigation.lvlib | Stop Module.vi |

Table 12. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.2.3. MODULE START/STOP CALLS

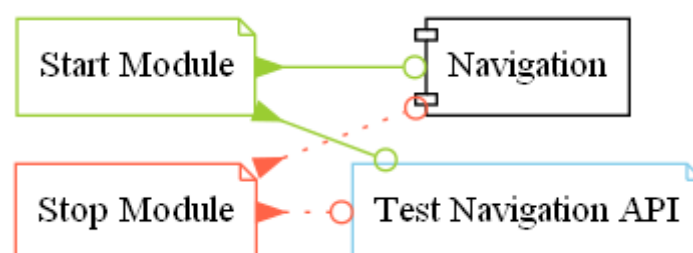


Table 13. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | Navigation.lvlib:Load Module.vi<br>Test Navigation API.vi |
| Stop Module  | Navigation.lvlib:Handle Exit.vi<br>Test Navigation API.vi |

## A.2.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module Navigation.lvlib use the following custom errors:

Table 14. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

## A.3. UI MANAGER.LVLIB


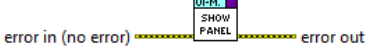

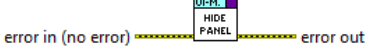

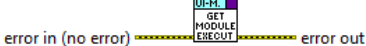

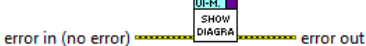

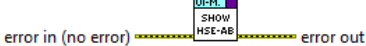

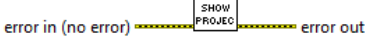

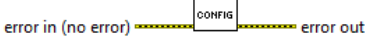

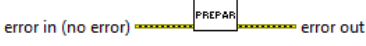

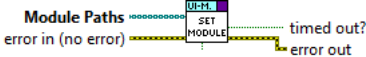

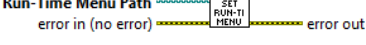

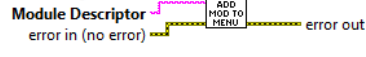


**Type:** Singleton

**Responsibility:** No description found (add content in DQMH module lvlib description)


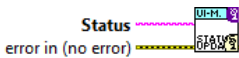

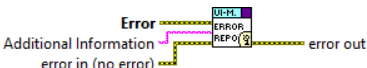

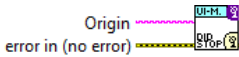

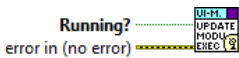

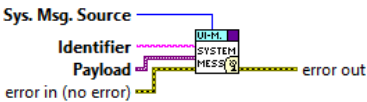

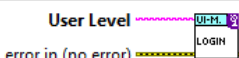

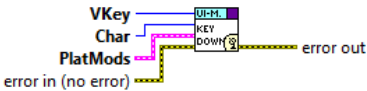
### A.3.1. EVENT LIST


Table 15. Events

| Name         | Type | Connector pane | Description   | S. | R. | I. |
|--------------|------|----------------|---|----|----|----|
| Start Module |      |                | Launches the Module Main.vi.  |    |    |    |
| Stop Module  |      |                | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |

| Name                             | Type  | Connector pane  | Description   | S. | R. | I. |
|----------------------------------|---|---|---|----|----|----|
| Show Panel                       |    |    | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                       |    |    | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status      |    |    | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                     |    |    | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc). |    |    |    |
| Show HSE-ABOUT                   |    |    | Shows the About window of Hampel Software Engineering   |    |    |    |
| Show PROJECT-ABOUT               |    |    | Shows the About window of this application  |    |    |    |
| Configure                        |    |   | Triggers the auto-configuration of the module.  |    |    |    |
| Prepare                          |  |  | Prepares the module for displaying its front panel  |    |    |    |
| Set Modules                      |  |  | Lets UI know which modules are loaded so it can register for broadcast events   |    |    |    |
| Set Run-Time Menu                |  |  | Loads the Run-Time Menu set in <b>Run-Time Menu Path</b>  |    |    |    |
| Add Module to Run-Time Menu      |  |  | Add module options (show in subpanel, open window, show BD) to the Run-Time Menu  |    |    |    |
| Remove Module from Run-Time Menu |  |  | Removes all run-time menu entries for the given module  |    |    |    |

| Name                         | Type | Connector pane | Description  | S. | R. | I. |
|------------------------------|------|----------------|--|----|----|----|
| Display another Module UI    | →    |                | <p>&lt;b&gt;Note&lt;/b&gt;: This VI was renamed by the DQMH Rename Event utility. Make sure the VI Description is updated to reflect the new event name, then delete this comment.</p> <p>&lt;b&gt;Note&lt;/b&gt;: This VI was renamed by the DQMH Rename Event utility. Make sure the VI Description is updated to reflect the new event name, then delete this comment.</p> <p>Requests another module to display its UI in the given &lt;b&gt;Display Scenario&lt;/b&gt;: The "Stand-Alone" scenario asks the module to open its front panel as a new windows. The "Managed" scenario asks the module to broadcast a request for display which the UI Manager then processes, showing the module in its subpanel.</p> |    |    |    |
| Update Status Bar            | →    |                | Prints a message to the status bar   |    |    |    |
| Trigger System Message       | →    |                | Manually triggers a System Message broadcast event   |    |    |    |
| Set Run-Time Menu Visibility | →    |                | Sets the Visibility of the Run-Time Menu. Setting <b>Visible?</b> to true shows the menu, while setting it to false hides it.  |    |    |    |
| Set Window Closeable State   | →    |                | Sets the closeable state of the window. Setting <b>Closeable?</b> to true enables the close button in the title bar, while setting it to false disables it.  |    |    |    |
| Shutdown Application         | →    |                | Tell the UI Manager to initiate the application shutdown sequence. Optionally show a confirmation dialog.  |    |    |    |
| Set CLI Arguments            | →    |                | <p>&lt;b&gt;Note&lt;/b&gt;: This VI was renamed by the DQMH Rename Event utility. Make sure the VI Description is updated to reflect the new event name, then delete this comment.</p> <p>requests the UI Manager to broadcast the arguments via System Message</p>  |    |    |    |
| Get CLI Arguments            | →    |                | requests the UI Manager to provide the CLI Arguments   |    |    |    |
| Register for Module Events   | →    |                | Registers for the default module events  |    |    |    |
| Module Did Init              | →    |                | No description found (add content in vi description)   |    |    |    |

| Name                           | Type  | Connector pane  | Description   | S. | R. | I. |
|--------------------------------|---|---|---|----|----|----|
| Status Updated                 |    |    | No description found (add content in vi description)  |    |    |    |
| Error Reported                 |    |    | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string.   |    |    |    |
| Module Did Stop                |    |    | No description found (add content in vi description)  |    |    |    |
| Update Module Execution Status |    |    | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to have a broadcast event glyph overlay on its icon.  |    |    |    |
| System Message                 |    |    | Sends a HSE-generic broadcast message, consisting of an Identifier, a variant Payload and Source information.<br><br><b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to have a broadcast event glyph overlay on its icon. |    |    |    |
| Login                          |  |  | No description found (add content in vi description)  |    |    |    |
| Key down                       |  |  | Forwards certain key down events via broadcast to allow other modules to react to those   |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

### A.3.2. MODULE RELATIONSHIP

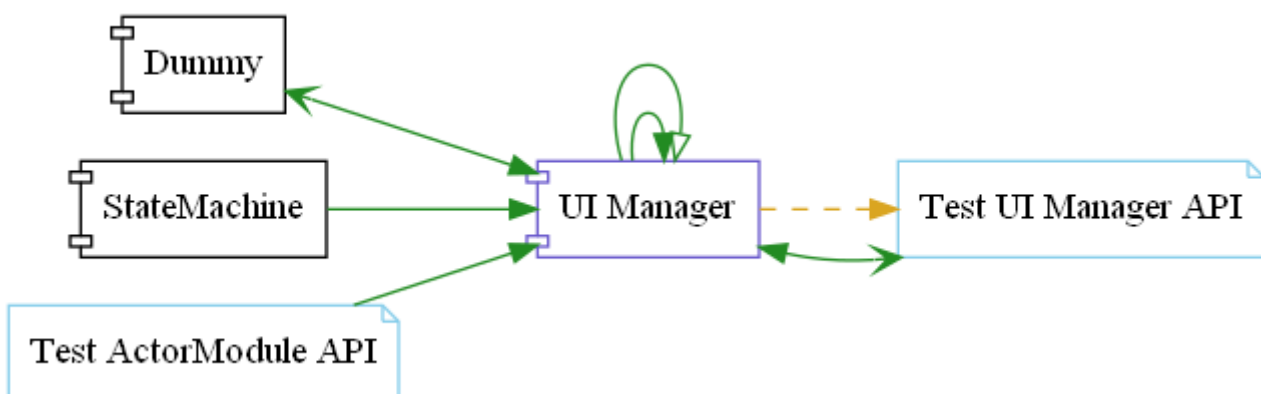


Table 16. Requests callers

| Request Name                     | Callers  |
|----------------------------------|--|
| Add Module to Run-Time Menu      | Test UI Manager API.vi   |
| Configure                        | Test UI Manager API.vi   |
| Display another Module UI        |  |
| Get CLI Arguments                | Dummy.lvlib:Main.vi<br>Test UI Manager API.vi  |
| Get Module Execution Status      | UI Manager.lvlib:Obtain Broadcast Events for Registration.vi<br>UI Manager.lvlib:Start Module.vi |
| Hide Panel                       | Test UI Manager API.vi   |
| Prepare                          | Test UI Manager API.vi   |
| Register for Module Events       | UI Manager.lvlib:Register Modules in UI Manager—helper.vi  |
| Remove Module from Run-Time Menu | Test UI Manager API.vi   |
| Set CLI Arguments                | Test UI Manager API.vi   |
| Set Modules                      | Test UI Manager API.vi   |
| Set Run-Time Menu Visibility     | Dummy.lvlib:Main.vi<br>Test UI Manager API.vi  |
| Set Run-Time Menu                | Test UI Manager API.vi   |
| Set Window Closeable State       | Dummy.lvlib:Main.vi<br>StateMachine.lvlib:Main.vi<br>Test UI Manager API.vi                      |
| Show Diagram                     | Test UI Manager API.vi   |
| Show HSE-ABOUT                   | Test UI Manager API.vi   |
| Show PROJECT-ABOUT               | Test UI Manager API.vi   |
| Show Panel                       | Test UI Manager API.vi   |
| Shutdown Application             | StateMachine.lvlib:Main.vi<br>Test UI Manager API.vi   |
| Trigger System Message           | Test ActorModule API.vi<br>Test UI Manager API.vi  |
| Update Status Bar                |  |

Table 17. Broadcasts Listeners

| Broadcast Name  | Listeners              |
|-----------------|------------------------|
| Error Reported  | Test UI Manager API.vi |
| Key down        |                        |
| Login           | Test UI Manager API.vi |
| Module Did Init | Test UI Manager API.vi |
| Module Did Stop | Test UI Manager API.vi |
| Status Updated  | Test UI Manager API.vi |
| System Message  | Test UI Manager API.vi |

| Broadcast Name                 | Listeners              |
|--------------------------------|------------------------|
| Update Module Execution Status | Test UI Manager API.vi |

Table 18. Used requests

| Module           | Requests  |
|------------------|---|
| UI Manager.lvlib | Register for Module Events.vi<br>Stop Module.vi |

Table 19. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.3.3. MODULE START/STOP CALLS

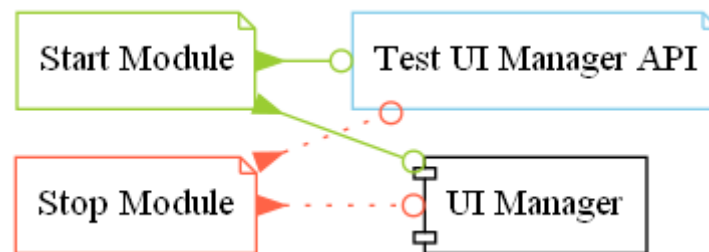


Table 20. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | Test UI Manager API.vi<br>UI Manager.lvlib:Load Module.vi |
| Stop Module  | Test UI Manager API.vi<br>UI Manager.lvlib:Handle Exit.vi |

### A.3.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module UI Manager.lvlib use the following custom errors:

Table 21. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

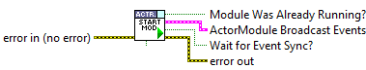
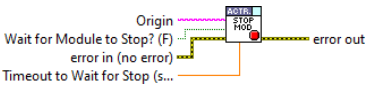


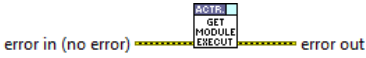





## A.4. ACTORMODULE.LVLIB


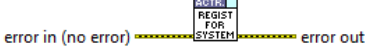

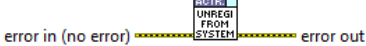

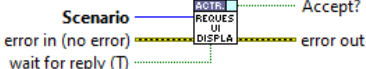

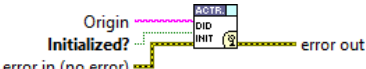

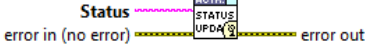

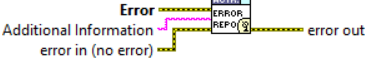



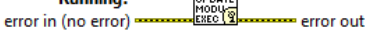

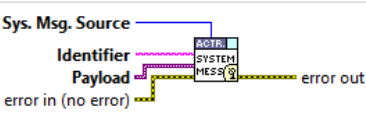
**Type:** Singleton

**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.4.1. EVENT LIST

Table 22. Events

| Name                        | Type | Connector pane  | Description   | S. | R. | I. |
|-----------------------------|------|---|---|----|----|----|
| Start Module                |      |    | Launches the Module Main.vi.  |    |    |    |
| Stop Module                 |      |    | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |
| Show Panel                  | ➡    |  | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                  | ➡    |  | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status | ➡    |  | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                | ➡    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).   |    |    |    |
| Prepare                     | ➡    |  | Prepare (the UI of the) module for display  |    |    |    |
| Configure                   | ➡    |  | Triggers the auto-configuration of the module   |    |    |    |
| Enable Actor                | ➡    |  | Activates the helper loop timeout structure   |    |    |    |
| Disable Actor               | ➡    |  | Stops the timeout polling of the helper loop  |    |    |    |

| Name                            | Type  | Connector pane  | Description  | S. | R. | I. |
|---------------------------------|---|---|--|----|----|----|
| Register for System Messages    |    |    | Registers for other modules' System Message broadcast events   |    |    |    |
| Unregister from System Messages |    |    | Unregisters from other modules' System Message broadcast events  |    |    |    |
| Request UI Display              |    |    | Requests the module to display its UI as specified in <b>Scenario</b>: "managed" => in the UI Manager's subpanel "stand-alone" => as a separate window   |    |    |    |
| Module Did Init                 |    |    | Send the Module Did Init event to any VI registered to listen to this module's broadcast events.   |    |    |    |
| Status Updated                  |    |    | Send the Status Updated event to any VI registered to listen to events from the owning module.   |    |    |    |
| Error Reported                  |    |    | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string.  |    |    |    |
| Module Did Stop                 |  |  | Send the Module Did Stop event to any VI registered to listen to this module's broadcast events.   |    |    |    |
| Update Module Execution Status  |  |  | Broadcast event to specify whether or not the module is running.   |    |    |    |
| System Message                  |  |  | <p>Broadcasts a "System Message" consisting of an Identifier (string), a Payload (variant) and a Source (enum).</p> <p>&lt;b&gt;Source&lt;/b&gt; values are: - "module": A broadcast from within a module itself - "application": A broadcast generated from outside a module - "network": A broadcast sent/received via network</p> |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.4.2. MODULE RELATIONSHIP

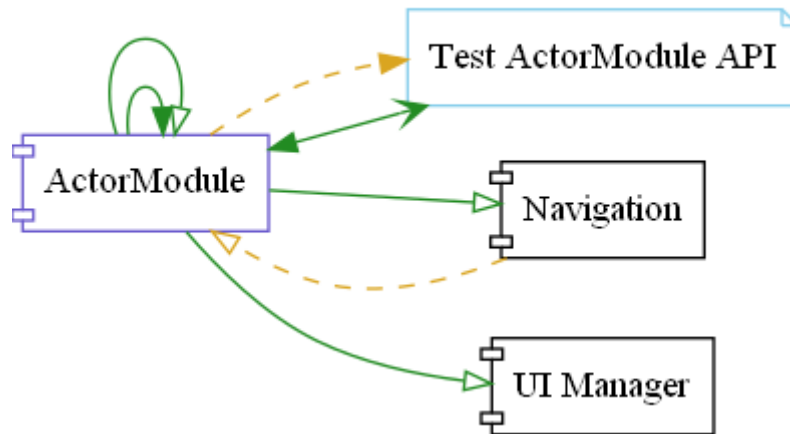


Table 23. Requests callers

| Request Name                    | Callers  |
|---------------------------------|--|
| Configure                       | Test ActorModule API.vi  |
| Disable Actor                   | ActorModule.lvlib:Main.vi<br>Test ActorModule API.vi   |
| Enable Actor                    | ActorModule.lvlib:Main.vi<br>Test ActorModule API.vi   |
| Get Module Execution Status     | ActorModule.lvlib:Obtain Broadcast Events for Registration.vi<br>ActorModule.lvlib:Start Module.vi |
| Hide Panel                      | Test ActorModule API.vi  |
| Prepare                         | Test ActorModule API.vi  |
| Register for System Messages    | ActorModule.lvlib:Main.vi<br>Test ActorModule API.vi   |
| Request UI Display              | Test ActorModule API.vi  |
| Show Diagram                    | Test ActorModule API.vi  |
| Show Panel                      | Test ActorModule API.vi  |
| Unregister from System Messages | ActorModule.lvlib:Main.vi<br>Test ActorModule API.vi   |

Table 24. Broadcasts Listeners

| Broadcast Name                 | Listeners               |
|--------------------------------|-------------------------|
| Error Reported                 | Test ActorModule API.vi |
| Module Did Init                | Test ActorModule API.vi |
| Module Did Stop                | Test ActorModule API.vi |
| Status Updated                 | Test ActorModule API.vi |
| System Message                 | Test ActorModule API.vi |
| Update Module Execution Status | Test ActorModule API.vi |

Table 25. Used requests

| Module            | Requests   |
|-------------------|--|
| ActorModule.lvlib | Disable Actor.vi<br>Enable Actor.vi<br>Register for System Messages.vi<br>Stop Module.vi<br>Unregister from System Messages.vi |
| Navigation.lvlib  | Get Module Execution Status.vi<br>Update Navigation.vi   |
| UI Manager.lvlib  | Get Module Execution Status.vi   |

Table 26. Registered broadcast

| Module           | Broadcasts             |
|------------------|------------------------|
| Navigation.lvlib | Sub-Control Pressed.vi |

### A.4.3. MODULE START/STOP CALLS

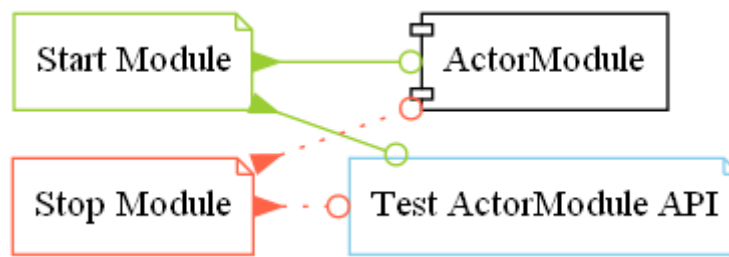


Table 27. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | ActorModule.lvlib:Load Module.vi<br>Test ActorModule API.vi |
| Stop Module  | ActorModule.lvlib:Handle Exit.vi<br>Test ActorModule API.vi |

### A.4.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module ActorModule.lvlib use the following custom errors:

Table 28. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

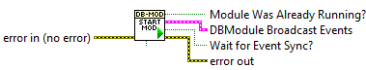
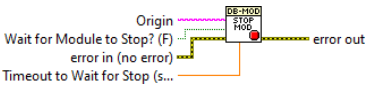
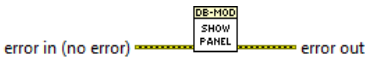

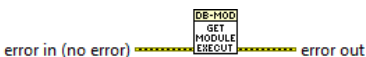

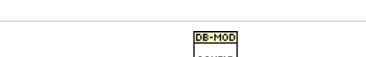
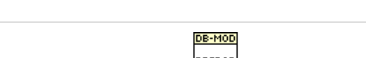
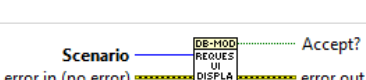
## A.5. DBMODULE.LVLIB


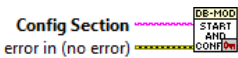

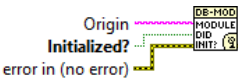

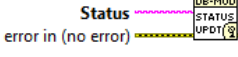

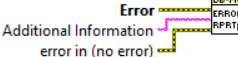

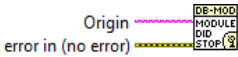

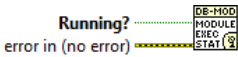

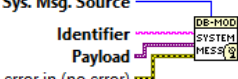
**Type:** Singleton

**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.5.1. EVENT LIST

Table 29. Events

| Name                        | Type | Connector pane  | Description   | S. | R. | I. |
|-----------------------------|------|---|---|----|----|----|
| Start Module                |      |    | Launches the Module Main.vi.  |    |    |    |
| Stop Module                 |      |    | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |
| Show Panel                  | ➡    |  | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                  | ➡    |  | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status | ➡    |  | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                | ➡    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).   |    |    |    |
| Configure                   | ➡    |  | Triggers the auto-configuration of the module.  |    |    |    |
| Prepare                     | ➡    |  | Prepare (the UI of the) module for display.   |    |    |    |
| Request UI Display          | ➡    |  | Requests the module to display its UI as specified in <b>Scenario</b> : "managed" => in the UI Manager's subpanel "stand-alone" => as a separate window   |    |    |    |

| Name                             | Type  | Connector pane  | Description   | S. | R. | I. |
|----------------------------------|---|---|---|----|----|----|
| Start and Configure DB_Connector |    | <b>Config Section</b><br>  | starts and configures the DB_Connector Module   |    |    |    |
| Module Did Init                  |    | <b>Origin</b><br><b>Initialized?</b><br>                             | Send the Module Did Init event to any VI registered to listen to this module's broadcast events.  |    |    |    |
| Status Updated                   |    | <b>Status</b><br>  | Send the Status Updated event to any VI registered to listen to events from the owning module.  |    |    |    |
| Error Reported                   |    | <b>Error</b><br>Additional Information<br>                           | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string. |    |    |    |
| Module Did Stop                  |    | <b>Origin</b><br>  | Send the Module Did Stop event to any VI registered to listen to this module's broadcast events.  |    |    |    |
| Update Module Execution Status   |    | <b>Running?</b><br>  | Broadcast event to specify whether or not the module is running.  |    |    |    |
| System Message                   |  | <b>Sys. Msg. Source</b><br><b>Identifier</b><br><b>Payload</b><br> | Broadcast a system generic message.   |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.5.2. MODULE RELATIONSHIP

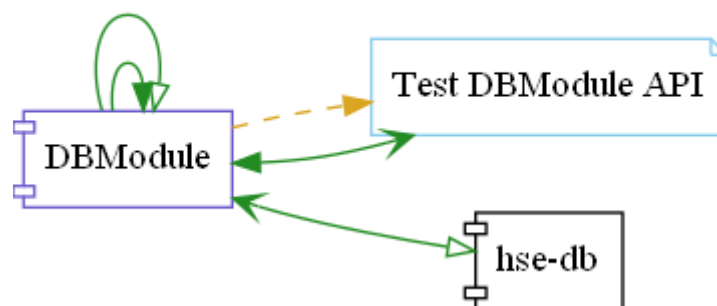


Table 30. Requests callers

| Request Name                     | Callers  |
|----------------------------------|--|
| Configure                        | Test DBModule API.vi   |
| Get Module Execution Status      | DBModule.lvlib:Obtain Broadcast Events for Registration.vi<br>DBModule.lvlib:Start Module.vi |
| Hide Panel                       | Test DBModule API.vi   |
| Prepare                          | Test DBModule API.vi   |
| Request UI Display               | Test DBModule API.vi   |
| Show Diagram                     | Test DBModule API.vi   |
| Show Panel                       | Test DBModule API.vi   |
| Start and Configure DB_Connector | DBModule.lvlib:Main.vi   |

Table 31. Broadcasts Listeners

| Broadcast Name                 | Listeners            |
|--------------------------------|----------------------|
| Error Reported                 | Test DBModule API.vi |
| Module Did Init                | Test DBModule API.vi |
| Module Did Stop                | Test DBModule API.vi |
| Status Updated                 | Test DBModule API.vi |
| System Message                 | Test DBModule API.vi |
| Update Module Execution Status | Test DBModule API.vi |

Table 32. Used requests

| Module         | Requests   |
|----------------|--|
| DBModule.lvlib | Start and Configure DB_Connector.vi<br>Stop Module.vi  |
| hse-db.lvlib   | DB_CONNECTOR.lvlib:Configure.vi<br>DB_CONNECTOR.lvlib:Get DB-Type.vi<br>DB_CONNECTOR.lvlib:Query.vi (3)<br>DB_CONNECTOR.lvlib:Stop Module.vi |

Table 33. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.5.3. MODULE START/STOP CALLS

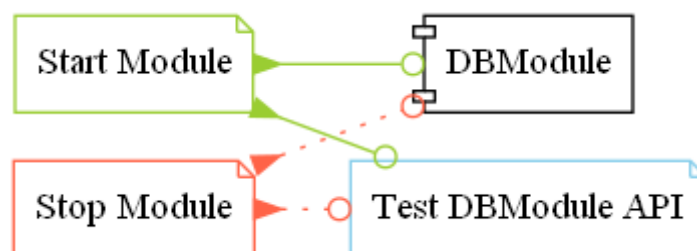


Table 34. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | DBModule.lvlib:Load Module.vi<br>Test DBModule API.vi |
| Stop Module  | DBModule.lvlib:Handle Exit.vi<br>Test DBModule API.vi |

## A.5.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module DBModule.lvlib use the following custom errors:

Table 35. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

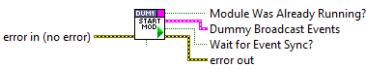
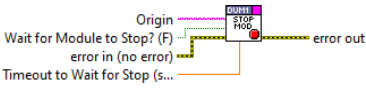
## A.6. DUMMY.LVLIB

**Type:** Singleton

**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.6.1. EVENT LIST


Table 36. Events

| Name         | Type | Connector pane  | Description   | S. | R. | I. |
|--------------|------|---|---|----|----|----|
| Start Module |      |  | Launches the Module Main.vi.  |    |    |    |
| Stop Module  |      |  | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |

| Name                           | Type | Connector pane  | Description   | S. | R. | I. |
|--------------------------------|------|---|---|----|----|----|
| Show Panel                     | ➡    |  error in (no error) error out   | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                     | ➡    |  error in (no error) error out   | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status    | ➡    |  error in (no error) error out   | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                   | ➡    |  error in (no error) error out   | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).                   |    |    |    |
| Configure                      | ➡    |  error in (no error) error out   | Self-configuration (triggered automatically from main.vi)   |    |    |    |
| Prepare                        | ➡    |  error in (no error) error out   | Prepare (the UI of the) module for display  |    |    |    |
| Register for UI Login          | ➡    |  error in (no error) error out   | Registers for the UI module's "Login" broadcast event   |    |    |    |
| Request UI Display             | ↻    |  error in (no error) error out | Requests the module to display its UI as specified in <b>Scenario</b>: "managed" => in the UI Manager's subpanel "stand-alone" => as a separate window  |    |    |    |
| Module Did Init                | ↻    |  error in (no error) error out | No description found (add content in vi description)  |    |    |    |
| Status Updated                 | ↻    |  error in (no error) error out | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to have a broadcast event glyph overlay on its icon.                          |    |    |    |
| Error Reported                 | ↻    |  error in (no error) error out | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string. |    |    |    |
| Module Did Stop                | ↻    |  error in (no error) error out | No description found (add content in vi description)  |    |    |    |
| Update Module Execution Status | ↻    |  error in (no error) error out | No description found (add content in vi description)  |    |    |    |
| System Message                 | ↻    |  error in (no error) error out | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to have a broadcast event glyph overlay on its icon.                          |    |    |    |

**Type:** ➡ → Request | ↻ → Request and Wait for Reply | ↻ → Broadcast

**Scope:** 🔑 → Protected | 🔑 → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## A.6.2. MODULE RELATIONSHIP

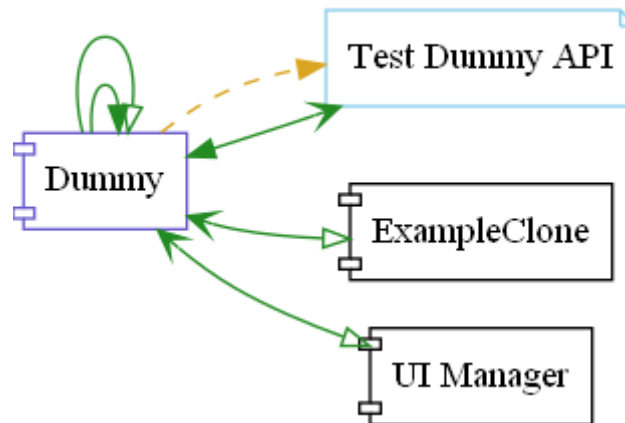


Table 37. Requests callers

| Request Name                | Callers  |
|-----------------------------|--|
| Configure                   | Test Dummy API.vi  |
| Get Module Execution Status | Dummy.lvlib:Obtain Broadcast Events for Registration.vi<br>Dummy.lvlib:Start Module.vi |
| Hide Panel                  | Test Dummy API.vi  |
| Prepare                     | Test Dummy API.vi  |
| Register for UI Login       |  |
| Request UI Display          | Test Dummy API.vi  |
| Show Diagram                | Test Dummy API.vi  |
| Show Panel                  | Test Dummy API.vi  |

Table 38. Broadcasts Listeners

| Broadcast Name                 | Listeners         |
|--------------------------------|-------------------|
| Error Reported                 | Test Dummy API.vi |
| Module Did Init                | Test Dummy API.vi |
| Module Did Stop                | Test Dummy API.vi |
| Status Updated                 | Test Dummy API.vi |
| System Message                 | Test Dummy API.vi |
| Update Module Execution Status | Test Dummy API.vi |

Table 39. Used requests

| Module      | Requests       |
|-------------|----------------|
| Dummy.lvlib | Stop Module.vi |

| Module             | Requests   |
|--------------------|--|
| ExampleClone.lvlib | Configure.vi<br>ExampleMessage.vi<br>Request UI Display.vi<br>Show Diagram.vi<br>Stop Module.vi (2)                                |
| UI Manager.lvlib   | Get CLI Arguments.vi<br>Get Module Execution Status.vi<br>Set Run-Time Menu Visibility.vi (2)<br>Set Window Closeable State.vi (2) |

Table 40. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.6.3. MODULE START/STOP CALLS

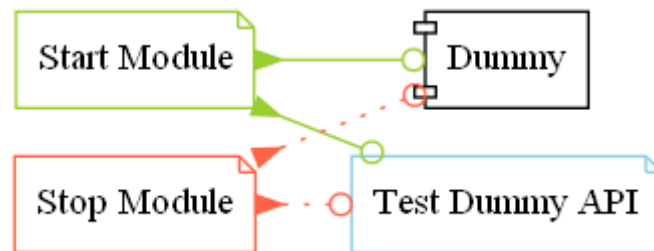


Table 41. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | Dummy.lvlib:Load Module.vi<br>Test Dummy API.vi |
| Stop Module  | Dummy.lvlib:Handle Exit.vi<br>Test Dummy API.vi |

### A.6.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module Dummy.lvlib use the following custom errors:

Table 42. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

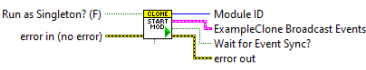
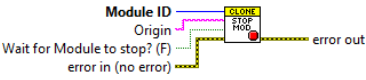
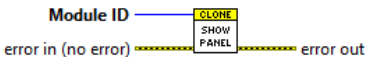
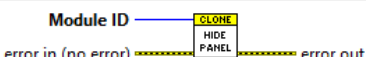
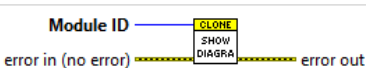
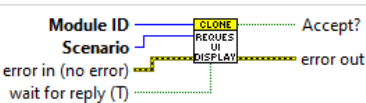
## A.7. EXAMPLECLONE.LVLIB


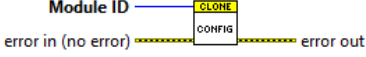

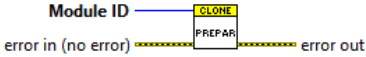

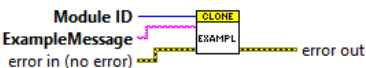

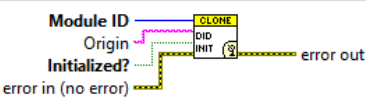

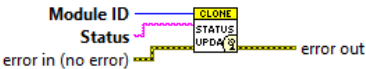

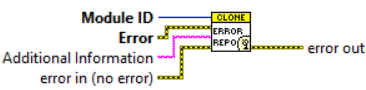

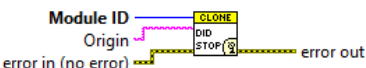

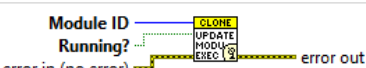

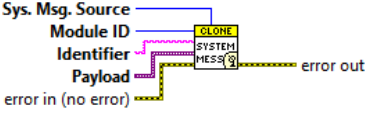
**Type:** Cloneable

**Responsibility:** No description found (add content in DQMH module lvlib description)

### A.7.1. EVENT LIST


Table 43. Events

| Name               | Type | Connector pane  | Description  | S. | R. | I. |
|--------------------|------|---|--|----|----|----|
| Start Module       |      |    | Launches the Module Main.vi.   |    |    |    |
| Stop Module        |      |    | <p>Send the Stop request to the Module's Main.vi. If <b>Wait for Module to stop?</b> is TRUE, then this VI will not complete execution until the Module Main VI has stopped running.</p> <p><b>Note:</b> If the cloneable module is running as singleton, then the 'Wait for Module to stop?' input is ignored... this VI will <b>always</b> wait until a cloneable Main VI running as singleton has stopped running.</p> <p><b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to upgrade it to the DQMH 6.0 approach to poll the execution state of a cloneable module running as singleton to know when the module has gone idle.</p> <p><b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to upgrade it to the DQMH 5.0 approach to destroying cloneable module event references.</p> |    |    |    |
| Show Panel         | →    |  | Send the Show Panel request to the Module's Main.vi.   |    |    |    |
| Hide Panel         | →    |  | Send the Hide Panel request to the Module's Main.vi.   |    |    |    |
| Show Diagram       | →    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).  |    |    |    |
| Request UI Display | →    |  | Requests another module to display its UI in the given <b>Display Scenario</b> : The "Stand-Alone" scenario asks the module to open its front panel as a new windows. The "Managed" scenario asks the module to broadcast a request for display which the UI Manager then processes, showing the module in its subpanel.   |    |    |    |

| Name                           | Type  | Connector pane  | Description   | S. | R. | I. |
|--------------------------------|---|---|---|----|----|----|
| Configure                      |    |    | Triggers the auto-configuration of the module   |    |    |    |
| Prepare                        |    |    | Prepares the module UI (front panel) for display  |    |    |    |
| ExampleMessage                 |    |    | Send a message to the module that is displayed on its front panel   |    |    |    |
| Module Did Init                |    |    | No description found (add content in vi description)  |    |    |    |
| Status Updated                 |    |    | No description found (add content in vi description)  |    |    |    |
| Error Reported                 |    |    | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string. |    |    |    |
| Module Did Stop                |  |  | No description found (add content in vi description)  |    |    |    |
| Update Module Execution Status |  |  | No description found (add content in vi description)  |    |    |    |
| System Message                 |  |  | No description found (add content in vi description)  |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.7.2. MODULE RELATIONSHIP



Table 44. Requests callers

| Request Name       | Callers   |
|--------------------|---|
| Configure          | Dummy.lvlib:Main.vi<br>Test ExampleClone API.vi |
| ExampleMessage     | Dummy.lvlib:Main.vi<br>Test ExampleClone API.vi |
| Hide Panel         | Test ExampleClone API.vi                        |
| Prepare            | Test ExampleClone API.vi                        |
| Request UI Display | Dummy.lvlib:Main.vi<br>Test ExampleClone API.vi |
| Show Diagram       | Dummy.lvlib:Main.vi<br>Test ExampleClone API.vi |
| Show Panel         | Test ExampleClone API.vi                        |

Table 45. Broadcasts Listeners

| Broadcast Name                 | Listeners                |
|--------------------------------|--------------------------|
| Error Reported                 | Test ExampleClone API.vi |
| Module Did Init                | Test ExampleClone API.vi |
| Module Did Stop                | Test ExampleClone API.vi |
| Status Updated                 | Test ExampleClone API.vi |
| System Message                 | Test ExampleClone API.vi |
| Update Module Execution Status | Test ExampleClone API.vi |

Table 46. Used requests

| Module             | Requests       |
|--------------------|----------------|
| ExampleClone.lvlib | Stop Module.vi |

Table 47. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.7.3. MODULE START/STOP CALLS

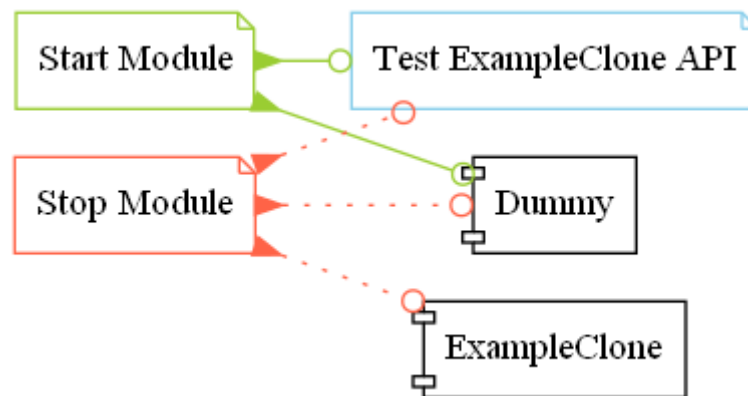


Table 48. Start and Stop module callers

| Function     | Callers  |
|--------------|--|
| Start Module | Dummy.lvlib:Main.vi<br>Test ExampleClone API.vi                                      |
| Stop Module  | Dummy.lvlib:Main.vi<br>ExampleClone.lvlib:Handle Exit.vi<br>Test ExampleClone API.vi |

## A.7.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module ExampleClone.lvlib use the following custom errors:

Table 49. Custom errors

| Name                               | Code   | Description  |
|------------------------------------|--------|--|
| Module Running as Singleton        | 403680 | The "%s" module is currently running as singleton, but the Start Module VI was called with 'Run as Singleton' specified as FALSE.  |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running.  |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.  |
| Module Not Running                 | 403684 | Not a single instance of "%s" Module running.  |
| Module Running as Cloneable        | 403685 | The "%s" module is currently running as cloneable, but the Start Module VI was called with 'Run as Singleton' specified as TRUE.   |
| Request and Wait for Reply Timeout | 403686 | %s   |
| Master Reference Not Closed        | 403687 | The "%s" module cannot be run as singleton because the Master Reference is still open from a prior run as cloneable. If you plan on running this module as both singleton and cloneable, consider changing your Main VI to wire a value of TRUE to the 'Close Master Reference' input of Init Module.vi. |

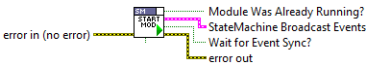
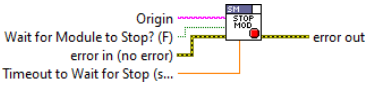


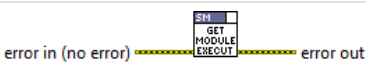




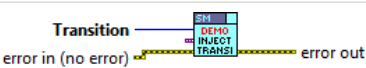
## A.8. STATEMACHINE.LVLIB


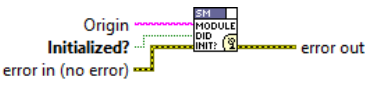

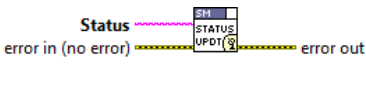

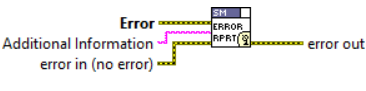

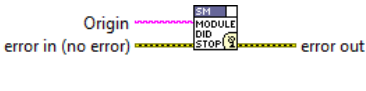

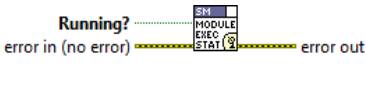

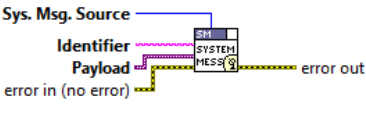

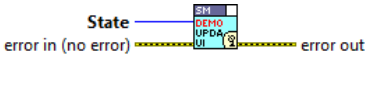


**Type:** Singleton


**Responsibility:** No description found (add content in DQMH module lvlib description)

## A.8.1. EVENT LIST



Table 50. Events

| Name                        | Type | Connector pane  | Description   | S. | R. | I. |
|-----------------------------|------|---|---|----|----|----|
| Start Module                |      |    | Launches the Module Main.vi.  |    |    |    |
| Stop Module                 |      |    | <p>Send the Stop request to the Module's Main.vi.</p> <p>If <b>Wait for Module to Stop?</b> is TRUE, this VI will wait until the module main VI stops, and will timeout at the <b>Timeout to Wait for Stop</b> value. This value defaults to "-1", which means the VI will not timeout, and will always wait until the module main VI stops before completing execution.</p> <p>Note: The <b>Timeout to Wait for Stop</b> value is ignored if 'Wait for Module to Stop?' is set to FALSE.</p> |    |    |    |
| Show Panel                  | →    |  | Send the Show Panel request to the Module's Main.vi.  |    |    |    |
| Hide Panel                  | →    |  | Send the Hide Panel request to the Module's Main.vi.  |    |    |    |
| Get Module Execution Status | →    |  | Fire the Get Module Execution Status request.   |    |    |    |
| Show Diagram                | →    |  | This VI tells the Module to show its block diagram to facilitate troubleshooting (add probes, breakpoints, highlight execution, etc).   |    |    |    |
| Configure                   | →    |  | Triggers the auto-configuration of the module.  |    |    |    |
| Prepare                     | →    |  | Prepares the module for displaying its front panel.   |    |    |    |
| Request UI Display          | →    |  | Requests the module to display its UI as specified in <b>Scenario</b> : "managed" => in the UI Manager's subpanel "stand-alone" => as a separate window   |    |    |    |
| DEMO Inject Transition      | →    |  | <p>Triggers a transition via the public API.</p> <p>This request serves the purpose of testing/show-casing the state machine. By design, transitions should not be triggered from outside the DQMH module (i.e. via the public API)</p>   |    |    |    |

| Name                           | Type  | Connector pane  | Description  | S. | R. | I. |
|--------------------------------|---|---|--|----|----|----|
| Module Did Init                |    |    | Send the Module Did Init event to any VI registered to listen to this module's broadcast events.   |    |    |    |
| Status Updated                 |    |    | Send the Status Updated event to any VI registered to listen to events from the owning module.   |    |    |    |
| Error Reported                 |    |    | <b>Note:</b> This VI was modified by the <b>Validate DQMH Module</b> tool to parse additional information tags out of the incoming error source string.  |    |    |    |
| Module Did Stop                |    |    | Send the Module Did Stop event to any VI registered to listen to this module's broadcast events.   |    |    |    |
| Update Module Execution Status |    |    | Broadcast event to specify whether or not the module is running.   |    |    |    |
| System Message                 |    |   | Broadcasts a "System Message" consisting of an Identifier (string), a Payload (variant) and a Source (enum).<br><br>Source values are: - "module": A broadcast from within a module itself - "application": A broadcast generated from outside a module - "network": A broadcast sent/received via network |    |    |    |
| DEMO Updated UI State          |  |  | Broadcasts whenever the "Update UI State" private request was executed after a state change  |    |    |    |
| Exit EHL                       |  |  | this event will stop the event handling loop   |    |    |    |

**Type:**  → Request |  → Request and Wait for Reply |  → Broadcast

**Scope:**  → Protected |  → Community

**Reentrancy:**  → Preallocated reentrancy |  → Shared reentrancy

**Inlining:**  → Inlined

## A.8.2. MODULE RELATIONSHIP

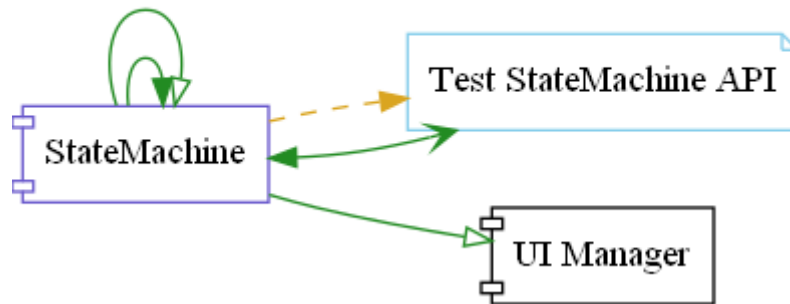


Table 51. Requests callers

| Request Name                | Callers  |
|-----------------------------|--|
| Configure                   | Test StateMachine API.vi   |
| DEMO Inject Transition      | Test StateMachine API.vi   |
| Exit EHL                    | StateMachine.lvlib:Main.vi   |
| Get Module Execution Status | StateMachine.lvlib:Obtain Broadcast Events for Registration.vi<br>StateMachine.lvlib:Start Module.vi |
| Hide Panel                  | Test StateMachine API.vi   |
| Prepare                     | Test StateMachine API.vi   |
| Request UI Display          | Test StateMachine API.vi   |
| Show Diagram                | Test StateMachine API.vi   |
| Show Panel                  | Test StateMachine API.vi   |

Table 52. Broadcasts Listeners

| Broadcast Name                 | Listeners                |
|--------------------------------|--------------------------|
| DEMO Updated UI State          | Test StateMachine API.vi |
| Error Reported                 | Test StateMachine API.vi |
| Module Did Init                | Test StateMachine API.vi |
| Module Did Stop                | Test StateMachine API.vi |
| Status Updated                 | Test StateMachine API.vi |
| System Message                 | Test StateMachine API.vi |
| Update Module Execution Status | Test StateMachine API.vi |

Table 53. Used requests

| Module             | Requests   |
|--------------------|--|
| StateMachine.lvlib | Exit EHL.vi<br>Stop Module.vi                                |
| UI Manager.lvlib   | Set Window Closeable State.vi (2)<br>Shutdown Application.vi |

Table 54. Registered broadcast

| Module | Broadcasts |
|--------|------------|
| ☒—☒    | ☒—☒        |

### A.8.3. MODULE START/STOP CALLS

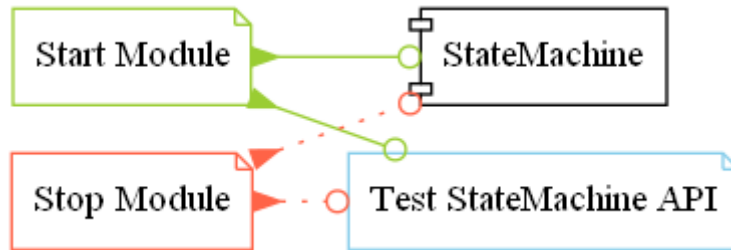


Table 55. Start and Stop module callers

| Function     | Callers   |
|--------------|---|
| Start Module | StateMachine.lvlib:Load Module.vi<br>Test StateMachine API.vi |
| Stop Module  | StateMachine.lvlib:Handle Exit.vi<br>Test StateMachine API.vi |

### A.8.4. MODULE CUSTOM ERRORS



Custom errors are added to the module via vi named `*--error.vi`.

Module StateMachine.lvlib use the following custom errors:

Table 56. Custom errors

| Name                               | Code   | Description   |
|------------------------------------|--------|---|
| Module Not Running                 | 403681 | %s Module is not running.   |
| Module Not Stopped                 | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. |
| Module Not Synced                  | 403683 | %s Module was unable to synchronize events.   |
| Request and Wait for Reply Timeout | 403686 | %s  |

# APPENDIX B: LIBRARIES

Misc. reuse libraries

## B.1. HSE-DB-ADO.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 57. Nested libraries

| Name                | Type    |
|---------------------|---------|
| DB-ADO.lvclass      | LVClass |
| ADO-DB-Driver.lvlib | Library |

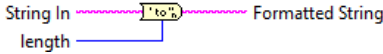
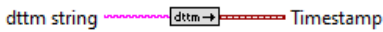
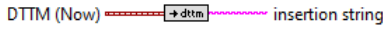


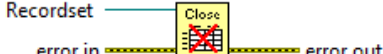
This library has no functions set to non private scope.

## B.2. ADO-DB-DRIVER.LVLIB

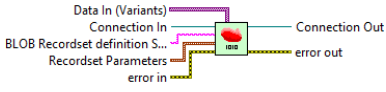
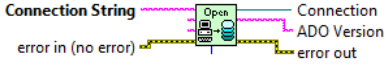
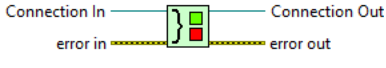
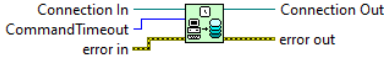
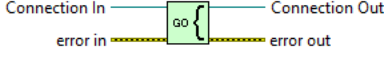
**Responsibility:** ADO-DB driver.


**Version:** 1.0.0.0


Table 58. Functions (non private scope only)

| Name                              | Connector pane  | Description  | S. | R. | I. |
|-----------------------------------|---|--|----|----|----|
| convert " to NULL                 |  | No description found (add content in vi description) |    |    |    |
| Convert from date-first Timestamp |  | No description found (add content in vi description) |    |    |    |
| Convert to date-first Timestamp   |  | No description found (add content in vi description) |    |    |    |
| format floats for database        |  | No description found (add content in vi description) |    |    |    |
| format floats[] for database      |  | No description found (add content in vi description) |    |    |    |
| Close Recordset+                  |  | No description found (add content in vi description) |    |    |    |

| Name                                    | Connector pane  | Description  | S. | R. | I. |
|---|---|--|----|----|----|
| Create New Record in Recordset          |    | No description found (add content in vi description) |    |    |    |
| Open Recordset+                         |    | No description found (add content in vi description) |    |    |    |
| parse field names from SELECT statement |    | No description found (add content in vi description) |    |    |    |
| Read Recordset (DBVIEW)                 |    | No description found (add content in vi description) |    |    |    |
| Read Recordset (DOUBLE)                 |    | No description found (add content in vi description) |    |    |    |
| Read Recordset (STRING)                 |  | No description found (add content in vi description) |    |    |    |
| Read Recordset (VARIANT)                |  | No description found (add content in vi description) |    |    |    |
| SQLSTATE Lookup                         |  | No description found (add content in vi description) |    |    |    |
| _Database Driver Catalog                |  | No description found (add content in vi description) |    |    |    |
| Close Connection+                       |  | No description found (add content in vi description) |    |    |    |
| Create and Read Recordset               |  | No description found (add content in vi description) |    |    |    |
| Execute SQL Command (no data returned)  |  | No description found (add content in vi description) |    |    |    |
| Get Database Errors                     |  | No description found (add content in vi description) |    |    |    |
| Get Table Info                          |  | No description found (add content in vi description) |    |    |    |

| Name                          | Connector pane  | Description  | S. | R. | I. |
|-------------------------------|---|--|----|----|----|
| Insert BLOB data              |  | No description found (add content in vi description) |    |    |    |
| Open Connection+              |  | No description found (add content in vi description) |    |    |    |
| Rollback Transaction on Error |  | No description found (add content in vi description) |    |    |    |
| Set Command Timeout           |  | No description found (add content in vi description) |    |    |    |
| Start Transaction             |  | No description found (add content in vi description) |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.3. HSE-DB-MYSQL.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 59. Nested libraries

| Name              | Type    |
|-------------------|---------|
| DB-MySQL.lvclass  | LVClass |
| MySQL (TCP).lvlib | Library |

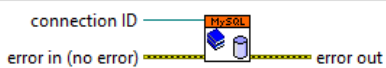

This library has no functions set to non private scope.

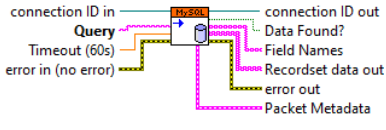

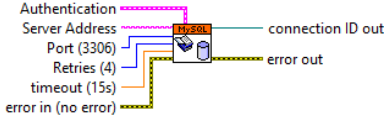

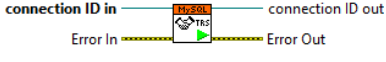

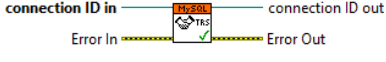

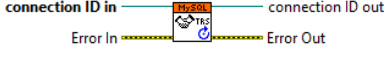



## B.4. MYSQL (TCP).LVLIB

**Responsibility:** No description found (add content in lvlib description)



**Version:** 1.0.0.0

Table 60. Functions (non private scope only)

| Name             | Connector pane  | Description  | S. | R.  | I. |
|------------------|---|--|----|---|----|
| Close Connection |  | No description found (add content in vi description) |    |  |    |

| Name                 | Connector pane  | Description  | S. | R.  | I. |
|----------------------|---|--|----|---|----|
| Execute              |  | No description found (add content in vi description) |    |  |    |
| Open Connection      |  | No description found (add content in vi description) |    |  |    |
| Begin Transaction    |  | No description found (add content in vi description) |    |  |    |
| Commit Transaction   |  | No description found (add content in vi description) |    |  |    |
| Rollback Transaction |  | No description found (add content in vi description) |    |  |    |
| Validate Connection  |  | No description found (add content in vi description) |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.5. HSE-DB-SQLITE.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 61. Nested libraries

| Name              | Type    |
|-------------------|---------|
| DB-SQLite.lvclass | LVClass |

This library has no functions set to non private scope.

## B.6. HSE-DB.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 62. Nested libraries



| Name                 | Type    |
|----------------------|---------|
| DB-Interface.lvclass | LVClass |

| Name                            | Type    |
|---------------------------------|---------|
| [DB_CONNECTOR.lvlib]            | Library |
| [VI Reference Management.lvlib] | Library |
| [Clone Registration.lvlib]      | Library |

Table 63. Functions (non private scope only)

| Name                        | Connector pane  | Description              | S. | R. | I. |
|-----------------------------|---|--------------------------|----|----|----|
| Test<br>DB_CONNECTOR<br>API |  | DB_CONNECTOR API Tester. |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.7. HSE-CONFIG.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 64. Nested libraries

| Name                  | Type    |
|-----------------------|---------|
| [config-base.lvclass] | LVClass |
| [config-ini.lvclass]  | LVClass |

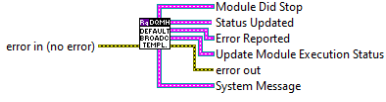
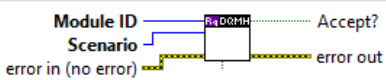
This library has no functions set to non private scope.

## B.8. HSE-DQMH-DYNAMICREQUESTERS.LVLIB

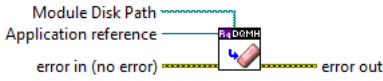
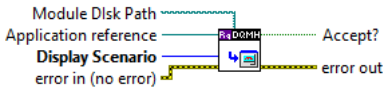
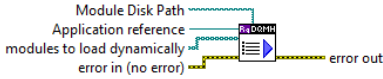
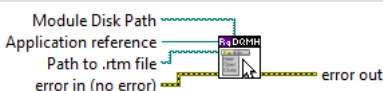
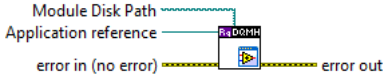
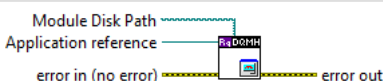
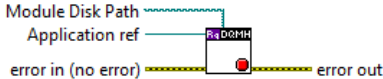
**Responsibility:** No description found (add content in lvlib description)


**Version:** 1.0.0.0



Table 65. Functions (non private scope only)

| Name   | Connector pane  | Description  | S. | R. | I. |
|--|---|--|----|----|----|
| Default<br>Broadcast<br>(Cloneable)--<br>template  |  |  |    |    |    |
| Request UI<br>Display<br>(Cloneable)--<br>template |  | No description found (add content in vi description) |    |    |    |

| Name   | Connector pane  | Description  | S. | R. | I. |
|--|---|--|----|----|----|
| Show Diagram (Cloneable)--template               |    | No description found (add content in vi description)   |    |    |    |
| DQMH Configure (Cloneable)                       |    | Calls the "Configure" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Obtain Default Broadcast Events (Cloneable) |    | Calls the "Obtain Default Broadcast Events" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Prepare (Cloneable)                         |    | Calls the "Prepare" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Request UI Display (Cloneable)              |    | Calls the "Request UI Display" request VI of the module in <b>Path to module directory</b>. Hands over the <b>Module ID</b> and the <b>Display Scenario</b>. |    |    |    |
| DQMH Show Diagram (Cloneable)                    |   | Calls the "Request UI Display" request VI of the module in <b>Path to module directory</b>. Hands over the <b>Module ID</b> and the <b>Display Scenario</b>. |    |    |    |
| Default Broadcast—template                       |  |  |    |    |    |
| Request UI Display—template                      |  | No description found (add content in vi description)   |    |    |    |
| Set Modules—template                             |  | No description found (add content in vi description)   |    |    |    |
| DQMH Configure                                   |  | Calls the "Configure" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Load API Tester                             |  | Calls the "Load Module" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Load Module                                 |  | Calls the "Load Module" request VI of the module in <b>path</b>  |    |    |    |
| DQMH Obtain Default Broadcast Events             |  | Calls the "Obtain Default Broadcast Events" request VI of the module in <b>path</b>  |    |    |    |

| Name                    | Connector pane  | Description   | S. | R. | I. |
|-------------------------|---|---|----|----|----|
| DQMH Prepare            |    | Calls the "Prepare" request VI of the module in <b>&lt;b&gt;path&lt;/b&gt;</b>  |    |    |    |
| DQMH Request UI Display |    | Calls the "Request UI Display" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b> . Hands over the <b>&lt;b&gt;Module Name&lt;/b&gt;</b> and the <b>&lt;b&gt;Display Scenario&lt;/b&gt;</b> . |    |    |    |
| DQMH Set Modules        |    | Calls the "Set Modules" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b> . Hands over paths to all dynamically loaded modules in <b>&lt;b&gt;modules to load dynamically&lt;/b&gt;</b> .    |    |    |    |
| DQMH Set Runtime Menu   |    | Calls the "Set Runtime Menu" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b> . Hands over the <b>&lt;b&gt;Path to .rtm file&lt;/b&gt;</b> .  |    |    |    |
| DQMH Show Diagram       |    | Calls the "Request UI Display" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b> . Hands over the <b>&lt;b&gt;Module Name&lt;/b&gt;</b> and the <b>&lt;b&gt;Display Scenario&lt;/b&gt;</b> . |    |    |    |
| DQMH Show Panel         |   | Calls the "Show Panel" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b>   |    |    |    |
| DQMH Stop Module        |  | Calls the "Stop Module" request VI of the module in <b>&lt;b&gt;Path to module directory&lt;/b&gt;</b>  |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

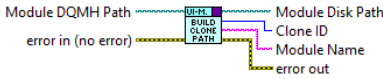
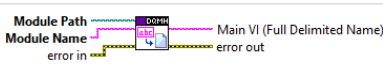

Inlining:  → Inlined



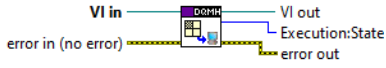

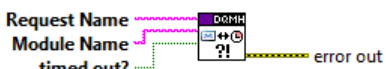

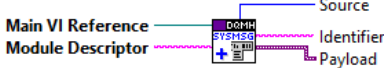



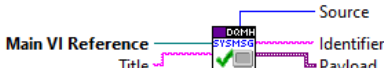






## B.9. HSE-DQMH.LVLIB


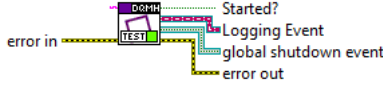
**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 66. Functions (non private scope only)

| Name  | Connector pane  | Description   | S. | R.  | I. |
|---|---|---|----|---|----|
| DQMH Build Module Disk Path From DQMH Path              |  | Parses the Instance Name for the Clone ID and returns the full path to the module's directory, the Clone ID and the module's name     |    |   |    |
| DQMH Get Fully Delimited Instance Name from Module Name |  | Parses the fully delimited VI name from the module path and the module name. For cloneables, the clone ID is appended to the VI name. |    |  |    |

| Name  | Connector pane   | Description   | S. | R.  | I. |
|---|--|---|----|---|----|
| DQMH Get Module Type                            |  The diagram shows a DQMH module icon with a question mark. It has two inputs: 'Module Path' (blue line) and 'error in' (yellow line). It has two outputs: 'Module Types' (blue line) and 'error out' (yellow line).  | Returns the type (singleton or cloneable) of the module in <b>&lt;b&gt;Module Path&lt;/b&gt;</b>  |    |    |    |
| DQMH Load Main VI Reference                     |  The diagram shows a DQMH module icon with a grid. It has three inputs: 'VI in' (blue line), 'error in (no error)' (yellow line), and 'Execution:State' (blue line). It has two outputs: 'VI out' (blue line) and 'error out' (yellow line).                    | <p>Loads the VI reference to a Singleton DQMH module's main.vi. On Linux RT in Runtime Environment, the main.vi is loaded reentrant in order to circumvent a bug in LabVIEW.</p> <p>Details: On Linux RT with Embedded UI enabled running a startup.exe, a VI server invoke method (Control Value.set) doesn't work. This is possibly related to / covered by CAR 514879 (see <a href="https://forums.ni.com/t5/Delacor-Toolkits-Discussions/Deploy-and-run-at-Startup-for-RT-systems/m-p/3620339/highlight/true#M256">https://forums.ni.com/t5/Delacor-Toolkits-Discussions/Deploy-and-run-at-Startup-for-RT-systems/m-p/3620339/highlight/true#M256</a>).</p> <p>In order for this VI to work, you need to: 1. set the DQMH module's main.vi execution setting to "preallocated clone reentrant execution" 2. set the DQMH module's main.vi scope to "community" 3. add the hse-dqmh.lvlib as a friend in the DQMH module's .lvlib Friends properties</p> |    |    |    |
| DQMH Request Reply Timed Out—error              |  The diagram shows a DQMH module icon with a question mark and a clock. It has two inputs: 'Request Name' (blue line) and 'Module Name timed out?' (blue line). It has one output: 'error out' (yellow line).   | No description found (add content in vi description)  |    |  |    |
| DQMH System Message - Add to Run-Time Menu      |  The diagram shows a DQMH module icon with a plus sign. It has three inputs: 'Main VI Reference' (blue line), 'Module Descriptor' (blue line), and 'Source' (blue line). It has two outputs: 'Identifier' (blue line) and 'Payload' (blue line).              | Sends the modul's <b>&lt;b&gt;Path&lt;/b&gt;</b> and <b>&lt;b&gt;Module Descriptor&lt;/b&gt;</b> via the "Add to Run-Time Menu" System Message broadcast. The UI Manager inserts the module into the relevant locations in the run-time menu.   |    |  |    |
| DQMH System Message - Get Module Identifier     |  The diagram shows a DQMH module icon with a question mark. It has three inputs: 'VI Ref' (blue line), 'Module Path' (blue line), and 'error in (no error)' (yellow line). It has two outputs: 'Module Identifier' (blue line) and 'error out' (yellow line). | No description found (add content in vi description)  |    |  |    |
| DQMH System Message - Ready for Display         |  The diagram shows a DQMH module icon with a checkmark. It has three inputs: 'Main VI Reference' (blue line), 'Title' (blue line), and 'Source' (blue line). It has two outputs: 'Identifier' (blue line) and 'Payload' (blue line).                          | No description found (add content in vi description)  |    |  |    |
| DQMH System Message - Remove from Run-Time Menu |  The diagram shows a DQMH module icon with a minus sign. It has three inputs: 'Main VI Reference' (blue line), 'Source' (blue line), and 'Identifier' (blue line). It has one output: 'Payload' (blue line).  | No description found (add content in vi description)  |    |  |    |
| DQMH System Message - Removed from Subpanel     |  The diagram shows a DQMH module icon with a red X. It has three inputs: 'Removed Module' (blue line), 'Source' (blue line), and 'Identifier' (blue line). It has one output: 'Payload' (blue line).  | No description found (add content in vi description)  |    |  |    |
| DQMH Tester Cleanup hse-appl                    |  The diagram shows a DQMH module icon with a red square and the word 'TEST'. It has two inputs: 'Stop?' (blue line) and 'error in' (yellow line). It has one output: 'error out' (yellow line).   | If the hse-application object was instantiated and the hse-logger was initialized when starting the Tester, this VI cleans up both objects.   |    |   |    |

| Name   | Connector pane  | Description  | S. | R. | I. |
|--|---|--|----|----|----|
| DQMH Tester<br>Prepare hse-<br>appl - Get<br>Name and Path |  | <p>Returns APP-NAME as Project Name and /APP-NAME_Source as Project Path</p> <p>HSE projects follow this folder structure: /APP-NAME_Config ..... Configuration Files /APP-NAME_Data ..... Measured and Other Data /APP-NAME_Source ..... LabVIEW Sources /APP-NAME ..... Compiled Application</p> <p>REAL-TIME: As the configuration directory on real-time systems always needs to reside at "C:\&lt;Project Name&gt;_Config\", and as it tedious (embedded UI) or impossible (no embedded UI) to enter the path, it can be supplied via the optional Real-Time App Name string input.</p>   |    |    |    |
| DQMH Tester<br>Prepare hse-<br>appl                        |  | <p>If the hse-application class is not running, queries the user for the path of the containing application and instantiates the hse-appl class. Returns if it did load the class.</p> <p>HSE projects follow this folder structure: /APP-NAME_Config ..... Configuration Files /APP-NAME_Data ..... Measured and Other Data /APP-NAME_Source ..... LabVIEW Sources /APP-NAME ..... Compiled Application</p> <p>The hse-application:ApplicationInit.VI expects the "APP-NAME_Source" folder and the "application name", and processes these to automatically find the "_Config" and "_Data" directories.</p> <p>REAL-TIME: As the configuration directory on real-time systems always needs to reside at "C:\&lt;Project Name&gt;_Config\", and as it tedious (embedded UI) or impossible (no embedded UI) to enter the path, it can be supplied via the optional Real-Time App Name string input.</p> |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.10. HSE-GENNET.LVLIB

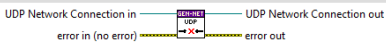


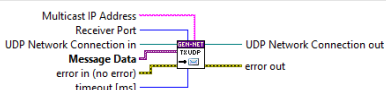


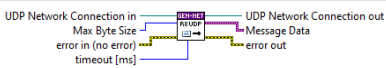














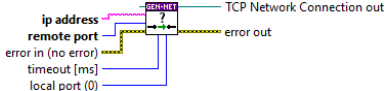


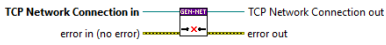




**Responsibility:** The DQMH-GenNet library contains all support files necessary to use the HSE Generic Networking Singleton Module provided by HAMEL SOFTWARE ENGINEERING.

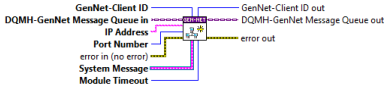

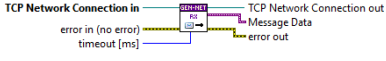


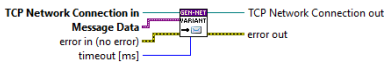





The Delacor Queued Message Handler (DQMH) reference design is provided by Delacor, an NI Alliance Partner. The DQMH is available for download from the LabVIEW Tools Network. You can find more information on the Delacor Queued Message Handler (DQMH) at <http://delacor.com/products/dqmh/>.

**Version: 1.0.0.0**
*Table 67. Nested libraries*

| Name                              | Type    |
|-----------------------------------|---------|
| GenNet Protocol.lvclass           | LVClass |
| GenNet Variant Protocol.lvclass   | LVClass |
| DQMH-GenNet Message Queue.lvclass | LVClass |

*Table 68. Functions (non private scope only)*

| Name                                   | Connector pane  | Description  | S. | R.  | I.  |
|--|---|--|----|---|---|
| GenNet Close UDP Connection            |    | Closes a TCP/IP connection.  |    |    |    |
| GenNet Send UDP Message                |    | Sends a message via TCP/IP to a GenNet-Server module.<br><br>The message is flattened to a string, and the length of the string is prepended before sending it over the network. |    |    |    |
| GenNet Receive UDP Message             |   | Receives a message sent by a GenNet-Client module. The first 4 bytes of the message contain the length of the actual data sent. The received message is converted to a variant.  |    |   |   |
| GenNet Get Broadcast Name From Variant |  | No description found (add content in vi description)   |    |  |  |
| GenNet Add Broadcast Name To Variant   |  | No description found (add content in vi description)   |    |  |  |
| DQMH-GenNet Add Notifier To Variant    |  | HSE: If a notifier reference is given, stores it as an attribute inside the Message Data variant. The notification data type is variant.   |    |  |  |
| DQMH-GenNet Get Notifier From Variant  |  | HSE: Gets the Wait Notifier Refnum (datatype variant) from the Message Data variant  |    |  |  |
| GenNet Check Connection                |  | Checks for a valid TCP/IP connection. Reestablishes the connection if no valid connection found. Creates a new connection if none was given.                                     |    |  |  |
| GenNet Close Connection                |  | Closes a TCP/IP connection.  |    |  |  |
| GenNet Format System Message for MsgQ  |  | Formats the contents of a System Message   |    |  |   |

| Name                                  | Connector pane  | Description  | S. | R.  | I.  |
|---------------------------------------|---|--|----|---|---|
| GenNet Init Client                    |  | Initializes a GenNet Client if <B>ClientID == -1</B> and automatically connects to it. See usage example inside for how to use this VI.  |    |  |   |
| GenNet Receive Variant Message        |  | Receives a message sent by a GenNet-Client module. The first 4 bytes of the message contain the length of the actual data sent. The received message is converted to a variant.  |    |  |  |
| GenNet Send Message                   |  | Sends a message via TCP/IP to a GenNet-Server module.<br><br>The message is flattened to a string, and the length of the string is prepended before sending it over the network. |    |  |  |
| GenNet Version-Safe Unflatten Variant |  | Unflattens a variant from a string. Automatically prepends the correct header if the variant was flattened in another LabVIEW version.   |    |  |  |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.11. HSE-MISC.LVLIB

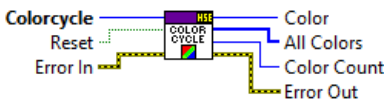



**Responsibility:** source code password: bowman-tyro-kickback-besides











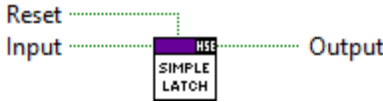


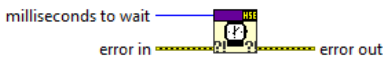

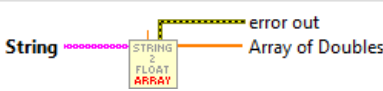

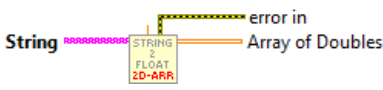

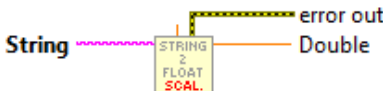



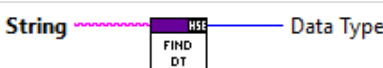



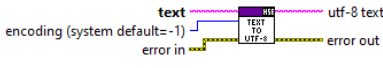


**Version:** 1.0.0.0

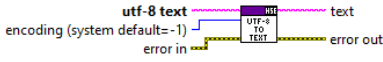












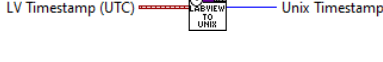








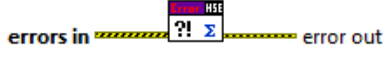





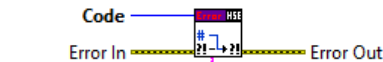

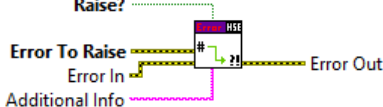

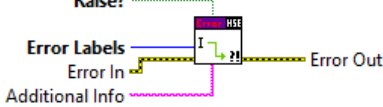

Table 69. Nested libraries

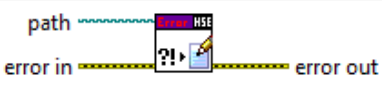
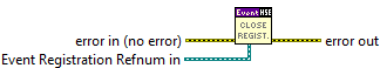


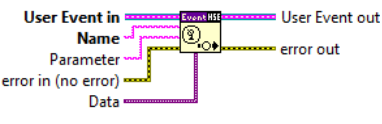







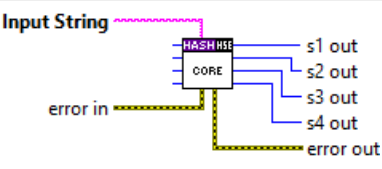






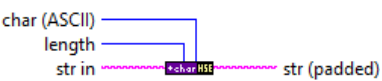



| Name               | Type    |
|--------------------|---------|
| Loop Timer.lvclass | LVClass |

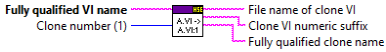




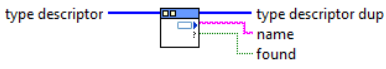


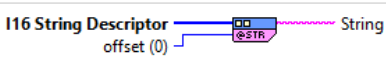


Table 70. Functions (non private scope only)

| Name                              | Connector pane  | Description  | S. | R.  | I. |
|-----------------------------------|---|--|----|---|----|
| ColorCycle                        |  | With every call, this VI returns a color from a color pallet. If the last color from a pallet is reached, the VI continues with the first color.<br><br>This Vi is useful to give plots and graphs better looking colors.<br><br>The color sets are inspired by a subset of the colormaps from the Python plotting library Matplotlib. |    |  |    |
| Get Enum Details from Type String |  | No description found (add content in vi description)   |    |  |    |

| Name                                 | Connector pane  | Description   | S. | R.  | I.  |
|--------------------------------------|---|---|----|---|---|
| Get Multiple Attributes from Variant |    | No description found (add content in vi description)  |    |   |   |
| Graph Scale Axis                     |    | Calculates usefull values for the Graph scaling (Minimum, Maximum) that go 10% over the min/max-values and include zero.                |    |    |   |
| Set Multiple Attributes to Variant   |    | Set multiple attributes (key-values-pairs) to a variant.  |    |   |   |
| Simple Edge Detection (Falling)      |    | Returns True if a falling edge (True -> False) occures.<br><br>(This VI is inlined.)  |    |    |    |
| Simple Edge Detection (Rising)       |    | Returns True if a rising edge (False -> True) occures.<br><br>(This VI is inlined.)   |    |    |    |
| Simple Latch                         |   | A simple boolean latch with reset functionality.  |    |   |   |
| Wait_ErrorCluster                    |  | Simple wrapper for the Wait function that allows for data flow.   |    |  |   |
| ConvertStringToFloat_Array-1D        |  | converts array of string values to floating point values  |    |  |   |
| ConvertStringToFloat_Array-2D        |  | converts array of string values to floating point values  |    |  |   |
| ConvertStringToFloat_Scalar          |  | converts single string value to floating point value  |    |  |   |
| Filename Sanitizer                   |  | Removes all characters that are not supported in filenames (/ \ : * ? " < >   ) and replaces it with "Replace String" (default is "_"). |    |  |   |
| Find Data Type                       |  | No description found (add content in vi description)  |    |   |   |
| Represent Boolean                    |  | No description found (add content in vi description)  |    |  |  |
| Text to UTF-8 Wrapper                |  | Converts LabVIEW text to UTF-8.   |    |  |  |

| Name                                 | Connector pane  | Description   | S. | R.  | I.  |
|--------------------------------------|---|---|----|---|---|
| UTF-8 to Text Wrapper                |    | Converts UTF-8 text to text encoded in the specified system.  |    |    |    |
| U8-Array to U64                      |    | Convert an array of Bytes (U8) to an array of U64.  |    |    |   |
| U64-Array to U8                      |    | Convert an array of U64 to an array of Bytes (U8).  |    |    |   |
| Variant_BuildClusterFromElementArray |    | From the LabVIEW Open Source project DataManipulation library v1.4.0 by Francois Normandin ( <a href="https://github.com/LabVIEW-Open-Source/DataManipulation">https://github.com/LabVIEW-Open-Source/DataManipulation</a> ). |    |    |    |
| Variant_EmptyCluster                 |    | From the LabVIEW Open Source project DataManipulation library v1.4.0 by Francois Normandin ( <a href="https://github.com/LabVIEW-Open-Source/DataManipulation">https://github.com/LabVIEW-Open-Source/DataManipulation</a> ). |    |    |    |
| LV Timestamp to Unix Epoch           |    | Convert a LabVIEW Timestamp (UTC Timezone) to a Unix Epoch Timestamp (C time_t).  |    |    |    |
| Seconds to Time                      |   | Convert a time range (in seconds) to a time string in the format "hh:mm:ss". E.g. 3680s -> "01:01:20".  |    |   |   |
| Unix Epoch to LV Timestamp           |  | Convert a Unix Epoch Timestamp (C time_t) to a LabVIEW Timestamp (UTC Timezone).  |    |  |  |
| Error_AddAdditionalInformation       |  | Adds <b>Additional Info</b> to the source of <b>Error In</b>  |    |  |   |
| Error_AppendErrorsToSource           |  | Takes the first element of <b>errors in</b> and concatenates all other elements' code and source into the source of the first error.  |    |  |   |
| Error_Clear                          |  | Clears the error in <b>error in</b>   |    |  |   |
| Error_Helper_BuildCluster            |  | Builds an error cluster from <b>Code</b> and <b>Additional Info</b>   |    |  |   |
| Error_Helper_OverwriteCluster        |  | If <b>Error In</b> is true, overwrites the error cluster information with <b>Code</b> and <b>Additional Info</b>.   |    |  |   |
| Error_Helper_RaiseError              |  | If <b>Raise?</b> is true, puts the error in <b>Error To Raise</b> on the error output and adds <b>Additional Info</b> to the source of the error.   |    |  |   |
| Error_Helper_RaiseErrorFromLabel     |  | If <b>Raise?</b> is true, sets an error with code set by <b>Error Labels</b> and source by <b>Additional Info</b>   |    |  |   |

| Name                                     | Connector pane  | Description  | S. | R.  | I.  |
|--|---|--|----|---|---|
| Error_LogToFile                          |    | If <b>error in</b> is true, writes the error to the file identified by <b>path</b> and clears the error.   |    |    |   |
| Event_CloseRegistrationRef               |    | Unregisters the given event registration from the HSE-Event  |    |    |  |
| Event_Generate                           |    | Generates an HSE-Event and sends <b>Name</b>, <b>Parameter</b> and <b>Data</b> as event data.  |    |    |  |
| Event_GetRefAndReg                       |    | Gets the HSE-Event refnum and a new event registration refnum for it.  |    |    |  |
| Event_LoadOrCreateRefs                   |    | Returns the refnum of the HSE-Event  |    |    |  |
| Hash Core                                |   |  |    |    |   |
| Hash                                     |  |  |    |  |   |
| Delete Duplicates From 1D-Array (String) |  | (v0.2.1b; 2017-08-14 16:44)  |    |  |   |
| Sort 2D-Array                            |  | Sorts a 2D string array by the column declared in <b>Search parameters</b> and by <b>Sort Order</b>.   |    |  |   |
| String_PadWithCharacters                 |  | Adds <b>char (ASCII)</b> characters to <b>str in</b> until it is <b>length</b> characters long.<br><br>Common ASCII characters: 0x09 ... tab 0x20 ... space 0x2E ... dot (.) |    |  |   |
| String_StripNullValues                   |  | Removes all NULL values from a string  |    |  |   |

| Name                      | Connector pane  | Description   | S. | R.  | I.  |
|---------------------------|---|---|----|---|---|
| Generate Clone Name       |    | <p>Given the fully qualified name of a VI (meaning the name includes any library namespace prefixes), this VI returns the name of a clone of the VI. By default, it returns the name of the first clone that gets created, but you can request the Nth clone by supplying the "Clone number" input.</p> <p>USE WITH CAUTION. The name returned by this VI can be used with the "Open VI Reference" function to open a VI reference to a clone VI. This is an unsupported feature of LabVIEW (i.e. opening an additional reference to a clone VI was never intended to work but someone forgot to disable it when clones were added to LabVIEW). Opening extra references beyond the one used to create the clone (i.e. the clone's "this VI" reference) is known to cause instabilities, including crashes, in some situations. However, such refnums are critical for writing certain debugging tools. Be careful.</p> |    |    |   |
| ShowRunningVIs            |   | Returns a list of VIs in memory   |    |   |   |
| StringLogger              |  | Simple helper VI for writing data to a log file. <b>Path Data</b> and <b>Label</b> form the folder structure, and <b>Function</b> is part of the file name.   |    |  |   |
| TypeDescriptor_GetName    |  | From the LabVIEW Open Source project DataManipulation library v1.4.0 by Francois Normandin ( <a href="https://github.com/LabVIEW-Open-Source/DataManipulation">https://github.com/LabVIEW-Open-Source/DataManipulation</a> ).   |    |  |  |
| TypeDescriptor_GetPString |  | From the LabVIEW Open Source project DataManipulation library v1.4.0 by Francois Normandin ( <a href="https://github.com/LabVIEW-Open-Source/DataManipulation">https://github.com/LabVIEW-Open-Source/DataManipulation</a> ).   |    |  |  |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## B.12. HSE-NETWORK.LVLIB

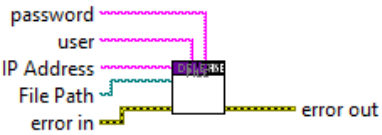
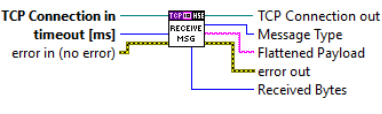
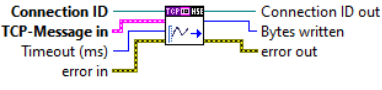

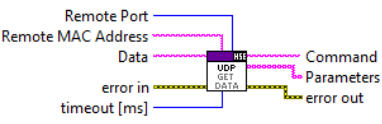
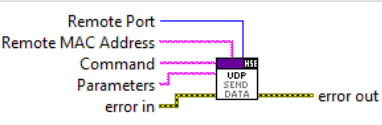


**Responsibility:** No description found (add content in lvlib description)

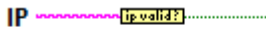

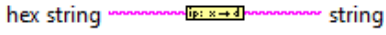
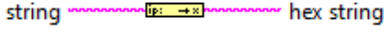


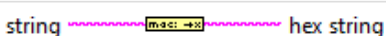

**Version:** 1.0.0.0

Table 71. Nested libraries

| Name              | Type    |
|-------------------|---------|
| NetStream.lvclass | LVClass |

Table 72. Functions (non private scope only)

| Name                           | Connector pane  | Description   | S. | R. | I.  |
|--------------------------------|---|---|----|----|---|
| FTP_CreateRemotePath           |    |   |    |    |   |
| FTP_RemoveRemoteFile           |    |   |    |    |   |
| TCP Receive Message            |    |   |    |    |   |
| TCP Send Message               |   | Send a message (measurement data, command, ...) via TCP. The message must be flattened to a string and the message type is determined by the "Message Type Enum". |    |    |  |
| UDP__ReceiveDataViaSystemEvent | [hse-network.lvlib:UDPReceiveDataViaSystemEvent.vi]                                 |   |    |    |   |
| UDP__Send                      | [hse-network.lvlib:UDPSend.vi]  |   |    |    |   |
| UDP__TransmitData              | [hse-network.lvlib:UDPTransmitData.vi]  |   |    |    |   |
| UDP_GetDataFromDevice          |  |   |    |    |   |
| UDP_SendData                   |  |   |    |    |   |
| COM_ParseCommand               |  | (v0.2.1b; 2017-08-14 16:44)   |    |    |   |
| GetNetworkInfo                 |  | (v0.2.1b; 2017-08-14 16:44)   |    |    |   |

| Name                | Connector pane  | Description                                     | S. | R.  | I. |
|---------------------|---|---|----|---|----|
| IP_CheckIfValid     |  | Check if the string input is a valid IP address |    |  |    |
| IP_ToDecimalString  |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |
| IP_ToHexString      |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |
| MAC_ColonToHex      |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |
| MAC_HexToColon      |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |
| MAC_ToHexString     |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |
| SystemConfigSession |  | (v0.2.1b; 2017-08-14 16:44)                     |    |   |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy


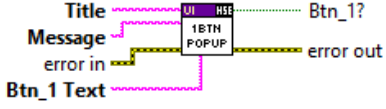
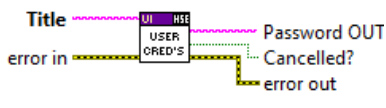
Inlining:  → Inlined

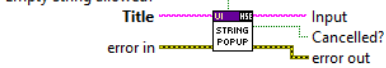
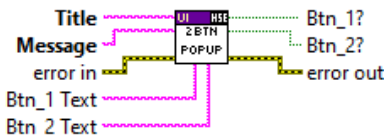
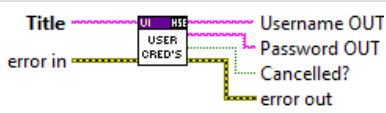
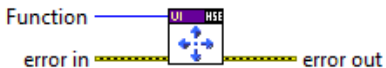
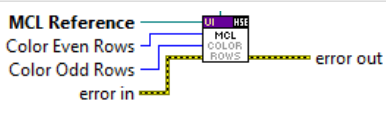
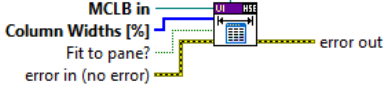
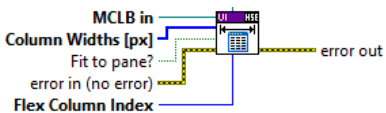
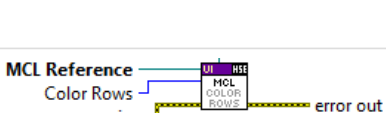
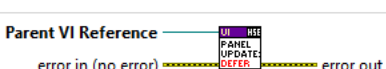
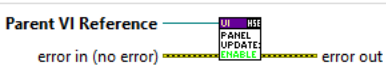
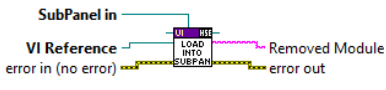

## B.13. HSE-UI.LVLIB

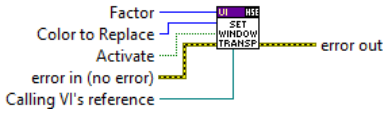

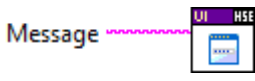



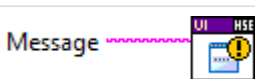

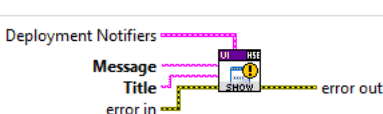

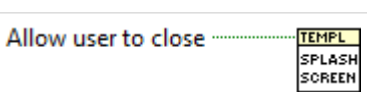

**Responsibility:** No description found (add content in lplib description)

**Version:** 1.0.0.0

Table 73. Functions (non private scope only)

| Name               | Connector pane  | Description  | S. | R. | I. |
|--------------------|---|--|----|----|----|
| Dialogue_Error     |  | Shows a dialog window for displaying an error message. |    |    |    |
| Dialogue_OneButton |  | Shows a dialog window with a message and an OK button  |    |    |    |
| Dialogue_Password  |  | Shows a dialog window for entering a password.         |    |    |    |

| Name                               | Connector pane  | Description   | S. | R. | I. |
|------------------------------------|---|---|----|----|----|
| Dialogue_String                    |    | Shows a dialog window for entering a string value.  |    |    |    |
| Dialogue_Two Button                |    | Shows a dialog window with a message and two buttons (default: "Ok" and "Cancel")   |    |    |    |
| Dialogue_User Credentials          |    | Shows a dialog window for entering user credentials (username and password).  |    |    |    |
| FPControl                          |    |   |    |    |    |
| MultiColumnListBox_ColorRows       |    | Colors the rows of a MCLB in alternate colors. If <b>&lt;b&gt;Parent VI Reference&lt;/b&gt;</b> is supplied, panel updates are deferred.  |    |    |    |
| MultiColumnListBox_Resize          |  | Resizes the columns of a MCLB according to the widths given in <b>&lt;b&gt;Column Widths [%]&lt;/b&gt;</b> . If <b>&lt;b&gt;Parent VI Reference&lt;/b&gt;</b> is supplied, panel updates are deferred.  |    |    |    |
| MultiColumnListBox_Resize_Absolute |  | Resizes the columns of a MCLB according to the widths given in <b>&lt;b&gt;Column Widths [px]&lt;/b&gt;</b> . The column with the index in <b>&lt;b&gt;Flex Column Index&lt;/b&gt;</b> uses the remaining space. If <b>&lt;b&gt;Parent VI Reference&lt;/b&gt;</b> is supplied, panel updates are deferred.  |    |    |    |
| MultiColumnListBox_UnColorRows     |  | Colors the rows of a MCLB in alternate colors. If <b>&lt;b&gt;Parent VI Reference&lt;/b&gt;</b> is supplied, panel updates are deferred.  |    |    |    |
| PanelUpdates_Defer                 |  |   |    |    |    |
| PanelUpdates_Enable                |  |   |    |    |    |
| Subpanel - Load VI                 |  | <p>Opens the VI reference to <b>&lt;b&gt;Full Delimited Name&lt;/b&gt;</b> and inserts it into <b>&lt;b&gt;SubPanel in&lt;/b&gt;</b>. The reference of the inserted VI is returned in Subpanel VI Ref OUT.</p> <p>If Subpanel VI Ref IN is a valid reference, the front panel of the referenced VI is opened hidden before removing it from the subpanel in order to avoid losing the VI from memory.</p> |    |    |    |
| Toggle Radio Buttons               |  | No description found (add content in vi description)  |    |    |    |

| Name                           | Connector pane  | Description  | S. | R. | I. |
|--------------------------------|---|--|----|----|----|
| Window Color to Transparent    |    |  |    |    |    |
| Window Handle                  |    | <p>This VI will use the FindWindow API function to retrieve a window refnum for the window identified by window name. 'window name' is the text appearing in the title bar of a window. If the window cannot be found, the window refnum out will be 'Not a Window Refnum', and an error will occur.</p> |    |    |    |
| ProgressPopup                  |    |  |    |    |    |
| ProgressPopup_Close            |    | Closes the modal progress window.  |    |    |    |
| ProgressPopup_Show             |   | <p>Shows a modal window with an animated progress bar, indicating that some (background) process is running.</p> <p>The <b>Title</b> of the window and the <b>Message</b> being displayed can be specified.</p>  |    |    |    |
| ProgressPopup_Update           |  | Closes the modal progress window.  |    |    |    |
| ProgressPopup_WithStatus       |  |  |    |    |    |
| ProgressPopup_WithStatus_Close |  | Closes the modal progress window.  |    |    |    |
| ProgressPopup_WithStatus_Show  |  | <p>Shows a modal window with an animated progress bar, indicating that some (background) process is running.</p> <p>The <b>Title</b> of the window and the <b>Message</b> being displayed can be specified.</p>  |    |    |    |
| HSE_AboutScreen                |  |  |    |    |    |
| PROJECT_SplashScreen_Template  |  | No description found (add content in vi description)   |    |    |    |
| Screen_ShowHseAbout            |  |  |    |    |    |

| Name                        | Connector pane  | Description | S. | R. | I. |
|-----------------------------|---|-------------|----|----|----|
| Screen_ShowP<br>rojectAbout |  |             |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

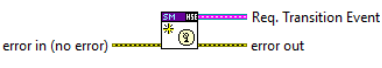
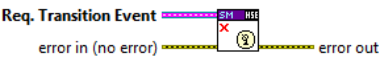
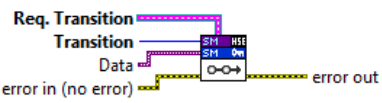



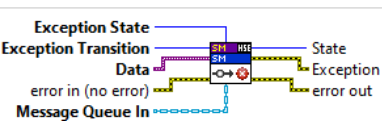

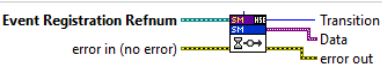

Inlining:  → Inlined

## B.14. HSE-STATE-MACHINE.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 74. Functions (non private scope only)

| Name                              | Connector pane  | Description   | S. | R.  | I. |
|-----------------------------------|---|---|----|---|----|
| SM Create Event                   |   | Creates the local user event used for requesting a transition.  |    |   |    |
| SM Destroy Event                  |  | Destroys the local user event used for requesting a transition.   |    |   |    |
| SM Request Transition             |  | Sends a Transition to the State Machine which will react dependent on it's state.   |    |   |    |
| SM Polling - Leave State if FALSE |  | <b>Keep polling</b> if the boolean condition is TRUE  |    |   |    |
| SM Polling - Leave State if TRUE  |  | <b>Keep polling</b> if the boolean condition is TRUE  |    |   |    |
| SM DEMO                           |  | Demonstrates the use of the HSE-State Machine and can be used as a Copy and Paste Template.   |    |   |    |
| SM Process Exception Transition   |  | If an error occurs, go to the "Erroring" state and send an update to the UI   |    |   |    |
| SM Update UI State                |  | Propagate state change to UI.<br><br>HSE: This is only a place holder, in DQMH modules this would use the Message Queue. Implement your own communication mechanism here. |    |   |    |
| SM Wait for Transition            |  | Waits for a Transition to occur in the duration of Timeout.   |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy








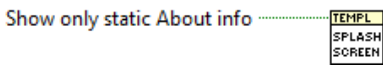
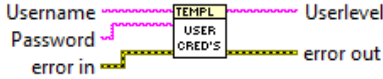
Inlining:  → Inlined

## B.15. PROJECT.LVLIB

**Responsibility:** No description found (add content in lvlib description)

**Version:** 1.0.0.0

Table 75. Functions (non private scope only)

| Name                                 | Connector pane  | Description  | S. | R.  | I.  |
|--------------------------------------|---|--|----|---|---|
| PROJECT_ApplicationVersion—constant  |    | Version number of the application. This is set automatically during build.   |    |  |  |
| PROJECT_EvaluateDefaultMenuSelection |    | No description found (add content in vi description)   |    |   |   |
| PROJECT_InitLogging                  |  | Initiate the logging functions.  |    |   |   |
| PROJECT_Layout-VI                    |  | <p>This is the default layout VI for the HSE UI Framework. It features three areas: - header (contains the "SP_Header" subpanel) - navigation (contains the "SP_Navigation" subpanel) - content (contains the "SP_Content" subpanel)</p> <p>This VI is loaded by the UI Manager module, the subpanels are then populated with DQMH modules as configured in the UI Manager's configuration file.</p> |    |   |   |
| PROJECT_Name—constant                |  | Constant VI defining the name of the Project. This influences directory structure and other things.  |    |   |   |
| PROJECT_SplashScreen                 |  | No description found (add content in vi description)   |    |   |   |
| PROJECT_UserCredentials              |  | No description found (add content in vi description)   |    |   |   |

Scope:  → Protected |  → Community

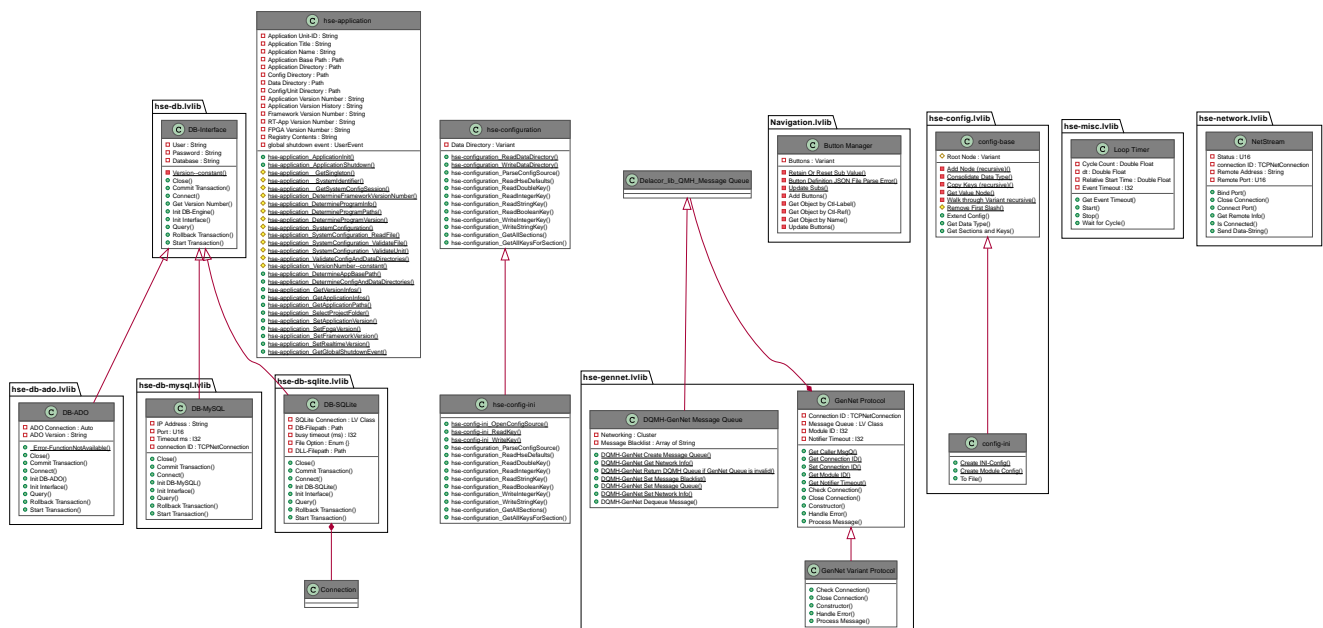
Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## LabVIEW Classes

This project contains 15 classes and 0 interface.

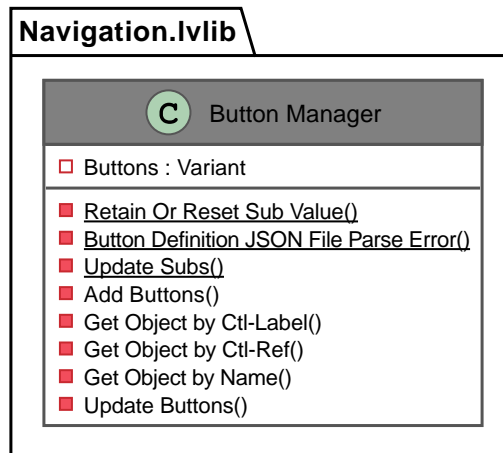
| Classes                           | Interfaces |
|-----------------------------------|------------|
| Button Manager.lvclass            |            |
| DB-ADO.lvclass                    |            |
| DB-MySQL.lvclass                  |            |
| DB-SQLite.lvclass                 |            |
| DB-Interface.lvclass              |            |
| [hse-application.lvclass]         |            |
| [hse-config-ini.lvclass]          |            |
| [hse-configuration.lvclass]       |            |
| [config-base.lvclass]             |            |
| [config-ini.lvclass]              |            |
| GenNet Protocol.lvclass           |            |
| GenNet Variant Protocol.lvclass   |            |
| DQMH-GenNet Message Queue.lvclass |            |
| Loop Timer.lvclass                |            |
| NetStream.lvclass                 |            |



## C.2. BUTTON MANAGER.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0



This library has no functions set to non private scope.

## C.3. DB-ADO.LVCLASS

**Responsibility:** ADO-Driver subclass.

**Version:** 1.0.0.2

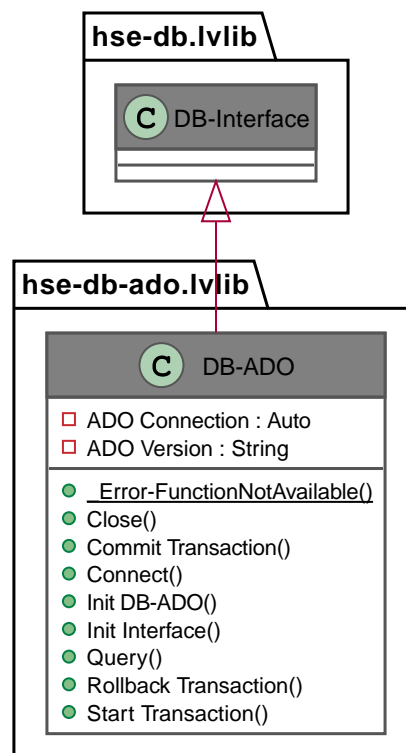





Table 77. Functions (non private scope only)

| Name                        | Connector pane  | Description  | S. | R.  | I. |
|-----------------------------|---|--|----|---|----|
| _Error-FunctionNotAvailable |  error out   | No description found (add content in vi description)   |    |    |    |
| Close                       | DB-ADO in  DB-ADO out<br>error in  error out  | Close the ADO connection.  |    |    |    |
| Commit Transaction          | DB-ADO in  DB-ADO out<br>error in  error out  | Commit a transaction. Either all SQL-commands get committed or, in case of an error, all get rejected. |    |    |    |
| Connect                     | DB-ADO in  DB-ADO out<br>error in  error out  | Connect to a ADO database.   |    |    |    |
| Init DB-ADO                 | DB-ADO in  DB-ADO out<br>Authentication  error in  error out   | Init a new ADO DB object.  |    |    |    |
| Init Interface              | DB-ADO in  DB-ADO out<br>hse-config  Config Section  error in  error out | No description found (add content in vi description)   |    |    |    |
| Query                       | DB-ADO in  DB-ADO out<br>Query  Return Data<br>error in  Packed Metadata<br>Field Names  | Send a SQL-query and return the answer. Return data is a 2D-array of strings wrapped in variants.      |    |  |    |
| Rollback Transaction        | DB-ADO in  DB-ADO out<br>error in  error out  | Rollback the active transaction.   |    |   |    |
| Start Transaction           | DB-ADO in  DB-ADO out<br>error in  error out  | Start a transaction to get sure all following SQL commands get executed or none.                       |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.4. DB-MYSQL.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0

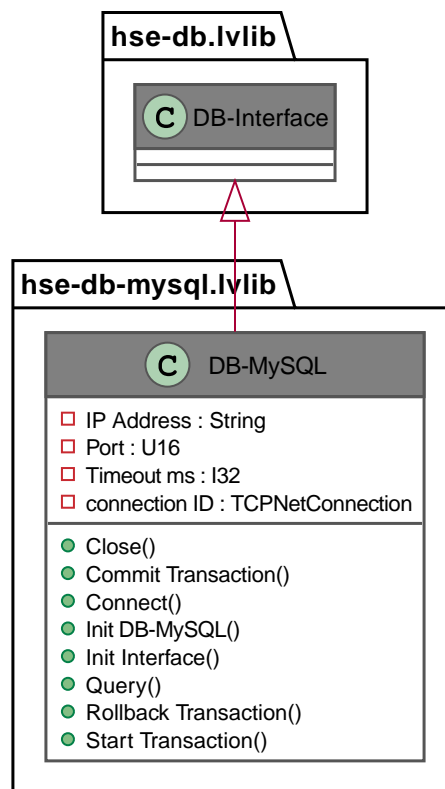





Table 78. Functions (non private scope only)

| Name                 | Connector pane | Description  | S. | R. | I. |
|----------------------|----------------|--|----|----|----|
| Close                |                | No description found (add content in vi description)   |    |    |    |
| Commit Transaction   |                | Commit a transaction. Either all SQL-commands get committed or, in case of an error, all get rejected. |    |    |    |
| Connect              |                | No description found (add content in vi description)   |    |    |    |
| Init DB-MySQL        |                | No description found (add content in vi description)   |    |    |    |
| Init Interface       |                | No description found (add content in vi description)   |    |    |    |
| Query                |                | No description found (add content in vi description)   |    |    |    |
| Rollback Transaction |                | Rollback the active transaction.   |    |    |    |

| Name              | Connector pane  | Description  | S. | R.  | I. |
|-------------------|---|--|----|---|----|
| Start Transaction |  | Start a transaction to get sure all following SQL commands get executed or none. |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.5. DB-SQLITE.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0

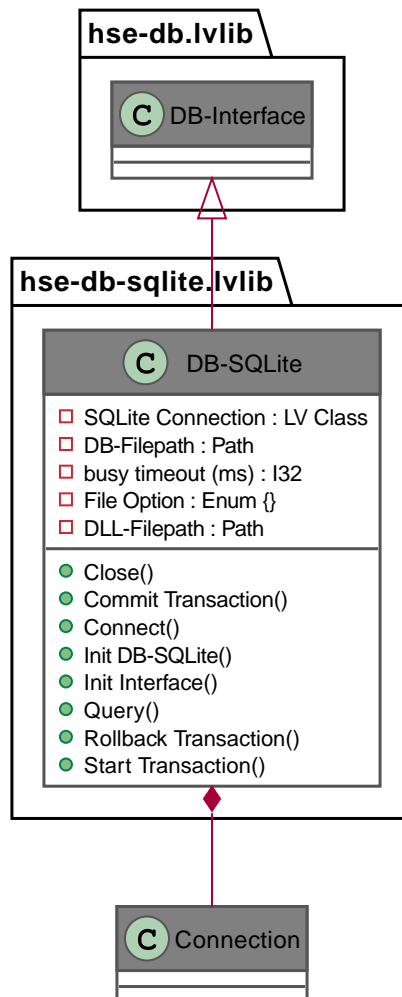






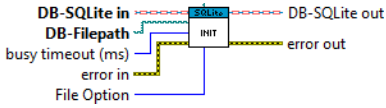

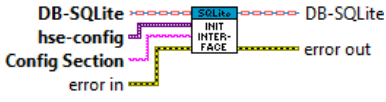

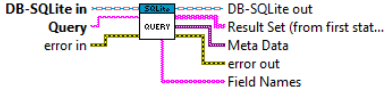

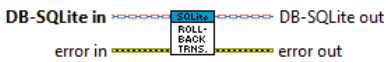
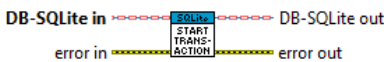



Table 79. Functions (non private scope only)

| Name  | Connector pane  | Description  | S. | R.  | I. |
|-------|---|--|----|---|----|
| Close |  | No description found (add content in vi description) |    |  |    |

| Name                 | Connector pane  | Description  | S. | R.  | I. |
|----------------------|---|--|----|---|----|
| Commit Transaction   |    | No description found (add content in vi description) |    |    |    |
| Connect              |    | No description found (add content in vi description) |    |    |    |
| Init DB-SQLite       |    | No description found (add content in vi description) |    |    |    |
| Init Interface       |    | No description found (add content in vi description) |    |    |    |
| Query                |    | No description found (add content in vi description) |    |    |    |
| Rollback Transaction |    | Rollback the active transaction.                     |    |   |    |
| Start Transaction    |  | No description found (add content in vi description) |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.6. DB-INTERFACE.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0

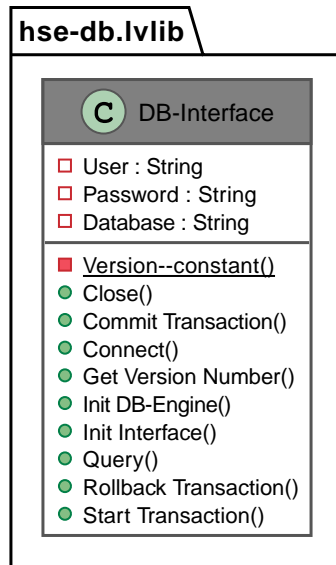






Table 80. Functions (non private scope only)

| Name                 | Connector pane | Description   | S. | R. | I. |
|----------------------|----------------|---|----|----|----|
| Close                |                | <p>Close connection.</p> <p>-- This Method is just a prototype --</p>   |    |    |    |
| Commit Transaction   |                | <p>Commit a transaction. Either all SQL-commands get committed or, in case of an error, all get rejected.</p> |    |    |    |
| Connect              |                | <p>Connect.</p> <p>-- This method is just a prototype --</p>  |    |    |    |
| Get Version Number   |                | <p>No description found (add content in vi description)</p>   |    |    |    |
| Init DB-Engine       |                | <p>Initialize the class.</p>  |    |    |    |
| Init Interface       |                | <p>No description found (add content in vi description)</p>   |    |    |    |
| Query                |                | <p>No description found (add content in vi description)</p>   |    |    |    |
| Read Authentication  |                | <p>Returns the authentication data.</p>   |    |    |    |
| Rollback Transaction |                | <p>No description found (add content in vi description)</p>   |    |    |    |

| Name              | Connector pane  | Description  | S. | R.  | I. |
|-------------------|---|--|----|---|----|
| Start Transaction |  | No description found (add content in vi description) |    |  |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

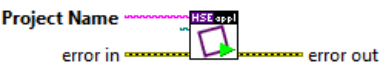

## C.7. HSE-APPLICATION.LVCLASS





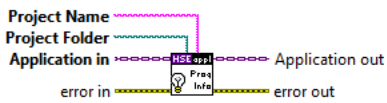

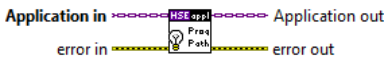













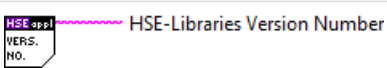

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.4

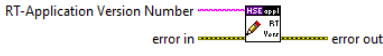



| C hse-application  |
|--|
| <ul style="list-style-type: none"> <li>□ Application Unit-ID : String</li> <li>□ Application Title : String</li> <li>□ Application Name : String</li> <li>□ Application Base Path : Path</li> <li>□ Application Directory : Path</li> <li>□ Config Directory : Path</li> <li>□ Data Directory : Path</li> <li>□ Config/Unit Directory : Path</li> <li>□ Application Version Number : String</li> <li>□ Application Version History : String</li> <li>□ Framework Version Number : String</li> <li>□ RT-App Version Number : String</li> <li>□ FPGA Version Number : String</li> <li>□ Registry Contents : String</li> <li>□ global shutdown event : UserEvent</li> </ul>   |
| <ul style="list-style-type: none"> <li>● <u>hse-application ApplicationInit()</u></li> <li>● <u>hse-application ApplicationShutdown()</u></li> <li>◆ <u>hse-application GetSingleton()</u></li> <li>◆ <u>hse-application SystemIdentifier()</u></li> <li>◆ <u>hse-application GetSystemConfigSession()</u></li> <li>◆ <u>hse-application DetermineFrameworkVersionNumber()</u></li> <li>◆ <u>hse-application DetermineProgramInfo()</u></li> <li>◆ <u>hse-application DetermineProgramPaths()</u></li> <li>◆ <u>hse-application DetermineProgramVersion()</u></li> <li>◆ <u>hse-application SystemConfiguration()</u></li> <li>◆ <u>hse-application SystemConfiguration ReadFile()</u></li> <li>◆ <u>hse-application SystemConfiguration ValidateFile()</u></li> <li>◆ <u>hse-application SystemConfiguration ValidateUnit()</u></li> <li>◆ <u>hse-application ValidateConfigAndDataDirectories()</u></li> <li>◆ <u>hse-application VersionNumber--constant()</u></li> <li>● <u>hse-application DetermineAppBasePath()</u></li> <li>● <u>hse-application DetermineConfigAndDataDirectories()</u></li> <li>● <u>hse-application GetVersionInfos()</u></li> <li>● <u>hse-application GetApplicationInfos()</u></li> <li>● <u>hse-application GetApplicationPaths()</u></li> <li>● <u>hse-application SelectProjectFolder()</u></li> <li>● <u>hse-application SetApplicationVersion()</u></li> <li>● <u>hse-application SetFpgaVersion()</u></li> <li>● <u>hse-application SetFrameworkVersion()</u></li> <li>● <u>hse-application SetRealtimeVersion()</u></li> <li>● <u>hse-application GetGlobalShutdownEvent()</u></li> </ul> |

Table 81. Functions (non private scope only)



| Name                                | Connector pane  | Description   | S. | R. | I. |
|-------------------------------------|---|---|----|----|----|
| hse-application_ApplicationInit     |  | Initializes the HSE Application and its configuration variables with names, paths, version strings and other information. |    |    |    |
| hse-application_ApplicationShutdown |  | Stops and frees all hse resources.  |    |    |    |
| hse-application_GetSingleton        | [hse-application.lvclass:hse-application</em>GetSingleton.vi]                       | Contains the DVR to the HSE ApplicationClass object.  | ●  |    |    |

| Name   | Connector pane  | Description  | S.  | R. | I. |
|--|---|--|---|----|----|
| hse-application__SystemIdentifier                | [hse-application.lvclass:hse-application</em>SystemIdentifier.vi]                   |  |    |    |    |
| hse-application__GetSystemConfigSession          | [hse-application.lvclass:hse-application</em>GetSystemConfigSession.vi]             | Tries 10 times to create a System Configuration session reference  |    |    |    |
| hse-application_DetermineFrameworkVersionNumber  |    | Sets the version of the framework used for the application.  |    |    |    |
| hse-application_DetermineProgramInfo             |    |  |    |    |    |
| hse-application_DetermineProgramPaths            |    | Determines the Application Base, Configuration and Data paths.   |    |    |    |
| hse-application_DetermineProgramVersion          |  |  |  |    |    |
| hse-application_SystemConfiguration              |  | Reads global (system-wide) configuration parameters from the config.ini file or creates it if it couldn't be found.  |  |    |    |
| hse-application_SystemConfiguration_ReadFile     |  | Reads configuration parameters from the <b>Config File</b>.  |  |    |    |
| hse-application_SystemConfiguration_ValidateFile |  | Check if <b>Config File</b> exists. If it can't be read, try and copy config.ini.default over to config. ini and show a message. If that also doesn't work, throw an error and show a message. |  |    |    |
| hse-application_SystemConfiguration_ValidateUnit |  | Check if <b>Unit Directory</b> exists.   |  |    |    |
| hse-application_ValidateConfigAndDataDirectories |  | No description found (add content in vi description)   |  |    |    |
| hse-application_VersionNumber—constant           |  | No description found (add content in vi description)   |  |    |    |

| Name  | Connector pane | Description  | S. | R. | I. |
|---|----------------|--|----|----|----|
| hse-application_DetermineAppBasePath              |                | Determines the "Root" path of the application: - When running from the development environment, this is identical to the application directory. - When running from the run-time environment, this includes the name of the .exe   |    |    |    |
| hse-application_DetermineConfigAndDataDirectories |                | Determines the paths of the _Config and _Data directories: - either by reading from the [HSE] section of <%APPNAME%>.ini in the application directory - or by defining them to live parallel to the application directory (this is HSE default)  |    |    |    |
| hse-application_GetVersionInfos                   |                | Returns the various stored version numbers:<br>Application Version: This project (the built application)<br>Framework Version: The HSE UI-Framework (Windows Application Template)<br>HSE-LIB Version: The hse-libraries   |    |    |    |
| hse-application_GetApplicationInfos               |                | Returns information on the application itself for display, logging, ...  |    |    |    |
| hse-application_GetApplicationPaths               |                | Returns the various paths of the hse-lib based application's folder structure: - Application Directory (the folder on disk the startup.vi or the .exe is stored in) - Config Directory (the folder containing all the configuration files) - Data Directory (the folder designed to hold data generated by the application) - Config/Unit Directory (the folder holding the configuration for this unit - see config.ini file) - Tmp Directory (the system-specific temporary location)<br><br>The <b>Application Base Path</b> points to the root of the call chain. In the development environment, this path is identical to the Application Directory. In a built .exe, this path points to the .exe itself. |    |    |    |
| hse-application_SelectProjectFolder               |                | Opens a file dialog to select the folder in which the project file and the startup.vi are located.   |    |    |    |
| hse-application_SetApplicationVersion             |                | Stores the version number of the application for later usage (display, logging, ...).  |    |    |    |
| hse-application_SetFpgaVersion                    |                | Stores the version number of the FPGA bitfile (if any) for later usage (display, logging, ...).  |    |    |    |
| hse-application_SetFrameworkVersion               |                | Stores the version number of the framework for later usage (display, logging, ...).  |    |    |    |

| Name                                   | Connector pane  | Description  | S. | R.  | I.  |
|--|---|--|----|---|---|
| hse-application_SetRealtimeVersion     |  | Stores the version number of the connected Real-Time application (if any). |    |   |   |
| hse-application_GetGlobalShutdownEvent |  | Returns information on the application itself for display, logging, ...    |    |  |  |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.8. HSE-CONFIG-INI.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.1

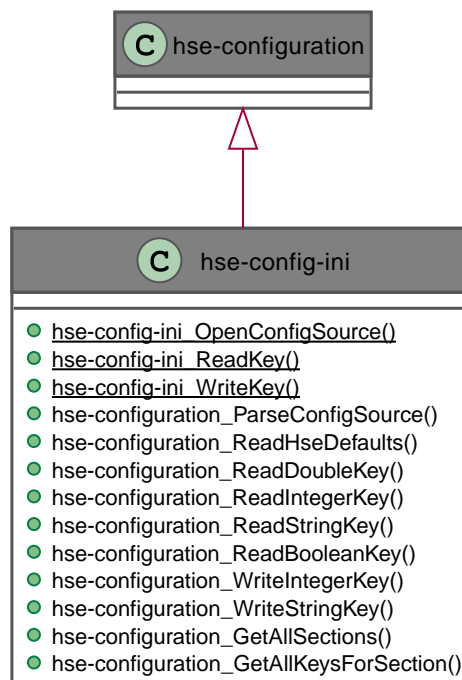


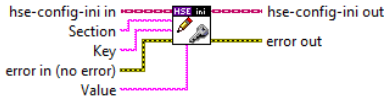


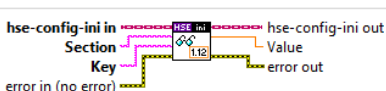





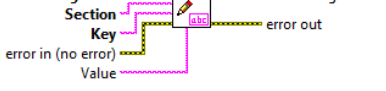





Table 82. Functions (non private scope only)

| Name                            | Connector pane  | Description   | S. | R. | I. |
|---------------------------------|---|---|----|----|----|
| hse-config-ini_OpenConfigSource |  | Finds the path to the <b>Name</b>.ini file inside the config/unit directory |    |    |    |
| hse-config-ini_ReadKey          |  | No description found (add content in vi description)                        |    |    |    |

| Name   | Connector pane  | Description  | S. | R.  | I. |
|--|---|--|----|---|----|
| hse-config-<br>ini_WriteKey                        |    | No description found (add content in vi description)   |    |   |    |
| hse-<br>configuration_<br>ParseConfigSo<br>urce    |    | Reads the contents of the configuration file and keeps them in memory  |    |   |    |
| hse-<br>configuration_<br>ReadHseDefaul<br>ts      |    | Reads HSE specific configuration values:<br><br>[globals].descriptor (used as a configurable label for DQMH modules)                       |    |   |    |
| hse-<br>configuration_<br>ReadDoubleKe<br>y        |    | Reads the numeric configuration value (I32) identified by <b>section</b> and <b>key</b> from the configuration object                      |    |   |    |
| hse-<br>configuration_<br>ReadIntegerKe<br>y       |    | Reads the numeric configuration value (I32) identified by <b>section</b> and <b>key</b> from the configuration object                      |    |   |    |
| hse-<br>configuration_<br>ReadStringKey            |  | Reads the string configuration value identified by <b>section</b> and <b>key</b> from the configuration object                             |    |   |    |
| hse-<br>configuration_<br>ReadBooleanK<br>ey       |  | Reads the numeric configuration value (I32) identified by <b>section</b> and <b>key</b> from the configuration object                      |    |   |    |
| hse-<br>configuration_<br>WriteIntegerKe<br>y      |  | Writes the string configuration <b>value</b> identified by <b>section</b> and <b>key</b> to the configuration object and the config source |    |  |    |
| hse-<br>configuration_<br>WriteStringKey           |  | Writes the string configuration <b>value</b> identified by <b>section</b> and <b>key</b> to the configuration object and the config source |    |  |    |
| hse-<br>configuration_<br>GetAllSections           |  | Reads the numeric configuration value (DOUBLE) identified by <b>section</b> and <b>key</b> from the configuration object                   |    |   |    |
| hse-<br>configuration_<br>GetAllKeysForS<br>ection |  | Reads the numeric configuration value (DOUBLE) identified by <b>section</b> and <b>key</b> from the configuration object                   |    |   |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.9. HSE-CONFIGURATION.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.1

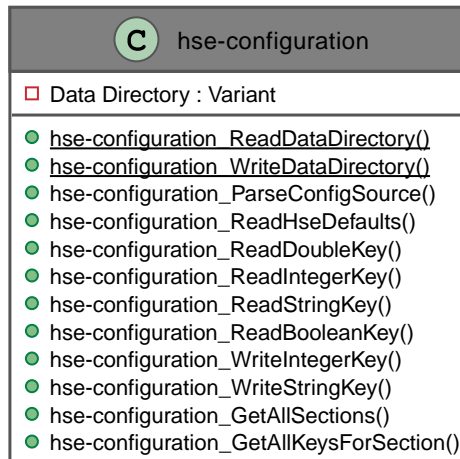


Table 83. Functions (non private scope only)

| Name                                 | Connector pane | Description  | S. | R. | I. |
|--------------------------------------|----------------|--|----|----|----|
| hse-configuration_ReadDataDirectory  |                | No description found (add content in vi description)   |    |    |    |
| hse-configuration_WriteDataDirectory |                | No description found (add content in vi description)   |    |    |    |
| hse-configuration_ParseConfigSource  |                | Parses the configuration source and stores the contents in memory for future use.  |    |    |    |
| hse-configuration_ReadHseDefaults    |                | Reads HSE specific configuration values:<br>[globals].descriptor (used as a configurable label for DQMH modules)         |    |    |    |
| hse-configuration_ReadDoubleKey      |                | Reads the numeric configuration value (DOUBLE) identified by <b>section</b> and <b>key</b> from the configuration object |    |    |    |
| hse-configuration_ReadIntegerKey     |                | Reads the numeric configuration value (I32) identified by <b>section</b> and <b>key</b> from the configuration object    |    |    |    |
| hse-configuration_ReadStringKey      |                | Reads the string configuration value identified by <b>section</b> and <b>key</b> from the configuration object           |    |    |    |

| Name                                   | Connector pane | Description   | S. | R. | I. |
|--|----------------|---|----|----|----|
| hse-configuration_ReadBooleanKey       |                | Reads the numeric configuration value (DOUBLE) identified by <b>&lt;b&gt;section&lt;/b&gt;</b> and <b>&lt;b&gt;key&lt;/b&gt;</b> from the configuration object                                      |    |    |    |
| hse-configuration_WriteIntegerKey      |                | Writes the string configuration <b>&lt;b&gt;value&lt;/b&gt;</b> identified by <b>&lt;b&gt;section&lt;/b&gt;</b> and <b>&lt;b&gt;key&lt;/b&gt;</b> to the configuration object and the config source |    |    |    |
| hse-configuration_WriteStringKey       |                | Writes the string configuration <b>&lt;b&gt;value&lt;/b&gt;</b> identified by <b>&lt;b&gt;section&lt;/b&gt;</b> and <b>&lt;b&gt;key&lt;/b&gt;</b> to the configuration object and the config source |    |    |    |
| hse-configuration_GetAllSections       |                | Reads the numeric configuration value (DOUBLE) identified by <b>&lt;b&gt;section&lt;/b&gt;</b> and <b>&lt;b&gt;key&lt;/b&gt;</b> from the configuration object                                      |    |    |    |
| hse-configuration_GetAllKeysForSection |                | Reads the numeric configuration value (DOUBLE) identified by <b>&lt;b&gt;section&lt;/b&gt;</b> and <b>&lt;b&gt;key&lt;/b&gt;</b> from the configuration object                                      |    |    |    |

Scope: → Protected | → Community

Reentrancy: → Preallocated reentrancy | → Shared reentrancy

Inlining: → Inlined

## C.10. CONFIG-BASE.LVCLASS

**Responsibility:** Base class for the hse-configuration.

**Version:** 1.0.0.0

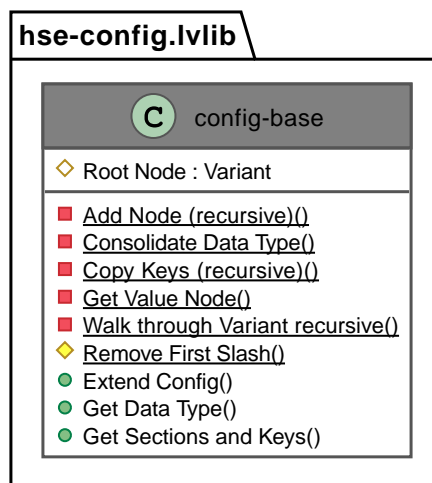










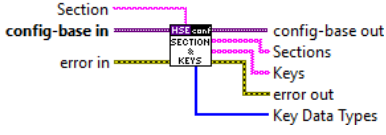








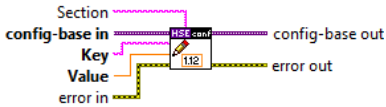
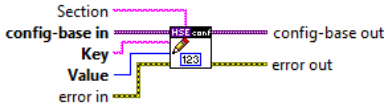
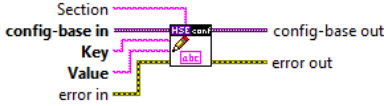






Table 84. Functions (non private scope only)

| Name                  | Connector pane  | Description   | S.  | R.  | I.  |
|-----------------------|---|---|---|---|---|
| Read Root Node        |    | No description found (add content in vi description)  |  |   |   |
| Write Root Node       |    | No description found (add content in vi description)  |  |   |   |
| Remove First Slash    |    | The "String to Array" can't handle a separation character (slash) as first element. This function removes a leading slash ("/") in "String In".                       |  |  |  |
| Extend Config         |    | Adds or replaces own config keys and sections with the content from "Additional Config".  |   |   |   |
| Get Data Type         |    | Returns the data type of a key.   |   |   |   |
| Get Sections and Keys |   | Returns all sub-sections, keys and the data types of the keys in a section.   |   |  |   |
| Read Boolean          |  | Returns a boolean config key.   |   |   |   |
| Read Cluster          |  | Returns a cluster of config values (can be nested) of the same type as "Type in". Use the "Variant to Data" function to convert the Variant back to the cluster type. |   |   |   |
| Read Float            |  | Returns a float (double) config key.  |   |   |   |
| Read Integer          |  | Returns a integer (I64) config key.   |   |   |   |
| Read String           |  | Returns a string config key.  |   |   |   |
| Write Boolean         |  | Set a boolean config key.   |   |   |   |
| Write Cluster         |  | Set a cluster of config keys, can be nested. The cluster labels correspond to sections in the config-object.  |   |   |   |

| Name          | Connector pane  | Description               | S. | R. | I. |
|---------------|---|---------------------------|----|----|----|
| Write Float   |  | Set a float config key.   |    |    |    |
| Write Integer |  | Set a integer config key. |    |    |    |
| Write String  |  | Set a string config key.  |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.11. CONFIG-INI.LVCLASS

**Responsibility:** Read and write INI-configuration files.

**Version:** 1.0.0.1

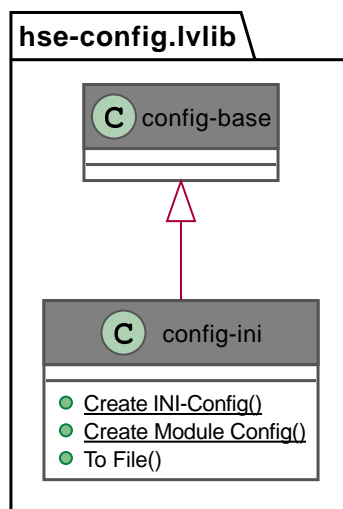
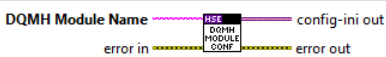



Table 85. Functions (non private scope only)

| Name                 | Connector pane  | Description  | S. | R. | I. |
|----------------------|---|--|----|----|----|
| Create INI-Config    |  | Creates a new "config-ini" object based on the INI-file given. |    |    |    |
| Create Module Config |  | Loads the INI-file of an (HSE) DQMH module.                    |    |    |    |

| Name    | Connector pane  | Description                                  | S. | R. | I. |
|---------|---|--|----|----|----|
| To File |  | Writes the config-ini object to an INI-file. |    |    |    |

Scope:  → Protected |  → Community

Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.12. GENNET PROTOCOL.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.1

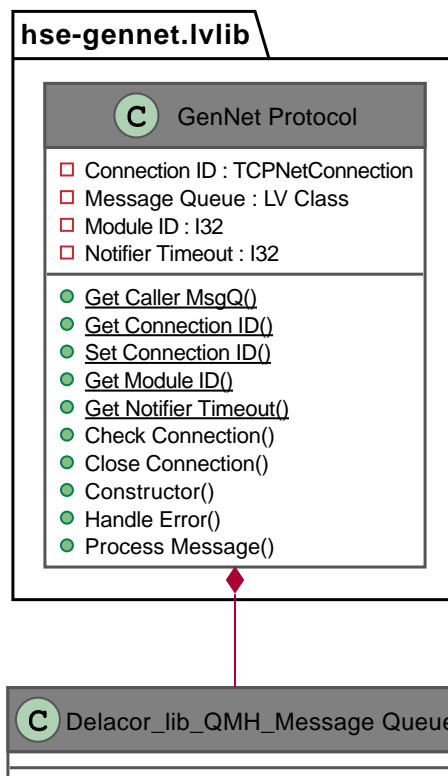
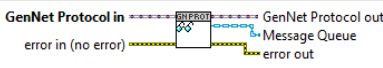


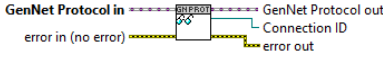


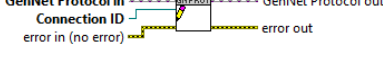




Table 86. Functions (non private scope only)

| Name              | Connector pane  | Description  | S. | R.  | I.  |
|-------------------|---|--|----|---|---|
| Get Caller MsgQ   |  | No description found (add content in vi description) |    |  |  |
| Get Connection ID |  | No description found (add content in vi description) |    |  |  |
| Set Connection ID |  | No description found (add content in vi description) |    |  |  |

| Name                 | Connector pane | Description  | S. | R. | I. |
|----------------------|----------------|--|----|----|----|
| Get Module ID        |                | No description found (add content in vi description) |    |    |    |
| Get Notifier Timeout |                | No description found (add content in vi description) |    |    |    |
| Check Connection     |                | No description found (add content in vi description) |    |    |    |
| Close Connection     |                | No description found (add content in vi description) |    |    |    |
| Constructor          |                | No description found (add content in vi description) |    |    |    |
| Handle Error         |                | No description found (add content in vi description) |    |    |    |
| Process Message      |                | No description found (add content in vi description) |    |    |    |
| Read Message         |                | No description found (add content in vi description) |    |    |    |
| Write Message        |                | No description found (add content in vi description) |    |    |    |

Scope: → Protected | → Community

Reentrancy: → Preallocated reentrancy | → Shared reentrancy

Inlining: → Inlined

## C.13. GENNET VARIANT PROTOCOL.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.2

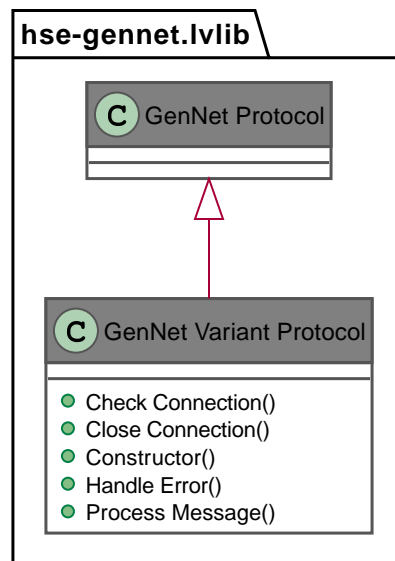


Table 87. Functions (non private scope only)

| Name             | Connector pane | Description  | S. | R. | I. |
|------------------|----------------|--|----|----|----|
| Check Connection |                | No description found (add content in vi description) |    |    |    |
| Close Connection |                | No description found (add content in vi description) |    |    |    |
| Constructor      |                | No description found (add content in vi description) |    |    |    |
| Handle Error     |                | No description found (add content in vi description) |    |    |    |
| Process Message  |                | No description found (add content in vi description) |    |    |    |
| Read Message     |                | No description found (add content in vi description) |    |    |    |
| Write Message    |                | No description found (add content in vi description) |    |    |    |

Scope: → Protected | → Community

Reentrancy: → Preallocated reentrancy | → Shared reentrancy

Inlining: → Inlined

## C.14. DQMH-GENNET MESSAGE QUEUE.LVCLASS

**Responsibility:** The DQMH-GenNet Message Queue class adds properties for network connection configuration and methods for forwarding messages to another module to the DQMH message queue.

**Version:** 1.0.0.2

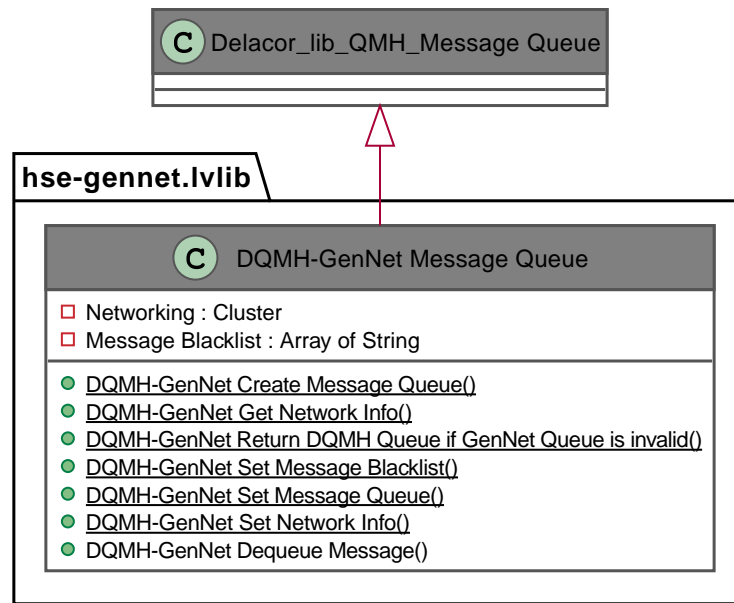


Table 88. Functions (non private scope only)

| Name   | Connector pane | Description   | S. | R. | I. |
|--|----------------|---|----|----|----|
| DQMH-GenNet Create Message Queue                         |                | This is the modified "Create Message Queue" VI for DQMH Generic Networking  |    |    |    |
| DQMH-GenNet Dequeue Message                              |                | This VI pulls messages off the DQMH Generic Networking Message Queue.   |    |    |    |
| DQMH-GenNet Get Network Info                             |                | Gets the network information from the Message Queue   |    |    |    |
| DQMH-GenNet Return DQMH Queue if GenNet Queue is invalid |                | No description found (add content in vi description)  |    |    |    |
| DQMH-GenNet Set Message Blacklist                        |                | sets the message message blacklist to the GenNet Message Queue. In default, Add is set to true and the current Blacklist will be extended. If it is set to false, the current Blacklist will be replaced. |    |    |    |
| DQMH-GenNet Set Message Queue                            |                | Gets the message queue from the original DQMH object in <b>Message Queue in</b> and writes it to the <b>DQMH-GenNet Message Queue</b>   |    |    |    |
| DQMH-GenNet Set Network Info                             |                | Sets or clears the network info in the Message Queue private data   |    |    |    |

Scope: → Protected | → Community

Reentrancy: → Preallocated reentrancy | → Shared reentrancy

Inlining:  → Inlined

## C.15. LOOP TIMER.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0

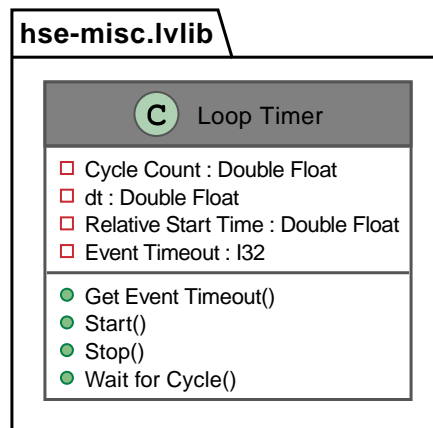

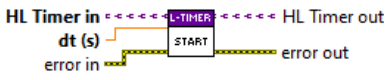

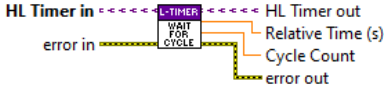


Table 89. Functions (non private scope only)

| Name              | Connector pane  | Description  | S. | R. | I. |
|-------------------|---|--|----|----|----|
| Get Event Timeout |  | No description found (add content in vi description)   |    |    |    |
| Start             |  | Start the timed loop by setting the event timeout to "0". The first iteration is executed immediately. |    |    |    |
| Stop              |  | Stop the timed loop by setting the event timeout to "-1".  |    |    |    |
| Wait for Cycle    |  | Waits until the next time cycle is reached.  |    |    |    |

Scope:  → Protected |  → Community

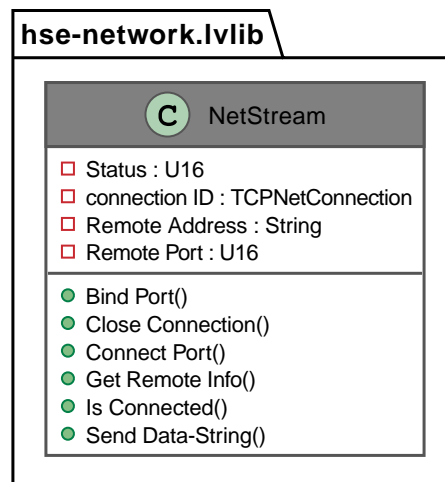
Reentrancy:  → Preallocated reentrancy |  → Shared reentrancy

Inlining:  → Inlined

## C.16. NETSTREAM.LVCLASS

**Responsibility:** No description found (add content in lvclass description)

**Version:** 1.0.0.0



# APPENDIX D: CUSTOM ERRORS

List of Custom Error VIs

## D.1. CUSTOM ERRORS



Custom errors are added via vi named `*--error.vi`.

Table 91. Custom errors

| Name   | Code   | Description   | Owned by  |
|--|--------|---|---|
| DB_CONNECTOR.lvlib:Module Running as Singleton | 403680 | The "%s" module is currently running as singleton, but the Start Module VI was called with 'Run as Singleton' specified as FALSE.     | [hse-db.lvlib]  |
| Module Running as Singleton                    | 403680 | The "%s" module is currently running as singleton, but the Start Module VI was called with 'Run as Singleton' specified as FALSE.     | [GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ExampleClone.lvlib  |
| Module Not Running                             | 403681 | %s Module is not running.   | Event Manager.lvlib<br>Navigation.lvlib<br>UI Manager.lvlib<br>ActorModule.lvlib<br>DBModule.lvlib<br>Dummy.lvlib<br>StateMachine.lvlib   |
| DB_CONNECTOR.lvlib:Module Not Stopped          | 403682 | %s Module did not finish clean up on exit.  | [hse-db.lvlib]  |
| Module Not Stopped                             | 403682 | %s Module did not finish clean up on exit.  | [GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]  |
| Module Not Stopped                             | 403682 | The Stop Module VI for the %s module timed out while waiting for the module main VI to stop. The module main VI may still be running. | Event Manager.lvlib<br>Navigation.lvlib<br>UI Manager.lvlib<br>ActorModule.lvlib<br>DBModule.lvlib<br>Dummy.lvlib<br>ExampleClone.lvlib<br>StateMachine.lvlib   |
| DB_CONNECTOR.lvlib:Module Not Synced           | 403683 | %s Module was unable to synchronize events.   | [hse-db.lvlib]  |
| Module Not Synced                              | 403683 | %s Module was unable to synchronize events.   | Event Manager.lvlib<br>Navigation.lvlib<br>UI Manager.lvlib<br>[GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ActorModule.lvlib<br>DBModule.lvlib<br>Dummy.lvlib<br>ExampleClone.lvlib<br>StateMachine.lvlib |

## TEMPLATE

| Name  | Code   | Description  | Owned by  |
|---|--------|--|---|
| DB_CONNECTOR.lvlib:Module Not Running                 | 403684 | Not a single instance of "%s" Module running.  | [hse-db.lvlib]  |
| Module Not Running                                    | 403684 | Not a single instance of "%s" Module running.  | [GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ExampleClone.lvlib  |
| DB_CONNECTOR.lvlib:Module Running as Cloneable        | 403685 | The "%s" module is currently running as cloneable, but the Start Module VI was called with 'Run as Singleton' specified as TRUE.   | [hse-db.lvlib]  |
| Module Running as Cloneable                           | 403685 | The "%s" module is currently running as cloneable, but the Start Module VI was called with 'Run as Singleton' specified as TRUE.   | [GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ExampleClone.lvlib  |
| DB_CONNECTOR.lvlib:Request Timed Out                  | 403686 | The reply for the request "%s" of the "%s" Module timed out.   | [hse-db.lvlib]  |
| DB_CONNECTOR.lvlib:Request and Wait for Reply Timeout | 403686 | %s   | [hse-db.lvlib]  |
| DQMH Request Reply Timed Out                          | 403686 | The '%s' request for the %s module timed out.  | [hse-dqmh.lvlib]  |
| Request Timed Out                                     | 403686 | The reply for the request "%s" of the "%s" Module timed out.   | [GenNet-Client.lvlib]   |
| Request and Wait for Reply Timeout                    | 403686 | %s   | Event Manager.lvlib<br>Navigation.lvlib<br>UI Manager.lvlib<br>[GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ActorModule.lvlib<br>DBModule.lvlib<br>Dummy.lvlib<br>ExampleClone.lvlib<br>StateMachine.lvlib |
| DB_CONNECTOR.lvlib:Master Reference Not Closed        | 403687 | The "%s" module cannot be run as singleton because the Master Reference is still open from a prior run as cloneable. If you plan on running this module as both singleton and cloneable, consider changing your Main VI to wire a value of TRUE to the 'Close Master Reference' input of Init Module.vi. | [hse-db.lvlib]  |
| Master Reference Not Closed                           | 403687 | The "%s" module cannot be run as singleton because the Master Reference is still open from a prior run as cloneable. If you plan on running this module as both singleton and cloneable, consider changing your Main VI to wire a value of TRUE to the 'Close Master Reference' input of Init Module.vi. | [GenNet-Client.lvlib]<br>[GenNet-Server.lvlib]<br>ExampleClone.lvlib  |

# GLOSSARY

The rat-documentr tool facilitates the following LabVIEW-related tools and libraries:

- Antidoc by Wovalab
- AsciiDoc Toolkit by Wovalab
- Graph Builder by C. Gambini
- Classy by T. Boyé
- DQMH® by Delacor

Furthermore, it relies on the following tools and libraries:

- Ruby
- AsciiDoctor
- Java
- GraphViz